CEAM028002

Operation & Maintenance Manual

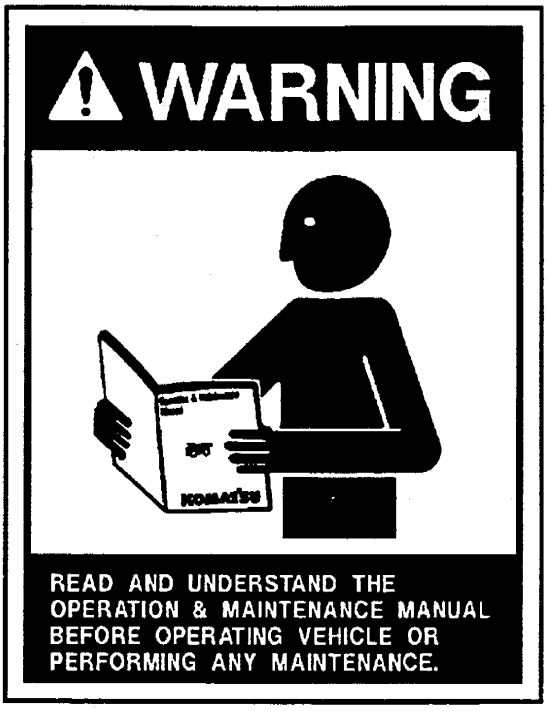
WA270-7

WHEEL LOADER

SERIAL NUMBERS **WA270-7 A27001 and up**

ENGINE **6D107E-2**

KOMATSU



⚠ 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 come in contact with it.

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, birth defects and reproductive harm. Wash hands after handling.

FOREWORD

⚠ WARNING

Komatsu recommends that any service parts used for maintenance, repair or replacement of emission control systems be genuine new Komatsu or Komatsu approved parts or Komatsu approved rebuilt parts or assemblies or others parts of equivalent quality, and that the engine be serviced by an authorized Komatsu distributor. Failure to follow these recommendations could result in ineffective service, damage to the product, or safety risks (including serious personal injury or death).

In the United States, the owner may choose to have maintenance, replacement or repair of the emissions-related parts performed by a facility other than an authorized Komatsu distributor.

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

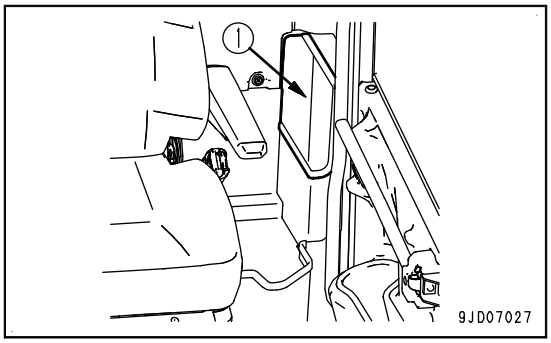
Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Wash hands after handling.

BEFORE READING THIS MANUAL *(WA320-0110-010-A-00-A)*

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.
Storage location for the Operation and Maintenance Manual:
Space for storage of Operation and Maintenance Manual on the left side of operator's seat (1).



If this manual is lost or damaged, contact and tell your distributor about the machine model name and the serial No. immediately to arrange for its replacement. For details regarding the machine model name and the serial No., see the machine serial No. plate. In order to arrange the proper Operation and Maintenance Manual, you will need to provide the machine model name and the serial No. to your Komatsu distributor.
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 *(ALL-1110-010-A-00-A)*

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 observed.
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 *(WA-0000-001-K-00-A)*

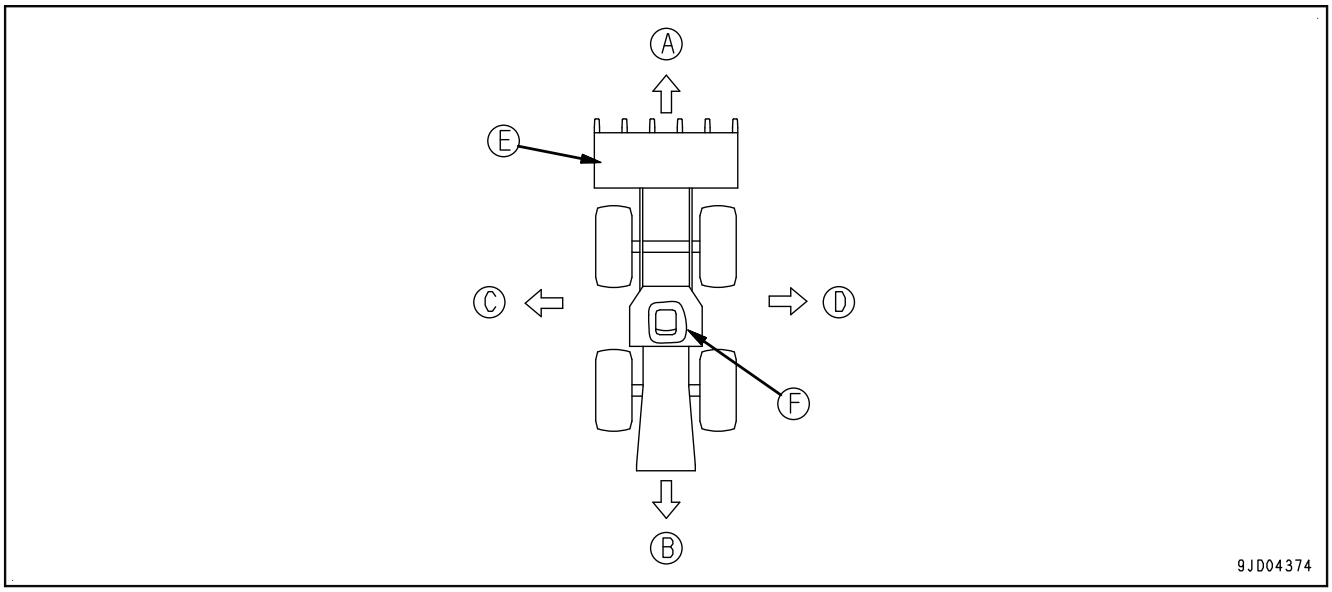
USE OF MACHINE *(WA-0000-04H-K-00-A)*

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

- Digging work
- Leveling work
- Dozing work
- Loading work

See the section "RECOMMENDED APPLICATIONS (PAGE 3-191) " for further details of the work.

DIRECTIONS OF MACHINE *(WA500-0000-04B-K-00-A)*



(A) Front
(B) Rear
(C) Left
(D) Right
(E) Bucket
(F) Operator's seat

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

VISIBILITY FROM OPERATOR'S SEAT *(WA380-0000-031-K-00-A)*

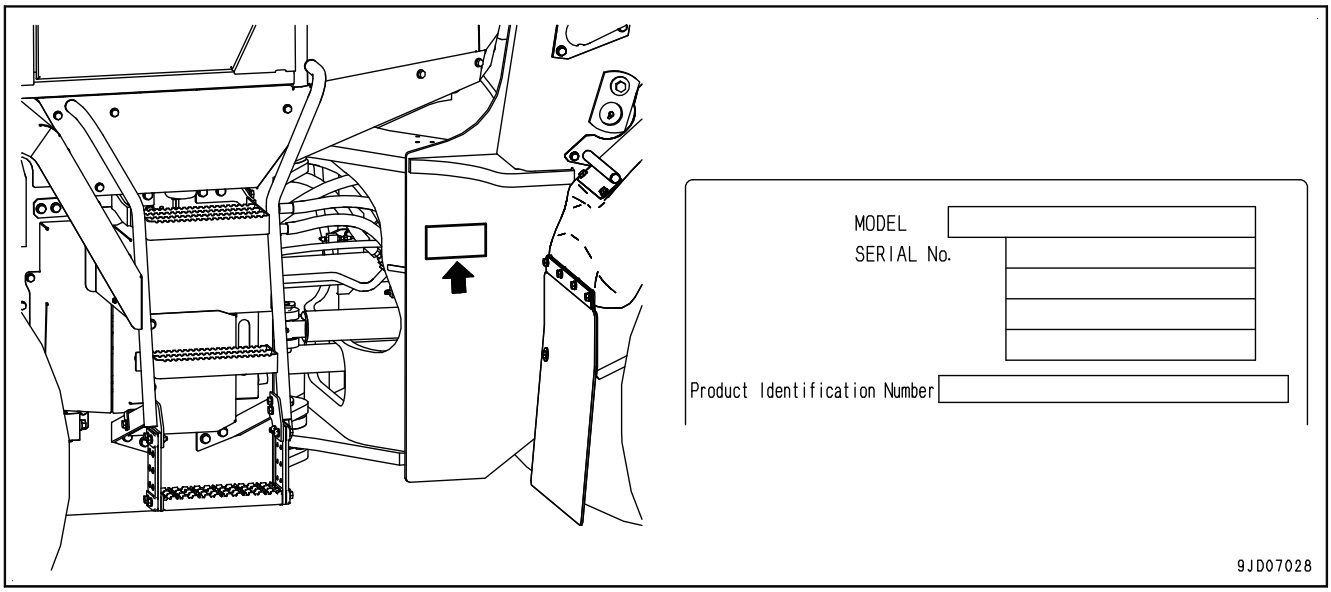
This machine complies with the visibility standard (ISO 5006).
This machine maintains a close visibility of a height of 1.5 m (4ft 11in) at a point 1 m (3ft 3in) away from the outside surface of the machine, and a visibility for a circumference of 12 m (39ft 4in).

PRODUCT INFORMATION *(ALL-0000-20E-K-00-A)*

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

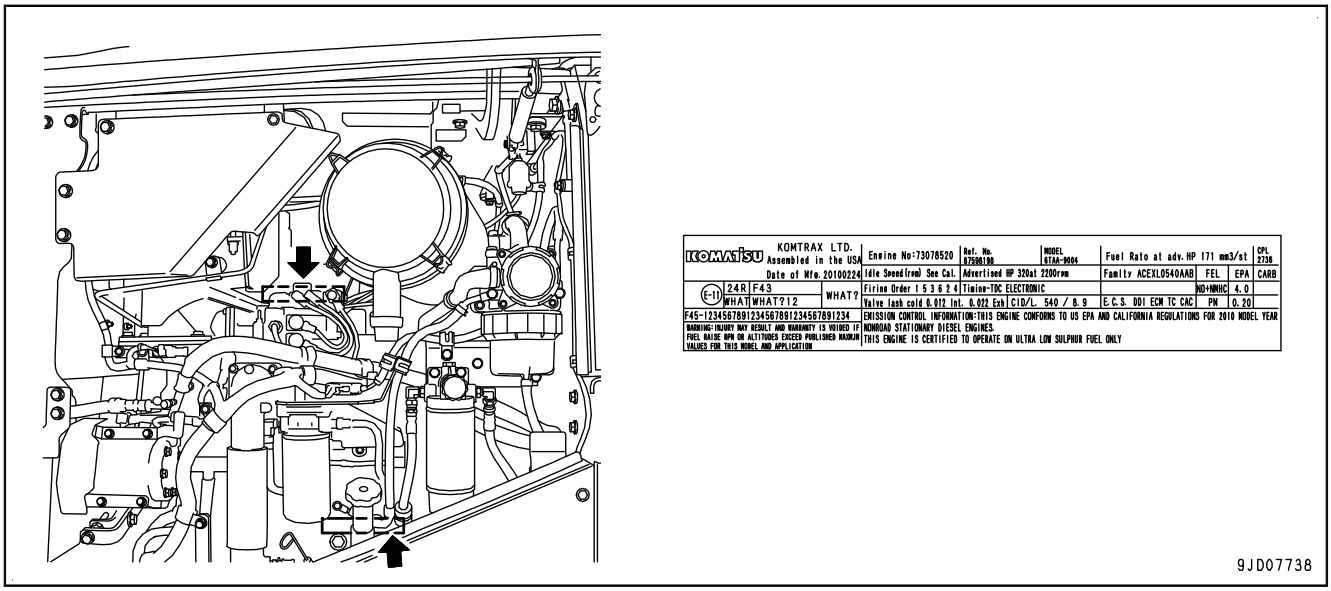
PRODUCT IDENTIFICATION NUMBER (PIN)/MACHINE SERIAL NO. PLATE *(WA320-0000-20R-K-00-A)*

The nameplate is located at the center of the front frame on the right side of the machine.
The design of the nameplate differs according to the district.



EPA REGULATIONS, ENGINE NUMBER PLATE *(WA270-0000-20S-K-00-A)*

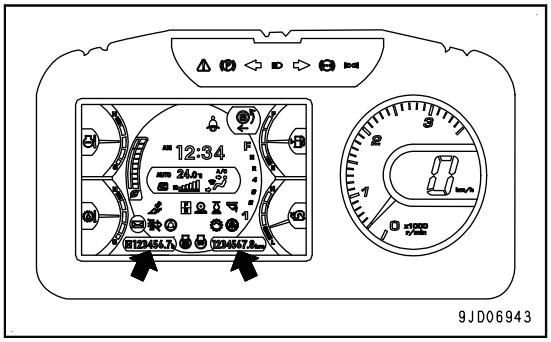
They are on the top of the engine and on the side of the engine on the right side of the machine.



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

SERVICE METER LOCATION *(WA320-0000-20T-K-00-A)*

The service meter is located at the lower center of the machine monitor.



YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR *(ALL-0000-20E-K-01-A)*

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

CONTENTS *(PC-0310-001-A-00-A)*

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.

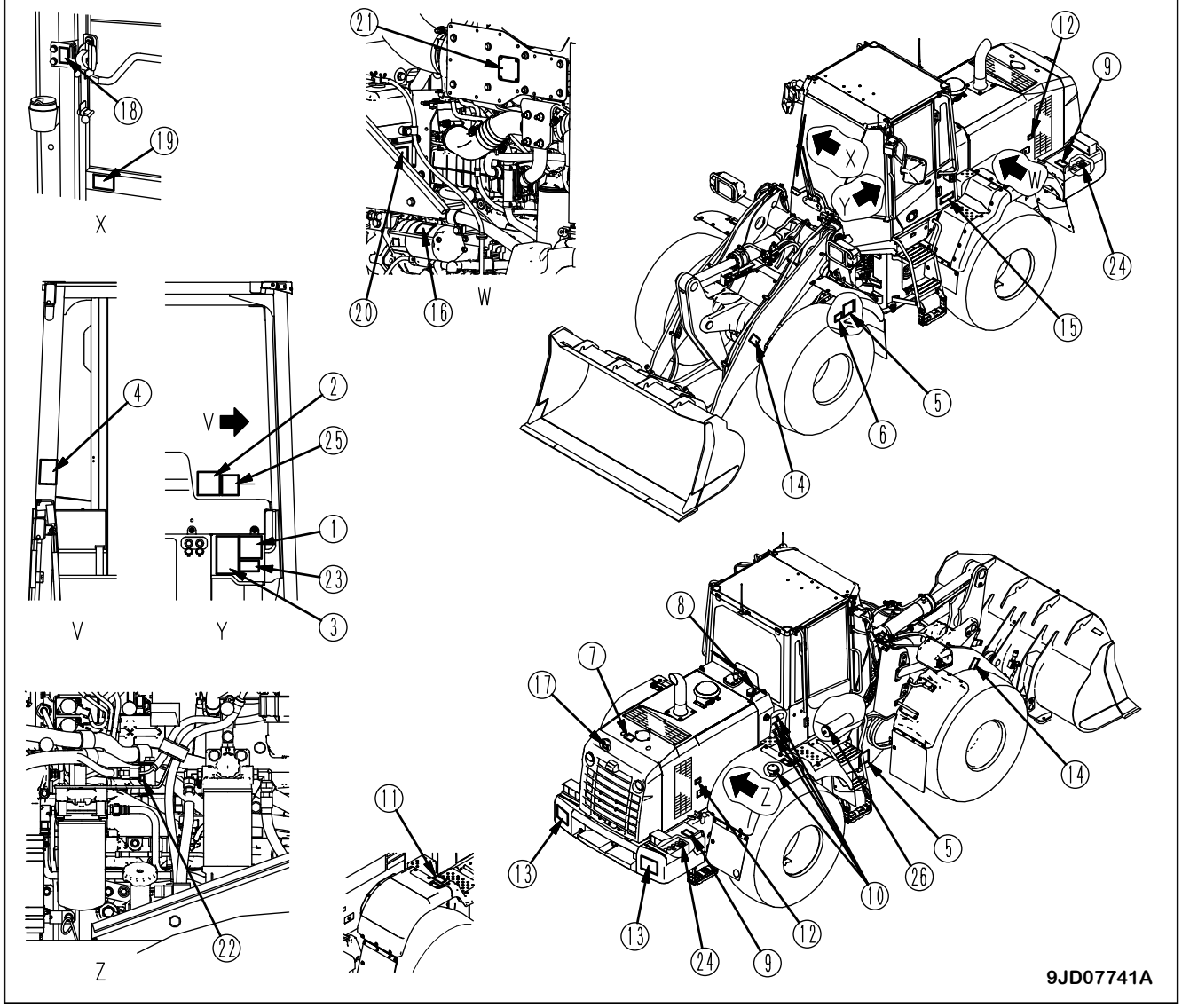
SAFETY *(PC220-1210-002-A-00-A)*

SAFETY LABELS *(ALL-Q5L0-043-K-00-A)*

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.
- 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.
- There are also other labels in addition to the warning signs and safety labels. Handle those labels in the same way.

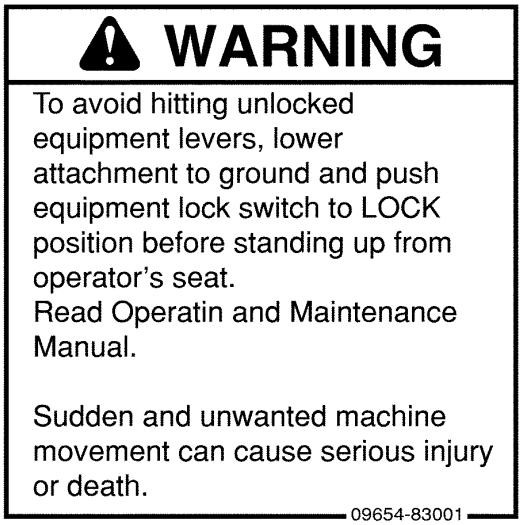
LOCATION OF SAFETY LABELS *(WA270-Q5L0-04D-K-00-A)*



SAFETY LABELS *(WA320-Q5L1-012-K-00-A)*

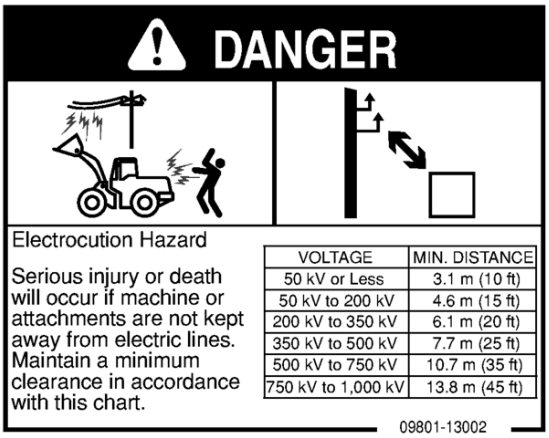
(1) Caution before operating (09651-03001)

(2) Caution for leaving operator's seat (09654-83001)

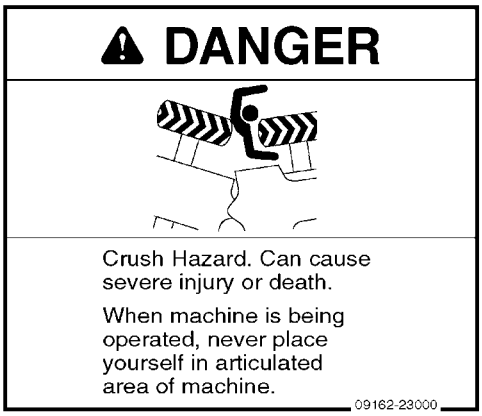


(3) Caution for traveling in reverse (09802–33000)

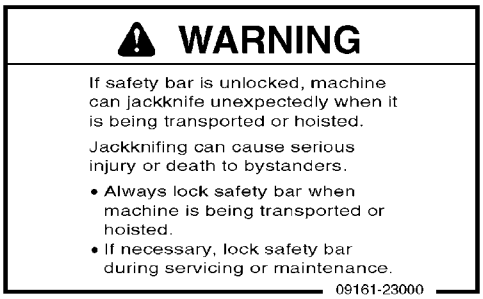
(4) Caution for going close to electric cables (09801-13002)



(5) Prohibition of trespassing (09162-23000)



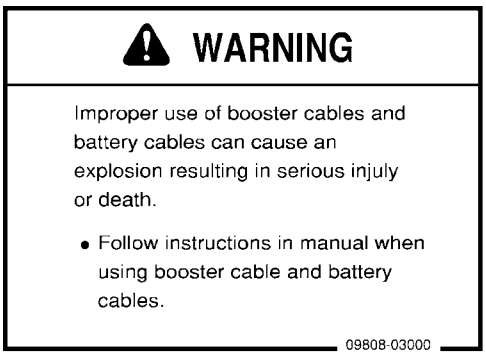
(6) Cation for frame lock bar (09161-23000)



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

(8) Caution for high-temperature oil and hydraulic oil (09653-03001)

(9) Caution for handling battery cable (09808-03000)



(10) Caution for explosion (09659-53000)

(11) Prohibition of getting on or off fender (09805-03000)
(for machine equipped with rear full fender)

(12) Caution while engine is running (09667-03001)

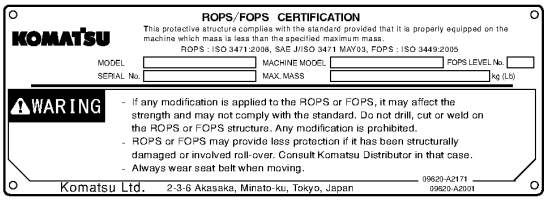
(13) Caution for nearing machine (09812-13000)

(14) Prohibition of entering beneath work equipment (09807-C0883)

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

Keep away when the working device is raised.

(15) Caution for modification of ROPS (09620-A2001, 09620-A2171)



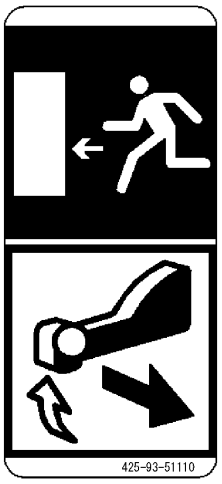
(16) Prohibited to start by short-circuiting (09842-A0481)

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

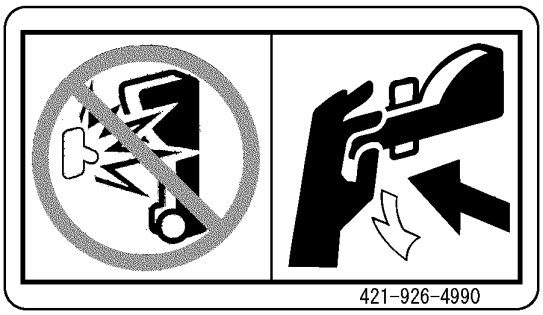
Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.

(17) Caution for cleaning cooler core (418-93-43341)

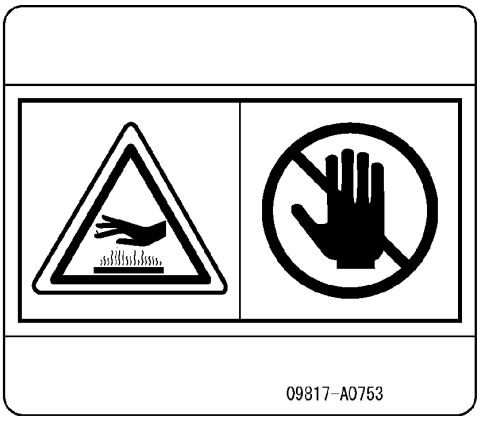
(18) Emergency escape (425-93-51110)



(19) Caution when closing emergency escape right window (421–926-4990)



(20) Caution for high-temperature turbocharger (09817-A0753)



Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation.

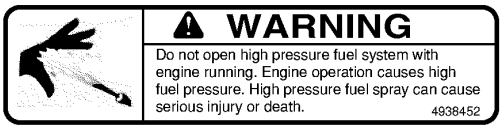
Never touch when hot.

(21) Caution for high-temperature exhaust pipe (09817-A0753)

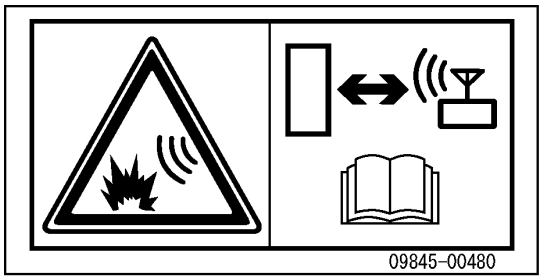
Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation.

Never touch when hot.

(22) Caution for high-pressure common rail (6754-71-1991)



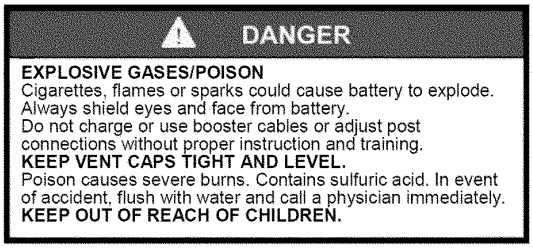
(23) Caution for blast site (09845-00480)
(only when equipped with KOMTRAX)



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

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

(24) Caution for handling battery (09664-30012)



(25) Caution for traveling in reverse (for machine equipped with rear view camera) (09833–33000)

(26) Caution for explosion (09659-63000)

GENERAL PRECAUTIONS COMMON TO OPERATION AND MAINTENANCE *(ALL-1130-010-A-00-A)*

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 *(ALL-0000-001-K-07-A)*

ENSURING SAFE OPERATION *(ALL-0000-177-K-00-A)*

- 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 *(ALL-0000-178-K-00-A)*

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 *(ALL-0000-001-K-08-A)*

SAFETY-RELATED EQUIPMENT *(ALL-0000-127-K-00-A)*

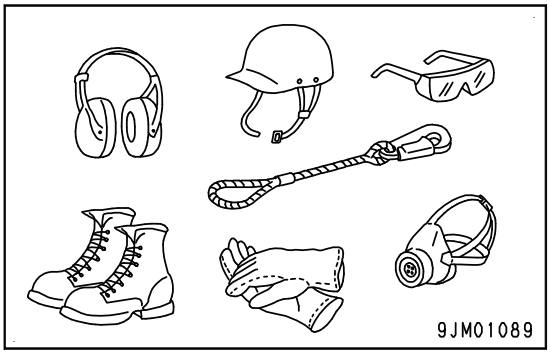
- Be sure that all guards, covers, cameras, and mirrors are in their proper position. Have them repaired immediately if they are damaged.
- Understand the method of use of safety features and use them properly.
- Never remove any safety features. Always keep them in good operating condition.

INSPECTING MACHINE *(ALL-0000-128-K-00-A)*

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.

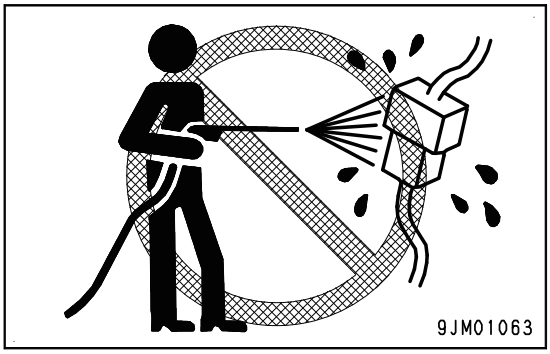
WEAR WELL-FITTING CLOTHES AND PROTECTIVE EQUIPMENT *(ALL-0000-129-K-00-A)*

- 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 protective eyeglasses, 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 *(WA-0000-12A-K-00-A)*

- 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 a 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.
- When washing the machine with high-pressure water, direct spray onto camera may cause trouble. Defective camera cannot monitor surrounding area. When cleaning camera, do not allow the high-pressure water to get into camera directly, and wipe off any dirt with soft cloth.
- When cleaning camera, if you stand on an unstable place, or take an unstable posture, you may fall and be injured. Put proper stepladder or step on the level and firm ground, and clean the camera in secure posture.



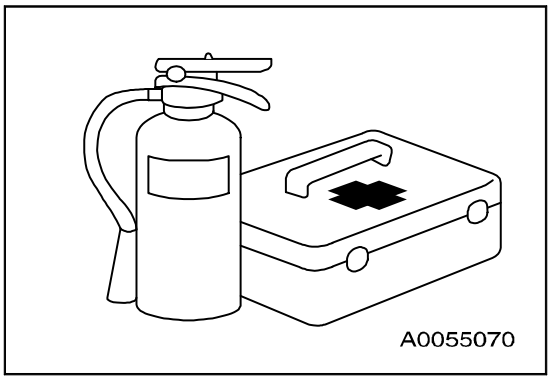
INSIDE OPERATOR'S COMPARTMENT *(ALL-0000-12B-K-00-A)*

- 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 cellular 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 *(ALL-Q5G5-012-K-00-A)*

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 *(ALL-0000-12C-K-00-A)*

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 *(ALL-0000-001-K-09-A)*

ACTION IF FIRE OCCURS *(ALL-0000-17A-K-00-A)*

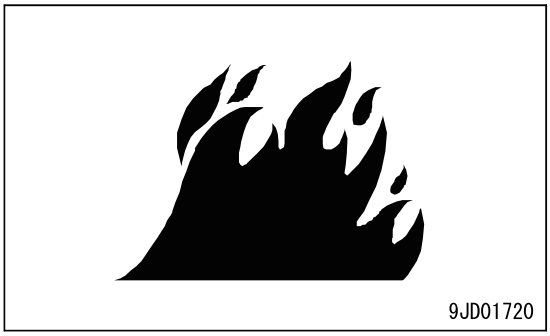
- Turn the start switch OFF to stop the engine.
- Use the handrails and steps to get off the machine.
- Do not jump off the machine. There is the danger of falling and suffering serious injury.
- When the machine is involved with a fire, fumes include harmful materials.
  Don't breathe the fumes.
- After a fire, there might be harmful material left. Don't touch them directly, because they might be harmful to person.
  Anyone conducting clean-up must wear rubber groves.
  Rubber gloves should be polychloroprene (Neoprene) or polyvinyl chloride (in the case of low temperature).
  When wearing cotton-work-gloves, wear rubber gloves under them.

PREVENT FIRE *(WA270-0000-17B-K-00-A)*

FIRE CAUSED BY FUEL, OIL, COOLANT OR WINDOW WASHER FLUID

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

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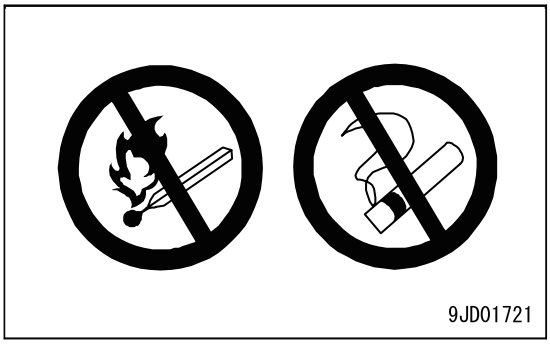
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FIRE CAUSED BY ACCUMULATION OF FLAMMABLE MATERIAL

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.

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.

FIRE AROUND THE MACHINE DUE TO HIGHLY HEATED EXHAUST GAS

This machine is equipped with Komatsu Diesel Particulate Filter (hereafter KDPF).

KDPF is a system for purifying soot in exhaust gas. Its exhaust gas discharged during purification process (regeneration) can be at higher temperature than that from existing models. Do not bring any flammable close the outlet of the exhaust pipe.

- When there are thatched houses, dry leaves or pieces of paper near the work site, set the system to disable the regeneration before starting work to prevent fire hazards due to highly heated exhaust gas.For the setting procedure, see "HANDLING Komatsu Diesel Particulate Filter (KDPF) (PAGE 3-131) ".

EXPLOSION CAUSED BY LIGHTING EQUIPMENT

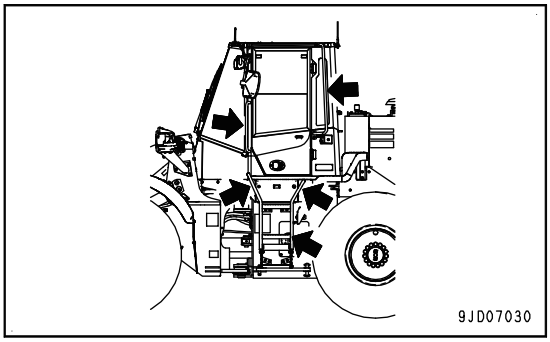
- When checking fuel, oil, battery electrolyte, or coolant, always use lighting with anti-explosion specifications.
- When taking the electrical power for the lighting from the machine itself, see "AUXILIARY ELECTRIC POWER (PAGE 3-112) ".

PRECAUTIONS WHEN GETTING ON OR OFF MACHINE *(ALL-0000-001-K-10-A)*

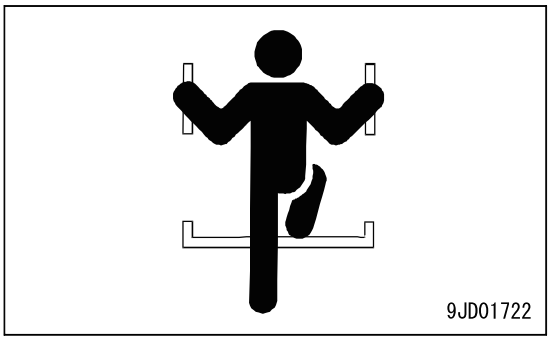
USE HANDRAILS AND STEPS WHEN GETTING ON OR OFF MACHINE *(WA320-0000-17D-K-00-A)*

To prevent personal injury caused by slipping or falling off the machine, always observe the following.

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



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



- 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 bolt.
- Do not grip the control levers when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- Do not try to get on a tire from the step in the rear side of the machine or the step beside the cab.
- Do not get on or off the machine while holding tools in your hand.

NO JUMPING ON OR OFF MACHINE *(ALL-0000-17E-K-00-A)*

Getting on or off the moving machine can cause serious personal injury. Always observe the following.

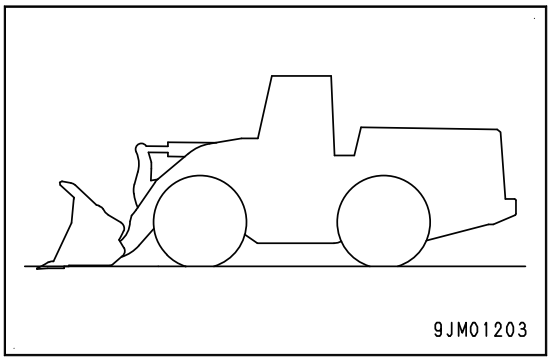
- Never jump on or off the machine. Never get on or off a moving machine.
- If the machine starts to move when there is no operator on the machine, do not jump on to the machine and try to stop it.

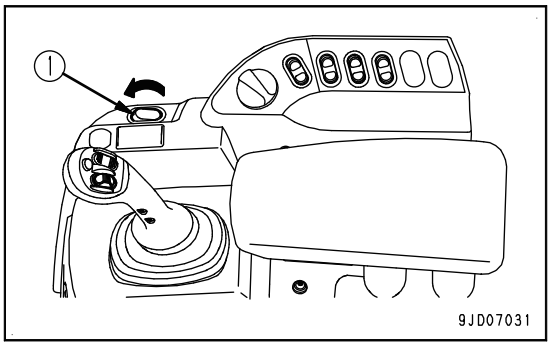
NO PEOPLE ON ATTACHMENTS *(ALL-0000-17F-K-00-A)*

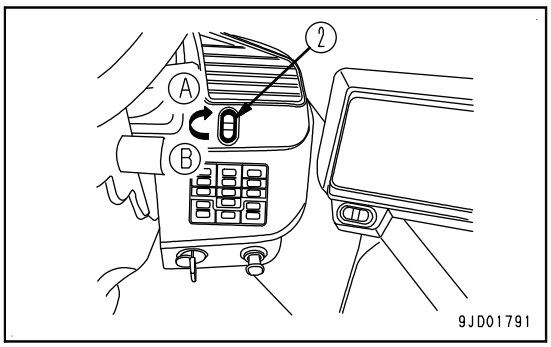
Never let anyone ride on the work equipment or other attachments. There is a hazard of falling and suffering serious personal injury or death.

WHEN STANDING UP FROM OPERATOR'S SEAT *(WA320-0000-17G-K-00-A)*

When standing up from the operator's seat to adjust the operator's seat, be sure to lower the work equipment completely to the ground, lock the work equipment by pressing work equipment lock switch (1) (pilot lamp lights up) and stop the engine by setting parking brake switch (2) to the ON (operation) position (A).
If the control levers are touched by mistake, there is a danger that the machine may suddenly move and cause serious personal injury or death.



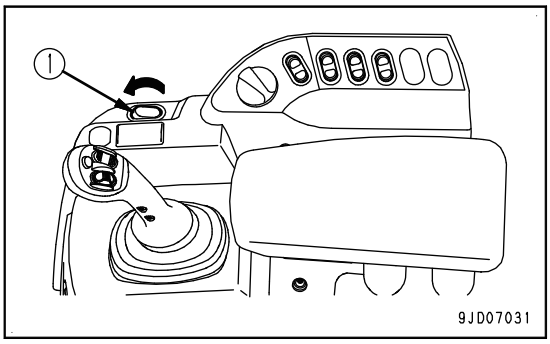


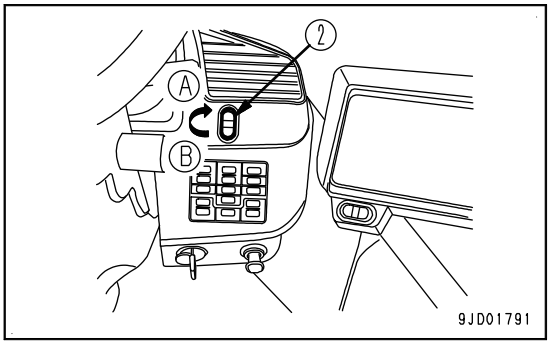


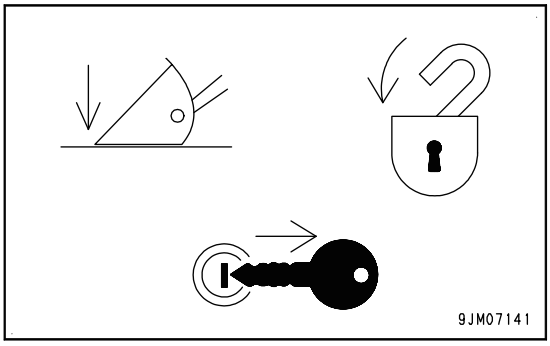
WHEN LEAVING MACHINE *(WA320-0000-17H-K-00-A)*

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 observe the following.

- Whenever leaving the machine, be sure to lower the work equipment to the ground, lock the work equipment by pressing work equipment lock switch (1) (pilot lamp lights up) and stop the engine by setting parking brake switch (2) to the ON (operation) position (A).
  Lock every necessary place and take the key with you and store it in the specified place.







EMERGENCY EXIT FROM OPERATOR'S CAB *(WA380-0000-17J-K-00-A)*

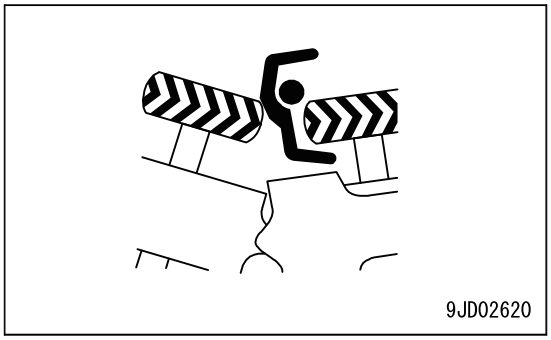
Machines equipped with a cab have a door on the left side and a door for an emergency escape on the right side. If the door on the left side does not open, use the right side emergency escape door.

PRECAUTIONS FOR CLEANING CAB GLASS *(WA320-K183-25C-K-00-A)*

Clean the cab glass to ensure visibility during operation.
Make sure to clean the glass from the ground using a mop.
For details of the cleaning procedure, see "WALK-AROUND CHECKS (PAGE 3-142) ".

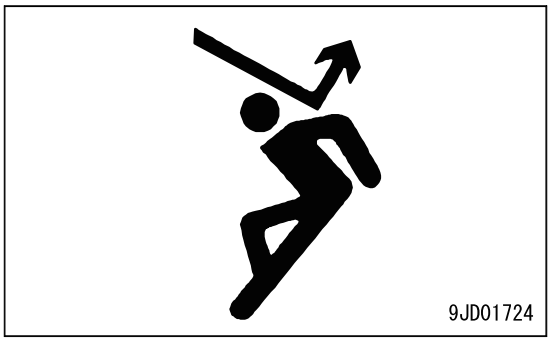
DO NOT GET CAUGHT IN WORK EQUIPMENT *(WA-0000-17K-K-00-A)*

- If the clearance at the articulating portion changes and you get caught in it, you will suffer serious personal injury or death. Do not allow anyone to come inside the articulation range.
- The clearance in the area around the work equipment changes according to the movement of the link. If you are caught, there is danger that you will suffer serious injury or death. Do not allow anyone near any of the rotating or telescopic parts.



PRECAUTIONS RELATED TO PROTECTIVE STRUCTURES *(D65-K200-170-K-00-A)*

The operator's compartment is equipped with a structure (such as ROPS, FOPS) to protect the operator by absorbing the impact energy.
As for the machine equipped with ROPS, 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 seat belt properly, it cannot display its effect. Always fasten your seat belt while operating the machine.

UNAUTHORIZED MODIFICATION *(ALL-0000-17M-K-00-A)*

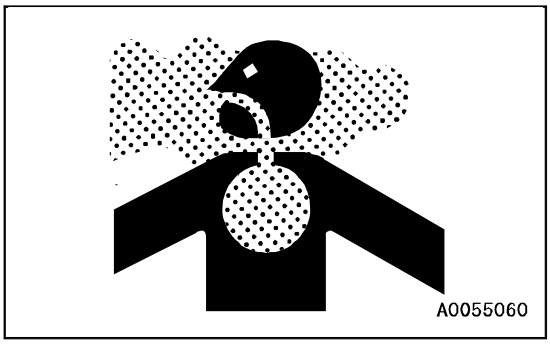
- Komatsu will not be responsible for any injuries, accidents, product failures or other property damages resulting from modifications made without authorization from Komatsu.
- Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu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

PRECAUTIONS RELATED TO ATTACHMENTS AND OPTIONS *(WA-RA17-170-K-00-A)*

- 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 *(ALL-0000-17N-K-00-A)*

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.



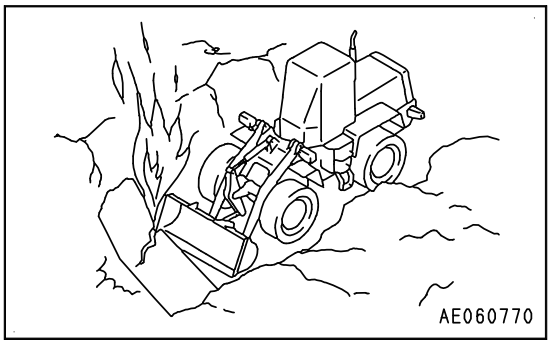
PRECAUTIONS FOR OPERATION *(ALL-1140-001-A-00-A)*

PRECAUTIONS FOR JOBSITE *(PC-0000-001-K-08-A)*

INVESTIGATE AND CONFIRM JOBSITE CONDITIONS *(WA-0000-17R-K-00-A)*

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 jobsite, 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 jobsite, 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 jobsite traffic duty or by installing fences around the jobsite.
- 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.
- Maintain the travel path on the jobsite so that there is no obstruction to travel operations.



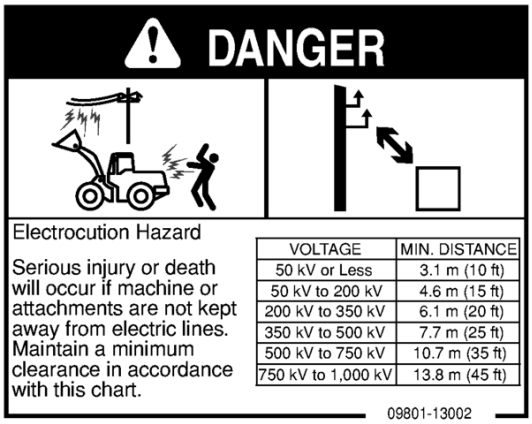
WORK ON LOOSE GROUND *(ALL-0000-17S-K-00-A)*

- 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.

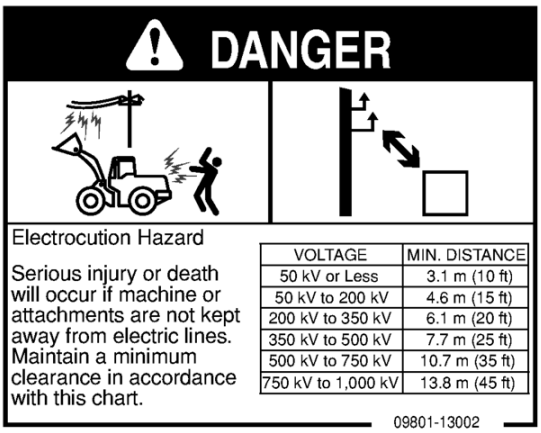
DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES *(WA-0000-17T-K-00-A)*

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 observe the following.

- 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.



ENSURE GOOD VISIBILITY *(WA320-0000-17U-K-00-A)*

This machine is equipped with mirrors and cameras 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.
- When cameras are installed, clean stains off the lens of it to ensure sharp images.
- The rear view monitor is provided to the secure rear side visibility. If, however, an obstacle is detected on the monitor, you must confirm it with your eyes.

CHECK SIGNS AND SIGNALMAN'S SIGNALS *(ALL-0000-17V-K-00-A)*

If signals and labels are not clear, serious personal injury can result from downward slip, overturn or accidental contact with nearby people or obstacles. Always observe the following.

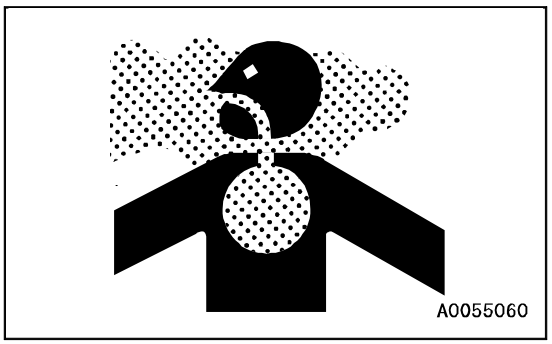
- Set up signs to inform of road shoulders and soft ground. If the visibility is not good, position a signalman if necessary. Operator should pay careful attention to the signs and follow the instructions from the signalman.
- Only one signalman should give signals.
- Make sure that all workers understand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

BEWARE OF ASBESTOS DUST *(ALL-0000-17W-K-00-A)*

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.

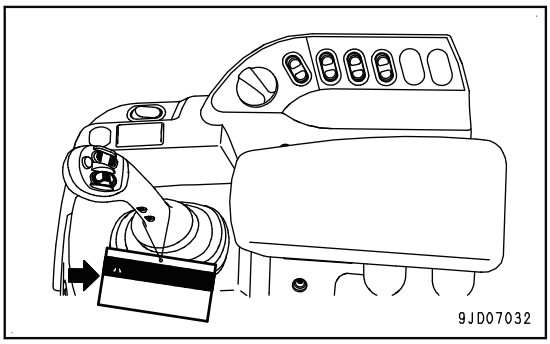
This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.



STARTING ENGINE *(ALL-0000-001-K-05-A)*

USE WARNING TAGS *(WA320-0000-17Y-K-00-A)*

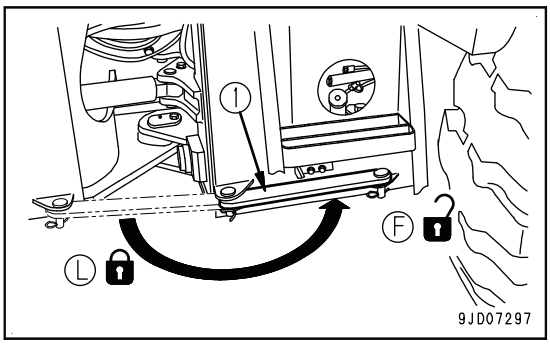
If there is any "DANGER! Do NOT operate!" warning tag displayed, it means that someone is carrying out inspection and maintenance of the machine. If the warning sign is ignored and the machine is operated, there is a danger that the person carrying out inspection or maintenance may be caught in the rotating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



CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE *(WA270-0000-17Z-K-00-A)*

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 CHECKS (PAGE 3-142) ".
- Remove all dirt from the surface of the lens of the headlamps, working lamps, and rear combination lamp, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Check that there is no mud or dust accumulated around the movable parts of the accelerator pedal or brake pedal, and check that the pedals work properly.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the mirror, and check that the control levers are all at the NEUTRAL position.
- Adjust the mirrors so that the rear of the machine can be seen easily from the operator's seat. For details of the adjustment, see "MIRRORS ADJUSTMENT (PAGE 3-159) ".
- Check that there are no persons or obstacles above, below, or in the area around the machine.
- Check that the parking brake switch is at the ON position.
- Check that frame lock bar (1) is fixed securely at FREE position (F).
- Adjust the angle of each camera so that the surrounding area can be seen clearly from the operator's seat.
  For details of the adjustment, see "ADJUST REAR VIEW CAMERA (PAGE 3-161) ".
- If snowfalls adhered to a camera, eliminate them with securing your safety by using a stepladder.



WHEN STARTING ENGINE *(WA-0000-181-K-00-A)*

- Start the engine only while sitting down in the operator's seat.
- When starting the engine, sound the horn as a warning.
- Do not allow anyone other than 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.
- Check that the backup alarm (alarm buzzer when machine travels in reverse) works properly.

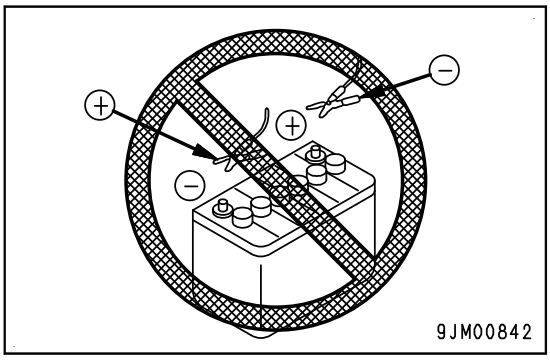
IN COLD AREAS *(ALL-0000-182-K-00-A)*

- If the warm-up operation is not carried out thoroughly, and the work equipment is operated, the reaction of the work equipment to the operation of the control levers and pedals will be slow and the movement of it may not be what the operator intended. Be sure to carry out the warm-up operation. Particularly in cold weather, be sure to carry out the warm-up operation thoroughly.
- 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.

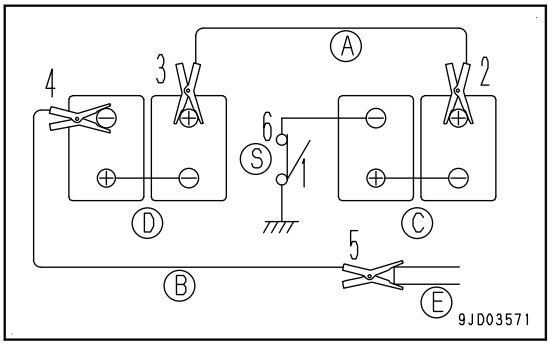
START ENGINE WITH BOOSTER CABLES *(WA270-AW10-14J-K-00-A)*

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

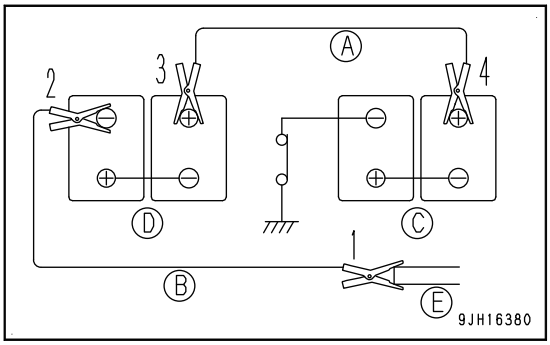
- Always wear protective eyeglasses and rubber gloves when starting the engine with booster cable.
- When connecting a normal machine to a failed machine with booster cables, always use a normal machine with the same battery voltage as the failed machine.
- When starting with a booster cable, carry out 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 failed machine and the normal machine. If the failed machine has battery disconnect switch (S), turn the switch to the OFF position, and turn it ON again after connecting the cables.
  For detail, see "BATTERY DISCONNECT SWITCH (PAGE 3-101) ".
  There is a danger 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 starting procedure when using booster cables, see "START ENGINE WITH BOOSTER CABLES (PAGE 3-229) " in the OPERATION section.



Connecting procedure



Disconnecting procedure



Connection and disconnection of booster cable

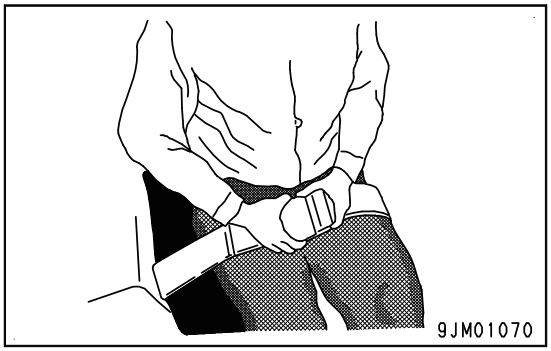
(A): Booster cable
(B): Booster cable
(C): Battery of failed machine
(D): Battery of normal machine
(E): Engine block of failed machine
(S): Battery disconnect switch is ON

OPERATION *(ALL-0000-001-K-11-A)*

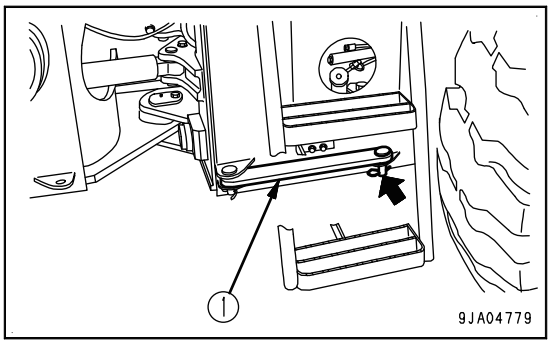
CHECKS BEFORE OPERATION *(WA320-0000-184-K-00-A)*

If the checks before starting are not carried out properly, the machine will be unable to display its full performance, and there is also a 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 fasten the seat belt. There is a 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.

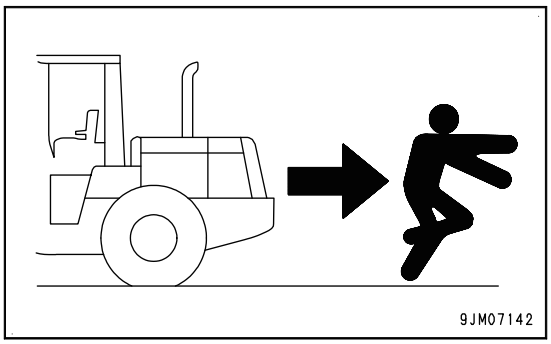


- Before starting to travel or operations, check that frame lock bar (1) is fixed securely at the FREE position.



WHEN TRAVELING IN FORWARD OR REVERSE *(WA320-0000-185-K-00-A)*

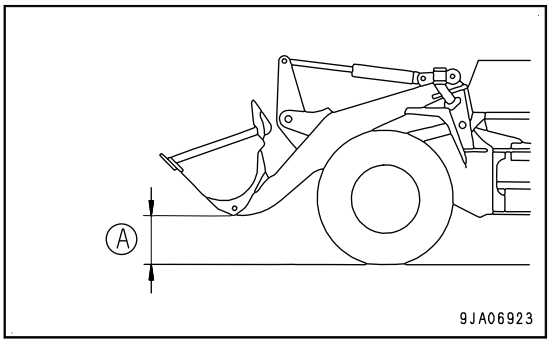
- Lock every cab door and windows securely, both when they are open and closed.
- Do not allow anyone apart from the operator to ride on the machine.
- If there are any persons in the area around the machine, there is danger that they may be hit or caught by the machine, and this may lead to serious 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 or camera.

WHEN TRAVELING *(WA320-0000-186-K-01-A)*

- Never turn the key in the starting switch to the OFF position when the machine is traveling. If the engine stops when the machine is traveling, the steering becomes heavy, and this will cause misoperation of the steering wheel and may lead to 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 the machine on a level ground, hold the work equipment at height (A) of 40 to 50 cm {16 to 20 in} above the ground. If that height is not maintained between the work equipment and the ground, the work equipment may get stuck in the ground and the machine may tip over.
  When you are forced to operate the multi-function mono-lever, do it after stopping the travel once.
- Try to avoid traveling over obstacles. 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 right or left than tipping over to the front or rear, so do not travel over obstacles which make the machine tilt strongly to the right or left sides.
- When traveling on rough ground, travel at low speed and do not operate the steering suddenly. There is a 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.

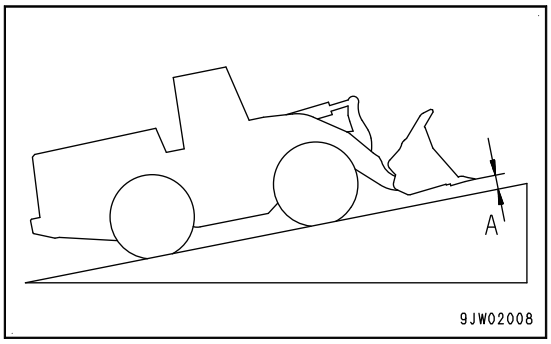


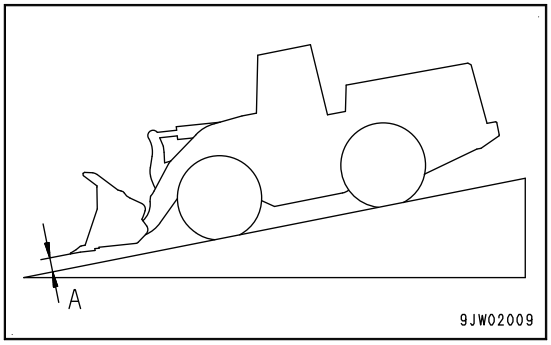
- When using the machine, to prevent personal injury caused by damage to the work equipment or by the machine overturning due to overloading, do not exceed the permitted performance of the machine or the maximum permitted load for the structure of the machine.
- When passing over bridges or structures, 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.
- If you travel the machine at high speed continuously for a long time, the tires will overheat and the internal pressure will become abnormally high. This may cause the tires to burst. If a tire bursts, it produces a large destructive force, and this may cause serious injury or death.
  If you are going to travel continuously, please consult your Komatsu distributor.

WHEN TRAVELING ON SLOPES *(WA320-0000-187-K-00-A)*

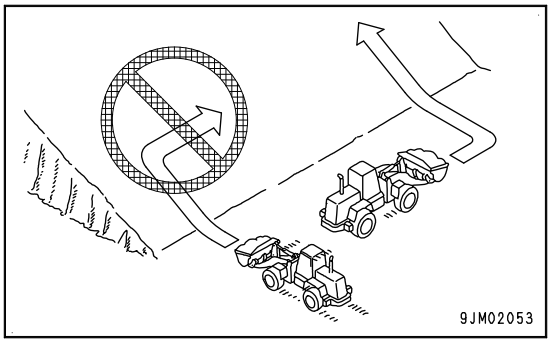
To prevent the machine from turning over or slipping to the side, always observe following

- Keep the work equipment approximately 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 stopping 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.



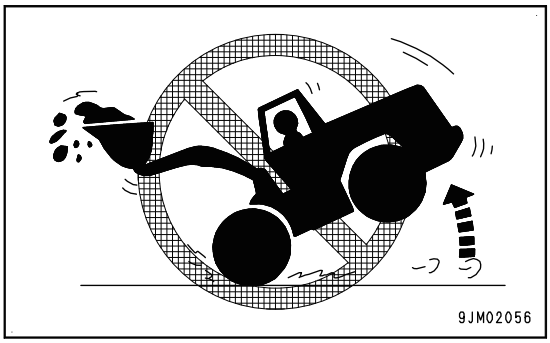
- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- If the engine should stop on a slope, depress the brake pedal immediately, lower the bucket and apply the parking brake to stop the machine.
- When traveling downhill, travel slowly at a low speed. Depress the brake pedal or use the engine brake as necessary.
- When the bucket is loaded, direct the bucket toward the top of a hill both in uphill and downhill travel. Directing the bucket downhill tends induce a danger of tipping over the machine.

METHOD OF USING BRAKES *(WA320-0000-130-K-00-A)*

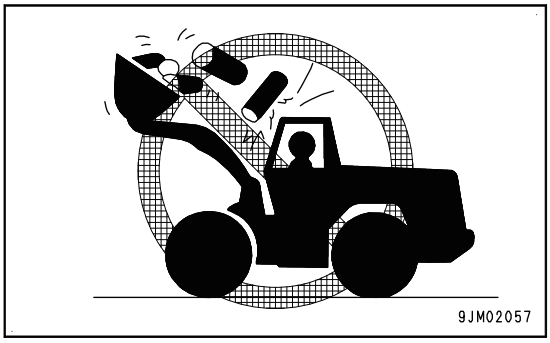
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary.
- When traveling downhill,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

WHEN OPERATING *(WA320-0000-170-K-00-A)*

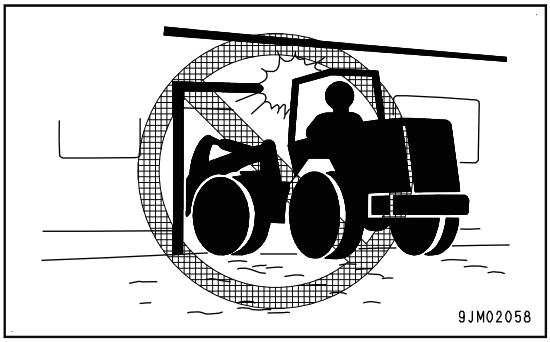
- When using the machine, to prevent personal injury caused by damage to the work equipment or by the machine overturning due to overloading, do not exceed the permitted performance of the machine or the maximum permitted load for the structure of the machine.
- If the engine cannot be started again after it has stopped, turn the starting switch key to the ON position, and immediately operate the multi-function mono-lever to lower the work equipment to the ground. (The accumulator is capable of working only for a limited time after the engine is stopped.)
- 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 a danger that the travel speed will suddenly increase, so be sure to reduce the speed.
- When the bucket is fully loaded, never make a sudden start, sharp turn, or sudden stop. There is a danger of machine turning over.



- When handling unstable loads such as round and cylindrical materials, and stacked plates, they may drop onto the operator's seat if the work equipment is raised high, and cause serious personal injury or death.
- When handling unstable loads, be careful not to raise the work equipment too high or tilt the bucket back too much.
- If the work equipment is suddenly lowered or stopped, the reaction may cause the machine to turn over. Particularly when carrying a load, be sure to operate the work equipment carefully.



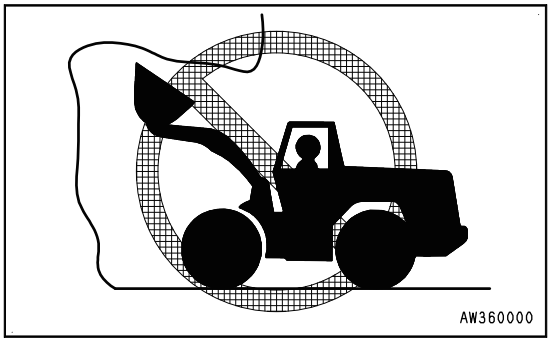
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, be extremely careful not to let the work equipment etc. hit anything.
- To prevent accidents caused by hitting other objects, always operate the machine at a speed which is safe for operation, particularly in confined spaces, indoors, and in places where there are other machines.



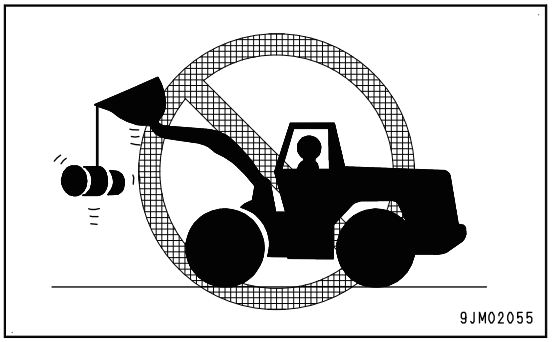
PROHIBITED OPERATIONS *(WA-0000-189-K-00-A)*

If the machine rolls over or falls, or the ground at the working point collapses, it may lead to serious personal injury or death. Always observe the following precautions.

- Do not dig the work face under an overhangs. There is a danger that the work face will collapse.
- When digging, never thrust the bucket into a load at an angle. This will bring an excessive load on the machine and will reduce the machine life.
- Wall surface digging by using of driving force is dangerous. Since it also applies excessive load to the machine, and cause the machine, it is strictly prohibited.
- Never carry out digging operations on a downhill slope. An excessive load will be brought on the machine and this will cause damage to the machine.



- Do not use the bucket or boom for crane operations. There is a danger that the machine will turn over and that the load will fall.
- Do not pass the bucket over the heads of other workers or over the operator's seat of dump trucks or other hauling equipment. There is a danger that the load may spill or the bucket may hit the dump truck and cause serious personal injury or death.

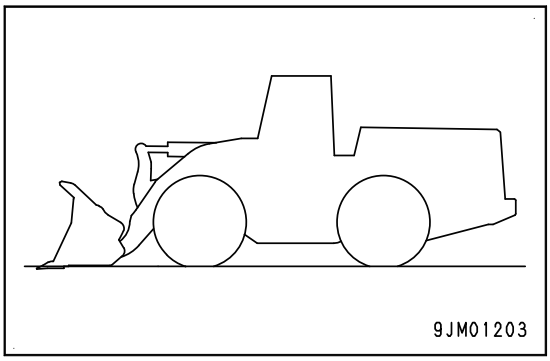


WHEN OPERATING ON SNOW OR FROZEN SURFACES *(WA-0000-18A-K-00-A)*

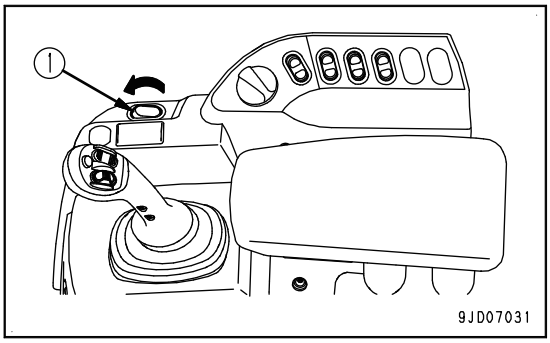
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes soft when the temperature rises, and this may cause the machine to turn over or make it impossible for the machine to escape.
- When traveling on snow-covered roads, always fit tire chains.
- If the machine enters deep snow, there is a hazard that it may turn 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 turning 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 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.

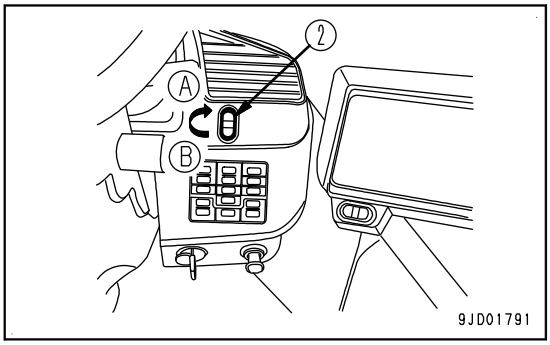
WHEN PARKING MACHINE *(WA320-0000-161-K-00-A)*

- 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 to the ground.

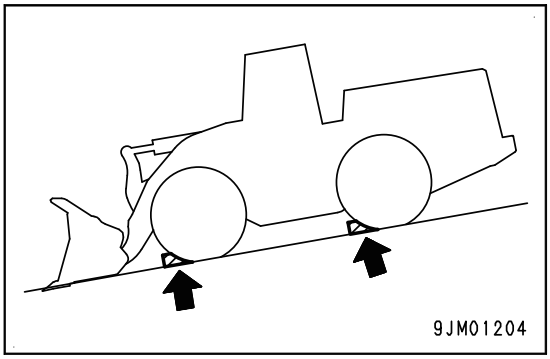


- When leaving the machine, lock the work equipment by pressing work equipment lock switch (1) (pilot lamp lights up) and set parking brake switch (2) to ON (operation) position (A), then stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from moving the machine. Always remove the key, take it with you, and leave it in the specified place.





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



TRANSPORTATION *(WA-0000-81A-K-00-A)*

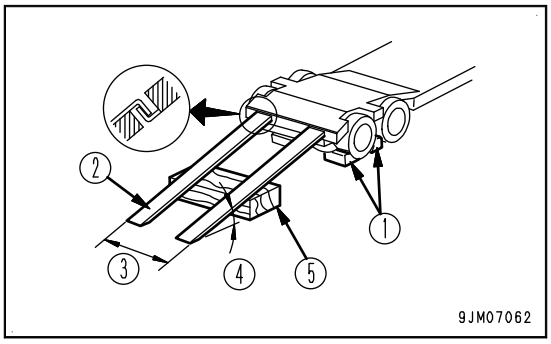
When the machine is transported on a trailer, there is danger of serious personal injury or death during transportation. To prevent accidents, always observe the following.

- 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.
- This machine needs to be divided into components for transportation depending on the regulation. When transporting the machine, consult your Komatsu distributor.
- Lock the frame with the frame lock bar to prevent the machine from articulating.
- Fit chains to the front frame and the rear frame to hold the machine securely in position.
- For details of the transportation procedure, see "TRANSPORTATION (PAGE 3-212) ".

SAFETY RULES FOR LOADING AND UNLOADING *(WA-0000-84A-K-00-A)*

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 observe the following.

- 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 the tire of the machine. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Run the engine at low idle and drive the machine slowly at low speed.
- Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.



(1) Chocks
(2) Ramp
(3) Distance between ramps to match the distance between the left and right tires
(4) Angle of ramps: Max. 15 degrees
(5) Block

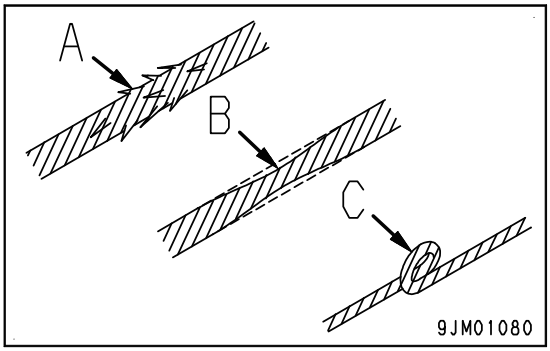
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- For machines equipped with a cab, always lock the door after loading the machine. If this is not done, the door may open during transportation.
  See "TRANSPORTATION (PAGE 3-212) ".

TOWING *(ALL-0000-001-K-15-A)*

SAFETY RULES FOR TOWING *(WA270-0000-147-K-00-A)*

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 "TOWING MACHINE (PAGE 3-224)".

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



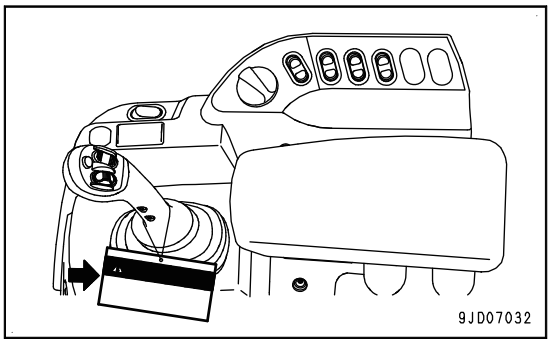
PRECAUTIONS FOR MAINTENANCE *(ALL-1150-001-A-00-A)*

PRECAUTIONS BEFORE STARTING INSPECTION AND MAINTENANCE *(ALL-0000-001-K-12-A)*

DISPLAY WARNING TAG DURING INSPECTION AND MAINTENANCE *(WA320-0000-2A6-K-00-A)*

Always display the warning tag "DANGER! Do NOT operate!" during inspection and maintenance.
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 a 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.

- If necessary, put up signs around the machine also.
  Warning tag part No. 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 WORK PLACE CLEAN AND TIDY *(D65-0000-2A7-K-00-A)*

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 the 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 *(ALL-0000-2A8-K-00-A)*

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

ONLY AUTHORIZED PERSONNEL *(ALL-0000-2A9-K-00-A)*

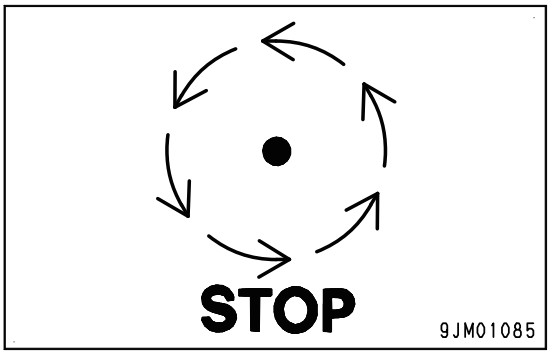
As long as maintenance of the machine is continued, do not allow unauthorized person comes near the workplace. They might get unexpected personal injury from, for instance, touching machine. Do not allow anyone except the workers concerned to enter the workplace. If necessary, employ a guard.

APPOINT LEADER WHEN WORKING WITH OTHERS *(ALL-0000-2AA-K-00-A)*

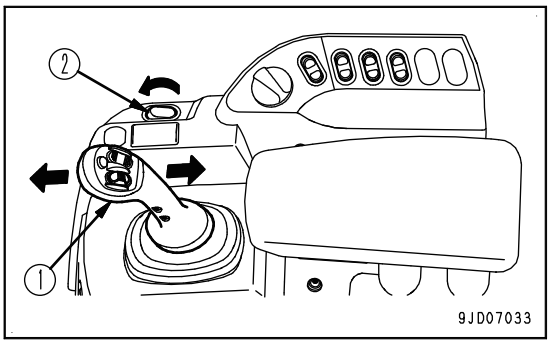
- When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation in order to prevent personal injuries caused by being caught or pinched.

STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE *(WA320-0000-2AB-K-00-A)*

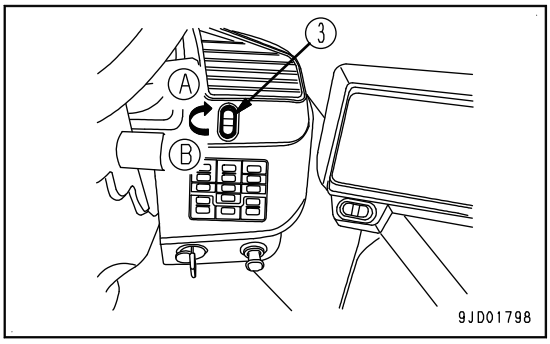
- Lower the work equipment completely to the ground and stop the engine before performing any inspection and maintenance.

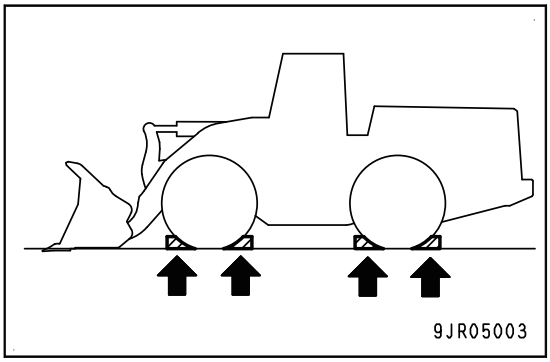


- After stopping engine (work equipment is lowered to the ground), turn the starting switch to the ON position. Then operate multi-function mono-lever (1) to the RAISE and LOWER position fully two or three times to release the remaining pressure in the hydraulic circuit, then lock the work equipment (pilot lamp lights up) by pressing work equipment lock switch (2).
  After releasing the remaining pressure in the hydraulic circuit, turn the starting switch to the OFF position.

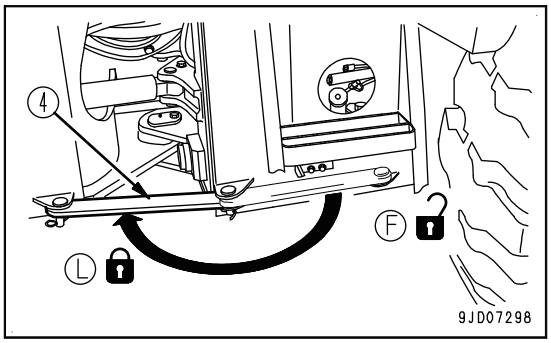


- Set parking brake switch (3) to the ON (operation) position (A) to apply the parking brake, chock the wheels (in front of and rear the tires) to prevent them from moving.





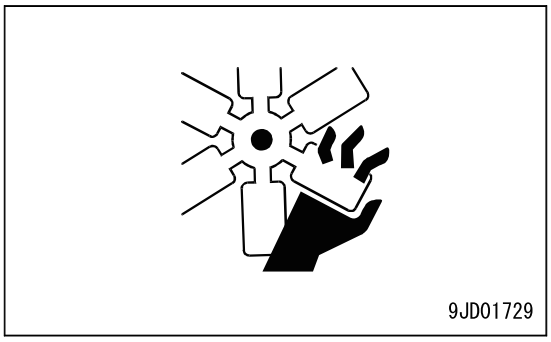
- Set frame lock bar (4) to lock position (L) to lock the front and rear frame.



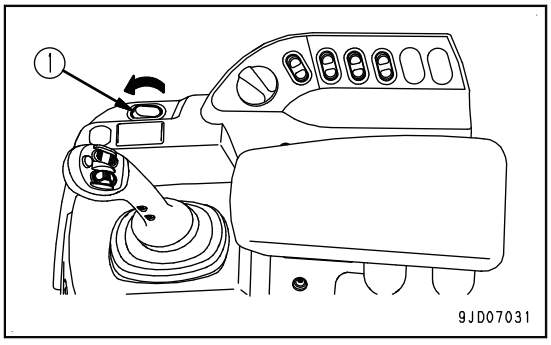
TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING *(WA270-0000-2AC-K-00-A)*

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 observe the following.

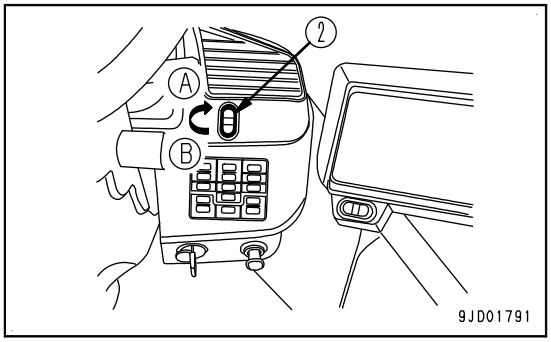
- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- When carrying out operations near the fan, fan belt, or other rotating parts, there is a hazard of being caught in the parts, so be careful not 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.
- If the KDPF automatic regeneration starts during maintenance, the temperature around KDPF increases. During maintenance, stop the KDPF regeneration according to "HANDLING Komatsu Diesel Particulate Filter (KDPF) (PAGE 3-131) ".



- Lower the work equipment to the ground, then press work equipment lock switch (1) to lock the work equipment (the pilot lamp lights up) and prevent it from moving.



- Set parking brake switch (2) to ON (operation) position (A), to apply the parking brake, and put blocks in front and back sides of the tires to prevent the machine from moving.
- Do not touch the control levers or steering system. If it is necessary to operate the control lever or steering system, always give a signal to your fellow workers and have them take refuge to a safe place.

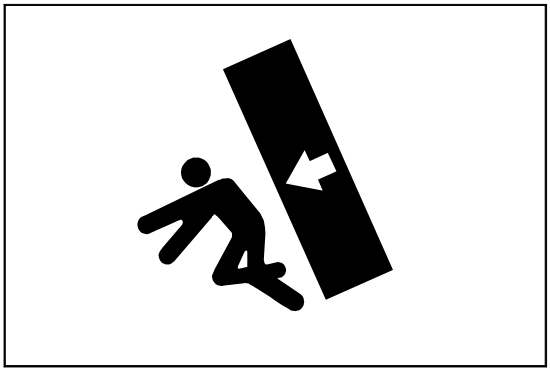


TURN OFF ECSS SWITCH BEFORE CARRYING OUT INSPECTION AND MAINTENANCE *(WA-0000-2AH-K-00-A)*

Before starting the inspection and maintenance, lower the bucket to the ground and turn the ECSS switch to the OFF position, then stop the engine. Never turn the switch ON during the inspection and maintenance.

INSTALLING, REMOVING, OR STORING ATTACHMENTS *(ALL-0000-2AD-K-00-A)*

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



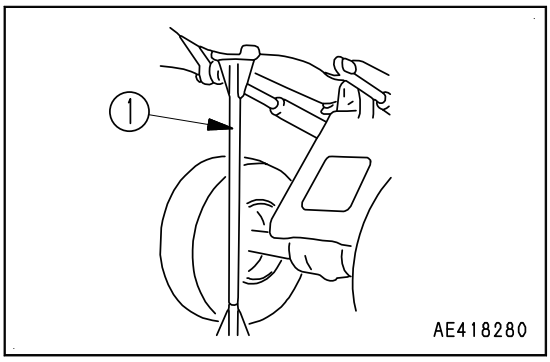
WORK AT HIGH PLACES *(ALL-0000-2AE-K-00-A)*

When working at high places, use a step ladder or other stand to ensure that the work can be carried out safely. There is a danger falling from high place that can lead to serious personal injury.

WORK UNDER MACHINE OR WORK EQUIPMENT *(WA-0000-2AF-K-00-A)*

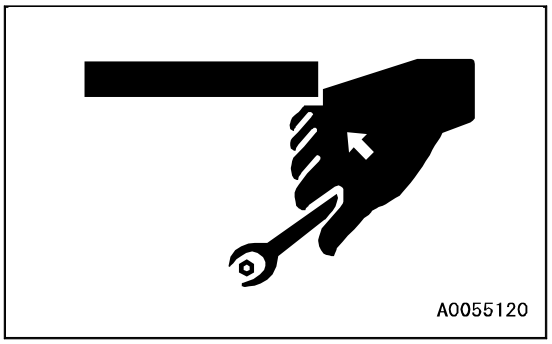
- Make sure the hoists or jacks you use are in good repair and strong enough to handle the weight of the component. Never use jacks at places where the machine is damaged, bent, or twisted. Never use frayed, twisted or pinched wire rope. Never use bent or distorted hooks.

- If it is necessary to raise the work equipment or a component and then go under it to carry out inspection or maintenance, support the work equipment or component securely with blocks and stands (1) strong enough to support their weight. If the work equipment or component is not supported, they may come down, causing serious personal injury or death.
- Never use concrete blocks for supports. They can collapse under even light loads.



PROPER TOOLS *(ALL-0000-2AG-K-00-A)*

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 *(ALL-0000-001-K-06-A)*

TURN BATTERY DISCONNECT SWITCH TO OFF POSITION *(ALL-AW1P-012-K-00-A)*

In the following cases, turn the starting switch to the OFF position and check that the system operating lamp is turned off. Then set the battery disconnect switch to the OFF position to pull the key out.
If the battery disconnect switch is set to the OFF position without checking that the system operating lamp is turned off, serious personal injuries like electric shock, etc may occur.

- When the machine is stored for a long time (more than a month)
- When the electrical system is repaired
- When an electrical welding is performed
- When the battery is handled
- When replacing the fuse

WELDING INSTRUCTIONS *(ALL-0000-629-K-00-A)*

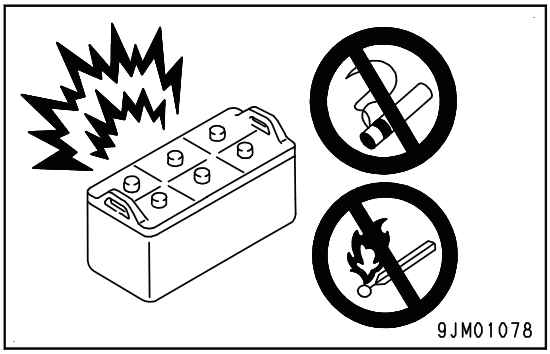
Welding operations must always be carried out by a qualified welder and in a place equipped with proper equipment. There is a hazard of gas, fire, or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

BATTERY *(WA-AW10-012-K-00-A)*

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

DANGER OF BATTERY EXPLODING

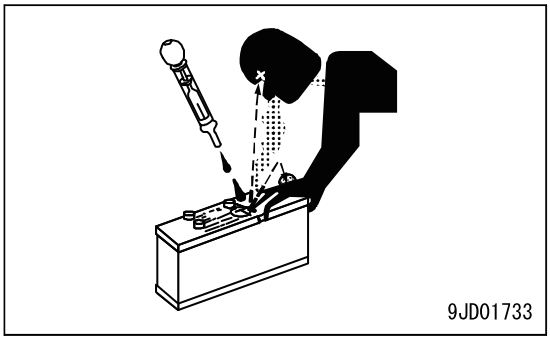
When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire, so always observe the following.



- Do not use or charge the battery if the battery electrolyte is below the LOWER LEVEL mark. This may cause an 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 eyeglasses 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.

DANGER OF SPARKS

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

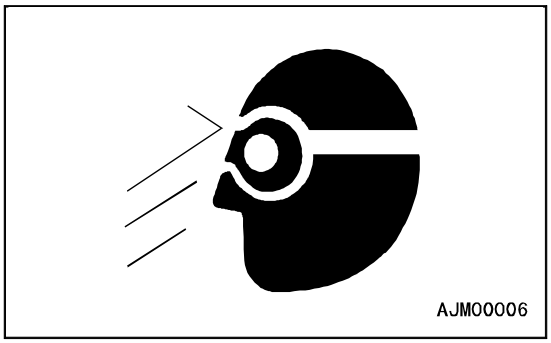
- Do not let tools or other metal objects make any contact between the battery cables. Do not leave tools lying around near the battery.

- When removing the battery cables, turn the starting switch to the OFF position and, after checking that the system operating lamp goes out, set the battery disconnect switch key to the OFF position and pull it out. 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.

WHEN USING HAMMER *(ALL-0000-2AK-K-00-A)*

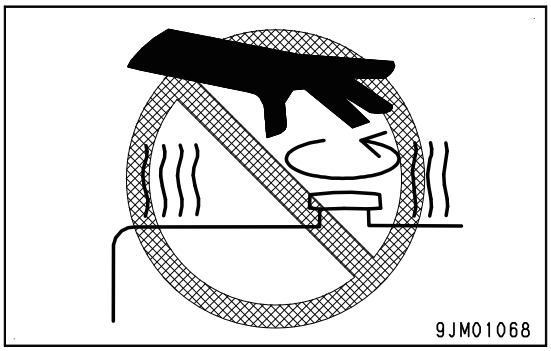
When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious personal injury or death. Always observe the following.

- 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 protective eye 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.



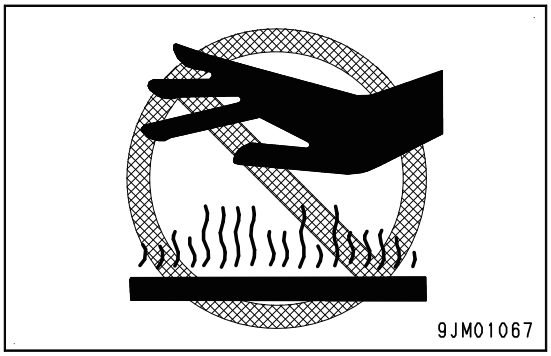
HIGH-TEMPERATURE COOLANT *(ALL-B210-012-K-00-A)*

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.



HIGH-TEMPERATURE OIL *(ALL-0000-2AL-K-00-A)*

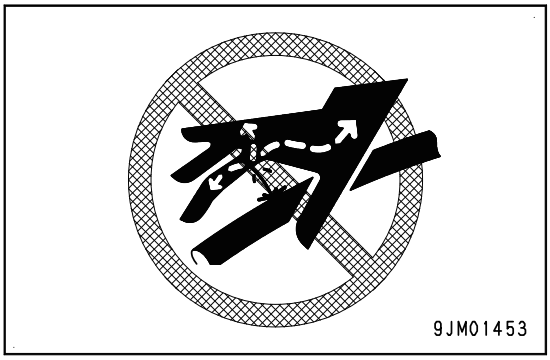
To prevent burns from hot oil spurting out or from touching high-temperature parts when checking or draining the oil, wait for the oil to cool down to a temperature where the cap or plug can be touched by hand. Then loosen the cap or plug slowly to release the internal pressure and remove the cap or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



HIGH-PRESSURE OIL *(WA320-0000-2AM-K-00-A)*

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 observe the following.

- Do not carry out inspection or replacement work with the circuit under pressure.
  Release the pressure by referring to "STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE (PAGE 2-37) ".
- 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 protective equipment such as protective eyeglasses 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.
- The oil pressure in the ECSS circuit is stored by the accumulator. Do not remove the ECSS piping and parts.
  If it is necessary to remove them, ask your Komatsu distributor to carry out the removal work.



HIGH-PRESSURE FUEL *(ALL-AD02-2AH-K-00-A)*

When the engine is running, high-pressure is generated in the engine fuel piping. If you try to disassemble the piping before the internal pressure is released, serious personal injury can result. 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.

HIGH-PRESSURE HOSES AND PIPING *(ALL-0000-2AN-K-00-A)*

- 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 *(ALL-0000-2AQ-K-00-A)*

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.

ACCUMULATOR AND GAS SPRING *(WA320-0000-2AS-K-00-A)*

This machine is equipped with an accumulator. Even after the engine has been stopped, it is possible to operate the multi-function mono-lever in the LOWER direction for a short time to allow the work equipment to go down under its own weight.
After stopping the engine, turn the work equipment lock switch to the LOCK position and the parking brake switch to the ON (operation) 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, nor 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. Ask your Komatsu distributor to carry out this work.

COMPRESSED AIR *(ALL-0000-2AT-K-00-A)*

- 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 protective eyeglasses, anti-dust mask, gloves, and other protective equipment.

MAINTENANCE OF AIR CONDITIONER *(ALL-K500-2AH-K-00-A)*

- 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.

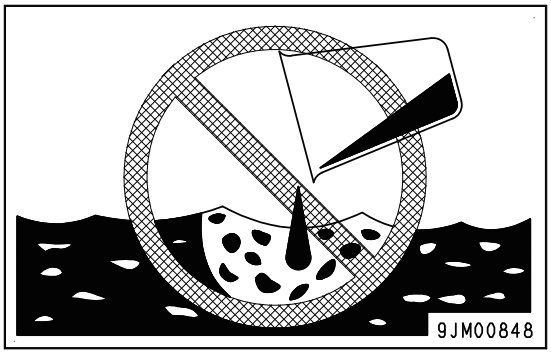
DISPOSE OF WASTE MATERIALS *(ALL-0000-99A-K-00-A)*

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.

Some kinds of rubber, plastics might produce poisonous gas harmful to person, when they are burned.

- When disposing of rubber, plastics, or parts (hoses, cables, and harness) made of those materials, these must be treated by industrial waste disposer in accordance with local regulations.



SELECT WINDOW WASHER FLUID *(ALL-K7B3-171-K-00-A)*

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

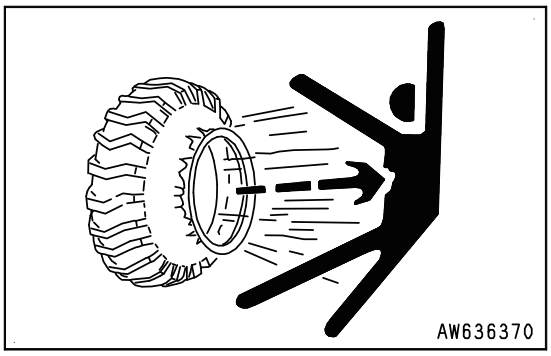
PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS *(WA-0000-2AU-K-00-A)*

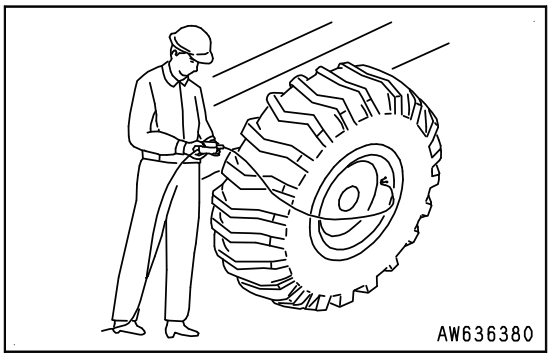
- For using the machine safely for a long period, always carry out periodic replacement of safety critical parts that have a particularly close relation to safety, such as hoses and the seat belt.
  Replacement of safety critical parts: See "SAFETY CRITICAL PARTS (PAGE 7-2) ".
- The material of these 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.

TIRES *(WA-DW60-001-K-00-A)*

HANDLING TIRES *(WA-DW60-100-K-00-A)*

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

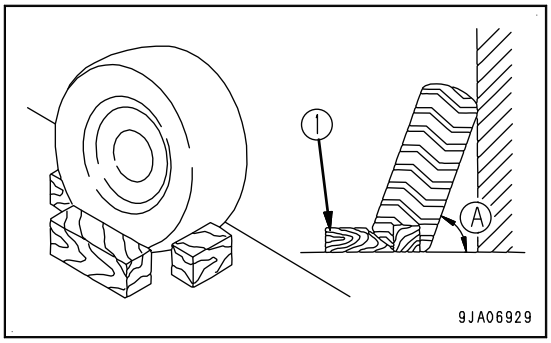




- Maintenance, disassembly, repair, and assembly of the tires and rims requires special equipment and special technology, so always ask your Komatsu distributor to carry out these operations.
- Use only specified tires and inflate them to the specified pressure.
  Appropriate inflation pressure: See "HANDLING TIRES (PAGE 3-210) "
- When pumping up the tires, check that no other person is standing near the tire, and install an air chuck with a clip that can be secured to the air valve.
  To prevent the tire inflation pressure from becoming too high, measure the pressure from time to time with an air gauge while pumping up the tire.
- If the tire pressure goes down abnormally or the rim parts do not fit the tire, there is a problem with the tire or rim parts. Always contact your Komatsu distributor for repairs.
- If the rim parts are not fitted properly when the tire is being pumped up, there is a danger that the rim parts may fly off, so set up a protective fence around the tire, and do not stand directly in front of the rim. Stand beside the tread when pumping up the tire.
- Do not adjust the tire inflation pressure immediately after traveling at high speed or operating under heavy load.
- Never carry out welding or light a fire near the tire.
- Always release the pressure from a tire prior to removing rim from tire.
- Before removing the tire from the machine for repairs, remove the valve partially to release the air from the tire, then remove the tire.

STORING TIRES *(HM-DW60-876-K-00-A)*

Tires for construction equipment are extremely heavy, it may lead to serious personal injury or death. To maintain safety, always do as follows.



- As a basic rule, store the tires in a warehouse which unauthorized persons cannot enter.
  If the tires must be stored outside, always erect a fence and put up "No Entry" signs.
- Stand the tire on level ground at angle (A) of 60 to 70 deg. and fit blocks (1) securely so that the cannot roll or fall over if any person should touch it. Do not lay the tire on its side. This will deform the tire and cause it to deteriorate.
- If the tire should fall over, do not attempt to stop it. Get out of the way quickly.

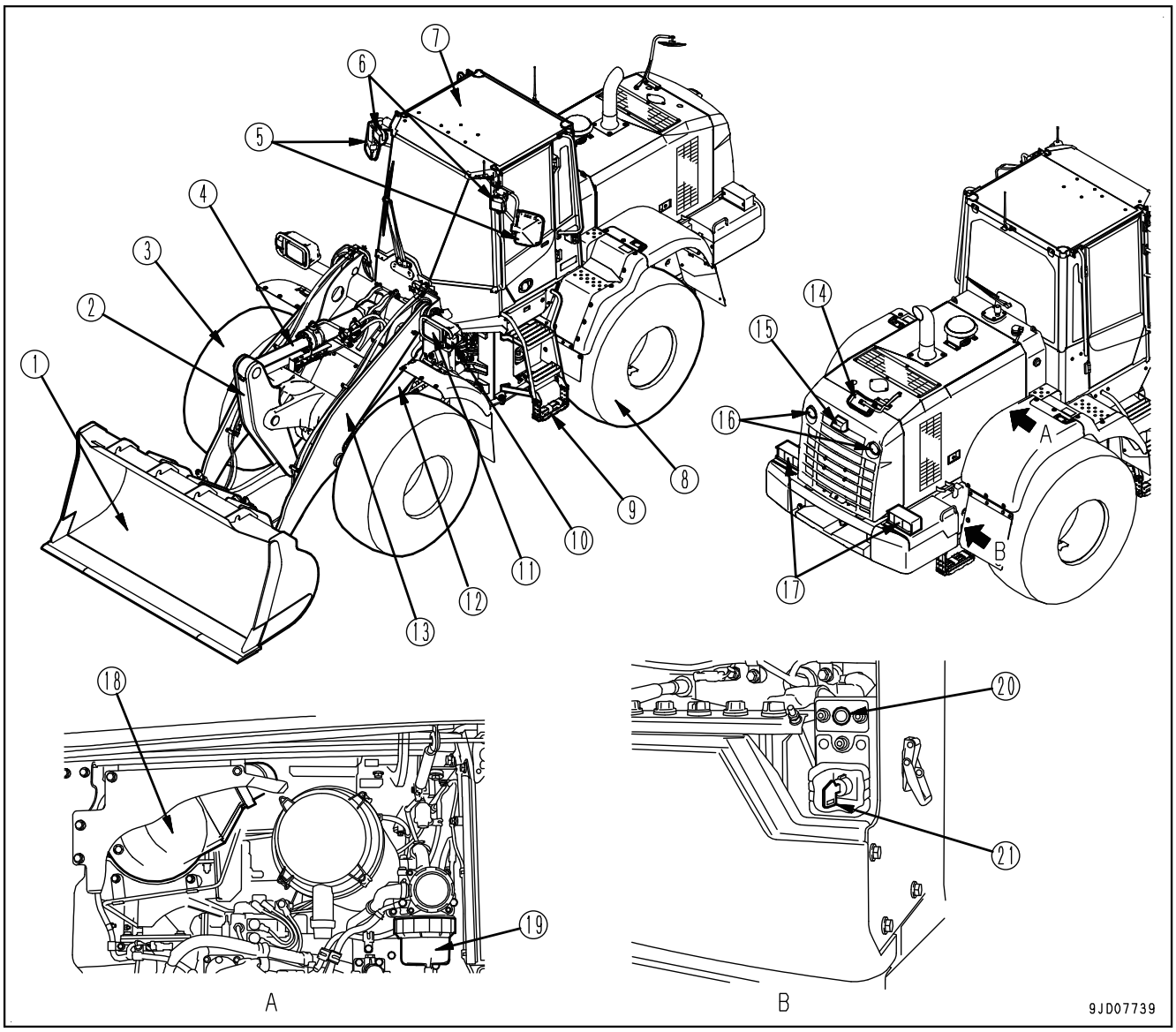
OPERATION

⚠ WARNING

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

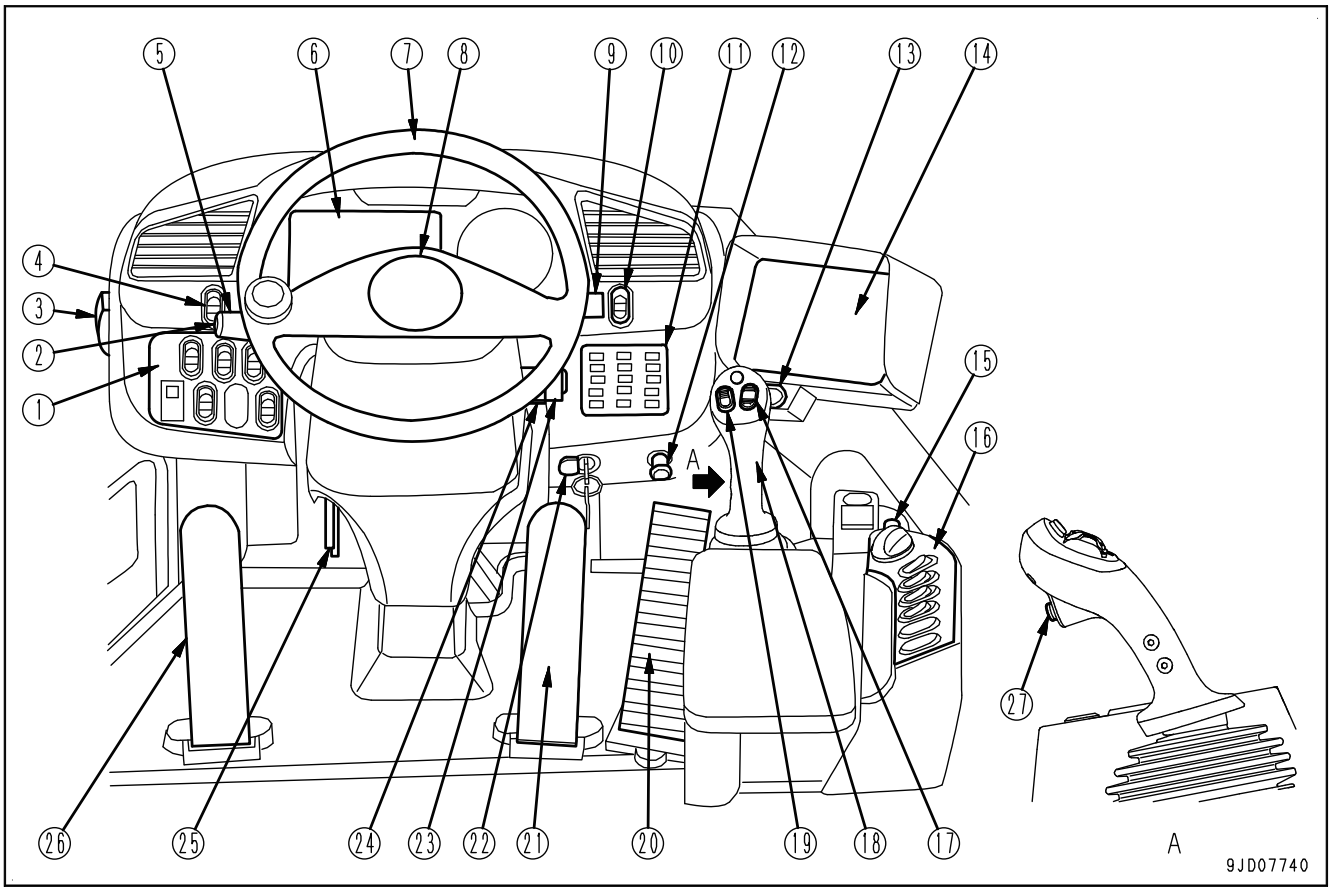
GENERAL VIEW *(PC-0000-001-K-01-A)*

GENERAL VIEW OF MACHINE *(WA270-0000-04D-K-00-A)*



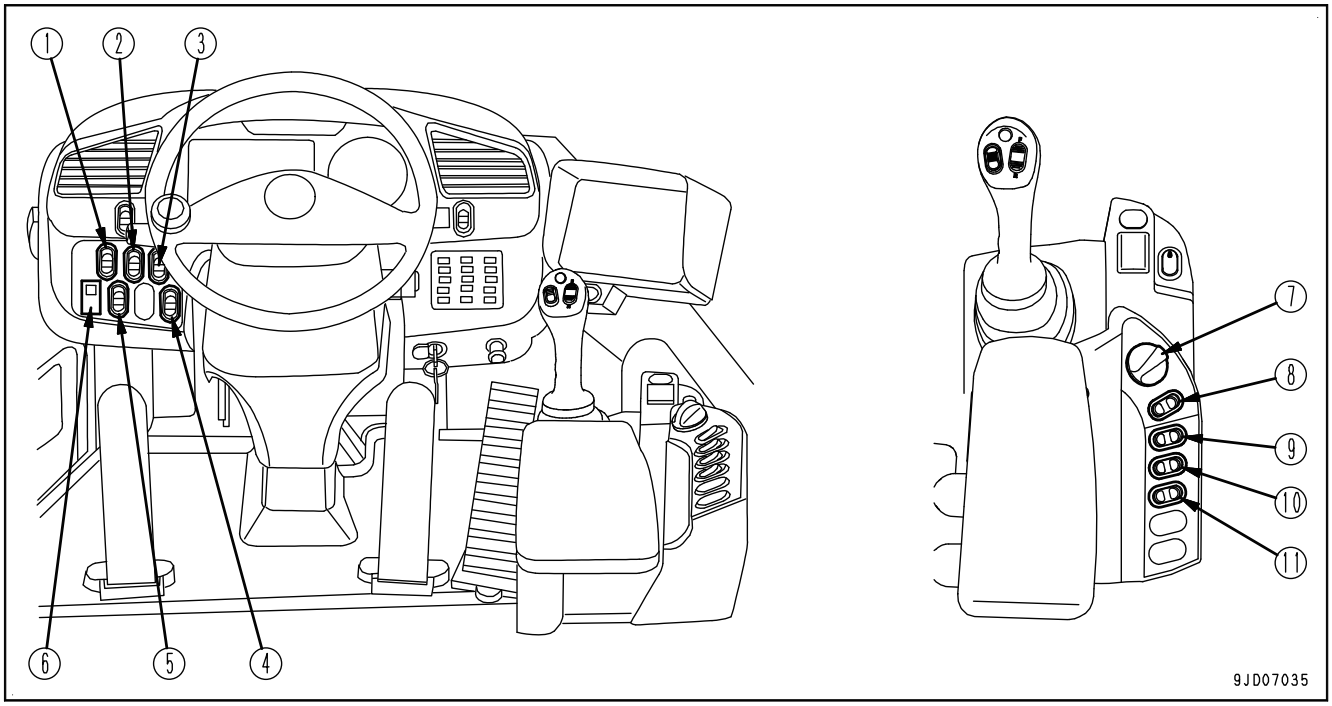
(1) Bucket
(2) Bell crank
(3) Front wheel
(4) Bucket cylinder
(5) Rearview mirror
(6) Front working lamp
(7) ROPS cab
(8) Rear wheel
(9) Stepladder
(10) Turn signal lamp
(11) Head lamp
(12) Lift cylinder
(13) Boom
(14) Rear under view mirror (if equipped)
(15) Rear view camera
(16) Rear working lamp
(17) Rear combination lamp
(18) KDPF
(19) Komatsu Closed Crankcase Ventilation (hereafter KCCV) ventilator
(20) System operating lamp
(21) Battery disconnect switch

GENERAL VIEW OF CONTROLS AND GAUGES *(WA270-K190-04D-K-00-A)*



(1) Front switch panel
(2) Directional lever
(3) Engine shutdown secondary switch
(4) Hazard lamp switch
(5) Speed range selector switch
(6) Machine monitor
(7) Steering wheel
(8) Horn switch
(9) Lamp switch
(9) Turn signal lever
(9) Dimmer switch
(10) Parking brake switch
(11) Monitor switches
(12) Cigarette lighter
(13) Brightness adjustment switch of rear view monitor
(14) Rear view monitor
(15) Work equipment lock switch
(16) R.H. switch panel
(17) Directional selector switch
(18) Multi-function mono-lever
(19) PCS (Proportional Control Switch) (if equipped)
(20) Accelerator pedal
(21) R.H. brake pedal
(22) Starting switch
(23) Front wiper switch
(24) Rear wiper switch
(25) Steering tilt lock lever
(26) L.H. brake pedal
(27) Max. traction switch

SWITCH PANEL *(WA320-Q180-04D-K-01-A)*



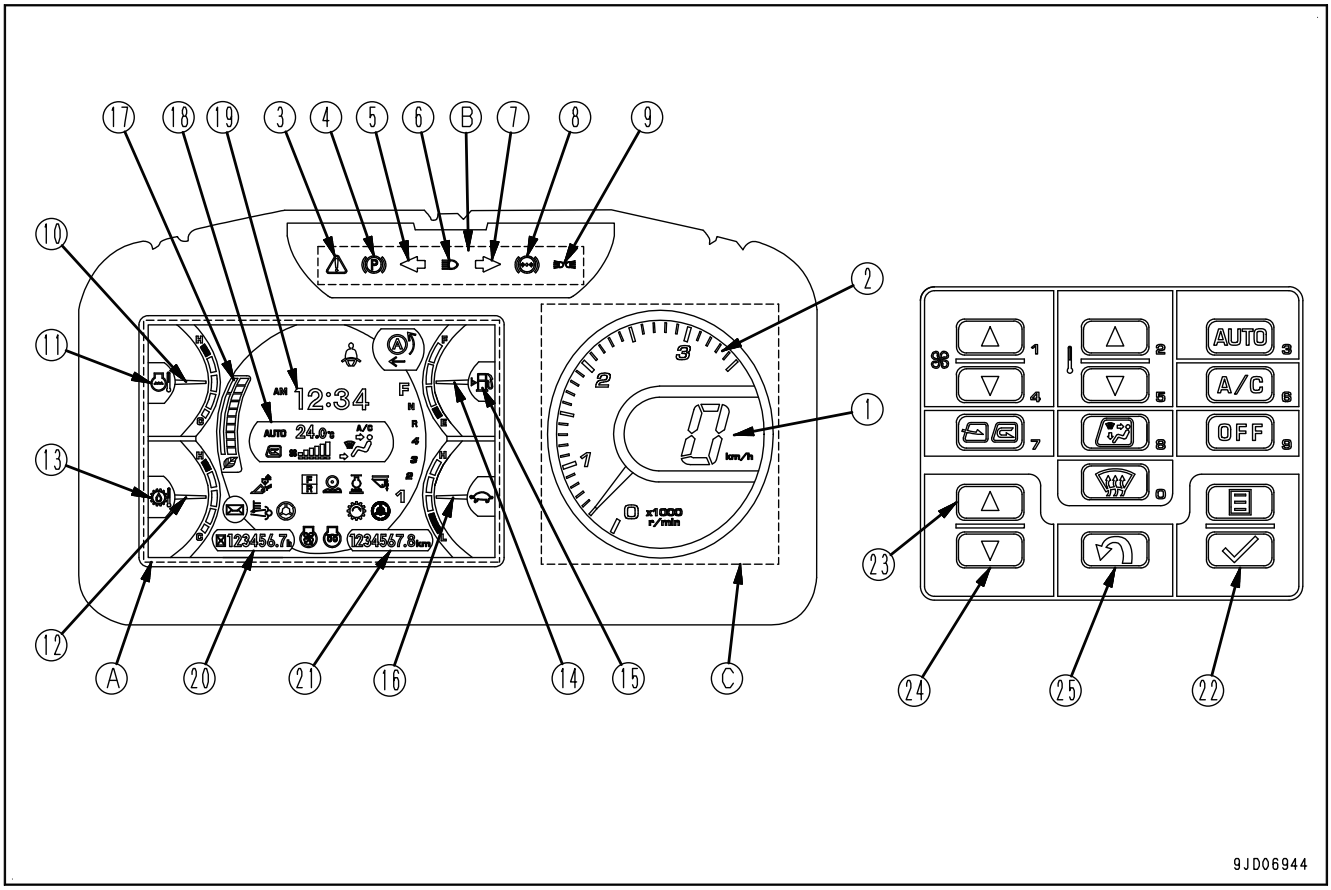
Front switch panel
(1) Front working lamp switch
(2) Rear working lamp switch
(3) Beacon lamp switch (if equipped)
(4) Monitor brightness selector switch
(5) ECSS switch(*)
(6) Quick coupler attachment switch

R.H. switch panel
(7) Travel speed control dial
(8) Traction control switch
(9) Directional selector switch actuation switch
(10) Attachment selector switch (if equipped)
(11) Remote positioner switch

* ECSS: Electronic Controlled Suspension System

MACHINE MONITOR *(WA320-Q180-04D-K-00-A)*

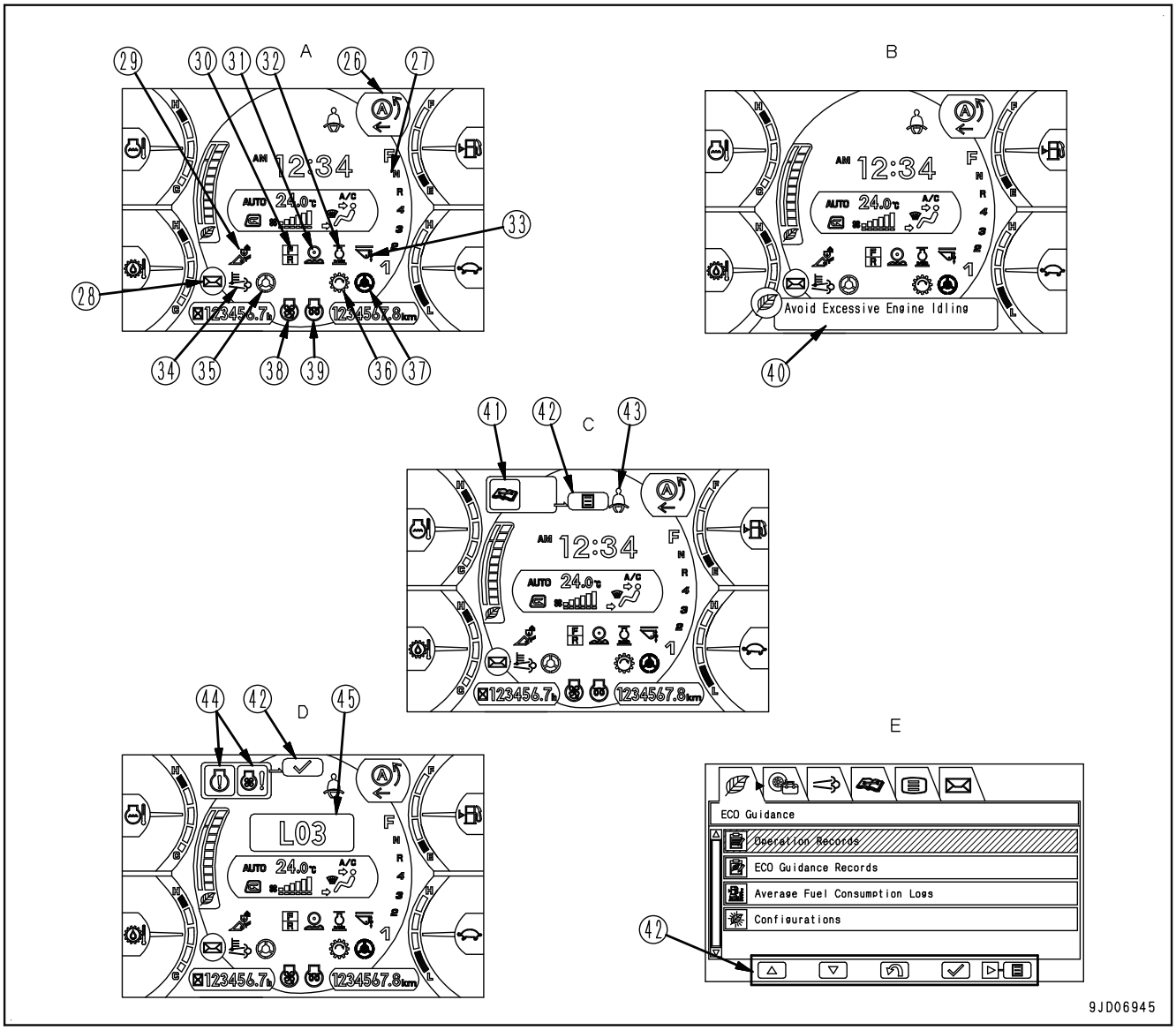
GENERAL VIEW



(A) Liquid crystal unit
(B) LED (light emitting diode) unit
(C) Meter unit

(1) Speedometer
(2) Engine tachometer
(3) Centralized warning lamp
(4) Parking brake pilot lamp
(5) Turn signal lamp pilot lamp (left)
(6) Headlamp (high beam) pilot lamp
(7) Turn signal lamp pilot lamp (right)
(8) Brake oil pressure caution lamp
(9) Clearance lamp pilot lamp
(10) Engine coolant temperature gauge
(11) Engine coolant temperature caution lamp
(12) HST oil temperature gauge
(13) HST oil temperature caution lamp
(14) Fuel gauge
(15) Fuel level caution lamp
(16) Variable speed display
(17) ECO gauge
(18) Air conditioner display
(19) Clock
(20) Left meter (Select the service meter, odometer, or clock.)
(21) Right meter (Select the fuel consumption gauge, service meter, odometer or clock.)
(22) Enter switch
(23) Up switch
(24) Down switch
(25) Return switch

DISPLAY OF LIQUID CRYSTAL UNIT



(A) Standard screen
(B) ECO guidance screen
(C) Maintenance time warning screen
(D) Warning screen
(E) User menu screen

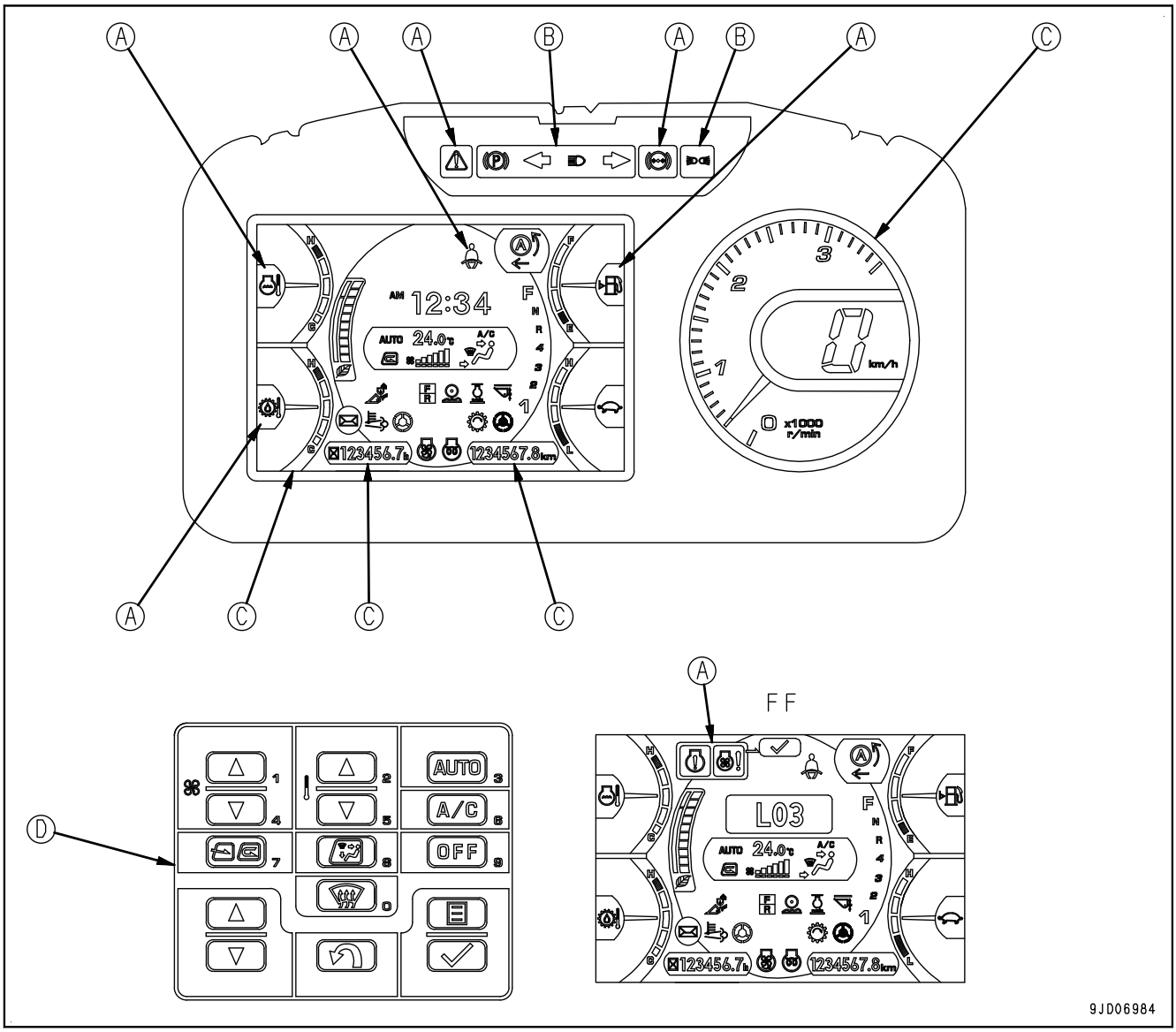
(26) Traction level
(27) Shift lever position pilot lamp
(28) Message pilot lamp
(29) Quick coupler lock release pilot lamp (if equipped)
(30) Directional selector pilot lamp
(31) ECSS (electronically controlled suspension system) pilot lamp
(32) 2-stage low idle pilot lamp (if equipped)
(33) Work equipment lock pilot lamp
(33) Remote positioner pilot lamp
(34) KDPF regeneration pilot lamp
(35) Emergency steering pilot lamp (if equipped)
(36) Emergency HST pump drive switch pilot lamp
(37) Steering oil pressure low pilot lamp (if equipped)
(38) Fan reverse pilot lamp
(39) Preheating pilot lamp
(40) ECO guidance
(41) Maintenance time caution
(42) Guidance icon
(43) Seat belt caution lamp
(44) Caution display
(45) Action level

* At section (33), 2 types of pilot lamp are prepared.

EXPLANATION OF COMPONENTS *(ALL-0000-043-K-00-A)*

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

MACHINE MONITOR *(WA320-Q180-04D-K-02-A)*



FF: Failure display screen

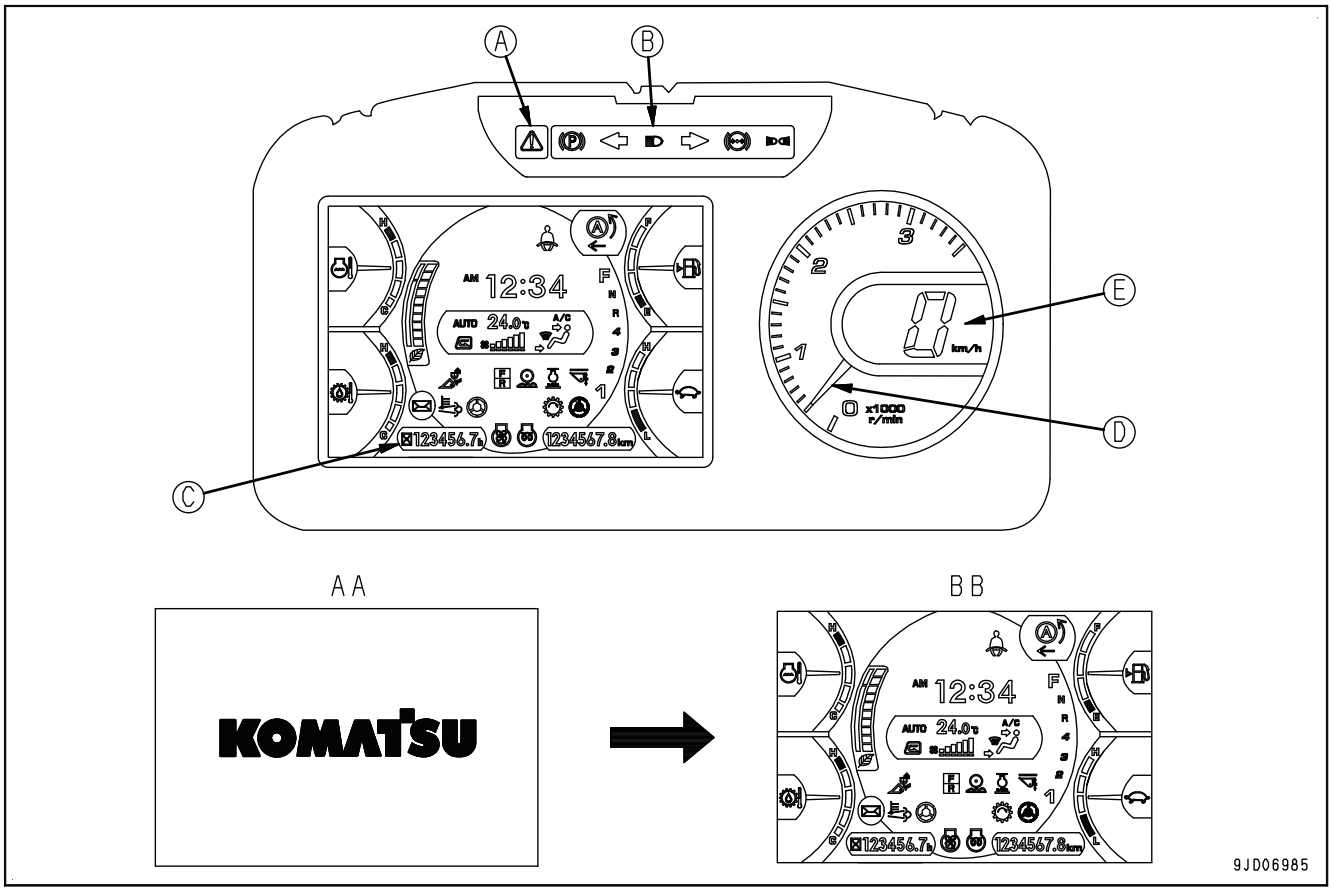
(A) Warning display
(B) Pilot display
(C) Meter display
(D) Monitor switches

REMARK

- For the user menus used for various machine settings done from the machine monitor, see "USER MENU (PAGE 3-42) ".
- One of the features of liquid crystal display panels is that there may be black spots (spots that do not light up) or white spots (spots that stay lit) on the screen. If there are fewer than 10 black or white spots, this is not a failure or a defect.

BASIC OPERATION OF MACHINE MONITOR *(WA380-Q180-044-K-00-A)*

STARTING ENGINE WHEN SITUATION IS NORMAL *(WA320-Q180-044-K-01-A)*



When the starting switch is turned to ON position, the machine monitor starts and operates as follows.

1. Centralized warning lamp (A) and pilot lamp (B) light up for 2 seconds and go out for 1 second.
2. Liquid crystal display (C) displays starting screen AA for 2 seconds, and then changes to standard screen BB.
3. The pointer of engine tachometer (D) moves one cycle.
4. Speed meter (E) displays "88" for 2 seconds.
5. The alarm buzzer sounds for 2 seconds, then stops under the normal condition.

NOTICE

If the lamps, alarm buzzer, etc. do not work, the machine monitor may be defective or the electric wiring may have breakage. In this case, ask your Komatsu distributor for repair.

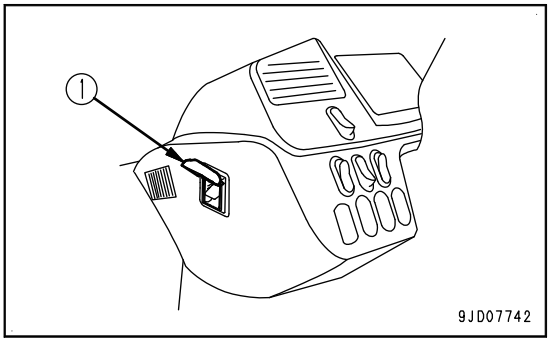
REMARK

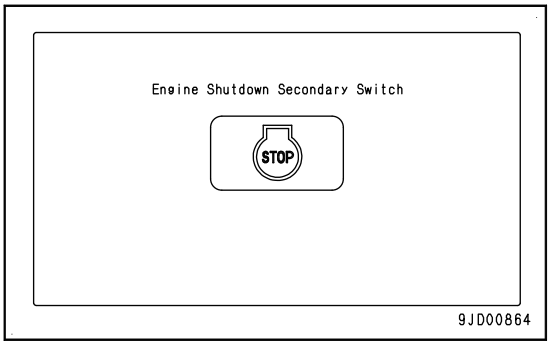
When the engine is started, the battery voltage may suddenly drop depending on the temperature and the battery condition.

In such case, the machine monitor may go out temporarily or restart, but it is not a trouble.

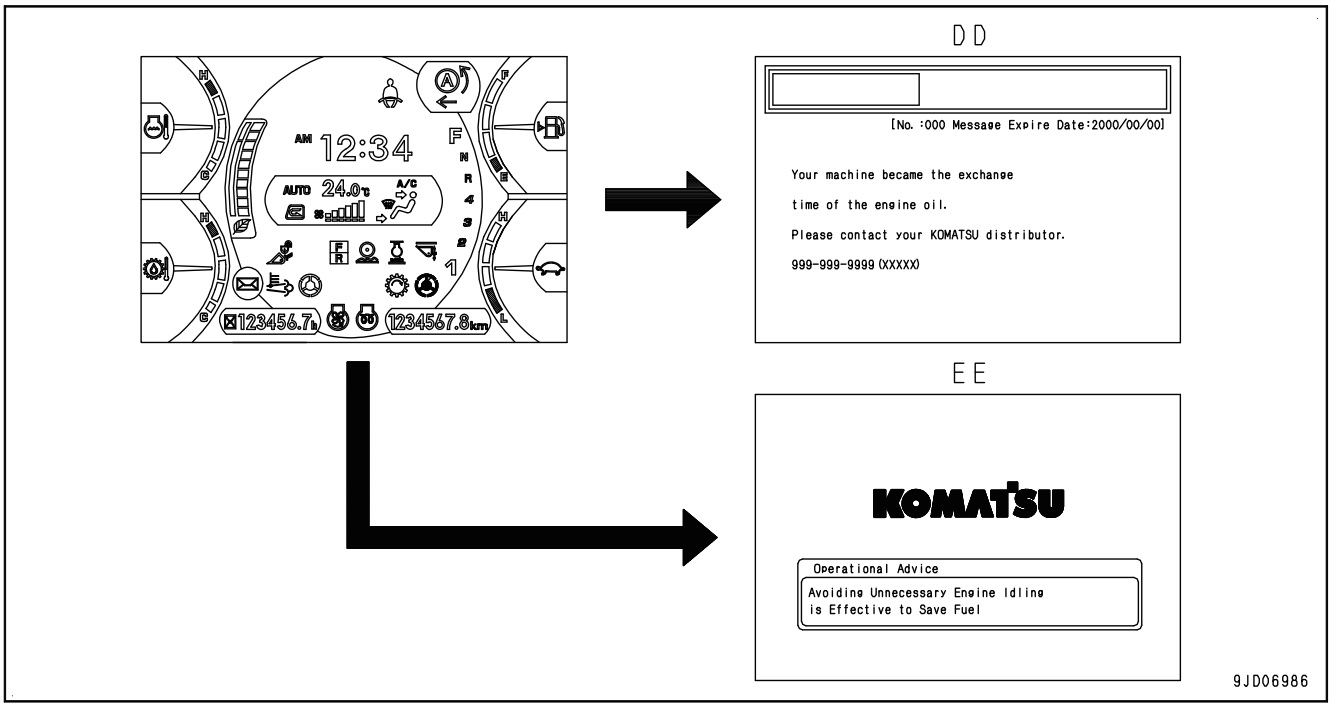
START ENGINE WHILE ENGINE SHUTDOWN SECONDARY SWITCH IS ON *(WA270-Q180-044-K-00-A)*

While engine shutdown secondary switch (1) is ON (engine stopped), even if the starting switch is turned to ON position, the screen shown at right is displayed and the engine does not start.
When engine shutdown secondary switch (1) is turned OFF (normal), the machine monitor switches to the standard screen, and the engine can be started with usual starting switch operation.
For the function and operating method of engine shutdown secondary switch (1), see "ENGINE SHUTDOWN SECONDARY SWITCH (PAGE 3-81) ".





STOPPING ENGINE WHEN SITUATION IS NORMAL *(WA270-Q180-044-K-01-A)*



When starting switch is turned to OFF position, the screen goes out. In the following case, the end screen is displayed for 5 seconds, and then screen goes out.

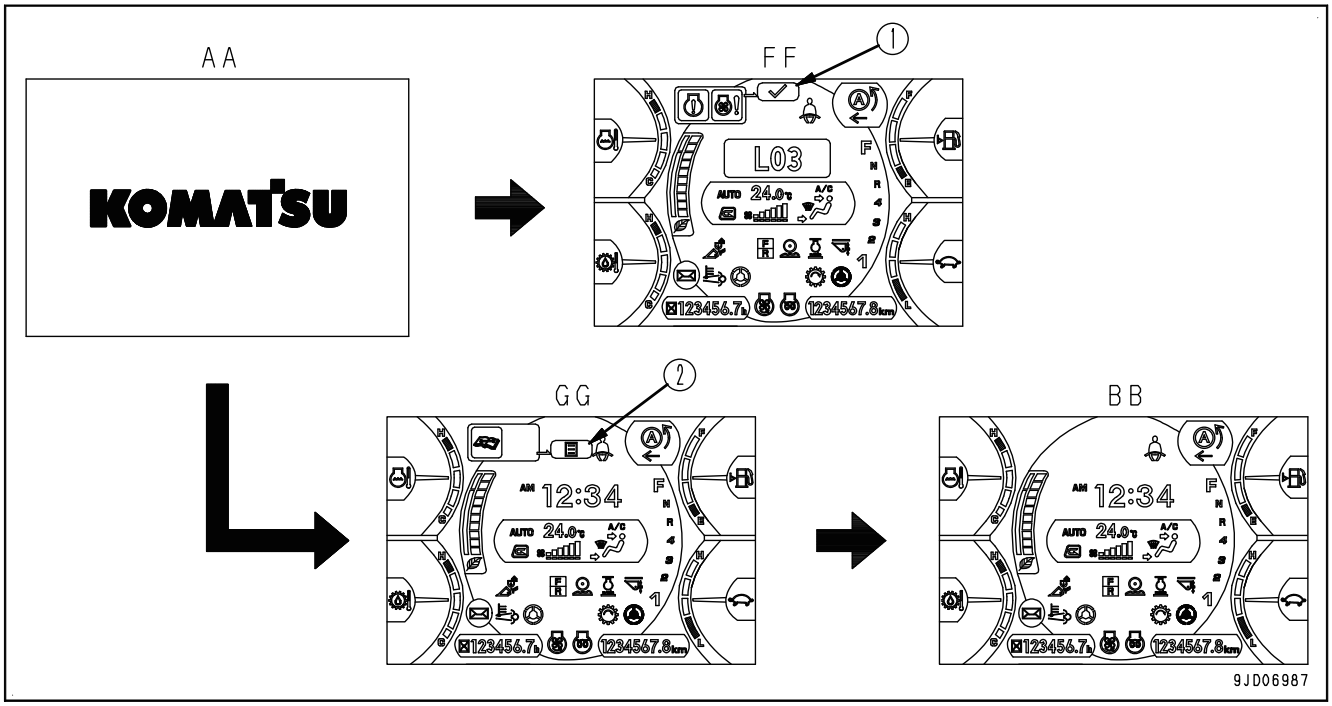
END SCREEN WITH MESSAGE

If there is any message from your Komatsu distributor, it is displayed on end screen DD for 5 seconds, and then the screen goes out.
In this case, turn the starting switch to ON position to re-check the message, and if it is the message requesting response, send back your reply.
For the method of display and reply for messages, see "MESSAGE DISPLAY (PAGE 3-73) ".

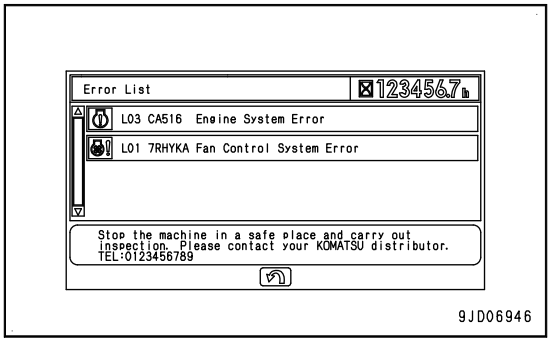
END SCREEN WITH ONE-POINT ADVICE

If there is any one-point advice, it is displayed on end screen EE for 5 seconds, and then the screen goes out.
For the one-point advice when ending, see "SWITCHING DISPLAY/NON-DISPLAY OF GUIDANCE WHEN KEY IS OFF (PAGE 3-52) ".

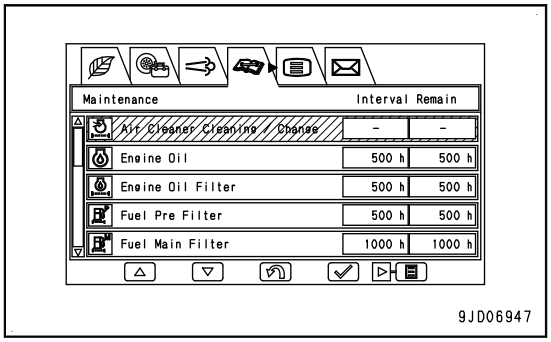
IF PROBLEM WAS FOUND WHEN STARTING MACHINE *(WA320-Q180-044-K-04-A)*



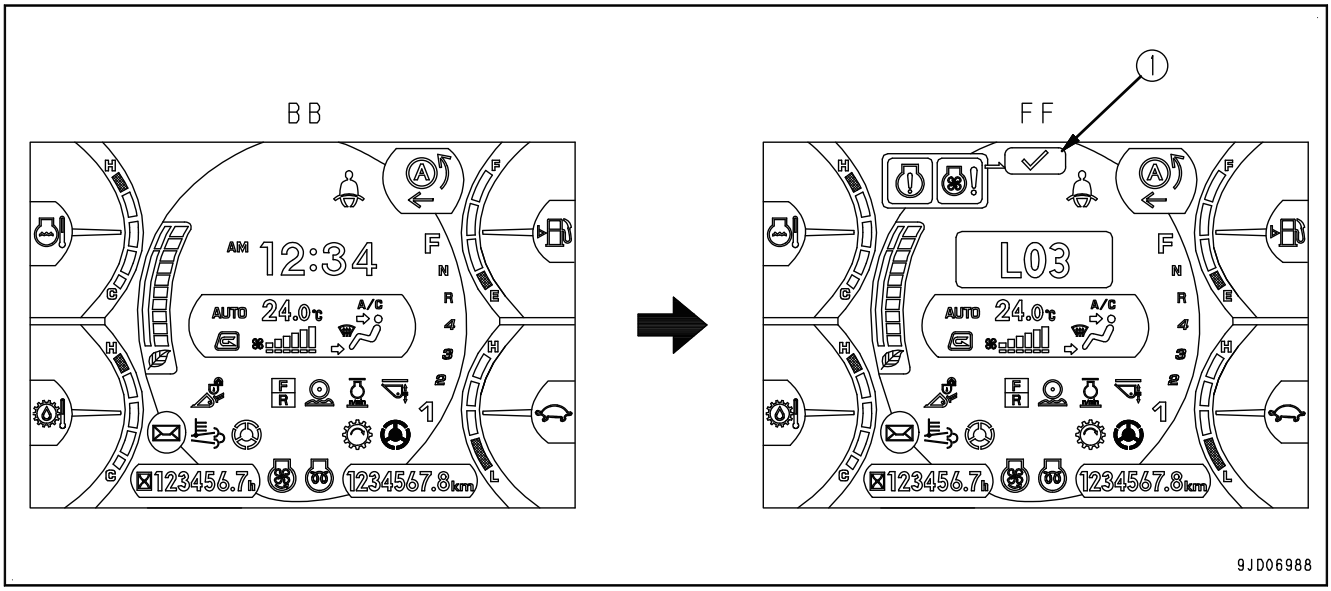
When the machine monitor is started, if the machine has trouble, starting screen AA is displayed for 2 seconds and then it is changed to the failure display screen FF.
When the enter switch displayed in guidance icon (1) is pressed, the occurred error list screen is displayed.
For the occurred error list screen and the remedies, see "WARNING DISPLAY (PAGE 3-12) ".



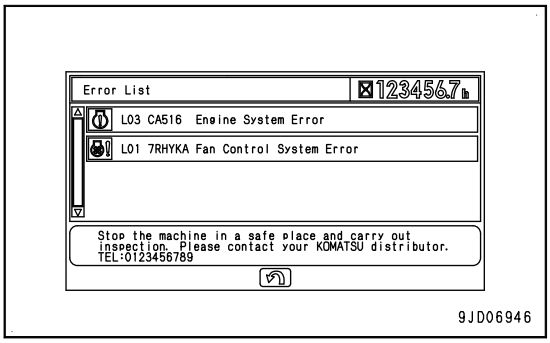
When the machine monitor is started, if the time to the next maintenance of any item is 30 hours or less, starting screen AA is displayed for 2 seconds and then it is changed to maintenance time warning screen GG.
When the menu switch displayed in guidance icon (2) is pressed, the maintenance menu screen is displayed.
For the maintenance menu screen and the remedies, see "MAINTENANCE (PAGE 3-61) ".
After displaying the maintenance time warning screen GG for 30 seconds, the screen returns to the standard screen BB.



IF TROUBLE OCCURS WHILE OPERATING MACHINE *(WA320-Q180-044-K-05-A)*



If any trouble occurs during operation, the standard screen BB changes to the failure display screen FF.
When the enter switch is pressed while guidance icon (1) is displayed, the occurred error list screen is displayed.
For the occurred error list screen and the remedies, see "WARNING DISPLAY (PAGE 3-12) ".



REMARK
Guidance icon (1) is displayed only while the machine is stopped completely.
Even when the enter switch is pressed while the machine is not stopped completely, the occurred error list screen is not displayed.

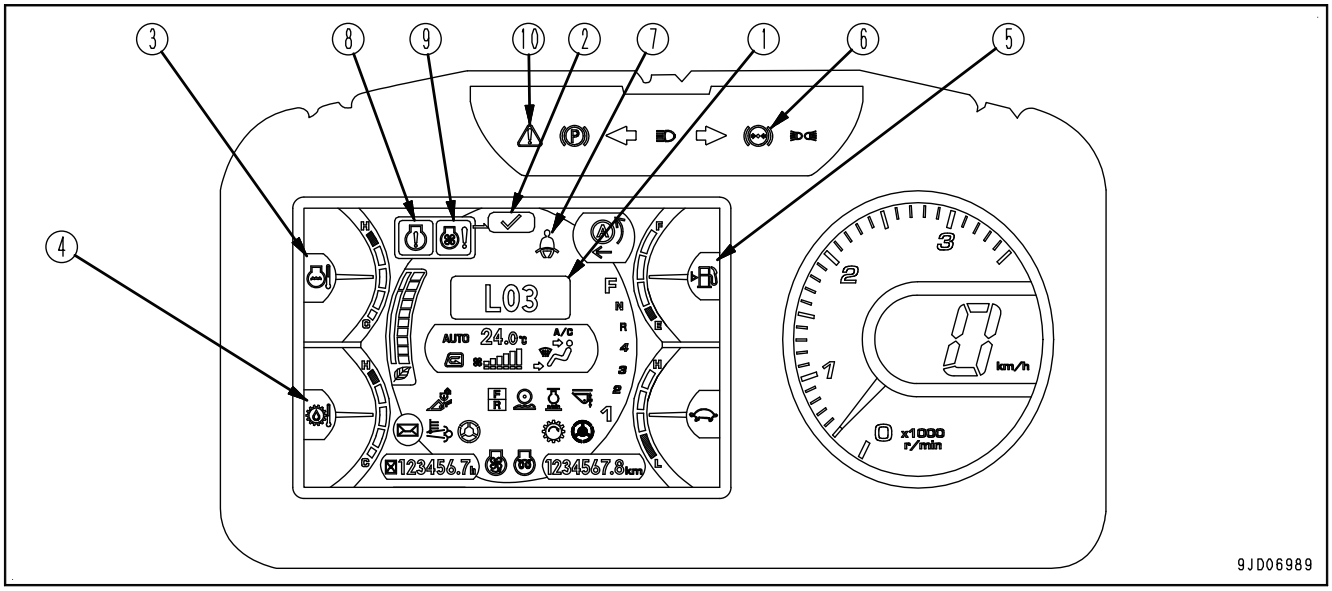
WARNING DISPLAY *(WA320-Q1FB-043-K-00-A)*

NOTICE

Appearance of any of action levels "L01" to "L04" on the machine monitor indicates presence of an trouble in the machine.

Carry out the inspection and maintenance according to "ACTION LEVEL (PAGE 3-13) ".

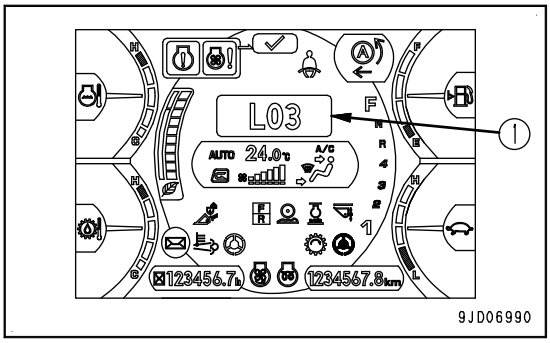
- **These cautions do not guarantee the condition of the machine.**
  Do not simply rely on the monitor when carrying out checks before starting (daily inspection). Always get off the machine and check each item directly.
- **When the warning caution is displayed in red, if no action is taken, the machine can be seriously affected. Accordingly, take proper remedies immediately.**
- **The engine output or engine speed is limited and the machine operation speed may become slow, depending on the contents of the alarm.**



(1) Action level
(2) Guidance icon
(3) Engine coolant temperature caution lamp
(4) HST oil temperature caution lamp
(5) Fuel level caution lamp
(6) Brake oil pressure caution lamp
(7) Seat belt caution lamp
(8) Caution display
(9) Caution display
(10) Centralized warning lamp

ACTION LEVEL *(WA320-Q1FC-043-K-00-A)*

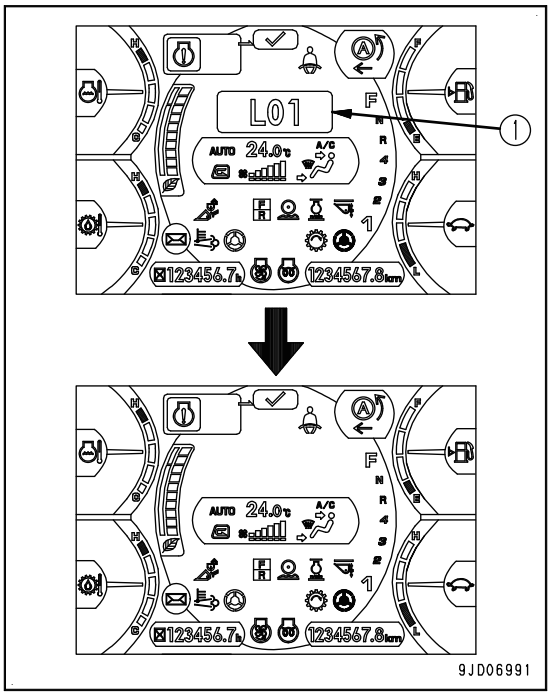
This action level (1) indicates the level of urgency of the trouble in the machine by "L01" to "L04".
The larger number in the table is, the more serious effects the trouble has on the machine if it is left with no remedy.
If the machine monitor indicates an action level, take appropriate remedies according to "List of action levels and remedies".



LIST OF ACTION LEVELS AND REMEDIES

Urgency	Action level	Centralized warning lamp	Alarm buzzer	Color of caution	Remedy
High ↑	L04	ON	Sounds continuously	Light up red	Stop the machine immediately, and carry out the inspection and maintenance. Check the failure code and ask your Komatsu distributor for inspection and maintenance.
	L03	ON	Sounds intermittently	Light up red	Stop the operation, move the machine to a safe place, stop the machine, and carry out the inspection and maintenance. Check the failure code and ask your Komatsu distributor for inspection and maintenance.
	L02	ON	Sounds intermittently	Light up red	If there is an overrun related display, reduce the engine speed and machine travel speed while continuing operations. If there is an overheat related display, stop the machine at a safe place, and run the engine at medium speed with no load. If there is an emergency steering related display, avoid a long time usage of the emergency steering. If the condition is not improved, check the failure code and ask your Komatsu distributor for inspection and maintenance.
↓ Low	L01	OFF	-	Light up yellow	Part of the functions may be restricted in some cases. However, you can carry out the operation. When you finish the operation, carry out the inspection and maintenance. Ask your Komatsu distributor for inspection and maintenance as needed.

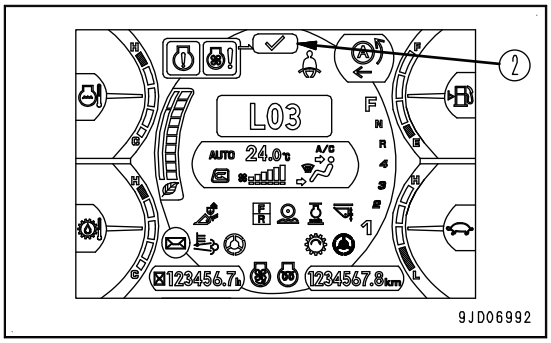
REMARK
- When a failure at action level (1) of "L01" occurs, the "L01" display is indicated only for 2 seconds, and then disappears.
- If plural failures occur at the same time, the action level with the highest urgency (the greatest number) is displayed.

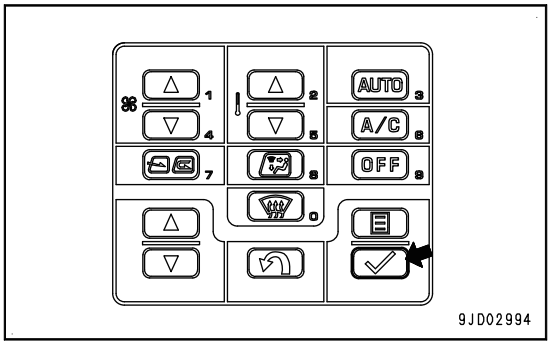


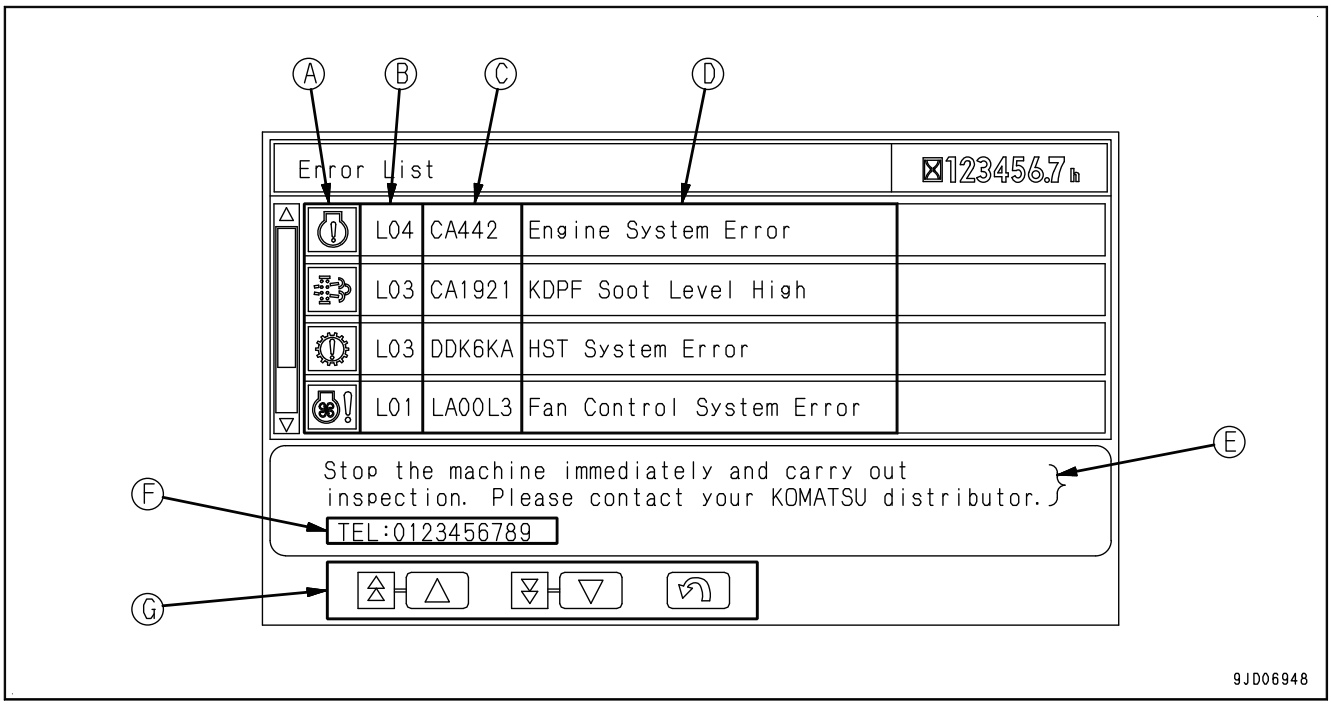
OCCURRED FAILURE CODE DISPLAY *(WA320-Q1FB-043-K-01-A)*

The monitor provides information on failures that occurred on the machine and necessary remedies for action levels that are displayed.
When the enter switch is pressed while guidance icon (2) is displayed, the screen changes to the occurred error list screen.
Take appropriate remedies according to the message displayed on the monitor panel.

REMARK
Guidance icon (2) is displayed only while the machine is stopped completely.
Even when the enter switch is pressed while the machine is not stopped completely, the occurred error list screen is not displayed.

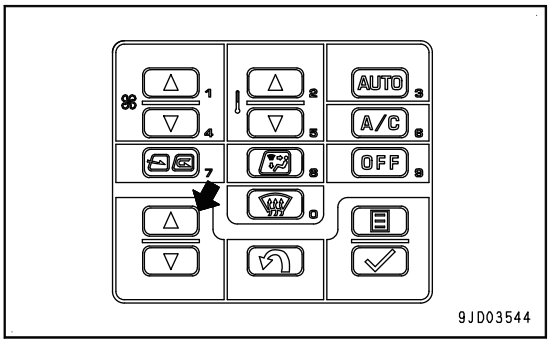




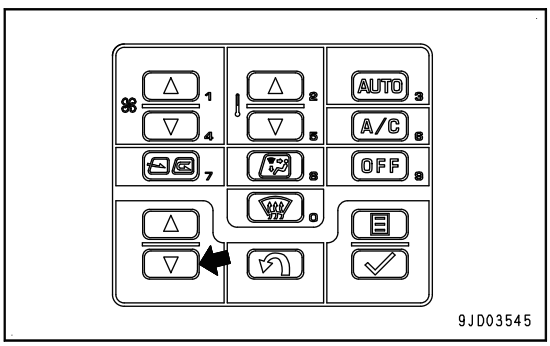


(A): Caution lamp
(B): Action level
(C): Failure code
Code to indicate the content of the failure. Notify it when calling your Komatsu distributor.
(D): Failure name
(E): Message
Take appropriate remedies according to the displayed message.
(F): Contact telephone number
The telephone number of the contact such as your Komatsu distributor is displayed.
If no point of contact telephone number has been registered, no telephone number is displayed.
When it is necessary to register the telephone number, ask your Komatsu distributor for the registration.
(G): Guidance icon

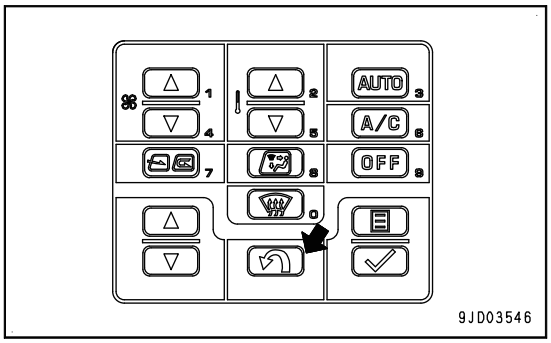
On the occurred error list screen, the following switches displayed in guidance icon (G) can be operated.
Up switch: Move to the previous page. When on the first page, move to the last page.



Down switch: Move to the next page. When on the last page, move to the first page.

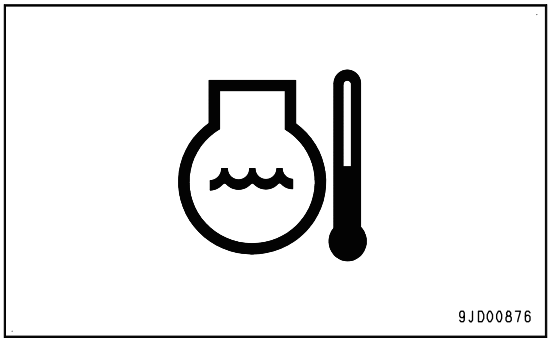


Return switch: Return to the standard screen.



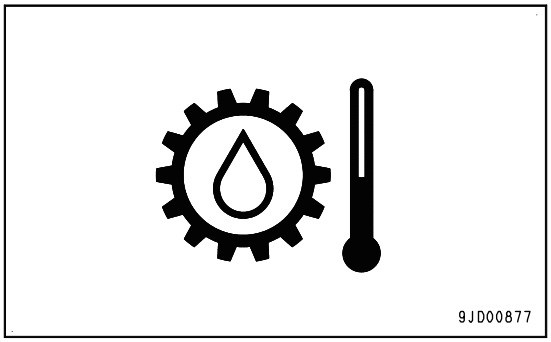
ENGINE COOLANT TEMPERATURE CAUTION LAMP *(WA320-BA8D-043-K-00-A)*

This lamp (3) warns the operator that the engine coolant is overheated.
If the engine coolant temperature is abnormally high, the lamp lights up in red and action level "L02" appears. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
Place the machine in a safe place, set the directional lever and directional selector switch to N (neutral) position, and run the engine at a medium speed with no load until the lamp goes out.



HST OIL TEMPERATURE CAUTION LAMP *(WA320-C7Q5-043-K-00-A)*

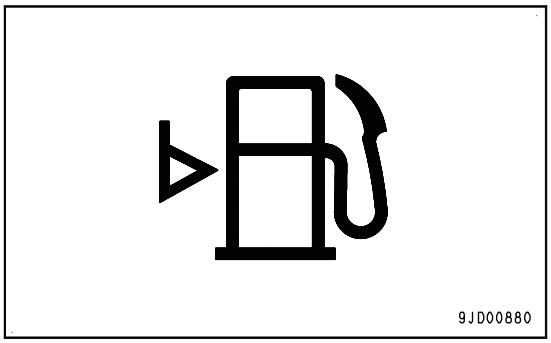
This lamp (4) warns the operator that the HST oil is overheated.
If the HST oil temperature is abnormally high, the lamp lights up in red and action level "L02" is displayed. At the same time, the centralized warning lamp lights up and alarm buzzer sounds intermittently.
Place the machine in a safe place, set the directional lever and directional selector switch to N (neutral) position, and run the engine at a medium speed with no load until the lamp goes out.
When the HST oil temperature drops below 10 °C (50 °F) caution lamp is displayed in white and acceleration in travel is restricted.
Perform warm-up operation and increase the HST oil temperature.
For details, see "RUNNING-IN (PAGE 3-171) ".



REMARK
Engine speed at low idle can be set higher when ambient temperature is low. For detail, see "2-STAGE LOW IDLE PILOT LAMP (PAGE 3-28) ".

FUEL LEVEL CAUTION LAMP *(WA270-AD45-043-K-00-A)*

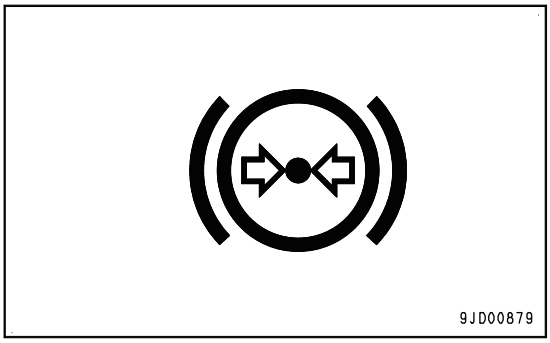
This lamp (5) warns the operator that the fuel level is low.
The lamp lights up in red if the fuel level is below 27 liters (7.13 US gal).
Add fuel as soon as possible.



BRAKE OIL PRESSURE CAUTION LAMP *(WA320-G423-043-K-00-A)*

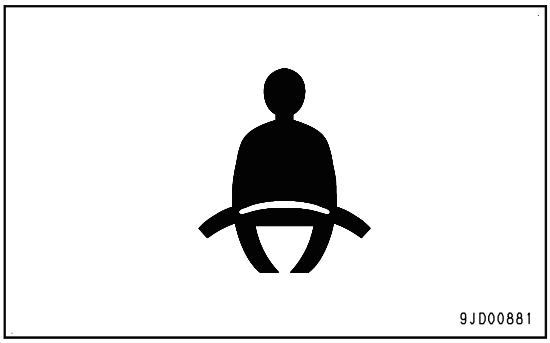
This lamp (6) warns the operator that the brake oil pressure is below the specified value.

- When action level "L03" is displayed
  If the brake oil pressure drops below the specified value while the engine is running, the lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
  Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.
- Action level is not displayed and lamp lights up in red
  If the brake oil pressure is below the specified value while the engine is stopped, the lamp lights up in red.
  When the engine is started, the lamp lights up in red until the brake oil pressure rises above the specified value. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
  Wait until the lamp goes out, and then start the machine.



SEAT BELT CAUTION LAMP *(WA320-K2S5-043-K-00-A)*

This lamp (7) lights up if the seat belt is not fastened.
There is a danger when traveling, so always fasten your seat belt.

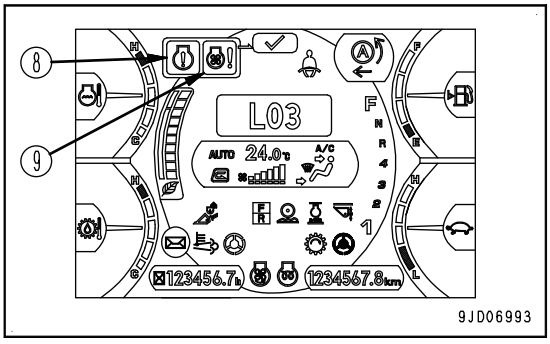


CAUTION DISPLAY *(WA320-Q180-043-K-00-A)*

The following caution lamps are displayed in caution display areas (8) and (9). Take appropriate measures according to the specified remedies.

REMARK

- If one caution is currently issued, its caution lamp is displayed on caution display area (8).
- If 2 cautions are currently issued, their caution lamps are displayed on caution display areas (8) and (9).
- If 3 cautions are currently issued, their caution lamps are displayed on caution display areas (8) and (9) alternately on a 2-second basis.



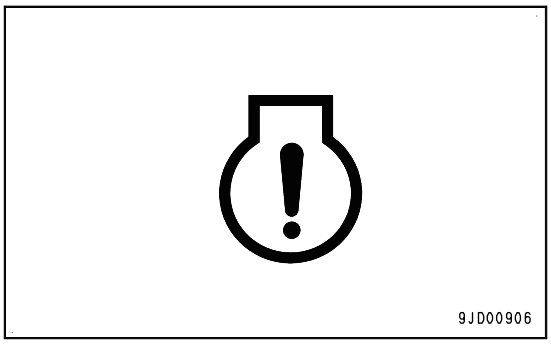
ENGINE SYSTEM CAUTION LAMP *(WA-A9HC-043-K-00-A)*

⚠ WARNING

If the operation is continued while the red lamp is lit, accumulation and combustion of the soot in KDPF are accelerated, and consequently the temperature of KDPF and exhaust gas can increase high. Stop the engine immediately.

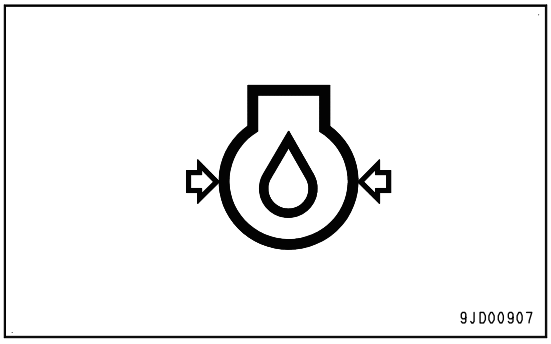
This lamp warns the operator that the engine system has a trouble.

- When action level "L04" is displayed
  The lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds continuously.
  Stop the machine immediately and ask your Komatsu distributor for inspection and maintenance.
- When action level "L03" is displayed
  The lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
  Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.
- When action level "L01" is displayed
  The lamp lights up in yellow.
  When you finish the operation, always carry out the inspection and maintenance.
  Ask your Komatsu distributor for inspection and maintenance as needed.



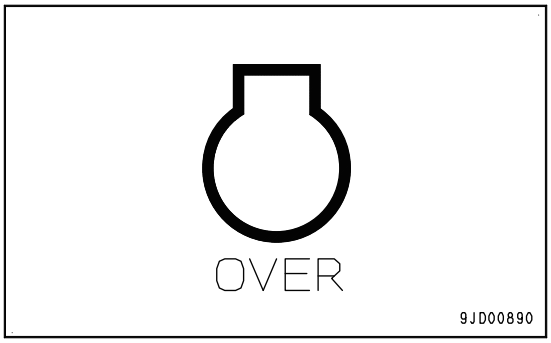
ENGINE OIL PRESSURE CAUTION LAMP *(WA-ABL0-043-K-00-A)*

This lamp warns the operator that the engine lubricating oil pressure is low.
If the engine oil pressure drops below the specified value while the engine is running, the lamp lights up in red and action level "L03" appears. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.



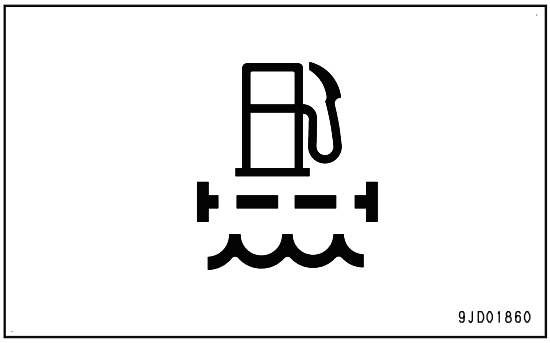
ENGINE OVERRUN CAUTION LAMP *(WA-APE7-043-K-00-A)*

This lamp warns the operator that the engine speed is higher than the allowable range.
When the lamp lights up in red, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.
If the engine speed increases more, action level "L02" is displayed.
Operate the machine with moderate engine speed and travel speed.



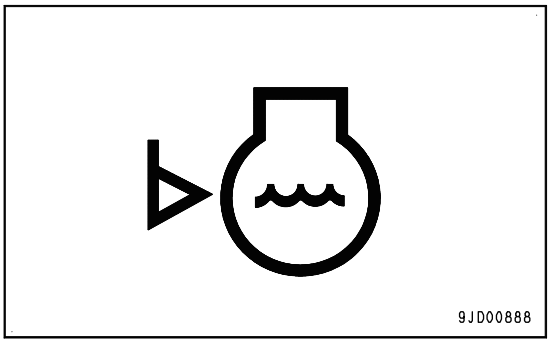
WATER SEPARATOR CAUTION LAMP *(WA270-AEBA-043-K-00-A)*

This lamp warns the operator that water separator installed to fuel prefilter is filled with water.
If the lamp lights up in red, carry out inspection and maintenance according to "REPLACE FUEL PREFILTER CARTRIDGE (PAGE 4-57) ".



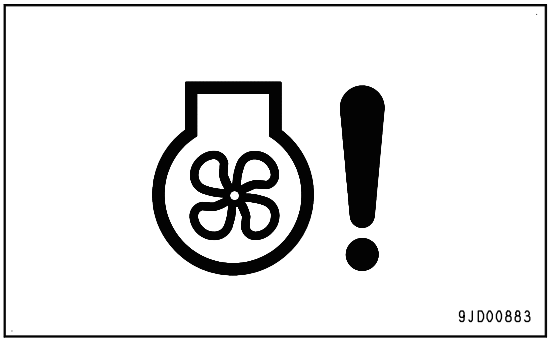
RADIATOR COOLANT LEVEL CAUTION LAMP *(WA270-B255-043-K-00-A)*

This lamp warns the operator that the radiator coolant level is low.
If the lamp lights up in yellow and action level "L01" is displayed, inspect the coolant level in the sub-tank and add coolant.
For the method of checking coolant level and refilling it, see "CHECK COOLANT LEVEL, ADD COOLANT (PAGE 3-146) ".
If the coolant level drops again in a short time, the coolant may be leaking from the radiator. Ask your Komatsu distributor for inspection and maintenance.



FAN CONTROL SYSTEM CAUTION LAMP *(WA320-B7B2-043-K-00-A)*

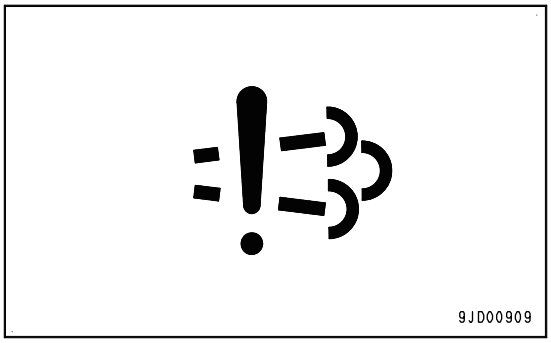
This lamp warns the operator that the fan control system has a trouble.
If the lamp lights up in yellow and action level "L01" is displayed, always carry out inspection and maintenance after the operation is finished.
Ask your Komatsu distributor for inspection and maintenance as needed.



KDPF SYSTEM CAUTION LAMP *(WA270-A9HD-043-K-00-A)*

This lamp warns the operator that the KDPF system has a trouble.

- When action level "L04" is displayed
  The lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds continuously.
  Stop the machine immediately and ask your Komatsu distributor for inspection and maintenance.
- When action level "L03" is displayed
  The lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
  Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.
- When action level "L01" is displayed
  The lamp lights up in yellow.
  When you finish the operation, always carry out the inspection and maintenance.
  Ask your Komatsu distributor for inspection and maintenance as needed.



REMARK

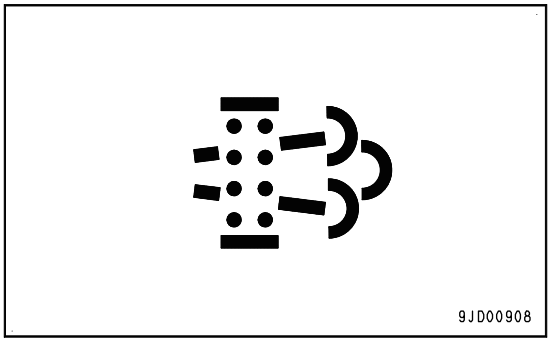
If the caution lamp is ignored and the operation is continued, there is a danger that the temperature around KDPF becomes abnormally high.

For details of KDPF, see "HANDLING Komatsu Diesel Particulate Filter (KDPF) (PAGE 3-131) ".

KDPF SOOT ACCUMULATION CAUTION LAMP *(WA270-A9HE-043-K-00-A)*

This lamp warns the operator that soot is accumulated in KDPF or the filtering function of KDPF has lowered abnormally.

- When action level "L03" is displayed
  The lamp lights up in red if much soot is accumulated in KDPF or a system trouble such as lowering of the filtering function of KDPF occurs. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
  Stop the operation, move the machine to a safe place, and carry out the manual stationary regeneration.
  The manual stationary regeneration may start automatically to protect the KDPF system.
- When action level "L01" is displayed
  The lamp lights up in yellow if much soot is accumulated in KDPF.
  After the operation is finished, move the machine to a safe place and carry out manual stationary regeneration.



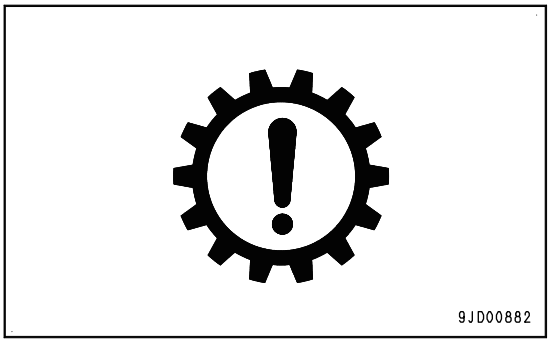
REMARK

For details of the manual stationary regeneration, see "HANDLING Komatsu Diesel Particulate Filter (KDPF) (PAGE 3-131) ".

HST SYSTEM CAUTION LAMP *(WA320-C7E1-043-K-00-A)*

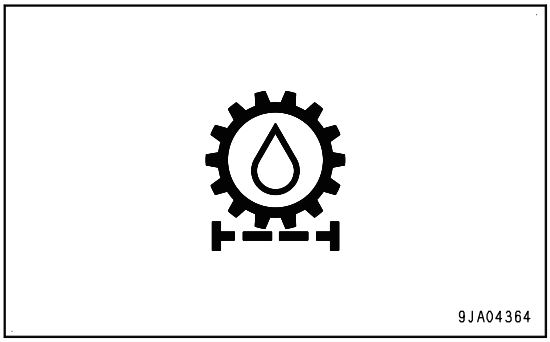
This lamp warns the operator that the HST system has a trouble.

- When action level "L03" is displayed
  The lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently. Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.
- When action level "L01" is displayed
  The lamp lights up in yellow.
  When you finish the operation, always carry out the inspection and maintenance.
  Ask your Komatsu distributor for inspection and maintenance as needed.



HST OIL FILTER CLOGGING CAUTION LAMP *(WA320-C744-043-K-00-A)*

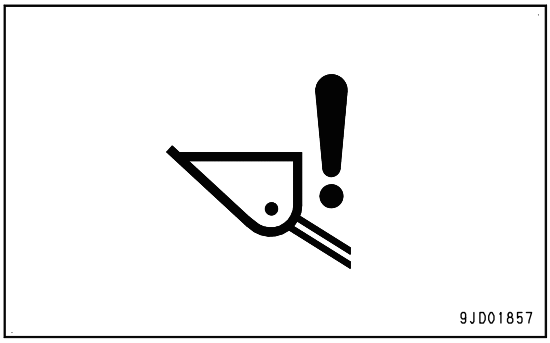
This lamp warns the operator about clogging of HST oil filter while engine is running.
If the lamp lights up in yellow and action level "L01" is displayed, see "REPLACE HST OIL FILTER CARTRIDGE (PAGE 4-64) ", and replace oil filter.



WORK EQUIPMENT SYSTEM CAUTION LAMP *(WA-RA1J-043-K-00-A)*

This lamp warns the operator that the work equipment system has a trouble.

- When action level "L03" is displayed
  The lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently. Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.
- When action level "L01" is displayed
  The lamp lights up in yellow.
  When you finish the operation, always carry out the inspection and maintenance.
  Ask your Komatsu distributor for inspection and maintenance as needed.

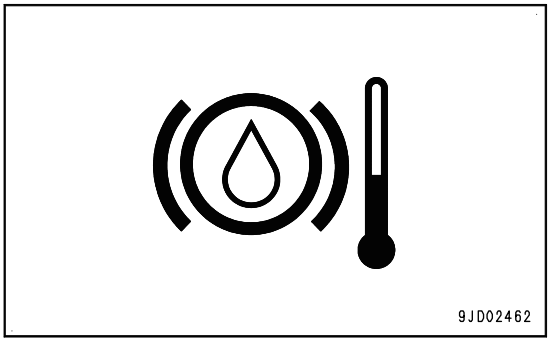


BRAKE OIL TEMPERATURE CAUTION LAMP *(WA320-G4K2-043-K-00-A)*

This lamp warns the operator that the brake oil is overheated.
If the machine is operated continuously under severe condition or the brake is used frequently during a long downhill travel, the brake oil temperature increases.
If the lamp lights up in yellow, carry out the following remedies.

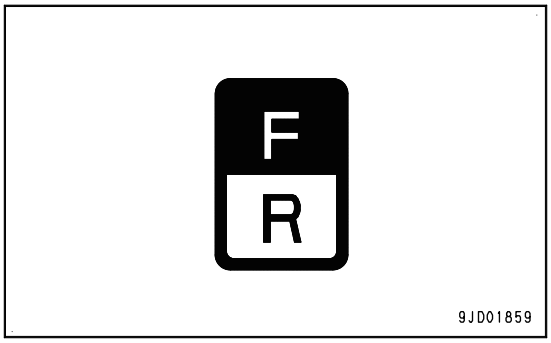
1. Release the accelerator pedal, and reduce the travel speed.
2. Avoid frequent use of the brake.
   - Do not depress the brake pedal continuously but depress it intermittently.

When the machine is operated with the brake used less frequently as described above for a while, the brake oil temperature decreases and the caution lamp goes out.



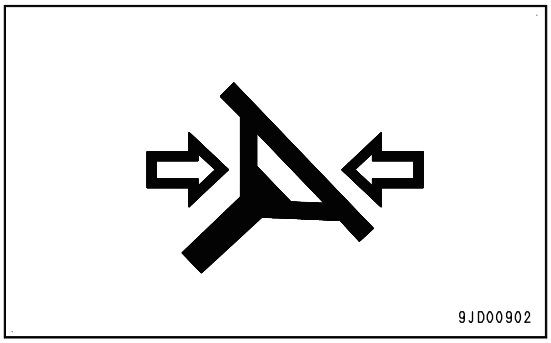
DIRECTIONAL SWITCH CAUTION LAMP *(WA320-CX84-043-K-00-A)*

This lamp warns the operator that there is wrong operation of the directional switch or directional lever.
If the lamp lights up in red, return the directional switch and directional lever to the N (NEUTRAL) position.



STEERING OIL PRESSURE CAUTION LAMP *(WA320-F7C4-043-K-00-A)*

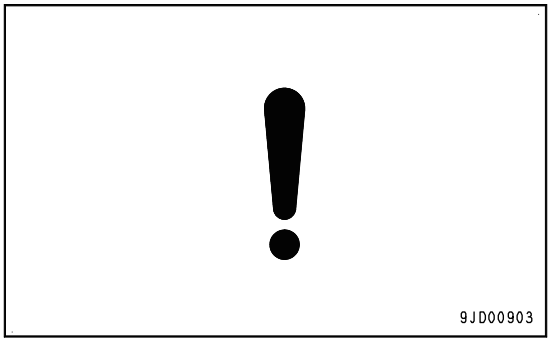
This lamp warns the operator that the steering oil pressure is below the specified value.
If the steering oil pressure drops below the specified value while the engine is running, the lamp lights up in red and action level "L03" appears. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.



SYSTEM CAUTION LAMP *(WA-Q1FD-043-K-00-A)*

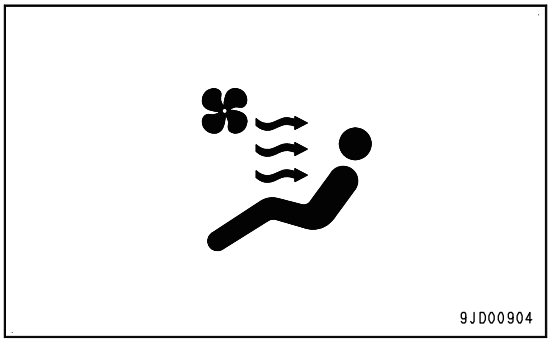
This lamp warns the operator that the system has a trouble.

- When action level "L03" is displayed
  The lamp lights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
  Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.
- When action level "L01" is displayed
  The lamp lights up in yellow.
  When you finish the operation, always carry out the inspection and maintenance.
  Ask your Komatsu distributor for inspection and maintenance as needed.

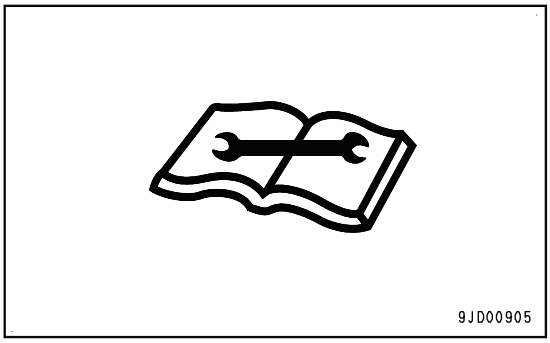


AIR CONDITIONER SYSTEM CAUTION LAMP *(WA-K5V3-043-K-00-A)*

This lamp warns the operator that the air conditioner system has a trouble.
If the lamp lights up in yellow and action level "L01" is displayed, always carry out inspection and maintenance after the operation is finished.
Ask your Komatsu distributor for inspection and maintenance as needed.



MAINTENANCE TIME CAUTION LAMP *(WA320-Q1D3-043-K-00-A)*



This lamp displays notices and alarms concerning maintenance time.
This monitor lights up when the starting switch is turned to ON position. It goes out after 30 seconds and the display changes to the standard screen.

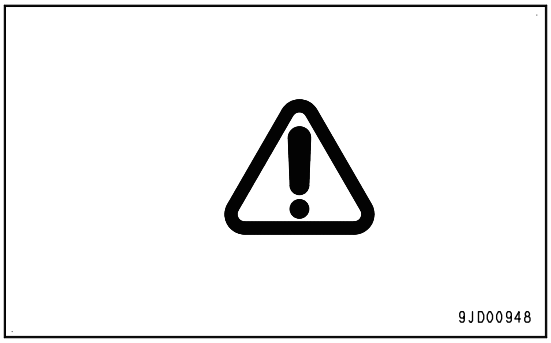
- When lamp lights up in red
  The maintenance time has already passed.
  If no action is taken, the machine performance will become worse and the machine life will be shortened. Carry out necessary maintenance as soon as possible.
- When lamp lights up in yellow
  The maintenance time is approaching.
  Prepare necessary parts for the maintenance.

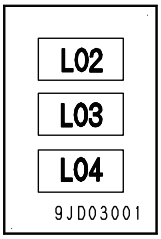
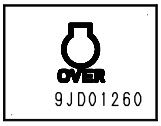
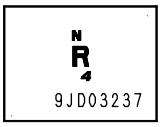
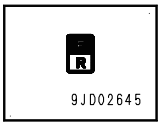
REMARK

- To check the items that need maintenance, see the maintenance menu screen.
- On the standard screen, when the menu switch is pressed while the lamp is lit, the screen changes directly to the maintenance menu screen.
- For operations on the maintenance menu screen, see "MAINTENANCE (PAGE 3-61) ".
- By default, the maintenance time caution lamp (yellow) is set to light up when the remaining time reaches 30 hours. However, you can change this setting. To change the initial setting, ask your Komatsu distributor for change.

CENTRALIZED WARNING LAMP *(WA320-Q1G4-043-K-00-A)*

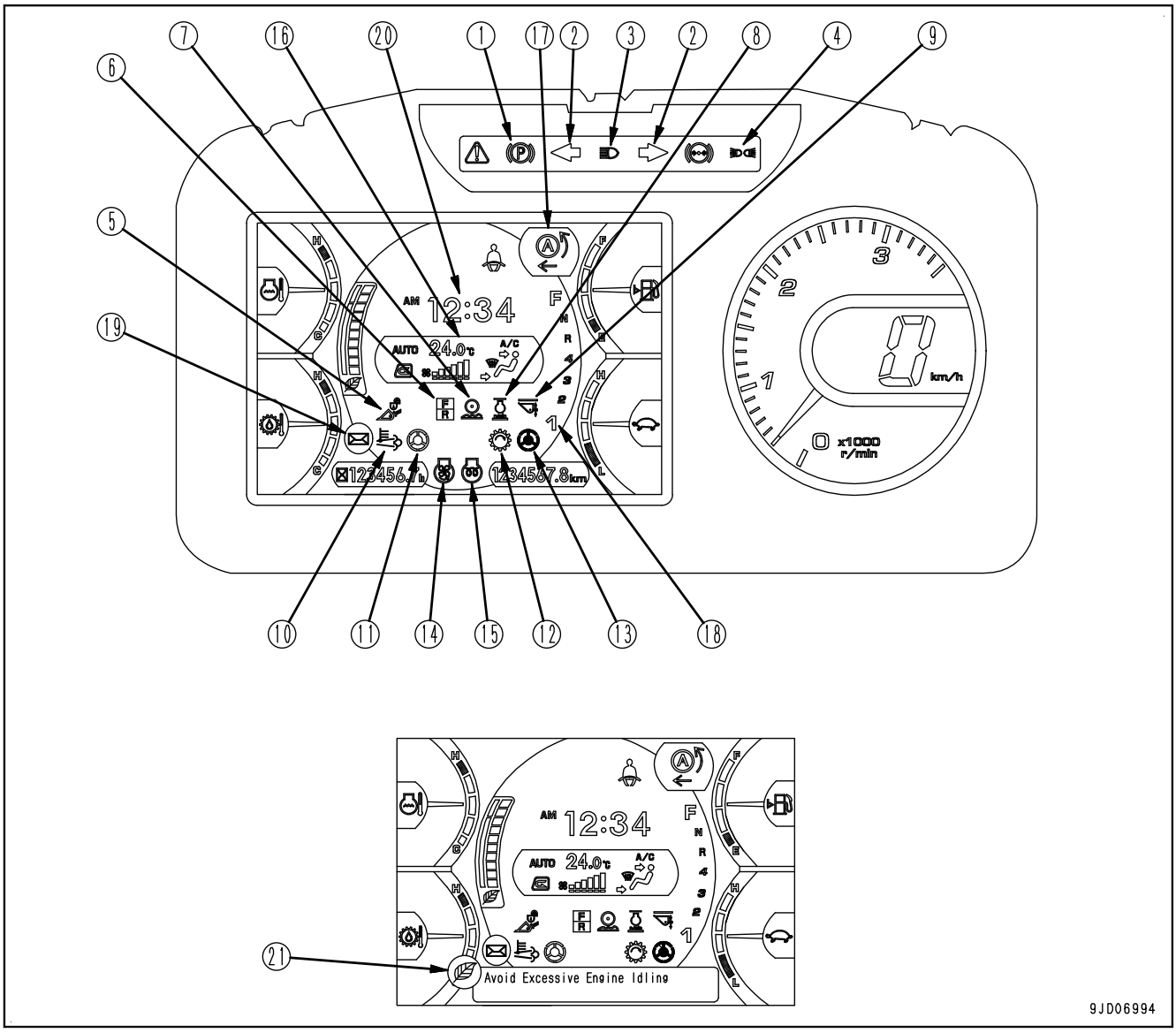
This lamp (10) lights up in red, and at the same time the alarm buzzer sounds intermittently when the machine is in any of the following conditions.



Machine conditions under which centralized warning lamp lights up	Other monitor displays	
When action level "L02", "L03", or "L04" is displayed on the machine monitor.		
When the engine overrun caution lamp lights up.		
When the brake oil pressure is below the specified value while the engine is running.		The brake oil pressure caution lamp lights up.
When starting switch is turned to ON position while directional lever and directional selector switch are at position other than N (neutral). When signals from directional lever and directional selector switch become all OFF.		The current speed range flashes.
When directional lever and directional selector switch are not at N (neutral) position while parking brake is applied.	-	
When operating speed range selector switch to 1st or 2nd during traveling at 3rd or 4th speed range.	-	
When performing directional change operation during traveling at high speed with 3rd or 4th speed range.	-	
When the directional lever is not in N (neutral) position while the directional selector switch is effective.		The directional switch caution lamp lights up in red.
When the overrun prevention control is actuated while the travel speed exceeds the limit value.	-	

PILOT DISPLAY *(WA320-Q15A-043-K-00-A)*

The pilot display consists of the pilot lamps to check the actuation of each function.
While the starting switch is in ON position, the pilot lamp lights up when the display items are functioning.

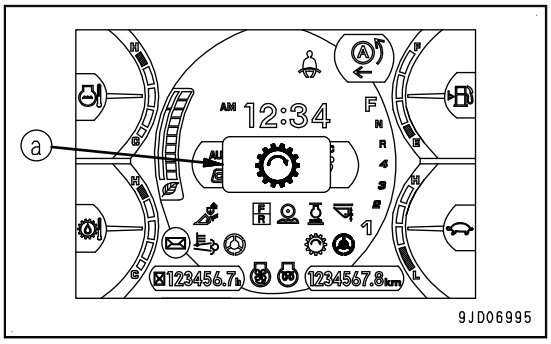


(1) Parking brake pilot lamp
(2) Turn signal lamp pilot lamp
(3) Headlamp (high beam) pilot lamp
(4) Clearance lamp pilot lamp
(5) Quick coupler lock release pilot lamp (if equipped)
(6) Directional selector pilot lamp
(7) ECSS (Electronically Controlled Suspension System) pilot lamp
(8) 2-stage low idle pilot lamp (if equipped)
(9) Work equipment lock pilot lamp
(9) Remote positioner pilot lamp
(10) KDPF regeneration pilot lamp
(11) Emergency steering pilot lamp (if equipped)
(12) Emergency HST pump drive switch pilot lamp
(13) Steering oil pressure low pilot lamp (if equipped)
(14) Fan reverse pilot lamp
(15) Engine preheating pilot lamp
(16) Air conditioner display
(17) Traction level
(18) Shift lever position pilot lamp
(19) Message pilot lamp
(20) Clock
(21) ECO guidance

* At section (9), 2 types of pilot lamp are prepared.

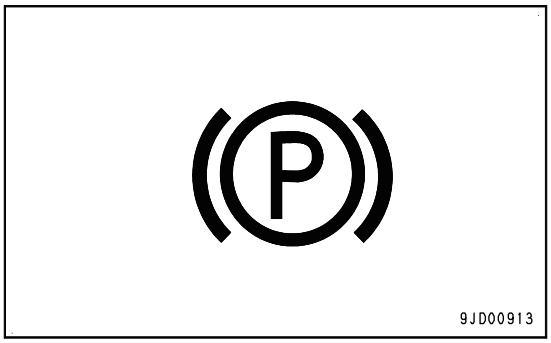
Pop-up display

For some pilot lamps, pop-up display (a) appears on the screen when they are selected.
See the following details of the pilot lamps.



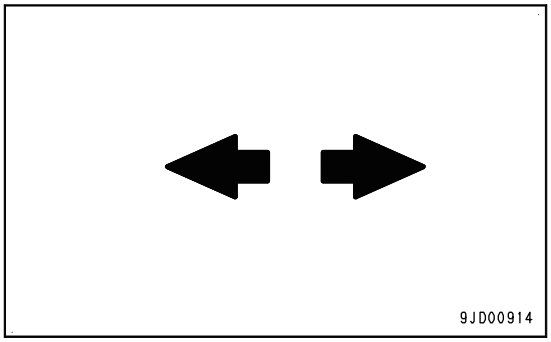
PARKING BRAKE PILOT LAMP *(WA-GP31-043-K-00-A)*

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



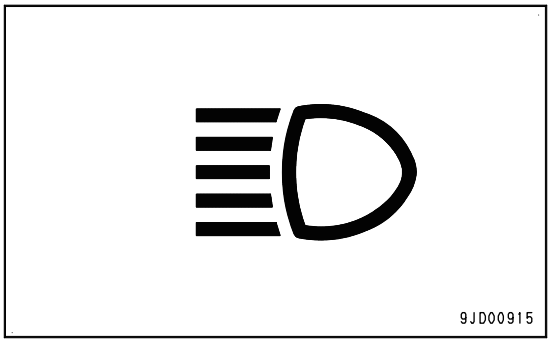
TURN SIGNAL LAMP PILOT LAMP *(WA-Q6DM-043-K-00-A)*

This lamp (2) flashes synchronously with the turn signal lamp, when it is turned on.



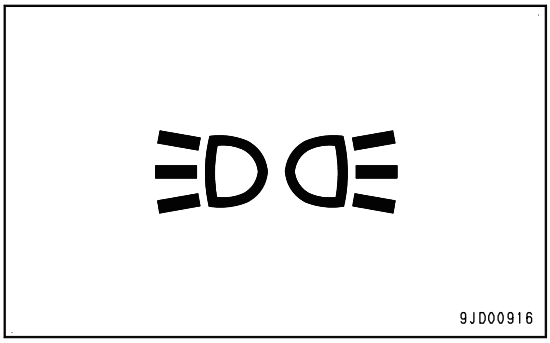
HEAD LAMP (HIGH BEAM) PILOT LAMP *(WA-Q646-043-K-00-A)*

This lamp (3) lights up when the headlamp (high beam) is turned on.



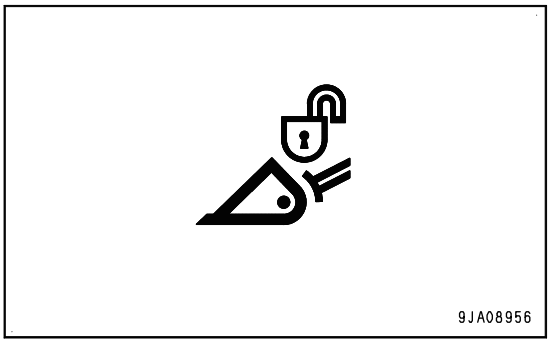
CLEARANCE LAMP PILOT LAMP *(WA-Q647-043-K-00-A)*

This lamp (4) lights up when the clearance lamps are turned on.



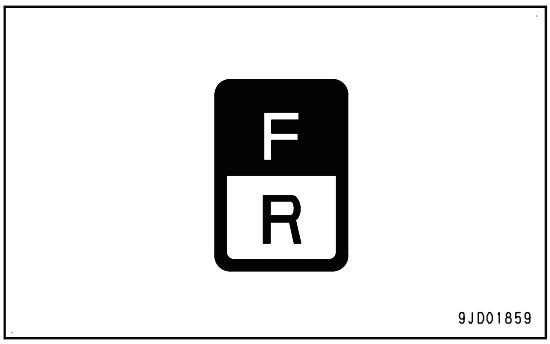
QUICK COUPLER LOCK RELEASE PILOT LAMP *(WA320-LGCB-043-K-00-A)*

(if equipped)
This lamp (5) lights up when the quick coupler attachment switch is in the position of decoupling.
In order to decouple the quick coupler, operate the multi-function mono lever to tilt side while the quick coupler attachment switch is in the position of decoupling
If this lamp is lit in other time than the decoupling operation of quick coupler, there is a trouble in quick coupler solenoid actuating circuit. Move the machine immediately to a safe place, stop the engine, then perform inspection.
For detail, see "HANDLING HYDRAULIC TYPE QUICK COUPLER (PAGE 3-187) ".



DIRECTIONAL SELECTOR PILOT LAMP *(WA320-C7N5-043-K-00-A)*

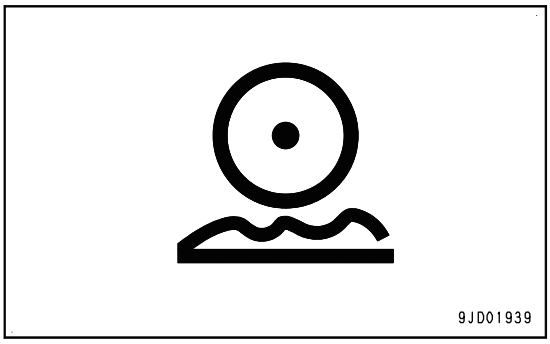
This lamp (6) lights up in green when the directional switch is effective.
It lights up in yellow when the directional switch is operated wrongly.
This pilot lamp pops up when the directional selector switch actuation switch is turned on.



ECSS (Electronically Controlled Suspension System) PILOT LAMP *(WA320-L3C4-043-K-00-A)*

This lamp (8) lights up when ECSS is effective.
When ECSS switch is turned ON, the display pops up.
For detail, see "ECSS SWITCH (PAGE 3-80) ".

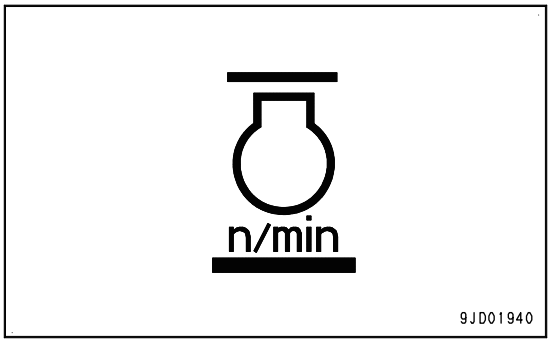
REMARK
ECSS : Electrically Controlled Suspension System



2-STAGE LOW IDLE PILOT LAMP *(WA320-AF73-043-K-00-A)*

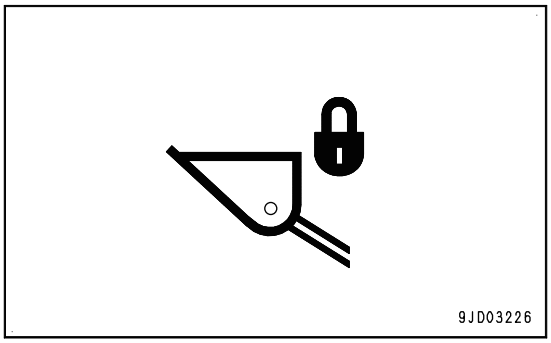
(if equipped)
This lamp (8) lights up when the 2-stage low idle is effective.

REMARK
2-stage low idle
When the HST oil temperature is below 25°C (77°F), the warm-up operation (engine speed: 1,000 rpm) is carried out automatically and stopped when the HST oil temperature increases to 30°C (86° F) or above. (Engine speed: 825 rpm)
2-stage low idle can be selected as an option, contact your Komatsu distributor if necessary.



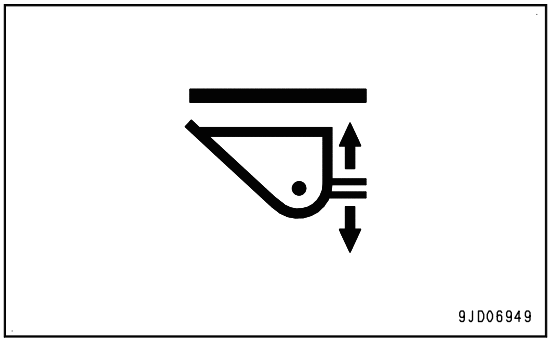
WORK EQUIPMENT LOCK PILOT LAMP *(WA320-PK22-043-K-00-A)*

This lamp (9) lights up when the work equipment is locked.
This lamp pops up on the screen when the work equipment is switched from the unlock mode to the lock mode.
For detail, see "WORK EQUIPMENT LOCK SWITCH (PAGE 3-86) ".



REMOTE POSITIONER PILOT LAMP *(WA320-L223-043-K-00-A)*

This lamp (9) lights up in green when the remote positioner is effective.
When the remote positioner function is changed from OFF to ON, the display pops up.
The remote positioner does not operate when the boom detent function is OFF.
For detail, see "BOOM RAISE DETENT SETTING (PAGE 3-57) ".
For details of the remote positioner, see "REMOTE BOOM POSITIONER OPERATION (PAGE 3-200) ".

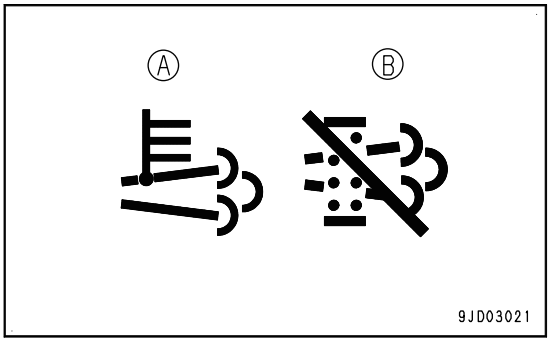


KDPF REGENERATION PILOT LAMP *(WA270-A9HF-043-K-00-A)*

⚠ CAUTION

- **Exhaust gas temperature may increase higher than the current models during KDPF regeneration. Avoid getting near the exhaust pipe outlet to prevent being burnt. Also, keep flammables away from the exhaust pipe outlet to prevent a fire.**
- **When there are thatched houses, dry leaves or pieces of paper near the work site, set the system to regeneration disable to prevent fire hazards due to highly heated exhaust gas while regeneration of KDPF. For details of the setting method, see "HANDLING Komatsu Diesel Particulate Filter (KDPF) (PAGE 3-131) ".**

This lamp (10) indicates the regeneration state of KDPF.
(A): Lights up while KDPF is being regenerated. It goes out when the regeneration is completed.
(B): Lights up when KDPF is set to regeneration disable.

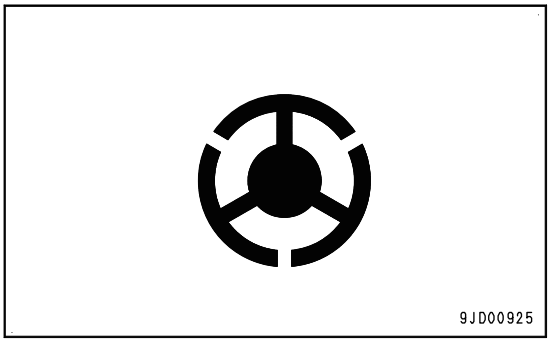


REMARK

- The lighting frequency is higher when the ambient temperature is lower or working load is lower.
- Even if KDPF is set to regeneration disable, when the manual stationary regeneration is necessary, soot accumulation caution lamp of KDPF lights up. If it lights up, cancel regeneration disable setting and carry out manual stationary regeneration. For the procedures of cancellation of regeneration disable setting, and setting of manual stationary regeneration, see "HANDLING Komatsu Diesel Particulate Filter (KDPF) (PAGE 3-131) " .

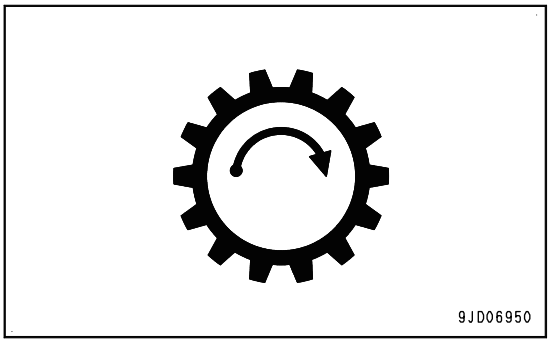
EMERGENCY STEERING PILOT LAMP *(WA320-F9S9-043-K-00-A)*

(if equipped)
When this lamp (11) is lit in green while engine is running or machine is operating, machine is normal state.
If it does not light up, there is an abnormality in emergency steering circuit. Move the machine to a safe place, stop the engine, then perform the inspection and maintenance.



EMERGENCY HST PUMP DRIVE SWITCH PILOT LAMP *(WA320-C7H8-043-K-00-A)*

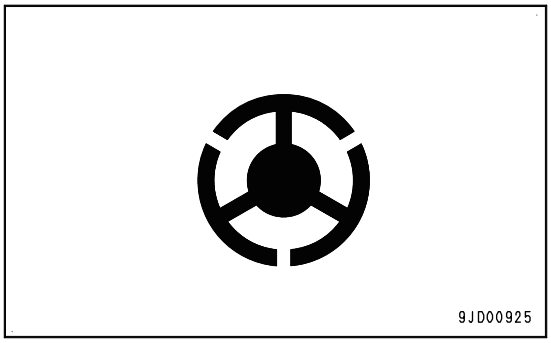
This lamp (12) lights up when the emergency HST pump drive switch is ON, and at the same time the alarm buzzer sounds intermittently.
For the emergency HST pump drive switch, see "EMERGENCY HST PUMP DRIVE SWITCH (PAGE 3-84) ".



STEERING OIL PRESSURE LOW PILOT LAMP *(WA320-C7H9-043-K-00-A)*

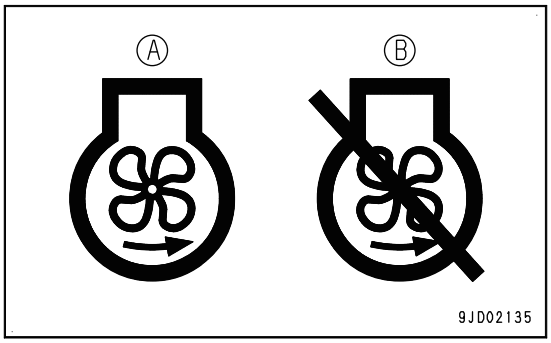
(if equipped)
This lamp (13) lights up in red when the steering pressure is low.

REMARK
While engine is stopped, steering pressure is low and steering low pressure pilot lamp (13) lights up, but this does not indicate any abnormality.



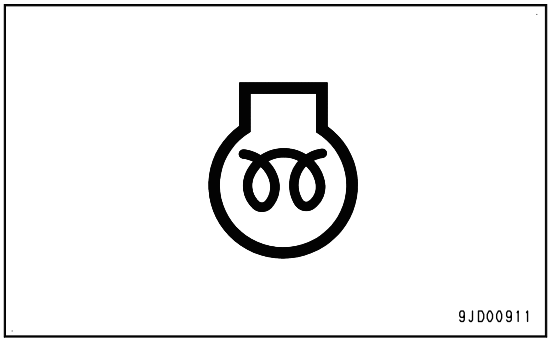
FAN REVERSE PILOT LAMP *(WA320-B736-043-K-00-A)*

When the radiator fan is set in manual or auto reverse rotation mode, if the fan starts to rotate in reverse, this lamp (14) lights up as reverse rotation pilot lamp (A).
This lamp flashes while the rotation direction is being changed.
If the condition for changing the fan rotation direction is not satisfied, changing condition satisfaction waiting pilot lamp (B) lights up.
For details of the method of setting the fan reverse mode, see "MANUAL FAN REVERSE MODE (PAGE 3-53) " or "AUTOMATIC FAN REVERSE MODE (PAGE 3-55) ".



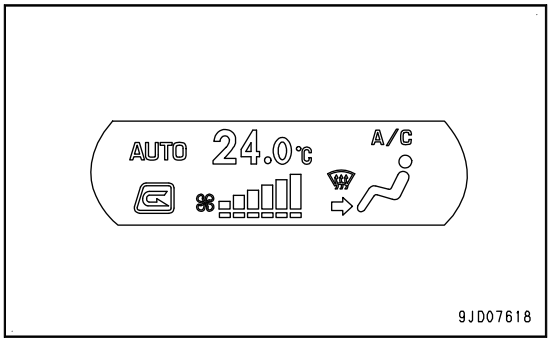
ENGINE PREHEATING PILOT LAMP *(WA320-AM4A-043-K-00-A)*

This lamp (15) lights up when the automatic preheating function of the engine is actuated, and goes out when preheating is completed.
This lamp also lights up during manual preheating. The electrical heater for engine preheating is activated while this lamp is lit.
For details of engine preheating, see "STARTING ENGINE (PAGE 3-166) ".



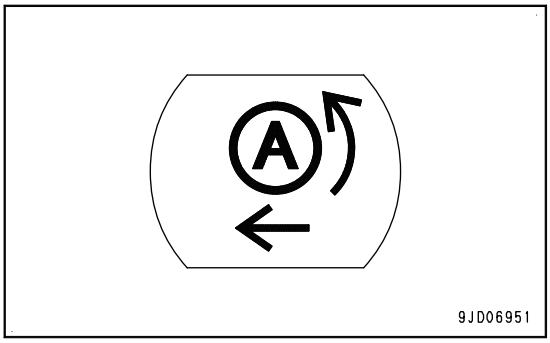
AIR CONDITIONER DISPLAY *(WA320-K5V3-043-K-01-A)*

This monitor (16) displays the working state of the air conditioner.
For detail, see "HANDLING AUTO AIR CONDITIONER (PAGE 3-118) ".



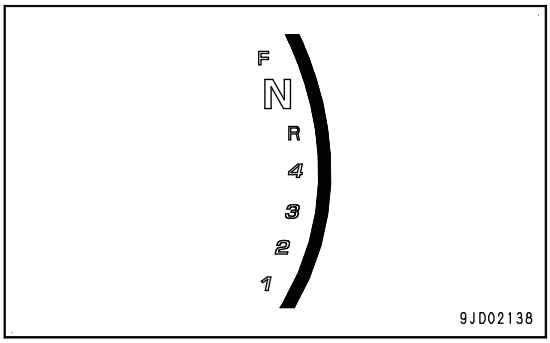
TRACTION LEVEL *(WA320-C7K6-043-K-00-A)*

This indicator (17) shows the setting of traction control.
For detail, see "TRACTION LEVEL SELECTION (PAGE 3-56) ","TRACTION CONTROL SWITCH (PAGE 3-87) ".



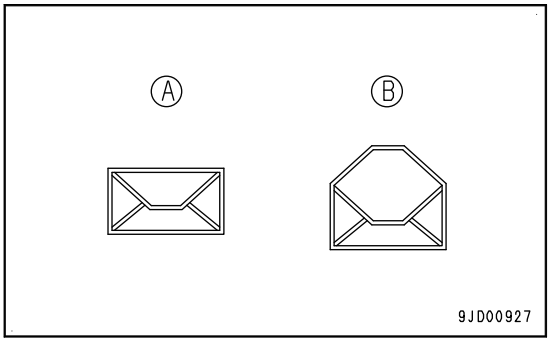
SHIFT LEVER POSITION PILOT LAMP *(WA320-CZ34-043-K-00-A)*

This lamp (18) indicates position of directional lever and speed range selector switch.
Enlarged letters of selected position of directional lever and speed range selector switch are displayed.



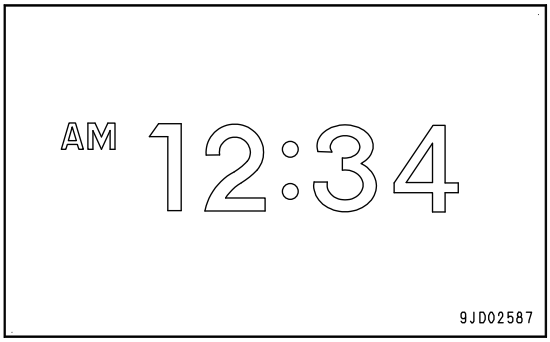
MESSAGE PILOT LAMP *(WA320-Q235-043-K-00-A)*

This lamp (19) lights up when Komatsu send out any information.
(A): There is unread information.
(B): There is any read information to which no reply is made.
To read the information, see "MESSAGE DISPLAY (PAGE 3-73) ".



CLOCK *(WA320-Q1MA-043-K-00-A)*

This monitor (20) displays the current time.
For detail, see "CLOCK ADJUSTMENT (PAGE 3-68) ".



ECO GUIDANCE *(WA320-Q1L3-043-K-00-A)*

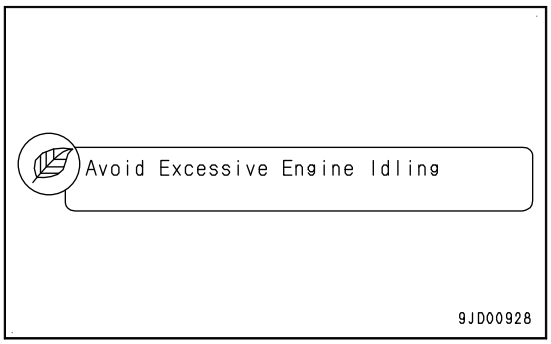
This guidance (21) is displayed during the operation that lowers the fuel efficiency, and support energy saving operation for reducing the fuel consumption.
The details of the guidance are as follows:

EXCESSIVE IDLING GUIDANCE *(WA270-Q1L3-043-K-00-A)*

If the engine continues running idle for more than 5 minutes, the excessive idling message is displayed on the monitor.
When waiting for work or taking short break, stop the engine to reduce unnecessary fuel consumption.

- When the accelerator pedal is depressed or the machine starts traveling or the work equipment is operated, the excessive engine idling message goes out.

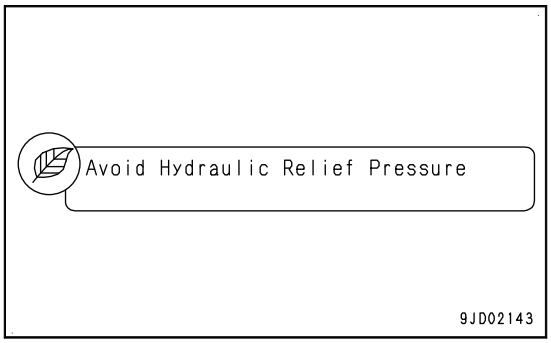
For the auto idle stop system, see "AUTO IDLE STOP TIMER SETTING (PAGE 3-59) ".



GUIDANCE TO AVOID HYDRAULIC RELIEF *(WA-Q1L3-043-K-02-A)*

If the hydraulic equipment is relieved for more than 8 seconds during operation, the notification of hydraulic relief limit is displayed on the monitor.
The hydraulic equipment is relieved when an attempt is made to lengthen each cylinder further over the maximum (for example, to move bucket control lever to TILT while the bucket is fully tilted) or reduce it further over the minimum.
Stop unnecessary relief.

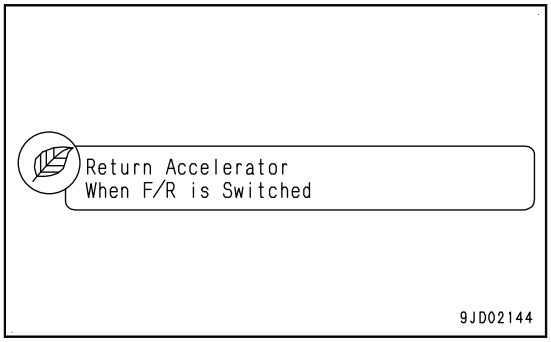
- The notification of hydraulic relief limit goes out automatically after 10 seconds.



GUIDANCE OF ACCELERATOR PEDAL DEPRESSING LIMIT *(WA320-Q1L3-043-K-04-A)*

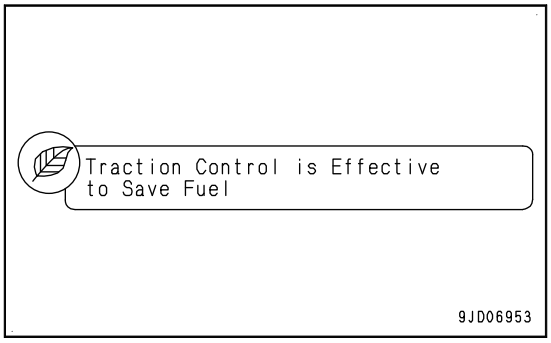
If the accelerator pedal is depressed too much during operation, the notification of accelerator pedal depressing deterrence is displayed on the monitor.
Restrict the accelerator operation in order to reduce the fuel consumption.

- The notification of accelerator pedal depressing deterrence goes out automatically after 10 seconds.



TRACTION CONTROL RECOMMENDATION GUIDANCE *(WA270-C7K8-043-K-00-A)*

When "Traction Control Is Effective to Save Fuel" is displayed on monitor, using traction control is recommended to restrain fuel consumption.
For how to use traction control, see "TRACTION CONTROL SWITCH (PAGE 3-87) ".

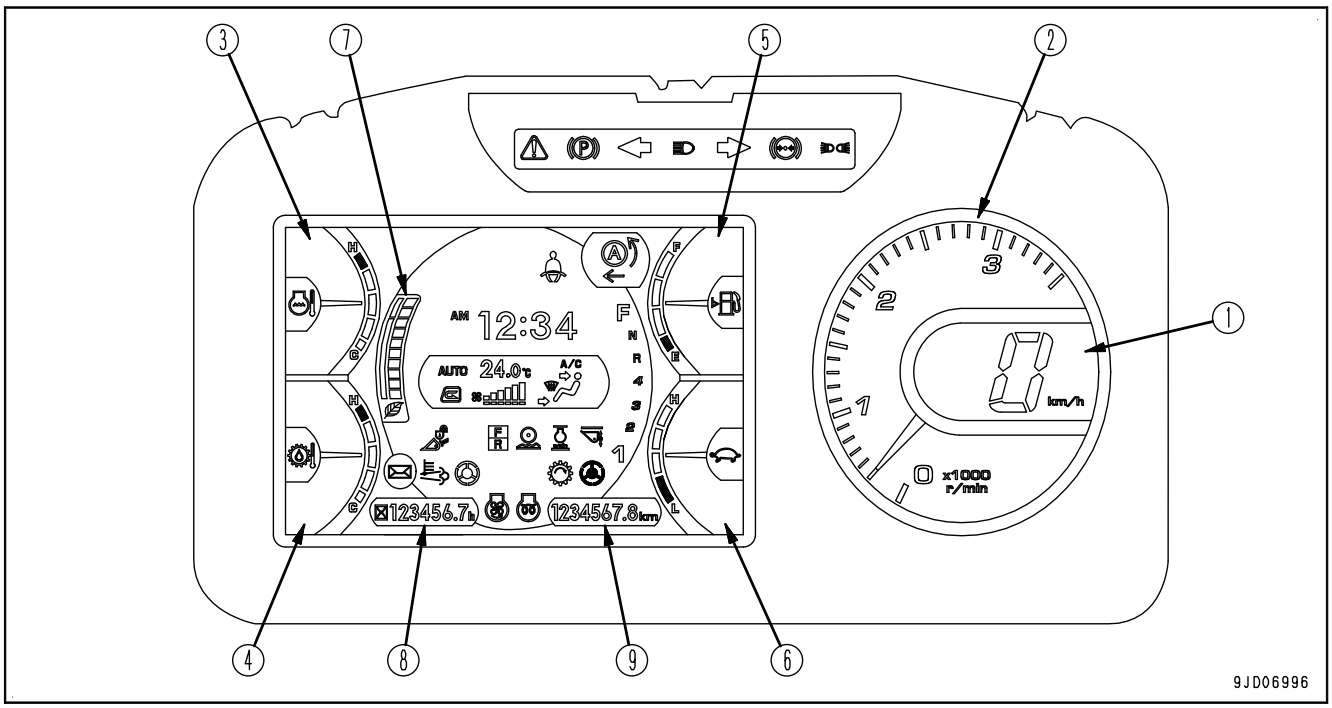


REMARK

Display/Non-display of ECO guidance can be switched.

For the method of switching the display, see "SWITCHING DISPLAY/NON-DISPLAY OF ECO GUIDANCE (PAGE 3-51) ".

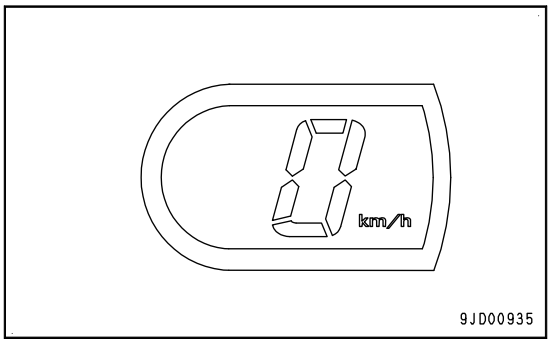
METER DISPLAY *(WA320-Q1LB-04D-K-00-A)*



(1) Speedometer
(2) Engine tachometer
(3) Engine coolant temperature gauge
(4) HST oil temperature gauge
(5) Fuel gauge
(6) Variable speed display
(7) ECO gauge
(8) L.H. meter
(9) R.H. meter

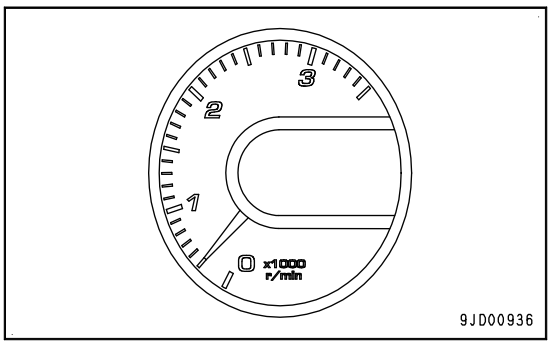
SPEEDOMETER *(WA-Q1LH-043-K-00-A)*

This meter (1) indicates the travel speed of the machine.



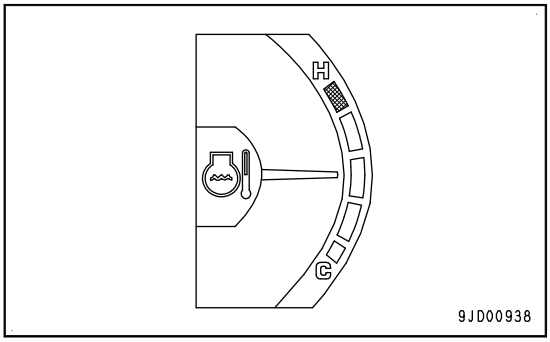
ENGINE TACHOMETER *(WA-Q1LJ-043-K-00-A)*

This meter (2) indicates the engine speed.
If the engine speed is higher than the allowable range during operation, the engine overrun caution lamplights up in red. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
Operate the machine with moderate engine speed and travel speed.



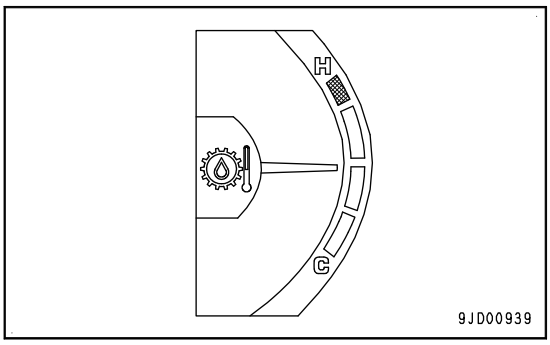
ENGINE COOLANT TEMPERATURE GAUGE *(WA320-BA80-043-K-00-A)*

This meter (3) indicates the engine coolant temperature.
When the indicator is in the white or green range during operation, engine coolant temperature is normal.
If the indicator is in the red range, the engine coolant temperature caution lamp lights up in red, and action level "L02" appears. The centralized warning lamp lights up simultaneously and alarm buzzer sounds intermittently.
The engine output is then limited automatically.
Place the machine in a safe place, set the directional lever and directional selector switch to N (neutral) position, and run the engine at a medium speed with no load until engine coolant temperature caution lamp goes out.



HST OIL TEMPERATURE GAUGE *(WA320-C7Q6-043-K-00-A)*

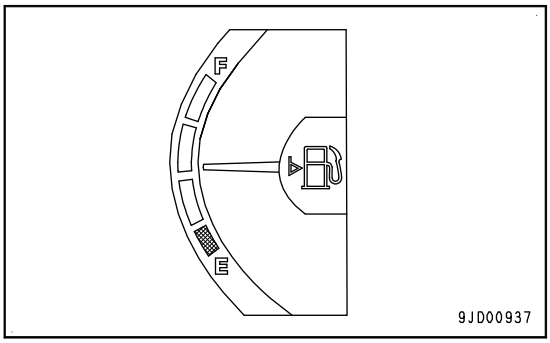
This meter (4) indicates the HST oil temperature.
When the indicator is in the green range during operation, it is normal.
If the indicator is in the red range, HST oil temperature caution lamp lights up in red, and action level "L02" is displayed. At the same time, the centralized warning lamp lights up and alarm buzzer sounds intermittently.
Place the machine in a safe place, set the directional lever and directional selector switch to N (neutral) position, and run the engine at a medium speed with no load until HST oil temperature caution lamp goes out.
When the HST oil temperature drops below 10 °C (50°F), caution lamp is displayed in white and acceleration in travel is restricted.
Perform warm-up operation and increase the HST oil temperature.
For details, see "RUNNING-IN (PAGE 3-171) ".



REMARK
Engine speed at low idle can be set higher when ambient temperature is low. For detail, see "2-STAGE LOW IDLE PILOT LAMP (PAGE 3-28) ".

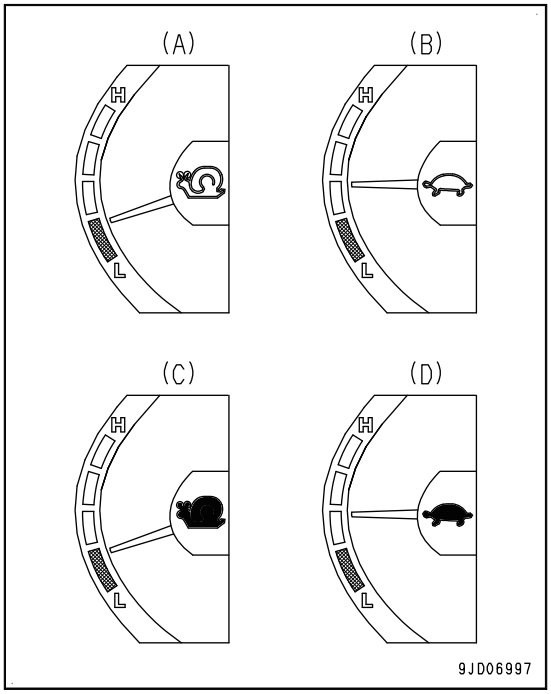
FUEL GAUGE *(WA270-AER3-043-K-00-A)*

This meter (5) indicates the amount of fuel remaining in the fuel tank.
If the indicator is in red range, the fuel level caution lamp lights up in red. The fuel level is below 33 liters (7.13 US gal) Check fuel level, and add fuel.



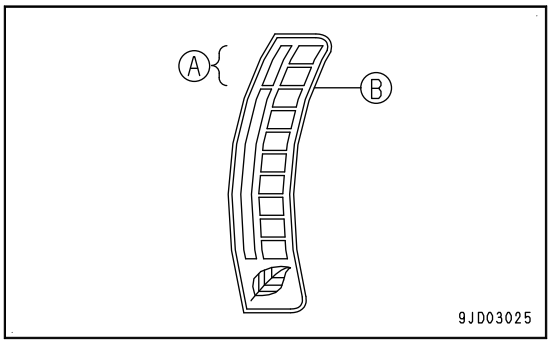
VARIABLE SPEED DISPLAY *(WA320-Q1LH-043-K-00-A)*

This meter (6) indicates the setting speed of travel speed adjusting dial.
(A): Speed range selection is 1st speed and maximum setting speed is lower than 4km/h.
(B): Speed range selection is 1st speed and maximum setting speed is 4km/h or higher.
(C) (D): This is displayed in gray and speed adjusting function is not operated when selecting 2nd to 4th of speed range.
Setting speed is for reference since it varies depending on the condition of road surface and load.
For setting of travel speed adjusting, see "TRAVEL SPEED CONTROL DIAL (PAGE 3-86) ".



ECO GAUGE *(WA270-Q1LC-043-K-00-A)*

This gauge (7) indicates the instantaneous fuel consumption (fuel consumption rate at each moment).
The instantaneous fuel consumption varies depending on the operation ways (accelerator operation, travel speed, speed range, etc.) and the work load (load weight, slope, ground condition, etc.).
As the gauge is higher, the fuel consumption is higher. Reduce the gauge to a point where there is no adverse effect on the operation, leading to energy saving operation to reduce the fuel consumption.



REMARK
Even if the gauge is in orange range (A), it is not a machine trouble.
Target fuel consumption (B) displayed by ECO gauge can be changed as necessary.
For the method of changing the target value, see "SETTING THE TARGET FUEL CONSUMPTION VALUE DISPLAYED IN ECO GAUGE (PAGE 3-50) ".

L.H. AND R.H. METER *(WA270-Q196-043-K-00-A)*

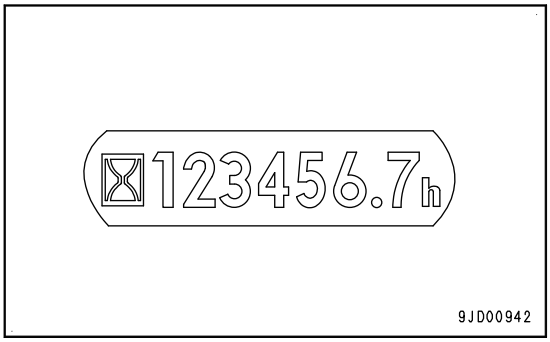
L.H. meter (8) indicates either of the following which can be selected.
- Service meter
- Odometer
- Clock

For the method of selecting the display, see "SELECT L.H. METER DISPLAY (PAGE 3-65) ".
R.H. meter (9) indicates either of the following which can be selected.
- Fuel consumption gauge
- Service meter
- Odometer
- Clock

For the method of selecting the display, see "SELECT R.H. METER DISPLAY (PAGE 3-66) ".

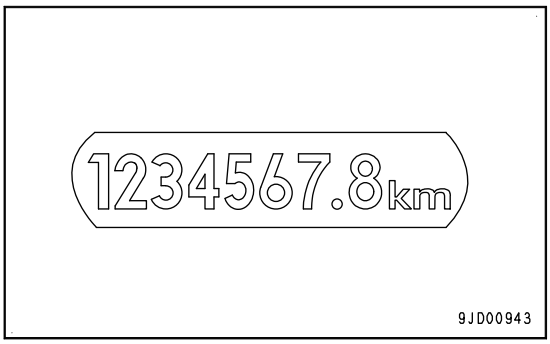
SERVICE METER DISPLAY

Indicates the integrated operating hours of the machine.
When the engine is running, the service meter advances even if the machine is not being operated.
The service meter advances by 0.1 for 6 engine running minutes and by 1 for 1 engine running hour, regardless of the engine speed.



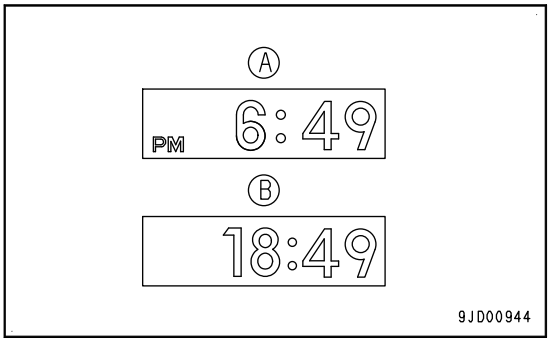
ODOMETER DISPLAY

Indicates the total distance that machine has traveled in kilometers.



CLOCK DISPLAY

Indicates the current time.
(A): 12-hour display
(B): 24-hour display



REMARK

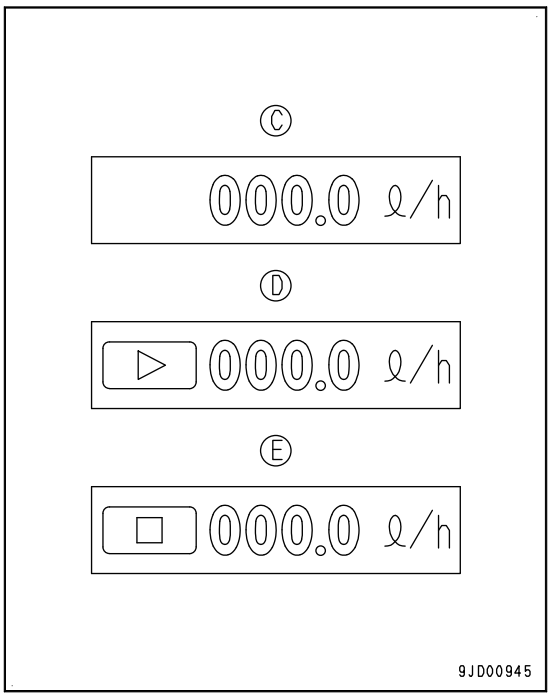
If the battery is disconnected for a long period for storage etc., the time information may be lost.
For the method of setting and correcting the time and changing the display of the clock, see "CLOCK ADJUSTMENT (PAGE 3-68) ".

FUEL CONSUMPTION GAUGE DISPLAY

Indicates the average fuel consumption of the machine.
(C): Displays the average fuel consumption of a day (from 0:00 a. m. of the day to 0:00 a.m. of the next day).
(D): Displays the split fuel consumption under measurement.
(E): Displays that the measurement of split consumption is stopped.

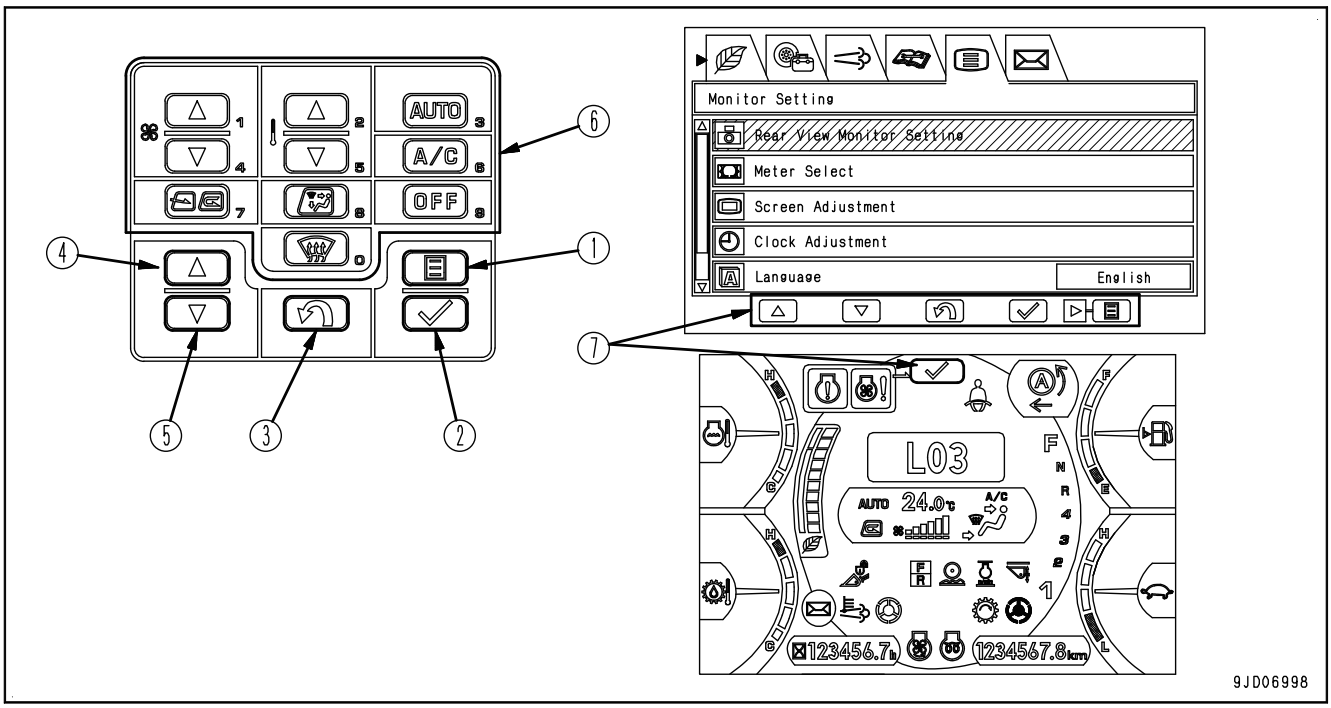
REMARK

Display on the fuel consumption gauge can be switched between the average fuel consumption per day and the average fuel consumption during an selected period (split fuel consumption).
For the method of switching the display, see "SETTING DISPLAY OF FUEL CONSUMPTION GAUGE (PAGE 3-48) ".



MONITOR SWITCH PORTION *(WA320-Q1C0-04D-K-00-A)*

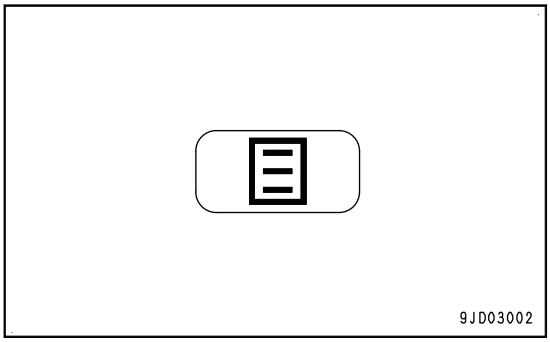
Used for the operation of the machine monitor or air conditioner.
The function of each switch varies depending on the screen of the machine monitor.



(1) Menu switch
(2) Enter switch
(3) Return switch
(4) Up switch
(5) Down switch
(6) Air conditioner switches / Numeric keypad
(7) Guidance icon

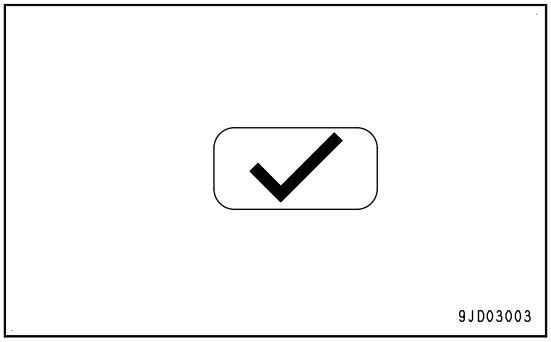
MENU SWITCH *(WA320-Q1C1-04D-K-01-A)*

When this switch (1) is pressed on the standard screen, the following user menu screen is displayed. The user menu screen is not displayed during traveling.
For details of the user menu screen, see "USER MENU (PAGE 3-42) ".
Normal: Displays the ECO guidance menu screen.
When KDPF soot accumulation caution lamp lights up: Displays the KDPF Regeneration menu screen.
When maintenance caution lights up: Displays the Maintenance menu screen.
When fan reverse pilot lamp lights up: Displays the Machine Setting/Information menu screen.
When message pilot lamp lights up: Displays the Message display menu screen.
When this switch (1) is pressed on the user menu screen, the menu screen changes.



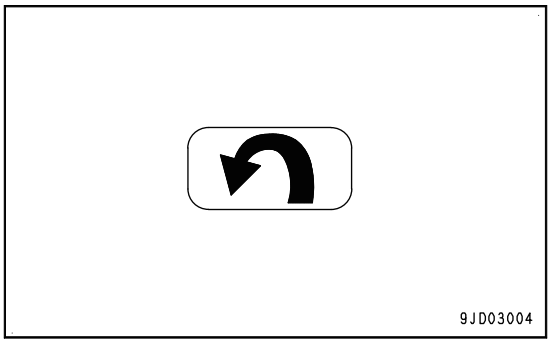
ENTER SWITCH *(WA320-Q1C1-04D-K-02-A)*

Pressing this switch (2) on the user menu screen decides any selection and changes, and proceeds to the next screen.
When this switch is pressed on the standard screen with a warning message displayed, the occurred error list screen is displayed.
For the occurred error list screen, see "OCCURRED FAILURE CODE DISPLAY (PAGE 3-14) ".



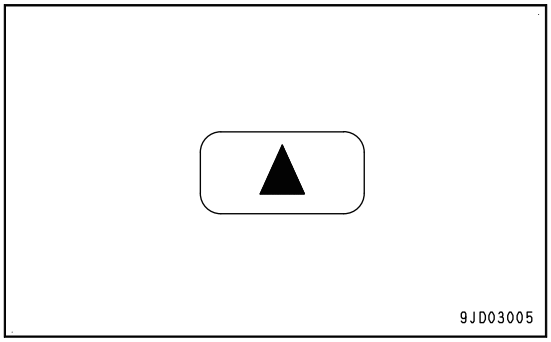
RETURN SWITCH *(WA-Q1C1-04D-K-03-A)*

Pressing this switch (3) cancels a selection or changes, and returns to the previous screen or the standard screen.



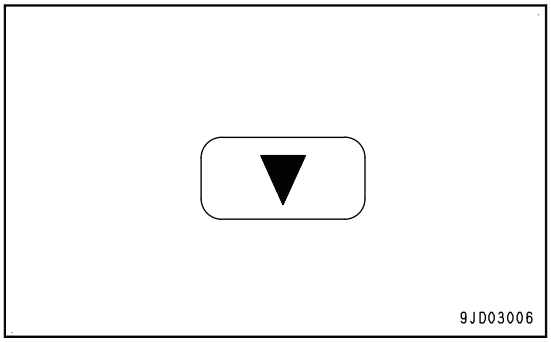
UP SWITCH *(WA-Q1C1-04D-K-04-A)*

Pressing this switch (4) moves up by one item. When on the top, it moves to the last on the previous page.
On the value input screen, the value is increased by one.



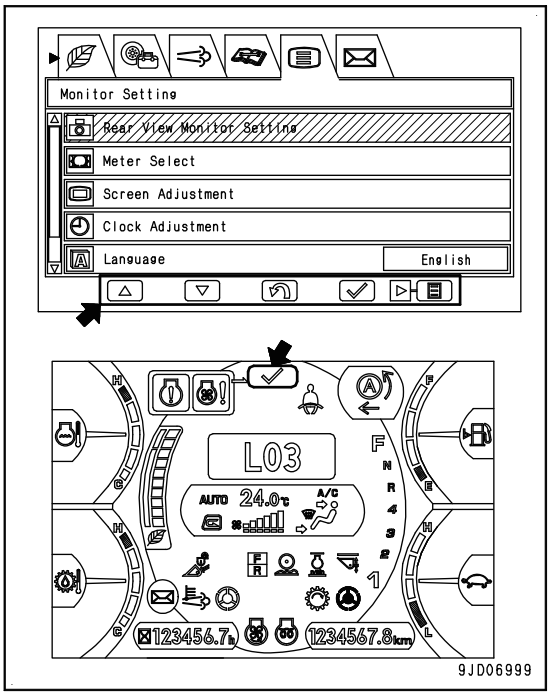
DOWN SWITCH *(WA320-Q1C1-04D-K-05-A)*

Pressing this switch (5) moves down by one item. When on the last, it moves to the top on the next page.
On the value input screen, the value is decreased by one.



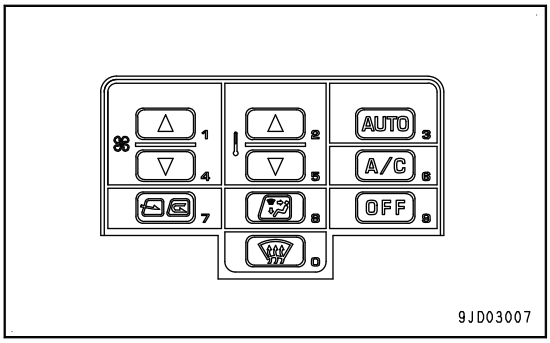
REMARK

- The switches effective on each screen can be checked with guidance icon (7).
  This function is not available when you press a switch not marked by guidance icon (7) or you press guidance icon (7) itself.



AIR CONDITIONER SWITCHES / NUMERIC KEYPAD *(WA320-K5FK-043-K-01-A)*

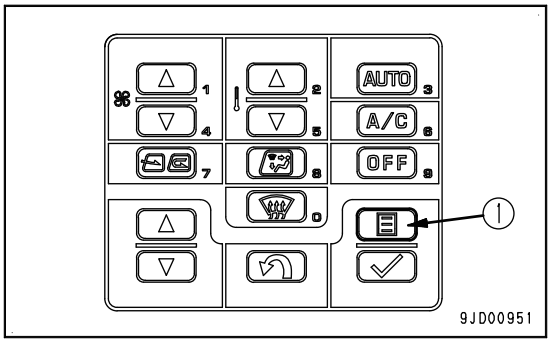
This switch (6), which is used for the operation of the air conditioner, consists of 10 switches.
For explanation of each switch, see "HANDLING AUTO AIR CONDITIONER (PAGE 3-118) ".
These switches can be used as a numeric keypad to enter a numeric value such as a password.
Press a desired switch to enter a numeric value 0 to 9, which is indicated at the lower right of each switch.



- For details of other switch functions, see the explanation for each screen in "USER MENU (PAGE 3-42) ".
- The confirmation sound is heard when the switch is pressed, but a reaction is taken (the switch function is operated) when the switch is released.

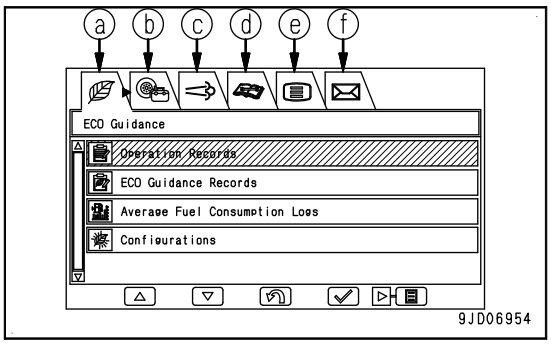
USER MENU *(WA320-Q1C3-110-K-01-A)*

When menu switch (1) is pressed on the standard screen while the machine is stopped, the user menu screen is displayed to enable you to configure and confirm machine settings.



The user menu consists of the following kinds. The menu screen can be changed by pressing the menu switch (1).

(a): ECO guidance
(b): Machine setting/Information
(c): KDPF regeneration
(d): Maintenance
(e): Monitor setting
(f): Message display



These menus (a) to (f) are for setting and confirming the following items:

a: ECO guidance
- Check of operating record
- Check of ECO guidance record
- Check and reset of fuel consumption record
- Configurations

b: Machine setting/Information
- Setting for manual fan reverse mode
- Setting for automatic fan reverse mode
- Traction level selection
- Setting speed range limit of reverse travel speed
- Boom raise detent setting
- PZ auto tilt-in select
- Display and reset of trip meter
- Setting for auto idle stop

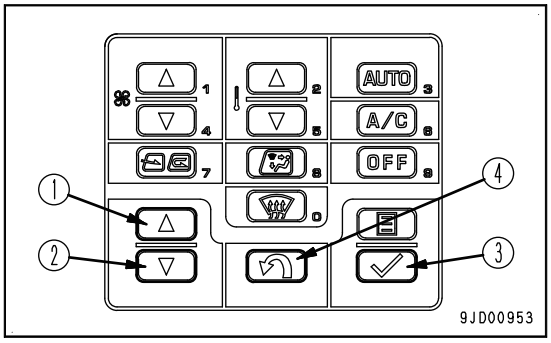
c: KDPF regeneration
- Setting for regeneration disable
- Operation of manual stationary regeneration

d: Maintenance
- Check and reset of various maintenance remaining times

e: Monitor setting
- Rear View Monitor Setting
- Meter Select
- Screen Adjustment
- Clock Adjustment
- Language selection

f: Message display
- Check of message contents and reply to message

On the user menu screen, it is possible to carry out the following operations with the switches.
(1) Up switch: Moves to item above. When on the first item, moves to the last item.
(2) Down switch: Moves to item below. When on the last item, moves to the first item.
(3) Enter switch: Enters any selection or changes and to proceed to the next screen.
(4) Return switch: Cancels a selection or changes, and returns to the previous screen or the standard screen.



REMARK

- If no switch is operated for 30 seconds on the user menu screen, the screen automatically returns to the previous screen or the standard screen.
- The user menu screen is displayed only while the machine is stopped completely.
- If the machine travels while the user menu screen is displayed, the screen automatically returns to the standard screen.

REMARK

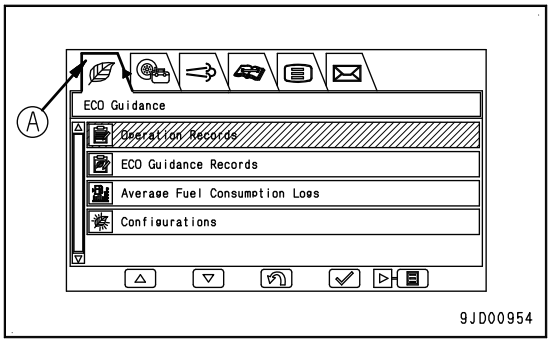
The default tab when the standard screen is changed to the user menu screen varies with the machine condition.

1. KDPF event is occurring: KDPF Regeneration
2. Hydraulic fan is rotating in reverse: Machine Setting/Information
3. Maintenance caution is occurring: Maintenance
4. Message is not read yet: Message display
5. Other than 1 to 4: ECO guidance

* If multiple conditions are established simultaneously, the above priority is given.

ECO GUIDANCE *(WA-Q1L3-110-K-00-A)*

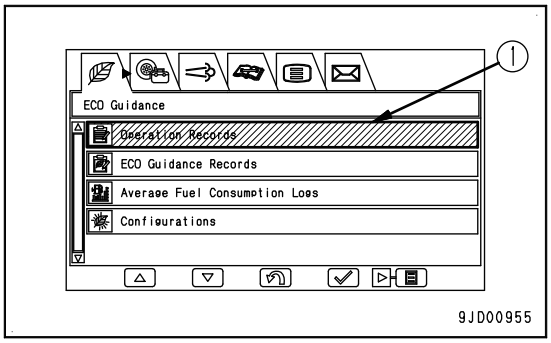
Each item of this menu (a) is used for displaying and setting the notification relevant to energy saving.



OPERATING RECORD *(WA270-Q1L3-110-K-05-A)*

The operating record screen displays the following information on a daily basis or during the split measurement period.

- Working Hours (Engine On):
  The time during which the engine was run
- Average Fuel Consumption:
  Average of the fuel consumed while the engine was run
- Actual Working Hours:
  The time spent for traveling, operation of work equipment and operation of accelerator
- Actual Fuel Consumption:
  Average of the fuel consumed during actual work.
- Fuel Consumption: The amount of fuel consumed
- Idling Hours:
  The time during which the machine is stopped, and the work equipment and accelerator are not operated.
- K-TCS Hours Ratio:
  This is the ratio of time that traction control is ON or S mode is selected to the time that engine is running.



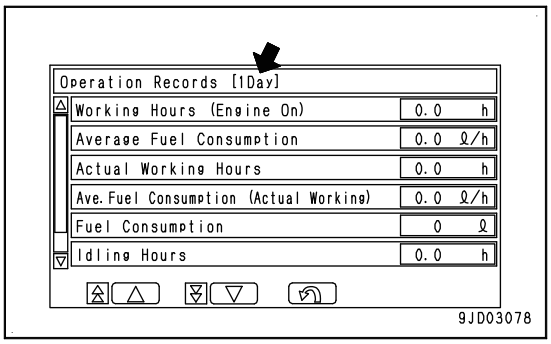
Select operating record (1) from the ECO guidance menu screen, then press enter switch.

REMARK

For the definition and display change method of the daily and split measurements, see "SETTING DISPLAY OF FUEL CONSUMPTION GAUGE (PAGE 3-48) ".

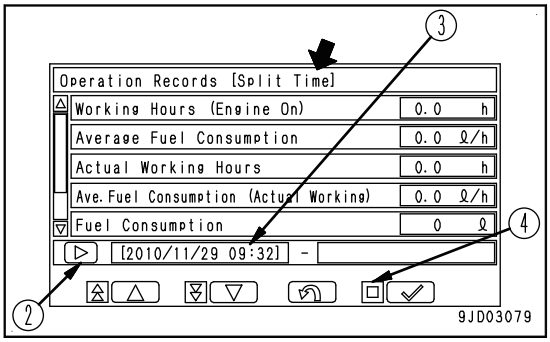
WHEN THE FUEL CONSUMPTION GAUGE IS SET TO "1 DAY":

"1 Day" is displayed on the place shown with arrow in the right figure.

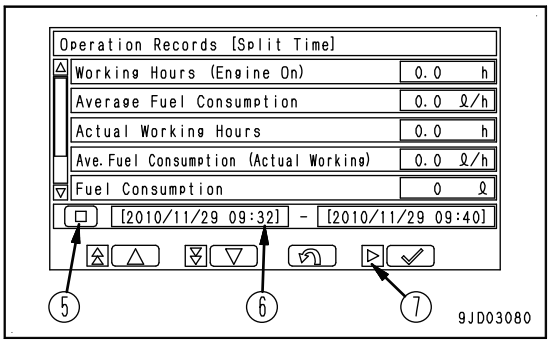


WHEN THE FUEL CONSUMPTION GAUGE IS SET TO "SPLIT TIME":

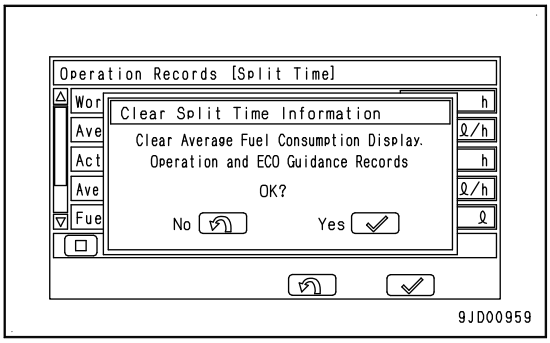
"Split Time" is displayed on the place shown with arrow in the right figure.
Screen displayed during split measurement
(2): Display during measurement
(3): Date and time when the measurement is started
To stop the split measurement, see guidance icon (4) and press the Enter switch.



Screen displayed while split measurement is stopped
(5): Display while measurement is stopped
(6): Dates and times when the measurement is started and stopped
To start the split measurement, see guidance icon (7) and press the Enter switch.
When the split measurement is started, the previous split measurement results (fuel consumption gauge, operation record, and ECO guidance records) are reset.



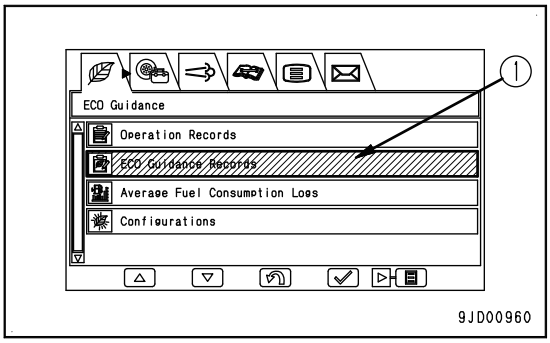
When the confirmation screen is displayed, press the enter switch again to start the split measurement, or press the return switch to cancel the start.



NOTICE
The displayed value of fuel consumption may differ from the actual value due to the operating conditions of the customers (fuel used, weather or operation contents, etc.).

ECO GUIDANCE RECORD *(WA270-Q1L3-110-K-06-A)*

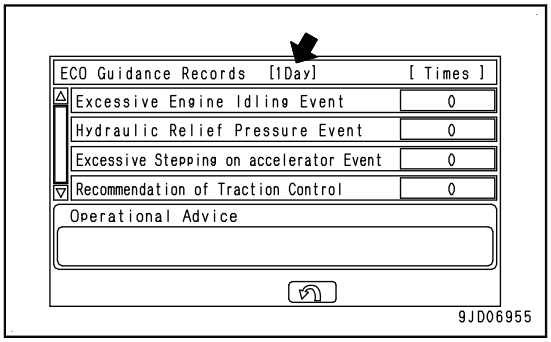
From the ECO guidance record screen, the frequency of display of the ECO guidance on a daily basis or during the split measurement period and the one-point advice are displayed.
Select ECO Guidance Record (1) from the ECO guidance menu screen, then press enter switch.



REMARK
For the definition and display change method of the daily and split measurements, see "SETTING DISPLAY OF FUEL CONSUMPTION GAUGE (PAGE 3-48) ".
For the ECO guidance, see "ECO GUIDANCE (PAGE 3-32) ".
In the one-point advice section, the advice to the ECO guidance that appeared most frequently is displayed.
The ECO guidance count increases when display conditions are satisfied even if the ECO guidance is not displayed.

WHEN THE FUEL CONSUMPTION GAUGE IS SET TO "1 DAY":

"1 Day" is displayed on the place shown with arrow in the right figure.



WHEN THE FUEL CONSUMPTION GAUGE IS SET TO "SPLIT TIME":

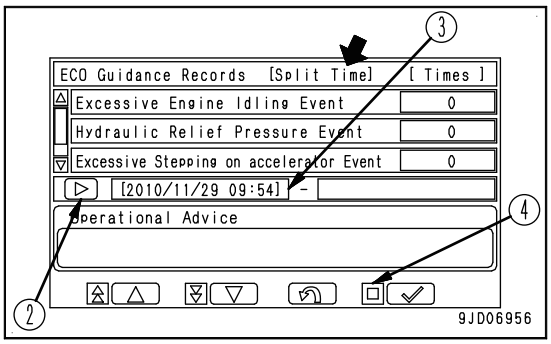
"Split Time" is displayed on the place shown with arrow in the right figure

Screen displayed during split measurement

(2): Display during measurement

(3): Date and time when the measurement is started

To stop the split measurement, see guidance icon (4) and press the Enter switch.



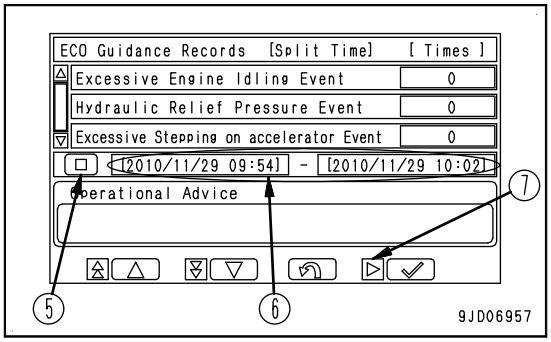
Screen displayed while split measurement is stopped

(5): Display while measurement is stopped

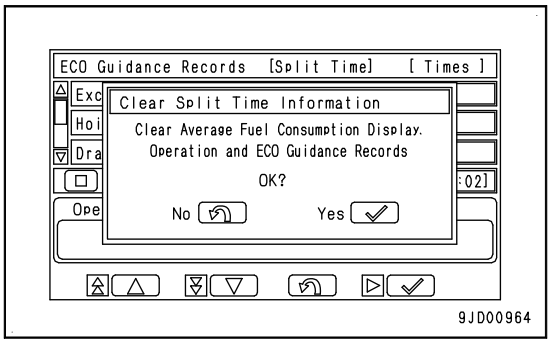
(6): Dates and times when the measurement is started and stopped

To start the split measurement, see guidance icon (7) and press the Enter switch.

When the split measurement is started, the previous split measurement results (fuel consumption gauge, operation record, and ECO guidance records) are reset.



When the confirmation screen is displayed, press the enter switch again to start the split measurement, or press the return switch to cancel the start.

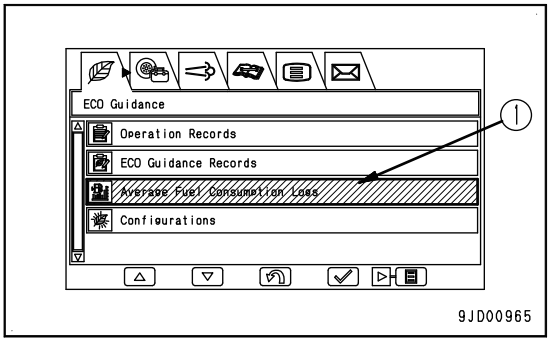


FUEL CONSUMPTION RECORD *(WA-Q1L3-110-K-03-A)*

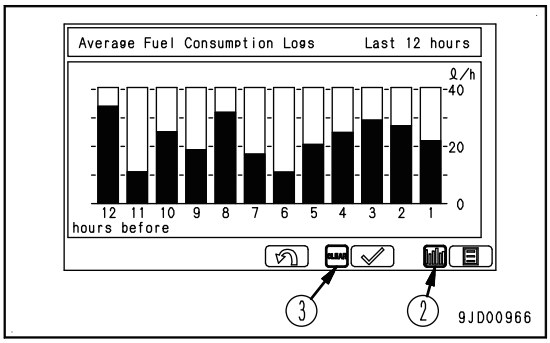
The fuel consumption record screen alternately displays the following graphs.

- Average fuel consumption for the last 12 hours
- Average fuel consumption for the last 1 week

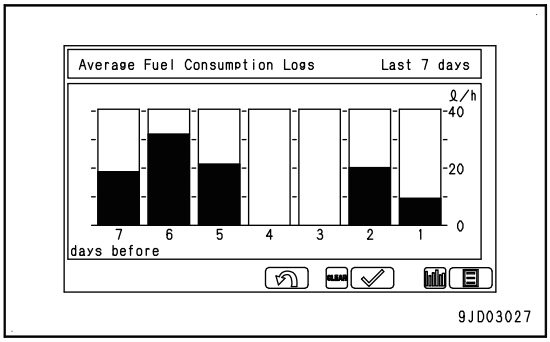
Select fuel consumption record (1) from the ECO guidance menu screen, then press enter switch.
To change a graph, see guidance icon (2) and press the menu switch.



- When display of the last 12 hours is selected



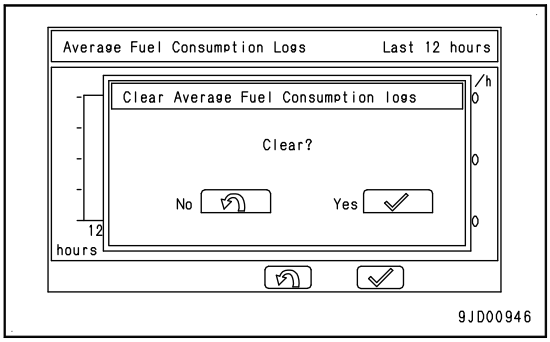
- When display of the last 1 week is selected



REMARK
The graph of the last 12 hours is updated every hour of the service meter reading.
The graph of the last 1 week is updated every day.

To clear a graph, see guidance icon (3) and press the Enter switch.

When the confirmation screen is displayed, press the enter switch again to clear or press the return switch to cancel clearing.



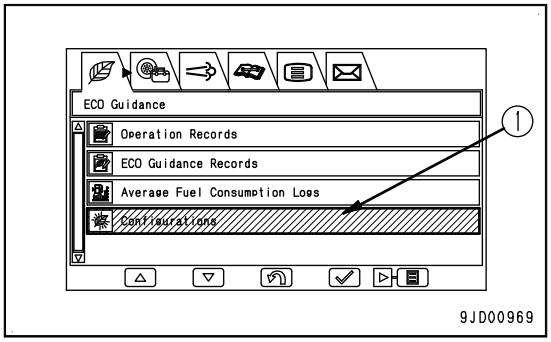
REMARK
If a graph for the last 12 hours is selected to be cleared, only this graph is cleared. If a graph for the last 1 week is selected to be cleared, both the graphs for the last 12 hours and last 1 week are cleared.

DISPLAY SETTING *(WA-Q1L3-110-K-06-A)*

On the display setting menu, it is possible to perform following settings.

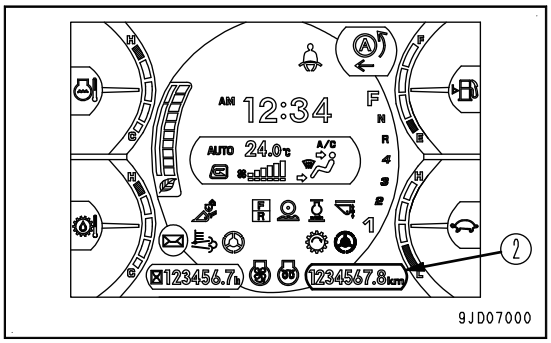
- Setting the display of the fuel consumption gauge
- Switching display/non-display of ECO gauge
- Setting the target fuel consumption value displayed in the ECO gauge
- Switching display/non-display of ECO guidance
- Switching display/non-display of guidance at key-off

Select display setting (1) from the ECO guidance menu screen, then press enter switch.

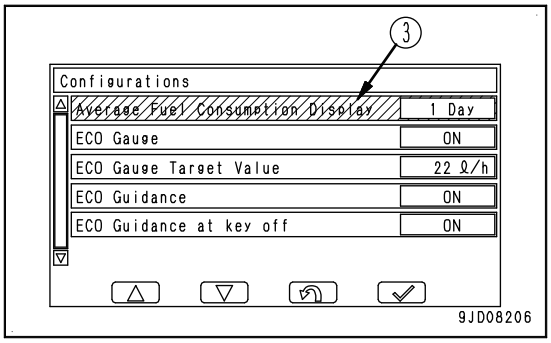


SETTING DISPLAY OF FUEL CONSUMPTION GAUGE *(WA270-Q1L3-110-K-04-A)*

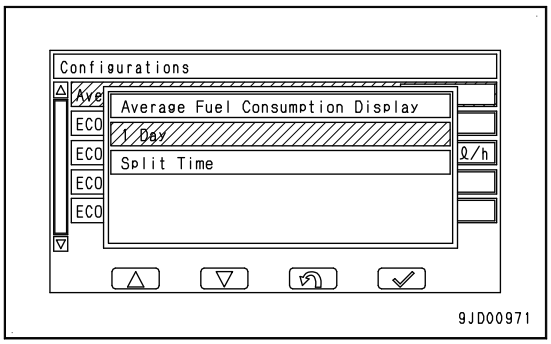
The display of fuel consumption gauge (2) can be set to the value on daily basis or during split measurement period.



1. Select fuel consumption gauge display (3) from the display setting menu, then press enter switch.



2. Select 1 Day or Split Time, then press the enter switch.



1 DAY

Displays the average fuel consumption in 1 day from 0:00 a.m. of the day to 0:00 a.m. of the next day.
Reset at 0.00 a.m. of the next day.

SPLIT TIME

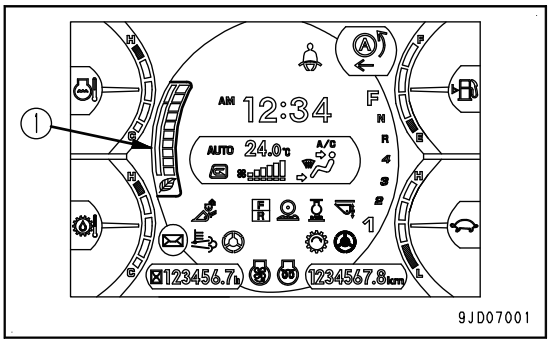
Displays the average fuel consumption during the split measurement period (after the measurement is started until it is finished).
Select the split to start the split measurement automatically.
To cancel setting, press the return switch.
Initially, the 1 Day is selected.

REMARK

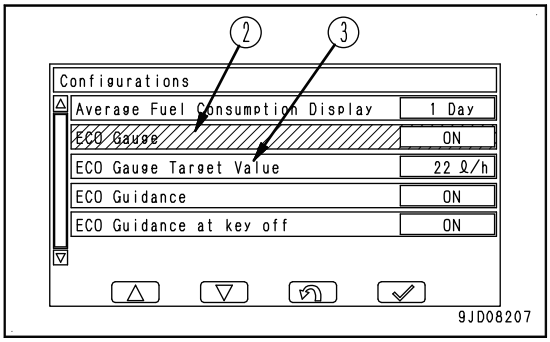
For the display of the fuel consumption gauge, see "L.H. AND R.H. METER (PAGE 3-36) ".
Setting of the daily or split is also applied to the display of the operation record and ECO guidance record.
When stopping the split measurement, see "OPERATING RECORD (PAGE 3-44) " or "ECO GUIDANCE RECORD (PAGE 3-45) ".

SWITCHING DISPLAY/NON-DISPLAY OF ECO GAUGE *(WA270-Q1L3-110-K-00-A)*

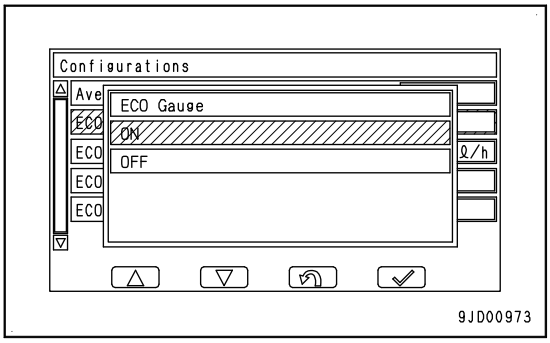
Display/non-display of ECO gauge (1) can be switched.



1. Select ECO gauge display (2) from the display setting menu, then press enter switch.



2. Select ON or OFF, then press the enter switch.
   ON: Displays the ECO gauge.
   OFF: Does not display the ECO gauge.
   To cancel setting, press the return switch.
   Initially, ON is selected.

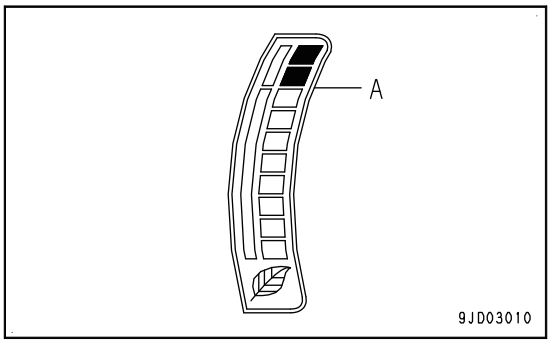


REMARK

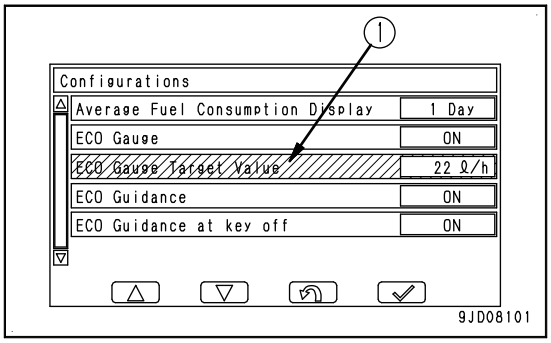
For the ECO gauge, see "ECO GAUGE (PAGE 3-36) ".
If the ECO Gauge display is set to OFF, the items of ECO Gauge Target Value (3) are not indicated.

SETTING THE TARGET FUEL CONSUMPTION VALUE DISPLAYED IN ECO GAUGE *(WA270-Q1L3-110-K-01-A)*

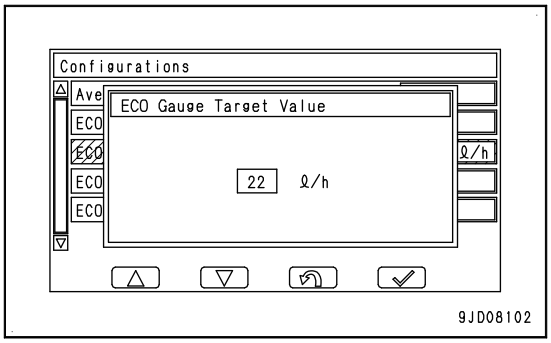
ECO Gauge Target Value (A) (the upper limit value of the green range) can be changed.



1. Select ECO Gauge Target Value (1) displayed in the ECO gauge from the display setting menu, then press enter switch.



2. By using the UP switch or DOWN switch to set the value, and press the enter switch.
   UP switch: Increases the target fuel consumption value by 1 liter/h.
   DOWN switch: Decreases the target fuel consumption value by 1 liter/h.
   To cancel setting, press the return switch.
   Initially, this value is set to 22 liters/h.



REMARK

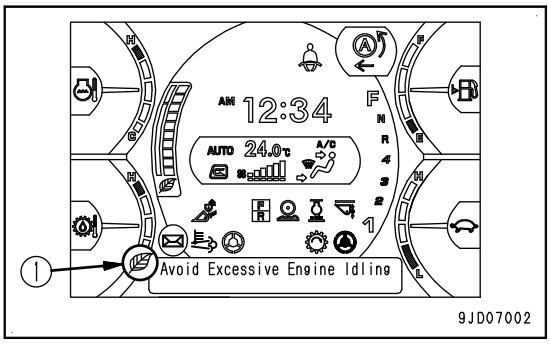
If the target fuel consumption value is increased, the fuel consumption indicated when the ECO gauge is at the maximum is also increased in proportion.

If the target fuel consumption value is decreased, the fuel consumption indicated when the ECO gauge is at the maximum is also decreased in proportion.

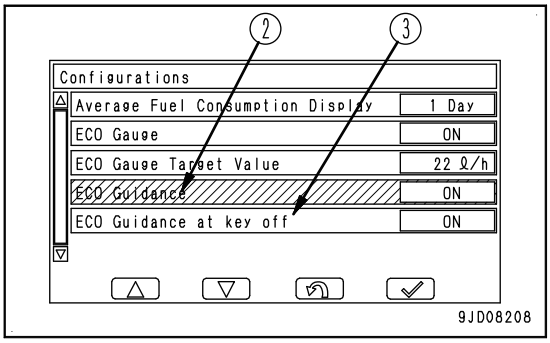
For the ECO gauge, see "ECO GAUGE (PAGE 3-36) ".

SWITCHING DISPLAY/NON-DISPLAY OF ECO GUIDANCE *(WA270-Q1L3-110-K-02-A)*

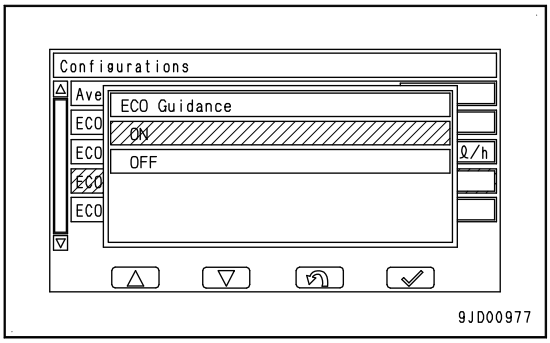
Display/non-display of ECO guidance (1) indicated on the standard screen can be switched.



1. Select ECO Guidance display (2) from the display setting menu, then press enter switch.

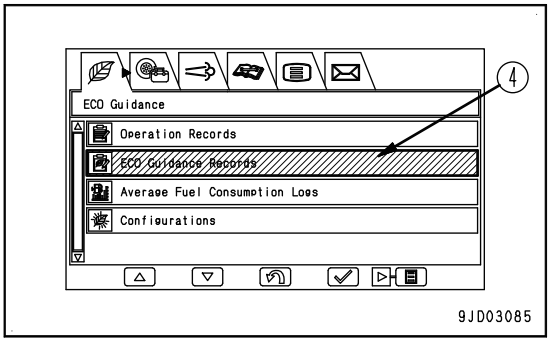


2. Select ON or OFF, then press the enter switch.
   ON: Displays the ECO guidance on the standard screen.
   OFF: Does not display the ECO guidance on the standard screen.
   To cancel setting, press the return switch.
   Initially, ON is selected.



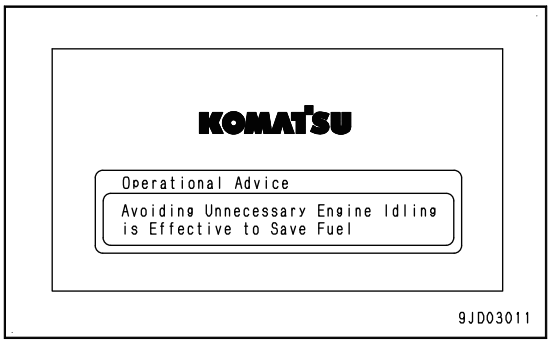
REMARK

For the ECO guidance, see "ECO GUIDANCE (PAGE 3-32) ".
If the ECO Guidance display is set to OFF, the items of ECO Guidance at key off (3) and ECO Guidance Records (4) are not displayed when starting key is OFF, but the ECO guidance records are not reset.

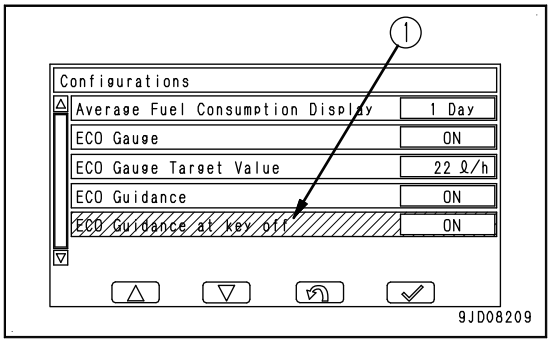


SWITCHING DISPLAY/NON-DISPLAY OF GUIDANCE WHEN KEY IS OFF *(WA270-Q1L3-110-K-03-A)*

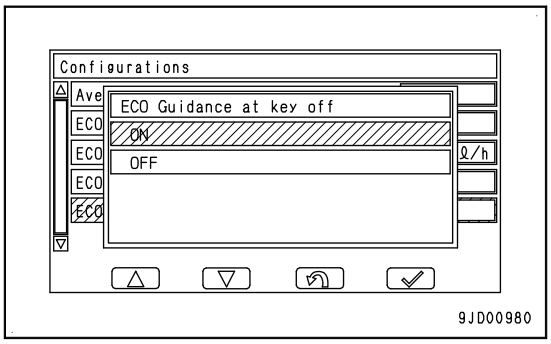
Display/non-display of the one-point advice indicated on the end screen when the key is turned to OFF position can be switched.



1. Select display ECO Guidance at key off (1) from the display setting menu, then press enter switch.



2. Select ON or OFF, then press the enter switch.
   ON: Displays the one-point advice on the end screen.
   OFF: Does not display the one-point advice on the end screen.
   To cancel setting, press the return switch.
   Initially, ON is selected.

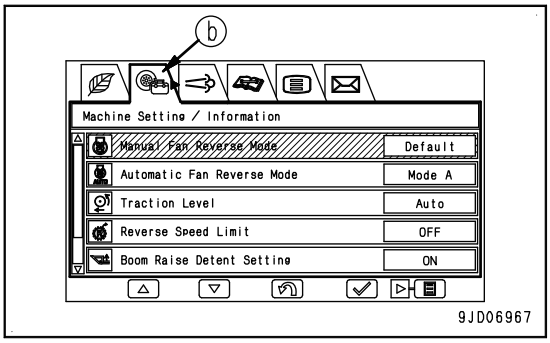


REMARK

In the one-point advice section indicated on the end screen, the advice to the ECO guidance that was displayed most frequently after the key is turned to ON position is indicated. Accordingly, the one-point advice indicated on the end screen may be different from the one-point advice indicated on "ECO GUIDANCE RECORD (PAGE 3-45) ".

MACHINE SETTING / INFORMATION *(WA320-Q1C9-110-K-00-A)*

In each item of this menu (b), setting and information of the machine are checked or changed.



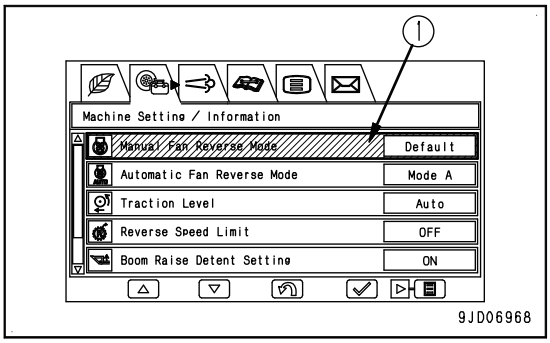
MANUAL FAN REVERSE MODE *(WA320-Q1C9-110-K-01-A)*

⚠ CAUTION

When rotating the fan in the reverse direction, beware extremely that dirt will not fly out and cloth etc. will not be wound in the fan.
Since dust may blown up, check that there is no person around while the fan is rotating in reverse.

In the manual fan reverse mode, the fan can be rotated in reverse to blow off any mud or dirt sticks to the radiator.

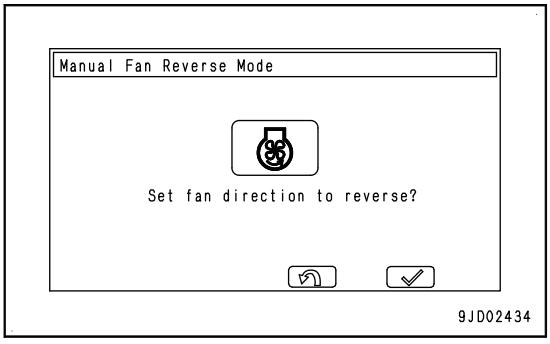
1. Set the engine speed to low idle.
2. Select manual fan reverse mode (1) on the machine setting/ information menu, and press the enter switch.



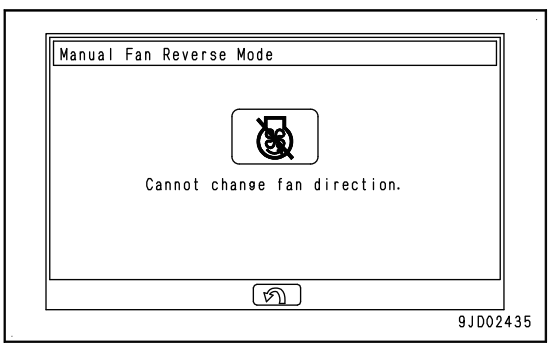
REMARK
The fan rotation switches from the normal direction to the reverse direction only when all of the following conditions are satisfied.

- The engine coolant temperature is less than 102°C (215.6°F).
- The boost temperature is below 119°C (246.2°F).
- The HST oil temperature is below 100°C (212°F).
- It is 20 seconds or more after the engine was started.

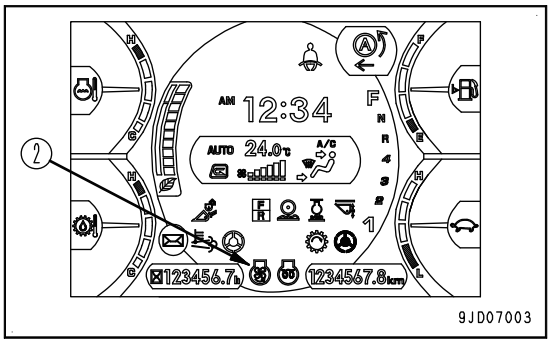
3. Press the enter switch to rotate the fan in the reverse direction, or press the return switch to cancel setting.



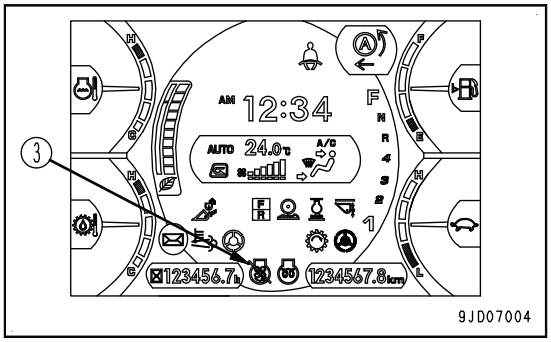
If the fan reverse operation is performed without satisfying the condition for reversing the fan, the screen shown at the right appears, and the fan rotation direction can not be switched.
In this case, press the return switch, and then repeat the procedure from the first.



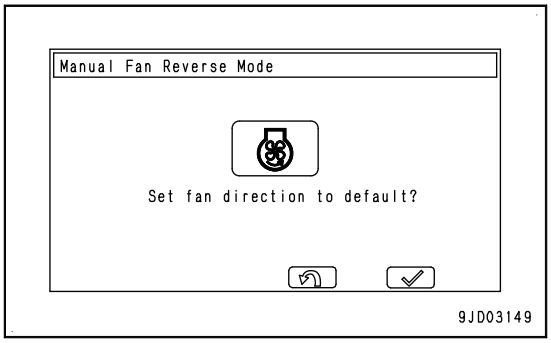
4. Fan reverse pilot lamp (2) flashes, then lights up.



If the condition for reversing the fan is not satisfied, changeover condition waiting pilot lamp (3) lights up in red.



5. Set the engine speed to high idle and perform cleaning.
6. After finishing cleaning, set the engine speed to low idle.
7. If the menu switch is pressed on the standard screen, the screen shown at right appears.
   Press the enter switch to return the fan to the normal rotation mode.
   Fan reverse pilot lamp (2) flashes and then goes out.



REMARK

If one of the following conditions is satisfied, the fan rotation returns from reverse direction to normal direction.

- It is 10 minutes or more after the fan rotation direction is reversed.
- Stop the engine.
- The coolant temperature, boost temperature, and HST oil temperature overheat during fan rotating in reverse, and the action level "L02" is displayed.

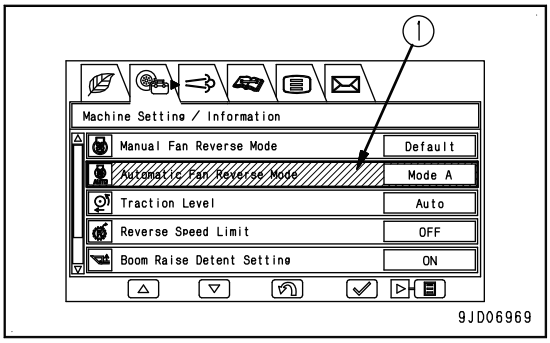
AUTOMATIC FAN REVERSE MODE *(WA320-Q1C9-110-K-02-A)*

⚠ CAUTION

When rotating the fan in the reverse direction, beware extremely that dirt will not fly out and cloth etc. will not be wound in the fan.
Since dust may blown up, check that there is no person around while the fan is rotating in reverse.

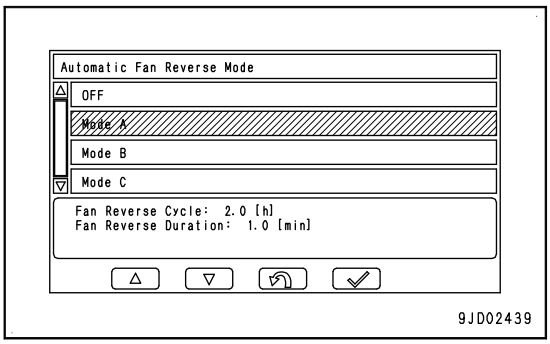
In the automatic fan reverse mode, you can configure the setting for automatically rotating the fan in the reverse direction to blow off mud and dirt sticks to the radiator.

1. Select automatic fan reverse mode (1) on the machine setting/information menu, and press the enter switch.



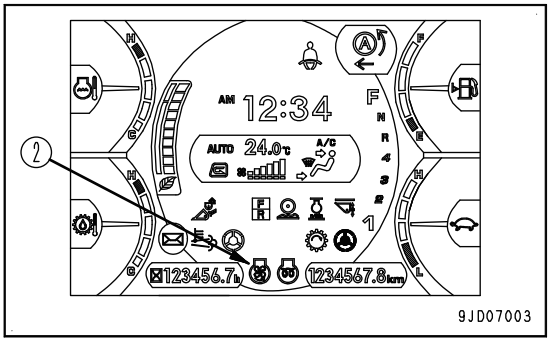
2. Select the duration and cycle of the automatic fan reverse, and press the enter switch.
   The following 4 items can be selected.

- OFF: Does not turn on the automatic fan reverse.
- Mode A: The fan rotates in the reverse direction for 1 minute once for every 2 hours.
- Mode B: The fan rotation in the reverse direction for 1 minute once for every 1 hour.
- Mode C: The fan rotation in the reverse direction for 4 minutes once for every 30 minutes.

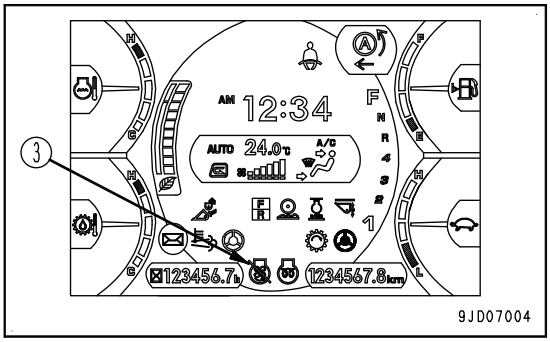


Initially, Mode A is selected.
When you want other than above settings for the duration and cycle of the fan reverse rotation, consult your Komatsu distributor.

3. When the set changeover time elapses, fan reverse pilot lamp (2) flashes and lights up.



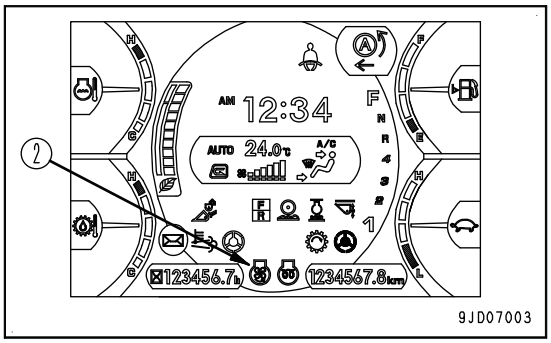
If the condition for reversing the fan is not satisfied, changeover condition waiting pilot lamp (3) lights up in red.



REMARK
The fan rotation switches from the normal direction to the reverse direction only when all of the following conditions are satisfied.

- The engine coolant temperature is less than 102°C (215.6°F).
- The boost temperature is below 119°C (246.2°F).
- The HST oil temperature is below 100°C (212°F).
- It is 20 seconds or more after the engine was started.

4. The fan returns from the reverse rotation to the normal when the set duration for the reverse rotation elapses.
   Fan reverse pilot lamp (2) flashes and then goes out.

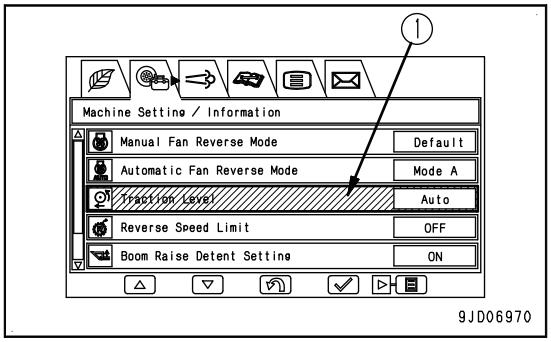


REMARK
If one of the following conditions is satisfied, the fan rotation returns from reverse direction to normal direction.
- The automatic fan reverse mode is set to OFF.
- Stop the engine.
- The coolant temperature, boost temperature, and HST oil temperature overheat during fan rotating in reverse, and the action level" L02" is displayed.

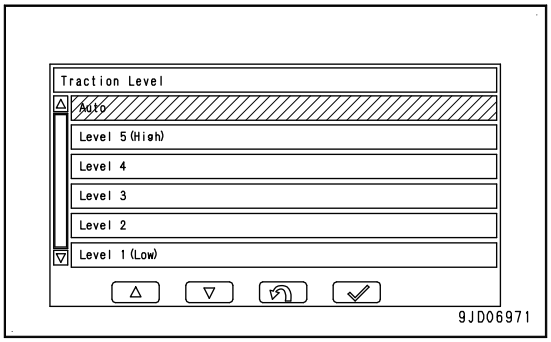
TRACTION LEVEL SELECTION *(WA320-Q1C9-110-K-03-A)*

A suitable Traction Level in accordance with the operating condition can be selected according to the following procedure.

1. Select Traction Level (1) on the Machine Setting/Information menu, then press the enter switch.



2. Select Traction Level in accordance with the operating condition, then press the enter switch.
   Auto: Controller judges the operating condition, and set maximum drawbar pull automatically.
   Level 5 to 1: Most suitable setting can be selected in accordance with the specific gravity of handled material, operating condition and application.
   Initially, Auto is selected.



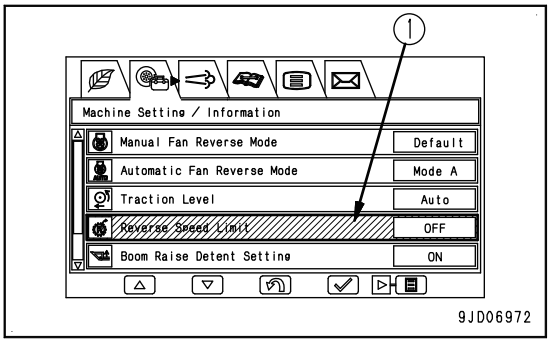
REMARK
Traction control at selected traction level is not actuated if traction control switch is at a position other than ON.
For the traction control, see "TRACTION CONTROL SWITCH (PAGE 3-87) ".

REVERSE TRAVEL SPEED RANGE LIMITATION *(WA320-Q1C9-110-K-04-A)*

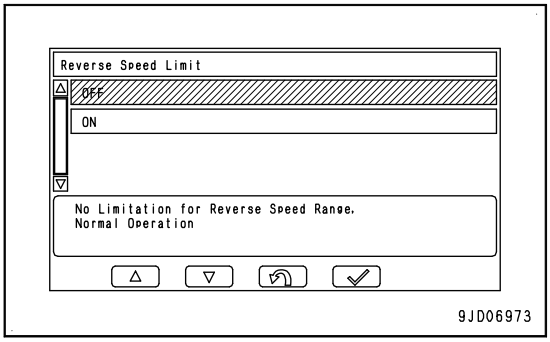
Even when speed range selector switch is at 3rd or 4th, speed range in reverse can be limited to 2nd or below.

SETTING REVERSE TRAVEL SPEED RANGE LIMITATION

1. Select reverse speed limit (1) on the Machine Setting/Information menu, then press the enter switch.



2. Select ON or OFF, then press the enter switch.
   OFF: Reverse speed is not limited.
   ON: Even when travel speed range is set in 3rd or 4th, reverse speed range is limited to 2nd or below.
   Initially, OFF is selected.

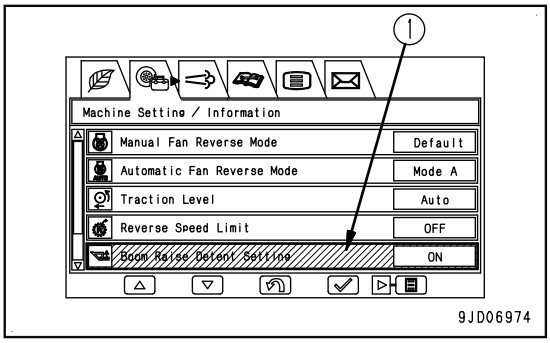


BOOM RAISE DETENT SETTING *(WA320-Q1C9-110-K-05-A)*

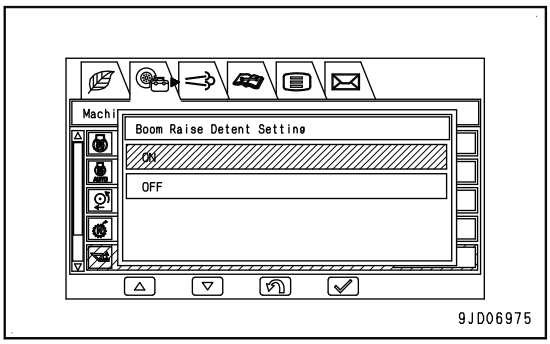
Boom raise detent is the function to stop the lever at the position multi-function mono-lever is drawn further than RAISE position.

BOOM RAISE DETENT SETTING

1. Select Boom Raise Detent Setting (1) on the Machine Setting/Information menu, then press the enter switch.



2. Select ON or OFF, then press the enter switch.
   ON: Boom raise detent is enabled.
   OFF: Boom raise detent is disabled.
   Initially, ON is selected.



REMARK

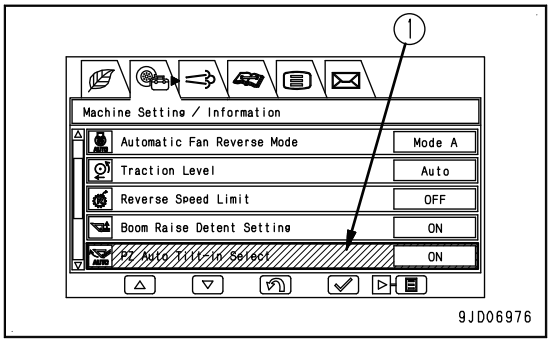
When the boom raise detent is disabled, remote-positioner function is also disabled.
For detail, see "REMOTE POSITIONER (PAGE 3-199) ".

PZ AUTO TILT-IN SELECT *(WA320-Q1C9-110-K-06-A)*

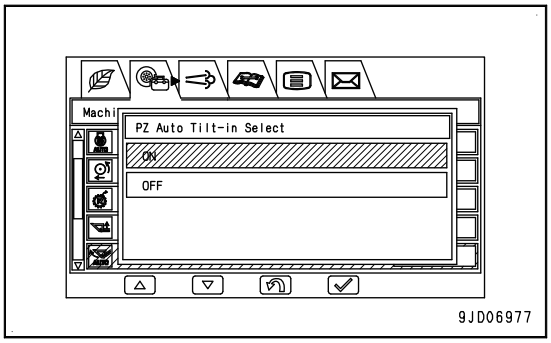
PZ auto tilt-in function is to prevent spillage of the loaded material by tilting the bucket automatically while the boom is raised.

SETTING PZ AUTOMATIC TILT-IN

1. Select PZ Auto Tilt-in Select (1) on the Machine Setting/Information menu, and press the enter switch.



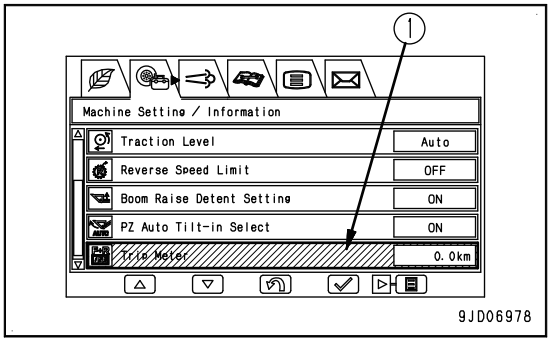
2. Select ON or OFF, then press the enter switch.
   ON: PZ auto tilt-in is enabled.
   OFF: PZ auto tilt-in is disabled.
   Initially, ON is selected.



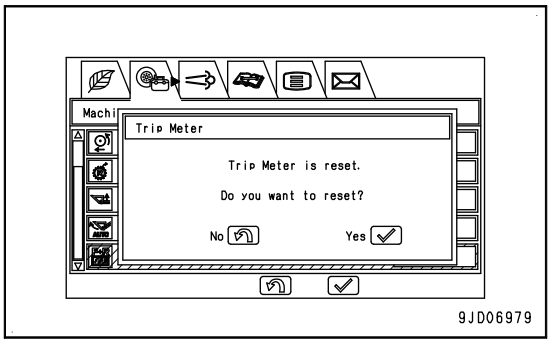
TRIP METER *(WA320-Q1C9-110-K-07-A)*

The overall travel distance after the previous resetting can be checked by using trip meter (1).
The trip meter can be reset according to the following procedure.

1. Select Trip Meter (1), then press the enter switch.



2. Press the enter switch to reset or press the return switch to cancel resetting.

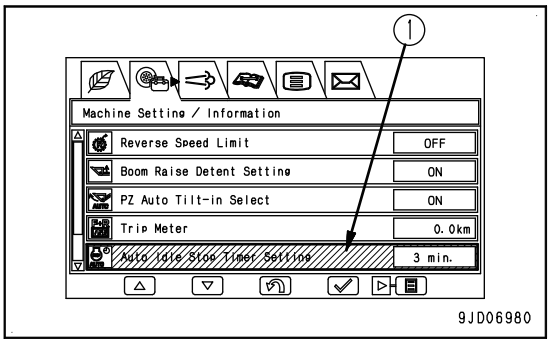


AUTO IDLE STOP TIMER SETTING *(WA270-Q1C9-110-K-00-A)*

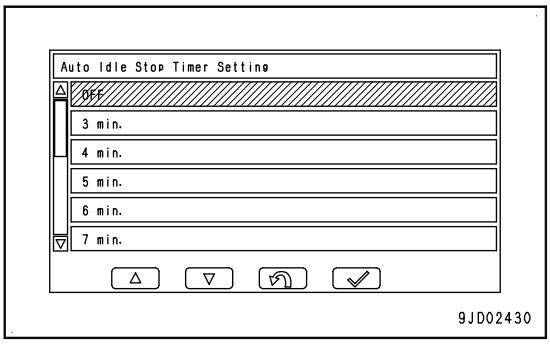
Stops the engine automatically when the idle state continued for a predetermined time.
The auto idle stop works only when all of the following conditions are met.

- The accelerator pedal is not depressed.
- Directional lever and directional selector switch are at N (neutral) position.
- The machine is stopped.
- KDPF regeneration is not performed.

1. Select Auto Idle Stop Timer Setting (1) on the Machine Setting/Information menu, and press the enter switch.



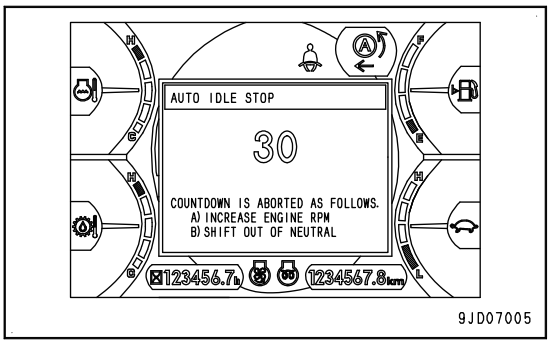
2. Select the operating time of the auto idle stop, and press the enter switch.
   You can select the operating time in the range of 3 minutes to 60 minutes.



REMARK

- You cannot select a duration longer than that specified in the service menu.
- Choosing OFF disables operation of the auto idle stop.

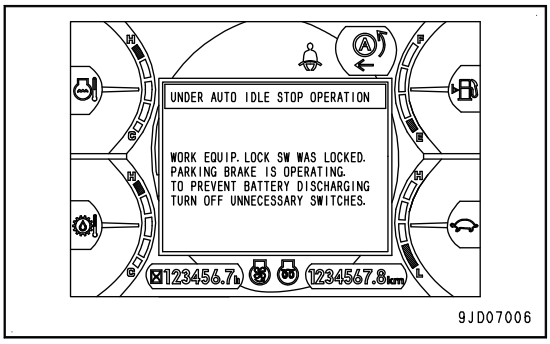
3. If the idle state is continued up to 30 seconds before the currently auto idle stop timer setting , the countdown screen appears on the standard screen.
   If you increase the engine speed or set the directional lever or directional selector switch to any position other than N (neutral) at this point, the countdown is stopped and the screen returns to the standard screen.



4. If the idle state is further continued and the countdown reaches 0 second, the parking brake is applied and engine stops.
   After engine stops, work equipment is locked.

REMARK

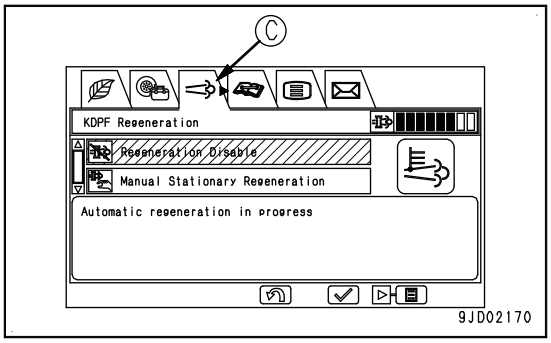
If the parking brake is failed and does not operate, auto idle stop does not operate.
When the auto idle stop starts while the parking brake is OFF, release the parking brake by turning it to ON once and turning it to OFF again.



When restarting the engine, turn the starting switch as usual.

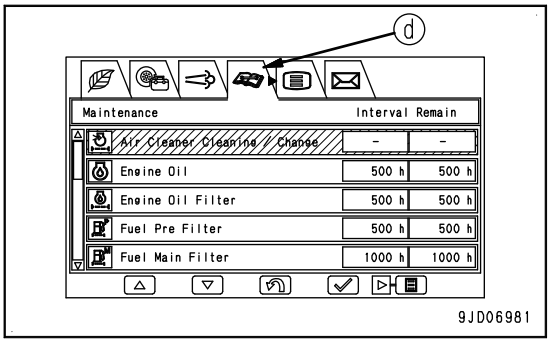
KDPF REGENERATION *(WA270-Q1C8-100-K-00-A)*

Each item of this menu (c) is for setting and operating KDPF.
For details of the KDPF regeneration, see "HANDLING Komatsu Diesel Particulate Filter (KDPF) (PAGE 3-131) ".



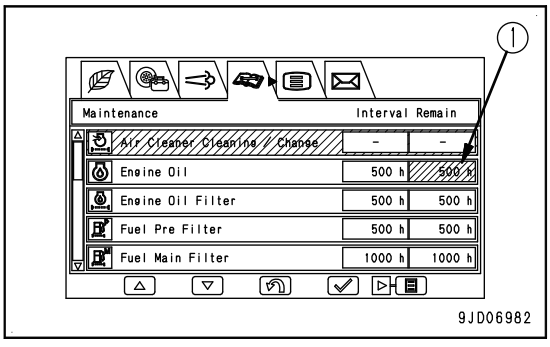
MAINTENANCE *(WA320-Q1C2-110-K-00-A)*

Each item of this menu (d) is used for displaying and setting the notification relevant to maintenance.
On the maintenance menu screen, the following maintenance items, their replacement intervals, and their remaining times to the next replacement are displayed.

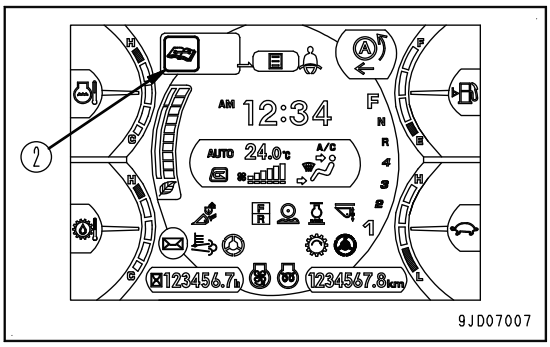


Maintenance item	Replacement interval (h) (Default)
Clean and change air cleaner	-
Engine oil	500
Engine oil filter	500
Fuel prefilter	500
Fuel main filter	1000
Transfer oil	1000
HST oil filter	1000
Hydraulic oil filter	2000
Hydraulic tank breather	2000
Hydraulic oil	2000
Axle oil	2000
KCCV filter	2000
Clean KDPF filter	4500

When the time remaining to the next maintenance for any item is less than the maintenance notice time (initial setting: 30 hours), the remaining time display (1) is highlighted in yellow.
When the time remaining to the maintenance becomes 0 hours, the remaining time display (1) is highlighted in red. The time after the replacement interval is indicated with the negative symbol.
If any item is displayed in red, perform the maintenance for it immediately.



REMARK
The replacement interval in "Clean and replace air cleaner" is not set initially.
If you want to change the setting for the maintenance interval and the maintenance notice time, consult your Komatsu distributor.
When the maintenance time caution lamp (2) lights up on the standard screen, press the menu switch, and the screen automatically displays the maintenance menu screen (d).

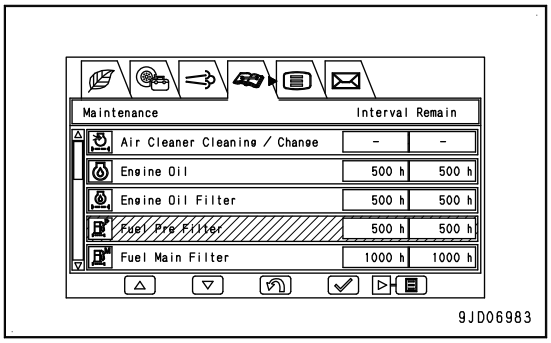


RESET REMAINING TIME FOR MAINTENANCE *(WA320-Q1C2-110-K-01-A)*

After performing maintenance, reset the remaining time for maintenance according to the following procedure.

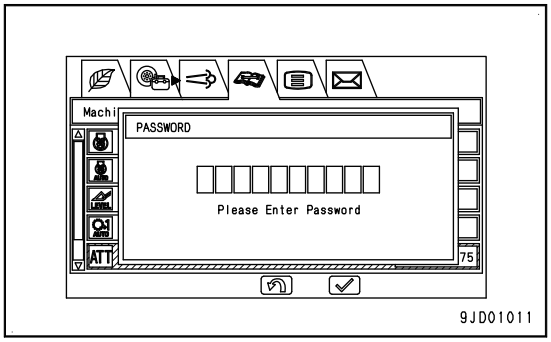
1. On the maintenance menu screen, select an item to reset the remaining time, then keep pressing the enter switch for more than 1.5 seconds.

REMARK
If the enter switch is not pressed for enough time, the switch operating sound can be heard, but the screen does not switch to the screen for resetting the remaining time for maintenance.

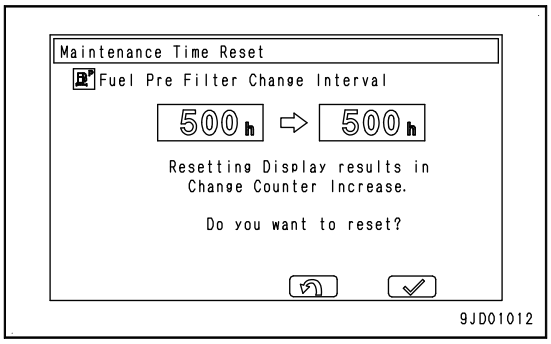


When a password for restriction of use has been set, the password input screen is displayed.
Input the password for restriction of use by using the numeric keypad, then press the enter key.

REMARK
Contact your Komatsu distributor for details of the method of setting, changing, or canceling the password.

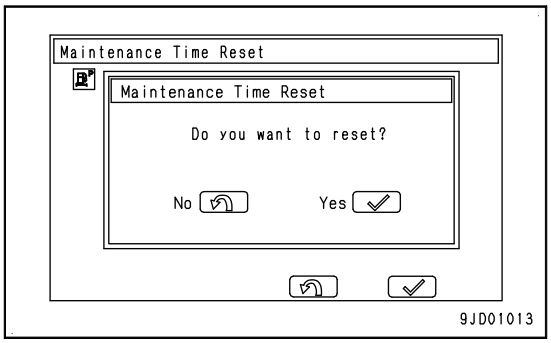


2. The screen changes to the maintenance time reset screen. When the enter switch is pressed, the following reconfirmation screen is displayed.
   To cancel setting, press the return switch.



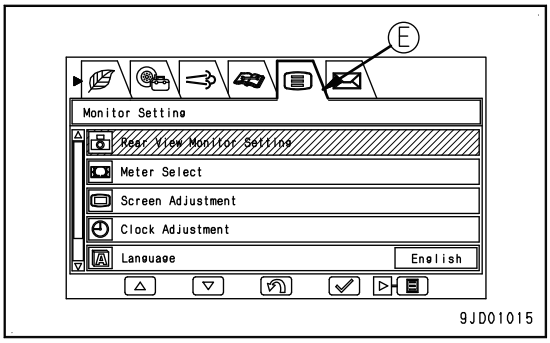
3. When the enter switch is pressed again, the remaining time is reset and the screen returns to the maintenance menu screen.
   To cancel setting, press the return switch.

REMARK
If the remaining time and the replacement interval are the same, the remaining time cannot be reset.



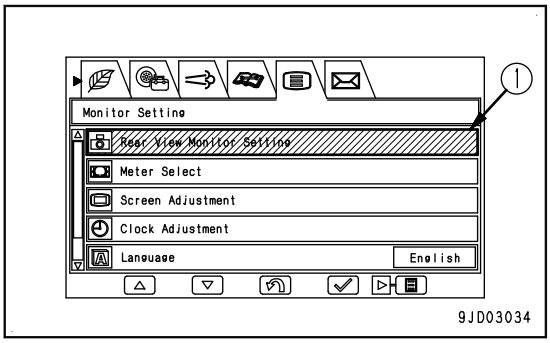
MONITOR SETTING *(WA-Q193-110-K-00-A)*

Each item of this menu (e) is to make settings for the monitor.



REAR VIEW MONITOR SETTING *(WA270-Q193-110-K-00-A)*

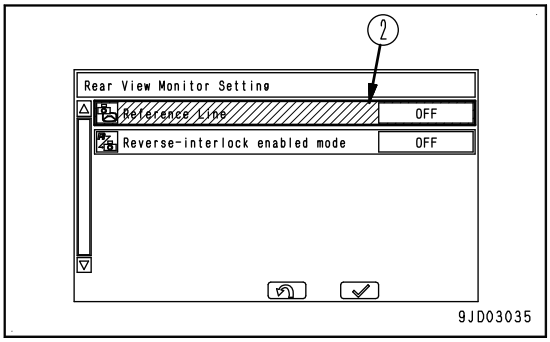
This is used to set the rear view monitor.
Select rear view monitor setting (1) on the monitor setting menu screen, and press the enter switch.



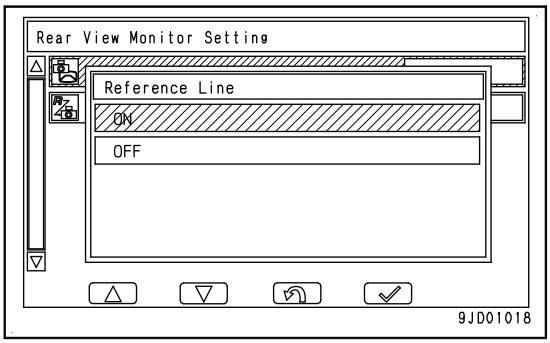
REFERENCE LINE DISPLAY

The is used to change ON/OFF of the reference line on the rear view monitor.

1. Select reference line display (2) from the rear view monitor setting menu, and press the enter switch.



2. Select ON or OFF, then press the enter switch.
   ON: Displays the reference line.
   OFF: Hides the reference line.



REMARK

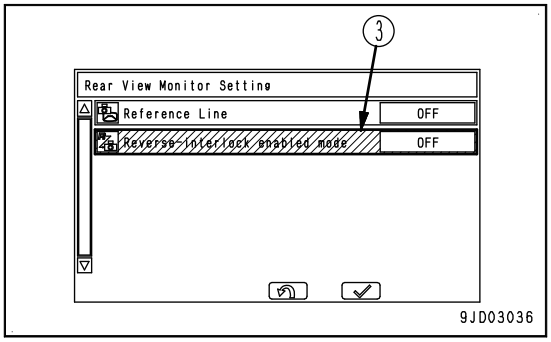
For the rear view monitor and the reference line, see "HANDLING REAR VIEW MONITOR (PAGE 3-130) " and "ADJUST REAR VIEW CAMERA (PAGE 3-161) ".

This setting is held even if the starting switch key is turned to OFF position.
The default is ON.

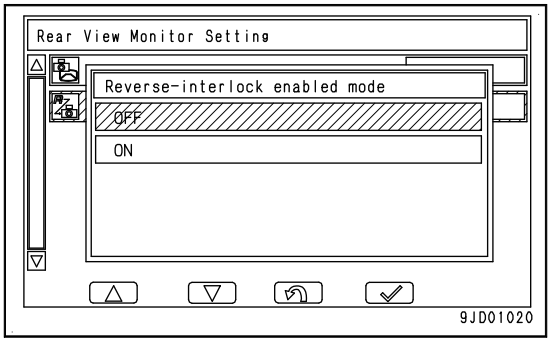
REVERSE-INTERLOCK ENABLED MODE *(WA-Q193-110-K-03-A)*

This mode allows you to change the method for displaying the rear view monitor that is displayed only when traveling in reverse.

1. Select reverse-interlock enabled mode (3) on the rear view monitor setting menu, then press the enter switch.



2. Select ON or OFF, then press the enter switch.
   ON: Displays images on the rear view monitor only when traveling in reverse.
   OFF: Always displays images on the rear view monitor.

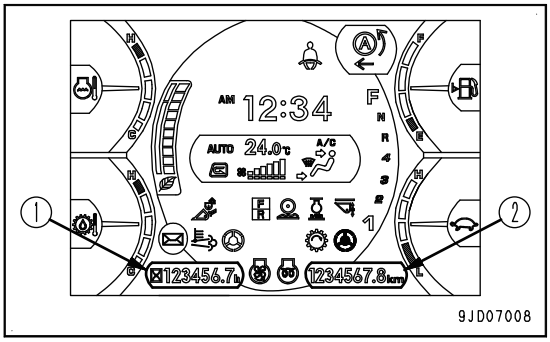


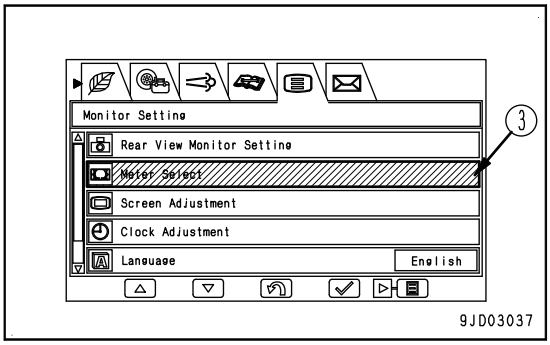
REMARK

This setting is held even after the starting switch key is turned to OFF position.
The default is OFF.

METER DISPLAY SELECTION *(WA320-Q193-110-K-04-A)*

This is used for the selection of the items to be displayed on L.H. meter display (1) or R.H. meter display (2).
Select meter display selection (3) on the monitor setting menu screen, then press the enter switch.

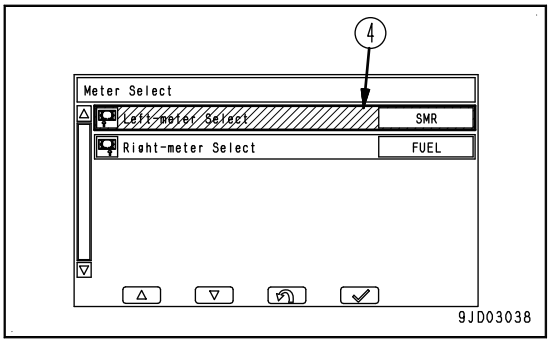




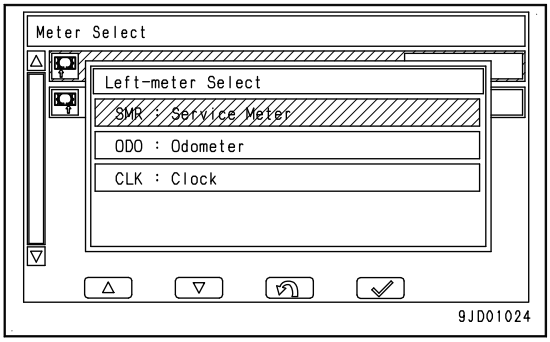
SELECT L.H. METER DISPLAY *(WA270-Q193-110-K-01-A)*

This is used for the selection of the items to be displayed on L.H. meter display (1).

1. Select Left-meter Select (4) on the meter display selection menu, then press the enter switch.



2. Select the items to be displayed, then press the enter switch.
   The following 3 items can be selected.
   - SMR: Service Meter
   - ODO: Odometer
   - CLK: Clock

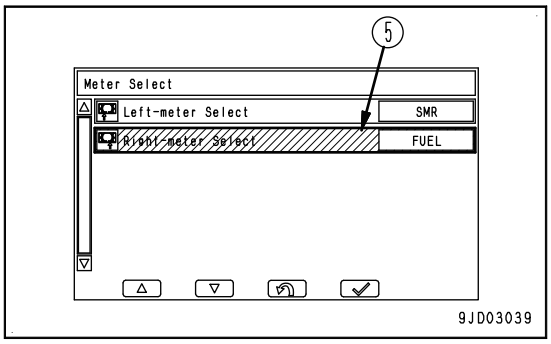


For details of each item, see "L.H. AND R.H. METER (PAGE 3-36) ".
The default of L.H. meter is a service meter.

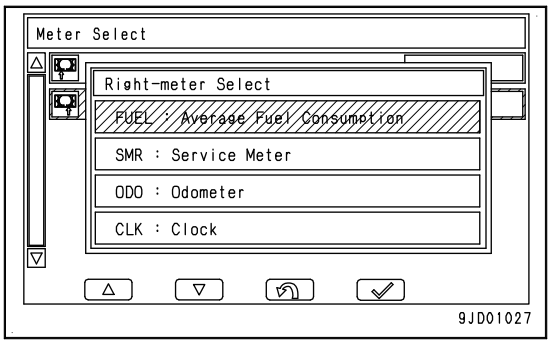
SELECT R.H. METER DISPLAY *(WA270-Q193-110-K-02-A)*

This is used for the selection of the items to be indicated on R.H. meter display (2).

1. Select Right-meter Select (5) on the Meter Select menu, then press the enter switch.



2. Select the items to be displayed, then press the enter switch. The following 4 items can be selected.
   - FUEL: Fuel consumption gauge
   - SMR: Service Meter
   - ODO: Odometer
   - CLK: Clock



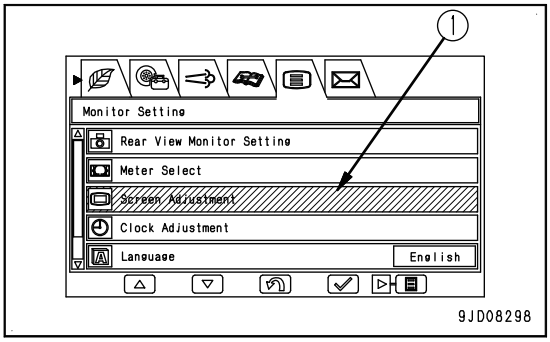
REMARK

For details of each item, see "L.H. AND R.H. METER (PAGE 3-36)".
The default of R.H. meter is a fuel consumption gauge.

SCREEN ADJUSTMENT *(WA320-Q19C-110-K-00-A)*

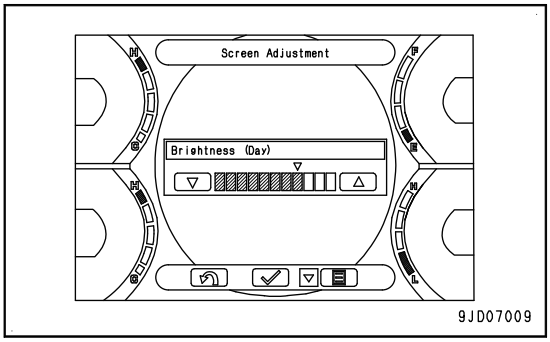
This function is used for the adjustment of brightness of the machine monitor.

1. Select Screen Adjustment (1) on the Monitor Setting screen, then press the enter switch.



2. Adjust the brightness by using the switch panel.
   The brightness can be adjusted individually in the day and night modes.
   - When the screen is adjusted while the lamp switch is turned OFF, the brightness in the day mode can be adjusted.
   - When the screen is adjusted while the lamp switch is turned ON, the brightness in the night mode can be adjusted.

   Menu switch: Sets brightness to the initial state.
   UP switch: Increases the brightness. (Moves the indicator to the right by one division.)
   DOWN switch: Decreases the brightness. (Moves the indicator to the left by one division.)
   Return switch: Cancels the change and returns to the Monitor Setting menu.
   Enter switch: Accepts change and returns to the Monitor Setting menu.



REMARK

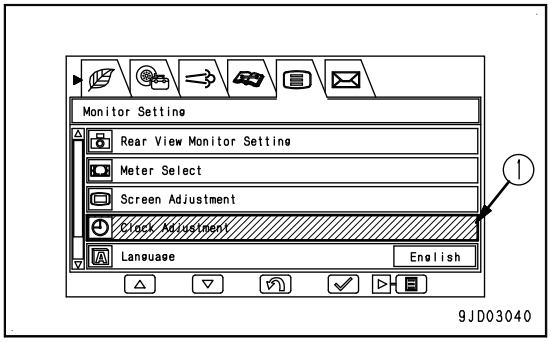
The brightness of night illumination for the switch panel, and operation switches is adjusted synchronously with the brightness of the machine monitor.

CLOCK ADJUSTMENT *(WA-Q1MC-110-K-00-A)*

On the clock adjustment menu, you can change the setting of the clock displayed on the standard screen.
The following items can be changed.

- GPS Synchronization
- Calendar
- Time
- 12h/24h Mode
- Daylight Saving Time (summer time)

Select Clock Adjustment (1) on the Monitor Setting menu screen, then press the enter switch.



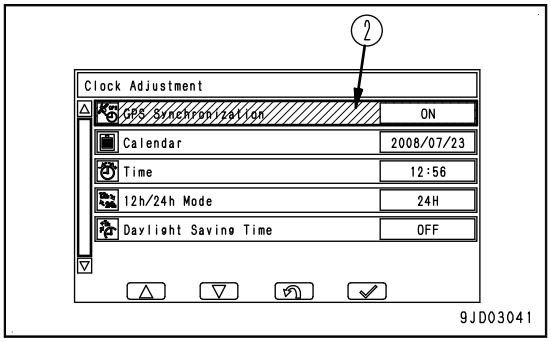
REMARK

- After a long-term storage of the machine, Calendar and Time are reset, so you must readjust them.
- When the GPS Synchronization is set to ON, the above are automatically readjusted.

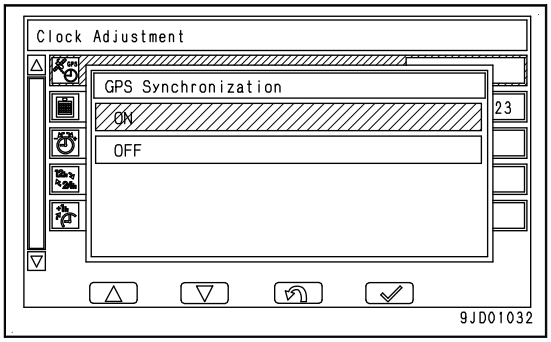
GPS SYNCHRONIZATION *(WA-Q1MC-110-K-01-A)*

On the machines equipped with KOMTRAX, you can configure automatic setting of the monitor's date and time in accordance with the GPS's clock.

1. Select GPS Synchronization (2) from the Clock Adjustment menu, then press enter switch.



2. Select ON or OFF, then press the enter switch.
   ON: Sets the date and time automatically.
   OFF: Does not set the date and time automatically.(Can be set manually.)



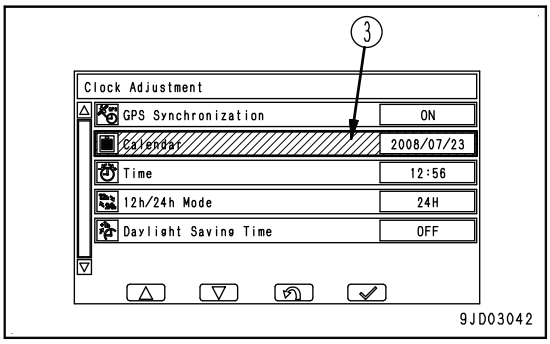
REMARK

This setting is held even after the starting switch key is turned to OFF position.
The default is OFF.
When the machine is in the environment where the radio waves from GPS cannot be received, the automatic setting function might be disable.
Turning the GPS Synchronization ON disables selecting the Calendar and Time.

CALENDAR SETTING *(WA-Q1MC-110-K-02-A)*

Adjust the date of the monitor.

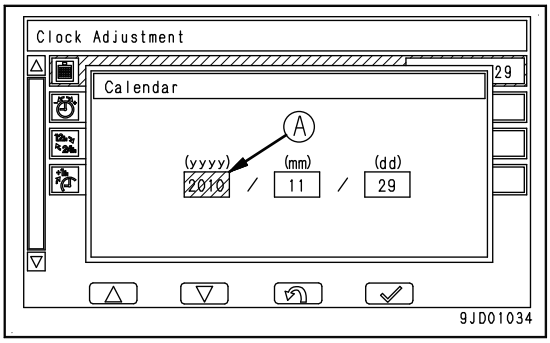
1. Select Calendar (3) from the Clock Adjustment menu, then press enter switch.



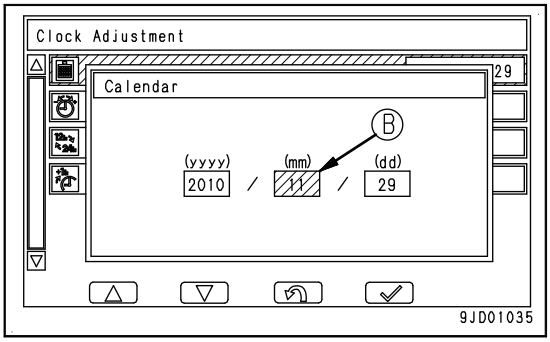
REMARK

As long as ON is selected for the GPS Synchronization menu, Calendar (3) is not selectable.

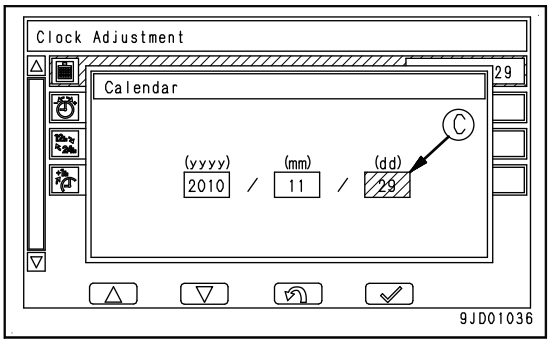
2. "Calendar Setting" screen is displayed.
   When year display (A) is highlighted in yellow, operate the switches as follows to change the year display.
   When it is not necessary to change the year setting, press the enter switch.
   UP switch: Sets calendar forward one year.
   DOWN switch: Sets calendar back one year.
   RETURN switch: Cancels the change and returns to the Clock Adjustment menu.
   ENTER switch: Proceeds to setting for month



3. When month display (B) is highlighted in yellow, operate the switches as follows to change month display.
   When it is not necessary to change the month setting, press the enter switch.
   UP switch: Sets calendar forward one month.
   DOWN switch: Sets calendar back one month.
   RETURN switch: Cancels the change and returns to the year setting.
   ENTER switch: Proceeds to setting for date.



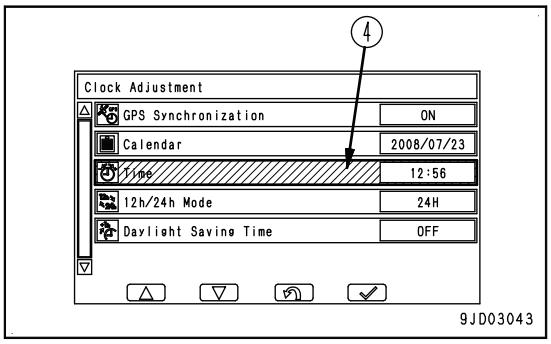
4. When day display (C) is highlighted in yellow, operate the switches as follows to change day display.
   When it is not necessary to change the date setting, press the enter switch.
   UP switch: Sets calendar forward one day.
   DOWN switch: Sets calendar back one day.
   RETURN switch: Cancels the change and returns to the month setting.
   ENTER switch: Accepts change and returns to the Clock Adjustment menu.



TIME SETTING *(WA-Q1MC-110-K-03-A)*

Adjust the time of the monitor clock.

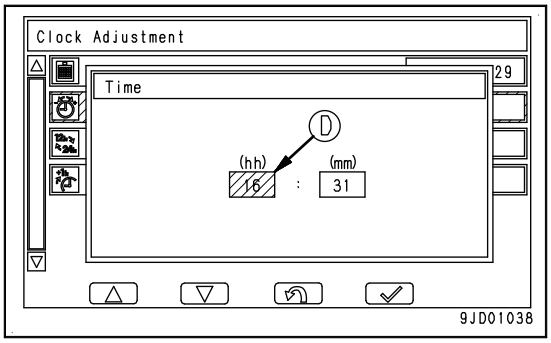
1. Select "Time" (4) from the Clock Adjustment menu, and press the enter switch.



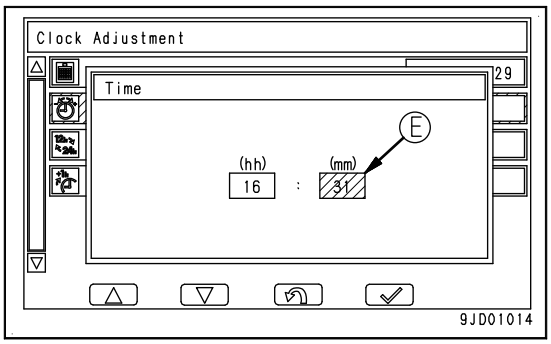
REMARK

If ON is selected for the setting of GPS Synchronization, you cannot select the "Time" (4).

2. The "Time" screen appears.
   When time display (D) is highlighted in yellow, operate the switches as follows to change time display.
   When it is not necessary to change the time setting, press the enter switch.
   UP switch: Sets time forward 1 hour.
   DOWN switch: Sets time back 1 hour.
   RETURN switch: Cancels the change and returns to the Clock Adjustment menu.
   ENTER switch: Proceeds to setting for minute.



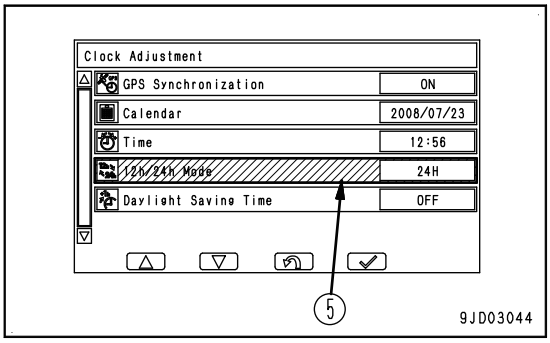
3. When minute display (E) is highlighted in yellow, operate the switches as follows to change minute display.
   When it is not necessary to change the minute setting, press the enter switch.
   UP switch: Sets time forward 1 minute.
   DOWN switch: Sets time back 1 minute.
   RETURN switch: Cancels the change and returns to the time setting.
   ENTER switch: Accepts change and returns to the clock adjustment menu.



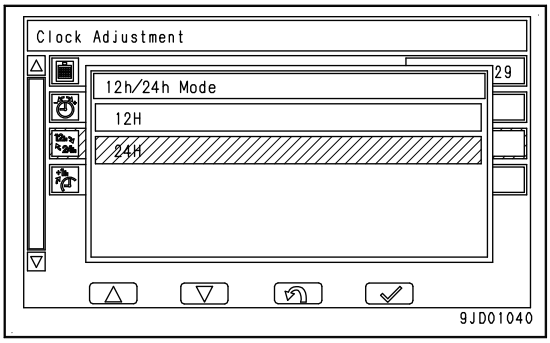
12H/24H DISPLAY MODE *(WA-Q1MC-110-K-04-A)*

Choose either a 12-hour display (am/pm) or a 24-hour display.

1. Select 12h/24h Mode (5) from the Clock Adjustment menu, then press enter switch.



2. Select 12H or 24H, then press the enter switch.
   12H: Sets 12-hour display (am/pm).
   24H: Sets 24-hour display.



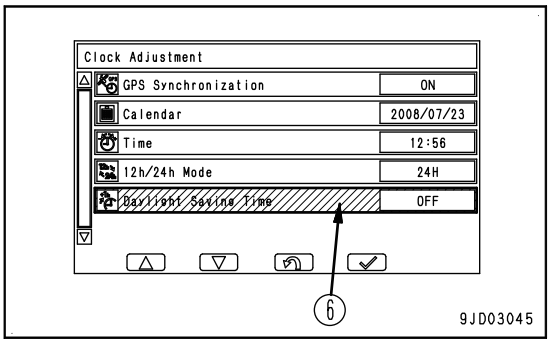
REMARK

This setting is held even after the starting switch key is turned to OFF position.
The default is 24H.

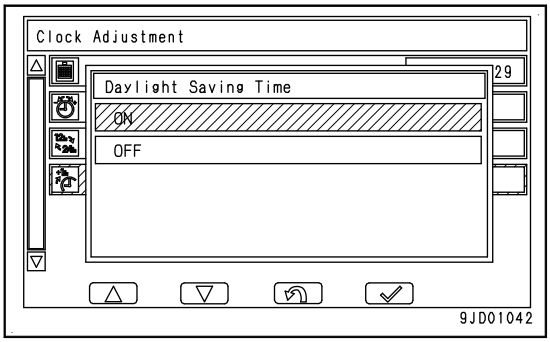
DAYLIGHT SAVING TIME (SUMMER TIME) *(WA-Q1MC-110-K-05-A)*

Set the clock display based on the Daylight Saving Time.

1. Select Daylight Saving Time (6) from the Clock Adjustment menu, then press enter switch.



2. Select ON or OFF, then press the enter switch.
   ON: Displays the time 1 hour earlier.
   OFF: Returns the time to the original.



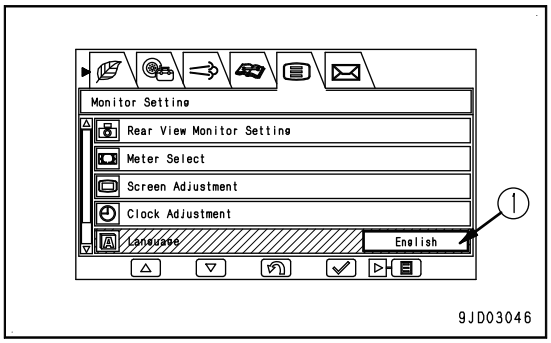
REMARK

Daylight saving time (summer time) means moving the clock forward 1 hour to take advantage of the fact that the sun rises early in summer.
This setting is held even after the starting switch key is turned to OFF position.
The default is OFF.

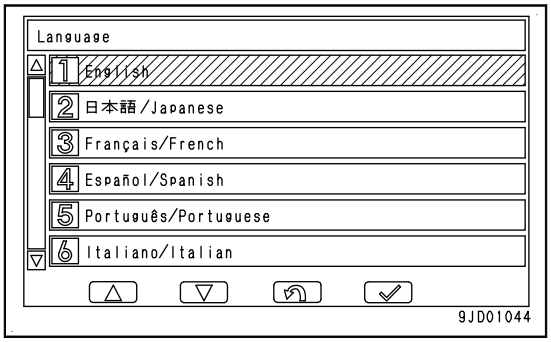
LANGUAGE SELECTION *(WA-Q19B-110-K-00-A)*

The language displayed on the monitor can be selected.
The languages that can be selected are as follows.
English, Japanese, French, Spanish, Portuguese, Italian, German, Swedish, Dutch, Danish, Norwegian, Finish, Icelandic, Czech, Hungarian, Polish, Slovak, Slovene, Romanian, Croat, Estonian, Latvian, Lithuanian, Bulgarian, Greek

1. Select Language (1) on the Monitor Setting menu, then press the enter switch.



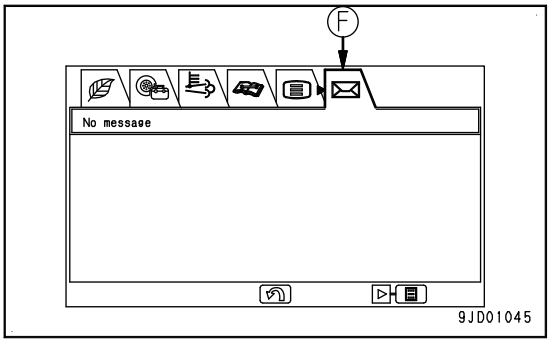
2. Select the language to be displayed, then press the enter switch.



REMARK
This setting is held even after the starting switch key is turned to OFF position.

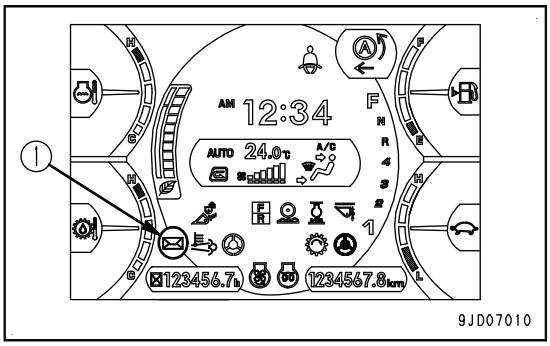
MESSAGE DISPLAY *(WA320-Q235-110-K-00-A)*

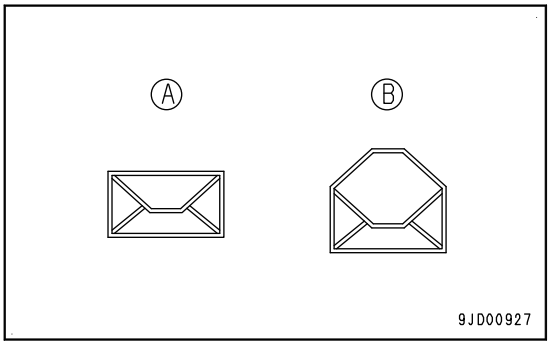
On machines equipped with KOMTRAX, you can see the messages from your Komatsu distributor on this menu (f).
When there is any massage, message pilot lamp (1) of the standard screen lights up.
(A): There is unread message.
(B): There is any read message to which no reply is made.
Reply to the message in accordance with the replying method mentioned later.



REMARK

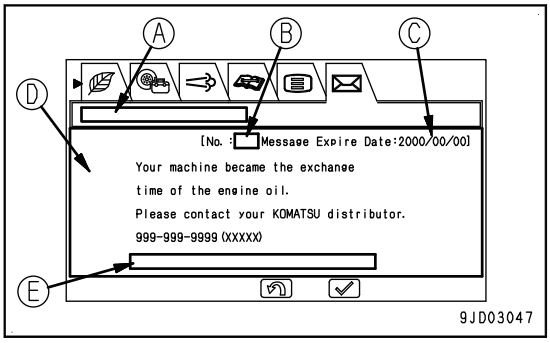
- While message pilot lamp (1) is lit on the standard screen, when the menu switch is pressed, message display menu screen (f) appears automatically.
- When the starting switch is turned OFF while there is any unread message, the message is displayed on the end screen, and when the monitor is started next time, the message changes to a read message.
  The message is deleted when it becomes out of date or when a new message reaches.





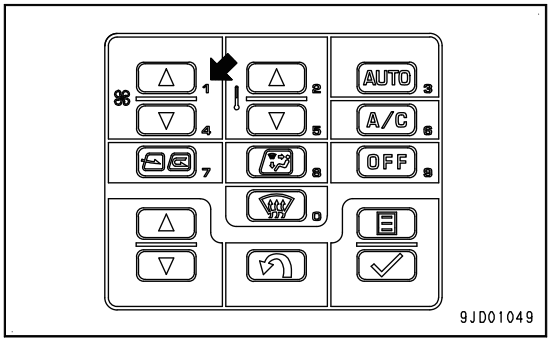
CONFIRMING METHOD OF A MESSAGE *(WA-Q235-110-K-01-A)*

Select message display menu screen (f), and you can read the arrived message.
a: Subject of message
When no message has been received, "No message." is displayed.
b: Serial No. of message
c: Validity of message
d: Text
e: Reply field
In case of a message requesting for reply, the column of "Numeric Input: [ ]" is displayed. Make any reply to the message.



REPLYING METHOD TO A MESSAGE *(WA-Q235-110-K-02-A)*

1. When replying to a message, input the selected item number shown in text (d) of the message by using the switch panel.
   - Each switch of the switch panel corresponds to the number shown on the lower right of the switch.
   - The input number is displayed in "Numeric Input: [ ]" of the reply field (e).
   - If you input an incorrect number, press the return switch, and you can clear an input character at a time.
   - If the return switch is pressed while no number is entered, the display returns to the standard screen.



2. After inputting a selected item number, press the enter switch.
3. When message (2) "Proceed?" is displayed, press the enter switch again.
   The input number will be sent out.
   To cancel sending, press the return switch.
   The input number is cleared.

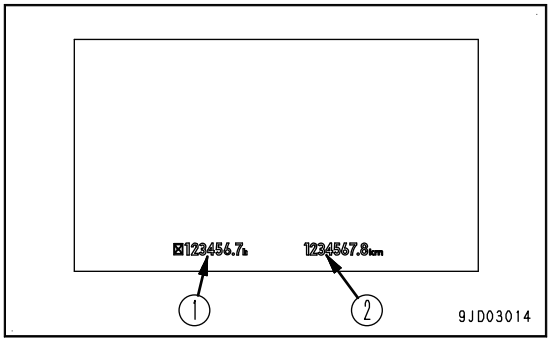
REMARK
If the message is replied, "Numeric Input Done." (3) is displayed for it.

OTHER FUNCTIONS OF MACHINE MONITOR *(HM-Q170-110-K-00-A)*

CONFIRM THE SERVICE METER OR ODOMETER WHEN THE STARTING SWITCH KEY IS SET TO THE OFF POSITION

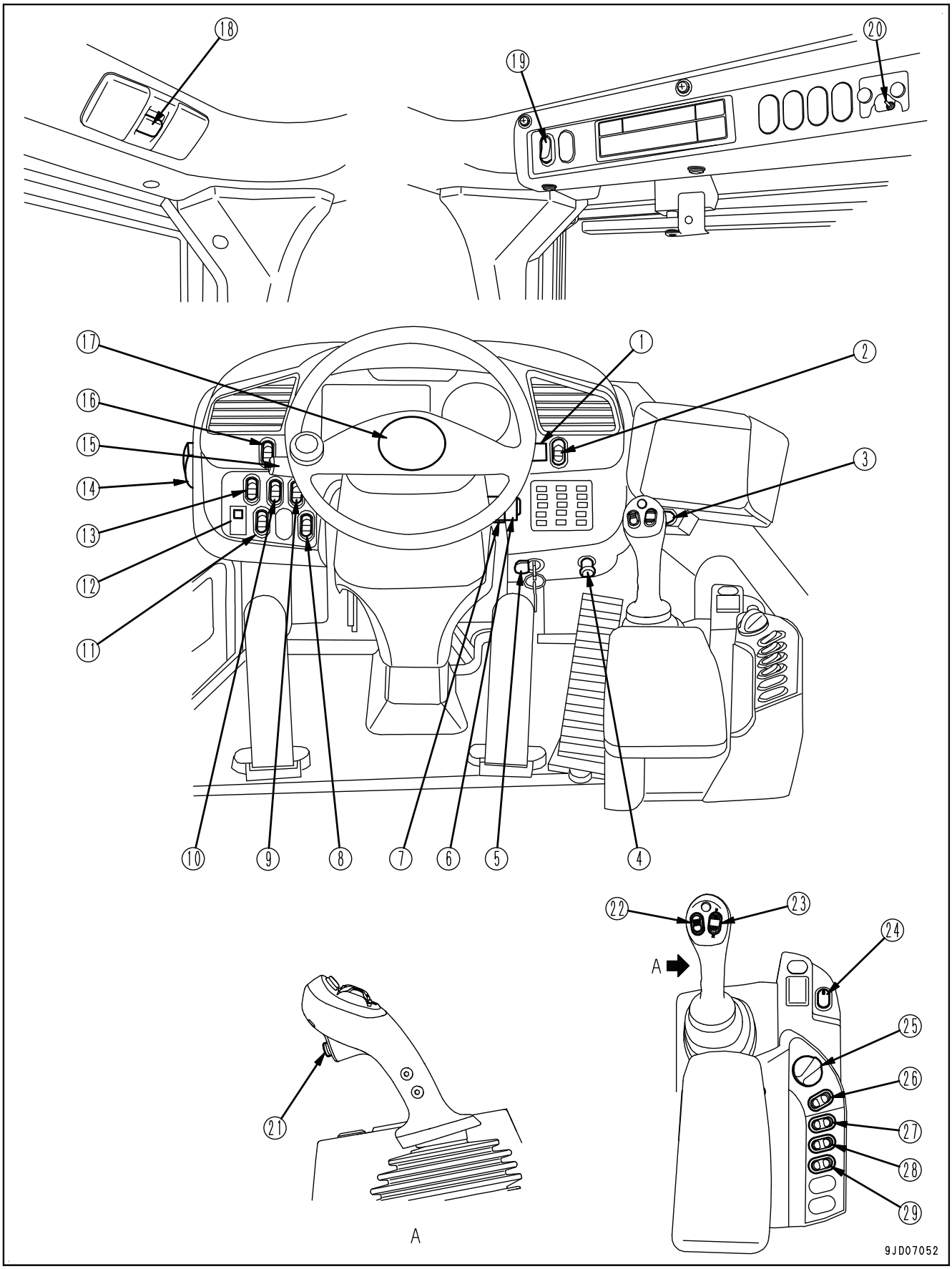
The service meter and odometer can be displayed even if the machine monitor is not turned ON.

1. Press UP switch while holding down DOWN switch when the starting switch key is set to OFF position.
2. Service meter (1) and odometer (2) are displayed while both switches are held down.



NOTICE
If the monitor screen is displayed during other operations while the starting switch is at OFF position, there is probably a failure in the equipment, so ask your Komatsu distributor for inspection.

SWITCHES *(WA320-Q13C-04D-K-00-A)*



(1) Lamp switch
(1) Turn signal lever
(1) Dimmer switch
(2) Parking brake switch
(3) Brightness adjustment switch of rear view monitor
(4) Cigarette lighter
(5) Starting switch
(6) Front wiper switch
(7) Rear wiper switch
(8) Monitor brightness selector switch
(9) Beacon lamp switch (if equipped)
(10) Rear working lamp switch
(11) ECSS switch
(12) Quick coupler attachment switch
(13) Front working lamp switch
(14) Engine shutdown secondary switch
(15) Speed range selector switch
(16) Hazard lamp switch
(17) Horn switch
(18) Room lamp switch
(19) Rear heated wire glass switch
(20) Emergency HST pump drive switch
(21) Max. traction switch
(22) PCS (Proportional Control Switch) (if equipped)
(23) Directional selector switch
(24) Work equipment lock switch
(25) Travel speed control dial
(26) Traction control switch
(27) Directional selector switch actuation switch
(28) Attachment selector switch (if equipped)
(29) Remote positioner switch

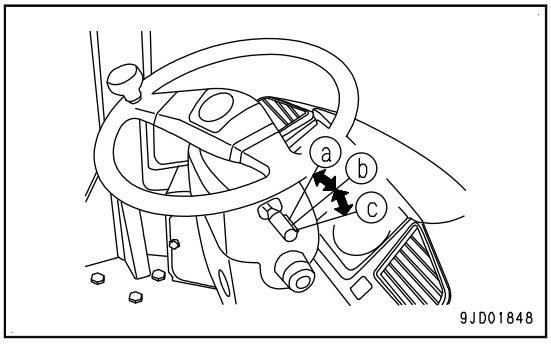
LAMP SWITCH *(WA320-Q684-043-K-00-A)*

⚠ CAUTION

When the headlamps are lit, the surface of the headlamp is at high temperature. Always turn the lamp switch OFF before washing the lamp.

This switch (1) is used to light up the headlamps, clearance lamps, tail lamps and instrument panel lamp.
Position (a): OFF
Position (b): Clearance lamps, tail lamps, and instrument panel lamp light up.
Position (c): Headlamps light up together with the lamps lit in position (b).

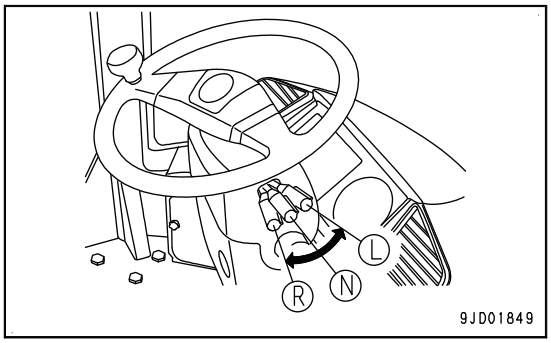
REMARK
The lamp switch can be operated regardless of the turn signal lever position.



TURN SIGNAL LEVER *(WA320-Q6D6-043-K-00-A)*

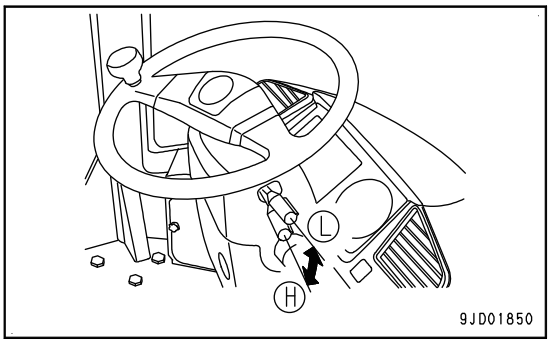
This lever (1) operates the turn signal lamp.
Position (L): The left turn signal lamp lights up (when the lever is pushed forward).
Position (N): OFF
Position (R): The right turn signal lamp lights up (when the lever is pulled backward).

REMARK
- When the lever is operated, the turn signal pilot lamp also lights up.
- The lever is automatically returned when the steering wheel is turned back. If the lever does not return, move it by hand.



DIMMER SWITCH *(WA320-Q688-043-K-00-A)*

This switch (1) is used to switch the headlights between high and low beams.
Position (L): Low beam
Position (H): High beam



PARKING BRAKE SWITCH *(WA320-GP26-043-K-00-A)*

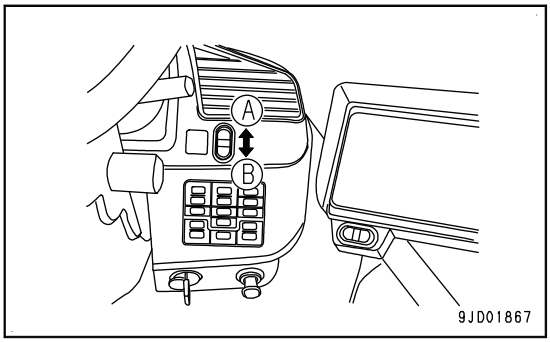
⚠ WARNING

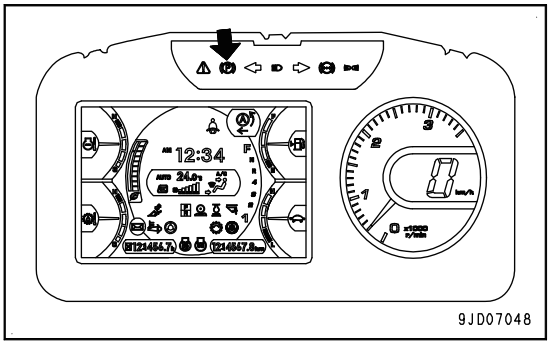
When parking or leaving the machine, always apply the parking brake.
Keep depressing the brake pedal until the parking brake pilot lamp lights up on the monitor even when the parking brake switch is turned to ON.

NOTICE

- **Do not use the parking brake switch during travelling except for an emergency. If so, the parking brake may be damaged and a serious accident may result. After the machine has stopped from travelling, apply the parking brake.**
- **If the parking brake is used for an emergency when the machine is travelling at high speed, ask your Komatsu distributor for inspection of the parking brake system.**

This switch (2) applies the parking brake.
Position (A):
The parking brake applies, and the parking brake pilot lamp lights up on the monitor.
Position (B):
OFF position. The parking brake is released.



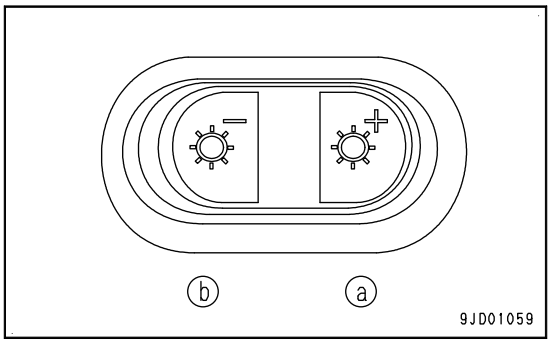


REMARK

- If the parking brake is applied, the machine does not move even if the directional lever is operated.
- If the directional lever is shifted to the F (forward) or R (reverse) position while the parking brake is applied, the centralized warning lamp lights up and the alarm buzzer sounds.
- Start the engine after turning the parking brake switch to ON position.

REAR VIEW MONITOR BRIGHTNESS ADJUSTMENT SWITCH *(WA320-Q16E-043-K-00-A)*

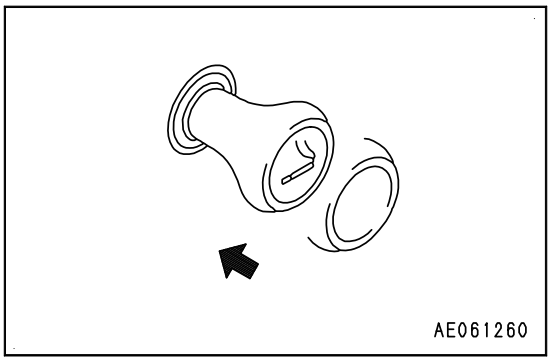
This switch (3) is used for adjusting the brightness (luminance) of the rear view monitor.
The brightness can be adjusted individually in the day and night modes.
(a) side: Brightness increases.
(b) side: Brightness decreases.



CIGARETTE LIGHTER *(WA320-K850-043-K-00-A)*

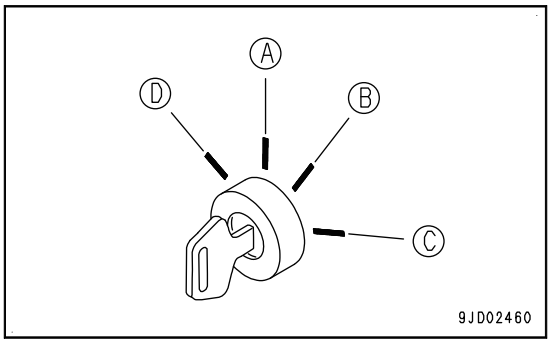
This switch (4) is used to light a cigarette.
When cigarette lighter (4) is pushed in, it will return to its original position after several seconds, so pull it out to use it.
If the cigarette lighter is removed, the socket can be used as an 85 W (24 V x 3.5 A) power source.

NOTICE
The voltage for this cigarette lighter is 24 V. Do not use it as the power supply for 12 V equipment.



STARTING SWITCH *(WA320-AKB0-043-K-00-A)*

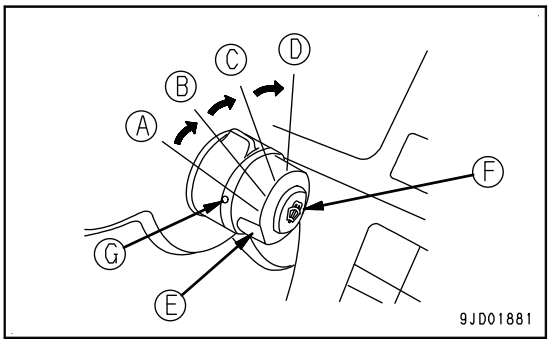
This switch (5) is used to start or stop the engine.
(A): OFF position
At this position, the starting switch key can be inserted and removed. When the switch is turned to this position, all the electric circuits are shut off and the engine stops. And, the parking brake applies automatically.
(B): ON position
Electric current flows through the charging and lamp circuits. Keep the starting switch key at ON position while the engine is running.



When the ambient temperature is low during engine startup, the engine preheating pilot lamp lights up and engine preheating starts automatically.
This preheating time depends on the ambient temperature during engine startup.
When the engine preheating pilot lamp lights up, wait for a while. When it goes out, then turn the starting key to START position.
(C): START position
This is the position to start the engine. Hold the key at this position while cranking the engine. Release your fingers off the key immediately after the engine has been started. The key will return to ON position (B).
(D):Manual preheat position
In the cold weather, the engine preheating time can be increased longer than the automatic preheating time. To make it, rotate the starting switch key to this position.
When you release your fingers off the key, it returns to position (A). Start up the engine immediately by rotating the key to position (C).

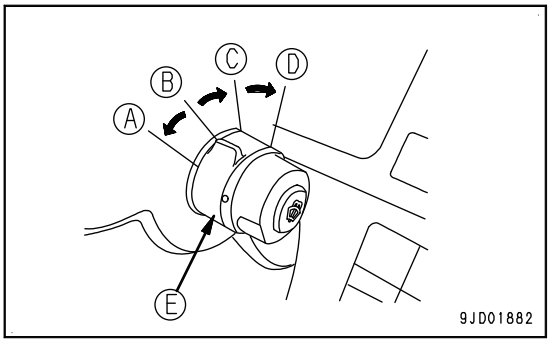
FRONT WIPER SWITCH *(WA320-K751-043-K-00-A)*

If rotary switch (E) of this switch (6) is rotated, the front windshield wiper operates.
If push button (F) is pressed, washing water is sprinkled on the front windshield while the push button is held down.
The switch position can be checked by the position of round mark (G).
Position (A): (OFF) Wiper is stopped.
Position (B): (INT) Wiper moves intermittently.
Position (C): Wiper moves at low speed.
Position (D): Wiper moves at high speed.



REAR WIPER SWITCH *(WA320-K760-043-K-00-A)*

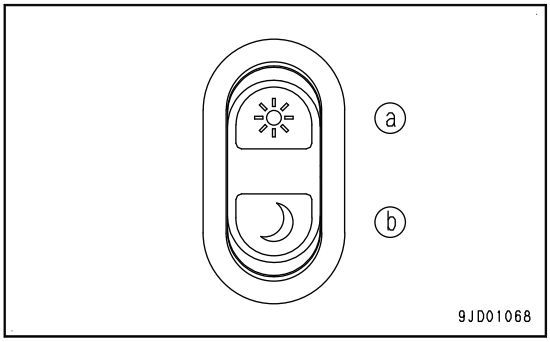
If lever (E) of this switch (7) is rotated, the rear wiper operates.
Position (A):
Washing water is sprinkled. If your hand is released, the switch returns to position (B).
Position (B): (OFF) Wiper is stopped.
Position (C): Wiper is actuated.
Position (D):
Wiper is actuated and washing water is sprinkled. If your hand is released, the switch returns to position (C).



MONITOR BRIGHTNESS SELECTOR SWITCH *(WA320-Q1G6-043-K-00-A)*

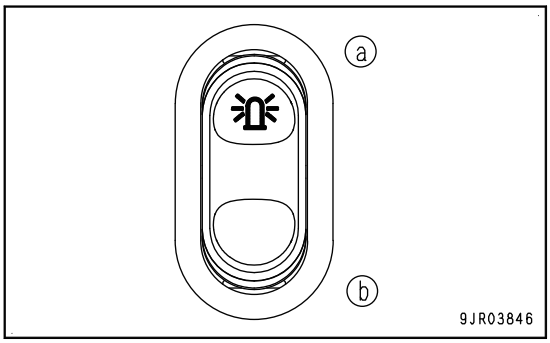
This switch (8) is used for switching the brightness (luminosity) of the machine monitor and rear view monitor while lamp switch is turned ON.
When operating the machine with the headlamp lit during the day, if this switch is set to Day mode, monitor screen does not loose the brightness.
(a): Day mode
(b): Night mode

REMARK
When the lamp switch is turned to OFF position, operating this switch does not change the brightness.
For the fine adjustment method of brightness of the machine monitor, see "SCREEN ADJUSTMENT (PAGE 3-67) ".
For the fine adjustment method of brightness of the rear view monitor, see "REAR VIEW MONITOR BRIGHTNESS ADJUSTMENT SWITCH (PAGE 3-78) ".



BEACON LAMP SWITCH *(WA320-Q5F1-043-K-00-A)*

(If equipped)
This switch (9) is used to turn the beacon lamp ON and OFF.
Position (a): ON
Position (b): OFF

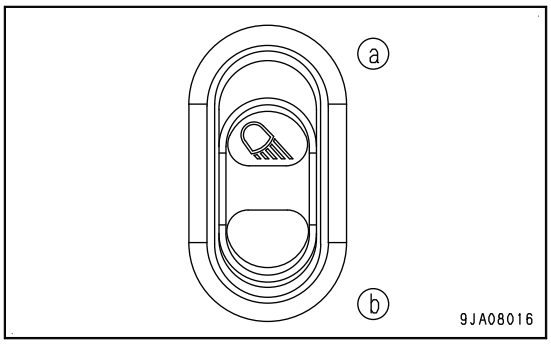


REAR WORKING LAMP SWITCH *(WA320-Q6B9-043-K-00-A)*

⚠ WARNING

The working lamps must be turned off when the machine is travelling on a public road.

Use this switch (10) to light up the rear working lamps.
Position (a): The working lamps light up.
Position (b): The working lamps go out.
When position (a) is pressed, the pilot lamp turns ON.



ECSS SWITCH *(WA320-L3C5-043-K-00-A)*

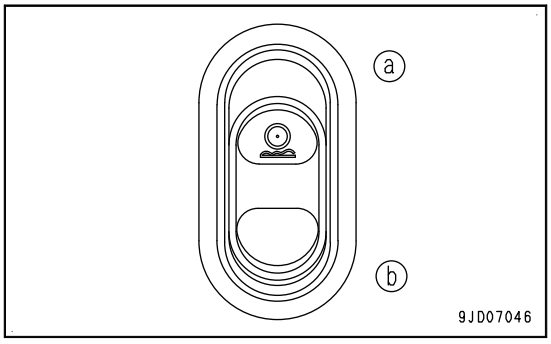
⚠ WARNING

- **If ECSS switch is turned ON during travel or with the work equipment raised, the machine starts moving at the moment.**
- **If the machine is operated with ECSS switch turned ON, the work equipment may start moving at the moment when the ECSS operates. Care must be taken.**
- **Be sure not to turn ECSS switch to ON position as long as the inspection or maintenance is continued. The work equipment will move and it is dangerous.**

NOTICE

- **Before operating ECSS switch, be sure to stop the machine and lower the work equipment to the ground.**
- **When performing inspection or maintenance, lower the work equipment to the ground first, turn ECSS switch to OFF position, then start the work.**
- **Keep ECSS switch turned OFF during leveling work.**

This switch (11) is used to turn the ECSS ON or OFF.
Position (a): ON
The pilot lamp lights up and the ECSS operates.
Position (b): OFF
The ECSS does not operate.

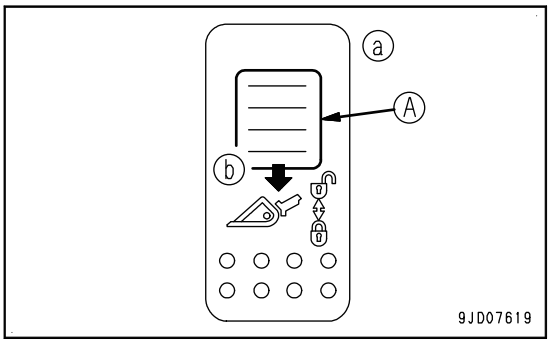


REMARK

- The ECSS absorbs the machine vibration during travel with the hydraulic spring effect of the accumulator to attain smooth high speed travel.
- If the travel speed goes above 5 km/h (3.1 MPH), the ECSS is automatically activated; when the travel speed goes below 4 km/h (2.5 MPH), the ECSS is automatically turned off.
- When the bucket is fully tilted and is in contact with the stopper at the boom end, the ECSS effect is reduced.
- Operate the bucket slightly to DUMP position to move it away from the stopper at the boom end. This enables the ECSS to have effect.
- Contact your Komatsu distributor if you want to adjust the speed at which the ECSS is actuated or turned off.

QUICK COUPLER ATTACHMENT SWITCH *(WA320-LGC8-043-K-00-A)*

Use this switch (12) when installing or removing the attachment or when connecting or releasing the attachment and coupler.
Position (a): Release
Push the switch in to this position, then pull lock (A) in the direction of the arrow (b) and release the connection
When you release the switch, the switch returns automatically to the original position.
For detail, see "HANDLING HYDRAULIC TYPE QUICK COUPLER (PAGE 3-187) ".

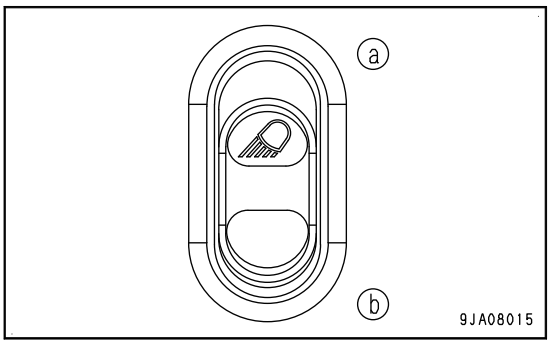


FRONT WORKING LAMP SWITCH *(WA320-Q6B8-043-K-00-A)*

⚠ WARNING

The working lamps must be turned off when the machine is travelling on a public road.

Use this switch (13) to light up the front working lamps.
Position (a): The working lamps light up.
Position (b): The working lamps go out.
When position (a) is pressed, the pilot lamp turns ON.



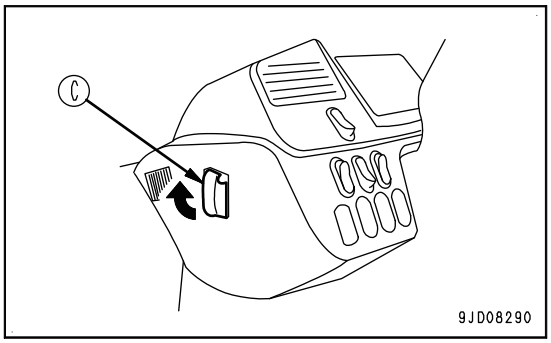
ENGINE SHUTDOWN SECONDARY SWITCH *(WA320-AKHL-100-K-00-A)*

NOTICE
This switch (14) is used to stop the engine when the starting switch is turned to OFF position but the engine does not stop.

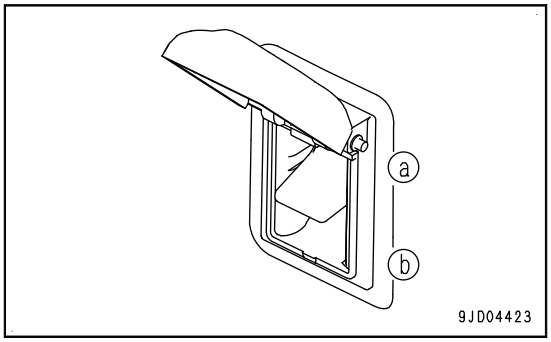
- **Do not use this switch (14) except in emergencies.**
  Ask for repair of the problem as soon as possible.
- **If this switch is moved to "STOP ENGINE" position by mistake while the machine is operating normally, "Engine Shutdown Secondary Switch Activated" is displayed on the machine monitor.**
  If "Engine Shutdown Secondary Switch Activated" is displayed on the machine monitor, check that the switch cover is closed and the switch is in "NORMAL" position. If not, set it to "NORMAL" position.

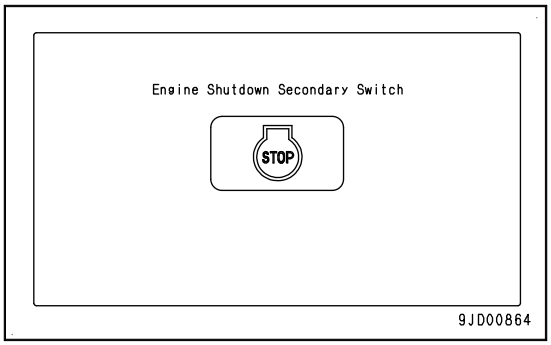
See "WHEN STANDING UP FROM OPERATOR'S SEAT (PAGE 2-18) ", lower the work equipment to the ground, lock the work equipment by pressing work equipment by lock switch, and turn the parking brake switch to ON (operation) position.
Then turn the starting switch to OFF position.
If the engine does not stop, operate the engine shutdown secondary switch as follows.

1. Raise cover (C) to open it.
   When raised, the switch (14) is found.



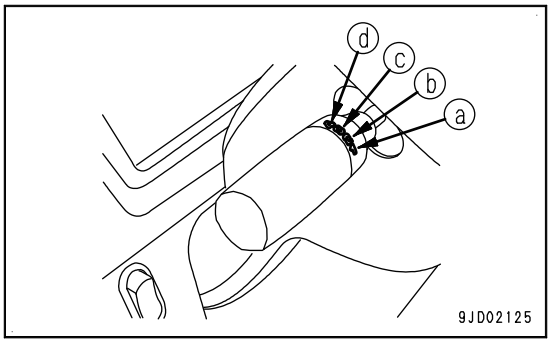
2. Pull up the switch (14), and the engine stops.
   (a) Stop engine: When abnormal (switch is pulled up)
   (b) Normal: When normal (switch is pushed down)
   - When cover (1) is closed, switch (14) is automatically returned to normal position (b).
   - When the starting switch is turned to ON position while this switch is in stop engine position, "Engine Shutdown Secondary Switch Activated" is displayed on the machine monitor.
     If this screen is displayed, return switch (14) to normal position.





SPEED RANGE SELECTOR SWITCH *(WA320-C7HC-043-K-00-A)*

This switch (15) is used to change the speed range of the machine.
Position (a): 1st speed
Position (b): 2nd speed
Position (c): 3rd speed
Position (d): 4th speed



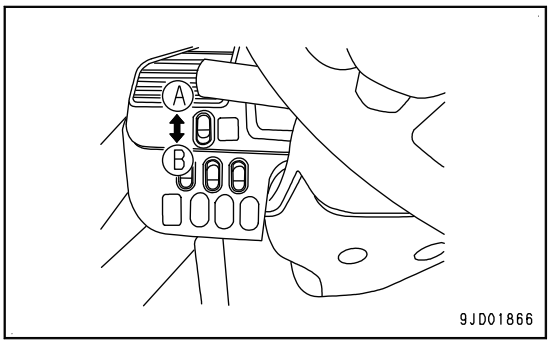
REMARK
When traveling at high speed with 3rd or 4th speed range (travel speed 8km/h (5.0 MPH) or higher), even if the speed range is shifted to 1st or 2nd, speed range does not change to 1st or 2nd in order to prevent HST motor overrunning.
In such case, the centralized warning lamp lights up and the alarm buzzer sounds.
To cancel the alarm buzzer, perform the following.
- Reduce travel speed to 7km/h (4.3 MPH) or slower. Speed range becomes 1st or 2nd, and the alarm buzzer is canceled.
- Shift the speed range selector switch to 3rd or 4th.

HAZARD LAMP SWITCH *(WA320-Q6D7-043-K-00-A)*

⚠ WARNING

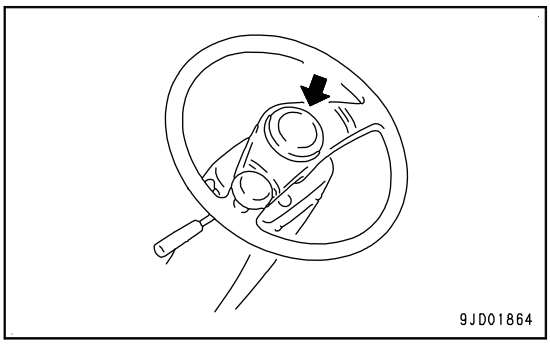
When the machine is traveling normally, do not use this switch as it can mislead another vehicles.

Use switch (16) when you need to park the machine on a road due to machine failure or during emergency only.
Position (A):
All of turn signal lamps and the turn signal pilot lamp blink.
Position (B):The lamps go out.



HORN SWITCH *(WA320-Q543-043-K-00-A)*

When switch (17) is pressed, the horn sounds.

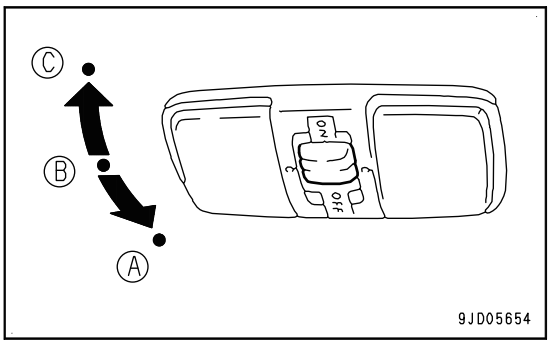


ROOM LAMP SWITCH *(WA320-Q6L3-043-K-00-A)*

NOTICE
If the room lamp is left to be turned on, the batteries may be exhausted. Do not forget to turn it off.

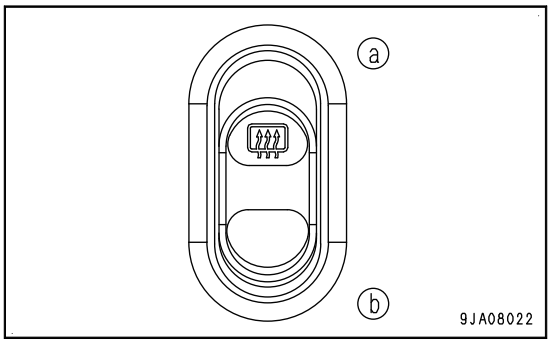
This switch (18) illuminates the room lamp.
Position (A): OFF (Light out)
Position (B): Lights up when cab door opens.
Position (C): ON (Lights up).

REMARK
- The room lamp lights up even when the starting switch is at OFF position, so when leaving the operator's compartment, set the switch to position (A) or (B).
- When operating the machine with the door fully opened, set the switch to position (A).



REAR HEATED WIRE GLASS SWITCH *(WA320-K18K-043-K-00-A)*

If this switch (19) is pressed, the rear heated wire glass is turned ON to clear the glass.
Position (a): ON (Clearing the glass)
Position (b): OFF
When position (a) is pressed, the pilot lamp turns ON.

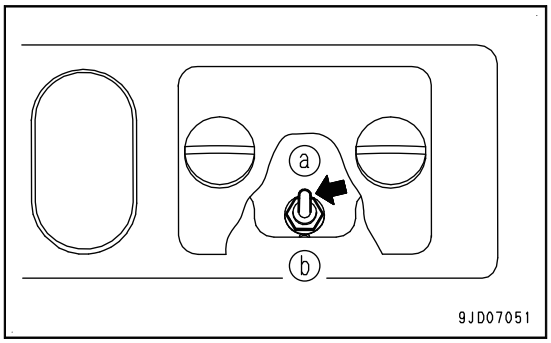


EMERGENCY HST PUMP DRIVE SWITCH *(WA320-C7H9-043-K-01-A)*

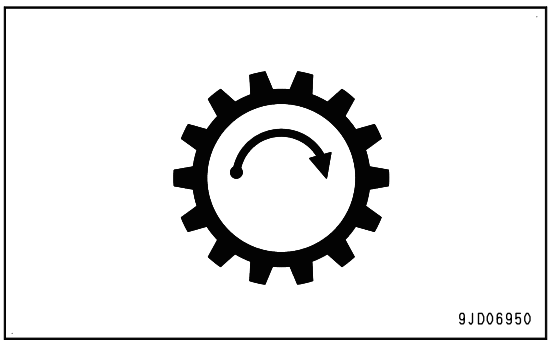
NOTICE

- **Do not use this switch (20) except in emergencies. Ask for repair of the problem as soon as possible.**
- **Be careful that the machine starts traveling at the same time as the switch is moved to (b) position when directional lever is at the position other than N (neutral).**

This switch (20) enables the machine to travel temporarily when the machine is unable to travel due to abnormality of pump control system (HST system caution lamp lights up in red and action level "L03" is displayed).
Position (a): OFF (when normal)
Position (b): ON (in emergencies)



Alarm buzzer sounds and emergency HST pump drive switch pilot lamp in machine monitor lights up when switch is turned to (b) position.
When the machine is unable to travel due to abnormality of pump control system, move directional lever to F (forward) position or R (reverse) position while setting this switch to (b). Then the machine travels forward or reverse at low speed.
Move the machine to a safe place, stop the engine, then perform the inspection and maintenance.

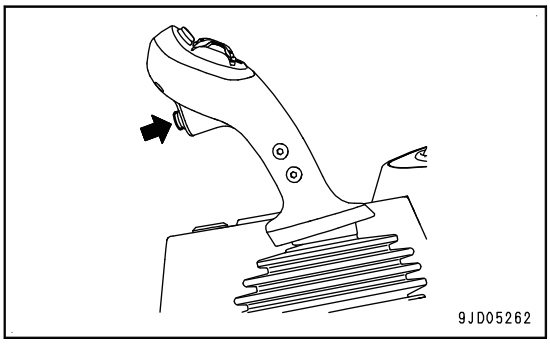


REMARK

- When you release the switch, the switch returns automatically to (a) position.
  Hold the switch at (b) position during the operation.
- When you release the switch during traveling, the machine may stop abruptly.
  Release the accelerator pedal, depress the brake pedal, and release the switch after the machine stops.

MAX. TRACTION SWITCH *(WA320-C7L1-043-K-00-A)*

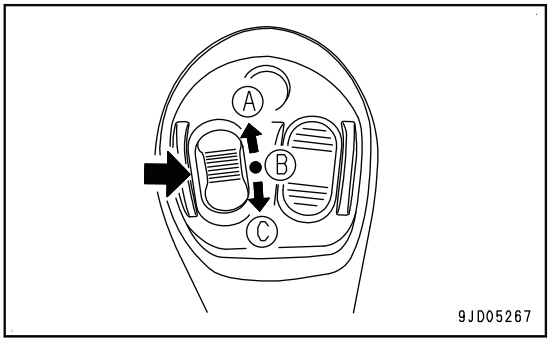
Use this switch (21) to cancel the traction control or S mode.
Use the traction control switch to select traction control ON or S mode.
When the traction control ON or S mode selection is active, if switch (21) pressed, the traction control or S mode is cancelled and the maximum traction becomes larger. At the same time, the traction control operation pilot lamp or S mode operation pilot lamp on the machine monitor goes out.
To return to the traction control ON or S mode state, press switch (21) again or change the position of the directional lever.



REMARK
Use this function for scooping-up operations or other operations where the maximum traction is desired.

PCS (Proportional Control Switch) *(WA320-PT0V-100-K-00-A)*

(if equipped)
This switch (22) is used to operate the attachment.
Position (A): Expand left cylinder (retract right cylinder)
Position (B): HOLD
Position (C): Expand right cylinder (retract left cylinder)

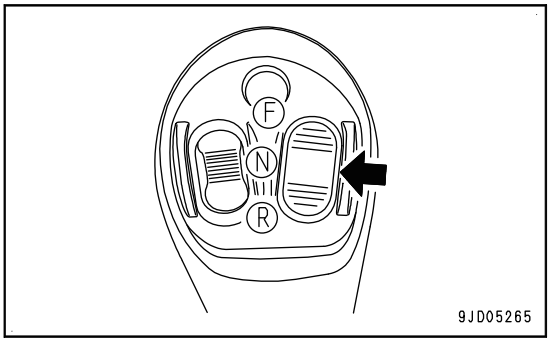


DIRECTIONAL SELECTOR SWITCH *(WA320-C7N1-043-K-00-A)*

This switch (23) is used to set the travel direction to forward, neutral, and reverse.
Position (F): Forward
Position (N): Neutral
Position (R): Reverse
Before operating this switch, check that the condition is as follows.

- Directional lever is at N
- Directional selector switch actuation switch is at ON

If the condition is not as above, the switch will not work.
For detail, see "SHIFT BETWEEN FORWARD AND REVERSE (PAGE 3-178)".

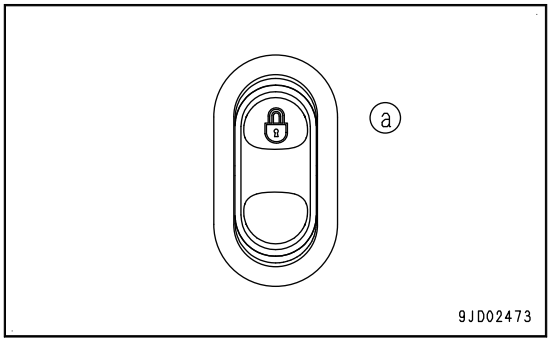


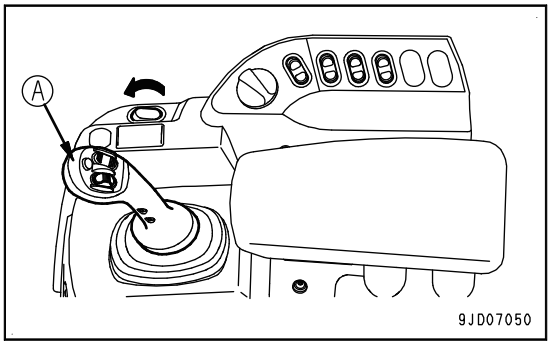
WORK EQUIPMENT LOCK SWITCH *(WA320-PK1J-043-K-00-A)*

⚠ WARNING

- **When leaving the operator's seat, be sure to lock the work equipment by pressing the work equipment lock switch (pilot lamp lights up). If the work equipment is not locked and the multi-function mono-lever (A) is touched by mistake, it may lead to serious accident.**
- **If the work equipment is not securely locked, it can start moving and cause a serious personal injury. Check that the pilot lamp lights up.**
- **Before operating the work equipment lock switch, make sure that multi-function mono-lever (A) is in HOLD position.**
- **When operating the work equipment lock switch, be sure not to touch multi-function mono-lever (A).**

This switch (24) is a device used to lock the work equipment.
The work equipment is locked (the pilot lamp lights) or unlocked (the pilot lamp goes out) each time you press work equipment lock switch (a).
Even if you may turn the starting switch to OFF position with the work equipment unlocked (pilot lamp goes out), the work equipment is locked (pilot lamp lights up) if you turn the starting switch to ON position again.

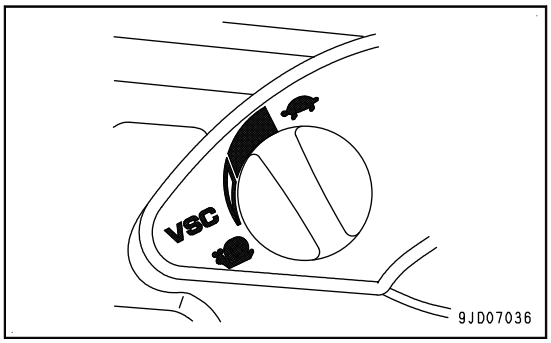




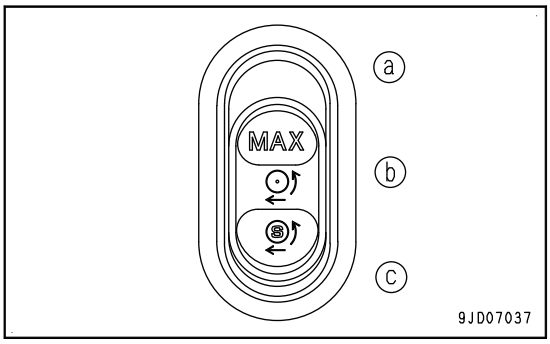
TRAVEL SPEED CONTROL DIAL *(WA320-C7HD-043-K-00-A)*

This switch (25) is used to freely set the maximum travel speed at the 1st speed range.
As turning the dial clockwise or counterclockwise, the maximum travel speed becomes higher or lower respectively.
The maximum travel speed may vary depending on the conditions of use or on road surface condition.

Tire installed	Maximum travel speed [km/h (MPH)]
Standard tire (20.5R25☆)	1.0 to 13.0 (0.6 to 8.1)



TRACTION CONTROL SWITCH *(WA320-C7K5-043-K-00-A)*



Use this switch (26) to actuate the traction control and make it possible to reduce the maximum traction.
Position (a): Traction control OFF (MAX)
The traction control is not actuated.
Position (b): Traction control ON
The traction control is actuated.
When the traction control is actuated, the traction control operation pilot lamp on the machine monitor lights up.You can select the maximum drawbar pull from Auto, and level 1 to 5 by using drawbar pull selection function.
For details of the method of selecting the traction level, see "TRACTION LEVEL SELECTION (PAGE 3-56) ".

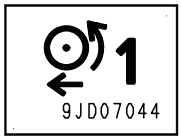
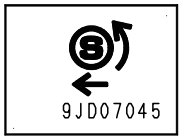
Position (c): S mode
The S mode is actuated.
If the S mode is actuated, the S mode operation pilot lamp on the machine monitor lights up.
If the S mode is actuated, it becomes possible to select the most suitable drive power when operating on extremely slippery roads, such as during snow-clearing operations, and this makes it possible to reduce tire slip and carry out the operation easily. In addition, it also suppresses the sudden movement when driving forward and allows the machine to move off smoothly.

REMARK
By using the traction control switch and traction level selector function makes it possible to carry out efficient operations with reduced tire slip by selecting the most suitable maximum traction to match the job conditions.
If the traction is too great for the operating conditions:

- It will become more difficult to raise the boom and tire slip will be more likely to occur. If tire slip becomes common, the working efficiency will become poor and the life of the tires will also be reduced.

If the traction is too small for the operating conditions:

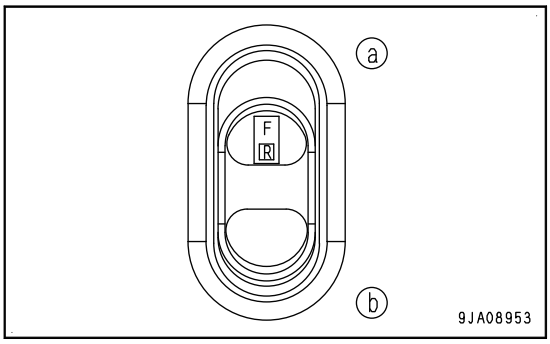
- It will become impossible to thrust the bucket in sufficiently into the materials being loaded, and the working efficiency will become poor.

<table>
<tr><th rowspan="2">Switch position</th><th rowspan="2">Traction control setting</th><th rowspan="2">Display on monitor</th><th colspan="3">Features</th></tr>
<tr><th>Drawbar pull</th><th>Target material of loading</th><th>Road conditions</th></tr>
<tr><td>(a)</td><td>-</td><td>  *1</td><td>Large</td><td>Suitable for heavy target material.</td><td>Suitable on the ground where not slippery.</td></tr>
<tr><td rowspan="6">(b)</td><td>Auto</td><td>  </td><td>Automatic adjustment *2</td><td colspan="2">Can be applied for loading work by automatic adjustment.</td></tr>
<tr><td>Level 5 (High)</td><td>  *1</td><td rowspan="5">Large
↑
↓
Small</td><td colspan="2">Suitable for loading heavy target material and on the ground not slippery.
In the stall range (when travel speed is around 0 km/h (0 MPH)), the equivalent drawbar pull when traction control is OFF (MAX.) can be performed.</td></tr>
<tr><td>Level 4</td><td>  </td><td rowspan="4">Suitable for heavy target material.
↑
↓
Suitable for light target material.</td><td rowspan="4">Suitable on the ground where not slippery.
↑
↓
Suitable on the slippery ground.</td></tr>
<tr><td>Level 3</td><td>  </td></tr>
<tr><td>Level 2</td><td>  </td></tr>
<tr><td>Level 1 (Low)</td><td>  </td></tr>
<tr><td>(c)</td><td>-</td><td>  </td><td colspan="3">Tires will not easily slip and operation on a slippery ground such as a snow removal work can be performed easily, because an appropriate driving force is obtained.</td></tr>
</table>

*1 When the traction control is set to OFF (MAX.), the maximum drawbar pull can be performed over all speed ranges. When machine is operated in the stall range (when travel speed is around 0 km/h (0 MPH)), however, slipping of tires can be easily controlled by setting the traction control to ON.
*2 It selects the most suitable drawbar pull corresponding to the depressed amount of the accelerator pedal and restrains the fuel consumption.

DIRECTIONAL SELECTOR SWITCH ACTUATION SWITCH *(WA320-C7N3-043-K-00-A)*

If this switch (27) is pressed, the directional selector switch can be used.
The basic operation is as follows.
Position (a): Directional selector switch is enabled.
Position (b): Directional selector switch is disabled.

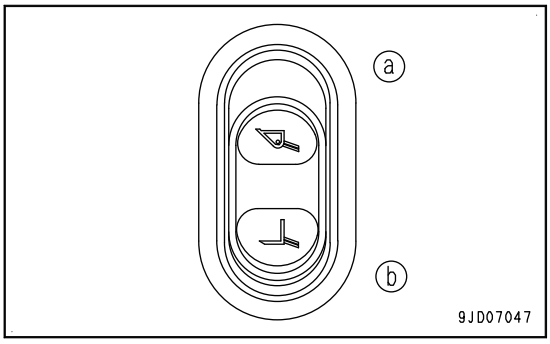


REMARK

- Turn this switch ON when the directional lever and directional selector switch are at the neutral position. At any other position, this switch does not work.
- Even if the directional selector switch is functioning, when the directional lever is operated, the operation of the directional lever is given priority.

ATTACHMENT SELECTOR SWITCH *(WA320-PT5X-043-K-00-A)*

(If equipped)
This switch (28) switches the bucket positioner and fork positioner.
Position (a): Bucket positioner
When using the bucket, set to this position.
Position (b): Fork positioner
When using the fork, set to this position.

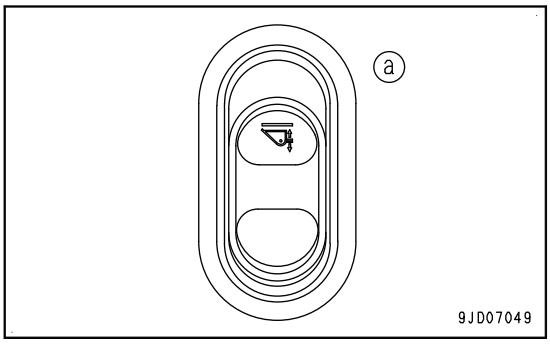


REMARK

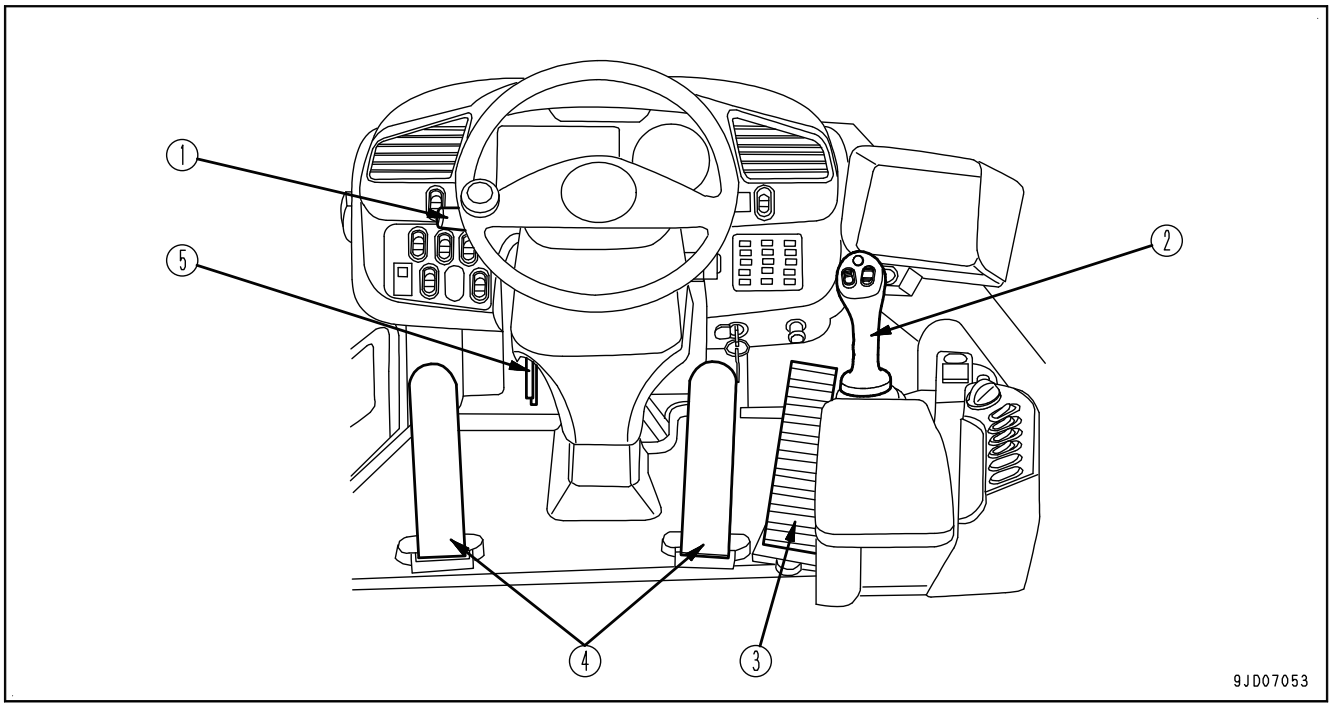
PZ auto-tilt-in function is disabled while fork positioner is selected.
For PZ auto-tilt-in function, see "PZ AUTO TILT-IN SELECT (PAGE 3-58) ".

REMOTE POSITIONER SWITCH *(WA320-L222-043-K-00-A)*

This switch (29) is used to freely set the stopping position of the boom.
Position (a): Set or cancel stopping position of boom
For the setting and cancelling method of the remote positioner, see "REMOTE POSITIONER (PAGE 3-199) ".



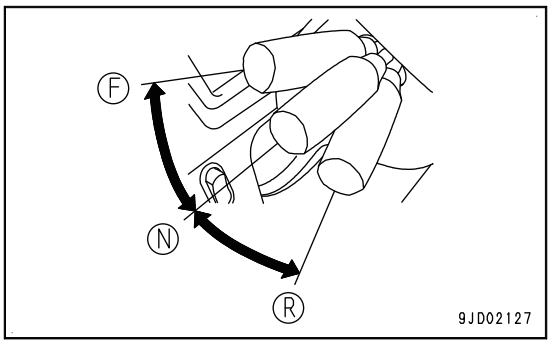
CONTROL LEVERS AND PEDALS *(WA320-K191-04D-K-00-A)*



(1) Directional lever
(2) Multi-function mono-lever
(3) Accelerator pedal
(4) Brake pedal
(5) Steering tilt lock lever

DIRECTIONAL LEVER *(WA320-CX31-043-K-00-A)*

This lever (1) switches the machine travel between the forward and reverse.
The engine can not be started if the directional lever is not in N (neutral) position.
In such case, the centralized warning lamp lights up and the alarm buzzer sounds.
Start the engine after turning the directional lever to the N (neutral) position.
Position (F): Forward
Position (N): Neutral
Position (R): Reverse

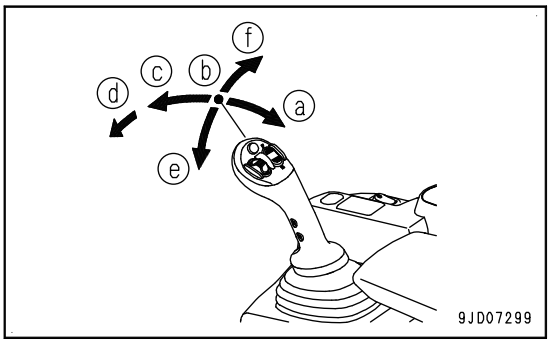


REMARK
Don’t leave the directional lever at the mid position between (F) and (N) as well as (N) and (R).

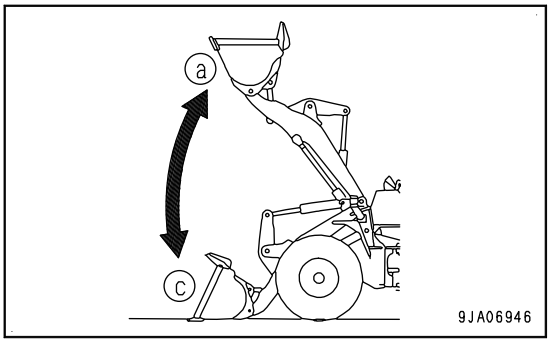
MULTI-FUNCTION MONO-LEVER *(WA320-PK10-100-K-00-A)*

This lever (2) is used to operate the boom and bucket.

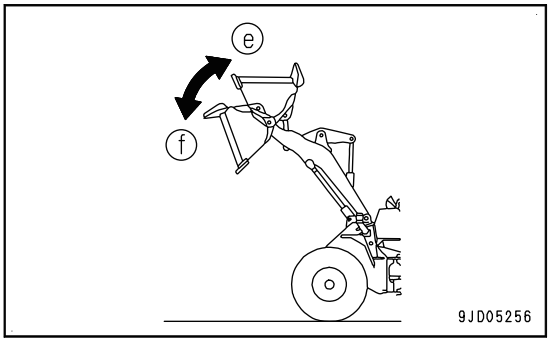
NOTICE
Do not use "FLOAT" position when lowering the bucket. Use "FLOAT" when "LEVELING WORK (**PAGE 3-194**) **".**



Position (a): RAISE
When the multi-function lever is pulled further from the "RAISE" position, the lever stops in that position. When the remote boom positioner is enabled, the boom stops at the preset position and the lever returns to "HOLD" position at the same time. When the remote boom positioner is disabled, the boom stops at the highest position and the lever returns to "HOLD" position at the same time.
Position (b): HOLD
The boom and bucket remain in the positions where they are stopped.
Position (c): LOWER
Position (d): FLOAT
The boom moves freely under external force. When the lever is set to "FLOAT" position, the lever stops in that position.

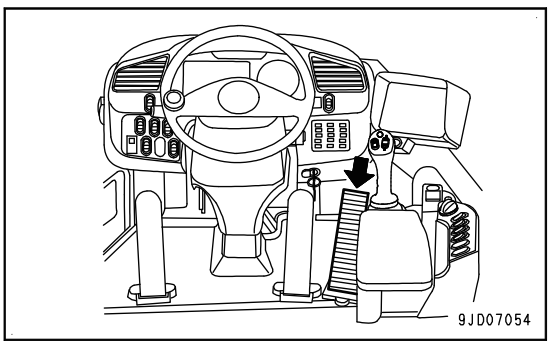


Position (e): TILT
When the multi-function lever is pulled further from the "TILT" position, the lever stops in that position. When the bucket reaches the position preset by the bucket positioner, the lever returns to the "HOLD" position.
Position (f): DUMP



ACCELERATOR PEDAL *(WA320-AEX1-043-K-00-A)*

This pedal (3) is used to adjust the speed and output of the engine.
It perfectly controls the engine from Low idle (MIN) to High idle (MAX).



BRAKE PEDAL *(WA320-G4A1-012-K-00-A)*

⚠ WARNING

- **When traveling downhill, use the engine brake together with the brake.**
  The brake pedals installed on right and left sides of the steering post provide the same function.
- **Do not depress the brake pedal repeatedly if not necessary. Excessive use of the brake heats it up, degrading its function and may result in serious personal injuries.**
- **Do not rest your foot on the brake pedal unless it is required.**

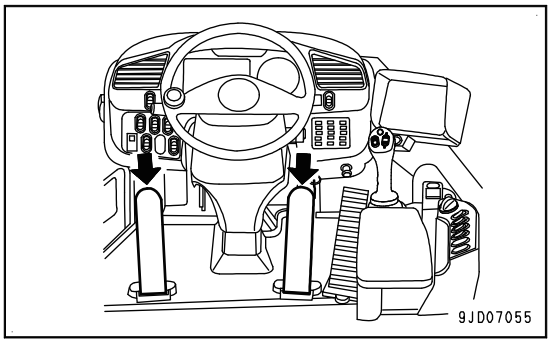
NOTICE

Frequent braking increases the axle oil temperature. As a result, the alarm buzzer may sound and the warning lamp may light up for protection of the brake discs. Observe the following ways of operation to prevent the increase of the axle oil temperature.

- **Try to avoid the over travel speed and sudden braking.**
- **Try to apply the brake on and off rather than continuously.**
- **Try gradual acceleration and braking rather than sudden acceleration and braking .**
- **When traveling downhill, use a low speed range so that the engine brake works well.**

This pedal (4) is used to operate the brake.

- Inching function
  By depressing the brake pedal halfway, inching function of HST operates and machine can be decelerated and stopped without reducing engine speed.
  When you approach to the truck while raising the boom, use this inching function.



REMARK

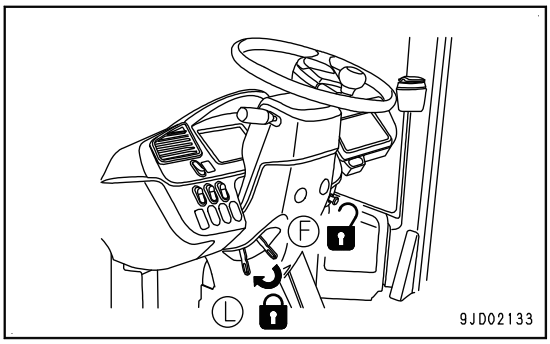
When you decelerate and stop the machine by using both of brake pedal and accelerator pedal, it is easier to use left brake pedal.

STEERING TILT LOCK LEVER *(WA320-F172-043-K-00-A)*

⚠ WARNING

Stop the machine before adjusting the tilt of the steering wheel. If this operation (adjustment) is performed while the machine is moving, serious personal injuries can result.

Use this lever (5) to fix position of the steering wheel.
(F) FREE position:
The steering wheel is allowed to move back and forth, and up and down.
(L) LOCK position:
The steering wheel is fixed in the position.

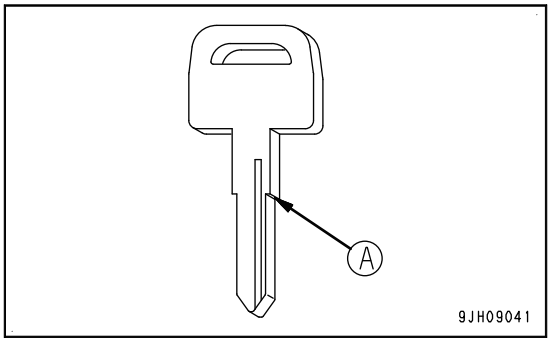


Vertical adjustment	When moved 0 mm (0 in)	When moved 40 mm (1.6 in) up
Tilt adjustment	0 to 129 mm (0 to 5.1 in)	0 to 162 mm (0 to 6.4 in)

NOTICE
Do not operate the steering tilt lock lever repeatedly with an excessive force. The lever can be loosened or its angle can be displaced. In such case, ask your Komatsu distributor for the inspection.

CAPS AND COVERS WITH LOCK *(WA270-Q8E0-043-K-00-A)*

Use the starting key to open and close the locks on the caps and covers.
For details of the locations of the caps and covers with locks, see "LOCKING (PAGE 3-209) ".
Insert the key as far as it will go to the shoulder (A).
If the key is turned before it is inserted all the way, it may break.

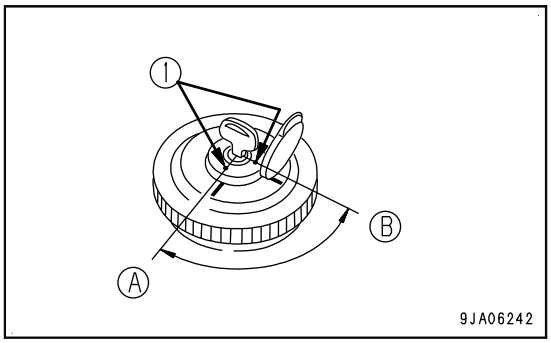


CAP WITH LOCK *(WA320-Q8E1-043-K-00-A)*

OPEN AND CLOSE FUEL FILLER PORT CAP *(WA320-AD1C-100-K-00-A)*

OPEN *(WA-Q8E1-100-K-01-A)*

1. Insert the key into the key slot.
2. Turn the key clockwise, align the key groove with mark (1) on the cap, then open the cap.
   Position (A): OPEN
   Position (B): LOCK



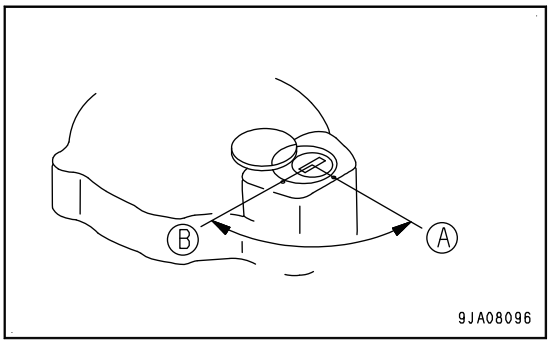
LOCK *(WA-Q8E1-100-K-02-A)*

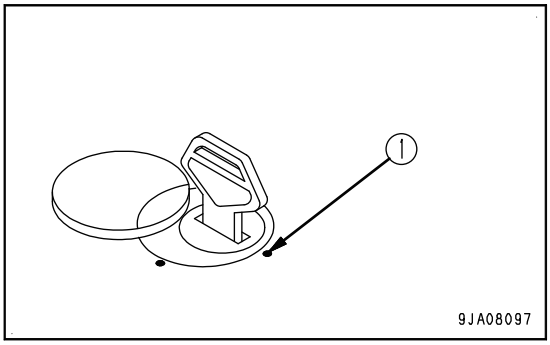
1. Turn the cap until tight, then insert the key into the key slot.
2. Turn the starting switch key to LOCK position (B), then remove the key.

OPEN AND CLOSE HYDRAULIC TANK OIL FILLER CAP *(WA-PM37-100-K-00-A)*

OPEN *(WA320-PM37-100-K-01-A)*

1. Insert the key into the key slot.
2. Turn the key counterclockwise to align the match mark (1) on the cap with the key groove, then turn the cap slowly. When a click is heard, the lock is released, enabling the cap to be opened.
   Position (A): OPEN
   Position (B): LOCK





LOCK *(WA320-Q8E2-043-K-02-A)*

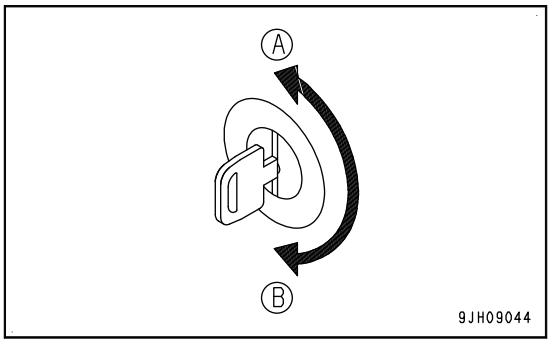
1. Turn the cap until tight, then insert the key into the key slot.
2. Turn the starting switch key to LOCK position (B), then remove the key.

OPEN AND CLOSE COVERS WITH LOCK *(WA320-Q8E2-043-K-00-A)*

OPEN *(WA320-Q8E2-043-K-01-A)*

(When it is locked)

1. Insert the key into the key slot.
2. Turn the key counterclockwise and open the cover by pulling the cover grip.
   Position (A): OPEN
   Position (B): LOCK

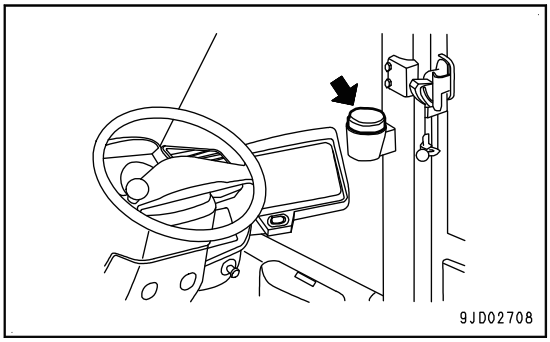


LOCK *(WA320-AD1C-100-K-02-A)*

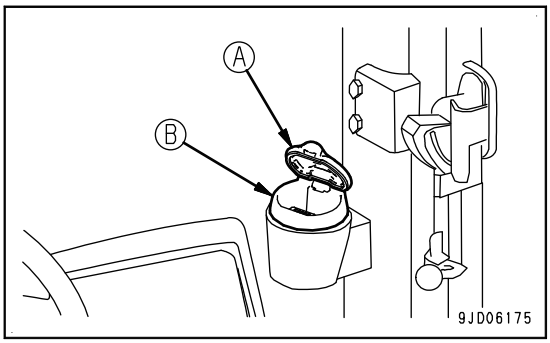
1. Close the cover and insert the key into the key slot.
2. Turn the key clockwise and take the key out.

ASHTRAY *(WA-K851-043-K-00-A)*

This is on the right side of the operator's seat.
Always put out your cigarette before putting it in the ashtray and be sure to close the lid.



NOTICE
While removing the ashtray, if it is stuck in the console cover and hard to remove, open the lid (A) of ashtray, then hold and twist the ashtray body (B) to remove.
If you hold and twist the lid (A) of ashtray, there is a danger that the ashtray may break.

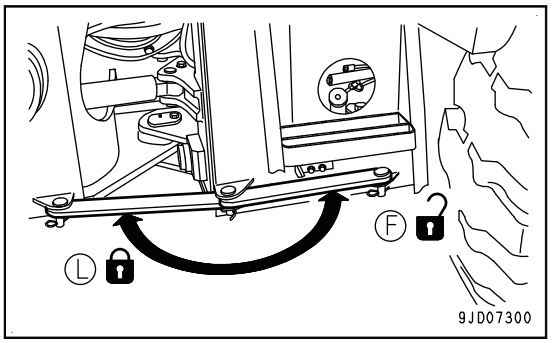


FRAME LOCK BAR *(WA320-H1LF-100-K-01-A)*

⚠ WARNING

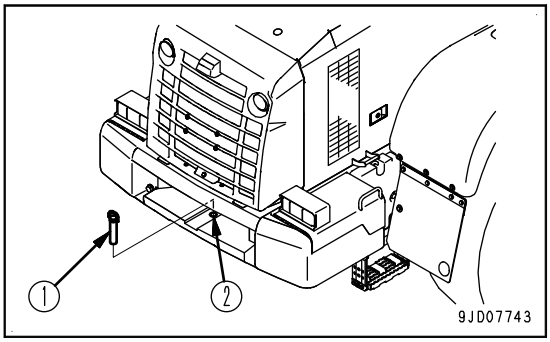
- **When performing maintenance or transporting the machine, always set the frame lock bar to the LOCK position.**
- **Always disengage the frame lock bar when traveling. If it is not disengaged, the steering becomes inoperative and this may lead to serious personal injury or death.**

This is a device used to lock the front and rear frames to prevent the machine from articulating during maintenance or transporting the machine.
(L) LOCK position:
The front and rear frames are locked and the machine does not articulate. Set the bar to this position for inspection and maintenance during maintenance or transporting the machine.
(F) FREE position: Set the bar to this position for normal operation.

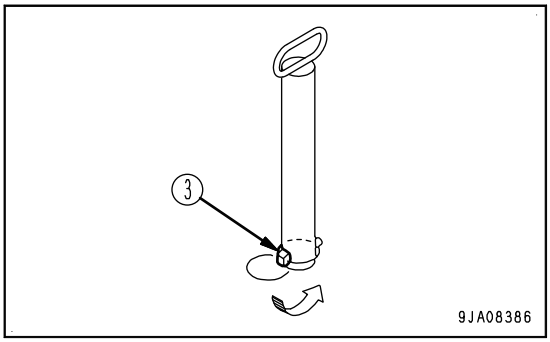


TOWING PIN *(WA270-H761-100-K-00-A)*

1. Insert towing pin (1) in hole (2) of the counterweight.

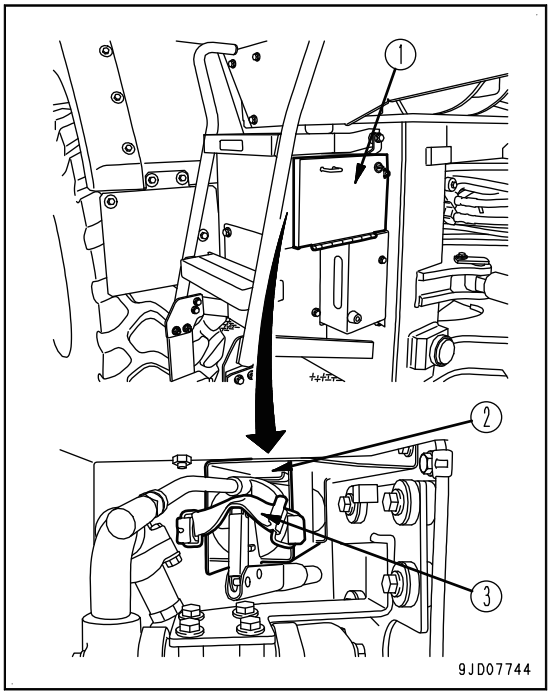


2. Use lynch pin (3) to set so that the towing pin does not come out.
   To remove, perform the procedure in the reverse order.



GREASE PUMP HOLDER *(WA270-Q8A6-043-K-00-A)*

Open cover (1) inside the step on the right side of the machine.
The grease pump is stored in storage box (2).
After using the pump, wipe off the grease from its outside, and store it in storage box (2).
Fix the grease pump with rubber band (3) to prevent it from wobbling.



BATTERY DISCONNECT SWITCH *(WA270-AW1P-043-K-00-A)*

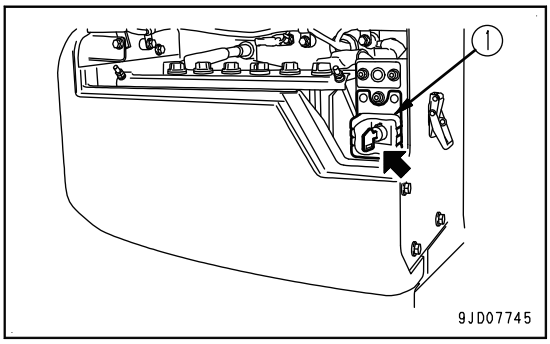
⚠ CAUTION

Do not turn the battery disconnect switch to OFF position while the engine is running or immediately after the engine is stopped. The electrical system may be seriously damaged.
If the battery disconnect switch is turned to OFF position, always remove the switch key.
If someone turns the key to ON position carelessly, this is extremely dangerous.

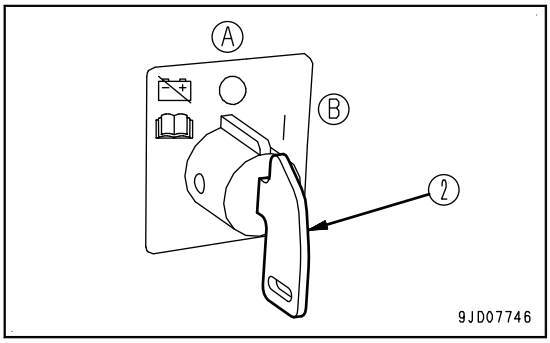
NOTICE

- **Keep this switch in ON position, except the following cases.**
  - **When the machine is stored for a long time (more than a month)**
  - **When the electrical system is repaired**
  - **When an electrical welding is conducted**
  - **When inspecting or handling the battery**
  - **When replacing the fuse and slow blow fuse**
- **Do not turn this switch to OFF position while the system operating lamp is lit. The electrical system may have failure or abnormality.**
- **If this switch is turned to OFF position, all the electrical system is cut out and the functions of KOMTRAX stop. In addition, the time setting of the clock may be lost. In this case, set the information again. For detail, see "CLOCK ADJUSTMENT (PAGE 3-68) ".**

This switch is used to cut off the current from the battery.
You can find it by opening the battery box on the right side of the machine.
Raise rubber cover (1), and the switch is seen.

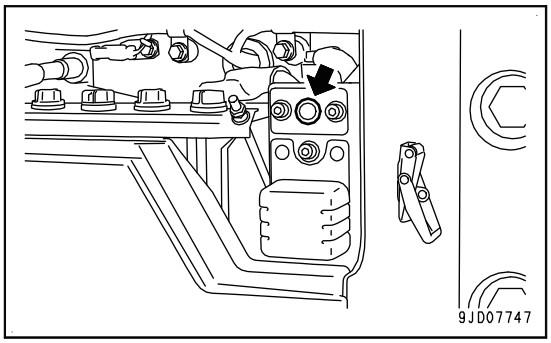


(A): OFF position
It allows moving in and out of switch key (2) and used for cutting off the current from the battery.
(B): ON position
The current from the battery flows into the circuit.
Before starting the machine, be sure to set the switch to this position.



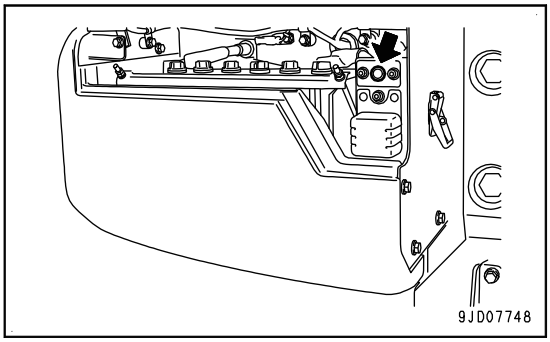
REMARK

- If the battery disconnect switch is turned to OFF position, every electric system of the machine becomes inoperable.
- Since memory of the clock of the radio and monitor is lost, set it again when using.
- Immediately after the starting switch is turned to OFF position, data is saved on each controller.
  Before turn the battery disconnect switch to OFF position, make sure that system operating lamp above the battery disconnect switch is off.
- Immediately after the reverse rotation of the fan, power to the fan reverse solenoid is supplied for some time to protect the hydraulic motor even if the starting switch is turned to OFF position. Before turning the battery disconnect switch to OFF position, make sure that the fan is stopped completely.



SYSTEM OPERATING LAMP *(WA270-AW1Q-043-K-00-A)*

This lamp indicates that the controller mounted on the machine is turned ON.
Lamp lights up in green when the controller is turned ON and normally goes out in 1 to 2 minutes after the power for the machine is turned OFF.
Before operating the battery disconnect switch, check that lamp is turned OFF.

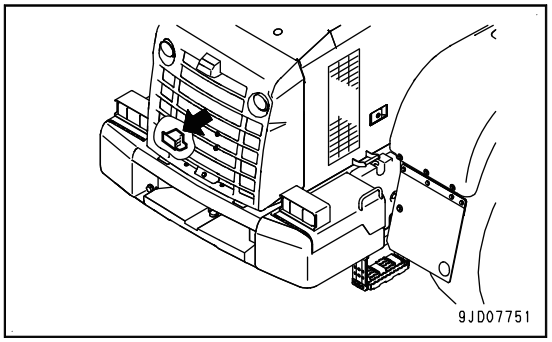


NOTICE
If the battery disconnect switch is turned OFF while this lamp is lit, the data in the controller may be lost.
If the data are lost, "L04" appears on the monitor panel when you try to start the engine next time, and the engine may not start.
In such case, ask your Komatsu distributor for inspection and repair.

REMARK
- Even if the starting switch is in OFF position, the controller is sometimes activated. The lamp lights up at this time, but it is not trouble.
- After the starting switch has been turned off, the system operating lamp may stay lit for a long time.
  In such case, ask your Komatsu distributor for inspection and repair.

BACKUP ALARM *(WA270-Q510-043-K-00-A)*

It generates alarm sounds when the machine is set to the reverse travel to alert the people around the machine.
When the directional lever is set in the REVERSE position, the alarm sounds. This alarm warns people behind the machine when the machine moves in reverse.

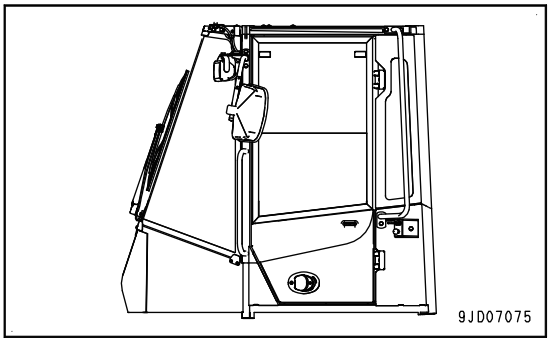


NOTICE
When washing the machine with high-pressure water, do not allow the water to hit the backup alarm directly. It is because sound pressure drops if water enters into it.

OPEN AND CLOSE CAB DOOR *(WA320-K160-012-K-00-A)*

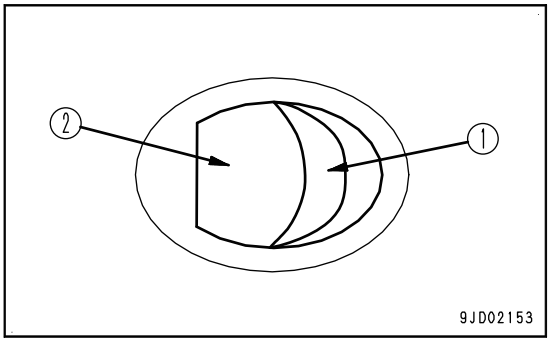
⚠ CAUTION

- **Always check that the cab door is locked in position, both when it is open and when it is closed.**
- **Always stop the machine on level ground when opening or closing the door.**
  Avoid opening or closing the door on a slope, there is a danger that the operating effort may suddenly change.
- **Hold the door handle and knob whenever opening or closing the door.**
- **Be careful not to get your hands caught between the front pillar or center pillar.**
- **When there is anyone inside the cab, always call out a warning before opening or closing the door.**



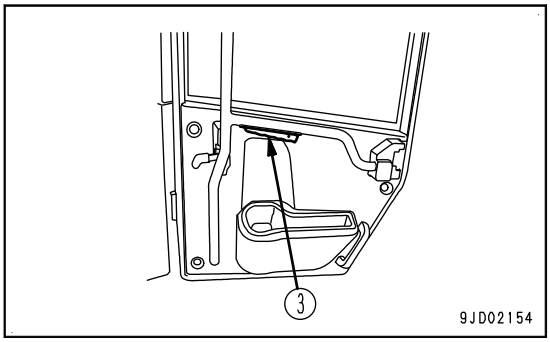
CAB L.H. DOOR HANDLE *(WA320-K161-043-K-00-A)*

While the key is not in the lock position, pull right side (1) of the door handle with the right hand, and push left side (2) with the thumb, and the door opens to the full open position,



OPEN HANDLE FOR CAB L.H. DOOR *(WA-K161-043-K-01-A)*

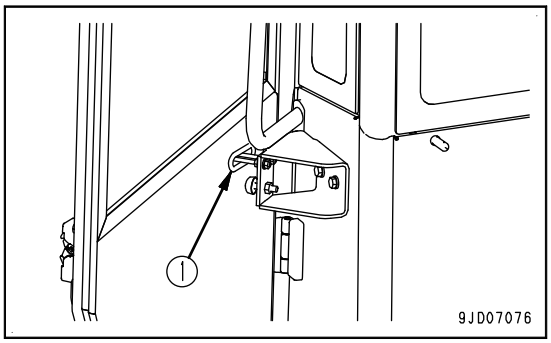
Grasp open handle (3), and the door opens to the full open position.



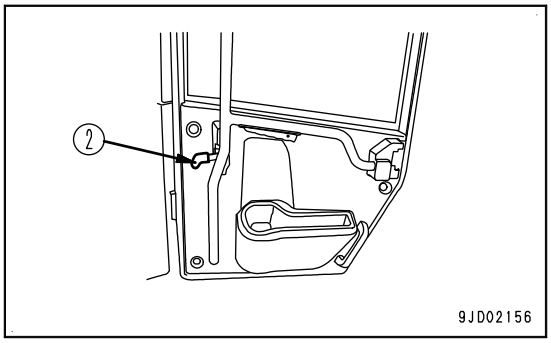
OPEN LOCK FOR CAB L.H. DOOR *(WA320-K160-043-K-00-A)*

Use the door open lock to fix the door in position after opening it or when getting on and off the operator's cab.

1. Push the door against catch (1) to lock it in position.
2. When keeping the door open, fix it securely to the catch.
3. When getting on or off the machine, hold the inside handrail.

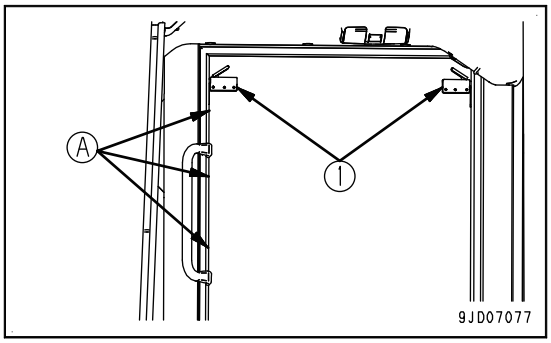


4. When closing the door, push down knob (2) to release the catch.



UNLOCK KNOB FOR SLIDE WINDOW OF CAB *(WA320-K162-043-K-00-A)*

(L.H., R.H.)
Use this knob to open and close the door window glass up and down.
Grip unlock knob (1) to release the lock, then move it to the lower LOCK position and release it.
There are 3 stages for LOCK position (A).



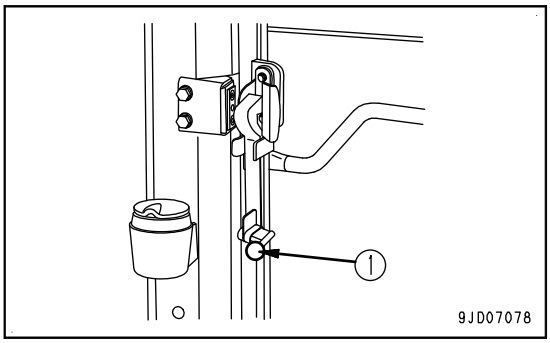
OPEN LOCK KNOB FOR EMERGENCY ESCAPE DOOR FROM CAB *(WA320-Q5K2-043-K-00-A)*

⚠ CAUTION

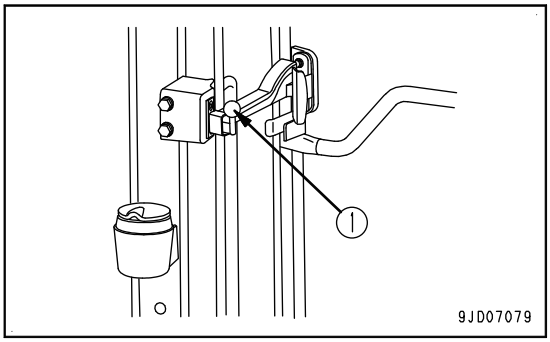
- **The door on the right side of the cab is provided as an emergency escape door for use when the operator cannot get out through the door on the left side. Do not use this door to get on and off the operator's cab normally.**
- **Do not operate the machine with the door open full or halfway. The door may suddenly close or open full. Never operate the machine with the door open since it is very dangerous.**
- **When operating the machine, always close the door fully or lock it halfway.**

EMERGENCY ESCAPE DOOR CLOSED FULLY OR LOCKED HALF OPEN *(WA320-Q5K2-043-K-01-A)*

1. When door knob (1) is pressed down completely, the door is locked closed fully.
   When cooling or heating the cab, keep the door locked closed fully with this function.



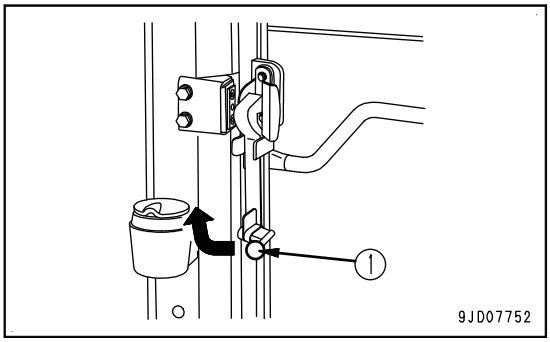
2. If the door knob (1) is pulled up, the door is locked half open.
   When talking to a person on the right outside of the machine, keep the door locked half open with this function.



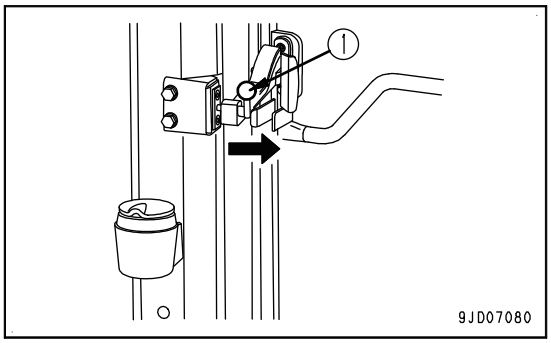
UNLOCK IN EMERGENCY *(WA270-Q5K2-043-K-00-A)*

If the door on the left side of the cab does not open or it is dangerous to get off the cab through the left side door, release the emergency escape door knob on the right side to open the right side door fully and get off the cab.

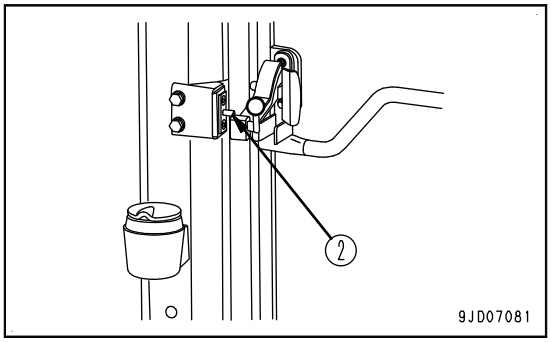
1. Pull up door knob (1).



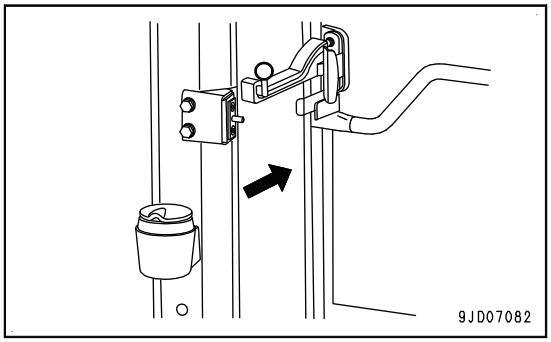
2. Hold door knob (1) and pull it toward the rear of the machine.



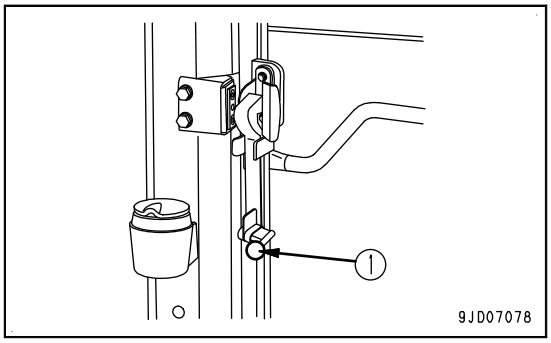
3. Remove the guide rail of the door knob from guide pin (2) fixed to the cab and unlock the right side door.



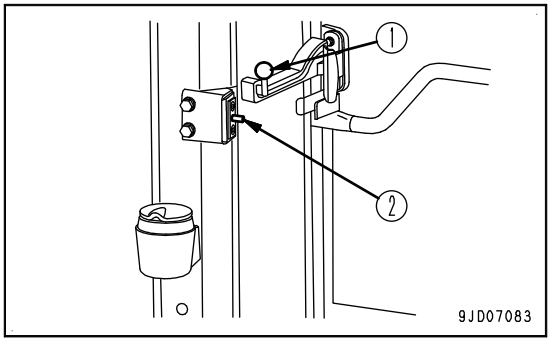
4. Open the right side door wide and go out.



To lock door knob again, hold door knob (1) and pull it toward the rear of the machine. Match the guide rail of the door knob with the guide pin on the guide cab side and push in door knob (1) forward. Check that the guide pin is inserted into the guide rail securely, and push in and fix door knob (1) to the lock position.



NOTICE
If the door is closed without holding door knob (1), the plastic part of the door knob hits against guide pin (2) on the cab side and may be broken.
Always close the door while holding door knob (1).



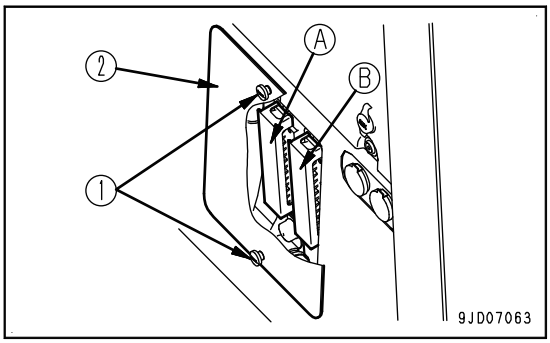
FUSE *(WA320-Q6G0-043-K-00-A)*

NOTICE

Before replacing a fuse, always turn the starting switch to OFF position, then turn the battery disconnect switch key to OFF position.

The fuses protect the electrical equipment and wiring from burning out.
If the fuse becomes corroded, or white powder can be seen, or the fuse is loose in the fuse holder, replace the fuse.
Replace the fuse with another of the same capacity.
Should the fuse is blown, investigate the cause and take necessary actions.

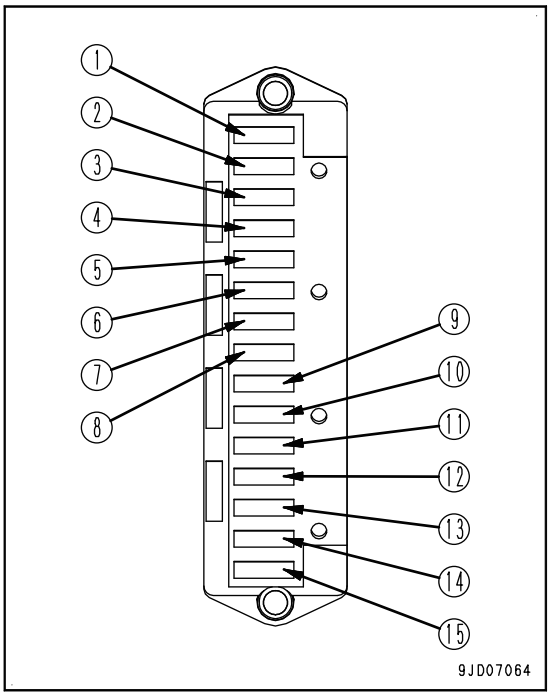
Inside rear console box
Loosen knob (1) at 2 places, then remove cover (2). Fuse boxes are A and B inside.



FUSE CAPACITIES AND CIRCUIT NAMES *(WA380-Q6G0-001-K-00-A)*

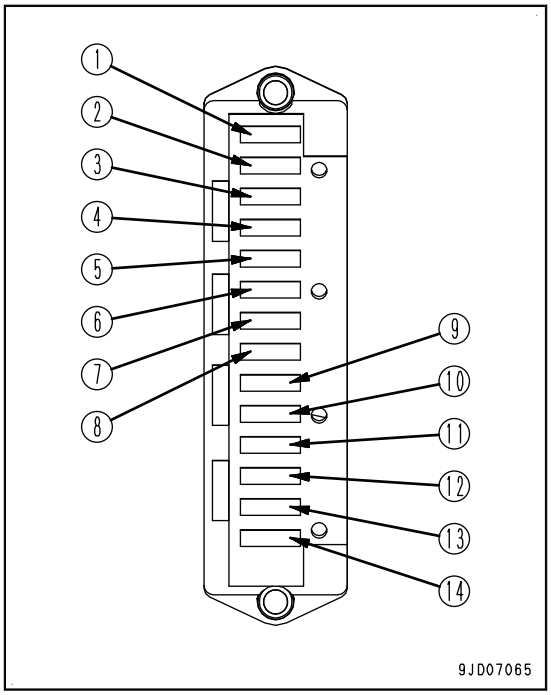
FUSE BOX A *(WA320-Q6G0-04D-K-00-A)*

No.	Fuse capacity	Name of circuit
(1)	20A	Starting switch
(2)	10A	Hazard lamp
(3)	15A	HST
(4)	30A	Engine control
(5)	10A	Monitor
(6)	15A	Radio
(7)	10A	Auxiliary power supply
(8)	10A	L.H. headlamp
(9)	10A	R.H. headlamp
(10)	10A	Turn signal indicator
(11)	10A	Backup lamp, brake lamp
(12)	20A	HST control
(13)	10A	Boom
(14)	20A	Wiper
(15)	20A	Radio



FUSE BOX B *(WA270-Q6G0-04D-K-01-A)*

No.	Fuse capacity	Name of circuit
(1)	20 A	Air conditioner blower
(2)	5 A	Air compressor
(3)	20 A	Revolving warning lamp
(4)	20 A	Heated wire glass
(5)	10 A	Spare
(6)	20 A	Auxiliary power supply
(7)	10 A	DC converter
(8)	10 A	Parking brake
(9)	20 A	Horn
(10)	10 A	L.H. clearance lamp
(11)	10 A	R.H. clearance lamp
(12)	20 A	Front working lamp
(13)	20 A	Rear working lamp
(14)	5 A	Starting switch, accessory



SLOW BLOW FUSE *(WA270-Q6G1-043-K-00-A)*

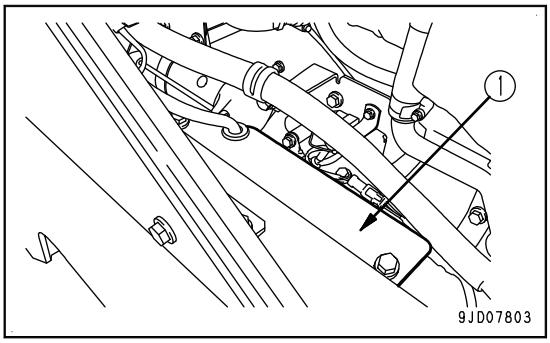
NOTICE

Before replacing a slow blow fuse, always turn the starting switch to OFF position, then turn the battery disconnect switch key to OFF position.

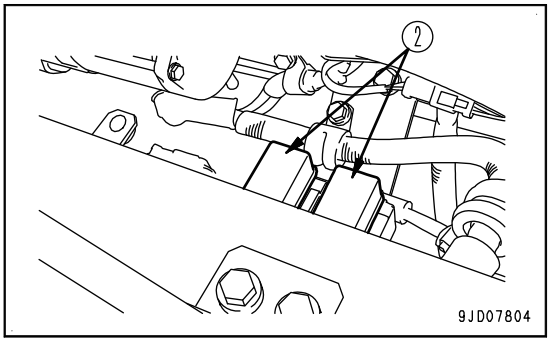
When the starting switch is turned to ON position, if the power does not come out, the slow blow fuse may be blown. Check and replace it.

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

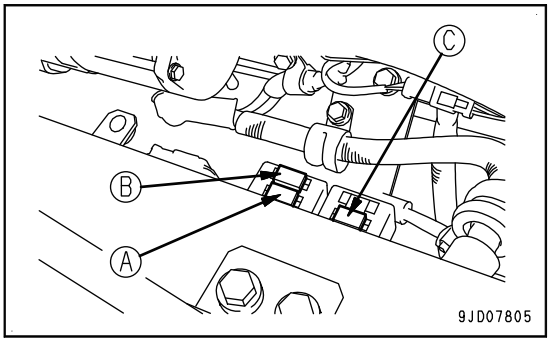
1. Remove cover (1).



2. Open cover (2) of the slow blow fuse box and check the fuse. For replacement of the slow blow fuse, see "REPLACE SLOW-BLOW FUSE (PAGE 4-37) ".



Slow blow fuse
(A) 80 A: For machine power supply
(B) 120 A: For engine preheater power supply
(C) 50 A: For battery power supply (starting switch, hazard)



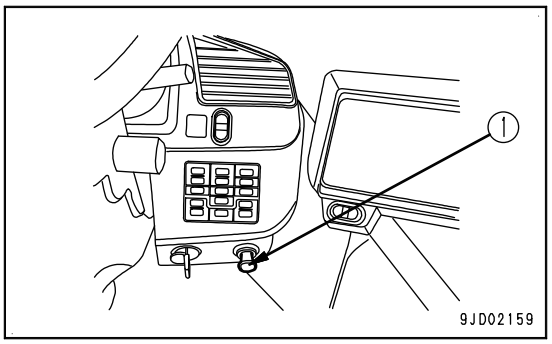
AUXILIARY ELECTRIC POWER *(ALL-K890-001-K-00-A)*

24V POWER SOURCE *(WA-K891-043-K-00-A)*

NOTICE
Do not use as a power supply for 12V equipment.
This will cause failure of the equipment.

When cigarette lighter (1) is removed, its socket can be used as a 24V power supply.
The maximum current is 3.5 A (85 W).

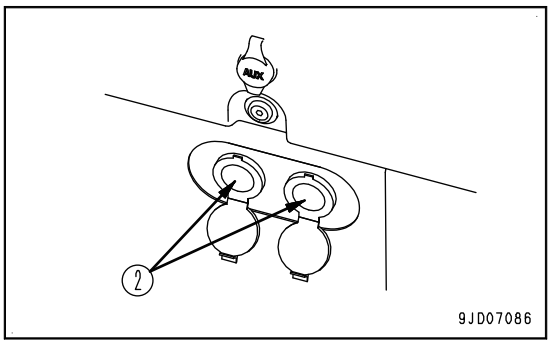
REMARK
Use this power supply while engine is running.



12V POWER SOURCE *(WA320-K892-043-K-00-A)*

Power supply take-out (2) at rear left of operator's seat can be used as a 12V power supply.
The maximum current is as follows.
When using one side: 10A (120W)
When using both sides: 14.7A (176W) in total.

REMARK
Use this power source while engine is running.



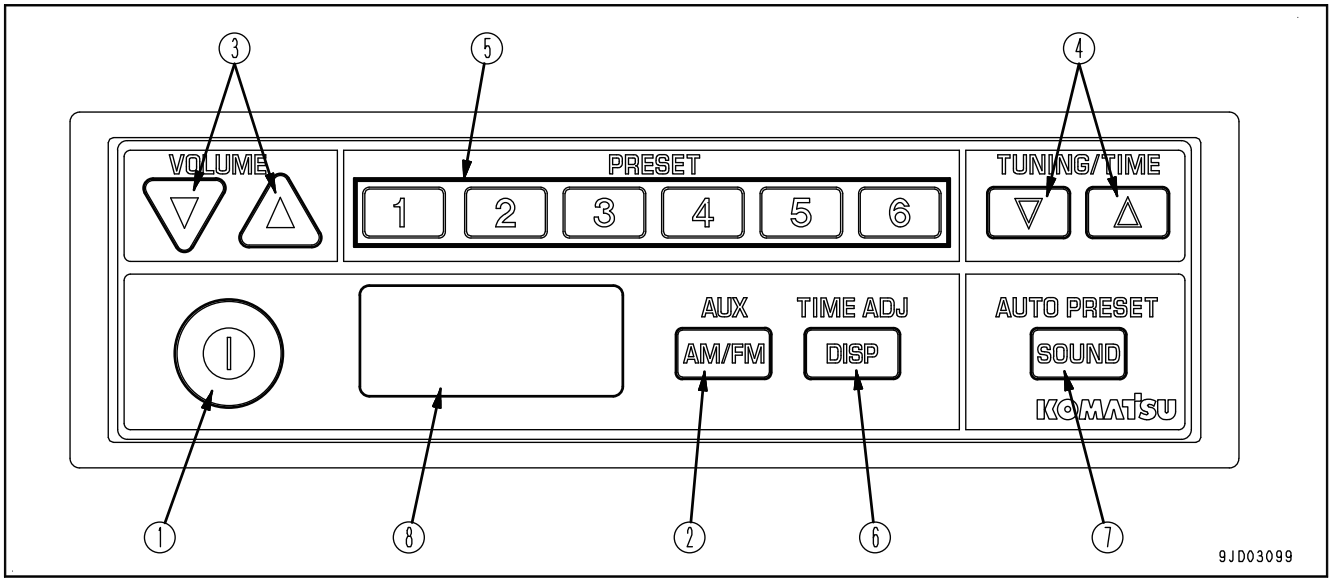
HANDLING RADIO *(WA320-K860-001-K-00-A)*

(If equipped)

PRECAUTIONS *(WA270-K860-170-K-00-A)*

- To ensure safety, always keep the sound to a level where it is possible to hear outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to an unexpected failure, so be careful not to get water on the equipment.
  Do not wipe the scales or buttons with solvent such as benzene or thinner. Wipe with a dry soft cloth. If the dirt cannot be removed easily, soak the cloth with alcohol.
- When the battery disconnect switch is turned to OFF (○) position or the power for the machine is turned off for replacement of the battery, all settings saved to the preset buttons may be lost. In such a case, you must set them again.
  For details of the battery disconnect switch operating procedure, see "BATTERY DISCONNECT SWITCH (PAGE 3-101) ".

EXPLANATION OF COMPONENTS *(HM-K860-043-K-00-A)*



(1) Power button
(2) Band/AUX selector button
(3) Volume control button
(4) Tuning/time adjust button
(5) Preset buttons
(6) Display selection button
(7) Sound adjust button
(8) Display

POWER BUTTON *(HM-K860-043-K-01-A)*

Press this power button (1) to supply the power to the radio and the frequency is shown on the display (8). As long as AUX is selected, display (8) indicates AUX on it. Press the button again to turn the power off.

BAND/AUX SELECTOR BUTTON *(HM-K860-043-K-02-A)*

Press this button (2) to select the desired ban or AUX.
Each time the button is pressed, the band changes FM -> AM -> AUX -> FM - - - -

VOLUME CONTROL BUTTON *(HM-K860-043-K-03-A)*

Use this button (3) to control volume.
Press the △ button, and the volume increases. Press the ▽ button, and the volume decreases. The range for the volume is 0 to 32.
Hold down this button, and you can change the volume in stepless.

TUNING/TIME ADJUST BUTTON *(HM-K860-043-K-04-A)*

Use the button (4) to select frequency and step for sound adjustment and to adjust time.
For details of the adjusting method, see "OPERATION METHOD (PAGE 3-116) ".

PRESET BUTTON *(HM-K860-043-K-05-A)*

If you register desired stations to this button (5) beforehand, you can select the station by touching this button once.
It is possible to preset 6 stations each for both AM and FM.
For details of the presetting method, see "OPERATION METHOD (PAGE 3-116) ".

DISPLAY SELECTOR BUTTON *(HM-K860-043-K-06-A)*

Use this button (6) to change frequency and time shown on the display.
Each time you press this button, frequency, time and band are shown on the display in this order.
1.5 seconds elapse when a band is shown, a frequency will be displayed again.
As long as AUX is selected, this button alternately switches the display between AUX and the time.

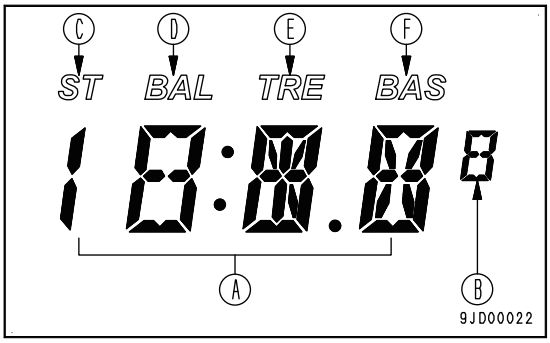
SOUND ADJUST BUTTON *(HM-K860-043-K-07-A)*

Press this button (7), and the sound adjustment is ready.
Each time this button is pressed, BAL (Balance), TRE (Treble) and BAS (Bass) will be selected in this order.
If this button (7) is pressed while BAS is displayed, the sound adjustment will be cancelled.

For details of the sound adjusting method, see "OPERATION METHOD (PAGE 3-116) ".

DISPLAY *(HM-K860-043-K-08-A)*

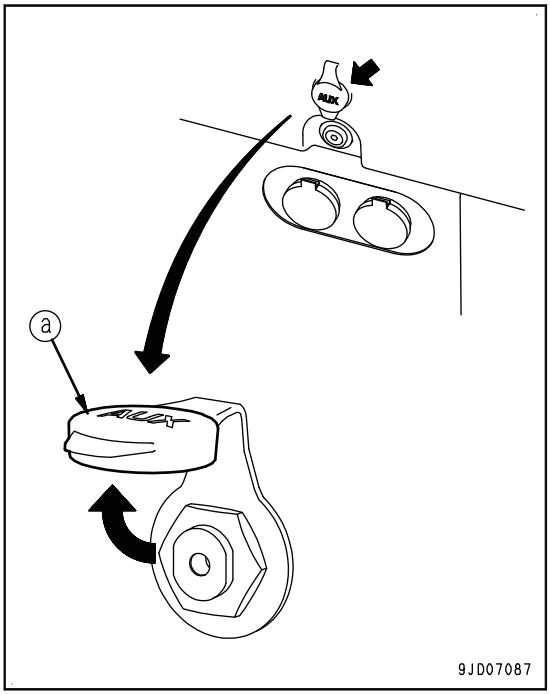
(A): Band name, "AUX", frequency, time and other character/numeric information are displayed.
(B): Frequencies are displayed in step of 50 kHz in certain areas.
(C): Lights up when a stereo broadcasting is heard while a FM station is selected.
(D): Lights up at the time of balance adjustment in the sound adjusting condition.
(E): Lights up at the time of treble adjustment in the sound adjusting condition.
(F): Lights up at the time of bass adjustment in the sound adjusting condition.



AUX *(WA320-K866-043-K-00-A)*

You can hear the sound through the speaker of the machine when you connect a commercially available portable audio equipment to the machine.

1. Open cap (a) at the rear left of the operator's seat.
2. Connect a portable audio equipment by using an commercially available audio cable.
3. Press band/AUX selector button (2) and select AUX.



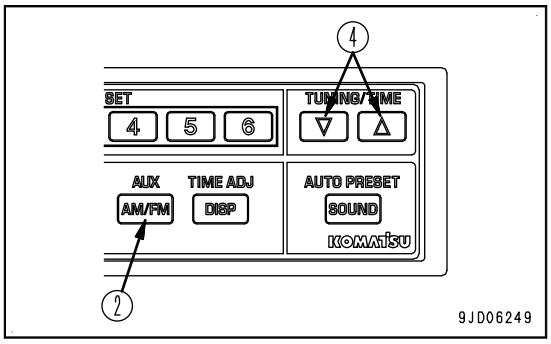
NOTICE

- **A stereo miniature plug can be connected.**
  Read the instruction manual of the equipment to connect carefully.
- **As a power source, use the battery attached to the equipment to connect.**
  If you use an electric power supply installed to the machine, the noise may occur.
- **The noise may occur if you pull out the input plug when AUX is selected, or if you push in or pull out the plugs of the equipment to connect.**

OPERATION METHOD *(HM-K860-001-K-01-A)*

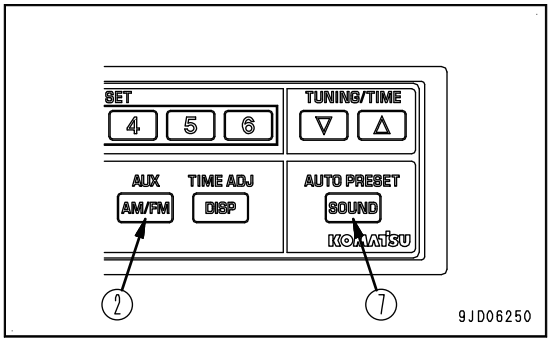
FREQUENCY ADJUSTMENT *(HM-K860-100-K-00-A)*

1. Press band/AUX selector button (2) and select FM or AM.
2. In this condition, press the △ button of the tuning/time adjust button (4), and the frequency becomes higher.
   Also, press the ▽ button, and the frequency becomes lower.
3. Keep pressing the △ button of tuning/time adjust button (4), and the frequency becomes higher continuously.
4. Keep pressing the ▽ button of tuning/time adjust button (4), and the frequency becomes lower continuously.
5. Keep pressing the △ button and release it, and the frequency becomes higher continuously. Keep pressing the ▽ button and release it, and the frequency becomes lower continuously as an auto seek.
   When a proper frequency is picked up, the tuning automatically stops.



AUTO PRESETTING *(HM-K860-100-K-01-A)*

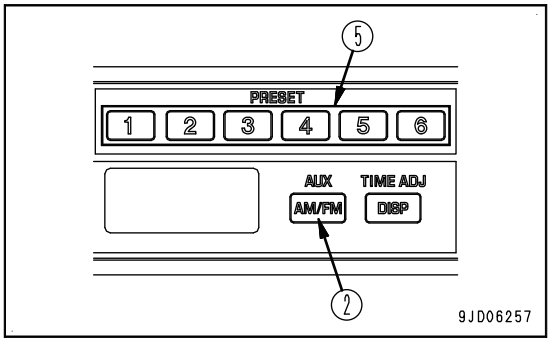
1. Press band/AUX selector button (2) and select FM or AM.
2. In this condition, keep pressing sound adjust button (7), and the auto presetting starts, i.e., a well-receiving frequency is detected and is automatically registered in the preset memory 1 to 6.



PRESET CALL *(HM-K860-100-K-07-A)*

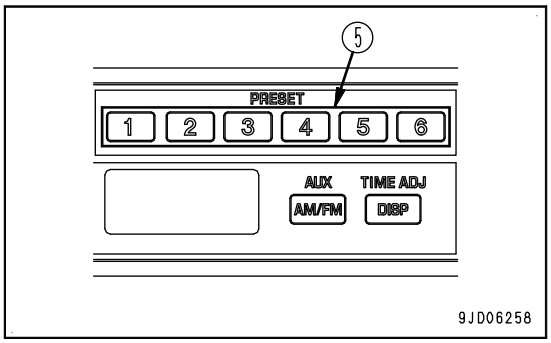
1. Press band/AUX selector button (2) and select FM or AM.
2. In this condition, press any of buttons 1 to 6 of preset button (5), and the frequency registered to the preset number is called to start receiving.

Example:
While a frequency is displayed, press button 1 of preset button (5), and the preset number "P-1" appears on the display.
The preset number is shown for 0.5 seconds, and then the frequency is displayed.



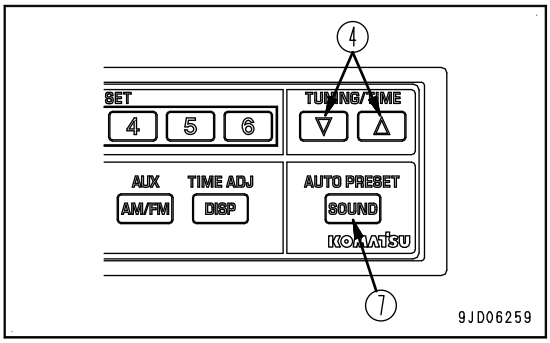
PRESET MEMORY *(HM-K860-100-K-02-A)*

While the radio is receiving a station, keep pressing any of buttons 1 to 6 of preset button (5), and the frequency being received now is memorized to the corresponding preset number.
Example:
While a frequency is displayed, keep pressing button 1 of preset button (5), and the preset number "P-1" is displayed.
After the preset number flashes 3 times, the frequency is displayed and then memorized to the preset number "P-1".



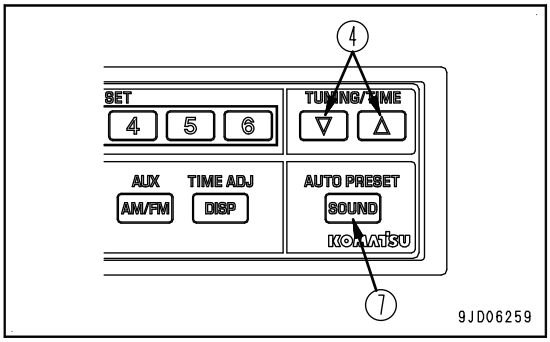
SOUND CONTROL (BALANCE) *(HM-K860-100-K-03-A)*

1. Press the sound adjust button (7) to turn on BAL on the display for starting sound adjustment (balance).
2. In this condition, press the △ button of the tuning/time adjust button (4), and the speaker output increases by 1 towards R output. (R1 to R7)
3. Also, press the ▽ button of the tuning/time adjust button (4), and the speaker output increases by 1 towards L output. (L1 to L7)



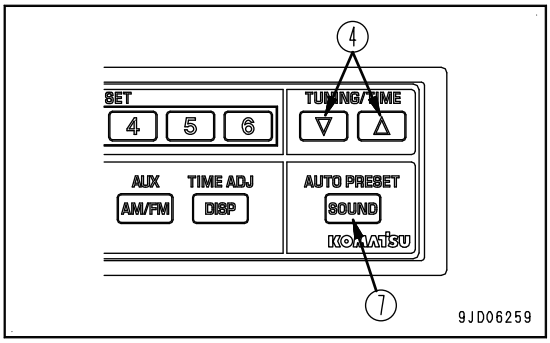
SOUND CONTROL (TREBLE) *(HM-K860-100-K-04-A)*

1. Press the sound adjust button (7) to turn on TRE on the display for starting sound adjustment (treble).
2. In this condition, press the △ button of the tuning/time adjust button (4), and the treble level increases by 1. (Maximum + 7)
3. Also, press the ▽ button of the tuning/time adjust button (4), and the treble level decreases by 1. (Minimum - 7)



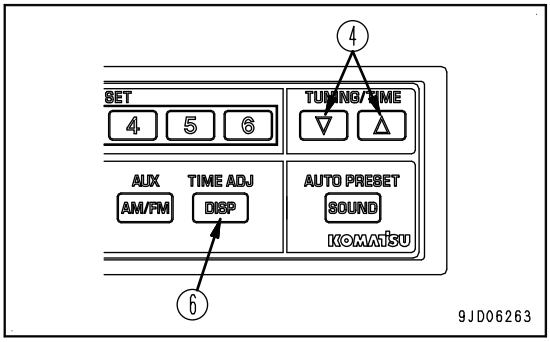
SOUND CONTROL (BASS) *(HM-K860-100-K-05-A)*

1. Press the sound adjust button (7) to turn on BAS on the display for starting sound adjustment (bass).
2. In this condition, press the △ button of the tuning/time adjust button (4), and the bass level increases by 1. (Maximum + 7)
3. Also, press the ▽ button of the tuning/time adjust button (4), and the bass level decreases by 1. (Minimum - 7)



TIME ADJUSTMENT BUTTON *(HM-K860-100-K-06-A)*

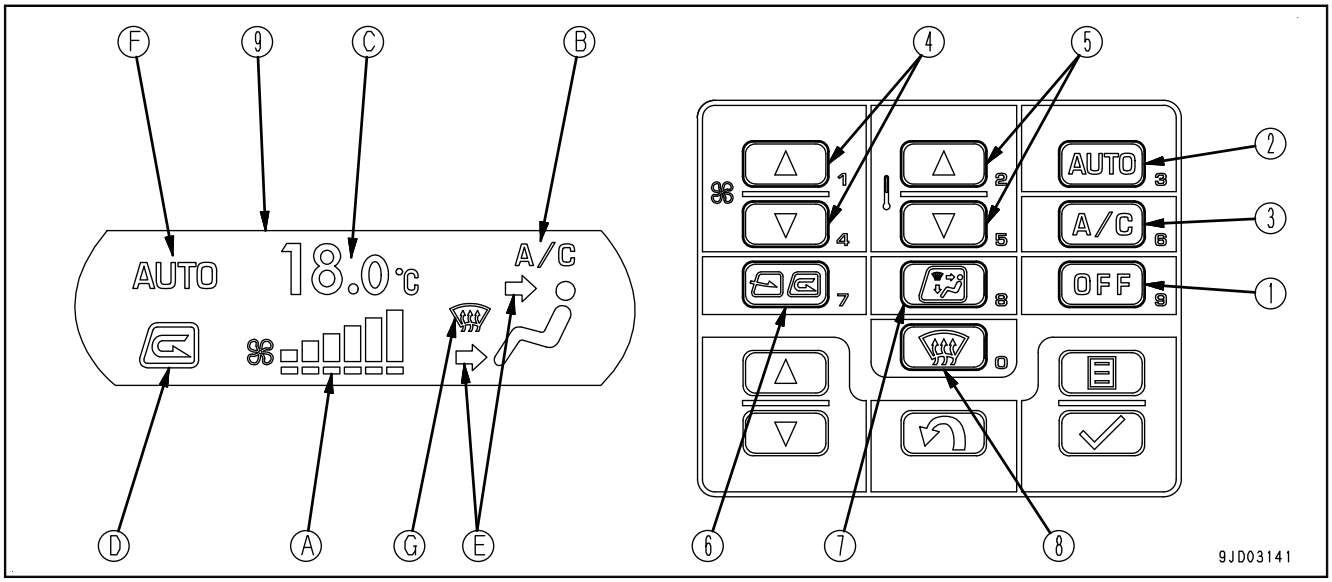
1. Press display selector button (6) to display the time.
2. In this condition, keep pressing display selector button (6) for starting time adjustment.
3. For the time adjustment, press display selector button (6), and the adjustment target changes from "Hour" to "Minute". At this time, the adjustment target flashes.
4. Flash the item to be adjusted, and press the tuning/time adjust button (4) and start the adjustment.
5. If display selector button (6) is pressed during the minute adjustment, the time adjustment will be released and the time display will resume.



HANDLING AUTO AIR CONDITIONER *(WA-K500-043-K-00-A)*

By taking fresh air into the cab through a filter, it is possible to raise the pressure inside the cab. This makes it possible to provide a pleasant working environment even on dusty jobsites.

NAMES AND FUNCTIONS OF EACH PART OF AIR CONDITIONER CONTROL PANEL *(WA-K500-04D-K-00-A)*



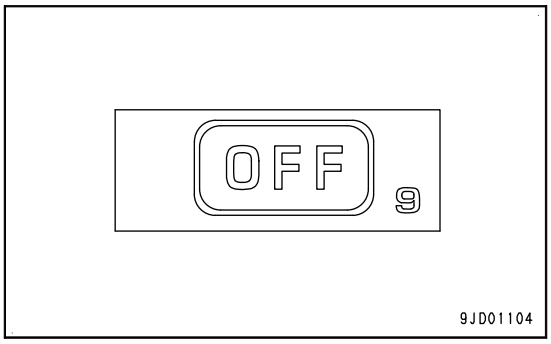
(1) OFF switch
(2) Auto switch
(3) Air conditioner switch
(4) Fan switch
(5) Temperature control switch
(6) FRESH/RECIRC selector switch
(7) Vent selector switch
(8) Defroster switch
(9) Display monitor

Air conditioner monitor

(A) Air flow bar
(B) Air conditioner operation symbol
(C) Set temperature display
(D) FRESH/RECIRC selector symbol
(E) Vent display
(F) Automatic operation symbol
(G) Defroster symbol

OFF SWITCH *(WA-K5V4-043-K-00-A)*

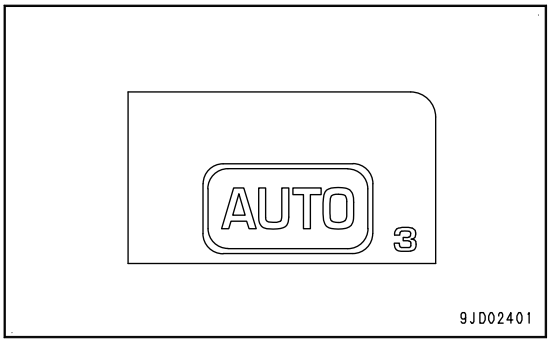
This switch (1) is used for stopping the fan and air conditioner.



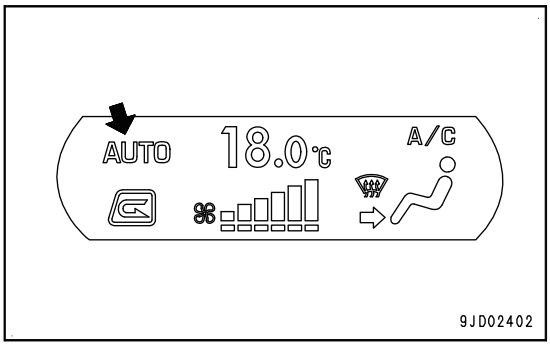
AUTO SWITCH *(WA-K5V8-043-K-00-A)*

Use this switch (2) for automatic selection of the air flow and vents according to the set temperature.
This switch is also used as the main switch of the air conditioner.

- When the AUTO switch is pressed, "AUTO" on the display monitor lights up to indicate that the air conditioner is in the automatic mode.
- When switching from automatic operation to manual operation, it is possible to use the switches to select the air flow and vents.
  At this time, "AUTO" on the display monitor goes out.
- When the window is fogged up because of the low temperature, turn the defroster switch to ON and defrost the window.



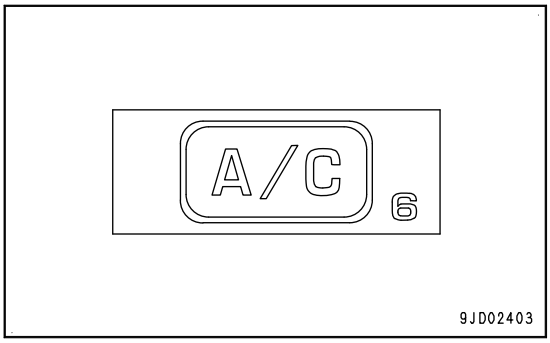
REMARK
Do not leave the door open for a long time (3 minutes or longer) while air conditioner is working.
Automatic air conditioner is automatically controlled according to the environment.
If the environment changed suddenly by leaving cab door open for a long time, etc., the control of air conditioner may change temporarily, but this is not a failure.
Even if the control changes, it returns automatically to AUTO control according to the environment after certain period elapses.

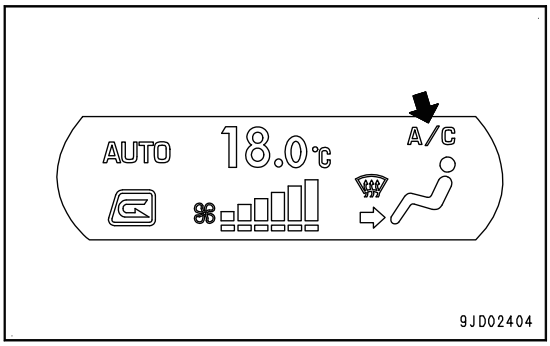


AIR CONDITIONER SWITCH *(WA-K5FK-043-K-00-A)*

Use this switch (3) to start and stop the cooling or dry heating function.

- When the air conditioner switch is pressed while the main power switch is turned ON, the air conditioner is turned ON and the air conditioner operation symbol is indicated on the display monitor.
- If the switch is pressed again, it is turned OFF and the operation symbol on the display monitor goes out.

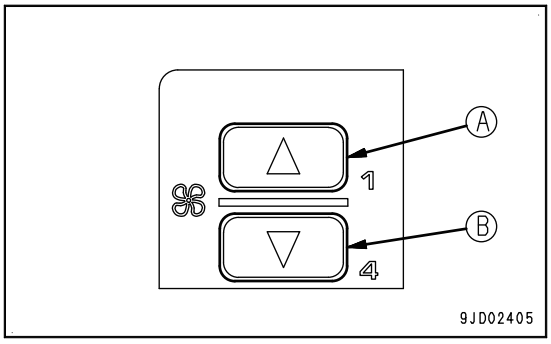




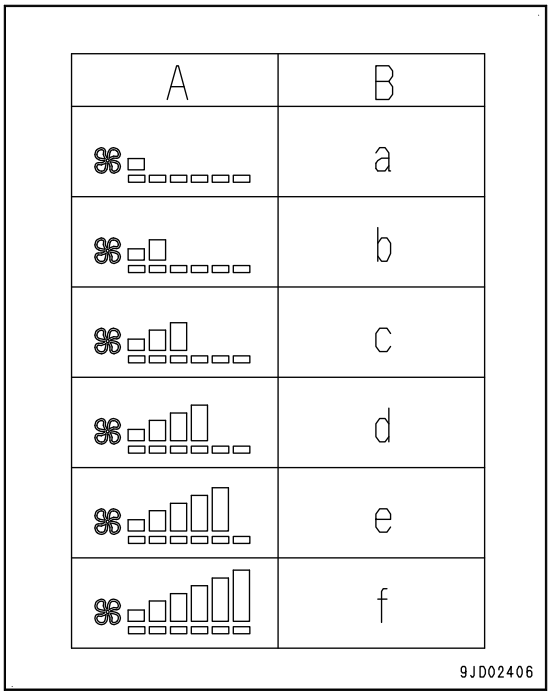
FAN SWITCH *(WA-K5V5-043-K-00-A)*

Use this switch (4) to adjust the air flow from the fan in the manual operation.
When switch (A) is pressed while the air conditioner power supply is OFF, the electric power for the air conditioner is turned ON. At this time the air flow starts from "Low".

- The air flow can be adjusted to 6 levels.
- Press switch (A) to increase the air flow and press switch (B) to decrease the air flow.
- During automatic operation, the air flow is automatically adjusted.



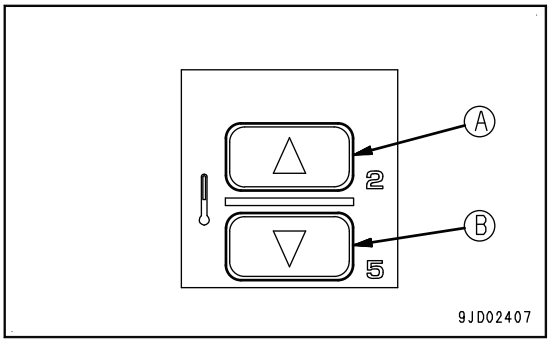
The set position of the air flow is indicated on the display monitor.
A: Monitor display
B: Air flow
a: Air flow "LOW"
b: Air flow "MEDIUM 1"
c: Air flow "MEDIUM 2"
d: Air flow "MEDIUM 3"
e: Air flow "MEDIUM 4"
f: Air flow "HIGH"



TEMPERATURE CONTROL SWITCH *(WA-K5V6-043-K-00-A)*

Use this switch (5) to adjust the temperature inside the cab. The temperature can be set between 18°C (64.4°F) and 32°C (89.6° F).

- When this switch (A) is pressed, the output air temperature increases, and when this switch (B) is pressed, the output air temperature decreases.
- The set output air temperature is indicated on the display monitor.
- The temperature can be set in stages of 0.5°C (0.9°F).



Monitor display and 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

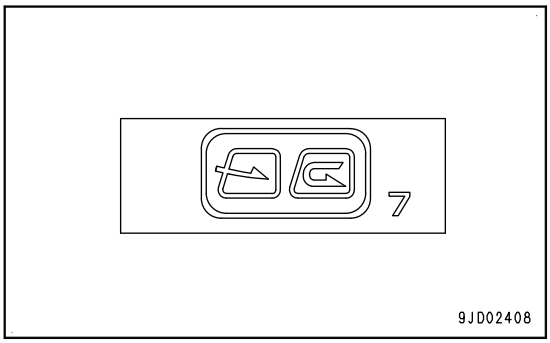
REMARK

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.

FRESH/RECIRC SELECTOR SWITCH *(WA-K5V9-043-K-00-A)*

Use this switch (6) to switch between recirculation of air inside the cab (RECIRC) and intake of outside air (FRESH).

- When intake of outside air (FRESH) is selected, (A) lights up on the display monitor.
- When recirculation of inside air (RECIRC) is selected, (B) lights up on the display monitor.

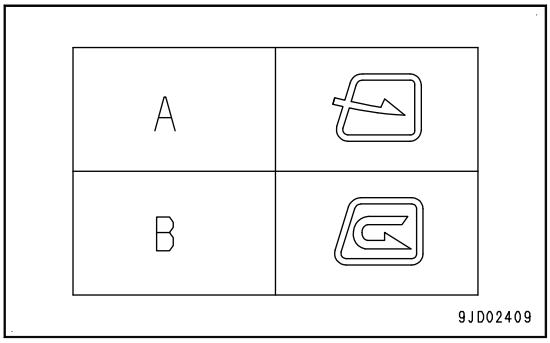


RECIRC

- Only the air inside the cab is circulated. Use this setting to perform quick cooling or heating of the cab or when outside air is dirty.

FRESH

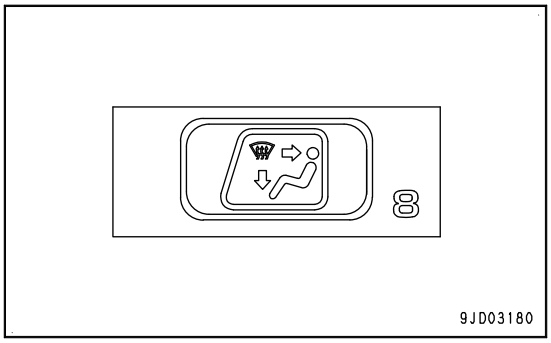
- Outside air is taken into the cab. Use this setting to take in fresh air from outside of the cab or to remove the mist from the cab windows.



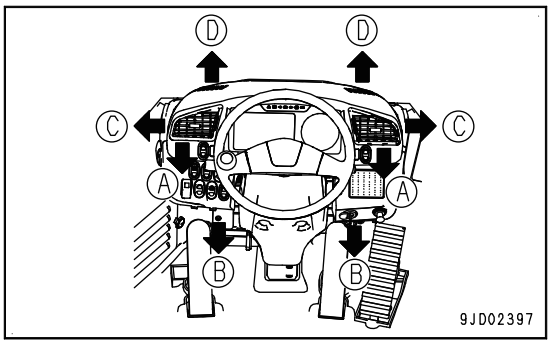
VENT SELECTOR SWITCH *(WA-K5V7-043-K-00-A)*

Use this switch (7) to select the vents in the manual mode.

- There are four combinations of vents: FACE, FACE/FOOT, FOOT, and FOOT/DEF.(DEF is selected only when the defroster switch is pressed)
- When the switch is pressed, the display on the display monitor switches in order and air blows out from the vents displayed.
- When this switch is pressed in the defroster mode, the vents right before being switched to DEF is selected.
- During automatic operation, the vents are automatically selected.



(A): FACE (2 places)
(B): FOOT (2 places)
(C): DEF (2 places)
(D): DEF (2 places)



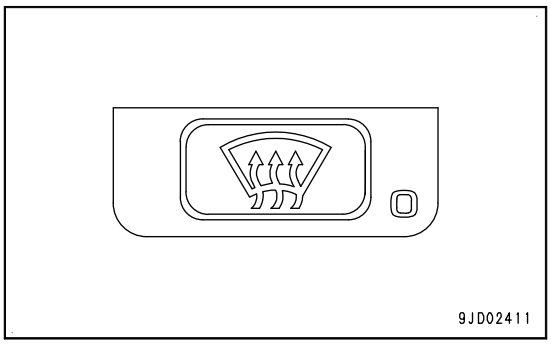
Liquid crystal display	Vent mode	Vent Ⓐ	Vent Ⓑ	Vent Ⓒ	Vent Ⓓ	Remarks
	Face vent	○				-
	Face and foot vents	○	○			-
	Foot vent		○			-
	Foot and defroster vents		○	○	○	-
	Defroster vent			○	○	Cannot be selected for automatic operation

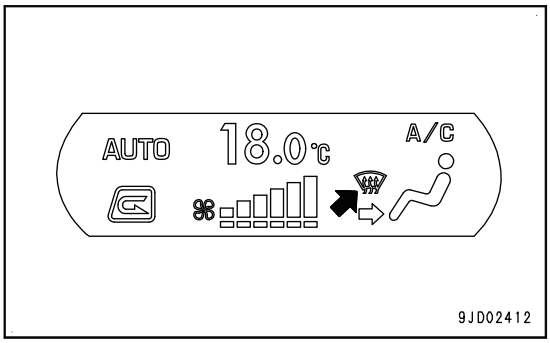
Note 1: Air blows out from vents marked ○

DEFROSTER SWITCH *(WA-K5VB-043-K-00-A)*

Use this switch (8) to change the vents to the defroster mode.

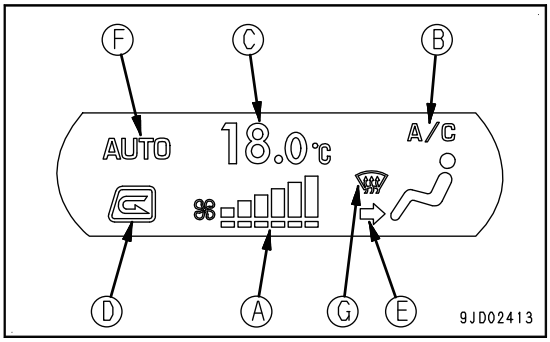
- Use this mode to clear the front glass, etc.
- When the defroster switch is pressed during automatic operation, "AUTO" on the air conditioner monitor goes out and the DEF mark appears.





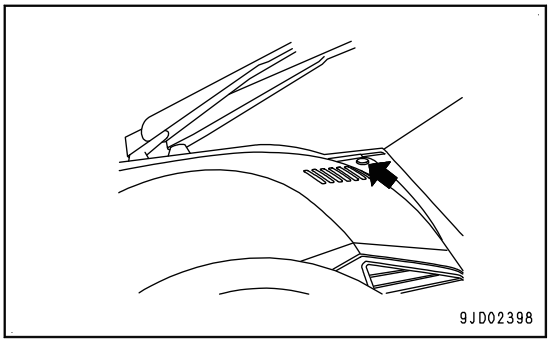
DISPLAY MONITOR *(WA-K5VA-043-K-00-A)*

Monitor (9) displays the state of air flow (A), operation of air conditioner (B), set temperature (C), FRESH/RECIRC air (D), vents (E), automatic operation (F), and defroster (G).



SUNLIGHT SENSOR *(WA-K5FH-043-K-00-A)*

This sensor automatically adjusts the flow of air from the vents to match the strength of the sun's rays. (only when performing automatic operation) In addition, it automatically detects changes in the temperature inside the cab caused by changes in the strength of the sun's rays beforehand and automatically adjusts the temperature.

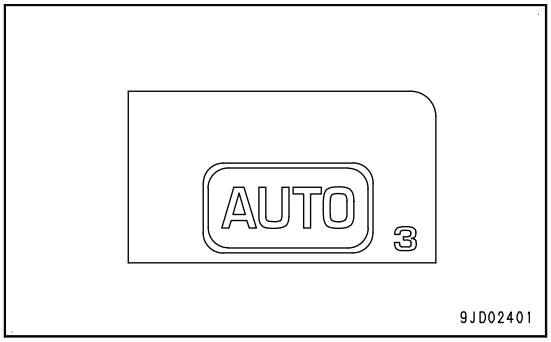


OPERATION METHOD *(D65-K500-100-K-03-A)*

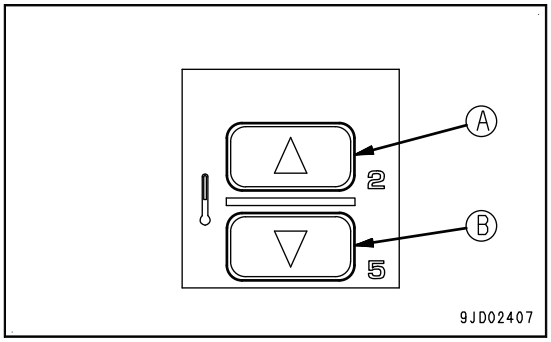
The air conditioner can be operated automatically or manually. Select the method of operation as desired.

AUTOMATIC OPERATION *(WA-K500-100-K-01-A)*

1. Turn auto switch (2) ON.
   "AUTO" lights up on the display monitor.



2. Press (A) or (B) of temperature control switch (5) to set to the desired temperature. The air flow and combination of the vents are automatically selected according to the set temperature, and the air conditioner is operated automatically to provide the set temperature.

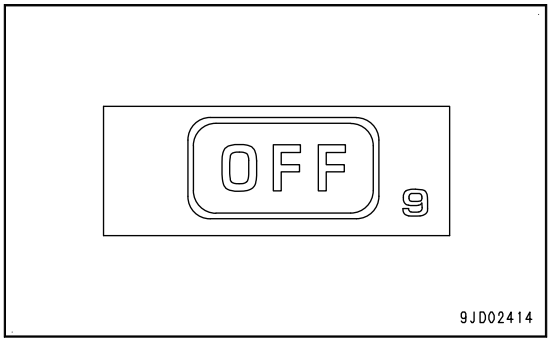


REMARK

- If the air conditioner switch is not turned ON when the ambient temperature is high, air is not cooled and its temperature may not decrease to the set temperature.
- After automatic operation, the air flow may be set to "Lo" for a certain period to prevent cold air from blowing out, depending on the ambient temperature.
- Once the desired temperature is set, do not operate the temperature control switch unnecessarily. It may take longer time to reach the set temperature.
- To heat or cool air quickly, set the temperature display to 18.0 °C (64.4 °F) (max. cooling) or 32.0 °C (89.6 °F) (max. heating).
- If any switch is operated during automatic operation, the function of that switch is applied first, and "AUTO" on the air conditioner monitor goes out and the manual operation is selected.

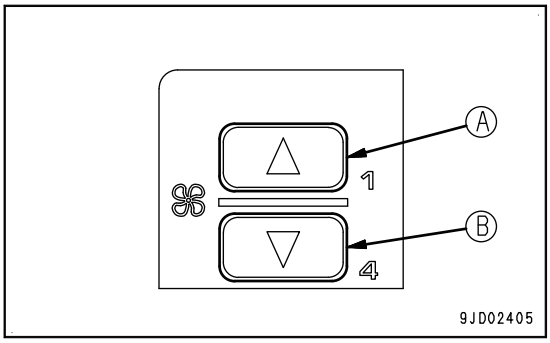
STOP AUTOMATIC OPERATION *(WA-K500-100-K-02-A)*

Press air conditioner OFF switch (1).
The display on the display monitor goes out and the operation stops.

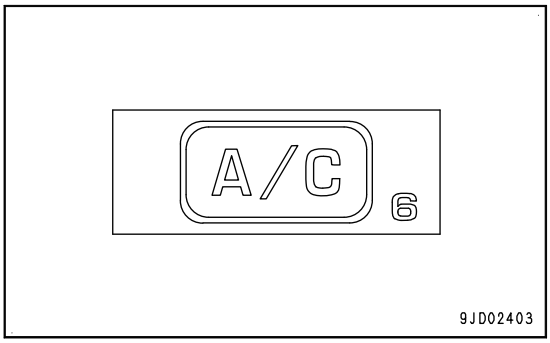


MANUAL OPERATION *(WA-K500-100-K-03-A)*

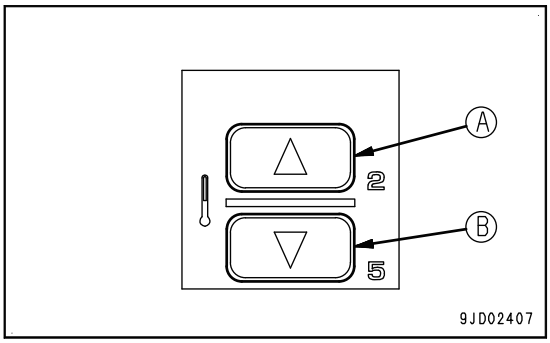
1. Press (A) or (B) of fan switch (4) to adjust the air flow.
   If fan switch (A) is pressed while the air conditioner power supply is OFF, the air conditioner power supply is turned ON and the air flow is set to "Lo".



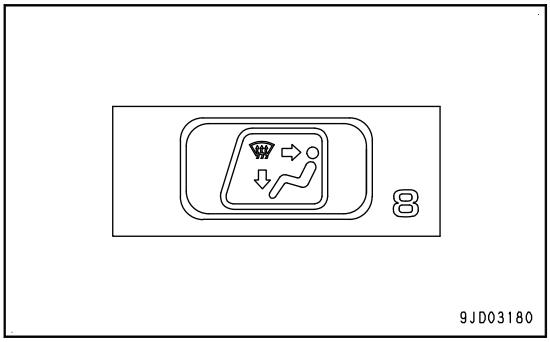
2. Turn air conditioner switch (3) ON.
   At this time, the air conditioner operation mark lights up on the display monitor.



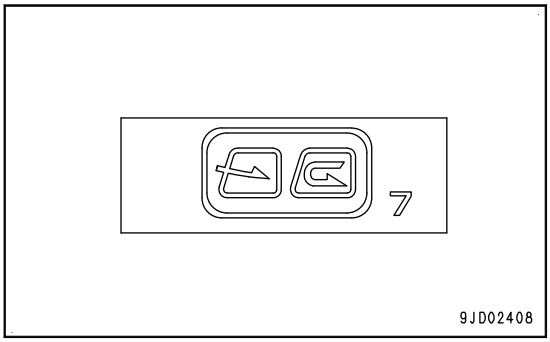
3. Press (A) or (B) of temperature control switch (5) to adjust the temperature in the cab.



4. Press vent selector switch (7) and select the desired vents.
   At this time, the display for the vent of the display monitor changes according to the selection.



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

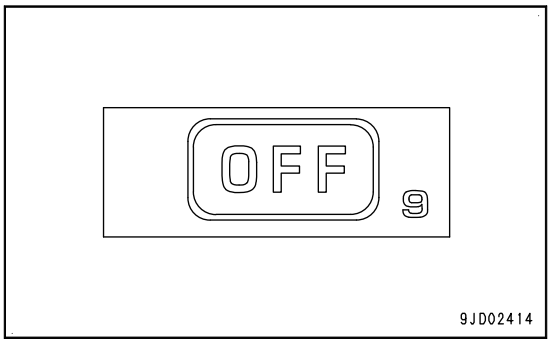


REMARK

- To heat or cool air quickly, set the temperature display to 18.0 °C (64.4 °F) (max. cooling) or 32.0 °C (89.6 °F) (max. heating).
- To select the automatic operation during manual operation, press the AUTO switch.

STOP MANUAL OPERATION *(WA-K500-100-K-04-A)*

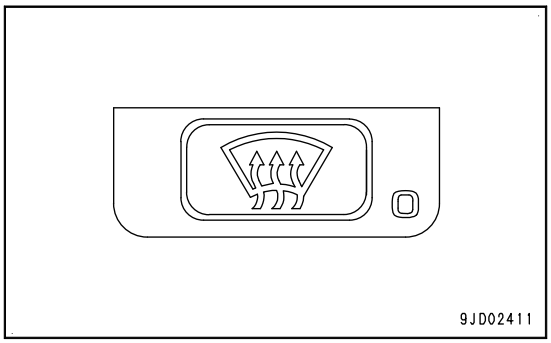
Press air conditioner OFF switch (1).
The display on the display monitor goes out and the operation stops.



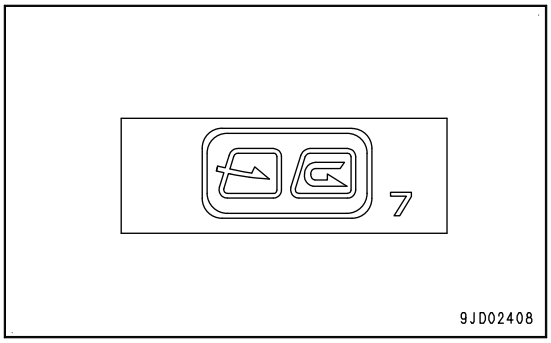
USE DEFROSTER *(WA-K500-100-K-05-A)*

Frost adhered to the outside of the window glass can be removed by defroster operation.

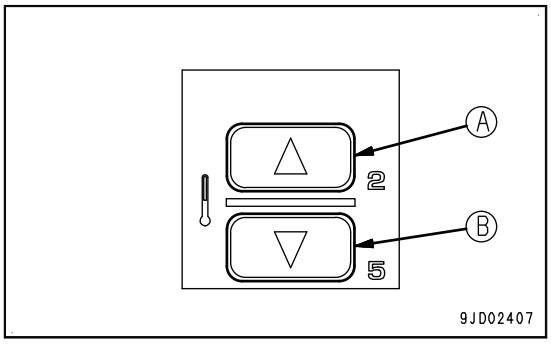
1. Press defroster switch (8) to set the vent in the defroster mode.



2. Press FRESH/RECIRC selector switch (6) and set it to recirculation of the air inside the cab (RECIRC).



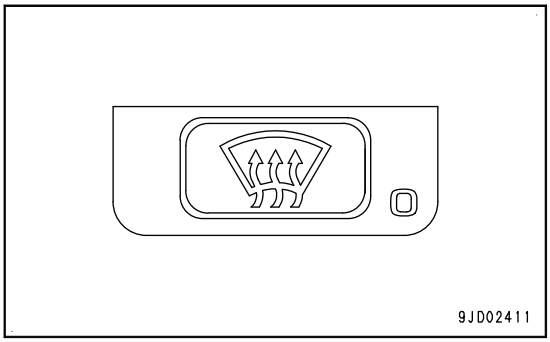
3. Press temperature control switch (5) to set the temperature to 32.0 °C (89.6 °F).
   To remove frost quickly, press the fan switch and set the air flow to "Hi".



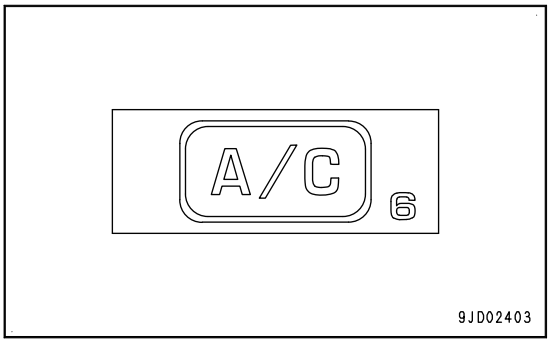
DEMIST OPERATION *(WA-K500-100-K-06-A)*

Condensation adhered to the inside of the window glass can be removed by demist operation.

1. Press defroster switch (8) to set the vent in the defroster mode.



2. Press air conditioner switch (3) and perform the cooling or dry heating operation.
   To remove the condensation quickly, press the fan switch to set the air flow to "Hi".



REMARK

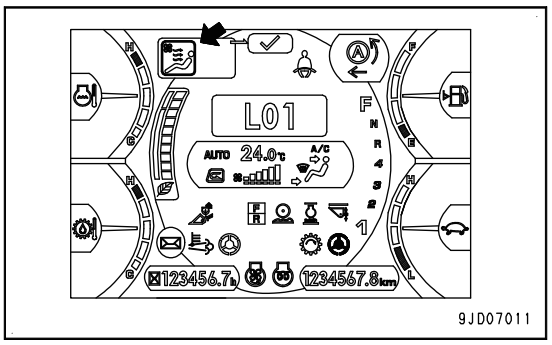
Do not decrease the set temperature too much during the demist operation. If the cold air blows against the front windshield glass, the outside of the glass become dim and that may lower the visibility.

RULES FOR USING AIR CONDITIONER *(WA-K500-170-K-00-A)*

- To prevent putting any excessive load on the engine or compressor, use the air conditioner only when the engine is running.
- If water gets into the control panel or sunlight sensor, it may lead to unexpected failure, take care not to let water get on these parts. In addition, never bring any open 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.
- If dust or offensive odor is in the machine operating environment, use the air conditioner in recirculation.
- To prevent leakage of the refrigerant from the air conditioner cooling circuit, operate the air conditioner for several minutes 2 or 3 times a month during the off-season. If the air conditioner is left for a long time when the refrigerant is leaking, internal rust may occur, causing failure.
- To prevent negative health effect, do not make the temperature inside the cab too low or expose your skin direct to the air flow for a long time.
  Also ventilate inside the cab from time to time.
- When turning the cooling on, if the temperature inside the cab is high, open the doors and windows to bring in fresh air before using the air conditioner.

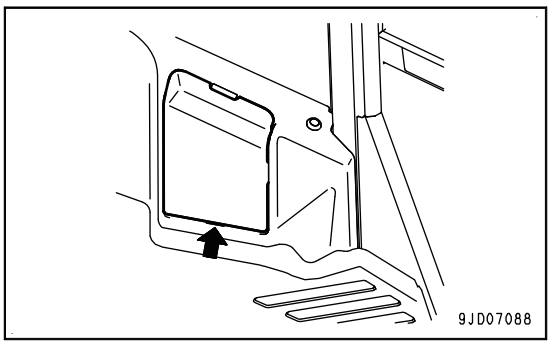
CHECKS AND ADJUSTMENT OF AIR CONDITIONER EQUIPPED MACHINE *(WA320-K500-200-K-00-A)*

- When carrying out inspection and maintenance of the air conditioner, observe the instructions in the table. For details, see "CHECK AND MAINTENANCE AIR CONDITIONER (PAGE 4-35) ".
- To allow the air conditioner to show its full performance and provide a comfortable environment, have inspection and maintenance carried out periodically.
  When adding refrigerant or carrying out other maintenance, special tools and instruments are needed, so ask your Komatsu distributor to carry out inspection and repair.
- If any abnormality is detected in any equipment or sensor used on the air conditioner, the air conditioner state monitor lights up on the monitor panel. If the air conditioner state monitor lights up, ask your Komatsu distributor for inspection and repair.



COOL BOX *(WA320-K821-043-K-00-A)*

Drink, hand towel, etc. can be kept cold during the cooling operation.
They can be kept warm during the heating operation.
Do not put things which smell or break easily or leak water, etc. in this box.
Do not use this box as a holder for small objects.



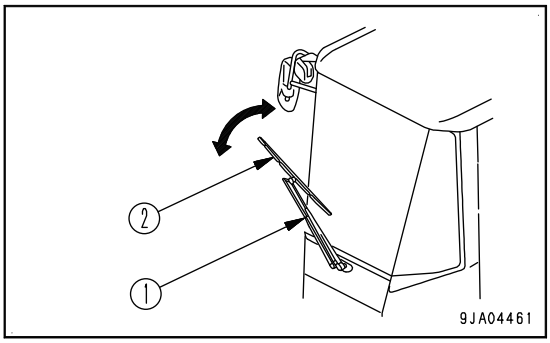
HANDLING FRONT WIPER *(WA-K714-170-K-00-A)*

Preventing the damage to the wiper arm bracket

NOTICE

When tilting wiper arm (1) forward, make sure that wiper blade (2) moves freely.

When tilting wiper arm (1) forward for cleaning cab glass, etc., make sure that wiper blade (2) is not locked in the arm (the bottom of the blade is not caught in the arm). If locked, an abnormal external force may apply to the bracket when you tilt the wiper arm forward, and the bracket may be damaged.

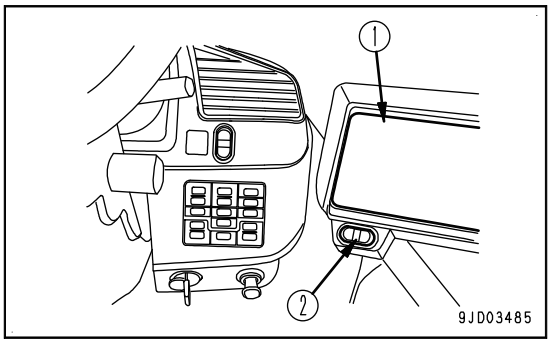


HANDLING REAR VIEW MONITOR *(WA270-Q16D-043-K-00-A)*

⚠ WARNING

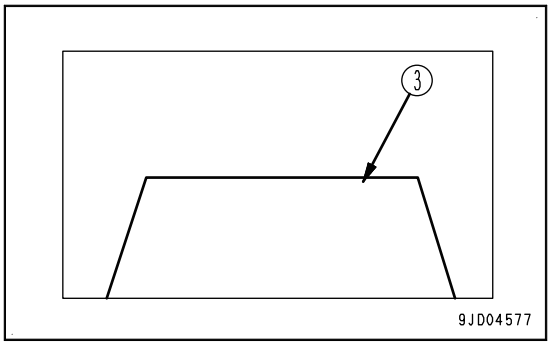
- **Never operate any of the switches while in running. If you do so, there is the fear that you may make an error in the machine operation, or neglect to watch the travel path ahead for safety, and as a result cause a serious personal injury.**
- **The rear view monitor is an supporting aid for checking obstacles in the rear or surroundings. An image appearing on the monitor is limited. So when backing up the machine, be sure to make a visual check, not relying solely on the monitor.**
  Never rely solely on the monitor when backing up the machine.
- **An image on the rear view monitor does not show an actual distance, so drive the machine slowly, when backing it up.**
- **The aberration appears on an image on the rear view monitor which is different from the actual state. So, look at the center of the screen as a reference.**

When the machine is backed up and rear view monitor (1) is set in operation, a monitor screen enables the operator to check the rear for safety.



REMARK

- The screen may be hard to see in the dark place at night, but it is not a trouble.
  The luminance of the rear view monitor can be adjusted with rear view monitor brightness adjustment switch (2).
  For the adjustment method, see "REAR VIEW MONITOR BRIGHTNESS ADJUSTMENT SWITCH (PAGE 3-78) ".
- Reference line (3) is used for checking the side and rear of the machine roughly.
  For the setting of rear view monitor, see "REAR VIEW MONITOR SETTING (PAGE 3-63) ", and for the setting of reference line, see "ADJUST REAR VIEW CAMERA (PAGE 3-161) ".
- The reference line dose not synchronize with steering angle. The reference line dose not indicate the actual moving direction or travel path.

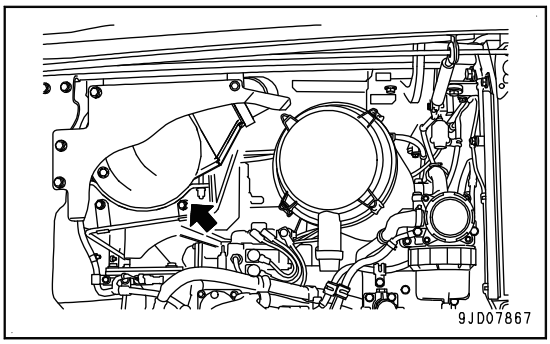


HANDLING Komatsu Diesel Particulate Filter (KDPF) *(WA270-A9H0-251-K-00-A)*

⚠ CAUTION

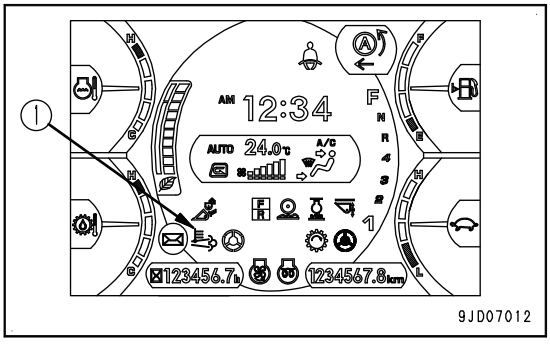
- **Exhaust gas temperature may increase higher than the current models during KDPF regeneration. Avoid getting near the exhaust pipe outlet to prevent being burnt. Also, keep flammables away from the exhaust pipe outlet to prevent a fire.**
- **When there are thatched houses, dry leaves or pieces of paper near the work site, set the system to disable the regeneration to prevent fire hazards due to highly heated exhaust gas while regeneration of KDPF. For the setting procedure, see "PROCEDURE FOR KDPF REGENERATION DISABLE SETTING (PAGE 3-137) ".**
- **While KDPF is being regenerated or when the engine is stopped after the regeneration, the parts around KDPF become hot.**
- **In order to protect KDPF, avoid running the engine at low idle for long periods of time. If it is necessary to run the engine at low idle, apply a load from time to time.**

KDPF is a device to capture soot in the exhaust gas to purify the exhaust gas.
If soot is accumulated to a certain level in the filter, a purification process to burn the soot is performed automatically to keep the filtering performance of KDPF high.
This purification process is called the "regeneration".
If operations which lower the purification function of KDPF continues for long hours, the regeneration is performed to protect the KDPF system, regardless of the quantity of the accumulated soot.

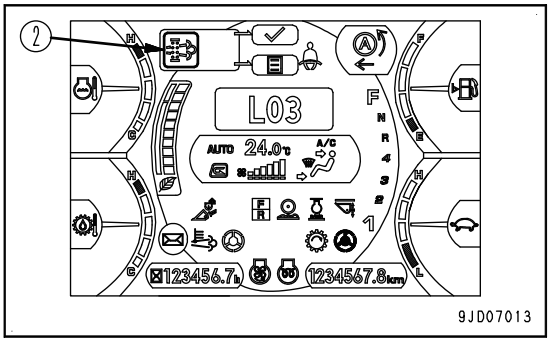


During the KDPF regeneration, KDPF regeneration pilot lamp (1) is displayed in the monitor panel.

REMARK
Even if KDPF regeneration pilot lamp (1) is displayed, there is no need of stopping the machine to suspend the work unless the alarm monitor appears at the center of the monitor panel.



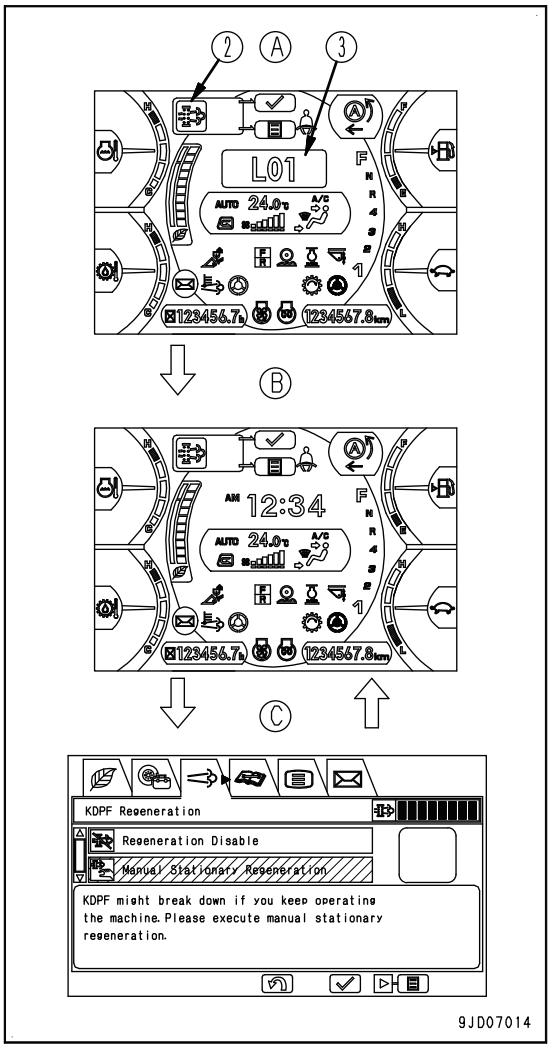
The KDPF regeneration is performed automatically. However, the accumulated soot may not be burnt sufficiently and the filtering function may not be improved under certain operating conditions. In that case, KDPF soot accumulation caution lamp (2) is displayed. If this caution lamp is displayed, stop the machine in a safe place and perform the manual stationary regeneration.
For details of the procedure, see "OPERATION PROCEDURE OF MANUAL STATIONARY REGENERATION (PAGE 3-134) ".



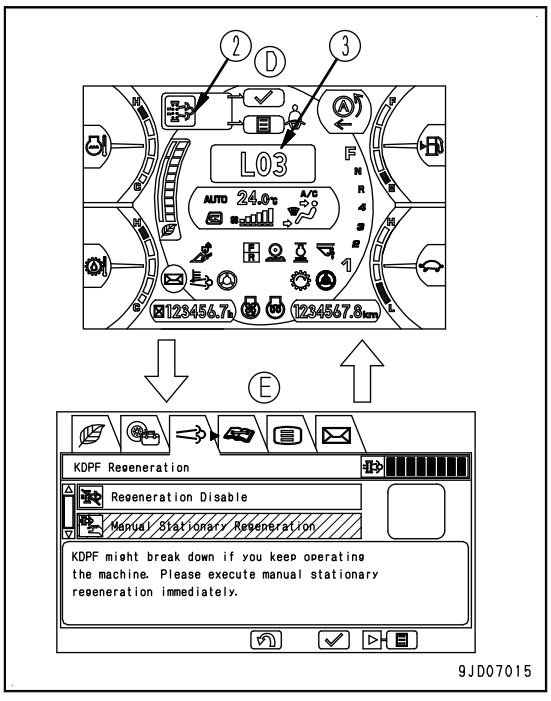
2 types of monitor display require the manual stationary regeneration, depending on the level of urgency.

NOTICE
If the work is continued when KDPF soot accumulation caution lamp (2) is displayed, failure on KDPF or the engine can result.
If KDPF soot accumulation caution lamp (2) is displayed, be sure to perform the manual stationary regeneration.

1. When level of urgency is low
   - If KDPF soot accumulation caution lamp (2) lights up in yellow (Action Level (3): L01), screen (A) is displayed first.
   - The action level goes out 2 seconds after and the screen changes to standard screen (B).
   - If the machine is stopped (travel speed 0 km/h (0 MPH)), the display switches to KDPF regeneration screen (C) after 3 seconds only the first time. If, however, the manual stationary regeneration is not performed, the display returns to standard screen (B) after 30 seconds.
     However, if the machine operation continues without turning on the manual stationary regeneration, and soot volume does not decrease, KDPF regeneration screen (C) is displayed for 30 seconds every 2 hours.
   - If KDPF soot accumulation caution lamp (2) lights up in yellow, stop the machine in a safe place after finishing the work and perform the manual stationary regeneration.



2. When level of urgency is high
   - If KDPF soot accumulation caution lamp (2) is displayed in red (action level monitor (3): L03), screen (D) is displayed.
   - If the machine is stopped (travel speed 0 km/h (0 MPH)), the display switches to KDPF regeneration screen (E) after 3 seconds only the first time. If, however, the manual stationary regeneration is not performed, the display returns to standard screen (D) after 30 seconds.
     Then, if the machine is stopped (travel speed 0 km/h (0 MPH)) while the standard screen is displayed, the display returns again to KDPF regeneration screen (E) in 3 seconds.
   - If KDPF soot accumulation caution lamp (2) is displayed in red, immediately stop the machine in a safe place and perform the manual stationary regeneration.

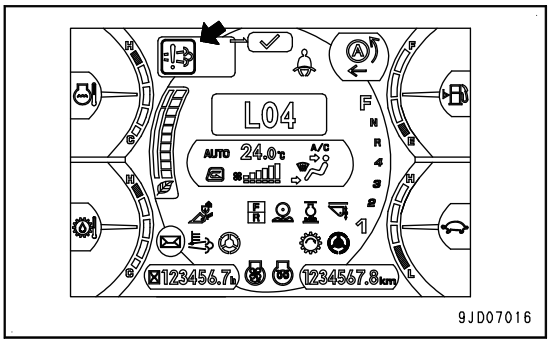


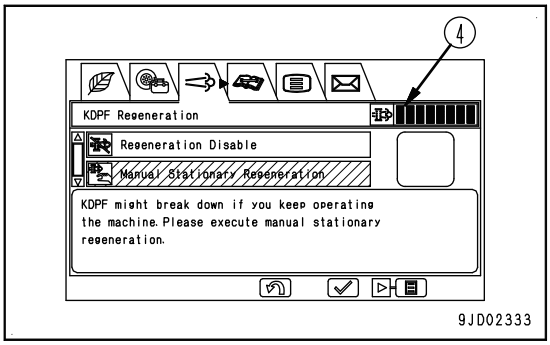
REMARK

- When the directional lever is turned to N (NEUTRAL) position and the parking brake switch is turned to "PARKING" position, the manual stationary regeneration may start automatically to protect the KDPF.
- When KDPF soot accumulation caution lamp (2) lights up in red, the maximum engine output and maximum engine speed are limited to protect the engine and KDPF system.

NOTICE

If the work is continued without performing the stationary manual regeneration, and the quantity of soot exceeds the allowable limit, action level "L04" lights up. In this case, the machine needs to be repaired by your Komatsu distributor. Also, the maximum engine output and maximum engine speed are limited to protect the engine and KDPF system.





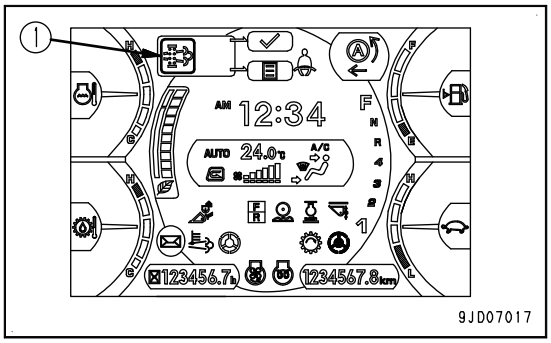
REMARK

- Soot accumulation level (4) can be checked with the KDPF regeneration screen. Press menu switch (A) on the standard screen to display the KDPF regeneration screen of the user menu.
- Since the soot in the filter of KDPF can be burnt by the high-performance catalyst and high-temperature exhaust heat, the soot accumulation quantity may decrease even if the regeneration is not performed, depending on the operating condition.
- Even when the soot accumulation level is low, the automatic regeneration may be performed and the manual stationary regeneration may be requested to protect the system. In particular, if light load operation is continued in the cold season, the regeneration frequency may increase, but this is not trouble.
- Even just after the regeneration is completed, the soot accumulation level may not be "0". This is caused by the accumulated noncombustible material in the exhaust gas and is not trouble.
- Since noncombustible material which cannot be burnt by the regeneration is accumulated in the filter of KDPF, the filter needs to be cleaned or replaced at regular intervals. See "CLEAN KDPF (PAGE 4-80) ".
- The engine speed or engine sound may change during or after the regeneration. This is caused by the control for better regeneration and is not trouble.
- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filtering function.
- White smoke may be discharged for a short time just after the engine is started or during the regeneration in the cold season, but this is not trouble.
- Always use Komatsu genuine engine oil for KDPF. If the engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as lubricating function reduction by deteriorated oil, and it may cause failure. In addition, the regeneration interval may be shortened and the fuel consumption may increase. For details of the genuine oil, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 7-4) ".

OPERATION PROCEDURE OF MANUAL STATIONARY REGENERATION *(WA320-A9H0-251-K-01-A)*

⚠ CAUTION

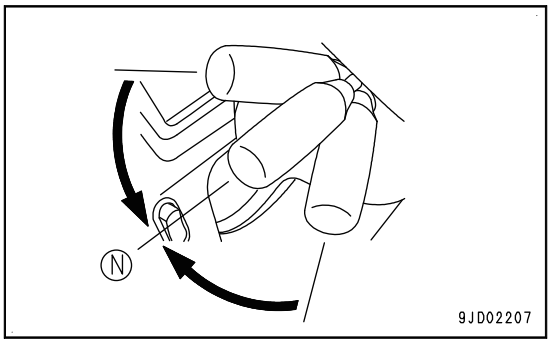
Exhaust gas temperature may increase higher than the current models during KDPF regeneration. Avoid getting near the exhaust pipe outlet to prevent being burnt. Also, keep flammables away from the exhaust pipe outlet to prevent a fire.



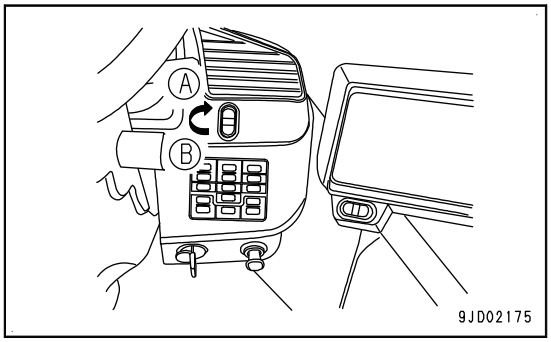
REMARK

The manual stationary regeneration can be performed while KDPF soot accumulation caution lamp (1) is lit.

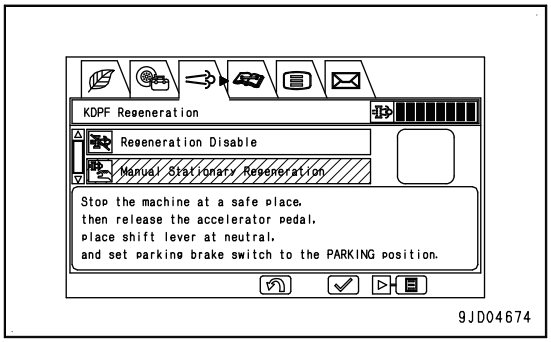
1. Move the machine to a safe place and stop it with engine running.
2. Check that there is no person or combustible matter around the machine (particularly in the direction of the exhaust gas flow).
3. Release your foot from the accelerator pedal and turn the directional lever to the neutral (N) position.



4. Turn the parking brake switch to ON position (A) and apply the parking brake.

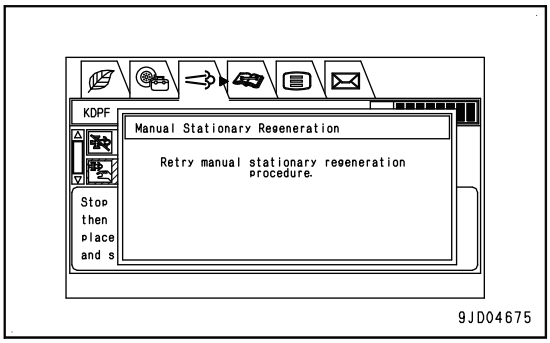


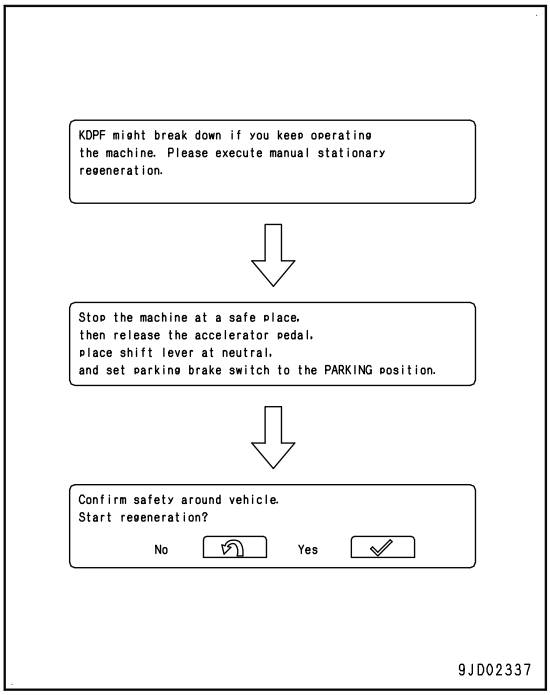
5. Press the enter switch to display the KDPF regeneration screen.
6. Select the manual stationary regeneration, check again safety of the surrounding area and make sure the area is free from unauthorized people or combustible matter, then press the enter switch.
   If it is needed to move the machine again to secure safety, move it to a safe place and repeat the procedure from the first.



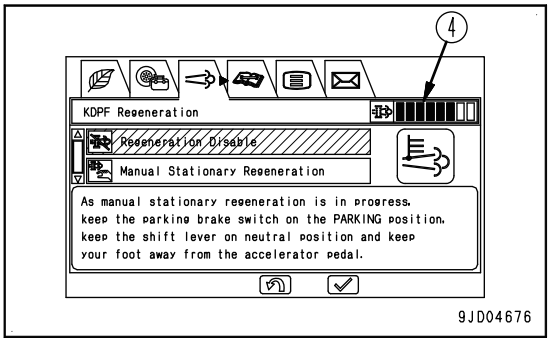
REMARK

- After the enter switch is pressed in step 6, the screen shown in the figure to the right may be displayed. This indicates that the operations in steps 1 to 4 were not performed correctly or there is a trouble other than the KDPF soot accumulation abnormality. Check operation of the engine, make sure you are not depressing the accelerator pedal and check the position of the directional lever and parking brake switch, then repeat the procedure from step 6.
  If the manual stationary regeneration still cannot be performed, return to the standard screen, press the enter switch to check the contents of other occurring errors, and take the necessary remedy.
- The explanation of the manual stationary regeneration is displayed in 3 parts on the monitor panel. When the enter switch is pressed, the regeneration can be started immediately, regardless of which part is displayed. When the return switch is pressed, the display returns to the standard screen.
- If no monitor switch is operated for 30 seconds, the explanation of the manual stationary regeneration disappears and the screen returns to the standard screen. In such case, if you want to display the explanation of the manual stationary regeneration again, press the enter switch on the standard screen to display the KDPF regeneration screen.





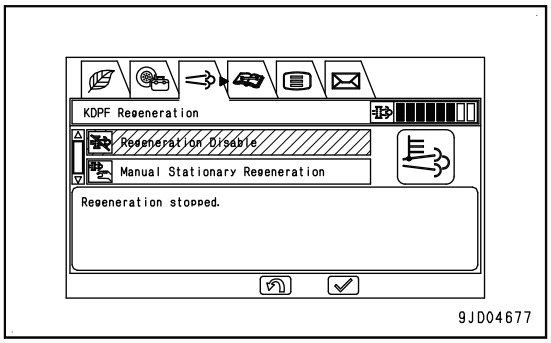
7. This screen is displayed during the manual stationary regeneration. It may take more than 30 minutes to complete the manual stationary regeneration. Do not touch the screen switches or operate the accelerator pedal until the regeneration is complete and the standard screen appears again.



REMARK

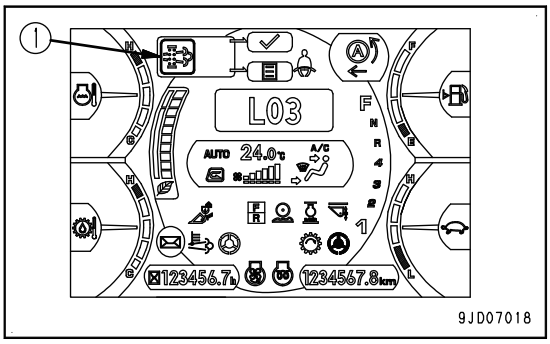
- The progress of the manual stationary regeneration performed when soot is accumulated can be checked by the number of lighting lamps of soot accumulation level (4). The manual stationary regeneration starts at soot accumulation level "4" or higher and finishes when all the level lamps go out.
- The manual stationary regeneration for protection of the system during cold season may start even when the soot accumulation level is "0" to "3". In this case, the soot accumulation level may not decrease, but this is not a failure. The progress is not displayed on the monitor during this regeneration. It is completed in approximately 10 minutes.
- If the accelerator pedal or directional lever is operated, or the parking brake is released during the manual stationary regeneration, the regeneration is stopped automatically. Release your foot from the accelerator pedal, turn the directional lever to the neutral (N) position, apply the parking brake, and then repeat the procedure from step 6.
- When the machine needs to be moved during the manual stationary regeneration, stop the regeneration temporarily and move the machine, referring to the KDPF regeneration disable and cancel of regeneration disable procedures described below.
  When restarting the manual stationary regeneration, secure the safety of the machine and around it, then cancel the regeneration disable.

8. After the manual stationary regeneration is completed, the screen automatically returns to the standard screen.



PROCEDURE FOR KDPF REGENERATION DISABLE SETTING *(WA320-A9H0-251-K-02-A)*

If the automatic active regeneration that increases the exhaust temperature must not be performed as in the case where there is combustible material around the machine, the automatic KDPF regeneration can be disabled. Also, the regeneration in progress can be stopped.



NOTICE

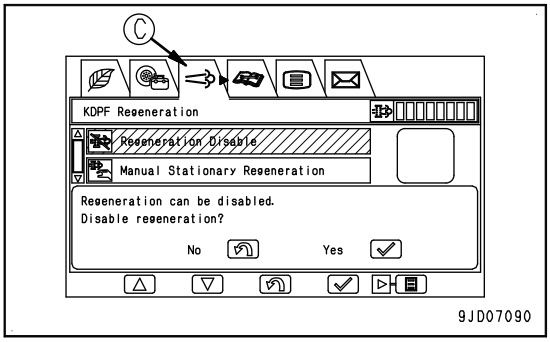
Even if the regeneration is disabled, KDPF soot accumulation caution lamp (1) lights up if soot is accumulated and the manual stationary regeneration is required. If KDPF soot accumulation monitor lights up, move the machine to a safe place and carry out manual stationary regeneration.

If the operation is continued without carrying out the manual stationary regeneration, it may cause the failure of KDPF or the engine.

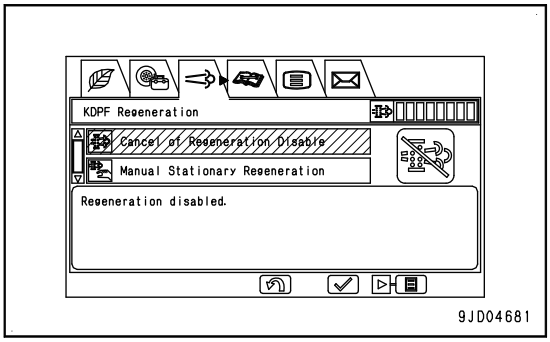
WHILE REGENERATION IS NOT BEING PERFORMED: SETTING FOR REGENERATION DISABLE *(WA320-A9H0-251-K-03-A)*

(When the KDPF regeneration pilot lamp is not lit on the standard screen)

1. Press the menu switch on the standard screen.
2. Operate the menu switch to select KDPF Regeneration menu (C) to display the KDPF Regeneration screen.

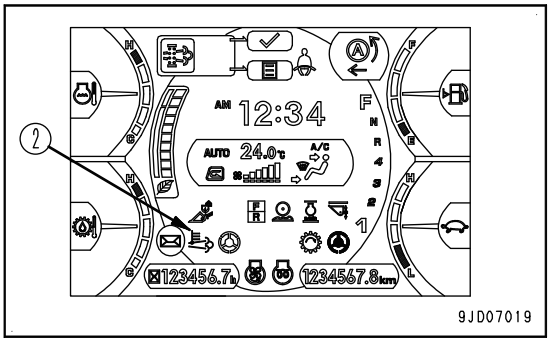


3. Select Regeneration Disable and press the enter switch. The regeneration function is disabled and the regeneration is not performed.



REMARK

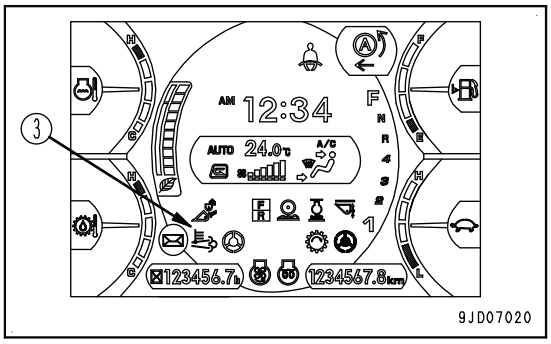
- When the regeneration is disabled, KDPF regeneration disable pilot lamp (2) with a hatched line is displayed on the standard screen.
- The setting of Regeneration Disable is canceled by turning starting switch to OFF position. When the automatic regeneration needs to be kept disabled, perform the above procedure each time you start the engine.
- Even when Regeneration Disable is selected, if the regeneration is performed to protect the system in the cold season, the regeneration monitor may light up, but this is not a failure. The exhaust gas temperature in this case is approximately the same as that of ordinary exhaust gas and is lower than that during the regeneration performed to burn soot.



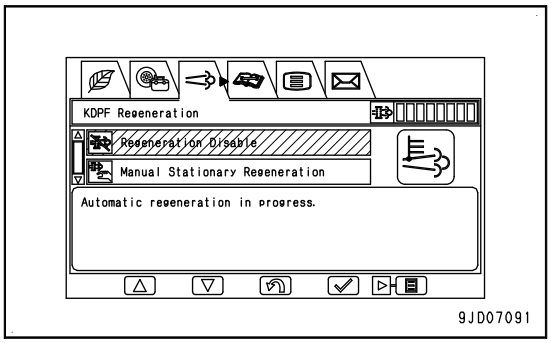
WHILE REGENERATION IS BEING PERFORMED: STOPPING REGENERATION *(WA320-A9H0-251-K-04-A)*

(When KDPF regeneration pilot lamp (3) lights up on the standard screen)

1. When the menu switch is pressed on the standard screen, the KDPF regeneration screen is displayed.



2. Press the enter switch after selecting Regeneration Disable, and then the regeneration stops.

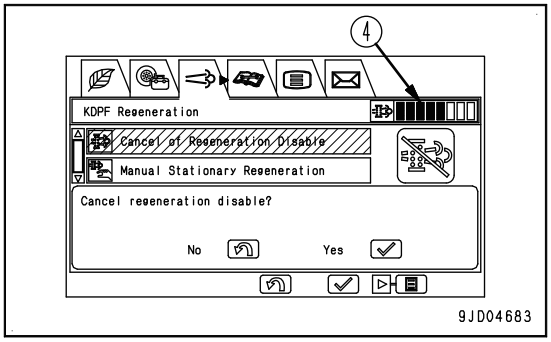


REMARK
The regeneration for protection of the system in the cold season may not be stopped, but this is not a failure.

PROCEDURE FOR CANCEL OF KDPF REGENERATION DISABLE SETTING *(WA-A9H0-251-K-05-A)*

⚠ CAUTION

When canceling the regeneration disable, move the machine to a safe place and check that there is no person or combustible matter around. And start the cancel operation.

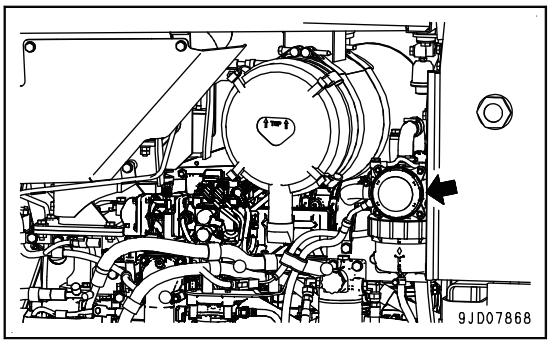


1. When menu switch is pressed on the standard screen, the KDPF regeneration screen is displayed.
   (If the KDPF regeneration screen is not displayed, display it by pressing the menu switch several times.)
2. Select Cancel of Regeneration Disable and press the enter switch, and the regeneration disable is canceled.
   If soot accumulation level (4) lights up 3 or more, the regeneration is started automatically.

REMARK
- When canceling the regeneration disable, release the accelerator pedal, set the directional lever in neutral (N), apply the parking brake, then cancel the regeneration disable.
- The regeneration disable setting is also canceled by turning the starting switch to OFF position to stop the engine.

HANDLING Komatsu Closed Crankcase Ventilation (KCCV) *(WA270-A185-043-K-00-A)*

KCCV is a device to clean the gas discharged from the engine crankcase with the filter element and return it to the engine air intake system.



NOTICE

- **The KCCV filter element needs to be replaced every 2000 hours. For details of the replacement procedure, see "REPLACE KCCV FILTER ELEMENT (PAGE 4-74) ".**
- **If the engine is operated without the KCCV filter element or if a filter element other than the Komatsu genuine one is used, the engine sucks oil and foreign material which can cause a trouble. Komatsu recommends using Komatsu genuine filter element for KCCV.**
- **The filter element cannot be cleaned. Never reuse the filter element since it can cause an engine trouble, even if it is cleaned.**

HANDLING MACHINES EQUIPPED WITH KOMTRAX *(ALL-Q210-043-K-01-A)*

KOMTRAX equipment may not be mounted on machines for some countries or regions.

OUTLINE OF KOMTRAX *(ALL-Q210-042-K-00-A)*

KOMTRAX is a system used for remote management of machines mounted with KOMTRAX equipment by using satellite communication or cellular wireless communication.
The customer can obtain various machine information (including machine position) by viewing the web screen on a personal computer.
Machine information that can be viewed with KOMTRAX includes the following.

- Machine position, service meter, operating hours, and fuel consumption

Komatsu and associated companies, Komatsu distributors will use these machine information to provide better service to customers and improve products and services, etc.
If you are interested in using KOMTRAX, consult your Komatsu distributor for registration of using KOMTRAX.

⚠ WARNING

- **Never disassemble, repair, modify, or move the communication terminal, antenna, or cables. This may cause failure or fire on the KOMTRAX equipment or the machine itself. (Your Komatsu distributor will carry out removal and installation of KOMTRAX.)**
- **For anyone wearing a pacemaker, make sure that the communications antenna is at least 22 cm (8.7 in) from the pacemaker. The radio waves may have an adverse effect on the operation of the pacemaker.**
- **Near the blasting jobsite, there may be a danger of unexpected explosion due to use of interactive wireless communication device of KOMTRAX and resulting serious personal injury or death. Make sure to operate the machine away from the blasting jobsite.**
  If you have to operate the machine within 12 m from the blasting jobsite or the remote-controlled blasting device, the power supply cable of KOMTRAX must be disconnected in advance. If you want to do this, ask your Komatsu distributor for disconnecting power supply cable of KOMTRAX.
  Also, if there are requirements or regulations concerning the operation of this machine in your area or country, be sure to observe them in priority to this warning.
  When checking for compliance with regulations, refer to the following KOMTRAX equipment satellite communication specifications.
  Transmit power: 5 to 10 W
  Transmit frequency: 148 to 150 MHz

PRECAUTIONS *(WA270-Q210-10A-K-00-A)*

- Even when the starting switch is at OFF position, a small amount of electric power is consumed by KOMTRAX system.
  It is recommended to run the engine periodically to charge the battery. When storing the machine for a long period, see "LONG-TERM STORAGE (PAGE 3-221) ".
- When using the battery disconnect switch, turn the starting switch to OFF position and turn the battery disconnect switch key to OFF position. Then, pull out the key.
  When the battery disconnect switch is turned to OFF position, it is possible to prevent power consumption of the battery, but the functions of KOMTRAX stop at the same time.
  For details of the operation of the battery disconnect device, see "BATTERY DISCONNECT SWITCH (PAGE 3-101) ".
- Contact your Komatsu distributor before installing a top guard or other attachment that covers the cab roof.

REMARK
The KOMTRAX equipment 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 outdoors, KOMTRAX cannot be used in areas where the radio signal is weak or in areas outside the wireless communication service area.

OBSERVANCE OF THE APPLICABLE LAWS AND REGULATIONS, EXEMPTION *(ALL-Q210-18B-K-00-A)*

The KOMTRAX equipment is a wireless device using radio waves, so it is necessary to obtain authorization and conform to the laws of the country or territory where the machine equipped with KOMTRAX is being used. Observe the applicable laws and regulations of the country or region in which the machine is used.
Always contact your Komatsu distributor before exporting this machine equipped with KOMTRAX or using it in a foreign country.
The KOMTRAX may already have been registered and used if the machine is purchased as second-hand. For the registration and usage records of KOMTRAX, consult your Komatsu distributor.
If the machine has been lent out by the customer, the borrower or another third party may have been using the KOMTRAX. Ask the borrower about the usage of KOMTRAX.
Komatsu may suspend KOMTRAX communication in the following cases.

- When Komatsu judges that KOMTRAX is used by an unregistered user.
- When Komatsu judges that KOMTRAX is used in a country or region not allowing the use of KOMTRAX.
- In other cases that Komatsu or Komatsu distributor judges that it is necessary to suspend KOMTRAX communication.

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.

MACHINE OPERATIONS AND CONTROLS *(ALL-0000-001-K-13-A)*

CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE *(ALL-3310-001-A-00-A)*

WALK-AROUND CHECKS *(WA320-0000-289-K-00-A)*

Before starting the engine, walk around the machine and look at the underside of chassis for anything unusual like loose bolts and nuts, damage of each part, or leakage of oil, fuel, or coolant. Also check the condition of the work equipment and the hydraulic system. Also check for loose wiring, play, and accumulation of dust in places that reach high temperature.

⚠ WARNING

Leakage of fuel or oil, or accumulation of flammable material around the battery and high temperature parts, such as the KDPF or turbocharger, may cause fire.
Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.

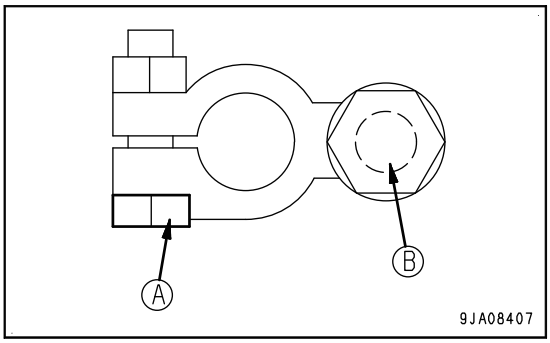
If the machine is inclining, make it level before checking.
Always perform the following inspections and cleaning every day before starting engine for the day's work.

1. Check for damage, wear, play in work equipment, cylinders, linkage, and hoses
   Check for cracks, excessive wear, play in work equipment, cylinders, linkage, and hoses. If any problem 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, KDPF, turbocharger, or other high temperature engine parts. If any dirt or flammable materials are found, remove them.
3. Check of engine and related parts for leakage of water, oil and exhaust gas
   Check the engine for leakage of oil and exhaust gas, and check the cooling system for coolant leakage. If any problem is found, repair it.
4. Check for leakage from fuel line
   Check for leakage of fuel or damage to the hoses and tubes. If any problem is found, repair it.
5. Check for oil leakage from HST piping, transfer case, axle, hydraulic tank, hoses and joints
   Check for oil leakage. If any problem is found, repair the place where the oil is leaking.
6. Check for oil leakage from brake line
   Check for leakage of oil or damage to the hoses and tubes. If any problem is found, repair it.
7. Check for damaged or worn tires, wheels, and wheel hub bolts and nuts, check for loose wheel hub bolts and nuts
   Check for cracks or peeling of the tires and for cracks or wear to the wheels (side ring, rim base, lock ring).
   Tighten any loose wheel hub bolts or nuts. If any problem is found, repair or replace the part.
   If any valve caps are missing, install new caps.
8. Check for damage and loose bolts on the handrails and steps
   If any problem is found, repair it. Tighten any loose bolts.
9. Check for problem in gauges, monitor
   Check for problem in the gauges and monitor in the operator's cab. If any problem is found, replace the parts.
   Clean off any dirt on the surface.

REMARK
To remove dust from the surfaces of the monitor, wipe it off with a clean, soft, and dry cloth.
For sticky dirt such as oil, remove it with glass cleaner for family use on the market (weakly acid to weakly alkaline, containing no abrasive), and then finish-wipe with a clean, soft, and dry cloth.

10. Check of rear view mirror
    Check for damage to the rear view mirror. If it is damaged, repair it. Clean the surface of the mirror and adjust the angle so that the area at the rear can be seen from the operator's seat.
11. Check for loose air cleaner mounting bolts
    Check for the loose bolts. If loose, tighten them.

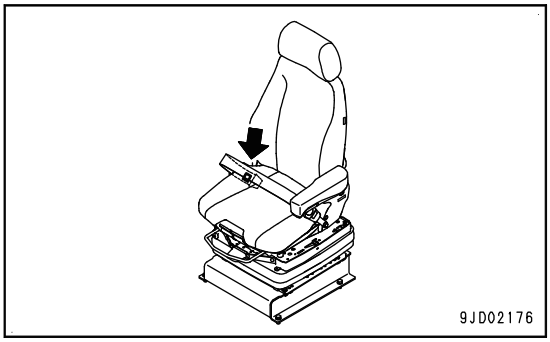
12. Check for loose battery terminals
    If terminals are found loosened, retighten them.
    Tightening torque of part A: 5.9 to 9.8 Nm {0.6 to 1.0 kgm, 4.3 to 7.2 lbft}
    Tightening torque of part B: 11.8 to 19.6 Nm {1.2 to 2.0 kgm, 8.7 to 14.5 lbft}



13. Check seat belt and mounting clamps

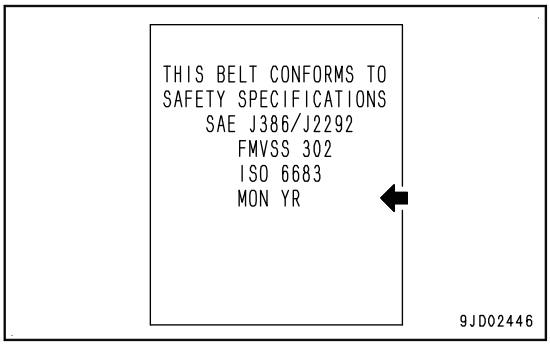
⚠ WARNING

Even if no problem can be seen in the belt, replace it in accordance with the following schedule:
5 years after the date of seat belt manufacture, or every 3 years after the start of actual usage, whichever date comes sooner.



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

REMARK
The manufactured date of the seat belt is printed on the label at the arrow in the figure at right.



    Check for any loose bolts of the clamps mounting the equipment to the machine. Tighten any loose bolts.
    Tightening torque: 39.2 ± 2 Nm {4 ± 0.2 kgm, 28.9 ± 1.45 lbft}
    If the seat belt is scratched or frayed, if any fittings are broken or deformed, replace the seat belt with a new one.

14. Cleaning of cab windows
    Clean the cab windows to secure visibility during operation.
    Cleaning from the top of the fender or platform is very dangerous.
    Clean with a mop etc. from the ground.

15. Check of tires

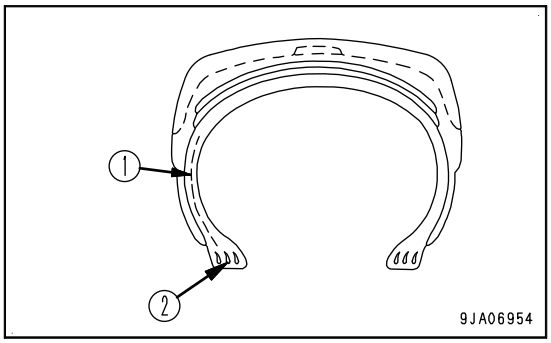
⚠ WARNING

If worn or damaged tires are used, they may burst and cause serious injury or death.
To ensure safety, do not use the following tires.
Wear:

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

Damage:

- **Tires with damage that has reached cords (1), or with cracks in the rubber**
- **Tires with cut or pulled cords (1)**
- **Tires with peeled (separated) surface**
- **Tires with damaged bead (2)**
- **Leaking or improperly repaired tubeless tires**
- **Deteriorated, deformed or abnormally damaged tires, which do not seem usable.**



16. Check of rims

⚠ WARNING

Check the rims (wheels) and rings for deformation, damage caused by corrosion and cracks.
In particular, check the side rings, lock rings and rim flanges thoroughly.
If any problem is found, replace the part.

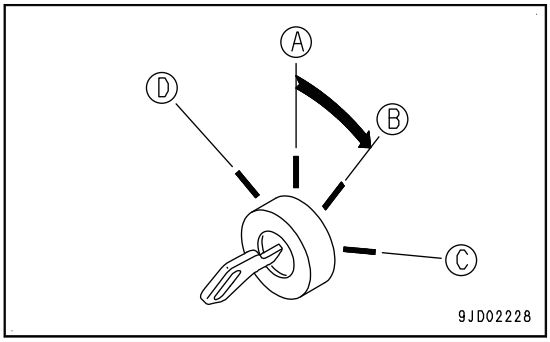
17. Check of rear view monitor
    Check the rear view monitor for problem. If it is failed, ask your Komatsu distributor for repair.
18. Remove dirt from around KDPF
    Check for dirt, flammable materials (dry leaves, twigs, etc.) accumulated around KDPF. If any dirt or flammable materials are found, remove them.
19. Check for gas leakage around KDPF
    Check the pipe connecting KDPF to turbocharger and also KDPF connection for leakage of exhaust gas (and deposition of soot). If any problem is found, ask your Komatsu distributor for repair.
20. Check of KCCV piping for gas leakage and oil leakage
    Check the 3 pipes between the KCCV filter, turbocharger, oil pan, and cylinder head for oozing oil. If any problem is found, ask your Komatsu distributor for repair.

CHECKS BEFORE STARTING *(ALL-3340-015-A-00-A)*

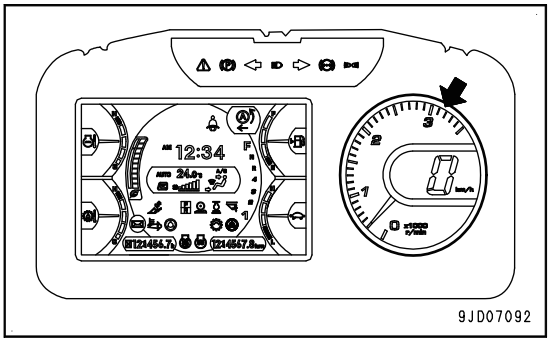
Always check the items in this section before starting the engine each day.

CHECK MACHINE MONITOR *(WA320-Q180-383-K-00-A)*

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



2. Check that all the monitors and gauges and centralized warning lamp light up for approximately 2 seconds and the alarm buzzer sounds for approximately 2 seconds.
   Check that the pointer of engine tachometer swings.
   If they do not light up, the machine monitor may be defective or open circuit is in the machine monitor. Ask your Komatsu distributor for check.



CHECK COOLANT LEVEL, ADD COOLANT *(WA270-B000-216-K-00-A)*

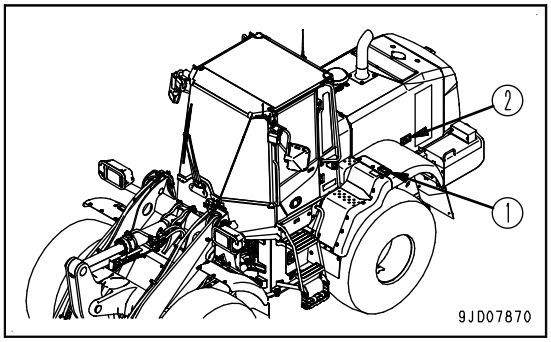
⚠ WARNING

- **Do not open the radiator cap unless necessary. When checking the coolant level, check the sub-tank when the engine is cold.**
- **Immediately after the engine is stopped, the coolant is at high temperature. And the pressure is still accumulated in the radiator. If the cap is removed in this condition, there is a hazard of burns. Accordingly, wait until the coolant temperature drops, then turn the cap slowly to release the pressure.**

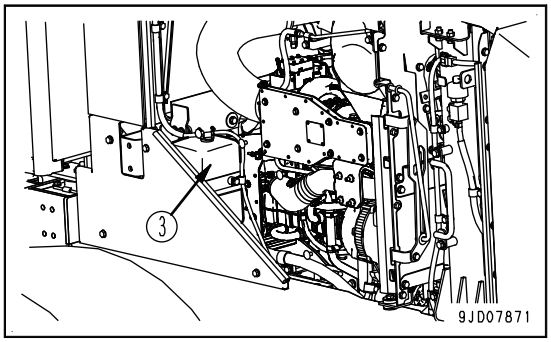
⚠ CAUTION

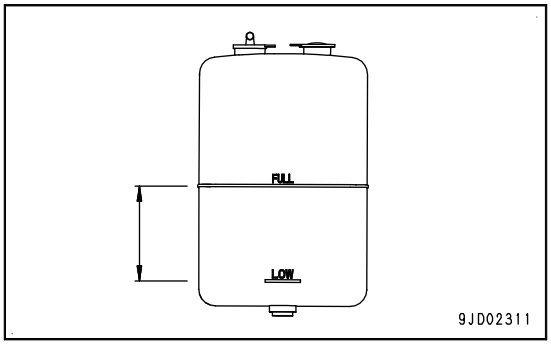
When refilling with coolant, support you body securely by using the step and handrail provided.

1. Undo lock (1) at the top of the rear full-length fender on the left side of the machine and open engine side cover (2).



2. Check if the coolant in sub-tank (3) is between the FULL and LOW marks. If the coolant level is low, add coolant to the FULL level through the filler port of sub-tank (3).
3. After adding coolant, tighten the cap securely.
4. If sub-tank (3) is empty, leakage of coolant should be suspected. After checking, repair any abnormality immediately. If no abnormality is found, check the level of the coolant in the radiator. If it is low, add coolant of the same density in radiator according to the coolant density table in "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-19) ", then add coolant to sub-tank (3).
   If the amount of added coolant is larger than usual, check for leakage of coolant.
   Check the coolant for any abnormality such as oil, etc. in it.



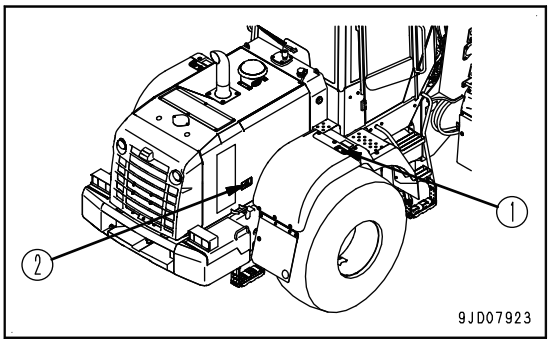


CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL *(WA270-AB20-212-K-00-A)*

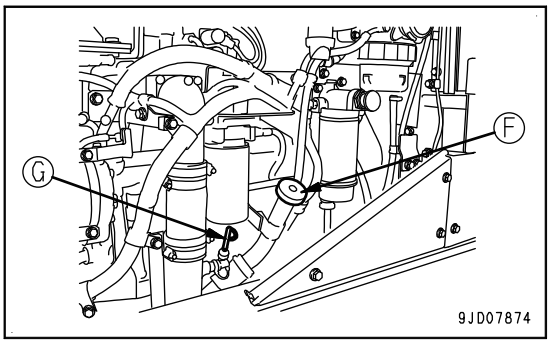
⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they cool down before starting the work.

1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).

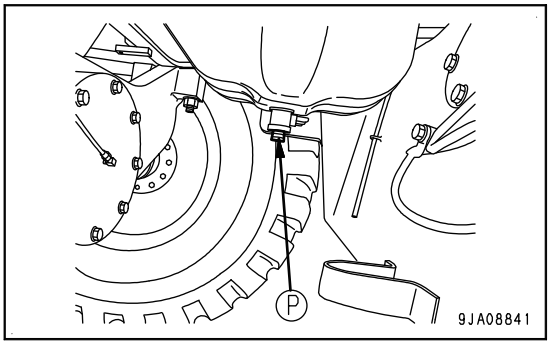


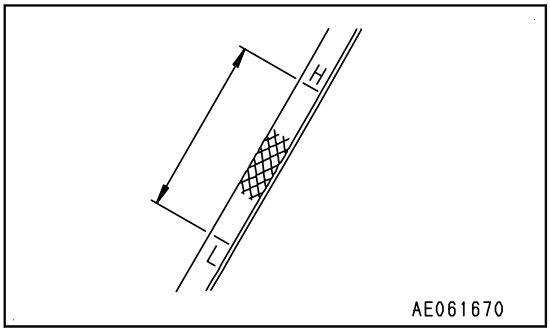
2. Take out dipstick (G) and wipe off the oil with cloth.
3. Fully insert dipstick (G) into the dipstick pipe, then remove it.
4. The oil level should be between the H and L stamped lines on dipstick (G).
   If the oil level is below the L mark, add oil through oil filler port (F).
5. If the oil level is above the H line, drain the excess oil from drain plug (P), then check the oil level again.
6. If the oil level is correct, tighten oil filler cap (F) securely and close engine side cover (1).



REMARK

- When checking the oil level after the engine has started, wait at least 15 minutes after stopping the engine before checking.
- If the machine is inclining, make it level before checking.
- When the ambient temperature is low, water or emulsified matter may stick to the dipstick, oil filler cap, etc. or the drained oil may be milky white because of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem.
  If the coolant level is low, add coolant.





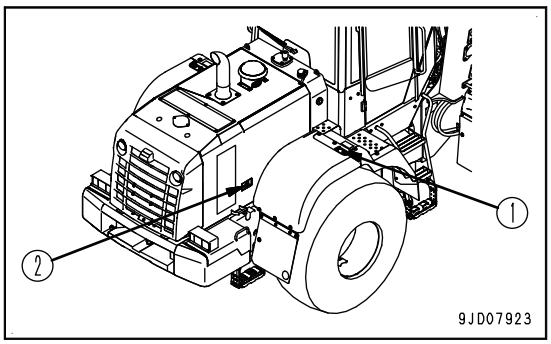
CHECK WATER SEPARATOR, DRAIN WATER *(WA380-AEB0-220-K-00-A)*

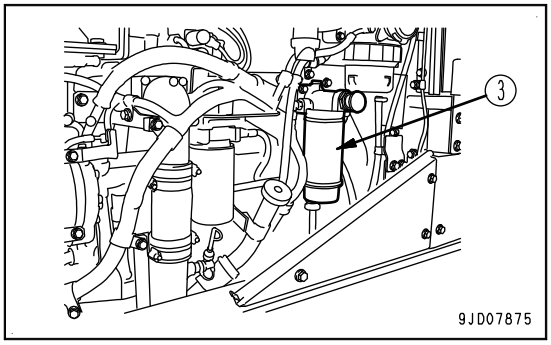
⚠ WARNING

- **Immediately after the engine has been operated, all parts are at high temperature, so do not drain the coolant or remove the filter element cup immediately.**
  Wait until the temperature of all parts to drop.
- **When the engine is running, high-pressure is generated in the engine fuel piping. When draining the coolant or removing the filter element cup, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before starting the work.**
- **Do not bring any open flame close.**

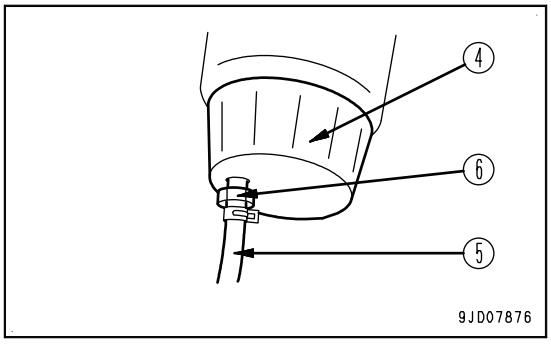
CHECK WATER SEPARATOR, DRAIN WATER AND SEDIMENT *(WA270-AEB0-220-K-00-A)*

1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2). Water separator (3) is in one piece with the fuel prefilter and located in the lower part.

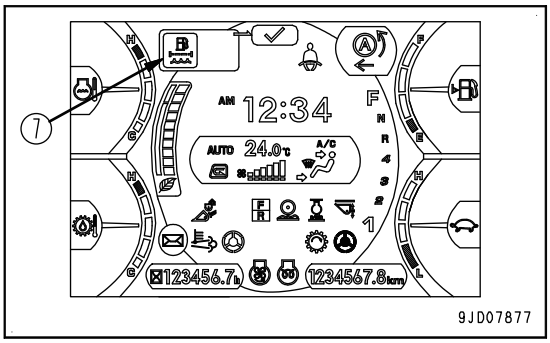




2. It is possible to judge the water level and amount of sediment by looking through transparent cap (4). If there is any water or sediment collected at the bottom, place a container to catch the drain water under drain hose (5).
3. Loosen plug (6) to drain the water.
4. When fuel starts flowing out through drain hose (5), tighten plug (6) immediately.
   (Tightening torque: 0.2 to 0.45 Nm {0.02 to 0.046 kgm})
5. On this machine, a sensor is installed to detect if water is accumulated in transparent cap (4).
   When water separator caution lamp (7) lights up in red on the machine monitor, it indicates that water is accumulated in transparent cap (4).
   Drain the coolant according to the above procedure in this case, as well.



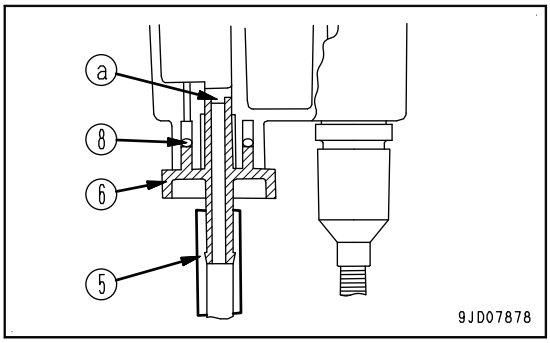
REMARK
When only the water separator caution lamp lights up, it lights up in the position shown in the figure on the right.
If other caution lamps also light up at the same time, the water separator caution lamp lights up at a different position.



NOTICE
- **If the water accumulated in transparent cap (4) freezes, the water separator caution lamp may not light up. After the engine is started, if frozen water melts due to increased temperature around fuel prefilter (3), the water separator caution lamp may suddenly light up. In cold weather, even if the water separator caution lamp is not lit, drain the water frequently.**
- **If the water inside transparent cap (4) freezes, check that the frozen water has melted completely, then use the procedure above to drain the water.**

REMARK
If drain plug (6) is heavy to operate, apply grease to O-ring (8) of plug (6) according to the following procedure.

1. Place a container under drain hose (5) to catch the drained fuel.
2. Loosen plug (6) and drain all the fuel and sediment through drain hose (5).
3. Check that nothing more comes out from drain hose (5), then remove drain plug (6).
4. Apply a suitable amount of grease to O-ring portion (8). At this time, take care that grease will not stick to water drain port (a) and threaded part of the plug.
5. Tighten plug (6) by hand until it stops.
6. Remove the container for catching the drained fuel.
    - If transparent cap (4) is so dirty that the inside cannot be seen, clean it when replacing the filter.
    - When the plug (6) has been removed during the cleaning work, apply grease to the O-ring and tighten with the figures until it stops.



CHECK AIR CLEANER *(WA270-A910-92D-K-00-A)*

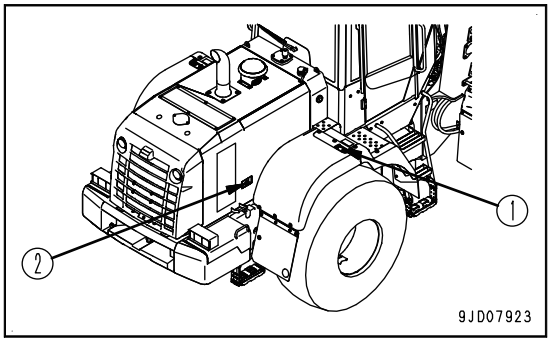
⚠ WARNING

- **If inspection, cleaning, or maintenance is performed while the engine is running, dirt enters into the engine and damages it. Be sure to stop the engine before performing these works.**
- **When using compressed air, there is a danger that dirt may scatter and cause personal injury. Always wear protective equipment such as protective eyeglasses and dust mask.**
- **When removing the outer element from the air cleaner body, it is dangerous to pull it out by force. When working in high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.**

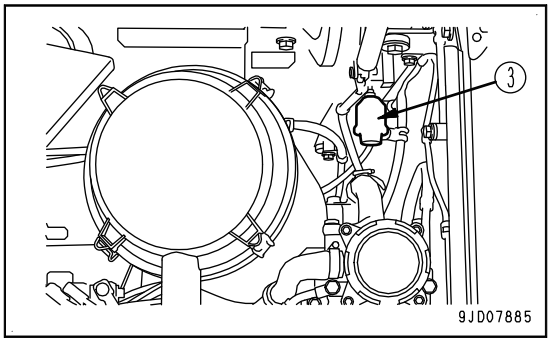
NOTICE

- **The dust indicator indicates clogging of the air cleaner.**
  The dust indicator notifies the clogging level of the air cleaner. Check the dust indicator before operating the machine so that cleaning of the air cleaner element is not required during operation.
- **If inspection, cleaning, or maintenance is carried out with the engine running, dirt will enter inside the engine and cause damage to the engine. Be sure to stop the engine before performing these works.**

1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).



2. Clean the element when the yellow piston shown in dust indicator (3) display of the air cleaner entered the red (7.5 kPa) position.
   For cleaning of the element, see "CLEAN OUTER ELEMENT (PAGE 4-14)".
3. After cleaning, press button (3) of the dust indicator to reset it.
4. If the yellow piston enters the red (7.5 kPa) position soon after the cleaning, the element must be replaced.
   For replacement of the element, see "REPLACE ELEMENT (PAGE 4-17)".



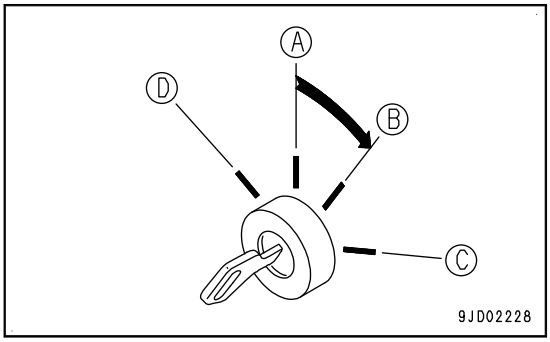
CHECK FUEL LEVEL, ADD FUEL *(WA270-AD10-211-K-00-A)*

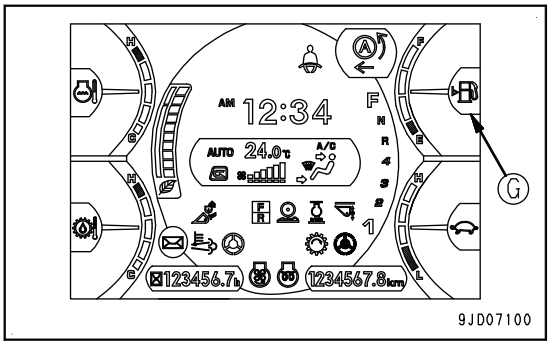
⚠ WARNING

When refilling with fuel, do not add any more fuel after the fuel filer gun has automatically stopped. If fuel is excessively added, fuel may inflate and flow out when ambient temperature increased and dangerous.
Spilled fuel may cause fire, so it must be wiped off completely.
Since fuel is flammable and dangerous, do not bring open flame near fuel.

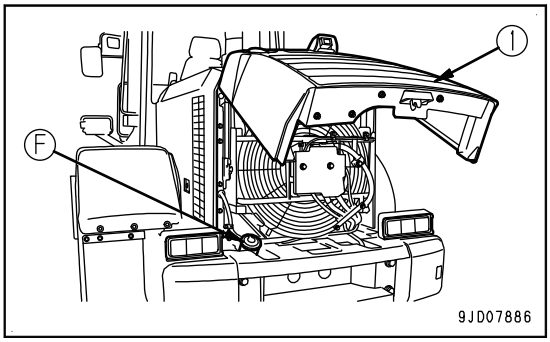
NOTICE
When restarting the engine that has stopped due to run out of fuel, all air must be sufficiently bled from the circuit.
For the air bleeding procedure, see "REPLACE FUEL MAIN FILTER CARTRIDGE (PAGE 4-60) ".
Take care not to cause engine stall due to run out of fuel.
When fuel is used up, you can cut the air bleeding time by filling the fuel tank fully with fuel.

1. Turn the engine starting switch to ON position (B) and check the level of remaining fuel with fuel gauge (G).
   After checking, turn the switch back to OFF position (A).





2. If the fuel level is low, open rear grill (1) and add fuel through the filler port (F) to fill the tank.
   Once the tank is filled up, do not try to supply additional fuel.
   For the cap opening and closing procedure, see "CAP WITH LOCK (PAGE 3-94) ".
3. After adding fuel, tighten the cap securely.
   Fuel tank capacity: 186 liters (49.1 US gal)



CHECK ELECTRIC WIRING *(ALL-AK51-280-K-00-A)*

⚠ CAUTION

- **If fuses are frequently blown or if there are traces of short-circuiting on the electrical wiring, promptly ask your Komatsu distributor to locate the cause and make the repair.**
- **Keep the top surface of the battery clean and check the breather hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap to clear the breather hole.**

Check that there is no damage to the fuses; that fuses of the specified capacity are used; that there is no disconnection or trace of short-circuiting in the electric wiring and no damage to the coating. Check also that there is no loosened terminals. If any, tighten them.
Moreover, pay particular attention to the electric wiring when checking the battery, engine starting motor and alternator.
Be sure to check that there is no inflammable material accumulated around the battery. If any is found, remove immediately.

CHECK TIRE PRESSURE *(WA-DW60-360-K-00-A)*

Measure the inflation pressure with tire pressure gauge while the tires are cool, before starting work.
Check the tires and rims for damage or wear, check the hub nuts (bolts) for loosening.
Appropriate inflation pressure varies depending on the type of work. For details, see "HANDLING TIRES (PAGE 3-210) ".

CHECK WINDOW WASHER FLUID SPOUTING OUT *(WA-K7B0-217-K-00-A)*

Operate the window washer and check that the washer fluid spouts out normally.
- If the fluid does not spout out normally, clean the washer nozzle hole with a fine wire such as a safety pin.
- If the condition does not become normal, ask your Komatsu distributor to carry out inspection and repair.

CHECK WIPER FUNCTION *(WA-K714-280-K-00-A)*

Operate the windshield wiper in the "Intermittent", "Low", and "High" mode and check that it operates and wipes normally.
- Operate the window washer to wet the glass, and check the operation of the windshield wiper.
- If the windshield wiper does not wipe normally, the glass needs to be cleaned or the wiper blade needs to be replaced.
- If the condition does not become normal, ask your Komatsu distributor to carry out inspection and repair.

CHECK HORN *(WA-Q544-280-K-00-A)*

Press the horn switch to check that the horn sounds.
If any problem is found, ask your Komatsu distributor for inspection and repair.

CHECK DEFROSTER FUNCTION *(WA-K500-280-K-00-A)*

- Operate the air conditioner and check that the air flows out of the vents properly onto the front glass.
  If any problem is found, ask your Komatsu distributor for inspection and repair.
- Operate the switch of heater wire for rear glass and check that the rear glass surface is heated properly.
  If any problem is found, ask your Komatsu distributor for inspection and repair.

CHECK LOCKS *(WA270-Q8E0-280-K-00-A)*

Check that all places can be locked properly.
(For the locations to be locked, see "LOCKING (PAGE 3-209) ".)
If there is any abnormality, ask your Komatsu distributor for inspection and repair.

CHECK EMERGENCY ESCAPE *(WA-Q5K2-280-K-00-A)*

Operate the knob for opening and closing the emergency exit, and check that the exit opens and closes properly.
If any problem is found, ask your Komatsu distributor for inspection and repair.

ADJUSTMENT *(ALL-K000-001-K-01-A)*

SEAT ADJUSTMENT *(WA380-K2Q0-270-K-00-A)*

⚠ WARNING

- **Place the machine in a safe place when adjusting the position of the operator's seat.**
  Be sure to apply the work equipment lock (the pilot lamp in the switch lights up) to prevent accidental movement of work equipment due to accidental contact with the control levers.
- **Always adjust the operator's seat before starting each operation or when operators change shift.**
- **When adjusting the seat, put your back against the backrest and adjust to a position where the brake pedal can be fully depressed.**

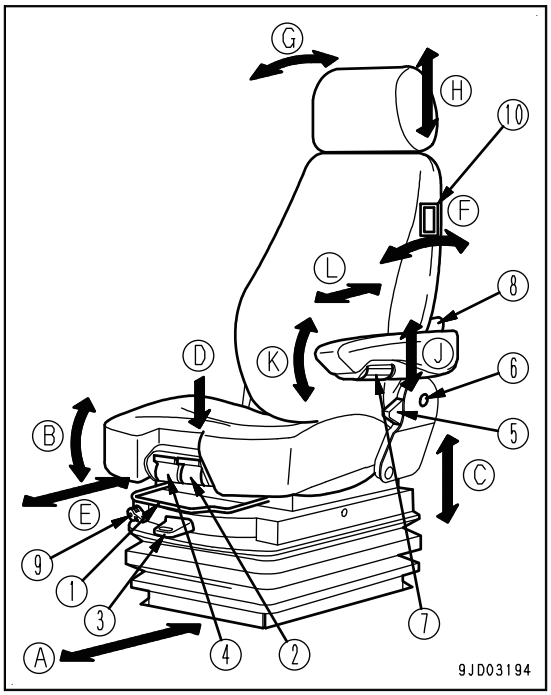
Adjustments (C) and (D) use the air compressor built in the seat, so turn the engine starting switch to ON position when performing the adjustments.

NOTICE
Do not operate lever (3) for 1 minute or more continuously, if you do so, the air compressor may be failed.

(A) Fore-and-aft adjustment
Pull lever (1) up, set the seat to the desired position, then release the lever.
Fore-and-aft adjustment: 210 mm (8.3 in) (10 mm (0.4 in) x 21 stages)
(B) Adjusting seat angle
Pull lever (2) up and move the front side of the seat cushion up and down to the desired position, then release the lever.
Amount of adjustment Forward tilt: 3 deg.
Backward tilt: 5 deg.
(C) Automatic seat adjustment for operator's weight
The suspension should be adjusted according to the operator's weight to protect the operator. At the initial adjustment or after a change of the operator, perform the automatic weight adjustment operation of the seat.

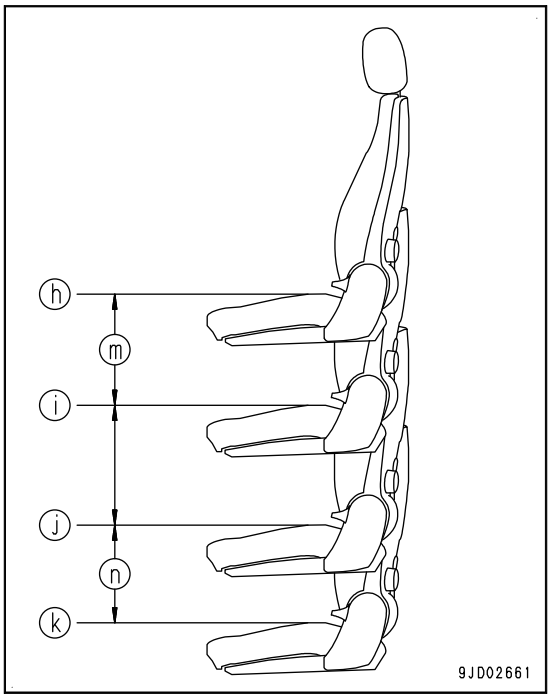
1. Operation of suspension damper lever
   Before adjusting for the weight, turn knob (9) toward inside of the seat to reduce the damping force of the suspension damper. (After the weight and height adjustment are completed, adjust the damping force of the suspension damper to the desired level.)
2. Resetting of weight adjustment
   Push lever (3) down to the stroke end to lower the seat to the lowest position. (The weight adjustment is reset by lowering the seat to lowest position (k).)
3. Setting of weight adjustment
   Release lever (3) after the seat is lowered to lowest position (k), and the air for weight adjustment is supplied automatically.
   Keep your body in the ordinary operating posture during adjustment (until automatic air supply is completed).

The stopped position after weight adjustment is lowest position (j) of the height adjustment range. After the weight adjustment is completed, adjust the seat height to a desired height according to "Adjustment of seat height".



REMARK

- At the initial adjustment or after a change of the operator, always reduce the damping force of the suspension damper before starting the adjustment referring to "Adjusting hardness of suspension damper". If the damping force of the suspension damper is not reduced before starting adjustment of the seat height, the seat might slide down from the adjusted-to-position. If the seat slides down, try the weight adjustment again after reducing the damping force of the suspension damper. After the weight and height adjustment are completed, adjust the damping force of the suspension damper to the desired level.
- If the lever is not pushed down sufficiently for resetting, air may not be supplied automatically. If air is not supplied, pull lever (3) up fully (until it clicks) and release it, and air is supplied automatically for weight adjustment.
- To ensure correct weight adjustment, keep your body in the ordinary operating posture during adjustment (until automatic air supply is completed). If you rise from the seat or try to change the load to the seat while air is supplied automatically, the air in the suspension may be released.



(h)	Highest position	(m)	Automatic lowering range
(i)	Height adjustment upper limit	(n)	Automatic rising range
(j)	Height adjustment lower limit		
(k)	Lowest position		

(D) Adjusting seat height

The seat height is adjusted pneumatically and in stepless.

The seat height is adjusted by fully pulling lever (3) up (until it clicks) or pressing it down. Release the lever at the desired height.

Amount of adjustment: 80 mm (3.2 in)

REMARK

- If the seat is raised higher (m) or lower (n) position than the height adjustment range, the suspension lowers or rises automatically to secure some stroke.
  "Automatic lowering"
  When the seat is stopped in range (m) by the height adjustment operation (raising operation), it automatically lowers and stops at height adjustment upper limit (i).
  "Automatic rising"
  When the seat is stopped in range (n) by the height adjustment operation (lowering operation), it automatically rises and stops at height adjustment lower limit (j).
  Perform height adjustment in the range between upper limit (i) and lower limit (j).
- Fully pull up (until it clicks) or press down the lever. Automatic lowering range (m) and automatic rising range (n) may shift and the following phenomena occur although rare, if "the lever operation stroke is short", "the lever is operated finely", or "the automatic weight adjustment is not performed after the operator changes".
  - The air compressor does not stop.
  - Air flows out unintentionally.

  If these unexpected phenomena occur, perform the "Automatic weight adjustment of seat" again to restore automatic lowering range (m) and automatic rising range (n) to the normal ranges before using the machine.
- Keep your body in the ordinary operating posture during adjustment. If you rise from the seat or try to change the load to the seat during adjustment, the air in the suspension may be released.

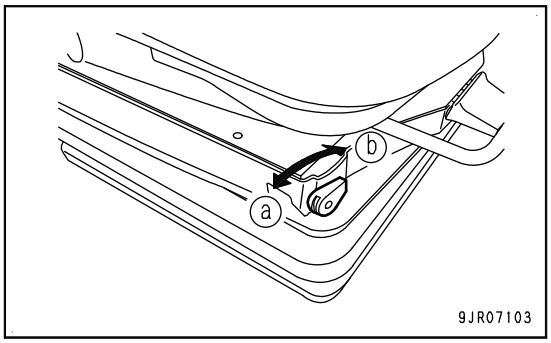
(E) Fore-and-aft adjustment of seat backrest
Pull lever (4) up to set the backrest to the desired position, then release the lever.
Fore-and-aft adjustment: 60 mm (2.4 in)
(F) Adjusting reclining angle
Pull lever (5) up, move the backrest forward or backward.
Sit with your back against the backrest when adjusting. If your back is not touching the backrest, it may suddenly return to the original position.
Amount of adjustment Forward tilt: 20 deg. (any degree is acceptable if it is greater than 20 deg.)
Backward tilt: 60 deg.

NOTICE

If the seat back is reclined too far, the headrest may contact the rear glass, so move it to a position where it does not contact the glass.

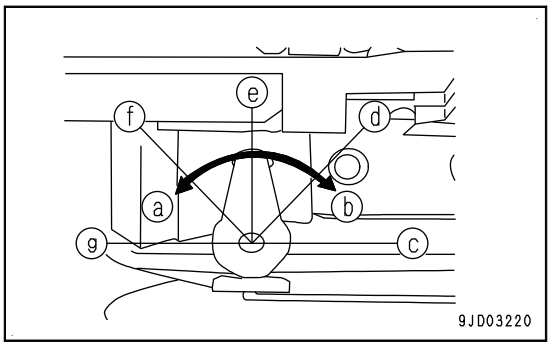
(G) Adjusting headrest angle
Move the headrest back and forth to set it to the desired angle.
Amount of adjustment: 38 deg.
(H) Up-down adjustment of headrest
Move the headrest up or down to set it to the desired height.
Amount of adjustment: 100 mm (3.9 in)
(J) Adjusting armrest height
Remove cap (6) and loosen the nut. After adjusting it to the desired height, tighten the nut and attach the cap.
Amount of adjustment Upward: 16 mm (0.6 in)
Downward: 24 mm (0.9 in)
You can flip up the armrest with your hand.
(K) Adjusting armrest angle
Turn knob (7) to adjust the armrest angle.
Amount of adjustment: 40 deg. (Front tilt 15 deg., rear tilt 25 deg.)
(L) Lumbar support
Turn knob (8) clockwise or counterclockwise to adjust the tension applied to the lumbar part.

(M) Adjusting hardness of suspension damper
By operating knob (9), damping force of the suspension damper can be adjusted. Direct knob (9) to outside (a) of the seat to increase the damping force and inside (b) of the seat to decrease the damping force.
Amount of adjustment
1st stage: at position (c)
2nd stage: at position (d)
3rd stage: at position (e)
4th stage: at position (f)
5th stage: at position (g)

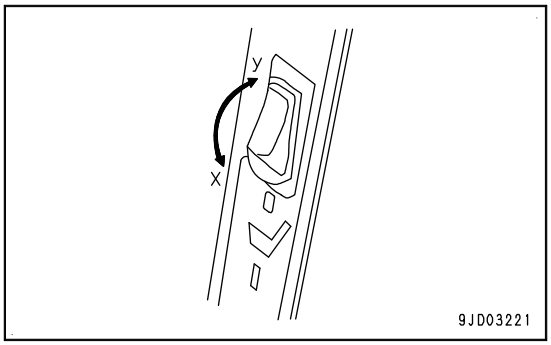


REMARK
As for the hardness adjustment of suspension damper, 3rd stage position (e) is preset as the best position for operator comfort. Accordingly, adjusting the knob to 3rd stage position (e) is recommended for usual operation.

1. When you want to decrease the vertical movement of the suspension, adjust the knob to 4th stage position (f) or 5th stage position (g). (The damper becomes harder.)
2. When you want to decrease the shock to the seat, adjust the knob to 2nd stage position (d) or 1st stage position (c). (The damper becomes softer.)



(N) Seat heater
(If equipped)
When switch (10) is operated in the (x) direction, the heater inside the seat cushion is activated. When it is operated in the (y) direction, the heater is turned off. Turn off the switch when the temperature of cushion becomes suitable.



⚠ CAUTION

- **By using the heater for a long time may cause low temperature burn (blister, etc.).**
- **Do not put heavy luggage on the cushion. Do not stick the cushion with needles, nails, etc.**
- **Do not put blanket, cushion, or other heat-retaining material on the seat cushion. Doing so may cause overheat.**
- **If water or juice, etc. spills on the cushion, wipe it off with soft cloth, etc., and dry out the cushion before using it.**

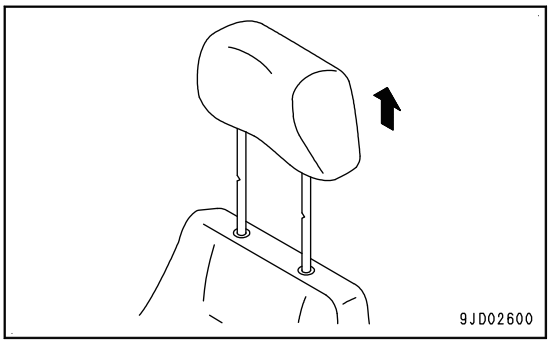
REMARK
The heater has no timer function and is not turned off automatically. Be sure to turn the switch off after using the heater.

REMOVAL AND INSTALLATION OF HEAD REST *(WA-K2QE-001-K-00-A)*

REMOVAL *(WA-K2QE-520-K-00-A)*

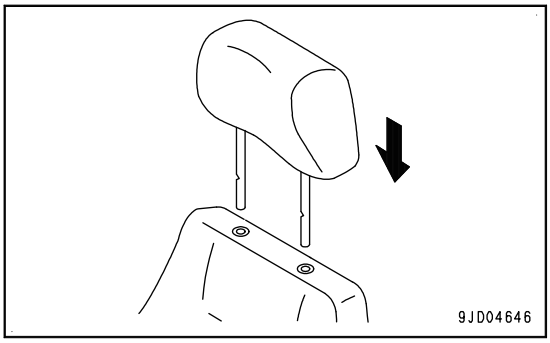
When the headrest is not necessary, remove it according to the following procedure.

1. Pull up the headrest until it stops.
2. Pull up the headrest strongly, and it will come out.



INSTALLATION *(WA-K2QE-720-K-00-A)*

Insert the headrest into the holes of the back seat and press it down.



ADJUSTING SEAT BELT *(WA-K2Q3-100-K-00-A)*

Always fasten the seat belt.

⚠ WARNING

- **Before fastening the seat belt, check that there is no problem in the belt mounting bracket or belt. If it is worn or damaged, replace it.**
- **Even if no problem can be seen in the belt, replace it in accordance with the following schedule: 5 years after the date of seat belt manufacture, or every 3 years after the start of actual usage, whichever date comes sooner.**
- **Before operating, fasten the seat belt.**
- **Be sure to use the seat belt during operation.**
- **Do not use the seat belt with either half of the belt twisted.**

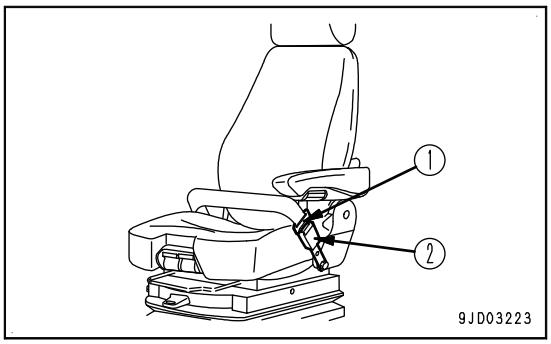
REMARK

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

FASTEN AND UNFASTEN SEAT BELT *(WA320-K2Q3-100-K-01-A)*

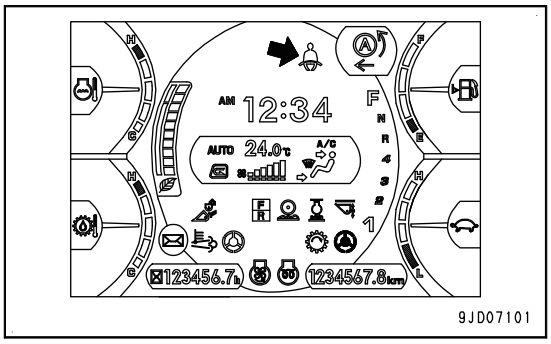
Fasten the seat belt so that it fits tightly, without being too tight.

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 belt on right side, then insert tongue (1) into buckle (2) until a click is heard. Pull the belt to check that it is securely locked.
3. When unfastening the belt, press the red button on buckle (2) to free the belt.
   Fit the belt along your body without twisting.



REMARK

If the seat belt is not locked, the seat belt caution lamp lights up on the machine monitor.



ADJUST ARMREST *(WA320-K2Q2-270-K-00-A)*

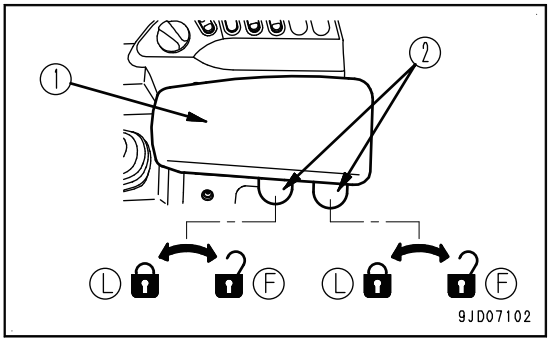
⚠ WARNING

When adjusting the armrest, make sure that the work equipment is locked (pilot lamp in the switch lights up).
If the multi-function mono-lever is touched by accident when adjusting the armrest, the work equipment may move suddenly, and cause a serious personal injury or death.

ADJUST HEIGHT AND ANGLE OF ARMREST *(WA320-K2Q2-100-K-01-A)*

The height and angle of armrest (1) can be adjusted by loosening lock lever (2).
Amount of height adjustment: 30 mm (1.2 in)
Amount of angle adjustment: 44 deg.

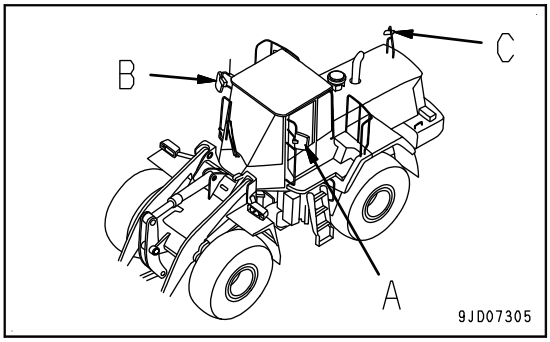
REMARK
Set lock lever (2) to FREE position (F). The lock lever is loosened. Hold the armrest at the desired height, and set the lock lever in LOCK position (L) to secure the armrest in position.



MIRRORS ADJUSTMENT *(WA320-K810-270-K-00-A)*

⚠ WARNING

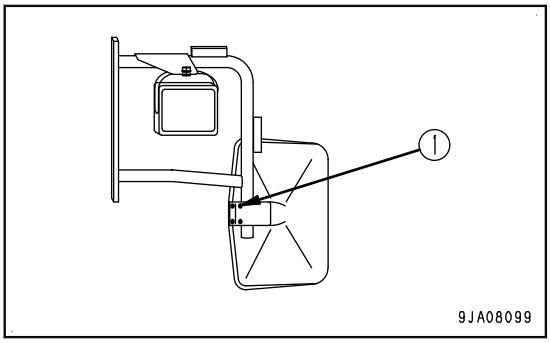
Be sure to adjust the mirrors before starting work. If they are not adjusted properly, you cannot secure the visibility and personal injury or death may result.



Mirrors A, B

Loosen bolt (1) of the mirror, then adjust the mirror to a position which gives the best view from the operator's seat of the blind spot at the right and left sides at the rear of the machine.

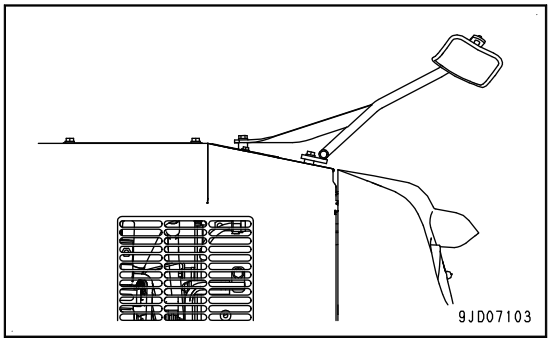
- Adjust the mirror mount so that it is possible to see any person (or any object approximately 1 m (3 ft 3 in) high and 30 cm (11.8 in) in diameter) at the rear right and left of the machine.



Mirrors C

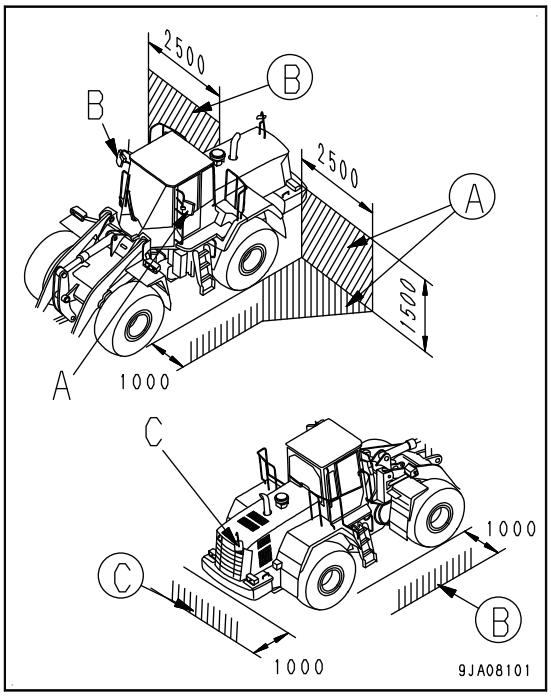
(If equipped)

Adjust so that is possible to see the ground around the machine at a range of 1 m (3 ft 3 in) from the operator's seat.



- Install the mirror in the location indicated in the figure. The reference values of the visibility range are as follows:

Visibility range (left): 2,500 mm (8 ft 2 in)
Visibility range (right): 2,500 mm (8 ft 2 in)
Mirror A: Must be possible to see hatched area (A).
Mirror B: Must be possible to see hatched area (B).
Mirror C: Must be possible to see hatched area (C).



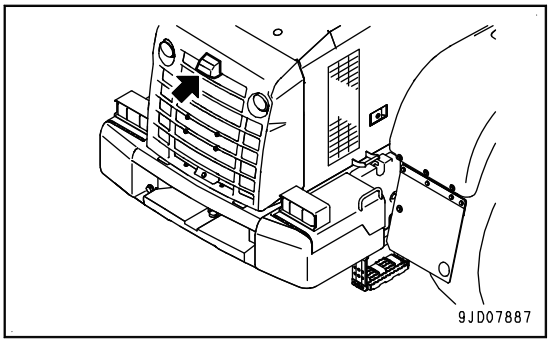
NOTICE

- **Tighten the mirror mounting bolts securely to prevent the mirrors from coming off due to loosening of the bolt.**
  Tightening torque
  Mirrors A, B: 2.0 to 2.5 Nm {0.2 to 0.25 kgm, 1.45 to 1.81 lbft}
  Mirrors C: 8.8 to 12.7Nm {0.9 to 1.3 kgm, 6.51 to 9.4 lbft}
- **If the torque cannot be controlled, ask your Komatsu distributor for adjustment.**

ADJUST REAR VIEW CAMERA *(WA270-Q162-270-K-00-A)*

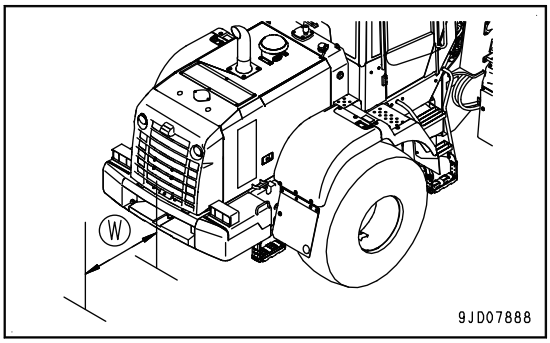
⚠ WARNING

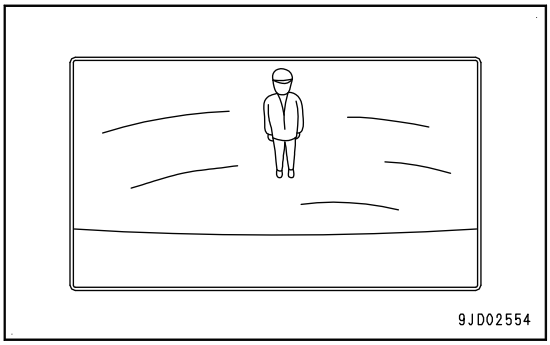
- **Be sure to adjust the camera before starting work. If it is not adjusted properly, you cannot secure the visibility and may be injured or may injure someone seriously.**
- **When adjusting the angle of the camera, prepare a scaffold first in order to provide a safe working platform.**
  If you try to make such an adjustment, standing on the counterweight, there is always a danger of serious injury due to falling off from the machine.
- **Install only the Komatsu genuine camera.**



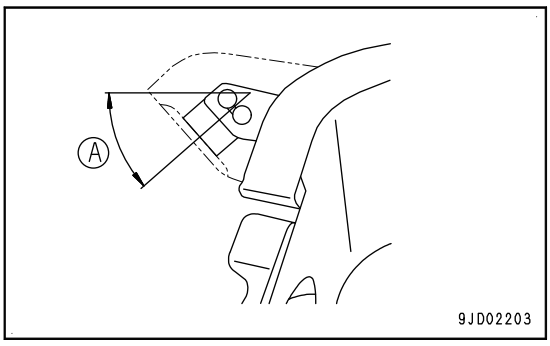
ADJUSTING REAR VIEW CAMERA ANGLE

Adjust the angle of the rear view camera so that people within 1 meter {3 ft 3 in} away from the machine's rear part (W) appears in the monitor at the operator's seat.





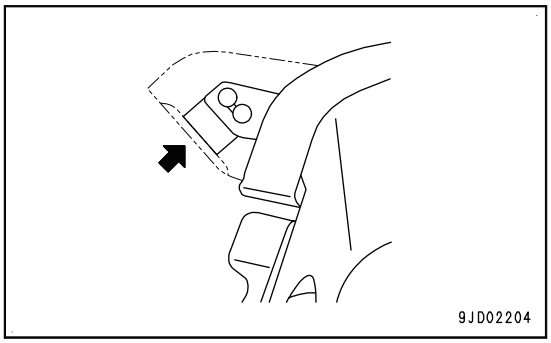
If the image on the monitor is not aligned correctly, adjust mounting angle (A) of the rear view camera.
Angle (A) can be adjusted within the range from 44.5 to 59.5 deg.

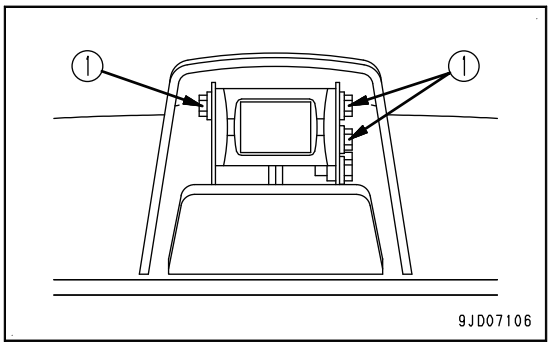


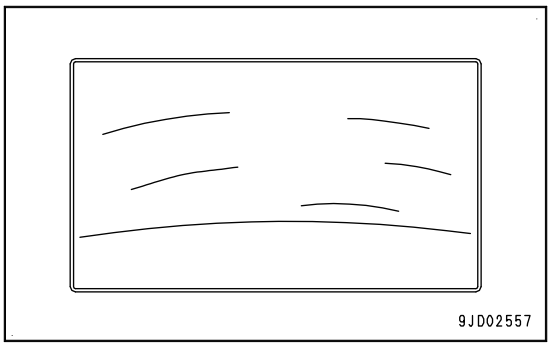
1. Loosen camera mounting bolts (1) (at 3 places) and adjust angle (A).

REMARK
A part of the machine is shown on the monitor screen.

2. After adjusting, tighten bolts (1) (at 3 places).

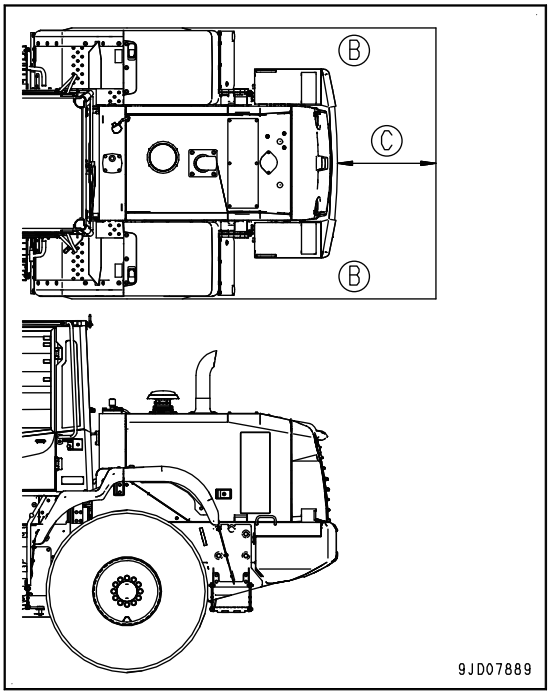


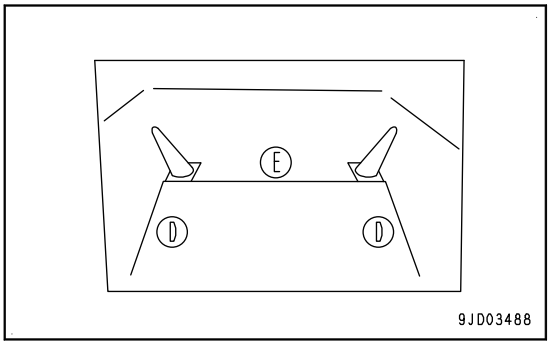




CHECKING REFERENCE LINE

Check that the images on the rear view camera monitor are normal as shown in the figure. Then confirm that machine width reference line (D) matches to tire outside width (B), and horizontal line (E) matches to position (C) that is 1.5 m {4 ft 11 in} away from the rear end of the machine.
When the reference line is abnormal, set it as non-display and contact your Komatsu distributor.

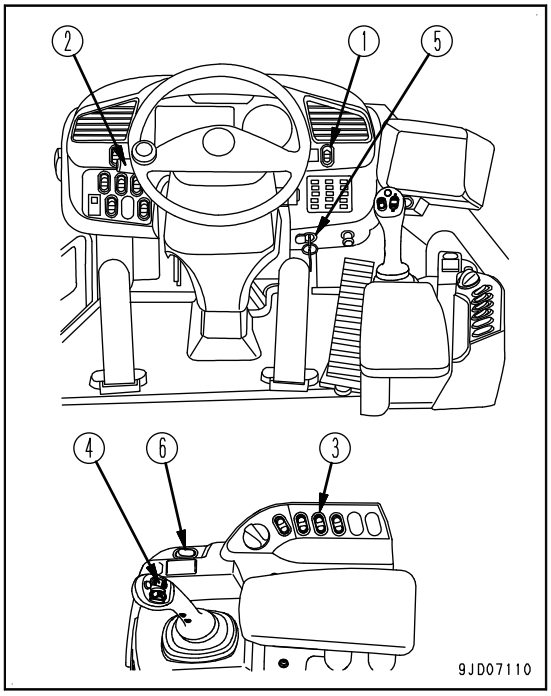




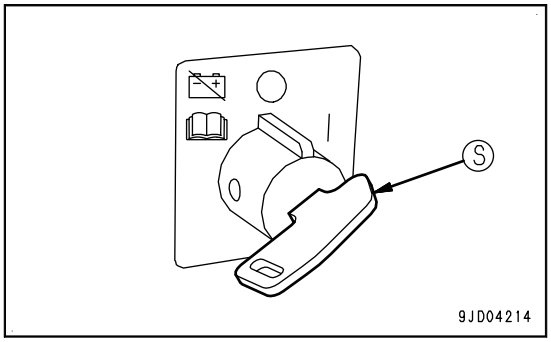
OPERATIONS AND CHECKS BEFORE STARTING ENGINE *(WA320-0000-12D-K-00-A)*

⚠ WARNING

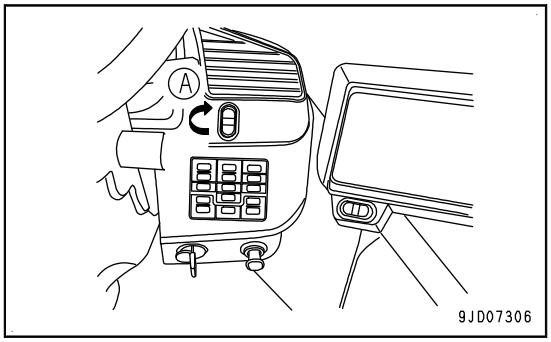
Before starting the engine, make sure that the work equipment lock is securely applied (pilot lamp in the switch lights up).
If the multi-function mono-lever is not locked and it is touched by accident when starting the engine, the work equipment may move unexpectedly, and this may lead to a serious injury or death.



1. Check that battery disconnect switch (S) is turned to ON position (I).

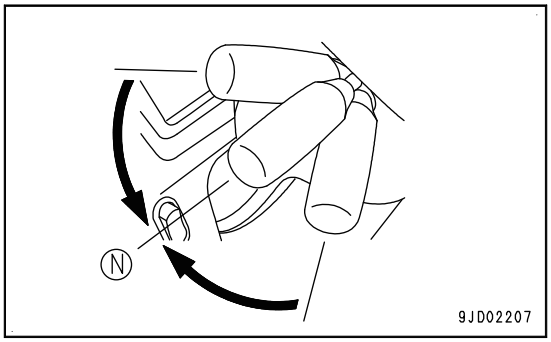


2. Check that parking brake switch (1) is turned to ON position (A).

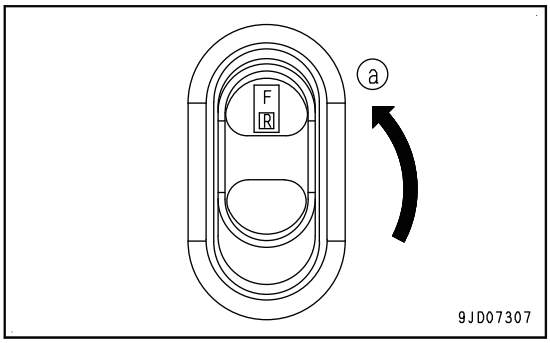


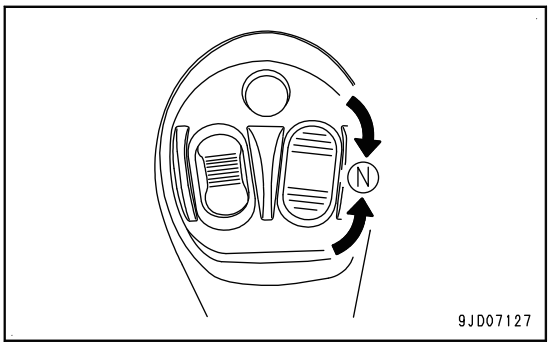
3. Check that directional lever (2) is turned to NEUTRAL position (N).

REMARK
If the directional lever is not at N (NEUTRAL) position, the engine can not be started.

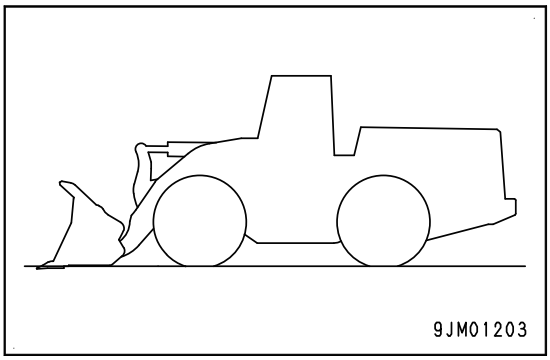


4. When directional selector switch actuation switch (3) is ON position (a), the engine will not start if directional lever (2) and directional selector switch (4) are not both at N (NEUTRAL) position.

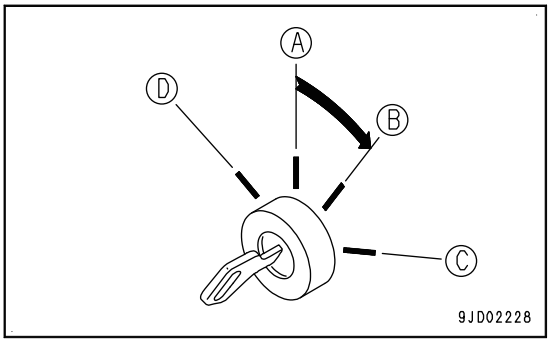




5. Check that the bucket is lowered to the ground.
   If not, lower the bucket to the ground in the following procedure.
   1) Check that the multi-function mono-lever is set to HOLD position. Then turn the starting switch (5) to ON position and release the work equipment lock (pilot lamp in the switch (6) goes out).
   2) Operate the multi-function mono-lever to lower the bucket to the ground.
   3) Check that the multi-function mono-lever is at HOLD position, then apply the work equipment lock (pilot lamp in the switch (6) lights up).
   4) Turn the starting switch (5) to OFF position.



6. Insert the key in starting switch (5), turn the key to ON position (B), then check that the machine monitor system works.
   When the starting switch is turned to ON position before starting the engine, the monitor, gauge and centralized warning lamp light up for approximately 2 seconds and the alarm buzzer is sounded for approximately 2 seconds.
   Check that the engine tachometer performs reciprocal motion.
   If the monitor does not light up, its failure or open circuit can be suspected. Ask your Komatsu distributor for inspection.



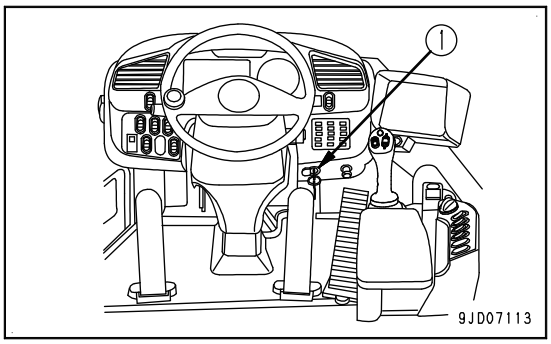
7. Check that the work equipment lock is applied (pilot lamp in the switch (6) lights up).

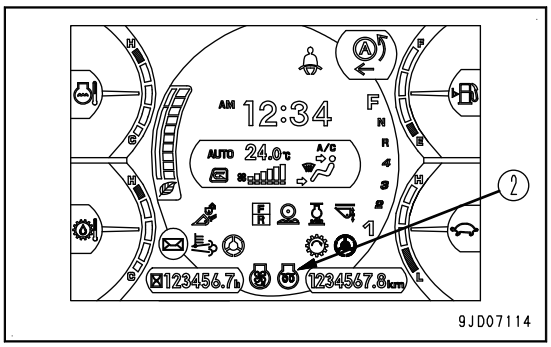
STARTING ENGINE *(ALL-0000-001-K-17-A)*

START IN NORMAL WEATHER *(WA320-0000-132-K-00-A)*

⚠ WARNING

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



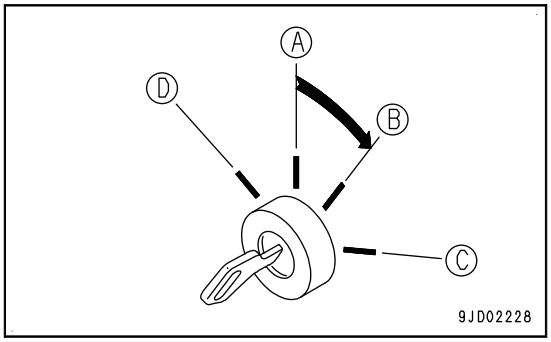


NOTICE

- **Do not accelerate the engine abruptly until it is warmed up.**
  Do not operate the starting motor continuously for more than 20 seconds.
- **If the engine does not start, wait for 2 minutes or so, and then try to start the engine again.**

This machine is equipped with an engine automatic preheating device that functions to start the engine preheating automatically.
When the key of starting switch (1) is turned to ON position at low ambient temperature, preheating pilot lamp (2) lights up and notice that the automatic preheating has been started.

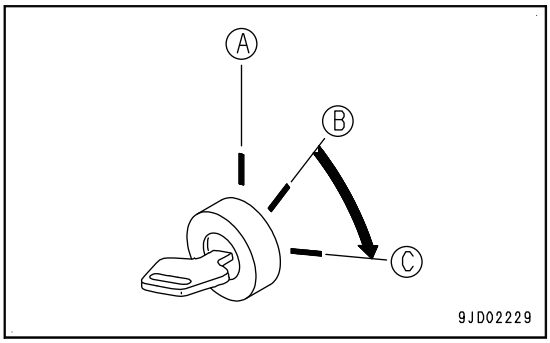
1. Turn the key in starting switch (1) to ON position (B).
   If the ambient temperature is low, preheating pilot lamp (2) lights up and automatic preheating is carried out. Keep the key in starting switch (1) at ON position until the preheating pilot lamp (2) goes out.
   The time that preheating pilot lamp (2) stays lit depends on the ambient temperature as shown in the table.



Ambient temperature (°C)	Lighting time (sec.)
-1 to -15	0 to 30
Max. -15	30

REMARK
Usually, the engine is preheated sufficiently by the automatic preheating. If it is needed to extend the preheating time, turn the key in starting switch (1) to position (D).
Do not preheat the engine more than 30 seconds, however.

2. If preheating pilot lamp (2) does not light up, or it lights up and then goes out to inform that the engine preheating has been completed, turn the key in starting switch (1) to START position (C).

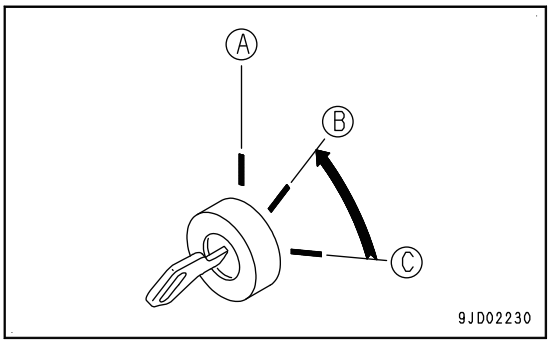


3. The starting motor keeps running to start the engine.
   Keep the key in starting switch (1) at position (C) to keep running the starting motor until the engine starts.

REMARK

When the ambient temperature is low, fuel is not supplied to the engine for 3 seconds to ensure lubrication of the engine and to improve the durability after the key in starting switch (1) is turned to START position (C), so the engine does not start during this time. Accordingly, keep the key in starting switch (1) at START position (C) to keep running the starting motor until the engine starts.

4. When the engine starts, release the key in starting switch (1).
   The key will return automatically to ON position (B).

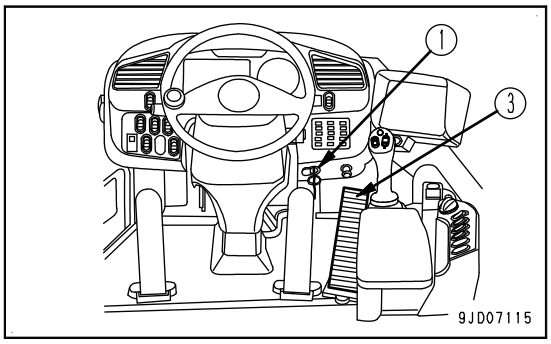


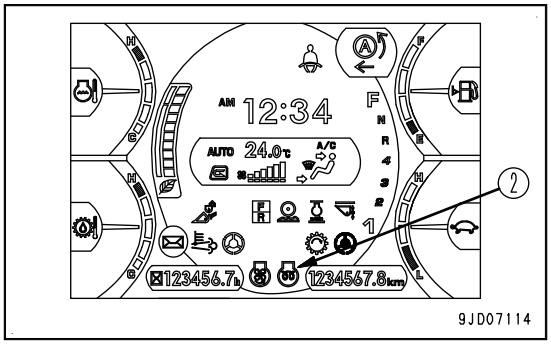
When the engine is started, white smoke may come out of the exhaust pipe. It is fine water particles which are produced from moisture or water vapor and which seem white, thus it does not indicate a problem.
The smell of the exhaust gas is different from that of the conventional diesel machine because of the exhaust gas filtering function.

START IN COLD WEATHER *(WA320-0000-132-K-01-A)*

⚠ WARNING

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





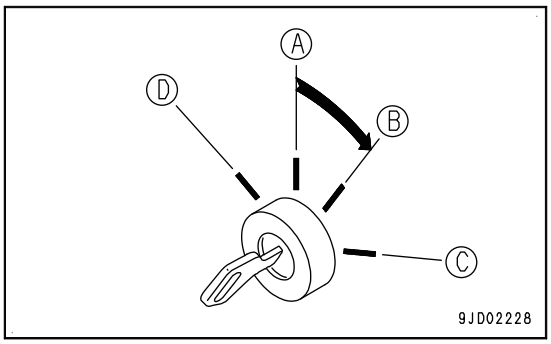
NOTICE

- **Do not accelerate the engine abruptly until it is warmed up.**
- **This machine is equipped with a function to automatically warm up engine coolant temperature more quickly and another function to protect the turbocharger.**
  In a cold weather startup, the engine speed may not change for several seconds immediately after the startup even if accelerator pedal (3) is depressed.

When starting the engine after it has been left for more than half a day in temperatures near -20°C (-4°F), it takes time before perfect combustion starts. In this case, operate the starting switch as follows.

1. Turn the key in starting switch (1) to ON position (B).
   If the ambient temperature is low, preheating pilot lamp (2) lights up and automatic preheating is carried out. Keep the key in starting switch (1) at ON position until the preheating pilot lamp (2) goes out.
   The time that preheating pilot lamp (2) stays lit depends on the ambient temperature as shown in the table.

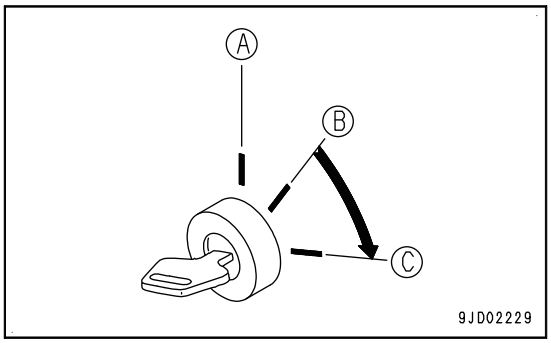
Ambient temperature (°C (°F))	Lighting time (sec.)
-1 to -15 (30.2 to 5)	0 to 30
Max. -15 (Max. 5)	30



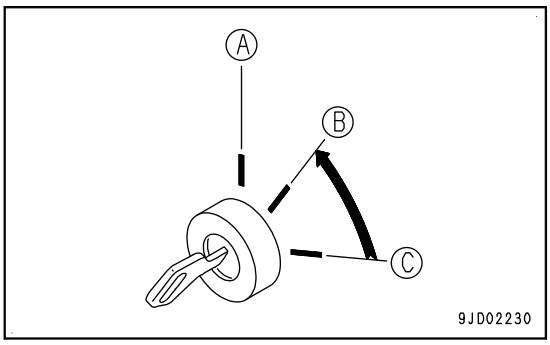
2. After preheater pilot lamp (2) goes out, turn the key in starting switch (1) to START position (C).
   Keep the key of starting switch (1) in position (C) to keep running the starting motor until the engine starts.
3. The starting motor keeps running to start the engine.

REMARK

Usually, the engine is preheated sufficiently by the automatic preheating. If it needs to be preheated more, however, the preheating time can be lengthened by turning the key of starting switch (1) to position (D).
Do not preheat more than 30 seconds, however.



4. Method of starting engine in temperatures near -20°C (-4°F)
   1) Keep the key in starting switch (1) at START position (C) to keep running the starting motor for the max. 20 seconds until the engine starts.
   2) If the engine does not start even after running the starting motor for approx. 20 seconds, stop the starting motor (release the starting switch) and wait for 1 minute or so, and then keep the key in starting switch (1) at START position (C) again to keep running the starting motor for the max. 20 seconds.
   3) If the engine does not start, wait for 1 minute again, then perform the third starting operation.
5. After the engine starts and its speed increases, release your hand from the key of starting switch (1). The key will return automatically to ON position (B).



REMARK
When the engine is started, white smoke may come out of the exhaust pipe. It is fine water particles which are produced from moisture or water vapor and which seem white, thus it does not indicate a problem.
The smell of the exhaust gas is different from that of the conventional diesel machine because of the exhaust gas filtering function.

TURBOCHARGER PROTECTION FUNCTION *(WA-AA90-043-K-00-A)*

The turbo protect function protects the turbocharger by keeping the engine speed at approximately 1000 rpm or less immediately after the engine is started.
When the turbo protect function and engine cooling water auto warm-up function are activated at the same time, the former takes priority over the latter.

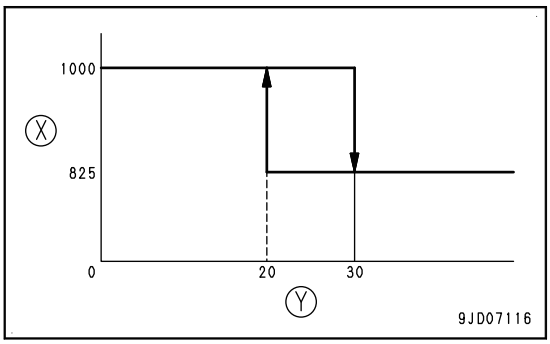
- While the turbo protect function is in operation, the engine speed is held at 1000 rpm even if the fuel control dial is set above 1000 rpm.
- When the turbo protect function is canceled, the engine speed becomes the speed according to the depressed level of the accelerator pedal.
- The relationship between the actuating time of the turbo protect function and the temperature of the engine coolant is as shown in the table.

Coolant temperature (°C (°F))	Turbo protect time (sec.)
Min. 10 (Min. 50)	0
10 to -30 (50 to -22)	Change between 0 to 20

AUTOMATIC WARM-UP OPERATION *(WA320-0000-132-K-02-A)*

When the engine is started, if the engine coolant temperature is below 20°C (68°F), the warming-up operation (engine speed: 1,000 rpm) is carried out automatically and stopped when the engine coolant temperature increases to above 30°C (86°F). (Engine speed: 825 rpm)

(X): Engine speed (rpm)
(Y): Coolant temperature (°C)



CHECKS AFTER STARTING ENGINE *(WA320-0000-133-K-00-A)*

⚠ WARNING

- **If there has been any Emergency stop, abnormal actuation or trouble, turn the starting switch key to OFF position.**
- **If you cannot stop the engine by turning the starting switch to OFF position, use the engine shutdown secondary switch to stop the engine.**
- **If the work equipment is operated without sufficient warming-up operation of the machine, 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 a cold weather, be sure the warming-up operation is completed.**
- **While the engine is running or just after stopping the engine, keep away from the exhaust pipe. Keep combustible materials away from the exhaust pipe outlet.**

NOTICE

When the hydraulic oil temperature is low, do not operate under heavy load or at high speed. There is danger that the pump may break.

CHECK ENGINE STARTABILITY AND ABNORMAL NOISE *(PC-0000-134-K-00-A)*

When starting the engine, check that the engine causes no abnormal noise and that it starts up easily and smoothly.
Check also that there is no abnormal noise when the engine is idling or when the engine speed rises slightly.

- When there is an abnormal noise at the engine startup and if that condition continues, the engine may be damaged. In that case, ask your Komatsu distributor to check the engine as soon as possible.

CHECK ENGINE ACCELERATION AND DECELERATION *(WA-0000-137-K-00-A)*

When stopping the machine during the normal traveling operation, check that the engine does not hunt or stop suddenly.
When the accelerator pedal is depressed, check that the engine speed rises smoothly.

- Carry out these checks in a safe place, watching out for danger in the surroundings.
- When the engine performs very badly at low idle and in the acceleration and if that condition continues, it may damage the engine or confuse the operator's sense of driving or lower the braking efficiency, and as a result lead to an unexpected accident. In that case, ask your Komatsu distributor to check the engine as soon as possible.

REMARK

- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filtering function.
- White smoke may be discharged for a short time immediately after the engine is started or during the KDPF regeneration in the cold season, but this is not a failure.

CHECK PARKING BRAKE *(WA-GJ00-360-K-00-A)*

Check that the parking brake works properly.
If any problem is found in operation, ask your Komatsu distributor for adjustment.

CHECK BRAKE PERFORMANCE *(WA-G4A1-360-K-00-A)*

Travel the machine forward and in reverse slowly on a level ground with no obstacles around and check the brake performance.
If any problem is found in operation of the brake, ask your Komatsu distributor for adjustment.

CHECK CLEARANCE BETWEEN BRAKE PEDAL AND FLOOR *(WA-G4A1-360-K-01-A)*

Depress the brake pedal fully and check that the pedal is not too close to the floor. Also check that the feeling when operating the brake pedal is normal.
If any problem is found, ask your Komatsu distributor for adjustment.

CHECK ABNORMAL PARTS FOUND PREVIOUSLY *(WA-0000-360-K-00-A)*

Check the area which were abnormal when the machine was used previous day.
If any problem is found, ask your Komatsu distributor for inspection and repair.

RUNNING-IN *(WA-0000-138-K-00-A)*

NOTICE
Your Komatsu machine has been thoroughly adjusted and tested before shipment. However, operating the machine under severe conditions at the beginning can adversely affect the performance and shorten the machine life. Be sure to run in the machine for the initial 100 hours (as indicated by the service meter).

Make sure that you fully understand the descriptions in this manual, then run in the machine while paying attention to the following points.

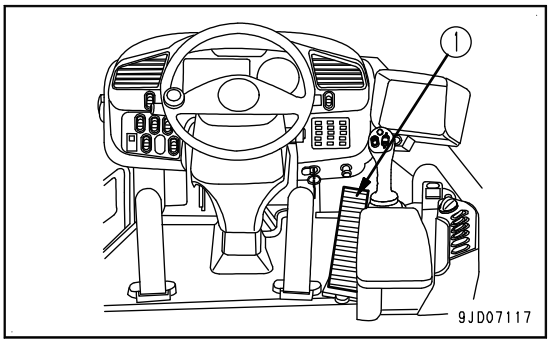
- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Immediately after starting the engine, avoid sudden starts, sudden acceleration, unnecessary sudden stops, and sudden changes in direction of the machine.

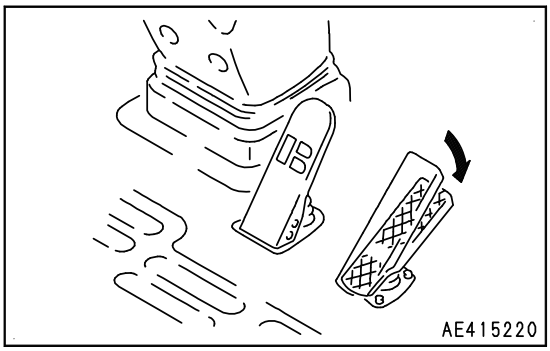
WHEN MACHINE IS NORMAL *(WA320-0000-139-K-00-A)*

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

NOTICE
Do not suddenly accelerate the engine before the warming-up operation is completed.
Do not run the engine at low idle or high idle continuously for more than 20 minutes.
If it is necessary to run the engine at low or high idle, apply a load from time to time or run at a mid-range speed.

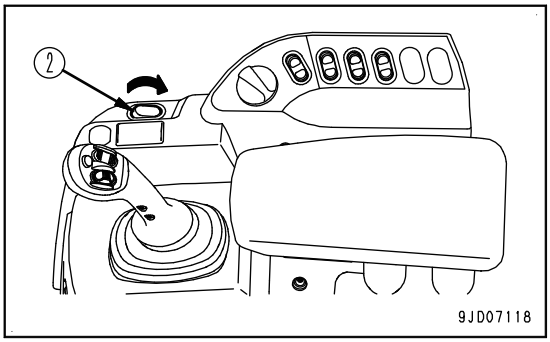
1. Depress accelerator pedal (1) lightly and run the engine at a medium speed for approximately 5 minutes with no load.



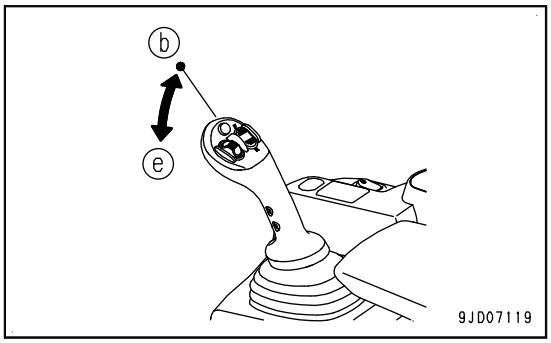


In only cold weather, carry out the following operation to warm up the hydraulic oil.

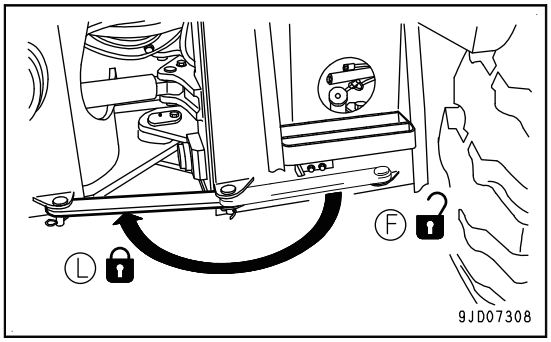
2. Check that the engine rotation has become smoother after the warm-up operation, then release the work equipment lock (the pilot lamp goes out) by using work equipment lock switch (2).



3. Operate the multi-function mono-lever to TILT position (e) and to HOLD position (b) repeatedly to warm up hydraulic oil.
   Relieve the circuit at TILT position (e) for a maximum of 10 seconds.
   Oil reaches the relief pressure through the above operations and hydraulic oil gets warmer in a shorter time.



4. Turn the steering wheel slowly approximately 10 times to the right and left to warm up hydraulic oil in the steering valve.

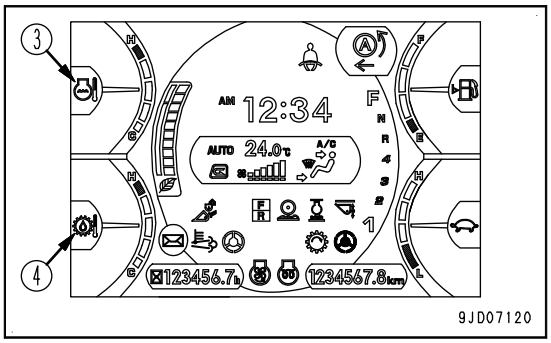


⚠ WARNING

If you turn the steering wheel and stop turning it while the oil temperature is low, there may be a time lag before the machine stops after the turning operation.
In such case, use the frame lock bar to secure safety, and perform the warm-up operation in a large place.
In this case, be sure not to relieve the oil pressure in the circuit continuously for more than 5 seconds.

NOTICE
Turn the steering wheel a little and stop in that position. Check that the machine has turned by the angle corresponding to the turning angle of the steering wheel.

5. After it performing the warm-up operation, check that all gauges and pilot lamps work properly.
   If any problem is found, carry out maintenance or repair.
   Run the engine under a light load until engine coolant temperature gauge (2) and HST oil temperature gauge (3) enter the green range.
6. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.



REMARK
The cooling fan speed varies according to the following conditions, but it is not abnormal.
The cooling fan speed increases when the hydraulic oil temperature or engine coolant temperature is high.
When the cooling fan is rotating in reverse, it rotates at a fixed speed in proportion to the engine speed, regardless of any oil or coolant temperature.

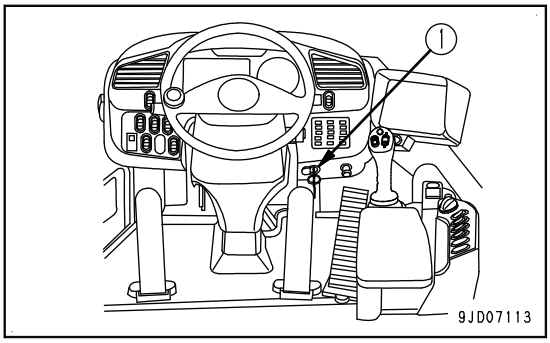
STOPPING ENGINE *(WA320-0000-13G-K-00-A)*

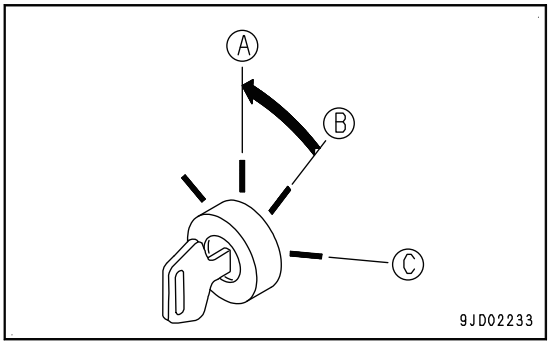
⚠ WARNING

Keep away the exhaust pipe immediately after stopping the engine.

NOTICE
If the engine is abruptly stopped before it has cooled down, service life of the engine parts may be reduced. Consequently, do not abruptly stop the engine except in emergency. If the engine is overheated, do not abruptly stop it. Run it at a medium speed to allow it to cool down gradually, then stop it.

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





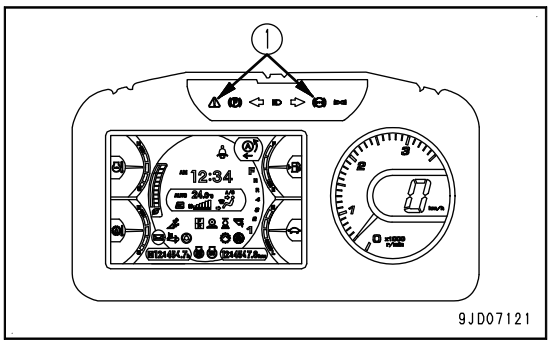
MACHINE OPERATION *(WA-0000-13H-K-00-A)*

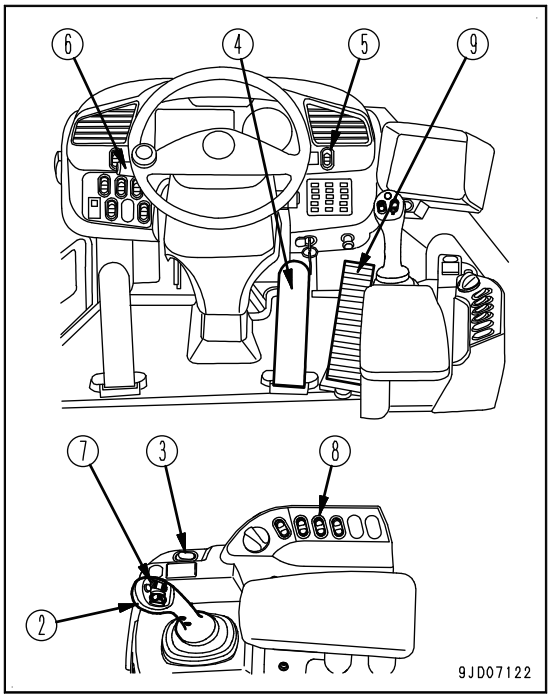
MOVE MACHINE *(WA320-0000-13H-K-01-A)*

⚠ WARNING

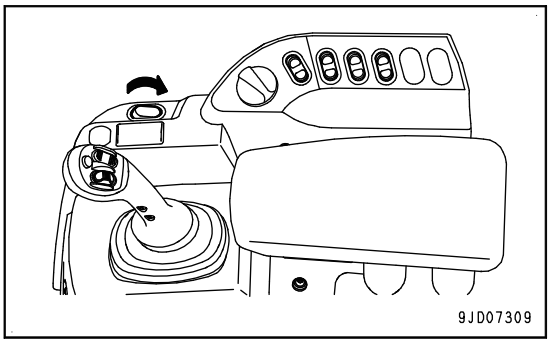
- **Always disengage the frame lock bar during traveling. If it is not disengaged, the steering becomes inoperative and this may lead to serious personal injury or death.**
- **Before moving the machine off, check that the area around the machine is safe, then sound the horn before starting.**
- **Do not allow anyone to enter the area around the machine.**
- **Clear any obstacles from the travel path.**
- **There is a blind spot behind the machine, so be extremely careful when traveling in reverse.**
- **Do not try to run the machine forward or in reverse abruptly while the engine speed is high.**

1. Check that caution lamp (1) is not lit.

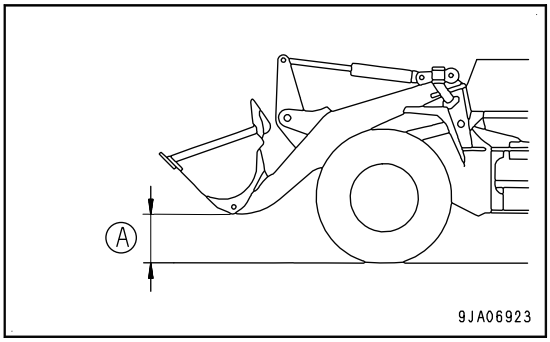




2. Be sure that multi-function mono-lever (2) is set to HOLD position. Then, release the work equipment lock (the pilot lamp goes out) by using work equipment lock switch (3).

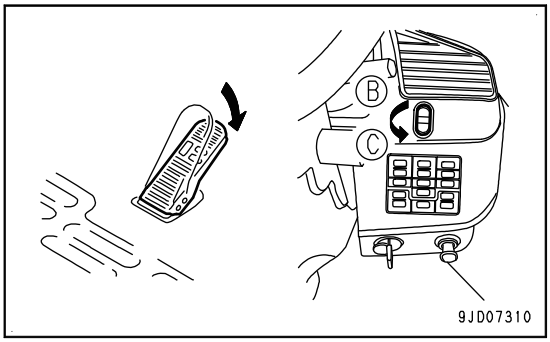


3. Operate multi-function mono-lever (3) to set the work equipment to the travel posture shown in the figure on the right.
(A): 40 to 50 cm (15.7 to 19.7 in)

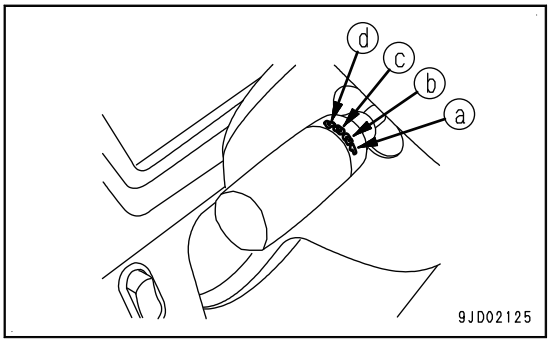


4. Depress R.H. brake pedal (4) and parking brake switch (5) to OFF position (C) to release the parking brake.
Keep R.H. brake pedal (4) depressed.

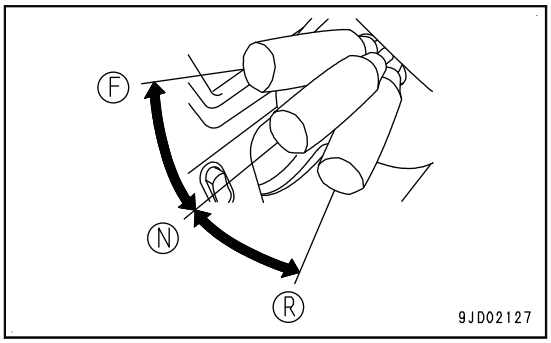
REMARK
If the parking brake is actuated even if parking brake switch (5) is at OFF position (C), turn the parking brake switch (5) to ON position (B), then turn it to OFF position (C) again.



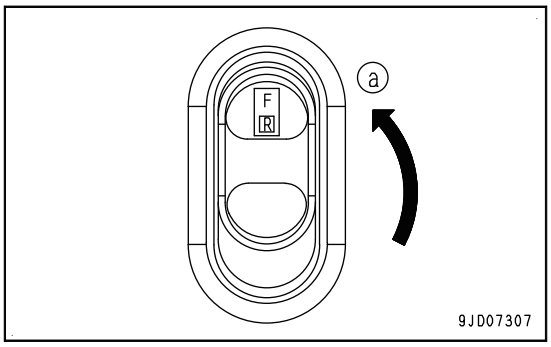
5. Set speed range selector switch (6) to the desired position.
Position (a): 1st speed
Position (b): 2nd speed
Position (c): 3rd speed
Position (d): 4th speed

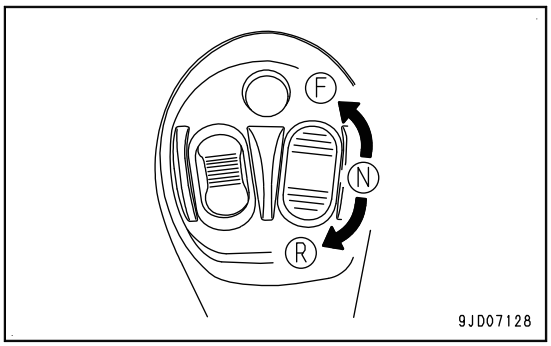


6. Set directional lever (6) to the desired position.
   Position (F): FORWARD
   Position (N): NEUTRAL
   Position (R): REVERSE
   - Check that the backup alarm sounds when the directional lever is set to R. If the backup alarm does not sound, ask your Komatsu distributor for repairs.

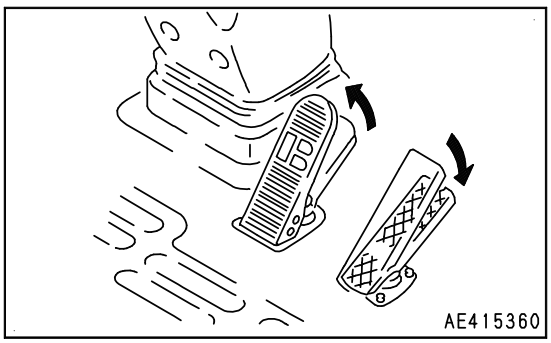


REMARK
Switch (7), as well, allows changing the travel direction in FORWARD, NEUTRAL, and REVERSE.
Position (F): FORWARD
Position (N): NEUTRAL
Position (R): REVERSE
When selecting the FORWARD, NEUTRAL or REVERSE with this switch (7), set directional lever (6) to the NEUTRAL position and directional selector switch actuation switch (8) to ON position (a).





7. Release R.H. brake pedal (4), then press accelerator pedal (9) to start the machine.

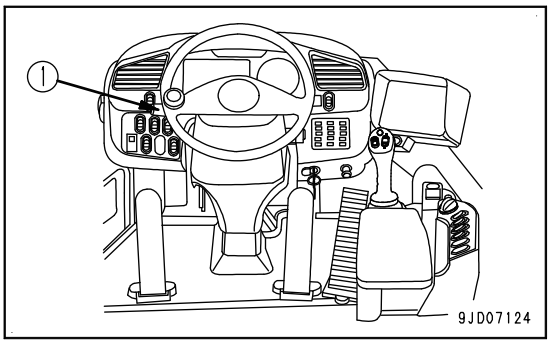


SELECT SPEED RANGE OF MACHINE *(WA320-0000-135-K-00-A)*

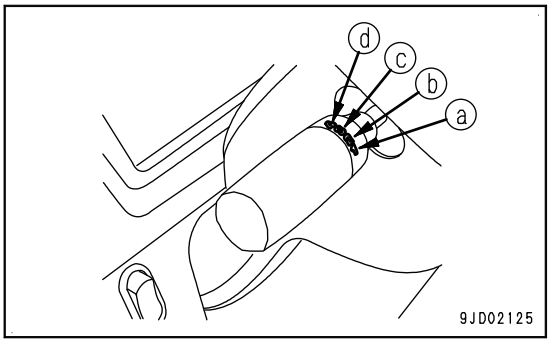
⚠ WARNING

Avoid abrupt shifting of speed range while traveling at high speed. Always reduce the speed by releasing the accelerator pedal before shifting the speed range.

Perform shifting of speed range as follows.
Move speed range selector switch (1) to the desired position to speed range.



Position (a): 1st speed
Position (b): 2nd speed
Position (c): 3rd speed
Position (d): 4th speed



REMARK

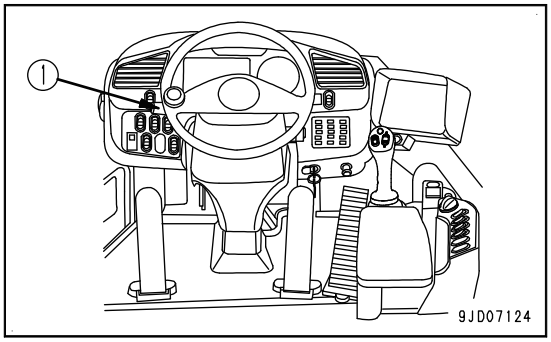
- If the speed range selector switch is operated slowly or is stopped between speed range positions, the centralized warning lamp may light up and the alarm buzzer may sound. In this case, there is no failure, however operate the speed range selector switch so that the speed range selecting is completed within 2 seconds.
- When the machine is traveling at high speed, if the speed range selector switch is shifted down to a slower speed range speed such as from the 4th to the 2nd, and from the 3rd to the 2nd while depressing the accelerator pedal, the shift down is not performed to protect the engine from overrun.
  In such case, the centralized warning lamp lights up and the alarm buzzer sounds.
  If the alarm buzzer sounds, release the accelerator pedal immediately, depress the brake pedal to reduce the speed and then shift the speed range.

SHIFT BETWEEN FORWARD AND REVERSE *(WA320-0000-13H-K-02-A)*

⚠ WARNING

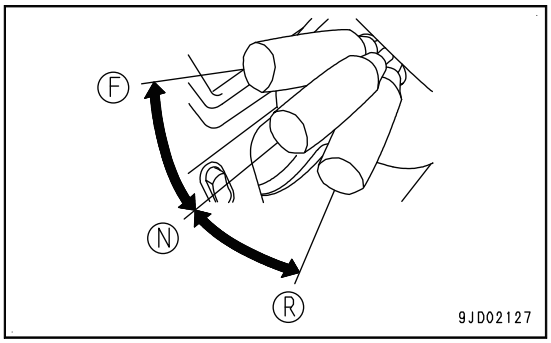
- **When switching between FORWARD and REVERSE, check that the new direction of travel is safe. There is a blind spot behind the machine, so be extremely careful when traveling in reverse.**
- **Do not try directional switching while the machine is traveling at a high speed.**
  When switching the direction, depress the brake to reduce the travel speed sufficiently, then switch the direction. (13 km/h (8.1 MPH) or less)
- **When traveling downhill through inertia, set the directional lever to the machine traveling direction. If the direction lever is set to the direction opposite to that of the machine travel, engine stall can result and it is very dangerous.**

You can switch the traveling direction without stopping the machine .
Set directional lever (1) to the desired position.



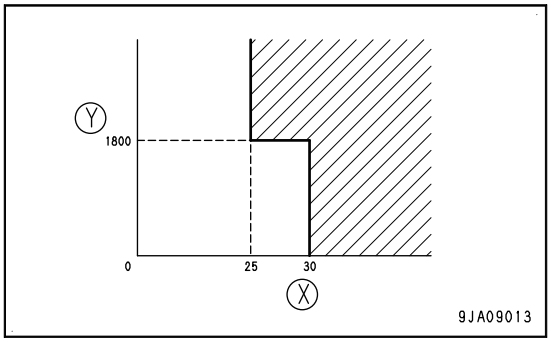
Position (F): FORWARD
Position (N): NEUTRAL
Position (R): REVERSE

- Check that the backup alarm sounds when the directional lever is set to R. If the backup alarm does not sound, ask your Komatsu distributor for repairs.



REMARK
If you operate the directional lever slowly or stop it at midway to the FORWARD or REVERSE position, the centralized warning lamp may light up and the alarm buzzer may sound. In this case, there is no failure, but try to operate the directional lever so that the change in direction is completed within 2 seconds.

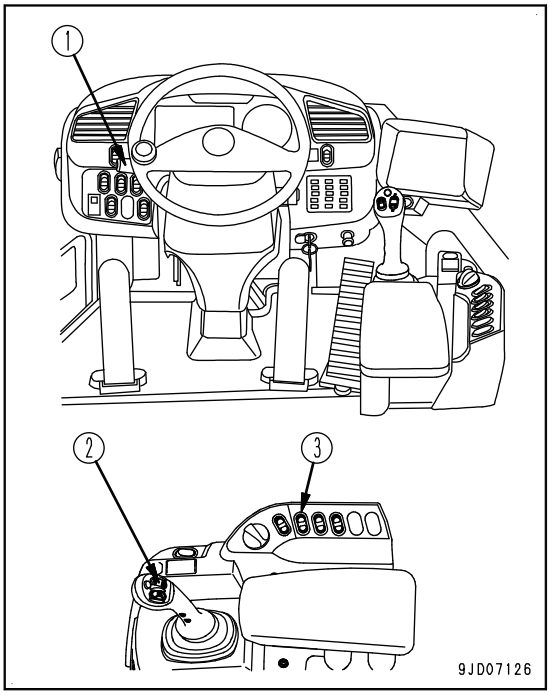
If you try to change the direction while the machine is traveling at a high speed (when 3rd or 4th speed is used), the centralized warning lamp lights up and alarm buzzer sounds if the travel speed and engine speed are in the hatched range shown in the table.
If the alarm buzzer sounds, depress the brake pedal immediately to reduce the speed sufficiently, then switch the direction.
(X): Travel speed (km/h)
(Y): Engine speed (rpm)



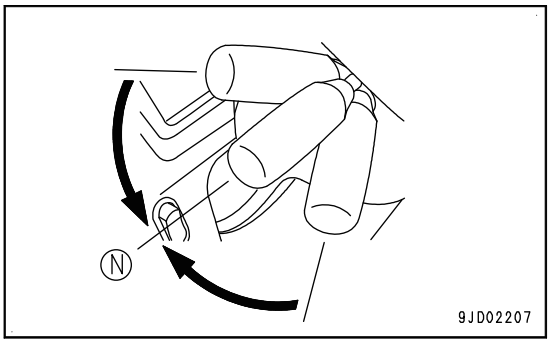
DIRECTIONAL SELECTION BY SWITCH OPERATION

⚠ WARNING

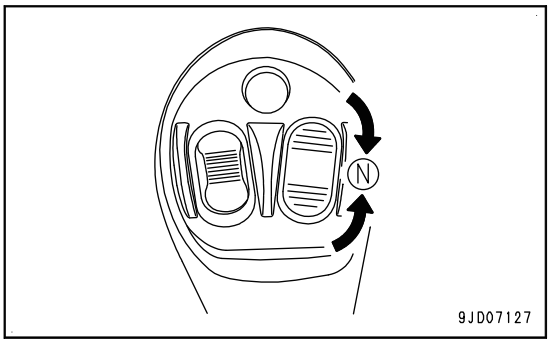
When moving directional lever (1) to F (forward) or R (reverse) position while directional selector switch actuation switch (3) is in ON position, the machine travels forward or in reverse in accordance with directional lever (1) regardless of the position of directional selector switch (2).
Be careful to operate because the operation of directional lever (1) is prior.



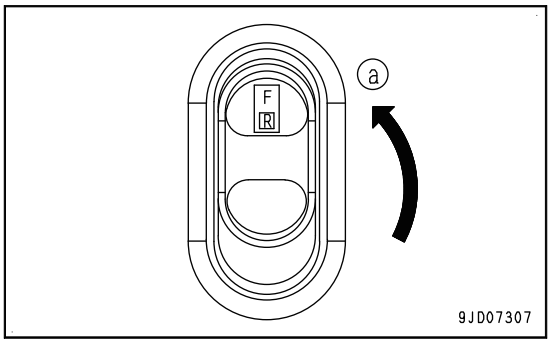
1. Set directional lever (1) to N (neutral) position.



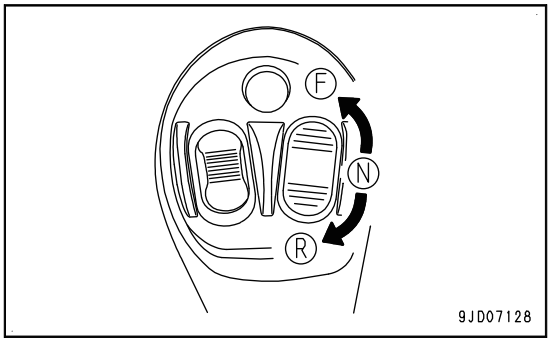
2. Set directional selector switch (2) to N (neutral) position.



3. Turn directional selector switch actuation switch (3) to ON position (a).



4. Set directional selector switch (2) to F (forward) or R (reverse) position.

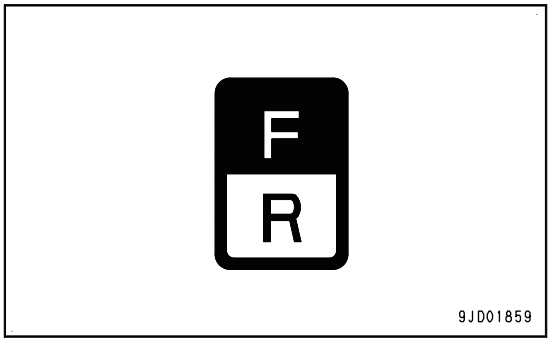


REMARK

When moving directional lever (1) to F (forward) or R (reverse) position while directional selector switch actuation switch (3) is in ON position, the machine travels forward or in reverse in accordance with directional lever (1) regardless of the position of directional selector switch (2).
(The operation of the directional lever is prior.)
When using directional selector switch (2) again, set directional lever (1) and directional selector switch (2) to N (neutral) position.

When the directional selector pilot lamp lights up in yellow, the switch and the lever are in the following condition. Set them to the proper positions.

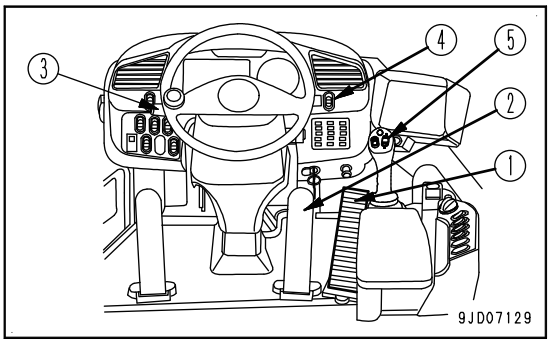
- When directional lever (1) is not in N (neutral) position.
  The pilot lamp lights up in yellow, the centralized warning lamp lights up at the same time, and the alarm buzzer sounds.
  In this condition, the machine travels forward and reverse in accordance with the directional lever position.
  Set directional lever (1) to N (neutral) position.
- When directional selector switch (2) is in F (forward) or R (reverse) position when starting the engine.
  The pilot lamp lights up in yellow, the centralized warning lamp lights up at the same time, and the alarm buzzer sounds.
  In this condition, engine does not start. Set directional selector switch (2) to N (neutral) position.



STOP MACHINE *(WA320-0000-13H-K-03-A)*

⚠ WARNING

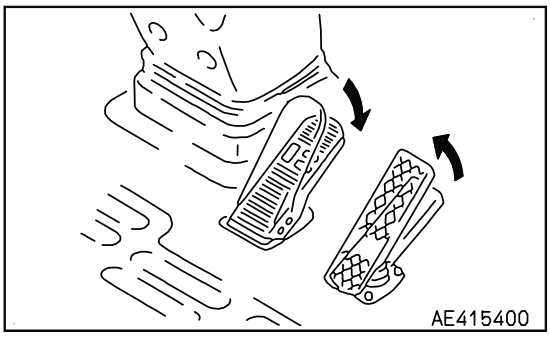
- **Avoid a sudden stop. Stop the machine gradually.**
- **Keep depressing the brake pedal until the parking brake pilot lamp lights up on the monitor even when the parking brake switch is turned ON.**



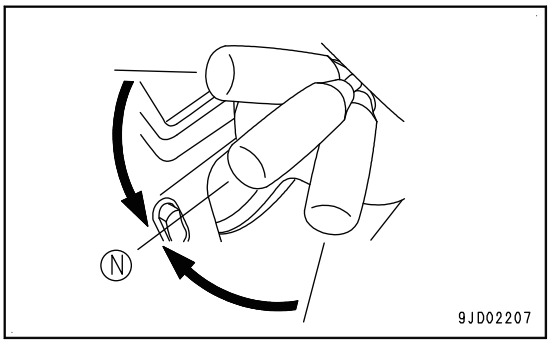
NOTICE

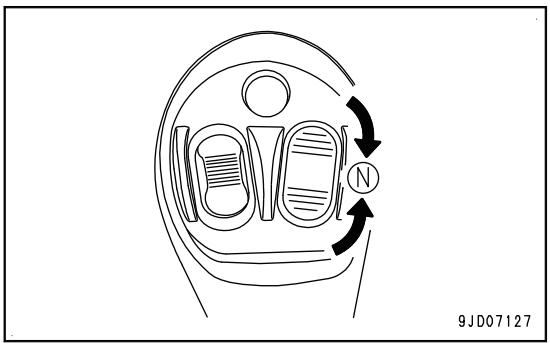
Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

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

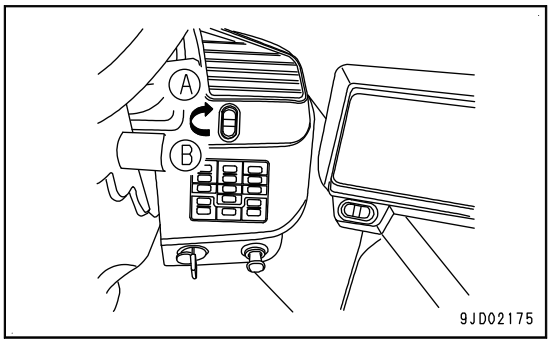


2. Set directional lever (3) and directional selector switch (5) to N (neutral) position.

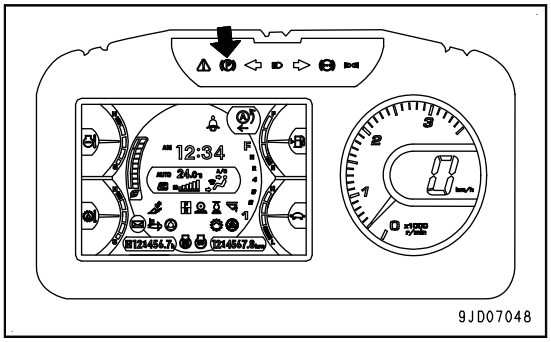




3. Move parking brake switch (4) from OFF position (B) to ON position (A) to apply the parking brake.



4. When the parking brake pilot lamp lights, release the brake pedal slowly.

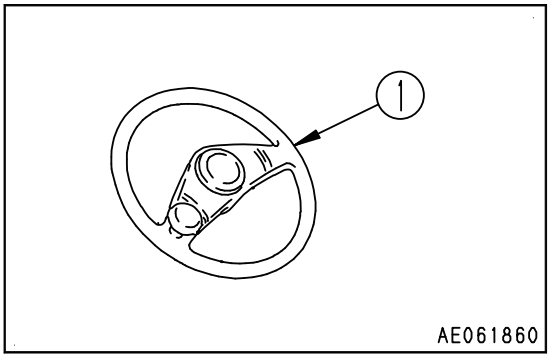


STEERING MACHINE *(WA320-0000-13T-K-00-A)*

⚠ WARNING

- **Avoid steering during high-speed travel or steering on steep slope.**
- **If the engine stops when the machine is traveling, the steering becomes heavy, so never stop the engine while traveling.**
  It is particularly dangerous if the engine stops while the machine is traveling on slops, so avoid such situations.
  If the engine stops, place the machine immediately in a safe place.

When traveling, turn steering wheel (1) in the desired direction, then machine turns.
On the machine, frames before and after the connection pin (center pin) are foldable with the connection pin at the center and the rear wheels follow the trace of the front wheels to turn the machine.
Turn the steering wheel lightly to follow the machine as it turns.



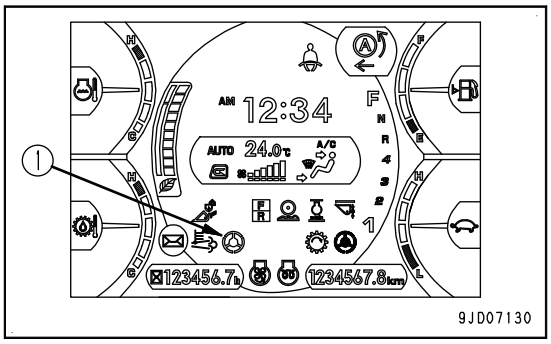
NOTICE
When the steering wheel is turned fully, if it reaches stroke end, do not try to turn further.
Check that the play of steering wheel is 60 mm (2 in) or less, and that operation of steering wheel is normal. If any problem is found, ask your Komatsu distributor for the inspection.

EMERGENCY STEERING *(WA320-F900-100-K-00-A)*

(if equipped)

⚠ CAUTION

- **Do not activate the emergency steering except in emergency or checking the function.**
- **When using the emergency steering, maintain the travel speed at 5 km/h (3.1 MPH) or below.**



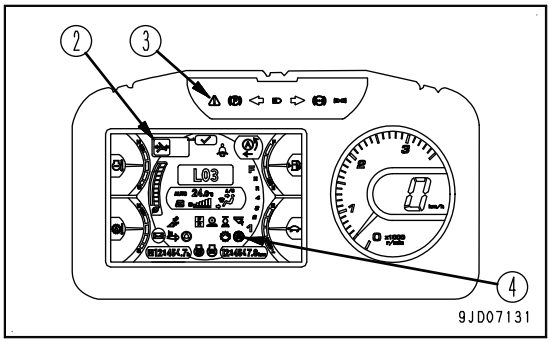
Emergency steering pilot lamp (1) (green) lights up to inform that the emergency steering system is normal.

The emergency steering system is designed to enable the turning (steering) operation under the following conditions.

- Traveling while steering system is being failed.
- Coasting while engine is stopped.

REMARK

When the machine is stopped, the emergency steering system does not operate.



Steering oil pressure low pilot lamp (4) (red) lights up when steering pressure is low.

While engine is stopped, steering pressure is low and steering oil pressure low pilot lamp (4) (red) lights up, but this does not indicate any abnormality.

When the emergency steering system detects lack of oil pressure in the steering system while engine is running, steering oil pressure caution lamp (2) (red), steering oil pressure low pilot lamp (4) (red) and the centralized warning lamp (3) lights up, and alarm buzzer sounds intermittently.

Steering oil pressure caution lamp (2) (red) lights up to inform the operator that there is a failure in the steering system.

If steering oil pressure caution lamp (2) (red) lights up, move the machine immediately to a safe place and stop it there.

Do not operate the machine until the cause is identified and repair is completed.

REMARK

When engine is running at low speeds and when you use some hydraulic system functions, steering oil pressure low pilot lamp (4) (red) may light up temporarily. There is no problem if the lamp lights up only instantaneously.

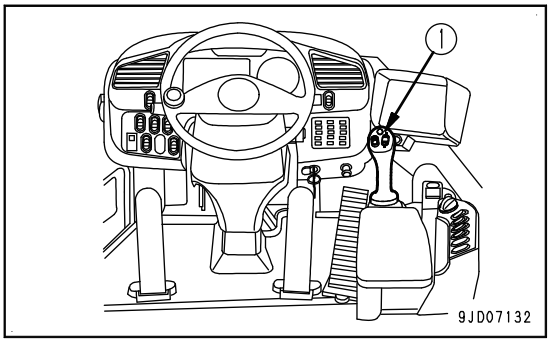
When the emergency steering system detects recovery of the steering system oil pressure, actuation of the emergency steering system is stopped.

WORK EQUIPMENT CONTROLS AND OPERATIONS *(WA320-0000-13U-K-00-A)*

⚠ WARNING

Never raise the boom with the bucket fully loaded when the machine is articulated. There is danger that the machine may tip over.

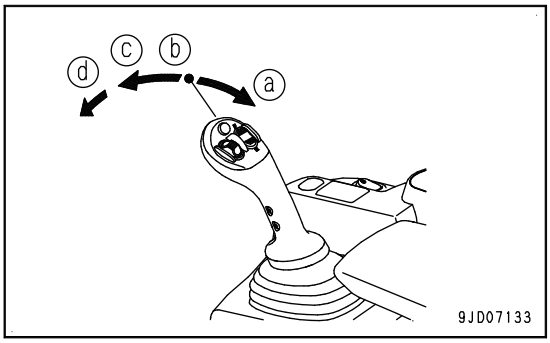
Multi-function mono-lever (1) allow operating the Boom and bucket in the following manners.

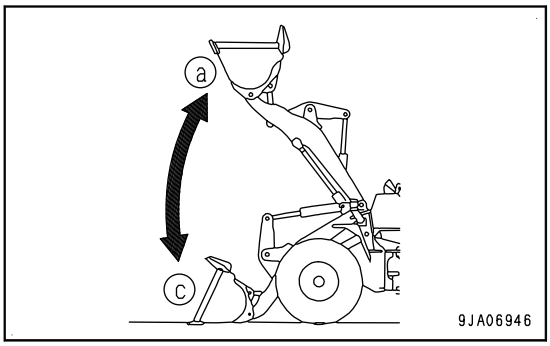


BOOM CONTROL *(WA320-PK31-100-K-00-A)*

NOTICE
Do not use "FLOAT" position when lowering the bucket. Use "FLOAT" when "LEVELING WORK (PAGE 3-194) ".

Position (a): RAISE
If the multi-function mono-lever is pulled further from "RAISE" position, the lever stops in that position.
When the remote boom positioner is set, the boom stops at the preset position and the lever returns to "HOLD" position at the same time.
When the remote boom positioner is disabled, the boom stops at the highest position and the lever returns to "HOLD" position at the same time.
Position (b): HOLD
The boom remains in the position where it was stopped.
Position (c): LOWER
Position (d): FLOAT
The boom moves freely under external force.
If the multi-function mono-lever is turned to "FLOAT" position, the lever stops in that position.

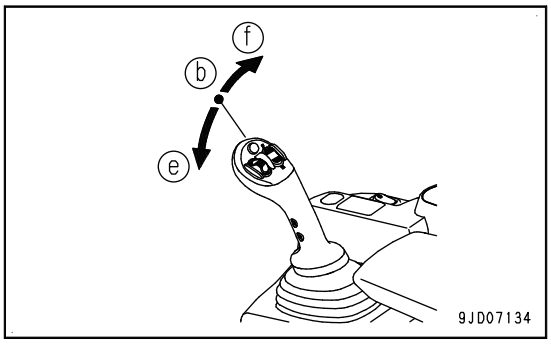


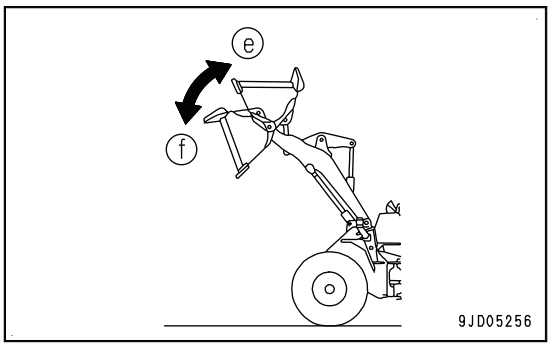


NOTICE
Even if the engine is stopped, if the starting switch is at ON position and lock of the work equipment is cancelled (pilot lamp is off), the work equipment can be operated.

BUCKET CONTROL *(WA320-PK33-100-K-00-A)*

Position (e): TILT
When the multi-function mono-lever is pulled further from the "TILT" position, the lever stops in that position until the bucket reaches the preset position by the bucket positioner, and the lever returns to the "HOLD" position.
Position (b): HOLD
The bucket remains in the position where it was stopped.
Position (f): DUMP





HANDLING HYDRAULIC TYPE QUICK COUPLER *(WA320-LGC7-100-K-00-A)*

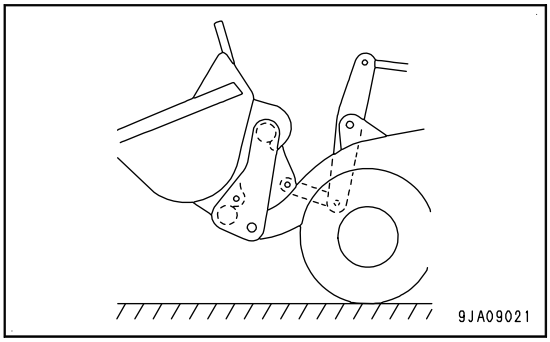
⚠ WARNING

Before operating the machine, check that the attachment is correctly connected. If it is not correctly installed, the attachment may fall off and cause serious injury.

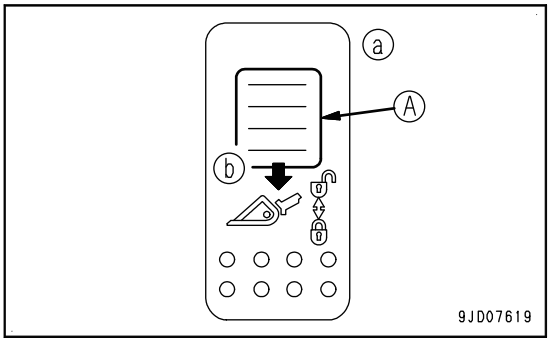
- **Check that the quick coupler attachment switch is at the CONNECT position.**
- **Check that the coupler plunger is completely inserted into the attachment.**

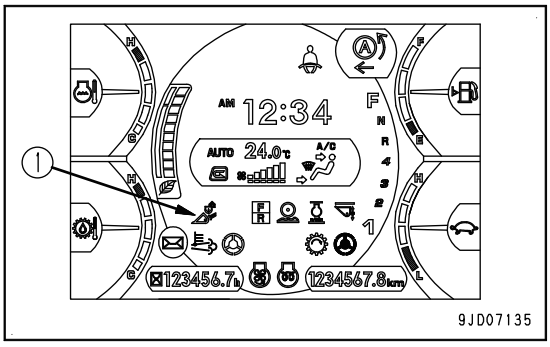
REMOVE ATTACHMENT *(WA320-LGC7-100-K-01-A)*

1. Raise the attachment to boom level position on a level ground, and check you can see coupler plunger.

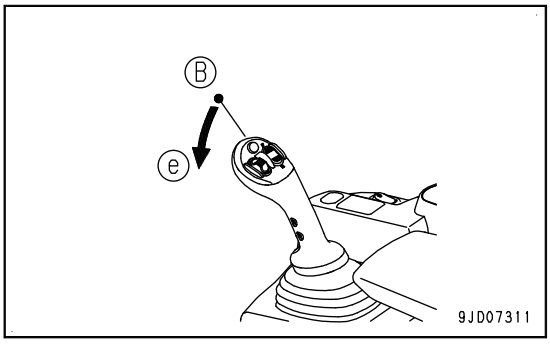


2. Pull lock (A) of the quick coupler attachment switch in the direction of the arrow (b), and push in to RELEASE position (a). Keep the switch pressed until the work of step 6. is completed.
   When the quick coupler release is operated, the quick coupler lock release pilot lamp (1) lights up and the alarm buzzer sounds intermittently.

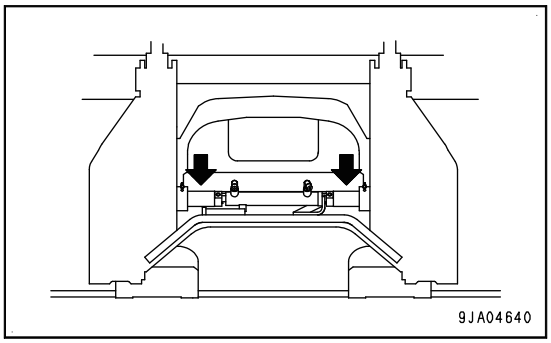




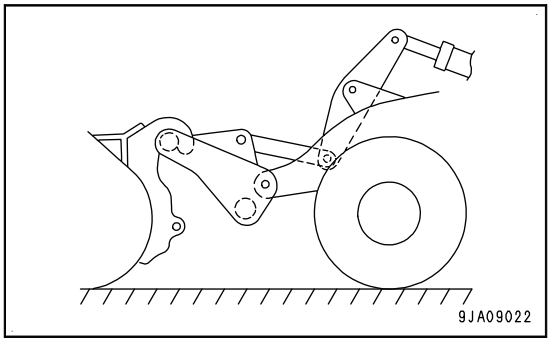
3. Operate multi-function mono-lever from HOLD position (B) to TILT position (e) while quick coupler attachment switch is pressed into (a). Retract coupler plunger while keeping it at TILT position (e) from the state that the coupler contacts to tilt-end stopper. Release the lock of attachment.



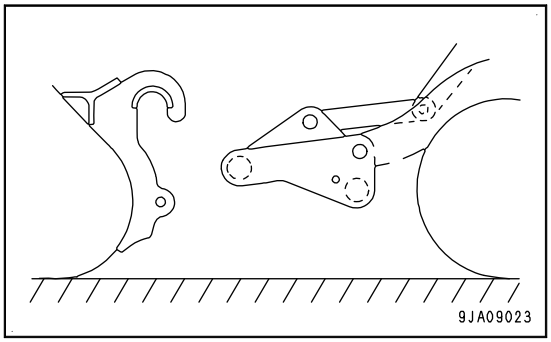
4. Check that the coupler plunger is completely pulled in.



5. Lower the attachment completely to the ground and set it in a stable position.

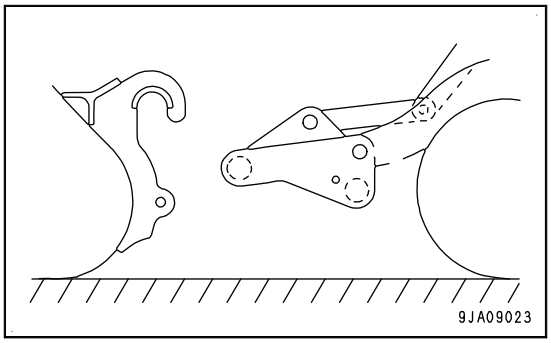


6. Tilt the coupler forward slowly and lower it slowly so that it separates from the attachment hook.
7. Release quick coupler attachment after checking that the coupler is released from attachment hook. The switch returns to its original position, pilot lamp (1) for releasing quick coupler goes out, and alarm buzzer stops sounding.
8. Drive the machine slowly in reverse and separate the attachment from the machine.

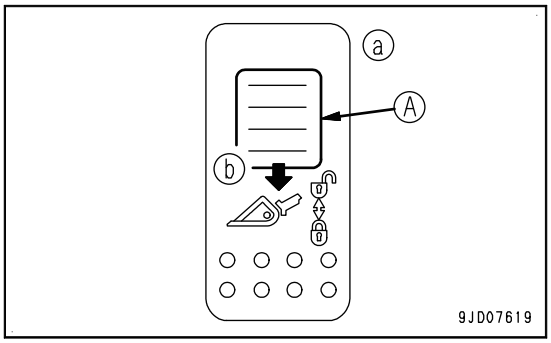


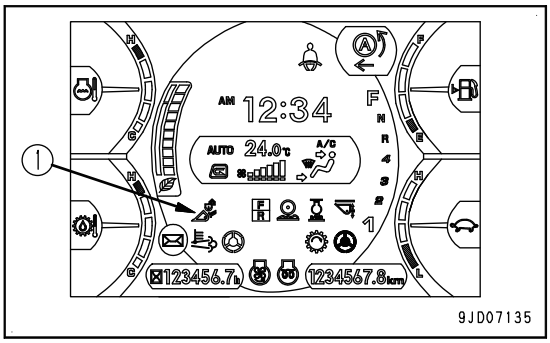
INSTALL ATTACHMENT *(WA320-LGC7-100-K-02-A)*

1. Set the coupler tilted forward posture on a level ground, stop the machine at the position just before attachment hook and the coupler tube come to the same line.
   Depress the brake pedal to stop the machine with directional lever at forward.

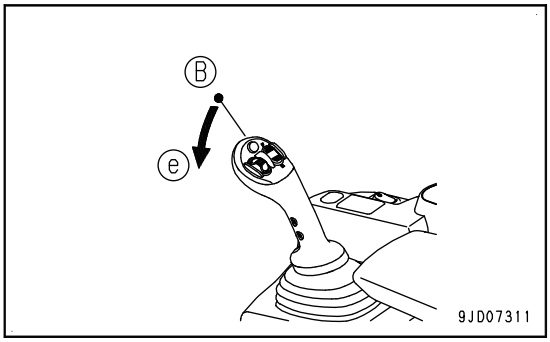


2. Pull lock (A) of the quick coupler attachment switch in the direction of the arrow (b), and push in to RELEASE position (a). Keep the switch pressed until the work of step 8. is completed.
   When the quick coupler release is operated, the quick coupler lock release pilot lamp (1) lights up and the alarm buzzer sounds intermittently.

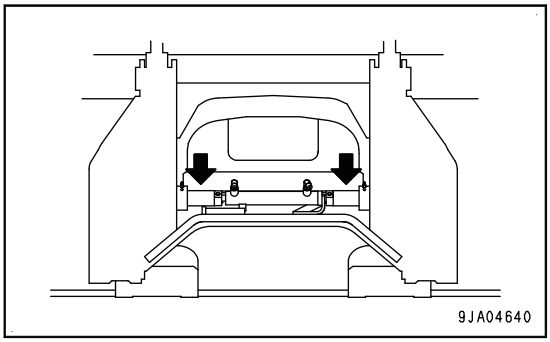




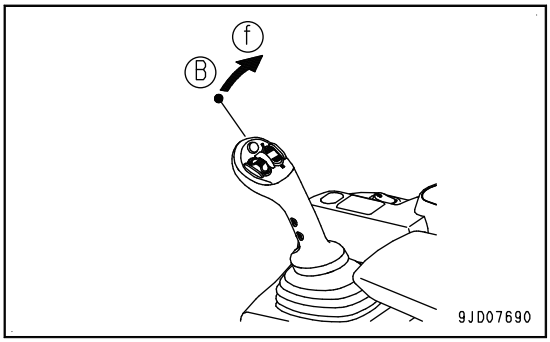
3. Operate multi-function mono-lever from HOLD position (B) to TILT position (e) while quick coupler attachment switch is pressed into (a). Retract coupler plunger while keeping it at TILT position (e) from the state that the coupler contacts to tilt-end stopper.



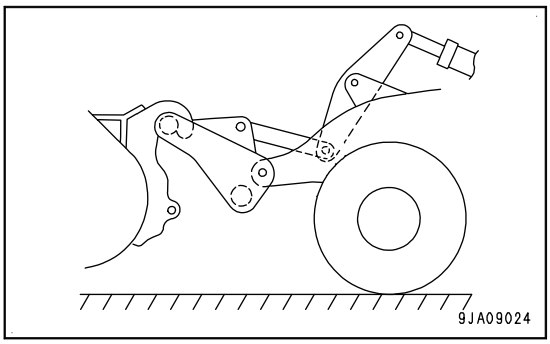
4. Check that the coupler plunger is completely pulled in.



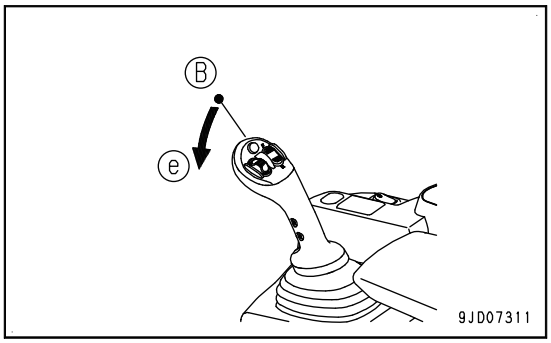
5. Operate multi-function mono-lever from HOLD position (B) to DUMP position (f), and set the coupler tilted forward.



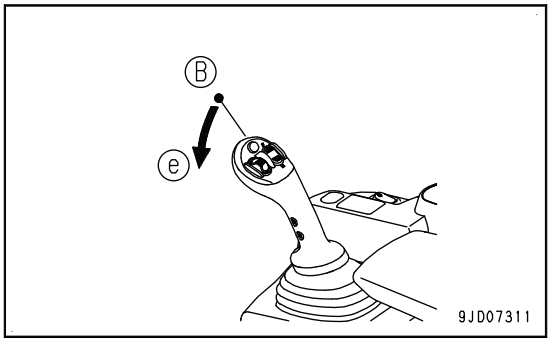
6. Raise the coupler slowly as the machine travels forward, keep raising it until coupler tube comes to be connected with attachment hook and attachment is lifted from the ground a little.
7. Check that the attachment is horizontal to the left and right and that each hook is correctly inserted.



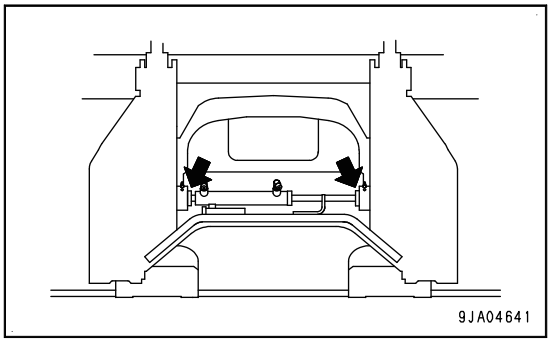
8. Operate multi-function mono-lever from HOLD position (B) to TILT position (e), and set the coupler tilted fully.



9. Put your hand off the quick coupler attachment switch. The switch returns to its original position, pilot lamp (1) for releasing quick coupler goes out, and alarm buzzer stops sounding.
10. Operate multi-function mono-lever from HOLD position (B) to TILT position (e), keep it, and pull out the coupler plunger to lock the attachment.



11. Check that the coupler plunger is completely inserted.



RECOMMENDED APPLICATIONS *(WA-0000-13V-K-00-A)*

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

DIGGING WORK *(WA320-0000-13V-K-01-A)*

⚠ WARNING

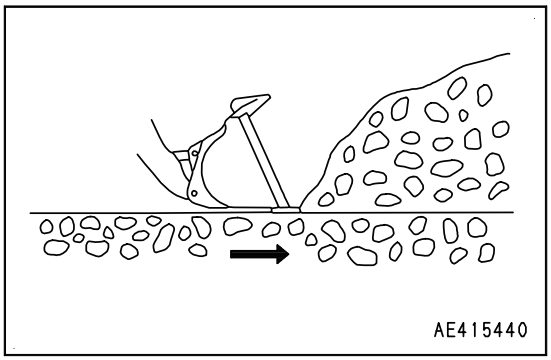
- **Never dig or scoop with the machine articulated. There is danger that the machine may tip over.**
- **Never raise the boom with the bucket fully loaded when the machine is articulated. There is danger that the machine may tip over.**
- **When the machine is traveling or the work equipment is raised, the moment that ECSS switch is turned ON, the work equipment will move.**
- **If operations are carried out with ECSS switch left at ON position, the moment that ECSS is actuated, the work equipment may move.**
- **When the boom is below the horizontal position, if the bucket is operated further from the maximum tilt, the boom may rise. If the bucket is operated to DUMP position immediately after that, the boom may go down slightly.**

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

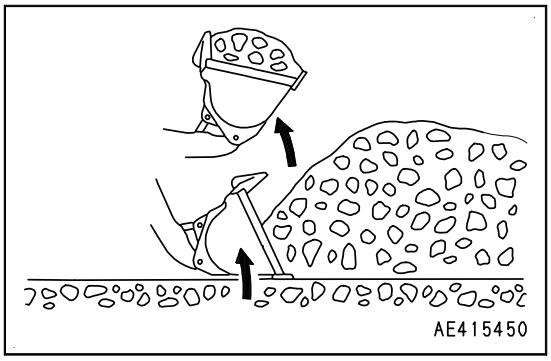
LOADING STOCK PILES *(WA320-0000-13V-K-02-A)*

Scoop up the piled soil by moving the machine forward as shown below. If the tires begin slipping under heavy load, raise the bucket slightly to reduce the load.

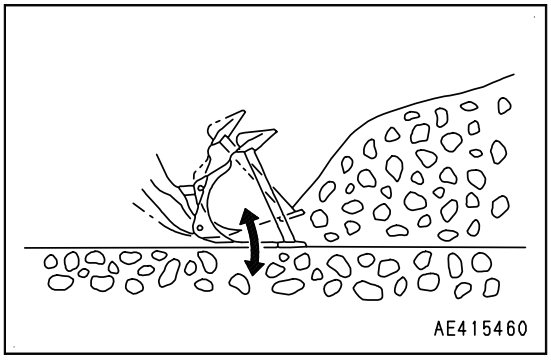
1. Force the bucket into the pile of soil while moving the machine forward.



2. Thrust the bucket fully into the soil, then drive the machine forward and operate the multi-function mono-lever to raise the boom. In addition, operate the multi-function mono-lever occasionally to tilt the bucket so that the bucket can be fully loaded.
   Try to keep the load in the center of the bucket; if the load is on one side of the bucket, the load will be unbalanced.



3. If it is difficult to thrust the bucket into the soil, operate the multi-function mono-lever to the left and right to move the cutting edge of the bucket up and down.



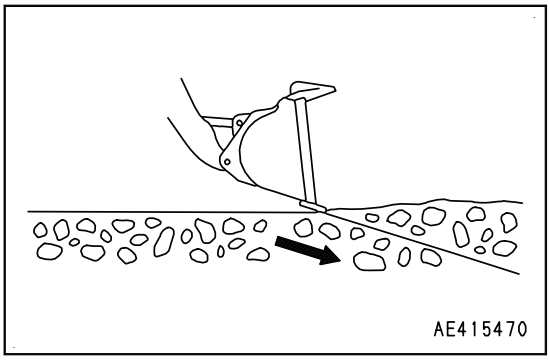
DIGGING OR LOADING ON LEVEL GROUND *(WA320-0000-13V-K-03-A)*

When digging and loading on level ground, set the bucket edge facing down slightly as follows and drive the machine forward. Always be careful not to load the bucket on one side and cause an unbalanced load.
The 1st speed range is recommended.

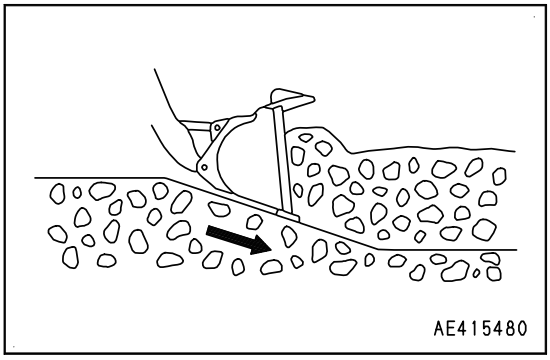
⚠ CAUTION

Do not set the bucket facing down more than 20 deg.

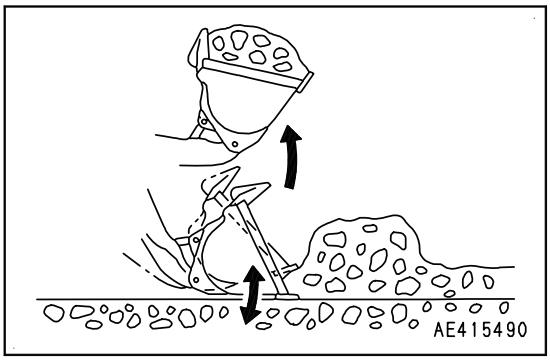
1. Direct the tooth tip somewhat downward from the horizontal position.



2. While driving the machine forward, tilt the multi-function mono-lever somewhat forward to dig bit by bit as earth and sand are peeled off.



3. Keep on driving the machine forward while adjusting the digging depth by using the multi-function mono-lever.
   When you carry out digging by use of the bucket, avoid applying the digging force only to one side of the bucket.

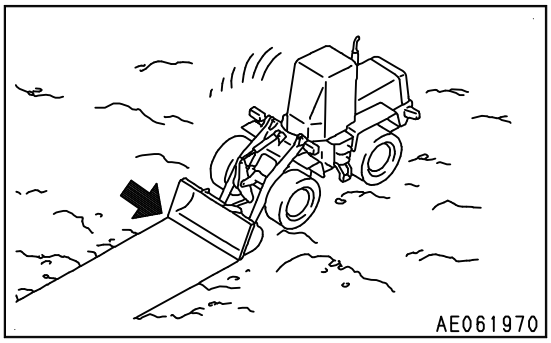


LEVELING WORK *(WA-0000-13V-K-04-A)*

NOTICE

- **Always to drive the machine in reverse when carrying out leveling operation.**
  When it is unavoidable to drive the machine forward for the given leveling work, do not dump the bucket more than 20 deg. The work equipment may be damaged.
- **Turn ECSS switch OFF during leveling operation.**

1. Scoop soils and sands into the bucket and then, while driving the machine in reverse, dump the bucket bit by bit to spread them.
2. When leveling the ground, dump the bucket to lower the bucket tooth tip to the ground, then drag the tooth tip by driving the machine in reverse.
3. When performing finish leveling, scoop earth and sand into the bucket, set the boom to “FLOAT” position with the bucket horizontal, and reverse the machine.



DOZING WORK *(WA-0000-13V-K-05-A)*

⚠ CAUTION

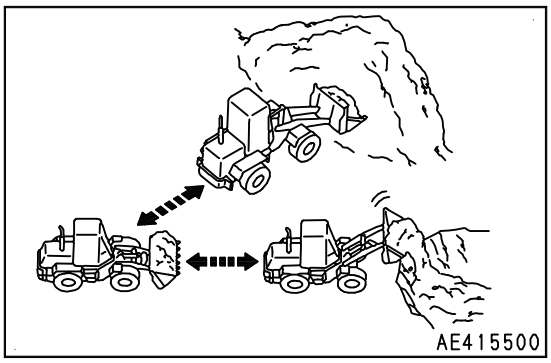
Never set the bucket to DUMP position when carrying out the dozing operation. The work equipment may be damaged.

When performing dozing operation, set the bottom of, the bucket parallel to the ground surface.

LOAD-AND-CARRY OPERATION *(WA-0000-13V-K-06-A)*

⚠ WARNING

- **When carrying a load, lower the bucket to lower the center of gravity of the machine and travel.**
- **Note that the work equipment moves at the moment the ECSS (Electronically Controlled Suspension System) switch is turned on while the machine is traveling or the work equipment is being raised.**
- **Note that the work equipment may move at the moment the ECSS is actuated if the machine is operated with the ECSS switch turned on.**



The load and carry method for wheel loaders consists of a cycle of scooping, hauling, and loading (into a hopper, glory hole etc.).
Maintain the travel road constantly in good condition.
When employing load and carry method, see "PRECAUTIONS ABOUT LOAD-AND-CARRY OPERATION (PAGE 3-211) ".

LOADING WORK *(WA320-0000-13V-K-07-A)*

Select an efficient loading method which minimizes the number of turns and travel distance according to the job site.

⚠ WARNING

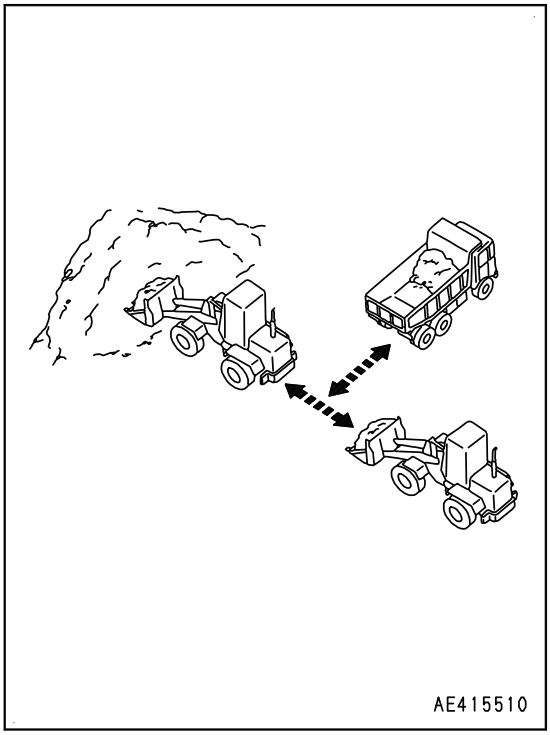
- **Level the job site constantly. Avoid sudden steering or braking while the boom is being raised with the bucket loaded. This is dangerous.**
- **Never thrust the bucket into the target material (soil or crushed rock) when the machine is traveling at high speeds. This is dangerous.**
- **Note that the work equipment moves at the moment ECSS (Electronically Controlled Suspension System) switch is turned on while the machine is traveling or the work equipment is being raised.**
- **Note that the work equipment may move at the moment the ECSS is actuated if the machine is operated with ECSS switch turned on**
- **When the boom is below the horizontal position, if the bucket is operated further from the maximum tilt, the boom may rise. If the bucket is operated to DUMP position immediately after that, the boom may go down slightly.**

NOTICE

- **If the tiers slip, the tire life will be reduced, so operate the machine avoiding tier slippage.**
- **Avoid excessive swinging of the bucket.**

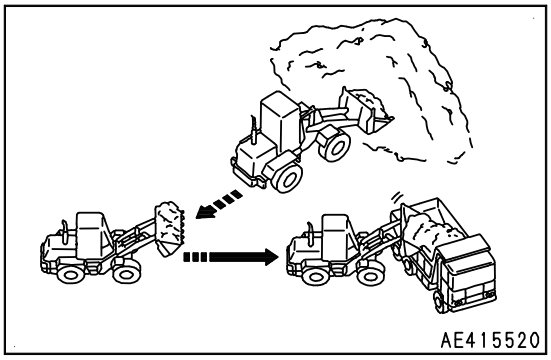
CROSS DRIVE LOADING *(WA-0000-13V-K-08-A)*

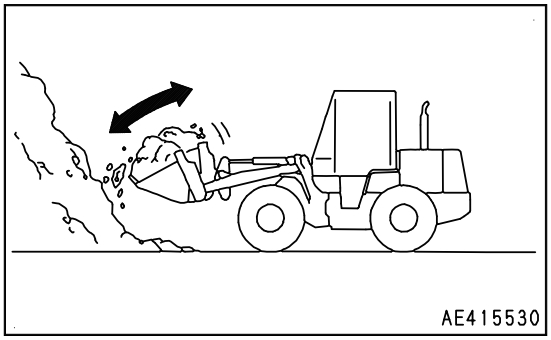
When carrying out digging, set the wheel loader at a right angle to the target stock pile. After digging in and scooping up the load, drive the machine straight back in reverse, then bring the dump truck in between the stock pile and the wheel loader. This approach minimizes the time required for loading, cuts the cycle time short and is efficient.



V-SHAPE LOADING *(WA-0000-13V-K-09-A)*

Park a dump truck at an angle of approximately 60 deg. to the scooping direction of the wheel loader. After scooping the soils, back the wheel loader in such direction that it is at a right angle to the dump truck and then move the machine forward to load the soils onto the dump truck.
The smaller the turning angle of the wheel loader is, the more efficient the operation becomes.
Before raising the boom to the maximum height after filling the bucket with load, shake the bucket near the ground to stabilize the load, then raise the bucket. This will prevent the load from spilling to the rear.





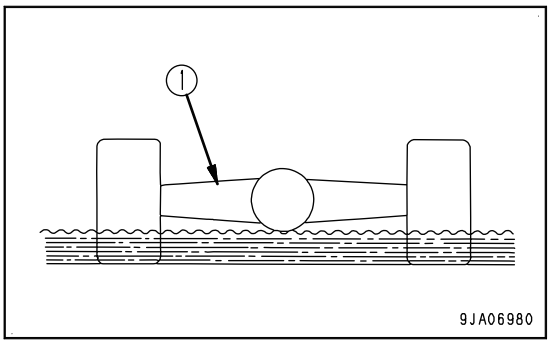
FORKING WORK *(WA320-0000-13V-K-10-A)*

When forming soils to be scooped into a pile, be careful not to let the rear counterweight come into contact with the ground.
Do not set the bucket to DUMP position when piling-up loads.

RULES FOR OPERATION *(PC-0000-001-K-13-A)*

PERMISSIBLE WATER DEPTH *(WA-0000-18N-K-00-A)*

When operating the machine in water or on swampy ground, do not move it to a place where the water depth is beyond the permissible level (up to the bottom surface of axle housing (1)).
After finishing the operations, wash the machine and lubricate the parts that have been exposed to water.



IF BRAKE DOES NOT STOP MACHINE MOVE *(WA-GJ00-100-K-00-A)*

If the machine is not stopped by depressing the brake pedal, use the parking brake to stop the machine.

NOTICE
If the parking brake is used as an emergency brake, ask your Komatsu distributor to inspect the parking brake system for any trouble.

TRAVEL ON SLOPES *(WA-0000-001-K-04-A)*

LOWER THE CENTER OF GRAVITY WHEN TURNING *(WA-0000-130-K-03-A)*

When turning the machine on a slope, lower the work equipment to lower the center of gravity before turning. Turning on a steep slop is dangerous and, thus, prohibited.

TRAVELING DOWNHILL *(WA320-0000-130-K-01-A)*

If the brake pedal is used frequently when traveling downhill, the brake will overheat and may be damaged.
Release the accelerator pedal to make full use of the braking force of the engine when traveling downhill.
If the brake oil temperature caution lamp lights up and the alarm buzzer soundsintermittently due to excessive frequency of the brake operation, take the remedy described in "BRAKE OIL TEMPERATURE CAUTION LAMP (PAGE 3-21) " of EXPLANATION OF COMPONENTS

IF ENGINE STOPS ON SLOPE *(WA320-0000-130-K-02-A)*

If the engine stops on a slope, apply the parking brake immediately, and lower the work equipment to the ground and stop the machine. Then put the directional lever and directional selector switch in neutral position, and start the engine again.

PRECAUTIONS FOR TRAVEL *(WA270-0000-130-K-04-A)*

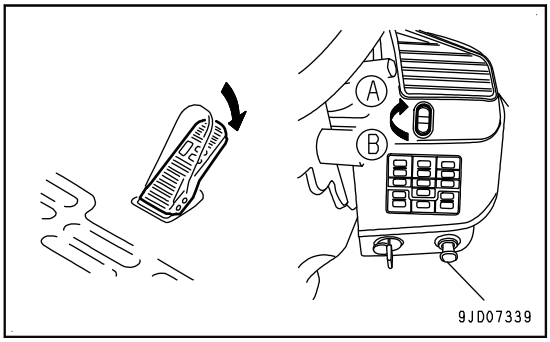
Avoid a long distance driving of the machine at high speed as much as possible since the tires can be highly heated, causing premature damage on tires. If the machine must be driven for a long distance, take the following precautions.

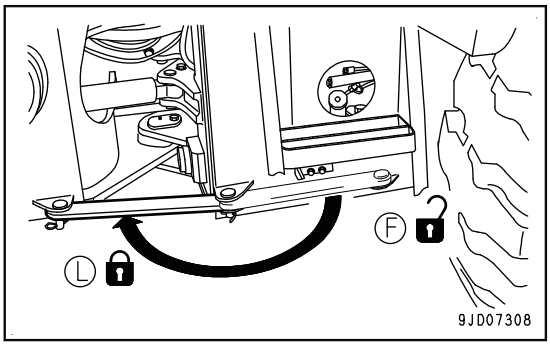
- Follow the regulations related to this machine, and drive carefully.
- Before driving the machine, carry out the checks before starting.
- The most suitable tire pressure and travel speed differ according to the tire type and condition of the travel surface. Contact your Komatsu distributor or tire dealer.
- The following shows a rough guideline for the appropriate inflation pressure and traveling speed when traveling on a paved surface with the standard tire (20.5R25☆).
  Inflation pressure: Front tires 350 kPa {3.5 kg/cm^2, 49.8 PSI}, rear tires 350 kPa {3.5 kg/cm^2, 49.8 PSI}
  Speed 14 km/h (8.7 MPH)
- Check the tire inflation pressure before driving, when the tires are cool.
- Stop the machine for 30 minutes after the travel of 1 hour, and check the tires and each part for any trouble. Check the oil level and coolant level also.
  However, when stopping the machine in extremely cold areas, do as follows.
  Do not stop the engine abruptly to prevent the radiator coolant temperature from rising sharply. Cool the radiator coolant down gradually before stopping the engine.
- Always travel with the bucket empty.
- Never travel with "calcium chloride" or "dry ballast" in the tires.

ADJUST WORK EQUIPMENT POSTURE *(WA320-L000-043-K-00-A)*

⚠ WARNING

- **Place the machine on a level ground and move parking brake switch from OFF position (B) to ON position (A) with brake pedal depressed to apply parking brake securely, and then confirm that the machine is stopped completely.**
- **Put blocks in front of and behind the tires.**
- **Secure the front and rear frames with the frame lock bar.**
- **Always hang the warning tag on the multi function monolever.**
- **Never work under the work equipment while the boom is raised. Support the work equipment securely with prop strong enough to support the weight of the work equipment to prevent the boom from lowering.**





Bucket can be stopped automatically when it is raised to the desired height with remote boom positioner (boom must be higher than level) and it becomes to the desired digging angle with bucket positioner.
Bucket also can be adjusted to the desired position in accordance with the operating condition.

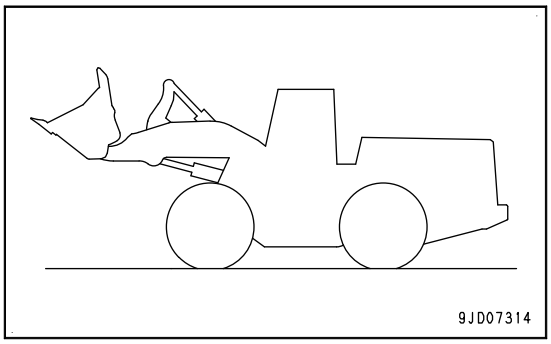
REMOTE POSITIONER *(WA320-LEE0-100-K-00-A)*

This machine equips with the function of the remote boom positioner.
For remote positioner, see "REMOTE POSITIONER SWITCH (PAGE 3-89)".

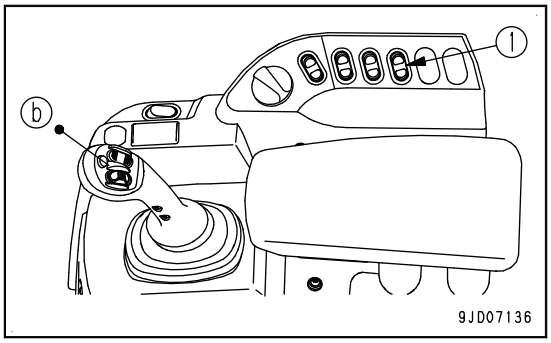
REMOTE BOOM POSITIONER OPERATION *(WA-L230-100-K-00-A)*

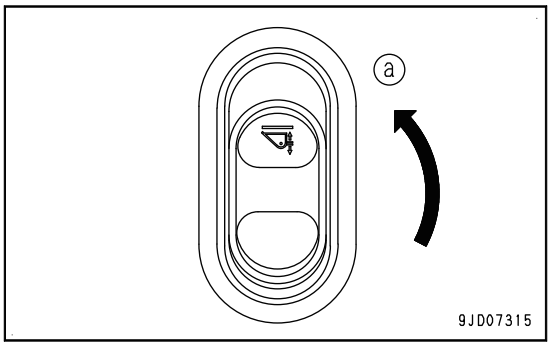
RAISE REMOTE BOOM POSITIONER OPERATION *(WA320-L230-100-K-01-A)*

1. Set the boom to a desired RAISE stop position above the horizontal.



2. Set the multi function mono-lever to HOLD position (b) and press position (a) of switch (1). The buzzer beeps indicating the RAISE stop position has been set.





Operation checkup procedure

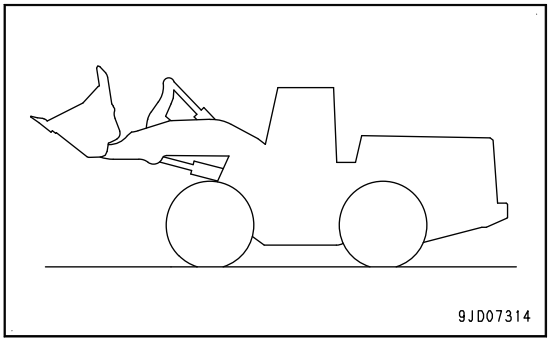
- Lower the boom once, move the multi function mono-lever to RAISE detent position and then release your hand from the lever.
- The boom rises and then stops at the moment when the multi function mono-lever returns from the detent position to HOLD position.

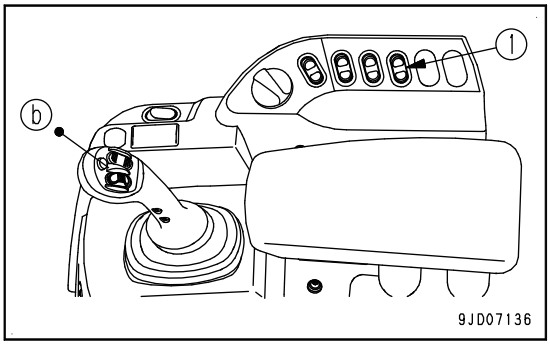
REMARK

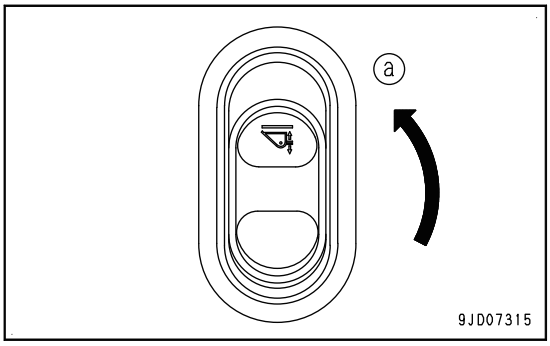
- When the multi function mono-lever is set to RAISE detent position, if the boom is very close to the position specified by the positioner (approximately within 2 deg.), the lever is not set to the detent position.
- For details of the boom raise detent, see "BOOM RAISE DETENT SETTING (PAGE 3-57) ".

RESET RAISE REMOTE BOOM POSITIONER *(WA320-L230-100-K-02-A)*

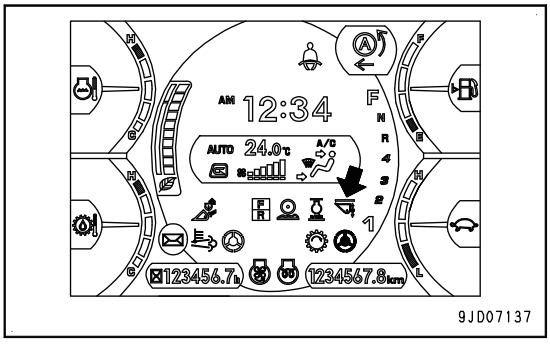
Raise the boom to a height above the horizontal, set the multi function mono-lever to HOLD position (b) and then press position (a) of switch (1) for more than 1 second. The buzzer beeps indicating that the RAISE stop position is reset.
With the RAISE stop position reset, if the multi function mono-lever is set to the detent position, the boom control lever returns from the detent position to HOLD position when the boom reaches near the maximum height. At the same time, the boom stops.





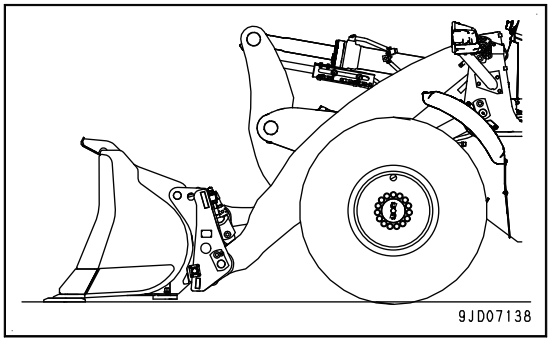


REMARK
When the remote positioner is enabled, the pilot lamp lights up on the machine monitor.

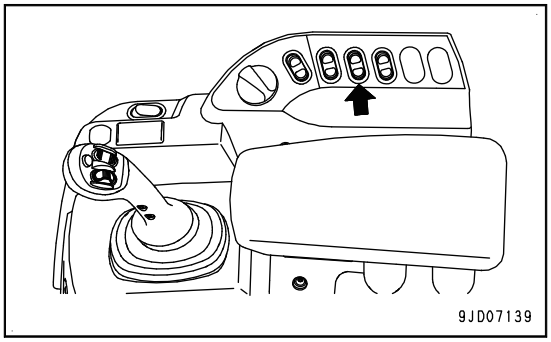


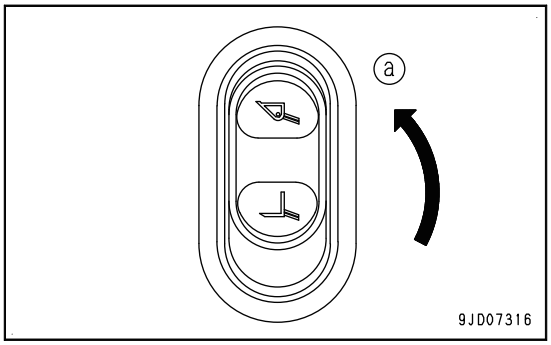
ADJUST BUCKET POSITIONER *(WA270-LEE0-270-K-00-A)*

1. Lower the bucket to the ground, return multi-function mono-lever to HOLD position according to the required digging angle. Then, lock the work equipment by using the work equipment lock switch (the pilot lamp lights up), and stop the engine.

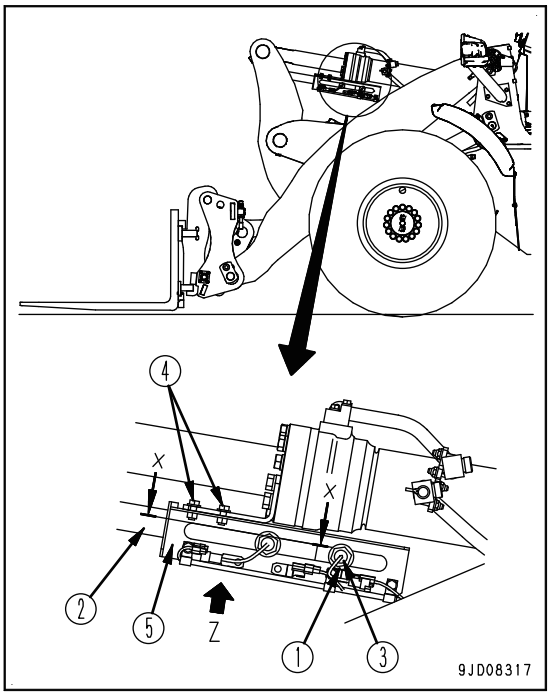


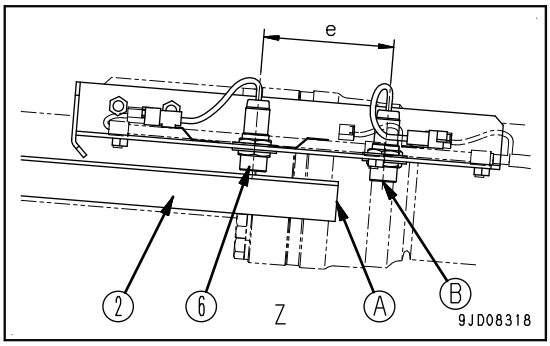
2. If attachment selector switch is equipped, turn the switch to bucket position (a).



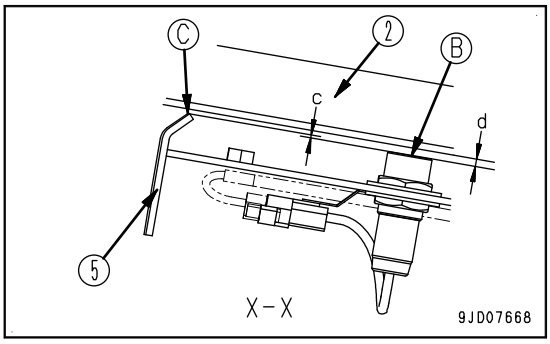


3. Loosen nut (1), and adjust the position of proximity switch (3) so that rear end (A) of bar (2) is matched to the center of sensory surface (B) of the proximity switch.





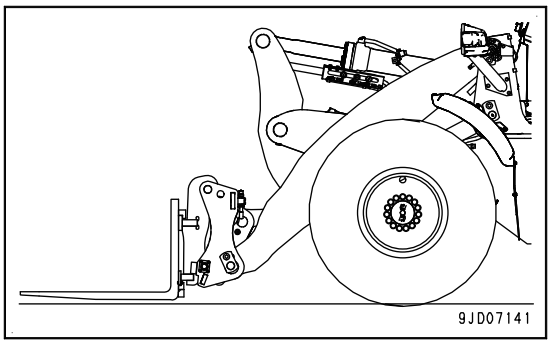
4. Adjust range "c" with nut (1) so that tip (C) of protector (5) protrudes 0.5 to 1.0 mm (0.02 to 0.039 in) from sensory surface (B) of all proximity switches.
5. Adjust auto tilt-in proximity switch (6) so that distance (e) between centers of bucket proximity switch (3) and auto tilt-in proximity switch (6) becomes 145.5 to 149.5 mm (5.7 to 5.9 in).
6. Loosen bolt (4), adjust clearance "d" between bar (2) and sensory surface (B) of all proximity switches so that it is within 3 to 5 mm, and fix it.
   Tightening torque: 14.7 to 19.6 Nm {1.5 to 2.0 kgm}
7. After adjustment, run the engine to raise the boom. Check that the lever automatically returns to HOLD position at desired digging angle when tilting back after bucket dump operation.



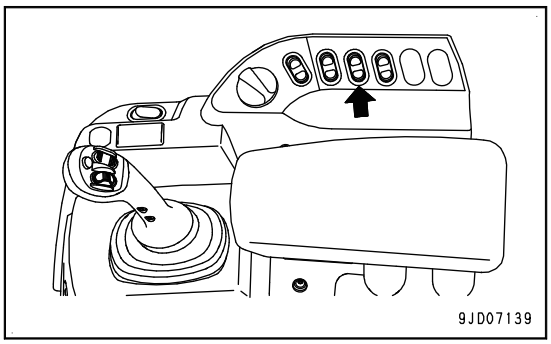
ADJUST FORK POSITIONER *(WA270-LEE4-270-K-00-A)*

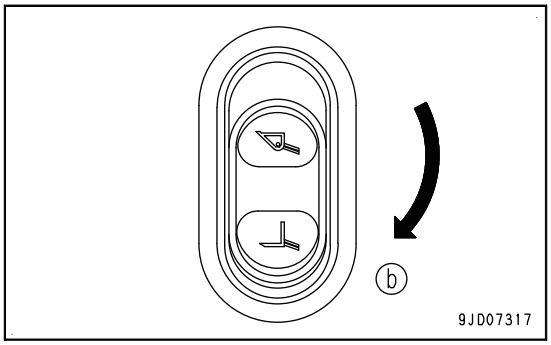
(if equipped)

1. Lower the fork to the ground, set it at level position, and return multi-function mono-lever to HOLD position. Then, lock the work equipment by using the work equipment lock switch (the pilot lamp lights up), and stop the engine.

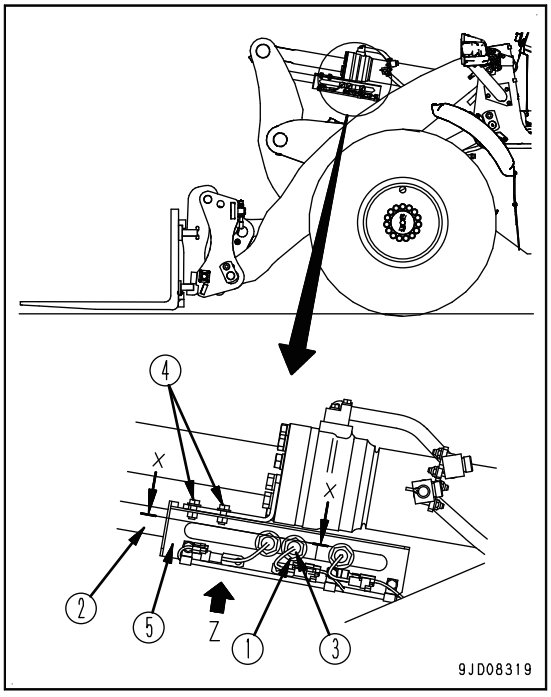


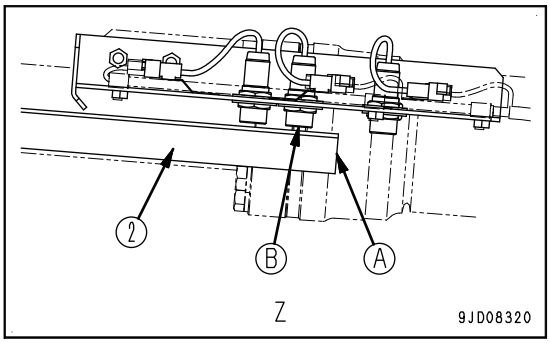
2. Turn attachment selector switch (if equipped) to fork position (b).



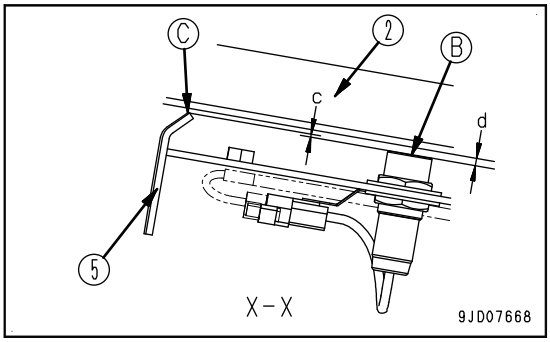


3. Loosen nut (1), and adjust the position of proximity switch (3) so that rear end (A) of bar (2) is matched to the center of sensory surface (B) of the proximity switch.





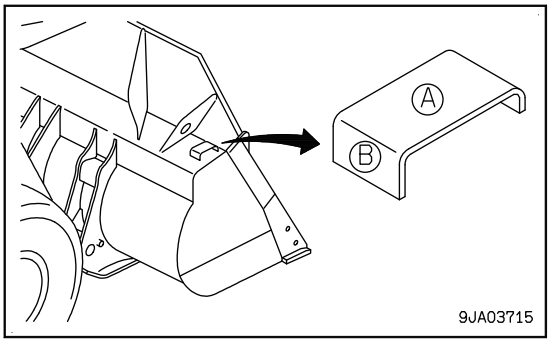
4. Adjust range "c" with nut (1) so that tip (C) of protector (5) protrudes 0.5 to 1.0 mm (0.02 to 0.039 in) from sensory surface (B) of all proximity switches.
5. Loosen bolt (4), adjust clearance "d" between bar (2) and sensory surface (B) of all proximity switches so that it is within 3 to 5 mm (0.1 to 0.2 in), and fix it.
   Tightening torque: 14.7 to 19.6 Nm {1.5 to 2.0 kgm}



6. After adjustment, run the engine to raise the boom. Check that the lever automatically returns to HOLD position when tilting back the fork after fork dump operation.

BUCKET LEVEL INDICATOR *(WA-LEC0-043-K-00-A)*

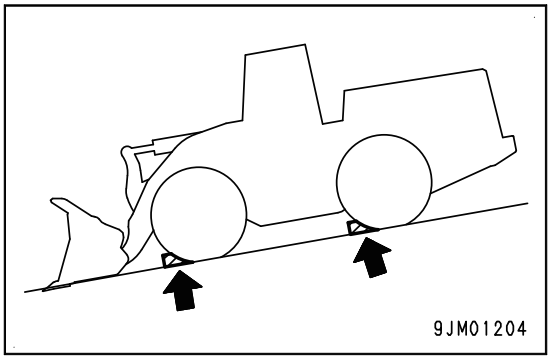
The indicator in the top right side corner of the bucket allows check of the bucket angle during operation.
(A): In parallel with cutting edge
(B): At 90 deg. to cutting edge



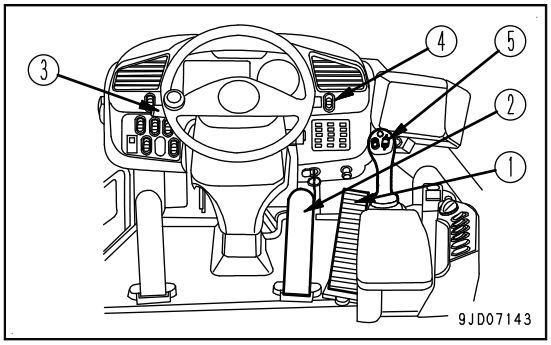
PARKING MACHINE *(WA320-0000-160-K-00-A)*

⚠ WARNING

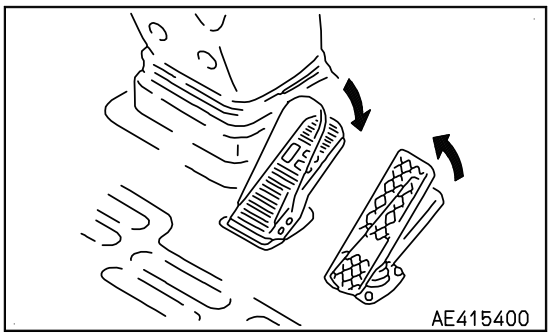
- **Avoid a sudden stop. Stop the machine gradually.**
- **Do not park the machine on a slope.**
  If it is unavoidable to park the machine on a slope, place the machine at a right angle to the slope face, chock the wheels and then lower the bucket to the ground.
- **If the control levers are touched by mistake, the work equipment or machine may move suddenly causing a serious accident. Before leaving the operator's seat, be sure to apply the work equipment lock (pilot lamp in the switch lights up).**
- **Keep depressing the brake pedal until the parking brake pilot lamp lights up on the monitor even when the parking brake switch is turned to ON.**



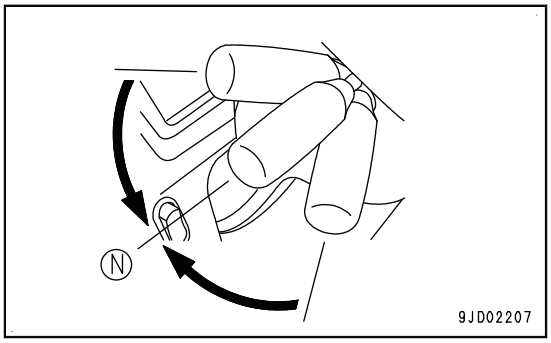
NOTICE
Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.



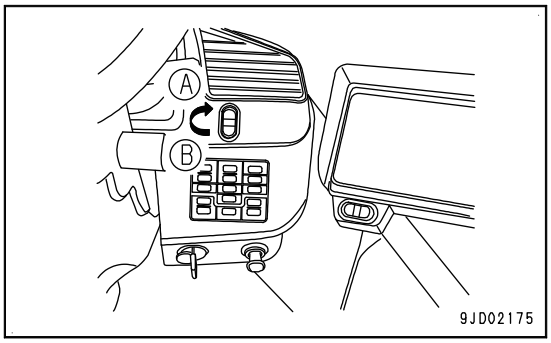
1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



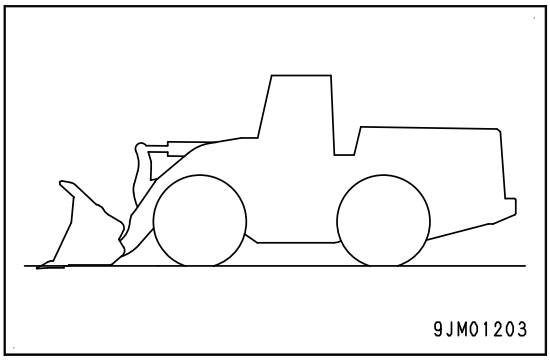
2. Set directional lever (3) to NEUTRAL position (N).



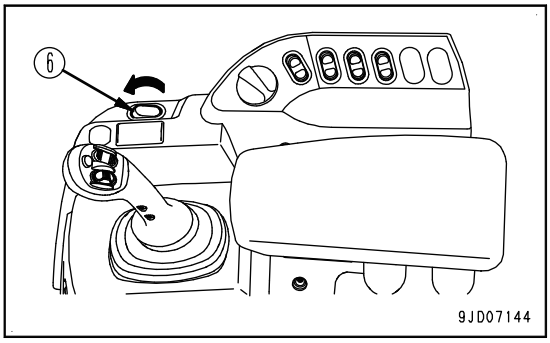
3. Move parking brake switch (4) from OFF position (B) to ON position (A) to apply the parking brake.



4. Operate multi-function mono-lever (5), to lower the bucket to the ground.



5. Make sure that multi-function mono-lever (5) is set to HOLD position. Then, apply the work equipment lock (the pilot lamp lights up) using work equipment lock switch (6).



CHECK AFTER FINISHING WORK *(D65-3330-200-A-00-A)*

BEFORE STOPPING ENGINE *(WA320-3330-200-A-00-A)*

Check the engine coolant temperature, engine oil pressure, HST oil temperature, and fuel level with the machine monitor.
When the engine is overheated, do not stop it suddenly. Run the engine at a medium speed to allow it to cool down gradually, then stop it.

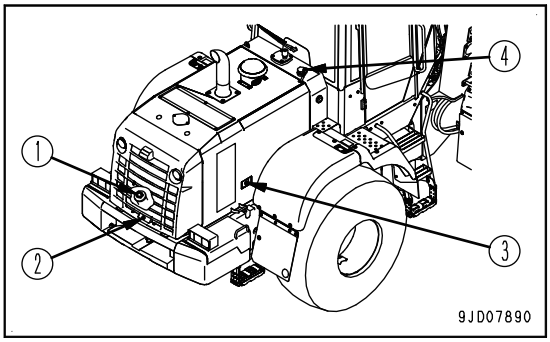
AFTER STOPPING ENGINE *(D65-3330-200-A-02-A)*

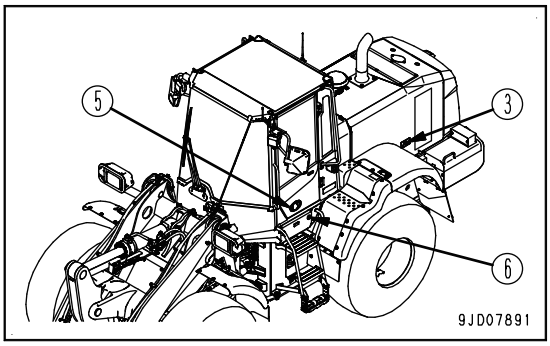
1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, also check for any leakage of oil or coolant. If any problems are found, repair them.
2. Fill the fuel tank.
3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.
4. Remove any mud affixed to the undercarriage.

LOCKING *(WA270-Q8E0-100-K-00-A)*

Always lock the following places.
(1) Fuel tank filler cap
(2) Rear grille
(3) Engine side cover (2 places)
(4) Hydraulic tank oil filler cap
(5) Cab door
(6) Cover of air conditioner fresh air filter.

REMARK
The starting switch key is commonly used for locks (1) to (6) as well.





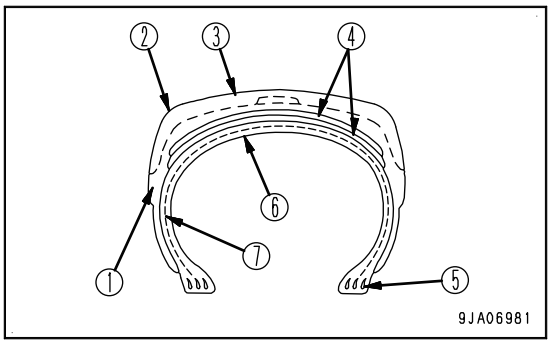
HANDLING TIRES *(WA-DW60-001-K-01-A)*

PRECAUTIONS WHEN HANDLING TIRES *(WA-DW60-04F-K-00-A)*

⚠ CAUTION

A tire that has reached the service limit shown below must be replaced with a new one in order to prevent an accident and secure safety.

- **Service limit for wear**
  - **When the remaining depth of the grooves on construction equipment tires (at a point approximately 1/4 of the tread width) is 15% of the groove depth on a new tire.**
  - **When an abnormal wear such as uneven wear and stepped wear is observed on a tire or when the cord layer of a tire is exposed**
- **Service limit for damage**
  - **When a damage or crack of a tire has reached the cord**
  - **When a damage on or dragging of cord is observed on a tire**
  - **When peeling (separation) is observed on a tire**
  - **When a damage is observed in the bead of a tire**
  - **When air leakage or an unrepairable damage is observed on a tubeless tire**
- **Do not install the tire protector (mesh chain) to rear wheels.**
- **Do not to use tires, such as urethane tires, that weigh remarkably more than the standard tires since the machine can be damaged due to an unexpected load.**
- **If a tire not specified by Komatsu is used, rim displacement may occur between the tire and rim. Operator comfort may be degraded as well.**



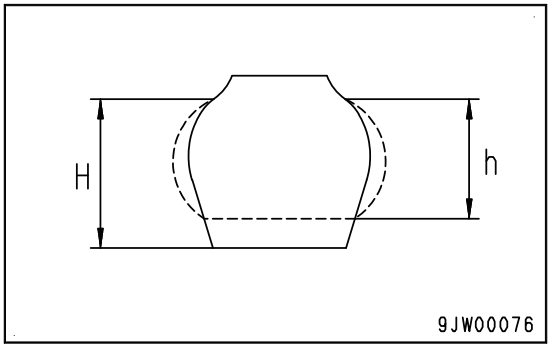
(1) Side wall
(2) Shoulder
(3) Tread
(4) Breaker or belt (cord layer)
(5) Bead
(6) Inner liner
(7) Cord

Contact your Komatsu distributor when replacing the tires. It is dangerous to jack up the machine without taking due care.

TIRE PRESSURE *(WA270-DW60-2A4-K-00-A)*

Check the tire inflation pressure before driving, when the tires are cool.
Excessively low tire inflation pressure induces overload, and excessively high pressure causes tire cut (surface wound) and shock burst. To prevent these problems, adjust the tire inflation pressure referring to the following table.

Deflection ratio = (H - h)/H x 100



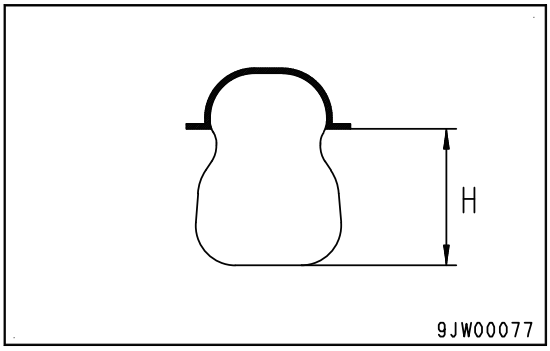
As a guideline that can be checked visibly, the deflection ratio of the front tire (deflection/free height) is as follows. When carrying normal load (boom horizontal): Approximately 15 to 25 % When digging (rear wheels off ground): Approximately 25 to 35 %
In addition to the checking of tire inflation pressure, check for small cuts and peeling on tires, for sticking of nails and metallic pieces that may cause punctures, and for any abnormal wear.
Keep the working road surface constantly clean by removing fallen stones. This will extend the tire life and give improved economy.

- For operations on normal road surfaces, rock digging operations: High end of range in air pressure chart
- Stock pile operations on soft ground: Average pressure in air pressure chart
- Operations on sand (operations not using much digging force): Low end of range in air pressure chart

If the deflection of the tire is excessive, raise the inflation pressure within the limits given in the table to give a appropriate deflection (see deflection ratio).

Tire size (Pattern)	H Free height [mm]	Inflation pressure [kPa {kg/cm^2, PSI}]			
		Ground (sandy ground)	Normal road		When shipped from factory
			Stock pile	Digging	
20.5R25☆ (L3: Rock)	383 (ML)	Front tires: 350 {3.5, 49.8} Rear tires: 350 {3.5, 49.8}	Front tires: 350 {3.5, 49.8} Rear tires: 350 {3.5, 49.8}	Front tires: 350 {3.5, 49.8} Rear tires: 350 {3.5, 49.8}	Front tires: 350 {3.5, 49.8} Rear tires: 350 {3.5, 49.8}
20.5-25-12PR (L2: Traction)	386 (BS)	Front tires: 190 to 330 {1.9 to 3.3, 27.0 to 46.9} Rear tires: 190 to 330 {1.9 to 3.3, 27.0 to 46.9}	Front tires: 190 to 330 {1.9 to 3.3, 27.0 to 46.9} Rear tires: 190 to 330 {1.9 to 3.3, 27.0 to 46.9}	Front tires: 210 to 350 {2.1 to 3.5, 29.9 to 49.8} Rear tires: 210 to 350 {2.1 to 3.5, 29.9 to 49.8}	Front tires: 325 {3.25, 46.2} Rear tires: 280 {2.8, 39.8}

Stock pile operation means scooping gravel into the bucket.



PRECAUTIONS ABOUT LOAD-AND-CARRY OPERATION *(WA-DW60-04F-K-01-A)*

When traveling continuously in load and carry operations, choose the appropriate tires to match the operating conditions, or choose the operating conditions to match the tires. If this is not done, the tires will be damaged, so contact your Komatsu distributor or tire dealer when selecting tires.

TRANSPORTATION *(ALL-0000-810-K-00-A)*

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

TRANSPORTATION PROCEDURE *(WA270-0000-813-K-00-A)*

When transporting the machine, select the transportation method in reference to the weight and dimensions shown in "SPECIFICATIONS (PAGE 5-2) ".
Note that the "machine specifications (weight and dimension)" vary depending on the type of tire and bucket.

LOADING AND UNLOADING WITH TRAILER *(WA380-0000-830-K-00-A)*

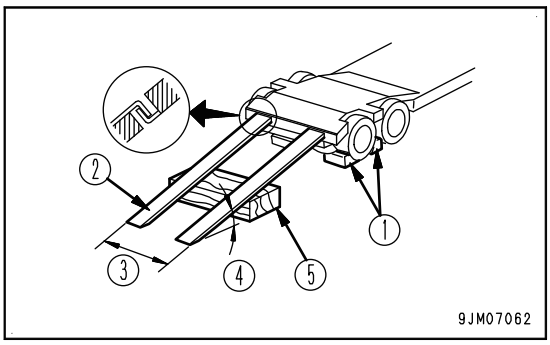
⚠ WARNING

- **When loading or unloading the machine, run the engine at a low speed and operate the machine slowly in low travel speed.**
- **Select firm, level ground when loading or unloading the machine.**
  Maintain a safe distance from the edge of a road.
- **Use ramps with ample width, length, thickness, and strength and install them with a maximum slope of 15 deg.**
  When using piled soil, compact the piled soil fully to prevent the slope face from collapsing.
- **Remove mud from the undercarriage of the machine so that the machine will not slip sideways on the ramps.**
  In addition, remove water, snow, ice, grease, oil, etc. from the ramps.
- **Never correct your steering on the ramps. There is a danger that the machine may tip over.**
  If necessary, drive off the ramps or back on to the bed of the trailer and correct the direction.
- **The center of gravity of the machine shifts suddenly at the joint between the ramps and the trailer, and there is a danger of the machine losing its balance. Accordingly, pass over this point slowly.**

When loading or unloading, always use ramps or a platform. Proceed as follows.

LOADING *(WA380-0000-831-K-00-A)*

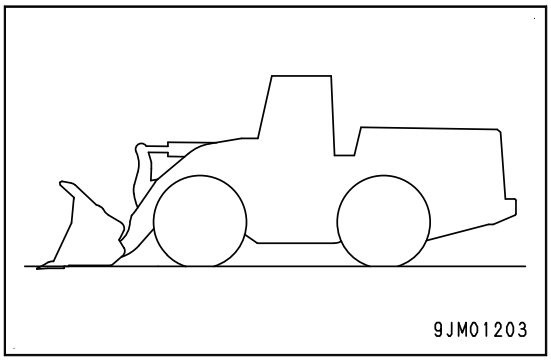
1. Load on firm level found only.
   Maintain a safe distance from the edge of a road.
2. Apply the trailer brakes securely, then put chocks (1) under the tires to prevent the trailer from moving.
   Set distance (3) between ramps (2) to match the distance between the left and right tires, and set angle (4) to less than 15 deg.
   If ramps (2) bend appreciably under the weight of the machine, put wooden block (5) under the ramps to support them.
3. Set the travel direction toward the ramps and drive slowly for loading.
4. Load the machine correctly in the specified position on the trailer.



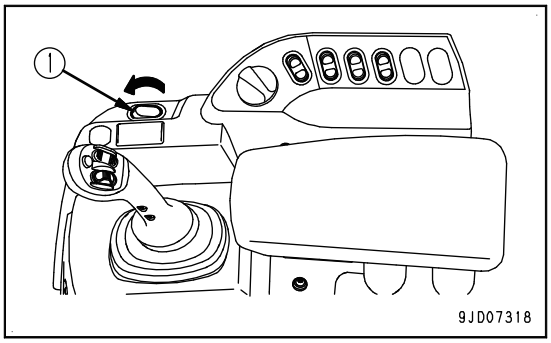
SECURE MACHINE *(WA320-0000-821-K-00-A)*

After loading the machine onto a trailer, secure the machine as follows.

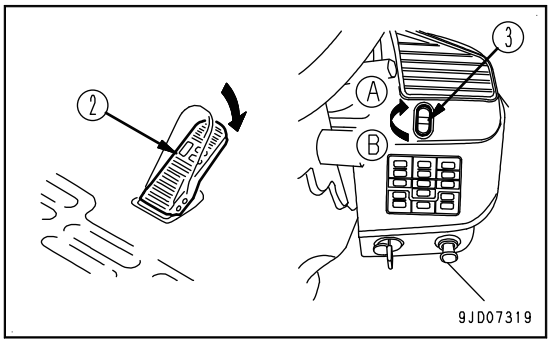
1. Lower the work equipment slowly.



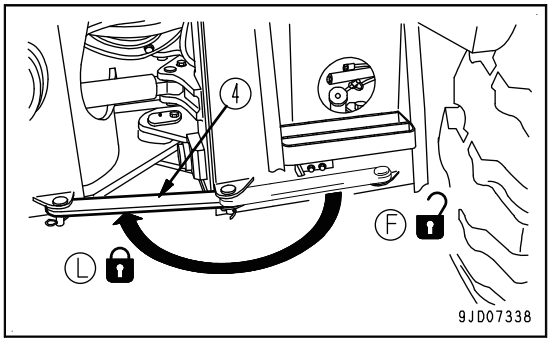
2. Make sure that multi-function mono-lever is set to HOLD position. Then, apply the work equipment lock (the pilot lamp lights up) using work equipment lock switch (1).



3. Move parking brake switch (3) from OFF position (B) to ON position (A) with brake pedal (2) depressed to apply parking brake securely, and then confirm that the machine is stopped completely.
4. Turn the starting switch to the "OFF" position and stop the engine.
   Remove the key from the starting switch.

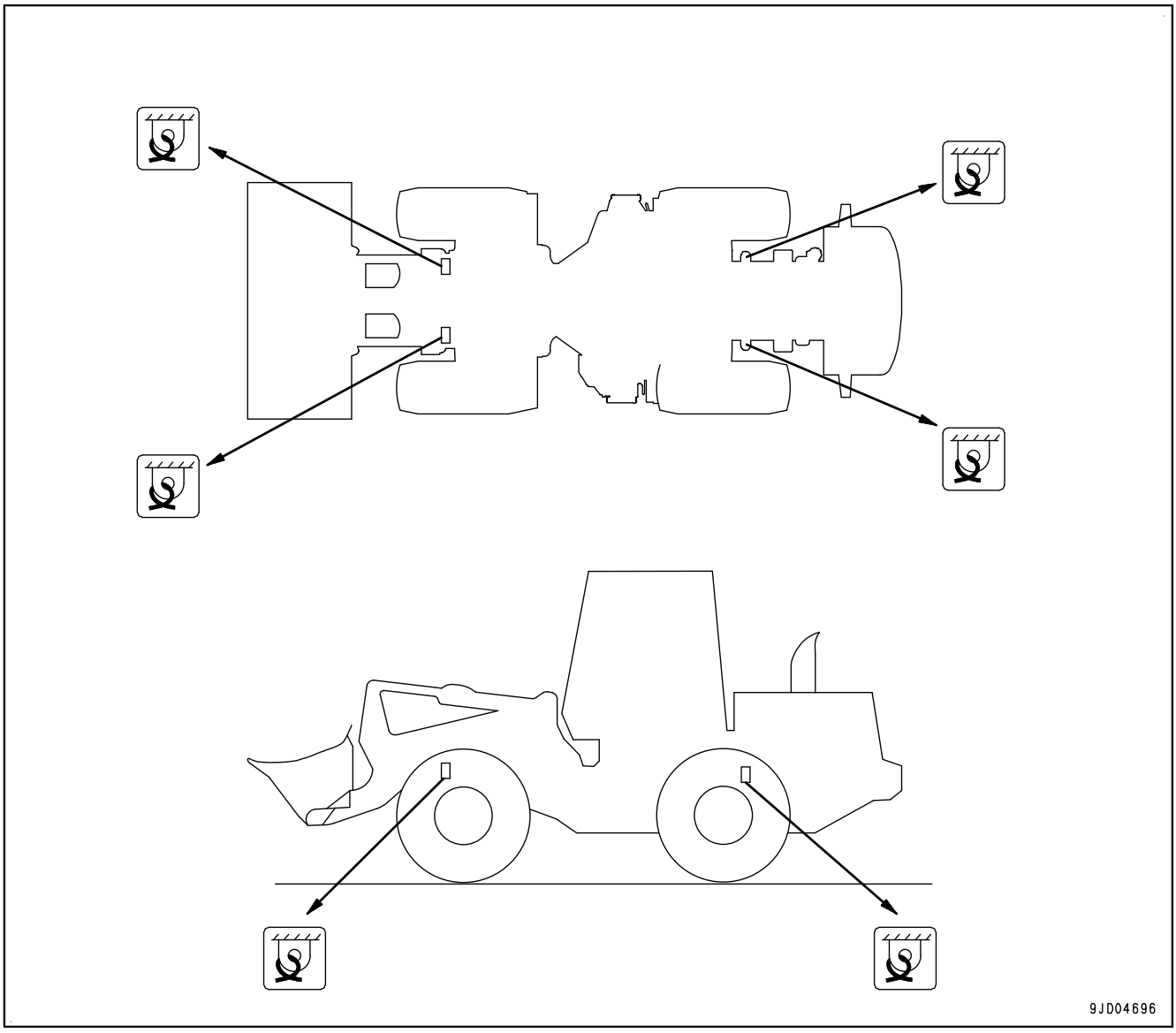


5. Set the frame lock bar to LOCK position (L) to lock the front frame and rear frame.



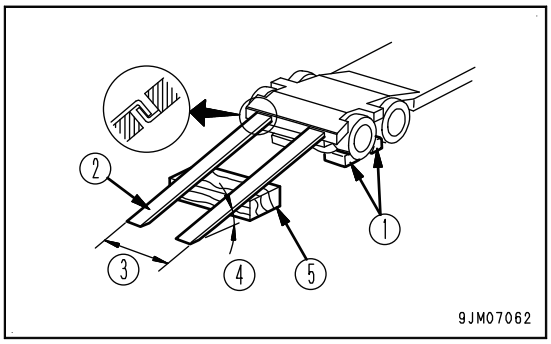
6. Put blocks in front of and behind the wheels, and secure the machine with chains or wire rope of a appropriate strength to prevent the machine from moving during transportation.
   In particular, fix the machine securely to prevent it from slipping sideways.
7. Stow the antenna and such.

Securing position

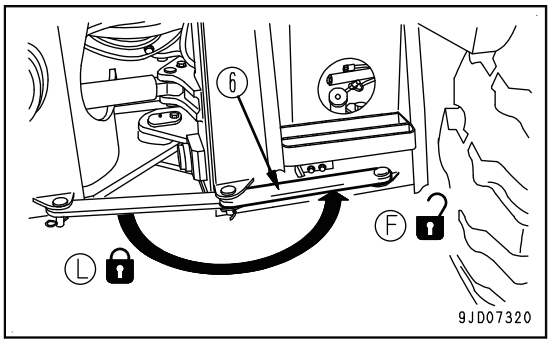


UNLOADING *(WA320-0000-841-K-00-A)*

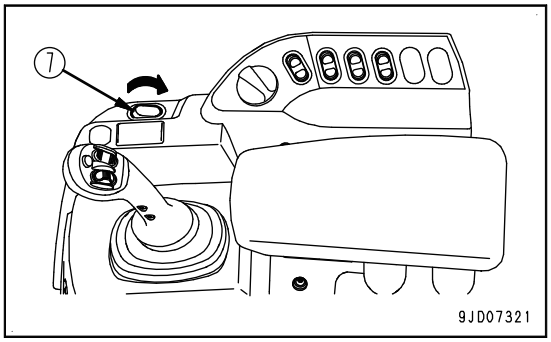
1. Unload on firm level ground only.
   Maintain a safe distance from the edge of a road.
2. Apply the trailer brakes securely, then put chocks (1) under the tires to prevent the trailer from moving.
   Set distance (3) between ramps (2) to match the distance between the left and right tires, and set angle (4) to less than 15 deg.
   If ramps (2) bend appreciably under the weight of the machine, put wooden block (5) under the ramps to support them.



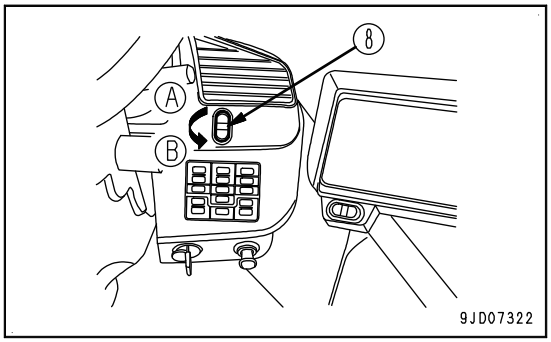
3. Remove the chains and wire ropes fastening the machine.
4. Set the frame lock bar (6) to FREE position (F).



5. Start the engine.
   Warm the engine up fully in cold weather.
6. Be sure that multi-function mono-lever is set to HOLD position. Then, release the work equipment lock (the pilot lamp goes out) by using work equipment lock switch (7).



7. Move parking brake switch (8) from ON position (A) to OFF position (B) to release the parking brake.



8. Set the travel direction toward the ramps and travel slowly for unloading.

LIFTING MACHINE *(WA270-0000-815-K-00-A)*

⚠ WARNING

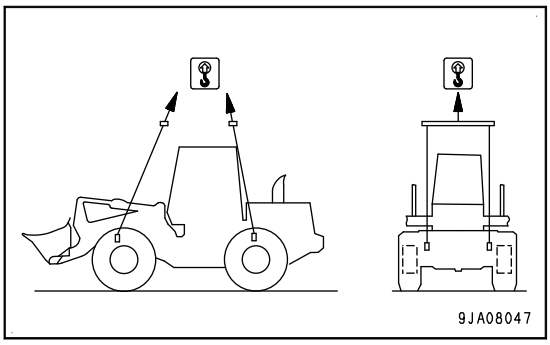
- **The person using the crane to carry out lifting operations must be a qualified crane operator.**
- **Never carry out lifting operations if any person is on the machine being lifted.**
- **Always use a wire rope that has ample strength for the weight of the machine being lifted.**
- **Keep the machine horizontal when lifting it.**
- **When carrying out lifting operations, do as follows to prevent the machine from moving unexpectedly.**
  Set the parking brake switch to ON position.
  Apply the work equipment lock (pilot lamp in the switch lights up).
  Set the frame lock bar to LOCK position.
- **Never enter the area under or around a raised machine.**
- **There is a danger of the machine losing its balance.**
  Use the procedure below to set the machine in the proper posture and use the lifting equipment when lifting the machine.

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, contact your Komatsu distributor.

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

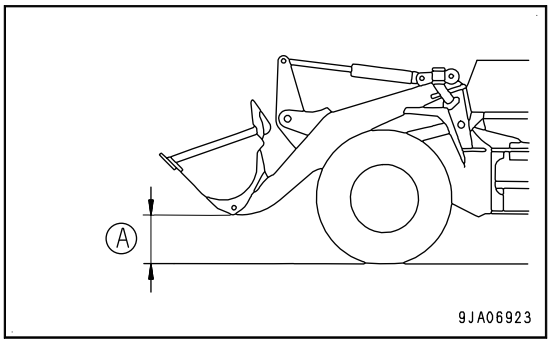
PROCEDURE FOR LIFTING MACHINE *(WA320-0000-816-K-00-A)*

Lifting position

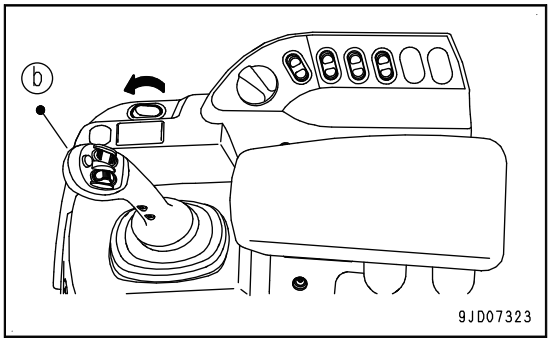


Lifting work can be carried out only for machines with lifting marks.
Before starting the lifting work, place the machine on a level ground and carry out the following.

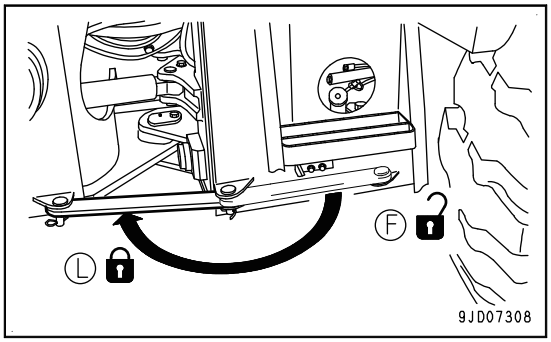
1. Start the engine, set the machine horizontal and set the work equipment to the travel posture (see "MOVE MACHINE (PAGE 3-174)").
   (A): 40 to 50 cm (15.8 to 19.7 in)



2. After making sure that the multi-function mono-lever is in HOLD position, apply the work equipment lock (pilot lamp in the switch lights up).



3. Stop the engine, check safety around the operator's compartment, set the frame lock bar to LOCK position (L) to prevent the front frame and rear frame from articulating.



4. Use the lifting tools such as the wire rope and sling suitable for the weight of the machine as shown in the figure of the lifting position. Extend the wire rope and fix the machine.

NOTICE

- **Use protectors, etc. to prevent the wire rope from being cut on sharp corners, and to prevent the wire rope from cutting into the machine bodywork.**
- **Width of the threader and bar must be sufficient for preventing the lifting equipment and wire rope from contacting the machine.**
- **For machines equipped with a rear full fender, remove the rear full fender before carrying out the operation.**

5. Immediately before lifting up the machine, set the slings and float the machine 100 to 200 mm (3.9 to 7.9 in) above the ground with the sling, and check that the wire ropes are not slack and the machine is level, then lift up slowly.

COLD WEATHER OPERATION *(ALL-0000-265-K-00-A)*

COLD WEATHER OPERATION INFORMATION *(ALL-0000-265-K-01-A)*

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

FUEL AND LUBRICANTS *(WA-RA19-265-K-00-A)*

Change fuel and oil with ones of low viscosity for all components.
For the details of specified viscosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 7-4) ".

COOLANT *(WA270-B210-265-K-00-A)*

⚠ WARNING

- **Coolant is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large amounts of fresh water and see a doctor immediately.**
- **When handling the coolant water containing Coolant that has been drained during changing the coolant or repair of radiator, contact your Komatsu distributor or request a qualified company to carry out the operation. Coolant is toxic, so never pour it into drainage ditches or drain it onto the ground surface.**

NOTICE
Komatsu recommends using genuine Non-Amine Engine Coolant (AF-NAC) for the coolant.

The Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, so it is not flammable.
For details of the density of the Non-Amine Engine Coolant (AF-NAC) and the interval for changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-19) ".

BATTERY *(ALL-AW10-265-K-00-A)*

⚠ WARNING

- **The battery generates flammable gas. Do not bring open flame near the battery.**
- **Battery electrolyte is dangerous object. 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 charging rate is low, the battery electrolyte may freeze. Maintain the battery charging rate 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 gravity of the electrolyte and calculate the charging rate from the following conversion table.

Electrolyte Temperature Charging Rate (%)	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

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

AFTER DAILY WORK COMPLETION *(WA-0000-15A-K-00-A)*

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 a firm, 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.

IN COLD AREAS *(WA320-0000-182-K-00-A)*

If engine is running at idle for a long time or machine is traveling at 3rd or 4th speed in cold weather, inside of KCCV and KCCV drain pipes may freeze and be plugged.
To avoid such long idling of the engine, stop the engine or, if it is necessary to run the engine at idle, apply a load from time to time.
Also, automatic fan reverse is useful to keep engine room warm and prevent inside of KCCV and KCCV drain pipes from the freeze. Set automatic fan reverse mode to "mode C" according to "AUTOMATIC FAN REVERSE MODE (PAGE 3-55) ".

AFTER COLD WEATHER SEASON *(WA270-0000-266-K-00-A)*

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

- Replace the fuel and oil for all equipments with the ones of the viscosity specified. For details, see "LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE AND RECOMMENDED GENUINE LUBRICANTS (PAGE 7-6) ".

LONG-TERM STORAGE *(ALL-0000-870-K-00-A)*

BEFORE STORAGE *(WA270-0000-870-K-00-A)*

When keeping in long-term storage (more than one month), store as follows.

- Clean and wash all parts and store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with a sheet.
- Completely fill the fuel tank. This prevents moisture from collecting.
- Lubricate and change the oil before storage.
- Coat the exposed portion of the hydraulic cylinder piston rod with grease.
- Turn the starting switch to OFF position, and then turn the battery disconnect switch key to OFF position and pull it out.
  For the operation of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (PAGE 3-101) ".
- Apply the work equipment lock (pilot lamp in the switch lights up).
- To prevent rust, fill the cooling circuit with Non-Amine Engine Coolant (AF-NAC) to give a density of at least 30% for the engine coolant.

DURING STORAGE *(ALL-0000-870-K-02-A)*

⚠ 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 2 a year.

AFTER STORAGE *(WA-0000-870-K-02-A)*

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.
- Check for rust on engine pulley and abnormality on belt.
  If the surface of pulley where contacting with the belt is covered with too much rust, remove them with wire brush.

STARTING MACHINE AFTER LONG-TERM STORAGE *(WA270-0000-870-K-01-A)*

- Insert the battery disconnect switch key and turn it to ON position.
  For the operation method, see "BATTERY DISCONNECT SWITCH (PAGE 3-101) ".
- If the machine is stored for a long period with the battery disconnect switch OFF or the battery terminal disconnected, the clock information may be lost. In this case, set the information again. For detail, see "CLOCK ADJUSTMENT (PAGE 3-68) ".

TROUBLES AND ACTIONS *(ALL-0000-001-K-14-A)*

RUNNING OUT OF FUEL *(WA270-0000-14G-K-00-A)*

⚠ WARNING

When starting the engine again, check safety around the engine thoroughly, and then crank the engine.

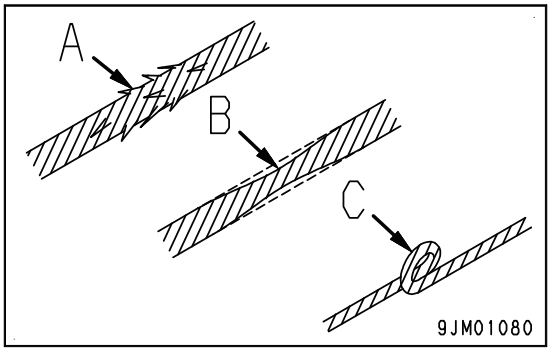
When starting the engine again after running out of fuel, fill with fuel, and bleed the air from the fuel system before starting the engine.
For the air bleeding procedure, see "REPLACE FUEL MAIN FILTER CARTRIDGE (PAGE 4-60) ".

TOWING MACHINE *(WA270-0000-146-K-00-A)*

⚠ WARNING

Any mistake in the selection of the wire rope or towing bar or in the method of towing, may lead to serious personal injury or death.

- **Always check that the wire rope used for towing has ample strength for the weight of the machine being towed.**
- **Never use the wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is a danger that the rope may break during the towing operation.**
- **Always wear leather gloves when handling the 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.**
- **If there is a failure in the brake system, the brakes will not work, so be extremely careful when towing.**

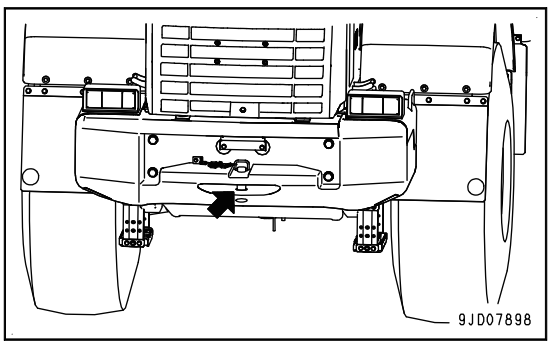


NOTICE

- **Tow the machine only for a short distances, such as to a place for inspection and maintenance. Do not tow the machine for long distances.**
- **For details of the allowable towing capacity for this machine, see "SPECIFICATIONS (PAGE 5-2) ".**
- **For details of the procedure for towing a disabled machine, consult your Komatsu distributor.**

This machine must not be towed except in emergencies. However, if it is avoidable to tow the machine, take the following precautions.

- When releasing the brake, secure the machine with chocks. If the wheels are not chocked, the machine may move suddenly.
- When towing a machine, tow it at a low speed of less than 2 km/h (1.2 MPH), and for a distance of a few meters to a place where repairs can be carried out. This method is applied only in emergencies. If the machine must be moved long distances, use a transporter.
- If it is impossible to operate the steering and brakes of the machine being towed, do not let anyone ride on the machine.
- Keep the angle of the towing rope as small as possible. Keep the angle between the center lines of the 2 machines to within 30 deg.
- Usually, use a towing machine of the same class as the machine being towed. Check that the towing machine and towed machine both have ample braking power, and rim pull to allow them to control both machines on slopes or on the tow road.
- When towing a machine downhill, it may be necessary to connect another machine to the rear of the towed machine in order to provide ample rim pull and breaking power. The controllability of the machines can be secured by this method.
- Towing may be carried out under various differing conditions, so it is impossible to determine beforehand the requirements for towing. Towing on flat level roads will require the minimum rim pull, while towing on slopes or on uneven road surfaces will require the maximum rim pull.
- Connect a wire rope to the part indicated with the arrow in the drawing at right.



WHEN ENGINE IS OPERABLE *(WA320-0000-146-K-04-A)*

- If the power train and steering operation can be operated and the engine is running, it is possible to tow the machine out of mud or to move it for a short distance to the edge of the road.
- The operator should sit on the machine being towed and operate the steering in the direction that the machine is towed.

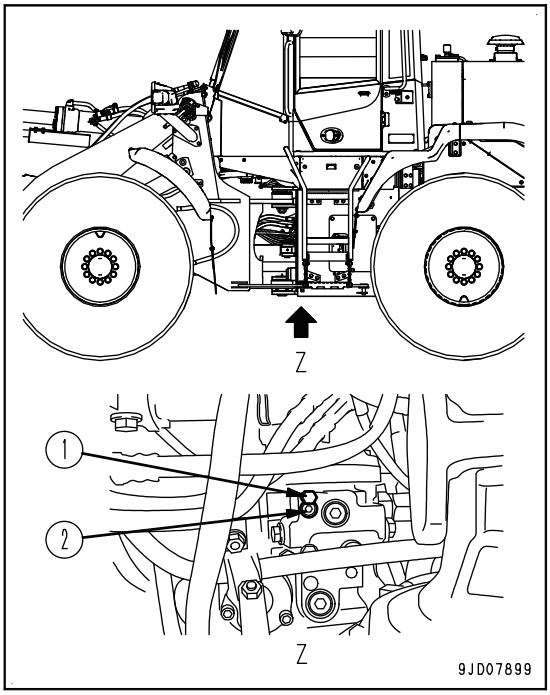
WHEN ENGINE IS NOT OPERABLE *(WA320-0000-146-K-02-A)*

When towing the machine with the engine stopped, observe the following procedures.

1. The transfer oil does not lubricate the system, so remove the front and rear drive shafts. If necessary, chock the wheels to prevent the machine from moving.
2. The steering cannot be operated, so remove the steering cylinder.
   Even if the brakes are in good condition, the brakes can only be used a limited number of times.
   There is no change in the operating force for the brake pedal, but the braking force is reduced each time the pedal is depressed.
3. Connect the towing equipment securely. When carrying out towing operations, use 2 machines of at least the same class as the machine being towed. Connect one machine each to the front and rear of the machine being towed, then remove the chocks from the wheels and tow the machine.

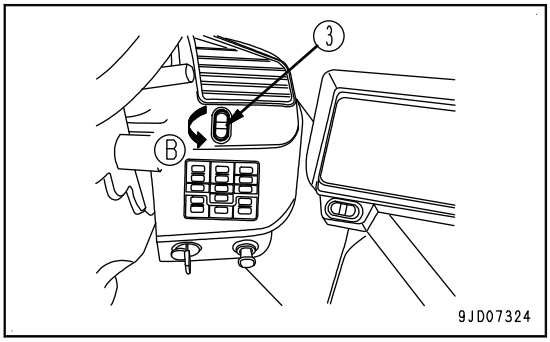
WHEN IT IS IMPOSSIBLE TO TRAVEL WHILE ENGINE IS RUNNING *(WA270-0000-146-K-01-A)*

1. Loosen plug (1) under the HST pump until it contacts stopper (2).
   By doing so, HST pump circuit is bypassed and travel is enabled.



2. Set parking brake switch (3) to OFF position (B) to release the parking brake.

REMARK
If the parking brake is not released, refer "RELEASING PARKING BRAKE (PAGE 3-226) " and release the parking brake.

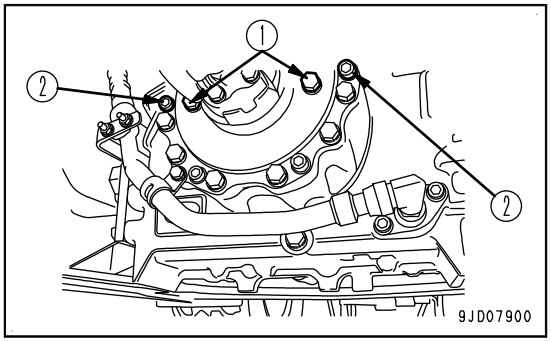


RELEASING PARKING BRAKE *(WA270-GJ00-100-K-00-A)*

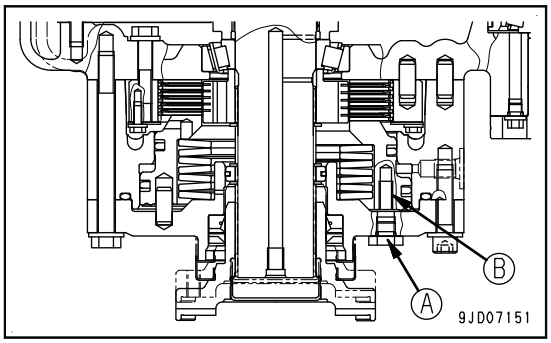
⚠ WARNING

- **When releasing the parking brake, stop the machine on a level ground and check that the surrounding area is safe. If it is necessary to release the brake on a slope in an emergency, chock the wheels before starting the work.**
- **If the parking brake is released, the brake cannot be used, so check the safety carefully when moving the machine.**

1. Remove plugs (1) from the rear of transfer case.
2. Remove bolts (2), insert them to the holes after plugs (1) are removed, and screw it in until its move is uniformly stopped.
3. The parking brake is released.



(A): Plug mounting hole (M14 O-ring boss)
(B): Releasing screw hole (M10)



EMERGENCY TRAVEL OPERATION *(WA320-C150-012-K-00-A)*

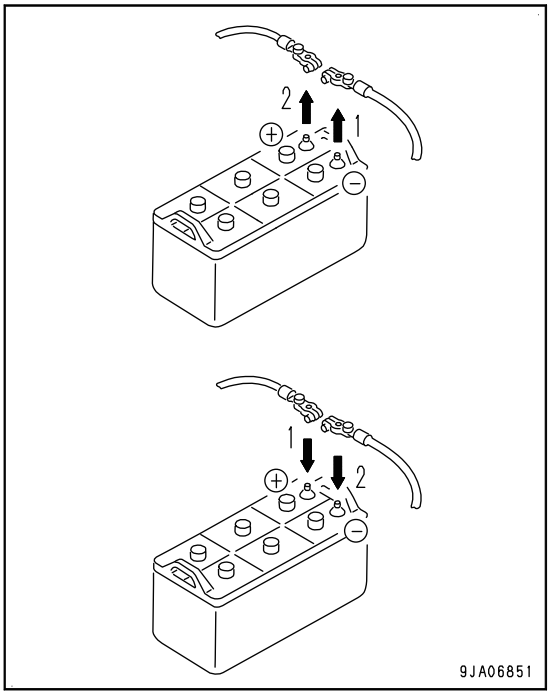
The normal speed range selecting operation is performed by electric signals. If there should be a failure in the electrical system, and the machine does not move, ask your Komatsu distributor to have the machine moved.
When the machine has a trouble, it may be able to travel temporarily by operating the emergency HST pump drive switch. If it is necessary to move the machine to the safe place urgently, move the machine with the emergency HST pump drive switch
For detail, see "EMERGENCY HST PUMP DRIVE SWITCH (PAGE 3-84) ".

NOTICE
If there should be a failure in the electrical system, and the machine does not move, ask your Komatsu distributor to have the machine moved.

DISCHARGED BATTERY *(WA380-AW10-2A1-K-00-A)*

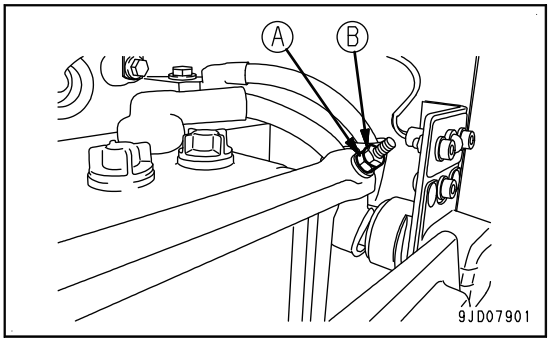
⚠ WARNING

- **It is dangerous to charge a battery when installed on a machine. Make sure that it is removed before charging.**
- **When checking or handling the battery, stop the engine and turn the starting switch and battery disconnect switch keys to OFF positions.**
- **The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring any open flame such as 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 them immediately with fresh water, then consult a doctor for treatment.
- **When handling batteries, always wear protective eyeglasses and rubber gloves.**
- **When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, first connect the cable to the positive (+) terminal.**
  If a tool touches the positive terminal and the chassis, there is a 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.**
  Install the cable terminals securely.
- **When removing or installing the cable terminals, check which is the positive (+) terminal and which is the negative (-) terminal.**



REMOVE AND INSTALL BATTERY *(WA270-AW10-924-K-00-A)*

1. Before removing battery, remove the ground cable (normally connected to the negative (-) terminal).
   If any tool touches the positive terminal of the battery and the chassis, there is a danger that it will cause a spark.
   Loosen the nuts of the terminal and remove the wires from the battery.
2. After installing the battery, fix it with the battery hold down.
   Tightening torque:
   (A) 1.77 to 2.16 Nm {0.18 to 0.22 kgm, 1.3 to 1.59 lbft}
   (B) 17.7 to 27.5 Nm {1.8 to 2.8 kgm, 13 to 20.3 lbft}
3. When installing the battery, connect the ground cable last.
   Insert the hole of the terminal on the battery and tighten the nut.
   Tightening torque: 5.9 to 9.8 Nm {0.6 to 1.0 kgm, 4.3 to 7.2 lbft}



REMARK

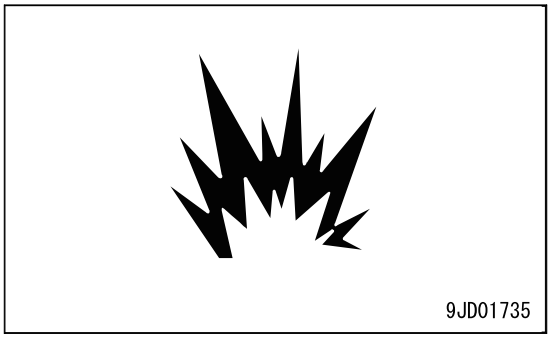
The batteries are on both sides at the rear of the machine. The ground wire side battery is on the right side of the machine.

BATTERY CHARGE *(WA380-AW10-2A3-K-00-A)*

⚠ WARNING

When charging the battery, if the battery is not handled correctly, there is a danger that the battery may explode. Always follow the instructions in "DISCHARGED BATTERY (PAGE 3-227) " and the instruction manual accompanying the charger, and do as follows.

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



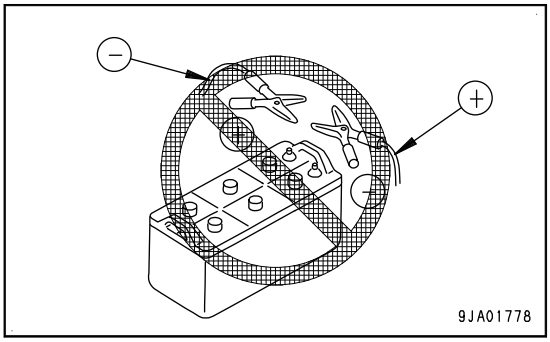
START ENGINE WITH BOOSTER CABLES *(ALL-AW10-14B-K-00-A)*

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

CONNECT AND DISCONNECT BOOSTER CABLES *(WA270-AW10-14B-K-00-A)*

⚠ WARNING

- **When connecting the cables, never contact the positive (+) and negative (-) terminals.**
- **When starting the engine with a booster cable, wear protective eyeglasses and rubber gloves.**
- **Be careful not to let the normal machine and problem machine contact each other.**
  The sparks caused near the battery could ignite the hydrogen gas generated from the battery, so be careful.
- **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.**
- **Never start the engine by short-circuiting the starting motor (jump start).**



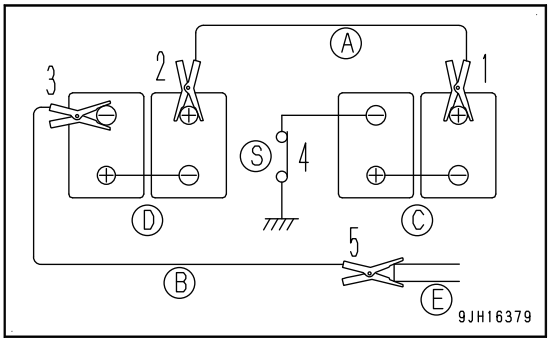
NOTICE

- **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 failed machine.**
- **Check the cables and clips for damage or corrosion.**
- **Make sure that the cables and clips are firmly connected.**
- **Check that the work equipment locks of both machine are applied (pilot lamp in the switch lights up) and the parking brake switches are in LOCK position.**
- **Check that each lever is in NEUTRAL position.**
- **To prevent damage of the electric devices of the failed machine, turn the starting switch of the failed machine to OFF position, and then turn the battery disconnect switch key to OFF position and pull it out before connecting the booster cable.**
  For the connection of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (PAGE 3-101) ".

CONNECT BOOSTER CABLES *(WA-AW10-14B-K-01-A)*

Set the starting switch and the battery disconnect switch of the failed machine, and the starting switch of the normal machine to OFF positions, and connect the booster cables as follows in the order of the numbers marked in the figure:

1. Connect the clip of booster cable (A) to the positive (+) terminal of battery (C) on the failed 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. Turn the battery disconnect switch (S) of the failed machine to ON position.
5. Connect the clip at the other end of booster cable (B) to engine block (E) of the failed machine.



STARTING ENGINE *(WA-AW10-14B-K-02-A)*

⚠ WARNING

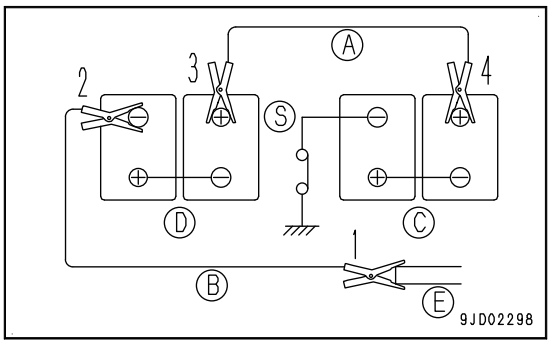
Check that the work equipment lock of both the normal and failed machines are applied (pilot lamp in the switch lights up). Check also that all the control levers are in NEUTRAL position.

1. Make sure the clips are firmly connected to the battery terminals.
2. Start the engine of the normal machine and run it at High idle (MAX).
3. Turn the starting switch of the failed machine to START position to start the engine.
   If the engine does not start, try it again after 2 minutes or so.

DISCONNECT BOOSTER CABLES *(WA-AW10-14B-K-03-A)*

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 failed 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 failed machine.



OTHER TROUBLE *(ALL-5110-001-A-00-A)*

ELECTRICAL SYSTEM *(WA380-AK50-400-K-00-A)*

- As for the remedies indicated with (*) in the remedy column, always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed	Defective wiring	Check and repair of loosening terminal and breakage of wire harness (*)
	Defective adjustment of belt tension	Check alternator belt tension See Every 1000 hours maintenance
Lamp flickers while engine is running	Defective wiring	Check and repair of loosening terminal and breakage of wire harness (*)
	Defective adjustment of belt tension	Check alternator belt tension See Every 1000 hours maintenance
Unusual noise is generated from alternator	Defective alternator	Replace (*)
Starting motor does not rotate even when starting switch is turned ON	Defective wiring	Check, repair (*)
	Defective starting motor	Replace (*)
	Battery disconnect switch is turned OFF	Turn it to ON position
	Engine shutdown secondary switch is at "Engine stop" position	Set it to "NORMAL" position
	Insufficient battery charge	Charge
Pinion of starting motor repeats engaging and going out	Insufficient battery charge	Charge
	Defective starting motor	Replace (*)
Starting motor turns engine sluggishly	Insufficient battery charge	Charge
	Defective starting motor	Replace (*)
Starting motor disengages before engine starts	Defective wiring Defective of ring gear and pinion	Check, repair (*)
	Insufficient battery charge	Charge
Preheating pilot lamp does not light up	Defective wiring	Check, repair (*)
	Defective heater relay, heater controller and temperature sensor	Replace (*)
	Defective monitor	Replace (*)
Engine does not start ("L04" is indicated on the monitor)	Data in the controller is damaged	Check, repair (*)
	Other system troubles	Check, repair (*)

CHASSIS *(WA320-RA15-400-K-00-A)*

- As for the remedies indicated with (*), always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
HST		
Engine runs but machine does not operate	Parking brake is applied	Release parking brake
	Directional lever is not completely shifted	Shift lever completely
	No electricity is flowing to directional lever	Check fuse and wiring harness connector
	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
Even after the full throttle is set, machine moves slowly and lacks power	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
	Hydraulic oil temperature is low	Carry out warming-up operation
Oil overheats	Too much oil or too little oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
	Clogged oil cooler core	Clean oil cooler core
Noises generated	Lack of oil in transfer case	Add oil to specified level See When required
Axle		
Noises generated	Lack of oil	Add oil to specified level See When required
	Improper oil used (for machines with anti-slip differential)	Change to specified oil
Brake		
Even when pedal is depressed, brake is not applied	Disc has reached the wear limit	Replace disc (*)
	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
	Air in brake system	Bleed air (*)
Brake drags or remains applied	Vent hole of brake valve is clogged	Clean
	Defective adjustment of brake pedal linkage	Check, repair (*)
Brake squeals	Disc is worn	Replace disc (*)
	Large amount of water in axle oil	Change axle oil
	Deteriorated axle oil due to overuse of brake	Change axle oil

Problem	Main causes	Remedy
Steering		
Steering wheel is heavy	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
Steering wheel jolts	Play in steering cylinder pin	Grease bearing Replace pin and bushing (*)
	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
Parking brake		
Braking effect is poor	Disc is worn.	Replace disc (*)
Brake drags or remains applied	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
	Hydraulic tank filter is clogged	Replace filter See Every 2000 hours maintenance
Hydraulic system		
Lack of bucket raising power	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
It takes time to raise the bucket	Hydraulic tank filter is clogged	Replace filter See Every 2000 hours maintenance
Excessive bubbles in oil	Low quality oil	Replace with good quality oil
	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance
	Air in oil system	Bleed air See Every 2000 hours maintenance
Oil pressure is insufficient	Lack of oil in hydraulic tank causes pump to suck in air	Add oil referring to Every 100 hours maintenance and then bleed air referring to Every 2000 hours maintenance
Movement of the cylinder is irregular	Lack of oil in hydraulic tank	Add oil to specified level See Every 100 hours maintenance

ENGINE *(WA380-A000-400-K-00-A)*

- As for the remedies indicated with (*) in the remedy column, always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

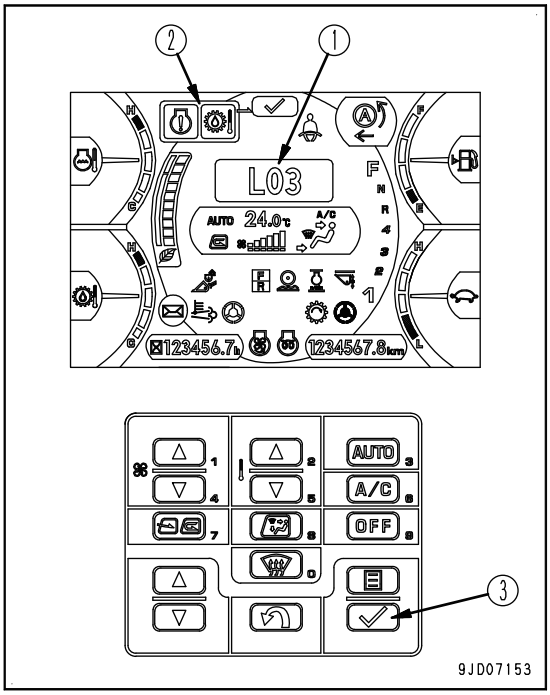
Problem	Main causes	Remedy
Engine oil pressure caution lamp lights up	Engine oil pan oil level is low (sucking in air)	Add oil to specified level See Check before starting
	Improper oil is used (viscosity is improper)	Replace oil See section of How to use lubricants according to ambient temperature and Komatsu genuine oil
	Clogged oil filter cartridge	Replace cartridge See Every 500 hours maintenance
	Oil leakage due to defective tightening of or damage on the oil pipe and pipe joint	Check, repair (*)
	Defective engine oil pressure sensor	Replace sensor (*)
	Defective monitor	Replace (*)
Steam spurts out from top of radiator (pressure valve)	Coolant level low, leakage of coolant	Check, add coolant or repair See when required
	Defective fan pump or motor	Check, repair (*)
Indicator of engine coolant temperature gauge is in red range	Accumulation of dirt or scale in cooling system	Change coolant, flush inside of cooling system See When required
Engine coolant temperature caution lamp lights up	Clogged radiator fins or damaged fin	Clean or repair it See Maintenance when required
	Defective thermostat	Replace thermostat (*)
	Defective sealing of thermostat	Replace thermostat seal (*)
	Loosened radiator filler cap (in high altitude operation)	Tighten cap or replace packing
	Defective coolant temperature gauge	Replace coolant temperature gauge (*)
	Defective coolant level sensor	Replace sensor
	Defective monitor	Replace (*)
Indicator of engine coolant temperature gauge does not rise up to the green range	Defective thermostat	Replace thermostat (*)
	Defective coolant temperature gauge	Replace coolant temperature gauge (*)
	Defective monitor	Replace (*)
Starting motor turns but engine does not start	Lack of fuel	Add fuel See Check before starting
	Air in fuel system	Repair place where air is sucked in
	Fuel filter is not filled with fuel	Fill filter with fuel See Every 500 hours maintenance
	Defective fuel injection pump or injector	Replace pump or injector (*)
	Starting motor turns engine sluggishly	See Electrical system
	Starting motor does not turn	See Electrical system
	Preheating pilot lamp does not light up	See Electrical system
	Defective valve clearance (defective compression)	Adjust valve clearance (*)
Exhaust gas is white or bluish	Water entry in KDPF	Check, repair (*)
	Broken KDPF	Replace KDPF (*)
	Excessive oil in oil pan	Add fuel See Check before starting
	Improper fuel	Change to specified fuel

Problem	Main causes	Remedy
Exhaust gas sometimes becomes black	Broken KDPF	Replace KDPF (*)
	Clogged air cleaner element	Clean or replace. See When required
	Defective injector	Replace injector (*)
	Defective compression	See the above section on defective compression (*)
	Defective turbocharger	Check, replace turbocharger (*)
Combustion sometimes makes breathing sound	Defective nozzle	Replace nozzle (*)
Unusual sound is generated (combustion or mechanical)	Low grade fuel being used	Replace with specified fuel
	Overheating	See the above section on "Indicator of engine coolant temperature gauge is in red range"
	KDPF broken internally	Replace KDPF (*)
	Excessive valve clearance	Adjust clearance (*)

ELECTRONIC CONTROL SYSTEM *(WA320-Q180-400-K-00-A)*

If action level (1) or caution lamp (2) appears on the machine monitor, press switch (3) to display the occurred error list and check the details and remedy.
For the contents of the action level and caution lamp, see "IF TROUBLE OCCURS WHILE OPERATING MACHINE (PAGE 3-11) ".

- When the machine has not run out of fuel, if "CA2249" or "CA559" appears on the occurred error list screen, replace both fuel main filter element and fuel prefilter element immediately.
  If "CA2249" or "CA559" does not disappear even after the replacement, ask your Komatsu distributor for an inspection immediately, even though the machine can perform normal operation.

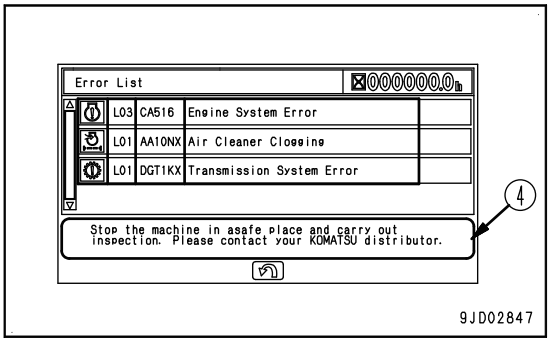


TELEPHONE NUMBER FOR THE POINT OF CONTACT IF AN ERROR Ooccurs:

When an error screen is displayed on the monitor, press the switch (3) to display the current error list screen and telephone number (4) for the point of contact is displayed in the message column at the bottom of the screen.

REMARK

If no point of contact telephone number has been registered, no telephone number is displayed.
When it is necessary to register the telephone number, ask your Komatsu distributor to carry out the registration.



MAINTENANCE

⚠ WARNING

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

RULES FOR MAINTENANCE *(ALL-0000-2A4-K-00-A)*

Do not perform any inspection and maintenance operation that are not found in this manual.

SERVICE METER READING *(ALL-Q1M0-280-K-00-A)*

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 *(ALL-0000-203-K-00-A)*

Komatsu recommends using Komatsu genuine parts specified in the Parts Book as replacement parts.

KOMATSU GENUINE LUBRICANTS *(ALL-0000-201-K-00-A)*

For lubrication of the machine, Komatsu recommends using the Komatsu genuine lubricants. Moreover use oil of the specified viscosity according to the ambient temperature.

ALWAYS USE CLEAN WASHER FLUID *(ALL-K7B3-200-K-00-A)*

Use automobile window washer fluid, and be careful not to let any dirt get into it.

FRESH AND CLEAN LUBRICANTS *(ALL-RA1A-2A4-K-00-A)*

Use clean oil and grease. Also, keep the containers of the oil and grease clean. Keep foreign materials away from oil and grease.

CHECK DRAINED OIL AND USED FILTER *(ALL-C940-2A4-P-01-A)*

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.

CAUTION FOR REFILLING OIL OR FUEL *(WA500-0000-21E-K-00-A)*

- Do not remove the strainer from the filler port when adding oil or fuel.
- When refilling oil or fuel, be careful not to spill it. If any oil or fuel should spill, wipe it up.
- Do not bring any lighted cigarette or open flame close to the oil or fuel.

WELDING INSTRUCTIONS *(PC-0000-628-K-00-A)*

- When conducting weld repair, turn the starting switch to OFF position and, after confirming that the system operating lamp is turned off, set the battery disconnect switch key to OFF position and pull it out.
- 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 grounding cable is connected near instruments, connectors, etc., the instruments may malfunction.
- Prevent seals, bearings or bushings from entering the space between the weld zone and grounding point. Seals and the like can cause damage to the nearby parts by catching fire from sparks.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point. Sparks generated there can damage the plated portion.

DO NOT DROP THINGS INSIDE MACHINE *(ALL-0000-20G-K-00-A)*

- When opening the 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.

PRECAUTIONS FOR KDPF *(D65-A9H0-2AH-K-01-A)*

When performing inspection and maintenance during or just after regeneration, take care of the high temperature parts.
Even after the engine stops the parts around KDPF may be at high temperature.

DUSTY JOBSITES *(ALL-0000-20H-K-00-A)*

When working at dusty jobsites, 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 OIL *(ALL-C940-2A4-P-02-A)*

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

LOCKING INSPECTION COVERS *(WA320-M190-2AH-P-00-A)*

Lock inspection cover securely into position with the lock bar etc. If inspection or maintenance is performed with inspection cover not locked in position, there is a danger that it may be suddenly shut by the wind and cause injury to the worker.
When closing the inspection cover, check that it is not locked with the lock bar.
If it is locked and a strong force is brought to bear on it, there is danger that it may become deformed.

BLEED AIR FROM HYDRAULIC CIRCUIT *(WA270-C000-231-P-00-A)*

When hydraulic equipment is repaired or replaced, or the hydraulic piping is disconnected, the air must be bled from the circuit. When bleeding air, see "CHANGE OIL IN HYDRAULIC TANK, AND CLEAN HYDRAULIC TANK STRAINER (PAGE 4-66)".

PRECAUTIONS WHEN INSTALLING HYDRAULIC HOSES *(ALL-CE00-72B-P-00-A)*

- When removing parts at locations where there are O-rings or gasket seals, clean the mounting surface, and replace them with new parts.
  When doing this, be careful not to forget to assemble the O-rings and gaskets.
- When installing the hoses, do not twist them or bend them sharply.
  If they are installed so, their service life will be shortened extremely and they may be damaged.

CHECKS AFTER INSPECTION AND MAINTENANCE *(WA270-0000-20J-K-00-A)*

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 observe 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 the engine is running
  - For details of the checks when the engine running, see "TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-38)" and pay attention to safety.
  - Do not run the engine for long hours with the engine hood open. The engine hood may be damaged by heat of exhaust gas.
  - Increase the engine speed to check for the leak of fuel and oil.
  - Check if the inspected and serviced area is normally operated.

FUEL AND LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE *(WA270-RA19-05A-K-01-A)*

It is necessary to select fuel or lubricant according to the ambient temperature.
For detail, see "LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE AND RECOMMENDED GENUINE LUBRICANTS (PAGE 7-6)".

CLOSE ENGINE SIDE COVER SECURELY *(WA-H547-2AH-K-00-A)*

When closing the engine side cover after inspection and maintenance, be sure to lock securely by the catcher.
If the engine side cover is not locked by the catcher, the engine side cover may open.

OUTLINE OF MAINTENANCE *(WA320-RA1B-2A4-K-00-A)*

- Komatsu recommends using 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 EO15W40-LA (Komatsu genuine)
Transfer case	Power train oil TO10 (Komatsu genuine)
Hydraulic tank	Engine oil EO10W30-DH (Komatsu genuine)
Axle	Axle oil AXO80 (Komatsu genuine)
Radiator	Non-Amine Engine Coolant (AF-NAC) (Komatsu genuine) (density: 30% or above)

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC *(PC-RA1B-001-K-00-A)*

OIL *(PC-C940-2A4-P-00-A)*

- 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 failures 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 failures.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, contact your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend you have an oil analysis periodically to check the condition of the machine. For those who wish to use this service, 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 check the characteristics of the oil in detail.

NOTICE

Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure, shortening of the machine life, lowering of performance and increase of fuel consumption.

FUEL *(WA-AD02-2A4-K-00-A)*

- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank with fuel 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 described in the Operation and Maintenance Manual.
  - Fuel has a characteristics of condensing when used at a temperatures lower than the specified operating temperature (particularly when used at temperatures below -15°C (5°F).
  - If the fuel is used at temperatures higher than the specified temperature, the viscosity will drop, and it may result in troubles such as a drop of output.
- Before starting the engine, or after 10 minutes of adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters are replaced, it is necessary to bleed the air from the circuit.

- Spilt fuel, if any, during refilling must be cleaned off. And when fuel is spilt to sand or soil, such sand or soil must be removed.

NOTICE
The fuel used must be ultra low-sulfur diesel 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 and emission gas control system (KDPF). Since the high-pressure fuel injection device requires high precision parts and lubrication, if low viscosity fuel with low lubricating ability is used, its durability may drop remarkably. And using fuel with high sulfur content can deteriorate the engine parts and KDPF catalyzer, inducing failures, decrease of the life and degradation in performance.

COOLANT AND WATER FOR DILUTION *(WA270-B210-2A4-K-00-A)*

- Coolant has the important function of anticorrosion as well as antifreeze.
  Even in the areas where freezing is not an issue, the use of coolant is essential.
  Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC). Non-Amine Engine Coolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours.
  Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC). If you use another coolant, it may cause serious problems, such as corrosion of the engine and aluminum parts of the cooling system.
- When using antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- The Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, thus it is not flammable.
- The coolant density needs to be changed according to the ambient temperature.
  For details of the coolant density, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-19) ".
  Even in areas where it is not considered necessary to prevent freezing, always use Non-Amine Engine Coolant (AF-NAC) of 30% density or higher in order to prevent corrosion of the cooling system.
  Coolant is diluted with distilled water that does not contain any ions or water-hardening substances. Never dilute the Non-Amine Engine Coolant (AF-NAC) 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 *(ALL-Q811-2A4-K-00-A)*

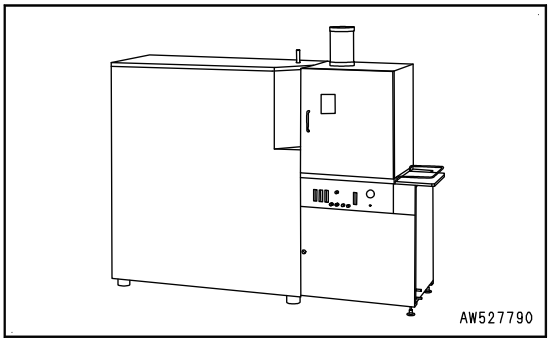
- Grease is used to prevent seizure and noises at the joints.
- This construction equipment is used under heavy-duty conditions. Komatsu recommends using the recommended grease and follow the change intervals and recommended ambient temperatures given in this Operation and Maintenance Manual.
- Grease fittings not included in the maintenance section are the 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) *(ALL-0000-371-K-00-A)*

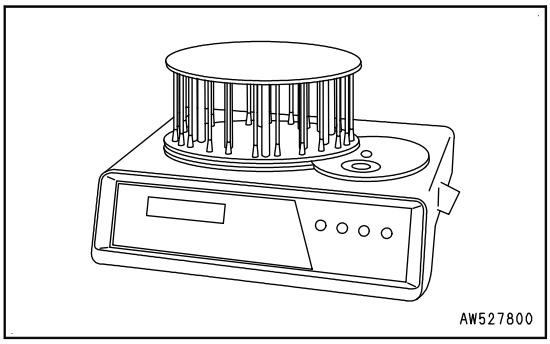
KOWA is a maintenance service that makes it possible to prevent machine failures and downtime. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other problems.
Thanks to long term experience and ample data accumulated, we can grasp condition of your machine accurately and provide proper recommendation.
We strongly recommend you to use this service. The oil analysis is carried out at actual cost, so the cost is low, and results of the analysis and recommendations are reported promptly.

KOWA ANALYSIS ITEMS *(ALL-0000-371-K-01-A)*

- Measurement of metallic powder density
  An ICP (Inductively Coupled Plasma) analyzer is used for measuring the density of iron, copper, and other metal powder in the oil.



- Measurement of quantity of iron particles
  A PQI (Particle Quantifier Index) measuring instrument is used for measuring the quantity of iron particles of 5µm or more, enabling early detection of failures.



- Others
  Measurements are made of items such as the ratio of water in the oil, density of the coolant, ratio of fuel in the oil, and dynamic viscosity, enabling a highly precise diagnosis of the machine's condition.

OIL SAMPLING *(ALL-0000-371-K-02-A)*

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

For further details of KOWA, contact your Komatsu distributor.

STORING OIL AND FUEL *(ALL-RA19-876-K-00-A)*

- Keep oil and fuel indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, lay the drums so that the filler ports of the drums are located in the lower part of 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 *(ALL-C950-2A4-P-00-A)*

- 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 and use again the filters (cartridge type). Always replace them with new filters.
- When replacing oil filters, check if any metal particles are attached to the old filters.
  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.
- Komatsu recommends using Komatsu genuine filters.

HANDLING ELECTRICAL COMPONENTS *(WA270-AK50-2A4-K-00-A)*

⚠ WARNING

- **When the battery disconnect switch key is turned to OFF position for the maintenance work, always remove the key and keep it with you. If the key is left in the switch, someone may turn ON the power by mistake, leading to a dangerous state such as an electric shock.**
  For the operation of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (PAGE 3-101) ".
- **It is extremely dangerous if the electrical component 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.**

- When removing the connectors of electrical components after washing the machine or in the rain, wipe off the water drop stuck around connectors before removing the connectors and keep the water drop away from inside of the connectors.
- Service relating to the electric system is checking fan belt tension, checking damage or wear to the fan belt and checking battery fluid level.
- Komatsu recommends installing electric components specified by Komatsu.
- External electro-magnetic interference may cause malfunction of the control system controller, Accordingly, contact your Komatsu distributor before installing a radio receiver or other wireless equipment.
- When working at the seashore, carefully clean the electric system to prevent corrosion.
- When installing electrical equipment, connect it to the special power supply connector.
  Do not connect the optional power supply to the fuse, starting switch, or battery relay.

STANDARD TIGHTENING TORQUE FOR BOLTS AND NUTS *(ALL-M140-03B-P-00-A)*

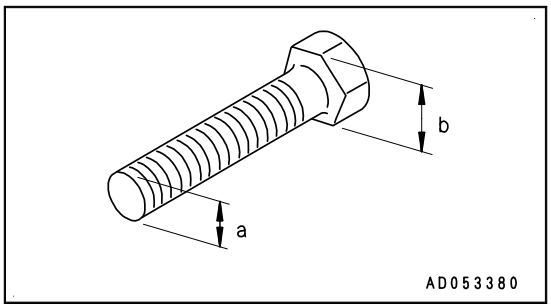
TIGHTENING TORQUE LIST *(D65-M140-03B-P-00-A)*

⚠ CAUTION

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

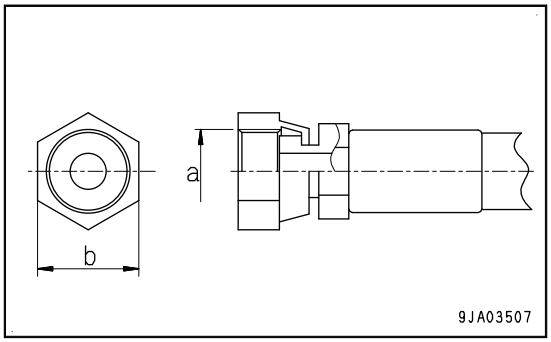
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that is removed.

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	172	17.5	126.6	153–190	15.5–19.5	112.1–141
16	24	260	26.5	191.7	235–285	23.5–29.5	170.0–213.4
18	27	360	37	267.6	320–400	33.0–41.0	238.7–296.6
20	30	510	52.3	378.3	455–565	46.5–58.0	336.3–419.5
22	32	688	70.3	508.5	610–765	62.5–78.0	452.1–564.2
24	36	883	90	651	785–980	80.0–100.0	578.6–723.3
27	41	1295	132.5	958.4	1150–1440	118.0–147.0	853.5–1063.3
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 value			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



MAINTENANCE SCHEDULE *(WA270-3110-015-A-00-A)*

- When using the engine oil for cold district, the maintenance intervals of the engine oil and filter cartridge are changed to every 250 hours. For detail, see the oil part number and notes in "LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE AND RECOMMENDED GENUINE LUBRICANTS (PAGE 7-6) ".
- Contact your Komatsu distributor for changing the maintenance interval on the machine monitor.

MAINTENANCE SCHEDULE TABLE *(ALL-3130-001-A-00-A)*

EVERY 10 HOURS MAINTENANCE (ONLY FOR THE FIRST 100 HOURS) *(WA320-33N0-002-A-00-A)*

INITIAL 250 HOURS MAINTENANCE (ONLY AFTER THE FIRST 250 HOURS) *(WA320-3350-002-A-00-A)*

INITIAL 1000 HOURS MAINTENANCE (ONLY AFTER THE FIRST 1000 HOURS) *(WA380-33D0-002-A-00-A)*

WHEN REQUIRED *(WA270-3370-002-A-00-A)*

CHECKS BEFORE STARTING *(PC-3340-208-A-00-A)*

EVERY 50 HOURS MAINTENANCE *(WA270-3390-002-A-00-A)*

EVERY 100 HOURS MAINTENANCE *(WA270-33A0-002-A-00-A)*

EVERY 250 HOURS MAINTENANCE *(WA270-33B0-002-A-00-A)*

EVERY 500 HOURS MAINTENANCE *(WA270-33C0-002-A-00-A)*

EVERY 1000 HOURS MAINTENANCE *(WA270-33D0-002-A-00-A)*

EVERY 2000 HOURS MAINTENANCE *(WA270-33E0-002-A-00-A)*

* The axle oil replacement interval of 2,000 hours is for the standard work. If the brake is used frequently and squeaks, shorten the oil replacement interval.

EVERY 4000 HOURS MAINTENANCE *(WA320-33F0-002-A-00-A)*

EVERY 4500 HOURS MAINTENANCE *(WA380-33M0-002-A-00-A)*

EVERY 8000 HOURS MAINTENANCE *(WA380-33H0-002-A-00-A)*

MAINTENANCE PROCEDURE *(ALL-3510-001-A-00-A)*

EVERY 10 HOURS MAINTENANCE (ONLY FOR THE FIRST 100 HOURS) *(WA320-33N0-208-A-00-A)*

Until first 100 hours operation, perform the following maintenance every 10 hours.

- Lubricate work equipment

For the method of maintenance, see Every 250 hours maintenance.

INITIAL 250 HOURS MAINTENANCE (ONLY AFTER THE FIRST 250 HOURS) *(WA320-3350-208-A-00-A)*

Perform the following maintenance only after the first 250 hours.

- Replace HST oil filter cartridge
- Replace hydraulic oil filter cartridge

For the method of maintenance, see Every 1,000 hours and 2,000 hours maintenance.

INITIAL 1000 HOURS MAINTENANCE (ONLY AFTER THE FIRST 1000 HOURS) *(WA-33D0-208-A-00-A)*

Perform the following maintenance only after the first 1000 hours.

- Check and adjust engine valve clearance

For details of the method of replacing or maintaining, see the section of service on Every 2000 hours service.

WHEN REQUIRED *(ALL-3370-001-A-00-A)*

CLEAN AND REPLACE AIR CLEANER *(WA270-A910-929-K-00-A)*

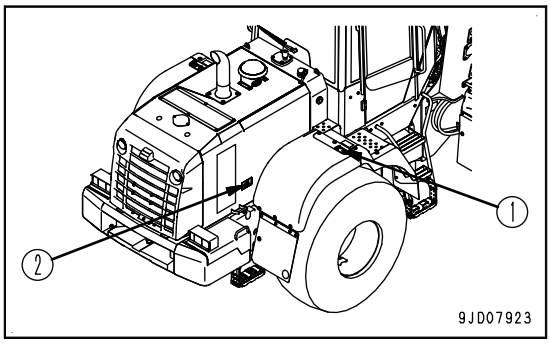
⚠ WARNING

- **If inspection, cleaning, or maintenance is carried out with the engine running, dirt will get into the engine and damage it. Be sure to stop the engine before carrying out these operations.**
- **When using compressed air, there is a danger of dirt flying and causing personal injury. Always wear protective equipment such as protective eyeglasses and dust mask.**

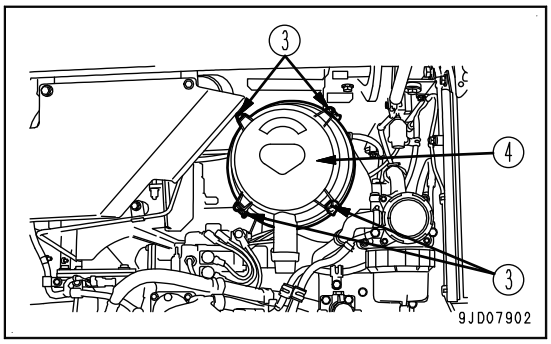
For the inspection method, see "CHECK AIR CLEANER (PAGE 3-150) ".
Clean the air cleaner element when the yellow piston of the dust indicator display entered the red (7.5 kPa {0.08 kg/cm^2, 1.1 PSI}) position or the air cleaner clogging caution lamp of the machine monitor lights up.

CLEAN OUTER ELEMENT *(WA270-A92G-250-K-00-A)*

1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).

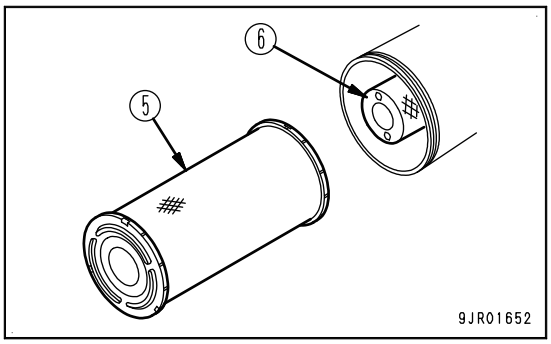


2. Remove 4 clips (3) to remove cover (4).

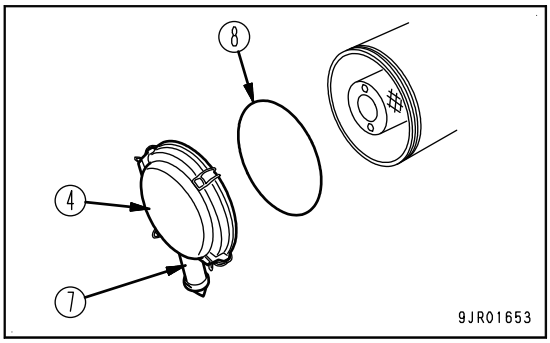


NOTICE
Never remove inner element (6). Dusts may enter, causing the engine failure.

3. Remove outer element (5).

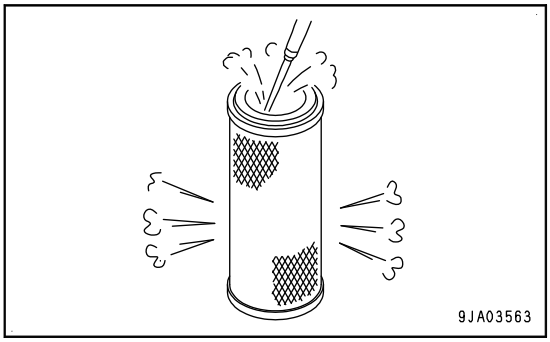


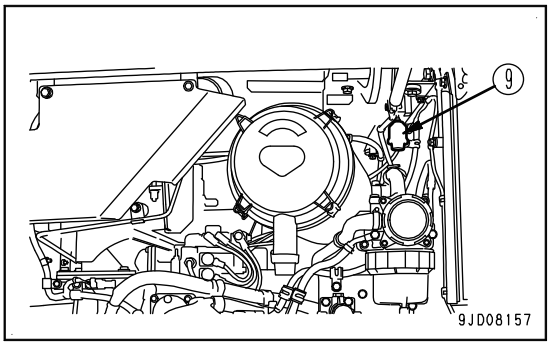
4. Clean the inside of the air cleaner body, cover (4) and vacuator valve (7).



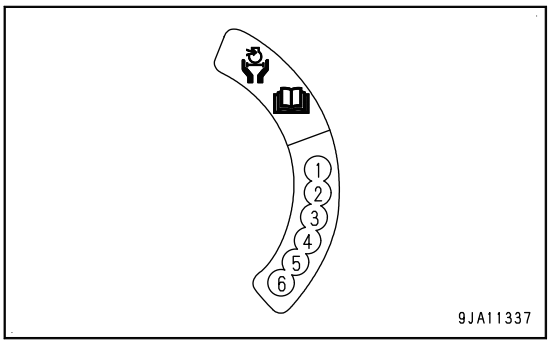
NOTICE
Do not clean and reuse the inner element. When replacing the outer element, replace the inner element with new one at the same time.

5. Blow dry compressed air (0.2 MPa {2.1 kg/cm^2, 30.0 PSI}) from the inside of the outer element along the pleats. Next, blow along the pleats from the outside, then blow again from the inside.

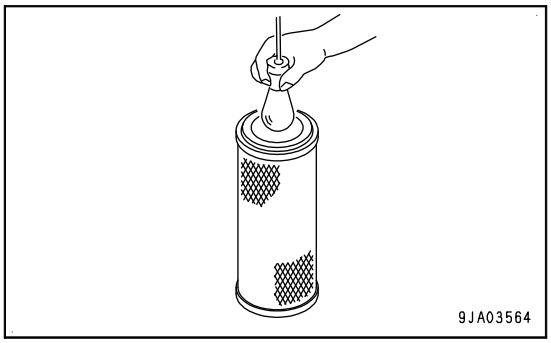




1) Replace the outer element if it is cleaned 6 times repeatedly or used throughout a year. Replace the inner element as well at the same time.
2) Even when the number of cleanings of the outer element is 6 times or less, if the yellow piston of dust indicator (9) reaches the red position (7.5 kPa {0.08 kg/cm^2, 1.1 PSI}) soon after the outer element is cleaned, replace both of the inner and outer elements with new ones.
3) Remove one seal from the element whenever the element is cleaned.



6. If small holes or thinner parts are found on the element when it is checked by lightening inside the element after cleaning, replace the element.

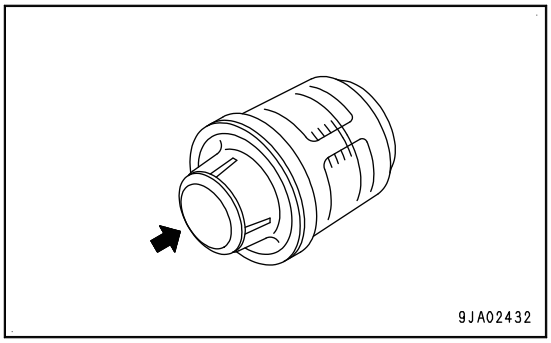


NOTICE
When cleaning the element, do not hit it or hit anything with the element.
Do not use the element with damaged pleats or a damaged gasket or seal.

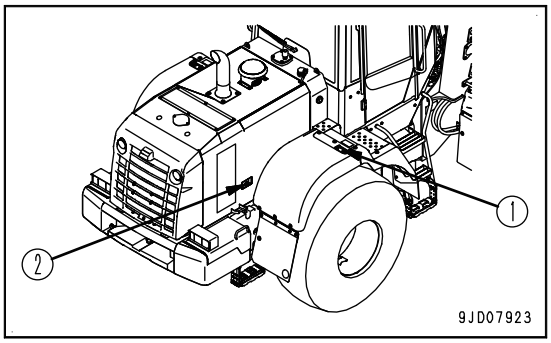
⚠ CAUTION

When installing cover (3), check O-ring (8) for scratches or damages and replace with a new one if there is any.

7. Set the cleaned outer element at the place, then install cover (4) and fix them with mounting clips (3).
8. Press the button of the dust indicator to return the yellow piston to the original position.

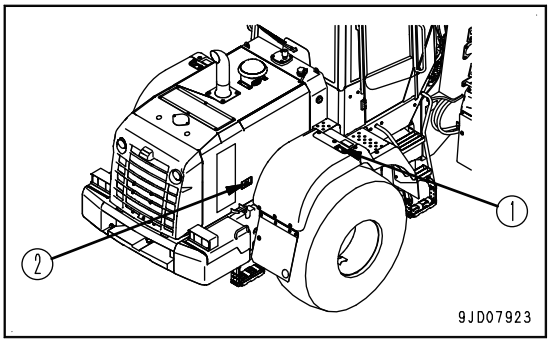


9. Close engine side cover (2) on the right side of the machine and apply lock (1) of the rear full-length fender.
   If the yellow piston reaches the red line (7.5 kPa {0.08 kg/cm^2, 1.1 PSI}) soon after the outer element is cleaned, replace both of the inner and outer elements with new ones.

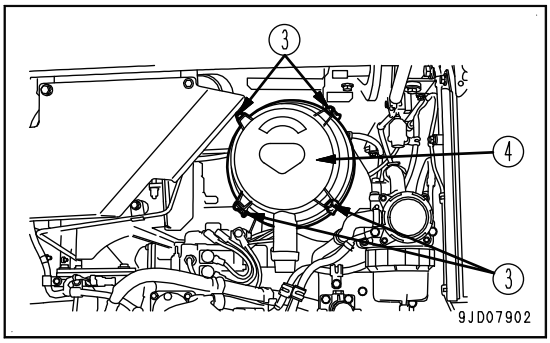


REPLACE ELEMENT *(WA270-A921-923-K-00-A)*

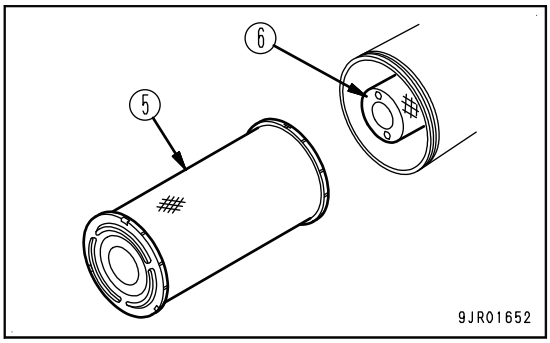
1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).



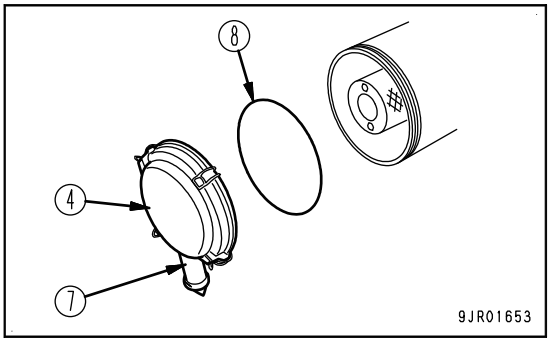
2. Remove 4 clips (3) to remove cover (4).



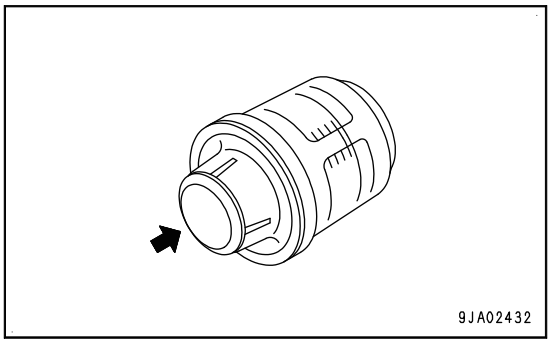
3. Remove the outer element (5).
   Do not remove inner element (6) at this time.



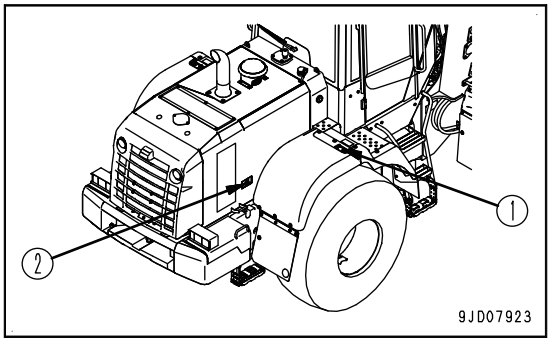
4. Clean the inside of the air cleaner body, cover (4) and vacuator valve (7).
5. Remove inner element (6), then quickly install the new inner element.
6. Set a new outer element (5) at the place, replace O-ring (8) with a new one, install cover (4) and fix them with mounting clips (3).



7. Press the button of the dust indicator to return the yellow piston to the original position.



8. Close engine side cover (2) on the right side of the machine and apply lock (1) of the rear full-length fender.



CLEAN INSIDE OF COOLING SYSTEM *(WA270-B000-255-K-00-A)*

⚠ WARNING

- **Immediately after the engine is stopped, the coolant is still hot and the pressure is accumulated in the radiator. If the cap is removed under this condition and the coolant is drained, it may cause burns. Accordingly, wait until the coolant temperature drops, then turn the cap slowly to release the pressure.**
- **Start the engine and clean the inside of the cooling system. When standing up or leaving the operator's seat, lock the work equipment (pilot lamp lights up).**
- **For details of starting the engine, see Operation, "CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE (PAGE 3-142) " and "STARTING ENGINE (PAGE 3-166) ".**
- **Never enter the rear of the machine when the engine is running.**

Clean the inside of the cooling system, change the coolant according to the table below.

Coolant	Interval for cleaning inside of cooling system and changing coolant
Non-Amine Engine Coolant (AF-NAC)	Every 2 years or every 4,000 hours whichever comes sooner

Place the machine on a level ground when cleaning or changing the coolant.
Non-Amine Engine Coolant (AF-NAC) has the important function of preventing corrosion as well as preventing freezing.
Even in the areas where freezing is not an issue, the use of coolant is essential.
Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC). Non-Amine Engine Coolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4,000 hours.
Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC). If you use another coolant, it may cause serious problems, such as corrosion of the engine and aluminum parts of the cooling system.
To maintain the anticorrosion properties of Non-Amine Engine Coolant (AF-NAC), always keep the density of Non-Amine Engine Coolant between 30% and 64%.
Check the lowest temperature in the past and decide the coolant density from the coolant density table below.
When actually deciding the density for the coolant, set a temperature that is approximately 10°C (18°F) lower than the lowest temperature. The density must be over 30% at least.
If the density of obtained coolant is higher than the necessary density for lowest temperature, dilute it with adequate distilled water, and then fill it into the tank.
If there is any unclear point, contact your Komatsu distributor.
Coolant density table

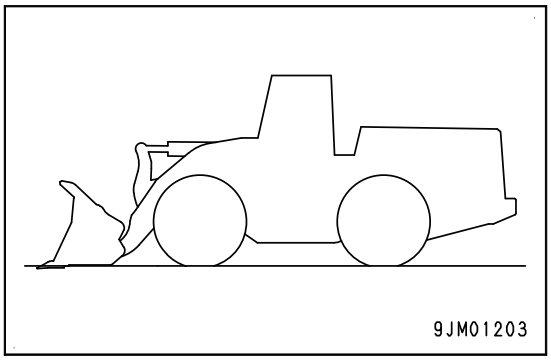
Min. atmospheric temperature	°C	Min. -10	-15	-20	-25	-30	-35	-40	-45	-50
	°F	Min. 14	5	-4	-13	-22	-31	-40	-49	-58
Density (%)		30	36	41	46	50	54	58	61	64

⚠ WARNING

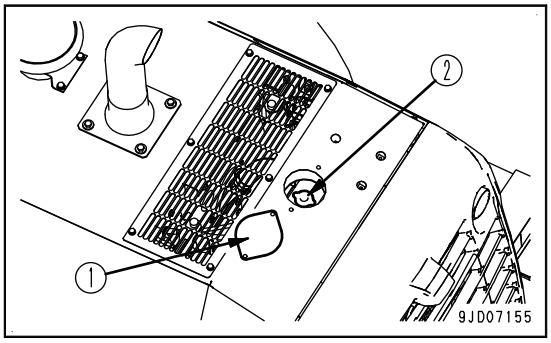
- **Coolant is toxic. When open the drain valve, be careful not to get coolant on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor immediately.**
- **When handling the cooling water containing coolant that has been drained during changing the coolant or repair of radiator, contact your Komatsu distributor or request a qualified company to carry out the operation. Coolant is toxic, so never pour it into drainage ditches or drain it onto the ground surface.**

Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, so it is not flammable. (For dilution 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.

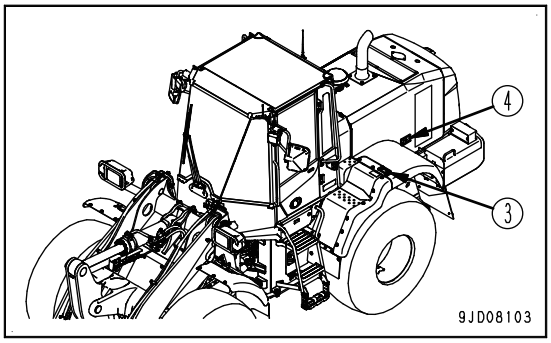
1. Place the machine on a level ground, then stop the engine.



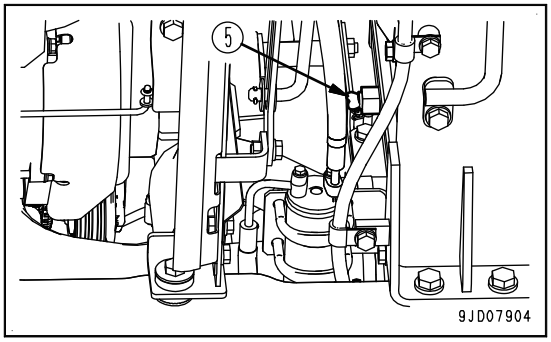
2. Remove cover (1) at the rear of the machine.
3. Check that radiator cap (2) is cool enough to touch by bare hands, and then turn it slowly until it stops to release the pressure.
4. Then, while pushing radiator cap (2), turn it until it touches to the stopper then remove it.



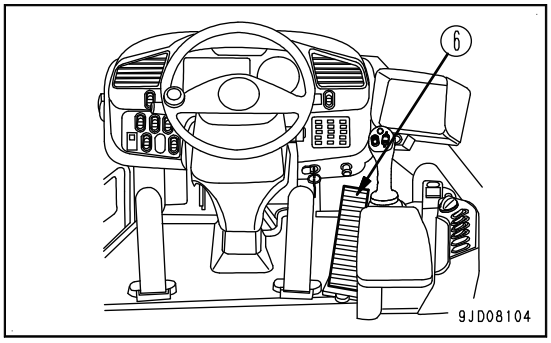
5. Undo lock (3) at the top of the rear full-length fender on the left side of the machine and open engine side cover (4).

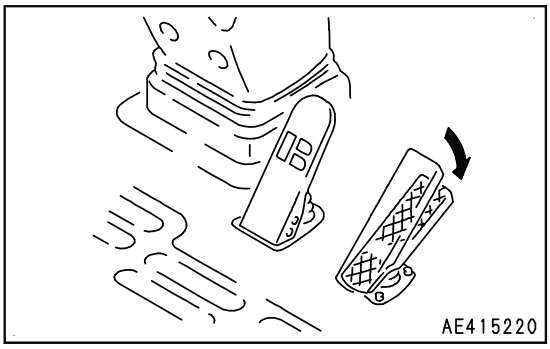


6. Place a container to receive the coolant, then open drain valve (5) at the bottom of the radiator to drain the coolant.
7. After draining the coolant, close drain valve (5) and fill with city water.
8. After the radiator is filled with water, start the engine.

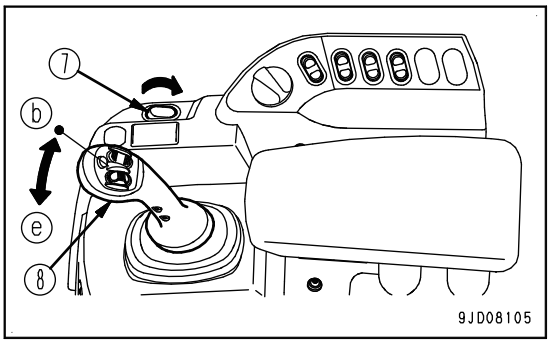


9. Depress accelerator pedal (6) lightly and run the engine at a medium speed for approximately 5 minutes with no load.



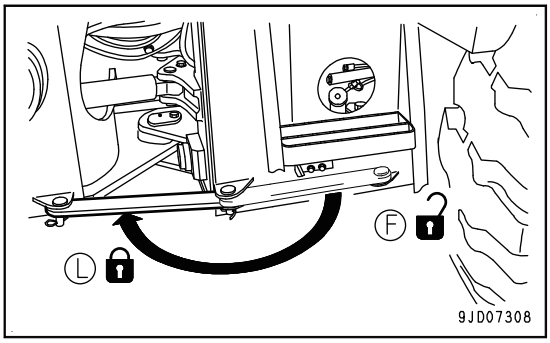


10. Check that the engine rotation has become smoother after the warm-up operation, then press work equipment lock switch (7) to release the work equipment lock (pilot lamp goes out).
11. Operate the multi-function mono-lever to TILT position (e) and to HOLD position (b) repeatedly to warm up the hydraulic oil. Oil reaches the relief pressure through the above operations and hydraulic oil gets warmer in a shorter time.
12. Turn the steering wheel slowly approximately 10 times to the right and left to warm up hydraulic oil in the steering valve.

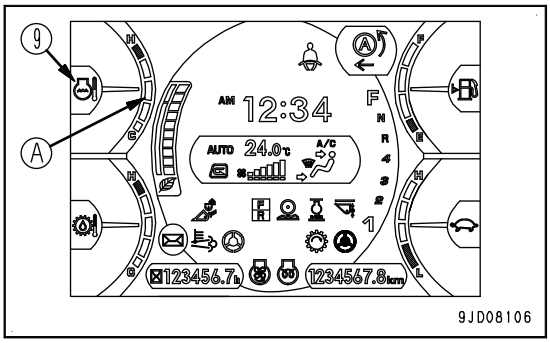


⚠ WARNING

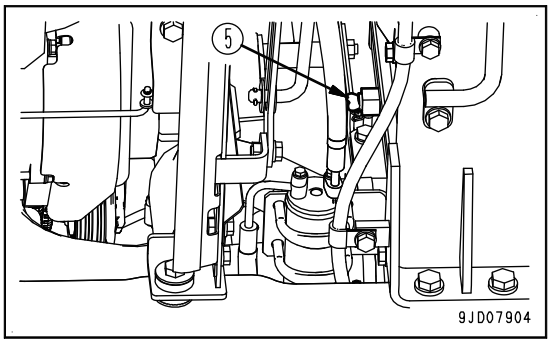
If you turn the steering wheel and stop turning it while the oil temperature is low, there may be a time lag before the machine stops after the turning operation.
In such case, set the frame lock bar to LOCK (L) position for the safety and perform the warm-up operation in a large place.
In the warm-up operation, be sure not to perform hydraulic relief continuously for more than 5 seconds.



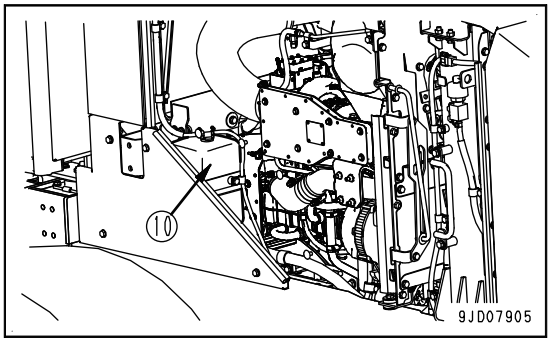
13. When the operations of steps 8 to 10 are repeated, the pointer of engine coolant temperature caution lamp (9) rises. The pointer of coolant temperature caution lamp (9) lowers temporarily at around the center of scale (A). Then, continue the above operations for approximately 10 seconds.

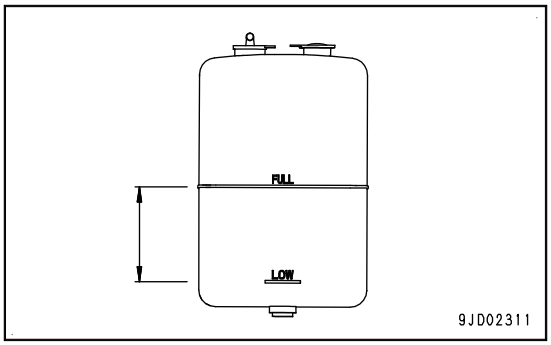


14. Stop the engine and open drain valve (5) to drain the water, then close it after draining.
15. Fill with Non-Amine Engine Coolant through the water filler port up to the mouth of the port.
    For the density of Non-Amine Engine Coolant, see "Coolant density table".
16. To remove the air in the coolant, run the engine at low idle for 5 minutes, and then run at high idle for a further 5 minutes. (Keep the radiator cap removed during the above operations.)



17. Drain coolant in sub-tank (10), clean the inside of sub-tank (10), and then fill with Non-Amine Engine Coolant up to a middle point between FULL and LOW.
18. Stop the engine, wait for approximately 3 minutes, then add Non-Amine Engine Coolant (AF-NAC) up to the bottom of the water filler port, and tighten the cap.





CHECK OIL LEVEL IN TRANSFER CASE, ADD OIL *(WA270-D348-212-K-00-A)*

⚠ WARNING

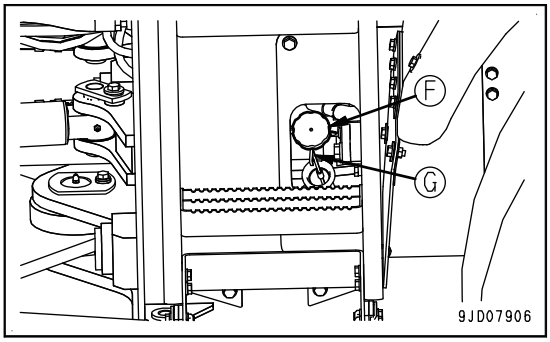
Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.

Carry out this procedure if there is any sign of oil on the transfer case.

1. Start the engine and carry out the warming-up operation for the transfer. When the warming-up operation of the transfer is completed, run the engine at low idle for at least 5 minutes.

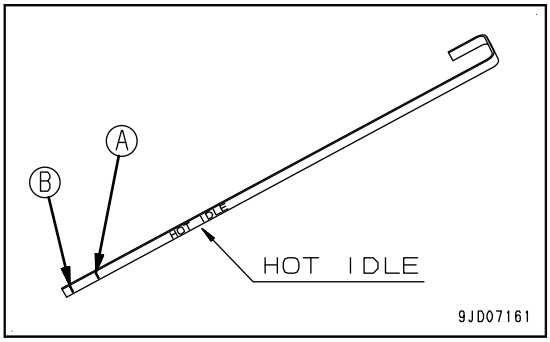
REMARK
"When the warming-up operation of the transfer is completed" means the condition where the transfer oil temperature has been warmed up to a temperature of approximately 40 to 60°C (104 to 104°F). As a guideline, this condition is usually reached when the machine travels under its own power for 30 to 40 minutes.
As a guideline if the ambient temperature is low (below 0°C (32° F)), the transfer is warmed up when the machine travels under its own power for approximately 1 hour.

2. When the engine is running at low idle, open the cap of oil filler port (F), pull out dipstick (G), and wipe off the oil with a cloth.
3. Insert dipstick (G) fully in the oil filler pipe, then take it out again.

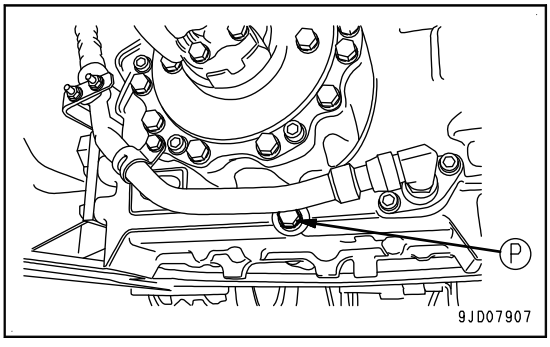


REMARK
Whenever inserting the dipstick, be sure to insert it into the dipstick pipe in the filler pipe.

4. The oil level should be between the (A) and (B) marks on the "HOT IDLE" side of dipstick (G).
   If the oil level does not reach the (B) mark, add oil through oil filler port (F).



5. If the oil level is above the (A) mark on the "HOT IDLE" side, drain the excess oil from drain plug (P), and check the oil level again.
6. If the oil level is correct, insert dipstick (G) in the dipstick guide, then tighten the cap.

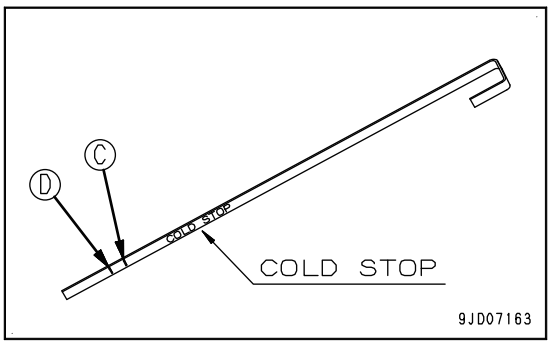


NOTICE

- **The oil level differs according to the oil temperature, so check the oil level after completing the warming-up operation of the transfer.**
- **If the transfer oil level is low, the oil level may go below the (B) mark on the "HOT IDLE" side when the engine is running at low idle.**
  (If the oil level is correct, the oil level will be between the (A) and (B) marks on the "HOT IDLE" side when the transfer oil is warmed up.)

Checking oil level with engine stopped

- When the oil level is checked with the engine stopped, as a guideline, the oil level should be between the (C) and (D) marks on the "COLD STOP" side of dipstick (G).
- When checking the oil level with the engine stopped, stop the engine and wait for at least 2 hours before checking.
- When making the final check of the oil level, complete the warming-up operation of the transfer, then follow steps 1 to 6 above and check the oil level with the" HOT IDLE" side of dipstick (G).



CHECK AXLE OIL LEVEL, ADD OIL *(WA320-DA10-212-K-00-A)*

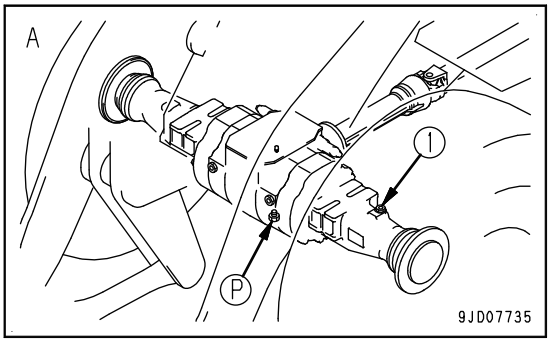
⚠ WARNING

- **When checking the oil level, apply the parking brake and fix the front and rear frames using the frame lock bar.**
- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**

If ooze of oil is recognized on the axle case, carry out the following checks.
Park the machine on a level ground before starting the check.
(If the machine is tilted in the right or left, exact measurement of oil level becomes unavailable.)

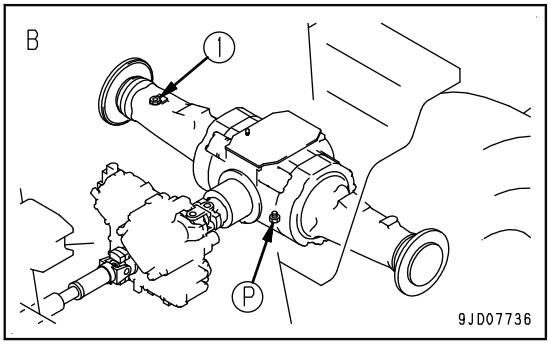
- A: Front B: Rear

1. Stop the engine and remove plug (1).

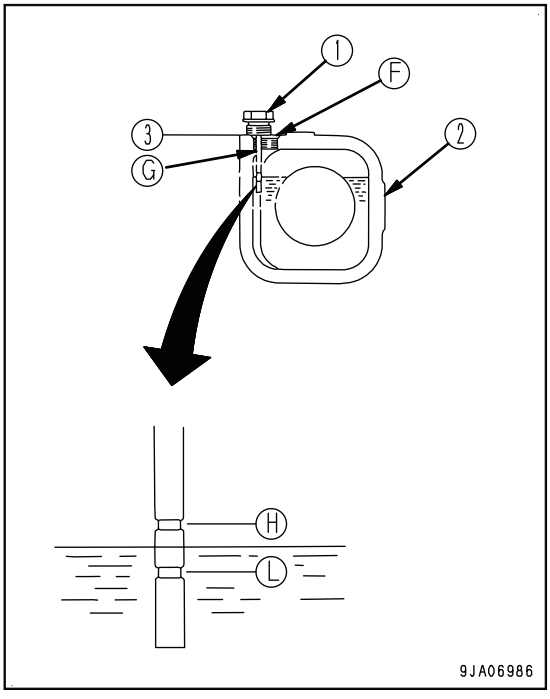


REMARK
Before removing plug (1), clean dirt and dusts on and near it.

2. Wipe off oil of dipstick (G) adhered to plug (1) using a piece of cloth.



3. Set dipstick (G) as shown in the figure to the right.
   (2): Axle
   (3): Spot facing surface
4. The level is appropriate if it is between 2 grooves (H) and (L) of the dipstick.
   If the oil does not reach the lower groove (L), supply axle oil from oil filler port (F).



REMARK
Since lubricating oil of a different brand is used for the axle with ASD (Anti-Slip Differential), be sure to use the specified lubricating oil.

5. If the oil level is above the upper groove (H), drain the excessive oil through drain plug (P), and check the oil level again.
6. If the oil level is appropriate, close plug (1).
   Tightening torque 93 to 123 Nm {9.5 to 12.5 kgm, 68.6 to 90.4 lbft}

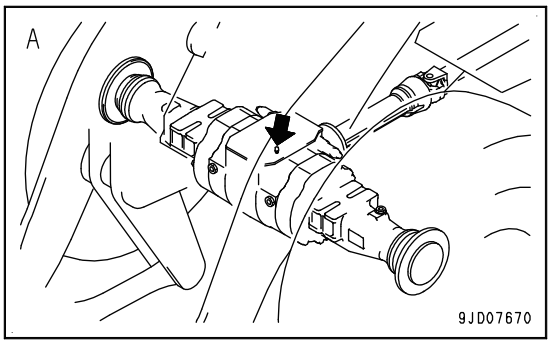
CLEAN AXEL BREATHER *(WA320-DA34-92D-K-00-A)*

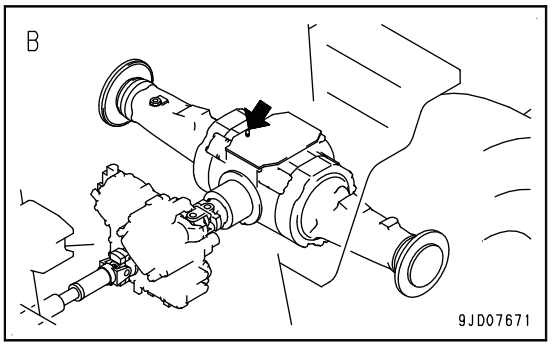
⚠ WARNING

When cleaning, apply the parking brake and fix the front and rear frames by using the frame lock bar.

- A: Front B: Rear

Remove dirt and dusts, if any, on and around the breather by using a brush.
After removing dirt and dusts around the breather, immerse it in detergent liquid to clean it.
Clean the breathers in 2 locations, the front and rear sides.
While the breather is removed, use care to prevent entry of dusts through the mounting location of the breather.





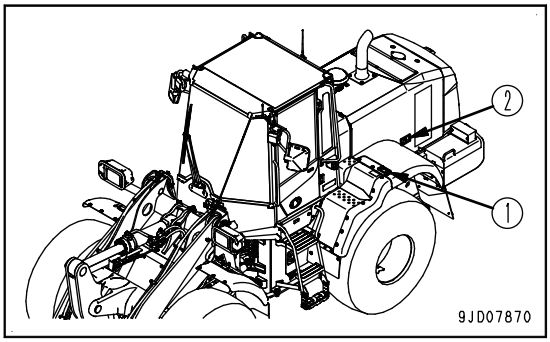
CLEAN AIR CONDITIONER CONDENSER *(WA270-K580-92D-K-00-A)*

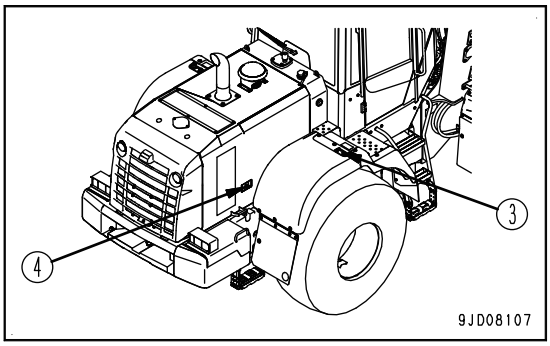
⚠ WARNING

- **Cleaning with steam cleaner is prohibited since it is dangerous as the condenser is heated.**
- **If the pressurized water hits a person directly or dirt scatters by using pressurized water, there is a danger of personal injury.**
  Always wear protective equipment such as protective eyeglasses and dust mask.

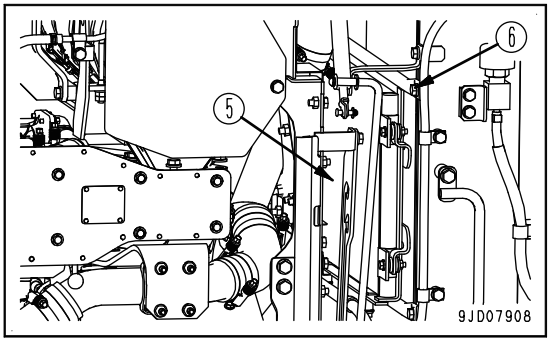
If adhesion of dirt or dusts to the condenser is recognized, clean them by using water.
If water pressure is excessive, the fin may be deformed. So cleaning by using pressurized water must be done from a sufficiently distant position.

1. Undo locks (1) and (3) at the top of the rear full-length fenders on the right and left sides of the machine and open R.H. and L.H. engine side covers (2) and (4).

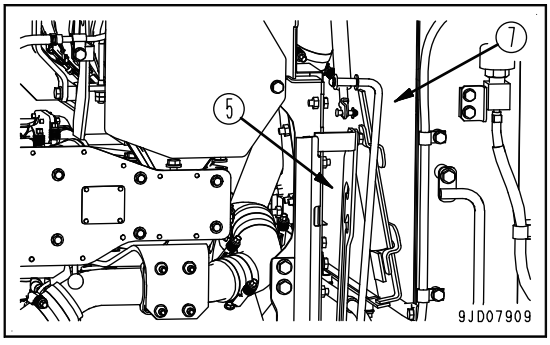




2. Remove mounting bolts (6) (2 places on top) of condenser (5).

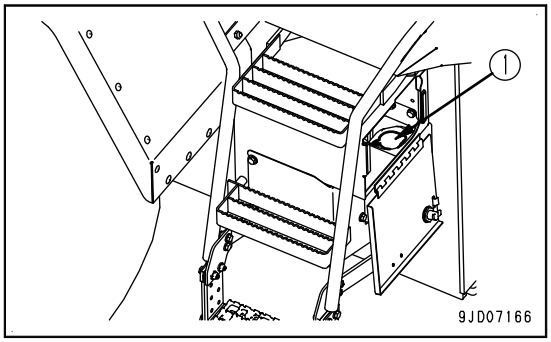


3. Hold the top of condenser (5) and tilt it forward.
   The clearance will be generated between radiator (7) and condenser (5).
4. Clean the condenser through this clearance.
5. Restore condenser (5) to the original position and fix it with bolt (6).



CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID *(WA320-K7B0-217-K-00-A)*

Open the cover inside the right step.
Check the water level in window washer tank (1), and if it is insufficient, add the window washer fluid for automobiles.
Be careful not to let dirt or dust get in when adding fluid.



CLEAN RADIATOR FIN AND COOLER FIN *(WA380-RA16-92D-K-00-A)*

⚠ WARNING

- **When the engine is running, do not open the engine side cover. When cleaning the fin, stop the engine rotation completely.**
- **If compressed air, high-pressure water, or steam hits your body directly or dirt is scattered by the compressed air, high-pressure water, or steam, there is a danger of personal injury. Always wear protective equipment such as protective eyeglasses and dust mask.**

Carry out this procedure if there is any mud or dirt stuck to the radiator.

CLEAN BY COOLING FAN REVERSE TURN *(WA380-RA16-92D-K-01-A)*

NOTICE

When rotating the fan in the reverse direction, beware extremely that dirt will not fly out and cloth etc. will not be wound in the fan.

Since dust may blown up, check that there is no person around while the fan is rotating in reverse.

On the jobsite where the dirt sticks easily to radiator or cooler, set the automatic cooling fan to rotate the fan in reverse. This will blow off any dirt stuck to radiator or cooler, and can extend the cleaning interval.

MANUAL FAN-REVERSE OPERATION *(WA320-RA16-92D-K-02-A)*

NOTICE

- **Never rotate the fan in reverse by hand when carrying out the operation.**
- **Before operating the manual reverse rotation of the fan, set the engine speed to low idle.**

For the manual reverse rotation of the fan, see "MANUAL FAN REVERSE MODE (PAGE 3-53) ".
After reverse rotation of the fan is started, set the engine speed to high idle.
Select the time for running engine at high idle as follows according to the condition of clogging.
Normal clogging: 1 to 2 minutes
Excessive clogging: 2 to 3 minutes
When the cleaning is completed, set the engine speed to low idle and restore the rotation of the fan to normal.

AUTOMATIC FAN-REVERSE OPERATION *(WA320-RA16-92D-K-03-A)*

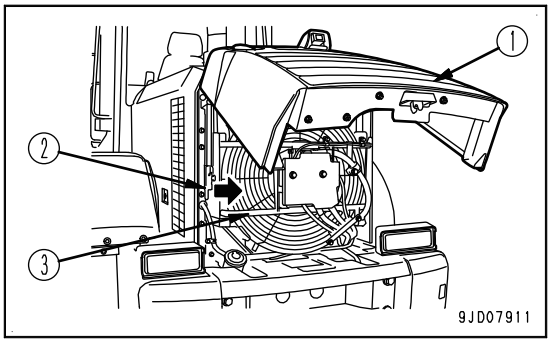
For the automatic reverse rotation of the fan, see "AUTOMATIC FAN REVERSE MODE (PAGE 3-55) ".

REMARK

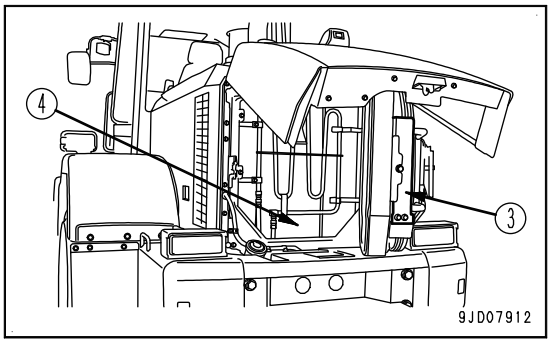
When the fan rotation direction is switched, the reverse rotation pilot lamp flashes.
After a heavy load operation, the fan rotation direction may not change to protect the machine.
Set the engine speed to low idle and wait until the oil and coolant temperature goes down before operating the switch.

CLEAN FIN WITH COMPRESSED AIR *(WA270-RA16-92D-K-00-A)*

1. Open rear grill (1).
2. Move up knob (2) to unlock and open fan guard (3).



3. Use compressed air to blow out any mud, dirt, or leaves clogging radiator fins (4). It is also possible to use steam or water in place of compressed air.



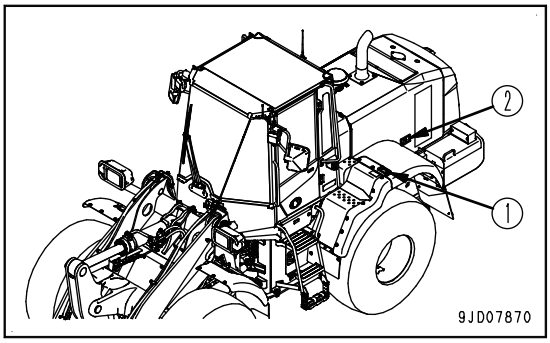
NOTICE

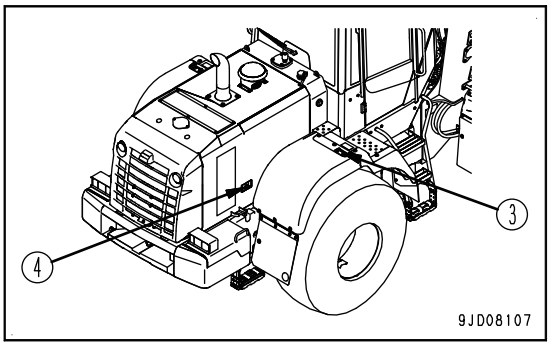
Steam or water may be used instead of compressed air. However, when using the powerful steam cleaning equipment (high-pressure machine wash) for the heat exchange equipment (radiator and cooler), keep a sufficient distance to the target machine. If steam cleaning (high-pressure machine wash) is performed at close range, there is a danger that the internal fins of the heat exchange equipment may be deformed, and this will cause early clogging and breakage of the equipment.

4. Check the rubber hoses. If any hose is cracked or hardened by age, replace it with a new hose. Also check and tighten all the loose hose clamps.
5. After cleaning, close fan guard (3) and check that it is locked.

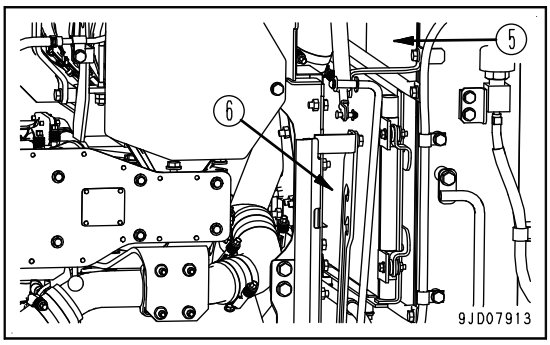
CLEAN FIN WITH ENGINE SIDE COVER OPEN *(WA270-RA16-92D-K-01-A)*

1. Undo locks (1) and (3) at the top of the rear full-length fenders on the right and left sides of the machine and open R.H. and L.H. engine side covers (2) and (4).





2. Insert the air nozzle through the clearance between the radiator, oil cooler, aftercooler (5), and air conditioner condenser (6) to clean.
3. Blow off the fallen soil and dirt toward the front of the machine by using the air nozzle. If soil and dirt are accumulated on the fuel tank, blow them off toward the front of the machine by using the air nozzle, as well.
   You may use steam or water instead of compressed air.



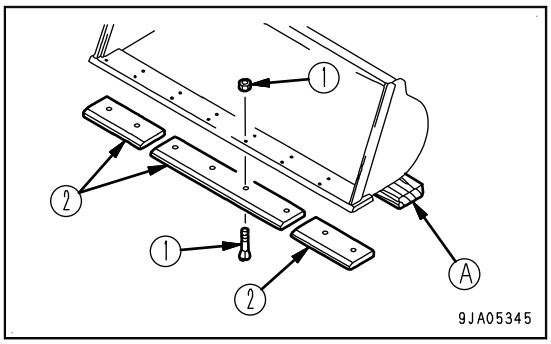
REPLACE AND INVERT BOLT-ON CUTTING EDGE *(WA320-LB70-928-K-00-A)*

⚠ WARNING

It is dangerous if the work equipment moves by mistake during the turning or replacement work.
Set the work equipment in a stable condition, stop the engine, then lock the work equipment (pilot lamp in the switch lights up).

Turn or replace the cutting edge before the wear reaches the edge of the bucket.

1. Raise the bucket to a suitable height, then put a block (A) under the bucket to prevent the bucket from lowering.
   Raise the bucket to make its bottom surface level.
2. Remove bolts and nuts (1), then remove cutting edge (2).
3. Clean the mounting surface of cutting edge (2).
4. Turn cutting edge (2) and install it to the bucket.
   When turning the edge, install it to the opposite side (left edge to right side, right edge to left side).
   If both sides of the cutting edge are worn out, replace with new ones.
   If the wear extends to the mounting surface, repair the mounting surface before installing the cutting edge.
5. Tighten bolts and nuts (1) uniformly so that there is no gap between the bucket and cutting edge.
   Tightening torque of mounting bolt: 883 to 1196 Nm {90 to 122 kgm, 651 to 882 lbft}
6. After operating for several hours, retighten the mounting bolts.

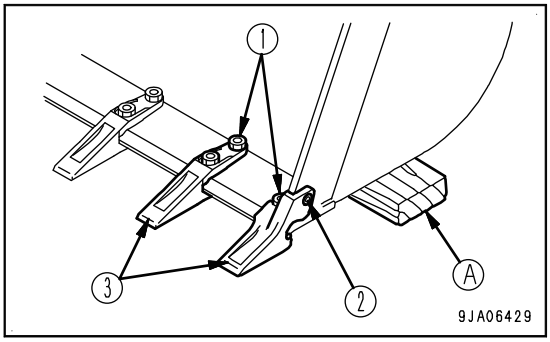


REPLACE BUCKET TEETH *(WA320-LBM2-923-K-00-A)*

(If equipped)

ONE-PIECE TOOTH *(WA320-LBM2-923-K-01-A)*

Replace the bucket teeth before they are worn to the bucket end face.



1. Lift the bucket to an appropriate height and prevent lowering of the bucket by placing block (A) under the bucket.
   Lift the bucket so that the bucket bottom becomes level.
2. Remove the bolts and nuts (1) and (2), and remove bucket teeth (3).
3. Clean the mounting surface of bucket teeth (3).
4. Install the new teeth to the bucket.
   Eliminate the clearance between the teeth and top face of the bucket by inserting shims.
   Continue the adjustment with shims until the insertion of 0.5 mm {0.02 in} thick of shim becomes impossible.
   If the mounting surface is worn, repair the mounting surface before installing the new teeth.
5. In order to eliminate the clearance between the bucket teeth and the top end of the bucket, tighten bolts and nuts (1) and (2) lightly, then tap the teeth ends using a hammer.
   Mounting bolt tightening torque
   (1): 1200 to 1330 Nm {122 to 136 kgm, 882 to 984 lbft}
   (2): 814 to 912 Nm {83 to 93 kgm, 600 to 673 lbft}
6. Retighten the mounting bolts after several hours of operation.

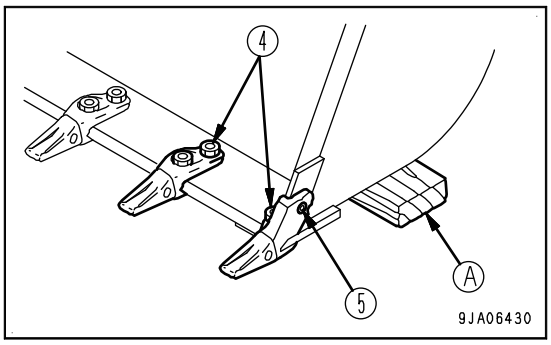
TIP TOOTH *(WA320-LBM2-923-K-02-A)*

⚠ WARNING

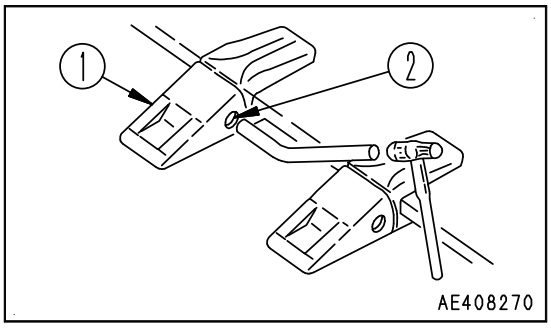
- **If the pin is hit out with strong force, there is danger that the pin may fly out. Check that there is no one in the surrounding area.**
- **There is danger of pieces flying during the replacement operation, so always wear protective clothing, such as protective eyeglasses and gloves.**

Replace the teeth before they wear down as far as the adapter.

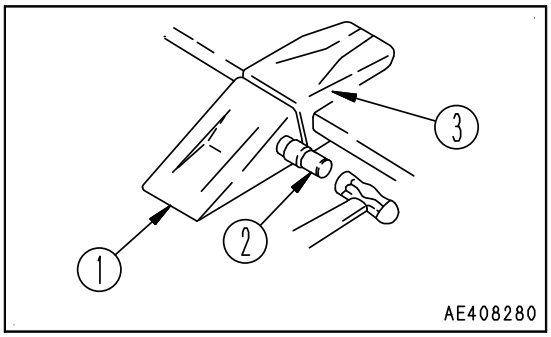
1. Raise the bucket to a suitable height, then put blocks (A) under the bucket to prevent the bucket from coming down. Raise the bucket so that the bottom surface of the bucket is horizontal.



2. Remove pin (2) installed to the bucket, then remove tooth (1). Put a rod (slightly narrower than the pin) in contact with the hatched portion (either left or right) and tap pin (2) out to the opposite side.



3. Fit new tooth (1) in adapter (3), push in pin (2) partially by hand, then knock it in with a hammer.
4. After operating the machine for a few hours, check that the pin does not come out.



5. If mounting bolts (4) or (5) of adapter (3) are loose, tighten them.
   Mounting bolt tightening torque
   (4): 1200 to 1330 Nm {122 to 136 kgm, 882 to 984 lbft}
   (5): 814 to 912 Nm {83 to 93 kgm, 600 to 673 lbft}

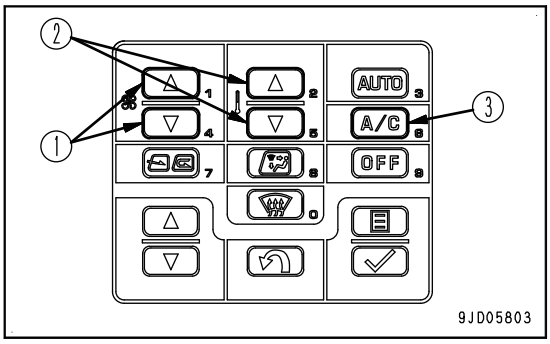
CHECK AND MAINTENANCE AIR CONDITIONER *(ALL-K500-001-K-01-A)*

CHECK LEVEL OF REFRIGERANT (GAS) *(WA270-K512-21D-K-00-A)*

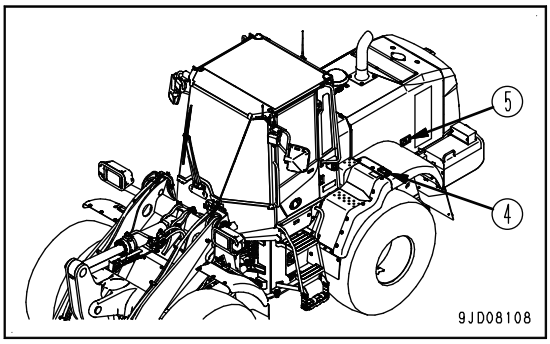
⚠ WARNING

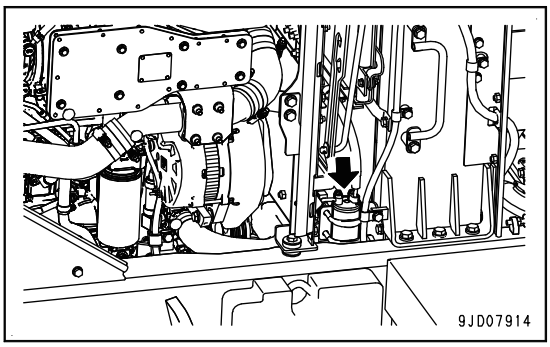
If the refrigerant used in the air conditioner gets into your eyes or on your hands, it may cause loss of sight or frostbite. Never touch the refrigerant. Do not loosen any part of the refrigerant circuit.
Do not bring any open flame close to any point where the refrigerant gas is leaking.

1. Start the engine and set the engine speed to approximately 1,500 rpm.
2. Press fan switch (1) and set the air flow to "Hi".
3. Press temperature adjustment switch (2) and set the temperature to 18°C (64.4°F).
4. Fully open the door and windows.
5. Press air conditioner switch (3) to turn the air conditioner switch ON.

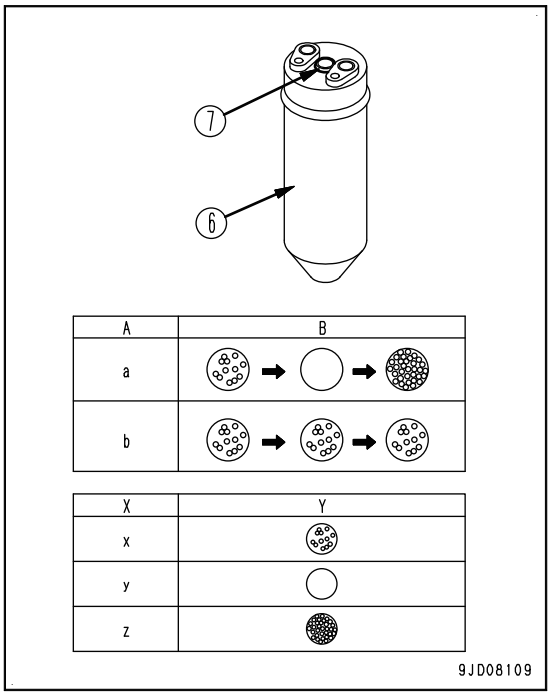


6. Undo lock (4) at the top of the rear full-length fender on the left side of the machine and open engine side cover (5).





7. Check the state of the refrigerant gas (R134a) that flows the refrigerant circuit, through sight glass (7) (inspection window) of receiver drier (6).
   A: Quantity of refrigerant
   B: Condition viewed through sight glass
   a: Appropriate: Just after the air conditioner switch is turned ON, a small number of bubbles are seen. Then, the sight glass becomes milky white, and then becomes pale.
   b: Insufficient: After the air conditioner switch is turned ON, bubbles are seen continuously.
   X: State of refrigerant flow
   Y: Condition viewed through sight glass
   x: Bubbles are seen: Gaseous and liquid refrigerants are mixed.
   y: No bubble: All refrigerant becomes liquid and transparent.
   z: Milky white: Oil and refrigerant are separated and their mixture is milky white.



MAINTENANCE AND SCHEDULE *(WA380-K500-208-K-00-A)*

Check point	Check items	Maintenance schedule		
		Check before operation	6 month	Replacement interval
Filter	Clogging, dust	Check	-	2 years
Condenser	Clogging, dust	Check	-	-
Belt	Looseness, damage	Check	-	2 years
Refrigerant gas	Amount	-	Check	-
Piping	Looseness, damage, leakage	-	Check	-
Receiver drier	-	-	-	2 years

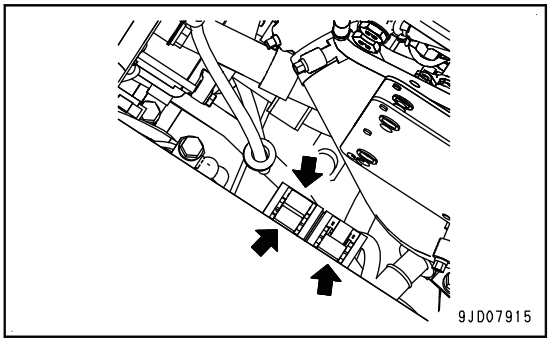
REPLACE SLOW-BLOW FUSE *(WA270-Q6G1-923-K-00-A)*

NOTICE

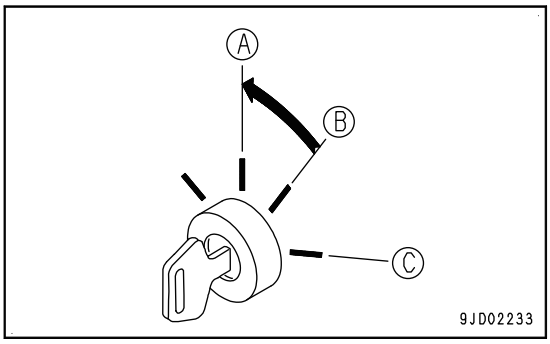
- **Before replacing the slow-blow fuse, be sure to turn the starting switch to OFF position and turn the battery disconnect switch key to OFF position.**
- **Replace the slow blow fuse with a new one of the same capacity.**

Should the slow-blow fuse is blown, investigate the cause and take necessary actions.

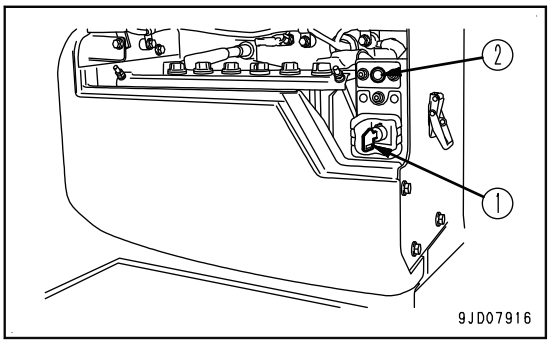
The slow-blow fuse is at the side of the engine on the left side of the machine.
For the slow blow fuse, see "SLOW BLOW FUSE (PAGE 3-111) ".

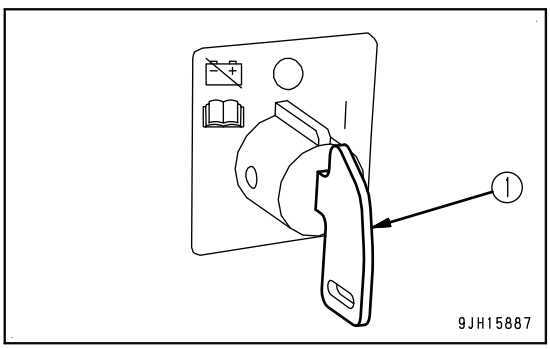


1. Turn the starting switch to OFF position (A).

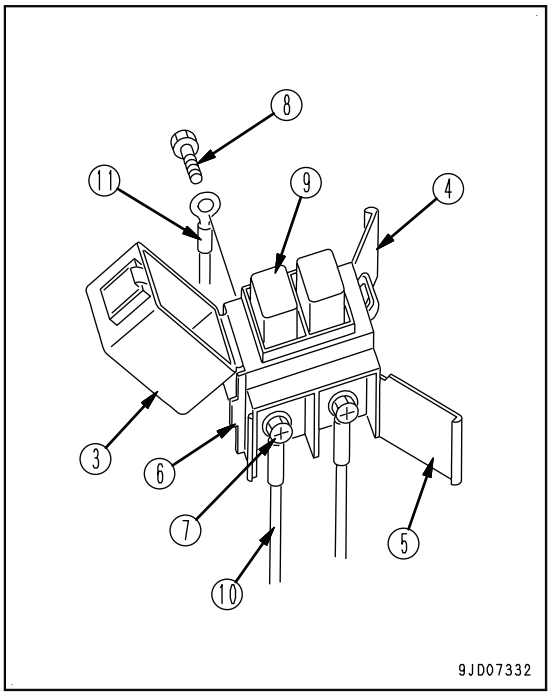


2. Turn the battery disconnect switch key (1) to OFF position and check that the system operation lamp (2) is turned off.





3. Remove the slow-blow fuse box from the machine body.
4. Open covers (3), (4) and (5) of the slow-blow fuse box.
   You can remove the box easily by removing the covers (4) and (5) with a flat-head screwdriver by using projection (6) as leverage.
5. Loosen and remove screws (7) and (8).
   When you remove screws (7) and (8), slow-blow fuse (9) comes off along with electric wiring (10) and (11).
6. Install a new slow-blow fuse to the slow-blow fuse box along with electric wiring (10) and (11) with screws (7) and (8), then close covers (3), (4) and (5).
7. Install the slow-blow fuse box to the machine.



CHECK FUNCTION OF ACCUMULATOR *(WA320-L370-360-K-00-A)*

For details of the handling of the accumulator, see "ACCUMULATOR AND GAS SPRING (PAGE 2-44) ".

ECSS ACCUMULATOR *(WA320-L370-360-K-01-A)*

If you turn ECSS switch to ON position, the function of the hydraulic spring of the accumulator reduces the bounce of the machine by absorbing the vertical motion of the machine in travel.
Compare the vertical motion of the machine when ECSS switch is turned to ON position with the vertical motion of the machine when ECSS switch is turned to OFF position.
If no difference is recognized in the vertical motion between the 2 settings, the accumulator gas pressure may lower.
Ask your Komatsu distributor for inspection.

REMARK
Carry out the inspection when the machine is traveling at a speed of at least 10 km/h (6.2 MPH). Even if the travel damper switch is ON, the travel damper is not actuated if the travel speed is less than 5 km/h (3.1 MPH).

BRAKE ACCUMULATOR *(WA320-G2G0-360-K-00-A)*

When the brake pedal is depressed, the hydraulic spring effect of the accumulator actuates the brake smoothly.
If any change is felt in the smoothness of the brake operation during daily operations, the gas pressure in the accumulator has probably dropped.
Ask your Komatsu distributor for inspection.

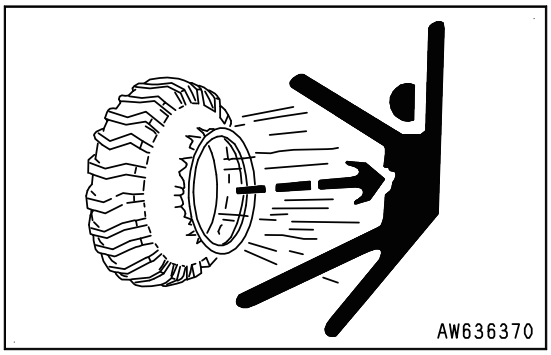
REMARK
Even if there is any change in the smoothness, there is no drop in the braking force or brake performance.

TIRE SELECTION AND CHECK *(WA-DW60-2AH-K-00-A)*

⚠ WARNING

If a tire or a rim is handled improperly, the tire may burst or may be damaged and the rim may be broken and scattered, and that can cause serious injury or death.

- **Since maintenance, disassembly, repair and assembly of the tires and rims require special equipment and skill, be sure to ask a tire repair shop to do the work.**
- **Welding and bonfire near the tires are prohibited.**



TIRE SELECTION *(WA320-DW60-05A-K-00-A)*

⚠ WARNING

Select the tires according to the conditions of use and the weight of the attachments on the machine. Use only specified tires and inflate them to the specified pressure.

Select the tires according to the conditions of use and the weight of the attachments of the machine. Use the following table. The speed display on machine monitor varies with the tire size. When using optional tires, contact to your Komatsu distributor.

NOTICE

To confirm whether the given tire can be installed or not, contract your Komatsu distributor.

- **Do not install the tire protector (mesh chain) to rear wheels.**
- **If you install tires that increases the weight remarkably such as urethane tires, the machine may be damaged due to the unexpected load, so do not install.**
- **If a tire not specified by Komatsu is used, rim displacement between the tire and rim may occur. Operator comfort, as well, may be degraded.**

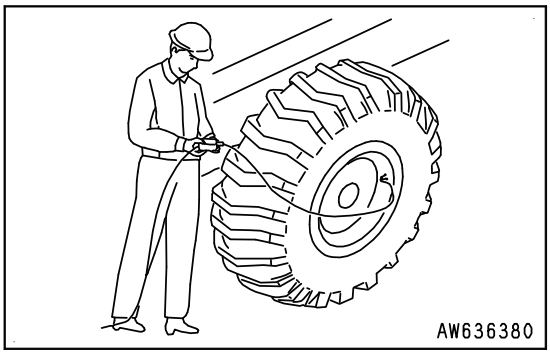
	Maximum load [kg {lb}]	Tire size
Radial	Front wheel: 8,000 {17,640} Rear wheel: 8,000 {17,640}	Front wheel: 20.5R25☆(L3:Rock) Rear wheel: 20.5R25☆(L3:Rock)
Bias	Front wheel: 6,775 {14,939} Rear wheel: 6,775 {14,939}	Front wheel: 20.5-25-12PR Rear wheel: 20.5-25-12PR

CHECK TIRE PRESSURE, INFLATE *(WA-DW60-2AH-K-01-A)*

⚠ WARNING

When inflating the tire, check that no one will enter the working area, and use an air chuck with a clip that can be fixed to the air valve.

- **When inflating the tire, check the inflation pressure occasionally with air gauge so that it will not rise too high.**
- **If the rim is not fitted normally, it may be broken and scattered while the tire is inflated. Accordingly, place a guard around the tire and do not work in front of the rim but work on the tread side of the tire.**
- **Abnormal drop of inflation pressure and abnormal fitting of the rim indicate a trouble in the tire or rim. In this case, be sure to ask a tire repair shop for repair.**
- **Be sure to observe the specified inflation pressure.**
- **Do not adjust the tire inflation pressure immediately after traveling at high speed or operating under heavy load.**



CHECK *(WA-DW60-360-K-01-A)*

Measure the inflation pressures of the tires while the tires are cool before work by use of the tire pressure gauge.

CHARGE *(WA270-DW60-21A-K-00-A)*

Adjust the inflation pressure properly.
When inflating a tire, use an air chuck which can be fixed to the air valve of the tire as shown in the figure. Do not work in front of the rim but work on the tread side of the tire.
The proper inflation pressure is shown below.

	Tire size	Standard inflation pressure [kPa {kg/cm^2, PSI}]
Radial	20.5R25☆(L3:Rock)	Front wheel: 350 {3.5, 49.8} Rear wheel: 350 {3.5, 49.8}
Bias	20.5-25-12PR	Front wheel: 325 {3.25, 46.2} Rear wheel: 280 {2.8, 39.8}

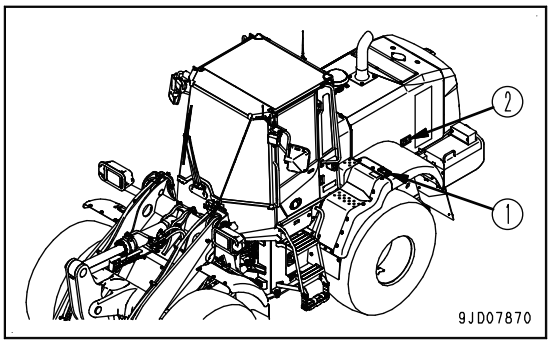
NOTICE
Appropriate inflation pressure varies depending on the given type of work. For details, see "HANDLING TIRES (PAGE 3-210) ".

CLEAN AND REPLACE FUEL BREATHER FILTER *(WA270-AD1D-92D-K-00-A)*

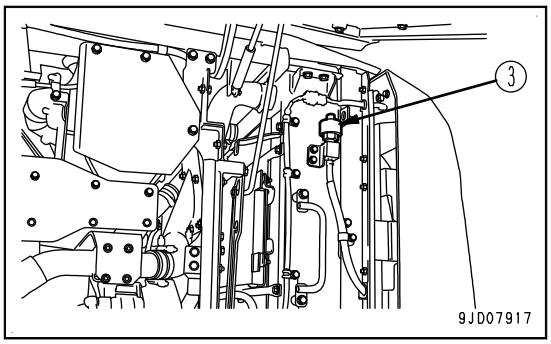
⚠ CAUTION

If you inspect or clean while engine is running, dirt enters the fuel tank and damages the engine.
Be sure to stop the engine before inspecting or cleaning.

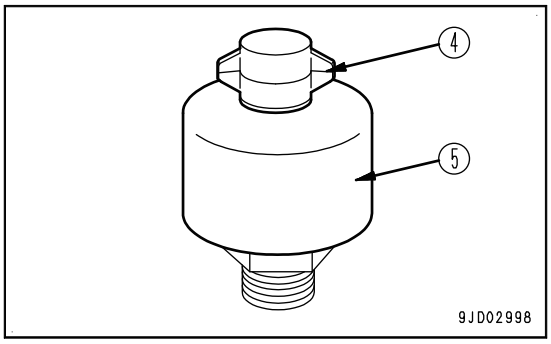
1. Undo lock (1) at the top of the rear full-length fender on the left side of the machine and open engine side cover (2).



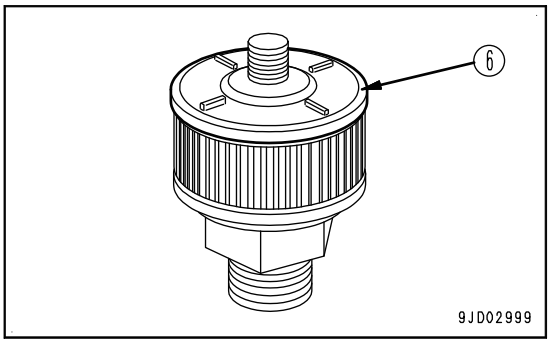
2. Loosen nut (4) at the top of fuel breather (3) on the left of aftercooler, then remove it.



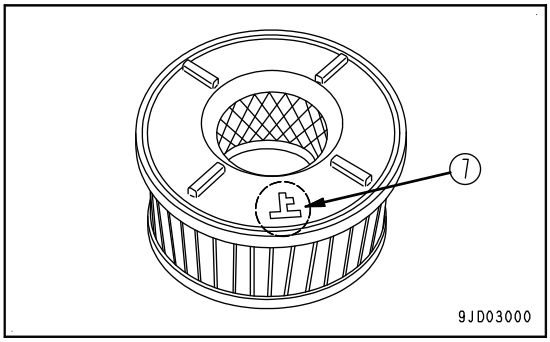
3. Turn cover (5) counterclockwise to remove it.



4. Remove element (6) upwards.
5. Blow the dry compressed air against inside of the element.



6. After cleaning, install the element to the breather body.
   At that time, install the element in correct direction.
   Direct the surface marked (7) towards up and install.
7. Install cover (5).
8. Tighten nut (4).
   Tightening torque: 10 to 14 Nm {1.0 to 1.4 kgm, 7.2 to 10.1 lbft}
9. Close engine side cover (2) and apply lock (1) of the rear full-length fender.



NOTICE
If the element is dirty or damaged, replace with new one.

CHECKS BEFORE STARTING *(WA320-3340-208-A-00-A)*

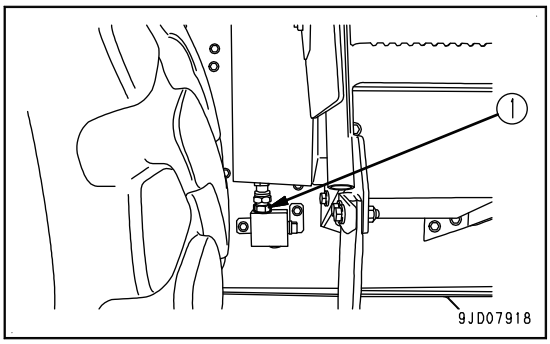
For details of the following items, see "CHECKS BEFORE STARTING (PAGE 3-145) ".

- Check machine monitor
- Check coolant level, add coolant
- Check oil level in engine oil pan, add oil
- Check water separator, drain water
- Check air cleaner
- Check fuel level, add fuel
- Check electric wiring
- Check tire pressure
- Check window washer fluid spouting out
- Check wiper function
- Check horn
- Check defroster function
- Check locks
- Check emergency escape

EVERY 50 HOURS MAINTENANCE *(ALL-3390-001-A-00-A)*

DRAIN WATER AND SEDIMENT FROM FUEL TANK *(WA270-AD10-220-K-00-A)*

Prepare a container to receive drained fuel under drain valve (1) on the left side of the fuel tank.
Open drain valve (1) and drain the water mixed in the fuel and sediment at the bottom of the tank.



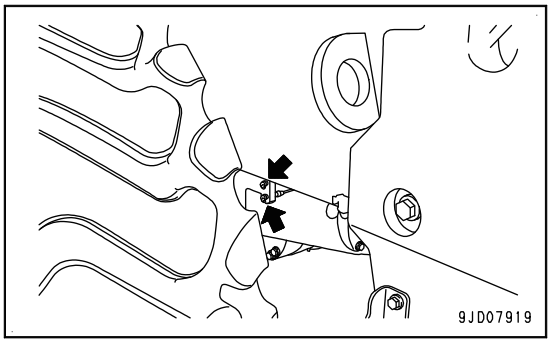
EVERY 100 HOURS MAINTENANCE *(ALL-33A0-015-A-00-A)*

Maintenance for every 50 hours service should be performed out at the same time.

LUBRICATE REAR AXLE PIVOT PIN *(WA270-DAC0-242-K-00-A)*

(2 places)

1. Pump in grease through the grease fittings marked by the arrows by using a grease pump.
2. After greasing, wipe off any old grease that is pushed out.



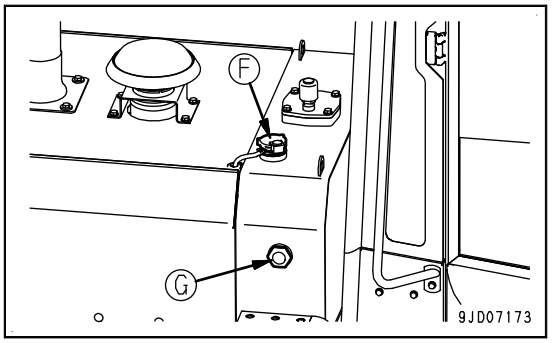
CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL *(WA320-PM30-212-K-00-A)*

⚠ WARNING

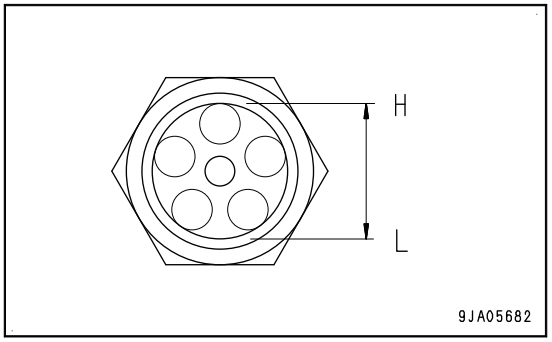
- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burn. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.**

1. Place the bucket on the ground and stop the engine. Wait for 5 minutes before checking oil level. Oil level should be between the H and L marks on sight gauge (G).

NOTICE
If the oil is added to above the H mark, stop the engine and wait for the hydraulic oil to cool down. Then drain excessive oil through the drain plug. It may damage the oil circuit and cause the oil to spurt out.



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



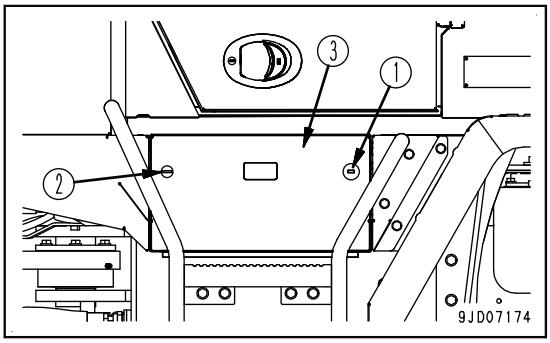
CLEAN AIR CONDITIONER FRESH AIR FILTERS *(WA320-K522-250-K-00-A)*

⚠ WARNING

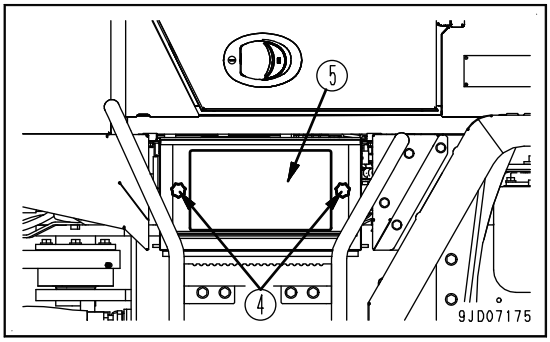
When using compressed air, there is a danger that dirt may be blown up and cause personal injury. Always wear protective equipment such as protective eyeglasses and dust mask.

When the air conditioner is used, clean the air filter element.
Before cleaning the element, stop the air conditioner.
When replacing the air filter element, articulate the machine fully to the right.

1. Insert the starting key into key slot (1), release the lock, loosen knob (2), and open cover (3).
   For details of the method of opening and closing the cover, see "OPEN AND CLOSE COVERS WITH LOCK (PAGE 3-96) "



2. Loosen knob (4) and remove element (5) to clean it.
3. Blow the dry compressed air (Max. 0.2 MPa {2.1kg/cm^2, 30.0 PSI}) to the element from inside along its pleats. Next, blow along the pleats from the outside, then blow again from the inside.
   Replace the element with a new part when the dirt clogging the element cannot be removed by blowing air or every year.
4. After cleaning, return element (5) to its original position and close the cover (3). Lock the cover with the starting key. Do not forget to remove the starting key after locking.



REMARK
If the element becomes clogged, the air flow will be reduced, and there will be an unusual noise from the air conditioner unit.

EVERY 250 HOURS MAINTENANCE *(ALL-33B0-015-A-02-A)*

Maintenance for every 50 hours service should be performed out at the same time.

CHECK LEVEL OF BATTERY ELECTROLYTE *(WA320-AW10-217-K-00-A)*

Perform this procedure before operating the machine.

⚠ WARNING

- **Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. The continuous use of the battery as it is will accelerate the deterioration of the inside materials 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 a danger of explosion. Do not bring open flame near the battery.**
- **Battery electrolyte is dangerous material. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.**

NOTICE

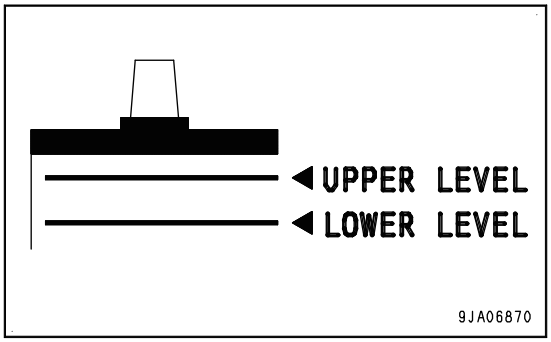
- **Do not add the electrolyte to the battery exceeding the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.**
- **When adding purified water in cold weather, add it before starting operations in the morning to prevent the purified water from freezing.**

Inspect the battery electrolyte level at least once a month and follow the procedures given below.

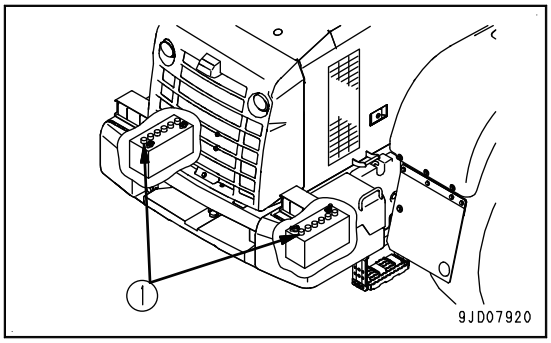
CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY *(WA270-AW10-217-K-00-A)*

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Open the cover of the battery box.
   One each of the battery box is provided on both sides of the rear part of the machine.
2. Clean the area around the electrolyte level lines with a wet cloth 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.



3. If the electrolyte level is below the middle between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines, immediately remove cap (1) and add purified water (e.g. commercially available replenishment water for a battery) to the U.L. line.
4. When you add the purified water to the cell of cap (1), add it to other cells as well.
5. Clean the vent hole of the battery cap, then close the cap securely.
   Keep the battery top surface clean and wipe off dirt on it using a wet cloth.



REMARK

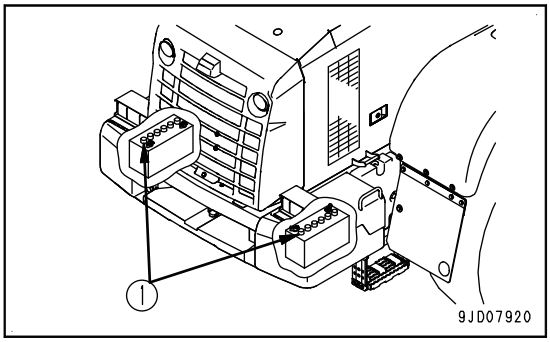
If the purified water is added to above the UPPER LEVEL (U.L.) line, use a syringe to lower the level to the UPPER LEVEL (U.L.) line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water. If necessary, consult your Komatsu distributor or a battery maker.

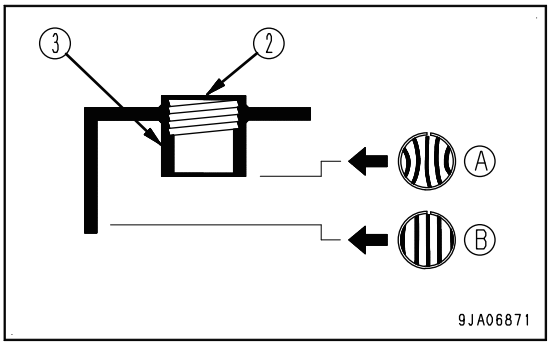
WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY *(WA270-AW10-217-K-01-A)*

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

1. Open the cover of the battery box.
   One each of the battery box is provided on both sides of the rear part of the machine.
2. Remove cap (1) at the top of the battery and check the electrolyte level through electrolyte filler port (2). If the electrolyte does not reach the sleeve (3), always add the purified water (e.g. commercially available replenishment water for a battery) so that the level reaches the bottom of the sleeve (UPPER LEVEL line).

- (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 level:
  Electrolyte level is not up to bottom of sleeve, so poles appear straight and not bent.





3. When you add the purified water to the cell of cap (1), add it to other cells as well.
4. After adding the purified water, tighten cap (1) securely.

REMARK

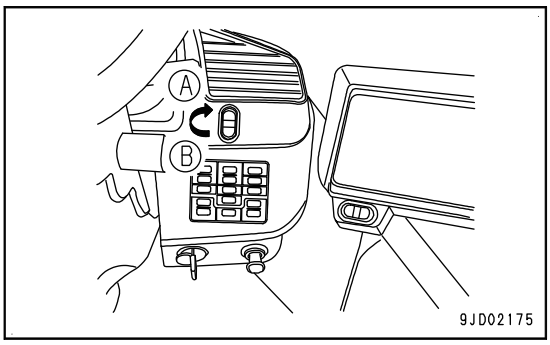
If the purified water is added to above the bottom of the sleeve, use a syringe to remove electrolyte. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water. If necessary, consult your Komatsu distributor or a battery maker.

WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL *(PC-AW10-217-K-03-A)*

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

CHECK PARKING BRAKE *(WA380-GJ00-360-K-00-A)*

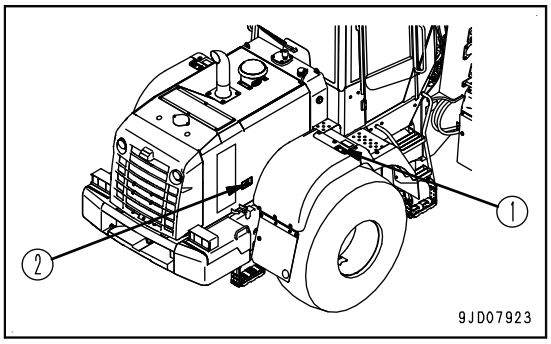
1. Turn the parking brake switch from OFF position (B) to ON position (A) on a dry sloping road (downhill) to check if the machine can be kept in that position.
2. If any thing unusual is found, ask Komatsu distributor for adjustment.

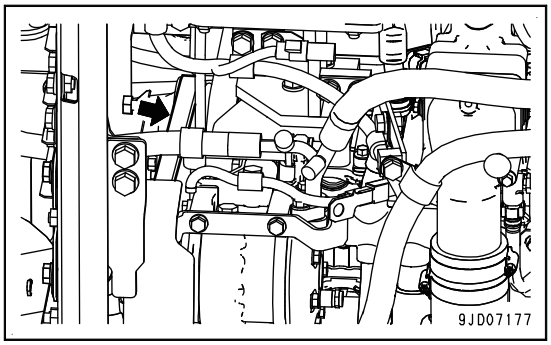


CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST *(ALL-K5A0-92C-K-00-A)*

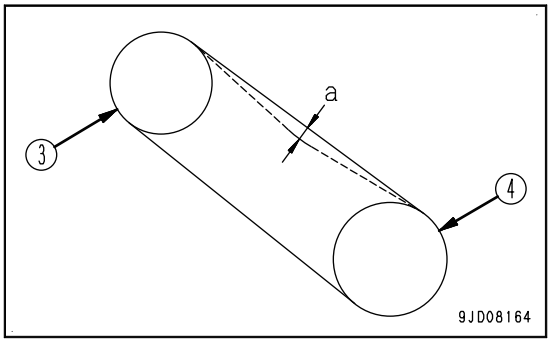
CHECK *(WA270-K5A0-360-K-00-A)*

1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).





2. Press the belt at the middle between air conditioner compressor pulley (3) and drive pulley (4) with your thumb (approximately 98 N {10 kg}). If deflection "a" is approximately 11 to 15 mm (0.43 to 0.59 in), the belt tension is normal.
   When you use a belt tension gauge, the tension is normal if it is in the range of 353 to 530 N {36 to 54 kg}.



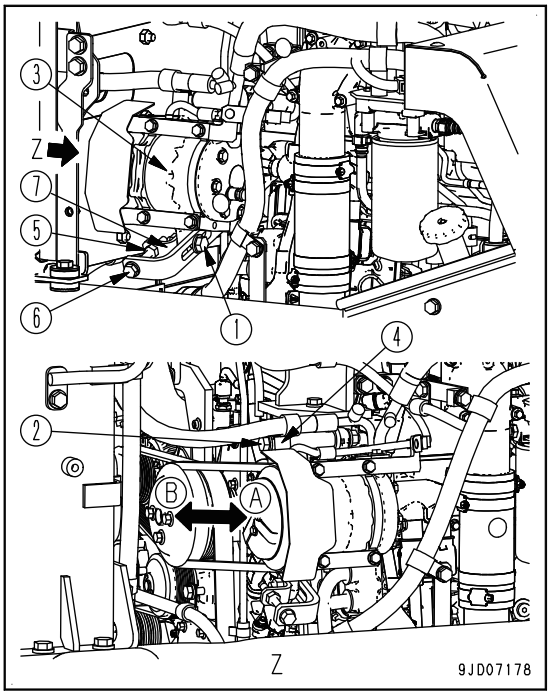
CHECKS WHEN REPLACING V BELT *(WA320-K5A0-360-K-01-A)*

Press the belt at the middle between the air conditioner compressor pulley (2) and drive pulley (3) with a finger pressure of approximately 98 N {10 kg}. If the deflection is approximately 8 to 11.5 mm (0.32 to 0.45 in), the belt tension is normal.
When you use a belt tension gauge, the tension is normal if it is in the range of 530 to 745 N {54 to 76 kg}.

REMARK
When the belt is replaced with a new one, the above value is employed as the initial tension since a stronger tension is required.

ADJUSTMENT *(WA320-K5A0-270-K-00-A)*

1. Loosen bolts (1) and (2).
   Compressor (3) is installed to bracket (4). When bolts (1) and (2) are loosened, it becomes possible to move bracket (4) with the mounting position of bolt (2) being the fulcrum.
2. Compressor (3) can be moved in direction A by tightening bolt (6) after loosening nut (5) installed to the bracket and the compressor belt can be stretched.
3. After adjusting the belt tension properly, tighten nut (5) until it touches bracket (7) and tighten it further in direction B.
   Tightening torque: 59 to 74 Nm {6 to 7.5 kgm, 43.4 to 54.2 lbft}
4. Tighten bolts (1) and (2) to fix bracket (4).
   Tightening torque of bolt (1): 98 to 123 Nm {10 to 12.5 kgm, 72.3 to 90.4 lbft}
   Tightening torque of bolt (2): 98 to 123 Nm {10 to 12.5 kgm, 72.3 to 90.4 lbft}



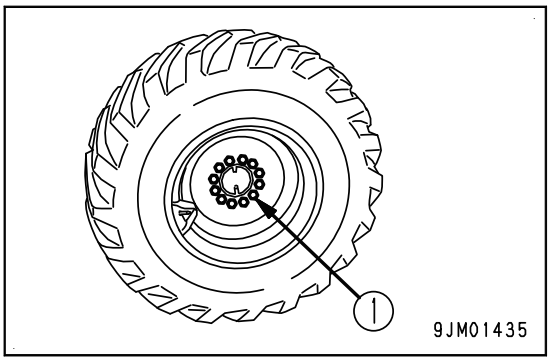
NOTICE

- **Check each pulley for damage and wear of the V-groove, and the wear of the V-belt.**
  In particular, be sure to check that the V-belt is not touching the bottom of the V-groove.
- **Replace the belt with a new one if the belt is stretched and has no allowance for adjustment, or has slipping sound or squeak because of cuts or cracks of the belt.**
- **When the new V-belt is installed, readjust it after one hour of operation.**

CHECK LOOSENESS OF WHEEL HUB BOLTS, RETIGHTEN *(WA320-DA51-71A-K-00-A)*

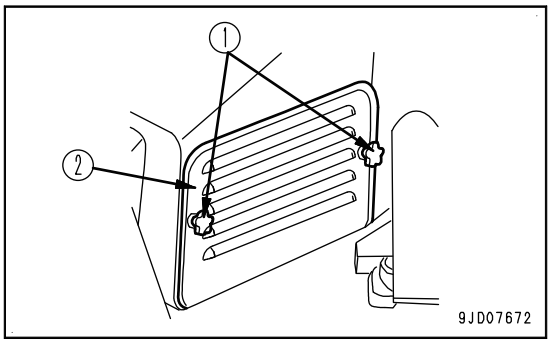
Loosening of wheel hub bolt (1) accelerates the wear of the tires and causes accidents.

1. Check the bolt for loosening and tighten it further if necessary.
   When you check the belt for loosening, be sure to do it by turning the bolt to the tightening direction.
   Tightening torque: 785 to 980 Nm {80 to 100 kgm, 579 to 723 lbft}
2. If the bolt is broken, replace all of the bolts of the wheel.

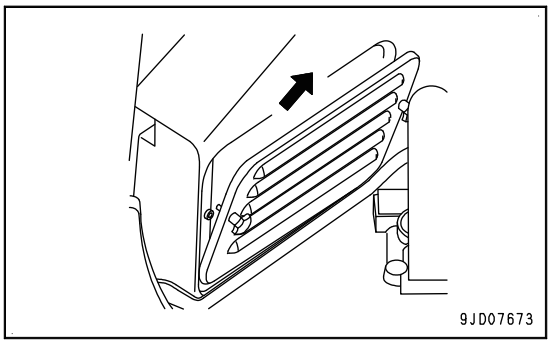


CLEAN AIR CONDITIONER RECIRCULATION AIR FILTER *(WA320-K521-250-K-00-A)*

1. Loosen knob (1) and tilt the top of filter inspection cover (2) along with the filter.



2. Remove cover (2) and filter together in the direction of the arrow.
3. Remove the filter from cover (2).
4. Clean it by using compressed air as you did for the fresh air filter.
   If the clogged material of the filter cannot be removed by blowing air, replace the filter immediately. Or, replace the filter with a new part every year.
5. When installing the filter, fit it to cover (2) first. Insert the filter and cover (2) together between the filter box and the floor mat from a diagonally upper position.
6. Tighten the knob aligning it with the knob installation position.



REMARK

If the filter becomes clogged, the air flow will be reduced, and there will be an unusual noise from the air conditioner unit.

CHECK FUNCTION OF ACCUMULATOR *(WA320-G2G0-360-K-02-A)*

For details of the handling of the accumulator, see "ACCUMULATOR AND GAS SPRING (PAGE 2-44) ".

BRAKE ACCUMULATOR *(WA-G2G0-360-K-01-A)*

If the engine stops during travel, the brake can be applied with the oil pressure in the accumulator as an emergency operation.

1. Park the machine on a level ground and lower the work equipment to the ground.
2. Apply the parking brake.
3. Start the engine and run it at medium speed for one minute, and then stop it.
4. Turn the starting switch to ON position and depress the brake pedal several times.
   - If the brake oil pressure caution lamp does not light up after you depress the brake pedal 6 times, the gas pressure in the accumulator is normal.
   - If the brake oil pressure caution lamp light up, when you depress the brake pedal 5 times or less, the accumulator gas pressure may be low. Ask your Komatsu distributor for inspection.

REMARK

The inspection must be done within 5 minutes after the engine stops. If the engine is kept stopped, the gas pressure in the accumulator lowers and the inspection cannot be made.

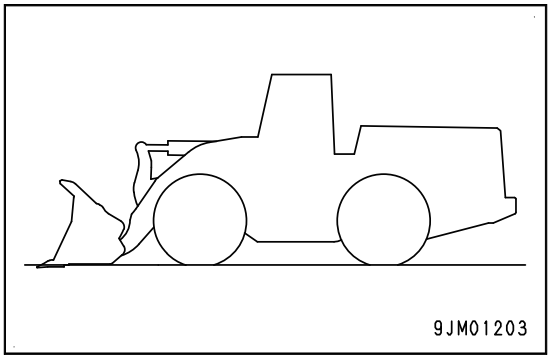
LUBRICATE WORK EQUIPMENT *(WA320-RA1H-242-K-00-A)*

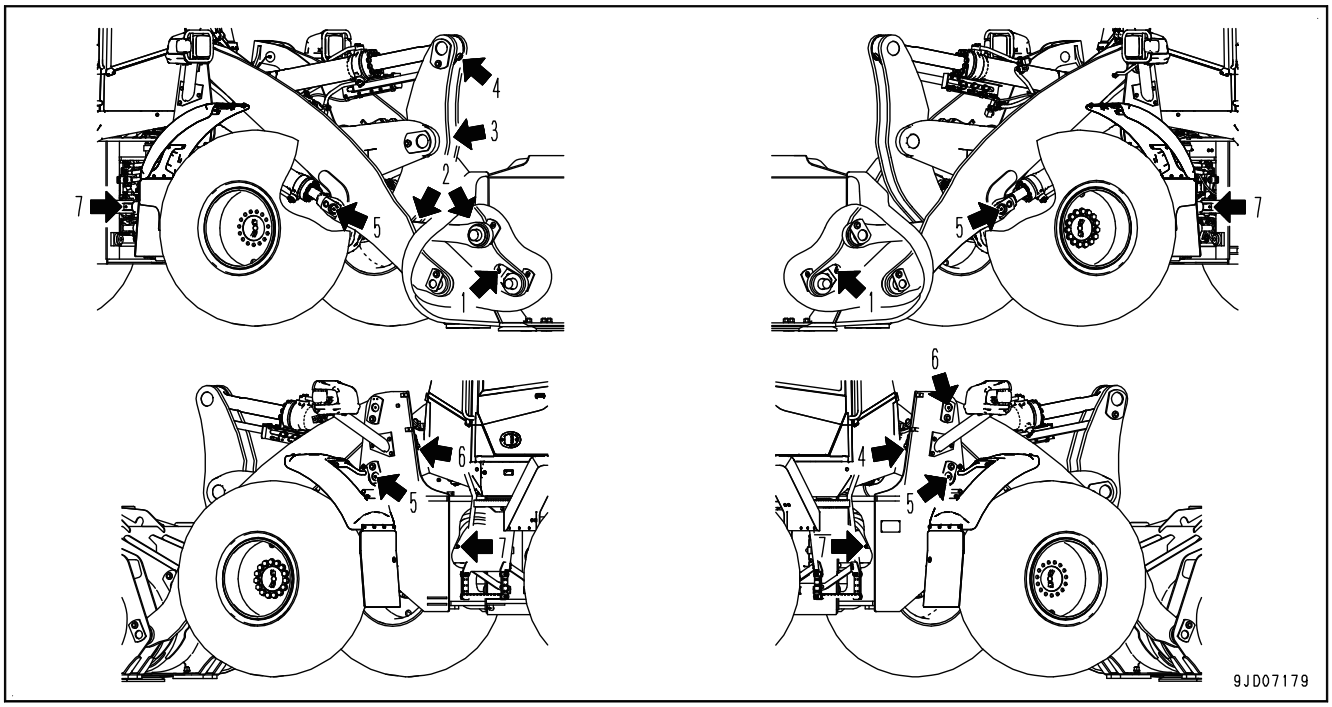
NOTICE

Shorten the greasing interval than usual in a jobsite where the machine works for severe operations, or for continuous operations that last eight or more hours.

Grease the machine once for every ten hours until the initial 100 hours are reached.

1. Put the work equipment horizontally in contact with the ground, then stop the engine.
2. By using a grease pump, pump in grease through the grease fittings marked by the arrows.
3. After greasing, wipe off any old grease that was pushed out.





(1) Bucket pin (2 places)
(2) Bucket link pin (2 places)
(3) Bell crank pin (1 place)
(4) Bucket cylinder pin (2 places)
(5) Lift cylinder pin (4 places)
(6) Boom pivot pin (2 places)
(7) Steering cylinder pin (4 places)

EVERY 500 HOURS MAINTENANCE *(ALL-33C0-015-A-05-A)*

Maintenance for every 50, 100 and 250 hours should be carried out at the same time.

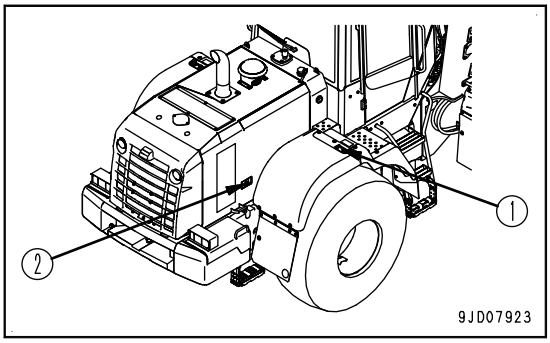
CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE *(WA270-AB02-923-K-00-A)*

⚠ WARNING

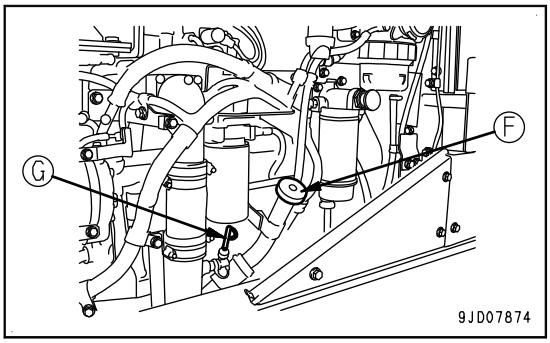
- **Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they cool down before starting the work.**
- **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.**

- Refill capacity: 23 liters (6.08 US gal)
- Prepare a filter wrench

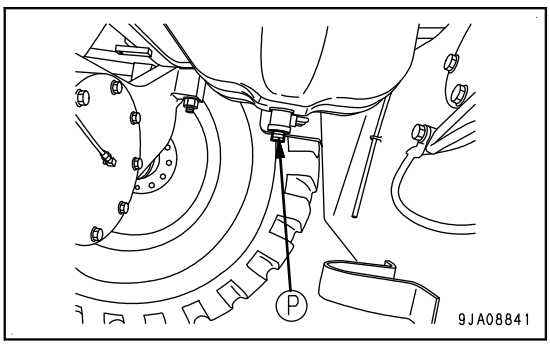
1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).



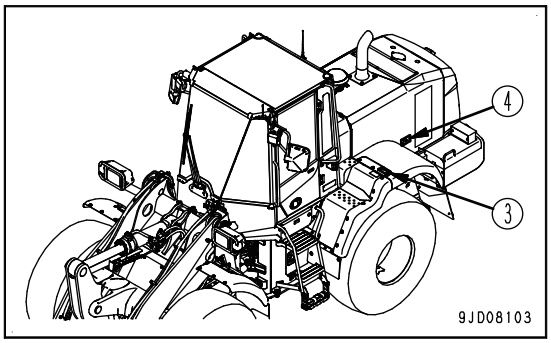
2. Open engine oil filler (F).



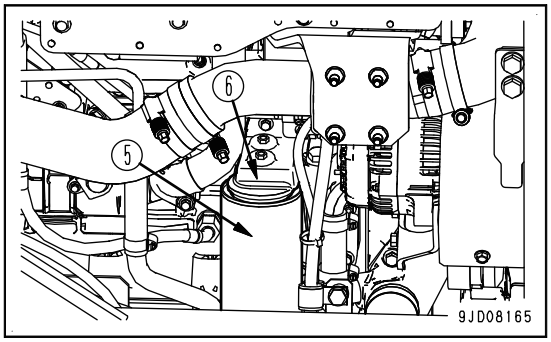
3. Place a container directly under drain plug (P) to catch the drained oil.
4. Loosen drain plug (P) to drain the oil.
5. Check the drained oil, and if there are excessive metal particles or foreign material, contact your Komatsu distributor.
6. Tighten drain plug (P).



7. Undo lock (3) at the top of the rear full-length fender on the left side of the machine and open engine side cover (4).

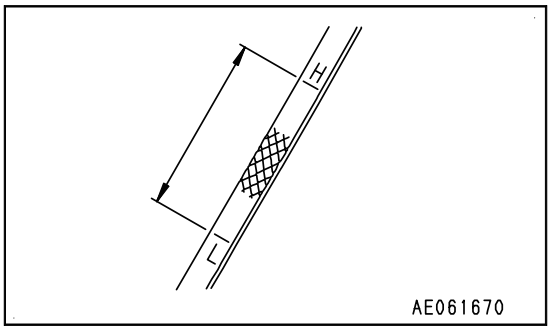


8. By using the filter wrench, turn filter cartridge (5) counterclockwise to remove it.
   If this operation is carried out immediately after stopping the engine, a large amount of oil will come out, so wait for 10 minutes before starting the work.
9. Clean filter holder (6), fill the new filter cartridge with clean engine oil, coat the seal and thread of the new filter cartridge with engine oil (or apply thin film of grease), then install it.



REMARK
Check that there is no old packing stuck to filter holder (6). If there is any old packing stuck to the holder, it will cause leakage of oil.

10. When installing the filter cartridge, tighten it until the seal surface contacts filter holder (6), then tighten it 3/4 of a turn.
11. After replacing the filter cartridge, refill with oil through oil filler (F) until the oil level is between the H and L marks on the dipstick (G).
12. Run the engine at low idle for a time, then stop the engine and check that the oil level is between H and L marks on the level gauge. For details, see "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-147) ".



REMARK
When the ambient temperature is low, water or emulsified matter may stick to the dipstick, oil filler cap, etc. or the drained oil may be milky white because of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem. After changing the oil, if small amount of emulsified matter remains, it is not a problem.

REPLACE FUEL PREFILTER CARTRIDGE *(WA270-AEA0-923-K-00-A)*

⚠ WARNING

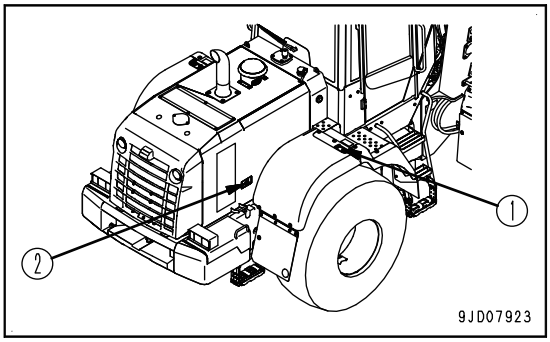
- **Immediately after the engine is stopped, the parts are still very hot. Do not replace the filter immediately. Wait until all of parts cool down before starting the work.**
- **High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
- **Do not bring any open flame close.**

NOTICE

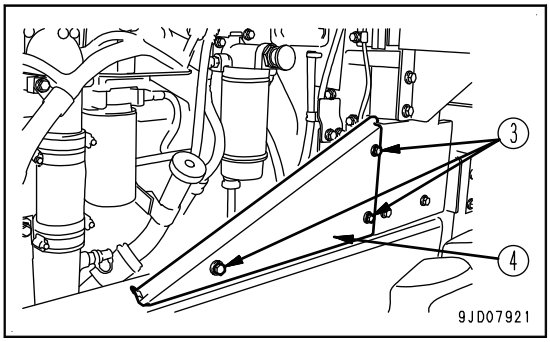
- **Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing parts, Komatsu recommends using Komatsu genuine parts.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle. If any cartridge other than a Komatsu genuine 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 the inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt sticks to any part, use fuel to wash it off completely.**

- Prepare a container to catch drained oil.
- Prepare a filter wrench

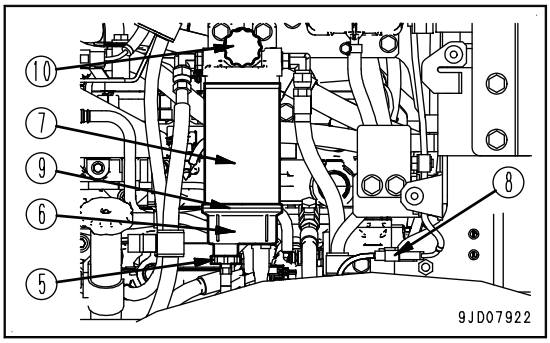
1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).



2. Remove bolts (3) (3 pieces) to remove cover (4).



3. Place the container to catch the fuel under the prefilter cartridge.
4. Loosen drain valve (5) to drain water and sediments from transparent cap (6), and also drain all the fuel from filter cartridge (7).
5. Remove connector (8). Wrap the removed connector with a vinyl bag to protect it from fuel, oil and water.
6. By using the filter wrench, turn transparent cap (6) counterclockwise to remove it. (This cap is used again.)
7. By using the filter wrench, turn filter cartridge (7) counterclockwise to remove it.
8. Install the removed transparent cap (6) to the bottom of the new fuel prefilter cartridge.

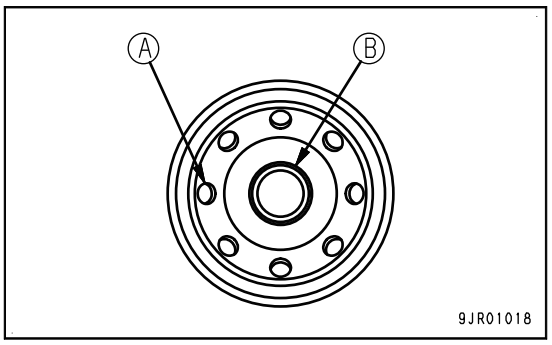


At this time, be sure to replace O-ring (9) with a new one.

9. When installing O-ring, apply thin film of fuel to the packing surface, contact it to the sealing surface of filter cartridge (7), and then tighten it 1/4 to 1/2 turns. If the transparent cap is tightened too much, the O-ring may be damaged, and this will cause the leakage of fuel. If it is not tightened enough, fuel will leak through the gap at the O-ring. Always be sure to tighten the cartridge to the specified angle.
10. Clean the filter holder, fill the new filter cartridge with clean fuel, apply thin film of fuel to the packing surface, then install it to the filter holder.

NOTICE

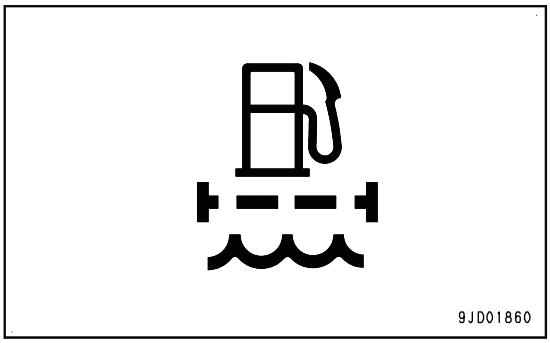
- **When filling the filter cartridge with fuel, do not remove center cap (B). Always fill with fuel from 8 small holes (A) on the dirty side.**
- **After filling with fuel, remove cap (B) and install the fuel filter.**
- **Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (B) when filling with fuel. Be careful not to let dirt or dust get into the center portion on the clean side.**



11. When installing the cartridge, tighten it 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 tightened too loose, fuel will also leak from the packing, so always tighten to the specified angle.
12. Check that drain valve (5) is tightened securely.
13. Remove the vinyl bag wrapping connector (8), then connect connector (8).

REMARK

- If water attaches to the connector (8), the sensor may malfunction and the water separator monitor may flash. When removing connector (8), take extreme care that water does not stick to connector (8).
- If water attaches to connector (8), dry it completely before connecting it.



14. After completing the replacement of filter cartridge (7), bleed the air.
15. Fill the fuel tank with fuel (to the level where the float is at the highest position).
16. Loosen the knob of feed pump (7), pull it out, then pump it in and out until the movement becomes heavy.

REMARK

- It is not necessary to remove the plugs at the fuel prefilter head and at the fuel main filter head.
- When the engine runs out of fuel, use the same procedure to operate feed pump (10) and bleed the air.

17. After bleeding air, push in the knob of feed pump (10) and tighten it.
18. After replacing the filter cartridge, start the engine and run it at low idle for 10 minutes.
    Check the filter sealing surface and transparent cap mounting surface for fuel leakage. If there is any leakage of fuel, check the tightening condition of the filter cartridge. If there is still fuel leakage, repeat steps 1 to 7 to remove the filter cartridge, and if any damage or pinched foreign material on the packing surface is found, replace it with a new cartridge and repeat steps 8 to 17 to install it.

REMARK

Sometimes some air is still left inside water separator (7) after air bleeding, but the engine can be started by operating feed pump (10) until its motion gets hard. The remaining air is naturally bled when the water separator is left as it is for a while after the engine stops.

EVERY 1000 HOURS MAINTENANCE *(ALL-33D0-015-A-04-A)*

Maintenance for every 50, 100, 250 and 500 hours service should be performed at the same time.

REPLACE FUEL MAIN FILTER CARTRIDGE *(WA270-AED0-923-K-00-A)*

⚠ WARNING

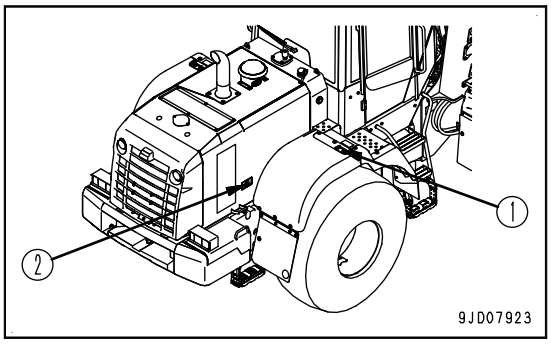
- **Immediately after the engine is stopped, the parts are still very hot. Do not replace the filter immediately. Wait until all of parts cool down before starting the work.**
- **High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
- **Do not bring any open flame close.**

NOTICE

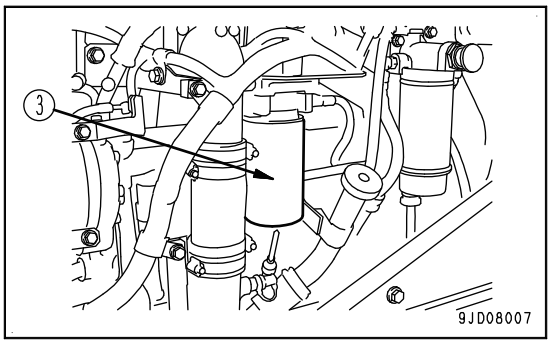
- **Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the fuel filter cartridge, use Komatsu genuine one.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle. If any cartridge other than a Komatsu genuine 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 the inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt sticks to any part, use fuel to wash it off completely.**
- **After removing the filter cartridge, fuel drops fall down from the filter head. In order to prevent the fuel from flowing out, be sure not to leave the machine without the filter cartridge.**

- Prepare a container to catch drained fuel.
- Prepare a filter wrench

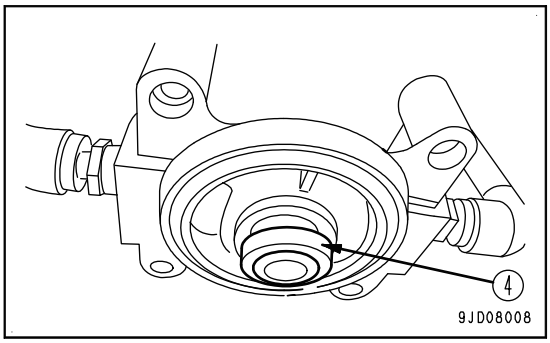
1. Undo lock (1) at the top of the rear full-length fender on the right side of the machine and open engine side cover (2).



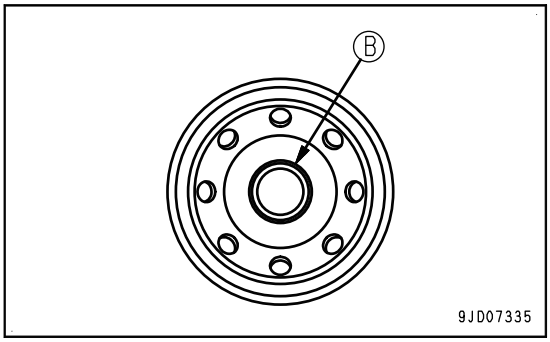
2. Place a container to catch the fuel under the fuel main filter cartridge.
3. By using the filter wrench, turn filter cartridge (2) counterclockwise to remove it.
   - If filter cartridge (3) is removed, fuel drops fall down from the filter head. In order to prevent the fuel from flowing out, be sure not to leave the machine while filter cartridge (3) is removed.
4. Clean the filter holder, apply the thin film of oil to the packing surface of the new filter cartridge, then install the filter cartridge to the filter holder.



- Replace inner seal (4) with a new part.



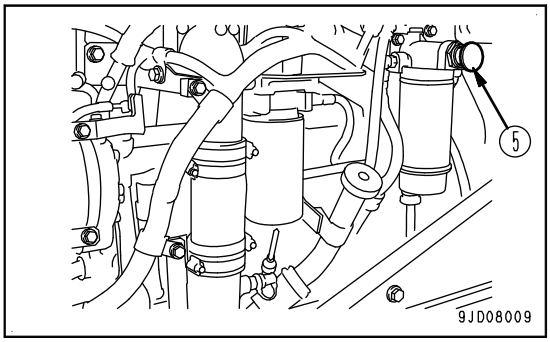
NOTICE
Do not fill the new filter cartridge with fuel.
Remove cap (B) at center and install the filter cartridge.



5. When installing the cartridge, tighten it 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 tightened too loose, fuel will also leak from the packing, so always tighten to the specified angle.
6. After completing the replacement of filter cartridge (3), bleed the air.

Bleed the air as follows:

7. Fill the fuel tank with fuel (to the level where the float is at the highest position).
8. Loosen the knob of feed pump (5), pull it out, then pump it in and out until the movement becomes heavy.



REMARK

- It is not necessary to remove the plugs at the fuel prefilter head and at the fuel main filter head.
- When the engine runs out of fuel, use the same procedure to operate feed pump (5) and bleed the air.

9. Push in the knob of feed pump (5) and tighten it.
10. After replacing the filter cartridge, start the engine and run it at low idle for 10 minutes.
    Check the filter seal surface for fuel leakage. If there is any leakage of fuel, check the tightening condition of the filter cartridge. If there is still fuel leakage, repeat steps 1 to 3 to remove the filter cartridge, and if any damage or pinched foreign material on the packing surface is found, replace it with a new cartridge and repeat steps 4 to 10 to install it.

REMARK

Sometimes some air is still left inside the water separator after air bleeding, but the engine can be started by operating feed pump (4) until its motion gets hard. The remaining air is naturally bled when the water separator is left as it is for a while after the engine stops.

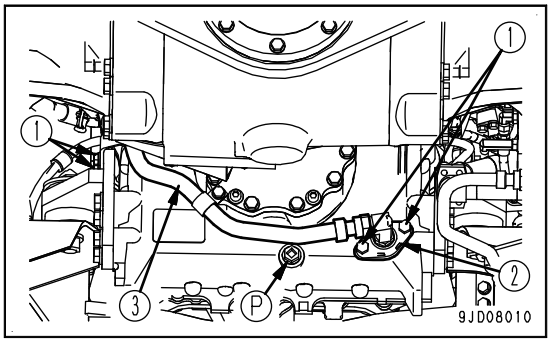
CHANGE OIL IN TRANSFER CASE AND CLEAN TRANSFER CASE STRAINER *(WA270-D348-923-K-00-A)*

⚠ WARNING

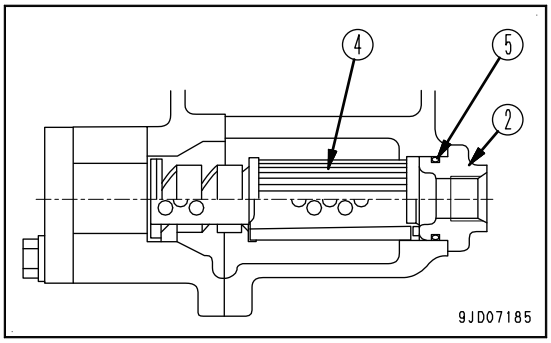
- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**
- **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it with care.**

- Refill capacity: 7.0 liters (1.85 US gal)

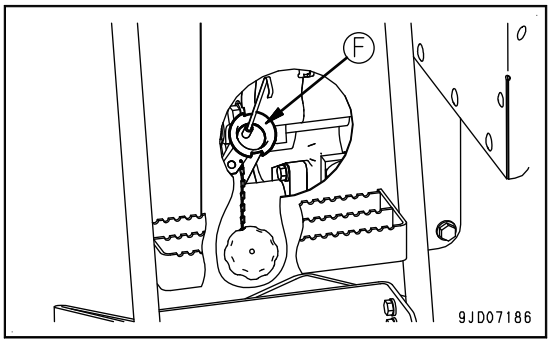
1. Place a container under drain valve (P) to catch the oil and remove drain plug (P) to drain the oil.
   Loosen drain plug (P) gradually so that the oil will not spout out, and then remove it.
2. After draining the oil, install drain plug (P).



3. Loosen bolt (1) and remove cover (2) and pipings (3) together, then take out strainer (4).
4. Remove any dirt stuck to strainer (4), then wash it with flushing oil. If the strainer (4) is damaged, replace it with a new part.
5. Install strainer (4) to the case.
   Replace the O-ring (5) of cover (2) and install cover (2).

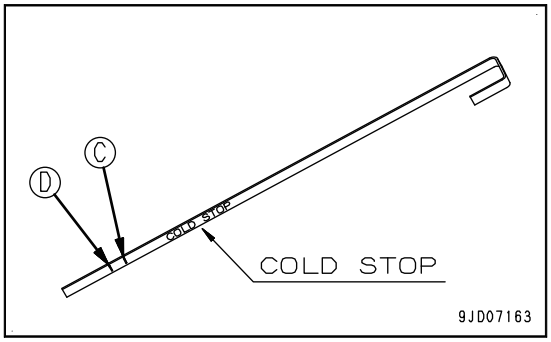


6. Refill with the specified quantity of oil through oil filler port (F).
7. Check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN TRANSFER CASE, ADD OIL (PAGE 4-23) ".



NOTICE

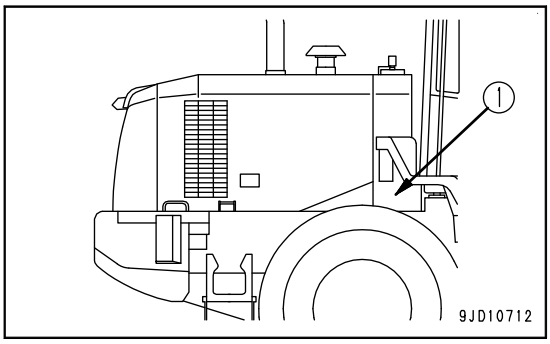
- **Before starting the engine, check that the oil level is between the (C) and (D) marks on the "COLD STOP" side of dipstick.**
- **When checking the oil level, complete the warming-up operation of the transfer, then use the "HOT IDLE" side of dipstick to make the final check of the oil level. For details, see "CHECK OIL LEVEL IN TRANSFER CASE, ADD OIL (PAGE 4-23) ".**



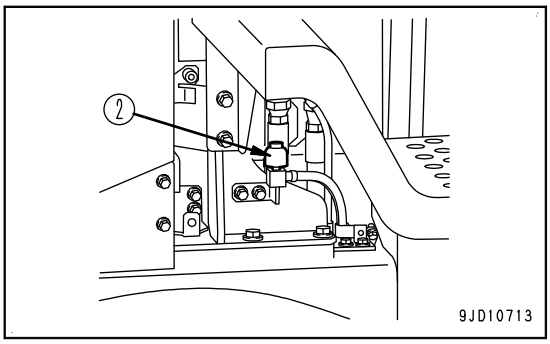
8. Check that there is no oil leakage from the transfer case.

CLEAN TRANSFER BREATHER *(WA320-D341-92D-K-00-A)*

1. Remove cover (1).



2. Remove the mud and dirt from around the breather (2), then remove breather (2).
   After removing the breather, take steps to prevent dirt or dust from entering the mount.
3. Soak the breather (2) in washing liquid and wash it.

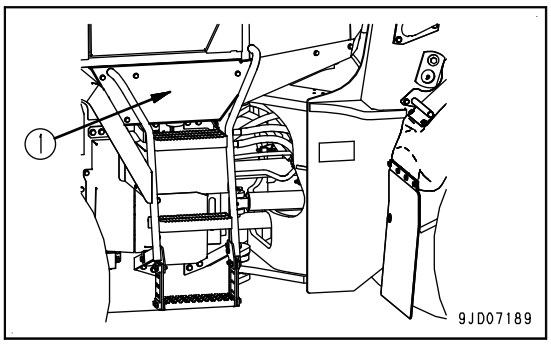


REPLACE HST OIL FILTER CARTRIDGE *(WA320-C741-923-K-00-A)*

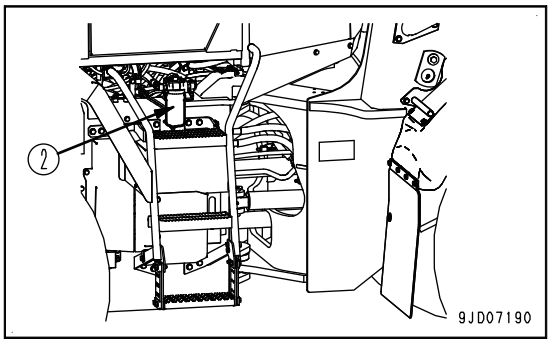
⚠ WARNING

- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**
- **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it with care.**

1. Remove cover (1).



2. By using a filter wrench, turn filter cartridge (2) to the left to remove it.
3. Install the new filter cartridge.
   When the packing surface comes into contact with the seal surface of the filter holder, tighten a further 1/2 turn.
   Tightening torque: 29 to 39 Nm {3.0 to 4.0 kgm, 21.7 to 28.9 lbft}
4. Run the engine at low idle for 5 minutes to bleed the air from the HST circuit.
5. Check that the hydraulic oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-46) ".
6. Run the engine at low idle, and extend and retract the steering, bucket, and lift cylinders 4 to 5 times. Be careful not to operate the cylinder to the end of its stroke (stop approx. 100 mm (3.9 in) before the end of stroke).



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.

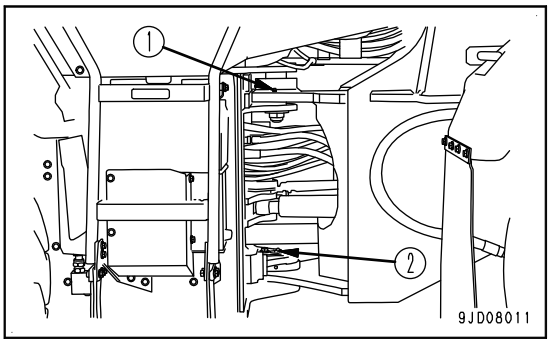
7. Operate the steering, bucket, and lift cylinders to the end of their stroke 3 to 4 times, then stop the engine and loosen filler cap to bleed the air from the hydraulic tank.
8. Check that the hydraulic oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-46) ".
9. After completing the air bleed operation, install cover (1).

Replace the HST filter element if the HST oil filter clogging caution lamp lights up, even if 1000 hours or 1 year has not passed.

LUBRICATE CENTER HINGE PIN *(WA270-H1L2-242-K-00-A)*

1. Pump in grease through the grease fittings marked by arrows by using a grease pump.
2. After greasing, wipe off any old grease that is pushed out.

(1) Upper part of center hinge pin (1 place)
(2) Lower part of center hinge pin (1 place)



CHECK FOR LOOSENESS OF ENGINE INTAKE PIPE CLAMP *(WA-A980-286-K-00-A)*

Ask your Komatsu distributor to check the tightening of the clamps between the air cleaner, turbocharger, after-cooler and engine.

CHECK ALTERNATOR DRIVE BELT TENSION, REPLACE *(WA-AKM4-92E-K-00-A)*

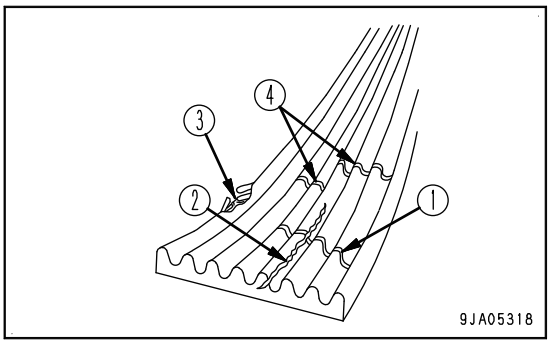
Special tools are required for the inspection and replacement of the belt. Contact your Komatsu distributor.

REMARK
Since the auto-tensioner is installed, tension adjustment is not required.

If the alternator drive belt shows the following conditions, it must be replaced. If it happens, ask your Komatsu distributor to replace it.

- When vertical flaw (2) that crosses horizontal flaw (1) is observed.
- When part of the belt has tears (3).

When only horizontal flaw (4) is found, replacement is not required.



EVERY 2000 HOURS MAINTENANCE *(ALL-33E0-015-A-04-A)*

Maintenance for every 50, 100, 250, 500 and 1000 hours service should be performed at the same time.

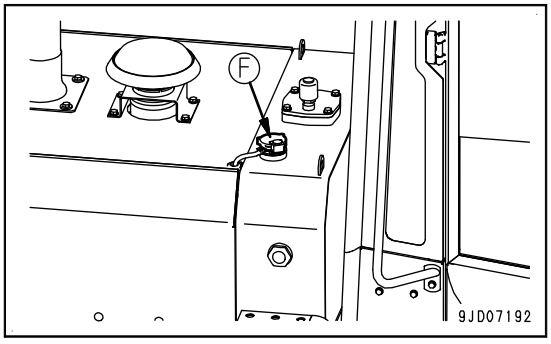
CHANGE OIL IN HYDRAULIC TANK, AND CLEAN HYDRAULIC TANK STRAINER *(WA270-PM30-292-K-00-A)*

⚠ WARNING

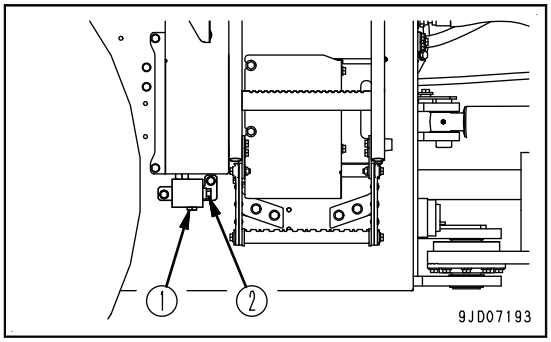
- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**
- **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.**

- Refill capacity: 78 liters (20.6 US gal)

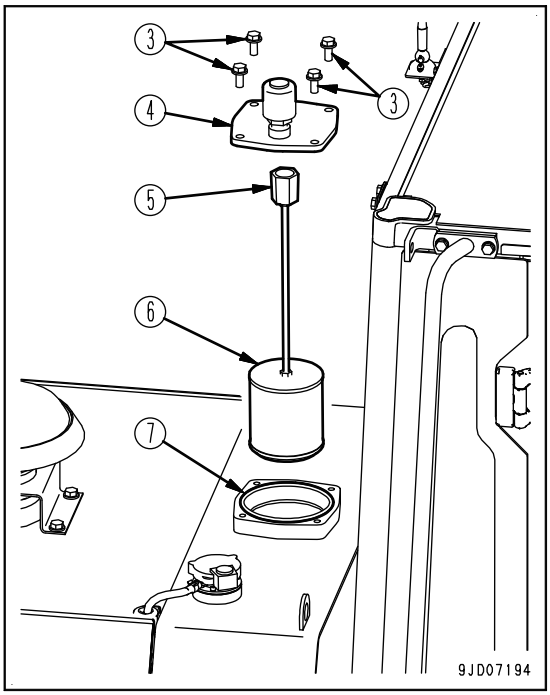
1. Lower the bucket to the ground with its bottom level, apply the parking brake, then stop the engine.
2. Remove the cap of oil filler port (F).



3. Place a container under drain plug (1) to catch the drained oil.
4. Remove drain plug (1).
5. Open drain valve (2) gradually to drain the oil.
6. After draining the oil, close drain valve (2) and tighten drain plug (1).
   Tightening torque
   Drain plug (1): 29.4 ± 4.9 Nm {3.0 ± 0.5 kgm, 21.7 ± 3.6 lbft}
   Drain tube (2): 63.7 ± 14.7 Nm {6.5 ± 1.5 kgm, 47 ± 10.8 lbft}



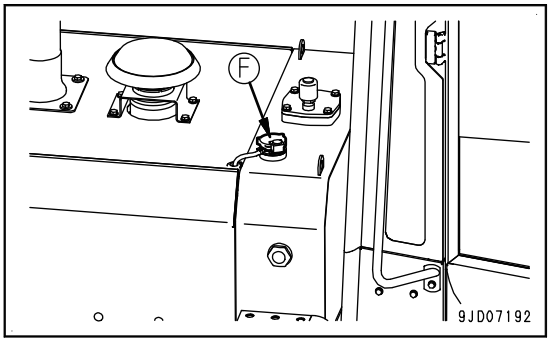
7. Remove bolts (3) (4 pieces), then remove cover (4).
8. Hold the top of rod (5) and pull it up to remove strainer (6).
9. Check inside of the tank for foreign material, then clean it.
10. Remove any dirt stuck to strainer (6), then wash it in flushing oil. If strainer (6) is damaged, replace it with a new one.
11. Install strainer (6) to the inside of the tank.
12. While pressing down the cover (4), tighten mounting bolts (3) evenly.
    When doing this, if the O-ring (7) of the cover is damaged or deteriorated, replace it.



13. Refill with the specified quantity of hydraulic oil through oil filler port (F), then install the cap.
14. Check that the hydraulic oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-46) ".
15. Run the engine at low idle, and extend and retract the steering, bucket, and boom cylinders 4 to 5 times. Be careful not to move them to the stroke end (stop them approx. 100 mm (3.9 in) before the stroke end).

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.

16. Next, move each of the steering, bucket, and boom cylinders to the stroke end 3 to 4 times. Stop the engine and loosen the cap of oil filler port (F) to bleed the air from the hydraulic tank. Then, tighten the cap.
    Bleed the air while running the engine at low idle.
17. Check that the hydraulic oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-46) ".



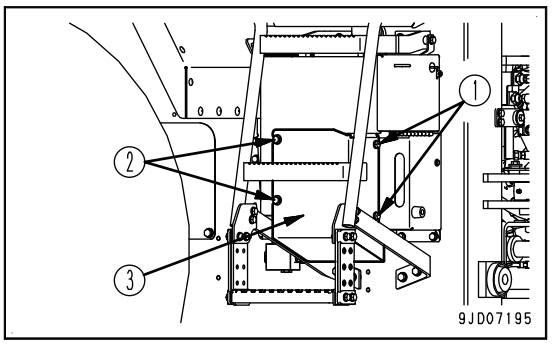
18. Next, increase the engine speed and bleed the air with procedure in step 16. Repeat this work until no air comes out.
19. Check that the hydraulic oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-46) ".
20. Check the filter cover mount for oil leakage.

REPLACE HYDRAULIC OIL FILTER CARTRIDGE *(WA320-PM35-923-K-00-A)*

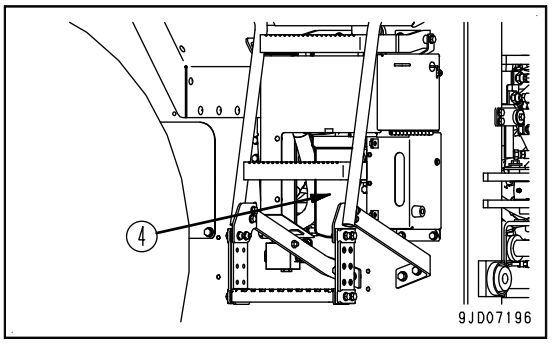
⚠ WARNING

- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**
- **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.**

1. Remove bolts (1) (2 pieces). Remove bolts (2) (2 pieces) and remove cover (3) by shifting it.



2. Put a container under filter cartridge (4) to receive drained oil.
3. By using the filter wrench, turn filter cartridge (4) counterclockwise to remove it.
4. Clean the filter holder, fill the new filter cartridge with clean oil, coat the sealing part and thread portion of the new filter cartridge with oil (or apply thin film of grease), then install. Tightening torque: 54 to 66 Nm {5.5 to 6.7 kgm, 39.8 to 48.5 lbft}
5. Install cover (3) and tighten bolts (1) and (2).



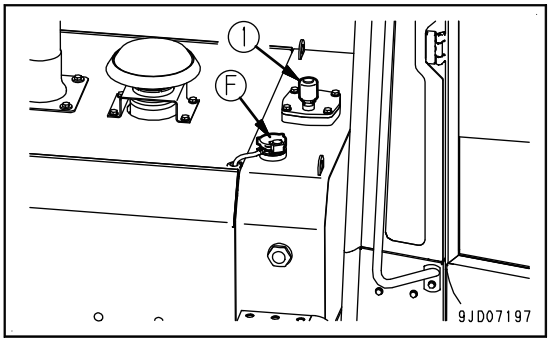
6. Check that the hydraulic oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-46) ".

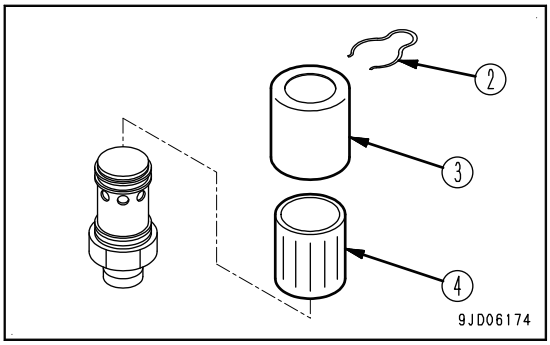
REPLACE BREATHER ELEMENT IN HYDRAULIC TANK *(WA320-PM39-923-K-00-A)*

⚠ WARNING

- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**
- **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.**

1. Before removing the breather, wipe off dirt and dusts around it.
2. Remove the cap of oil filler port (F).
3. Remove snap ring (2) of breather (1), remove breather cap (3), and replace filter element (4) with the new one. Install breather cap (3) and snap ring (2).
4. Close the cap of oil filler port (F).





CHANGE AXLE OIL *(WA270-DA10-292-K-00-A)*

⚠ WARNING

- **When changing the oil, apply the parking brake and secure the front and rear frames with the frame lock bar.**
- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**
- **If the plug is removed, oil may spurt out, so turn it slowly to release the internal pressure, then remove it with care.**

- Refill capacity
  Front: 18.5 liters (4.89 US gal)
  Rear: 18.0 liters (4.76 US gal)
- A: Front B: Rear

1. Place a container under drain plug (P) to catch the drained oil.
2. Remove front and rear plugs (1), then remove drain plug (P) to drain the oil.

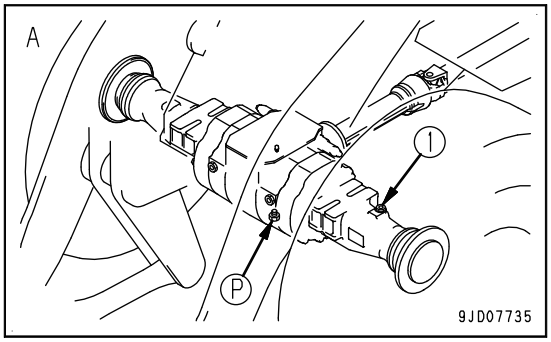
REMARK
Remove the mud and dirt from around plug (1), then remove the plug.

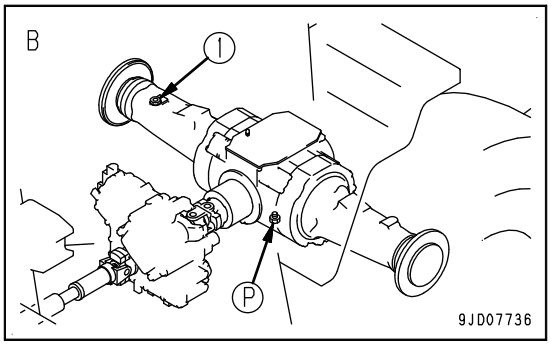
3. After draining the oil, clean drain plug (P) and install it again.
4. Refill with the specified quantity of oil through plug hole (1).

REMARK
Be sure to use the only specified lubricating oil for the axle with ASD (Anti-Slip Differential).

5. Check that the oil is at the specified level by using level plug (1). For details, see "CHECK AXLE OIL LEVEL, ADD OIL (PAGE 4-25)".

REMARK
When the given work requires to use the brake more frequently than usual, replace the axle oil earlier than the usual timing.





CHANGE AIR CONDITIONER RECIRCULATION AND FRESH AIR FILTERS *(WA320-K520-923-K-00-A)*

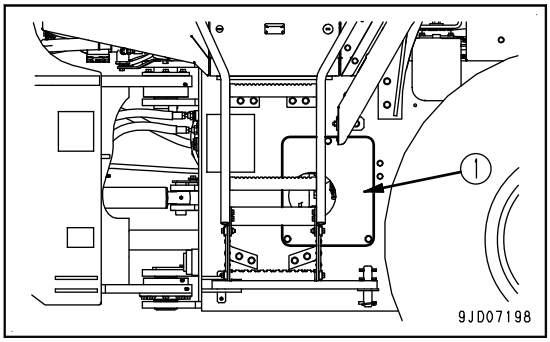
Remove both the recirculation air filter and fresh air filter in the same way as in the cleaning procedure, and replace them with new ones.
For replacement of the recirculation air filter, see "CLEAN AIR CONDITIONER RECIRCULATION AIR FILTER (PAGE 4-52)".
For replacement of the fresh air filter, see "CLEAN AIR CONDITIONER FRESH AIR FILTERS (PAGE 4-47)".

CLEAN BRAKE CIRCUIT STRAINER *(WA320-G23A-92D-K-00-A)*

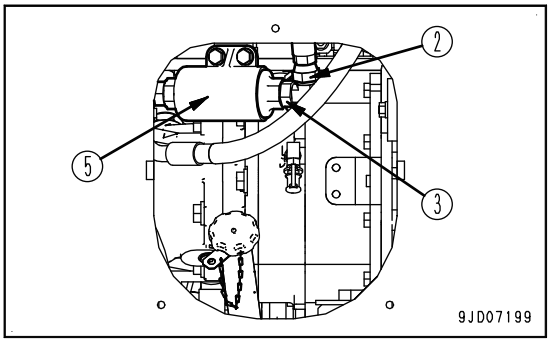
⚠ WARNING

- **After the engine is stopped, the parts and oil are at high temperature, and may cause burns. Wait for the temperature to go down before starting the operation.**
- **When the rubber hose is removed, oil may spurt out, so turn it slowly to release the internal pressure, then remove it carefully.**

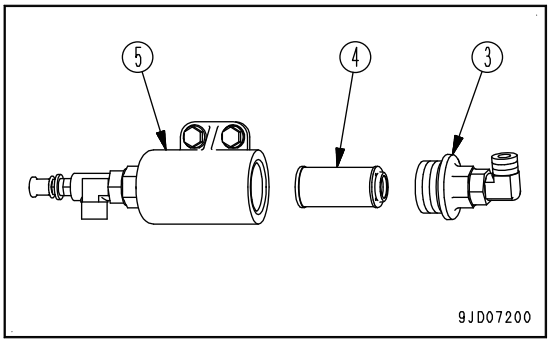
1. Remove rear frame cover (1) on the left side of the machine.



2. When rubber hose (2) and flange (3) are removed, oil will spill out, so set a container (capacity: approx. 300 cc) in position to catch the oil.
3. Remove rubber hose (2) and flange (3).



4. Remove strainer (4) and wash it in clean diesel oil.
5. Assemble strainer (4) in strainer case (5) with the strainer protrusion side (O-ring side) facing the front and fix it with flange (3).
6. Install rubber hose (2).
7. Install the cover (1).



CHECK BRAKE DISC WEAR AMOUNT *(WA270-GA77-389-K-00-A)*

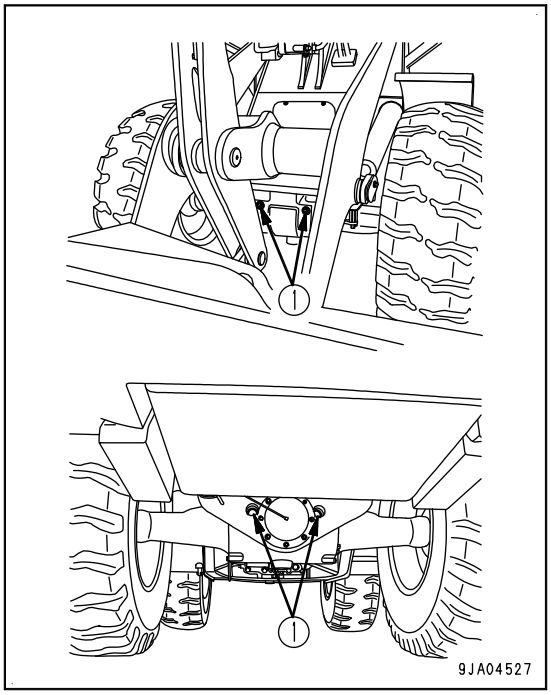
⚠ WARNING

- **When checking the condition, apply the parking brake and fix the front and rear frames by using the frame lock bar.**
- **Perform this check when the brake oil temperature is 60°C (140°F) or below.**
- **If the disc wear approaches the wear limit, check the condition frequently, regardless of the maintenance interval.**

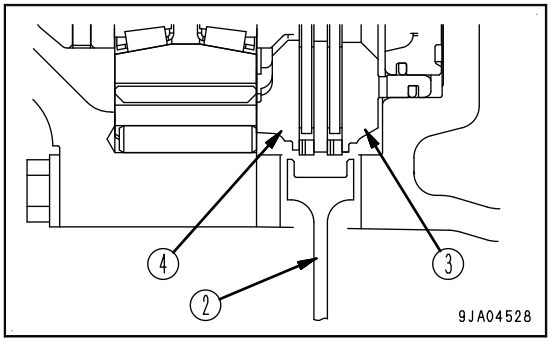
Inspection of wear on the brake disc must be done for 4 places, namely on both sides of the front and rear axle. Perform the inspection in same procedure for all of them.

- Prepare an inspection gauge.

1. Remove inspection plugs (1).



2. With brake pedal depressed, insert inspection gauge (2) to the protrusions of piston (3) and plate (4).
3. If the inspection gauge can be inserted to the protrusions, the disc wear has reached to the repair limit.
   Ask your Komatsu distributor to replace it.
4. After checking, install inspection plugs (1).
   Tightening torque: 127 to 177 Nm {13 to 18 kgm, 94.0 to 130.2 lbft}



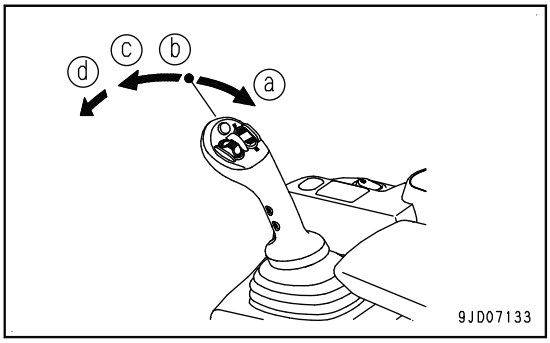
CHECK FUNCTION OF ACCUMULATOR *(WA320-PL40-360-K-00-A)*

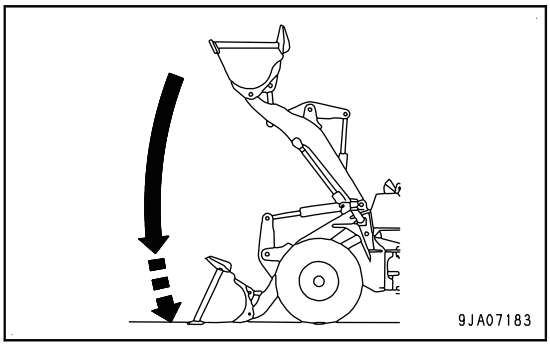
For handling of the accumulator, see "ACCUMULATOR AND GAS SPRING (PAGE 2-44) ".

PPC ACCUMULATOR *(WA320-PL40-360-K-01-A)*

When you cannot restart the stopped engine while the work equipment is raised, as urgent measures, you can use the oil pressure stored in the accumulator to operate the valve and you can lower the work equipment to the ground.

1. Apply the parking brake.
2. Raise the work equipment to the upper end and operate the multi-function mono-lever to HOLD position (b).
3. Stop the engine.
4. Turn the starting switch to ON position.
5. Press the work equipment lock switch to release the work equipment lock (pilot lamp goes out).
6. After checking safety around the machine, operate the multi-function mono-lever to FLOAT position (d) and lower the work equipment to a position 1 m (3 ft 3 in) from the ground.
7. After the work equipment is lowered to a position 1 m (3 ft 3 in) from the ground, return the multi-function mono-lever to LOWER position (c), and lower the work equipment gradually to the ground.





REMARK
Perform check within 2 minutes after the engine stops. If the engine is kept stopped, the gas pressure in the accumulator lowers and the check cannot be performed.

If the work equipment stops halfway, the accumulator gas pressure may be low.
Ask your Komatsu distributor for inspection.
Replace the accumulator for every 4000 hours or every 2 years.

CHECK ALTERNATOR *(ALL-AKK0-360-K-00-A)*

Ask your Komatsu distributor to have the alternator checked.
If the engine is started frequently, have this inspection carried out every 1000 hours.

CHECK ENGINE VALVE CLEARANCE, ADJUST *(ALL-A700-27D-K-00-A)*

Special tools are needed for inspection and maintenance. Contact your Komatsu distributor.

CHECK VIBRATION DAMPER *(WA-A5E0-360-K-00-A)*

Check that there are no cracks or peeling on the outside surface of the rubber.
If any cracks or peeling are found, contact your Komatsu distributor for replacement of the parts.

REPLACE KCCV FILTER ELEMENT *(WA270-A185-923-K-00-A)*

⚠ WARNING

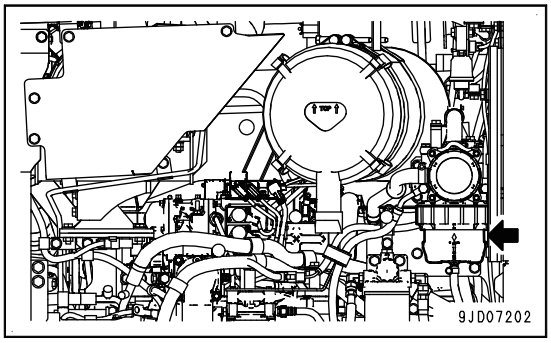
After the engine has been operated, all of parts are still very hot. Do not replace the filter element immediately. Wait until all of parts have cooled down before starting the work. Always stop the engine before starting the part replacement.

NOTICE

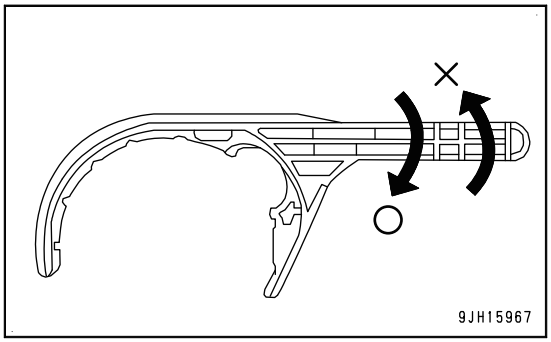
- **When replacing parts, Komatsu recommends using Komatsu genuine parts.**
- **If the engine is operated without the filter element, the turbocharger and aftercooler become dirty and their performance will lower and that can cause engine problems such as overrun caused by suction of oil. Therefore, do not start the engine without the filter element.**
- **The filter element cannot be cleaned. If the filter element is cleaned or refurbished, the filter performance lowers. As a result, the turbocharger and aftercooler become dirty and the crankcase pressure increases. Never reuse the filter element since it can cause an engine failure.**
- **After the filter element is replaced, if KCCV is not assembled correctly, oil or blowby gas may leak. Replace the filter element in the correct procedure.**

Prepare the special wrench for KCCV and a container to catch the oil.

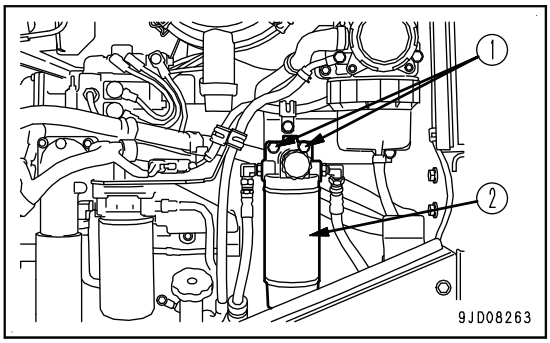
The KCCV ventilator is located at the positions shown in the figure on the right.



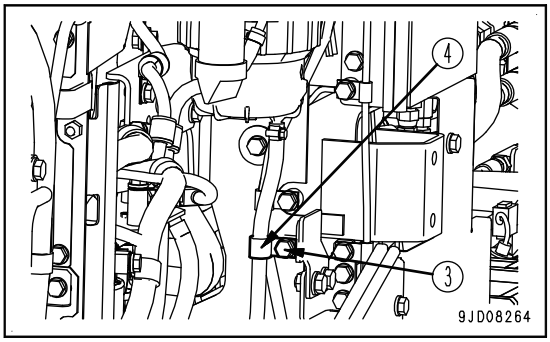
For how to use the special wrench, see the figure on the right.



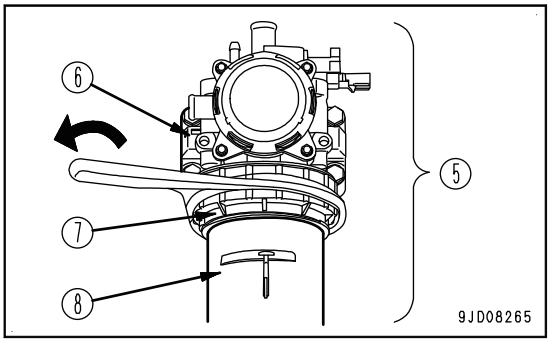
1. Remove bolts (1) (2 pieces) of fuel prefilter mounting bracket, and move fuel prefilter (2).



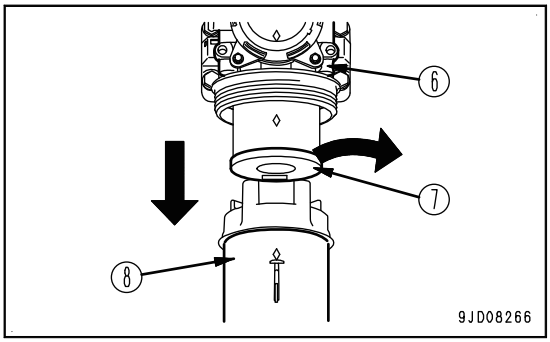
2. Remove bolt (3), then remove fixing clip of KCCV drain hose.



3. By using the special wrench, loosen ring (7) of KCCV ventilator (5).

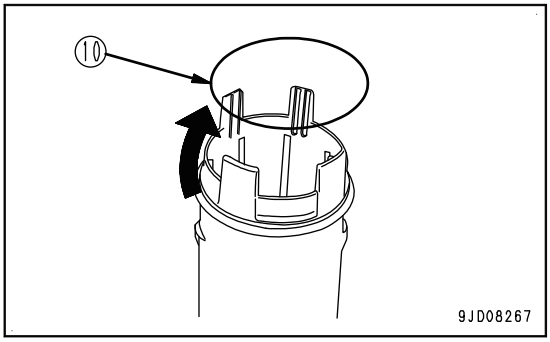


4. After ring (7) comes off, remove case (8) from body (6) and remove element (9).
   Oil may be accumulated in or sticking to the case and element. When replacing the element, take care that the oil will not spill out.

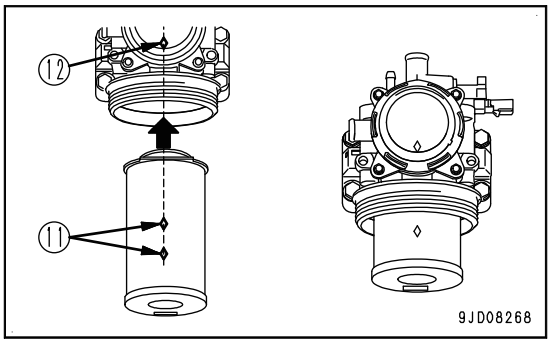


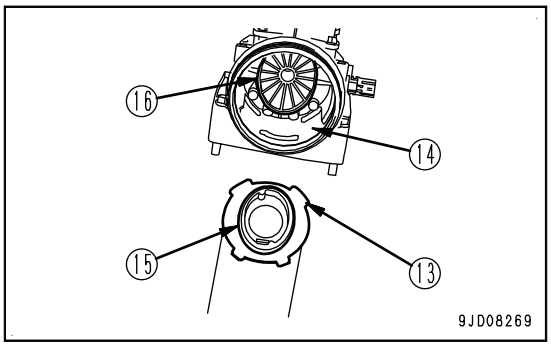
REMARK
When the ambient temperature is low, water or emulsified matter may stick to the inside of KCCV because of condensation of water vapor in the blowby gas. However, as far as the coolant level is normal, it is not a problem.

5. Remove used O-ring (10) sticking to case (8) and install a new O-ring contained in the service kit.
   Apply engine oil to the new O-ring.

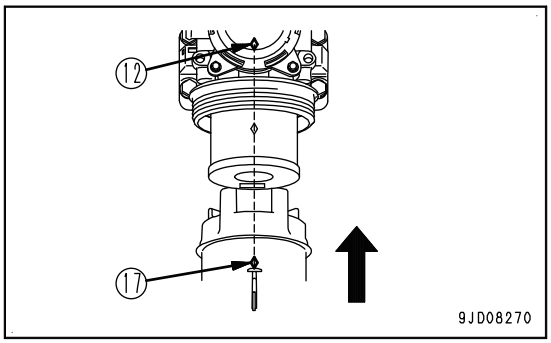


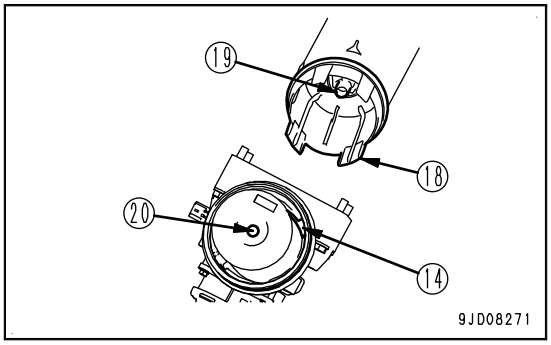
6. While matching ◇ mark (11) of the new element with ◇ mark (12) of the filter body label, insert the element firmly into the end of the filter body.
   The element can be installed only when its claws (13) are correctly inserted in grooves (14) of the filter body. Bases (15) and (16) are oval. Take extreme care so that those bases are matched with each other.



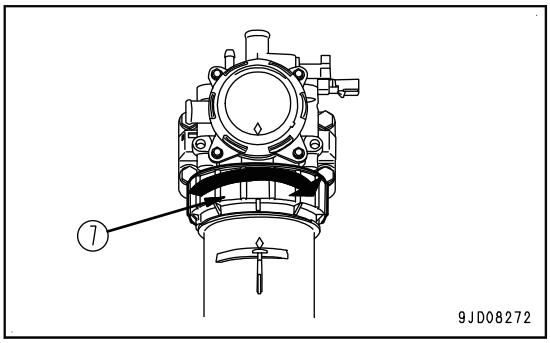


7. Align the position of ◇ mark (17) on the case with that of ◇ mark (12) of the filter body label, then install the case to the filter body.
   The case can be installed only when its claws (18) are correctly inserted in grooves (14) of the filter body. When inserting, take extreme care so that protrusion (19) in the case is joined together with rubber lip (20) of the element.

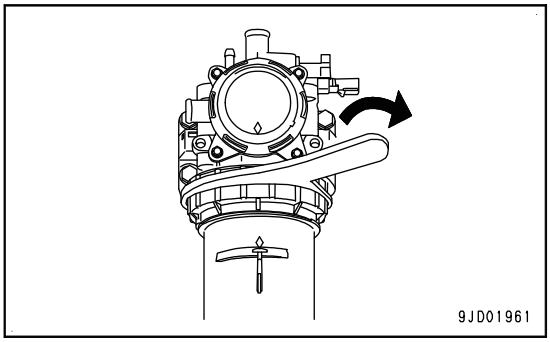




8. Fit ring (7) to the threaded part of the filter body and tighten it with the hand firmly until it stops.



9. By using the special wrench, further tighten the ring 1/15 to 2/15 turns (1 to 2 ridges of the ring). If the engine is operated with the ring tightened insufficiently, oil and blowby gas may leak.
10. Check the KCCV hose for leakage, crack, and loose clamp, and replace it if necessary.



EVERY 4000 HOURS MAINTENANCE *(ALL-33F0-015-A-04-A)*

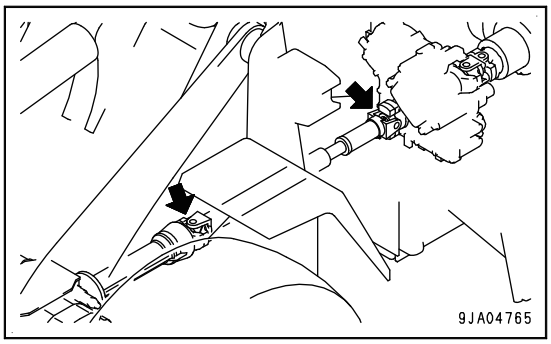
Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours service should be performed at the same time.

LUBRICATE DRIVE SHAFT *(WA320-D520-242-K-00-A)*

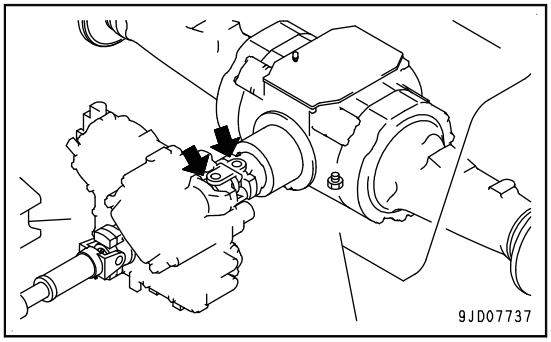
Greasing must be done at least once for every 2 years even if 4000 hours are not reached.

1. By using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that is pushed out.

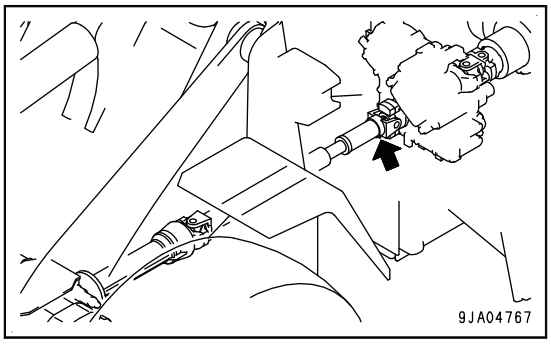
(1) Front drive shaft (2 places)



(2) Rear drive shaft (2 places)



(3) Drive shaft spline (1 place)



CHECK WATER PUMP *(WA-BA10-360-K-00-A)*

Check the water pump for water leakage, and if anything unusual is found, contact your Komatsu distributor for repairs or replacement.

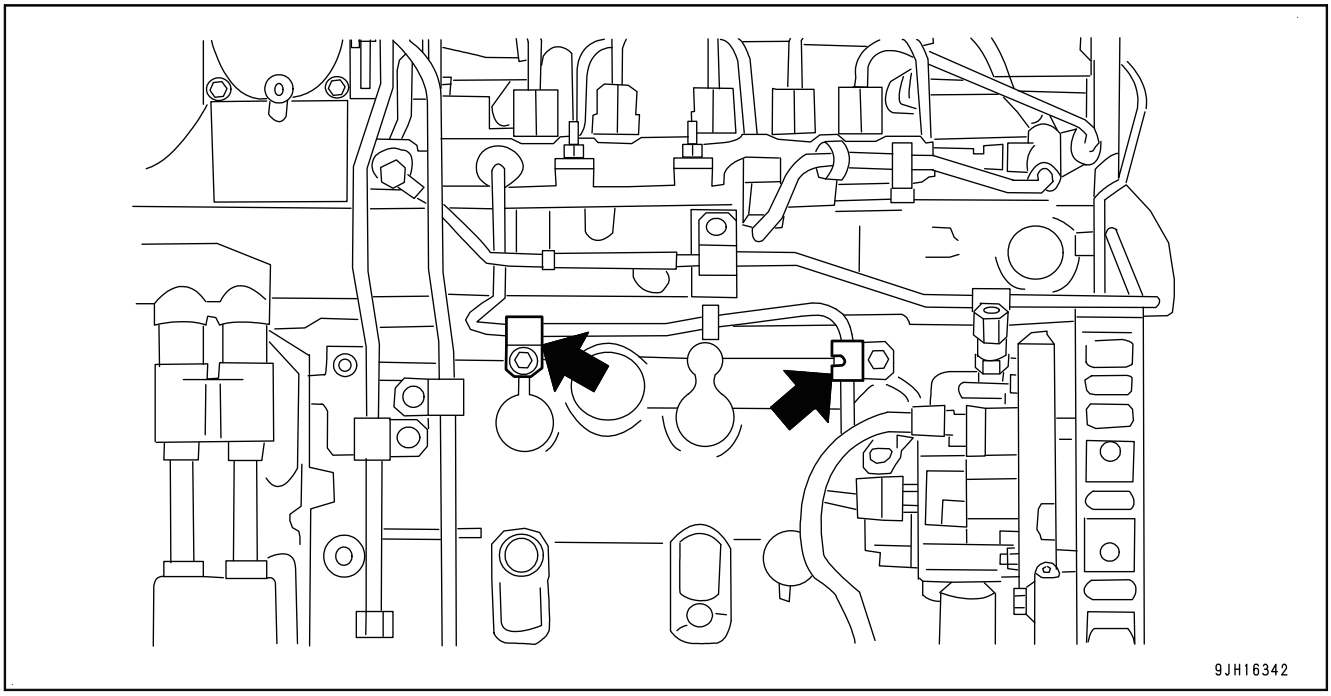
CHECK STARTING MOTOR *(ALL-AK70-360-K-00-A)*

Ask your Komatsu distributor to have the starting motor checked.
If the engine is started frequently, have this inspection carried out every 1000 hours.

CHECK AIR CONDITIONER COMPRESSOR, ADJUST *(ALL-K590-921-K-00-A)*

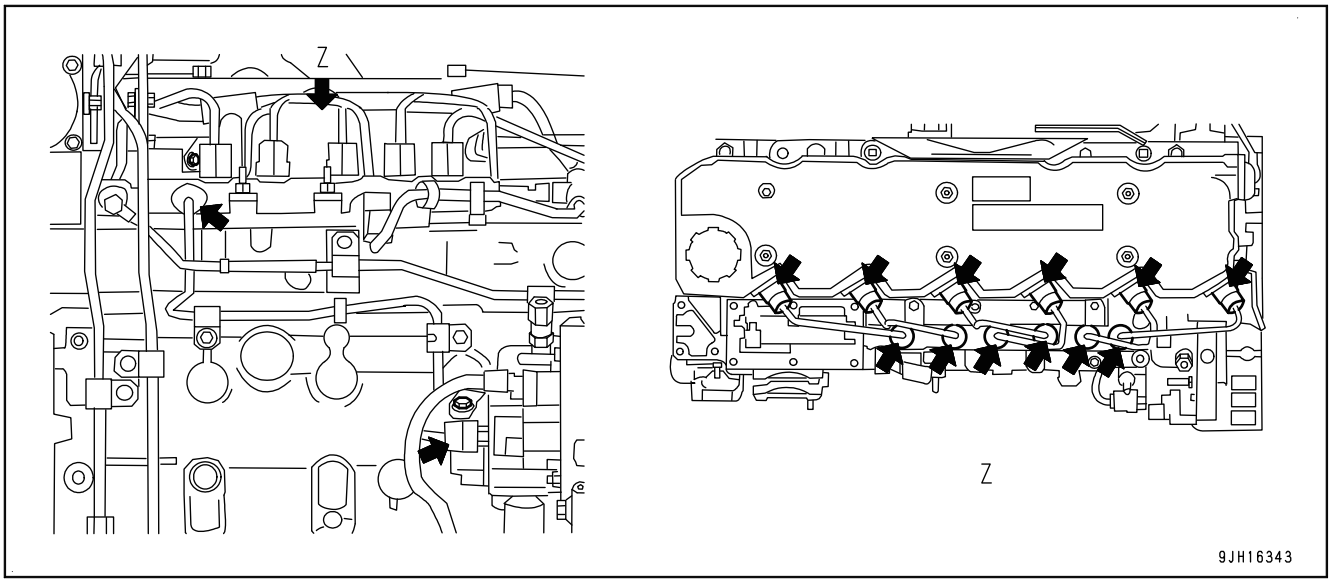
Ask your Komatsu distributor to carry out this work.

CHECK FOR LOOSENESS OF HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER *(PC-AEF2-287-K-00-A)*



Check visually and touch by hand to check that there is no hardening of the rubber and no loose bolts of the mounting clamps (2 places) for the high-pressure piping between the supply pump and the common rail. If there are any problems, the parts must be replaced. In this case, ask your Komatsu distributor for replacement. Replacement of the high-pressure piping must be made as an assembly.

CHECK FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER *(PC-AEFU-288-K-00-A)*



The fuel spray prevention caps (14 places) on the fuel injection piping and both ends of the high-pressure piping act to prevent the fuel from coming into contact with high-temperature parts of the engine and causing a fire if the fuel should leak or spray out. Check visually and touch by hand to check that there are no missing caps, loose bolts or hardening of the rubber. If there are any problems, the parts must be replaced. In this case, ask your Komatsu distributor for replacement.

EVERY 4500 HOURS MAINTENANCE *(ALL-33M0-015-A-05-A)*

Maintenance for every 50, 100, 250 and 500 hours service should be carried out at the same time.

CLEAN KDPF *(PC-A9H0-923-K-00-A)*

Komatsu recommends contacting your Komatsu distributor for cleaning of the KDPF.

EVERY 8000 HOURS MAINTENANCE *(ALL-33H0-015-A-04-A)*

Maintenance for every 50, 100, 250, 500, 1000, 2000 and 4000 hours service should be performed at the same time.

REPLACE STARTING MOTOR *(WA-AK70-923-K-00-A)*

(for the machine with auto idle stop specification)
Have your Komatsu distributor replace the starting motor.

REPLACE FUEL SPRAY PREVENTION CAP *(ALL-AEFU-923-K-00-A)*

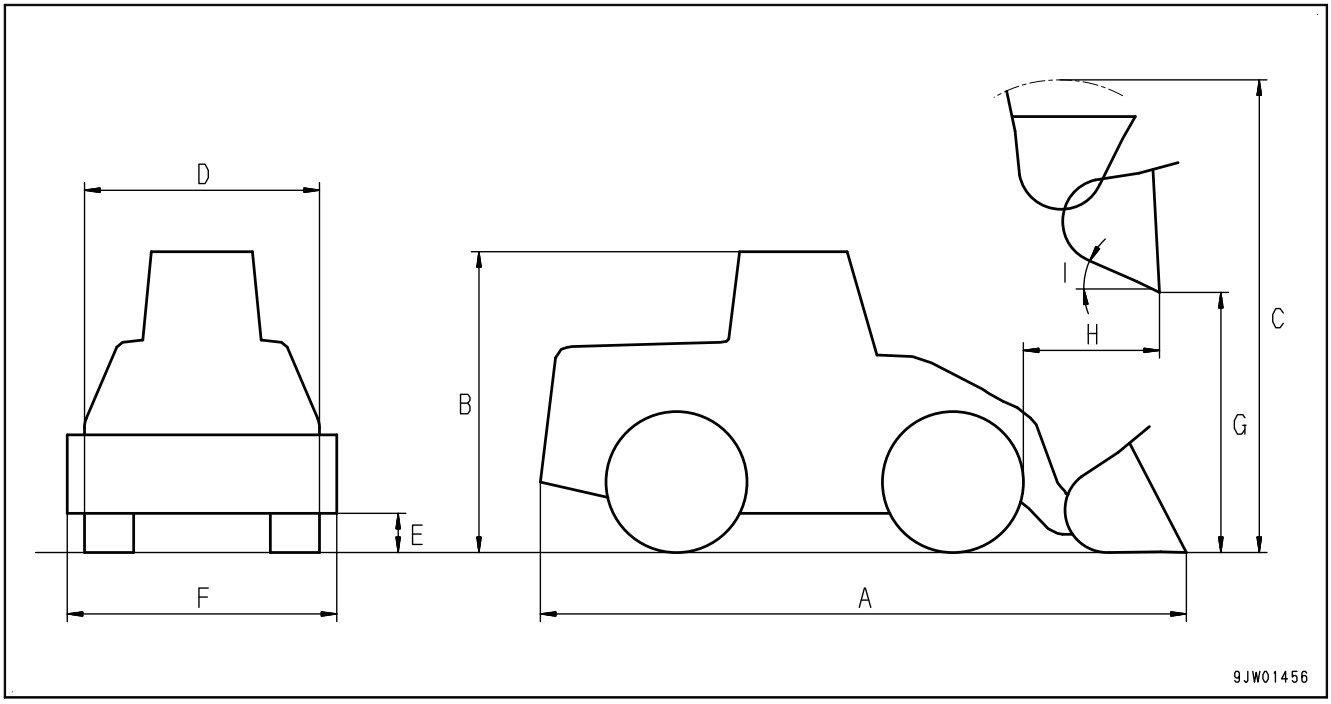
Contact your Komatsu distributor to have the fuel spray prevention cap replaced.

SPECIFICATIONS

SPECIFICATIONS *(WA270-2110-930-A-00-A)*

	Item			Unit	WA270-7
	Operating weight (with bolt on cutting edge (BOC))			kg (lb)	12,580 (27,739)
	Normal load			kg (lb)	3,680 (8,114)
	Bucket capacity	Heaped		m^3(cu.yd)	2.3 (3.0)
	Engine model			-	Komatsu SAA6D107E-2
	Rated hosepower	SAE J1995 (Gross)		kW {HP} / min^{-1} {rpm}	115 {153} /2,000 {2,000}
		ISO 9249 / SAE J1349 (Net)			111 {149} /2,000 {2,000}
A	Overall length			mm (ft in)	7,305 (24’ 0")
B	Overall height			mm (ft in)	3,200 (10’ 6")
C	Overall height with bucket lifted up			mm (ft in)	5,285 (17’ 4")
D	Overall width			mm (ft in)	2,505 (8’ 3")
E	Min. ground clearance			mm (ft in)	465 (1’ 6")
F	Bucket width			mm (ft in)	2,550 (8’ 4")
G	Dumpling clearance (*1)	Cutting edge [BOC tip]		mm (ft in)	2,975 (9’ 9") [3,040 (10’ 0")]
H	Dumpling reach (*1)	Cutting edge [BOC tip]		mm (ft in)	920 (3’ 0") [945 (3’ 1")]
I	Bucket dump angle (at max. height)			deg.	45 (48)
	Min. turning radius	Cutting edge [BOC tip]		mm (ft in)	6,000 (19’ 8") [6,025 (19’ 9")]
		Center of outside tire		mm (ft in)	5,175 (17’ 0")
	Allowable towing load			kN {kg}	92.5 {9,435}
	Travel speed	Forward	1st	km/h (MPH)	1.0 to 13.0 (0.6 to 8.1)
			2nd	km/h (MPH)	13.0 (8.1)
			3rd	km/h (MPH)	19.0 (11.8)
			4th	km/h (MPH)	38.0 (23.6)
		Reverse	1st	km/h (MPH)	1.0 to 13.0 (0.6 to 8.1)
			2nd	km/h (MPH)	13.0 (8.1)
			3rd	km/h (MPH)	19.0 (11.8)
			4th	km/h (MPH)	38.0 (23.6)

*1: Indicates the value when the bucket dump angle is 45 deg.


D
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ATTACHMENTS AND OPTIONS

⚠ WARNING

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

TIRE AND BUCKET SELECTION *(WA270-3900-05A-A-00-A)*

Select the most suitable bucket and tires for the type of the work and condition of the jobsite.

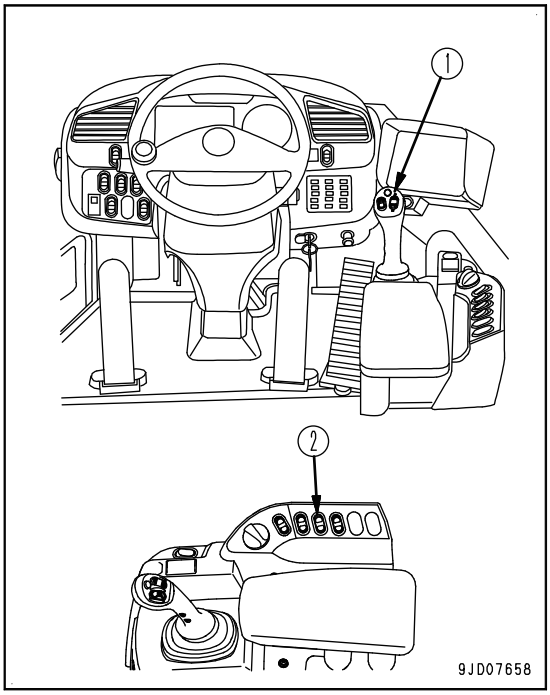
Type of work	Bucket	Ground conditions	Tire
Loading and carrying products	Light material bucket (with BOC) (2.7 m^3 (3.5 cu.yd))	General ground	20.5-25-12PR (L3: Rock)
		Leveled ground	20.5R25☆ (L2: Traction)
		Soft ground	20.5-25-12PR (L2: Traction)
Loading products and crushed rock	Excavating bucket (with BOC) (1.9 m^3 (2.5 cu.yd))	General ground	20.5-25-12PR (L3: Rock)
		Hard ground	20.5-25-12PR (L3: Rock)

BOC: Abbreviation for Bolt On Cutting edge.
The speed display on machine monitor varies with the tire size. When using optional tires, contact to your Komatsu distributor.

HANDLING FORK *(WA320-LF30-001-K-00-A)*

EXPLANATION OF COMPONENTS *(WA320-LF30-04D-K-00-A)*

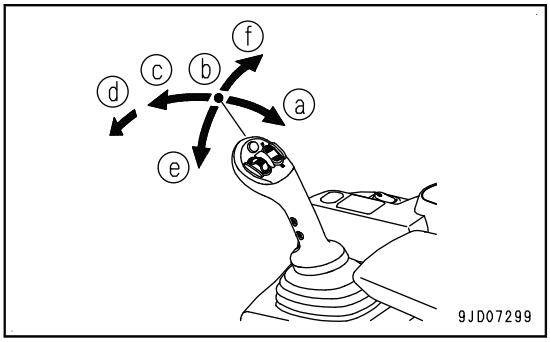
(1) Multi-function mono-lever
(2) Attachment selector switch



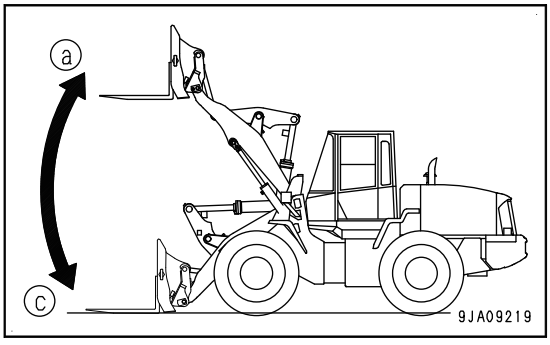
MULTI-FUNCTION MONO-LEVER *(WA320-PK10-100-K-01-A)*

Use this lever (1) to operate the boom and fork.

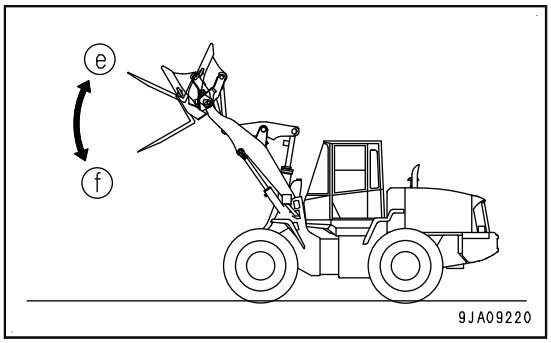
NOTICE
Do not use FLOAT position when lowering the fork.



Position (a): RAISE
When the multi-function mono-lever is pulled further beyond RAISE position, the lever is stopped in this position until the boom reaches the preset position of the positioner, and the lever is returned to HOLD position
Position (b): HOLD
The boom and fork stop and remain in the same position.
Position (c): LOWER
Position (d): FLOAT
The boom moves freely under external force.

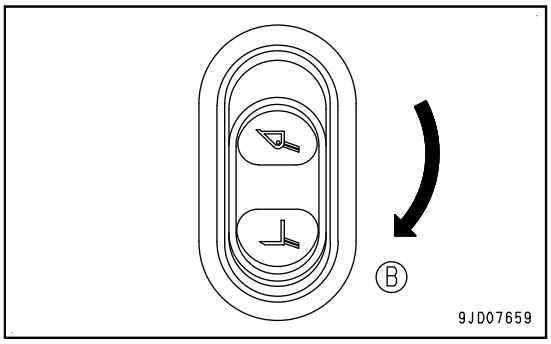


Position (e): TILT
When the multi-function mono-lever is pulled further from TILT position, the lever is stopped in this position until the fork reaches the preset position of the positioner, and the lever is returned to HOLD position.
Position (f): DUMP



ATTACHMENT SELECTOR SWITCH *(WA320-PT5X-043-K-01-A)*

This switch (2) switches the bucket positioner and fork positioner.
When using the fork, set it to (B) position.
For detail, see "ATTACHMENT SELECTOR SWITCH (PAGE 3-89) ".
For adjusting boom positioner and fork positioner, see "ADJUST WORK EQUIPMENT POSTURE (PAGE 3-199) ".



MACHINE OPERATIONS AND CONTROLS *(WA320-LF30-100-K-00-A)*

The operating speed of the forklift is determined according to the configuration of the ground, condition under foot, and size of the operating area.
When operating the forklift, maintain the engine speed at near High idle (MAX), and carry out the operation with the speed range in 1st or 2nd.
Use 3rd or 4th speed when traveling without a load.

LOADING AND UNLOADING OPERATION *(WA320-LF30-100-K-01-A)*

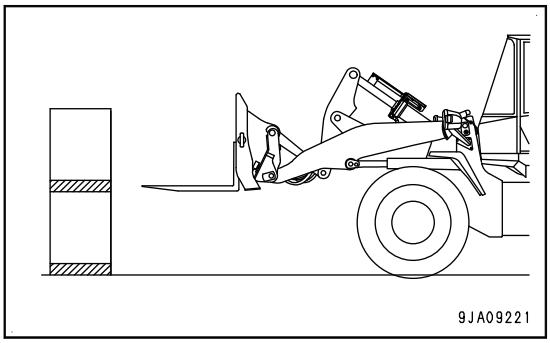
The following explanation of the method of operating the forklift does not cover all situations. The operating method differs according to each operating condition.
When operating the forklift, use the safest and most efficient method.

PICK UP LOAD *(WA320-LF30-100-K-02-A)*

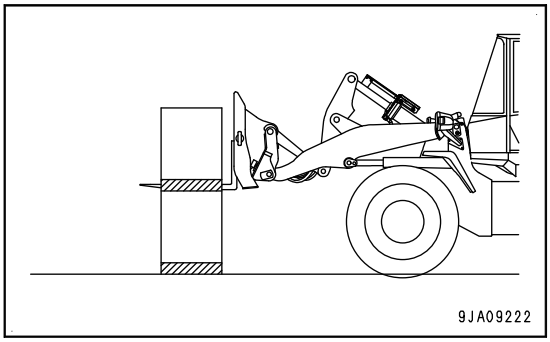
⚠ WARNING

- **When traveling with a load, do not turn suddenly or accelerate or decelerate suddenly. There is danger that the load will fall off or the machine will tilt.**
- **The fork tilt angle differs according to the load. If loads are stacked on top of each other, and the tilt angle is excessive, there is danger that the top load will extend over the backrest of the carriage and slip to the rear.**

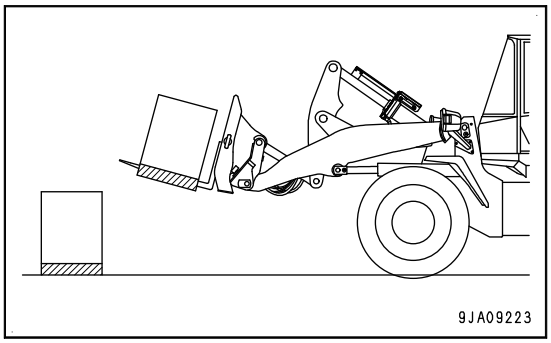
1. Adjust the distance between the forks to match the size of the load.
   To ensure the stability of the load, make the distance between the forks as large as possible.
2. Set the forks horizontal, drive forward slowly so that the load is centered on the forks, and insert the forks under the load.



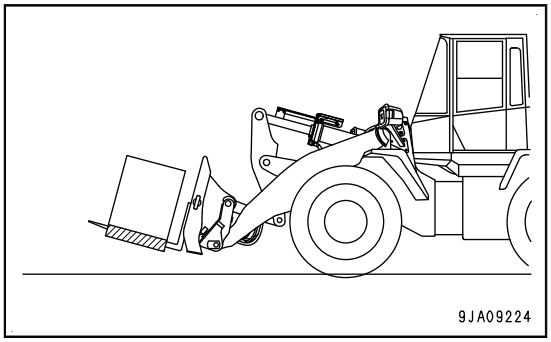
3. Insert the forks completely under the load and drive forward until the load is in contact with the backrest of the carriage.
4. Raise the forks so that they are approx. 15 cm (6 in) above the ground or the load under the forks, then tilt the forks and set so that the load rests against the backrest of the carriage.



5. Check that there is no obstacle behind the machine, lower the load as far as possible, then drive the machine slowly in reverse.



6. Lower the load until it is close to the ground surface (approx. 30 cm (1 ft) from the ground surface).

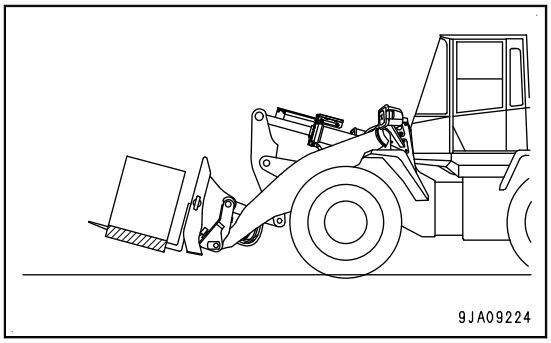


CARRY *(WA320-LF30-100-K-03-A)*

⚠ WARNING

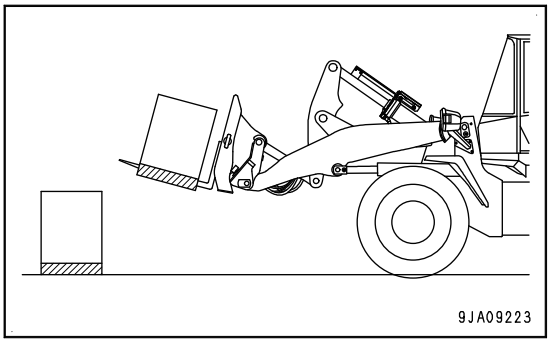
- **When traveling with a load, do not turn suddenly or accelerate or decelerate suddenly. There is danger that the load will fall off or the machine will tilt.**
- **The fork tilt angle differs according to the load. If loads are stacked on top of each other, and the tilt angle is excessive, there is danger that the top load will extend over the backrest of the carriage and slip to the rear.**

- Normally, keep the load near the ground surface when transporting. If the load must be transported when raised, be extremely careful when operating the steering.
- When transporting a load, carry out the operation with the speed range in 1st or 2nd. Use 3rd or 4th speed when traveling without a load.
- The travel speed when transporting differs according to the conditions. Always travel at a speed that ensures safety. When transporting on rough ground or slopes, travel at low speed.
- When transporting on slopes, travel with the load on the uphill side.
- If the load obstructs the view to the front, travel facing in reverse.

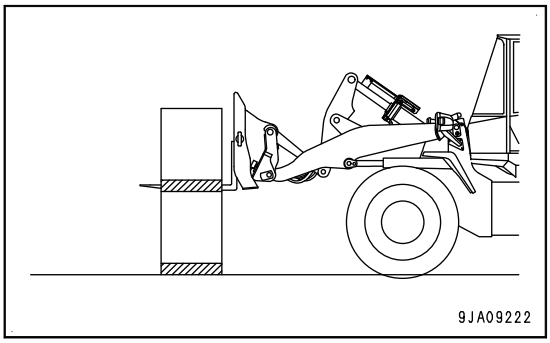


HOW TO LOAD *(WA320-LF30-100-K-04-A)*

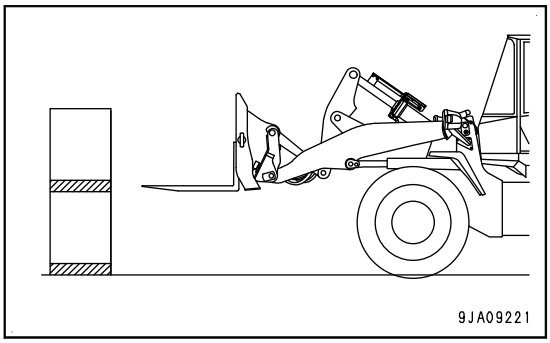
1. Set approx. 15 cm (6 in) above the position of the stacked load.



2. Drive slowly forward to the stacking point with the forks horizontal.
3. Lower the load.

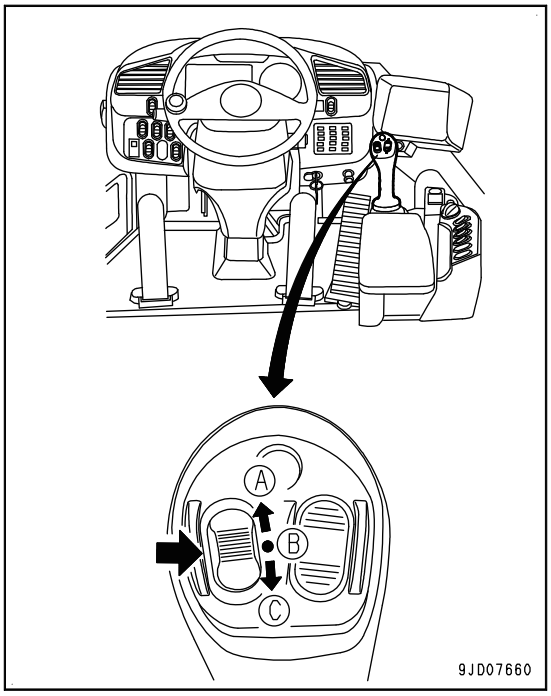


4. Drive the machine slowly in reverse and remove the forks from the load.
5. Lower the forks.



PCS (Proportional Control Switch) *(WA320-PT0V-100-K-01-A)*

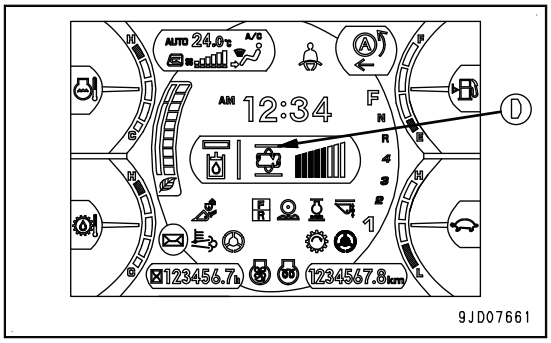
You can operate the third attachment with switch.
The hydraulic oil discharged by the switch operation is in proportion to the stroke of the switch.
This switch has 2 control modes; continuous mode and proportional mode.
You can set the maximum flow when the switch is operated and change the control mode on the monitor.
Position (A): RETRACT
Position (B): NEUTRAL
However, when switch is operated to the limit of position (C) to enable the detent control in the continuous mode, this position is for HOLD.
Position (C): EXTEND



CONTINUOUS MODE

When switch is operated to the limit of position (C), the set maximum flow is held and the third attachment continues the operation even if the switch operation is stopped. This action is called the detent control.
Use this control when the installed attachment requires continuous hydraulic oil flow.
Detent control operation pilot lamp (D) lights up during the detent control.
The detent control is canceled by any of the following operations.

- Operate the switch again.
- Turn the work equipment lock switch ON.
- Turn the starting switch key to OFF position.
- Stop the engine.
- Cancel the continuous mode on the monitor.



PROPORTIONAL MODE

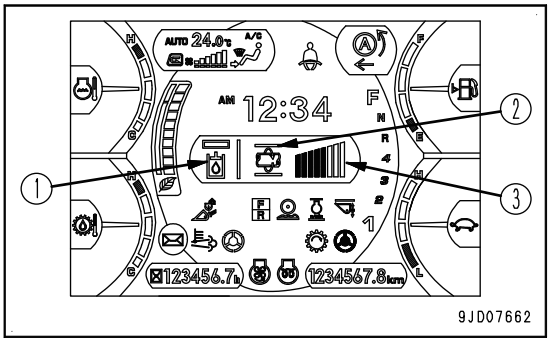
This mode does not have the detent control function which the continuous mode has.

REMARK

The hydraulic oil delivery is in proportion to the stroke of the switch in both continuous mode and proportional mode.

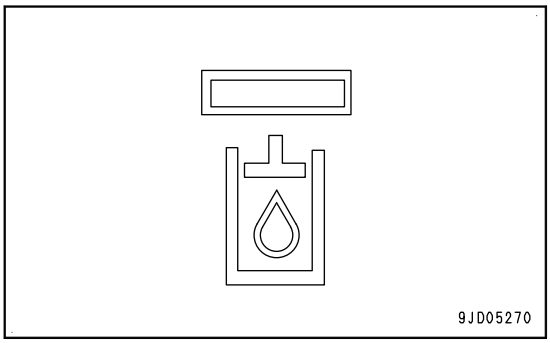
DISPLAY OF LIQUID CRYSTAL UNIT *(WA320-PT0A-100-K-00-A)*

(1) Flow control mode display lamp (continuous mode / proportional mode)
(2) Detent operation pilot lamp
(3) Attachment oil flow level



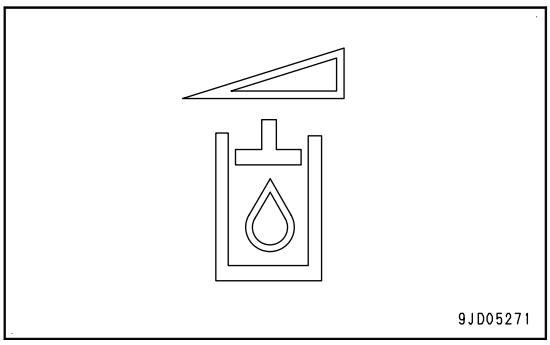
FLOW CONTROL MODE DISPLAY LAMP (CONTINUOUS MODE) *(WA380-PTLF-100-K-00-A)*

This lamp (1) lights up when the flow control of PCS is in the continuous mode.



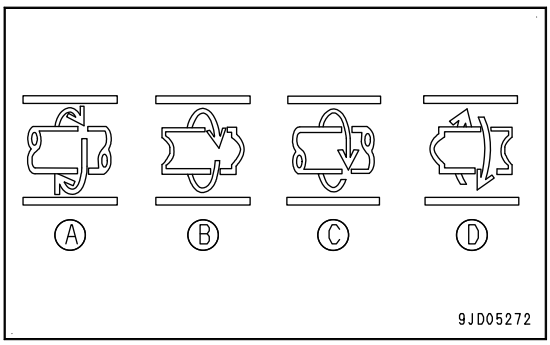
FLOW CONTROL MODE DISPLAY LAMP (PROPORTIONAL MODE) *(WA380-PTLJ-100-K-00-A)*

Lamp (1) lights up when the flow control of PCS is in the proportional mode.



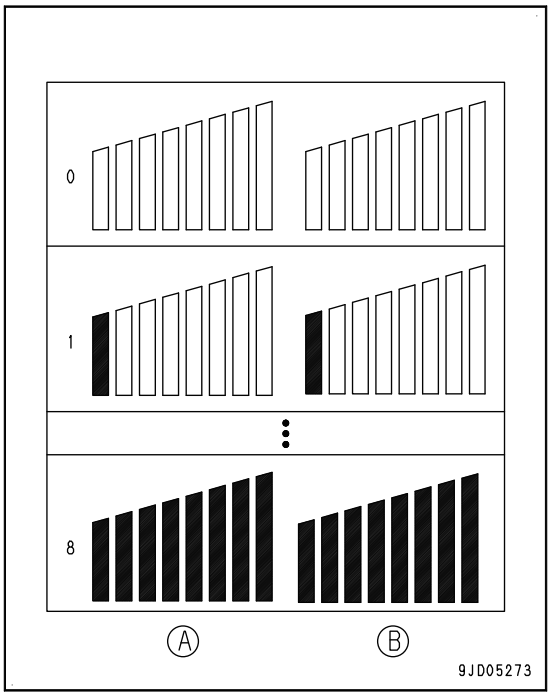
DETENT OPERATION PILOT LAMP *(WA380-PTLG-100-K-00-A)*

This lamp (2) lights up when the detent control is performed in the continuous mode.
(A) to (D) are displayed in order at intervals of 0.5 seconds.



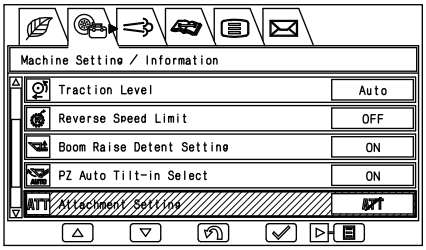
ATTACHMENT OIL FLOW LEVEL *(WA380-PTLK-100-K-00-A)*

This lamp (3) indicates the set maximum oil flow level.
It indicates level 0 to 8 according to the set attachment oil flow in green (A) normally and in orange (B) under detent control.

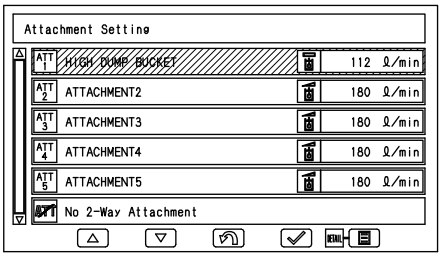


SETTING METHOD OF PCS *(WA320-PT0U-110-K-00-A)*

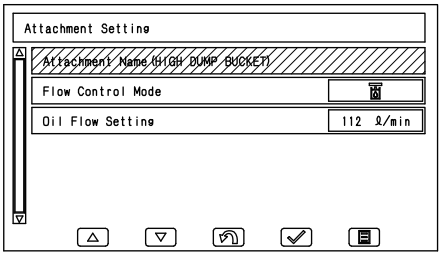
1. Press the menu switch to enter the setting mode and select "Attachment Setting", and then press the enter switch.



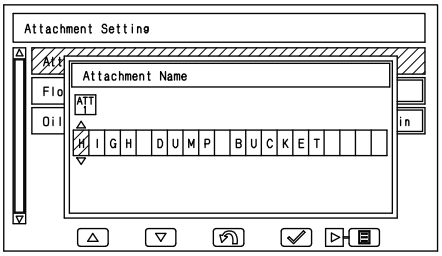
2. If the flow rate mode and maximum flow rate are set already, select any setting, and the setting is completed.
   If you press the menu switch at this time, you can change the setting of the selected attachment.
   You can save up to five settings.



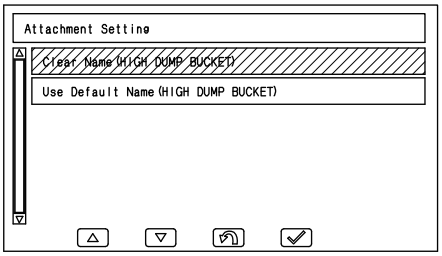
3. To change the setting name, select "Attachment Name" and press the enter switch.



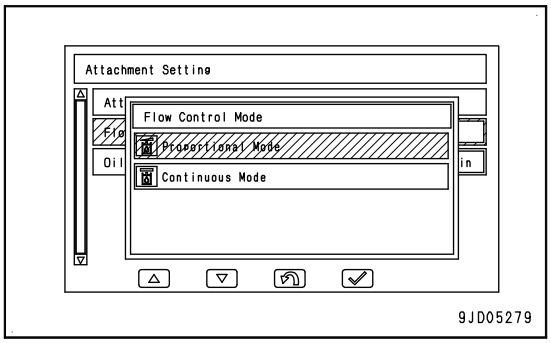
Change the alphabet at the cursor with the UP and DOWN switches and move the cursor with the menu.
After completing the change, press the enter switch.



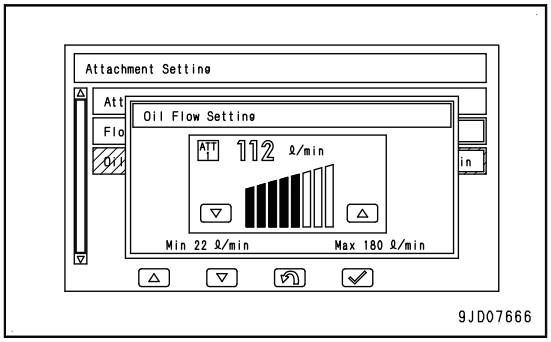
If you select "Attachment Name" and press the menu key, you can delete the setting name or return it to the default value.



4. If you select "Flow Control Mode", you can select "Proportional Mode" or "Continuous Mode".



5. If you select "Oil Flow Setting", you can set the maximum flow at the switch full stroke and the flow during the detent control in the continuous mode.
   Change the flow with the UP and DOWN switches, and then press the enter switch.
   You can set the maximum flow in the range from 22 to 180 liters/min (5.81 to 47.6 US gal/min) at intervals of 22 to 23 liters/min (5.81 to 6.08 US gal/min).



REPLACEMENT PARTS

SAFETY CRITICAL PARTS *(ALL-0000-20L-K-00-A)*

For using the machine safely for an extended period of time, you must periodically replace the safety critical and fire prevention-related parts listed in the table of important parts.
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.
Replace immediately the hose if any defect is found by checking. 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 not to be replaced periodically. Tighten all loose hoses 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 LIST *(WA320-0000-20M-K-00-A)*

No.	Parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (between fuel tank and fuel prefilter)	1	Every 2 years or 4,000 hours, whichever comes sooner
2	Fuel hose (between fuel prefilter and supply pump)	1	
3	Fuel hose (between engine and fuel tank)	1	
4	Steering hose (between pump and priority valve)	1	Replace if any of the damages were found when the daily check or periodical maintenance.
5	Steering hose (between priority valve and orbitrol valve)	2	
6	Steering hose (between orbitrol valve and steering cylinder)	6	
7	Steering hose (between steering cylinder line and cushion valve)	2	
8	Packings, seals, O-rings of steering cylinder	2	
9	Brake hose (between gear pump and charge valve)	2	
10	Brake hose (between brake valve and front brake)	2	
11	Brake hose (between brake valve and rear brake)	2	
12	Brake hose (between brake valve and accumulator)	2	
13	Brake hose (between accumulator and charge valve)	3	
14	Brake hose (between brake valve and hydraulic tank)	2	
15	Brake hose (between charge valve and block before return filter)	1	
16	O-rings and oil seals of brake valve	5	
17	Accumulator (for PPC)	1	
18	Horn	2	
19	Starting motor (for the machine with auto idle stop specification)	1 set	Every 8,000 hours
20	Fuel spray prevention cap	1 set	
21	Seat belt	1	Every 3 years from start of usage or 5 years after manufacturing of seat belt, whichever comes sooner

CONSUMABLE PARTS *(PC-0000-202-K-00-A)*

Replace consumable parts such as the filter element or air cleaner element at the time of periodic maintenance or before they reach the wear limit. The consumable parts should be replaced correctly in order to ensure more economic use of the machine. When replacing parts, Komatsu recommends using 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 the latest part number when ordering parts.

CONSUMABLE PARTS LIST *(WA270-0000-20N-K-00-A)*

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

Item		Part No.	Part Name	Q'ty	Replacement interval
Engine oil filter		6736-51-5142	Cartridge	1	Every 500 hours
Fuel prefilter		600-319-3610	Cartridge	1	
Fuel main filter		600-319-3750	Cartridge	1	Every 1000 hours
HST oil filter		418-18-34160	Cartridge	1	
Transfer strainer		124-15-51740 (07000-73042)	Magnet Ass'y (O-ring)	1 (1)	- Every 1000 hours
KCCV filter		600–331–2900	Element	1	Every 2000 hours
Brake circuit strainer		421-43-27920 (07002-15234) (02896-11015)	Strainer (O-ring) (O-ring)	1 (1) (1)	
Hydraulic oil filter		418-60-55150	Cartridge	1	
Hydraulic tank breather		285-62-17320	Element	1	
Air conditioner filter	Fresh air	423-07-52440	Filter	1	
	Recirculation air	423-07-52410	Filter	1	
PPC accumulator		419-62-52570 (07002-12034)	Accumulator (O-ring)	1 (1)	Every 4000 hours
Hydraulic tank strainer		21W-60-41150 (07000-15150)	Strainer (O-ring)	1 (1)	-
Fuel tank breather		421-60-35170	Element	1	
Air cleaner		600-185-4100	Element Ass'y	1	
Bolt-on Cutting edge		417-815-3210 417-815-1220 (02090-11475) (02290-11422) (01643-32260)	Center edge Side edge (Bolt) (Nut) (Washer)	1 2 (8) (8) (8)	

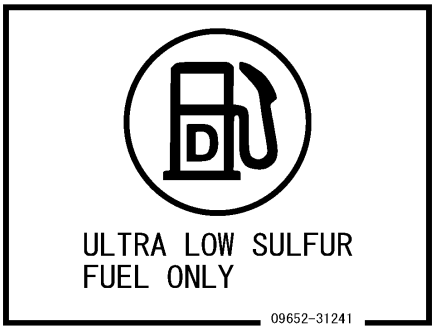
RECOMMENDED FUEL, COOLANT, AND LUBRICANT *(D65-RA1B-05A-K-00-A)*

NOTICE

- **Komatsu genuine oils are conditioned to maintain the reliability and durability of Komatsu construction equipment and components.**
  In order to keep your machine in the best condition for long period 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 excessive wear of the engine, power train, cooling system, and/or other components.**
- **Commercially available lubricant additives may be good or bad for the machine. Komatsu does not recommend any commercially available lubricant additive.**
- **Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure, shortening of the machine life, lowering of performance and increase of fuel consumption.**
- **Use the oil according to the ambient temperature as recommended in the chart below.**
- **If the machine is operated at a temperature below -20°C (-4°F), a separate device is needed, so consult your Komatsu distributor.**

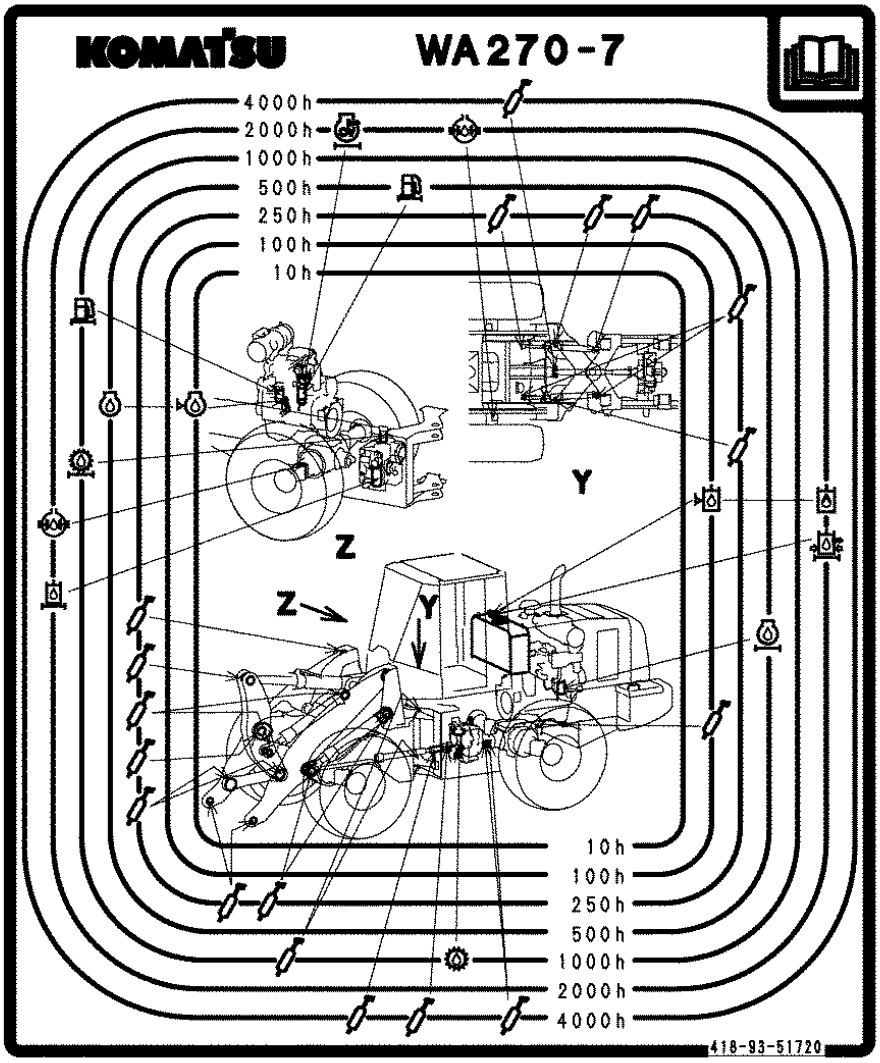
NOTICE

The fuel used must be ultra low-sulfur diesel oil.
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 and emission gas control system (KDPF). Since the high-pressure fuel injection device requires high precision parts and lubrication, if low viscosity fuel with low lubricating ability is used, its durability may drop remarkably. And using fuel with high sulfur content can deteriorate the engine parts and KDPF catalyzer, inducing failures, decrease of the life and degradation in performance.



LUBRICATION CHART *(WA270-2131-930-A-00-A)*

- The lubrication standard chart uses symbols to show the lubrication points and types of lubricant by each lubrication interval.
- Even if the same symbol is used in the lubrication standard chart, the recommended genuine oil may differ according to the lubricated location and the ambient temperature. For detail, see "LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE AND RECOMMENDED GENUINE LUBRICANTS (PAGE 7-6) ".
- For details of lubrication, see "MAINTENANCE SCHEDULE (PAGE 4-11) ".



- The symbols used in the lubrication standard chart are explained as follows.

Symbols used in the lubrication standard chart

Symbol	Meaning of symbol	Symbol	Meaning of symbol
	Read Operation and Maintenance Manual		Supply grease
	Change engine oil		Check engine oil level
	Change hydraulic oil		Check hydraulic oil level
	Change power train oil		Change power train oil filter
	Replace engine oil filter		Replace hydraulic oil filter
	Repalce hydraulic tank breather element		Replace fuel filter
	Replace KCCV filter		Change axle oil

LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE AND RECOMMENDED GENUINE LUBRICANTS *(WA270-RA19-05A-K-00-A)*

Reservoir	Fluid Type	Ambient Temperature -22 -4 14 32 50 68 86 104 122 °F -30 -20 -10 0 10 20 30 40 50 °C	Recommended Komatsu Fluids
Engine oil pan	Engine oil for KDPF used in cold terrain (Oil Change interval 250 hours)	(Note.1)	EOS5W30-LA (KES Diesel Engine Oil)
		(Note.1)	EOS5W40-LA (KES Diesel Engine Oil)
	Engine oil for KDPF (Oil Change interval 500 hours)		EO10W30-LA (KES Diesel Engine Oil)
			EO15W40-LA (KES Diesel Engine Oil)
Transfer case	Power train oil (Note.2)		TO10 (KES)
Hydraulic system	Engine oil		EO10W30-DH (KES)
Axle	Axle oil (Note.3)		AXO80 (KES)
	Power train oil (Note.4)		TO50 (KES)
Pin / Bushing Grease fitting	Hyper grease (Note.5)		G2-TE (KES)
	Lithium EP grease		G2-LI (KES)
Cooling system	Non-Amine Engine Coolant (AF-NAC) (Note.6)		AF-NAC (KES)
Fuel tank	Diesel fuel		ASTM Grade No.1-D S15
			ASTM Grade No.2-D S15

AJD00561

		Engine oil pan	Transfer case	Hydraulic oil system	Axle		Cooling system	Fuel tank
					Front	Rear		
Specified	liters	25.5	8.0	140	18.5	18	28	186
	US gal	6.74	2.11	37.0	4.89	4.76	7.4	49.1
Refill	liters	23	7.0	78	18.5	18	-	-
	US gal	6.08	1.85	20.6	4.89	4.76	-	-

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 remarkably.

Note 1: KDPF engine oil for cold district is deteriorated easily than that for normal area (replace every 500 hours), so replace oil and filter cartridge every 250 hours. For changing maintenance interval of machine monitor, ask Komatsu distributor to carry out.

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

Note 3: Axle oil AXO80 is capable of preventing the brake and LSD (Limited Slip Differential) from creaking. When only AXO80 is recommended, use Komatsu genuine AXO80 or equivalent.

Note 4: If the daily operation hours of the machine at ambient temperature above 45°C (113°F) exceed 12 hours, recommend TO50 instead of AXO80.

If TO50 is used, the brake may creak but there is no problem in performance and durability of the brake.

If the machine is equipped with LSD, use AXO80, regardless of the ambient temperature. Do not use TO50.

Note 5: Hyper grease (G2-TE) has 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-TE is recommended.

Note 6: Non-Amine Engine Coolant (AF-NAC)

1. 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 coolant is essential.
   Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC). Non-Amine Engine Coolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4,000 hours.
   Non-Amine Engine Coolant (AF-NAC) is strongly recommended wherever available.
2. For details of the density of Non-Amine Engine Coolant (AF-NAC), see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-19) ".
   Non-Amine Engine Coolant (AF-NAC) is supplied already diluted. In this case, fill up the tank with pre-diluted fluid. (Never dilute the Non-Amine Engine Coolant with ordinary water.)

RECOMMENDED BRANDS AND QUALITY FOR PRODUCTS OTHER THAN KOMATSU GENUINE OIL *(PC-RA1B-05A-K-01-A)*

When using commercially available oils other than Komatsu genuine oil, consult your Komatsu distributor.

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