

Operation & Maintenance Manual

EEAM022200

PC1800-6

HYDRAULIC EXCAVATOR

SERIAL NUMBER

PC1800-6 - 10011

PC1800-6 - 11002 and up



WARNING

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

KOMATSU

FOREWORD

FOREWORD

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

WARNING

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

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

Keep this manual at the storage location for the Operation and Maintenance Manual given below, and have all personnel read it periodically.

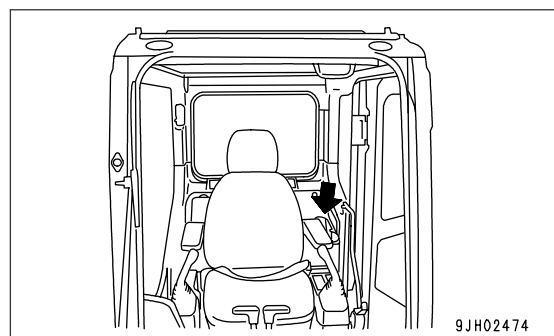
If this manual has been lost or has become dirty and cannot be read, request a replacement manual immediately from Komatsu or your Komatsu distributor.

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

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

Storage location for the Operation and Maintenance Manual:

Pocket rear of operator's seat.




SAFETY INFORMATION


To enable you to use this machine safely, safety precautions and labels are given in this manual and affixed to the machine to give explanations of situations involving potential hazards and of the methods of avoiding such situations.


Signal words

The following signal words are used to inform you that there is a potential hazardous situation that may lead to personal injury or damage.

In this manual and on machine labels, the following signal words are used to express the potential level of hazard.

 DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to most extreme situations.

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

 CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Example of safety message using signal word

 WARNING

**To avoid hitting unlocked operation levers, lower equipment to ground and move SAFETY LOCK LEVER (located near seat) to LOCK position before starting up from operator's seat.
Sudden and unwanted machine movement can cause serious injury or death.**

Other signal words

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

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

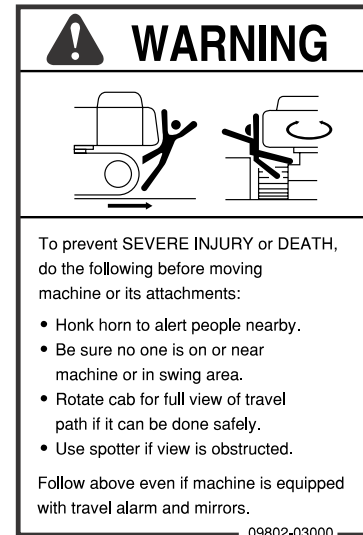
REMARKS This gives information that is useful to know.

Safety labels

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

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

Example of safety label using words



Part No.

Safety labels using pictogram

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



Part No.

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

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

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

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

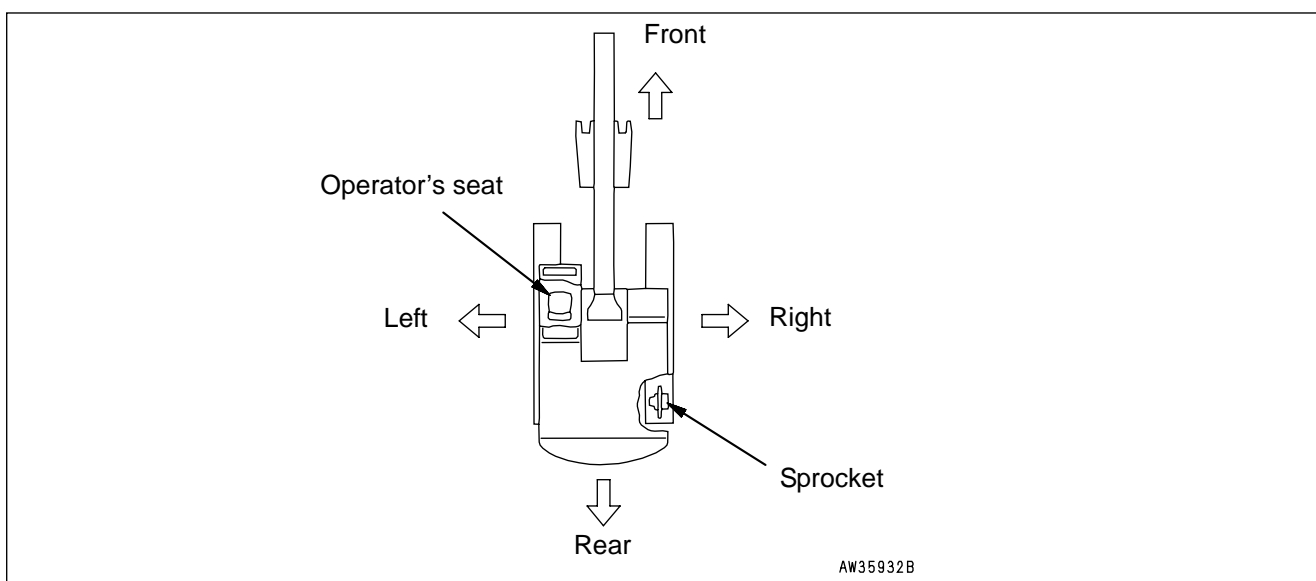
INTRODUCTION

This Komatsu HYDRAULIC EXCAVATOR is designed to be used mainly for the following works:

- Digging work
- Loading work

See the section "RECOMMENDED APPLICATIONS (PAGE 3-155)" for further details.

DIRECTIONS OF MACHINE



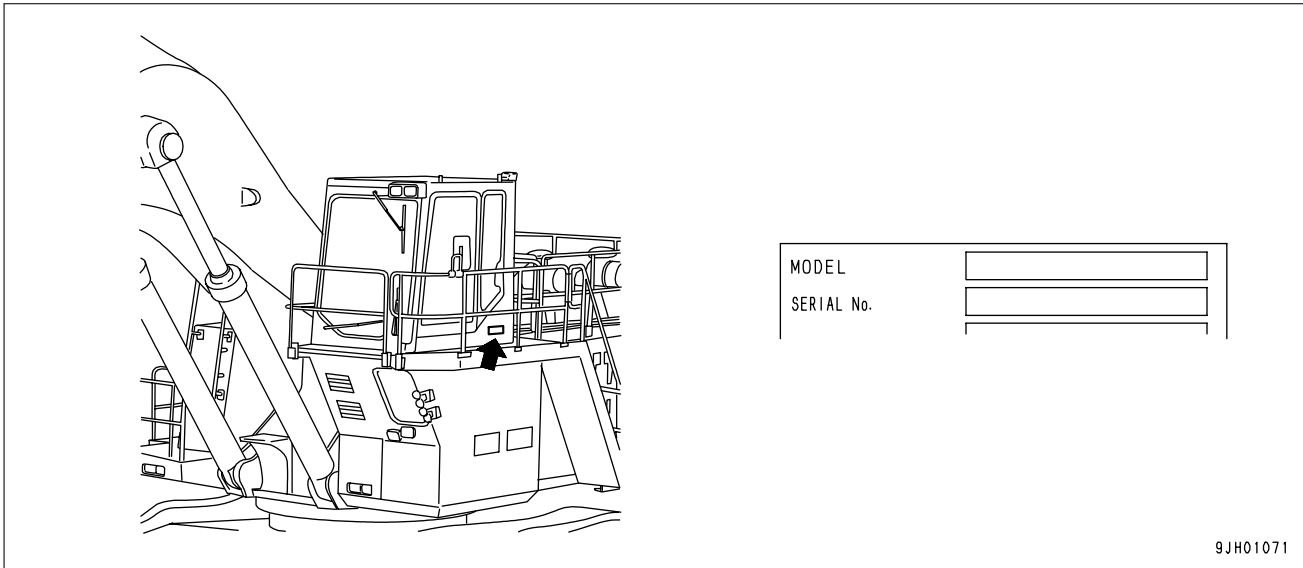
In this manual, the terms front, rear, left, and right refer to the travel direction as seen from the operator's cab when the operator's cab is facing the front and the sprocket is at the rear of the machine.

PRODUCT INFORMATION

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

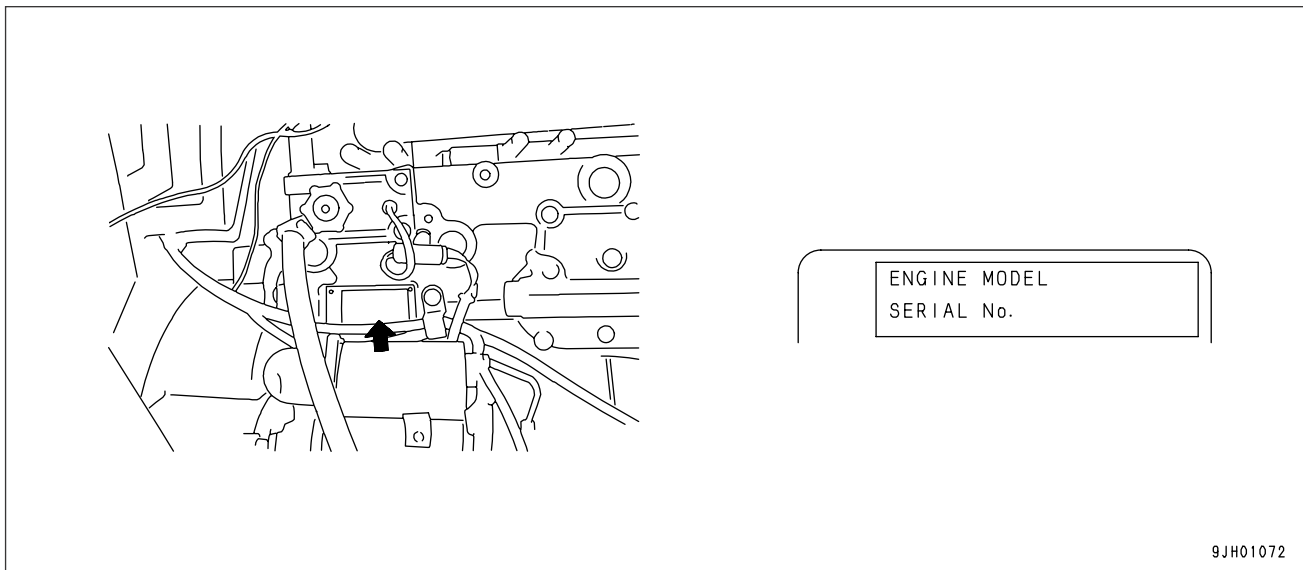
MACHINE SERIAL NUMBER PLATE AND ITS LOCATION

On the bottom left of the operator's cab



ENGINE SERIAL NUMBER PLATE AND ITS LOCATION

On the upper side of the oil cooler housing located on the left side of the engine cylinder viewed from the fan.



YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR

Machine serial No.	
Engine serial No.	
Distributor name	-----
Address	-----

Service Personal	-----
Phone/Fax	-----

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SAFETY

WARNING

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

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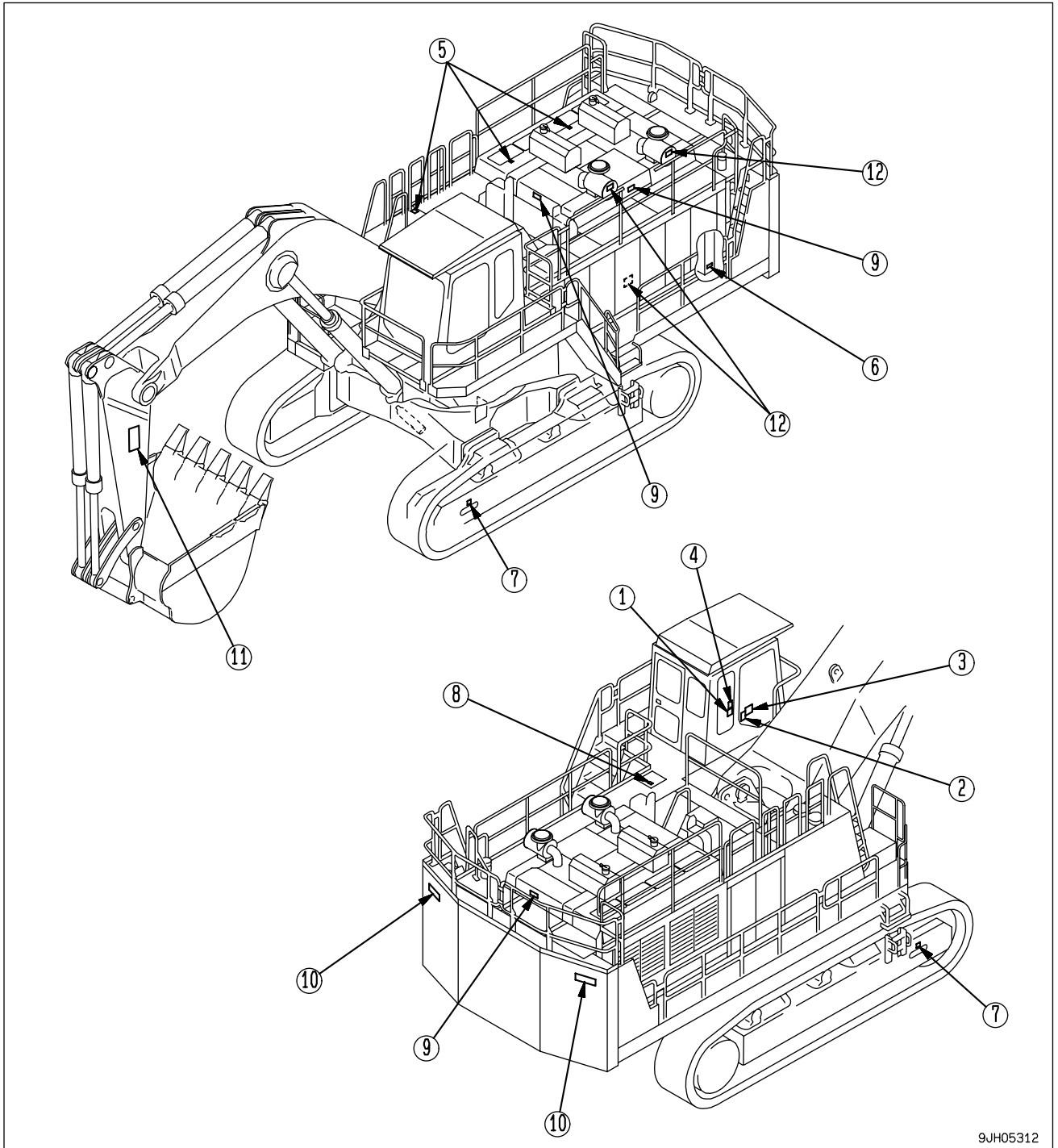
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POSITION FOR ATTACHING SAFETY LABELS

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

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

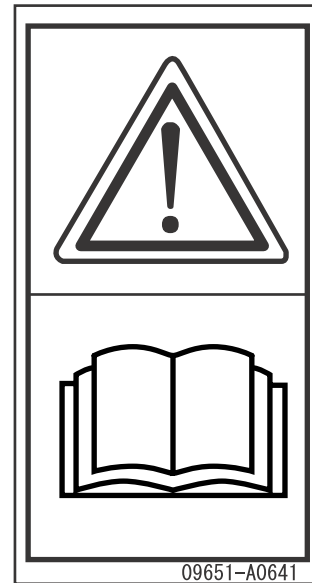
POSITION FOR ATTACHING SAFETY LABELS



SAFETY LABELS

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

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



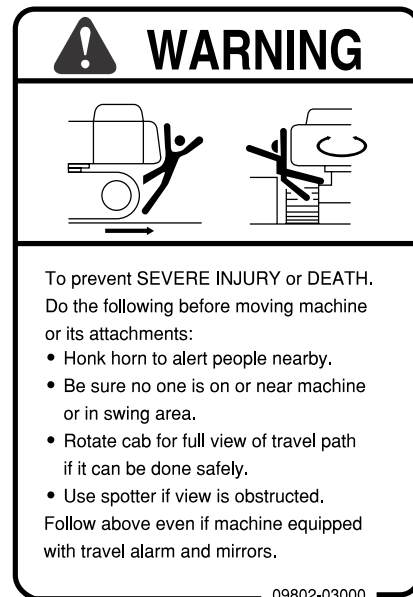
(2) Precautions for before operation (09802-03000)

WARNING

To prevent SEVERE INJURY or DEATH, do the following before moving.

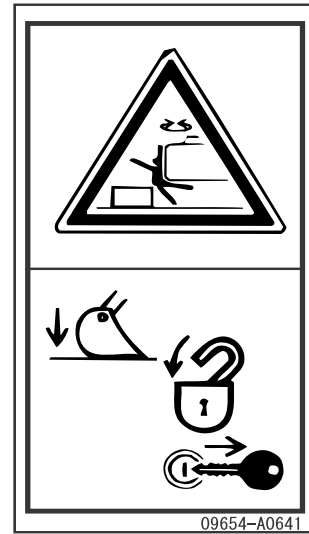
- Honk horn to alert people nearby.
- Be sure no one is near machine or in the swing area.
- Rotate cab for full view of travel path if it can be done safely.
- Use spotter if view is obstructed.

Follow above even if the machine is equipped with travel alarm and mirrors.



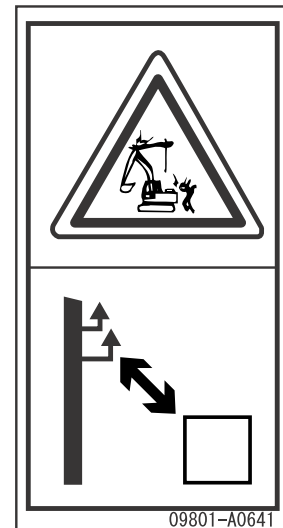
(3) Warning for leaving operator's seat (09654-A0641)

- Sign indicates a hazard being caused or run over by unexpected moving of stopped machine.
- Lower the work device to the ground, move safety lever to lock position and take engine key with you before leaving the machine.



(4) Warnings for high voltage (09801-A0641)

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



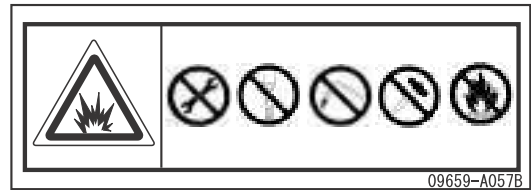
(5) Precautions for high-temperature cooling water and hydraulic oil (09653-A0481)

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



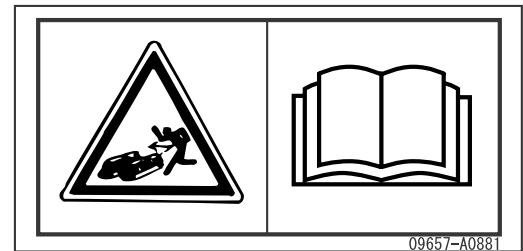
(6) Precautions when handling accumulator
(09659-A057B)

- Sign indicates an explosion hazard.
- Do not disassemble the accumulator, make holes in it, weld it cut it, hit it, roll it or bring it near flame



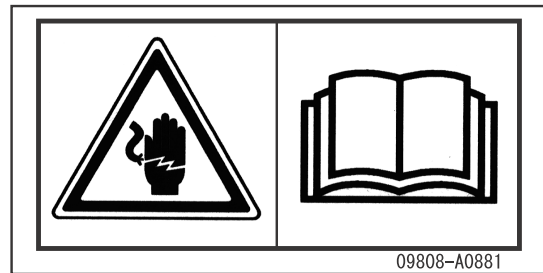
(7) Precautions when adjusting track tension
(09657-A0881)

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



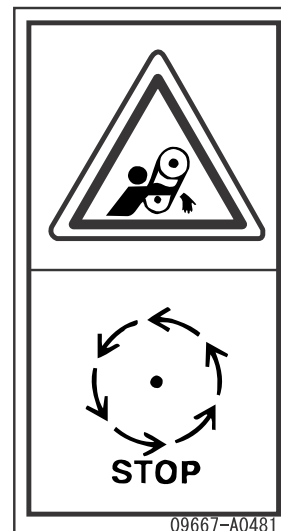
(8) Precautions when handling cable
(09808-A1201)

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



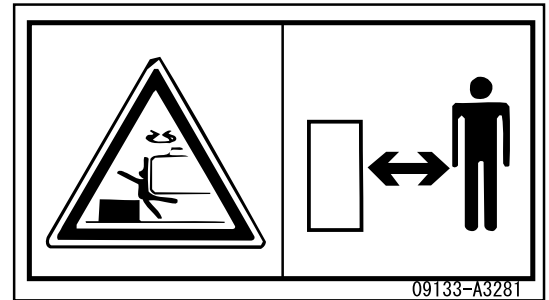
(9) Stop rotation when performing testing and adjusting
(09667-A0481)

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



(10) Prohibited to enter within swing range
(09133-A3281)

- Sign indicates a crush hazard by rotation of upper structure of the machine.
- Keep away from swinging area of the machine.

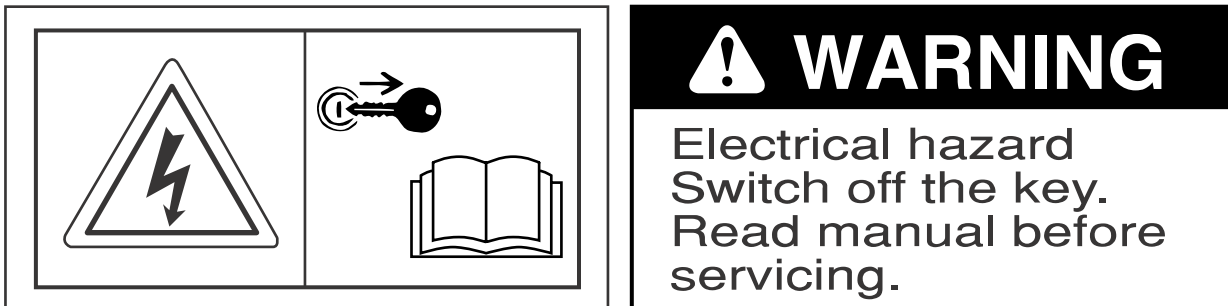


(11) Beware of equipment (09134-A1681)

- Sign indicates a hazard of being hit by the working device of the machine.
- Keep away from machine during operation



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



- There is danger of electrocution.
- Turn the starting switch OFF before starting inspection or repairs, and read the operation and maintenance manual.

WARNING

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

SAFETY INFORMATION

SAFETY RULES

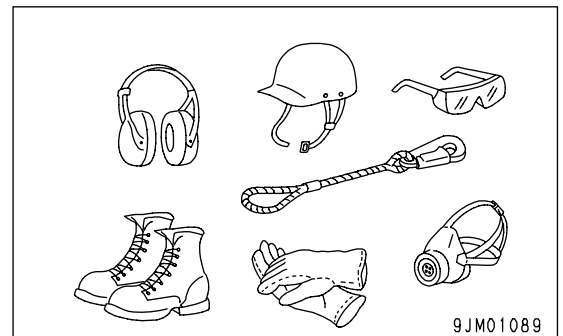
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine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

IF ABNORMALITIES ARE FOUND

If you find any abnormality 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 abnormality has been corrected.

WORKING WEAR AND PERSONAL PROTECTIVE ITEMS

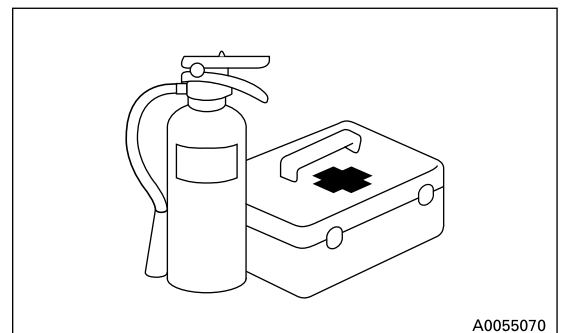
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get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



FIRE EXTINGUISHER AND FIRST AID KIT

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

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

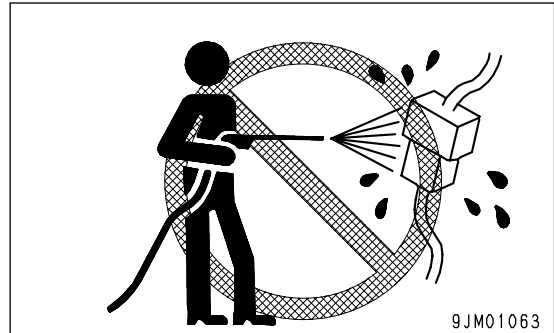


SAFETY EQUIPMENT

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

KEEP MACHINE CLEAN

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



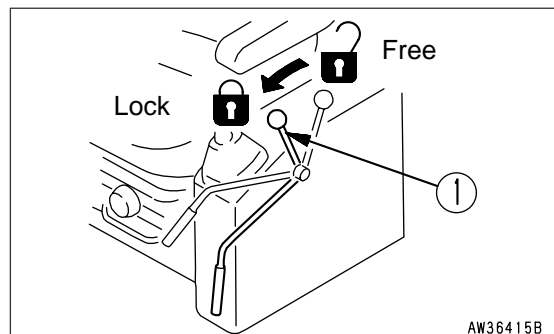
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KEEP OPERATOR'S COMPARTMENT CLEAN

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

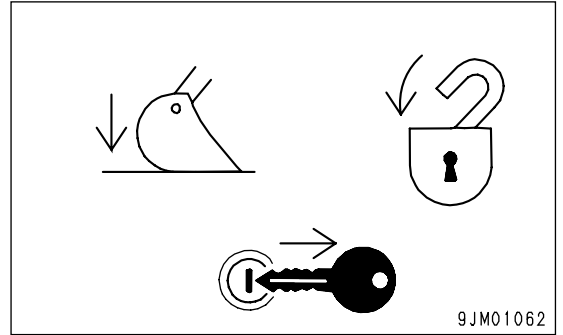
LEAVING OPERATOR'S SEAT WITH LOCK

- Before standing up from the operator's seat (such as when opening or closing the front window or roof window, or when removing or installing the bottom window, or when adjusting the operator's seat), lower the work equipment completely to the ground, set safety lock lever (1) securely to the LOCK position, then stop the engine. If you accidentally touch the levers when they are not locked, there is a hazard that the machine may suddenly move and cause serious injury or property damage.



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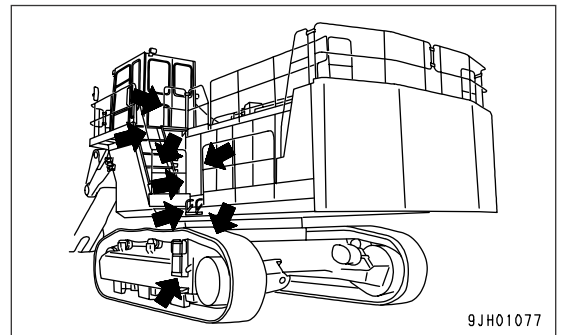
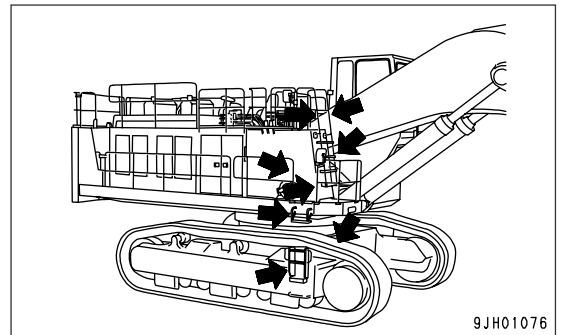
- When leaving the machine, always lower the work equipment completely to the ground, set safety lock lever (1) securely to the LOCK position, then stop the engine. Use the key to lock all the equipment. Always remove the key, take it with you, and keep it in the specified place.



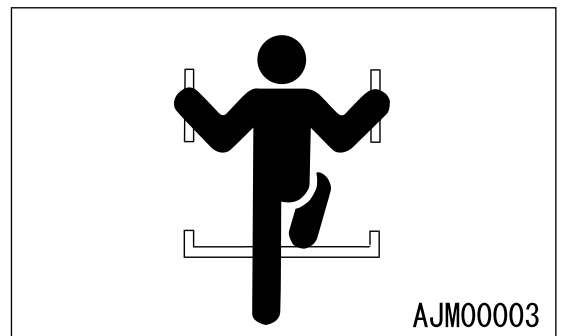
HANDRAILS AND STEPS

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

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



- To ensure safety, always face the machine and maintain three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps (including the track shoe) to ensure that you support yourself.
- Do not grip the control levers when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.



- Before getting on or off the machine, check the handrails and steps (including the track shoe). If there is any oil, grease, or mud on the handrails or steps (including the track shoe), wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.
- Do not get on or off the machine while holding tools in your hand.

MOUNTING AND DISMOUNTING

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

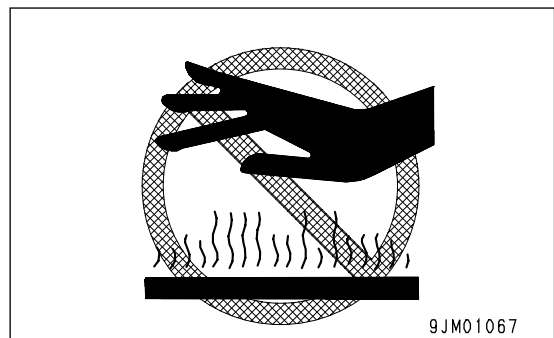
NO PERSONS ON ATTACHMENTS

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

BURN PREVENTION

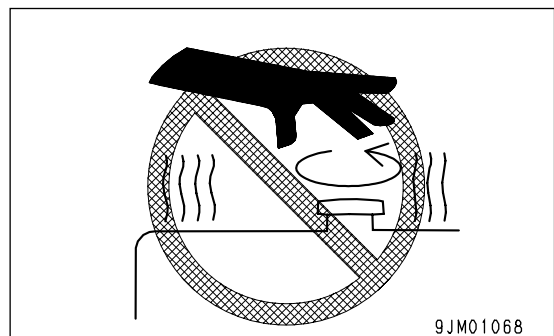
Hot coolant

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



Hot oil

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

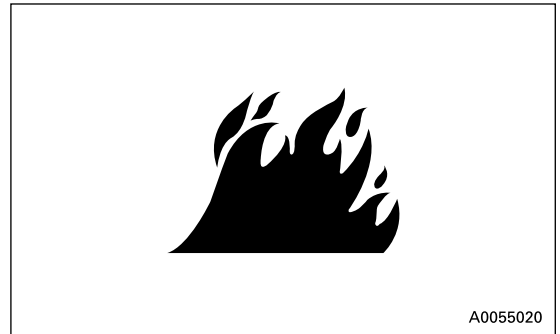


FIRE PREVENTION AND EXPLOSION PREVENTION

- **Fire caused by fuel or oil**

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

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



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

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

- **Fire coming from electric wiring**

Short circuits in the electrical system can cause fire.

- Always keep electric wiring connections clean and securely tightened.
- Check the wiring every day for looseness or damage. Tighten any loose connectors or wiring clamps. Repair or replace any damaged wiring.

- **Fire coming from hydraulic line**

Check that all the hose and tube clamps, guards, and cushions are securely fixed in position.

If they are loose, they may vibrate during operation and rub against other parts. This may lead to damage to the hoses, and cause high-pressure oil to spurt out, leading to fire damage or serious injury.

- **Explosion caused by lighting equipment**

- When checking fuel, oil, battery electrolyte, window washer fluid, or coolant, always use lighting with anti-explosion specifications. If such lighting equipment is not used, there is danger of explosion that may cause serious injury.
- When taking the electrical power for the lighting from the machine, follow the instructions in this manual.

ACTION IF FIRE OCCURS

If a fire occurs, escape from the machine as follows.

- Turn the starting switch OFF and stop the engine.
- Use the handrails and steps to get off the machine.

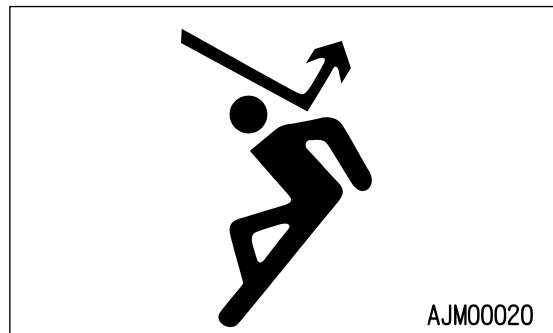
WINDSHIELD WASHER FLUID

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

FALLING OBJECTS, FLYING OBJECTS AND INTRUDING OBJECTS PREVENTION

On jobsites where there is a hazard that falling objects, flying objects, or intruding objects may hit or enter the operator's cab, consider the operating conditions and install the necessary guards to protect the operator.

- When carrying out demolition or breaker operations, install a front guard and use a laminated coating sheet on the front glass.
- When working in mines or quarries where there is a hazard of falling rock, install FOPS (Falling Objects Protective Structure) and a front guard, and use a laminated coating sheet on the front glass.
- When carrying out the above operations, always close the front window. In addition, always ensure that bystanders are a safe distance away and are not in hazard from falling or flying objects.
- The above recommendations assume that the conditions are for standard operations, but it may be necessary to add additional guards according to the operating conditions on the jobsite.
Always contact your Komatsu distributor for advice.



ATTACHMENT INSTALLATION

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

ATTACHMENT COMBINATIONS

Depending on the type or combination of work equipment, there is a hazard that the work equipment may hit the cab or other parts of the machine. Before using unfamiliar work equipment, check if there is any hazard of interference, and operate with caution.

CAB WIDOW GLASSES

- If the cab glass on the work equipment side is broken, there is a hazard that the work equipment may contact the operator's body directly. Stop operation immediately and replace the glass.
- Use water to clean roof windows made of organic glass (polycarbonate); do not use any organic solvent. If benzene, toluene, methanol, or other organic solvents are used, there will be chemical reactions such as the glass dissolving or decomposing, and the polycarbonate will deteriorate.

UNAUTHORIZED MODIFICATIONS

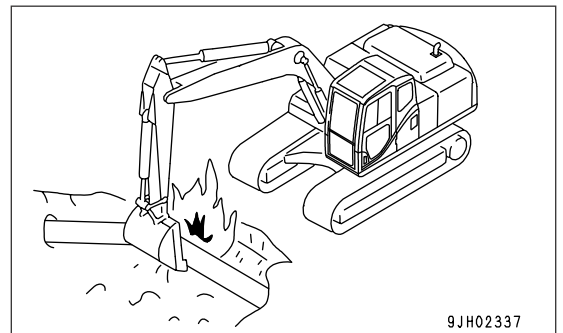
Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor.

- Komatsu will not be responsible for any injuries, accidents, or product failures resulting from modifications made without authorization from Komatsu.

SAFETY AT JOBSITE

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

- When carrying out operations near combustible materials such as thatched roofs, dry leaves or dry grass, there is a hazard of fire, so be careful when operating.
- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation. Do not carry out operations at places where there is a hazard of landslides or falling rocks.
- If water lines, gas lines, or high-voltage electrical lines may be buried under the worksite, contact each utility and identify their locations. Be careful not to sever or damage any of these lines.
- Take necessary measures to prevent any unauthorized person from entering the operating area.
- When traveling or operating in shallow water or on soft ground, check the shape and condition of the bedrock, and the depth and speed of flow of the water before starting operations.
- Do not light fires near the machine. There is danger that sparks may be sucked in and cause fire.



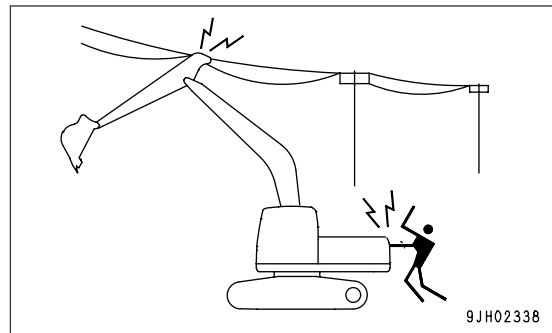
WORKING ON LOOSE GROUND

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

DISTANCE TO HIGH VOLTAGE CABLES

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

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



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

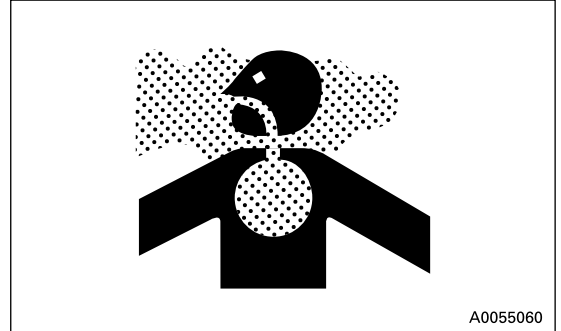
	Voltage	Min. safety distance
Low voltage	100V 200V	2m
	6,600V	2m
Very high voltage	22,000V	3m
	66,000V	4m
	154,000V	5m
	187,000V	6m
	275,000V	7m
	500,000V	11m

ENSURE GOOD VISIBILITY

- Check for any persons or obstacles in the area around the machine and check the conditions of the jobsite to ensure that operations and travel can be carried out safely. Always do as follows.
 - When working in dark places, turn on the working lamp and front lamps installed to the machine, and set up additional lighting in the work area if necessary.
 - Stop operations if the visibility is poor, such as in mist, snow, rain, or dust.

VENTILATION FOR ENCLOSED AREA

If it is necessary to start the engine within an enclosed area, or when handling fuel, flushing oil, or paint, open the doors and windows to ensure that adequate ventilation is provided to prevent gas poisoning.



SIGNALMAN'S SIGNAL AND SIGNS

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

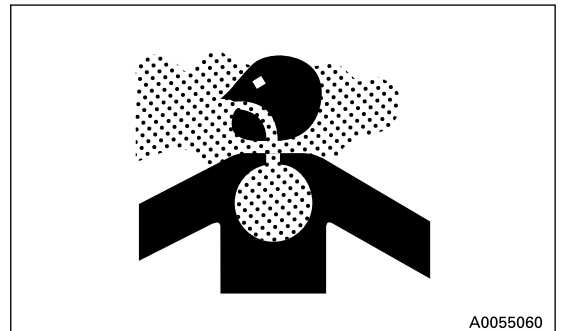
EMERGENCY EXIT FROM OPERATOR'S CAB

- If it should become impossible to open the cab door for any reason, open the rear window and use it as an emergency escape. For details, see "EMERGENCY ESCAPE HAMMER (PAGE 3-76)" in this manual.

ASBESTOS DUST HAZARD PREVENTION

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

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

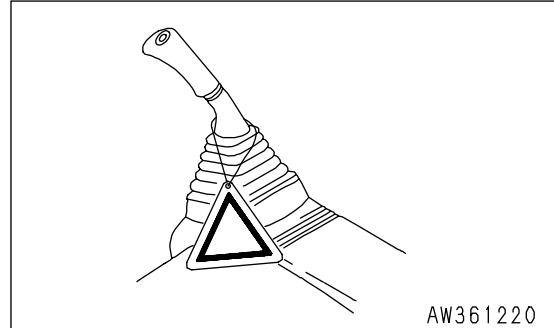


This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.

SAFETY MACHINE OPERATION

STARTING ENGINE

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



CHECKS BEFORE STARTING ENGINE

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

- Remove all dirt from the surface of the window glass to ensure a good view.
- Remove all dirt from the surface of the lens of the front lamps and working lamps, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the lights and working lamps, and check that the control levers are all at the neutral position.
- Before starting the engine, check that the safety lock lever is at the LOCK position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat. When adjusting, see "ADJUSTMENT OF MIRRORS (PAGE 3-118)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.

SAFETY RULES FOR STARTING ENGINE

- When starting the engine, sound the horn as a warning.
- Start and operate the machine only while seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Do not short circuit the starting motor circuit to start the engine. It is not only dangerous, but will also cause damage to the equipment.

STARTING ENGINE IN COLD WEATHER

- Carry out the warming-up operation thoroughly. If the machine is not thoroughly warmed up before the control levers are operated, the reaction of the machine will be slow, and this may lead to unexpected accidents.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery. Before charging or starting the engine with a different power source, melt the battery electrolyte and check for frost and leakage of battery electrolyte before starting.

OPERATION

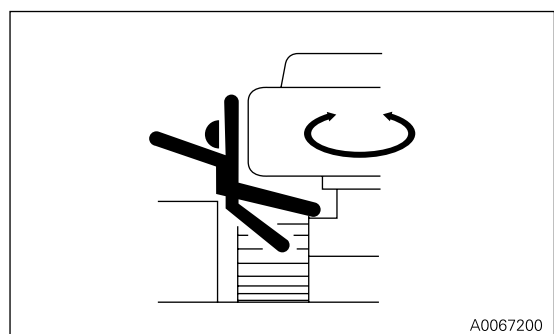
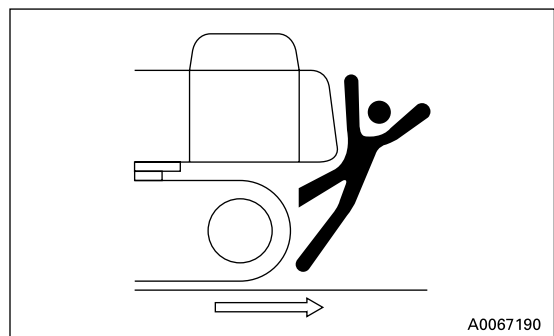
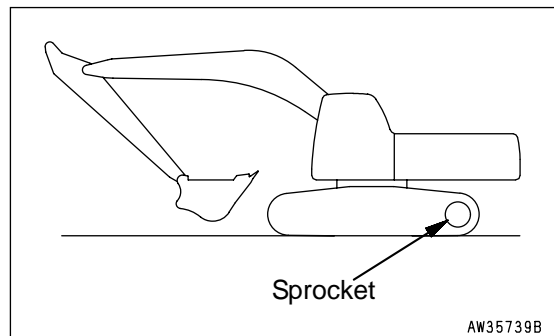
CHECKS AFTER STARTING ENGINE

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

- Always fasten your seat belt.
- Check that the movement of the machine matches the display on the control pattern card. If it does not match, replace it immediately with the correct control pattern card.
- Check the operation of the gauges and equipment, and check the operation of the bucket, arm, boom, travel system, swing system, and steering system.
- Check for any abnormality in the sound of the machine, vibration, heat, smell, or gauges; check also that there is no leakage of oil or fuel.
- If any abnormality is found, carry out repairs immediately.

SAFETY RULES FOR CHANGING MACHINE DIRECTIONS

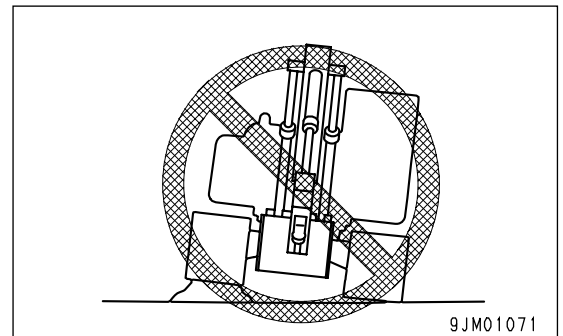
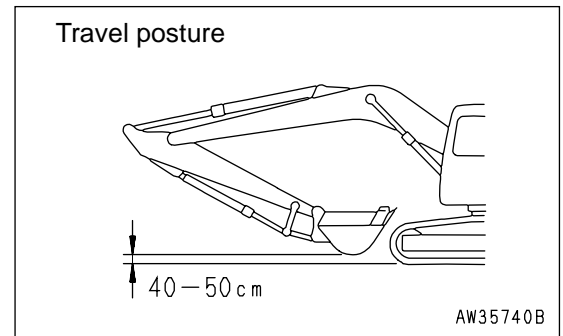
- Position the upper structure so that the sprocket is at the rear of the operator's cab before traveling. If the sprocket is at the front of the operator's cab, the direction of operations is reversed (for example, forward becomes reverse, and left becomes right).
- Before travelling, check again that there is no one in the surrounding area, and that there are no obstacles.
- Before travelling, sound the horn to warn people in the area.
- Always operate the machine only when seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Check that the travel alarm (if equipped) works properly.
- Always lock the door and windows of the operator's compartment in position (open or closed). On jobsites where there is a hazard of flying objects or of objects entering the operator's compartment, check that the door and windows are securely closed.
- If there is an area to the rear of the machine which cannot be seen, position a signal person. Take special care not to hit other machines or people when turning or swinging the machine.



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

SAFETY RULES FOR TRAVELING

- When using the machine, to prevent the machine from overturning due to overloading and to avoid damage to the work equipment, do not exceed the maximum permitted load or performance of the machine.
- When traveling on level ground, pull in the work equipment and keep it at a height of 40 to 50 cm from the ground.
- When traveling on rough ground, travel at low speed and do not operate the steering suddenly. There is danger that the machine may turn over. The work equipment may hit the ground surface and cause the machine to lose its balance, or may damage the machine or structures in the area.
- When traveling on rough ground or steep slopes, if the machine is equipped with auto-deceleration, always turn the auto-deceleration switch OFF (cancel). If the auto-deceleration is ON, the engine speed may rise and the travel speed may suddenly increase.
- Avoid traveling over obstacles when possible. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. Never travel over obstacles which make the machine tilt strongly to one side.
- When traveling or carrying out operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine.
When traveling on public roads, check first with the relevant authorities and follow their instructions.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the work equipment hit anything.



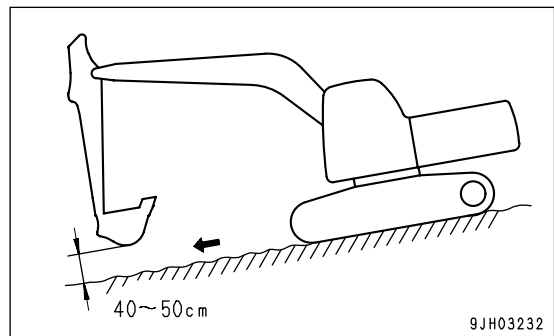
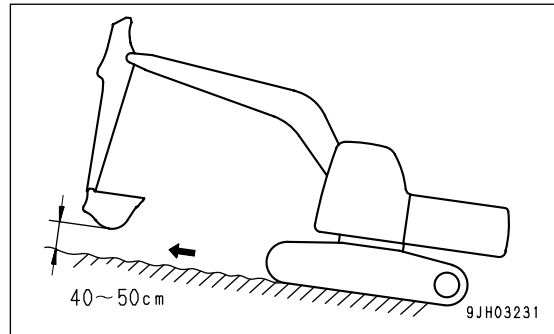
TRAVELING ON SLOPES

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

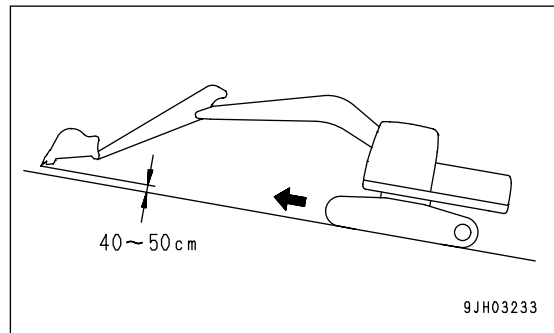
- When traveling on slopes, keep the work equipment approximately 40 to 50 cm above the ground. In case of emergency, quickly lower the work equipment to the ground immediately to help stop the machine.

- When travel up slopes, set the operator's cab facing uphill, when travel down slopes, set the operator's cab facing downhill.

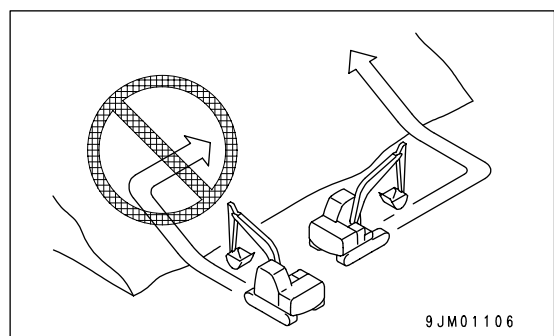
Always check the firmness of the ground under the front of the machine when traveling.



- When traveling up a steep slope, extend the work equipment to the front to improve the balance, keep the work equipment approximately 40 to 50 cm above the ground, and travel at low speed.
- When traveling downhill, lower the engine speed, keep the travel lever close to the neutral position, and travel at low speed.

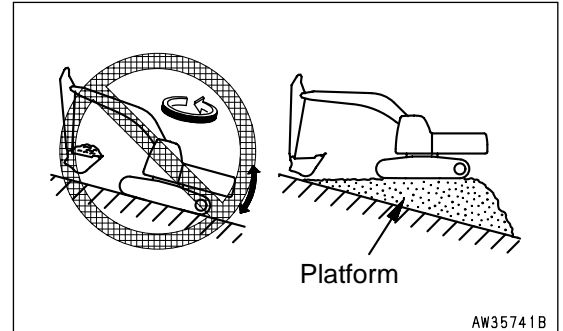


- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.
- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- If the engine stops when the machine is traveling on a slope, move the control levers immediately to the neutral position and start the engine again.



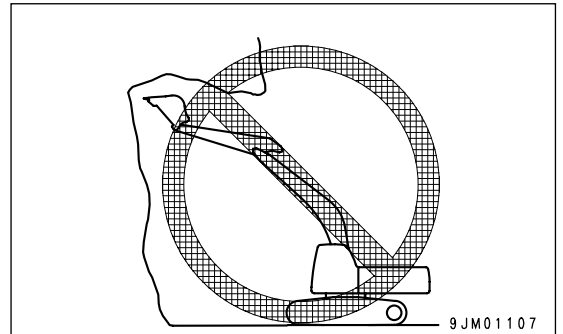
OPERATIONS ON SLOPES

- When working on slopes, there is a hazard that the machine may lose its balance and turn over when the swing or work equipment are operated. This may lead to serious injury or property damage, so always provide a stable place when carrying out these operations, and operate carefully.
- Do not swing the work equipment from the uphill side to the downhill side when the bucket is loaded. This operation is dangerous, and may cause the machine to tip over.
- If the machine has to be used on a slope, pile the soil to make a platform that will keep the machine as horizontal as possible.

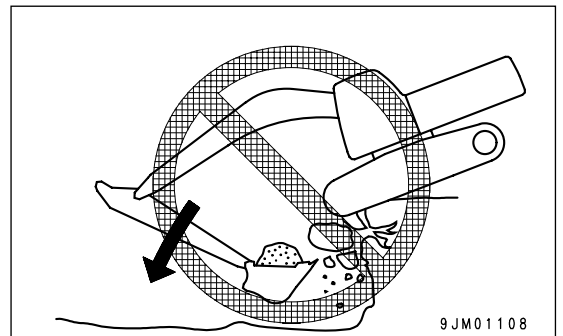


PROHIBITED OPERATIONS

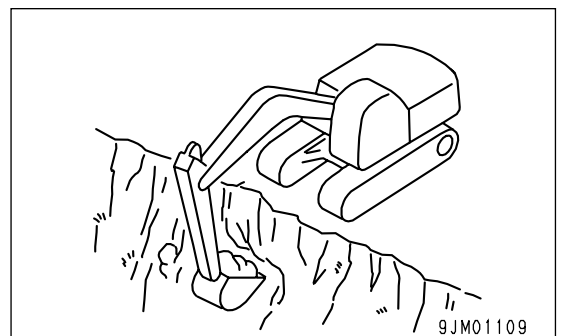
- Never dig the work face under an overhang. There is a hazard that rocks may fall or that the overhang may collapse and fall on top of the machine.



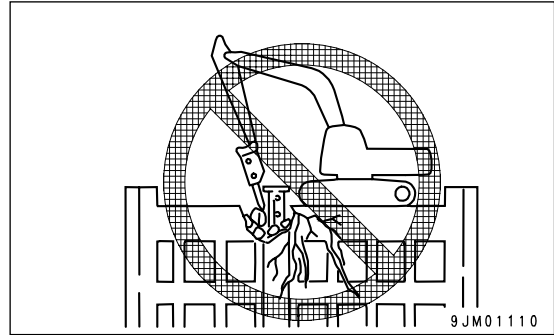
- Do not excavate too deeply under the front of the machine. The ground under the machine may collapse and cause the machine to fall.



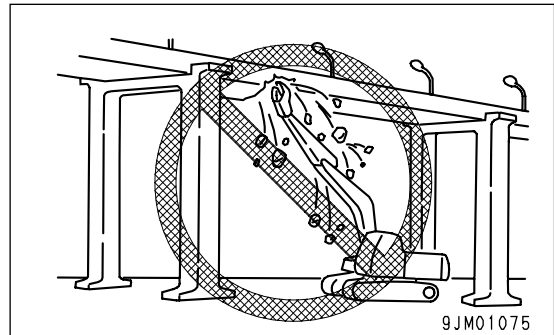
- To make it easier to escape if there is any problem, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when carrying out digging operations.



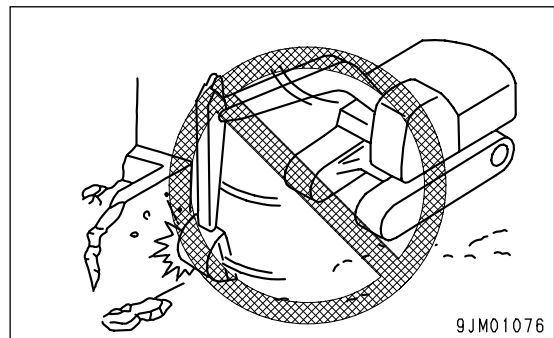
- Do not carry out demolition work under the machine. There is a hazard that the machine may become unstable and tip over.
- When working on or from the top of buildings or other structures, check the strength and the structure before starting operations. There is a hazard of the building collapsing and causing serious injury or damage.



- When carrying out demolition work, do not carry out demolition above your head. There is a hazard of broken parts falling or of the building collapsing and causing serious injury or property damage.



- Do not use the impact force of the work equipment for breaking work. There is a hazard of personal injury or property damage being caused by flying pieces of broken material or damage to the work equipment.
- Generally speaking, the machine is more liable to overturn when the work equipment is at the side than when it is at the front or rear.



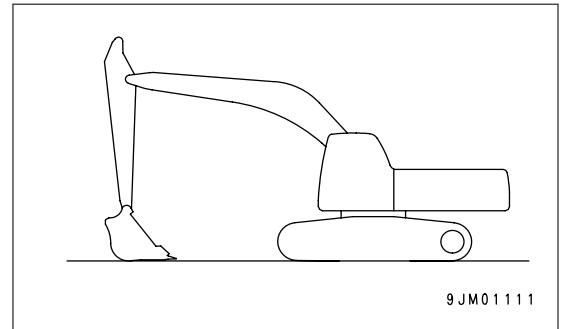
- When using a breaker or other heavy work equipment, there is a hazard of the machine losing its balance and tipping over. When operating on flat ground as well as on slopes.
 - Do not suddenly lower, swing, or stop the work equipment.
 - Do not suddenly extend or retract the boom cylinder. There is a hazard that impact will cause the machine to tip over.
- Do not pass the bucket over the head of other workers or over the operator's seat of dump trucks or other hauling equipment. The load may spill or the bucket may hit the dump truck and cause serious injury or property damage.

OPERATIONS ON SNOW

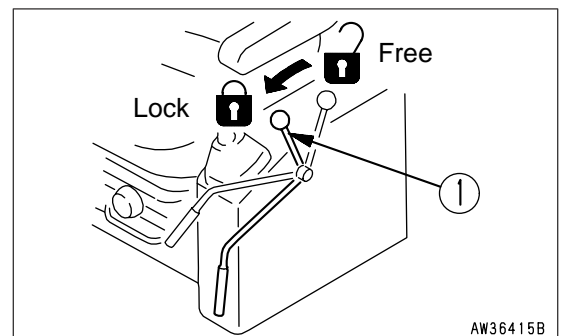
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes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

PARKING MACHINE

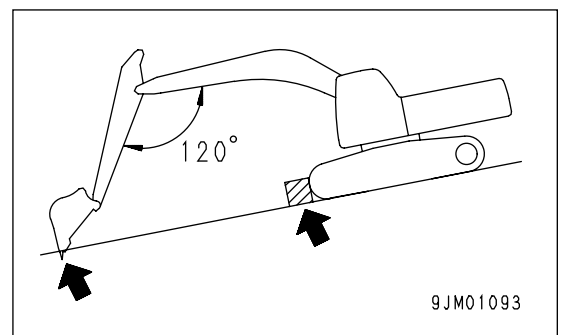
- Park the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground.



- When leaving the machine, set safety lock lever (1) to the LOCK position, 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, always do as follows.
 - Set the bucket on the downhill side, then dig it into the ground.
 - Put blocks under the tracks to prevent the machine from moving.



TRANSPORTATION

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

SHIPPING THE MACHINE

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

- Investigate all state and local laws governing the weight, width, and length of a load. If necessary, disassemble the work equipment. The width, height and weight of the load differ according to the work equipment, so take this into account when determining the shipping route.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- For details of the shipping procedure, see “TRANSPORTATION (PAGE 3-161)” in the OPERATION section.

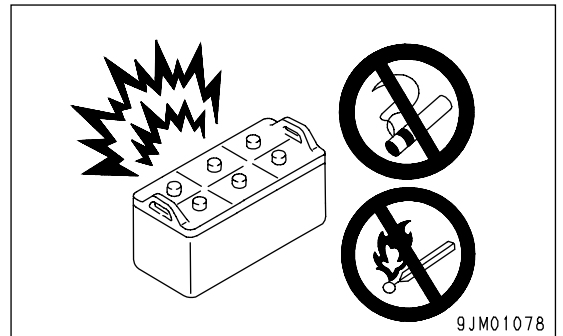
BATTERY

BATTERY HAZARD PREVENTION

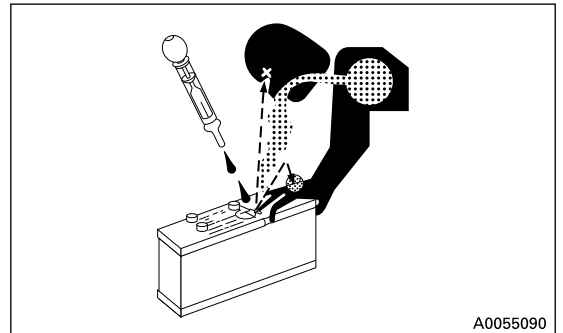
Battery electrolyte contains sulphuric acid, and batteries generate flammable hydrogen gas, which may explode.

Mistaken handling can lead to serious injury or fire. For this reason, always observe the following precautions.

- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Always check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.
- When working with batteries, always wear safety glasses and rubber gloves.
- Never smoke or use any flame near the battery.



- If you spill acid on your clothes or skin, immediately flush the area with large amounts of water.
- If acid gets into your eyes, flush them immediately with large quantities of water and seek medical attention.



- Before working with batteries, turn the starting switch to the OFF position.

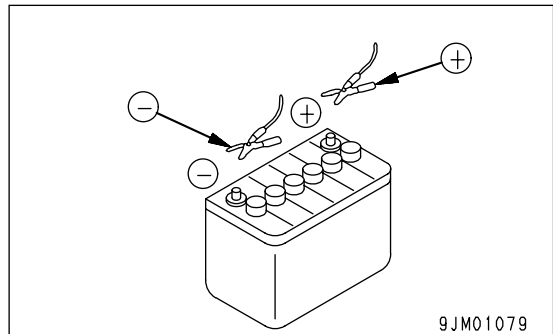
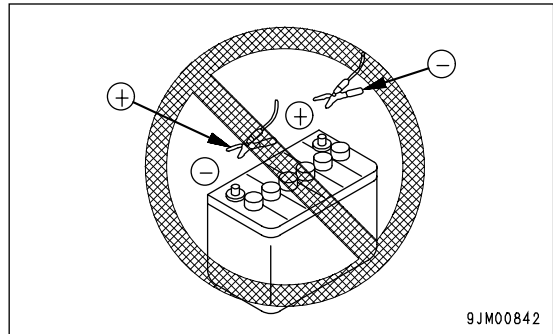
As there is a hazard that sparks will be generated, always do as follows.

- Do not let tools or other metal objects make any contact between the battery terminals. Do not leave tools or other metal objects lying around near the battery.
- Always disconnect the negative (-) terminal (ground side) first when removing the battery; when installing the battery, connect the positive (+) terminal first, and connect the ground last. Tighten the battery terminals securely.
- Flammable hydrogen gas is generated when the battery is charged, so remove the battery from the chassis, take it to a well-ventilated place, and remove the battery caps before charging it.
- Tighten the battery caps securely.
- Install the battery securely to the determined place.

STARTING ENGINE WITH BOOSTER CABLES

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

- When starting with a booster cable, carry out the starting operation with two workers (one worker sitting in the operator's seat and the other working with the battery).
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the booster cables. Disconnect the ground or negative (-) cable (ground side) first when removing them.
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.
- Always wear safety goggles and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- For details of the starting procedure when using booster cables, see "STARTING ENGINE WITH BOOSTER CABLES (PAGE 3-173)" in the OPERATION section.



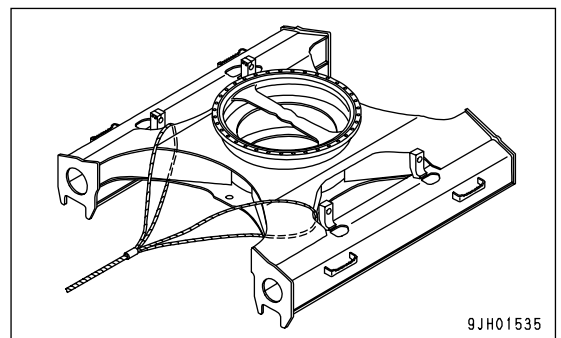
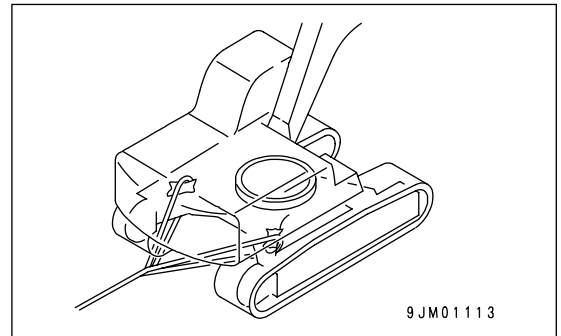
TOWING

SAFETY RULES FOR TOWING

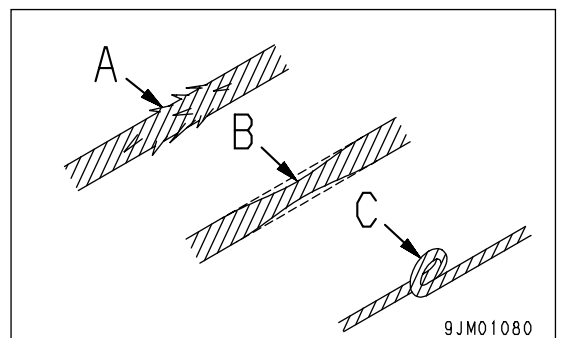
Serious injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection or inspection of the wire rope.

For towing, see "TOWING THE MACHINE (PAGE 3-170)".

- Always wear leather gloves when handling wire rope.
- Fix the wire rope to the truck frame.
- During the towing operation, never stand between the towing machine and the machine being towed.
- Never tow a machine on a slope.



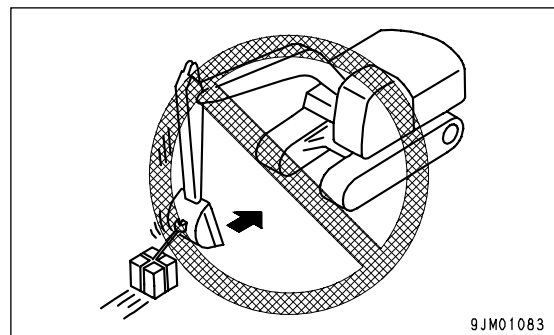
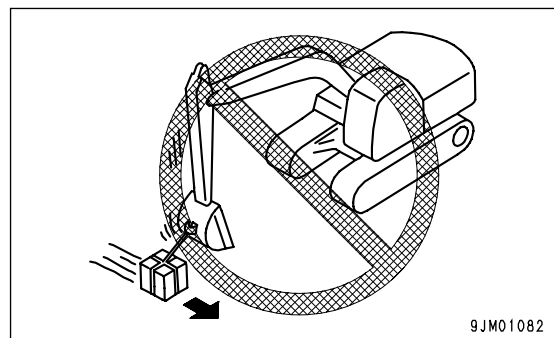
- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.



LIFTING OBJECTS WITH BUCKET

SAFETY RULES FOR LIFTING OBJECTS

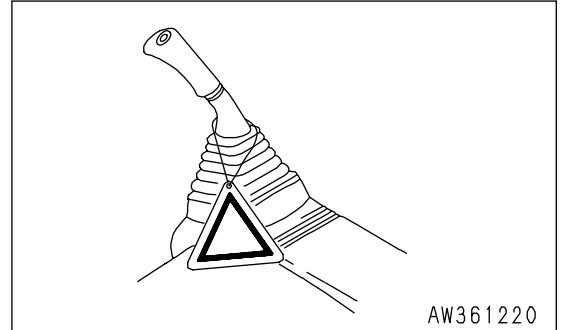
- Do not carry out lifting work on slopes, soft ground, or other places where the machine is not stable.
- Use wire rope that conforms to the specified standard.
- Always observe the specified lifting load strictly.
- It is dangerous if the load hits any worker or structure. Always check carefully that the surrounding area is safe before swinging or turning the machine.
- Do not start, swing, or stop the machine suddenly. There is a hazard that the lifted load will swing.
- Do not pull the load to the side or in towards the machine.
- Do not leave the operator's seat when there is a raised load.



SAFETY MAINTENANCE INFORMATION

WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to the work equipment control lever in the operator's cab to alert others that you are performing service or maintenance on the machine.
Attach additional warning tags around the machine if necessary.
Warning tag Part No. 09963-A1640
Keep this warning tag in the tool box while it is not used. If there is not the tool box, keep the tag in the operation manual pocket.
- If others start the engine, or touch or operate the work equipment control lever while you are performing service or maintenance, you could suffer serious injury or property damage.



KEEP WORK PLACE CLEAN AND TIDY

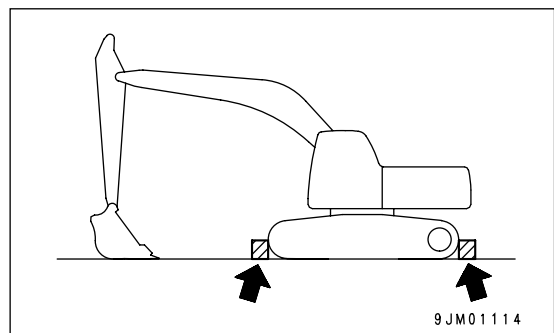
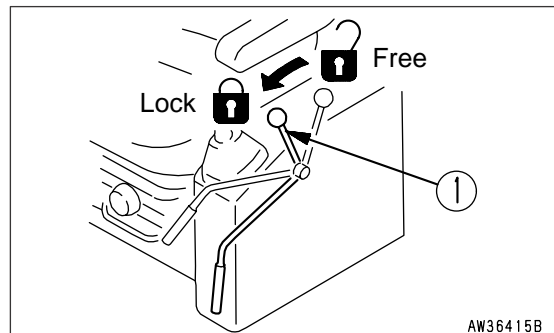
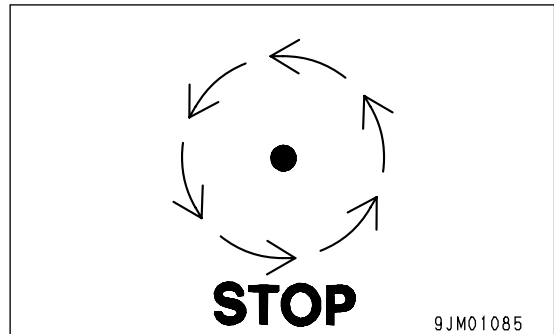
- Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely.
If the work place is not kept clean and tidy, there is the danger that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

APPOINT LEADER WHEN WORKING WITH OTHERS

- When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.
When working with others, misunderstandings between workers can lead to serious accidents.

STOP ENGINE BEFORE CARRYING OUT MAINTENANCE

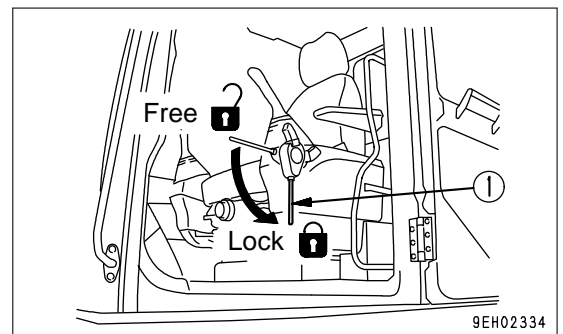
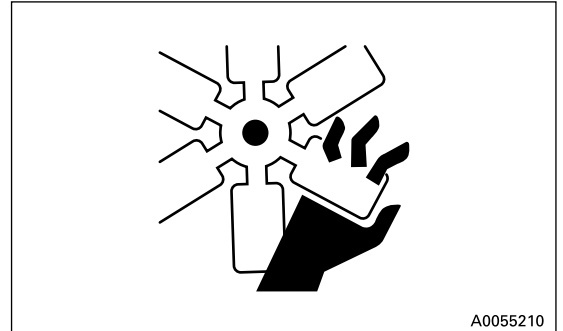
- Stop the machine on firm, level ground.
- Select a place where there is no danger of falling rocks, landslides, or flooding.
- Lower the work equipment completely to the ground and stop the engine.
- Place the work equipment control lever to the neutral position, set safety lock lever (1) to the LOCK position, then stop the engine.
- Put blocks under the track to prevent the machine from moving.



TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

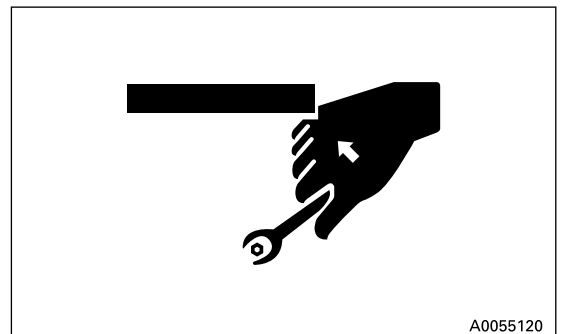
To prevent injury, do not carry out maintenance with the engine running. If maintenance must be carried out with the engine running, carry out the operation with at least two workers and do as follows.

- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- Set safety lock lever (1) to the LOCK position.
- 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 extremely careful.
- Do not touch any control levers. If any control lever must be operated, always give a signal to the other workers to warn them to move to a safe place.
- Never drop or insert tools or other objects into the fan or fan belt.
Parts may break or be sent flying.



PROPER TOOLS

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



ACCUMULATOR

The accumulator is charged with high-pressure nitrogen gas.

When handling the accumulator, careless procedure may cause an explosion which could lead to serious injury or property damage. For this reason, always observe the following precautions.

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



PERSONNEL

Only authorized personnel can service and repair the machine. Do not allow unauthorized personnel into the area.

If necessary, employ an observer.

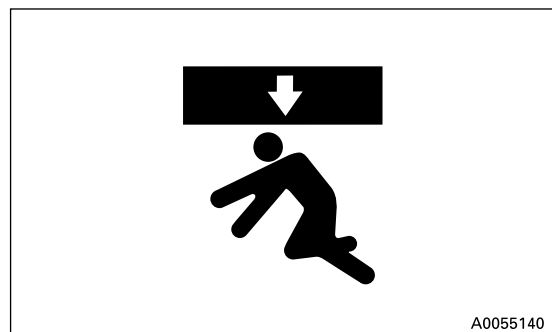
ATTACHMENTS

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



WORK UNDER THE MACHINE

- If it is necessary to go under the work equipment or the machine to carry out service and maintenance, support the work equipment and machine securely with blocks and stands strong enough to support the weight of the work equipment and machine.
- It is extremely dangerous to work under the machine if the track shoes are off the ground and the machine is supported only by the work equipment. If the control levers are touched by mistake, or there is a hazard to the hydraulic line, the work equipment or the machine may suddenly descend. This is extremely dangerous. Never work under the machine if the machine is not properly supported by blocks or stands.



NOISE

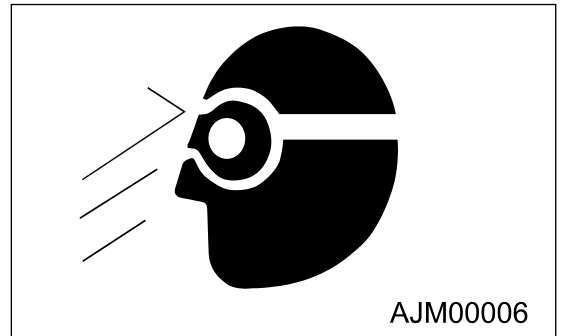
If the noise from the machine is too loud, it may cause temporary or permanent hearing problems.

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

WHEN USING HAMMER

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

- If hard metal parts such as pins, bucket teeth, cutting edges, or bearings are hit with a hammer, there is a hazard that pieces might be scattered and cause injury. Always wear safety goggles and gloves.
- When hitting pins or bucket teeth, there is a hazard that broken pieces might be sent flying and injure people in the surrounding area. Always check that there is no one in the surrounding area.
- If pins are hit with strong force, there is a hazard that the pin may fly out and injure people in the surrounding area.



WELDING WORKS

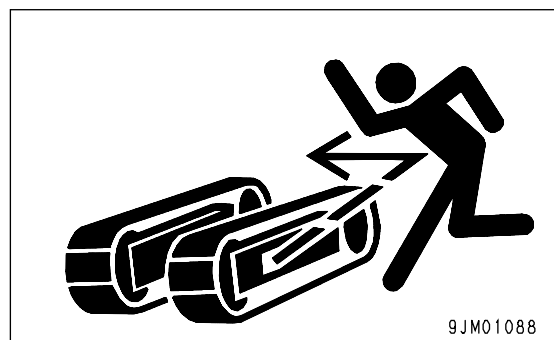
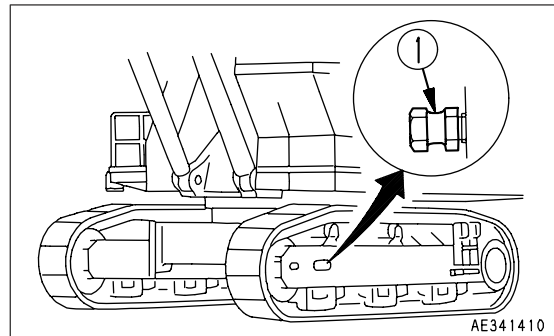
Welding operations must always be carried out by a qualified welder and in a place equipped with a proper equipment. There is a hazard of fire or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

REMOVING BATTERY TERMINALS

When repairing the electrical system or when carrying out electrical welding, remove the negative (-) terminal of the battery to prevent the flow of current.

SAFETY FIRST WHEN USING HIGH-PRESSURE GREASE TO ADJUST TRACK TENSION

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



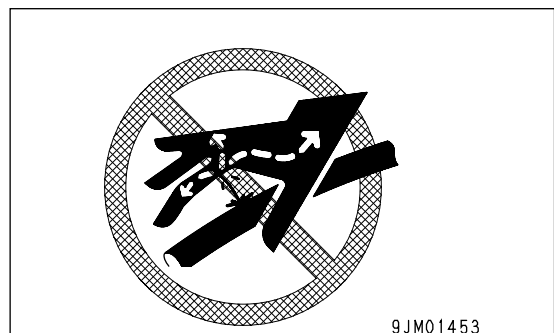
DO NOT DISASSEMBLE RECOIL SPRINGS

The recoil spring assembly is used to reduce the impact on the idler. It contains a spring under high pressure, so if it is disassembled by mistake, the spring will fly out and cause serious injury or even death. Never disassemble the recoil spring.

SAFETY RULES FOR HIGH-PRESSURE OIL

The hydraulic system is always under internal pressure. When inspecting or replacing piping or hoses, always check that the pressure in the hydraulic circuit has been released. If the circuit is still under pressure, it will lead to serious injury or property damage, so always do as follows.

- Do not carry out inspection or replacement work when the hydraulic system is under pressure.
- If there is any leakage from the piping or hoses, the surrounding area will be wet, so check for cracks in the piping and hoses and for swelling in the hoses.
When carry out inspection, wear safety glasses and leather gloves.
- There is a hazard that high-pressure oil leaking from small holes may penetrate your skin or cause blindness if it contacts your eyes directly. If you are hit by a jet of high-pressure oil and suffer injury to your skin or eyes, wash the place with clean water, and consult a doctor immediately for medical attention.



PRECAUTION FOR HIGH FUEL PRESSURE

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

SAFETY HANDLING HIGH-PRESSURE HOSES

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

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

- Damaged or leaking hydraulic fitting.
- Frayed or cut covering or exposed reinforcement layer of wire.
- Covering swollen in places.
- Twisted or crushed movable portion.
- Foreign material embedded in covering.

PRECAUTION FOR HIGH VOLTAGE

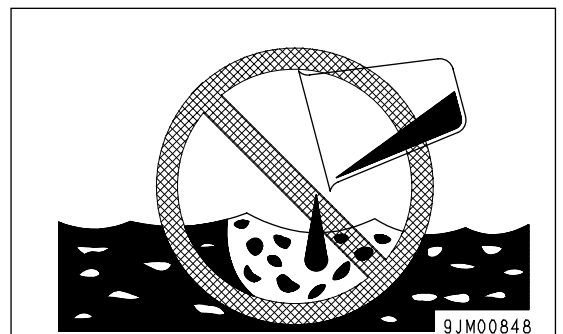
When the engine is running and immediately after it is stopped, high voltage is generated inside the engine controller and the engine injector, and there is danger of electrocution. Never touch the inside of the controller or the engine injector portion. If it is necessary to touch the inside of the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



WASTE MATERIALS

To prevent pollution, pay careful attention to the method of disposing of waste materials.

- Always put oil drained from your machine in containers. Never drain oil directly onto the ground or dump into the sewage system, rivers, the sea, or lakes.
- Obey appropriate laws and regulations when disposing of harmful objects such as oil, fuel, coolant, solvent, filters, and batteries.



AIR CONDITIONER MAINTENANCE

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

Never touch refrigerant.

COMPRESSED AIR

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

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

- In order for the machine to be operated safely for a long time, it is necessary to add oil and to carry out service and maintenance at periodic intervals. In order to further increase safety, components with a strong relationship to safety, such as hoses and seat belts, must be replaced at periodic intervals.
Replacement of safety critical parts: See "SAFETY CRITICAL PARTS (PAGE 4-16)".
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious injury or property damage. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety critical parts if any defect is found, even when they have not reached the time specified interval.

MEMO

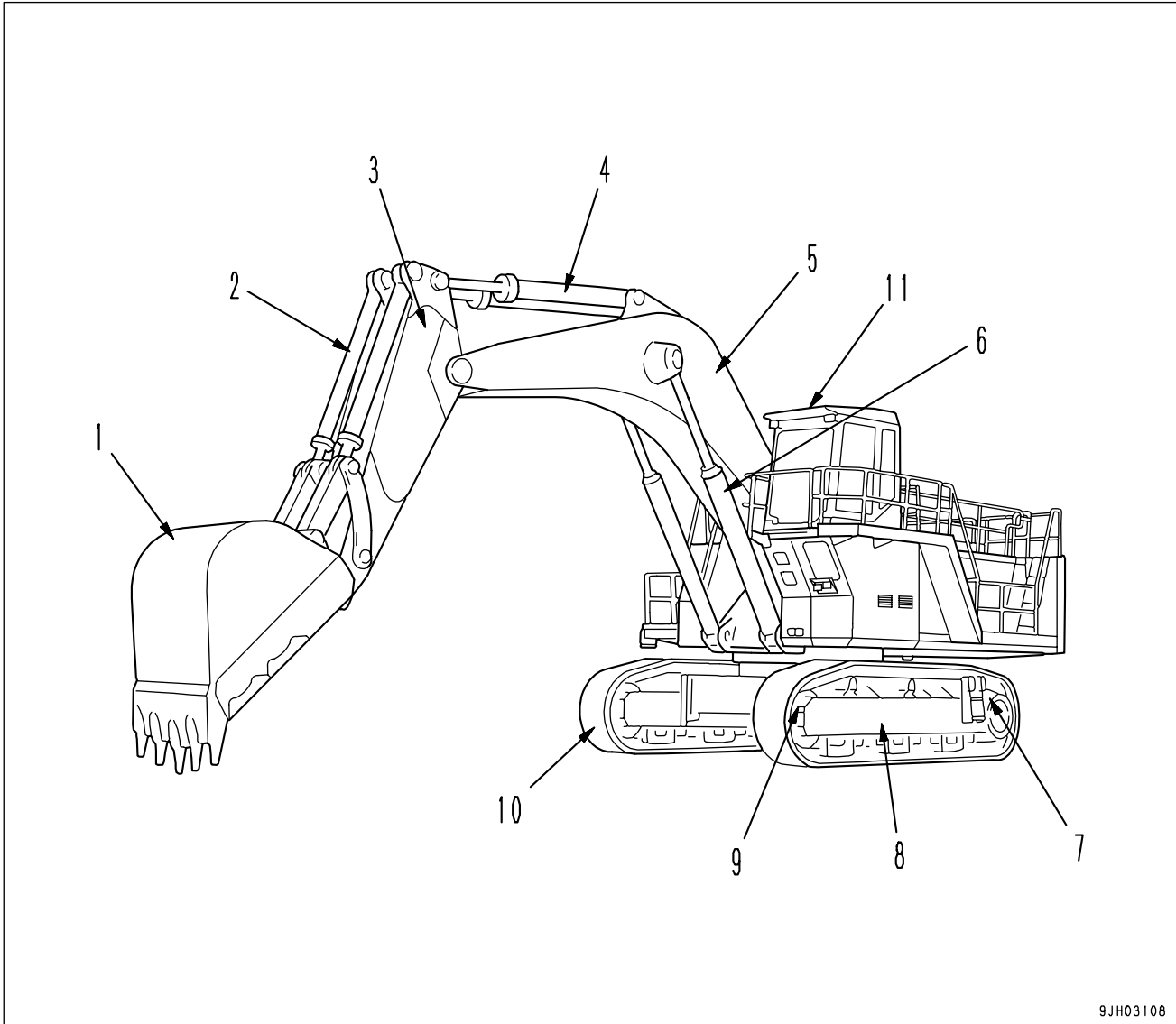
OPERATION

 **WARNING**

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

GENERAL VIEW

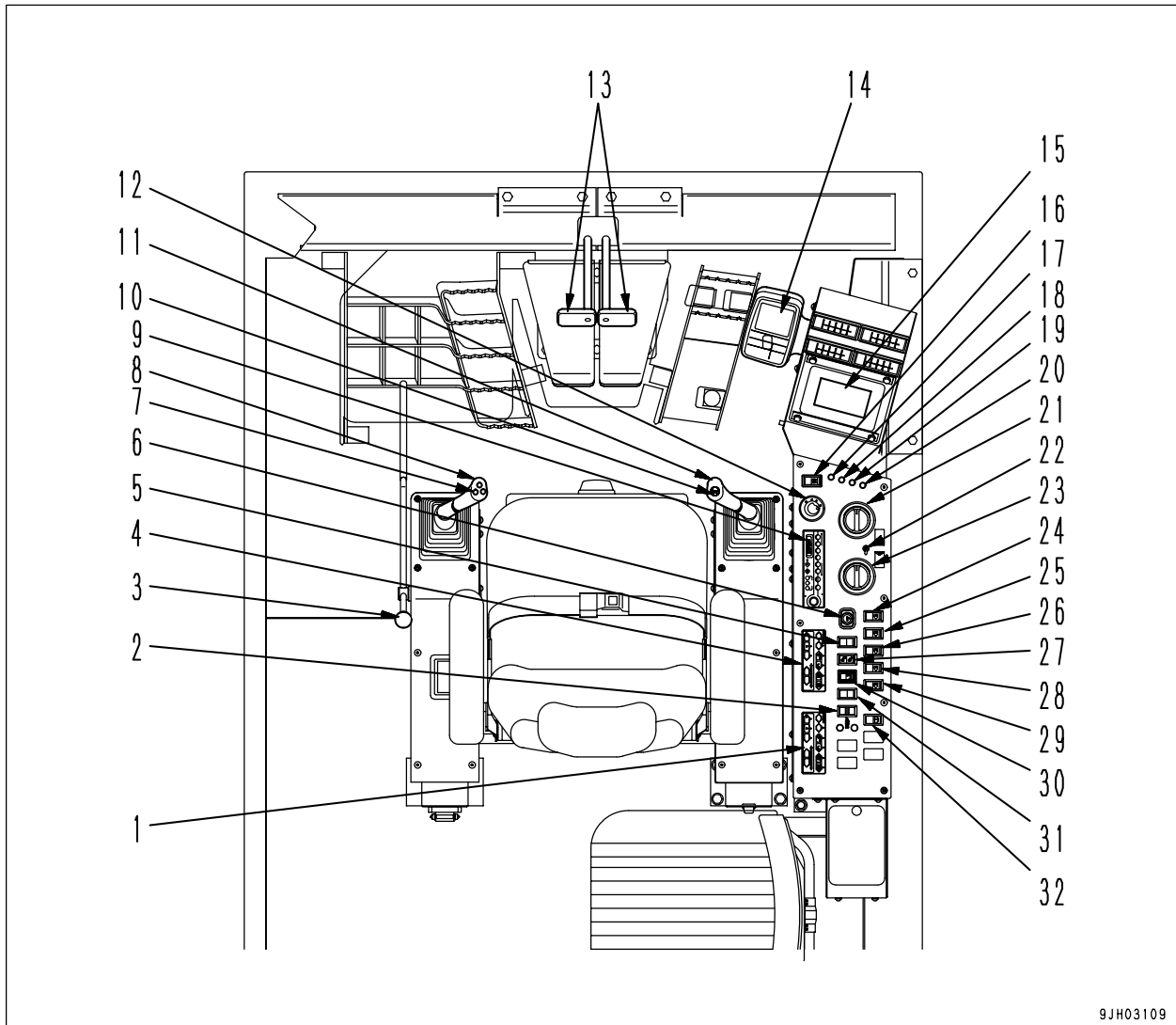
GENERAL VIEW OF MACHINE



9JH03108

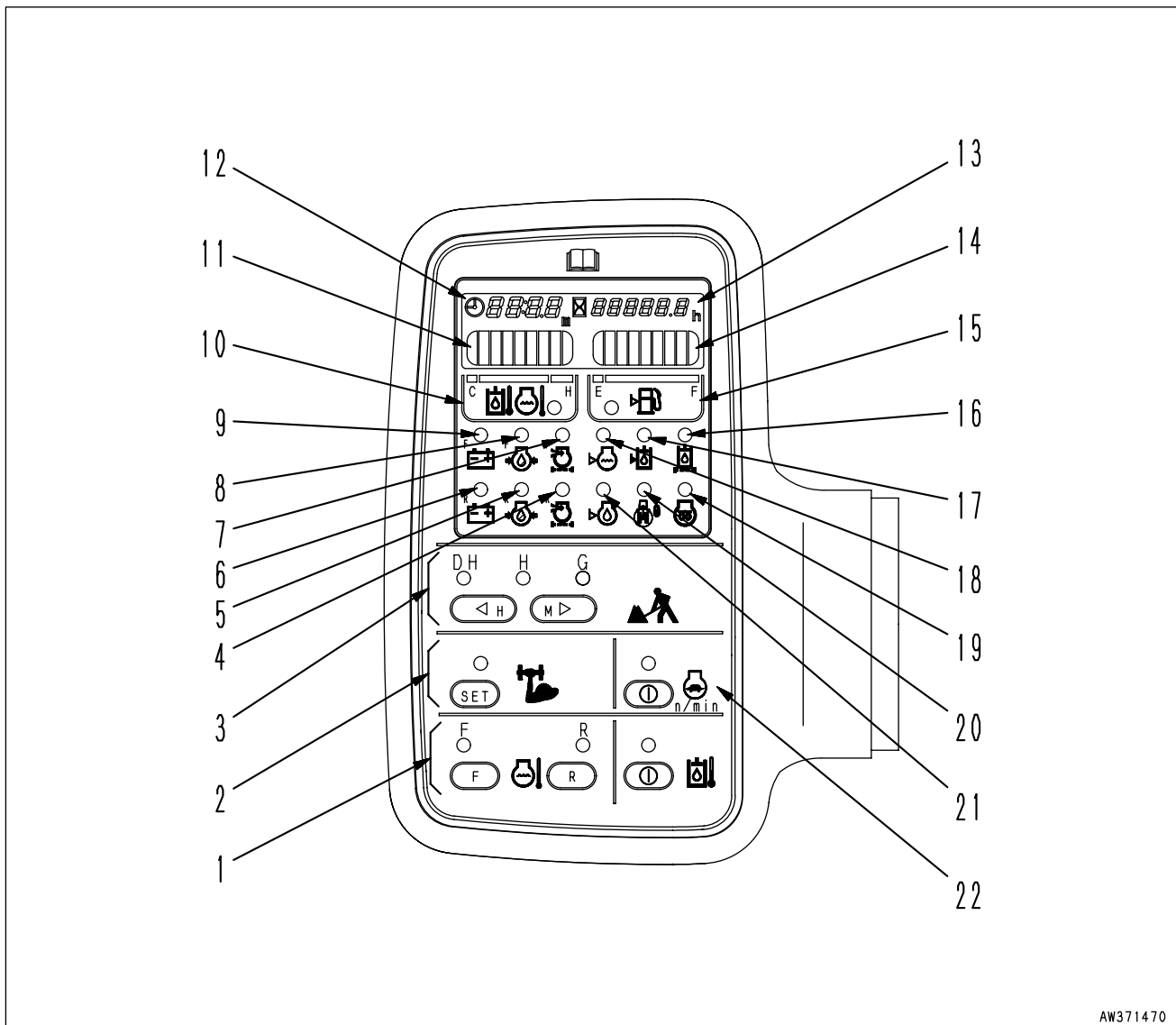
(1) Bucket	(7) Sprocket
(2) Bucket cylinder	(8) Track frame
(3) Arm	(9) Idler
(4) Arm cylinder	(10) Track shoe
(5) Boom	(11) Top guard
(6) Boom cylinder	

GENERAL VIEW OF CONTROLS AND GAUGES



9JH03109

- | | |
|--|---|
| (1) Air conditioner control panel 2 | (17) Engine emergency stop lamp |
| (2) Lubrication switch | (18) Auto-greasing caution lamp (if equipped) |
| (3) Safety lock lever | (19) Ladder caution lamp |
| (4) Air conditioner control panel 1 | (20) Truck counter lamp |
| (5) Swing parking brake switch | (21) Fuel control dial (F. engine) |
| (6) Cigarette lighter | (22) Starter selector switch |
| (7) Truck counter switches (2 positions) | (23) Fuel control dial (R. engine) |
| (8) Left work equipment control lever | (24) Lamp switch |
| (9) Car radio | (25) Step light switch |
| (10) Horn switch | (26) Room lamp switch |
| (11) Right work equipment control lever | (27) Machine push-up switch |
| (12) Starting switch | (28) Fog lamp switch |
| (13) Travel lever | (29) Rotating lamp switch |
| (14) Monitor | (30) Shockless boom control switch |
| (15) Health monitor | (31) Alarm buzzer stop switch |
| (16) Preheating switch | (32) Wiper switch |



AW371470

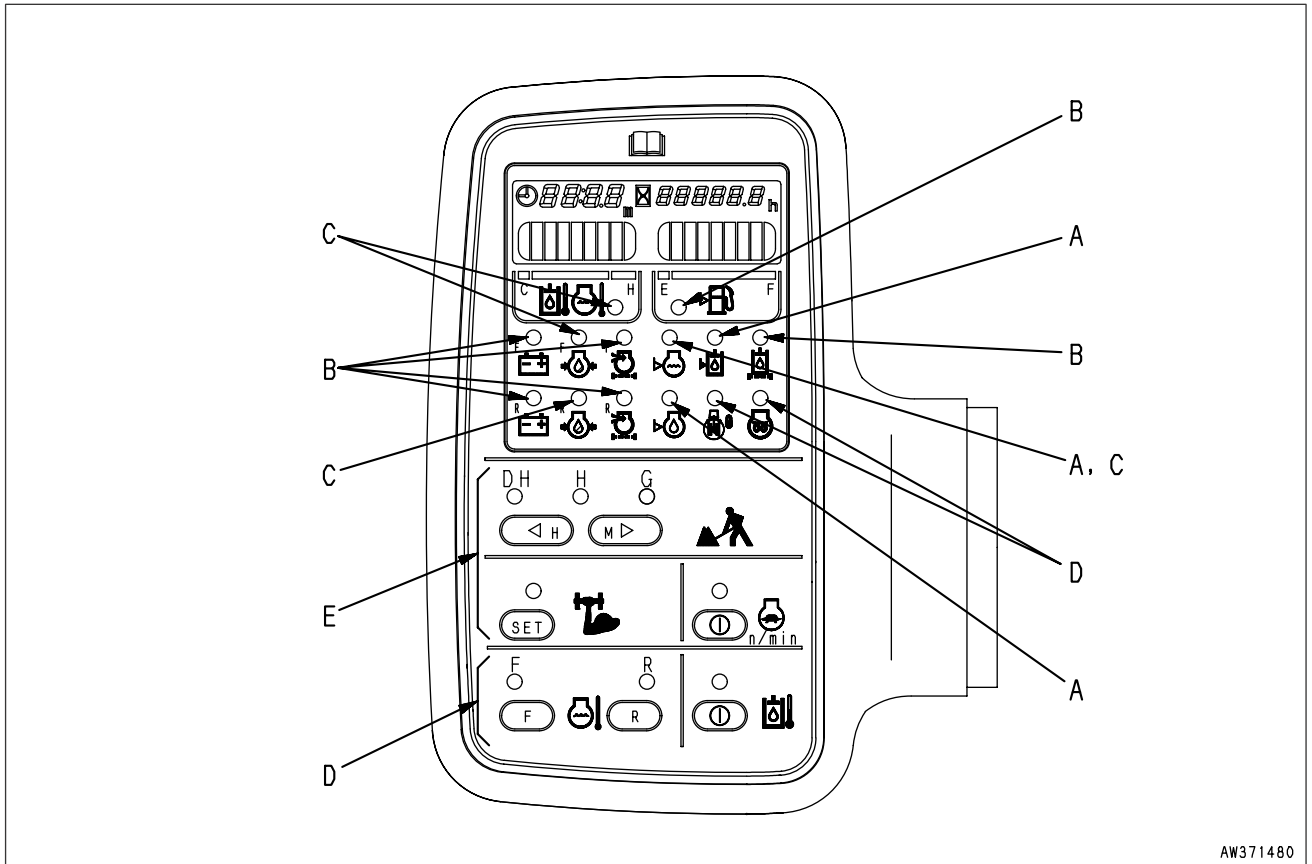
(1) Engine water temperature, hydraulic oil temperature display selector switch	(11) Engine water temperature gauge hydraulic oil temperature gauge
(2) Heavy life switch	(12) Display (for clock and fault indication)
(3) Working mode selector switch	(13) Service meter
(4) Air cleaner clogging monitor (R. engine)	(14) Fuel gauge
(5) Engine oil pressure monitor (R. engine)	(15) Fuel level monitor
(6) Charging level monitor (R. engine)	(16) Hydraulic filter clogging monitor
(7) Air cleaner clogging monitor (F. engine)	(17) Hydraulic oil level monitor
(8) Engine oil pressure monitor (F. engine)	(18) Radiator water level monitor
(9) Charging level monitor (F. engine)	(19) Engine pre-heating monitor
(10) Engine water temperature, hydraulic oil temperature monitor	(20) Swing lock monitor
	(21) Engine oil level monitor
	(22) Auto-deceleration switch

EXPLANATION OF COMPONENTS

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

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

MACHINE MONITOR



AW371480

A: Basic check Items	D: Meter Display Portion
B: Caution Items	E: Monitor Switches
C: Emergency Stop Items	

A. Basic check items (See Basic Check Monitors (PAGE 3-7))

This displays the basic items among the check before starting items that should be checked before starting the engine.

If there is any abnormality, the monitor showing the location of the abnormality will flash.

NOTICE

When carrying out the check before starting, do not rely only on these monitors. Always carry out the inspection items according to the Maintenance section or Section "MACHINE OPERATIONS AND CONTROLS (PAGE 3-103)".

B. Caution items (See Caution Monitors (PAGE 3-9)) **CAUTION**

If these monitor items flash, check and repair the appropriate location as soon as possible.

These are items which need to be observed while the engine is running. If any abnormality occurs, items which need to be repaired as soon as possible are displayed.

If there is any abnormality, the appropriate monitor lamp will flash to indicate the location of the abnormality.

C. Emergency stop items (See Emergency Monitors (PAGE 3-11)) **CAUTION**

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

This displays those of the abnormality items for which action must be taken immediately when the engine is running.

If there is any abnormality, the monitor showing the location of the abnormality will flash and the alarm buzzer will sound.

D. Meter Display Portion (See Meter Display Portion (PAGE 3-13))

This portion consists of pre-heating monitor, swing lock monitor, engine water temperature gauge, fuel gauge, service meter and display.

E. Monitor switches (See Monitor Switches (PAGE 3-17))

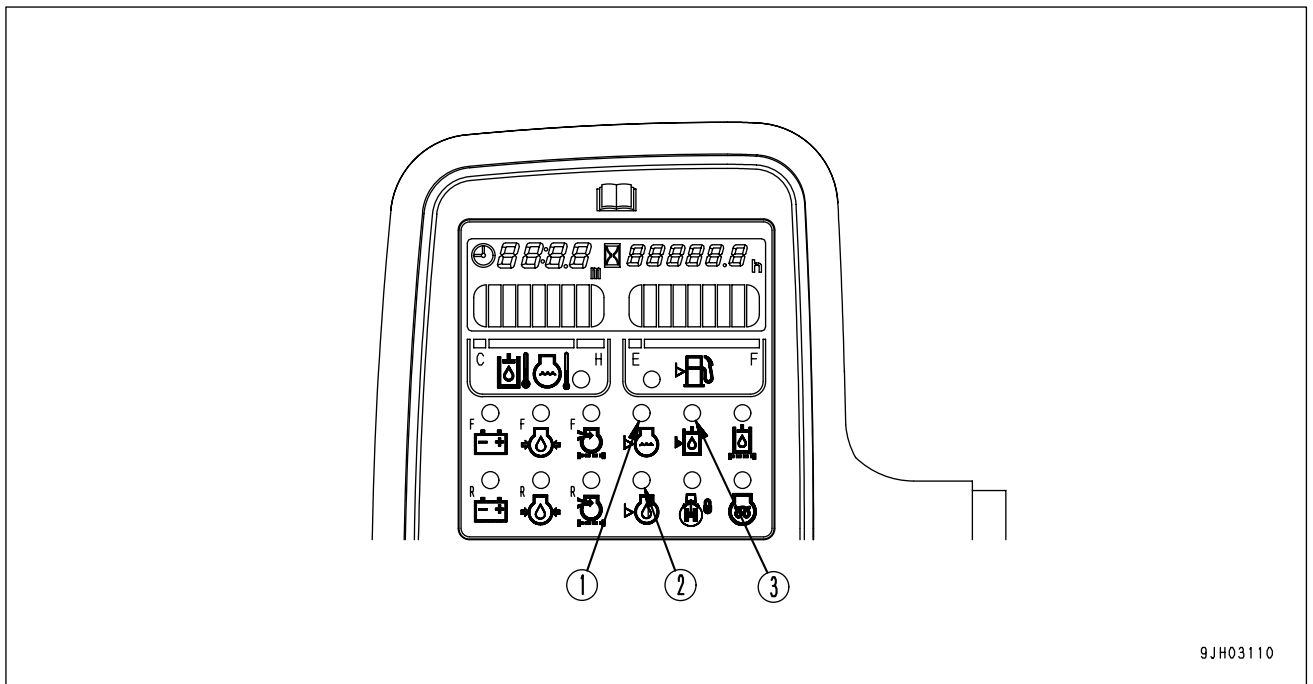
This select working mode, travel speed and time setting of clock.

BASIC CHECK ITEMS

⚠ WARNING

These monitors are not a guarantee of the condition of the machine. Do not simply rely on the monitors when carrying out checks before starting (daily checks). Always get off the machine and check each item directly.

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



9JH03110

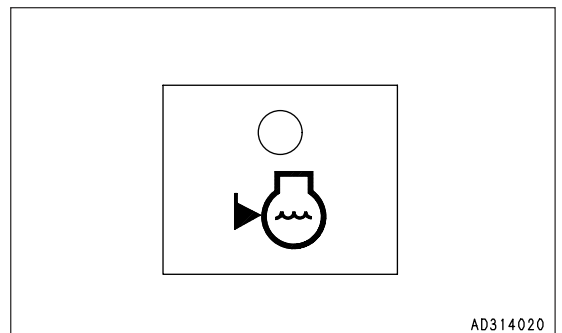
(1) Engine oil level monitor

(2) Engine oil replacement monitor (only for set machines)

ENGINE OIL LEVEL MONITOR

This monitor A (1) warns the operator if the oil level in the engine oil pan has dropped.

If the oil level in the engine oil pan is low, the monitor will flash, so check the oil level in the engine oil pan and add oil.

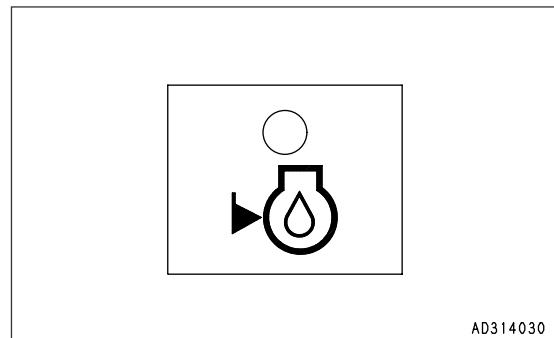


AD314020

ENGINE OIL LEVEL MONITOR

This warns monitor A (2) that the oil level in the engine oil pan is too low.

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

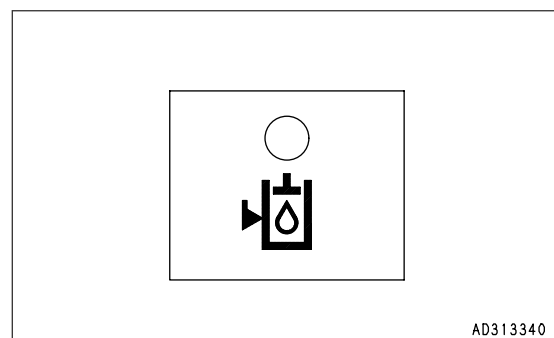


HYDRAULIC OIL LEVEL MONITOR

This warns monitor A (3) that the hydraulic oil level is too low.

If the monitor lamp flashes, check the hydraulic oil level, and add oil.

If you want to change the set time for replacement of oil, please consult your Komatsu distributor.



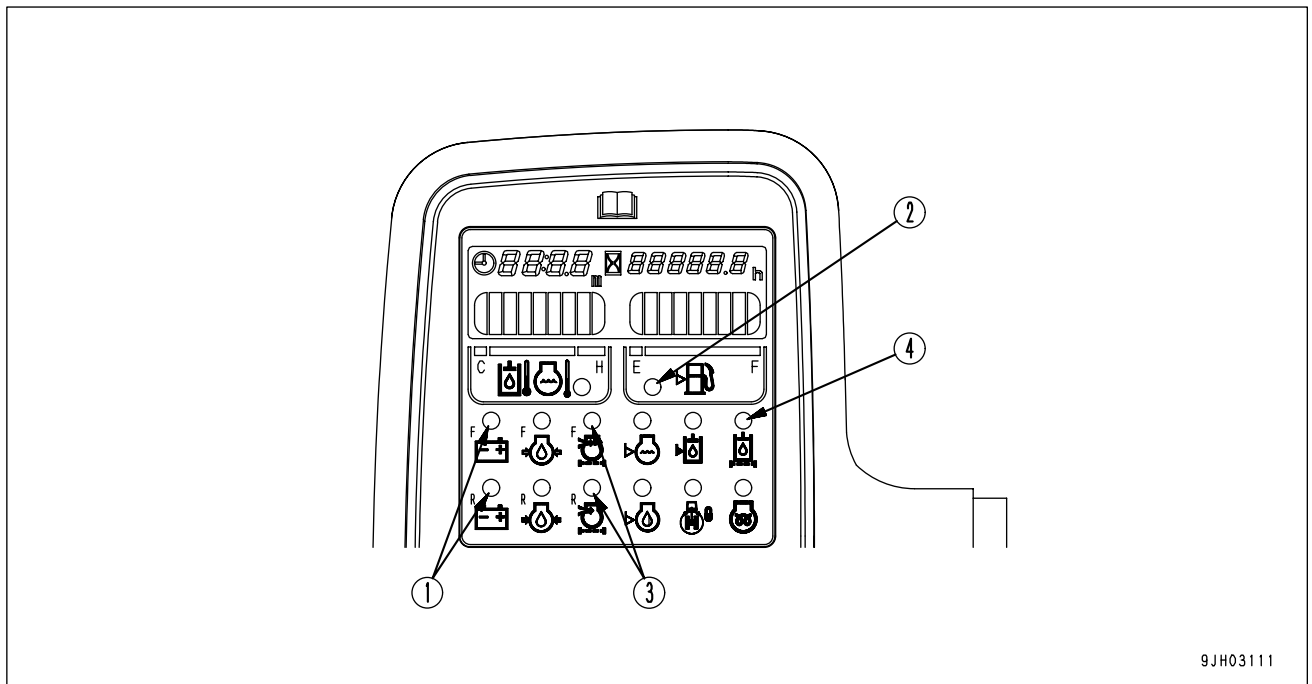
CAUTION ITEMS

⚠ CAUTION

If the warning monitor flashes or lights up, carry out inspection and maintenance of the appropriate point as soon as possible.

If the problem is not corrected, it may lead to failure of the machine.

These are items which need to be observed when the engine is running. If any abnormality occurs, the item needing immediate repair is displayed. If there is any abnormality, the abnormal location on the monitor will flash or light up.



9JH03111

(1) Charge level monitor	(3) Air cleaner clogging monitor
(2) Fuel level monitor	(4) Hydraulic filter clogging monitor

CHARGE LEVEL MONITOR

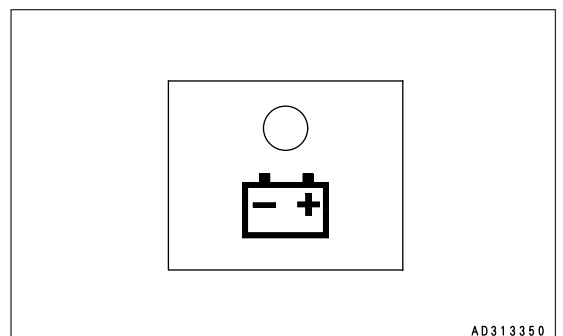
This monitor B (1) warns an abnormality in the charging system while the engine is running.

This monitor indicates an abnormality in the charging system while the engine is running.

While the starting switch is ON, the lamp will remain lit and will go off once the engine is started.

REMARK

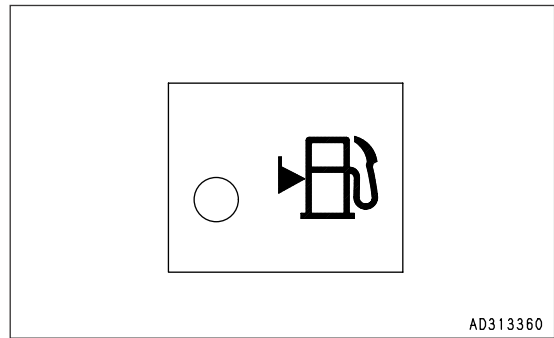
Immediately after the engine is started, the R lamp of charge level monitor (1) lights up after a short delay, but this does not indicate any abnormality.



AD313350

FUEL LEVEL MONITOR

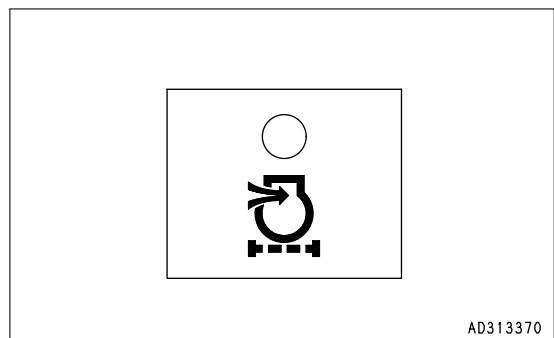
This monitor B (2) warns the amount of fuel in the fuel tank. If the fuel drops below 169 liters, the lamp will flash. Add the fuel before this.



AIR CLEANER CLOGGING MONITOR

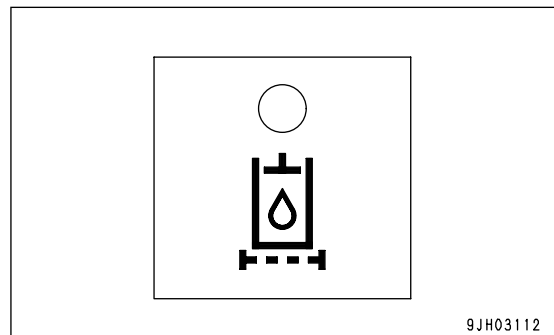
This monitor B (3) warns that the air cleaner is clogged.

If the monitor lamp flashes, stop the engine, then inspect and clean the air cleaner.



HYDRAULIC FILTER CLOGGING MONITOR

This monitor B (4) indicates clogging of the hydraulic filter. If the monitor lamp flashes, stop the engine and check, clean the filter element.

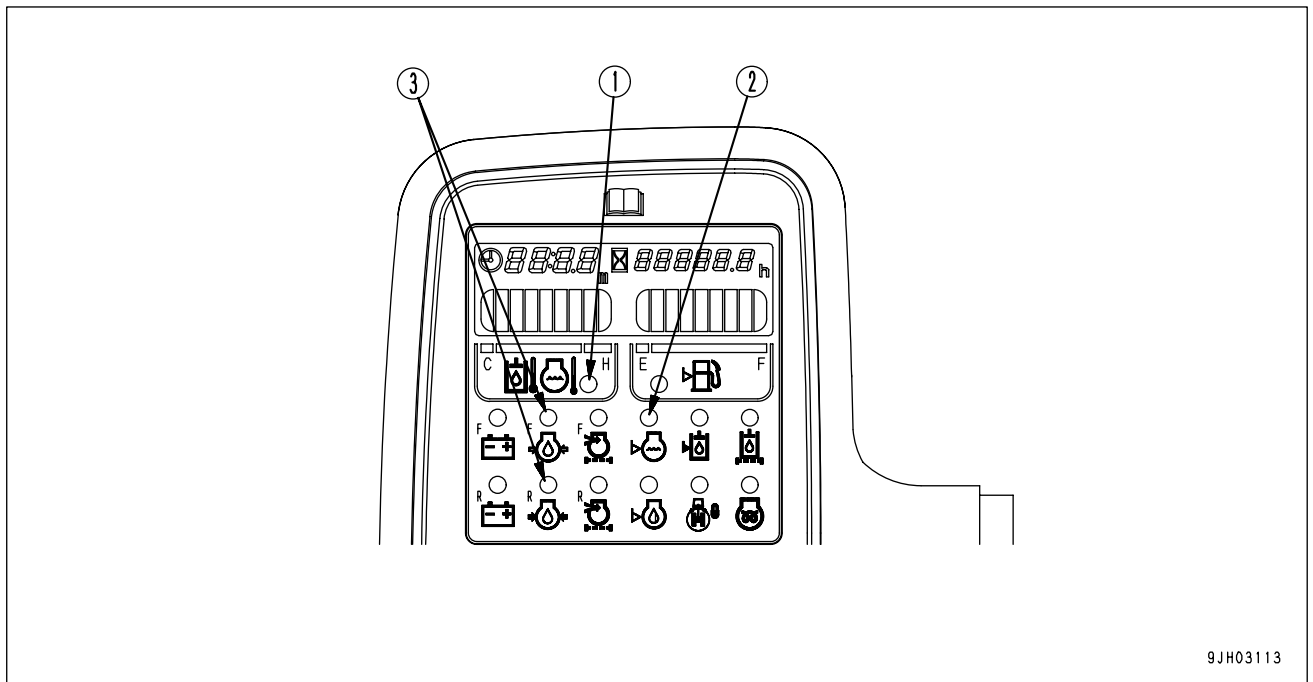


EMERGENCY STOP ITEMS

⚠ CAUTION

If the monitor flashes, stop the engine immediately or run at low idling, then inspect the problem point immediately and repair the problem.

These are items which need to be observed when the engine is running. If there is any abnormality, the abnormal location on the monitor will flash and the buzzer will sound. Carry out the necessary repairs immediately.



9JH03113

(1) Engine water temperature,
hydraulic oil temperature monitor

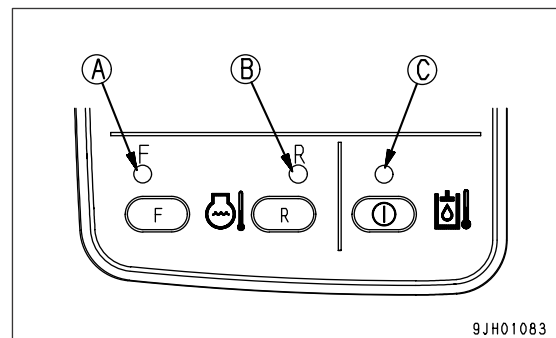
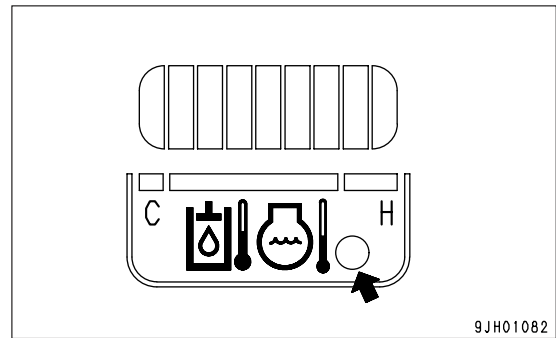
(2) Radiator coolant level monitor

(3) Engine oil pressure monitor

ENGINE WATER TEMPERATURE, HYDRAULIC OIL TEMPERATURE MONITOR

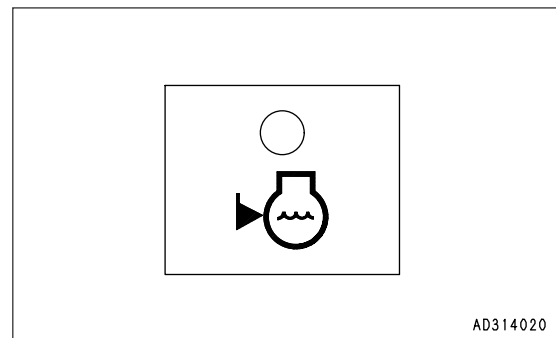
This monitor C (1) warns the operator that the engine water temperature or hydraulic oil temperature has risen. If the temperature becomes abnormally high, the monitor flashes.

- If the front engine cooling water temperature is abnormally high:
The overheat prevention system is automatically actuated and the engine speed goes down.
Monitor Lamp (A) of the display selector switch flashes and the cooling water temperature of the front engine is displayed on the engine cooling water and oil temperature gauge.
- If the rear engine cooling water temperature is abnormally high:
The overheat prevention system is automatically actuated and the engine speed goes down.
Monitor Lamp (B) of the display selector switch flashes and the cooling water temperature of the rear engine is displayed on the engine cooling water and oil temperature gauge.
- If the hydraulic oil temperature is abnormally high:
Monitor Lamp (C) of the display selector switch flashes and the hydraulic oil temperature is displayed on the engine cooling water and oil temperature gauge.



RADIATOR COOLANT LEVEL MONITOR

This monitor C (2) warns that the radiator cooling water level is too low. If the monitor lamp flashes, check the cooling water level in the radiator and sub-tank, and add water.

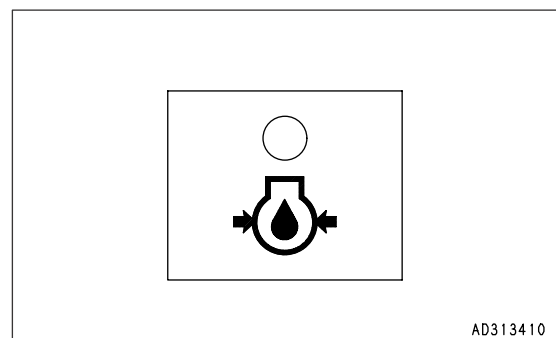


ENGINE OIL PRESSURE MONITOR

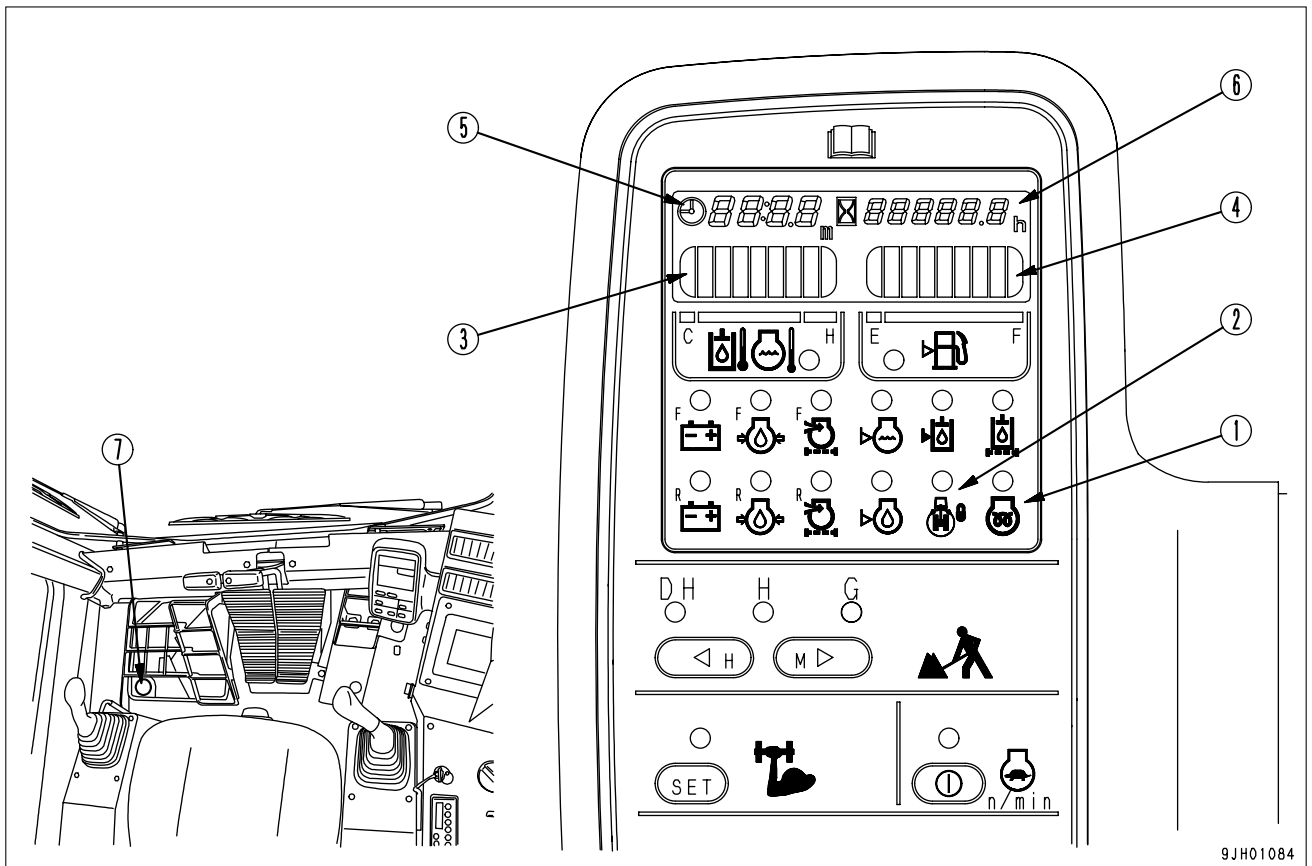
This monitor C (3) flashes if the engine lubricating oil pressure goes below the normal value. If it flashes, stop the engine and check the lubricating system and the level of the oil in the oil pan.

REMARK

- While the starting switch is ON, the lamp remains lit and goes off once the engine is started. When the engine starts, the buzzer may sound for a short time, however, this does not indicate a fault.
- Stop the machine on level ground and check the monitor.
- Stop the engine, then turn the starting switch to the ON position and check that the monitor lights up for 3 seconds. If it does not light up, please contact your Komatsu distributor to have the monitor inspected.



METER DISPLAY PORTION



Pilot display	Gauges and meter
(1) Engine pre-heating monitor	(3) Engine water temperature, hydraulic temperature gauge
(2) Swing lock monitor	(4) Fuel gauge
	(5) Display
	(6) Service meter
	(7) Grease pressure gauge

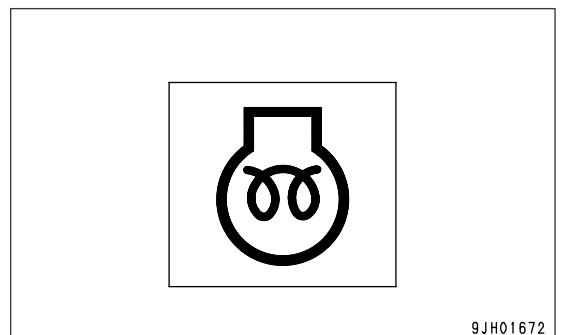
PILOT DISPLAY

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

ENGINE PRE-HEATING MONITOR

This monitor (1) indicates the preheating time when starting the engine in cold areas. When the preheating switch is turned to the ON position, the monitor lights up. After approx. 30 seconds, it flashes to inform the operator that preheating is completed. After flashing for approx. 30 seconds, the monitor goes out.

(Preheating switch: See "SWITCHES (PAGE 3-57)".)



9JH01672

SWING LOCK MONITOR

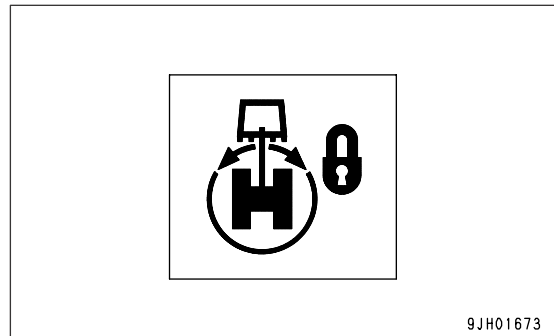
This monitor (2) informs the operator that the swing lock is being actuated.

Actuated: Lights up

When the swing lock switch is turned ON (ACTUATED), the monitor lamp lights up.
(See "SWITCHES (PAGE 3-57)".)

REMARK

- The swing motor is equipped with a disc brake that mechanically stops the rotation. When the swing lock monitor lamp is lighted up, the brake remains applied.
- This flashes when the swing holding brake release switch inside the room under the cab is turned ON.
(See "MONITOR SWITCHES (PAGE 3-17)".)

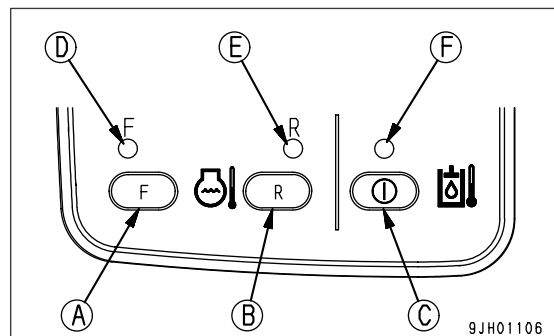


GAUGES AND METER

ENGINE WATER TEMPERATURE, HYDRAULIC OIL TEMPERATURE GAUGE

This meter (3) displays the engine water temperature or hydraulic oil temperature. The content of the display can be changed by operating switches (A), (B), and (C) on the display selector switch portion.

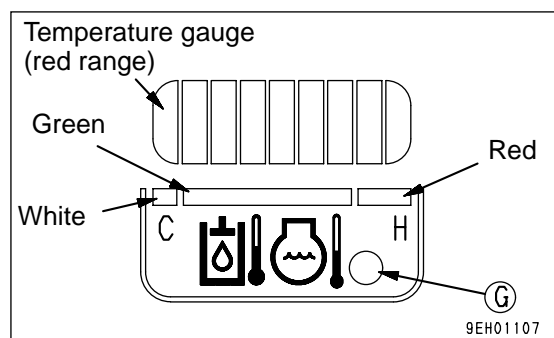
- When switch (A) is pressed, the engine water temperature of the front engine is displayed on the temperature gauge.
- When switch (B) is pressed, the engine water temperature of the rear engine is displayed on the temperature gauge.
- The hydraulic oil temperature is displayed on the temperature gauge only while switch (C) is being pressed. When switch (C) is released, the display returns to the condition before the switch was pressed.



During operation, the red segments of the temperature gauge should be lighted up inside the green range below the gauge. If the red segments of the temperature gauge light up inside the red range below the gauge, there is an abnormality. If this happens, monitor (G) flashes.

If the engine water temperature of or hydraulic oil temperature is abnormally high (when all the red segments on the temperature gauge are lighted up), one of the applicable lamps (D), (E), or (F) flashes and the temperature is displayed on the temperature gauge. At the same time, the alarm buzzer sounds.

For the engine water temperature only, the overheat prevention system is automatically actuated. When this happens, the engine speed is reduced to low idling until the red segments on the temperature gauge return to the green range. When the engine water temperature returns to normal, turn the fuel control dial to the low idling position. The overheat prevention system is canceled.



FUEL GAUGE

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

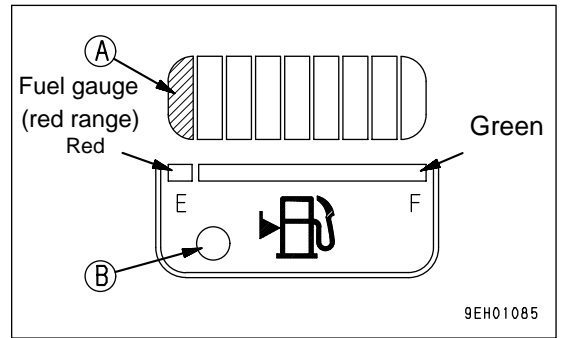
During operations, the green range should be lighted up.

If only the red range lights up during operations, the remaining fuel level is less than 169 liters, so carry out inspection and add fuel.

When red range (A) lights up: Fuel gauge monitor lamp (B) flashes.

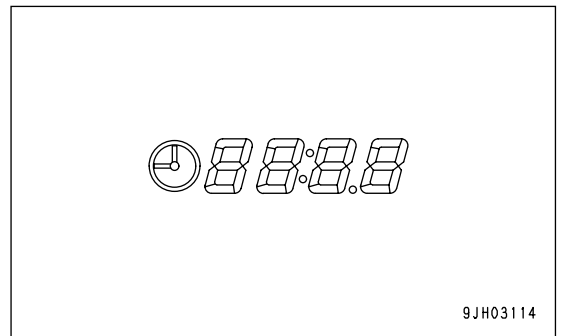
After the starting switch is turned ON, the correct level may not be displayed for a moment, but this does not indicate any abnormality.

When the engine is stopped, turn the starting switch ON and check that each item and the meters light up.



DISPLAY

This monitor (5) always displays the time and service meter when the starting switch is on. If there is any abnormality, it displays the contents of the failure.



REMARK

If the machine breaks down, the content of the failure is displayed when the starting switch is ON. The display shows all the failures flashing in turn.

Monitor display	Failure mode	Remedy
E02	TVC system error	
E03	Swing brake system error	
E0E	Network system error	
E10	Engine emergency stop system error	
E11	Engine control system error	
E14	Fuel control dial system error	
E15	Engine controller minor failure	
E22	Engine oil temperature or PTO oil temperature error	Have system inspected immediately
E23	E23 Defective connection of VHMS (※) controller connector or abnormality in F, R engine water temperature sensor	Can still be operated, but have system inspected immediately

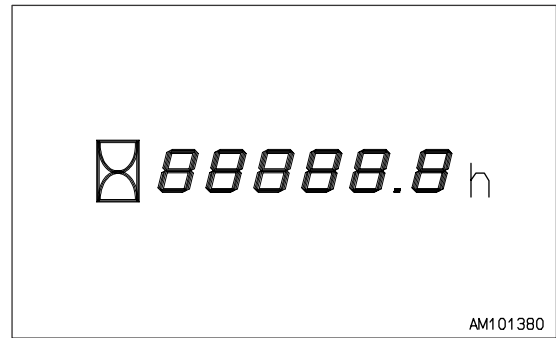
※ VHMS: Vehicle Health Monitoring System

If the above displays flash, go to the item in see “ELECTRONIC CONTROL SYSTEM (PAGE 3-179)”.

SERVICE METER

This meter (5) shows the total operation hours of the machine. Set the periodic maintenance intervals using this display. The service meter advances while the engine is running - even if the machine is not traveling.

The meter will advance by 1 for each hour of operation regardless of the engine speed.

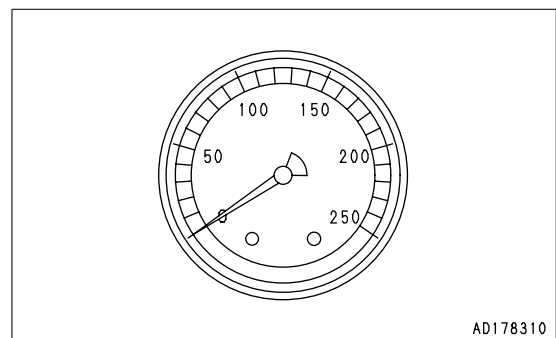


GREASE PRESSURE GAUGE

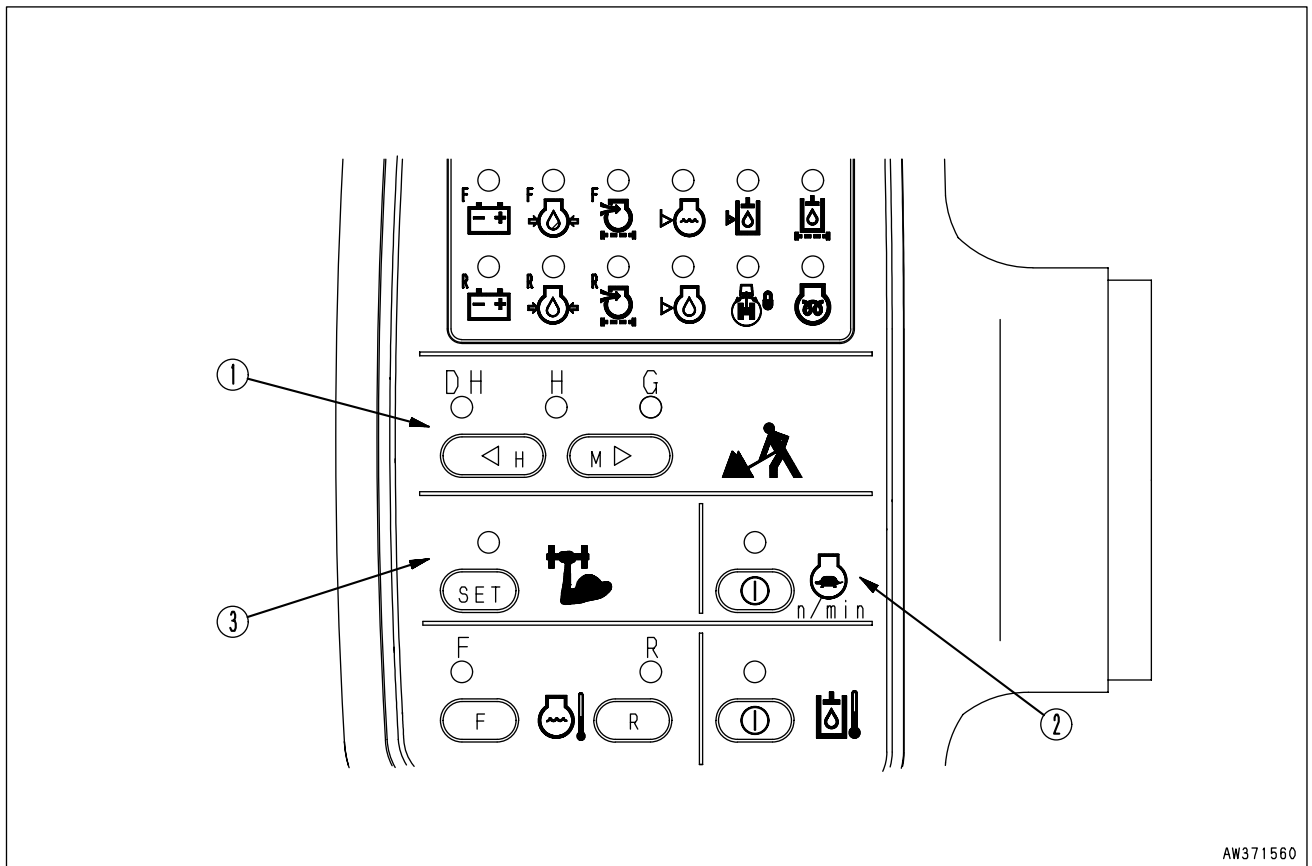
This indicates the grease pressure when greasing. The gauge should indicate 4.9 – 19.6 MPa (50 – 200 kg/cm²) when greasing.

REMARK

- If the pressure is below 4.9 MPa (50 kg/cm²), the grease can is empty, so replace the grease can.
- If the pressure is above 19.6 MPa (200 kg/cm²), there is probably clogging. For details, see "EVERY 10 HOURS MAINTENANCE (PAGE 4-56)".



MONITOR SWITCHES



AW371560

(1) Working mode selector switch (basic switch)	(3) Heavy lift switch
(2) Auto-deceleration switch (selection switch)	

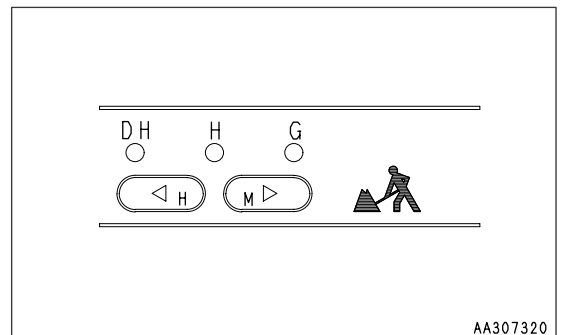
WORKING MODE SELECTOR SWITCH (BASIC SWITCH)

This switch (1) is used to set the movement or power for the work equipment.

By selecting the mode to match the working conditions, it is possible to carry out operations more easily.

Use the working mode selector switch to set to the most effective working mode to match the working conditions.

Working mode	Applicable work
DH mode	Large capacity digging, loading in a short time in quarry
H mode	Normal digging, loading operations
G mode	Fine operations not needing digging power or speed, Grading, leveling, hauling operations



AA307320

When starting the engine, H (heavy-duty operation) mode is automatically selected. Each time the switch is pressed, the mode selection changes.

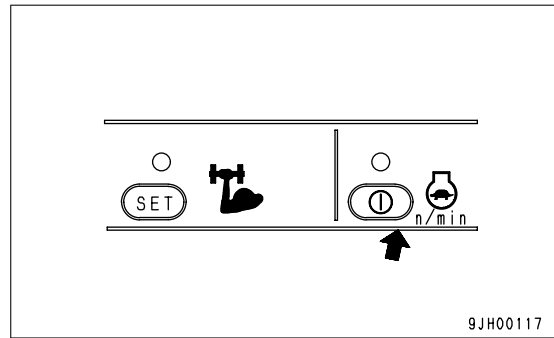
AUTO-DECELERATION SWITCH

This switch (2) acts to activate the function that automatically lowers the engine speed and reduces fuel consumption when the control lever is at neutral.

ON lights up: Auto-deceleration is actuated.

OFF: Auto-deceleration is canceled.

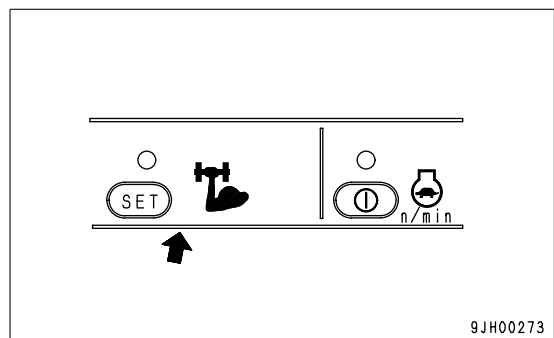
Each time the switch is pressed, the auto-deceleration is actuated or canceled.



HEAVY LIFT SWITCH

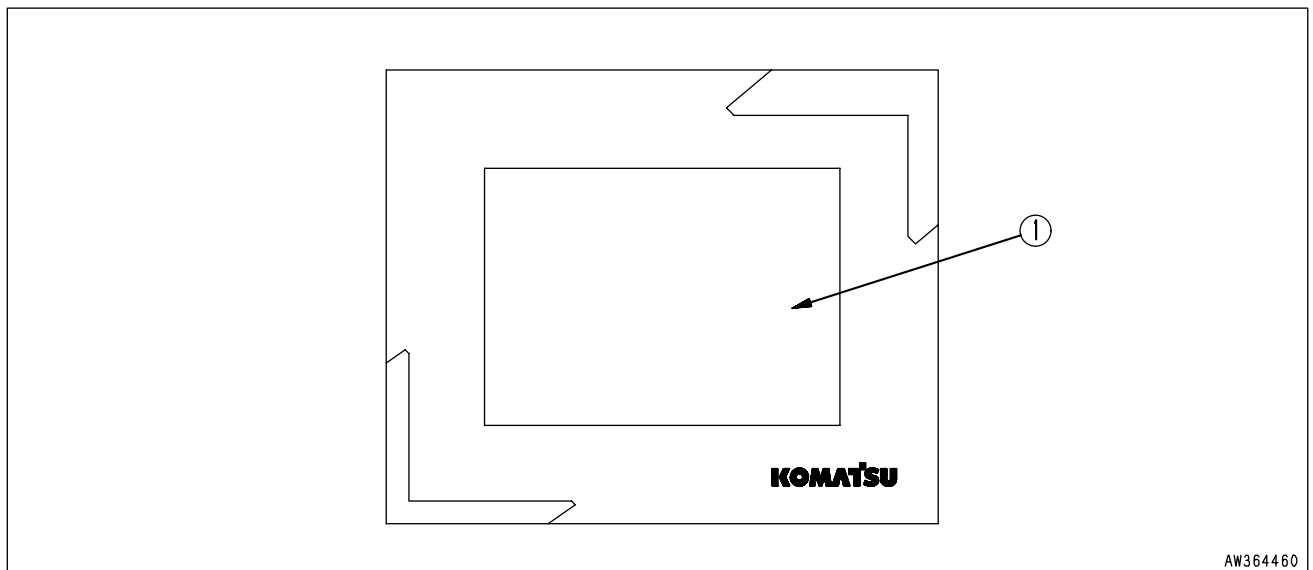
Operate this switch (3) to increase the pushing-up power during operations.

When the switch is turned ON, the boom lifting power is increased if the boom is being operated independently to the RAISE position.



CGC MONITOR

CGC MONITOR

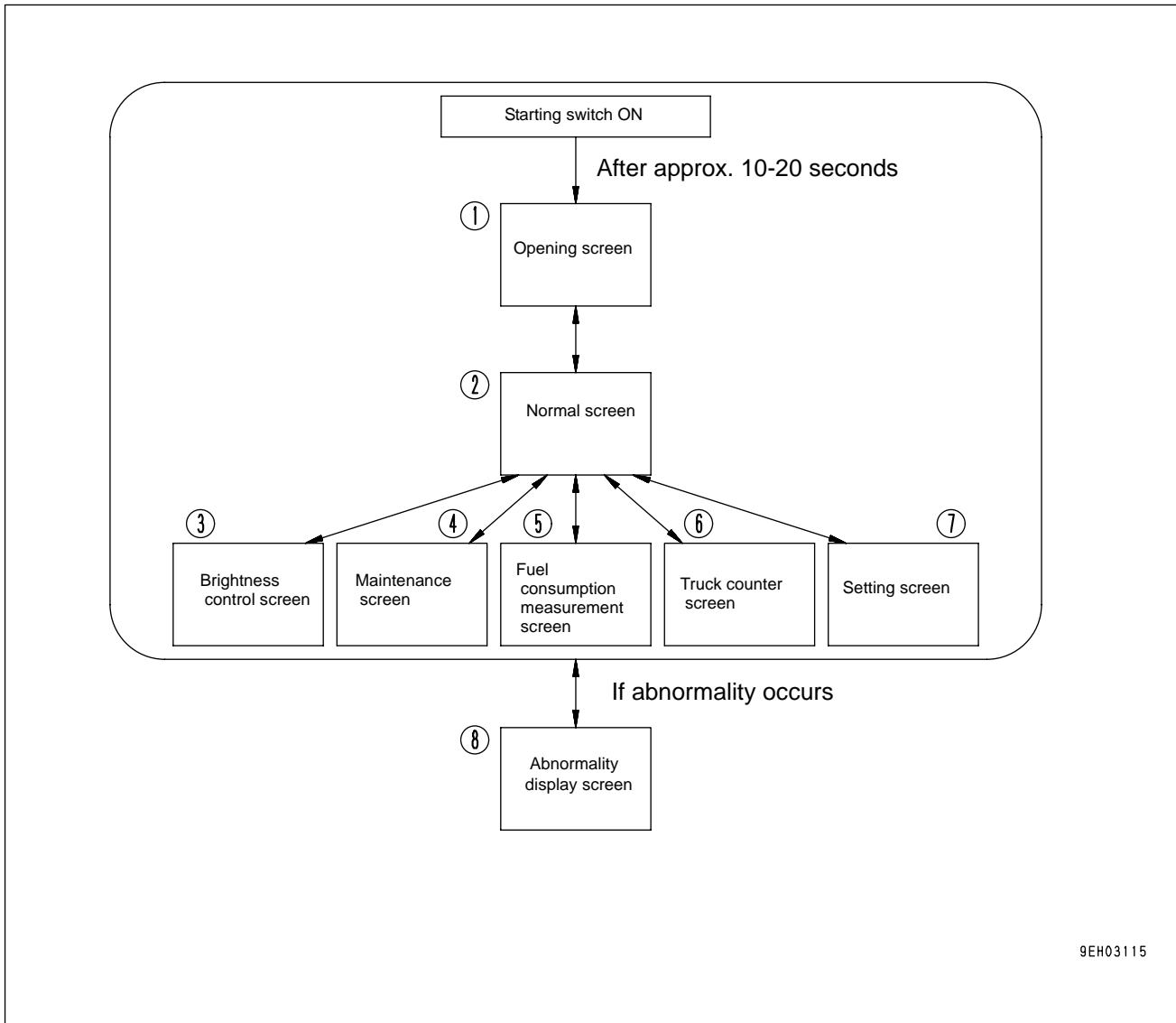


AW364460

- The CGC monitor displays the condition of the machine, the maintenance situation, and messages for the operator and service man, and is also used to input the necessary data.
- The surface of screen (1) is equipped with touch buttons to input the data and change the screen.
- When the starting switch is turned ON, the opening screen is displayed for approx. 10 – 20 seconds. The condition of the machine is not displayed.
- If the ambient temperature of the monitor goes below -30°C or above 55°C , the back lighting is turned off to protect the screen. The display cannot be seen, but this is not an abnormality. When the temperature returns to within the range of -30°C to 50°C , the display will appear again, so carry out operations according to the CGC monitor.

CHANGES OF SCREEN AND CONTENT OF DISPLAY ON CGC MONITOR

There are eight screens ((1) to (8)). The screen (1) to (8) can be changed by pressing the touch button.



9EH03115

(1) Opening screen	(5) Fuel consumption measurement screen
(2) Normal screen	(6) Truck counter screen
(3) Brightness control screen	(7) Setting screen
(4) Maintenance screen	(8) Abnormality display screen

NOTICE

Set the date and time to match the local time. If the setting is not correct, the operating data will not be correctly recorded.

OPENING SCREEN

After the starting switch is turned ON, it takes approx. 10 – 20 seconds for the condition of the machine to be displayed. During this time, the opening screen (1) is displayed.

NORMAL SCREEN

The screen (2) automatically switches to this screen approx. 10 seconds after the starting switch is turned ON. It displays the oil temperatures, water temperatures, and oil pressures on the meters. From this screen, press the touch button to switch to screens (3), (4), (5), (6), and (7).

BRIGHTNESS CONTROL SCREEN

If the brightness control button on screen (3) is pressed, the sub-screen is displayed on top of the normal screen.

MAINTENANCE SCREEN

This screen (4) displays the remaining time to the next maintenance.

FUEL CONSUMPTION MEASUREMENT SCREEN

This screen (5) displays the fuel consumption during the desired period from the start of operations (starting engine) to the completion of operations (stopping engine).

TRUCK COUNTER SCREEN

This screen (6) is used to input the user ID and to reset the number of trucks loaded after it has been cleared.

SETTING SCREEN

This screen (7) is used to set the language, date, time, and display unit.

ABNORMALITY DISPLAY SCREEN

This abnormality display screen (8) automatically appears if any abnormality occurs. It is displayed in turn with the screens displayed in (1) to (4) for 7 seconds at a time. When the abnormality is removed, this screen automatically disappears.

EXPLANATION OF SCREENS

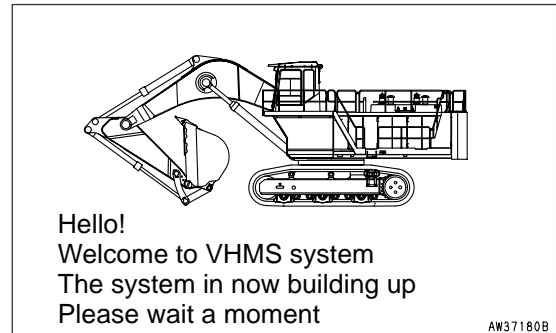
The screen uses a CGC monitor.
(CGC: Color Graphic Console)

OPENING SCREEN

After the starting switch is turned ON, it takes approx. 20 seconds for the condition of the machine to be displayed. The opening screen is displayed during this time.

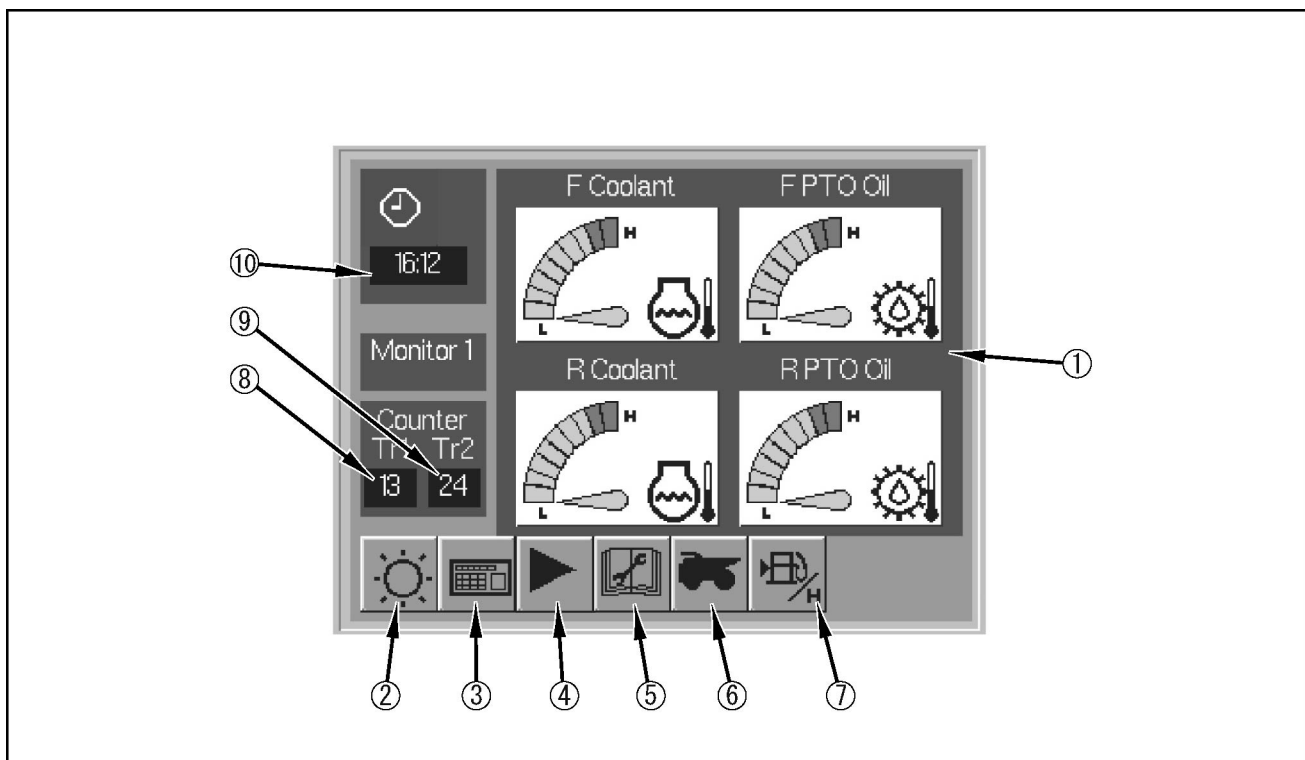
REMARK

- In cold weather, the screen display is slightly delayed, but this does not indicate any failure.
- VHMS: Vehicle Health Monitoring System



NORMAL SCREEN

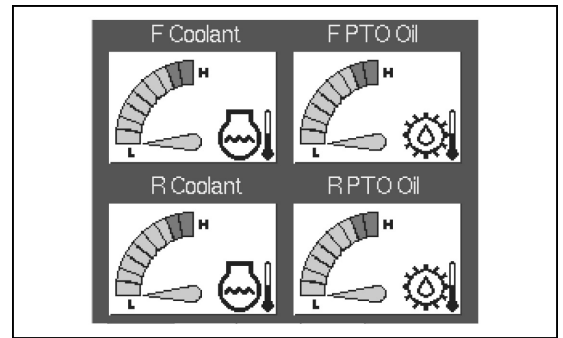
The screen automatically switches to this screen approx. 5 seconds after the starting switch is turned on. It displays the oil temperatures, water temperatures, and oil pressures on the meters.



(1) Meter display	(6) Truck counter button
(2) Brightness control screen selector button	(7) Fuel consumption measurement screen selector button
(3) Setting screen display button	(8) Truck counter display 1
(4) Display screen display button	(9) Truck counter display 2
(5) Maintenance screen display button	(10) Time display

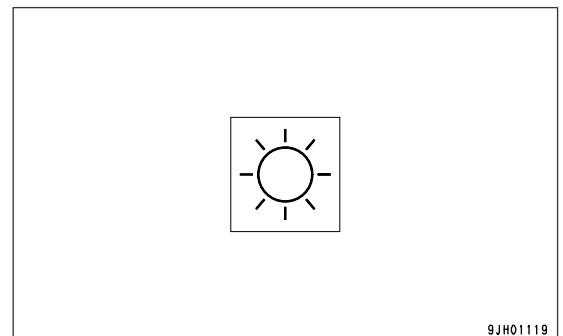
Meter display

This meter display (1) portion displays the water temperatures, oil temperatures, and pressures. The content of the display can be changed by pressing display selector button (4).



Brightness control screen display button

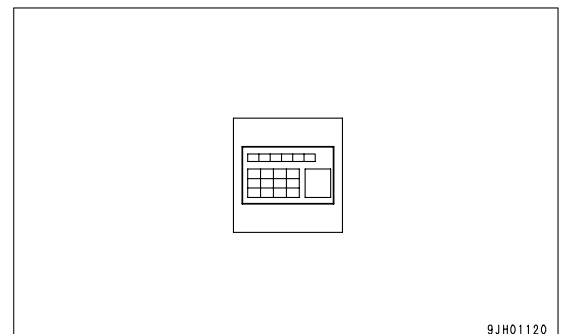
This button (2) switches the brightness display screen. For details of the method of adjusting the brightness, see "BRIGHTNESS CONTROL SCREEN (PAGE 3-27)".



9JH01119

Setting screen display button

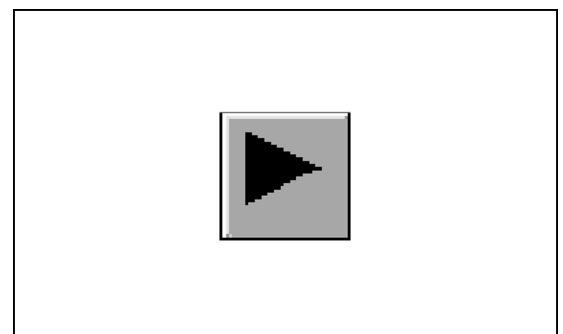
This button (3) switches to the setting screen.



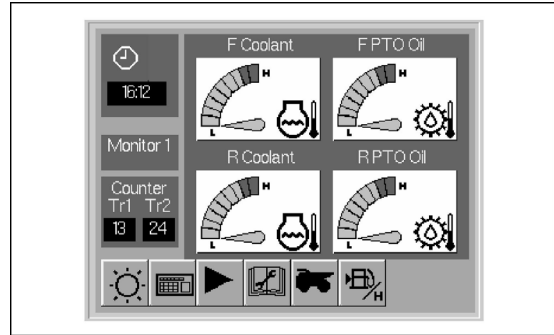
9JH01120

Display screen display button

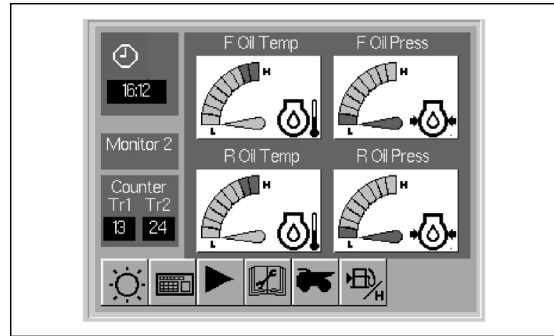
This button (4) switches the display to the next screen. Each time it is pressed, the display screen switches in the following cycle: monitor 1 → monitor 2 → monitor 3 → monitor 1.



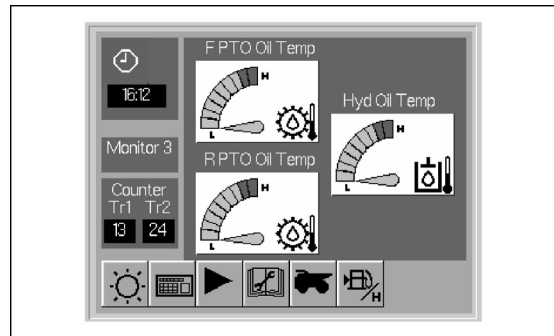
Monitor 1: Front engine water temperature, rear engine water temperature, front PTO oil temperature, rear PTO oil temperature



Monitor 2: Front engine oil temperature, rear engine oil temperature, front engine oil pressure, rear engine oil pressure



Monitor 3: Front PTO oil temperature, rear PTO oil temperature, hydraulic oil temperature



Maintenance screen display button

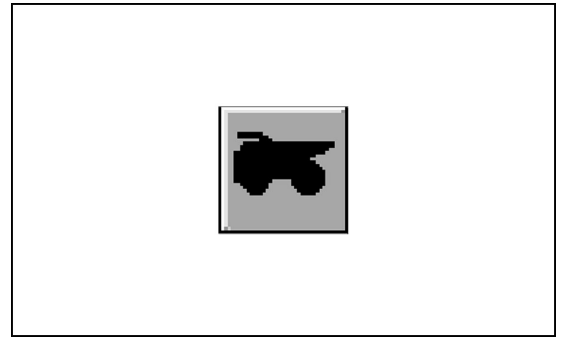
This button (5) switches to the maintenance screen. The color of the letters on this button (5) changes as follows according to the number of hours remaining to the next maintenance.

- 30 hours remaining: Yellow
- 0 hours remaining: Red

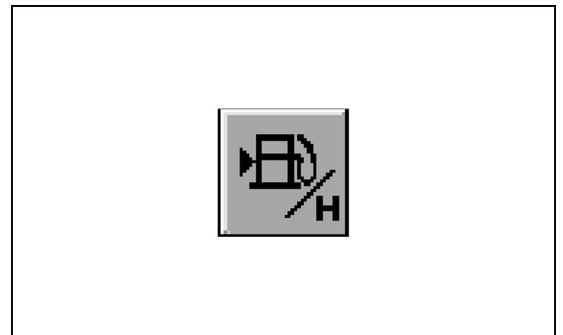


Truck counter button

This button (6) is used to switch to the screen for inputting the user ID in order to clear the counter and for resetting the counter for the number of trucks loaded.

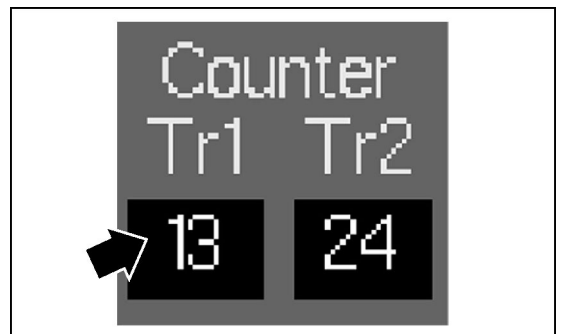
**Fuel consumption measurement screen selector button**

This button (7) is used to switch to the fuel consumption measurement screen. On the fuel consumption measurement screen, it is possible to set the hourly fuel consumption.

**Truck counter display 1**

On this counter display (8), the count for the number of trucks loaded is displayed.

The counter is advanced by pressing truck counter switch (A) at the top of the left control lever on the side at the front of the machine. Each time truck counter switch (A) is pressed, truck counter lamp (C) on the instrument panel on the right side of the operator's seat flashes once.



Truck counter display 2

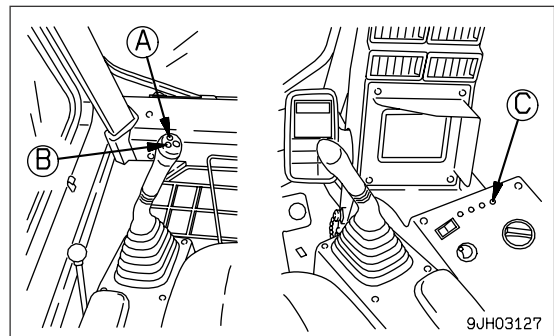
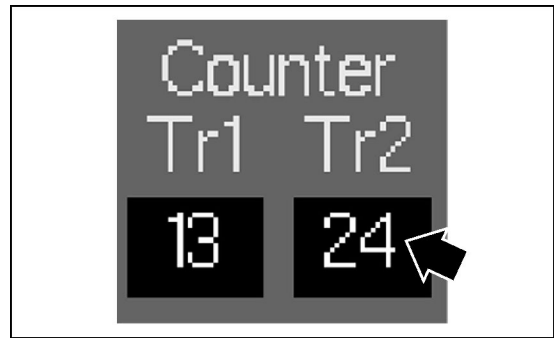
On this counter display (9), the count for the number of trucks loaded is displayed.

The counter is advanced by pressing truck counter switch (B) at the top of the left work equipment control lever on the side at the rear of the machine. Each time truck counter switch (B) is pressed, truck counter lamp (C) on the instrument panel on the right side of the operator's seat flashes once.

REMARK

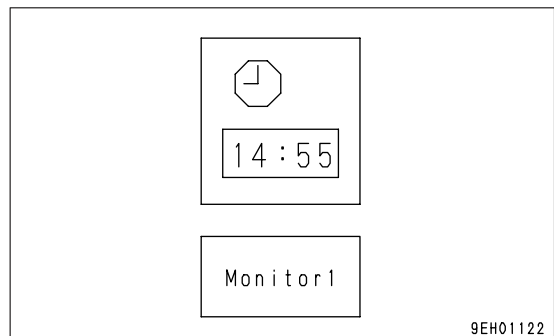
If the switch is pressed to match by mistake during operation of the hydraulic excavator, do not press the switch for the next count to compensate the number on the counter.

Truck counter switches (A) and (B) differ in the size of the truck being loaded, so please use these switches when it is necessary to differentiate.



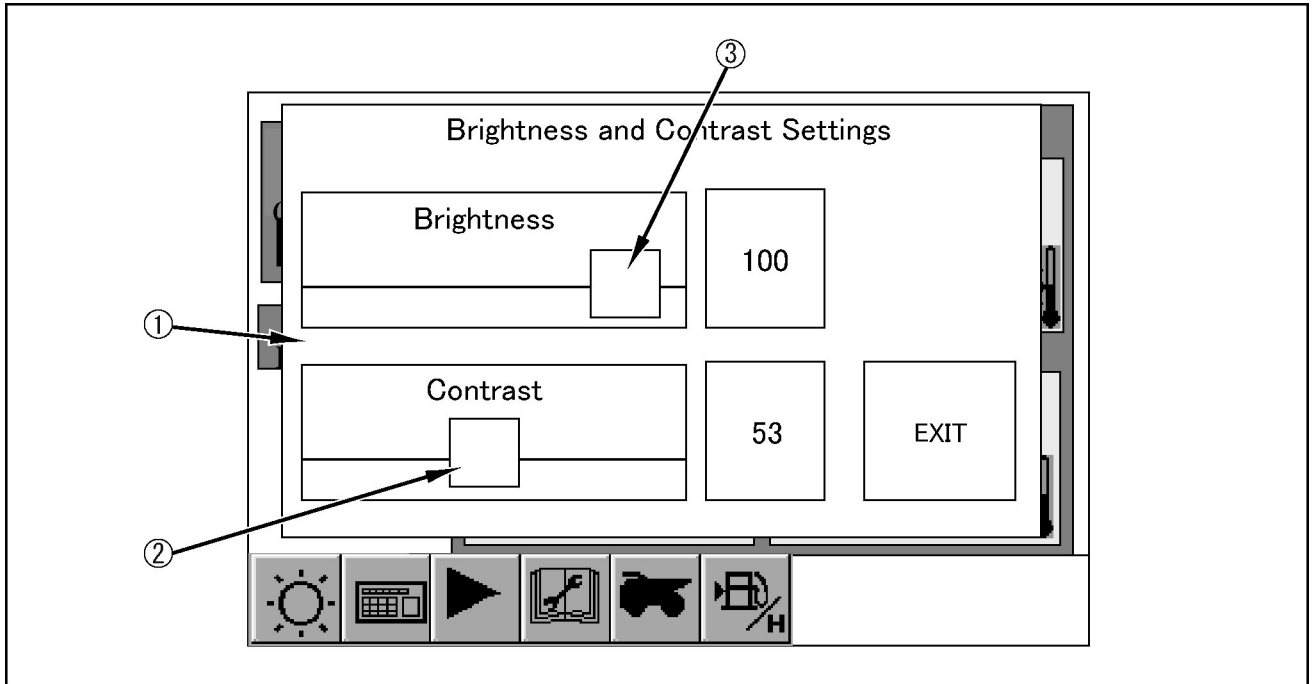
Time display

This meter display (10) displays the preset time.



BRIGHTNESS CONTROL SCREEN

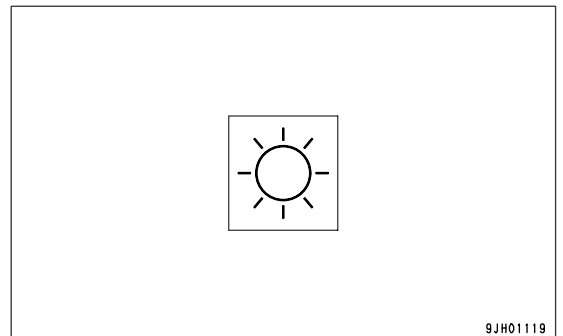
This screen is used to adjust the brightness and contrast of the machine management monitor screen.



(1) Brightness control screen	(3) Brightness control button
(2) Contrast control button	

Brightness control screen

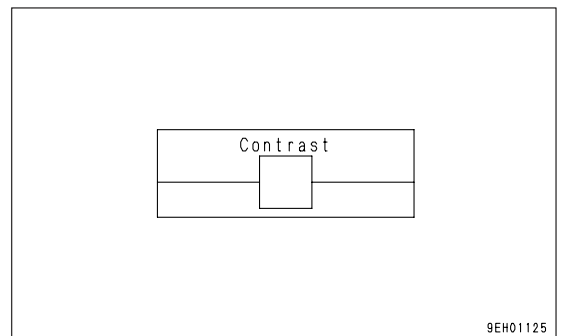
When selector button for the brightness control screen (1) on the normal screen is pressed, the sub-screen is displayed on top of the normal screen.



9JH01119

Contrast control button

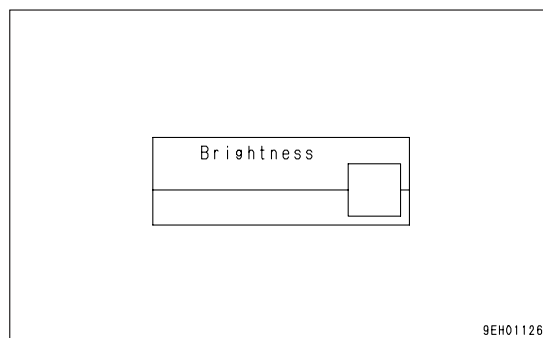
This button (2) is used to adjust the contrast of the screen. Touch button (2) on the screen and slide it to the desired position.



9EH01125

Brightness control button

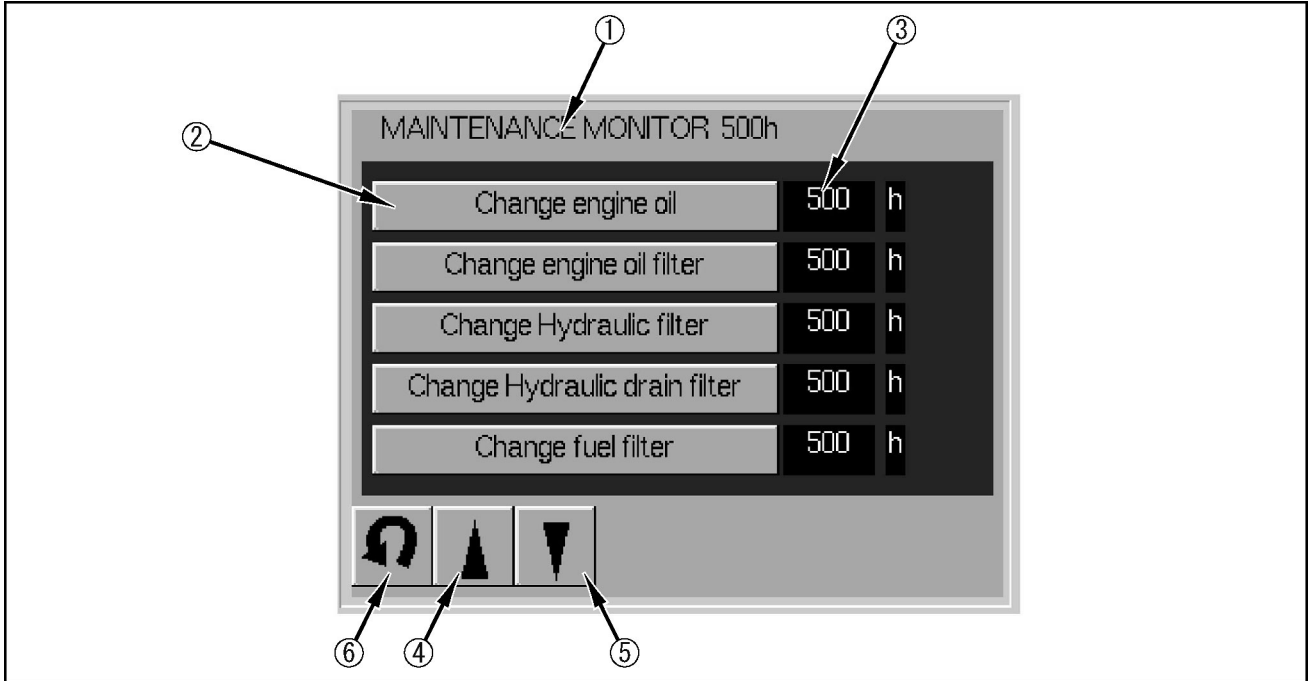
This button (3) is used to adjust the brightness of the screen. Touch button (3) on the screen and slide it to the desired position.



MAINTENANCE SCREEN

This maintenance screen displays the number of hours remaining until the next maintenance for each maintenance item.
 The color of the letters on this screen and the color of the letters on the selector buttons on the maintenance screen of the normal screen change as follows according to the number of hours remaining to the next maintenance.

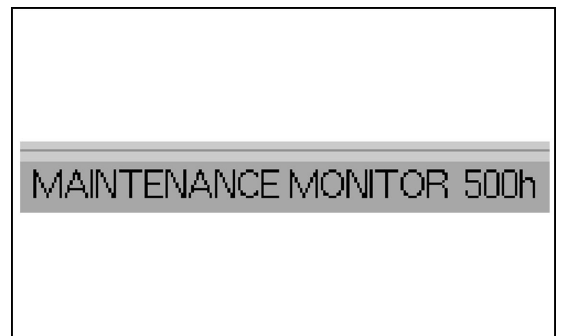
30 hours remaining: Yellow
 0 hours remaining: Red



(1) Standard maintenance interval display	(4) Maintenance item selector button (previous)
(2) Maintenance item display	(5) Maintenance item selector button (next)
(3) Remaining time display	(6) Normal screen selector button

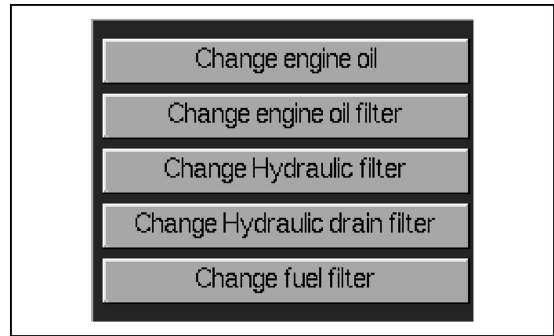
Standard maintenance interval display

This display portion (1) displays the standard maintenance interval.



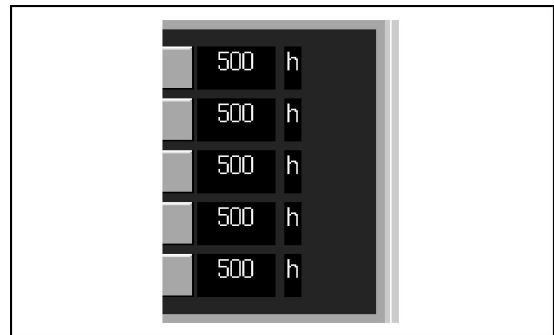
Maintenance item display

This display portion (2) displays the maintenance items.



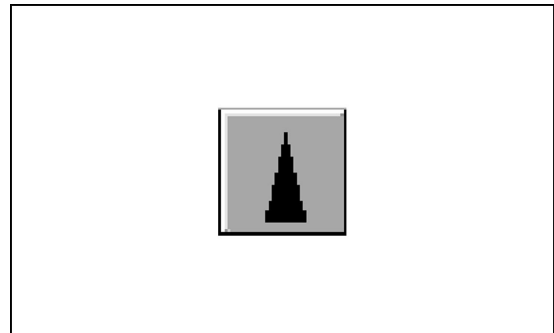
Remaining time display

This display (3) displays the time remaining until the next maintenance.



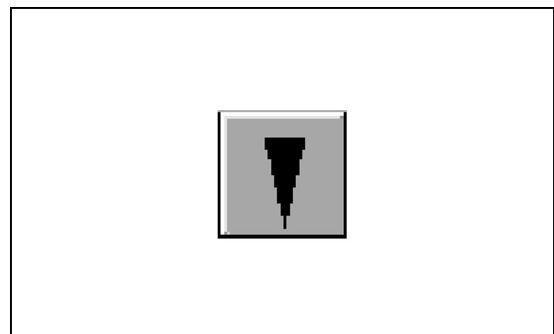
Maintenance item selector button (previous)

This button (4) switches the maintenance items display to the previous display. Each time the button is pressed, the display changes (E) → (D) → (C) → (B) → (A).

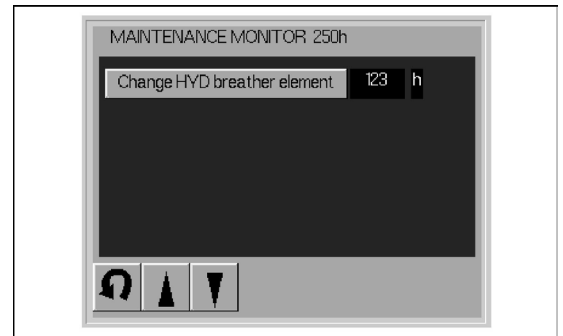


Maintenance item selector button (next)

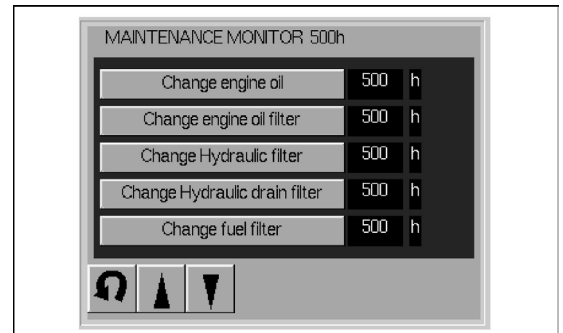
This button (5) switches the maintenance items that are displayed. Each time the button is pressed, the display changes (A) → (B) → (C) → (D) → (E).



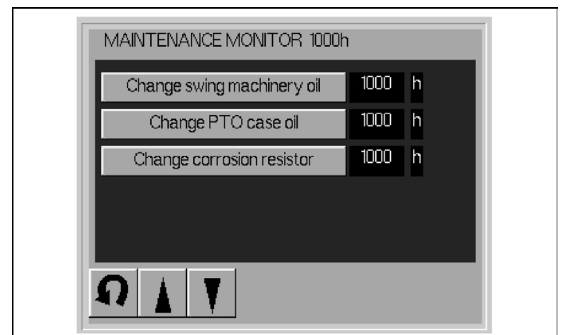
- (A): Maintenance items for every 250 hours
- Replace hydraulic tank breather filter element



- (B): Maintenance items for every 500 hours
- Change engine oil
 - Replace engine oil filter cartridge
 - Replace hydraulic filter element
 - Replace drain filter cartridge
 - Replace fuel filter



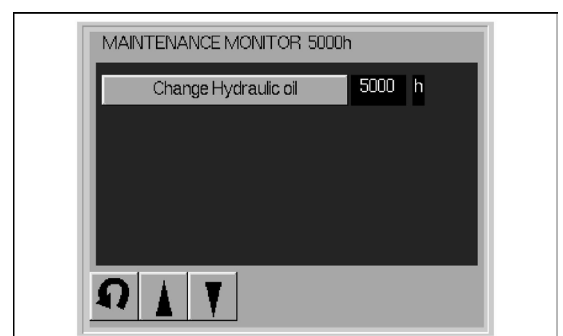
- (C): Maintenance items for every 1000 hours
- Change oil in swing machinery case
 - Change oil in PTO case
 - Replace corrosion resistor cartridge



- (D): Maintenance items for every 2000 hours
- Change oil in final drive case
 - Wash engine breather element
 - Wash hydraulic tank strainer



- (E): Maintenance items for every 5000 hours
- Change oil in hydraulic tank



Normal screen selector button

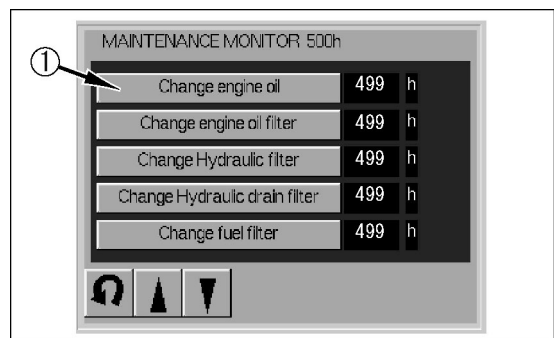
This button (6) switches to the normal screen.



Resetting maintenance interval

After replacing the oil or filter for each maintenance item, reset the time remaining to maintenance as follows to the original maintenance interval.

1. Press maintenance item screen (1) to specify the item on the maintenance screen to be reset. The maintenance item screen (1) will flash.
2. When maintenance item screen (1) flashes, press maintenance item screen (1) once more.



3. The confirmation screen in the diagram on the right is displayed. Press the (YES) button. If the (NO) button is pressed, the time remaining to maintenance stays as it is.



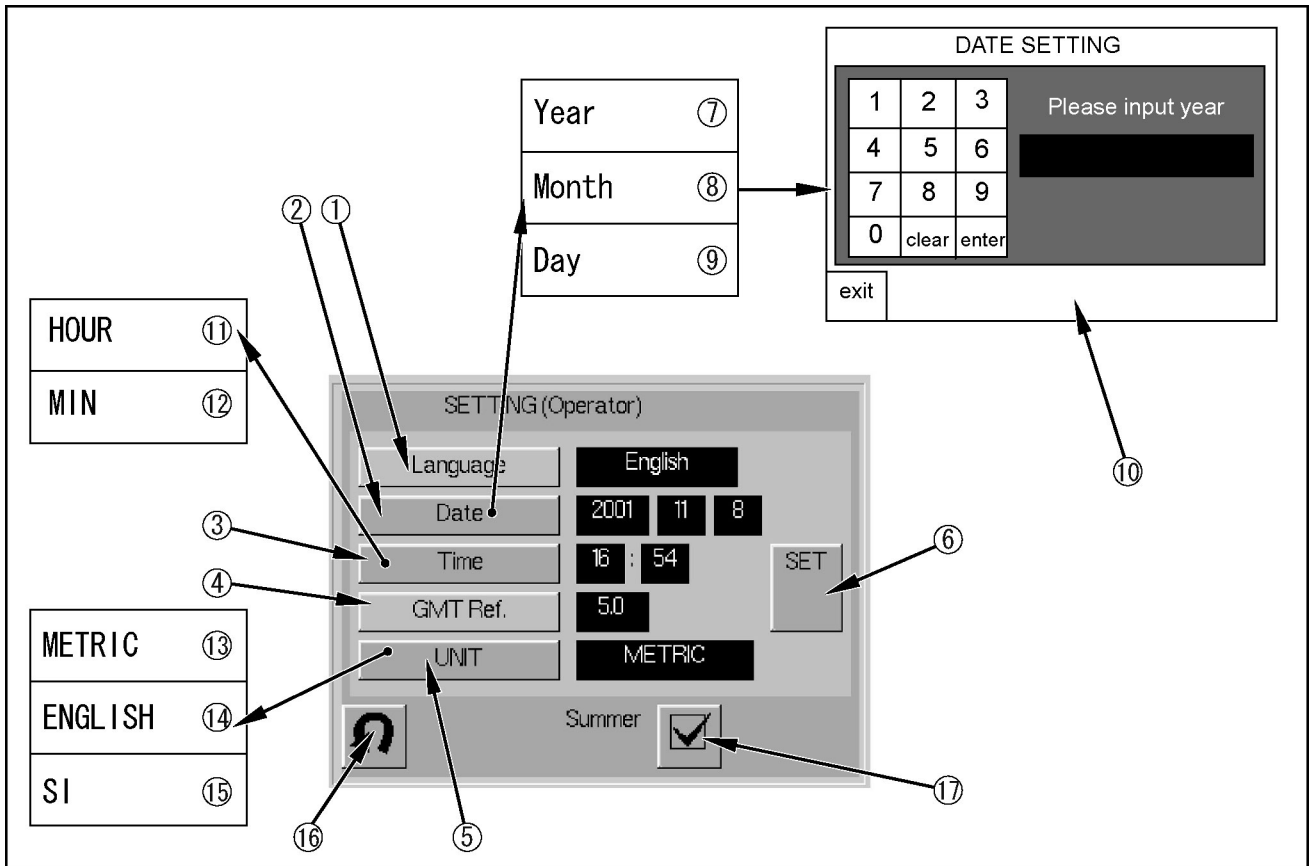
4. Using the compensation screen in the diagram on the right, time deletion screen (2) and maintenance interval screen (3) are displayed.

5. Press the maintenance item to be reset on the maintenance interval screen (3). The display for time deletion screen (2) goes out and only maintenance interval screen (3) is displayed.



SETTING SCREEN

This screen is used to input the language, date, time, and display unit.

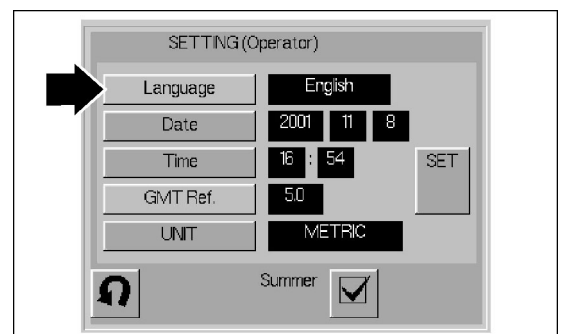


(1) Language selector button	(10) Sub-screen 10-key input button
(2) Date setting button	(11) Time input sub-screen button
(3) Time setting button	(12) Time input sub-screen button
(4) Time difference selector button	(13) Display unit input sub-screen button
(5) Display unit setting button	(14) Display unit input sub-screen button
(6) Item setting button	(15) Display unit input sub-screen button
(7) Date input sub-screen button	(16) Normal screen selector button
(8) Date input sub-screen button	(17) Summer setting button
(9) Date input sub-screen button	

Language selector button

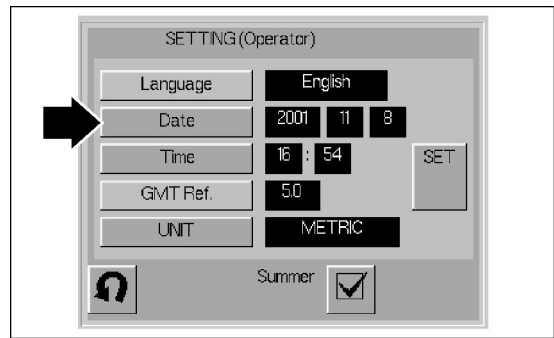
This button (1) is used to selector the language used for the management monitor display.

Note: The operator cannot change the language. If it is necessary to change the language, please ask your Komatsu distributor to carry out the change.

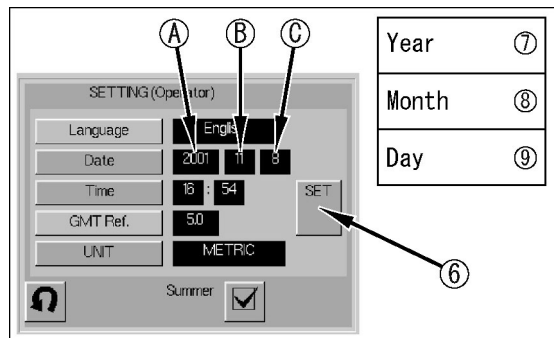


Date setting button

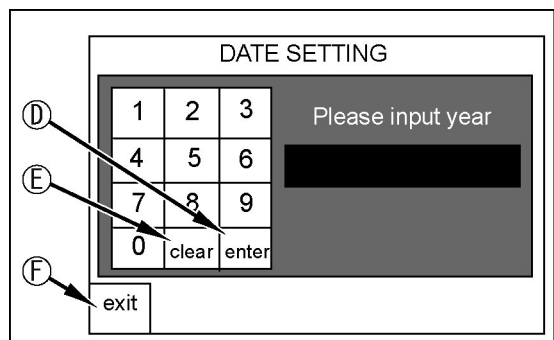
This button (2) is used to input the date. The procedure is as follows.



1. When this button (2) is pressed, date input sub-screens button (7), (8), and (9) are displayed. When this happens, date displays (A), (B), and (C) flash.
2. Press (YEAR) on date input sub-screen (7).



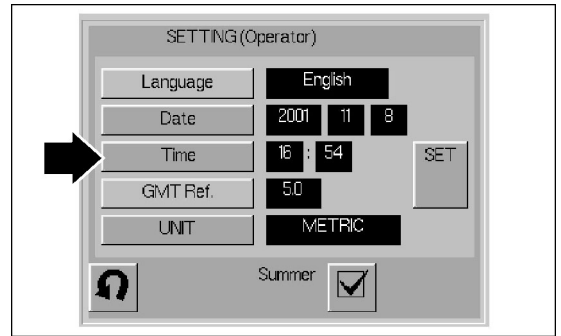
3. When Step 2. the 10-key screen shown in the diagram on the right is displayed.
4. Input the numerals for the year, then press Enter button (D). The 10-key display goes out.
 - If the wrong number is input, press Clear button (E), then input the numbers again.
 - To stop the operation before completing it, press (Exit) button (F).



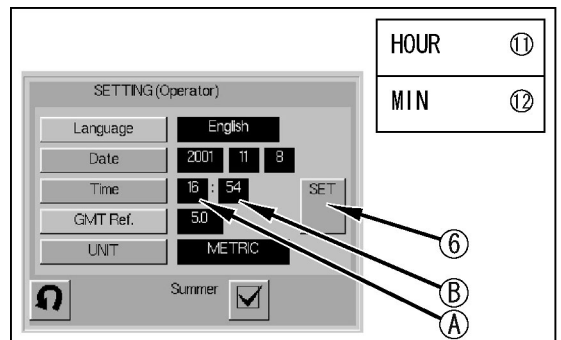
5. When Step 4. is completed, date display screen (A) lights up and screens (B) and (C) flash.
6. Press (Month) on date input sub-screen button (8). The 10-key screen is displayed.
7. Input the numerals for the month, then press Enter button (D). The 10-key display goes out.
8. When Step 7. is completed, date display screens (A) and (B) light up and screen (C) flashes.
9. Press Day on date input sub-screen (9). The 10-key screen is displayed.
10. Input the numerals for the day, then press Enter button (D). The 10-key display goes out.
11. When Step 10. is completed, date display screens (A), (B), and (C) light up.
12. Press setting button (6). Date input sub-screens button (7), (8), and (9) go out to inform the operator that the date setting process has been completed.

Time setting button

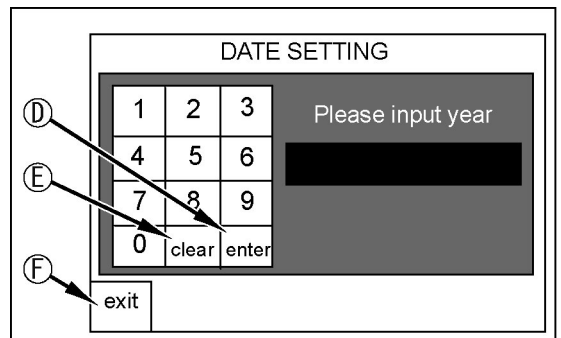
This button (3) is used to input the time. The procedure is as follows.



1. When this button (3) is pressed, date input sub-screens buttons (11) and (12) are displayed. When this happens, time displays (A) and (B) flash.
2. Press (HOUR) on time input sub-screen button (11).



3. The 10-key screen shown in the diagram on the right is displayed.
4. Input the numerals for the hour, then press Enter button (D). The 10-key display goes out.
 - If any mistake is made in inputting the numbers, press Clear button (E), then input the numbers again.
 - To stop the operation before completing it, press Exit button (F).

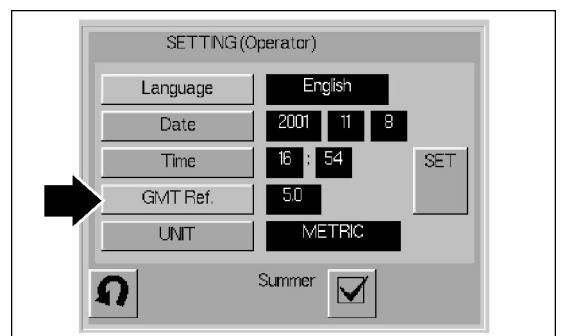


5. When Step 4. is completed, time display screen (A) lights up and screen (B) flashes.
6. Press (MIN) on time input sub-screen button (12). The 10-key screen is displayed.
7. Input the numerals for the minute, then press Enter button (D). The 10-key display goes out.
8. When Step 7. is completed, time display screens (A) and (B) light up.
9. Press setting button (6). Time input sub-screens buttons (11) and (12) go out to inform the operator that the time setting process has been completed.

Time difference selector button

This button (4) is used to select the time difference.

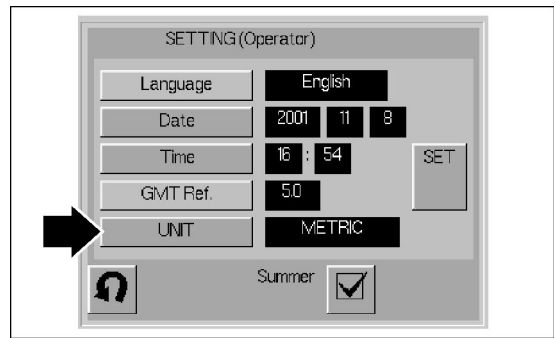
The operator cannot change the time difference. If it is necessary to change the time difference, please ask your Komatsu distributor to carry out the change.



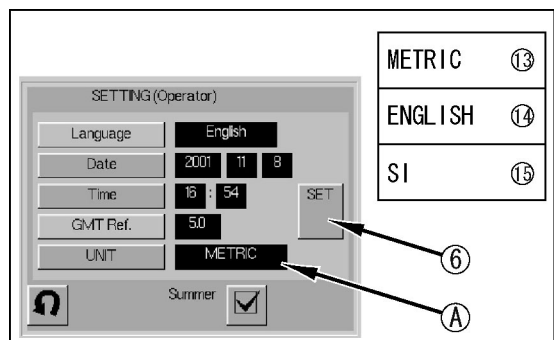
Display unit setting button

This button (5) is used to select the units used on the CGC monitor display.

The operation is as follows.



1. When button (5) is pressed, display unit input sub-screens buttons (13), (14), and (15), are displayed.
2. Press the necessary units on display unit input sub-screens (13), (14), and (15). The symbol for the unit is displayed on unit display (A).
3. Press setting button (6). Display unit input sub-screens buttons (13), (14), and (15) go out to inform the operator that the unit setting process has been completed.

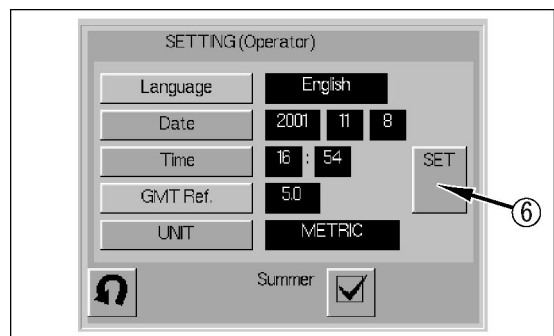


Unit symbols

- SI: The SI units are displayed. (When the language is set to Japanese, only the SI units are displayed.)
- METRIC: The metric units are displayed.
- ENGLISH: Yards, pounds, etc. are displayed.

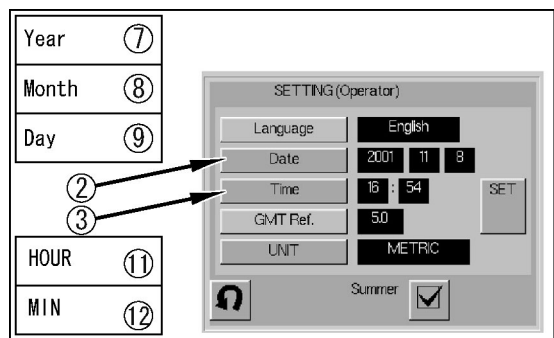
Item setting button

This button (6) is pressed as the final confirmation when setting the language, date, time, time difference, and unit display, and completes the setting operation.



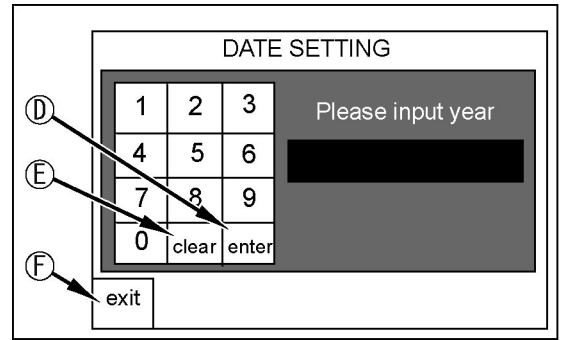
Date input sub-screen button

- When date setting button (2) is pressed, input sub-screen buttons (7), (8), and (9) are displayed, and the date input operation can be carried out.
- When time setting button (3) is pressed, time input sub-screen buttons (11) and (12) are displayed, and the time input operation can be carried out. In addition, if input buttons (7), (8), (9), (11), or (12) are pressed, the 10-key screen (10) is displayed and numerals can be input.



Sub-screen 10-key input button

- This display (10) is displayed when setting the date or time. Numerals can be input up to ten digits.
- When Enter button (D) is pressed, the operation is completed. When the operation is completed, 10-key display (10) goes out, the screen returns to the setting screen, and the input data is displayed.
- If any mistake is made in inputting the numbers, press Clear button (E), then input the numbers again. All the numerals are deleted.
- To stop the operation before completing it, press (Exit) button (F). The screen returns to the setting screen.

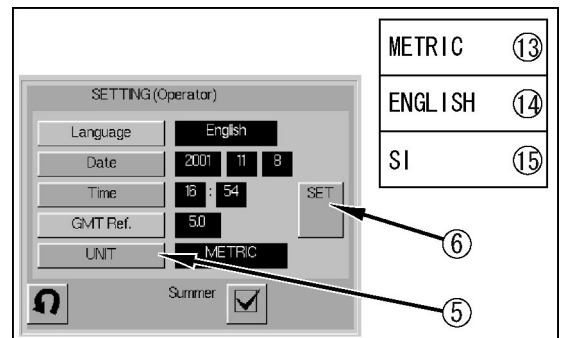


Display unit input sub-screen button

When display unit setting button (5) is pressed, display unit input sub-screens buttons (13), (14), and (15) are displayed, and the unit input setting operation can be carried out.

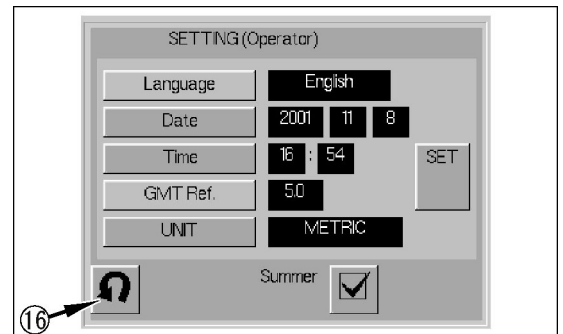
- When the language is set to Japanese, only SI units (15) can be set.

When setting button (6) is pressed, display unit input sub-screens buttons (13), (14), and (15) go out.



Normal screen selector button

When this button (16) is pressed, the screen switches to the "NORMAL SCREEN (PAGE 3-21)".

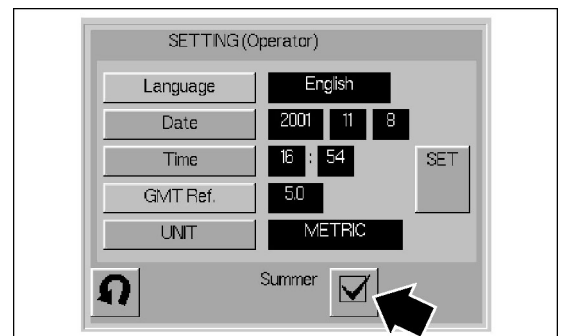


Summer time setting button

Press this button (17) to input Summer Time (Daylight Saving Time).

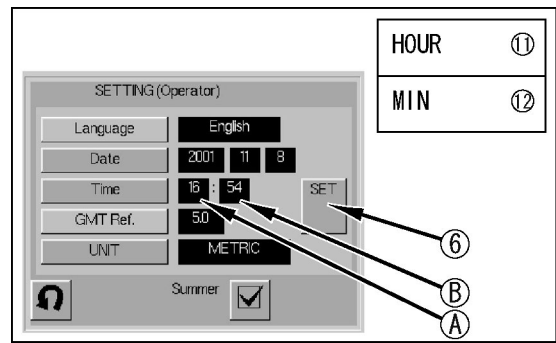
REMARK

Summer time (daylight saving time) is a system used in more than 70 countries around the world to make the most effective use of daylight by advancing the clock 1 hour in summer when the time of sunrise is early.

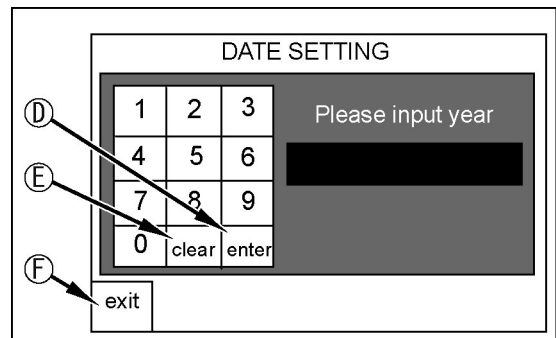


The procedure is as follows.

1. When this button (17) is pressed, time input sub-screens (11) and (12) are displayed. When this happens, date displays (A) and (B) flash.
2. Press HOUR on time input sub-screen (11).



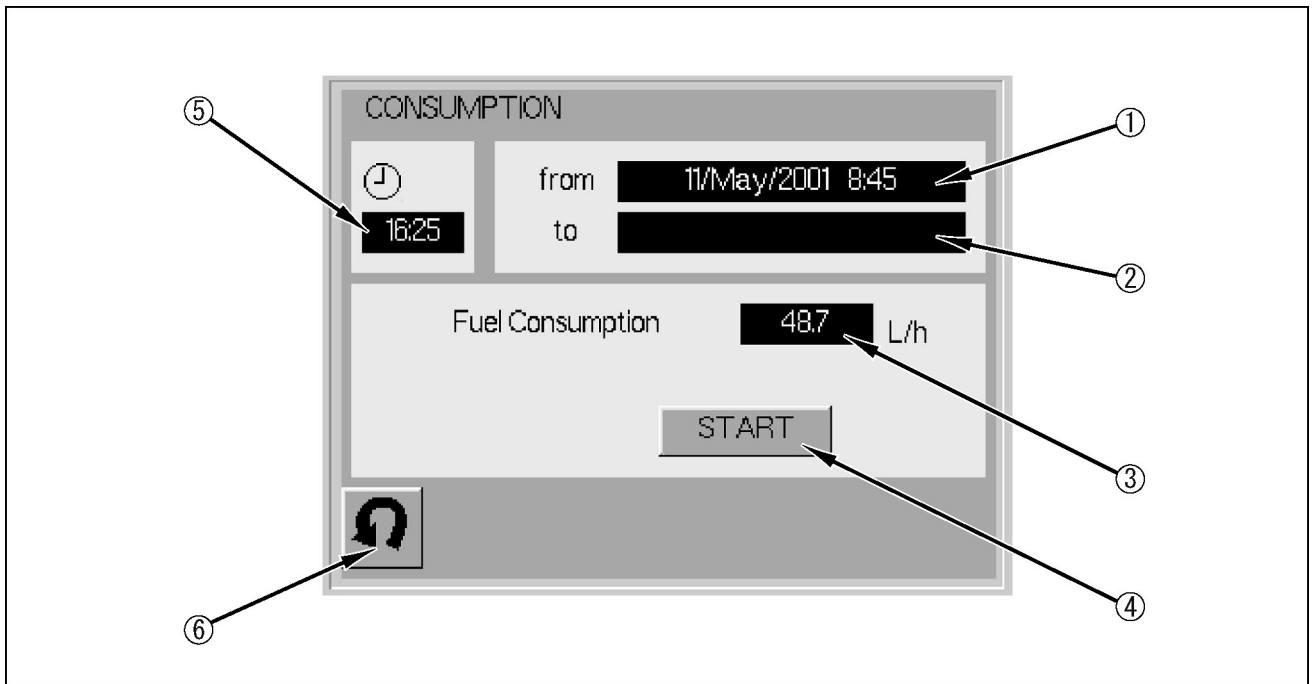
3. The 10-key screen shown in the diagram on the right is displayed.
4. Input the numerals for summer time, then press enter button (D). The 10-key display goes out.
 - If any mistake is made in inputting the numbers, press clear button (E), then input the numbers again.
 - To stop the operation before completing it, press exit button (F).



5. When Step 4. is completed, time display screen (A) lights up and screen (B) flashes.
6. Press (MIN) on time input sub-screen (12). The 10-key screen is displayed.
7. Input the numerals for the minute, then press enter button (D). The 10-key display goes out.
8. When Step 7. is completed, time display screens (A) and (B) light up.
9. Press setting button (6). Time input sub-screens (11) and (12) on the setting screen go out to inform the operator that the time setting process has been completed.

FUEL CONSUMPTION MEASUREMENT SCREEN

This screen displays the fuel consumption during the desired period from the start of operations (starting engine) to the completion of operations (stopping engine).

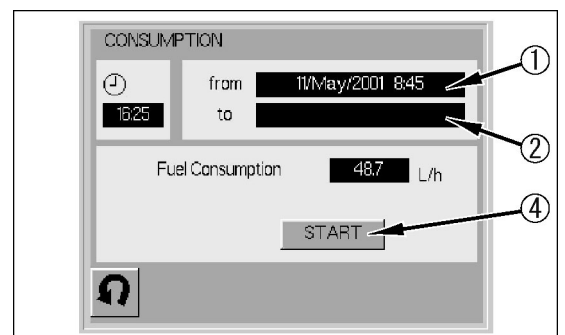


(1) Fuel consumption measurement start date display	(4) Start/stop button
(2) Fuel consumption measurement stop date display	(5) Time display
(3) fuel consumption display	(6) Normal screen selector button

Fuel consumption measurement start/stop date display

To set the starting date for measuring the fuel consumption, press the fuel consumption measurement screen selector button on the normal screen. When the fuel consumption measurement screen is displayed, it is automatically displayed in display portion (1).

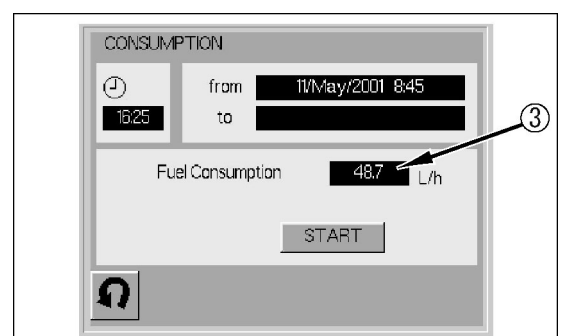
Display portion (2) is displayed when start/stop button (STOP) button (4) is pressed to stop measurement of the fuel consumption.



Fuel display

The previous value of the fuel consumption measurement that was displayed on the fuel consumption measurement screen is displayed on this display (3). Press the start/stop (START) button, and the present fuel consumption value is displayed at the same time as the fuel consumption measurement starts.

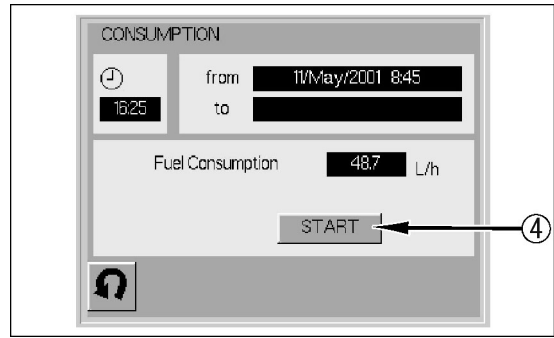
- The fuel consumption value on display (3) is the average value for the are the fuel consumption (L/h) from the time when the start/stop (START) button was pressed to the point where the start/stop (STOP) button is pressed again.



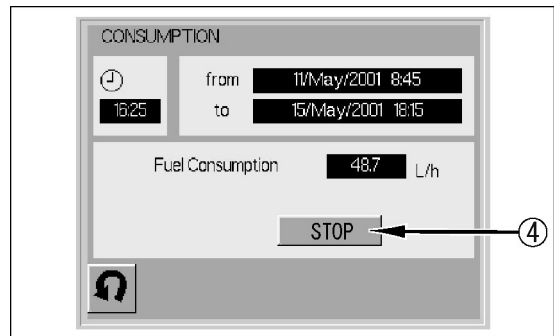
Start/stop button

This button (4) has two types of functions: fuel consumption measurement button and stop button.

- Before measurement of the fuel consumption is started, (START) is displayed on button (4).

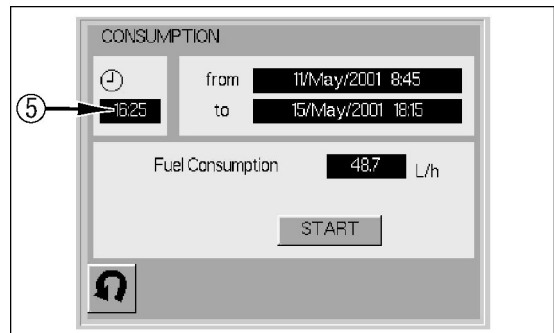


- If button (4) is pressed when the display is START, measurement of the fuel consumption starts. When button (4) is pressed, (STOP) is displayed on the button.
- When stopping measurement of the fuel consumption, press button (4) when the display is (STOP). When button (4) is pressed, (START) is displayed on the button.



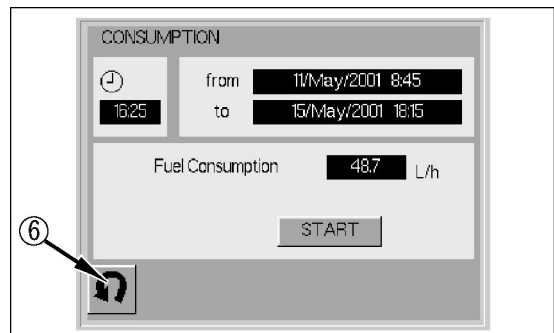
Time display

The present time is displayed on this meter display (6). If it is necessary to correct the time, see "SETTING SCREEN (PAGE 3-21)" for details.



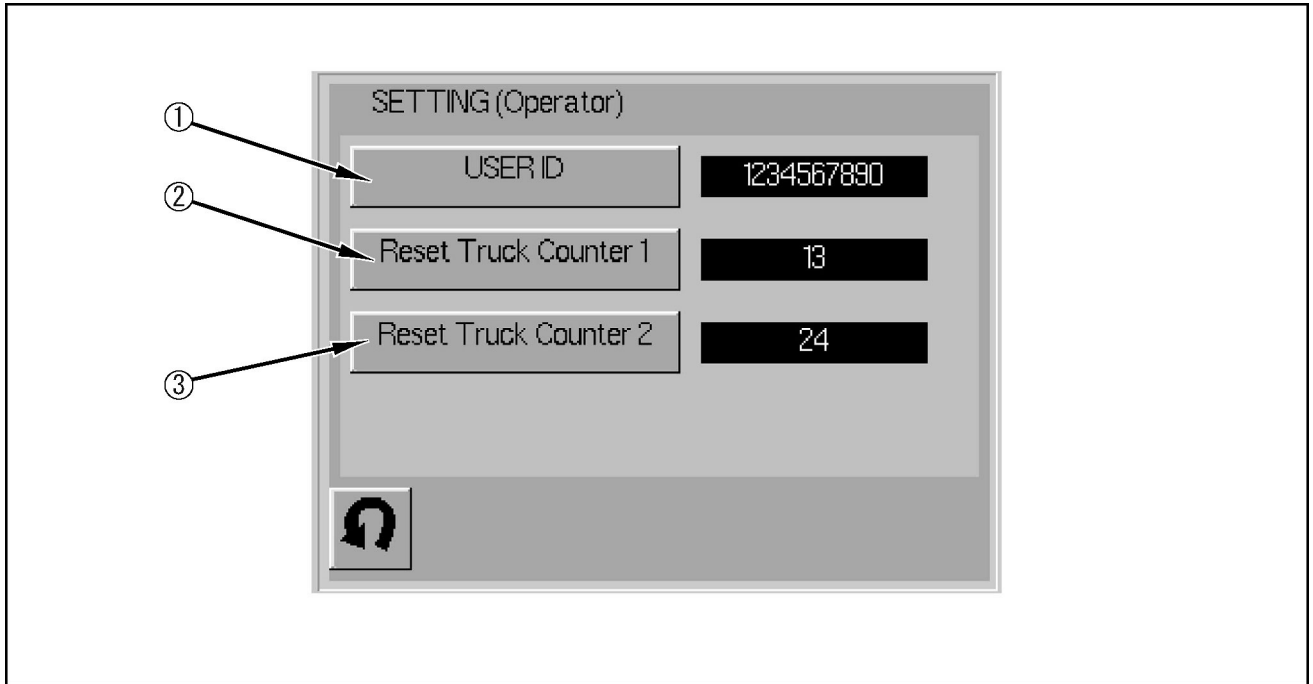
Normal screen selector button

When this button (6) is pressed, the screen switches to the "NORMAL SCREEN (PAGE 3-21)".



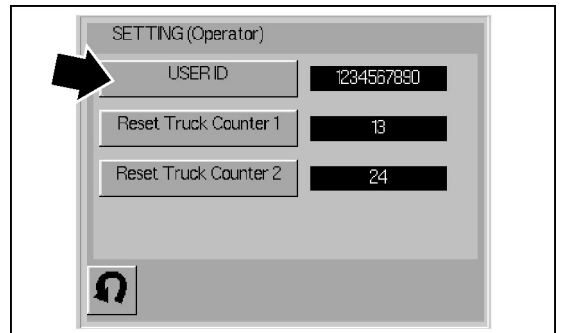
TRUCK COUNTER SCREEN

This screen is used to input the user ID and to reset the number of trucks loaded after it has been cleared.

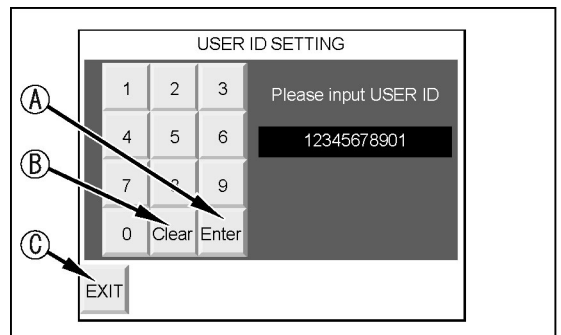


User ID input button

This button (1) is used to input the user ID. The procedure is as follows.



1. When this button (1) is pressed, the 10-key screen in the diagram on the right is displayed.
2. After inputting the desired ID number, press Enter button (A). The 10-key screen goes out and the new ID number is displayed.
 - The ID number can be input to a maximum of ten digits, so input the number of digits desired.
 - If any mistake is made in inputting the numbers, press Clear button (B), then input the numbers again.
 - To stop the operation before completing it, press (Exit) button (C).



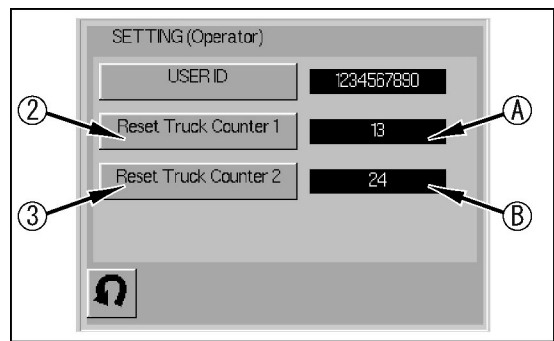
REMARK

- If the cleared number of trucks loaded for each hydraulic excavator operator is to be displayed in memory, input the user ID number.
- If it is desired to count the total number of trucks loaded, regardless of changes in shift of the hydraulic excavator operator, leave the ID number at the default setting and continue the count.

Truck counter reset button

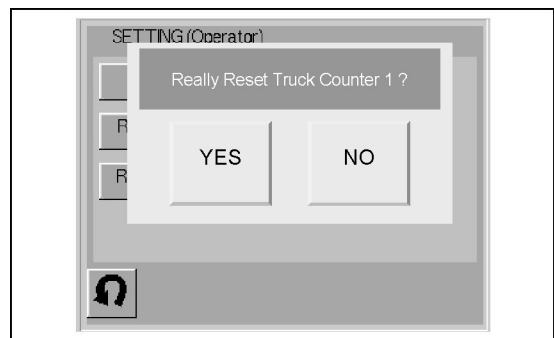
These buttons (2) and (3) are used to delete the count for the previous operation and reset the counter to 0 before starting the counter operation.

The procedure is as follows.



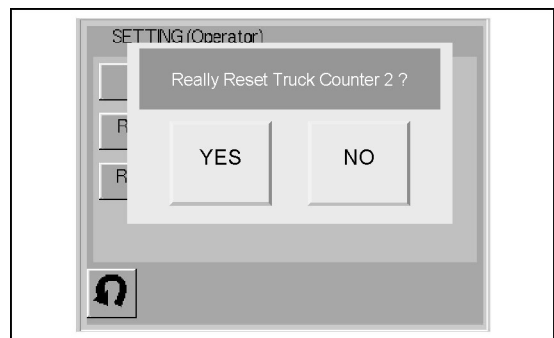
When this button (2) is pressed, the confirmation screen in the diagram on the right is displayed. Press the (YES) button. Count (A) for the previous operation on the dump counter screen is reset to 0.

- If the (NO) button is pressed, the count for the previous operation remains as it is and is not reset to 0.



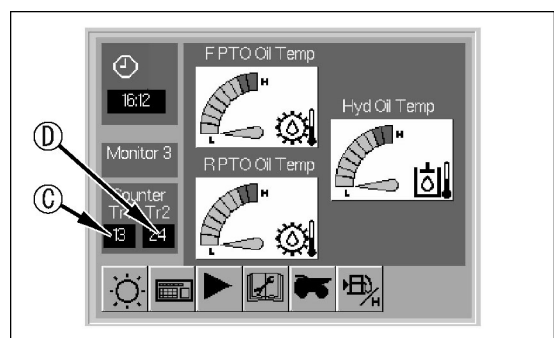
When this button (3) is pressed, the confirmation screen in the diagram on the right is displayed. Press the (YES) button. Count (B) for the previous operation on the dump counter screen is reset to 0.

- If the (NO) button is pressed, the count for the previous operation remains as it is and is not reset to 0.



REMARK

- When the count is reset to 0 in the operation above, truck counter displays (C) and (D) are also set to 0. (A) is linked to (C), and (B) is linked to (D).

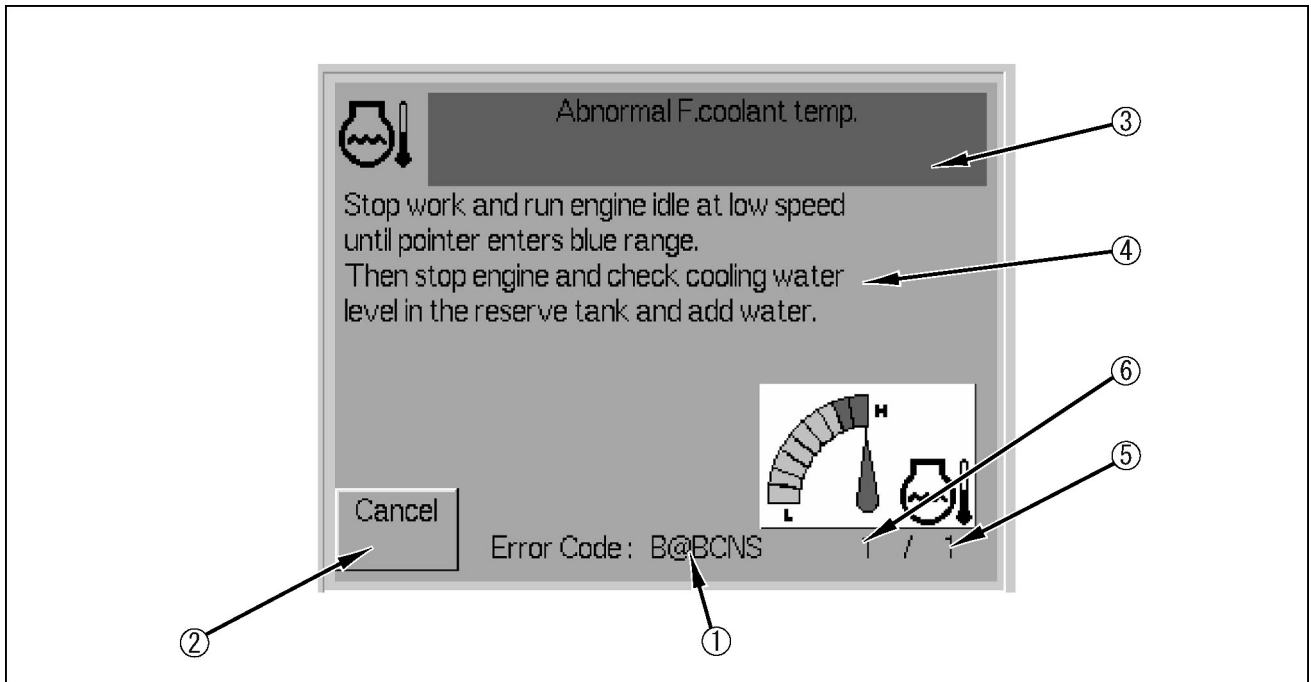


ABNORMALITY DISPLAY SCREEN

If any abnormality occurs on the machine, the screen automatically switches to the abnormality display screen, and displays the nature of the failure and the action to take. Take the action that is given on the display.

OPERATION ON SCREEN, METHOD OF CHECKING

(The screen explained below is the screen displayed when there is an abnormality in a warning item: Abnormality in engine water temperature.)



- The code displayed on screen (1) is the code number for the abnormal item. When contacting your Komatsu distributor, inform this code number together with the condition of the machine. This will assist in achieving smooth solution of the abnormality.
- If the delete switch displayed on screen (2) is pressed, the abnormality display screen will go out and the previous normal screen will be displayed. If it is desired to display the abnormality screen again, turn the starting switch OFF, then turn it ON again.
- The abnormality display screen is displayed according to the warning item column or emergency item column (3) and respective specified content (4).
 - Warning screen
 - When the warning screen is displayed, check the location of the problem according to the instructions displayed on the screen and carry out maintenance quickly. When a warning is displayed, the warning item on the screen is displayed in a yellow band.
 - Emergency stop screen
 - When the emergency stop screen is displayed, stop the engine immediately or run it at low idling, and follow the instructions given. When a warning is displayed, the emergency stop item is displayed in a red band.
- The value displayed on screen (5) is the total number of occurrences of the abnormality item so far.
- The value displayed on screen (6) shows the order of the displayed abnormality item in the total for abnormality items. After displaying all the abnormality items, the screen again immediately switches to display from the first item.

WARNING ITEMS

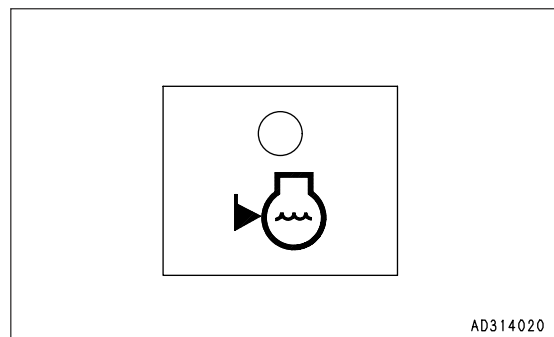
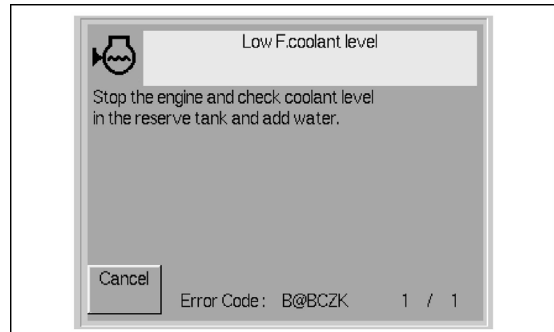
The item column on the warning screen is displayed in a yellow band.
The warning items are as follows.

Front engine water level low

This warning display warns the operator that the level of cooling water in the radiator for the front engine has dropped.

- Check before starting
When the starting switch is at the ON position and the engine is stopped, this display is given if the radiator cooling water level (level of water in the reserve tank) is low. If this abnormality is displayed, check the radiator cooling water level (level of water in the reserve tank) and add water.
- When engine is running
If the radiator cooling water level (level of water in the reserve tank) is low, this warning is displayed, the radiator water level monitor lamp on the machine monitor flashes, and the alarm buzzer sounds. If this happens, stop the engine, check the radiator water level, and add water.

Stop the machine on level ground when inspecting the machine.

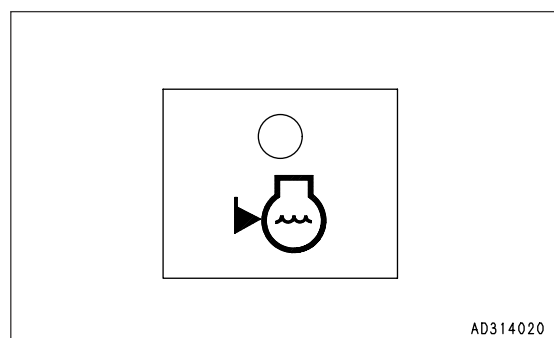
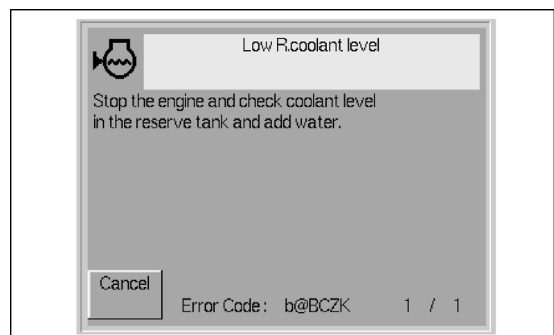


Rear engine water level low

This warning display warns the operator that the level of cooling water in the radiator for the rear engine has dropped.

- Check before starting
When the starting switch is at the ON position and the engine is stopped, this display is given if the radiator cooling water level (level of water in the reserve tank) is low. If this abnormality is displayed, check the radiator cooling water level (level of water in the reserve tank) and add water.
- When engine is running
If the radiator cooling water level (level of water in the reserve tank) is low, this warning is displayed, the radiator water level monitor lamp on the machine monitor flashes, and the alarm buzzer sounds. If this happens, stop the engine, check the radiator water level, and add water.

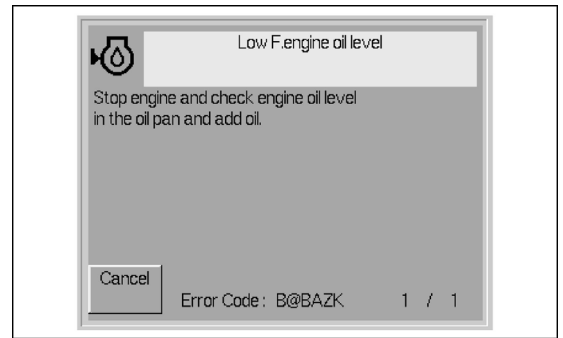
Stop the machine on level ground when inspecting the machine.



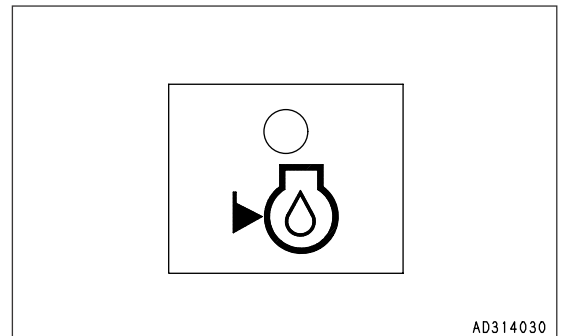
Front engine oil level low

This warning display warns the operator that the level of oil in the front engine oil pan has dropped.

- Check before starting
When the starting switch is at the ON position and the engine is stopped, if the oil level in the engine oil pan is low, this warning is displayed and the engine oil level monitor lamp on the machine monitor flashes. If this happens, check the oil level in the engine oil pan and add oil.



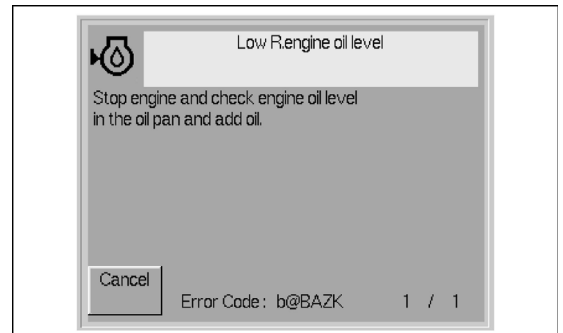
Stop the machine on level ground when inspecting the machine.



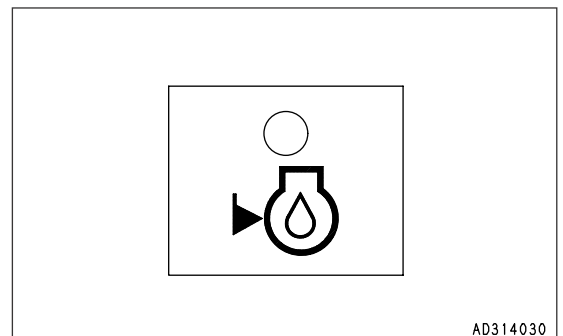
Rear engine oil level low

This warning display warns the operator that the level of oil in the rear engine oil pan has dropped.

- Check before starting
When the starting switch is at the ON position and the engine is stopped, if the oil level in the engine oil pan is low, this warning is displayed and the engine oil level monitor lamp on the machine monitor flashes. If this happens, check the oil level in the engine oil pan and add oil.



Stop the machine on level ground when inspecting the machine.



Hydraulic oil level low

This warning display warns the operator that the level of oil in the hydraulic tank has dropped.

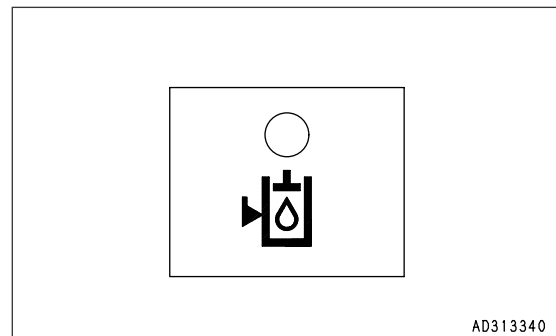
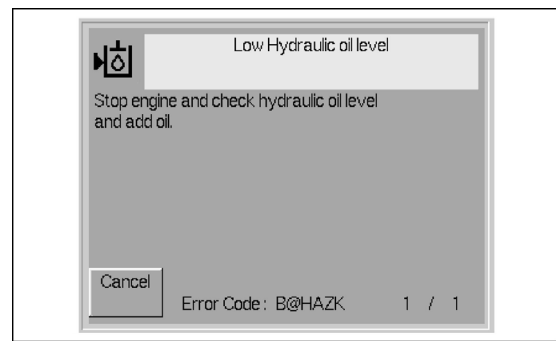
- Check before starting
When the starting switch is at the ON position and the engine is stopped, if the oil level in the hydraulic tank is low, this warning is displayed and the hydraulic oil level monitor lamp on the machine monitor flashes. If this happens, check the oil level in the hydraulic tank and add oil.

Stop the machine on level ground when inspecting the machine.

REMARK

If the level of the oil in the hydraulic tank is correct but an abnormality is displayed during the check before starting in one of the following two conditions (1) or (2), there is no abnormality.

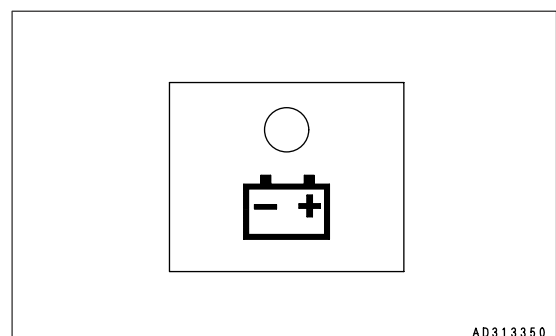
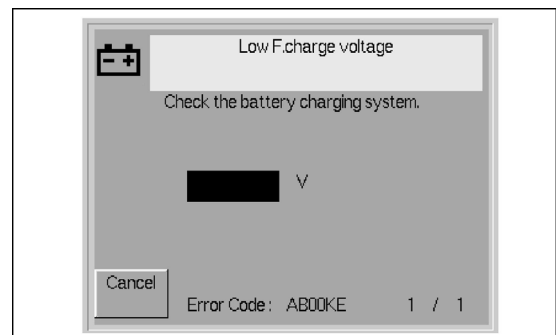
- (1) The engine is started when the machine is stopped on a slope of approx. 15° or more.
- (2) The engine is started when the machine is stopped with the boom cylinder fully extended.



Front battery charge abnormal

This warning display warns the operator that there is an abnormality in the charging system while the front engine is running.

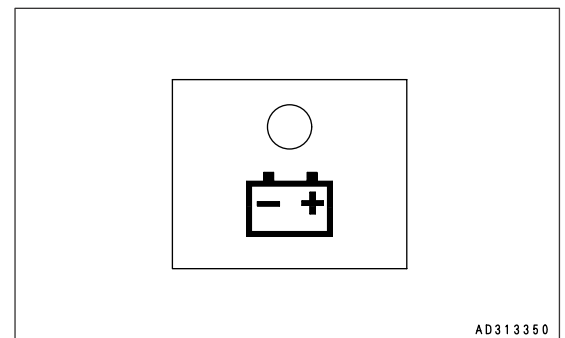
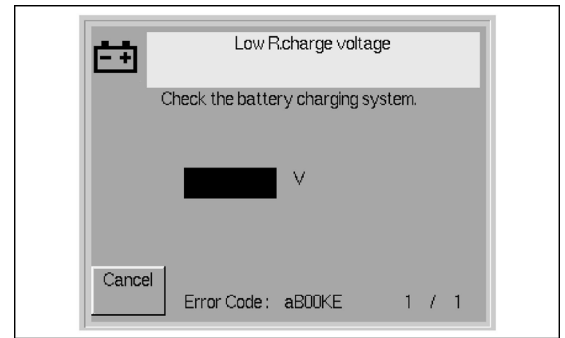
- When engine is running
If an abnormality occurs in the charging system, this warning is displayed and the battery charge monitor lamp on the machine monitor flashes. If this happens, stop the engine and check the charging system.



Rear battery charge abnormal

This warning display warns the operator that there is an abnormality in the charging system while the rear engine is running.

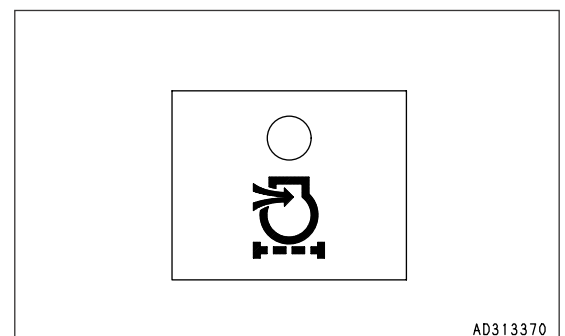
- When engine is running
If an abnormality occurs in the charging system, this warning is displayed and the battery charge monitor lamp on the machine monitor flashes. If this happens, stop the engine and check the charging system.



Front air cleaner clogged

This warning display warns the operator that the air cleaner for the front engine is clogged.

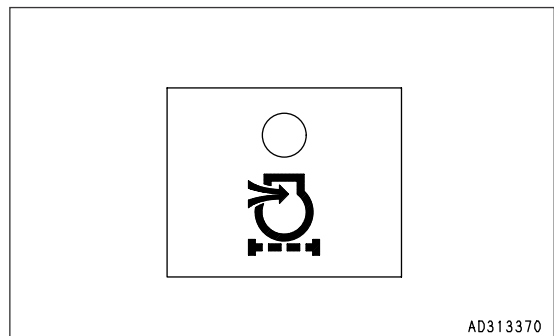
- When engine is running
If the air cleaner element becomes clogged, this warning is displayed and the air cleaner clogged monitor lamp on the machine monitor flashes. If this happens, stop the engine, then check, clean, or replace the air cleaner element.



Rear air cleaner clogged

This warning display warns the operator that the air cleaner for the rear engine is clogged.

- When engine is running
If the air cleaner element becomes clogged, this warning is displayed and the air cleaner clogged monitor lamp on the machine monitor flashes.
If this happens, stop the engine, then check, clean, or replace the air cleaner element.



EMERGENCY STOP ITEMS

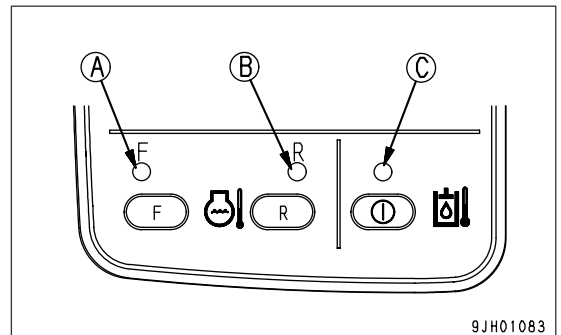
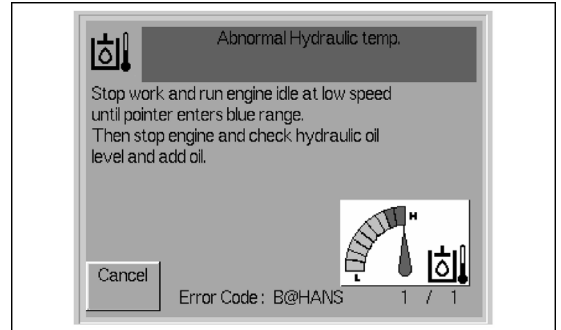
The item column on the emergency stop screen is displayed in a red band.

The emergency stop items are as follows.

Hydraulic oil temperature high

This emergency stop display warns the operator that the hydraulic oil temperature is abnormal.

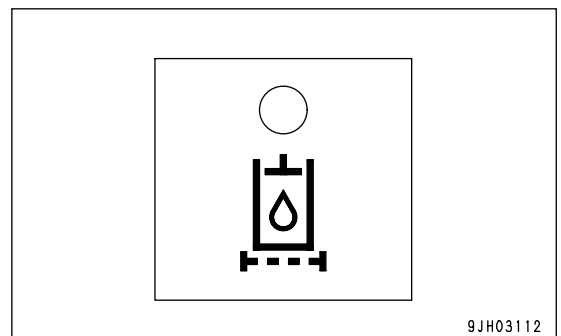
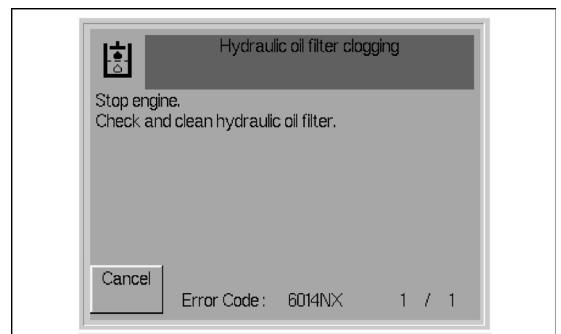
- When engine is running
 If the hydraulic oil temperature goes above 100°C, this warning is displayed, hydraulic oil temperature monitor lamp (C) on the machine monitor flashes, and the alarm buzzer sounds.
 If this happens, stop operations, run the engine at low speed or stop it, and wait for the hydraulic oil temperature to go down.



Hydraulic oil filter clogged

This emergency stop display warns the operator that the hydraulic oil filter is clogged.

- When engine is running
 If the hydraulic oil filter becomes clogged during operations, this warning is displayed and the hydraulic oil filter clogged monitor lamp on the machine monitor flashes.
 If this happens, stop operations, then stop the engine, and check, clean, or replace the hydraulic oil filter.



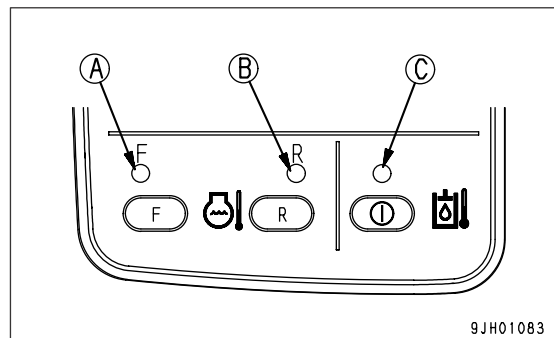
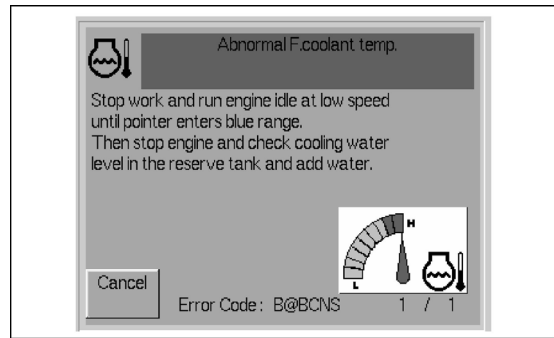
Front engine coolant temperature high

This emergency stop display warns the operator that the water temperature in the front engine cooling system is abnormal.

- When engine is running
 - If the front engine coolant temperature goes above 105°C, this warning is displayed, engine coolant temperature monitor lamp (A) on the machine monitor flashes, and the alarm buzzer sounds.
 - If this happens, stop operations, stop the engine, check the coolant level, check for leakage, and wait for the engine coolant temperature to go down.

REMARK

If the engine coolant temperature goes above 102°C, the engine is automatically run at low speed.



9JH01083

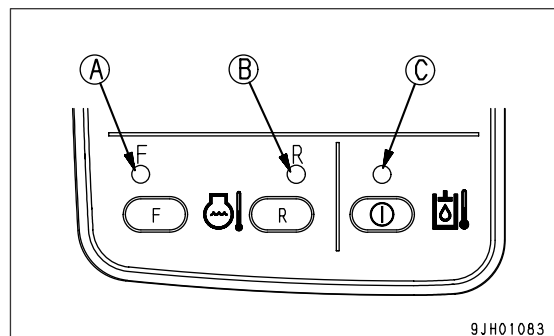
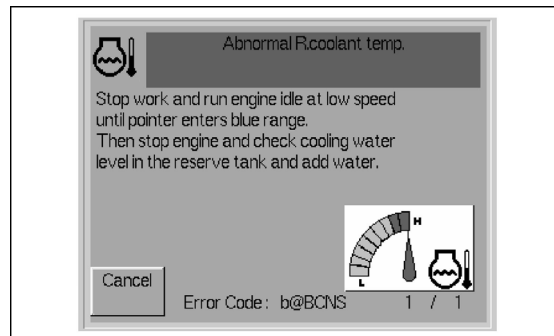
Rear engine coolant temperature high

This emergency stop display warns the operator that the water temperature in the rear engine cooling system is abnormal.

- When engine is running
 - If the rear engine coolant temperature goes above 105°C, this warning is displayed, engine coolant temperature monitor lamp (B) on the machine monitor flashes, and the alarm buzzer sounds.
 - If this happens, stop operations, stop the engine, check the coolant level, check for leakage, and wait for the hydraulic oil temperature to go down.

REMARK

If the engine coolant temperature goes above 102°C, the engine is automatically run at low speed.

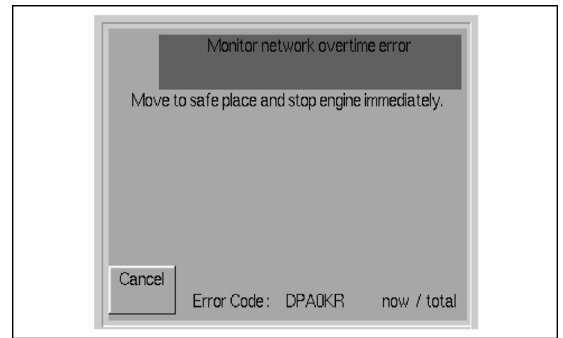


9JH01083

Monitor network abnormal

This emergency stop display warns the operator that there is an abnormality in the electrical system of the machine monitor.

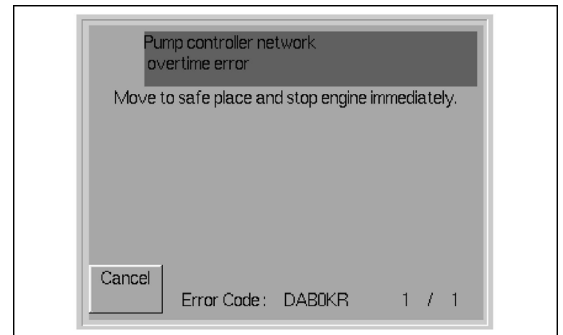
- When engine is running
If an abnormality occurs in the machine monitor, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



Pump controller network abnormal

This emergency stop display warns the operator that there is an abnormality in the electrical system of the pump controller.

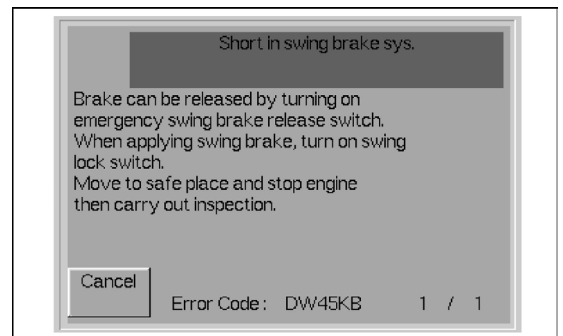
- When engine is running
If an abnormality occurs in the electrical system of the pump controller, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



Short circuit in swing holding brake circuit system

This emergency stop display warns the operator that there is an abnormality in the electrical system of the swing holding brake.

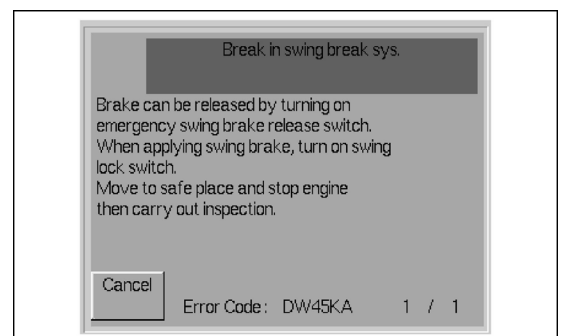
- When engine is running
If a short circuit occurs in the electrical system of the swing holding brake, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



Disconnection in swing holding brake circuit system

This emergency stop display warns the operator that there is an abnormality in the electrical system of the swing holding brake.

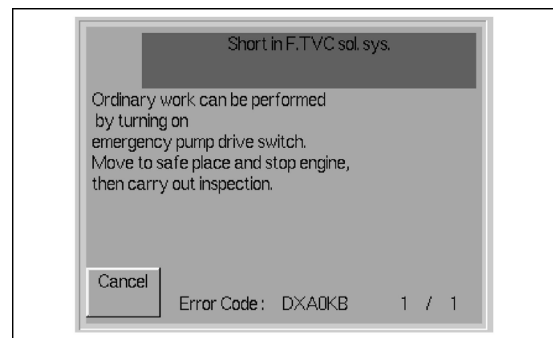
- When engine is running
If a disconnection occurs in the electrical system of the swing holding brake, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



Short circuit in front TVC solenoid circuit system

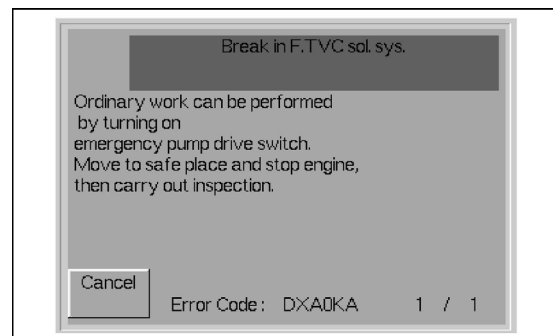
This emergency stop display warns the operator that there is an abnormality in the electrical system of the pump TVC valve of the front engine.

- When engine is running
If a short circuit occurs in the electrical system of the pump TVC valve of the front engine, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.

**Disconnection in front TVC solenoid circuit system**

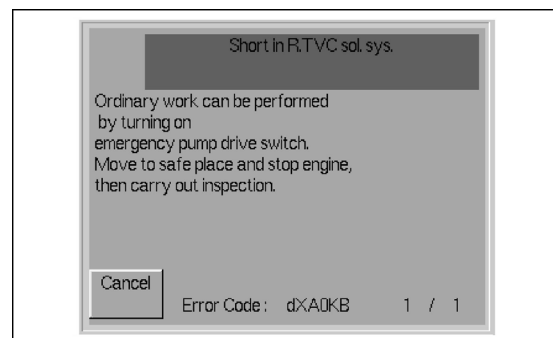
This emergency stop display warns the operator that there is an abnormality in the electrical system of the pump TVC valve of the front engine.

- When engine is running
If a disconnection occurs in the electrical system of the pump TVC valve of the front engine, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.

**Short circuit in rear TVC solenoid circuit system**

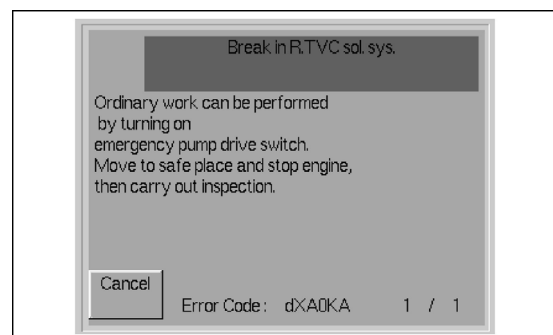
This emergency stop display warns the operator that there is an abnormality in the electrical system of the pump TVC valve of the rear engine.

- When engine is running
If a short circuit occurs in the electrical system of the pump TVC valve of the rear engine, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.

**Disconnection in rear TVC solenoid circuit system**

This emergency stop display warns the operator that there is an abnormality in the electrical system of the pump TVC valve of the rear engine.

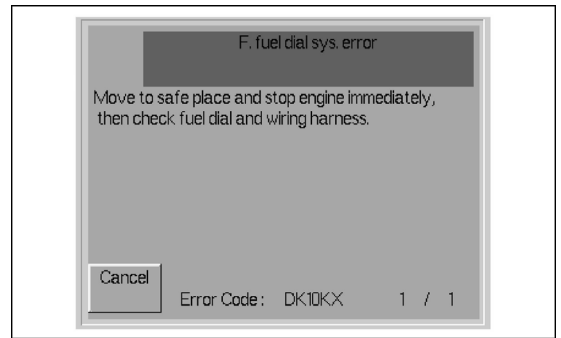
- When engine is running
If a disconnection occurs in the electrical system of the pump TVC valve of the rear engine, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



Front fuel control dial circuit system abnormal

This emergency stop display warns the operator that there is an abnormality in the electrical system of the fuel control dial of the front engine.

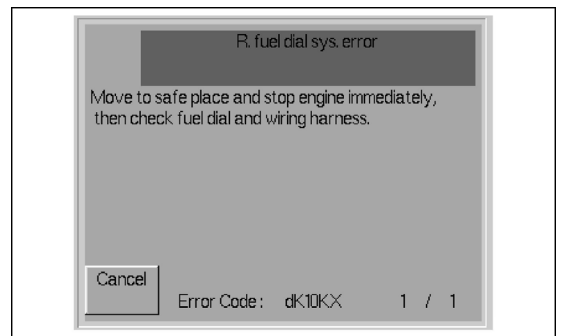
- When engine is running
If a short circuit occurs in the electrical system of the fuel control dial of the front engine, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



Rear fuel control dial circuit system abnormal

This emergency stop display warns the operator that there is an abnormality in the electrical system of the fuel control dial of the rear engine.

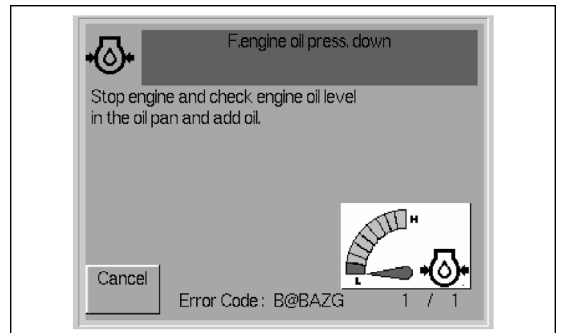
- When engine is running
If a short circuit occurs in the electrical system of the fuel control dial of the rear engine, this warning is displayed and the alarm buzzer sounds.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



Front engine oil pressure low

This emergency stop display warns the operator that the pressure of the front engine lubricating oil has dropped.

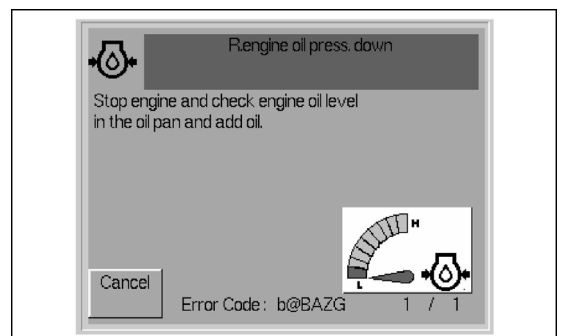
- When engine is running
If the pressure of the front engine lubricating oil has not reached the specified pressure, this warning is displayed and the alarm buzzer sounds.
If this happens, stop the engine, check the oil level, and check for leakage.



Rear engine oil pressure low

This emergency stop display warns the operator that the pressure of the rear engine lubricating oil has dropped.

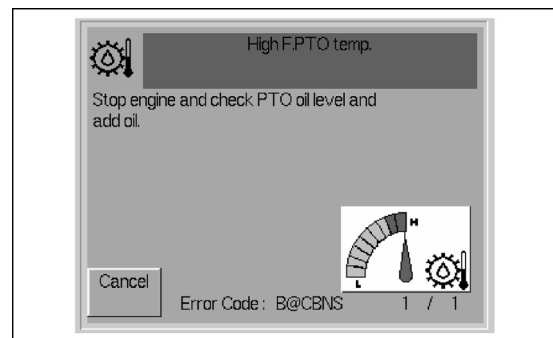
- When engine is running
If the pressure of the rear engine lubricating oil has not reached the specified pressure, this warning is displayed and the alarm buzzer sounds.
If this happens, stop the engine, check the oil level, and check for leakage.



Front PTO oil temperature high

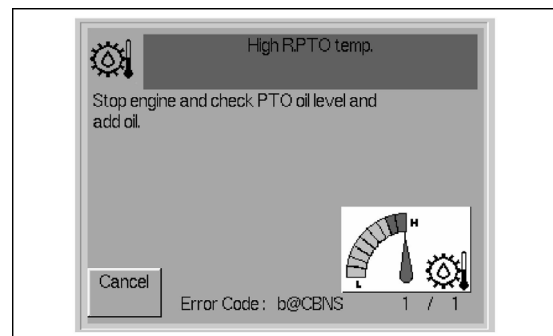
This emergency stop display warns the operator that the temperature of the front engine PTO lubricating oil is abnormal.

- When engine is running
 - If the temperature of the front engine PTO lubricating oil goes above 125°C, this warning is displayed and the alarm buzzer sounds.
 - If this happens, stop the engine, check the oil level, check for leakage, and wait for the oil temperature to go down.

**Rear PTO oil temperature high**

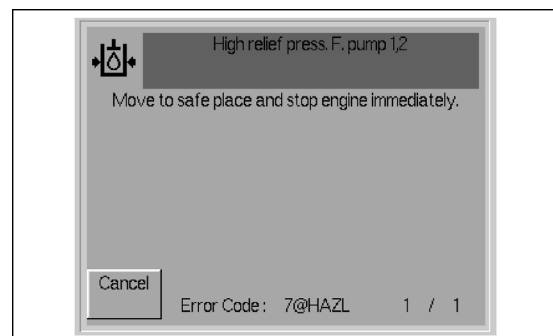
This emergency stop display warns the operator that the temperature of the rear engine PTO lubricating oil is abnormal.

- When engine is running
 - If the temperature of the rear engine PTO lubricating oil goes above 125°C, this warning is displayed and the alarm buzzer sounds.
 - If this happens, stop the engine, check the oil level, check for leakage, and wait for the oil temperature to go down.

**No. 1, 2 front pump pressure abnormal**

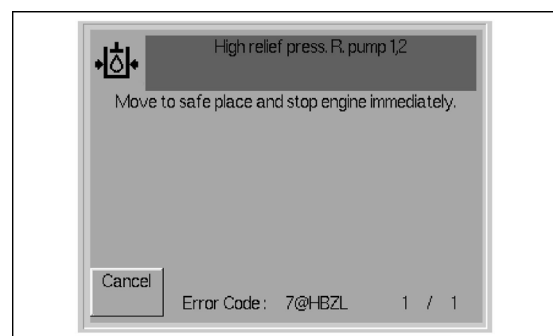
This emergency stop display warns the operator that the oil pressure of the front engine No. 1, 2 main pump at the front (engine side) has dropped or is abnormally high.

- When engine is running
 - If the oil pressure of the front engine No. 1, 2 main pump at the front (engine side) is below the specified pressure or is abnormally high, this warning is displayed.
 - If this happens, stop the engine and check for leakage in the hydraulic circuit.

**No. 1, 2 rear pump pressure abnormal**

This emergency stop display warns the operator that the oil pressure of the rear engine No. 1, 2 main pump at the rear (outside left of machine) has dropped or is abnormally high.

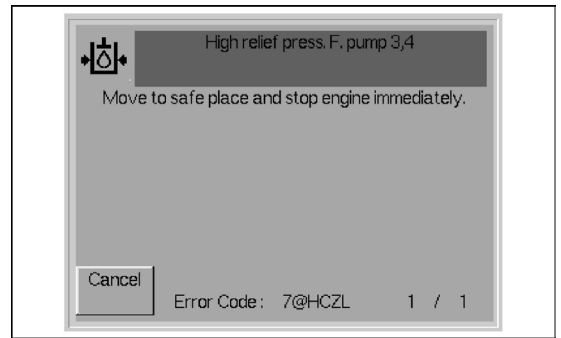
- When engine is running
 - If the oil pressure of the rear engine No. 1, 2 main pump at the rear (outside left of machine) is below the specified pressure or is abnormally high, this warning is displayed.
 - If this happens, stop the engine and check for leakage in the hydraulic circuit.



No. 3, 4 front pump pressure abnormal

This emergency stop display warns the operator that the oil pressure of the front engine No. 3, 4 main pump at the front (engine side) has dropped or is abnormally high.

- When engine is running
If the oil pressure of the front engine No. 3, 4 main pump at the front (engine side) is below the specified pressure or is abnormally high, this warning is displayed.
If this happens, stop the engine and check for leakage in the hydraulic circuit.



No. 3, 4 rear pump pressure abnormal

This emergency stop display warns the operator that the oil pressure of the rear engine No. 3, 4 main pump at the rear (outside left of machine) has dropped or is abnormally high.

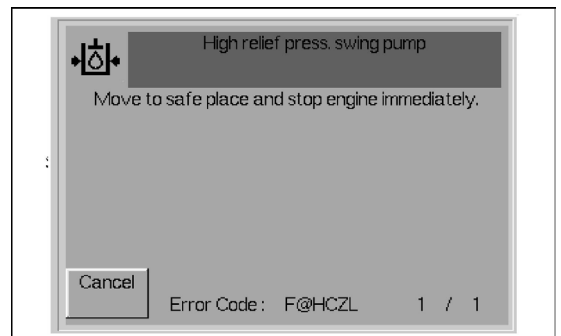
- When engine is running
If the oil pressure of the rear engine No. 3, 4 main pump at the rear (outside left of machine) is below the specified pressure or is abnormally high, this warning is displayed.
If this happens, stop the engine and check for leakage in the hydraulic circuit.



Swing pump system abnormal

This emergency stop display warns the operator that the oil pressure of the swing pump is abnormal.

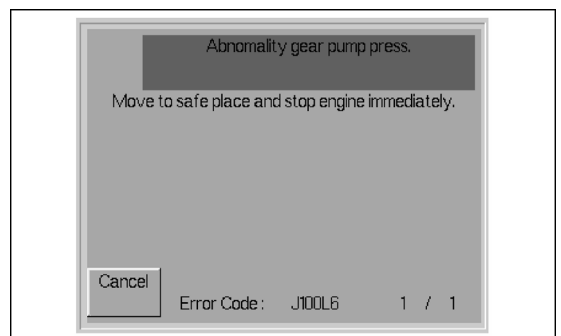
- When engine is running
If the oil pressure of the swing pump has not reached the specified pressure, this warning is displayed.
If this happens, stop the engine and check for leakage in the hydraulic circuit.



Gear pump system abnormal

This emergency stop display warns the operator that the oil pressure of the gear pump has dropped.

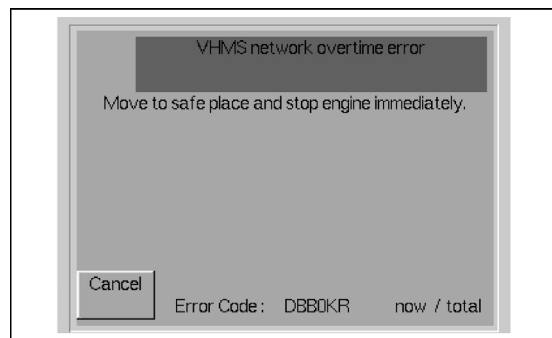
- When engine is running
If the oil pressure of the gear pump is not within the specified pressure, this warning is displayed.
If this happens, stop the engine and check for leakage in the hydraulic circuit.



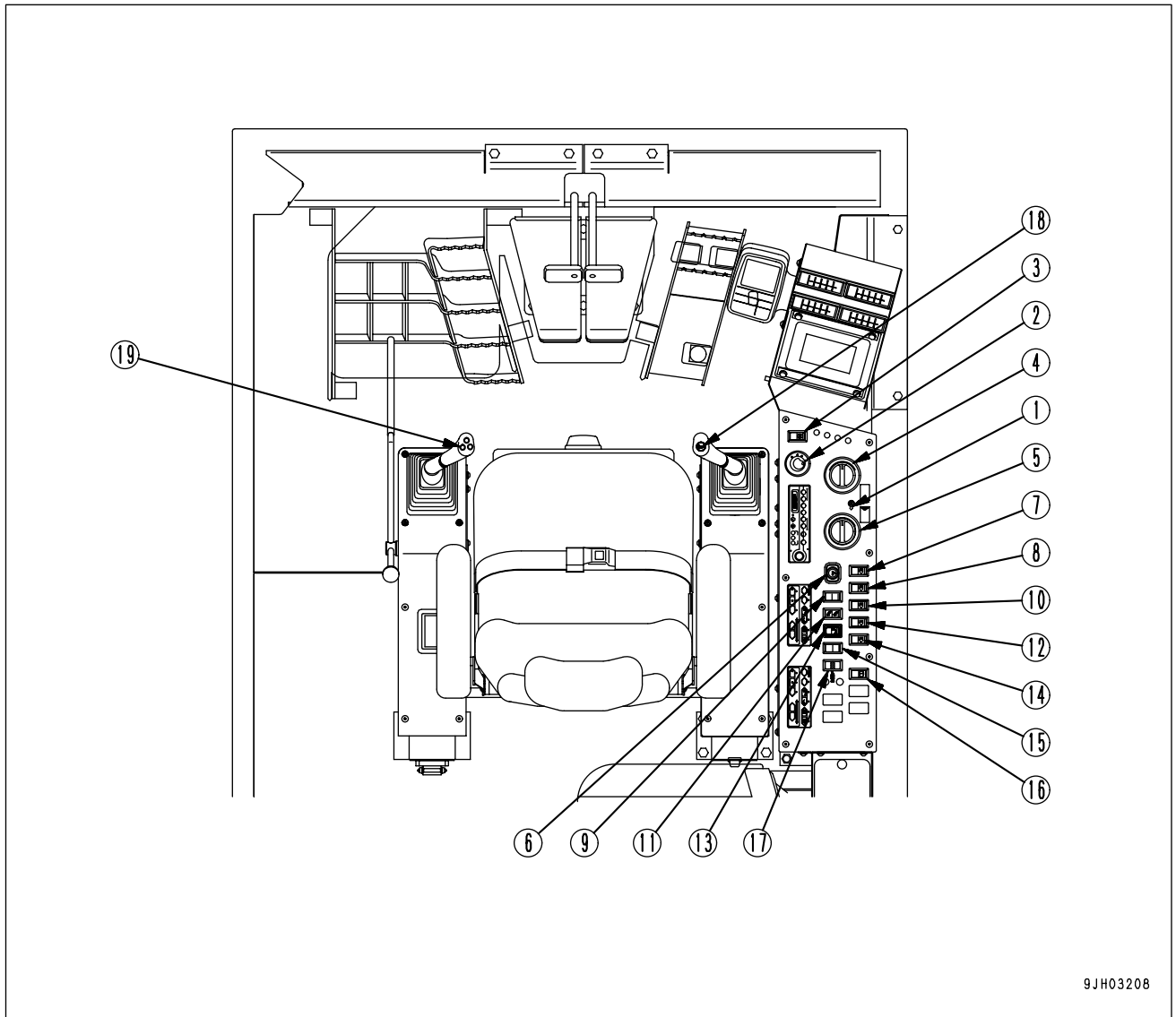
VHMS monitor network abnormal

This emergency stop display warns the operator that there is an abnormality in the electrical system of the VHMS monitor.

- When engine is running
This is displayed if there is defective wiring between the VHMS controller and another controller or if there is an abnormal signal on the circuit.
If this happens, set the machine to a safe posture, then stop the engine.
Please contact your Komatsu distributor to have the system returned to normal.



SWITCHES

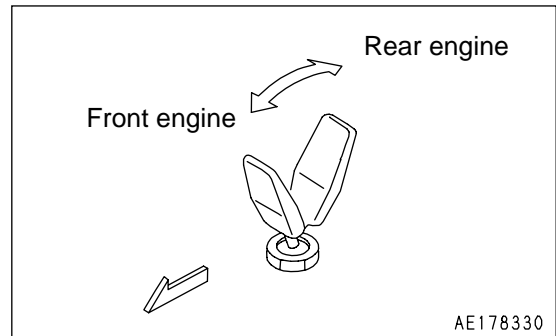


9JH03208

(1) Starter selector switch	(10) Room lamp switch
(2) Starting switch	(11) Machine push-up switch
(3) Preheating switch	(12) Fog lamp switch (if equipped)
(4) Fuel control dial (front engine) (with auto-deceleration mechanism)	(13) Shockless boom control switch
	(14) Rotating lamp switch (if equipped)
(5) Fuel control dial (rear engine) (with auto-deceleration mechanism)	(15) Alarm buzzer stop switch
	(16) Wiper switch
(6) Cigarette lighter	(17) Greasing switch
(7) Lamp switch	(18) Horn switch
(8) Step light switch	(19) Truck counter switch
(9) Swing lock switch	

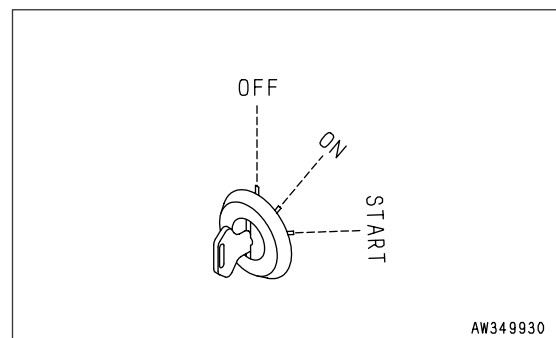
STARTER SELECTOR SWITCH

This switch (1) is used to select the front engine or rear engine when starting the engine.
 When starting the engines, start in the order front engine → rear engine.
 For details of the method of starting the engines, see “STARTING ENGINE (PAGE 3-124)”.



STARTING SWITCH

This switch (2) is used to start or stop the engine.
OFF position
 The starting key can be inserted or removed, switches for the electrical system except the room lamp and clock are switched off, and the engine stops.
 Both the front and rear engines stop at the same time.

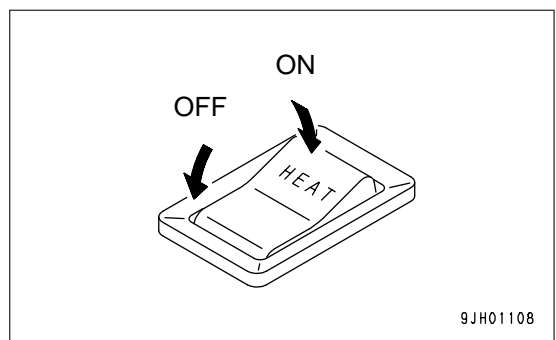


ON position
 Electric current flows in the charging and lamp circuits.
 Keep the starting switch key at the ON position while the engine is running.

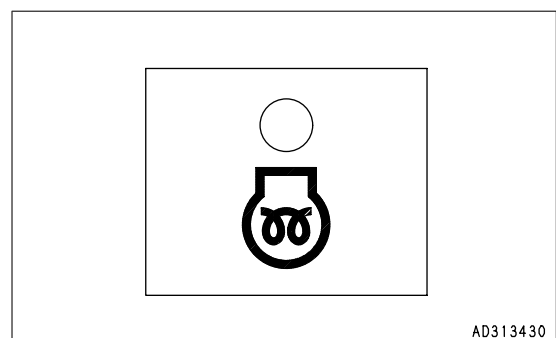
START position
 This is the engine-start position. Keep the key at this position during cranking. Immediately after starting the engine, release the key which will automatically return to the ON position.

PREHEATING SWITCH

This switch (3) is used to preheat the engine before starting the engine in cold areas. When the switch is set to the ON position, the preheating monitor lights up. Keep the switch pressed until the preheating monitor goes out.



When the preheating monitor goes out, release the switch. When the switch is released, it will return to the OFF position. Turn the starting switch immediately to the START position and start the engine.

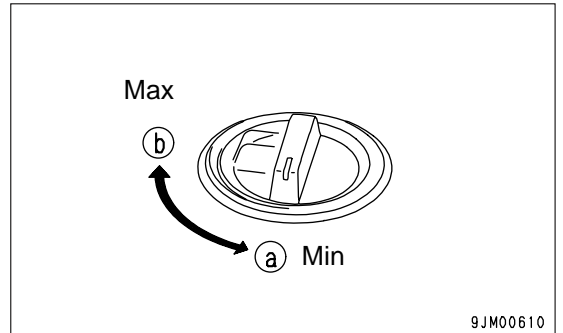


FUEL CONTROL DIAL (FRONT ENGINE)

(WITH AUTO-DECELERATION MECHANISM)

This dial (4) adjusts the engine speed and output.

- (a) Low idling (MIN): Turned fully to the left
- (b) Full speed (MAX): Turned fully to the right

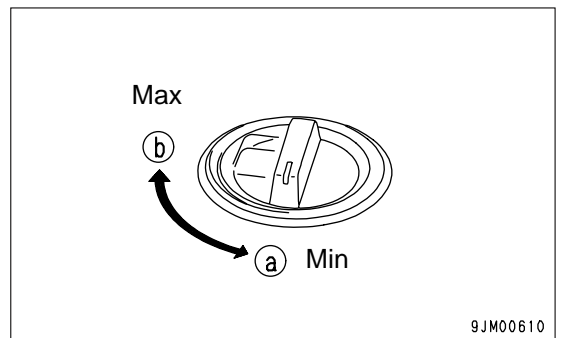


FUEL CONTROL DIAL (REAR ENGINE)

(WITH AUTO-DECELERATION MECHANISM)

This dial (5) adjusts the engine speed and output.

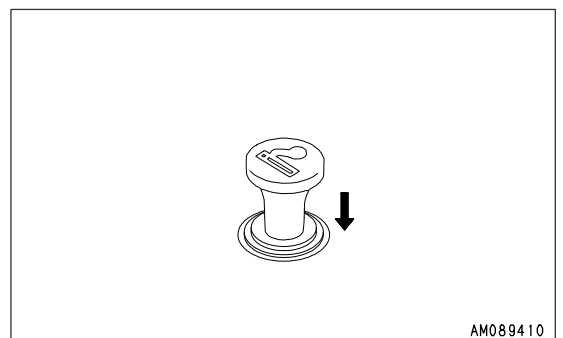
- (a) Low idling (MIN): Turned fully to the left
- (b) Full speed (MAX): Turned fully to the right



CIGARETTE LIGHTER

This switch (6) is used to light cigarettes. To use, push the lighter in. After a few seconds it will spring back. Pull out the lighter and light your cigarette. By removing the cigarette lighter, the socket is available as a power source for the yellow flashing lamp.

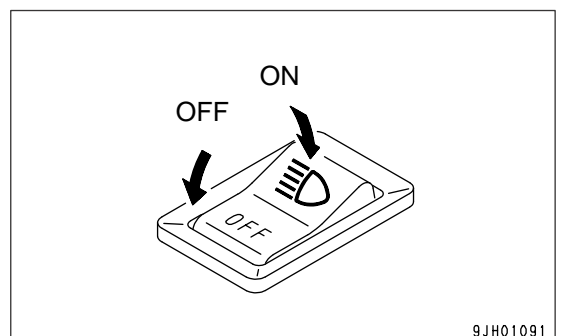
Max. current is 85 W (24V x 3.5 A).



LAMP SWITCH

This switch (7) is used to light up the front lamps, working lamps, bottom lamp, and monitor illumination.

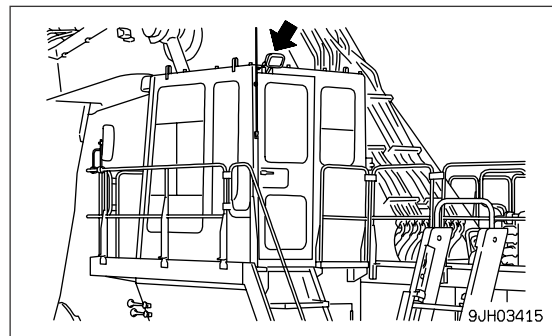
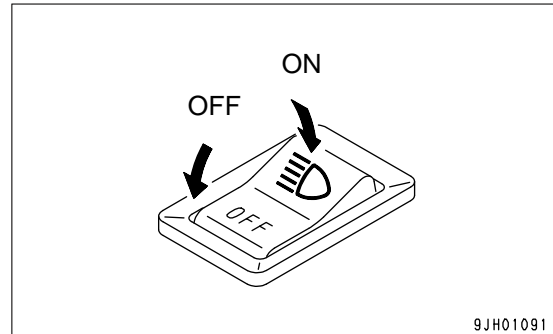
- ON position: Lamps light up
- OFF position: Lamps go out



STEP LIGHT SWITCH

This switch (8) is used at night to light up the step so that the operator can get off the machine safely.

- When the switch is set to the ON position, the step light lights up for approx. 60 seconds.
- Even when the starting switch is at the OFF position, if this switch is set to the ON position, the step light lights up for approx. 60 seconds.
- When the switch is released, it returns to the OFF position, but even when it is at the OFF position, the step light still lights up for approx. 60 seconds.
- When the starting switch is at the OFF position, and this switch is set to the ON position, there may be a delay before the step light lights up. Keep the switch pressed until the step light lights up. (Approx. 1 sec.)



SWING LOCK SWITCH

⚠ WARNING

- When the machine is traveling or the swing is not being operated, always set this switch to the swing lock position.
- Be careful when operating on slopes. The load on the work equipment may cause the upper structure to swing to the downhill side if the swing control lever is operated, even when the swing lock switch is at the ON position.
- If the swing lever is operated immediately after setting the swing lock switch to the ON position, the swing may drag. To prevent danger, when relieving the swing during warming-up operations, wait for at least 5 sec. after turning the swing lock switch ON before operating the swing relief.

This switch (9) is used to lock the upper structure so that it cannot swing.

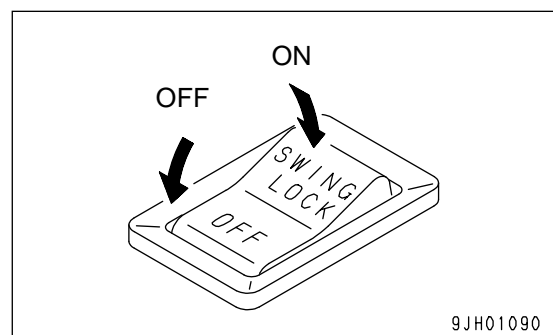
ON position (actuated):

The swing lock is always applied, and the upper structure will not swing even if the swing is operated. In this condition, the swing lock lamp lights up.

OFF position (canceled):

The swing lock is applied only when all work equipment control levers are at neutral; when any work equipment control lever is operated, it is canceled.

The swing lock is actuated approx. 10 seconds after all work equipment control lever is placed in neutral.



ROOM LAMP SWITCH

NOTICE

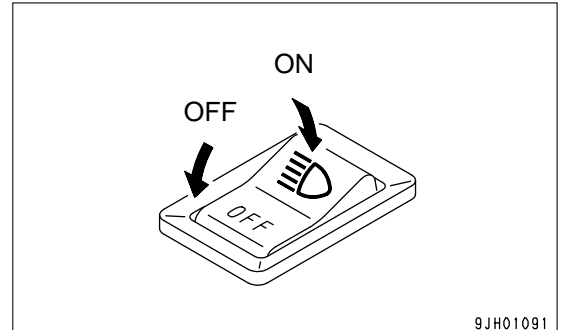
It is possible to turn on the room lamp even when the starting switch is at the OFF position, so be careful not to forget to turn it off.

This switch (10) is used to turn on the room lamp.

ON: Lights up

OFF: Lights off

This lamp also lights up when the engine is not running.



MACHINE PUSH-UP SWITCH

This switch (11) is used to switch the safety valve set pressure at the head end of the boom cylinder to two levels.

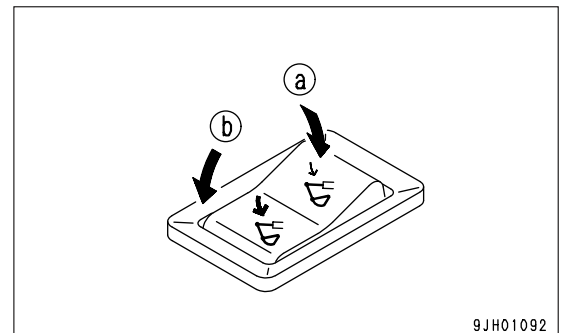
(a) Low pressure setting:

The boom thrust force is weak, so the swaying of the chassis is small during digging operations, and digging operations can be carried out smoothly.

This is used for general digging operations on normal ground, soft rock, or blasted rock.

(b) High pressure setting:

The thrusting force of the boom becomes more powerful, so it is easy to twist and swing or escape from soft ground. It is effective in carrying out digging operations using the bucket and the weight of the machine in confined areas.



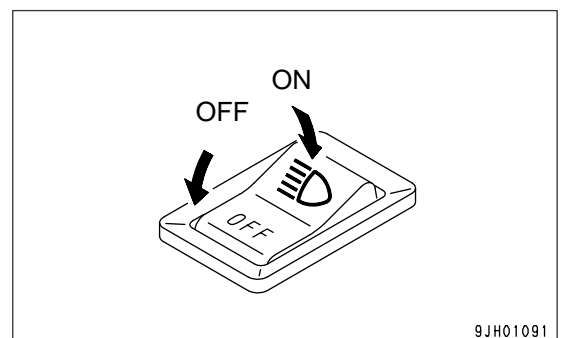
FOG LAMP SWITCH

(If equipped)

This switch (12) is used to light up the fog lamp.

ON position: Lamp lights up

OFF position: Lamp goes out



BOOM SHOCKLESS CONTROL SWITCH

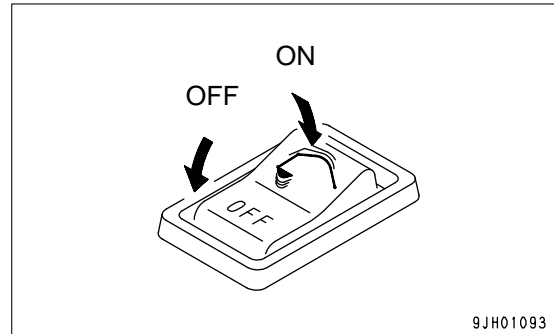
This switch (13) controls the shaking of the work equipment when the boom is stopped.

Effect

- The shaking and spillage of load from the bucket is reduced.
- Operator fatigue when operating for long periods is reduced, so operations can be carried out in safety.

REMARK

When the switch is at the ON position and the boom is stopped, the movement of the boom until it stops will increase slightly. Be careful when using this operation until you become accustomed to it.



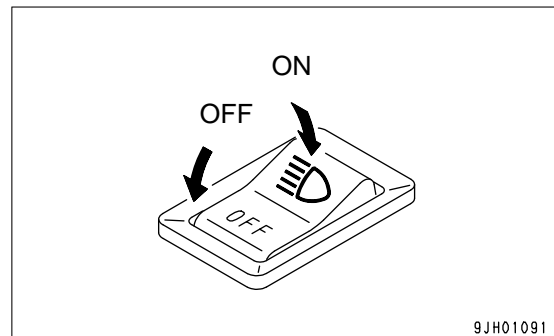
ROTATING LAMP SWITCH

(If equipped)

This switch (14) lights up the rotating lamp

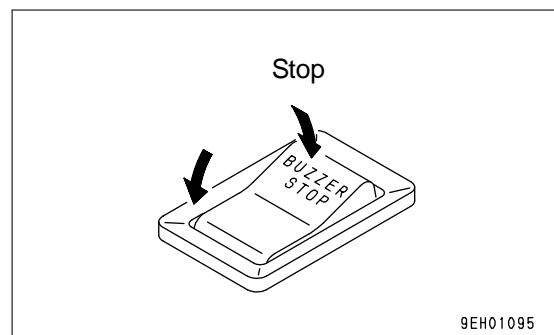
ON position: Lamp lights up

OFF position: Gose out



ALARM BUZZER STOP SWITCH

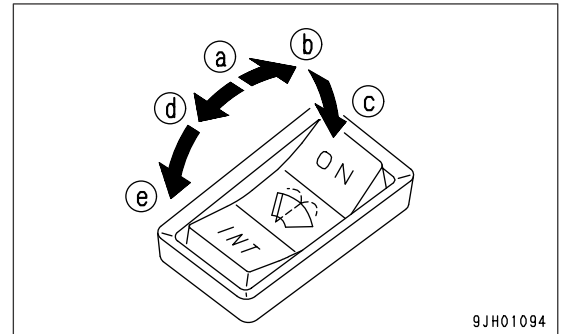
This switch (15) is used to stop the alarm buzzer if it sounds to warn of an abnormality during operation.



WINDSHIELD WIPER SWITCH

This switch (16) is used to operate the wiper for the front glass.

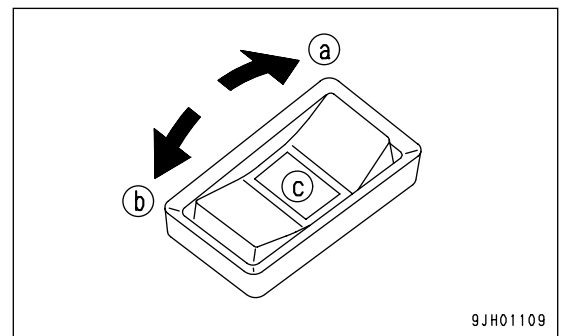
- (a) OFF: Wiper stopped
- (b) ON: Wiper moves continuously
- (c) Window washer fluid is sprayed out. When the switch is released, it returns to position (b).
- (d) ON: Wiper moves intermittently
- (e) Window washer fluid is sprayed out. When the switch is released, it returns to position (d).



GREASING SWITCH

This switch (17) actuates the grease pump.

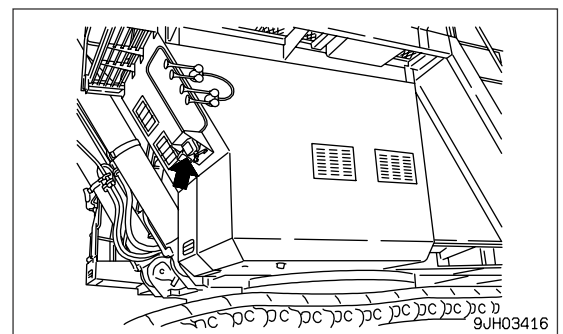
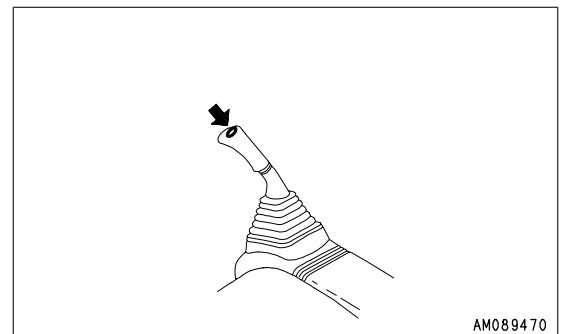
- (a) START: Greasing is started. When the switch is released, greasing will continue for 15 minutes and then stop.
- (b) STOP: This switch is used to forcibly stop the grease pump during greasing operations.
- (c) Pilot lamp: This lights up when the grease pump is operating.



HORN SWITCH

Press switch (18) on the right work equipment control lever to sound the horn.

At the same time, the flashing light (option) at the top front of the cab will flash for approx. 5 seconds to give a signal to the dump truck.

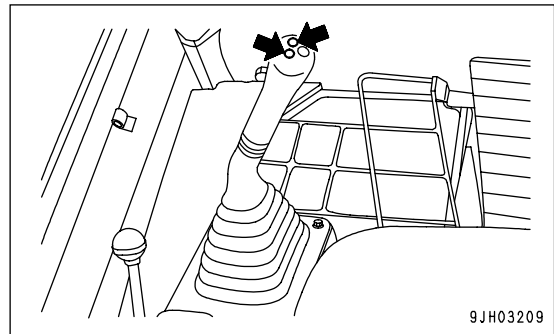


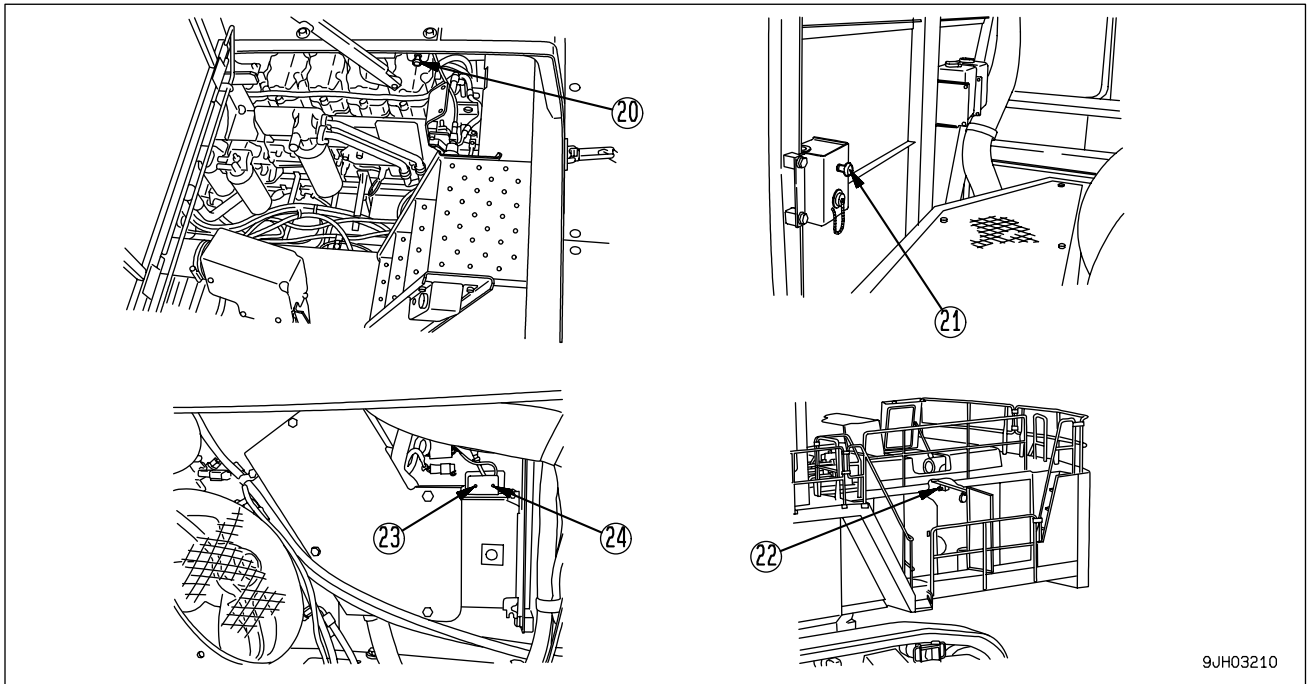
TRUCK COUNTER SWITCH

When switch (19) on the left work equipment control lever is pressed, the count for the truck counter on the normal screen of the machine management monitor advances. For details of the truck display, see "NORMAL SCREEN (PAGE 3-22)".

When this switch (19) is pressed, the truck counter on the instrument panel at the right side of the operator's seat flashes once at the same time to make it possible to confirm that switch (19) has been pressed.

For details of the truck counter lamp, see "LAMP (PAGE 3-68)".





9JH03210

(20) Room lamp switch (for engine room)	(23) Pump control override switch
(21) Room lamp switch (for room in cab)	(24) Swing lock override switch
(22) Room lamp switch (for pump room)	(25) Spare socket

ROOM LAMP SWITCH

(FOR ENGINE ROOM)

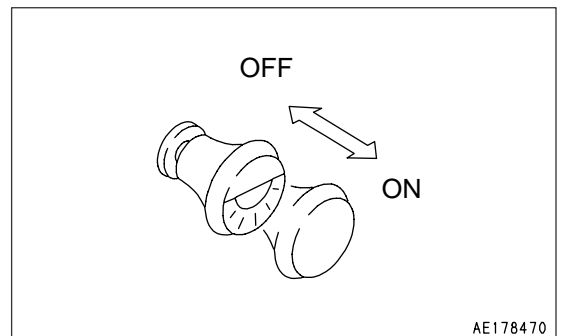
NOTICE

It is possible to turn on the room lamp even when the starting switch is at the OFF position, so be careful not to forget to turn it off.

This switch (20) is used to light up the room lamp inside the engine room.

ON position: Lamp lights up

OFF position: Lamp goes out



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ROOM LAMP SWITCH

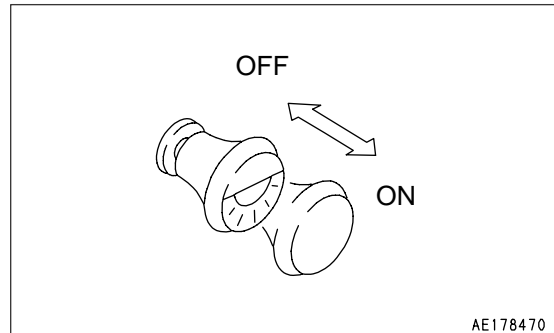
(FOR ROOM UNDER CAB)

NOTICE

It is possible to turn on the room lamp even when the starting switch is at the OFF position, so be careful not to forget to turn it off.

This switch (21) is used to light up the room lamp inside the room under the cab.

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



ROOM LAMP SWITCH

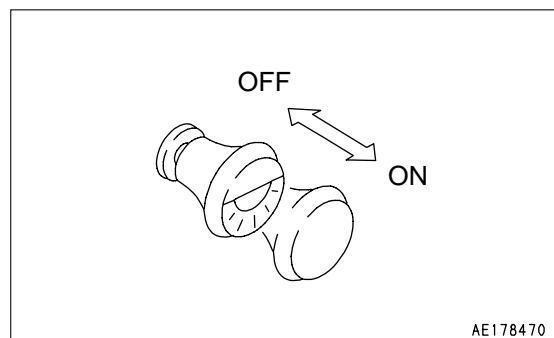
(FOR PUMP ROOM)

NOTICE

It is possible to turn on the room lamp even when the starting switch is at the OFF position, so be careful not to forget to turn it off.

This switch (22) is used to light up the room lamp inside the pump room.

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



PUMP DRIVE EMERGENCY SWITCH

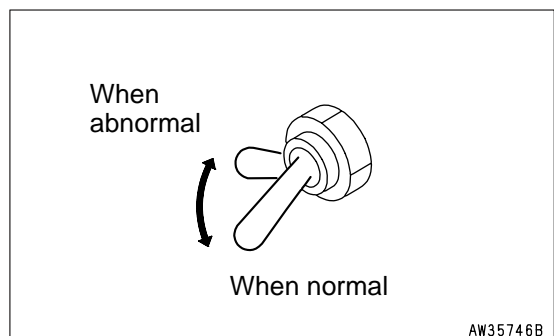
NOTICE

The emergency pump driving switch is provided to make it possible to carry out work for a short time when there is a failure in pump control system. It is necessary to repair the abnormal location as soon as possible.

This switch (23) enables operations to be carried out for a short time when an abnormality occurs in the pump control system (when display is E02).

- When normal: Switch is down
- When abnormal: Switch is up

If the display is E02 (TVC valve system error), operations become possible when this switch is switched up.



SWING HOLDING BRAKE REPLEASE SWITCH

NOTICE

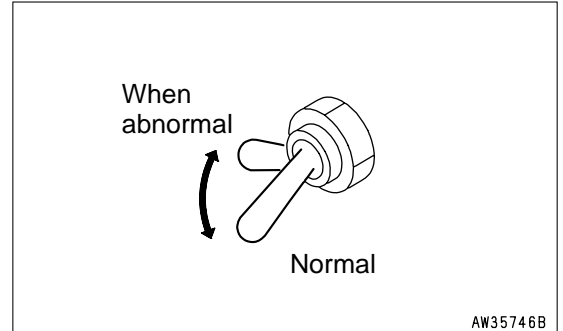
The swing holding brake release switch is provided to make it possible to carry out swing operations for a short time even when there is an abnormality in the swing brake electric system. It is necessary to repair the abnormality as soon as possible.

This switch (24) enables operations to be carried out for a short time when an abnormality occurs in the swing brake system (when display is E03).

When normal: Switch is down

When abnormal: Switch is up

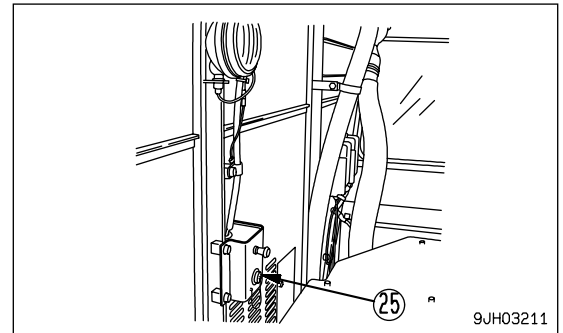
If the display is E03 (swing brake system error), operations become possible when this switch is switched up.



SPARE SOCKET

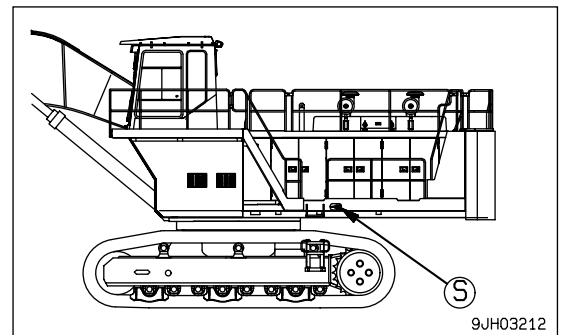
This socket (25) supplies 24V power. It can be used when inspecting or cleaning the machine.

It is installed inside the room under the cab.

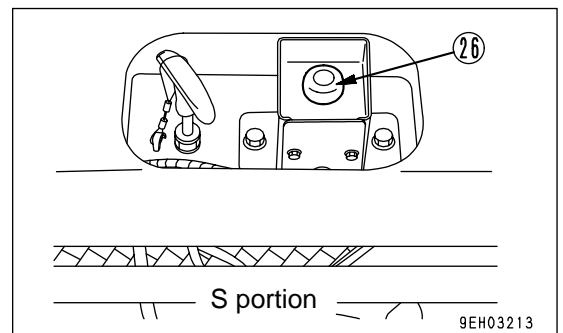


ENGINE EMERGENCY STOP SWITCH

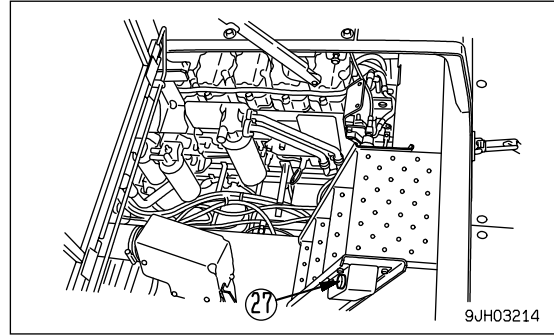
For details of engine stop switches (26) and (27) used in emergencies, see "STOPPING IN EMERGENCIES (PAGE 3-136)".



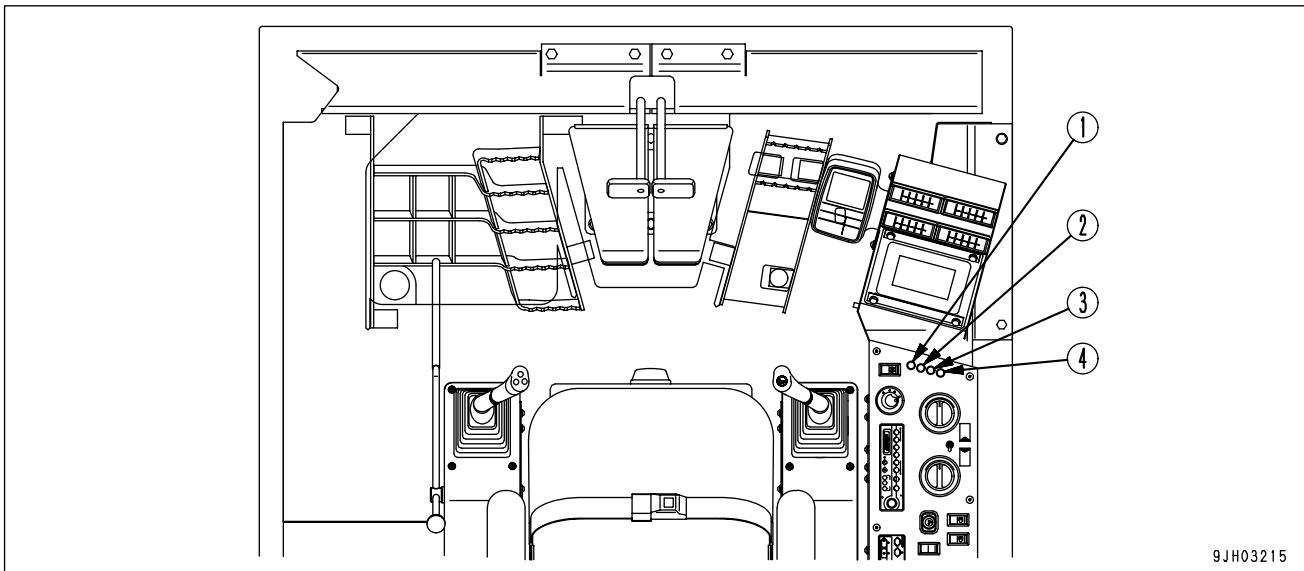
This switch (26) is at the side of the ladder (S portion) at the left side of the machine.



This switch (27) is at the side of the center ladder inside the engine room.



LAMP



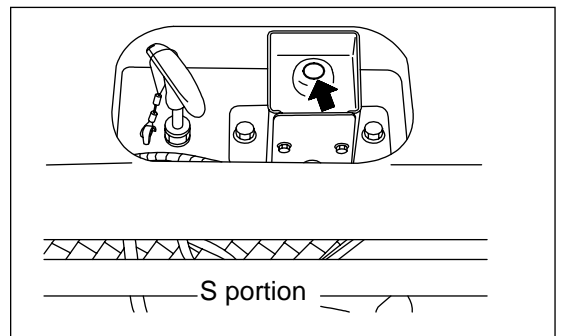
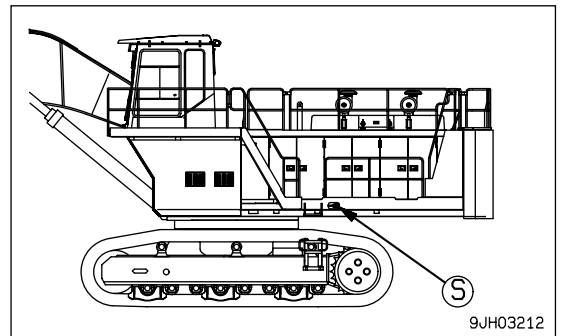
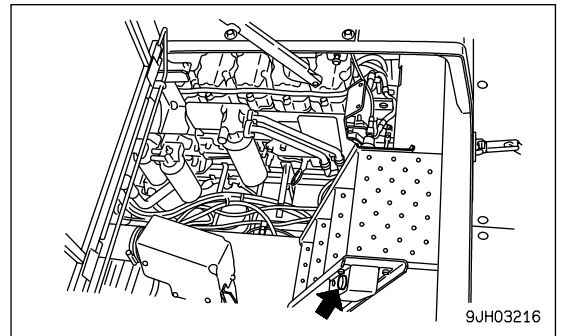
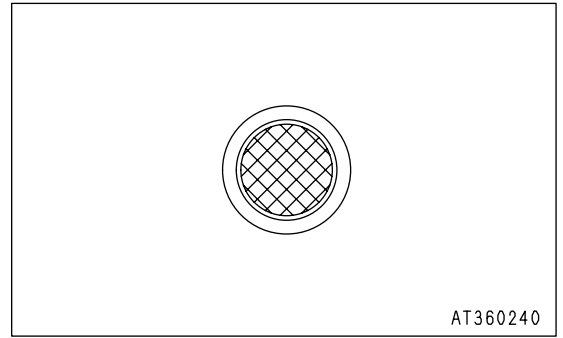
(1) Engine emergency stop lamp	(3) Ladder caution lamp (if equipped)
(2) Auto-greasing caution lamp (if equipped)	(4) Truck counter lamp

ENGINE EMERGENCY STOP LAMP

This lamp (1) lights up red when the engine stop switch at the side of the ladder at the left side of the machine is pressed ON or when the engine stop switch at the side of the center ladder inside the engine room is pressed ON. When the lamp lights up red, the engine will not start.

- To start the engine again, press the engine stop switch again to turn it OFF, then start the engine. When the starting switch is turned ON, if this lamp (1) is out, the engine can be started.

For details of the engine stop switches used in emergencies, see "STOPPING IN EMERGENCIES (PAGE 3-136)".



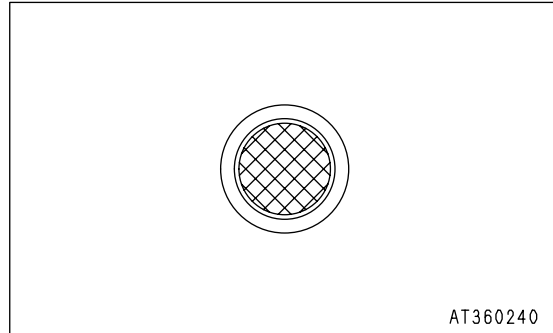
AUTO GREASING CAUTION LAMP

(If equipped)

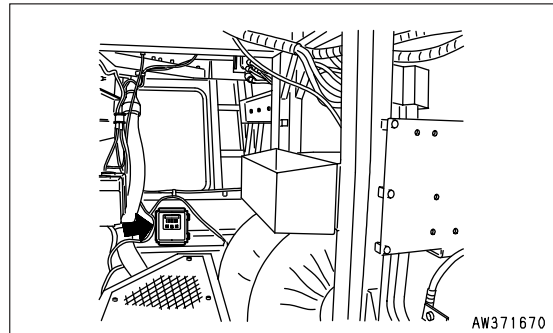
This lamp (2) lights up red when an abnormality occurs in the auto greasing system.

It is necessary to check the cause from the content of the display on the auto greasing controller inside the room under the cab and take action to remedy the problem.

Please contact your Komatsu distributor to have the system repaired.



After repairing, turn the auto greasing controller OFF. If the starting switch is turned OFF, the controller is also turned OFF.



Lamp	Controller display	Problem	Cause
Lights up	CONTROLLER REST FAILURE	Pump is actuated but pressure inside grease piping does not rise	<ul style="list-style-type: none"> ● Failure of pump ● Running empty ● Crack, leakage in grease piping
	VENT PRESSURE SW ALARM	Vent valve does not return, cannot charge injector again	<ul style="list-style-type: none"> ● Failure of vent valve ● Grease piping upstream from the injector crushed, clogged

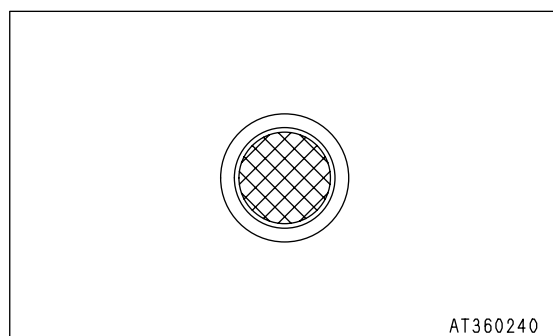
REMARK

- If the starting switch is left at the ON position with the engine not started, CONTROLLER REST FAILURE is displayed on the auto greasing controller display and the auto greasing caution lamp lights up, but this does not indicate any abnormality. When the starting switch is turned OFF, the condition returns to normal.
- For details of the auto greasing system, see "AUTO GREASING SYSTEM (PAGE 6-7)" in the OPTION section.

LADDER WARNING LAMP

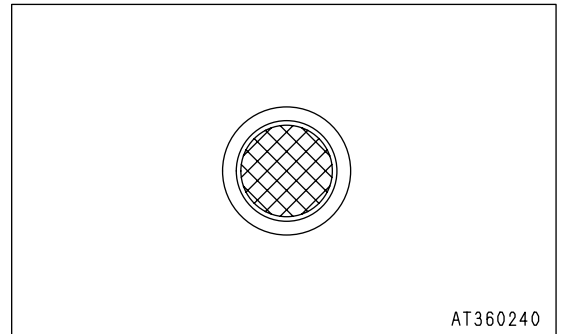
(If equipped)

This lamp (3) lights up red when the ladder is lowered. When the ladder is lowered, the swing brake is actuated, so even if the swing is operated, the upper structure will not swing. When the ladder is stowed away, the lamp goes out and it becomes possible to swing the upper structure.

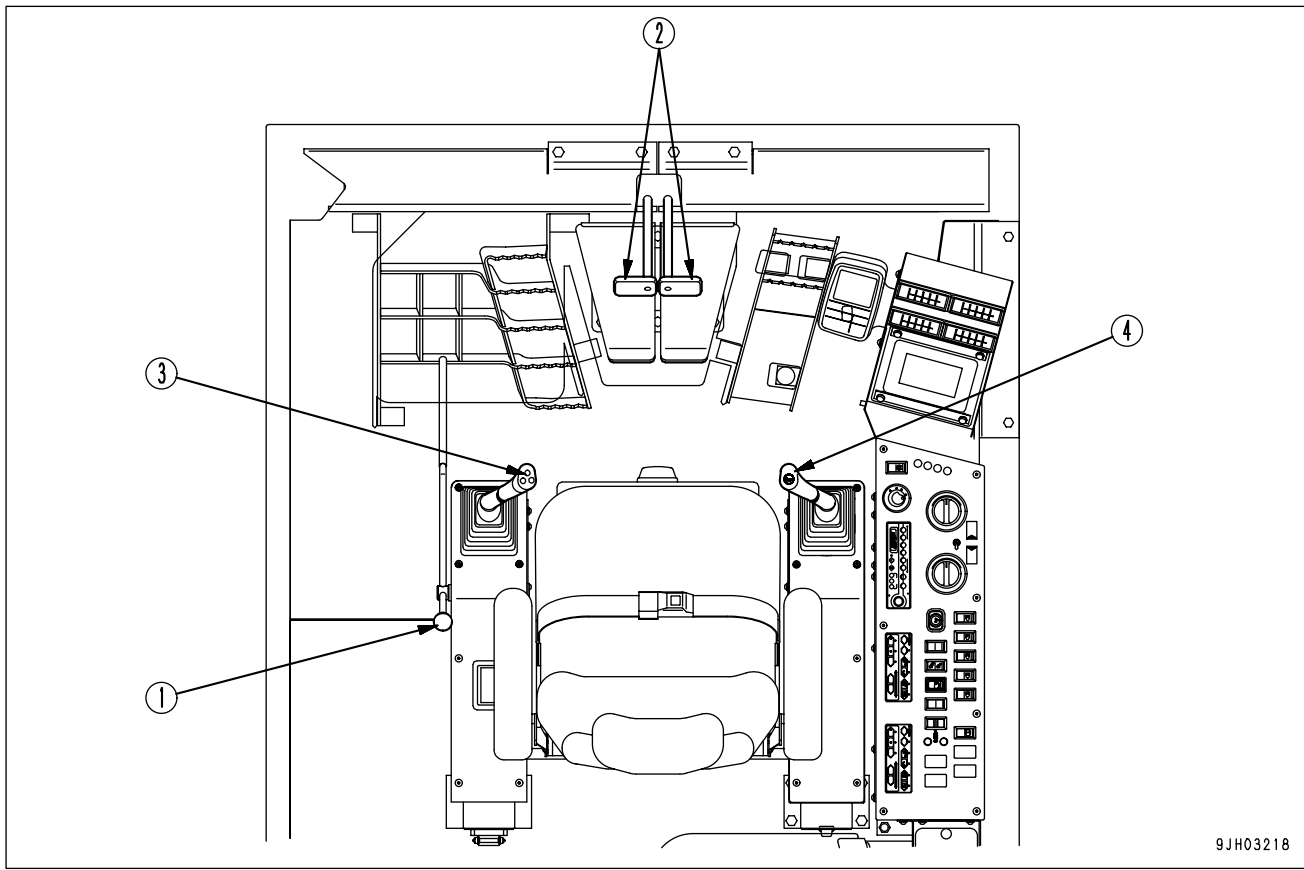


TRUCK COUNTER LAMP

Each time the truck counter switch on the left work equipment control lever is pressed, this lamp (4) flashes once (green) to inform the operator visually that the count has been made.



CONTROL LEVERS, PEDALS



(1) Safety lock lever

(3) Left work equipment control lever

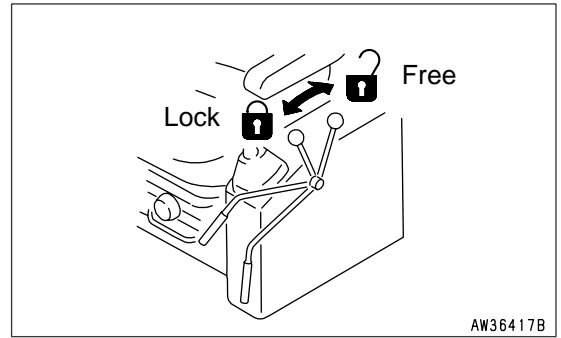
(2) Travel levers
(with pedal, auto-deceleration mechanism)

(4) Right work equipment control lever

SAFETY LOCK LEVER

⚠ WARNING

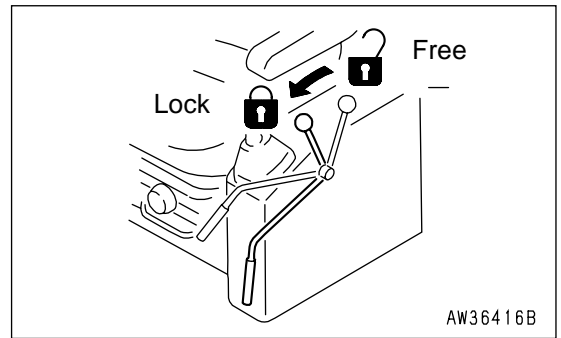
- When leaving the operator's compartment, set the safety lock lever securely to the LOCK position. If the safety lock lever is not at the LOCK position and the control levers are touched by mistake, it may lead to serious personal injury.
- If the safety lock lever is not placed securely at the LOCK position, the control lever may move and cause a serious accident or injury. Check that the condition of the lever is as shown in the diagram.
- When pulling the safety lock lever up, be careful not to touch the work equipment control lever.
- When pushing the safety lock lever down, be careful not to touch the work equipment control lever.



Lever (1) is a device to lock the work equipment, swing, travel, and attachment (if equipped) control levers.

Pull the lever up to apply the lock.

This lock lever is a hydraulic lock, so even if it is in the lock position, the work equipment control lever and travel lever will move, but the work equipment, travel motor, and swing motor will not work.

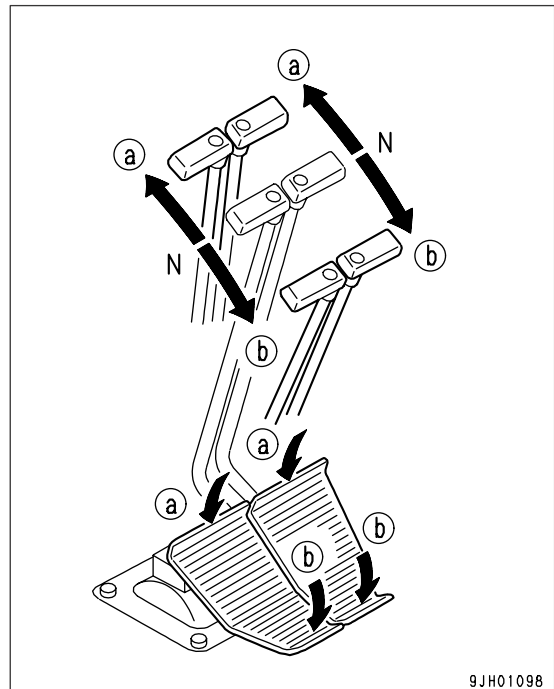


TRAVEL LEVERS

(WITH PEDAL, AUTO-DECELERATION MECHANISM)

⚠ WARNING

- Do not put your foot on the pedal unless the machine is traveling. If you leave your foot on the pedal and press it by mistake, the machine will move suddenly, and this may lead to a serious accident.
- With the track frame facing to the rear, the machine will move in the reverse direction by forward traveling and in the forward direction by reverse traveling. When the travel lever is used, check to see if the track frame is facing forward or backward. (If the sprocket is located to the rear, the track frame is facing forward.)
- Be extremely careful when using the pedal for operations and travel.



9JH01098

This lever (2) is used to switch the direction of travel of the machine. () shows the operation of the pedal.

(a) FORWARD:

The lever is pushed forward
(The pedal is angled forward)

(b) REVERSE:

The lever is pulled back
(The pedal is angled back)

N (Neutral): The machine stops

REMARK

- Machines equipped with travel alarm (If equipped)
If the lever is shifted to the advance or reverse position from the neutral position, the alarm sounds to warn that the machine is starting to advance.
- The travel lever can use the auto-deceleration mechanism to change the engine speed as follows.
- When the travel lever and work equipment control levers are at the neutral position, even if the fuel control dial is above midrange speed, the engine speed will go down to a midrange speed. If one of these levers is operated, the engine speed will rise to the speed set by the fuel control dial.
- If all the control levers are at the neutral position, the engine speed goes down approx. 100 rpm, then after approx. 4 seconds, the engine speed goes down to the deceleration speed (approx. 1400 rpm).

WORK EQUIPMENT CONTROL LEVER

(WITH AUTO-DECELERATION MECHANISM)

⚠ WARNING

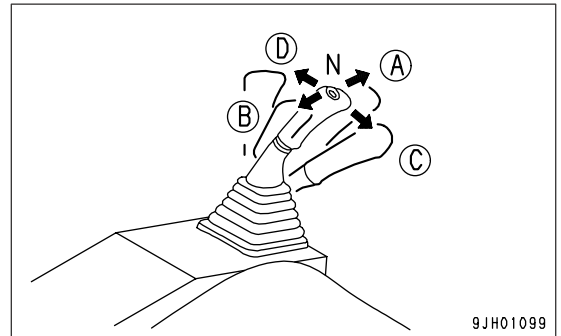
If any lever is operated when in the deceleration range, the engine speed will suddenly increase, so be careful when operating the levers.

This Left work equipment control lever (3) is used to operate the arm and upper structure.

Arm operation / Swing operation

- (A) Arm OUT
- (B) Arm IN
- (C) Swing to right
- (D) Swing to left

N (Neutral): The upper structure and arm are held in position and do not move.

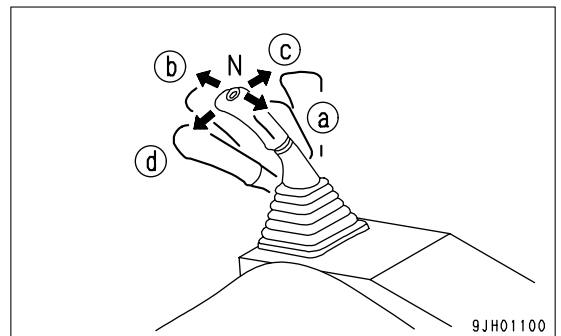


This Right work equipment control lever (4) is used to operate the boom and bucket.

Boom operation / Bucket operation

- (a) RAISE
- (b) LOWER
- (c) DUMP
- (d) CURL

N (Neutral): The boom and bucket are held in position and do not move.



For levers (2), (3) and (4), the engine speed changes as follows because of the auto-deceleration mechanism.

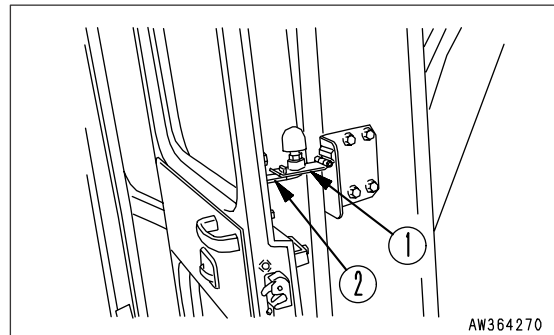
When the travel lever and work equipment control levers are at the neutral position, even if the fuel control dial is above midrange speed, the engine speed will go down to a midrange speed. If one of these levers is operated, the engine speed will rise to the speed set by the fuel control dial.

If all the control levers are at the neutral position, the engine speed goes down approx. 100 rpm, then after approx. 4 seconds, the engine speed goes down to the deceleration speed (approx. 1400 rpm).

DOOR LOCK

Use the door lock to fix the door in position after opening it.

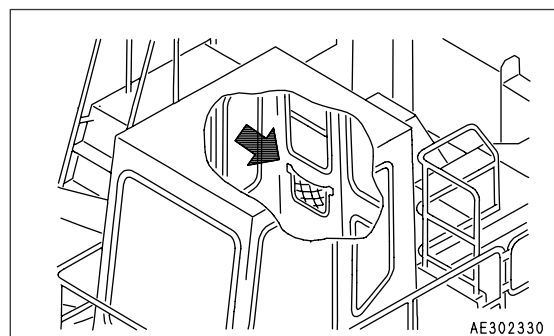
1. Hook lock (1) to portion (2) to hold the door in position.
2. When opening the door, lift lock (1) up slightly and remove it from portion (2).
When fixing the door, fix it firmly to the catch.



POCKET

Behind the operator's seat

Ordinarily, operation manual should be stored in this pocket, and able to read the manual every time.

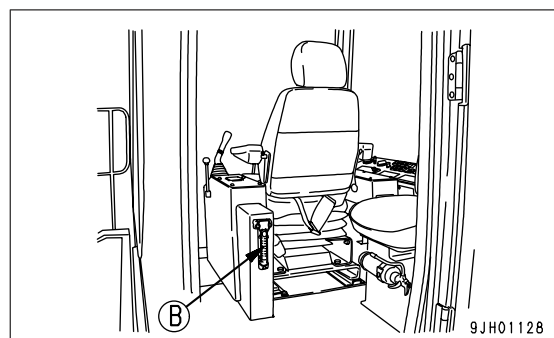


EMERGENCY ESCAPE HAMMER

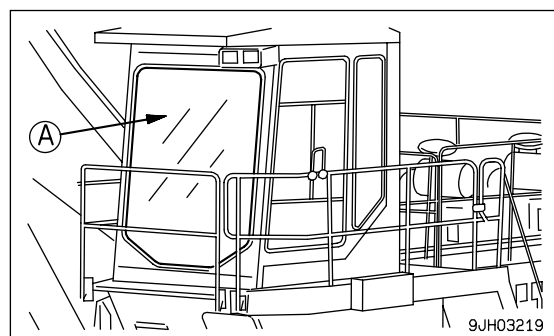
NOTICE

When escaping, remove the broken pieces of the glass from the sash so that you will not cut yourself with them. Take care not to slip on the broken and scattered pieces.

In case it becomes impossible to open the door, a hammer (B) to be used for escape from the cab is installed.

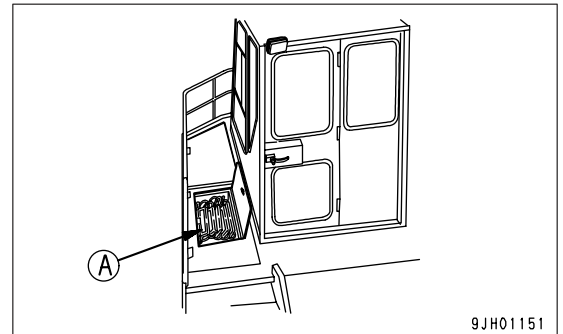


When escaping, break the window glass (A) with hammer (B).

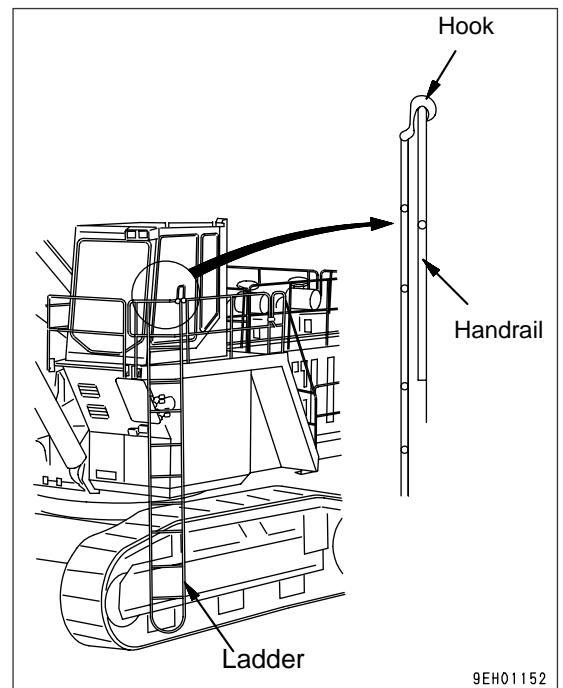


EMERGENCY ESCAPE LADDER

There is a rope ladder in the box (A) by the passage of the left side of the operator's compartment. Use it for escape in emergencies.



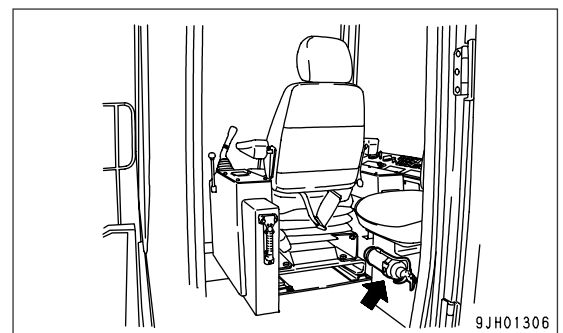
When using the ladder to escape, fit the hooks at the end of the ladder to the handrail, then lower the ladder. Check that the condition of the ladder is normal before going down it.



FIRE EXTINGUISHER

This is installed at the front under the assistant's seat.

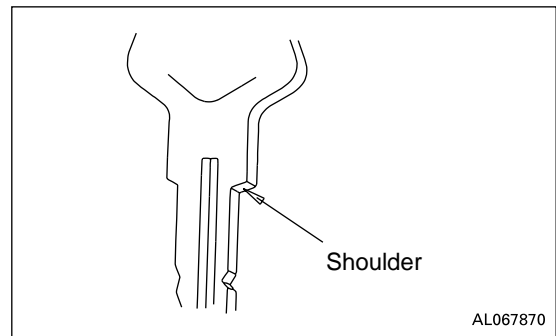
Details of the method of using the fire extinguisher are printed on the nameplate attached to the fire extinguisher. To prepare for any possible emergency, make sure that you read and understand the method of use beforehand.



CAP, COVER WITH LOCK

Locks are fitted to the fuel tank filler, hydraulic tank filler, operator's cab, engine hood, battery box cover, right side door of the machine, and left side door of the machine. Use the starting key to open and close the caps, doors and covers.

Insert the key as far as it will go, then turn it. If the key is turned before it is inserted fully, it may break.



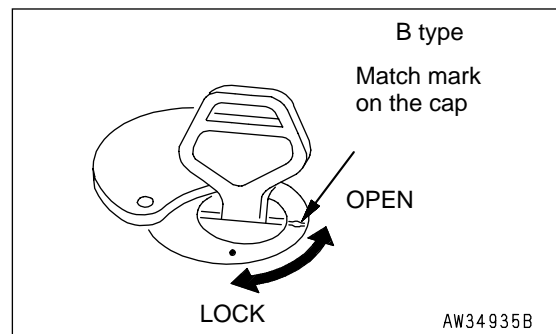
METHOD OF OPENING AND CLOSING CAP WITH LOCK

When opening

1. Insert the key into the key slot.
2. Turn the key counterclockwise, align the key slot with the match mark on the cap, then open the cap.

When locking

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



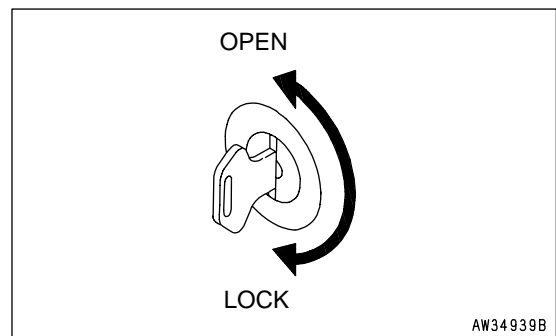
METHOD OF OPENING AND CLOSING COVER WITH LOCK

To open the cover (locked cover)

1. Insert the key into the key slot.
2. Turn the key counterclockwise and open the cover by pulling the cover grip.

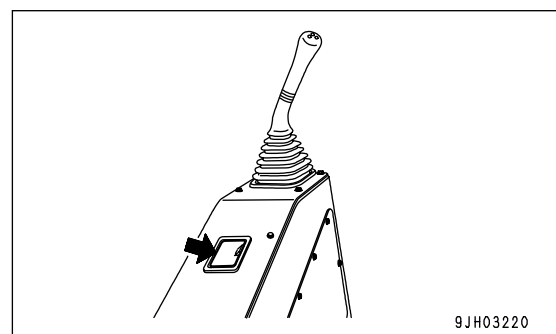
To lock the cover

1. Close the cover and insert the key into the key slot.
2. Turn the key clockwise and take the key out.



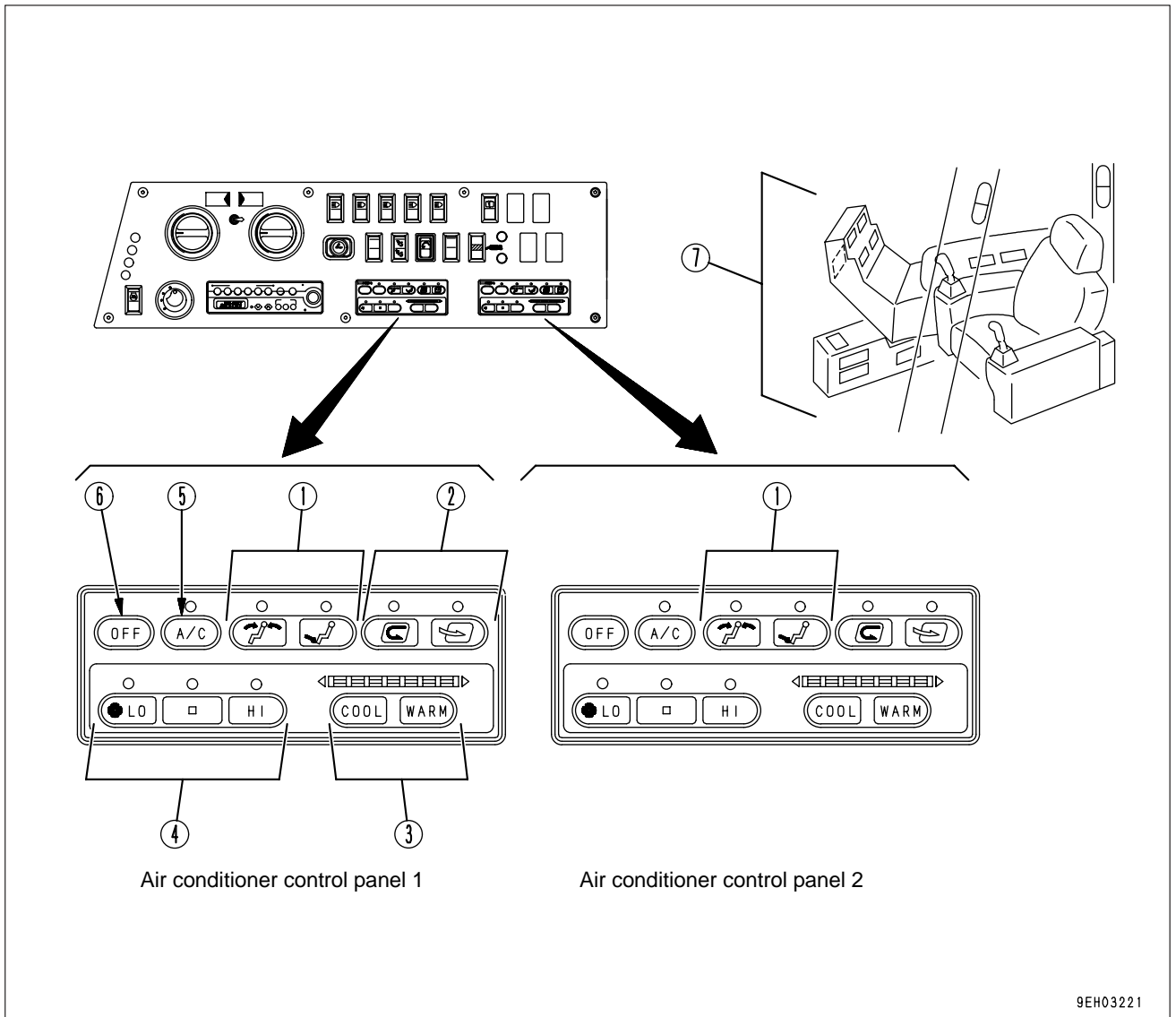
ASHTRAY

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



HANDLING AIR CONDITIONER

GENERAL LOCATIONS OF CONTROL PANEL



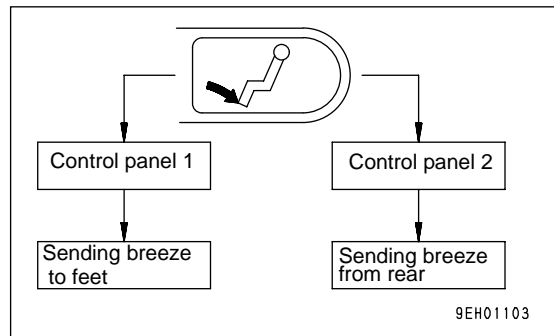
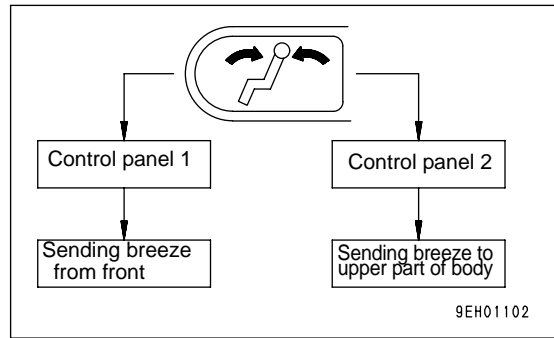
9EH03221

(1) Vent selector switch (Sending breeze from front or feet)	(3) Temperature control switch (Cooling)
	(3) Temperature control switch (Heating)
(1) Vent selector switch (Sending breeze to upper part of body or rear)	(4) Air flow selector switch (Low)
	(4) Air flow selector switch (Medium)
	(4) Air flow selector switch (High)
(2) Air circulation selector switch (Internal air circulation)	(5) Air conditioner switch
	(6) Off switch
(2) Air circulation selector switch (External air circulation)	(7) Defroster selector lever

When the function of the switch is actuated, the pilot lamp for the switch lights up.

VENT SELECTOR SWITCH

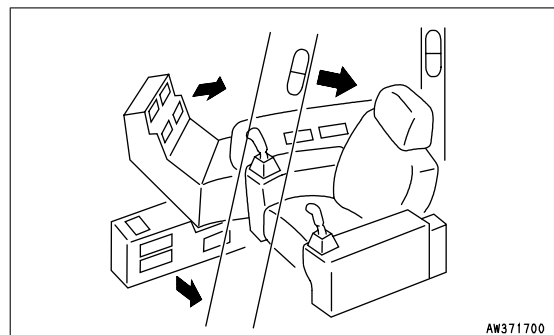
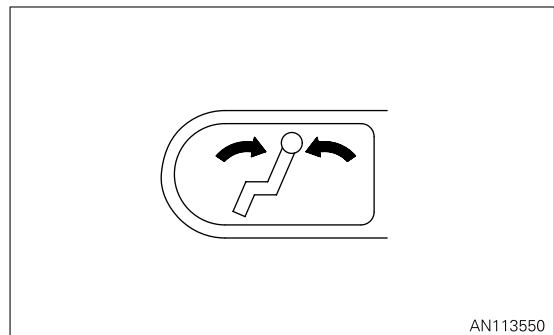
The direction of the airflow is different for this switch (1) depending on whether it is operated on air conditioner control panel 1 or on air conditioner control panel 2. Use differently or together according to the needs.



WHEN OPERATING AIR CONDITIONER PANEL 1

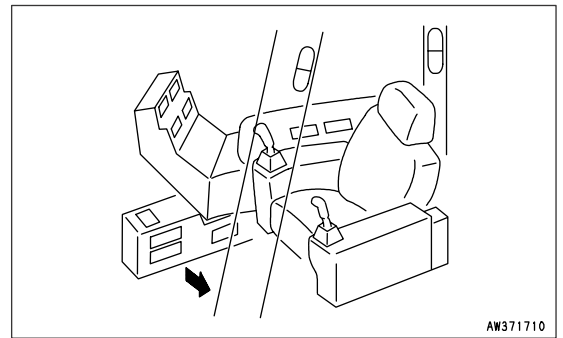
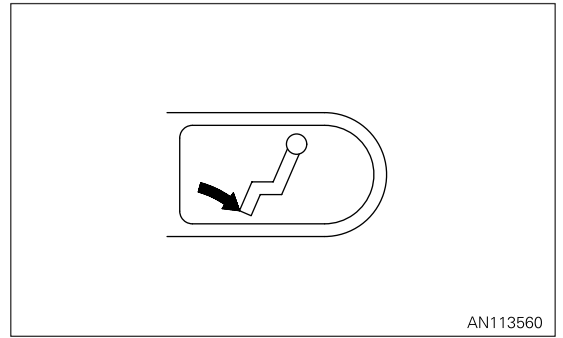
Vent selector switch (wind flow from front)

When this switch (1) is pressed, the wind flow from the air conditioner all blows out from the front.



Vent selector switch (wind flow to feet)

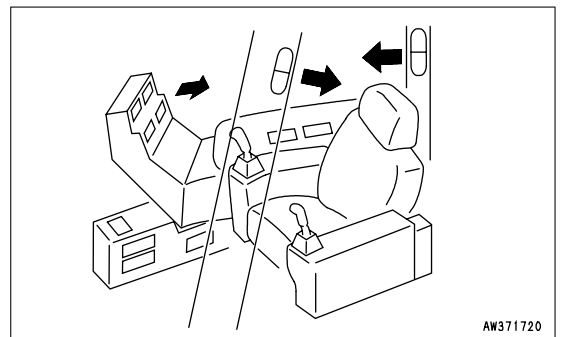
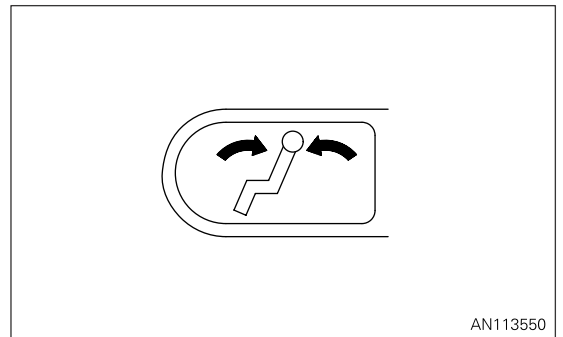
When this switch (1) is pressed, the wind flow from the air conditioner all blows out to the feet.



WHEN OPERATING AIR CONDITIONER PANEL 2

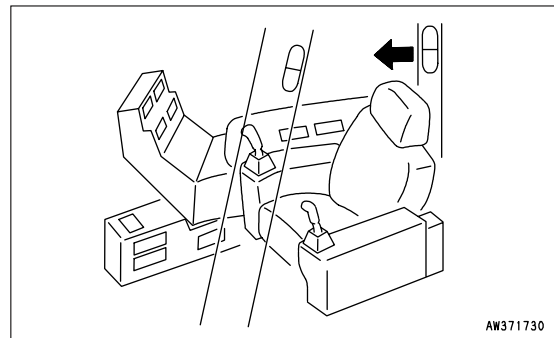
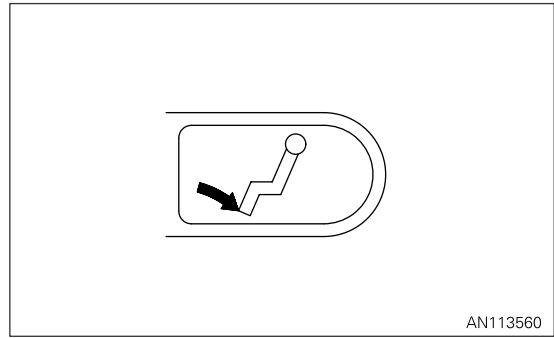
Vent selector switch (wind flow to face)

When this switch (1) is pressed, the wind flow from the air conditioner all blows out to the face.



Vent selector switch (wind flow from rear)

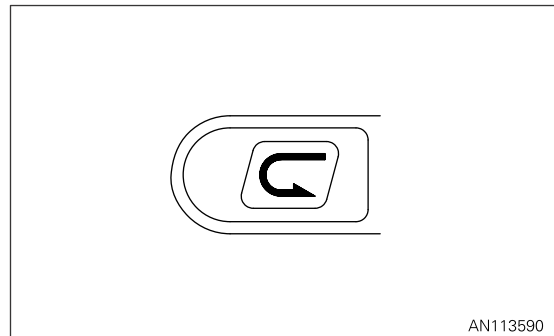
When this switch (1) is pressed, the wind flow from the air conditioner all blows out from the rear.



AIR CIRCULATION SELECTOR SWITCH (INTERNAL AIR CIRCULATION)

(Air conditioner control panel 1 and 2 the same)

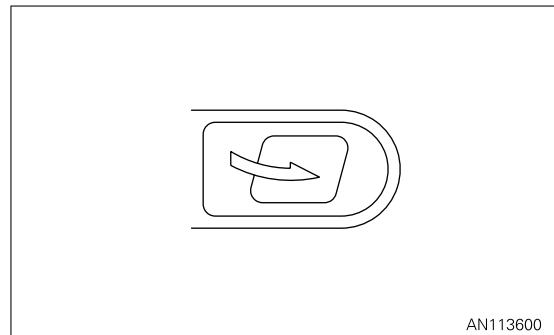
When switch (2) is pressed, the air inside the cab is recirculated and no fresh air is taken in from outside. This position is used when heating or cooling the cab quickly or when the outside air is dirty.



AIR CIRCULATION SELECTOR SWITCH (EXTERNAL AIR CIRCULATION)

(Air conditioner control panel 1 and 2 the same)

When switch (2) is pressed, fresh air is taken into the cab during heating or cooling. This position is used to bring in clean fresh air into the cab or to remove the mist from the cab windows.

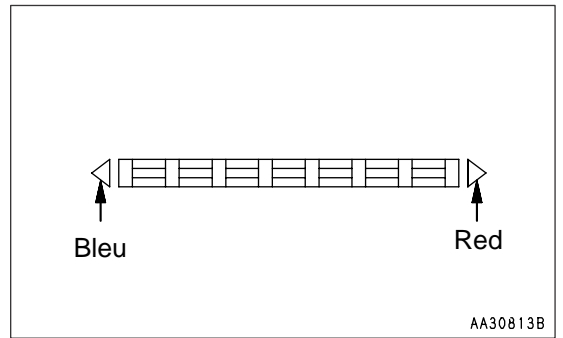


TEMPERATURE CONTROL SWITCH (COOLING)

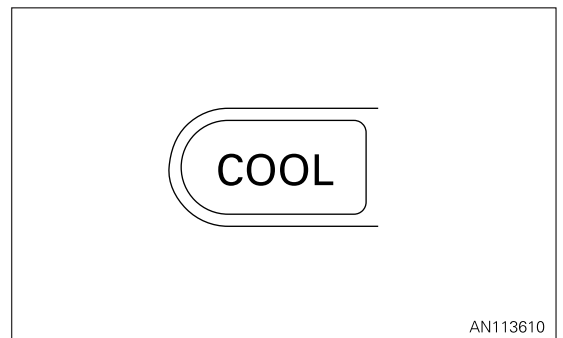
(Air conditioner control panel 1 and 2 the same)

The more the indicator is in the blue range, the lower the temperature is; the more the indicator is in the red range, the higher the temperature is.

The indicator range is divided into 7 levels, but within each range the temperature changes steplessly.



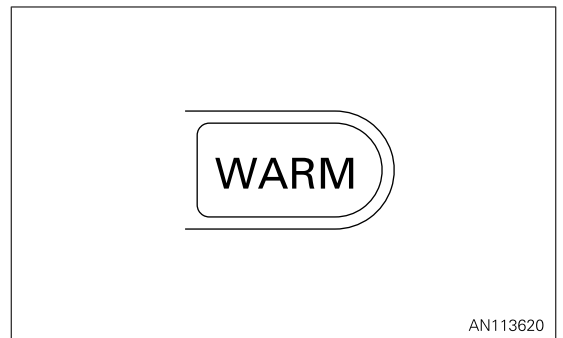
Use switch (3) to reduce the temperature.
 Press this switch to reduce the temperature of the air sent from the air conditioner.
 The lower the temperature becomes, the further the indicator moves into the blue range.



TEMPERATURE CONTROL SWITCH (HEATING)

(Air conditioner control panel 1 and 2 the same)

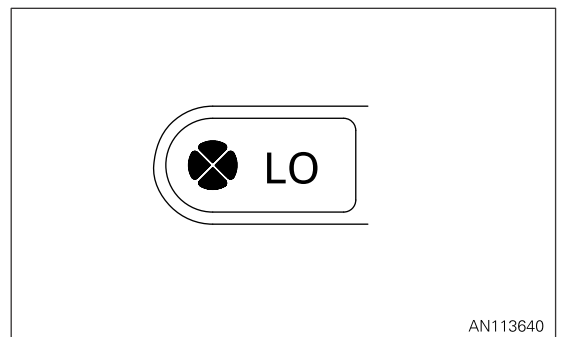
Use switch (3) to increase the temperature.
 Press this switch to increase the temperature of the air sent from the air conditioner.
 The higher the temperature becomes, the further the indicator moves into the red range.



AIR FLOW SELECTOR SWITCH (LOW)

(Air conditioner control panel 1 and 2 the same)

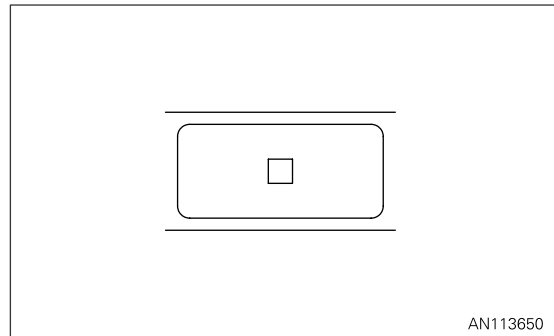
This switch (4) is used to adjust the air flow blowing out from the air conditioner. When this switch is pressed, the air conditioner is set to LOW, the smallest of the three levels of air flow.



AIR FLOW SELECTOR SWITCH (MEDIUM)

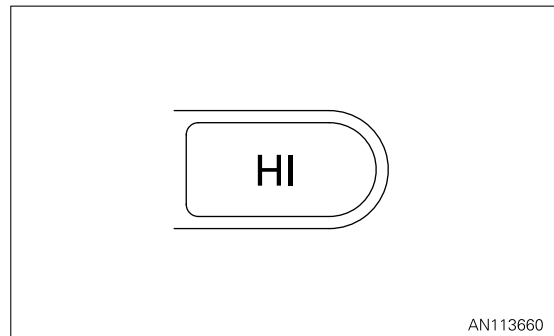
(Air conditioner control panel 1 and 2 the same)

This switch (4) is used to adjust the air flow blowing out from the air conditioner. When this switch is pressed, the air conditioner is set to MID, the middle of the three levels of air flow.

**AIR FLOW SELECTOR SWITCH (HIGH)**

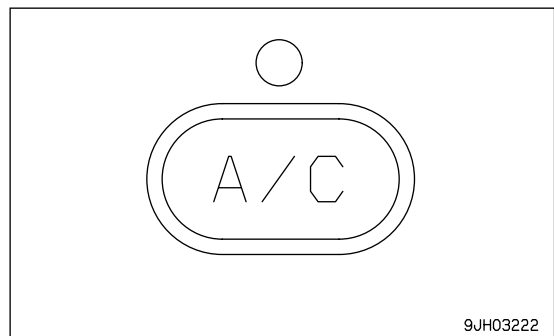
(Air conditioner control panel 1 and 2 the same)

This switch (4) is used to adjust the air flow blowing out from the air conditioner. When this switch is pressed, the air conditioner is set to HIGH, the largest of the three levels of air flow.

**AIR CONDITIONER SWITCH**

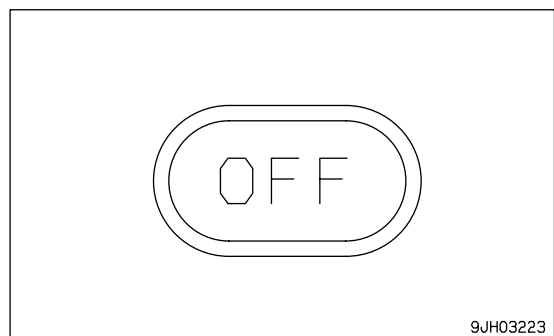
(Air conditioner control panel 1 and 2 the same)

This switch (5) is used to switch the air conditioner ON/OFF.

**OFF SWITCH**

(Air conditioner control panel 1 and 2 the same)

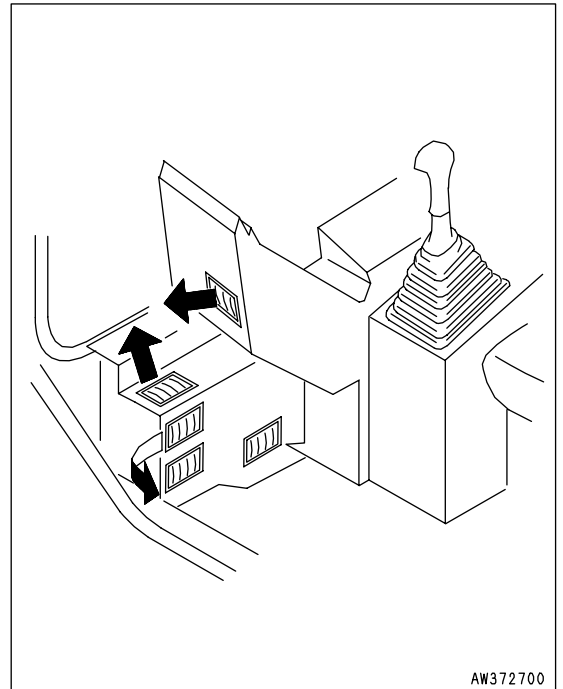
This switch (6) is use to stop the fan.



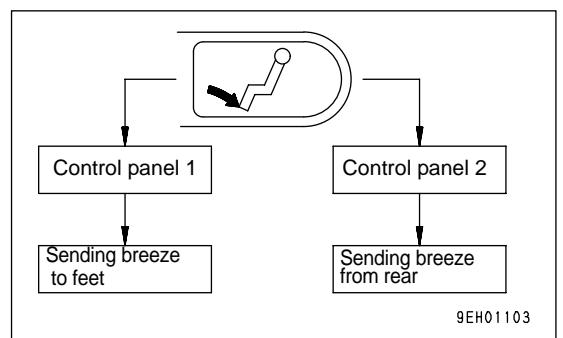
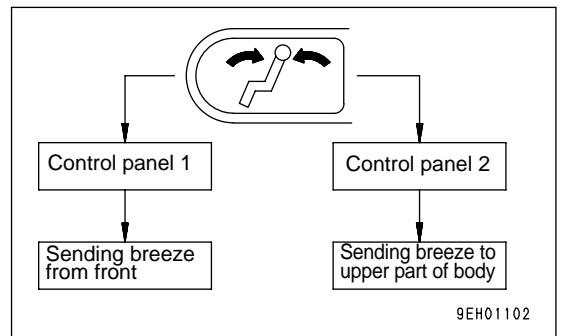
DEFROSTER

Use this defroster (7) to remove the mist from the front glass in rainy weather.

- Open the defroster vents and direct them to the front glass. (For normal operations, keep the defroster vents closed.)
- To remove the mist quickly, close the other vents.



- It is possible to use the defroster when the vent selection on air conditioner control panel 1 sends the wind flow to the feet and when the vent selection on air conditioner control panel 2 sends the wind flow to the face.



USE AIR CONDITIONER WITH CARE

Ventilation

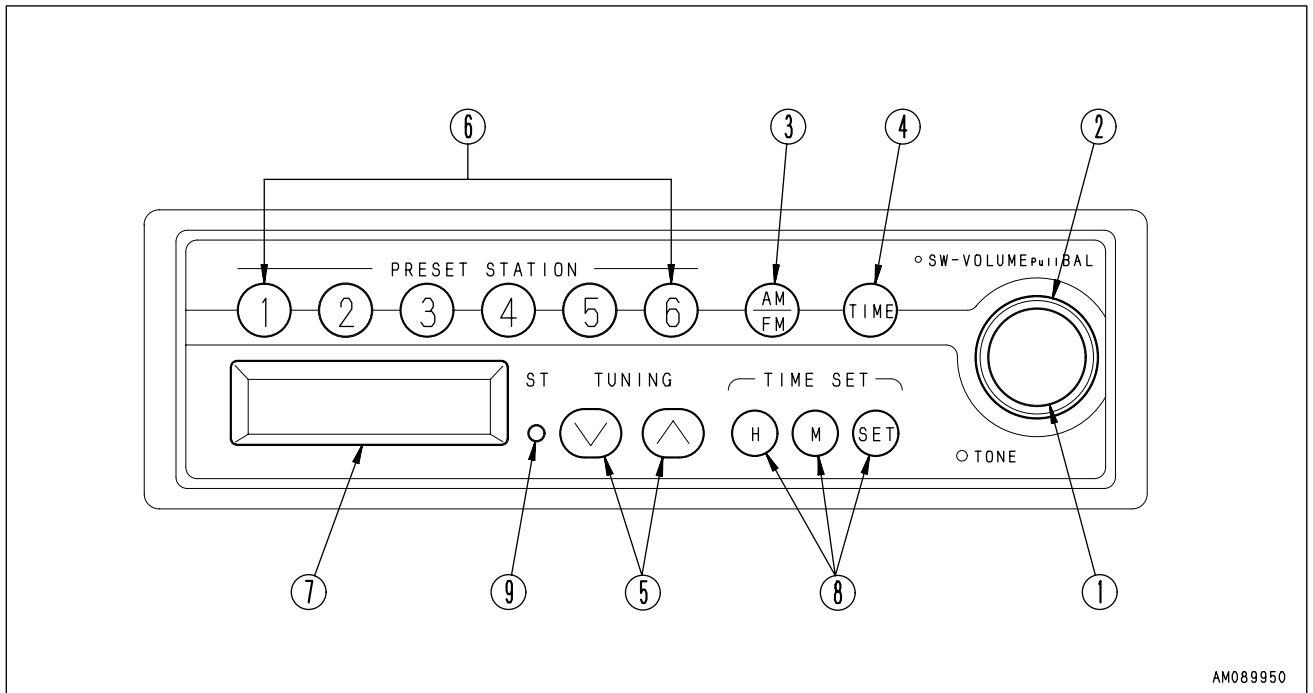
- If you smoke when the cooler is on, the smoke may start to hurt your eyes, so turn the lever to FRESH to remove the smoke while continuing the cooling.
- When running the air conditioner for a long time, turn the lever to the FRESH position once an hour to carry out ventilation and cooling.

Temperature control

- When the cooler is on, set the temperature so that it feels slightly cool when entering the cab (5 – 6°C lower than the outside temperature). This temperature difference is considered to be the most suitable for your health, always be careful to adjust the temperature properly.

CAR RADIO

EXPLANATION OF COMPONENTS



(1) Power switch/volume control (SW-VOLUME) and balance (Pull BAL) knob	(6) Preset station buttons (1, 2, 3, 4, 5, 6)
(2) Tone control knob (TONE)	(7) Display
(3) FM/AM selection button (AM/FM)	(8) Time reset button
(4) Display selection button (TIME)	(9) Stereo indicator (ST)
(5) Tuning button (TUNING) manual tuning (MANUAL)	

POWER SWITCH/VOLUME CONTROL (SW-VOLUME) AND BALANCE (PULL BAL) KNOB

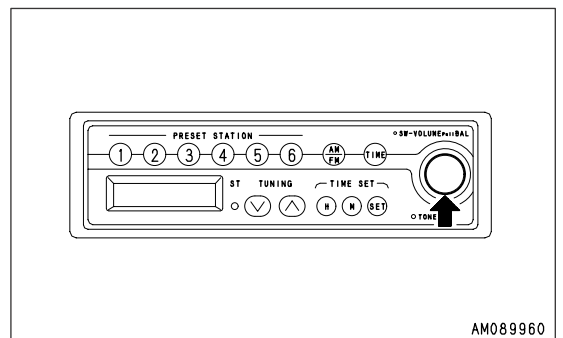
When this knob (1) is pressed, the power for the radio is turned on and the display shows the frequency. If the knob is pressed again, the power is switched off.

Turn the knob to the right to increase the volume; turn the knob to the left to reduce the volume. Pull the knob out to the lock position and turn it to adjust the balance between the left and right speakers.

Turn it to the right to increase the sound from the right speaker; turn it to the left to increase the sound from the left speaker.

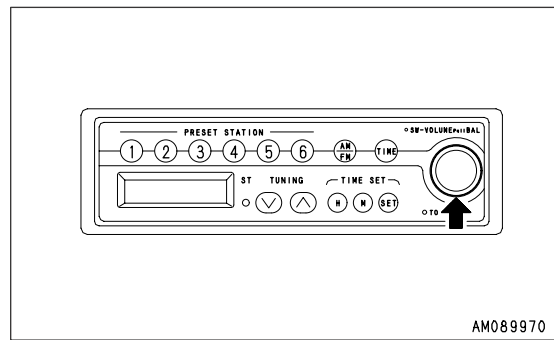
After adjusting the left and right balance, push the knob lightly to return it to its original position.

(If the knob is left pulled out, the volume cannot be adjusted.)



TONE CONTROL KNOB (TONE)

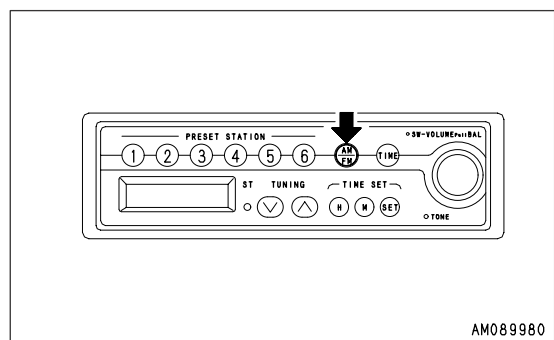
If this knob (2) is turned to the right from the center position, the high tone is emphasized; if it is turned to the left, the high tone is reduced.



FM/AM SELECTION BUTTON (AM/FM)

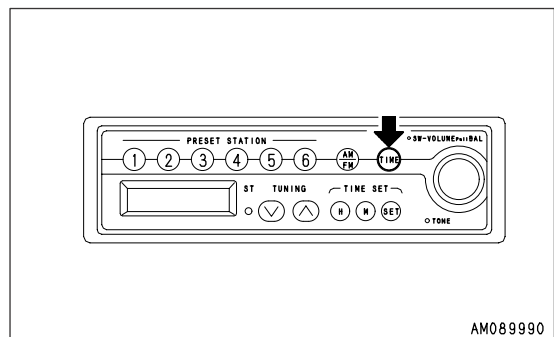
Press this button (3) and select the desired band.

Each time the button is pressed, it switches AM → FM → AM...



DISPLAY SELECTION BUTTON (TIME)

This equipment gives priority to the frequency display. If the button (4) is pressed when the frequency is displayed, display will give the present time for 5 seconds. After 5 seconds pass, the display will automatically return to the frequency display. If any button other than TIME SET (H, M, SET) is pressed within the 5 seconds, the display will return to the frequency display.

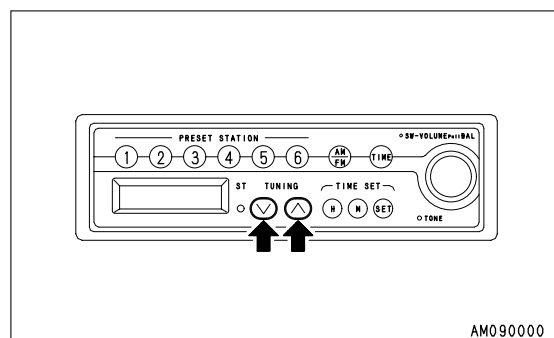


TUNING BUTTON (TUNING) MANUAL TUNING (MANUAL)

Press this button (5) to change the frequency.

Each time the UP button (^) is pressed, the frequency will go up (FM: 0.1 MHz; AM: 9 kHz)

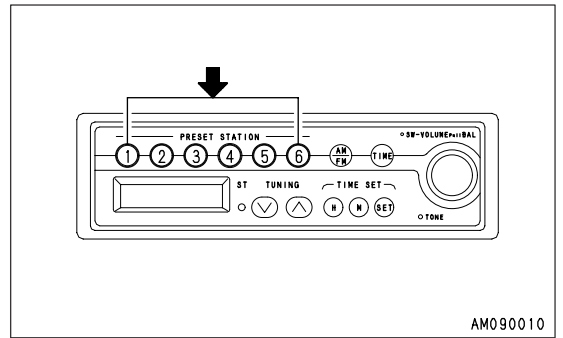
Each time the DOWN button (v) is pressed, the frequency will go down (FM: 0.1 MHz; AM: 9 kHz)



PRESET STATION BUTTONS (1, 2, 3, 4, 5, 6)

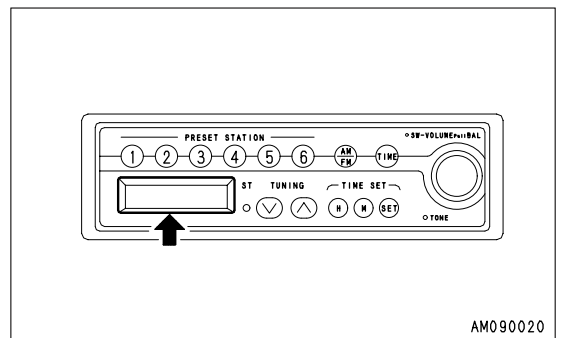
If this button (6) is preset to the desired station, the station can be selected at a touch.

For details of the methods of presetting, see "CONTROLS OF RADIO (PAGE 3-90)".



DISPLAY

This display (7) shows the reception band, frequency, preset No., and time.



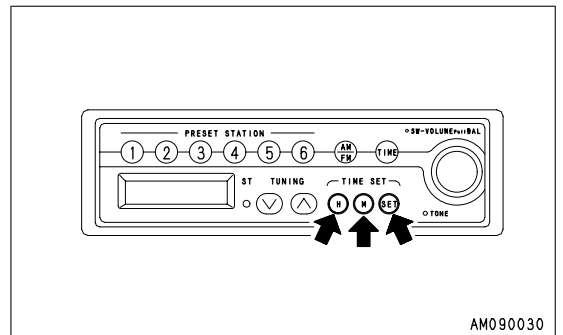
TIME RESET BUTTON

This button (8) is used to correct the time.

H: Hour

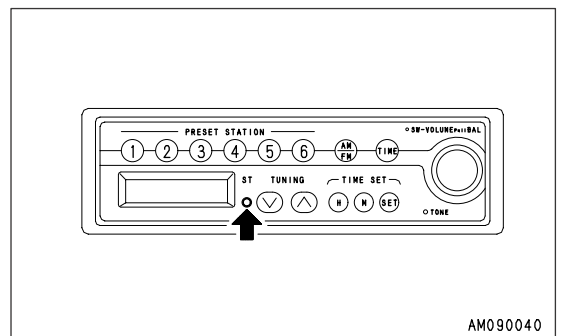
M: Minute

SET: Sets to start of hour (00 minutes)



STEREO INDICATOR (ST)

This indicator (9) lights up when a stereo broadcast is received from the FM station.

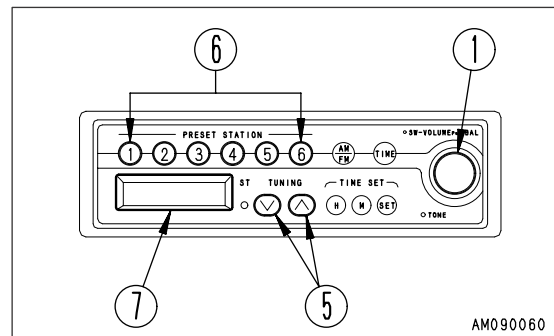


CONTROLS OF RADIO

PRESET STATION BUTTONS

1. Press power switch (1) and display the frequency on display (7).
2. Turn the tuning button (5) (manual, auto) to adjust to the desired frequency.
3. Select a preset button to use for recording the frequency setting, and keep that button pressed for at least 1.5 seconds. The sound will disappear, but when the setting is recorded, the sound will appear and the preset number will appear on display (7) to show that the station has been preset.

After completion of presetting, press preset button (6), and release it within approx. 1.5 seconds. The setting will change to the frequency of the broadcasting station recorded for that button. One AM station and one FM station can be recorded for each preset button.



MANUAL TUNING

Press tuning button (5) and set to the desired frequency.

Each time the button is pressed, the frequency will move up or down in steps of 9 kHz (AM) or 0.1 MHz (FM).

∨ button: Move to a higher frequency station

∧ button: Move to a lower frequency station

- If the frequency reaches the top or bottom limit, it will automatically change as follows: top limit → bottom limit, or bottom limit ← top limit

AUTOMATIC TUNING

Keep tuning button (5) pressed for at least 0.5 seconds. When a broadcasting station is picked up, it will automatically stop. To search for the next station, press tuning button (5) again for at least 0.5 seconds.

∨ button: Move to a higher frequency station

∧ button: Move to a lower frequency station

- If tuning button (5) is pressed during auto tuning, the auto tuning will be canceled and the frequency at the point where it is canceled will be picked up.

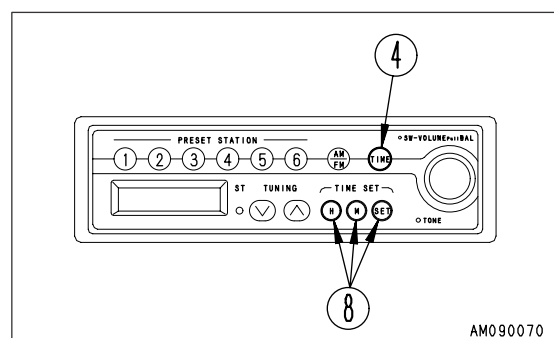
SETTING CORRECT TIME

1. Press display selector button (4) to display the time. After 5 seconds, the display will return to the frequency display and the time cannot be corrected. If this happens, press display selector button (4) again.
2. Press time adjustment button (8) and adjust the hour and minute.

H button: Adjusts hour (advances one hour each time it is pressed)

M button: Adjusts minute (advances one minute each time it is pressed)

If the H or M button are kept pressed, the time will advance continuously until the button is released.



SET button: Sets to start of hour (when it is pressed, the minute returns to 00)

If the minute display is between 0 and 05, and the SET button is pressed, the minute reading will return to 00. If it is pressed when the minute display is between 55 and 59, the minute display will return to 00 and the hour will advance by 1. If the minute display is between 06 to 54, can not adjust.

Example

10:05 → 10:00

10:59 → 11:00

10:26 → 10:26

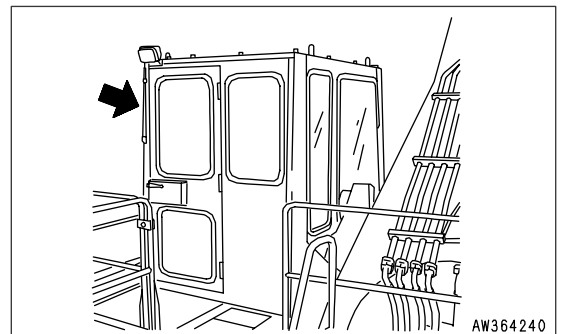
Press the H, M, and SET buttons to set to the correct time.

ANTENNA

NOTICE

Before transporting the machine or putting it inside a building, remove the antenna to prevent any interference.

In areas where the reception is weak or there is interference, extend the antenna. If the radio is set to a station with strong radio waves, retract the antenna to set to a weaker input.



USE RADIO WITH CARE

- To ensure safety, always keep the sound to a level where it is possible to hear outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to an unexpected failure, so be careful not to get water on the equipment.
- Do not wipe the scales or buttons with benzene, thinner, or any other solvent. Wipe with a soft dry cloth. Use a cloth soaked in alcohol if the equipment is extremely dirty.
- When the battery is replaced, the settings for the preset buttons are all cleared, so set again.

AUXILIARY ELECTRIC POWER

NOTICE

**Do not use as a power supply for 12V equipment.
This will cause failure of the equipment.**

It is possible to remove the cigarette lighter and use the socket as a power supply.

Capacity of cigarette lighter: 85W (24V x 3.5A)

FUSE

(Installed inside cab)

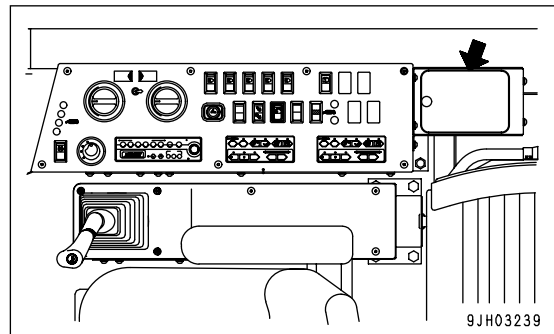
NOTICE

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

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

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

Replace the fuse with another of the same capacity.



CIRCUIT BREAKER

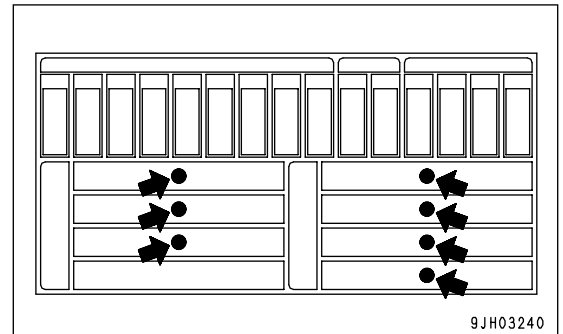
CIRCUIT BREAKER (20A)

(Installed inside cab)

The circuit breaker forms one unit with the fuse box.

The circuit breaker shuts off the electrical circuit when there is a surge in the current, and acts to protect the electrical equipment and wiring from burning out. To reset the electrical circuit after the circuit breaker has been actuated, push in the reset button that came out when the circuit was shut off.

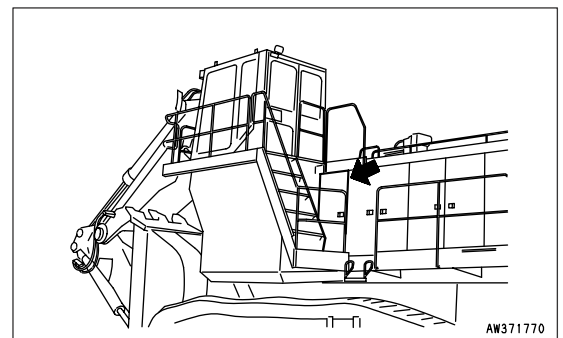
If the electrical circuit is working normally, the reset button will stay pushed in. If it comes out again immediately after being pushed in, the electrical circuit must be checked.



CIRCUIT-BREAKER (40A)

(Installed outside cab)

If the engine does not start even when the starting switch is turned to the ON position, the electrical circuit has probably been cut by the circuit breaker. Open the side door closest to the front of the machine on the left side and check the breaker button under the battery.

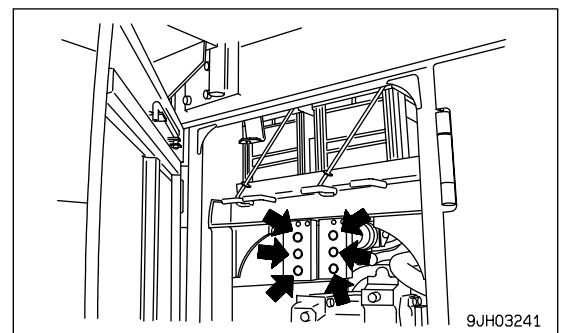


If the button is protruding, push it in.

If the electrical circuit is working normally, the button will stay pushed in. If it springs out immediately after it is pushed in, it is necessary to check the electrical circuit.

REMARK

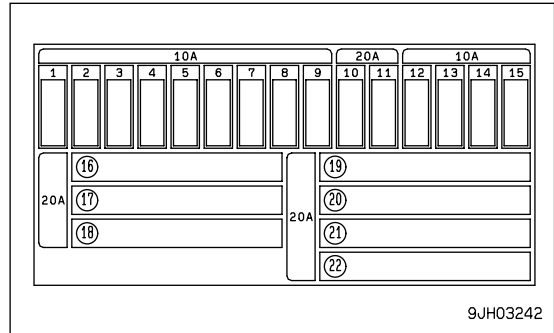
A circuit-breaker refers to the large-sized fuse breaker installed in the high current flow portion of the circuit to protect electrical components and wiring from burning, similarly to an ordinary fuse.



FUSE, CIRCUIT BREAKER CAPACITY AND NAME OF CIRCUIT

(Installed inside cab. (1) – (15): Fuse, (16) – (22): Circuit breaker)

No.	Fuse capacity	Circuit name
1	10A	Radio, Cigarette lighter
2	10A	Work lamp
3	10A	Fog lamp (left: if equipped) Rotating lamp (if equipped)
4	10A	Fog lamp (right: if equipped)
5	10A	Wiper
6	10A	Greasing, machine push up, boom shockless
7	10A	Engine room lamp, pump room lamp, cab base room lamp
8	10A	Work controller (L/S), bottom dump solenoid (L/S)
9	10A	Spare
10	20A	Front air conditioner
11	20A	Rear air conditioner
12	10A	Horn, air suspension seat
13	10A	Cab room lamp, step lamp
14	10A	Spare
15	10A	Spare
16	20A	Monitor panel, radio, VHMS (back up)
17	20A	CGC monitor, pump drive emergency switch, swing holding brake release switch, VHMS
18	20A	Head lamp (left), head lamp (right)
19	20A	Key switch, F/R engine controller (ECU)
20	20A	Key on signal, pump controller
21	20A	Head lamp, lamp relay, boom lamp (right), preheat signal
22	20A	F/R engine controller (EDU)

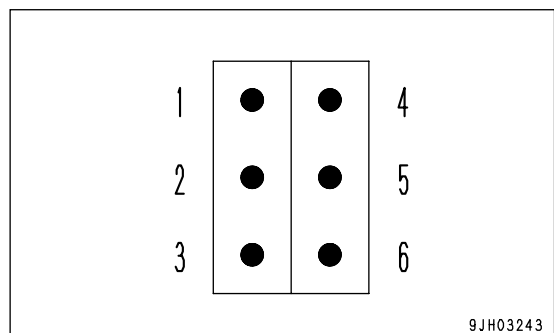


VHMS: Vehicle Health Monitoring System
CGC: Color Graphic Console

CIRCUIT BREAKER CAPACITY AND NAME OF CIRCUIT

(Installed outside cab)

No.	Fuse capacity	Circuit name
1	40A	Radio, work lamp, rotating lamp, wipper
2	40A	Air conditioner
3	40A	Head lamp controller
4	40A	Spare
5	40A	Spare
6	40A	Spare



FUSE

(Installed room under the cab)(If equipped)

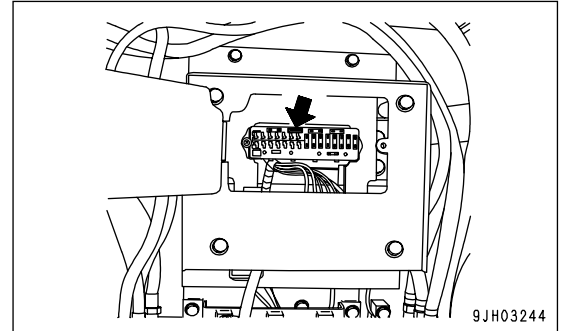
NOTICE

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

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

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

Replace the fuse with another of the same capacity.



FUSE CAPACITY AND CIRCUIT NAMES

No.	Fuse capacity	Circuit name
1	30A	Spare
2	10A	Spare
3	10A	Spare
4	10A	Spare
5	20A	Spare
6	20A	Spare
7	10A	Spare
8	10A	Spare
9	10A	Spare
10	10A	Spare
11	10A	Spare
12	10A	Spare
13	20A	Spare
14	20A	Spare
15	30A	Spare

CONTROLLER (COMPUTER)

The front and rear governors, pump controllers, and VHMS controllers are installed inside the room under the cab.

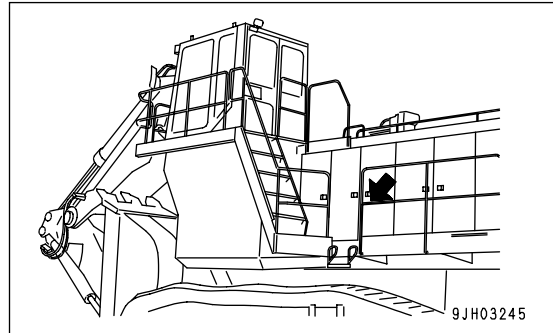
NOTICE

- Never splash or spill water, mud or drink over the controllers as this may cause a fault.
- If a fault occurs in the controller, do not attempt repair, but consult your Komatsu distributor.

1. Engine controller

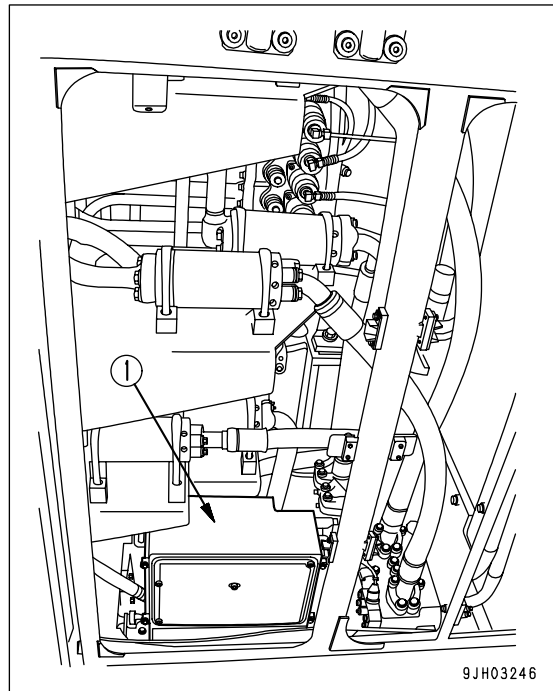
Engine controller (1) is under the line filter hose found when the second side door from the left of the machine is opened.

- When removing the engine controller, do as follows.
 1. Turn the starting switch OFF, wait for at least 3 minutes, then remove the negative (–) terminal of the battery.
 2. Remove the positive (+) terminal of the battery.



REMARK

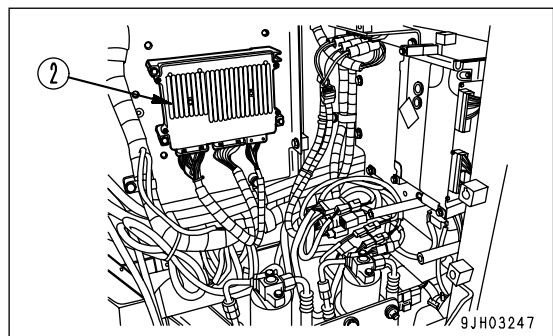
The engine controller is cooled by the air conditioner cooler. To prevent any drop in the cooling function, check before starting operations that the cooling hoses have not come out, are not cracked, and that the clamps are not loose.



2. Pump controller

Pump controller (2) is inside the cab room.

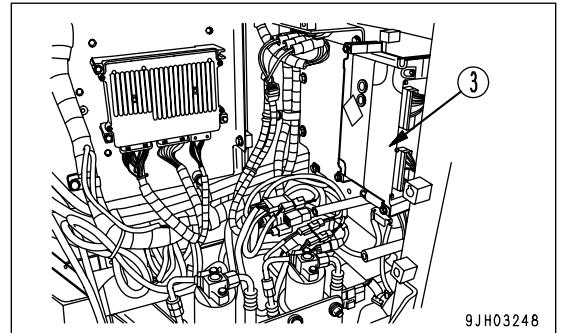
- When removing the pump controller, do as follows.
 1. Turn the starting switch OFF, wait for at least 3 minutes, then remove the negative (–) terminal of the battery.
 2. Remove the positive (+) terminal of the battery.



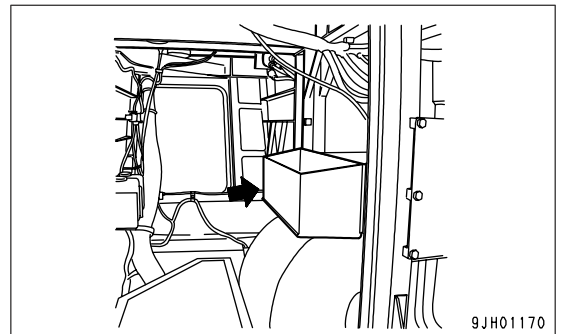
3. VHMS controller

VHMS controller (3) is on the right side of pump controller (2) inside the room under the cab.

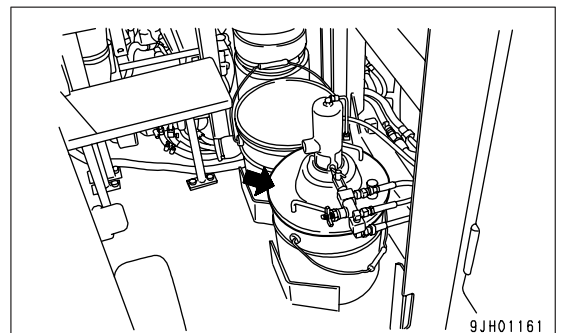
- When removing the VHMS controller, do as follows.
 1. Turn the starting switch OFF, wait for at least 3 minutes, then remove the C01 connector of the VHMS controller.
 2. Remove the other connectors.

**TOOLBOX**

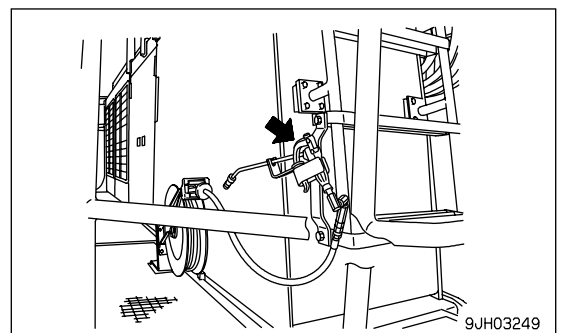
This is inside the room under the cab.

**HANDLING GREASE PUMP AND GREASE GUN**

The grease pump is installed near the entrance to the room under the cab.



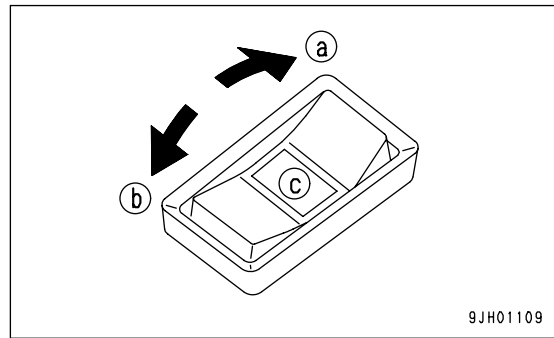
The grease gun is installed near the ladder for the catwalk on the right side of the machine.



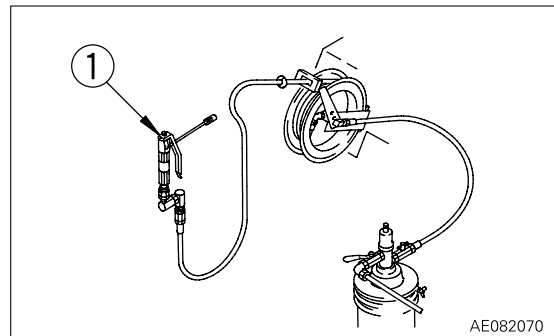
METHOD OF USE

Run the front engine at a mid-range speed when carrying out greasing with grease gun (1).

1. Press the greasing switch at the right side of the operator's seat inside the cab to start position (a), then release it.
 - Greasing can be carried out for 15 minutes when the switch is operated once. If it is needed to carry out further greasing, operate the switch again after completing the first greasing.
 - During the greasing operation, the lamp at position (c) in the middle of the switch lights up.
2. Pull the lever of grease gun (1).
When the lever is pulled, the pump is automatically actuated and grease is discharged. When the lever of grease gun (1) is released, the supply of grease stops.



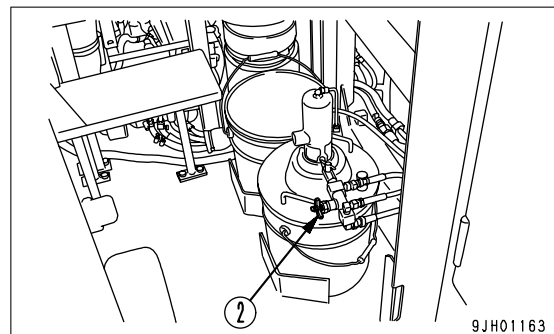
9JH01109



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REMARK

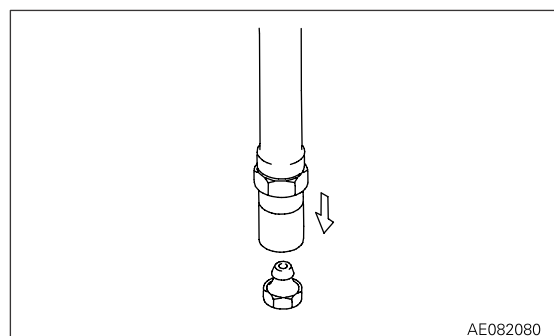
- When using grease gun (1) to carry out greasing around the bucket, tighten stopper (2) of the pump discharge port and close the circuit to other lines.
- After completing greasing with the grease gun, always return the stop valve (2) to its original open condition.



9JH01163

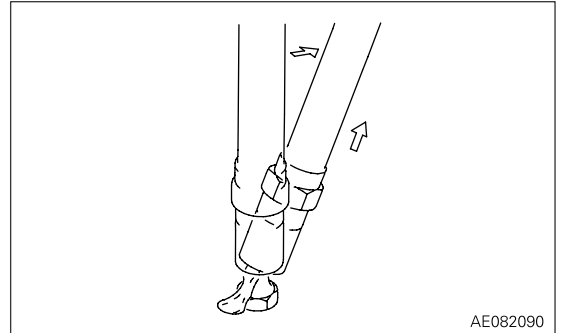
PRECAUTIONS WHEN USING

- Set so that the nipple and the nozzle at the tip of the grease gun are perpendicular.



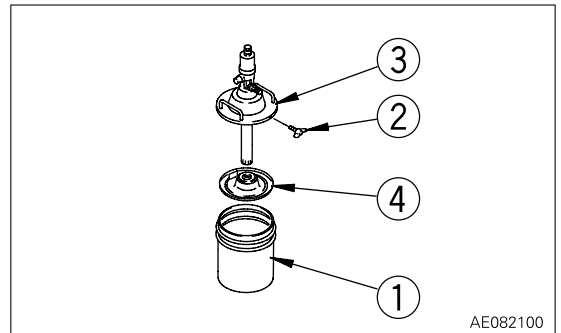
AE082080

- When removing the nozzle at the tip of the grease gun from the nipple, angle the tip of the nozzle slightly and remove it carefully.
- When the amount of grease in the grease can goes down, the pump will run empty, so move the grease to the center or supply new grease.

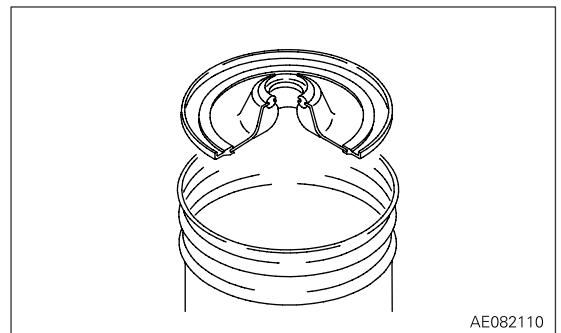


SUPPLYING GREASE

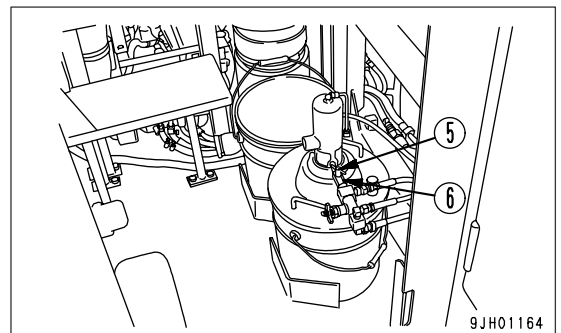
1. Remove three wing bolts (2) from grease can (1), then remove cover (3) together with the pump.
2. Remove follow plate (4) inside the grease can.



3. Replace empty grease can (1) with a charged spare grease can, then set follow plate (4) on top of the grease.
 - Fill the concave portion in the center of the follow plate with grease before putting the follow plate on top of the grease.
4. Insert the pump into the packing at the center of follow plate (4), set cover (3) on grease can (1), then tighten three wing bolts (2) uniformly to hold in position.
 - The pump will move for a short time and then stop, but the air inside the pump will mix with the first grease and become cloudy white, so the condition is not good.



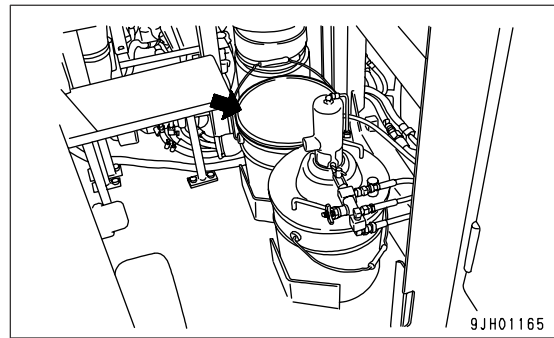
5. Loosen check valve (5) and discharge all the grease mixed with the air from hole (6) under check valve (5).
6. After bleeding the air, close check valve (5) securely.



7. After bleeding the air from inside the pump, pull the grease gun lever and discharge all the grease mixed with air from inside the hose and grease gun.
 - When supplying grease, be extremely careful not to let any sand or dirt stick to the follow plate or suction portion of the pump.
 - If the pump runs empty even when there is ample grease, the follow plate is probably not set properly, so check and set it properly.
 - The standard size for the grease can is 18 liters. If a 20 liters can is used, the remaining amount of grease will increase.

REMARK

- Keep a spare grease can beside the grease pump.
- When not using the machine for a long period, pull the grease gun after stopping the engine to discharge the grease and release the pressure inside the grease can.



HANDLING ACCUMULATOR

WARNING

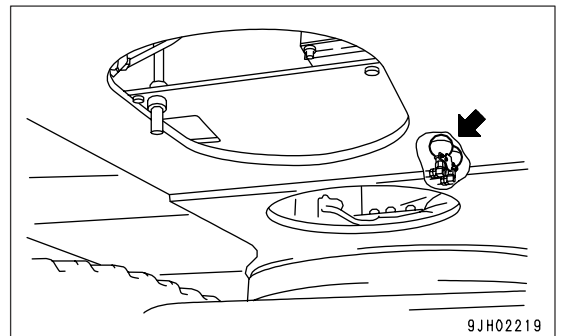
The accumulator is charged with high-pressure nitrogen gas, so mistaken operation may cause an explosion which will lead to serious injury or damage. When handling the accumulator, always do as follows.

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

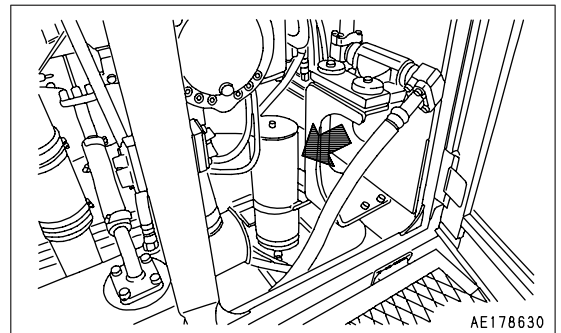
This machine is equipped with the accumulator in the control circuit.

The accumulator is a device to store the pressure in the control circuit, and when it is installed, the control circuit can be operated for a short time even after the engine is stopped. Therefore, if the control lever is moved in the direction to lower the work equipment, it is possible for the work equipment to move under its own weight. The accumulator is installed to the position shown in the diagram on the right.

- Inside track frame
Accumulator for adjusting track tension



- Inside left deck
Accumulator for hydraulic control circuit



METHOD OF RELEASING PRESSURE IN CONTROL CIRCUIT ON MACHINE EQUIPPED WITH ACCUMULATOR

1. Lower the work equipment to the ground, then close the crusher or other attachment.
2. Stop the engine.
3. Turn the key in the starting switch to the ON position again to let electric current flow in the circuits.
4. Set the safety lock lever to the FREE position, then operate the work equipment control levers and attachment control pedal (if equipped) backwards and forwards, and to the right and left to the full stroke to release the pressure in the control circuit.
5. Set the safety lock lever to the LOCK position to lock the control levers and attachment control pedal. Note that the pressure is not completely removed, so when removing accumulator (1) in the control circuit and accumulator (2) in the valve return circuit, loosen the bolts slowly and do not stand in the direction where oil spurts out.

ORBCOMM CONTROLLER

(If equipped)

Machine data can be transmitted without stopping the machine by using the satellite communications function of ORBCOMM (communications company). Please ask your Komatsu distributor to make the default setting when setting up communications.

MACHINE OPERATIONS AND CONTROLS

BEFORE STARTING ENGINE

WALK-AROUND CHECKS

Before starting the engine, look around the machine and under the machine to check for loose nuts or bolts, or leakage of oil, fuel, or coolant, and check the condition of the work equipment and hydraulic system. Check also for loose wiring, play, and accumulation of dust at places which reach high temperatures.

WARNING

Remove any flammable materials from around the battery or engine muffler, or other high temperature engine parts. Leakage of fuel or oil will cause the machine to catch fire. Check carefully, and be sure to repair any abnormalities, or please contact your Komatsu distributor.

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

1. Check for damage, wear, play in work equipment, cylinders, linkage, hoses
Check that there are no cracks, excessive wear, or play in the work equipment, cylinders, linkage, or hoses. If any abnormality is found, repair it.
2. Remove dirt and dust from around engine, battery, radiator
Check if there is any dirt or dust accumulated around the engine or radiator. Check also if there is any flammable material (dead leaves, twigs, grass, etc.) accumulated around the battery or high temperature engine parts, such as the engine muffler or turbocharger. Remove all such dirt or flammable material.
3. Check for leakage of water or oil around engine
Check that there is no leakage of oil from the engine or leakage of water from the cooling system. If any abnormality is found, repair it.
4. Check for oil leakage from hydraulic equipment, hydraulic tank, hoses, joints
Check that there is no oil leakage. If any abnormality is found, repair the place where the oil is leaking.
5. Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers
6. Check for damage to handrail, loose bolts
Repair any damage and tighten any loose.
7. Check for damage to gauges, monitor.
Check that there is no damage to the gauges and monitor in the operator's cab. If any abnormality is found, replace the parts. Clean off any dirt on the surface.
8. Clean rear view mirror, check for damage
Check that there is no damage to the rear view mirror. If it is damaged, replace it with a new mirror. Clean the surface of the mirror and adjust the angle so that the view to the rear can be seen from the operator's seat.
9. Seat belt option and mounting clamps
Check that there is no abnormality in the seat belt or mounting clamps. If there is any damage, replace with new parts.

CHECKS BEFORE STARTING

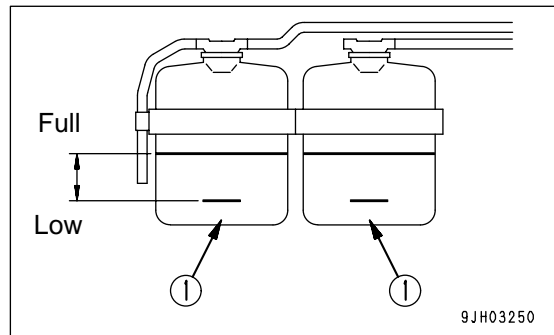
Always carry out the items of the checks in this section before starting the engine.

CHECK COOLANT LEVEL, ADD WATER

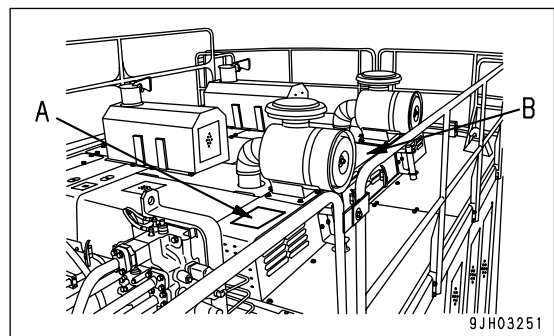
⚠ WARNING

- Do not open the radiator cap unless necessary. When checking the coolant, always wait for the engine to cool down and check the sub tank.
- Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a hazard of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure before removing it.

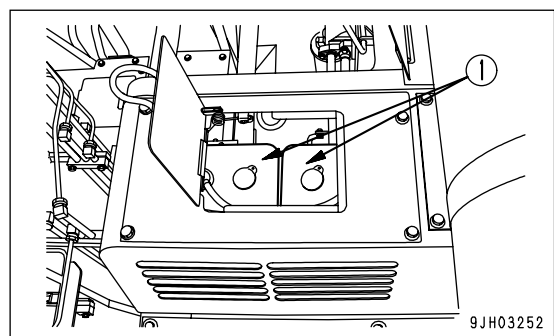
1. Open the door at the rear left of the machine, and check if the cooling water in sub-tank (1) (shown in the diagram on the right) is between the FULL and LOW marks. If the water level is low, add water to the FULL level through the filler port of sub-tank (1).
2. After adding water, tighten the caps securely.
3. If the sub tank is empty, there is probably leakage of water. After inspecting, repair any abnormality immediately. If there is no abnormality, check the water level in the radiator. If the water level is low, add water to the radiator, then fill the reserve tank (1).



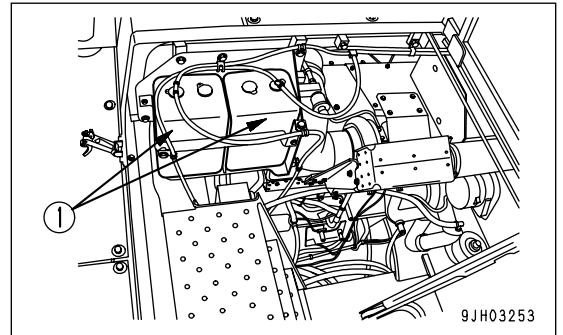
- There are two sub-tanks each for both the front engine and rear engine.
 A: Installation position of sub-tank for front engine
 B: Installation position for sub-tank for rear engine



Front sub-tank A

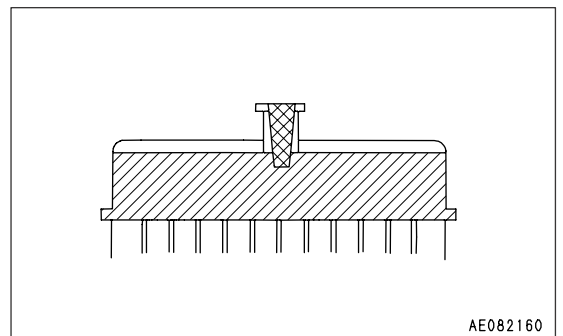
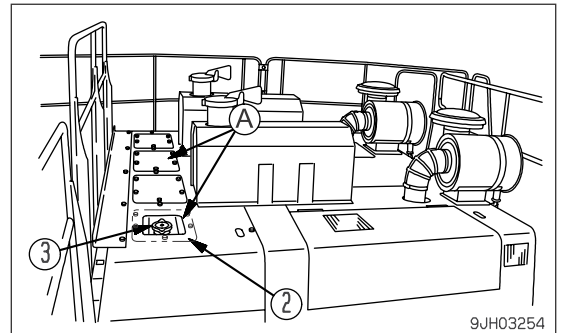


Rear sub-tank B



REMARK

- When adding water to the radiator, remove cover (2), then loosen radiator cap (3) (2 positions (A)) slowly. After checking that the pressure has been released, push in the cap, keep it pushed in, then loosen it further and remove it.
- Check that the level of the coolant is above the hatched portion in the diagram on the right. If the water level is low, add water through the water filler port.
- After adding water, install radiator cap (3).
When operating in cold areas, see "COLD WEATHER OPERATION (PAGE 3-163)".

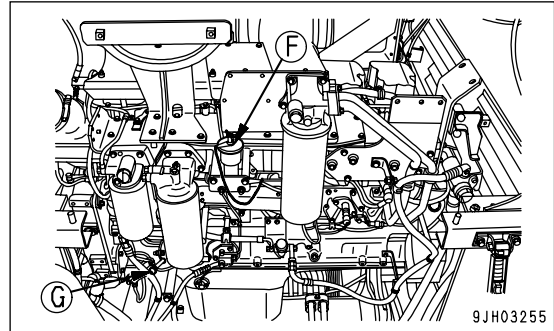


CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

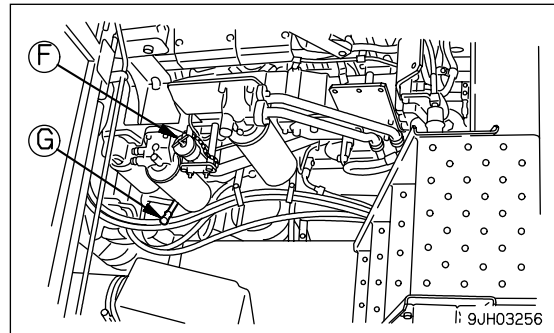
⚠ WARNING

The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.

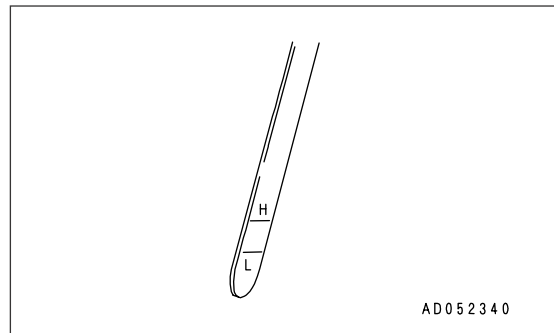
1. Open the front cover (for the front engine) and center cover (for the rear engine) of the engine hood.



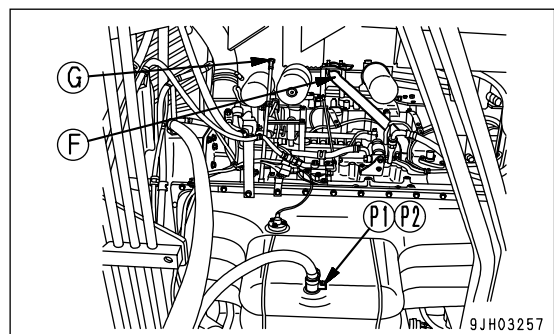
2. Open the engine hood on the machine.
3. Remove dipstick (G) and wipe the oil off with a cloth.



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

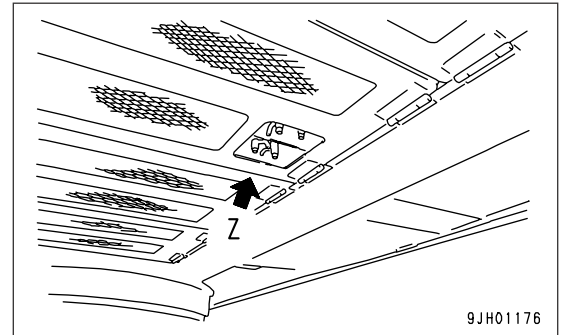


5. If the oil level is above the H line, loosen drain valves (P1) and (P2) of the oil pan.
The level will go down to drain valve (P3) and (P4).
P1: Drain valve in oil pan for front engine
P2: Drain valve in oil pan for rear engine
P3: External take-off drain valve for front engine
P4: External take-off drain valve for rear engine

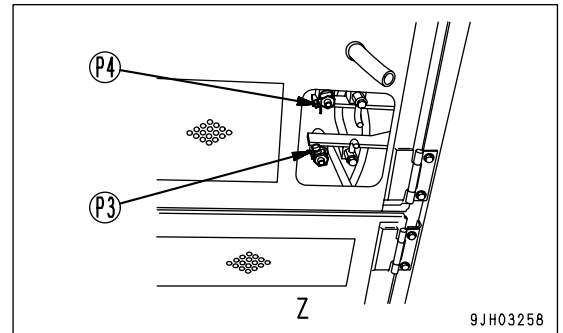


Next, open drain valves (P3) and (P4) from the drain control hole in the engine undercover and drain the excess oil. When doing this, be careful not to get oil on yourself.

- When draining the oil, put a container under drain valves (P3) and (P4) to catch the oil and prevent the oil from spraying or making the surrounding area dirty. After draining the oil, tighten drain valves (P3) and (P4).
- Pushing drain valves (P1), (P2), (P3), and (P4), then turning them, opens or closes the valves, so it is possible to operate the drain.



9JH01176



9JH03258

6. If the oil level is correct, tighten oil pan drain valves (P1), (P2), and oil filler (F) securely, then close the engine hood.

REMARK

When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.

If the machine is at an angle, make it horizontal before checking.

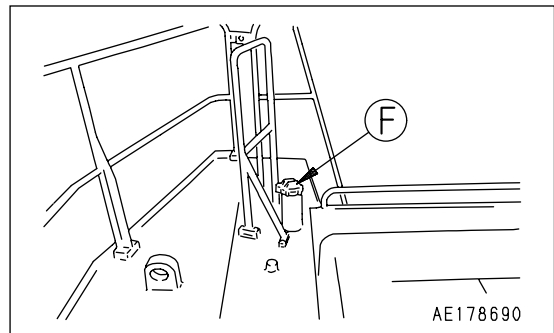
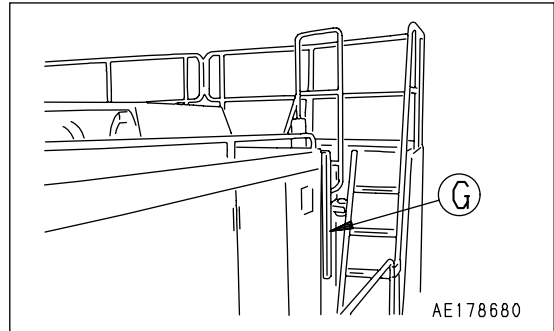
CHECK FUEL LEVEL, ADD FUEL**⚠ WARNING**

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

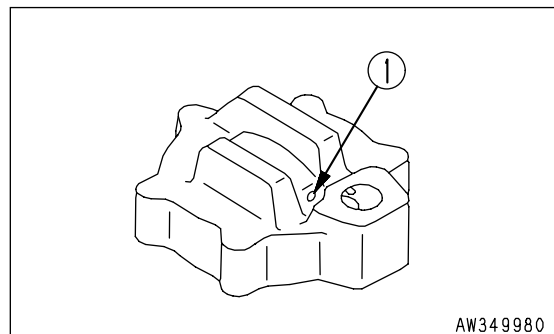
1. Use sight gauge (G) on the side of the fuel tank to check that the tank is full.
2. If the fuel level is not within the sight gauge, add fuel through filler port F while watching sight gauge (G).

Fuel capacity: 2370 liters
(if equipped: 3300 liters)

3. After adding fuel, tighten the cap securely.

**REMARK**

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

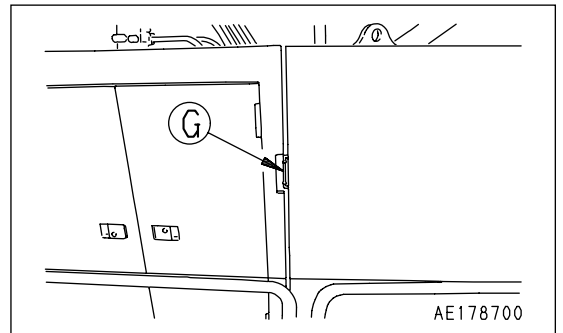
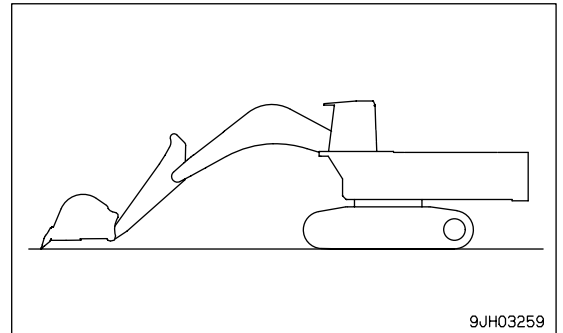


CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

⚠ WARNING

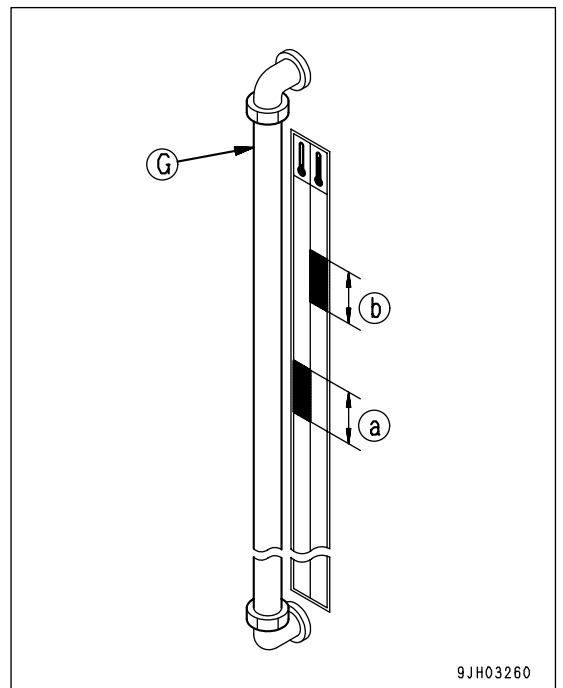
When removing the oil filler cap, oil may spurt out, so turn the cap slowly to release the internal pressure before removing the cap.

1. If the work equipment is not in the condition shown in the diagram on the right, start the engine, run the engine at low speed, retract the arm and bucket cylinders, then lower the boom, set the bucket teeth in contact with the ground, and stop the engine.
2. Within 15 seconds after stopping the engine, turn the starting switch to the ON position, and operate the control levers (work equipment, travel) fully in each direction to release the internal pressure.
3. Check oil level gauge (G) at the rear of the hydraulic tank on the right side of the machine. The oil level should be within the specified range for that oil temperature. If the oil level is low, add oil.



The proper way to check the hydraulic oil level is as follows.

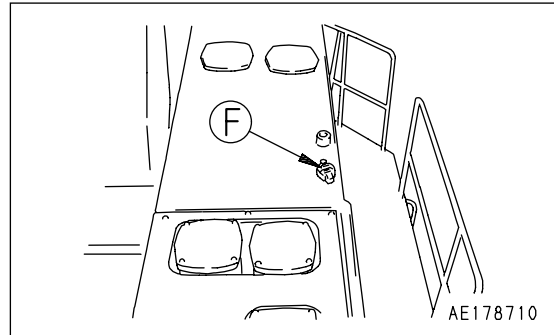
- When the hydraulic oil is at normal temperature (15 – 30°C), the oil level should be within the blue range of gauge label (a) in the diagram on the right.
- When the hydraulic oil is at high temperature (50 – 80°C), the oil level should be within the red range of gauge label (b) in the diagram on the right.



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

NOTICE

Do not add oil above the correct line. It will damage the hydraulic circuit and cause the oil to spurt out.

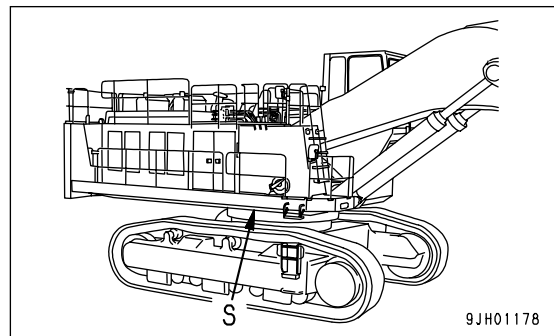


- If oil is added to above the correct line, and drain the excess oil as follows.

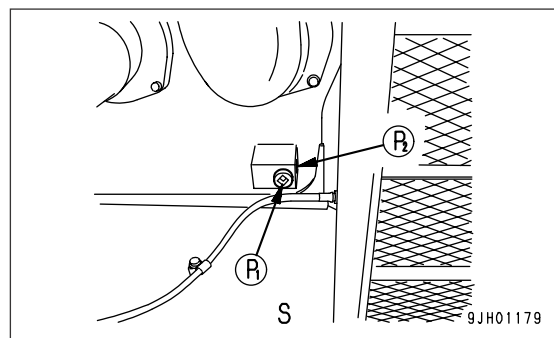
⚠ WARNING

If oil is added to above the correct line, stop the engine, wait for the hydraulic oil to cool down, then drain the excess oil from drain plug (P1). When draining the oil, loosen bottom drain plug (P1), then loosen drain plug (P2) at the side and drain the oil. After draining the oil, tighten drain plugs (P1) and (P2).

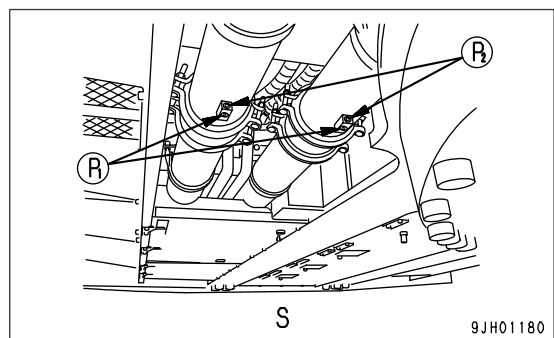
When draining the oil, use either the drain plug at the bottom of the hydraulic tank or the drain plug at the bottom of the hydraulic tank suction piping.



- When using drain plugs (P1) and (P2) at the bottom of the hydraulic tank



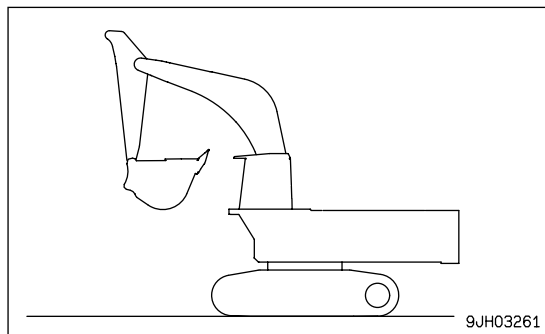
- When using drain plugs (P1) and (P2) at the bottom of the hydraulic tank suction piping



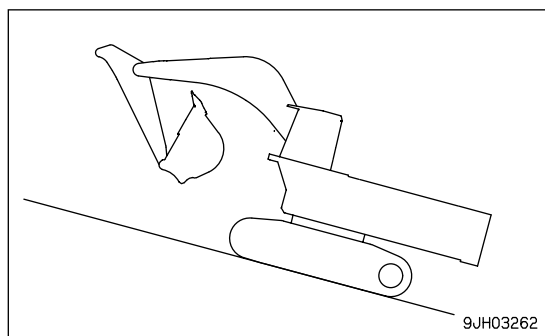
REMARK

If the hydraulic oil level is correct, but HYDRAULIC OIL LEVEL LOW is displayed when the machine is in the following postures, there is no problem in continuing operations.

- When starting with the machine in the parking posture with the boom cylinder fully extended



- When starting with the machine stopped on a steep slope



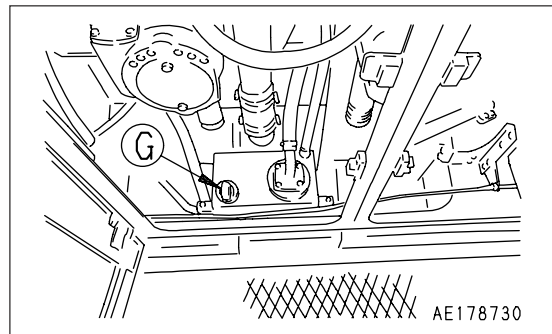
CHECK OIL LEVEL IN P.T.O CASE, ADD OIL**⚠ WARNING**

The parts and oil are at high temperature immediately after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.

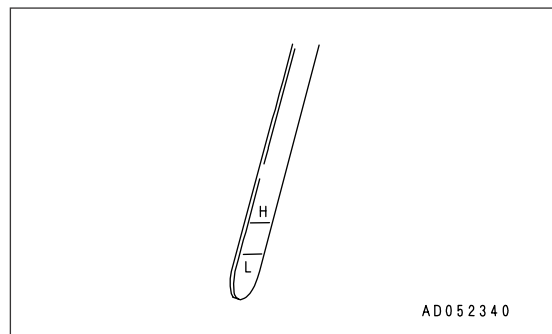
NOTICE

Park the machine on flat ground and stop the engine. After waiting for more than 30 minutes after stopping the engine, check the oil level.

1. Open the left side cover and use dipstick (G) to check the oil level.

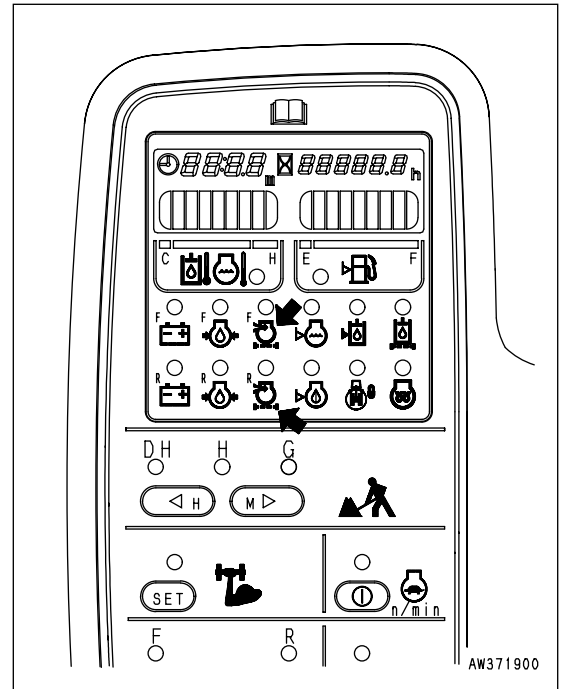


2. The oil level should be between the L and H marks. If necessary, add engine oil at the dipstick guide hole.



CHECK FOR CLOGGING OF AIR CLEANER

1. Confirm that the air cleaner clogging monitor does not flash.
2. If it flashes, immediately clean or replace the element.
For details of method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-22)".



CHECK ELECTRIC WIRINGS

⚠ WARNING

- If the fuses frequently blow or if there are traces of short circuits on the electrical wiring, locate the cause immediately and carry out repairs, or contact your Komatsu distributor for repairs.
- Keep the top surface of the battery clean and check the breather hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap to clean the breather hole.

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

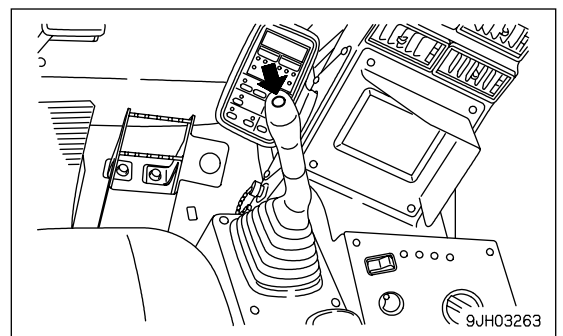
Check the wiring of the "battery", "starting motor" and "afternator" carefully in particular.

When carrying out walk-around checks or checks before starting, always check if there is any accumulation of flammable material around the battery, and remove such flammable material.

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

CHECK FUNCTION OF HORN

1. Turn the starting switch to the ON position.
2. Confirm that the horn sounds without delay when the horn button is pressed. If the horn does not sound, ask your Komatsu distributor for repair.

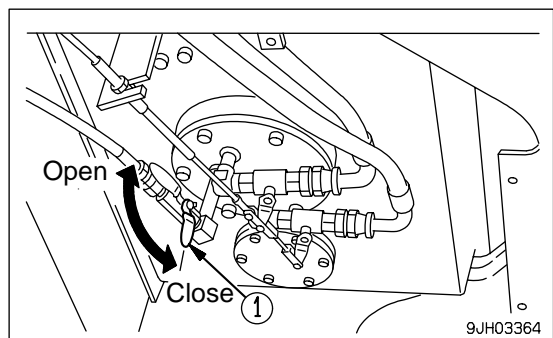
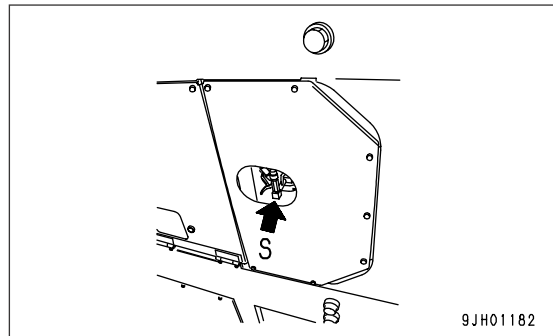


DRAIN WATER, SEDIMENT FROM FUEL TANK

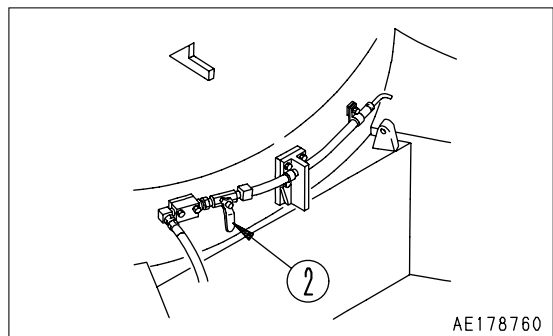
NOTICE

Do not use trichloroethylene to wash the inside of the tank.

1. Prepare a container to catch the drain fuel to prevent the sediment and water mixed with the fuel from spraying and making the surrounding area dirty.
2. Open drain valve (1) at the bottom of the fuel tank.

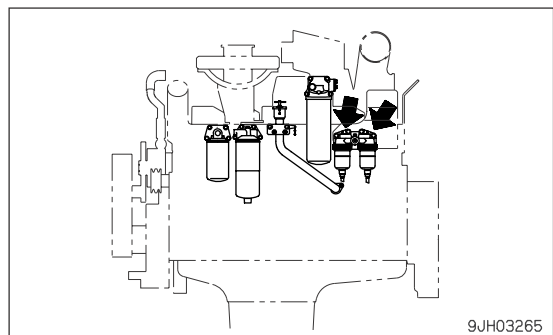


3. Open valve (2) at the rear of the revolving frame and drain the fuel together with the water and sediment accumulated at the bottom. When doing this, be careful not to get fuel on yourself.
4. When clean fuel comes out, close drain valves (1) and (2).



NOTICE

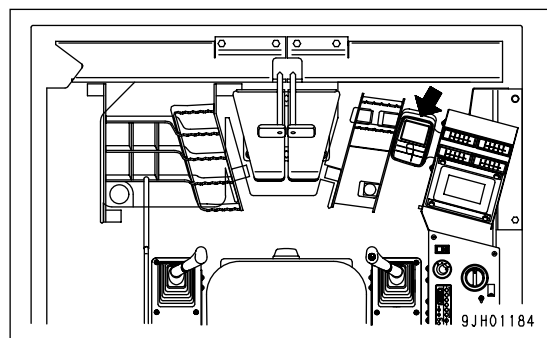
In areas where the fuel is poor quality, install a water separator (if equipped) to clean the fuel. Please ask your Komatsu distributor to install it.



CHECK CENTRAL MONITOR

Carry out the following checks to prevent loss of warning ability caused by defective operation of the buzzer or broken lamps on the monitor panel.

1. Before starting the engine, turn the starting switch to ON and check that the alarm buzzer (1 second) sounds and all monitor and gauge lamps light up for about 3 seconds. If any lamp does not light up or the buzzer does not sound, the cause is probably a broken bulb or disconnection, so contact your Komatsu distributor.



ADJUST BEFORE OPERATION

WARNING

- Adjust the seat position before starting operations or after changing the operator.
- Adjust the seat so that the control levers and switch is can be operated freely and easily with the operator back against the backrest.

A: Fore-and-aft adjustment

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

Fore-and-aft adjustment: 160 mm (16 stages)

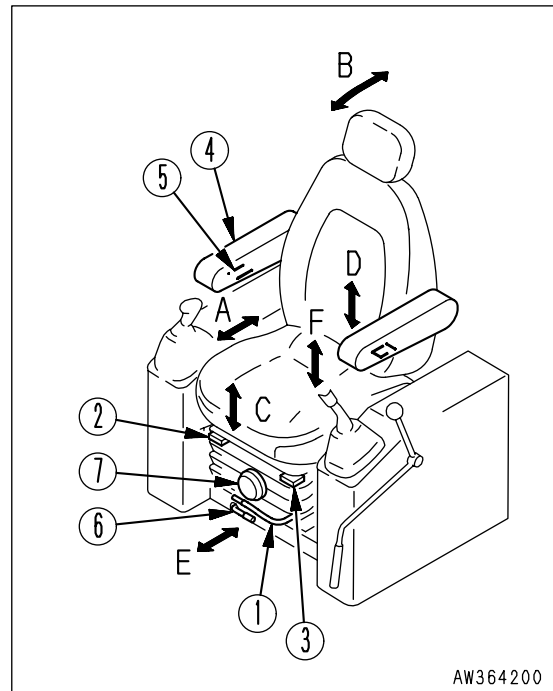
B: Adjusting reclining

NOTICE

The seat can be reclined to a large angle when the seat is pushed fully forward, but the reclining angle is reduced when the seat is moved back, so when moving the seat to the rear, return the seat back to its original position.

Pull lever (2) and set the seat back to a position which is comfortable for operation, then release the lever.

Sit with your back against the seat back when adjusting. If your back is not touching the seat back, the seat back may suddenly move forward.



AW364200

C: Adjusting seat tilt

- Forward tilt

Push lever (3) up to adjust the angle of the front of the seat. (4 stages)

- To raise the angle at the front of the seat, keep the lever pushed up and apply your weight to the rear of the seat.
- To lower the angle at the front of the seat, keep the lever pushed up and apply your weight to the front of the seat.

- Rear tilt

Pull lever (3) up to adjust the angle of the rear of the seat. (4stages)

- To raise the angle at the rear of the seat, keep the lever (3) pulled up and stand up slightly to remove your weight from the seat.
- To lower the angle at the rear of the seat, keep the lever (3) pulled up and apply your weight to the rear of the seat.

Amount of tilt: Up 13°, down 13°

- Adjusting seat height

It is possible to move the seat up or down by combining adjustments 1 and 2.

After setting the forward tilt or rear tilt to the desired height, operate the opposite part to set the seat horizontal then secure in position.

Height adjustment: 60 mm

D: Adjusting armrest angle

Armrest (4) can be made to spring up by hand approx. 90°.

In addition, by turning the bottom (5) of the armrest by hand it is possible to make fine vertical adjustments of the armrest angle.

Armrest adjustment angle: 25°

REMARK

If the seat back is tipped to the front without raising the armrest (5), the armrest will rise automatically.

E: Overall fore-and-aft adjustment of seat

Move lever (6) to right, set to the desired position, then release the lever. In this case, the operator's seat, left and right control levers, and safety lock lever all slide together.

Fore-and-aft adjustment: 120 mm

F: Adjusting suspension

Turn knob (7) to the right to make the suspension harder, or to the left to make the suspension softer. Adjust the reading of the dial to match the operator's weight and select the optimum suspension.

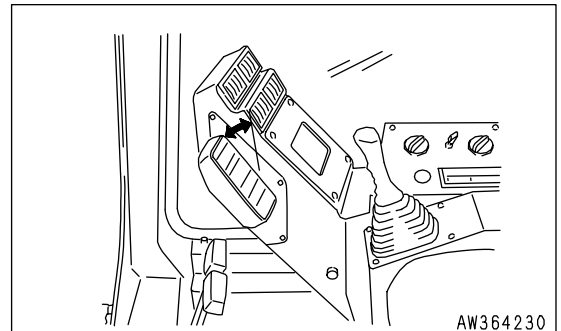
REMARK

To obtain the optimum adjustment, turn the knob (7) so that the indicator of the weight display (kg) in the transparent portion of knob (7) is the same as the operator's weight.

ADJUSTMENT OF MONITOR PANEL ANGLE

Turn the monitor panel so that the operator can view the monitor with ease. When adjusting the angle, the panel should be set to the desired position using both hands. The panel is automatically locked at that position.

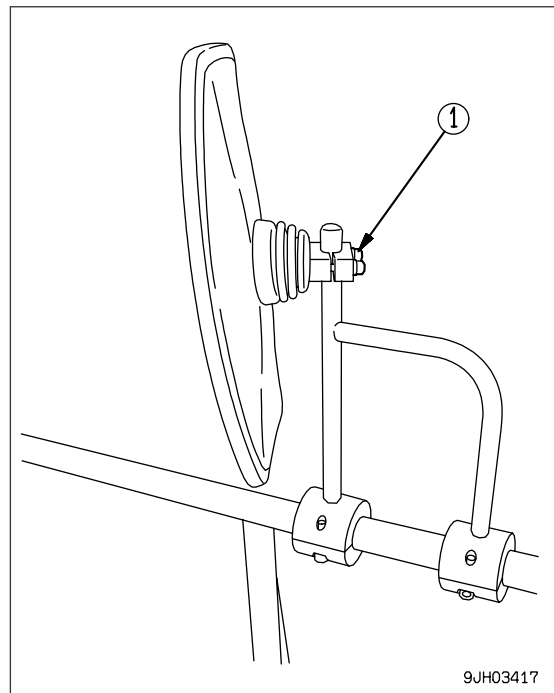
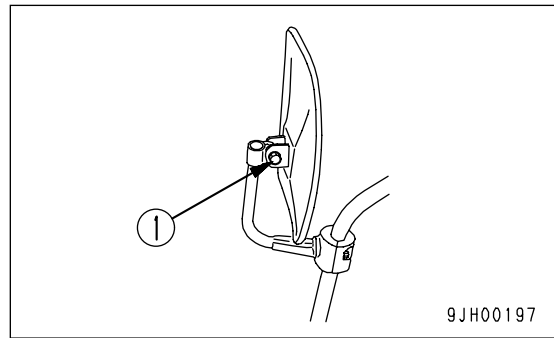
Amount of adjustment: 30° (stepless)



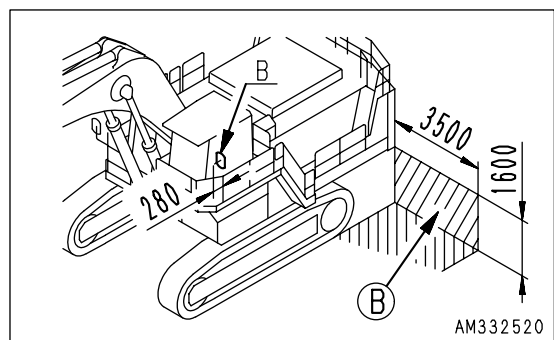
ADJUSTMENT OF MIRRORS

Loosen nut (1) mounting the mirror, and adjust to the position which gives the best view from the operator's seat of the blind spot to the left and right sides at the rear of the machine.

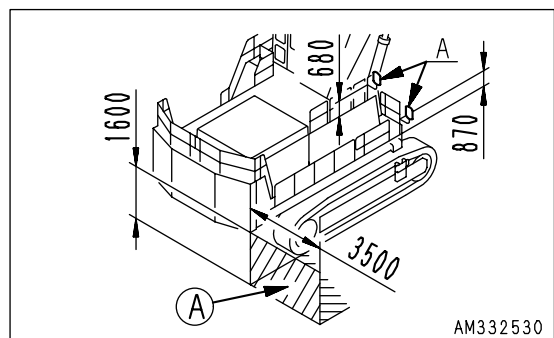
- Adjust the mirror mount so that it is possible to see any person (or object of height 1 m and diameter 30 cm) at the rear left and right of the machine.



- Refer to dimensions shown in right chart for position of mirror.



- Field of visibility reference value is shown below.
 Mirror (A): Hatched (A) area (opposite side of (B)) to be visible (if equipped)
 Mirror (B): Hatched (B) area to be visible.



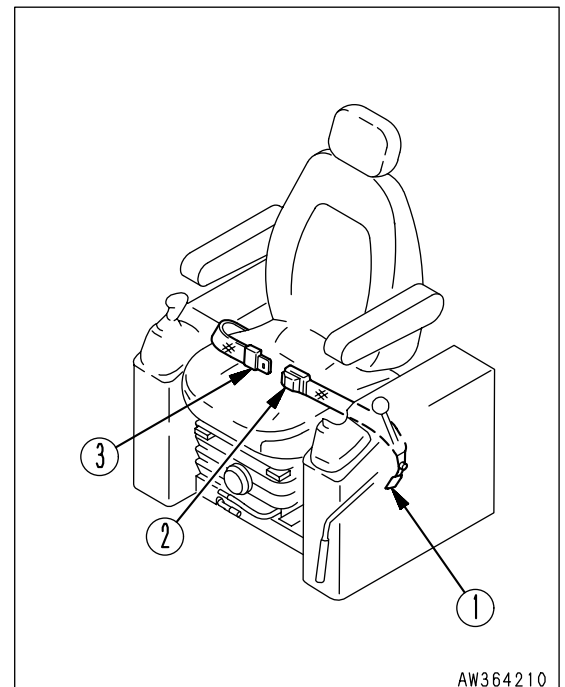
SEAT BELT

WARNING

- Before fastening the seat belt, inspect the securing brackets and belt for abnormal conditions. Replace any worn or damaged seat belt or the securing brackets.
- Even if there appears to be no abnormality in the belt, always replace the seat belt once every 3 years. The date of manufacture is shown on the back of the belt.
- Adjust and fasten the seat belt before operating the machine.
- Always use seat belt when operating the machine.
- Do not use seat belt with either half of the belt kinked.

FESTENING AND REMOVING

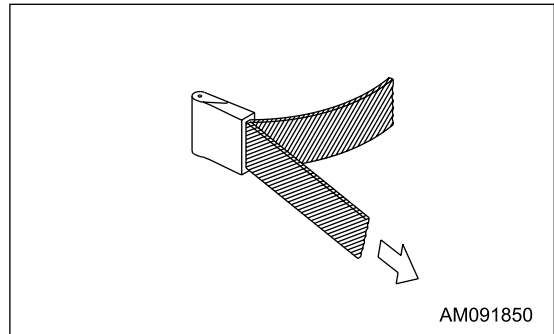
1. Sit in the seat and adjust the seat to a position where it is easy to carry out operations with your back against the backrest.
2. For machines with a suspension seat, adjust the position of the seat, then adjust tether belt (1). Install the tether belt so that it is tensed when no one is sitting in the seat. (Only machines equipped with suspension seat)
3. After adjusting the seat, sit in the seat, take buckle (2) and tongue (3) in your left and right hands, insert tongue (3) into buckle (2), then pull the belt to check that it is securely locked.
4. When removing the belt, raise the tip of buckle (2) lever to release it. Fasten belt along your body without kinking it. Adjust the lengths of the belt on both the buckle and the tongue sides so that the buckle is located at the mid-point of your body front.



SEAT BELT ADJUSTMENT

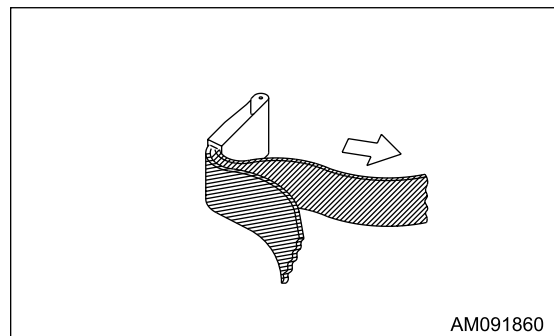
Shortening

Pull the free end of the belt on either the buckle body or tongue side.



Lengthening

Pull the belt while holding it at a right angle to the buckle or tongue.

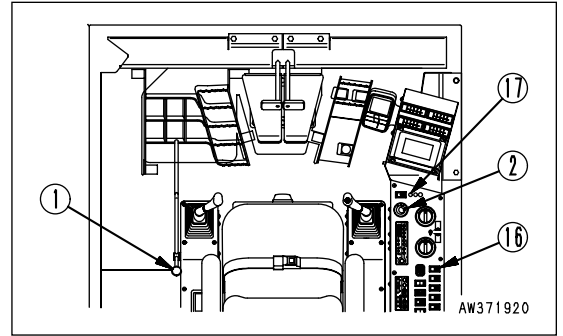


Check the mounting bolts of the belt fitting on the machine body for looseness, and re-tighten them if necessary. The tightening torque for the mounting bolt is 24.5 ± 4.9 N·m (2.5 ± 0.5 kgf·m). If the belt surface is scratched or frayed or if the fittings are broken or deformed, replace the seat belt unit.

OPERATIONS BEFORE STARTING ENGINE

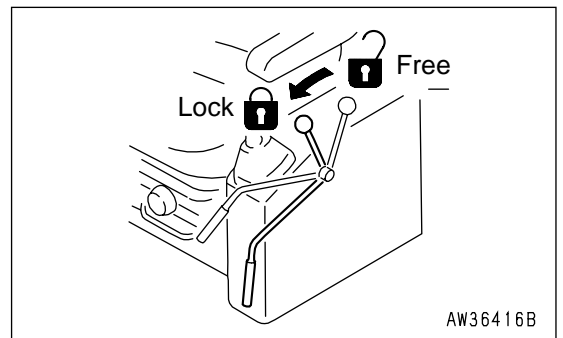
WARNING

- When starting the engine, check that the safety lock lever is securely at the LOCK position. If the control levers are not locked and they are touched by accident when starting the engine, the work equipment may move unexpectedly, and this may lead to a serious accident.
- When standing up from the operator's seat, always set the safety lock lever to the LOCK position, regardless of whether the engine is running or stopped.

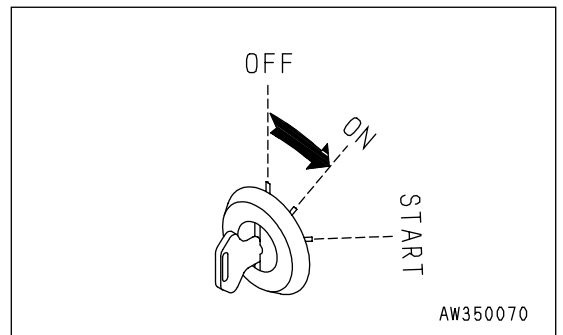


1. Check that safety lock lever (1) is at the LOCK position.
2. Check the position of each lever.

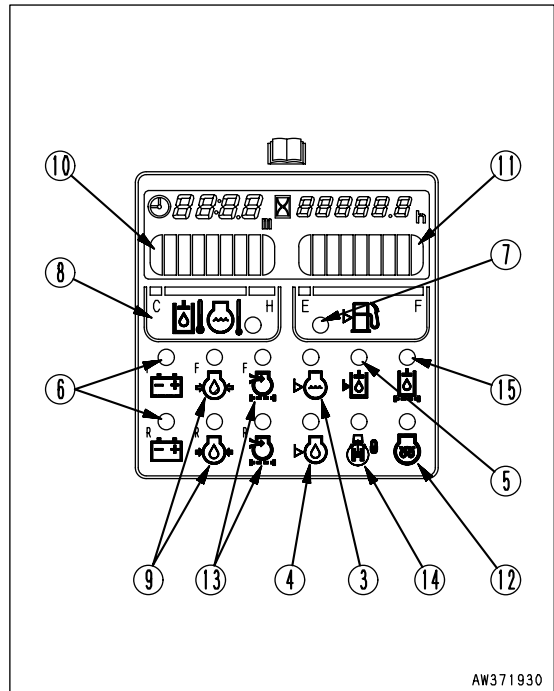
Set the control lever to the neutral position.
When starting the engine, never touch the knob switch.



3. Insert the key in starting switch (2), turn the key to the ON position, then carry out the following checks.



- 1) The buzzer will sound for approx. 1 sec, and the following monitors and gauges will light up for approx. 3 sec.
 - Radiator water level monitor (3)
 - Engine oil level monitor (4)
 - Hydraulic oil level monitor (5)
 - Charge level monitor (6)
 - Fuel level monitor (7)
 - Engine water temperature, hydraulic oil temperature monitor (8)
 - Engine oil pressure monitor (9)
 - Engine water temperature gauge (10)
 - Fuel gauge (11)
 - Engine pre-heating monitor (12)
 - Air cleaner clogging (13)
 - Swing lock lamp (14)
 - Hydraulic filter clogging monitor (15)



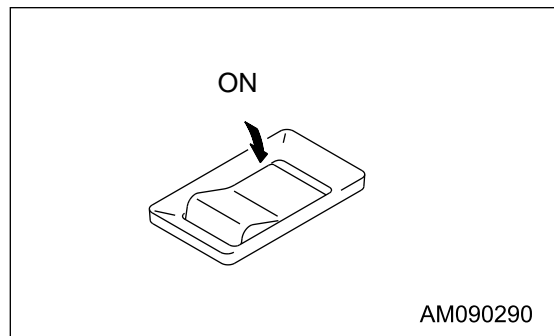
If the monitors or gauges do not light up or the buzzer does not sound, there is probably a broken bulb or disconnection in the monitor wiring, so contact your Komatsu distributor for repairs.

After approx. 3 sec, the following gauges will remain on and the other monitors will go out.

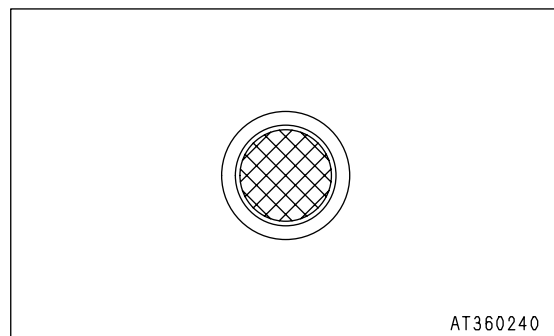
- Engine water temperature gauge (10)
- Fuel gauge (9)

- 2) Press lamp switch (16) and check that the front lamp lights up.

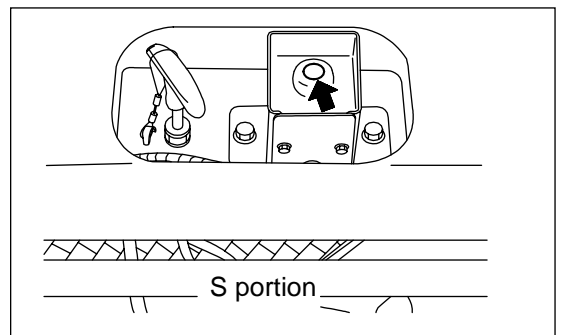
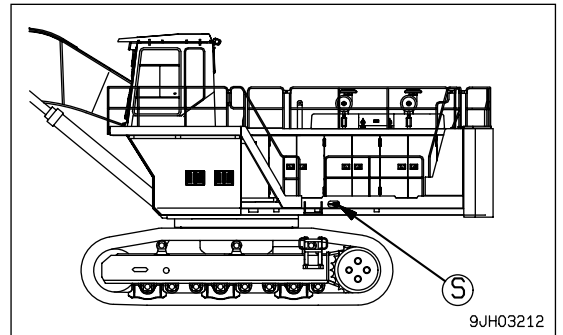
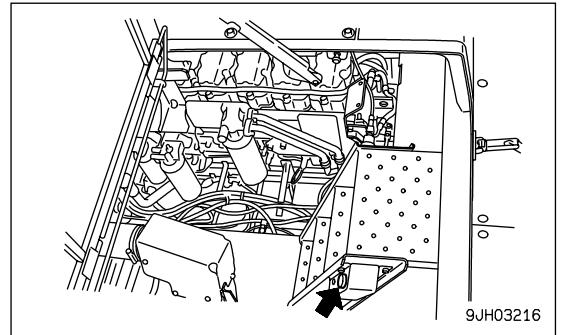
If it does not light up, there is probably a blown bulb or disconnection, so contact your Komatsu distributor for repairs.



- 3) Check that engine emergency stop lamp (17) is OFF. If it is lighted up, do as follows.



- If the engine emergency stop button at the side of the steps inside the engine room or the engine emergency button at the side of the steps on the left side of the machine is at the OFF position, press the button to turn it ON.
- If lamp (17) does not light up even when the engine emergency stop button is turned ON, there is probably a disconnection in the wiring, so please contact your Komatsu distributor for repairs.



STARTING ENGINE

NORMAL STARTING

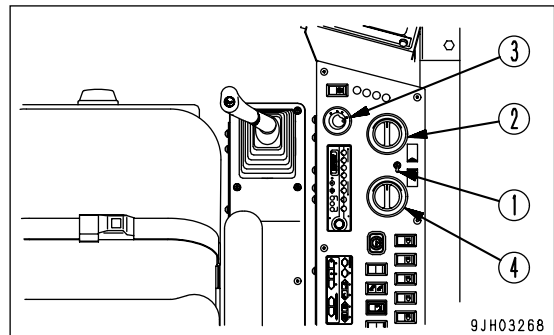
⚠ WARNING

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

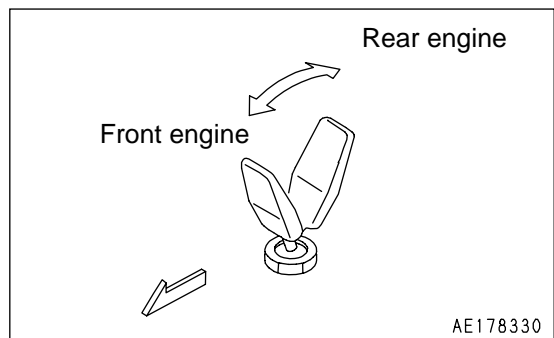
NOTICE

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

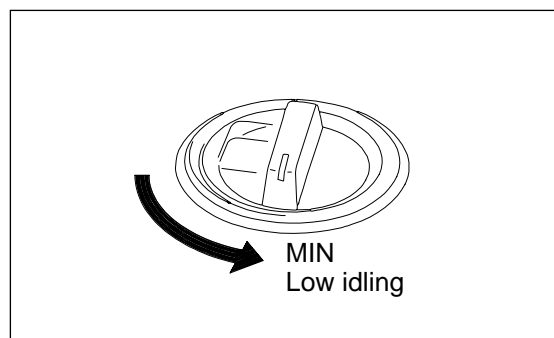
If the engine does not start, wait for at least 2 minutes before trying again.



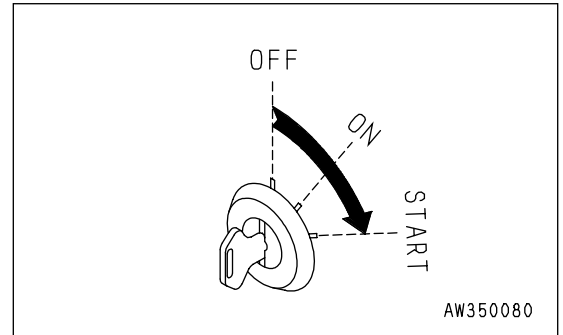
1. Turn the starter motor selector switch (1) to FRONT engine.



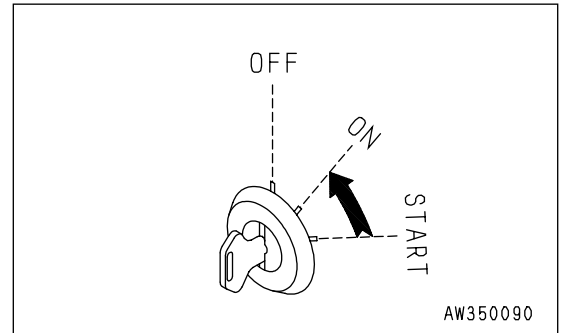
2. Set FRONT engine fuel control dial (2) at the low idling (MIN) position.
If it is at the high idling (MAX) position, always change it to the low idling (MIN) position.



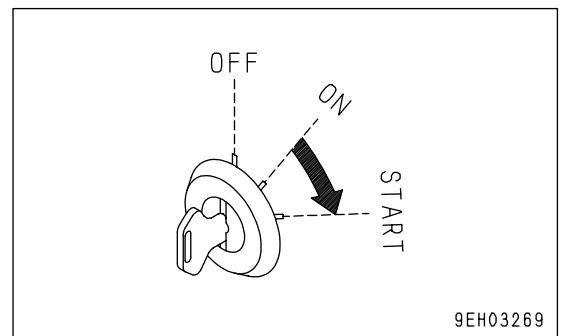
3. Turn the key in starting switch (3) to the START position. The FRONT engine will start.



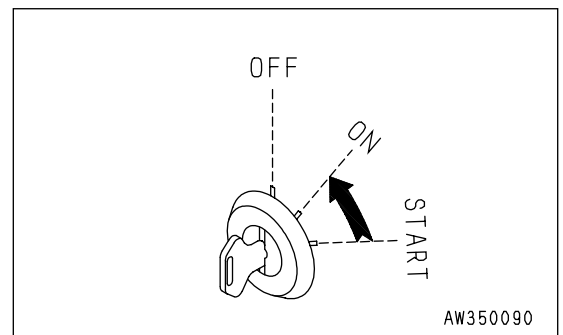
4. When the engine starts, release the key in starting switch (3). The key will return automatically to the ON position.



5. Set starting selector switch (1) to the rear engine position, turn fuel control dial (4) for the rear engine to the low idling (MIN) position, then turn starting switch (3) from the ON position to the START position. The rear engine will start.



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



STARTING ENGINE IN COLD WEATHER

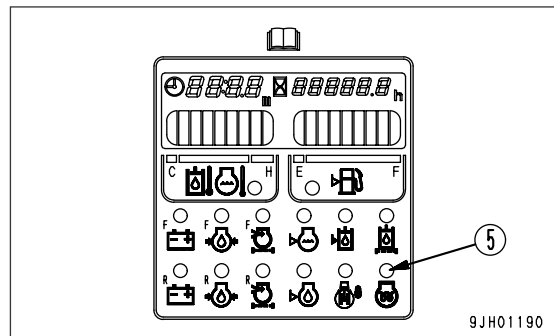
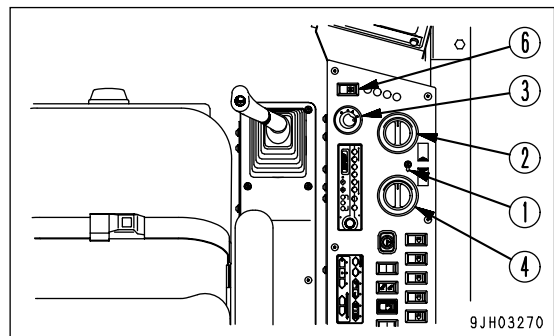
When starting in low temperatures, do as follows.

⚠ WARNING

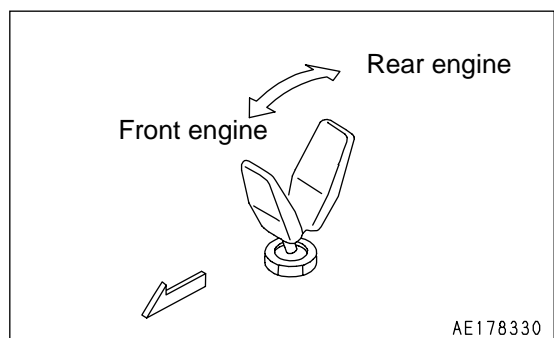
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.
- Never use starting aid fluids as they may cause explosions.
- Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.

NOTICE

- Do not crank the starting motor continuously for more than 20 seconds. If the engine does not start, wait for at least two minutes, return HEAT switch (6) to the OFF position, then repeat Steps 3 to 6.
- On this machine, to protect the turbocharger, a turbo protect function is provided. In cold weather, even if fuel control dial (1) is operated immediately after starting the engine, the engine speed may not change for several seconds.



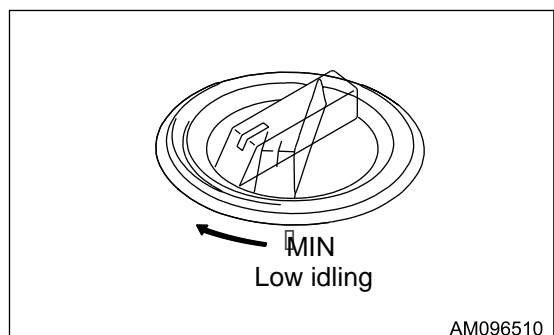
1. Turn the starter motor selector switch (1) to FRONT engine.



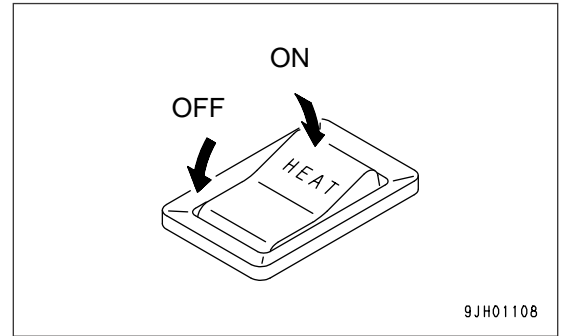
2. Set fuel control dial (2) at 3 notch from the low idling (MIN) position.

REMARK

There are 10 notches for the dial rotation, and the click can be felt by hand.



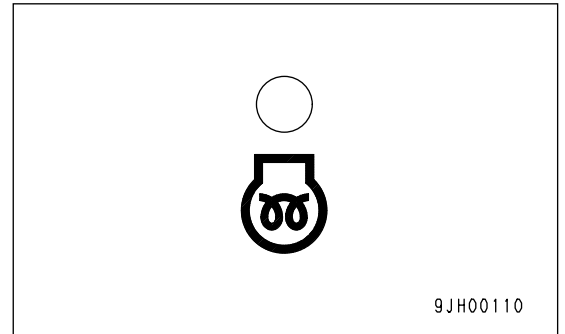
3. Hold HEAT switch (6) at the ON position.
When the HEAT switch is released, it will automatically return to the OFF position.



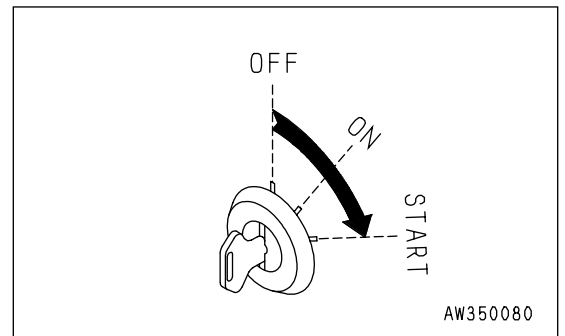
4. Check that preheating monitor (5) lights up.
After about 30 seconds, preheating monitor lamp (5) will flash for about 10 seconds to indicate that preheating is finished.
When the preheating switch is released, it will go off automatically.

REMARK

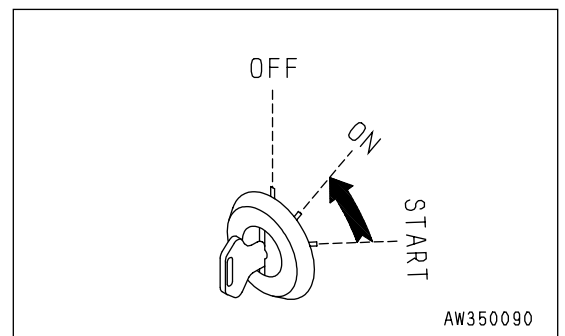
- The monitors and gauges will light up also when the key is turned to the HEAT position, but this is not an abnormality.



5. When preheating monitor (5) goes out, turn the key in starting switch (3) to the START position to start the FRONT engine.

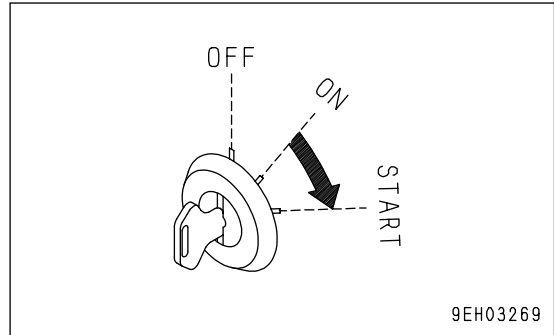


6. When the engine starts, release the key in starting switch (3).
The key will return automatically to the ON position.

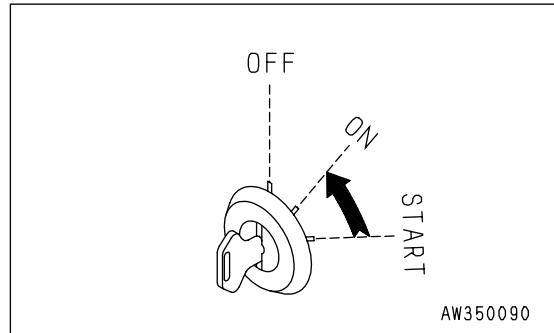


7. Set starting selector switch (1) to the rear engine, check that fuel control dial (4) for the rear engine is 3 notches from the low idling (MIN) position, then carry out Steps 3 to 4.

- 8. When the preheating monitor (5) starts to flash, turn starting switch (3) from the ON position to the START position. The rear engine will start.



- 9. When the engine starts, return the key in the starting switch to the ON position. When the switch is released, it will automatically return to the ON position.



REMARK

- The actuation time for the turbo protect function and the relationship with the engine coolant temperature are as shown below.
If the fuel control dial is operated within the time shown below, the engine speed will not change.

Cooling water temperature	Turbo protect time (sec.)
+10°C above	0
+10 to -10°C	Change 0 to 5
-10°C below	5

- In cold weather, the turbo protect function is actuated, so the engine speed is maintained below 1000 rpm for several seconds. After that, the automatic warming-up function raises the engine speed to 1200 rpm.

AFTER STARTING ENGINE

WARNING

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

BREAKING-IN THE NEW MACHINE

CAUTION

Your Komatsu machine has been thoroughly adjusted and tested before shipment. However, operating the machine under severe conditions at the beginning can adversely affect the performance and shorten the machine life.

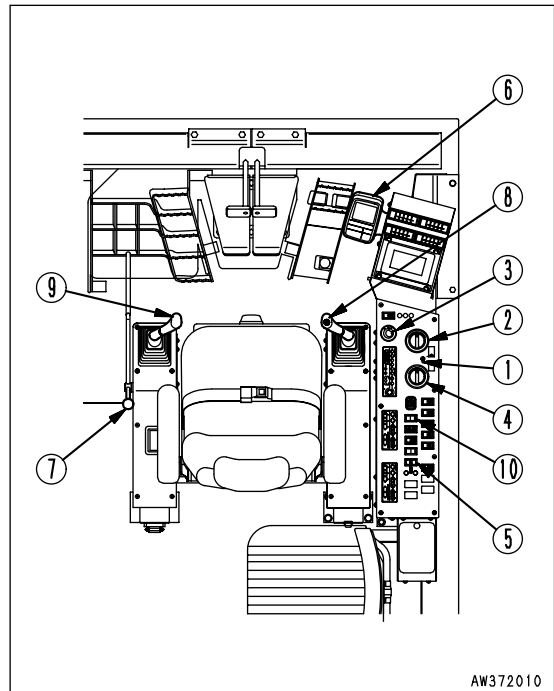
Be sure to running-in the machine for the initial 100 hours (as indicated by the service meter). During running-in operations, follow the precautions described in this manual.

- Run the engine at idling for 15 seconds after starting it. During this time, do not operate the control levers or fuel control dial.
- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Avoid sudden starts, sudden acceleration, sudden steering and sudden stops except in cases of emergency.

WARMING-UP OPERATION

NOTICE

- When the hydraulic oil is at a low temperature, do not carry out operations or move the levers suddenly. Always carry out the warming-up operation. This will help to extend the machine life.
- Do not suddenly accelerate the engine before the warming-up operation is completed. Do not run the engine at low idling or high idling continuously for more than 20 minutes. This will not only pollute the surrounding environment, but also have an adverse effect on the turbocharger and internal parts of the engine. If it is necessary to run the engine at idling (oil down), apply a load from time to time or run the engine at a mid-range speed.
- The hydraulic oil temperature should ideally lie within the range 50 to 80°C. If the machine is operated after raising the oil temperature to 20°C, the life of the machine will be extended.

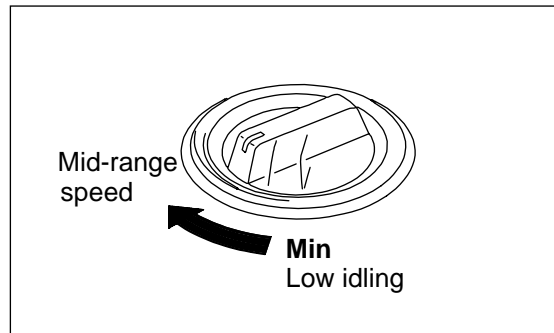


REMARK

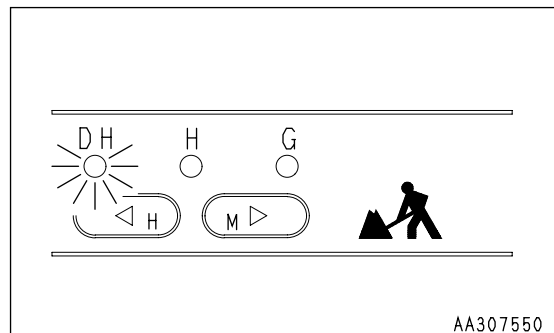
- If the engine water temperature is above 30°C, to protect the turbocharger, the engine speed does not rise for 2 seconds after starting, even if the fuel control dial is turned.
- If the hydraulic oil temperature is low, the hydraulic oil temperature monitor display will be white.

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

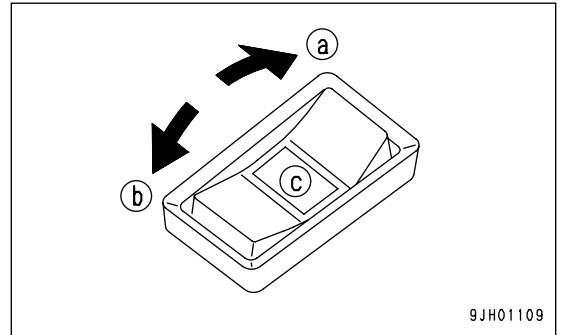
1. Turn fuel control dials (2) and (4) to the center position between LOW IDLING and HIGH IDLING and run the engine at medium speed for about 5 minutes with no load.



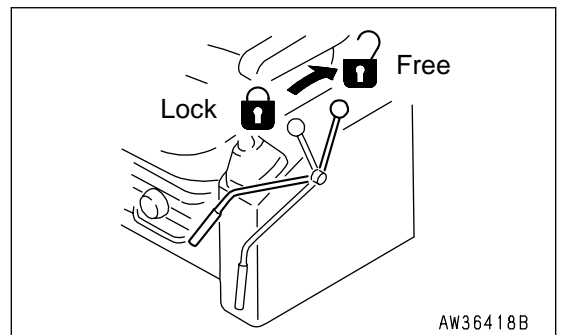
2. While running the engine at medium speed, press working mode switch (6) until the heavy-duty operation mode lamp is turned on.



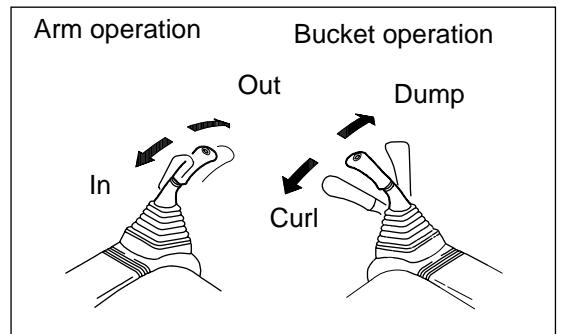
3. Press the START side (a) of greasing switch (5) and grease the work equipment and swing circle. Release the switch and carry out greasing for 15 minutes. During this time, the lamp at the center (c) of the switch lights up.
 - When the switch is released, it is automatically reset.
 - To stop during the operation, press STOP side (b) of switch (5).



4. Carry out greasing around the bucket. The greasing around the bucket is not carried out automatically, so operate the grease gun by hand. For details of greasing the bucket, see "EVERY 10 HOURS MAINTENANCE (PAGE 4-56)" and for details of greasing with the grease gun, see "HANDLING GREASE PUMP AND GREASE GUN (PAGE 3-97)".
5. Set safety lock lever (7) to the FREE position, and raise the bucket from the ground.



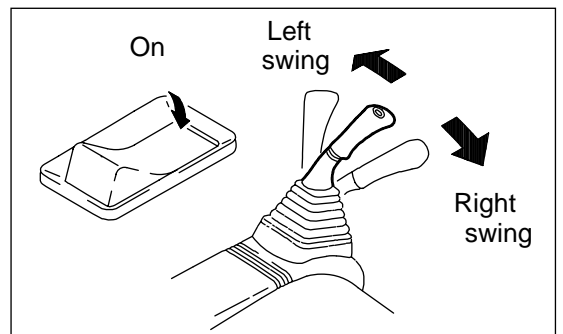
6. Operate bucket control lever (8) and arm control lever (9) slowly to move the bucket cylinder and arm cylinder to the end of the stroke.



7. Carry out bucket and arm operation for 5 minutes at full stroke, alternating between bucket operation and arm operation at 30 second intervals.

NOTICE

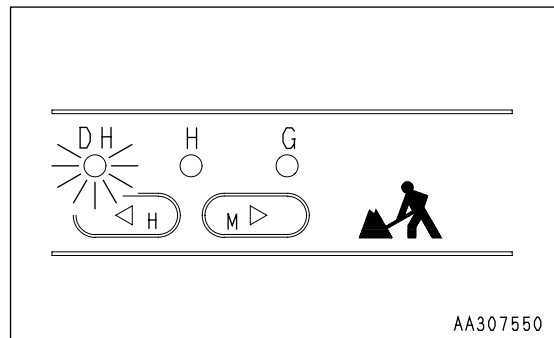
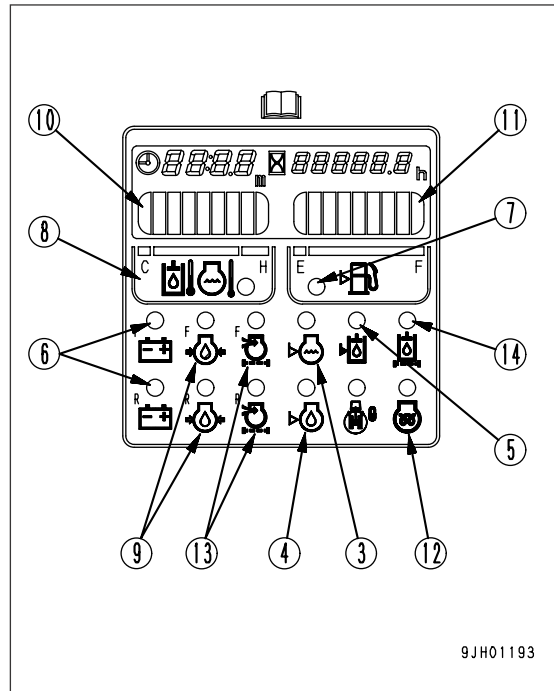
When the work equipment is retracted, take care that it does not interfere with the machine body or ground.



8. After carrying out the warming-up operation, check that each gauge and monitor lamp is in the following condition.
 - Radiator water level monitor (3): OUT
 - Engine oil level monitor (4): OUT
 - Hydraulic oil level monitor (5): OUT
 - Charge level monitor (6): OUT
 - Fuel level monitor (7): OUT
 - Engine water temperature hydraulic oil temperature monitor (8): OUT
 - Engine oil pressure monitor (9): OUT
 - Engine water temperature gauge (10): Inside green range
 - Fuel gauge (11): Inside green range
 - Engine pre-heating monitor (12): OUT
 - Air cleaner clogging monitor (13): OUT
 - Hydraulic filter clogging monitor (14): OUT

9. Check that there is no abnormal exhaust gas color, noise, or vibration. If any abnormality is found, repair it.

10. Press working monitor mode switch (6) until required operation mode lamp is turned on.



IN COLD AREAS

(AUTOMATIC WARMING-UP OPERATION)

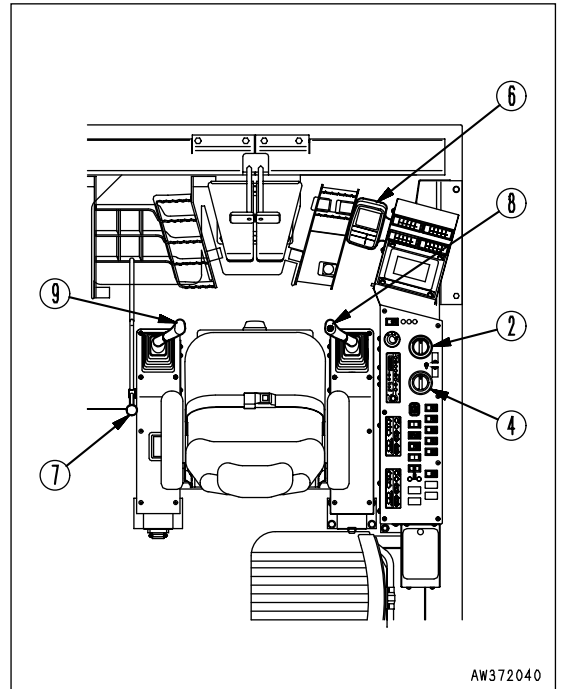
When starting the engine in cold areas, carry out the automatic warming-up operation after starting the engine.

When the engine is started, if the engine water temperature is low (below 30°C), the warming-up operation is carried out automatically.

The automatic warming-up operation is canceled if the engine water temperature reaches the specified temperature (30°C) or if the warming-up operation is continued for 10 minutes. If the engine water temperature or hydraulic oil temperature are low after the automatic warming-up operation, warm the engine up further as follows.

NOTICE

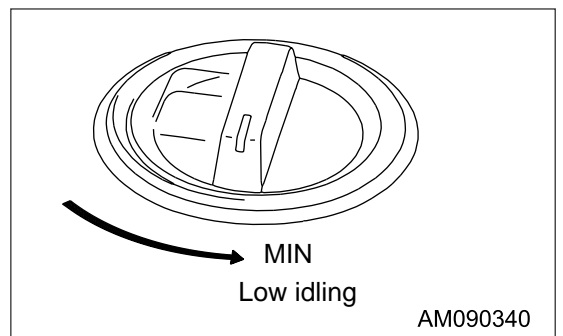
- **Never carry out operations or operate the levers suddenly when the hydraulic oil is still at low temperature. Always continue the warming-up operation until the work equipment monitor display is green. This will extend the service life of the machine.**
- **Do not suddenly accelerate the engine before the warming-up operation is completed. Do not run the engine at low idling or high idling continuously for more than 20 minutes. This will cause leakage of oil from the turbocharger oil supply piping. If it is necessary to run the engine at idling, apply a load from time to time or run the engine at a mid-range speed.**



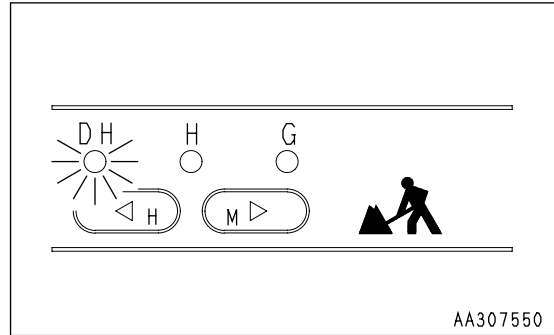
REMARK

If the hydraulic oil temperature is low, the hydraulic oil temperature monitor display will be white.

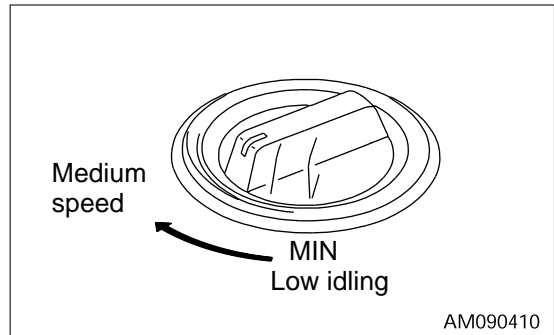
1. Set fuel control dial (2) and (4) to the low idling (MIN) position and run the engine for about 5 minutes without load.



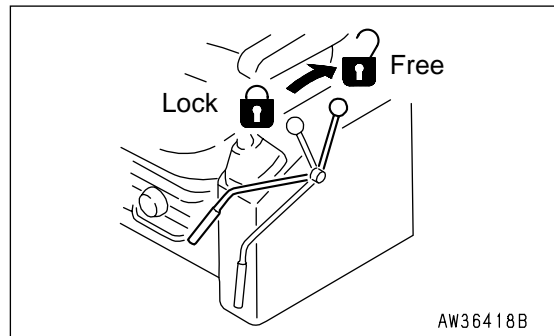
- Press working mode switch (6) on the monitor panel until the H.O (heavy-duty operation) mode lamp lights up.



- Turn fuel control dial (2) and (4) to the medium speed position.



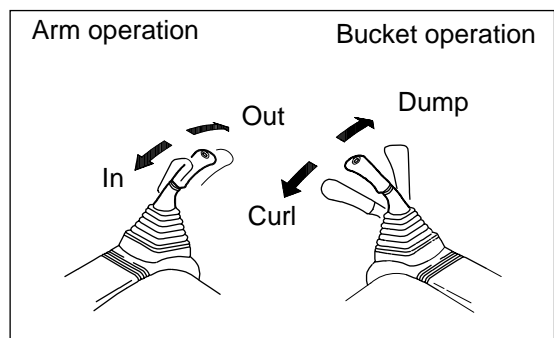
- Set safety lock lever (7) to the FREE position, and raise the bucket from the ground.



- Operate bucket control lever (3) and arm control lever (4) slowly to move the bucket cylinder and arm cylinder to the end of their stroke.
- Operate the bucket for 30 seconds and the arm for 30 seconds in turn fully for 5 minutes.

NOTICE

When the work equipment is retracted, take care that it does not interfere with the machine body or ground.

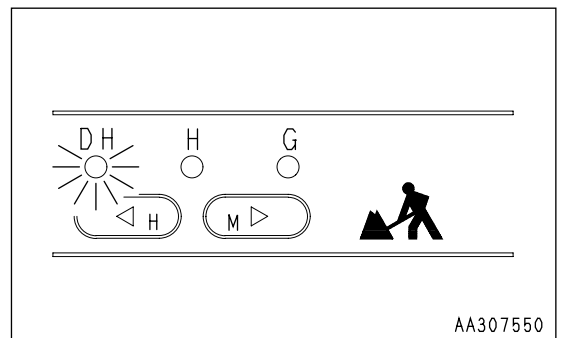
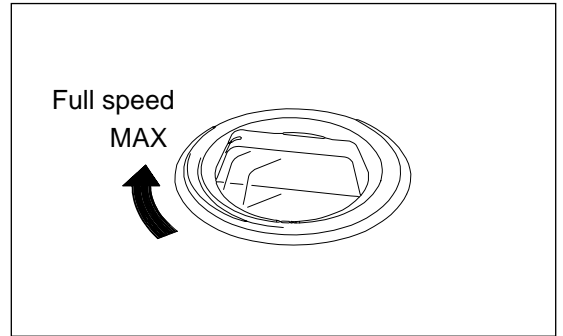


- 7. Turn fuel control dials (2) and (4) to the full speed (MAX) position and carry out the operation in Step 6 for 3 to 5 minutes.
- 8. Repeat the following operation 3 to 5 times and operate slowly.
Boom operation RAISE ↔ LOWER
Arm operation IN ↔ OUT
Bucket operation CURL ↔ DUMP
Swing operation LEFT ↔ RIGHT
Travel (Lo) operation FORWARD ↔ REVERSE

REMARK

In the above operation is not carried out, there may be a delay in response when starting or stopping each actuator, so continue the operation until it becomes normal.

- 9. Use working mode switch (6) on the monitor panel to select the working mode to be used.

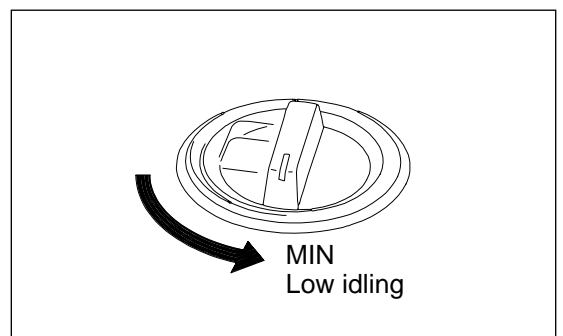
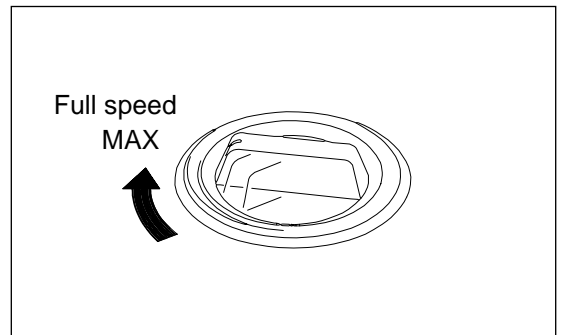


NOTICE

Canceling automatic warming-up operation

If it becomes necessary in an emergency to lower the engine speed to low idling, cancel the automatic warming-up operation as follows.

- 1) Turn fuel control dials (2) and (4) to the full speed (MAX) position and hold it for 3 seconds.
- 2) When fuel control dials (2) and (4) is returned to the low idling (MIN) position, the engine speed will drop.



STOPPING THE ENGINE

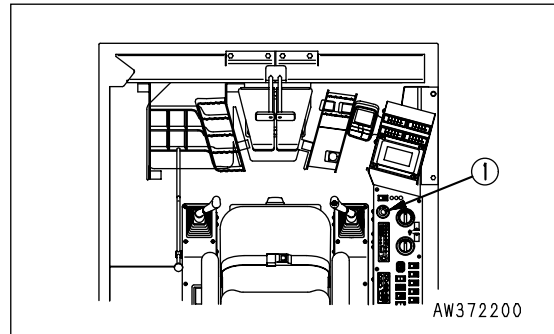
NORMAL STOPPING

NOTICE

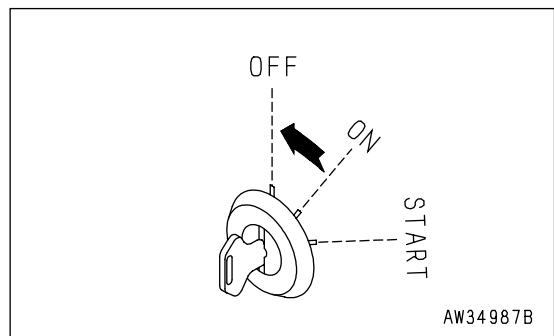
If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.

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

1. Run the engine at low idling speed for about 5 minutes to allow it to gradually cool down.



2. Turn the key in starting switch (1) to the OFF position and stop the engine.
3. Remove the key from starting switch (1).



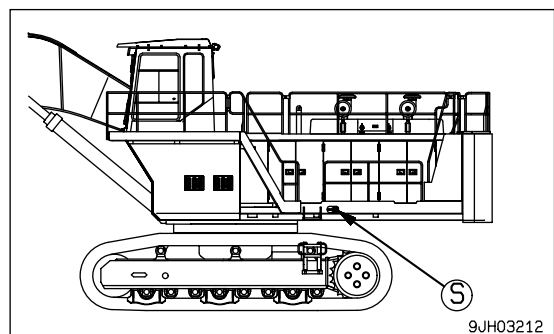
STOPPING IN EMERGENCIES

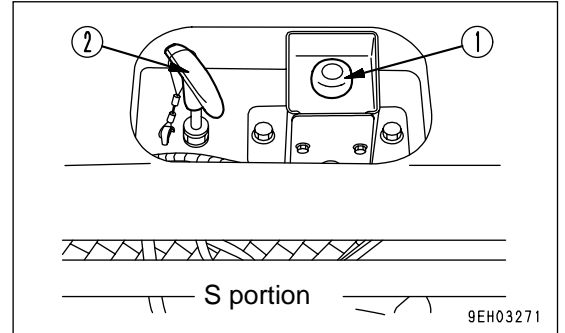
OPERATION TO STOP ENGINE FROM GROUND LEVEL

NOTICE

Use the engine stop switch (1) and fuel cut knob (2) only when stopping the engine in emergencies. When stopping the engine normally, follow the procedure in "STOPPING MACHINE (PAGE 3-143)".

Use fuel cut knob (2) and engine stop switch (1) installed at the side of the steps on the left side of the machine to stop the engine.

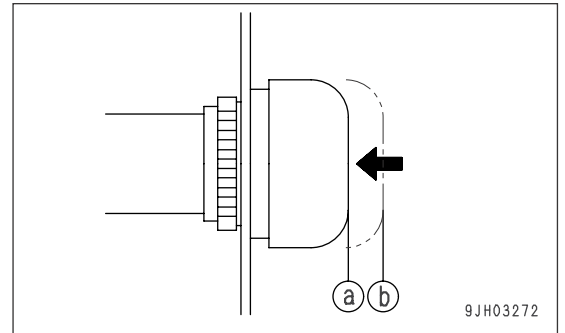




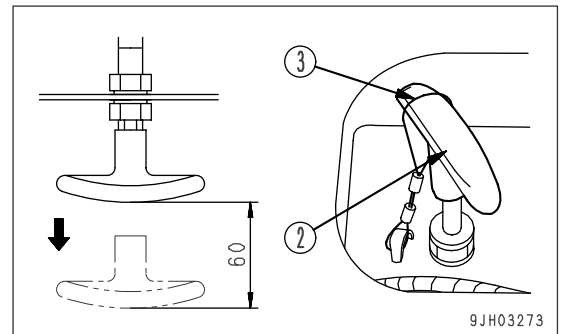
1. Press the red engine stop switch (1).
 Engine stop switch (1) is moved to pushed-in position (a) and the engine stops.
 (a): Engine stop position
 (b): Engine stop cancel position

NOTICE

If the engine does not stop even when engine stop switch (1) is pushed in, there is a failure (burn-out, etc.) in the electrical circuit. Go immediately to Step 2 and cut the fuel to stop the engine.

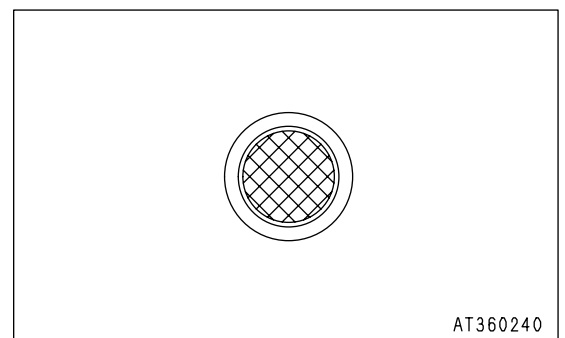


2. After removing lock wire (3) from fuel cut knob (2), pull fuel cut knob (2) towards you. The engine will stop after approx. 3 - 5 minutes.



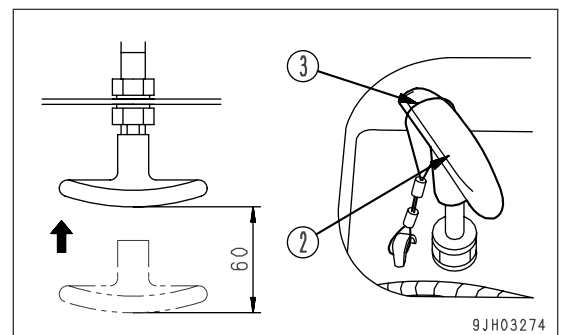
REMARK

The engine will stop even when the fuel cut operation is carried out independently with fuel cut knob (2), but engine emergency stop lamp (4) will not light up.

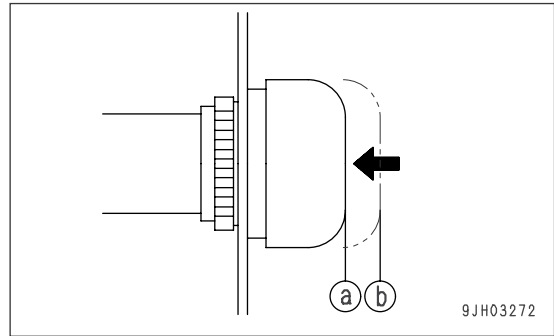


When starting again after stopping the engine, do as follows.

1. After pushing fuel cut knob (2) back to its original position, fit lock wire (3) to fuel cut knob (2) to lock fuel cut knob (2) and prevent it from moving.

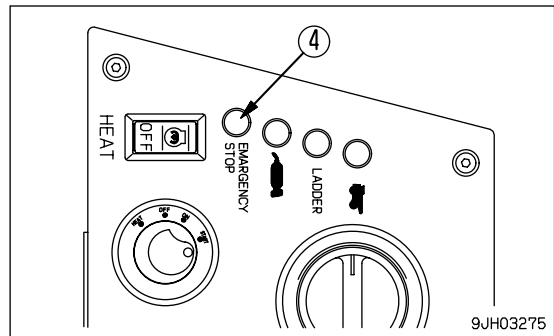


2. Press engine stop switch (1). When it is pressed, engine stop switch (1) will spring out several millimeters and be reset to position (b).
 - (a): Engine stop position
 - (b): Engine stop cancel position



3. Check that engine emergency stop lamp (4) on the panel on the right side of the operator's seat inside the cab is OFF when the starting switch is set to the ON position.

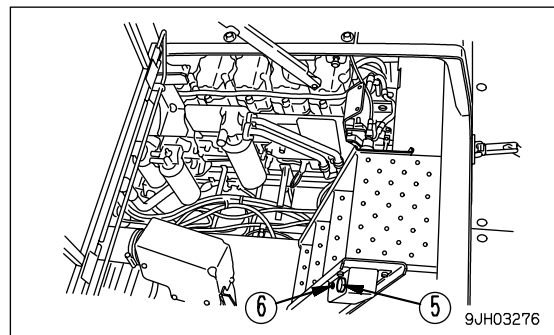
Use the procedure in STARTING ENGINE (PAGE 3-124) when starting the engine.



ENGINE STOP OPERATION INSIDE ENGINE ROOM

NOTICE

Engine stop switch (5) inside the engine room is mainly used to prevent the engine from being started from inside the cab when inspection and maintenance are being carried out inside the engine room. Normally, set engine stop switch (5) to engine stop cancel position (b). When this is done, lamp (6) goes out.

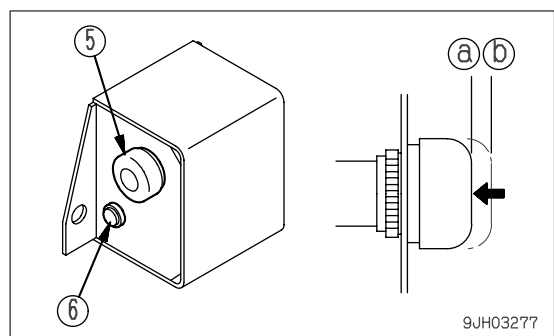


Press engine stop switch (5) installed at the side of the steps in the center of the engine room to set it to engine stop position (a). Engine stop switch (5) stays pushed in. When this happens, lamp (6) lights up red regardless of the operation of the starting switch.

- (a): Engine stop position
- (b): Engine stop cancel position

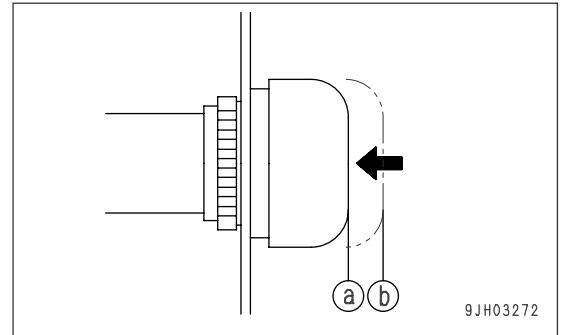
In this condition,

- Even if the starting switch is turned to the START position, the engine will not start.
- If the engine is running, it will stop.



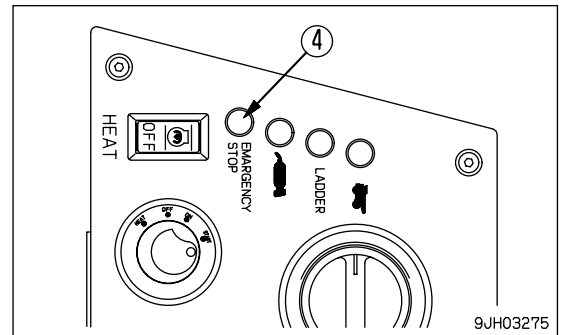
1. Press engine stop switch (5). When it is pressed, engine stop switch (5) will spring out several millimeters and be reset to position (b).

- (a): Engine stop position
- (b): Engine stop cancel position



2. Check that engine emergency stop lamp (4) on the panel on the right side of the operator's seat inside the cab is OFF when the starting switch is set to the ON position.

Use the procedure in "STARTING ENGINE (PAGE 3-124)" when starting the engine.



CHECK AFTER SHUT OFF ENGINE

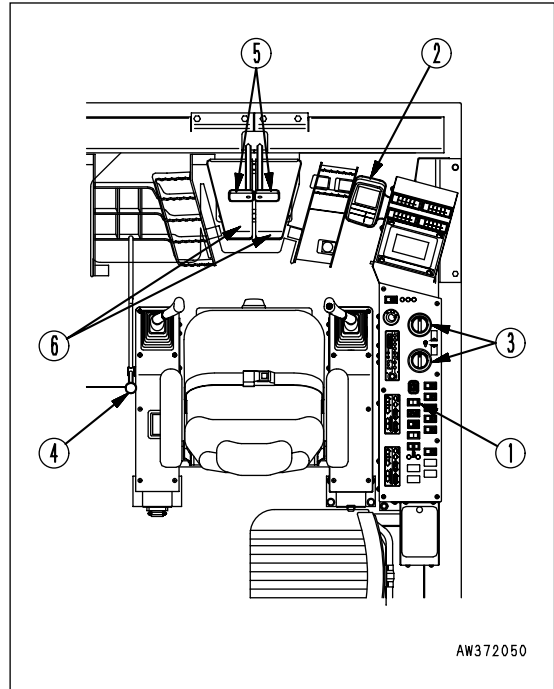
1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, and check also for leakage of oil or water. If any abnormalities are found, repair them.
2. Fill the fuel tank.
3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.
4. Remove any mud affixed to the undercarriage.

MACHINE OPERATION

PREPARATIONS FOR MOVING THE MACHINE OFF

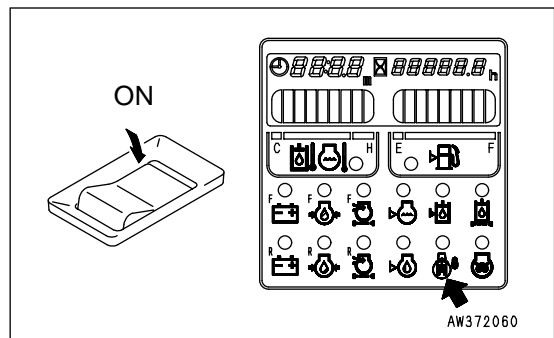
⚠ WARNING

- Before operating the steering levers, check the direction of the track frame.
If the sprocket is at the front, the operation of the travel levers is reversed.
- When moving off, check that the area around the machine is safe, and sound the horn before moving.
- Do not allow anyone in the area around the machine.
- Remove all obstacles from the travel path of the machine.
- The rear of the machine is a blind spot, so be particularly careful when travel in reverse.
- If the lever is moved inside the deceleration range, engine speed will rise suddenly. Operate the levers carefully.
- For machines equipped with a travel alarm (if equipped), check that the warning equipment works properly.



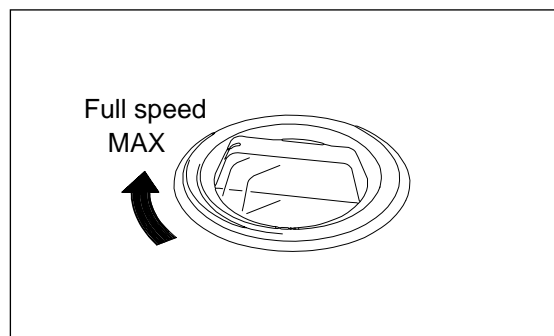
AW372050

1. Set swing lock switch (1) to the ON (actuated) position and confirm that swing lock monitor lamp (2) lights up.



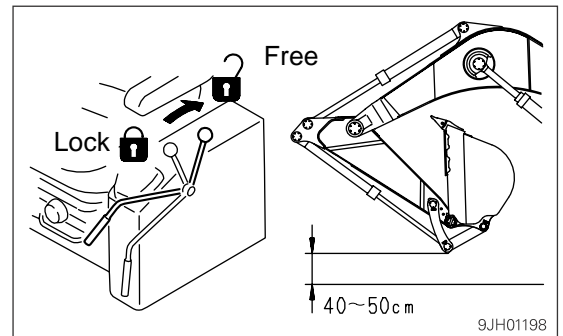
AW372060

2. Turn fuel control dial (3) towards the full speed position to increase the engine speed.



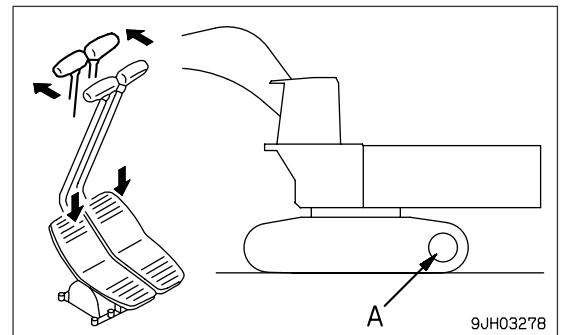
MOVING MACHINE FORWARD

1. Set safety lock lever (4) in the FREE position, fold the work equipment, and raise it 40 to 50 cm from the ground.

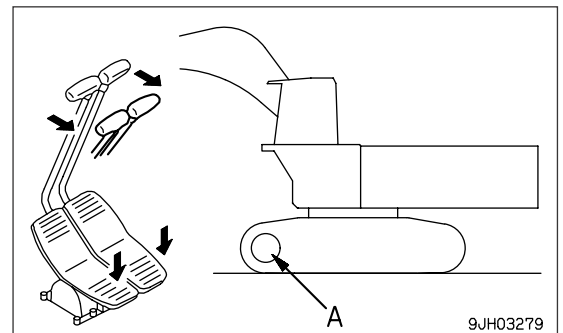


2. Operate right and left travel levers (5) or right and left travel pedals (6) as follows.

- When the sprocket (A) is at the rear of the machine
Push levers (5) forward slowly or depress the front part of pedals (6) slowly to move the machine off.



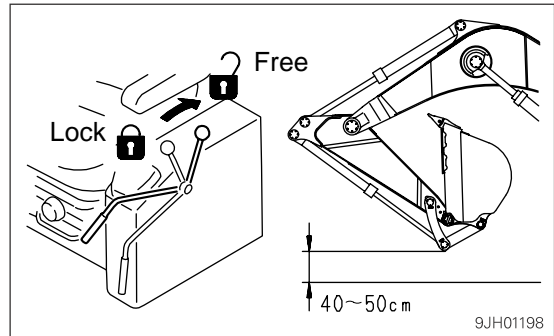
- When the sprocket (A) is at the front of the machine
Pull levers (5) backward slowly or depress the rear part of pedals (6) slowly to move the machine off.



3. For machines equipped with a travel alarm, check that the alarm sounds. If the alarm does not sound, please contact your Komatsu distributor for repairs.

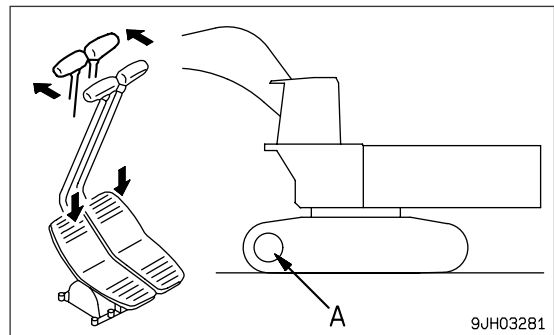
MOVING MACHINE BACKWARD

1. Set safety lock lever (4) in the FREE position, fold the work equipment, and raise it 40 to 50 cm from the ground.

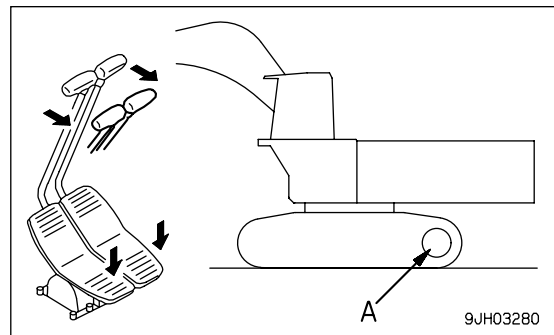


2. Operate right and left travel levers (5) or right and left travel pedals (6) as follows.

- When the sprocket (A) is at the rear of the machine
Pull levers (5) backward slowly or depress the rear part of pedals (6) to move the machine off.



- When the sprocket (A) is at the front of the machine
Push levers (5) forward slowly or depress the front part of pedals (6) to move the machine off.



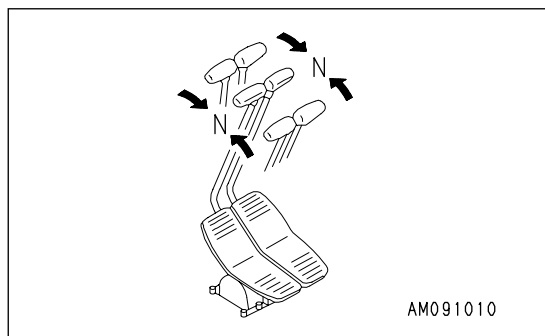
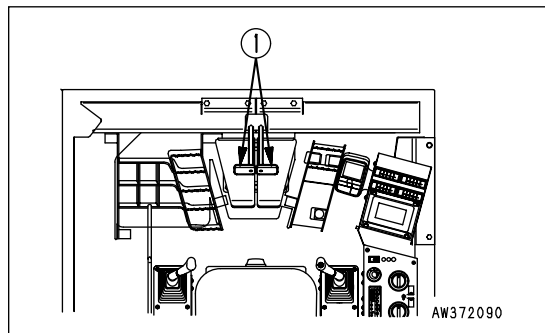
3. For machines equipped with a travel alarm, check that the alarm sounds. If the alarm does not sound, please contact your Komatsu distributor for repairs.

STOPPING MACHINE

WARNING

Avoid stopping suddenly. Give yourself ample room when stopping.

1. Put the left and right travel levers (1) in the neutral position, then stop the machine.



STEERING THE MACHINE

STEERING

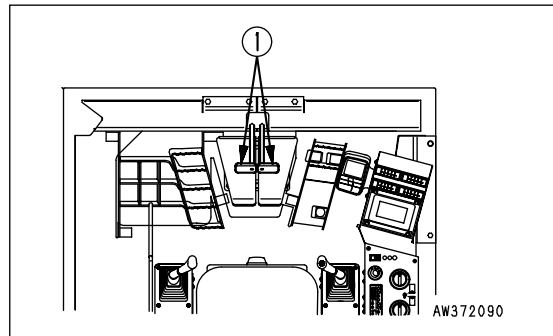
⚠ WARNING

Before operating the travel levers, check the position of the sprocket. If the sprocket is at the front, the operation of the travel levers is reversed.

Use the travel levers to change direction.

Avoid sudden changes of direction as far as possible. In particular, when carrying out counter-rotation (spin turn), stop the machine first before turning.

Operate two travel levers (1) as follows.



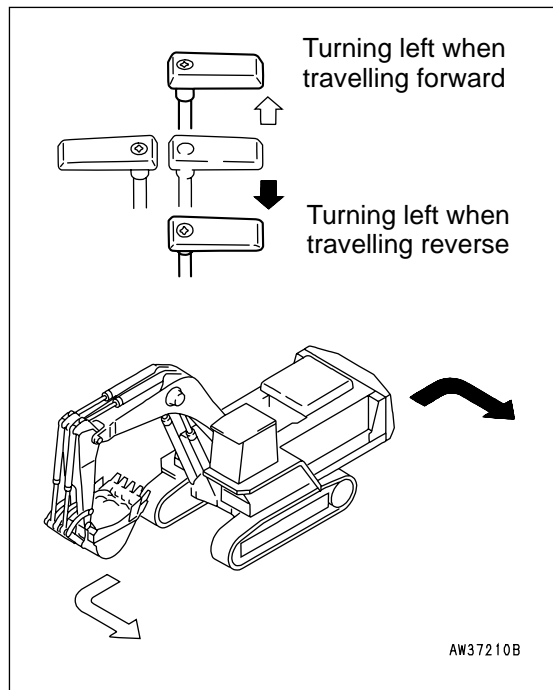
STEERING THE MACHINE WHEN STOPPED

When turning to the left:

Push the right travel lever forward to turn to the left when traveling forward; and pull it back to turn left when traveling in reverse.

REMARK

When turning to the right, operate the left travel lever in the same way.



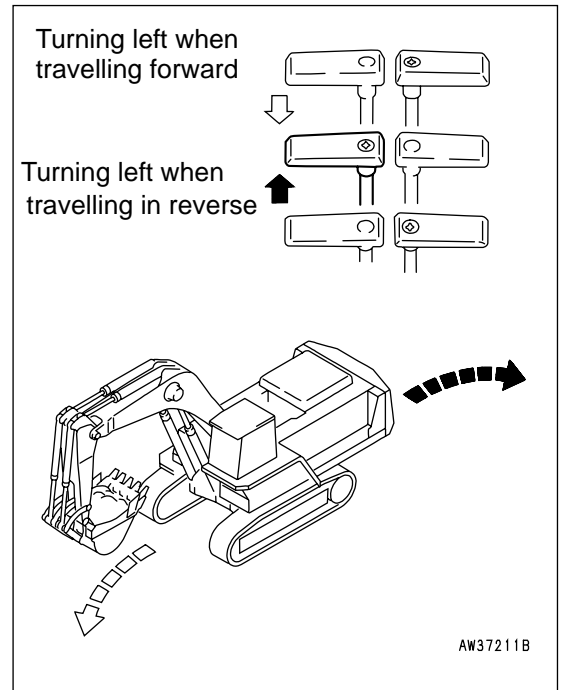
CHANGING DIRECTION OF THE MACHINE

When turning to the left:

If the left travel lever is returned to the neutral position, the machine will turn to the left.

REMARK

When turning to the right, operate the right travel lever in the same way.

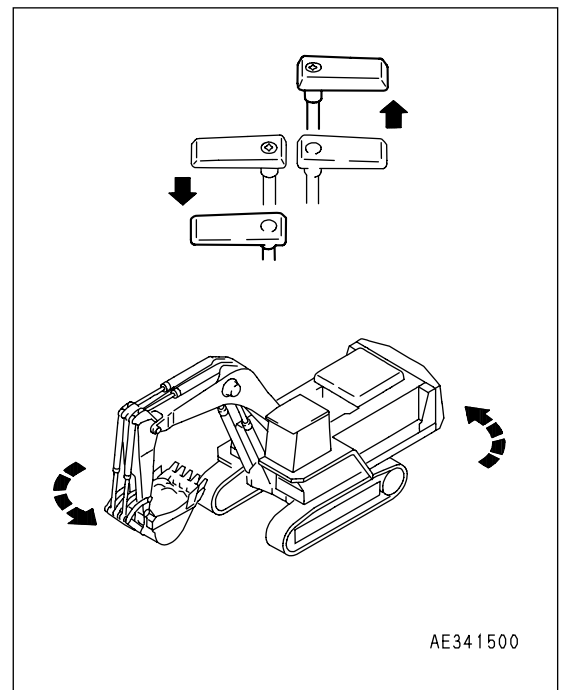


COUNTER-ROTATION TURN (SPIN TURN)

When using counter-rotation (spin turn) to turn left, pull the left travel lever back and push the right travel lever forward.

REMARK

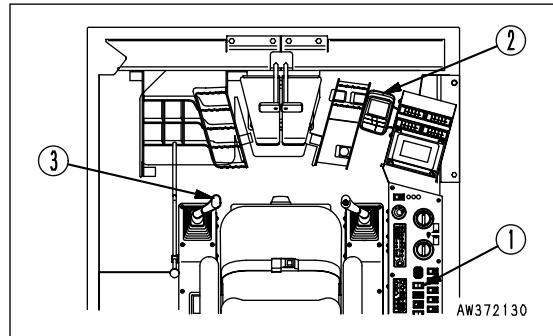
When using counter-rotation to turn right, pull the right travel lever back and push the left travel lever forward.



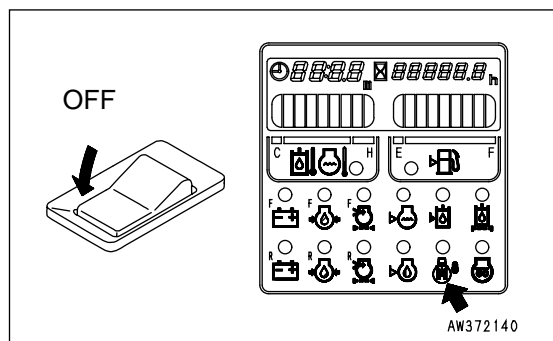
SWINGING

⚠ WARNING

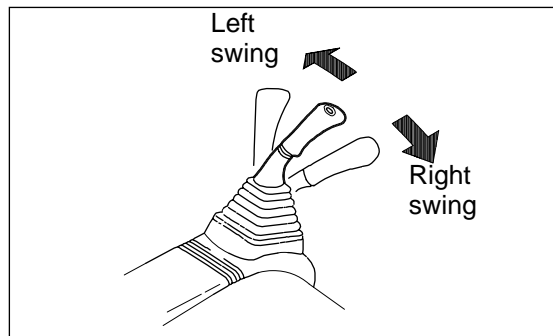
- The rear of the machine extends outside the track width. Check that the surrounding area is safe before swinging the upper structure.
- Check that swing lock monitor (2) is not lighted up.
- If the swing control lever is operated quickly, the upper structure will move quickly; if it is operated slowly, the upper structure will move slowly.



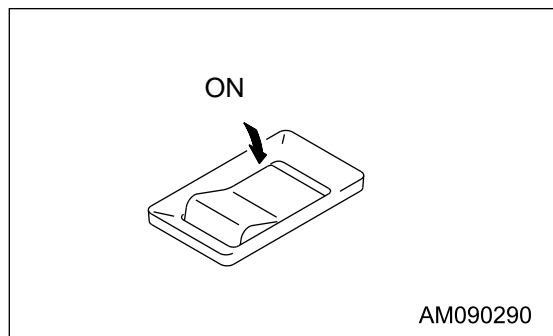
1. Before starting the swing operation, turn swing lock switch (1) OFF and check that swing lock monitor (2) has gone out.



2. Operate left work equipment control lever (3) to operate the swing.



3. When not using the swing, turn swing lock switch (1) ON. Check that swing lock monitor (2) lights up.



WORK EQUIPMENT CONTROLS AND OPERATIONS

⚠ WARNING

- If the lever is operated when the auto-deceleration is being actuated, the engine speed will suddenly rise, so be careful when operating the lever.
- If the work equipment control lever is operated quickly, the work equipment will move quickly; if the lever is operated slowly, the work equipment will move slowly.

The work equipment is operated by the left and right work equipment control levers. The left work equipment control lever operates the arm and swing, and the right work equipment control lever operates the boom and bucket.

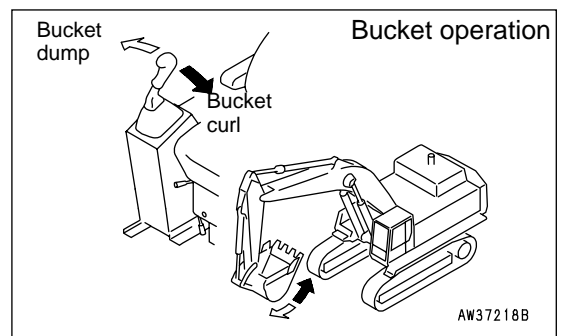
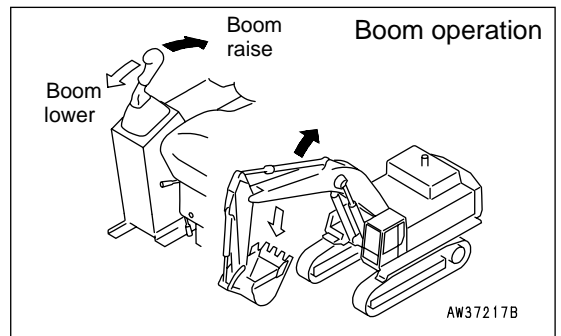
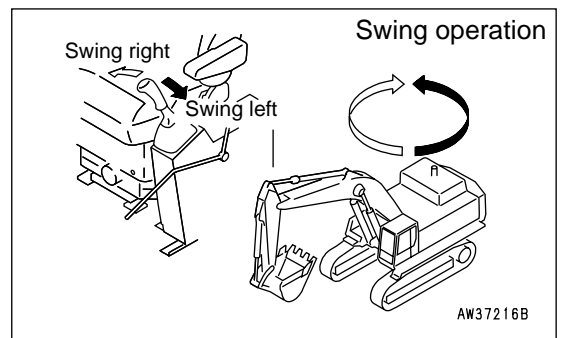
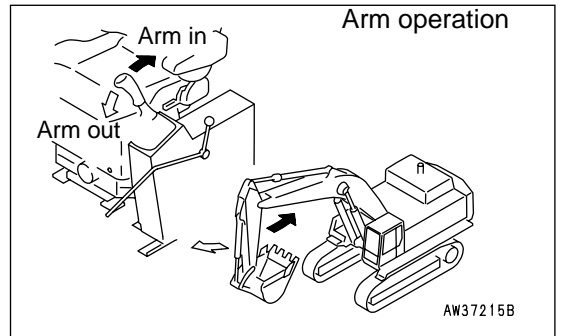
The movements of the lever and work equipment are as shown in the diagrams on the right. When the levers are released, they automatically return to the neutral position and the work equipment is held in place.

- When the machine is at a standstill, and the work equipment levers are put in neutral, the engine speed is kept at medium speed due to the function of the auto-deceleration, even if the fuel control dial is set at the MAX position.

REMARK

If the levers are operated within 15 seconds after stopping the engine, it is possible to lower the work equipment to the ground.

In addition, the levers can also be operated to release any remaining pressure inside the hydraulic cylinder circuit and to lower the boom after loading the machine on a trailer.



HANDLING WORKING MODE

WORKING MODE

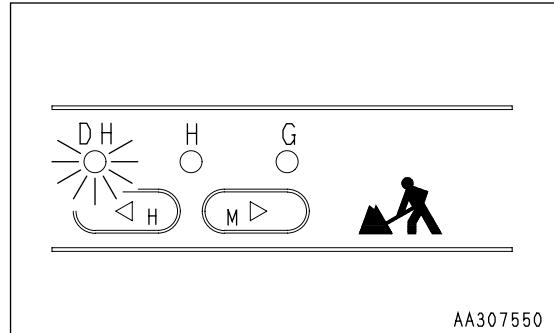
The mode selector switch can be used to switch the mode to match the operating conditions and purpose, thereby enabling work to be carried out efficiently.

Make effective use of each mode as follows.

When the starting switch is turned ON, the working mode is automatically set to H mode, so normal operations can be carried out without setting the mode.

Use the working mode switch to set the mode to the most efficient mode to match the type of work.

Working mode	Applicable work
DH mode	Large capacity digging, loading in a short time quarry
H mode	Normal digging, loading operations
G mode	Fine operations not needing digging power or speed, Grading, leveling, hauling operations



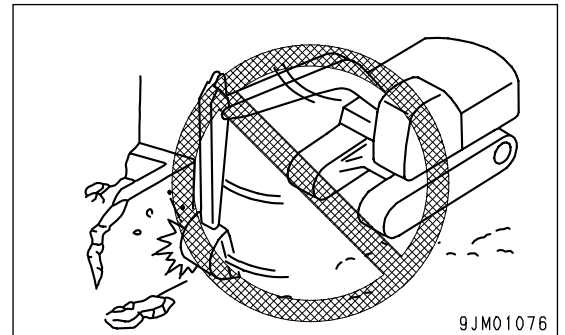
PROHIBITED OPERATIONS

WARNING

- If it is necessary to operate the work equipment control lever when the machine is traveling, be extremely careful when operating.
- If any lever is operated when the auto-deceleration is being actuated, the engine speed will suddenly increase, so be careful when operating.

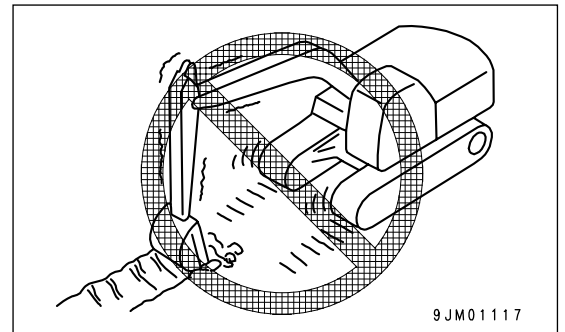
OPERATIONS USING SWING FORCE

Do not use the swing force to compact soil or break objects. This is not only dangerous, but will also markedly reduce the life of the machine.



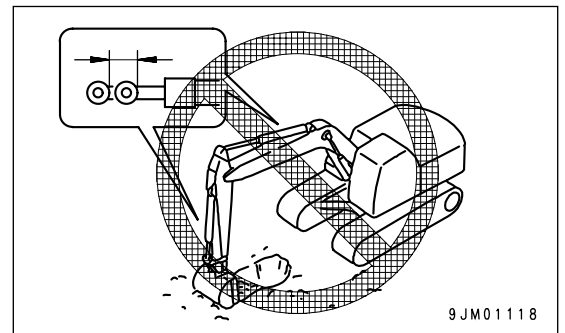
OPERATIONS USING TRAVEL FORCE

Do not dig the bucket into the ground and use the travel force to carry out excavation. This will damage the machine or work equipment.



OPERATIONS USING HYDRAULIC CYLINDER STROKE ENDS

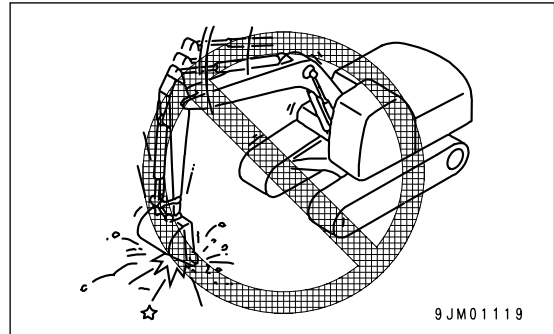
If the cylinder is used when the cylinder rod has been operated to the end of its stroke during operations, external force will cause impact to the work equipment, and this will damage the hydraulic cylinders. Avoid carrying out operations with the hydraulic cylinder fully retracted or fully extended.



OPERATIONS USING BUCKET DROPPING FORCE

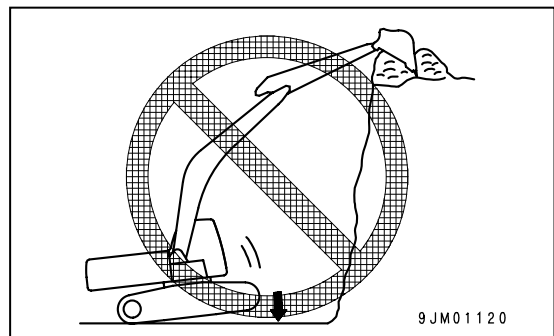
Do not use the dropping force of the machine for digging, or use the dropping force of the bucket as a pickaxe, breaker, or pile driver.

This will markedly reduce the life of the machine.



OPERATIONS USING MACHINE DROPPING FORCE

Do not use the dropping force of the machine for digging.



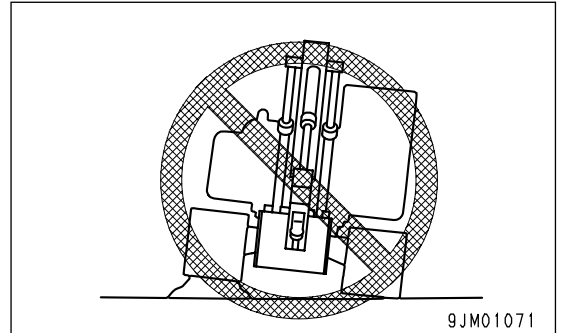
DIGGING HARD ROCKY GROUND

It is better to excavate hard rocky ground after breaking it up by some other means. This will not only reduce damage to the machine but make for better economy.

GENERAL OPERATION INFORMATION

TRAVELING

When traveling over obstacles such as boulders or tree stumps, the machine (in particular, the undercarriage) is subjected to a large shock, so reduce the travel speed and travel over the obstacle at the center of the tracks. As far as possible, remove such obstacles or avoid traveling over them.

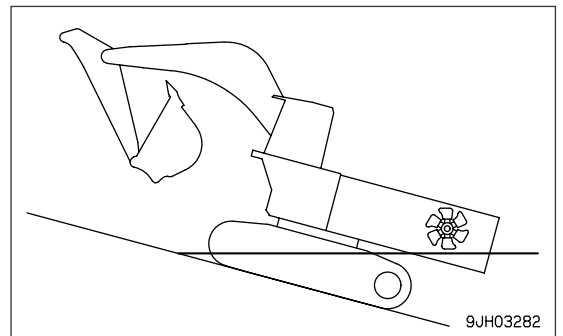


PERMISSIBLE WATER DEPTH

CAUTION

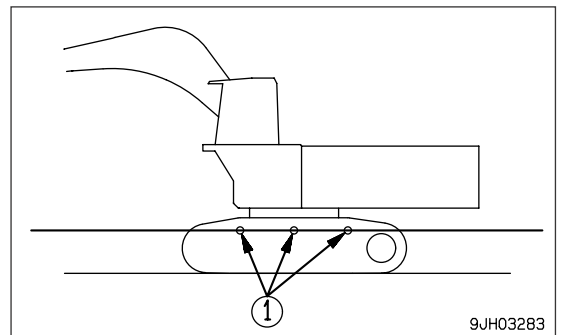
When driving the machine out of water, if the angle of the machine exceeds 15°, the rear of the upper structure will go under water, and water will be thrown up by the radiator fan. This may cause the fan to break.

Be extremely careful when driving the machine out of water.



Do not drive the machine in water deeper than of the center of carrier roller (1).

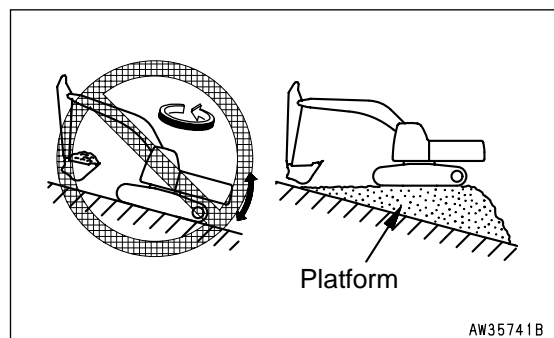
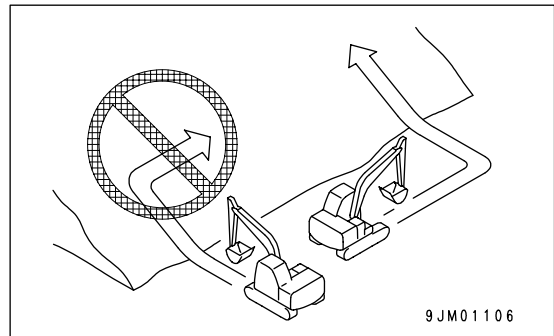
Supply grease to the parts which have been under water for a long time until the used grease is projected out of the bearings (around the bucket pin, in particular).



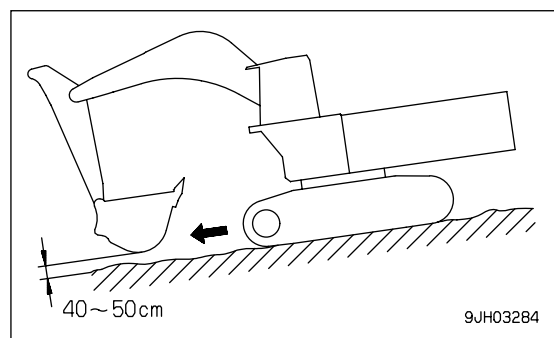
TRAVELING ON SLOPES

⚠ WARNING

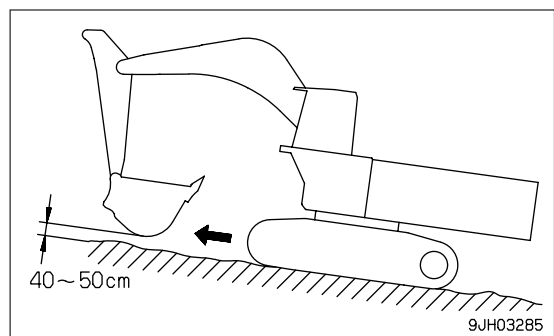
- When traveling, raise the bucket approx. 40 to 50cm from the ground.
- Do not travel downhill in reverse.
- When traveling over ridges or other obstacles, keep the work equipment close to the ground and travel slowly.
- Never turn on slopes or travel across slopes. Always go down to a flat place to perform these operations. It may be longer, but it will ensure safety.
- Always operate or travel in such a way that it is possible to stop safely at any time if the machine slips or becomes unstable.
- Turning or operating the work equipment when working on slopes may cause the machine to lose its balance and turn over, so avoid such operations. It is particularly dangerous to swing downhill when the bucket is loaded. If such operations have to be carried out, pile soil to make a platform on the slope so that the machine can be kept horizontal when operating.
- Do not travel up or down steep slopes. There is danger that the machine may turn over.
- When traveling uphill, if the shoes slip or it is impossible to travel uphill using only the force of the tracks, do not use the pulling force of the arm to help the machine travel uphill. There is danger that the machine may turn over.



1. When traveling down steep hills, use the travel lever and fuel control lever to keep the travel speed low. When traveling down a steep hill of more than 15°, set the work equipment to the posture shown in the diagram on the right, and lower the engine speed.



2. When traveling up a steep hill of more than 15°, set the work equipment to the posture shown in the diagram on the right.



TRAVELING DOWNHILL

To brake the machine during downhill runs, put the travel lever in the neutral position. This will cause the brake to be automatically applied.

ENGINE STOPPED ON SLOPE

If the engine stops when traveling uphill, move the all levers to the neutral position, then start the engine again.

PRECAUTIONS ON SLOPES

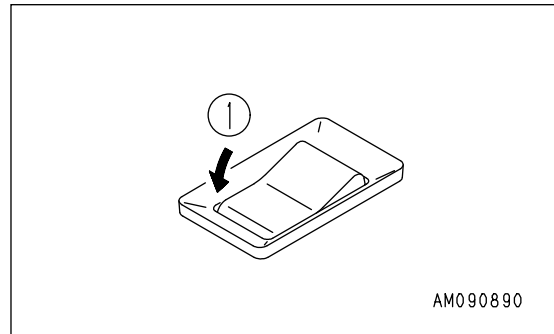
- If the engine stops when the machine is on a slope, never use the left work equipment control lever to carry out swing operations. The upper structure will swing under its own weight.
- Be extremely careful when opening or closing the door on slopes. The weight of the door may cause the door to open or close suddenly.
Always set the door so that it is firmly locked in position.

ESCAPE FROM MUD

Always operate carefully to avoid getting stuck in mud. If the machine does get stuck in mud, use the following procedures to get the machine out.

Be careful not to get stuck in mud when operating. If you do get stuck in mud, do as follows to escape.

- Place the machine push-up switch (1) at position. This will increase the pushing power of the boom and make it easier to escape.

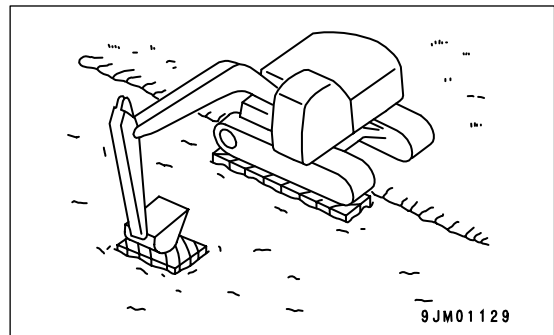


STUCK ONE SIDE OF TRACK

NOTICE

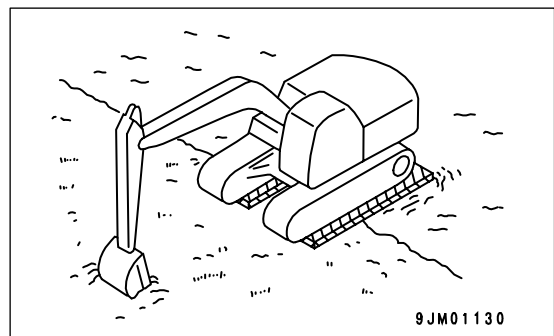
When using the boom or arm to raise the machine, always have the bottom of the bucket in contact with the ground. (Never push with the teeth). The angle between the boom and arm should be 90° to 110°. The same applies when using the inverting bucket.

When only one side is stuck in mud, use the bucket to raise the track, then lay boards or logs and drive the machine out. If necessary, put a board under the bucket also.



STUCK BOTH SIDES OF TRACKS

If the track on both sides are in mud and the machine slips and cannot move, use the procedure given above to lay logs or timber. Dig the bucket into the ground at the front, operate the arm in the same way as when digging, and set the travel lever to FORWARD to pull the machine out.



RECOMMENDED APPLICATIONS

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

BACKHOE WORK

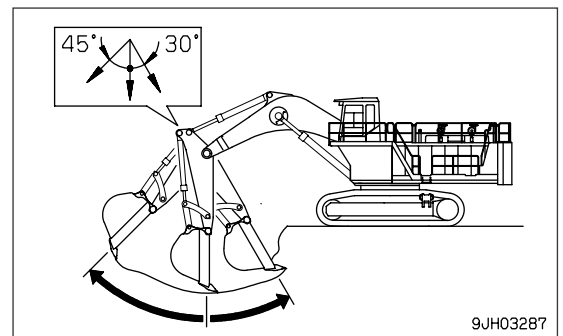
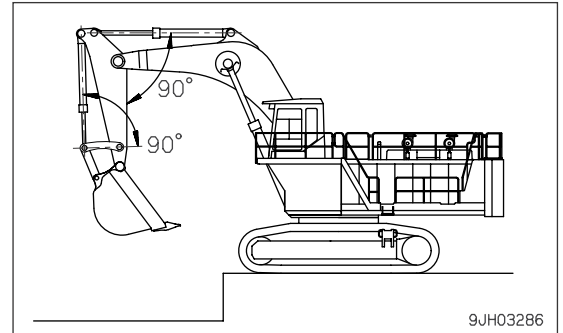
A backhoe is suitable for excavating at a position lower than the machine.

When the condition of the machine is as shown in the diagram at right, each cylinder's maximum pushing excavation force is obtained when the bucket cylinder and link, arm cylinder and arm are at 90° .

When excavating, use this angle effectively to optimize your work efficiency.

The range for excavating with the arm is from a 45° angle away from the machine to a 30° angle toward the machine.

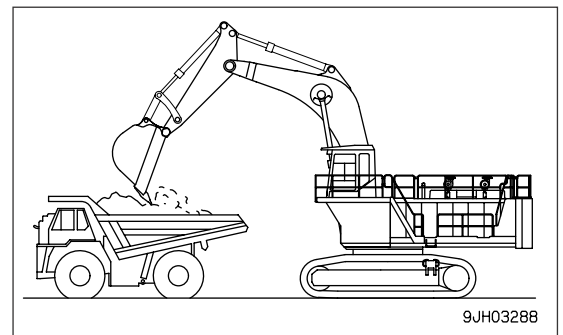
There may be some differences depending on the excavation depth, but try to stay within the above range rather than operating the cylinder is the end of its stroke.



LOADING WORK

In places where the swing angle is small, work can be carried out more efficiently by stopping the dump truck in a place where it can be seen easily by the operator.

Loading is easier and the capacity is greater if you load from the rear of the dump truck body than if you load from the side.



REPLACEMENT AND INVERSION OF BUCKET

WARNING

- When the pin is knocked in with a hammer, pieces of metal may fly into your eyes and cause serious injury.
When carrying out this operation, always wear goggles, hard hat, gloves, and other protective equipment.
- When the bucket is removed, place it in a stable condition.
- If the pins are hit with force, the pin may fly and injure people in the surrounding area, so check that the surrounding area is safe.
- When removing the pin, be extremely careful not to stand behind the bucket or to put your foot or any part of your body behind the bucket from the side.
- When removing or installing the pin, be extremely careful not to get your hands caught.
- Never put your fingers in the pin holes when aligning the holes.

Stop the machine on a firm, flat surface. When performing joint work, make clear signals to each other and work carefully for safety's sake.

REPLACEMENT

1. Place the bucket in contact with a flat surface.

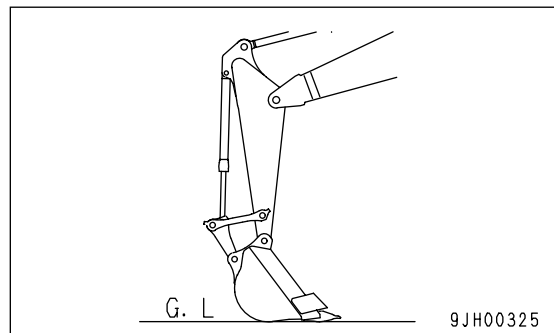
NOTICE

When removing the bucket, set the bucket cylinder facing down as shown in the diagram in the right to prevent the front link from jumping up under the weight of the bucket cylinder.

REMARK

When removing the pins, place the bucket so that it is in light contact with the ground.

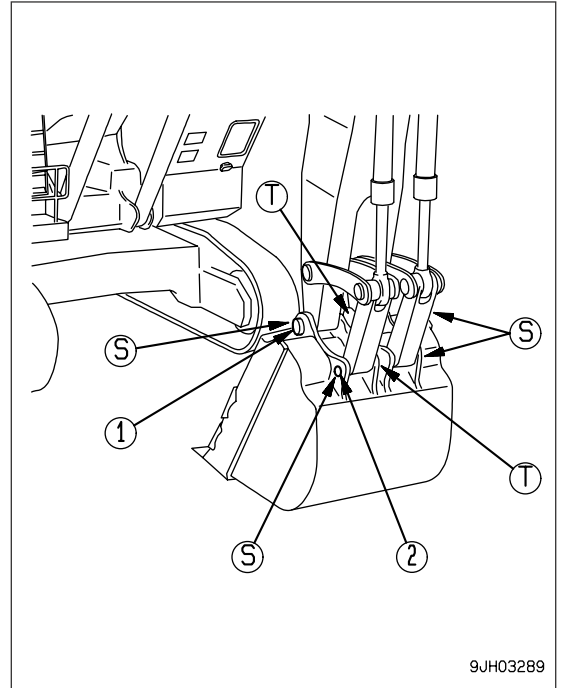
If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.



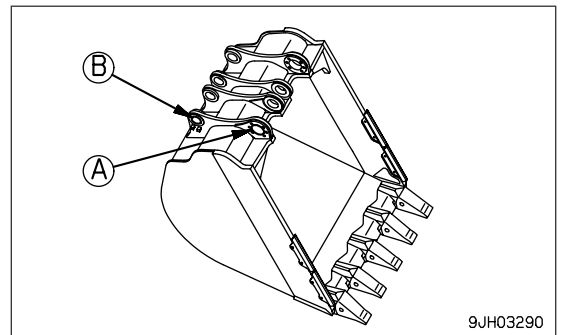
2. Remove pin (1) from the arm mounting hole and pin (2) from the link mounting hole, then remove the bucket.
 - Remove stopper bolts (3 each, 2 places) at portion (T) on the inside of the arm and 2 stoppers, remove stopper bolts (6 each, 2 places) at portion (S) on the outside of the arm, then remove pin (1).
 - Remove stopper bolts (3 each, 2 places) at portion (T) on the inside of the link and 2 stoppers, and install bolts (3 each, 2 places) in the forcing tap holes at portion (S) on the outside of the link, then remove pin (2).

NOTICE

After removing the pins, be careful not to let any sand or mud get on them. In addition, seals are fitted at both ends of the bushing, so be careful not to damage them.

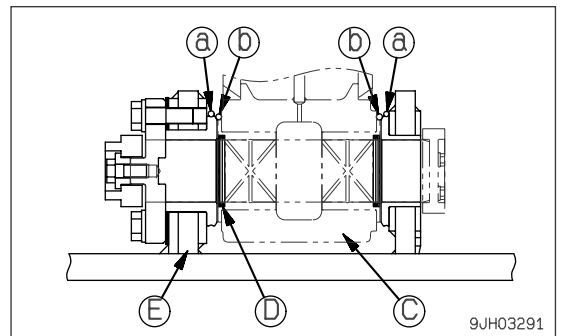


3. Align the arm with hole (A), align the link with hole (B), then coat pins (1) and (2) with the grease, and install them.



REMARK

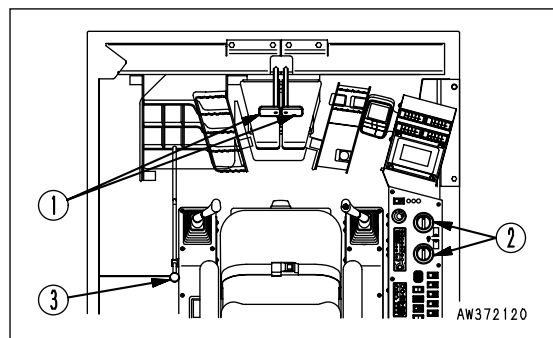
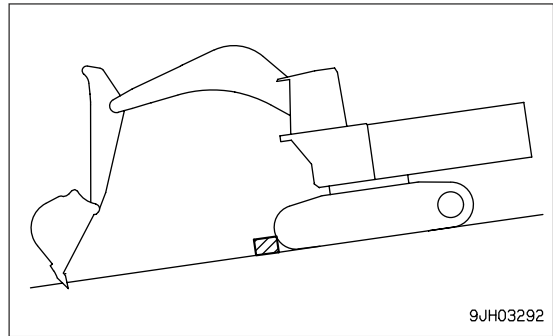
- Carry out installation in the reverse order to removal.
- When installing the bucket, the O-ring can easily be damaged, so fit the O-ring into the groove for bushing (a) at the bucket end (E). After installing the pin, fit it into the specified groove (b).
- After installing the stopper bolt, stopper, collar, and cover for each pin, coat the pins with grease.
- (C):Arm, (D):Seal, (E):Bucket.



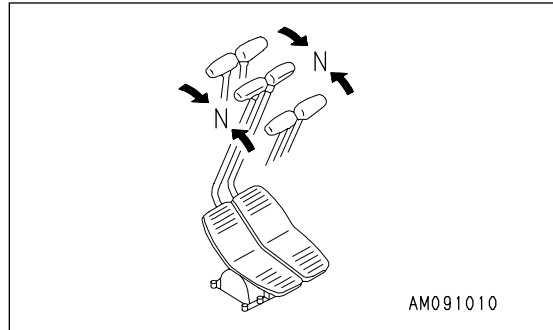
PARKING MACHINE

⚠ WARNING

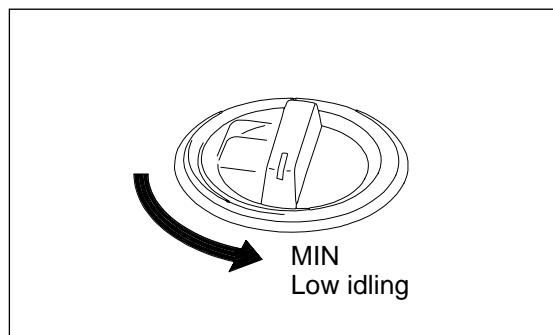
- Avoid sudden stops. Leave as much room as possible when stopping.
- Park the machine on firm level ground. Avoid parking the machine on a slope. If the machine must be parked on a slope, put blocks under tracks and dig the work equipment into the ground to prevent the machine from moving.
- If the work equipment lever is touched by mistake, the work equipment or machine may suddenly move and cause serious personal injury or accident. Always set the safety lock lever securely to the LOCK position before standing up from the operator's seat.



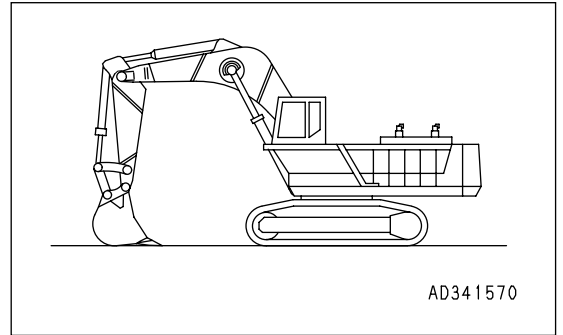
1. Put left and right travel levers (1) in the neutral position. The machine stops.



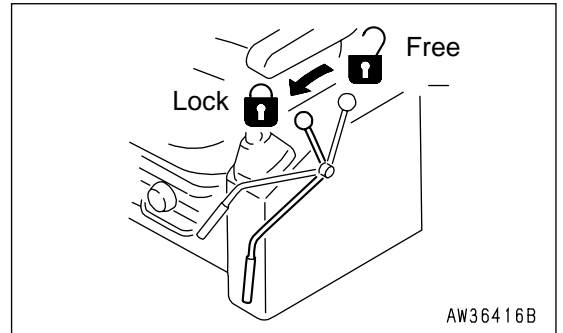
2. Lower the engine speed to low idling by fuel control dial (2).



- 3. Set the work equipment in the posture shown in the diagram on the right.

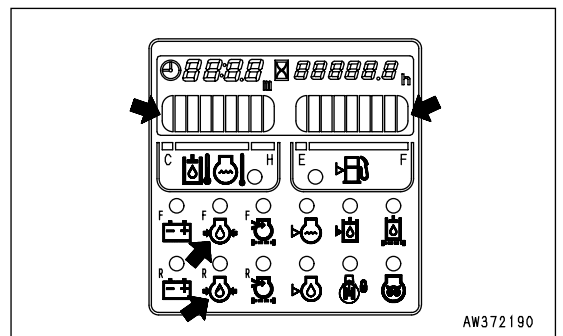


- 4. Set safety lock lever (3) in the LOCK position.



CHECK AFTER FINISHING WORK

Check the engine water temperature, engine oil pressure, and fuel level on the machine monitor.



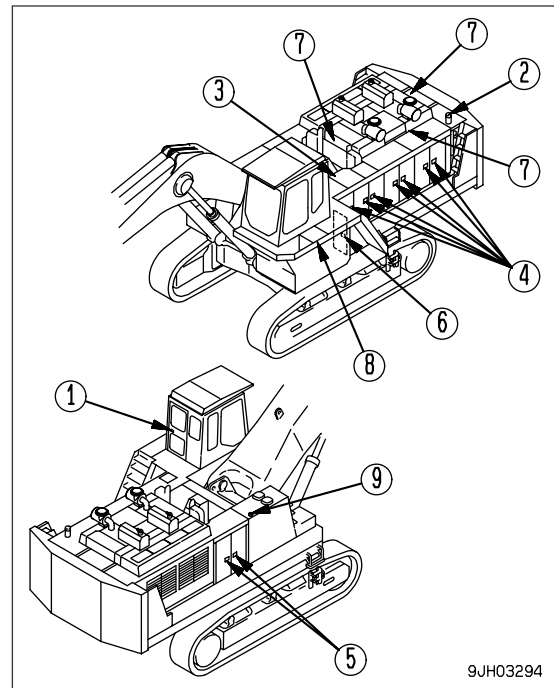
LOCKING

Always lock the following places.

- (1) Door of operator's cab
Always remember to close the window.
- (2) Fuel tank filler port
- (3) Battery box cover
- (4) Left side door of the machine (7 positions)
- (5) Right side door of the machine (2 positions)
- (6) Operator cab under box door
- (7) Engine hood (3 positions)
- (8) Box for storing emergency escape ladder
- (9) Hydraulic tank filler port

REMARK

Use the starting switch key to open and close all these places.



TRANSPORTATION

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

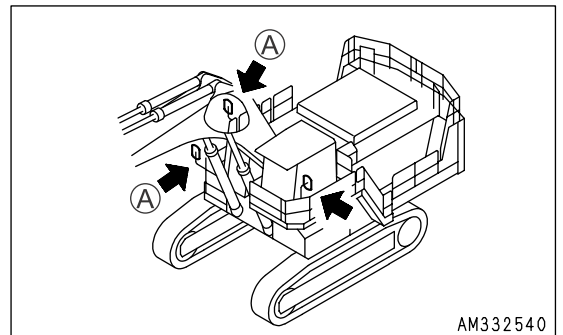
PRECAUTIONS FOR TRANSPORTATION

WARNING

This machine must be divided into several units for transportation. When transporting the machine, please consult your Komatsu distributor.

REMOVAL AND INSTALLATION OF MIRRORS

Mirrors are installed to the positions shown at right (The one marked with (A) is optional). When removing and installing them for replacement or transportation, observe the following procedure.

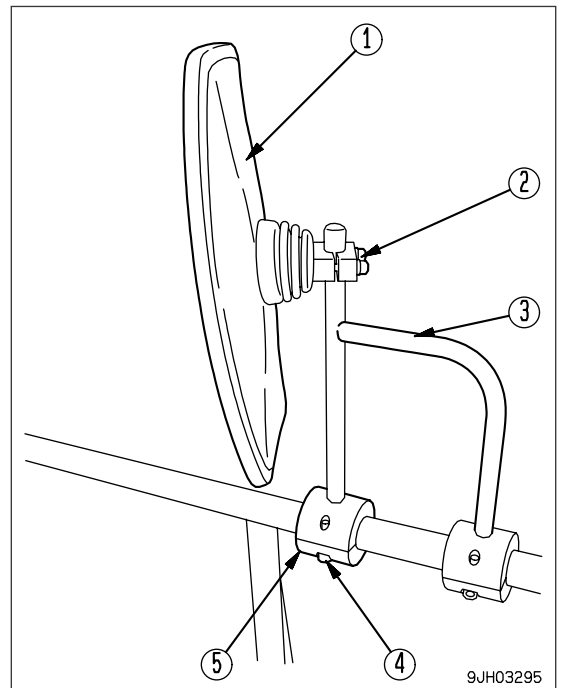


Removal

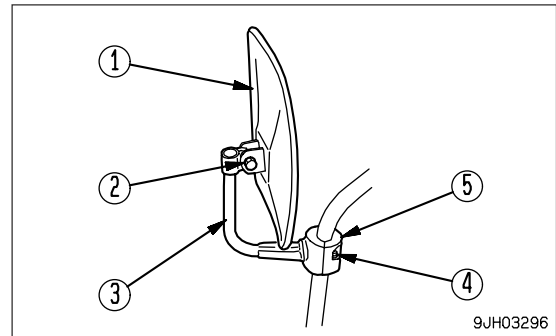
1. Loosen mounting nut (2) of mirror (1), and remove mirror (1) from support (3).
2. Remove bolt (4), then remove support (3) and clamp (5) from the handrail.

Installation

Carry out installation in the reverse order to removal.



- The mirror in the diagram on the right is optional (A).



LIFTING MACHINE

WARNING

- Never carry out the lifting operation with any person on the machine.
- Always make sure that the wire rope used for lifting the machine is of ample strength for the weight of the machine.
- When lifting the machine, pay careful attention to the center of gravity to maintain the balance.

PARTS FOR TRANSPORT

The dimensions in the diagrams are given in millimeters.

For ease of transport, the machine may be disassembled into the parts shown in the diagrams: the body, operator's cab, track frames, ladder, platform, attachments and counterweight.

Ask your Komatsu distributor to carry out the disassembly work.

COLD WEATHER OPERATION

COLD WEATHER OPERATION INFORMATION

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components. For details of the specified viscosity, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-10)".

COOLING SYSTEM COOLANT

WARNING

- Antifreeze is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large quantities of fresh water and see a doctor at once.
- Antifreeze is toxic. Be extremely careful when handling it. When replacing coolant containing antifreeze or when handling coolant when repairing the radiator, contact your Komatsu distributor or ask your local antifreeze dealer. Be careful not to let the water flow into drainage ditches or spray on to the ground surface.
- Antifreeze is flammable, so do not bring any flame close. Do not smoke when handling antifreeze.

NOTICE

- Never use methanol, ethanol or propanol based antifreeze.
- Absolutely avoid using any water leak preventing agent irrespective of weather it is used independently or mixed with an antifreeze.
- Do not mix one antifreeze with a different brand.

For details of the antifreeze mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-25)".

REMARK

Where no permanent antifreeze is available, an ethylene glycol antifreeze without corrosion inhibitor may be used only for the cold season. In this case, clean the cooling system twice a year (in spring and autumn). When refilling the cooling system, add antifreeze in autumn, but do not add any in spring.

For details of the antifreeze mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-25)".

BATTERY

⚠ WARNING

- The battery generates flammable gas, so do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amounts of water, and consult a doctor.
- Battery electrolyte dissolves paint. If it gets on to 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.

When the ambient temperature drops, the capacity of the battery will also drop. If the battery charge ratio is low, the battery electrolyte may freeze. Maintain the battery charge as close as possible to 100%, and insulate it against cold temperature so that the machine can be started easily the next morning.

REMARK

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

Temp. of fluid \ Rate of charge	20°C	0°C	-10°C	-20°C
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 drops markedly in low temperatures, cover the battery or remove it from the machine, keep it 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 the water after the day's work so as to prevent fluid in the battery from freezing in the night.

AFTER DAILY WORK COMPLETION

WARNING

- Performing idle-running of the tracks is dangerous, so stay well away from the tracks.
- After completion of operations, fill the fuel tank to prevent the formation of water caused by condensation of moisture in the empty space in the tank when the temperature goes down.

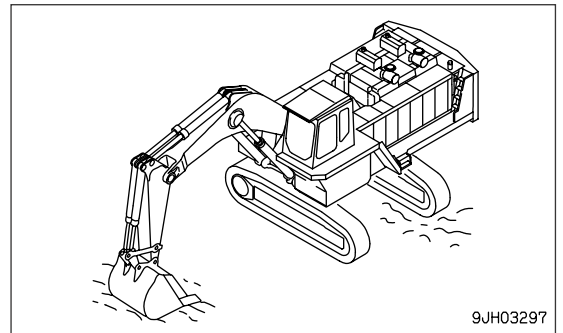
To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, always observe the following precautions.

- Mud and water on the machine body should be completely removed. This is to prevent damage to the seal caused by mud or dirt getting inside the seal with frozen drops of water.
- Park the machine on hard, dry ground.

If this is impossible, park the machine on wooden boards.

The boards help protect the tracks from being frozen in soil and the machine can start next morning.

- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
- After operation in water or mud, remove water from undercarriage as described below to extend undercarriage service life.
 1. Swing 90° with engine at low idling and bring the work equipment to the side of the track.
 2. Jack up the machine until the track is raised slightly from the ground. Rotate the track under no load. Repeat this procedure on both the left and right sides.



AFTER COLD WEATHER SEASON

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

- Replace the fuel and oil for all parts with oil of the viscosity specified.

For details, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-10)".

- If for any reason permanent antifreeze cannot be used, and an ethyl glycol base antifreeze (winter, one season type) is used instead, or if no antifreeze is used, drain the cooling system completely, then clean out the inside of the cooling system thoroughly, and fill with fresh soft water.

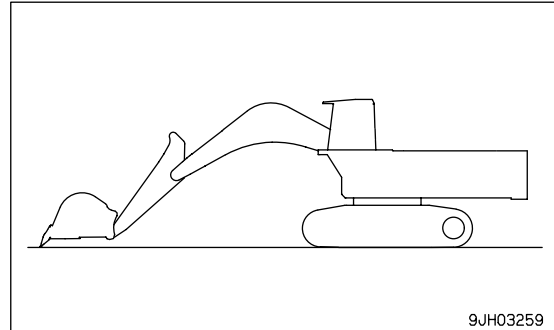
LONG TERM STORAGE

BEFORE STORAGE

NOTICE

When storing the machine, set the machine in the posture shown in the diagram on the right to protect the cylinder rod.

(To prevent rusting of the cylinder rod)



When putting the machine in storage for a long time, do as follows.

- Clean and wash all parts, then store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with a sheet.
- Completely fill the fuel tank, lubricate and change the oil before storage.
- Apply a thin coat of grease to the metal surface of the hydraulic piston rods.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
- If the ambient temperature is expected to drop below 0°C, always add antifreeze to the cooling water.
- Lock each control lever and pedal with the lock lever and pedal lock.
- Set the stop valve to the LOCK position on machines which can install attachments. Install a plug in the elbow.

DURING STORAGE

WARNING

If it is unavoidably necessary to carry out the rust-preventive operation while the machine is indoors, open the doors and windows to improve ventilation and prevent gas poisoning.

- During storage, always operate the machine once a month so that a new film of oil will be coated over movable parts and component surfaces. At the same time, also charge the battery.
- For machines equipped with an air conditioner, run the air conditioner.
- Rotate the tracks.

AFTER STORAGE

NOTICE

If the machine is to be used when the monthly rust prevention operation has not been carried out, please contact your Komatsu distributor.

When using the machine after long-term storage, do as follows before using it.

- Wipe off all the grease coating the hydraulic cylinder rods.
- Add oil and grease to all places.
- When the machine has been stored for a long time, the moisture in the atmosphere will get into the oil. Check the oil at all parts before and after starting the engine. If there is water in the oil, change all the oil.
- Bleed the air from the line filter and work equipment cylinder circuit. For details of the method of bleeding the air, see "PROCEDURE FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT (PAGE 4-45)".

STARTING MACHINE AFTER LONG-TERM STORAGE

When starting the engine after long-term storage, cancel the automatic warming-up operation as follows.

1. Turn the starting switch key to the ON position.
2. Turn the fuel control dial from the low idling (MIN) position to the full (MAX) position, hold it there for 3 seconds, then return it to the low idling (MIN) position and start the engine.

TROUBLESHOOTING

AFTER RUNNING OUT OF FUEL

⚠ WARNING

When air bleed plug (1) at the top of the fuel filter head or supply pump air breather (5) are removed, the system is still under pressure, so fuel may spurt out. Loosen these parts slowly before opening them.

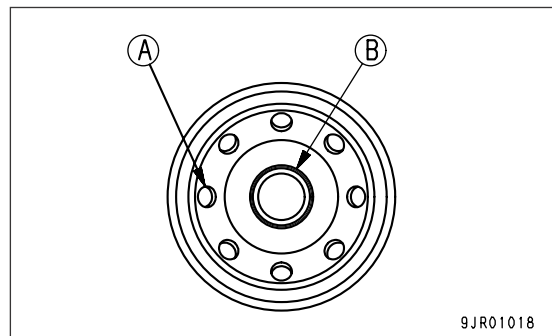
When starting after running out of fuel, fill the filter cartridge with fuel and bleed the air from the fuel system before starting.

PROCEDURE FOR BLEEDING AIR

1. Remove the fuel filter cartridge, fill the filter case with fuel, then install again.

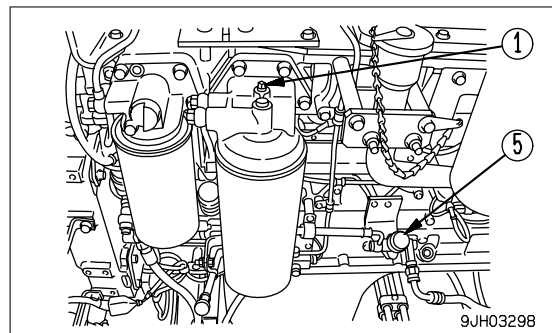
NOTICE

- The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle, so problems may be caused by dust or dirt getting in. When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.
- If no clean fuel is available, bleed the air with priming pump (3) without removing the fuel cartridge.
- When filling with fuel, use clean fuel and be careful not to let any dust or dirt get in. Portion (B) at the center is the clean side, so be particularly careful not to let any dust or dirt get in.
- When adding fuel, always add from small hole (A) at eight places on the dirty side.



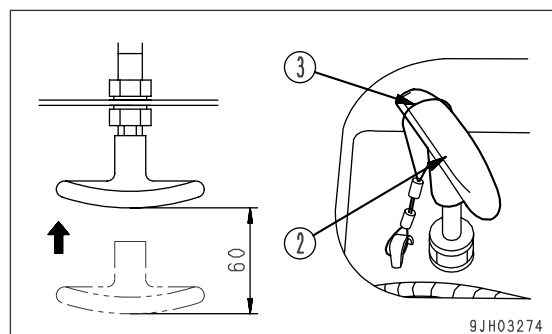
9JR01018

2. Loosen air bleed plug (1) at the top of the fuel filter head.



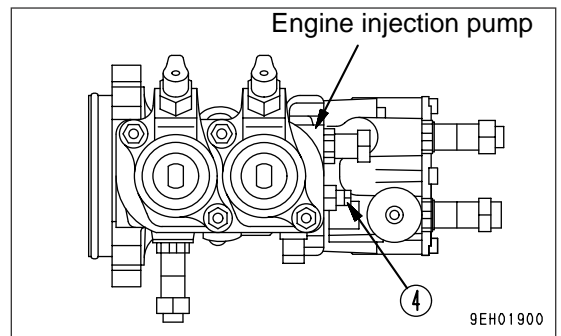
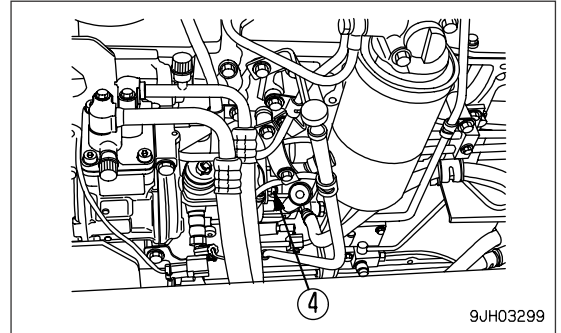
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3. Push in the fuel cut knob (2) installed at the side of the steps on the left side of the machine to set so that fuel is supplied.
After pushing it in, fit wire lock (3) to fuel cut knob (2) to lock fuel cut knob (2) and prevent it from moving.



9JH03274

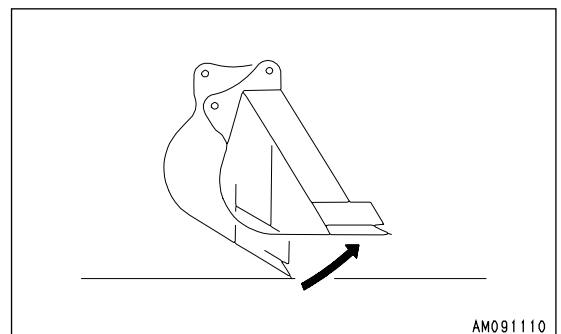
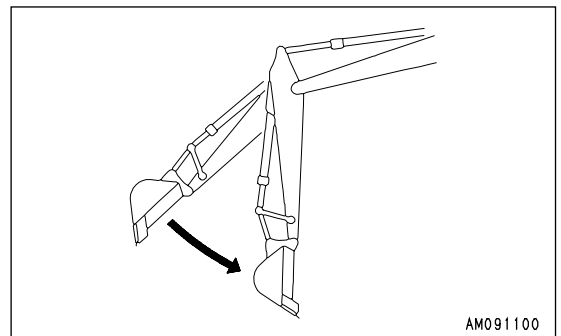
4. Loosen the knob of priming pump (5), pump the knob, and check that fuel comes out from air bleed plug (1). After checking, tighten the plug.
Tightening torque: 7.8 – 9.8 N·m
(0.8 – 1 kgf·m)
5. Open air breather (4) at the side of the supply pump, and pump priming pump (5) approx. 90 – 100 times. With this operation, fuel will start to overflow from air breather (4). When no more bubbles come out with the fuel, tighten air breather (4).
Tightening torque: 4.9 – 6.9 N·m
(0.5 – 0.7 kgf·m)
6. Pump the knob again several tens of times until it becomes stiff, then push in the knob of priming pump (5) and tighten it.
7. If the air is not bled properly, return to Step 4 and bleed the air again.
8. For normal starting operations, turn the key in the starting switch to the START position to start the engine.



PHENOMENA THAT ARE NOT FAILURES

Note that the following phenomena are not failures:

- When the arm is pulled in, the speed of movement will drop momentarily when the arm is more or less vertical.
- When the bucket teeth are almost horizontal, the speed of movement will drop momentarily.
- When starting or stopping the swing, noise will be emitted from the brake valve.
- When traveling down a steep slope at low speed, noise will be emitted from the travel motor.



- When starting or stopping the swing, noise will be emitted from the brake valve.
- When going down a steep slope at low speed, a noise will be emitted from the travel motor.

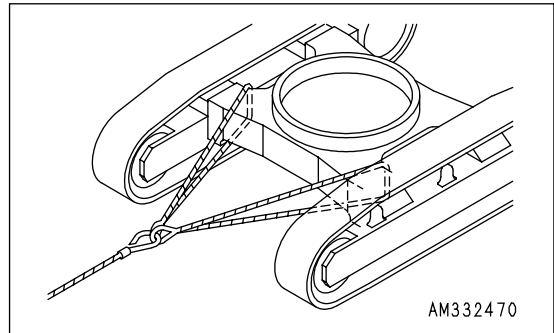
TOWING THE MACHINE

WARNING

- When towing the machine, use a wire rope that has ample strength for the weight of the machine that is being towed.
- Do not apply a sudden load to the wire rope.

If the machine sinks in mud and cannot get out under its own power, or if the drawbar pull of the excavator is being used to tow a heavy object, use a wire rope as shown in the diagram on the right.

Place pieces of wood between wire ropes and body to prevent damage to ropes and body.



PRECAUTIONS ON PARTICULAR JOBSITES

- When carrying out digging operations in water, if the work equipment mounting pin goes into the water, carry out greasing every time the operation is carried out.
- For heavy-duty operations and deep digging, carry out greasing of the work equipment mounting pins every time before operation.

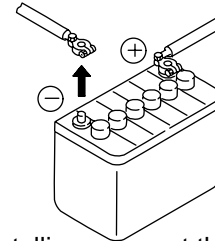
After greasing, operate the boom, arm, bucket, and blade several times, then grease again.

DISCHARGED BATTERY

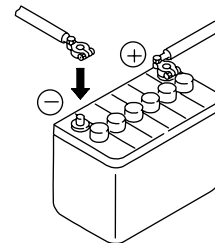
WARNING

- It is dangerous to charge the battery while it is still mounted on the machine. Always remove the battery before charging it.
- When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.
- The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.
- Battery electrolyte is dilute sulphuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, wash it immediately off with large amounts of water. If it gets in your eyes, wash it out with fresh water, and consult a doctor.
- When handling batteries, always wear protective goggles and rubber gloves.
- When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, install the positive (+) terminal first. If a tool touches the positive terminal and the chassis, there is danger that it will cause a spark, so be extremely careful.
- If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.
- When installing the terminals, install them tightly. When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.
- Green rust around the terminals is a cause of self-discharge of the battery. Polish the terminals with sandpaper. After removing the rust, coat the terminals thinly with grease before installing.

When removing, disconnect the cable from the ground terminal first.



When installing, connect the cable to the positive (+) terminal first.



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REMOVAL AND INSTALLATION OF BATTERY

NOTICE

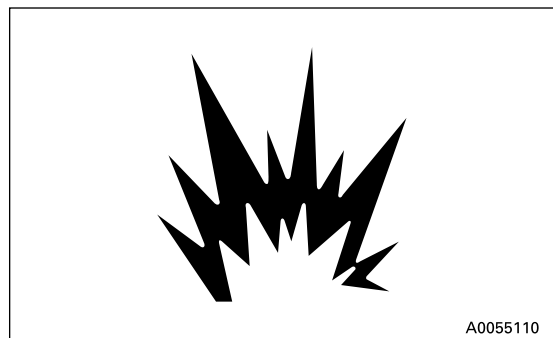
After fixing the battery in position, check that it does not move. If it moves, install it again.

- When removing, remove from the ground side first (normally the (-) terminal). Be careful not to touch between the (+) terminal and the machine with any tool. Letting a tool touch is dangerous as it causes sparks.
- When installing, connect the ground side last.
- When replacing the battery, fix the battery securely with the battery mount clamp.
- Tightening torque of mounting bolts: 9.8 to 14.7 N•m (1 to 1.5 kgf•m)

BATTERY CHARGES

When charging the battery, there is danger that the battery may explode if it is handled wrongly, so follow the instructions in "OTHER TROUBLE (PAGE 3-175)" and the instruction manual supplied with the charger, and be sure to observe the following precautions.

- Set the voltage of the charger to match the voltage of the battery to be charged. If the voltage is not selected correctly, 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 fix 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 hazard 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. Always check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.



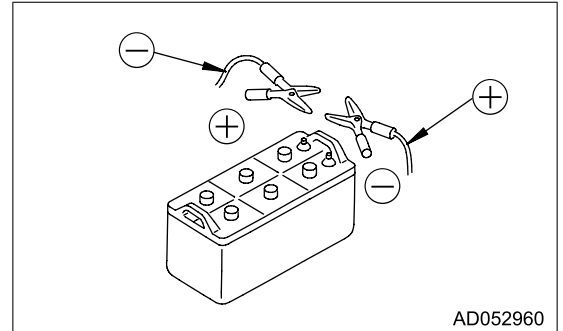
STARTING ENGINE WITH BOOSTER CABLES

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

CONNECTING AND DISCONNECTING BOOSTER CABLES

⚠ WARNING

- When connecting the cables, never contact the positive (+) and negative (-) terminals.
- When starting the engine with a booster cable, always wear safety glasses.
- Be careful not to let the normal machine and problem machine contact each other. This prevents sparks from generating near the battery which could ignite the hydrogen gas given off by the battery. If hydrogen gas explodes, it could cause serious injury.
- Make sure that there is no mistake in the booster cable connections.
The final connection is to the upper structure frame, but sparks will be generated when this is done, so connect to a place as far as possible from the battery. (However, avoid connecting the cable to the work equipment, as conduction is poor.)
- Use care when removing the cables from the machine that has been started. To avoid hydrogen explosion, do not allow the cable ends to contact each other or the machine.



NOTICE

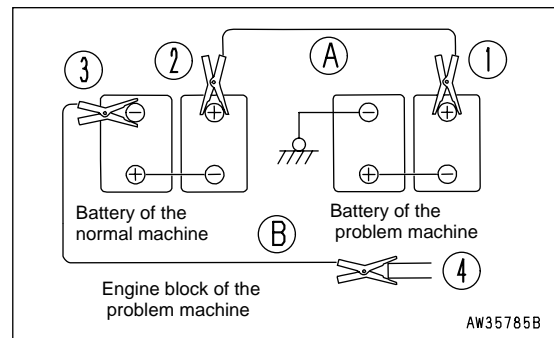
- The starting system for this machine uses 24 V. For the normal machine, also use a 24V battery.
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the engine to be started.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check that the safety lock levers and parking brake levers of both machine are in the LOCK position.
- Check that each lever is in the NEUTRAL position.

BOOSTER CABLE CONNECTION

Keep the starting switch of the normal machine and problem machine are both at the OFF position.

Connect the booster cable as follows, in the order of the numbers marked in the diagram.

1. Make sure that the starting switches of the normal machine and problem machine are both at the OFF position.
2. Connect one clip of booster cable (A) to the positive (+) terminal of the problem machine.
3. Connect the other clip of booster cable (A) to the positive (+) terminal of the normal machine.
4. Connect one clip of booster cable (B) to the negative (-) terminal of the normal machine.
5. Connect the other clip of booster cable (B) to the upper structure of the problem machine.



STARTING THE ENGINE

⚠ CAUTION

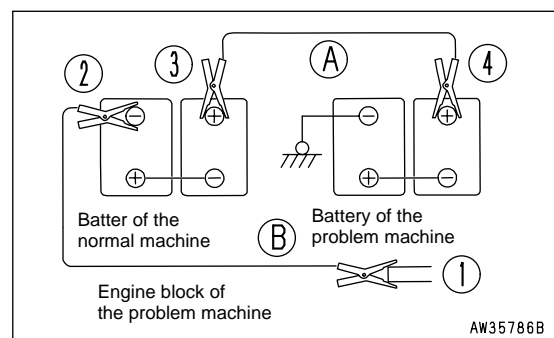
Always check that the safety lock lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Check also that all the control levers are at the HOLD or neutral position.

1. Make sure the clips are firmly connected to the battery terminals.
2. Start the engine of the normal machine and keep it to run at high idling speed.
3. Turn the starting switch of the problem machine to the START position and start the engine. If the engine doesn't start at first, try again after 2 minutes or so.

BOOSTER CABLE DISCONNECTION

After the engine has started, disconnect the booster cables in the reverse of the order in which they were connected.

1. Remove one clip of booster cable (B) from the upper structure of the problem machine.
2. Remove the other clip of booster cable (B) from the negative (-) terminal of the normal machine.
3. Remove one clip of booster cable (A) from the positive (+) terminal of the normal machine.
4. Remove the other clip of booster cable (A) from the positive (+) terminal of the problem machine.



OTHER TROUBLE

ELECTRICAL SYSTEM

- (): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed	● Defective wiring	(● Check, repair loose terminals, disconnections)
Lamp flickers while engine is running	● Defective adjustment of V belt tension	● Check, adjust V belt tension For details, see EVERY 250 HOURS SERVICE
Charge level monitor does not go out even when engine is running	● Defective alternator ● Defective wiring	(● Replace) (● Check, repair)
Abnormal noise is generated from alternator	● Defective alternator	(● Replace)
Starting motor does not turn when starting switch is turned to ON	● Defective wiring ● Defective starting motor ● Insufficient battery charge ● Defective safety relay ● Defective engine controller	(● Check, repair) (● Replace) ● Charge (● Replace) (● Replace)
Pinion of starting motor keeps going and out	● Insufficient battery charge ● Defective safety relay (direct starting motor)	● Charge (● Replace)
Starting motor turns engine sluggishly	● Insufficient battery charge ● Defective starting motor	● Charge (● Replace)
Starting motor disengages before engine starts	● Defective wiring ● Insufficient battery charge	(● Check, repair) (● Replace)
Pre-heating monitor does not light	● Defective wiring ● Defective heater relay ● Defective monitor	(● Check, repair) (● Replace) (● Replace)
Oil pressure monitor does not light up when engine is stopped (starting switch at ON position)	● Defective monitor ● Defective wiring	(● Replace) (● Replace)
Charge level monitor does not light up when engine is stopped (starting switch at ON position)	● Defective monitor ● Defective wiring	(● Replace) (● Check, repair)

CHASSIS

- (): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Speed of travel, swing, boom, arm, bucket is slow	<ul style="list-style-type: none"> ● Lack of hydraulic oil 	<ul style="list-style-type: none"> ● Add oil to specified level, see CHECK BEFORE STARTING
	<ul style="list-style-type: none"> ● Controller abnormal ● Hydraulic circuit abnormal ● Safety valve abnormal 	<ul style="list-style-type: none"> ● Have inspection carried out
Pump generates abnormal noise	<ul style="list-style-type: none"> ● Clogged element in the fuel tank strainer ● Loose suction hose ● Defective air bleeding 	<ul style="list-style-type: none"> ● Clean, see EVERY 2000 HOURS SERVICE ● Tighten ● Bleed air
Excessive rise in hydraulic oil temperature	<ul style="list-style-type: none"> ● Loose fan belt ● Dirty oil cooler ● Lack of hydraulic oil 	<ul style="list-style-type: none"> ● Check fan belt tension, see EVERY 500 HOURS SERVICE ● Clean, see EVERY 500 HOURS SERVICE ● Add oil to specified level, see CHECK BEFORE STARTING
Track comes off	<ul style="list-style-type: none"> ● Track too loose 	<ul style="list-style-type: none"> ● Adjust track tension, see WHEN REQUIRED
Abnormal wear of sprocket		
Does not swing	<ul style="list-style-type: none"> ● Swing lock switch still applied 	<ul style="list-style-type: none"> ● Turn swing lock switch OFF

ENGINE

- (): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Engine oil pressure monitor lights up	<ul style="list-style-type: none"> ● Engine oil pan oil level is low (sucking in air) ● Clogged oil filter cartridge ● Defective tightening of oil pipe, pipe joint, oil leakage from damaged point ● Disconnection, broken wiring to sensor 	<ul style="list-style-type: none"> ● Add oil to specified level, see CHECK BEFORE STARTING ● Replace cartridge, see EVERY 500 HOURS SERVICE (● Check, repair) (● Replace)
Steam is emitted from top part of radiator (pressure valve)	<ul style="list-style-type: none"> ● Cooling water level low, water 	<ul style="list-style-type: none"> ● Add cooling water, repair see leakage CHECK BEFORE STARTING
Radiator water level monitor lights up	<ul style="list-style-type: none"> ● Loosen fan belt 	<ul style="list-style-type: none"> ● Check fan belt tension, see EVERY 500 HOURS SERVICE
Engine water temperature gauge is in red range	<ul style="list-style-type: none"> ● Dirt or scale accumulated in cooling system 	<ul style="list-style-type: none"> ● Change cooling water, clean inside of cooling system, see WHEN REQUIRED
Engine water temperature monitor lights up	<ul style="list-style-type: none"> ● Clogged radiator fin or damaged fin ● Defective engine water temperature gauge ● Defective thermostat ● Defective thermostat seal ● Loose radiator filler cap (high altitude operation) ● Disconnection, broken wiring to sensor 	<ul style="list-style-type: none"> ● Clean or repair, see EVERY 500 HOURS SERVICE (● Replace engine water temperature gauge) (● Replace thermostat) (● Replace thermostat seal) ● Tighten cap or replace packing (● Repair, connect wiring)
Engine water temperature gauge display stays at lowest level and does not rise	<ul style="list-style-type: none"> ● Defective water temperature gauge monitor ● Defective thermostat ● In cold weather, cold wind is blowing strongly against engine 	<ul style="list-style-type: none"> (● Replace water temperature gauge monitor) ● Replace thermostat (● Install radiator curtain)
Engine does not start even when starting motor is turned	<ul style="list-style-type: none"> ● Lack of fuel ● Air in fuel system ● No fuel in fuel filter ● Starting motor cranks engine slowly ● Fuel cut knob is pulled out ● Defective valve clearance (defective compression) 	<ul style="list-style-type: none"> ● Add fuel, see CHECK BEFORE STARTING (● Repair place where air is sucked in) ● Fill filter with fuel. See EVERY 500 HOURS SERVICE. ● See ELECTRICAL SYSTEM ● Push fuel cut knob back in (● Adjust valve clearance)
Starting motor does not turn	<ul style="list-style-type: none"> ● Defective starting motor ● Engine stop switch is ON 	<ul style="list-style-type: none"> (● Check, replace, repair) (● Cancel engine stop switch)
Fuel stops from time to time	<ul style="list-style-type: none"> ● Crushed fuel tank breather tube 	<ul style="list-style-type: none"> (● Replace breather tube)

Problem	Main causes	Remedy
Excessive oil consumption	<ul style="list-style-type: none"> ● Oil leakage ● Excessive oil in oil pan 	(●Check, repair) ● Add oil to specified level. See CHECK BEFORE STARTING
Exhaust gas is white or blue	<ul style="list-style-type: none"> ● Worn piston, ring, cylinder liner ● Improper fuel ● Defective turbocharger 	(●Replace) ● Replace with specified fuel (●Check, replace)
Exhaust gas is black	<ul style="list-style-type: none"> ● Clogged air cleaner element ● Worn piston, ring, cylinder liner ● Defective compression ● Defective turbocharger ● Defective exhaust brake ● Defective injector 	<ul style="list-style-type: none"> ● Clean or replace. See WHEN REQUIRED (●Check, repair) ● See adjustment of clearance above (●Check, replace) (●Check, replace, repair) (●Check, adjust, repair)
Engine hunts	<ul style="list-style-type: none"> ● Air entering suction side of fuel line 	
There is knocking (combustion or mechanical)	<ul style="list-style-type: none"> ● Poor quality fuel being used ● Overheating 	
Error code is displayed on monitor	Please contact your Komatsu distributor	
Alarm buzzer sounds		
Engine suddenly loses power (entered delayed mode)		
Combustion noise occasionally make breathing sound	<ul style="list-style-type: none"> ● Defective nozzle 	(● Replace nozzle)
Abnormal noise generated (combustion or mechanical)	<ul style="list-style-type: none"> ● Low-grade fuel being used ● Overheating ● Damage inside muffler ● Excessive valve clearance 	<ul style="list-style-type: none"> ● Change to specified fuel ● Refer to "Radiator water level monitor lights up" as above ● Replace muffler (● Adjust clearance)

ELECTRONIC CONTROL SYSTEM

If an error code appears on the machine monitor display (normally displays TIME), follow the countermeasure table as shown below in the self-diagnosis.

Machine monitor trouble display

Monitor display	Error mode	Countermeasure
E02	TVC valve system error	When emergency pump drive switch is turned ON, normal operations become possible but have inspection carried out immediately. (※)
E03	Swing brake system error	Turn swing holding brake cancel switch ON to cancel brake. When applying swing brake, operate swing lock switch manually. In the case of some failures, it may be impossible to cancel. In any case, have inspection carried out immediately. (※)
E0E	Network system error	If engine can be operated, move machine to a safe posture, then have inspection carried out immediately. If engine is operated and then stalls, turn emergency pump drive switch ON, move machine to a safe posture, then have inspection carried out immediately. Even if engine is stopped, have inspection carried out immediately.
E10	Engine emergency stop error	Check that engine has not run out of fuel, that fuel cut knob is not pulled out, and that engine stop switch is not pushed in. If condition cannot be restored, have inspection carried out immediately.
E11	Engine control system error	If drop in engine output is excessive, for causes such as abnormality of engine control sensor, move machine to a safe place, stop it, then have inspection carried out immediately.
E14	Fuel control dial system error	If engine speed is not actuated normally even when fuel control dial is operated, check for problems such as disconnection in dial. If condition cannot be restored, have inspection carried out immediately.
E15	Engine controller minor failure	Normal operations are possible, but there is probably abnormality in engine sensing sensor, so have inspection carried out immediately.
E22	Engine oil temperature or PTO oil temperature abnormal	Stop engine and check PTO oil level and engine oil level
E23	Defective connection of VHMS or F, R engine water temperature sensor abnormal	Normal operations are possible, but there is probably abnormality in engine sensing sensor, so have inspection carried out immediately.
When no error code is displayed but it is impossible to operate work equipment and swing		Have inspection carried out immediately.

(※): For details of handling the emergency pump drive switch, swing holding brake cancel switch, and emergency work equipment actuation switch, see "SWITCHES (PAGE 3-57)".

MEMO

MAINTENANCE

 **WARNING**

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

MAINTENANCE INFORMATION

Do not carry out any inspection and maintenance operation that is not found in this manual.

SERVICE METER READING

Check the service meter reading every day to see if the time has come for any necessary maintenance to be carried out.

KOMATSU GENUINE REPLACEMENT PARTS

Use Komatsu genuine parts specified in the Parts Book as replacement parts.

KOMATSU GENUINE LUBRICANTS

Use Komatsu genuine oils and grease. Choose oils and grease with proper viscosities specified for ambient temperature.

WINDSHIELD WASHER FLUID

Use automobile windshield washer fluid, and be sure not to let any dirt get into it.

FRESH AND CLEAN LUBRICANTS

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

After oil is changed or filters are replaced, check the old oil and filters for metal particles and foreign materials. If large quantities of metal particles or foreign materials are found, always report to the person in charge, and carry out suitable action.

FUEL STRAINER

If your machine is equipped with a fuel strainer, do not remove it while fueling.

WELDING INSTRUCTIONS

- Turn off the engine starting switch.
- Do not apply more than 200V continuously.
- Connect grounding cable within 1m from the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may have troubles.
- Avoid seals, bearings, hydraulic pumps, or the swing circle from being between the area to be welded and the position of grounding.
The seals will be damaged by sparks.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

DO NOT DROP THINGS INSIDE MACHINE

- When opening inspection windows or the oil filler port of the tank to carry out inspection, be careful not to drop nuts, bolts, or tools inside the machine.
If such things are dropped inside the machine, it will cause damage and malfunction of the machine, and will lead to failure. If you drop anything inside the machine, always remove it immediately.
- Do not put unnecessary things in your pockets. Carry only things which are necessary for inspection.

DUSTY JOBSITE

When working at dusty worksites, do as follows:

- Check the clogging of the air cleaner more frequently with the air cleaner clogging monitor.
Clean the air cleaner element more frequently.
- Clean the radiator core frequently to avoid clogging.
- Clean and replace the fuel filter frequently.
- Clean the fuel filter To prevent it from becoming clogged with dust.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
- Clean and replace the hydraulic tank element more frequently.
- To prevent dust or dirt from getting in, move the machine to a place where there is no dust when checking or changing the oil.
- When inspecting or changing the oil, move the machine to a place that is free of dust to prevent dirt from getting into the oil.

AVOID MIXING LUBRICANTS

Never mix different kinds of oil. If a different type of oil has to be added, drain the old oil and replace all the oil with the new type of oil.

LOCKING THE INSPECTION COVERS

When carrying out maintenance with the inspection cover open, lock it in position securely with a lock bar. If inspection or maintenance is carried out with the inspection cover open and not locked in position, there is a hazard that it may be suddenly blown shut by the wind and cause injury to the worker.

HYDRAULIC SYSTEM – AIR BLEEDING

When hydraulic equipment has been repaired or replaced, or the hydraulic piping has been removed and installed again, the air must be bled from the circuit. For details, see “PROCEDURE FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT (PAGE 4-45)”.

HYDRAULIC HOSE INSTALLATION

- When removing parts at locations where there are O-rings or gasket seals, clean the mounting surface, and replace with new parts.
When doing this, be careful not to forget to assemble the O-rings and gaskets.
- When installing the hoses, do not twist them or bend them into loops with a small radius.
This will cause damage to the hose and markedly reduce its service life.

CHECKS AFTER INSPECTION AND MAINTENANCE WORKS

If you forget to carry out the checks after inspection and maintenance, unexpected problems may occur, and this may lead to serious injury or property damage. Always do as follows.

- Checks after operation (with engine stopped)
 - Have any inspection and maintenance points been forgotten?
 - Have all inspection and maintenance items been carried out correctly?
 - Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside machine and get caught in the lever linkage mechanism.
 - Is there any leakage of water or oil? Have all the bolts been tightened?
- Checks when operating engine
 - For details of the checks when operating the engine, see “TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-35)” and pay careful attention to safety.
 - Are the inspection and maintenance items working properly?
 - Is there any leakage of oil when the engine speed is raised and load is applied to the oil pressure?

LUBRICANTS, COOLANT AND FILTERS

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and work equipment under extremely severe conditions (high temperature, high pressure), and is deteriorates with use.

Always use oil that matches the grade and temperature for use given in the Operation and Maintenance Manual.

Even if the oil is not dirty, always change the oil after the specified interval.

- Oil corresponds to blood in the human body, so always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.

The majority of problems with machine are caused by the entry of such impurities.

Take particular care not to let any impurities get in when storing or adding oil.

- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
Having too much oil or too little oil are both causes of problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, please contact your Komatsu distributor.
- When changing the oil, always replace the related filters. In particular, when replacing the engine oil filter, fill the new filter with fresh, clean specified oil before installing.
- We recommend you to have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.

FUEL

- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified in the Operation and Maintenance Manual.

Fuel may congeal depending on the temperature when it is used (particularly in low temperature below – 15°C), so it is necessary to change to a fuel that matches the temperature.

- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.

COOLING SYSTEM COOLANT

- River water contains large amounts of calcium and other impurities, so if it is used, scale will stick to the engine and radiator, and this will cause defective heat exchange and overheating.

Do not use water that is not suitable for drinking.

- When using anti-freeze, always observe the precautions given in the Operation and Maintenance Manual.
- Komatsu machines are supplied with Komatsu specified anti-freeze in the coolant.

This anti-freeze is effective in preventing corrosion of the cooling system.

The anti-freeze can be used continuously for 2 years or 4000 hours. Therefore, it can be used as it is even in hot areas.

- Anti-freeze is flammable, so be extremely careful not to expose it to flame or fire.
- The ratio for the mixture of water and anti-freeze differs according to the ambient temperature.

For details of the ratio, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-25)".

- If the engine overheats, wait for the engine to cool before adding coolant.
- In addition to causing overheating, lack of cooling water also causes corrosion of the cooling circuit due to entry of air.

GREASE

- Grease is used to prevent twisting and noise at the joints.
- The nipples not included in the MAINTENANCE section are nipples used when overhauling, so they do not need grease.

If any part becomes stiff or generates noise after being used for a long time, grease it.

- Always wipe off all of the old grease that is pushed out when greasing.

Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

CARRYING OUT KOWA (Komatsu Oil Wear Analysis)

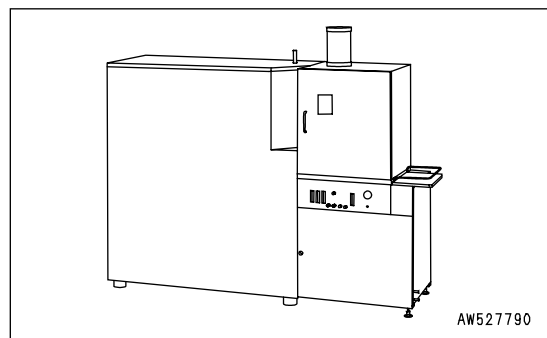
KOWA is a maintenance service that makes it possible to prevent machine failures and down-time. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other abnormalities.

Periodic use of KOWA makes the following possible:

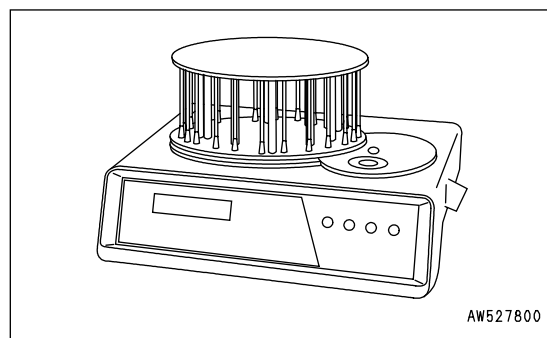
- It enables abnormalities to be detected early, leading to reduction of repair costs and machine downtime.
- It enables repair schedules to be planned, leading to improved machine availability.

KOWA ANALYSIS ITEMS

- Analysis of metal wear particles
This uses an ICP (Inductively Coupled Plasma) analyzer to measure the density of metal wear particles in the oil.



- Measurement of particle quantity
This uses a PQI (Particle Quantifier Index) measurer to measure the quantity of large iron particles in the oil.



- Others
Measurements are made of items such as the ratio of water or fuel in the oil, and the dynamic viscosity.

OIL SAMPLING

- Sampling interval
250 hours: Engine
500 hours: Other components
- Precautions when sampling
 - Make sure that the oil is well mixed before sampling.
 - Carry out sampling regularly at fixed intervals.
 - Do not carry out sampling on rainy or windy days when water or dust can get into the oil.

For further details of KOWA, please contact your Komatsu distributor.

OIL AND FUEL STORAGE

- Keep indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, put the drum on its side so that the filler port of the drum can is at the side. (To prevent moisture from being sucked in)
If drum cans have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

FILTERS

- Filters are extremely important safety parts. They prevent impurities in the fuel and air circuits from entering important equipment and causing problems.

Replace all filters periodically. For details, see the Operation and Maintenance Manual.

However, when working in severe conditions, replace the filters at shorter intervals according to the oil and fuel (sulfur content) being used.

- Never try to clean the filters (cartridge type) and use them again. Always replace with new filters.
- When replacing oil filters, check if any metal particles are affixed to the old filter. If any metal particles are found, please contact your Komatsu distributor.
- Do not open packs of spare filters until just before they are to be used.
- Always use Komatsu genuine filters.

ELECTRIC SYSTEM MAINTENANCE

- It is extremely dangerous if the electrical equipment becomes wet or the covering of the wiring is damaged. This will cause electrical leakage and may lead to malfunction of the machine. Do not wash the inside of the operator's cab with water. When washing the machine, be careful not to let water get into the electrical components.
- Service relating to the electric system is check of fan belt tension, check of damage or wear in the fan belt and check of battery fluid level.
- Never install any electric components other than those specified by Komatsu.
- External electrical interference may cause malfunction of the control system controller, so before installing a radio receiver or other wireless equipment, please contact your Komatsu distributor.
- When working at the seashore, carefully clean the electric system to prevent corrosion.
- When installing an operator's cab cooler or any other electrical equipment, connect it to an independent power source connector. The optional power source must never be connected to the fuse, starting switch, or battery relay.

WEAR PARTS LIST

Wear parts such as the filter element, bucket tooth, etc. are to be replaced at the time of periodic maintenance or before their abrasion limits.

The wear parts should be changed correctly in order to use the machine economically.

For part change, Komatsu genuine parts of excellent quality should be used.

When ordering parts, please check the part number in the parts book.

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

Item	Part No.	Part Name	Q'ty	Replacement frequency
Engine oil full flow filter	600-211-1340	Cartridge	1	Every 500 hours service
Fuel filter	600-311-3110	Cartridge	1	
Hydraulic tank breather element	198-60-55510 (421-60-35170)	Element (Ring)	2 (2)	Every 250 hours service
Hydraulic oil filter	07063-51210 (07000-15180)	Element (Hybrid) (O-ring)	6 (6)	Every 500 hours service
Drain filter	113-60-23160	Cartridge	2	Every 500 hours service
Pump Drain filter	21T-60-71180	Cartridge	6	
Corrosion resistor	600-411-1171	Cartridge	2	Every 1000 hours service
Line filter	209-60-63210 (07000-12075) (2988-01-2560)	Element (O-ring) (Ring)	2 2 2	—
	209-60-63310 (07000-12085) (YSY-392605)	Element (O-ring) (Ring)	4 4 4	
Air cleaner	621-60-35170	Element assembly	2	—
	561-02-62530	Outer element	2	
	561-02-62520	Inner element	2	
Bucket	Komatsu tooth 21T-72-74310 (21T-72-74320)	Point (Lock)	5 (5)	—
	ESCO tooth 21T-961-3320 (21T-961-3310)	Point (Pin)	5 (5)	—
	Side shroud 427-70-13611 (21N-939-3330)	Shroud (Pin)	4 (8)	—

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS

Reservoir	Kind of fluid	AMBIENT TEMPERATURE		Type	CAPACITY	
		Min	Max		Specified	Refill
Engine oil pan	Engine oil	0°C -20° C -15 °C -20° C	40°C 10° C 50° C 40° C	SAE 30 SAE 10W SAE 15W-40 SAE 10W-30	61 liter	55 liter
P.T.O. case		0°C -30°C	50° C 10° C	SAE 30 SAE10W	20 liter	20 liter
Swing machinery case (Front & rear)		-30° C	40° C	SAE 30	30 liter	30 liter
Final drive case (each)					85 liter	85 liter
Hydraulic system		-30° C	40° C	HO46HM ※	2400 liter	1500 liter
Fuel tank	Diesel fuel ※	-10° C -30° C	50° C -10° C	ASTM D975 No. 2 ASTM D975 No. 1 (for winter use) ※	2750 liter (if equipped 3300 liters)	
Cooling sytem (front & rear)	Water	Add antifreeze			85 liter	
Auto-Grease	Grease	-0° C -30° C	50° C -0° C	NLGI No. 2 NLGL No. 0	18 liters	18 liters

※ 1: For HO46-HM, use the oil recommended by komatsu.

※ 2: Use only diesel fuel.

※ 3: ASTM D975 No.1

REMARK

- When fuel sulphur content is less than 0.5%, change oil in the oil pan every periodic maintenance hours described in this manual.
Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sulphur content	Change interval of oil in engine oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

- When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.
- Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.
- There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30, 15W-40), but be sure to add single grade oil that matches the temperature in the table.
- We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

Specified capacity: Total amount of oil including oil for components and oil in piping.

Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

ASTM: American Society of Testing and Material

SAE: Society of Automotive Engineers

API: American Petroleum Institute

No.	Supplier	Engine Oil [CD or CE] SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.)	Gear Oil [GL-4 or GL-5] SAE80, 90, 140	Grease [Lithium-Base] NLGI No.2	Anti-freeze Coolant [Ethylene Glycol Base] Permanent Type
1	KOMATSU	EO10-CD EO30-CD EO10-30CD EO15-40CD	GO90 GO140	G2-LI G2-LI-S	AF-ACL AF-PTL AF-PT (Winter, one season type)
2	AGIP	Diesel sigma S super dieselmulti- grade *Sigma turbo	Rotra MP	GR MU/EP	—
3	AMOCO	*Amoco 300	Multi-purpose gear oil	PYKON premium grease	—
4	ARCO	*Arcofleet S3 plus	Arco HD gear oil	Litholine HEP 2 Arco EP moly D	—
5	BP	Vanellus C3	Gear oil EP Hypogear EP	Energrease LS-EP2	Antifreeze
6	CALTEX	*RPM delo 400 RPM delo 450	Universal thuban Universal thuban EP	Marfak all purpose 2 Ultra-duty grease 2	AF engine coolant
7	CASTROL	*Turbomax *RX super CRD	EP EPX Hypoy Hypoy B Hypoy C	MS3 Spheerol EPL2	Anti-freeze
8	CHEVRON	*Delo 400	Universal gear	Ultra-duty grease 2	—
9	CONOCO	*Fleet motor oil	Universal gear lubricant	Super-sta grease	—
10	ELF	Multiperformance 3C Performance 3C	—	Tranself EP Tranself EP type 2	Glacelf
11	EXXON (ESSO)	Essolube D3 *Essolube XD-3 *Essolube XD-3 Extra *Esso heavy duty Exxon heavy duty	Gear oil GP Gear oil GX	Beacon EP2	All season coolant
12	GULF	Super duty motor oil *Super duty plus	Multi-purpose gear lubricant	Gulfcrown EP2 Gulfcrown EP special	Antifreeze and coolant
13	MOBIL	Delvac 1300 *Delvac super 10W-30, 15W-40	Mobilube GX Mobilube HD	Mobilux EP2 Mobilgrease 77 Mobilgrease special	—
14	PENNZOIL	*Superme duty fleet motor oil	Multi-purpose 4092 Multi-purpose 4140	Multi-purpose white grease 705 707L White-bearing grease	Anti-freeze and summer coolant
15	PETROFINA	FINA kappa TD	FINA potonic N FINA potonic NE	FINA marson EPL2	FINA tamidor

No.	Supplier	Engine Oil [CD or CE] SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.)	Gear Oil [GL-4 or GL-5] SAE80, 90, 140	Grease [Lithium-Base] NLGI No.2	Anti-freeze Coolant [Ethylene Glycol Base] Permanent Type
16	SHELL	Rimura X	Spirax EP Spirax heavy duty	Albania EP grease	—
17	SUN	—	Sunoco GL5 gear oil	Sunoco ultra pres- tige 2EP Sun prestige 742	Sunoco antifreeze and summer cool- ant
18	TEXACO	*Ursa super plus Ursa premium	Multigear	Multifak EP2 Starplex 2	Coda 2055 startex antifreeze coolant
19	TOTAL	Rubia S *Rubia X	Total EP Total Transmission TM	Multis EP2	Antigal/antifreeze
20	UNION	*Guardol	MP gear lube LS	Unoba EP	—
21	VEEDOL	*Turbostar *Diesel star MDC	Multigear Multigear B Multigear C	—	Antifreeze

TIGHTENING TORQUE SPECIFICATIONS

TIGHTENING TORQUE LIST

⚠ CAUTION

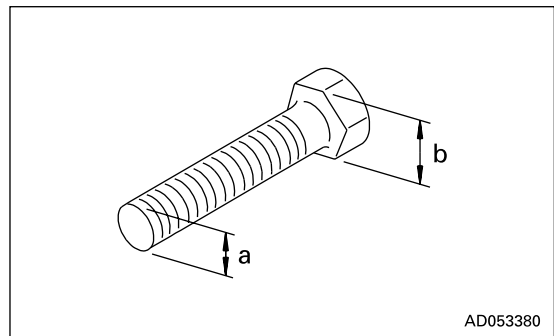
If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation. Always pay careful attention when tightening parts.

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

The tightening torque is determined by the width across the flats of the nut and bolt.

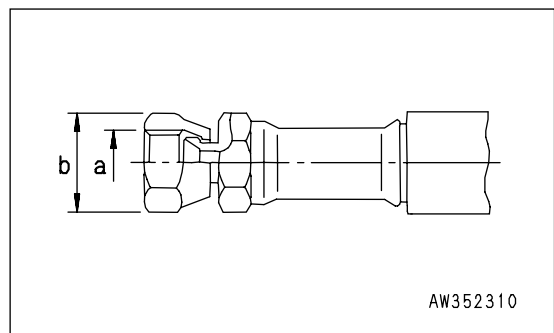
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter a (mm)	Width across flat b (mm)	Tightening torque			
		Target value		Service limit	
		N•m	kgf•m	N•m	kgf•m
6	10	13.2	1.35	11.8 – 14.7	1.2 – 1.5
8	13	31	3.2	27 – 34	2.8 – 3.5
10	17	66	6.7	59 – 74	6.0 – 7.5
12	19	11	11.5	98 – 123	10.0 – 12.5
14	22	177	18	157 – 196	16.0 – 20.0
16	24	279	28.5	245 – 309	25.0 – 31.5
18	27	382	39	343 – 425	35.0 – 43.5
20	30	549	56	490 – 608	50.0 – 62.0
22	32	745	76	662 – 829	67.5 – 84.5
24	36	927	94.5	824 – 1030	84.0 – 105.0
27	41	1320	135.0	1180 – 1470	120.0 – 150.0
30	46	1720	175.0	1520 – 1910	155.0 – 195.0
33	50	2210	225.0	1960 – 2450	200.0 – 250.0
36	55	2750	280.0	2450 – 3040	250.0 – 310.0
39	60	3280	335.0	2890 – 3630	295.0 – 370.0
42	65	3830	390.0	3430 – 4220	350.0 – 430.0
45	70	4650	475.0	4413 – 4903	450.0 – 500.0
48	75	1960 N•m {200 kgf•m} (1446.6 lbft) + Additional tightening angle			



Apply the following table for Hydraulic Hose.

Nominal - No. of threads (a) (mm)	Width across flat b (mm)	Tightening torque			
		Target value		Permissible range	
		N•m	kgf•m	N•m	kgf•m
10	14	14.7	1.5	12.7 – 16.7	1.3 – 1.7
14	19	29.4	3.0	27.5 – 39.2	2.8 – 4.0
18	24	78.5	8.0	58.8 – 98.1	6.0 – 10.0
22	27	117.7	12.0	88.3 – 137.3	9.0 – 14.0
24	32	147.1	15.0	117.7 – 176.5	12.0 – 18.0
30	36	215.7	22.0	176.5 – 245.2	18.0 – 25.0
33	41	255.0	26.0	215.7 – 284.4	22.0 – 29.0



PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

To ensure safety at all times when operating or driving the machine, the user of the machine must always carry out periodic maintenance. In addition, to further improve safety, the user should also carry out periodic replacement of the parts given in the table. These parts are particularly closely connected to safety and fire prevention.

With these parts, the material changes as time passed, or they easily wear or deteriorate. However, it is difficult to judge the condition of the parts simply by periodic maintenance, so they should always be replaced after a fixed time has passed, regardless of their condition. This is necessary to ensure that they always maintain their function completely.

However, if these parts show any abnormality before the replacement interval has passed, they should be repaired or replaced immediately.

If the hose clamps show any deterioration, such as deformation or cracking, replace the clamps at the same as the hoses.

When replacing the hoses, always replace the O-rings, gaskets, and other such parts at the same time.

Ask your Komatsu distributor to replace the safety critical parts.

SAFETY CRITICAL PARTS

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (fuel tank – fuel strainer)	2	Every 2 years or 4000 hours, whichever comes sooner
2	Fuel hose (fuel strainer – priming pump)	2	
3	Fuel hose (priming pump – supply pump)	2	
4	After cooler hose (Front)	2	
5	After cooler hose (Rear)	4	
6	Fuel return hose (injection pump – fuel cooler)	2	
7	Fuel return hose (fuel cooler – fuel tank)	2	
8	Spill hose (engine – fuel tank)	2	
9	Fuel drain hose	1	
10	Turbocharger lubricating hose	2	
11	No.1 pump discharge port hose	2	
12	No.2 pump discharge port hose	2	
13	Swing No.1 pump discharge port hose	1	
14	Swing No.1 pump outlet branch hose	1	
15	No.3 pump discharge port hose	2	
16	No.4 pump discharge port hose	2	
17	Branch hose	4	
18	Swing No.2 pump discharge port hose	1	
19	Swing No.2 pump outlet branch hose	1	
20	Heater hose (engine – heater)	8	
21	Swing line hose	4	
22	Boom cylinder line hose (B/H)	6	
23	Arm cylinder line hose (B/H)	8	
24	Bucket cylinder line hose (B/H)	8	
25	Pump suction cup ring	3	
26	Fuel hose (strainer – water separator) (if equipped)	2	
27	Fuel hose (water separator – priming pump) (if equipped)	2	
28	Water separator (case, O-ring, plug)	4	
29	Boom foot line hose (L/S)	6	
30	Boom cylinder line hose (L/S)	2	
31	Arm cylinder line hose (L/S)	4	
32	Bucket cylinder line hose (L/S)	4	
33	Bottom cylinder line hose (L/S)	8	

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
34	Hydraulic pump suction hose	8	Every 5000 hours
35	Injector nozzle tip	12	Every 8000 hours
36	High-pressure piping clamp	30	
37	Fuel spray prevention cap	32	
38	Seat belt	1	Every 3 years

MAINTENANCE SCHEDULE

MAINTENANCE SCHEDULE CHART

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Initial 250 Hours Maintenance (Only after the first 250 hours)

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 CHANGE OIL IN PTO CASE 4-89
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MAINTENANCE PROCEDURE

INITIAL 100 HOURS MAINTENANCE (ONLY AFTER THE FIRST 100 HOURS)

Carry out the following maintenance only after the first 100 hours of operation on new machines.

- CLEAN STRAINER OF PTO LUBRICATING OIL FILTER

For details of the method of replacing or maintaining, see the section on EVERY 500 HOURS SERVICE.

INITIAL 250 HOURS MAINTENANCE (ONLY AFTER THE FIRST 250 HOURS)

Carry out the following maintenance only after the first 1000 hours of operation on new machines.

- CHANGE OIL SWING MACHINERY CASE
- CHANGE OIL IN PTO CASE
- CHANGE OIL FINAL DRIVE CASE

For details of the method of replacing or maintaining, see EVERY 1000 HOURS SERVICE and EVERY 2000 HOURS SERVICE.

WHEN REQUIRED

CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

⚠ WARNING

- If inspection, cleaning, or maintenance is carried out with the engine running, dirt will enter the engine and cause damage to the engine. Always stop the engine before carrying out these operations.
- When using compressed air, there is danger of dirt flying and causing personal injury. Always wear protective glasses, dust mask, or other protective equipment.
- When removing the outer element from the air cleaner body, it is dangerous to pull it out by force. When working at high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

Checking

If air cleaner clogging monitor (1) of the monitor panel flashes, clean the air cleaner element.

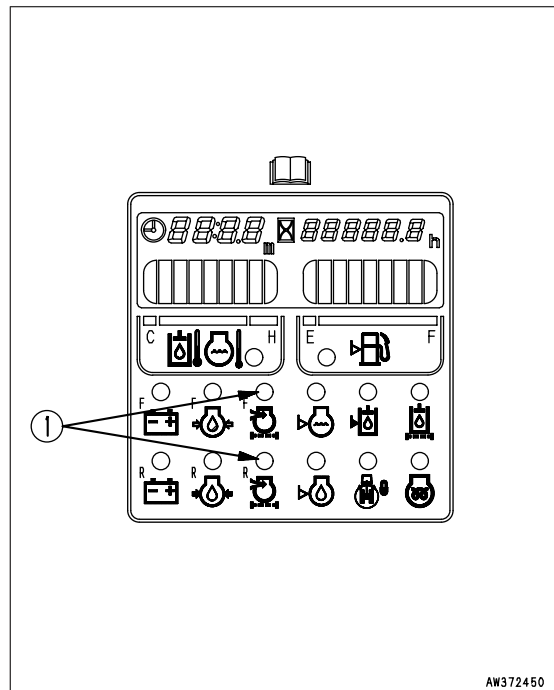
Replacing

- Replacing element, O-ring
 If one year has passed since installing the element or if air cleaner clogging monitor (1) on the monitor panel flashes immediately after the element is cleaned, replace the outer element, inner element, and O-ring.

NOTICE

Do not clean the air cleaner element until the air cleaner clogging monitor on the monitor panel flashes. If the element is cleaned frequently before the clogging monitor flashes, the air cleaner will not be able to display its performance fully, and the cleaning efficiency will also go down.

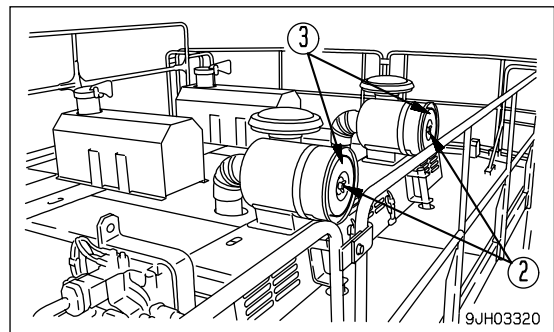
In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.



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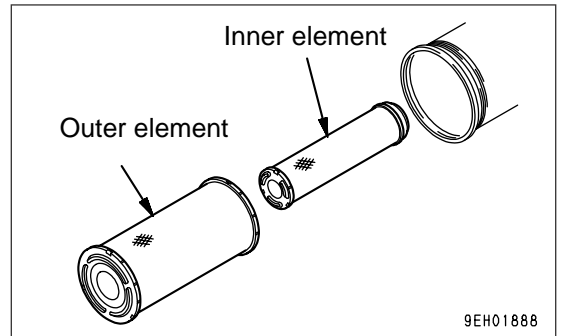
Outer Element - Clean

1. Loosen wing nut (2), then remove the outer element (3).

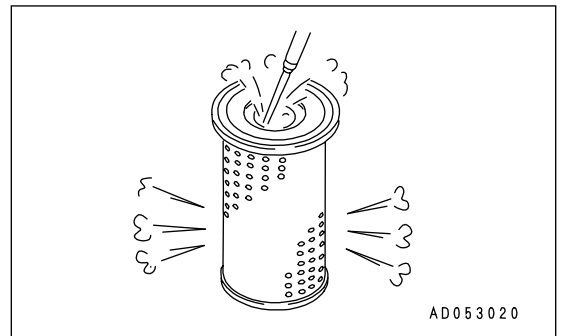


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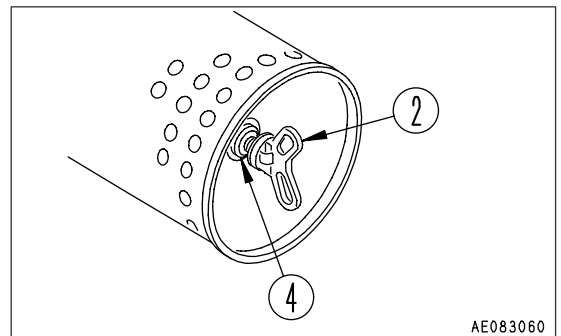
- 2. After removing the outer element (3), cover the air connector inside the air cleaner body with a clean cloth or tape to prevent dirt or dust from entering.



- 3. Wipe off or brush off the dirt stuck to cover and the inside of the air cleaner body.
- 4. Direct dry compressed air (less than 0.69MPa (7kgf/cm²)) to the outer element (4) from inside along its folds, then direct it from outside along its folds and again from inside.
 - 1) Remove one seal from the outer element. The number of times the outer element has been cleaned can be seen by the number of removed seals.
 - 2) Replace an outer element which has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.



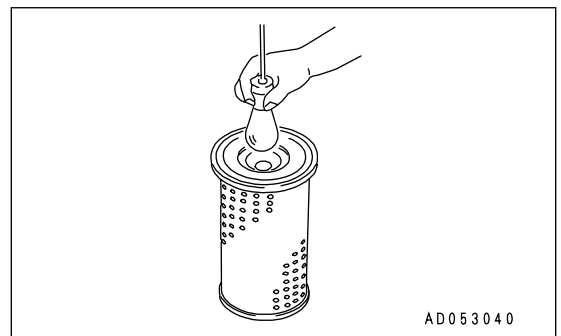
- 3) Replace the element when the air cleaner clogged warning lamp lights up soon after installing a cleaned element even though it has not been cleaned 6 times.
- 4) Check inner element mounting nuts for looseness and, if necessary, retighten.



- 5. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.

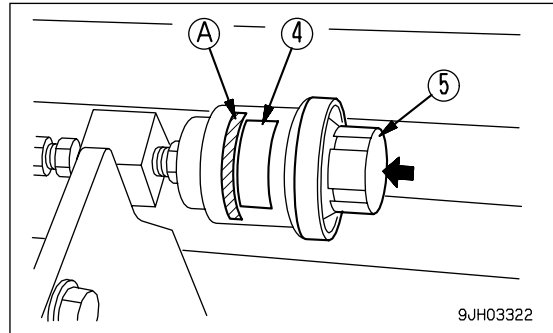
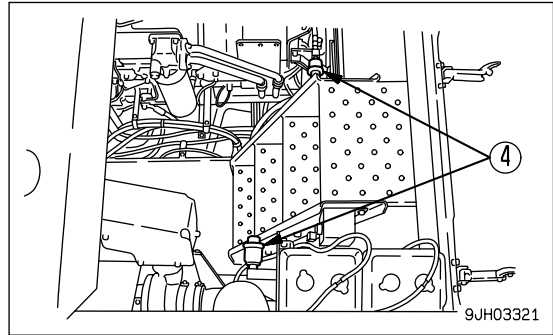
NOTICE

- When cleaning the element, do not hit or beat it against anything.
- Do not use an element whose folds or gasket or seal are damaged.



- 6. Remove the cloth and tape used for cover in Step 1.
- 7. Install the cleaned element and fix it with the wing nut.
- 8. Replace seal washer (4) or wing nut (2) with new parts if they are broken.

9. After replacing the element, press reset button (5) of dust indicator (4) inside the engine room to return the yellow piston to its original position.



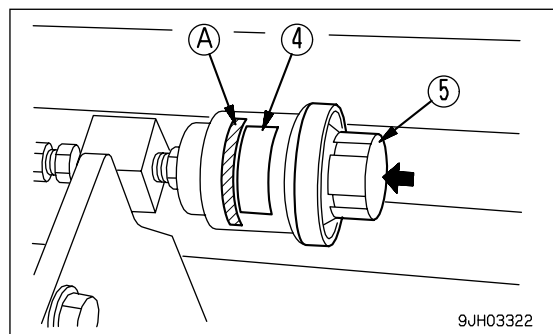
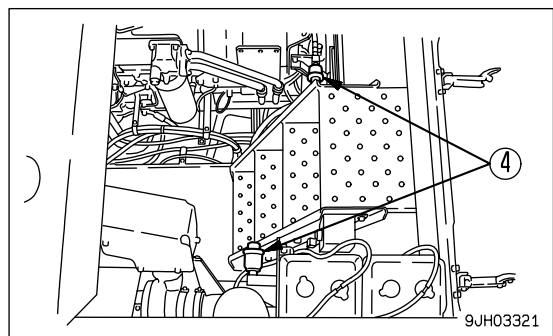
Air Cleaner Inner Element - Replace

1. First remove the outer element, and then remove the inner element.
2. Cover the air connector side (outlet side) with a clean cloth or tape.
3. Clean the air cleaner body interior, then remove the cover from the air intake port in Step 2.
4. Install a new inner element to the connector, then tighten the nut.

NOTICE

The inner element must not be cleaned and used again. When replacing the outer element, replace the inner element at the same time.

5. Set the outer element in position and secure it with the wing nut.
6. After replacing the element, press reset button (5) of dust indicator (4) inside the engine room to return the yellow piston to its original position.



CLEAN INSIDE OF COOLING SYSTEM

WARNING

- Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure.
If the cap is removed to drain the coolant in this condition, there is a hazard of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure before removing it.
- Cleaning is carried out with the engine running. When standing up or leaving the operator's seat, set the safety lock lever to the LOCK position.
- For details of starting the engine, see "BEFORE STARTING ENGINE (PAGE 3-103)" and "STARTING ENGINE (PAGE 3-124)" in the OPERATION section.
- There is danger of touching the fan if the undercover is left removed.
Never enter behind the machine when the engine is running.

Clean the inside of the cooling system, change the coolant and replace the corrosion resistor agent KI according to the table below.

Kind of coolant	Cleaning inside of cooling system and changing coolant	Adding corrosion resistor agent KI
Permanent type anti-freeze (All season type)	Every year (autumn) or every 2000 hours whichever comes first	Every 1000 hours and when cleaning the inside of the cooling system and when changing coolant.
Non permanent type antifreeze containing ethylene glycol (winter, one season type)	Every 6 months (spring, autumn) (Drain antifreeze in spring, add antifreeze in autumn)	
When not using anti-freeze	Every 6 months or every 1000 hours whichever comes first	

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

Use a permanent type of antifreeze.

If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol.

Super Coolant (AF-ACL) has an anti-corrosion effect as well as an antifreeze effect.

The ratio of antifreeze to water depends on the ambient temperature, but to obtain the corrosion resistance effect, a minimum ratio of 30% by volume is necessary.

In areas where the water is hard, always add Komatsu genuine corrosion resistor agent KI. One packet of corrosion resistor agent contains 100 g. The standard density of the mixture should be 7 g/liters.

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

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

Mixing rate of water and antifreeze

Min. atmospheric temperature	°C	-10	-15	-20	-25	-30
Amount of antifreeze	liters	25.5	30.5	34.8	39.0	42.5
Amount of water	liters	59.5	54.5	50.2	46.0	42.5

⚠ WARNING

Antifreeze is flammable, so keep it away from flame.

Antifreeze is toxic. When removing the drain plug, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large quantities of fresh water and see a doctor at once.

Use city water for the cooling water.

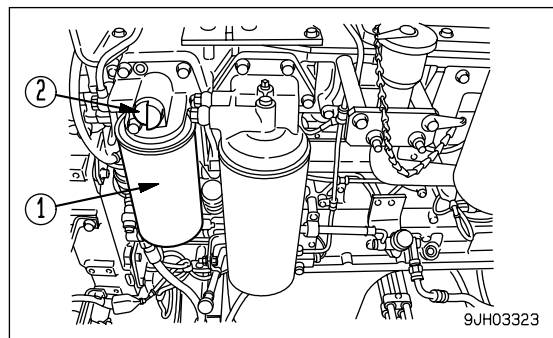
If river water, well water or other such water supply must be used, contact your Komatsu distributor.

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

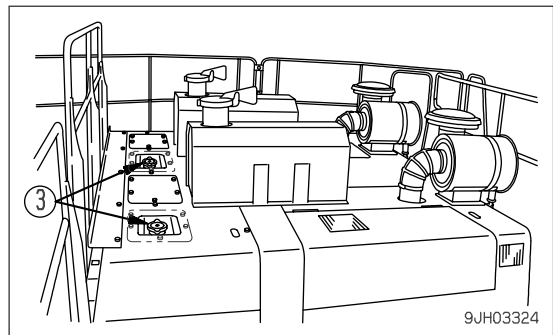
- Prepare containers of at least 170 liters (85 liters x 2) for mixing the coolant.
(For both front engine and the rear engine)

Prepare a hose to supply water.

1. Stop the engine, then turn valve (1) of corrosion resistor (2) to the CLOSE stopper position.



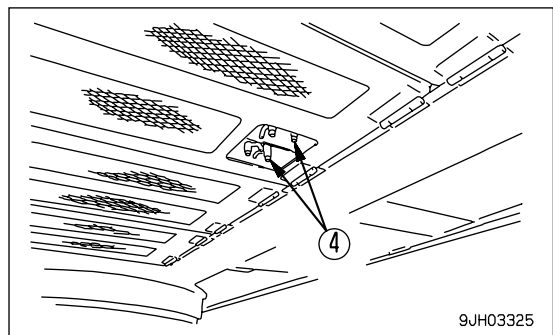
2. Turn the radiator cap (3) slowly to release the internal pressure.



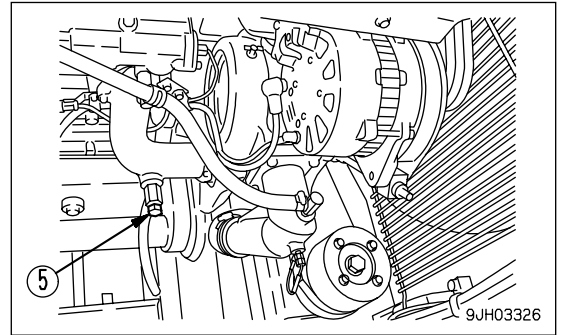
3. Set a container under drain valves (4) and drain valve (5) to catch the coolant.

- When draining the coolant, take the drain hose from the toolbox, install it to drain valve (5), and be sure that the water does not splash when it is drained.

4. Open drain valves (4) at the bottom of the engine and drain the water. Then open drain valve (5) in the water pump piping and drain the water.

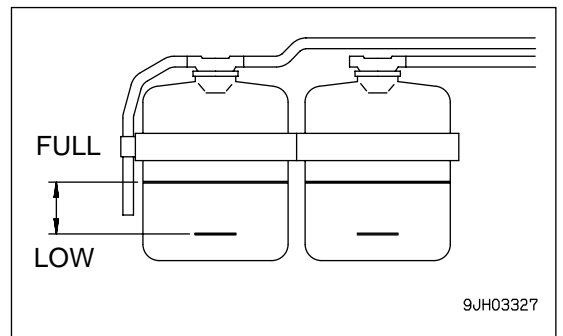


- 5. After draining the water, tighten drain valves (4) and (5), and fill with tap water. When the radiator is full, start the engine and run at low idling. Keep the engine running at low idling for 10 minutes until the water temperature reaches more than 90°C.

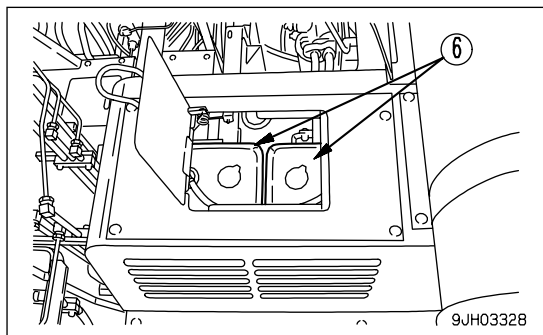


- 6. Stop the engine, open drain valves (4) and (5), and drain the water.
- 7. After draining the water, clean the radiator with detergent. When carrying out the flushing operation, follow the instructions given with the flushing agent.
- 8. Close drain valves (4) and (5).
- 9. Replace the corrosion resistor, and turn valve (1) to the OPEN stopper position. For details of the method for replacing the corrosion resistor cartridge, see "REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-90)".
- 10. Fill with antifreeze and tap water until the water overflows from the water filler. Determine the proportions of antifreeze and water in accordance with the water and antifreeze mixture table.
- 11. Remove the air in the cooling water, run the engine for 5 minutes at low idling, then for another 5 minutes at high idling. (While doing this, leave the radiator cap removed)

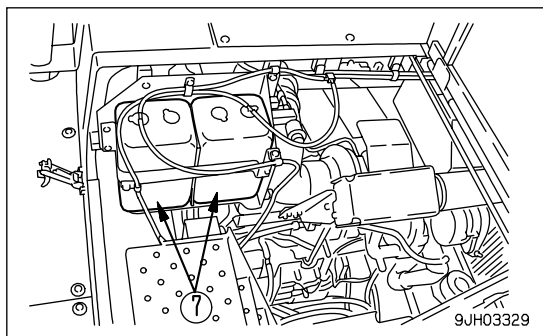
- 12. Drain the water from sub-tanks (6) and (7), wash the inside of the sub-tank, then add water to between the FULL and LOW marks. There are two sub-tanks each for both the front engine and rear engine. Add water to the tanks at both ends.
- 13. Stop the engine and tighten the cap. Check the coolant level, and add water if necessary.



- Sub-tank front engine

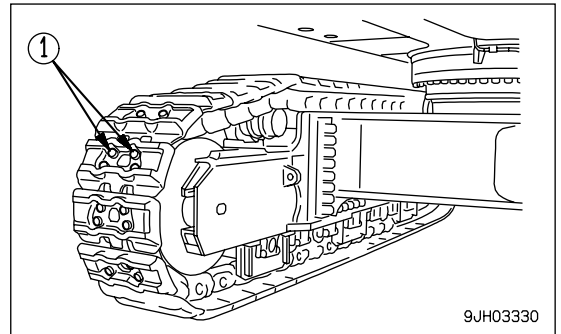


- Sub-tank for rear engine



CHECK AND TIGHTEN TRACK SHOE BOLTS

If the machine is used with track shoe bolts (1) loose, they will break, so tighten any loose bolts immediately.

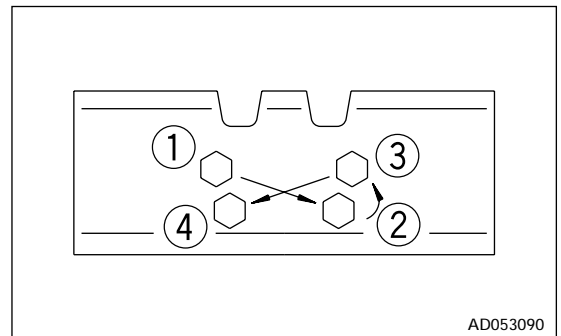


Method for tightening

1. First tighten to a tightening torque of $686 \pm 69 \text{ N}\cdot\text{m}$ ($70 \pm 7 \text{ kgf}\cdot\text{m}$) then check that the nut and shoe are in close contact with the link contact surface.
2. After checking, tighten a further $150^\circ \pm 10^\circ$.

Order for tightening

Tighten the bolts in the order shown in the diagram on the right. After tightening, check that the nut and shoe are in close contact with the link mating surface.



CHECK AND ADJUST TRACK TENSION

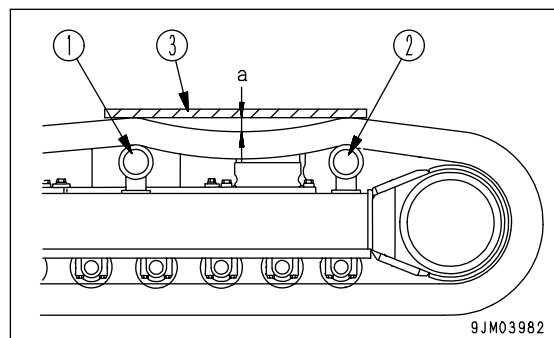
WARNING

For details of starting the engine and operating the work equipment, see “BEFORE STARTING ENGINE (PAGE 3-103)”, “STARTING ENGINE (PAGE 3-124)”, “AFTER STARTING ENGINE (PAGE 3-129)”, and “WORK EQUIPMENT CONTROLS AND OPERATIONS (PAGE 3-147)” in the OPERATION section.

The wear of the pins and bushings on the undercarriage will vary with the working conditions and type of soil, so inspect the track tension frequently in order to maintain the standard tension. Stop the machine on firm, horizontal ground when carrying out the inspection and maintenance.

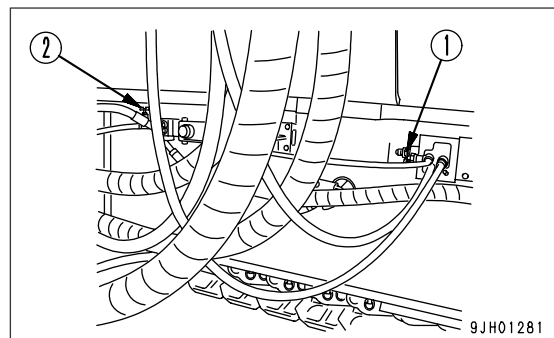
Checking

1. Run the engine at low idling, move the machine forward a distance equal to the length of track on ground, then stop the machine.
2. Choose wooden block (3) that will reach from 2nd carrier roller (1) to 3rd carrier roller (2), then replace it on top of the track.
3. Measure the maximum deflection between the top surface of the track and the bottom surface of the wooden block.
 - Standard deflection
Deflection “a” should be 10 to 30 mm.



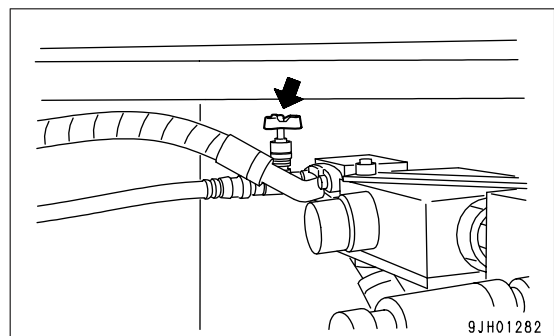
Adjusting

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

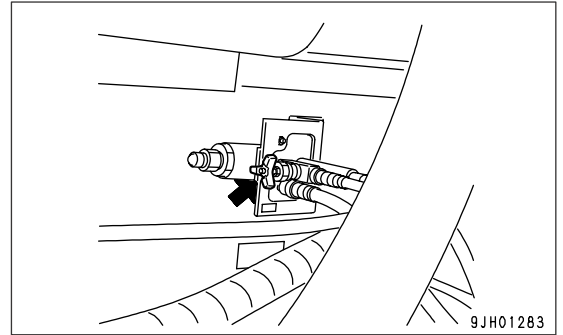


Adjusting hydraulic cushion (HIC) cylinder

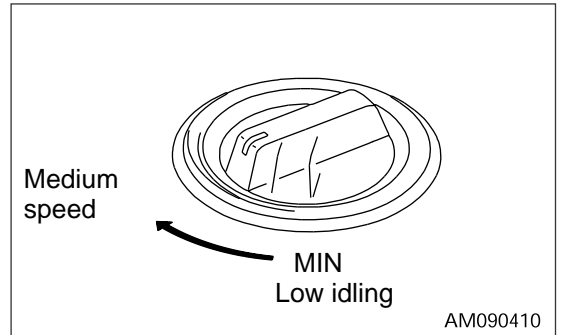
1. Check that stop valve (2) is completely closed.



- Open stop valve (1).



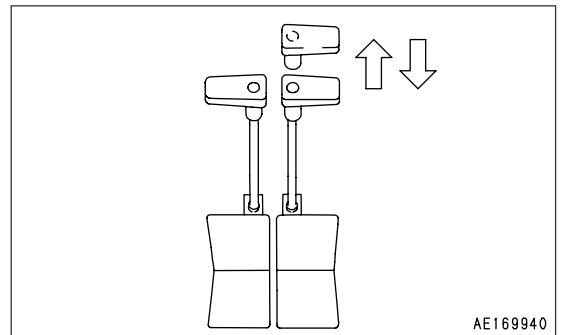
- Start engine and run at a medium speed.



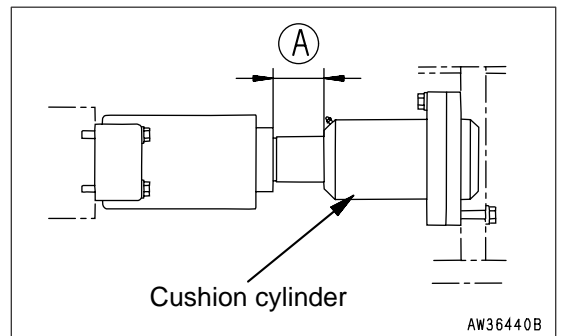
- Operate the right control lever to the FORWARD position intermittently (2 – 3 seconds) 3 – 4 times to relieve the travel motor.

NOTICE

- Do not carry out this operation on a slippery road surface (steel plate, etc.).
- Even when protrusion amount (A) of the hydraulic cushion is within the standard value, the HIC charge pressure may be low, so always carry out the above operation exactly.



- Check that the protrusion (A) of the plunger of the hydraulic cushion cylinder is 135 ± 5 mm on both the left and right.



- Close stop valve (1) completely.

Adjust grease cylinder

Do this after adjusting the hydraulic cushion cylinder.

⚠ WARNING

Do not loosen fitting (1) more than one turn.

If it is loosened more than one turn, there is danger that fitting (1) may fly out under the high internal pressure of the grease.

When doing this, loosen only fitting (1). Do not loosen any other part.

Do not put your face in the direction of installation of fitting (1).

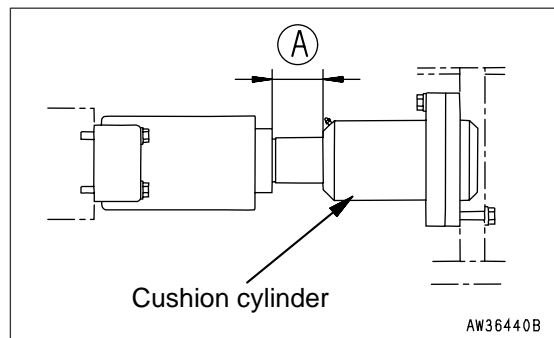
When the procedure given here is used but the track does not become loose, contact your Komatsu distributor for repairs.

NOTICE

Before pumping in grease, check that the protrusion (A) of the plunger of the hydraulic cushion cylinder is 135 ± 5 mm on both the left and right.

Check again after pumping in grease.

If the protrusion is not within this range, loosen grease fitting (1) one turn and let grease out to adjust. If the protrusion cannot be adjusted to 135 ± 5 mm, the hydraulic cushion must be adjusted, so please contact your Komatsu distributor for adjustment.

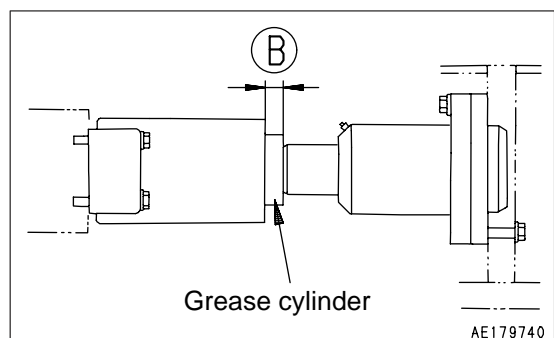
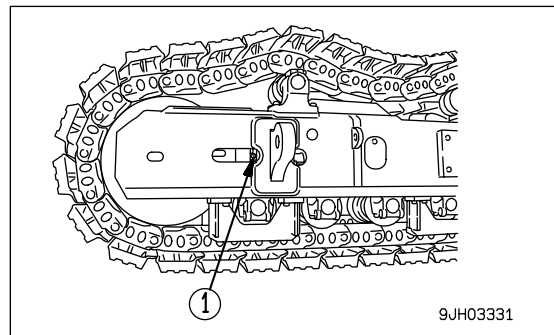


⚠ CAUTION

If the track tension is adjusted only by using grease and not by hydraulic pressure, excessive load may be brought to bear on the undercarriage and this may cause damage.

When increasing tension prepare a grease gun.

1. Pump in grease through grease fitting (1) with a grease gun.
2. To check that the correct tension has been achieved, move the machine backwards and forwards.
3. Check the tension again, and if it is not correct, adjust it again.
4. Continue to pump in grease until (B) becomes 35 to 190 mm. If the tension is still loose, the pin and bushing are excessively worn, so they must be either turned or replaced. Please contact your Komatsu distributor.

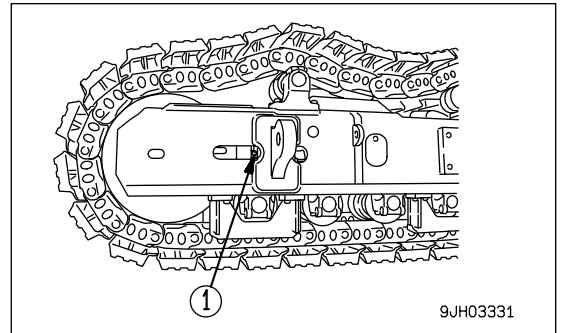


When loosening tension**⚠ WARNING**

It is extremely dangerous to release the grease by any method except the procedure given below.

If the track tension is not relieved by this procedure, please contact your Komatsu distributor for repairs.

1. Loosen plug (1) gradually to release the grease.
2. Turn plug (1) a maximum of one turn.
3. If the grease does not come out smoothly, move the machine forwards and backwards a short distance.
4. Tighten plug (1).
5. To check that the correct tension has been achieved, move the machine backwards and forwards.
6. Check the track tension again, and if the tension is not correct, adjust it again.

**CHECK ELECTRICAL INTAKE AIR HEATER**

Before the start of the cold season (once a year), contact your Komatsu distributor to have the electrical intake air heater repaired or checked for dirt or disconnections.

Remove the electrical intake air heater from the engine intake manifold and check that there is no disconnection or dirt.

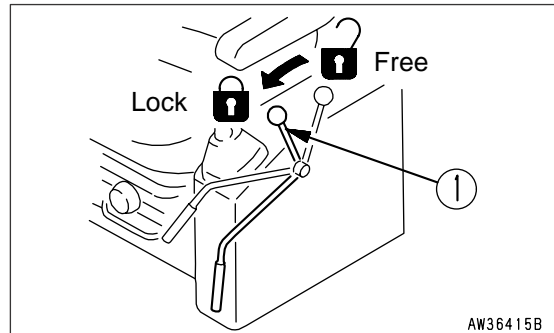
When inspecting or installing the electrical intake air heater, replace the gasket with a new part.

REPLACE BUCKET TEETH (VERTICAL PIN TYPE)

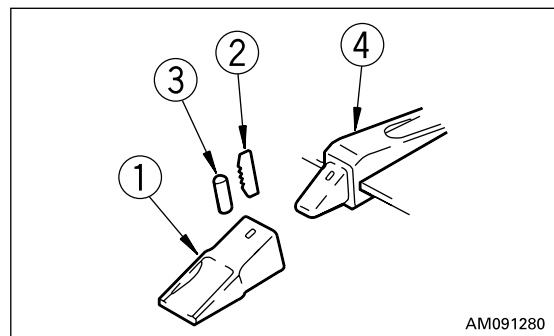
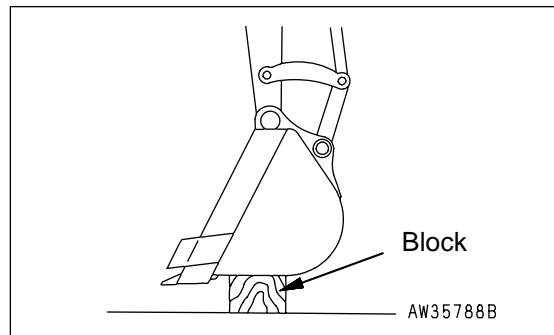
- Replace the bucket tooth before it wears down to the adapter.
- When replacing the bucket teeth, do not replace only both sides with new parts. If both sides only are replaced with new parts, the bucket will easily deform.

WARNING

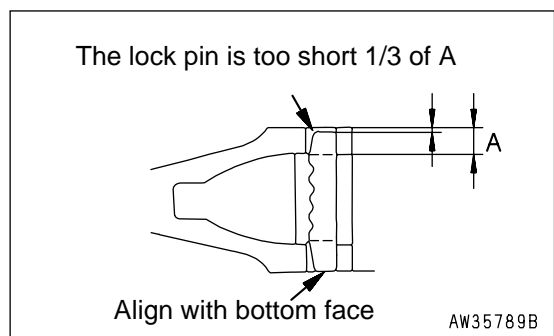
- It is dangerous if the work equipment moves by mistake when the teeth are being replaced. Set the work equipment in a stable condition, then stop the engine and apply the locks securely to the levers.
- If the locking pin is knocked out with excessive force, there is a hazard that the pin may fly out. Check that there is no one in the surrounding area.
- Pieces will often fly during the replacement operation, so always wear safety glasses, gloves, and other protective equipment.



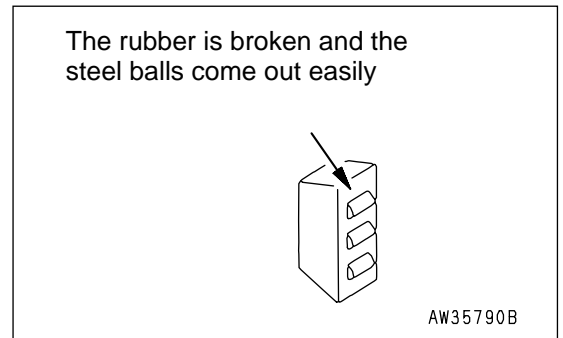
1. To make it possible to knock out the pin of tooth (1), set the bottom surface of the bucket on a block, check that the work equipment is in a stable condition, then set the safety lock lever to the LOCK position. Set so that the bottom face of the bucket is horizontal.
2. Use a hammer and drift (ESCO No. MUS2267-1) to knock out lock pin (2). (If the drift is set against rubber pin lock (3) when it is hit, the rubber pin lock may break. Set it against the back of the pin.)
3. After removing lock pin (2) and rubber pin lock (3), check them. If lock pins and rubber pin locks with the following defects are used, the teeth may come off the bucket. Replace them with new ones.



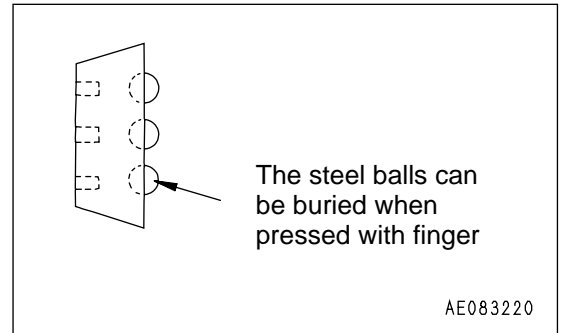
- The lock pin is too short.



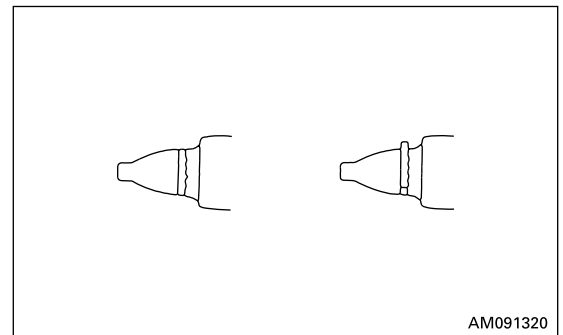
- The rubber of the rubber pin lock is torn, and the steel balls may come out.



- The steel balls are buried when they are pressed by hand.

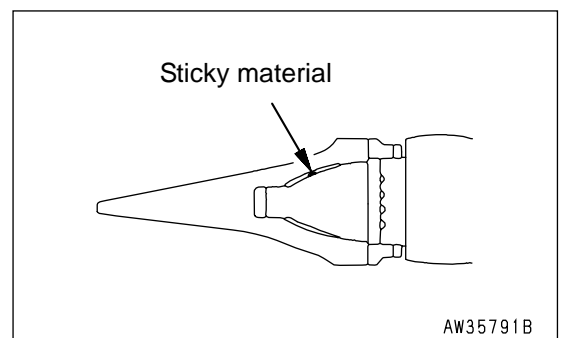


4. Clean the surface of adapter (4) and remove the soil with a knife.
5. Use your hand or a hammer to push rubber pin lock (3) into the hole of the adapter.
When doing this, be careful that the rubber pin lock does not fly out from the adapter surface.
6. Clean the inside of teeth (1), then install it to adapter (4).
If there is mud affixed to it or if there are protrusions, the teeth will not enter the adapter properly, and there will not be proper contact at the mating portion.

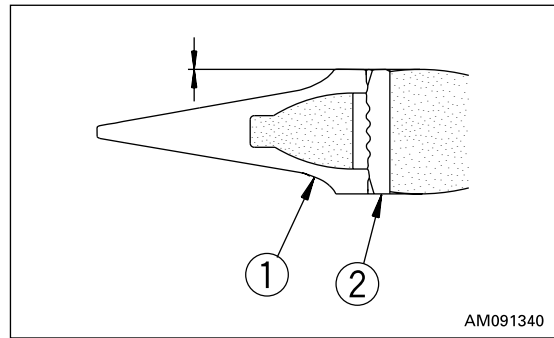


7. Fit teeth (1) to adapter (4), and confirm that when the pointer is pressed strongly, the rear face of the hole for the pin of the teeth (1) is at the same level as the rear face of the hole for the pin of the adapter.
If the rear face of the hole for the pin of teeth (1) is protruding to the front from the rear face of the pin hole for adapter (4), do not try to knock the pin in.

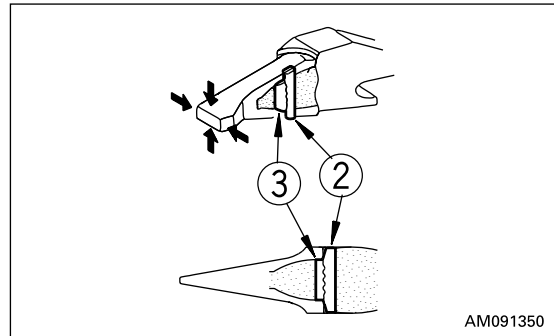
There is something preventing teeth (1) from entering adapter (4) fully, so remove the obstruction. When teeth (1) enters adapter (4) fully, knock in lock pin (2).



8. Insert lock pin (2) in the hole of the teeth and hit it until its top is the same level as the surface of teeth (1).



9. After replacing a bucket tooth, always check the following.
 - 1) After the lock pin has been knocked in completely, check that it is secured by the point and surface.
 - 2) Lightly hit lock pin (2) in the reverse direction from which it was hit in.
 - 3) Lightly hit the tip of the point from above and below, and hit its sides from right and left.
 - 4) Confirm that rubber pin lock (3) and lock pin (2) are set as shown in the figure.



The life of the teeth can be lengthened and the frequency of its replacement can be reduced by turning it upside down so that it will wear evenly.

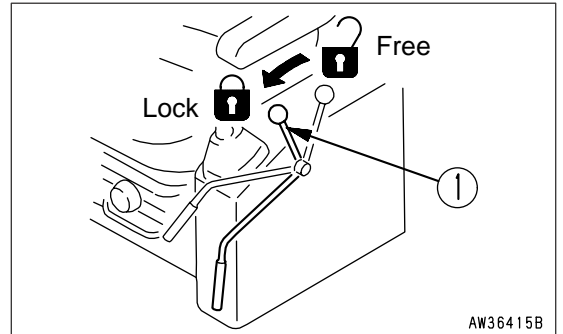
Replace the rubber pin lock and locking pin at the same time as replacing the teeth. This makes it possible to prevent the teeth from falling out.

REPLACE BUCKET TEETH (HORIZONTAL PIN TYPE)

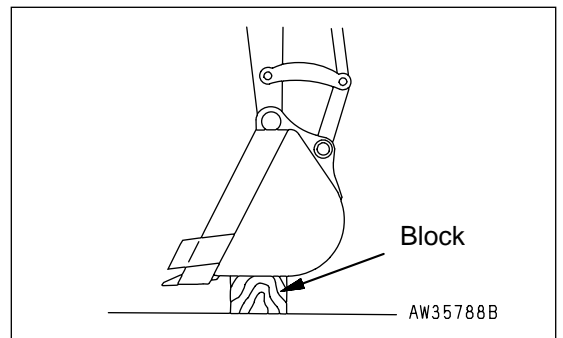
- Replace the bucket tooth before it wears down to the adapter.
- When replacing the bucket teeth, do not replace only both sides with new parts. If both sides only are replaced with new parts, the bucket will easily deform.

⚠ WARNING

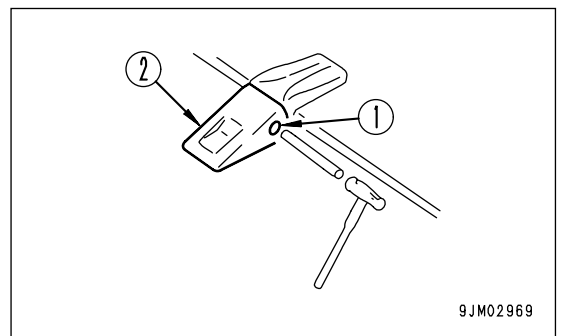
- It is dangerous if the work equipment moves by mistake when the teeth are being replaced. Set the work equipment in a stable condition, then stop the engine and apply the locks securely to the levers.
- If the locking pin is knocked out with excessive force, there is a hazard that the pin may fly out. Check that there is no one in the surrounding area.
- Pieces will often fly during the replacement operation, so always wear safety glasses, gloves, and other protective equipment.



1. Set the bottom of the bucket on a block to make it possible to remove pin (1), check that the work equipment is stable, then set the safety lock lever to the LOCK position. Set so that the bottom of the bucket is horizontal.



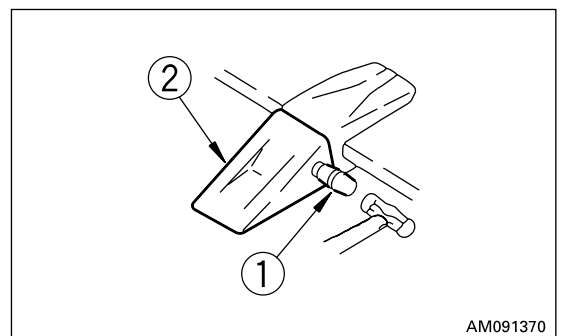
2. Place a bar on the pin head and strike the bar with a hammer to knock out pin (1). Remove tooth (2).



REMARK

If it cannot be removed by this method, for safety reasons, always contact your Komatsu distributor to have the replacement carried out.

3. Clean the mounting face. Fit a new tooth (2) in the adapter, push in pin (1) partially by hand, then lock it with a hammer to install the tooth to the bucket.

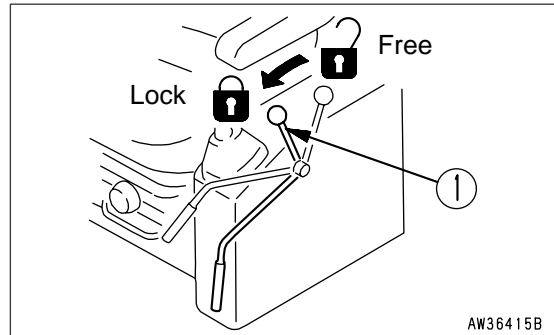


ADJUST BUCKET CLEARANCE

⚠ WARNING

It is dangerous if the work equipment moves by mistake when the clearance is being adjusted.

Set the work equipment in a stable condition, then stop the engine and lock the safety lock lever (1) securely.

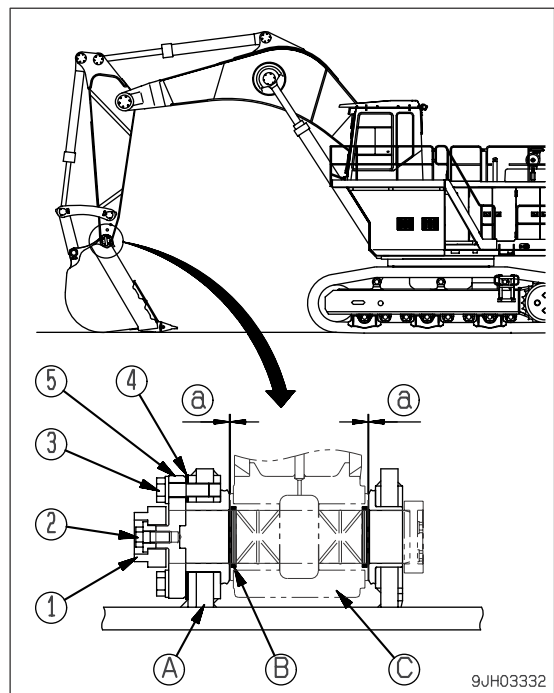


If there is excessive free play on the coupling section of the bucket and arm, adjust the bucket clearance in the following manner.

1. Set the work equipment to the position shown in the diagram on the right, then stop the engine and set the lock lever (1) to the LOCK position.
2. Loosen 3 bolts (2), 6 bolts (3), plate (1) and plate (5).
3. Take out shims (4) equivalent in size to free play (a).

Thickness of shim (4) is 0.5 or 1.0 mm.
When free play (a) is less than a thickness of shim, do not compress the shims by tightening bolt (2).

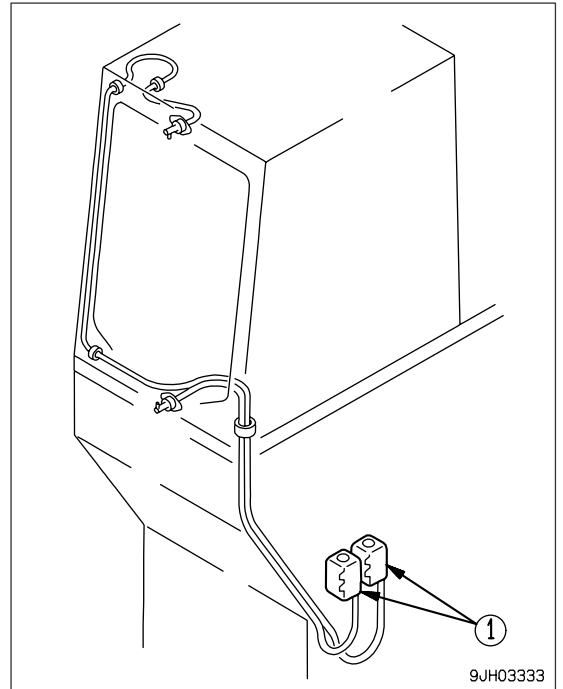
4. Tighten 3 bolts (2) and 6 bolts (3).
- (A): Bucket
(B): Seal
(C): Arm



CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

If there is air in the window washer fluid, check the level of the fluid in window washer tank (1). Add automobile window washer fluid if necessary.

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



Mixture ratio of pure washer fluid and water

Since the ratio should be varied depending on atmospheric temperature, replenish washer fluid at the following mixture ratio, taking temperature into account.

Operation area and season	Mixture ratio	Freezing temperature
Normal	Pure washer fluid 1/3: water 2/3	-10°C
Winter in cold region	Pure washer fluid 1/2: water 1/2	-20°C
Winter in extremely cold region	Pure washer fluid	-30°C

Pure washer fluid comes in two types: for -10°C (for general use) and for -30°C (cold regions).

Use pure washer fluid according to operation area and season.

CHECK AND ADJUST AIR CONDITIONER

(ONLY MACHINES EQUIPPED WITH AIR CONDITIONER)

CHECK LEVEL OF REFRIGERANT (GAS)

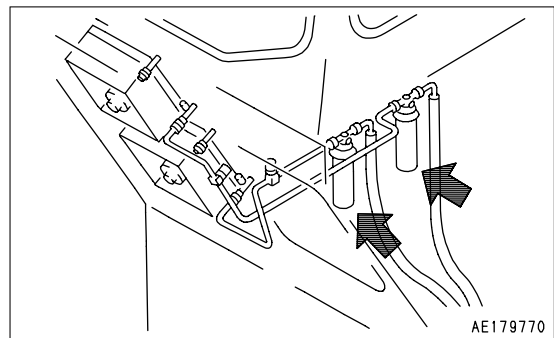
⚠ WARNING

If the refrigerant used in the cooler gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the refrigerant. Never loosen any part of the refrigerant circuit. Do not bring any flame close to any point where the refrigerant gas is leaking.

If there is a lack of refrigerant (Freon 134a), the cooling performance will be poor.

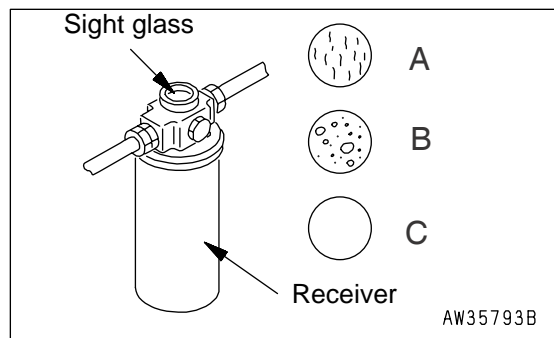
When operating the cooler at high speed, there should be no bubbles in the sight glass (inspection window) mounted on the condenser unit receiver.

- No bubbles in refrigerant flow: Correct
- Bubbles in refrigerant flow (bubbles continuously pass through): Refrigerant level low
- Colorless, transparent: No refrigerant



REMARK

When there are bubbles, the refrigerant gas level is low, so contact your refrigerant dealer to have refrigerant added. If the air conditioner is run with the refrigerant gas level low, it will cause damage to the compressor.



A	Suitable
B	Lack of refrigerant
C	No refrigerant (colorless transparent)

Check in off-season

When not being used for a long period, operate the cooler for 3 to 5 minutes once a month to supply lubricant to each component of the compressor.

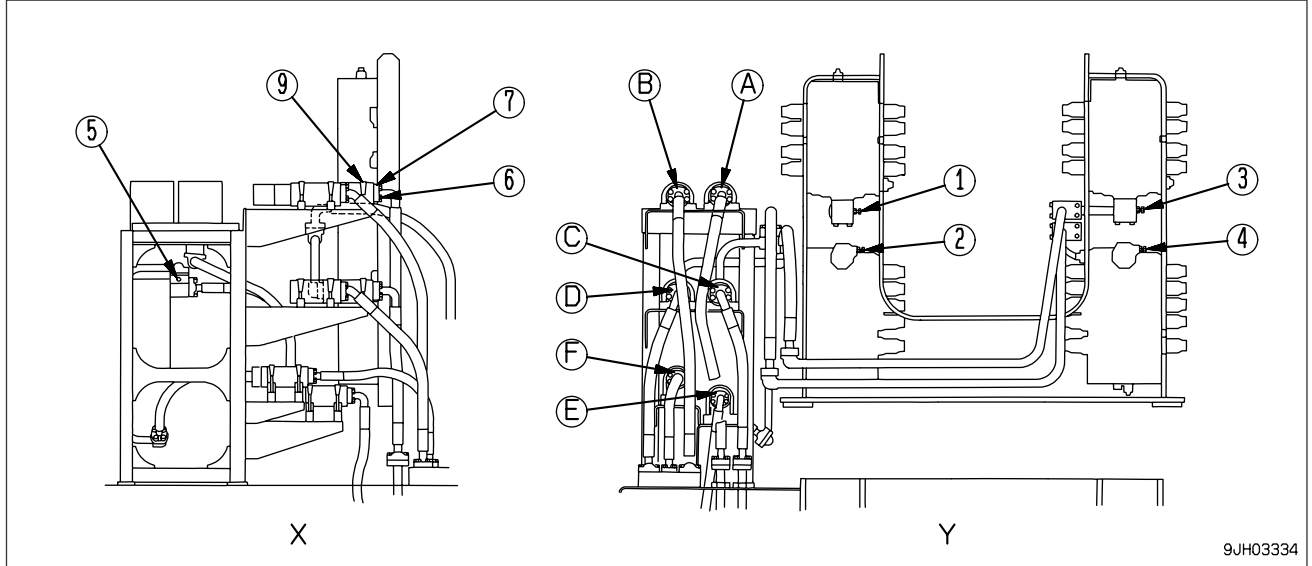
Inspection and maintenance items list for cooler

Inspection and maintenance items	Contents	Maintenance interval
Refrigerant (gas)	Filling quantity	Twice a year; spring and autumn
Condenser	Clogging of fin	Every 500 hours
Compressor	Function	Every 4000 hours
V belt	Damage and tension	Every 250 hours
Blower motor and fan	Function (Check for abnormal sound)	When required
Control mechanism	Function (Check for normal function)	When required
Piping for connection	Installation condition looseness of tightening connection portions gas leakage, damage	When required

CLEANING, REMOVING DIRT FROM LINE FILTER

If there is any abnormality in the pumps or other hydraulic equipment, do as follows, and remove the dirt from inside the line filter.

After assembling the line filter again, bleed the air from the system. (For details, see "PROCEDURE FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT (PAGE 4-45)")



X: As seen from left of chassis

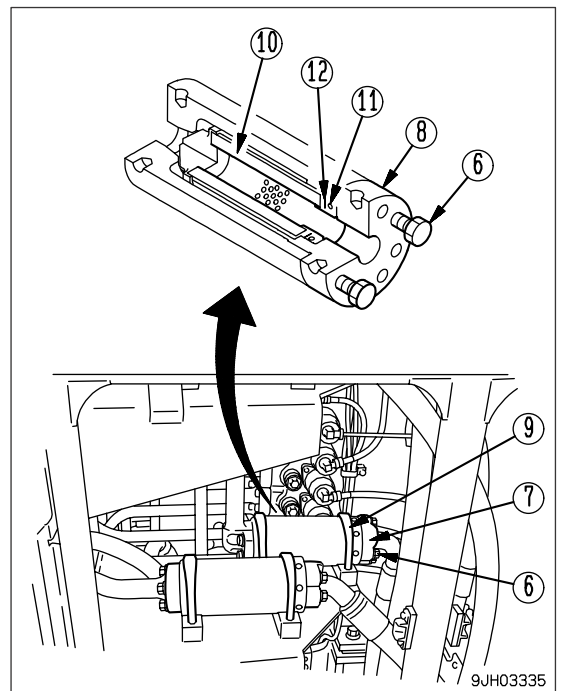
Y: As seen from rear of chassis

- Loosen the air suction plug ((1) – (5)) corresponding to the line filter to be removed 1 – 2 turns.

● Relationship of line filter and air suction plug

Line filter	Applicable plug
Line filter A	plug (4)
Line filter B	plug (1)
Line filter C	plug (3)
Line filter D	plug (2)
Line filter E	plug (5)
Line filter F	plug (5)

- Remove 4 bolts (6), and flange (7), then temporarily insert 2 of bolts (6) into cover (8).
Temporarily insert bolts (6) on diagonally opposite sides.
- Loosen clamp (9).
- Remove cover (8), and clean filter (10).
 - When cleaning the filter, also clean off the dirt and dust stuck to the side face of the case.
 - When assembling the case again, replace O-ring (11) and backup ring (12) together.
 - Tightening torque for cover: 108 ± 10 N·m (11 ± 1 kg·m)

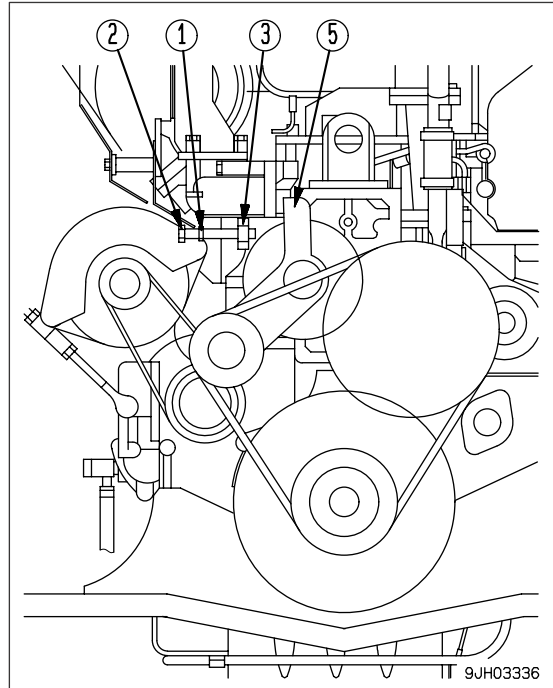


REPLACEMENT OF FAN BELT AND ADJUSTMENT OF AUTO TENSIONER

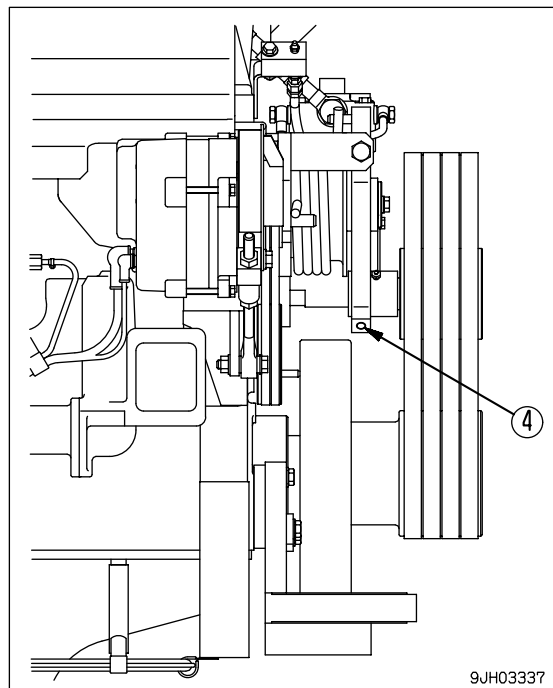
An auto-tensioner is installed, so there is no need to adjust until the belt is replaced.

Replacement

1. After loosening locknut (1), loosen adjustment screw (2) and return the adjustment screw to the surface of bracket (3).

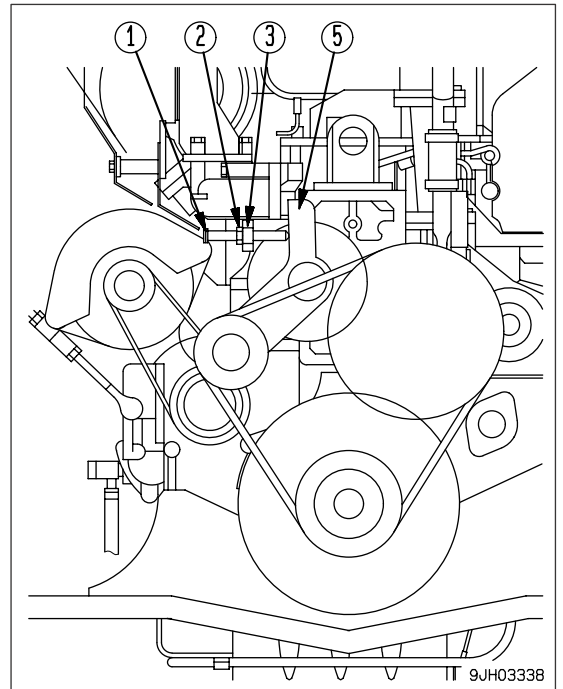


2. Screw an eyebolt into hole (4) (ø12 x P1.25) in the tension pulley bracket, then insert a bar of approx. 50 cm in length, and pull strongly towards you.
3. The tension of the spring is extended and the tension pulley is moved to the inside, so remove the old belt and fit a new belt. Replace the V-belts as a set of 4.



Adjustment

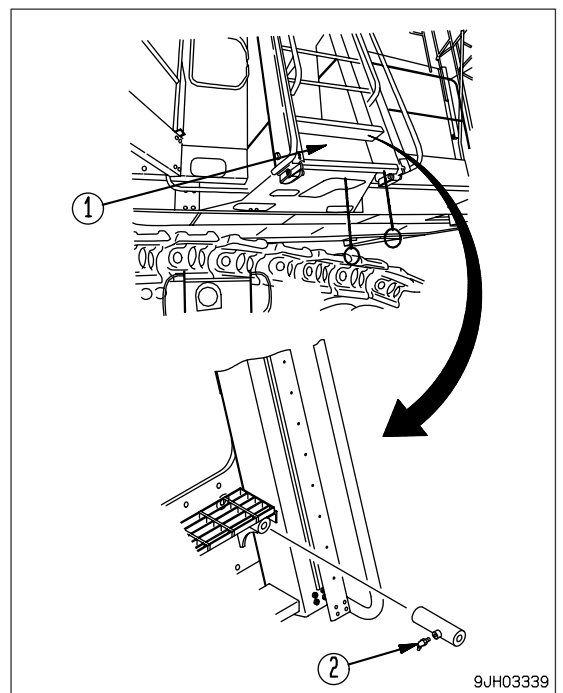
1. Tighten adjustment screw (2), bring the tip of the adjustment screw into contact with tension pulley lever (5), then tighten the adjustment screw a further 2 turns and hold it in position with locknut (1).
2. If a gap forms between the tip of adjustment screw (2) and tension pulley lever (5) during operation, repeat the adjustment procedure in Step 1.
If the fan belt screeches, use the same procedure to adjust.



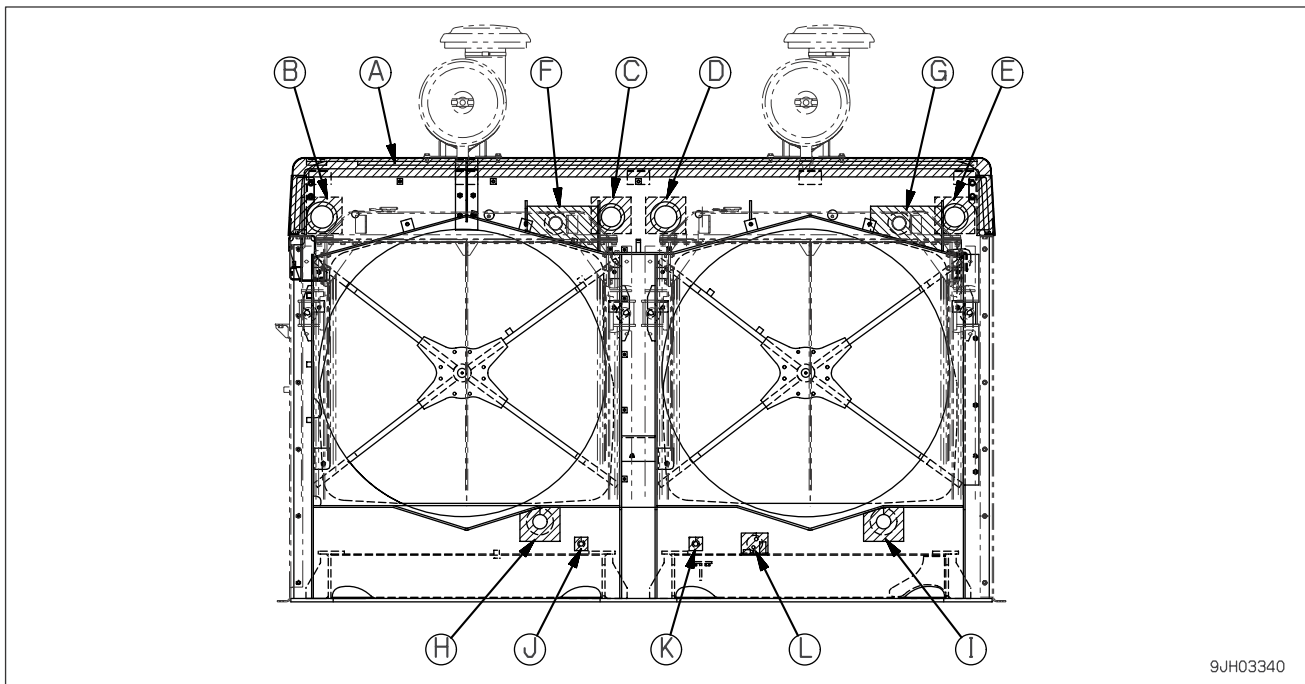
GREASE LADDER

(if equipped)

Stow ladder (1) as shown in the diagram on the right, then use a grease gun to supply grease to grease fitting (2).



INSPECT SEALANT AROUND ENGINE COOLING SYSTEM



9JH03340

Check that there is no deformation caused by gaps or peeling of the sponge seal material around the engine cooling system from inside the engine room.

Locations to inspect seal material

- (A) Seal around engine hood
- (B) Seal for return hose of front engine aftercooler
- (C) Seal for supply hose of front engine aftercooler
- (D) Seal for return hose of rear engine aftercooler
- (E) Seal for supply hose of rear engine aftercooler
- (F) Seal for upper tube of front engine radiator
- (G) Seal for upper tube of rear engine radiator
- (H) Seal for lower tube of front engine radiator
- (I) Seal for lower tube of rear engine radiator
- (J) Seal for drain hose of front engine radiator
- (K) Seal for drain hose of rear engine radiator
- (L) Seal for fuel hose

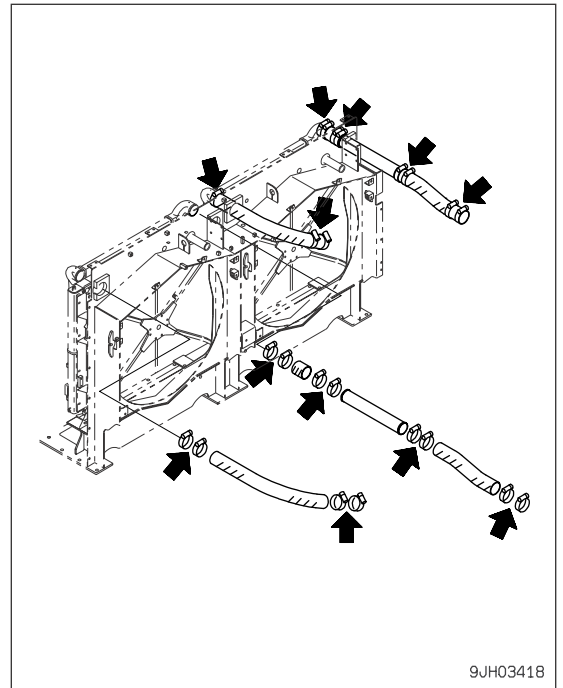
NOTICE

If the engine is operated for several days when the ambient temperature shows no change, but the water temperature is found to be higher, there is probably some deformation caused by gaps or peeling of the seal material around the engine cooling system. If no action is taken about this, it may lead to the deterioration in the balance and an increase in noise. Action should be taken quickly. In such a case, please contact your Komatsu distributor.

CHECK FOR LOOSE AFTERCOOLER HOSE CLAMPS

Check that the clamps of the aftercooler hose are tightened to the specified tightening torque.

Tightening torque: $10.8 \pm 0.98 \text{ N}\cdot\text{m}$
 $(1.10 \pm 0.1 \text{ kg}\cdot\text{m})$



9JH03418

PROCEDURE FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT

For details, see "STARTING ENGINE (PAGE 3-124)". If necessary, see STARTING ENGINE, MOVE THE MACHINE OFF, STEERING, STOPPING MACHINE in the instruction section.

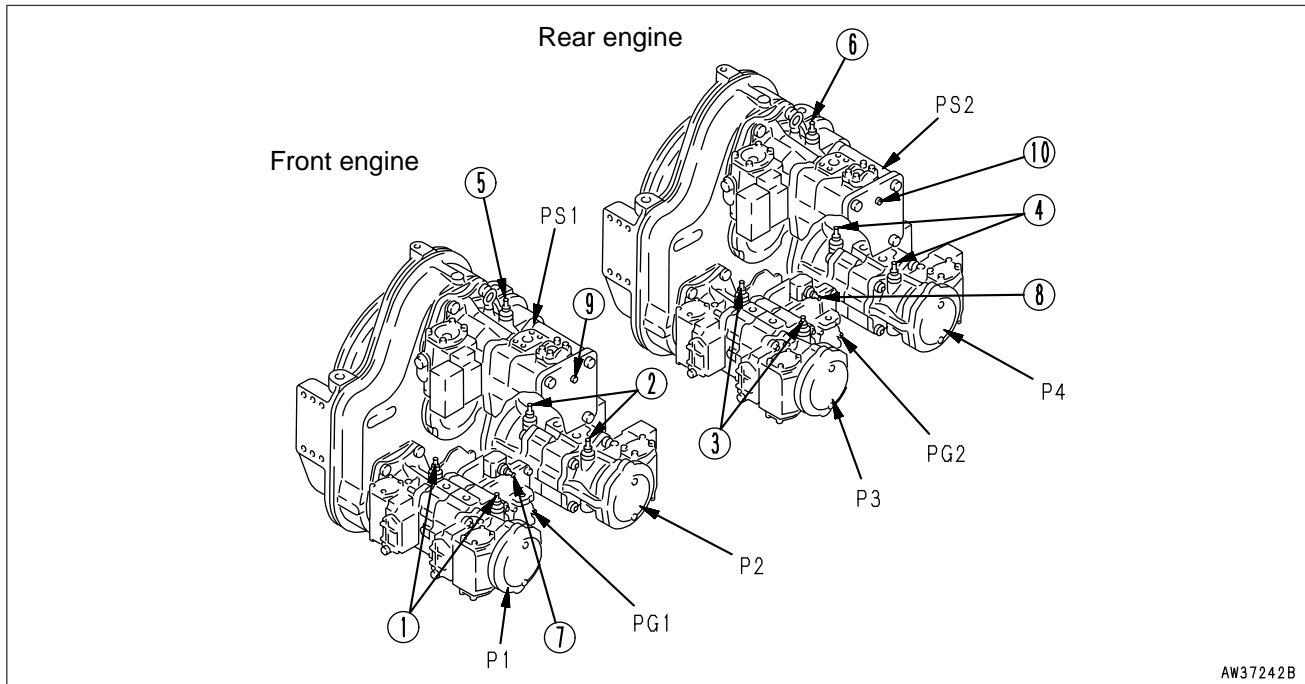
NOTICE

- Bleed the air in the following order.
 1. Pump (for swing, travel, hydraulic)
 2. Motor (for swing, travel)
 3. Pilot piping (for swing motor, main valve, travel motor)
 4. Idler cushion circuit
 5. Work equipment circuit
- Run the engine at less than 1000 rpm and operate the cylinders slowly.
- Do not raise the pressure inside the cylinder by suddenly operating the cylinder and do not operate the cylinder to the end of its stroke.
- For the first return movement of each cylinder, be particularly careful to operate the cylinder slowly.
- During the first stroke of the cylinder, there is a large amount of air inside the circuit, so the work equipment will not move for at least 10 seconds. However, do not move the lever to the end of the stroke.
- Use NAS7 class oil or above when filling the pump with oil. Use a clean container for the oil.

BLEEDING AIR FROM PUMP

Bleed the air at the same time from the swing, travel, hydraulic, and pilot pumps.

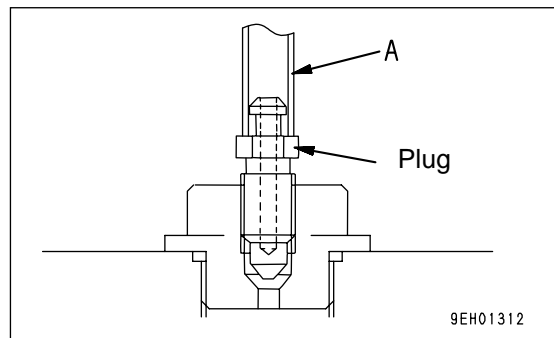
If the pump assembly has been removed, or the oil in the hydraulic tank has been changed, bleed the air from the pump as follows to prevent the pump from seizing.



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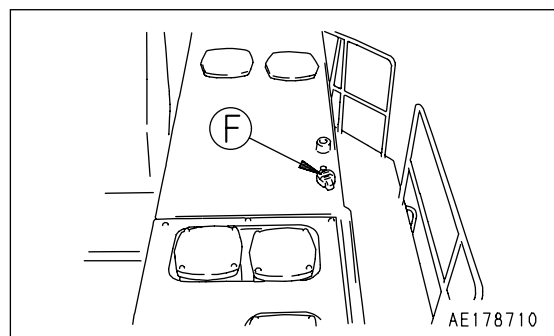
Name of pump	Front engine	Rear engine
Hydraulic pump	P1, P2	P3, P4
Swing pump	PS1	PS2
Gear pump	PG1	PG2

1. Install tube (A) to the plug to prevent the discharge oil from spurting out.
2. Loosen bleeders (1) – (10) (14 places) of each pump one or two turns.



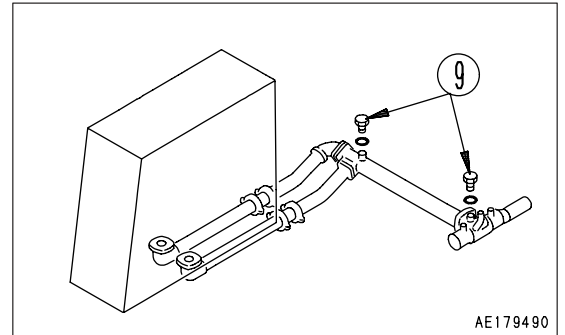
9EH01312

3. Add oil to fill the hydraulic tank to the specified level. Keep the oil filler cap (F) off after adding oil to the hydraulic tank.
4. Check that oil flows out from gear pump (7) and (8) and hydraulic pump bleeders (1), (2), (3), and (4), then temporarily tighten plugs (1), (2), (3), (4), (7), and (8).
5. Check that the air has stopped spurting out from swing pump plugs (5) and (6), then temporarily tighten rear engine plug (6). Leave front engine plug (5) loosened.



AE178710

6. Loosen suction tube plugs (9) (2 places), check that the oil flows out, then tighten it again temporarily.
7. Start the front engine (at low idling), and check that oil flows out from swing pump bleeder (5) for the front engine, then tighten plug (5) temporarily.
8. Loosen swing pump bleeder (6) for the rear engine.

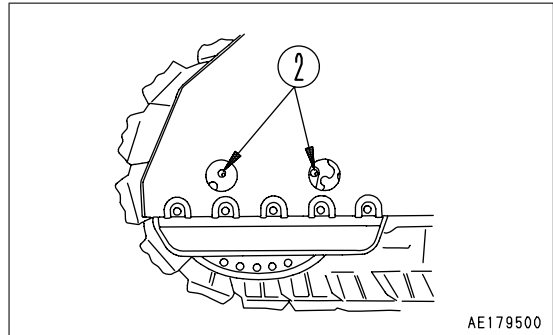


9. Start the rear engine (at low idling), and check that oil flows out from swing pump bleeder (6) for the rear engine, then tighten plug (6) temporarily.
10. Loosen plugs (1) – (8) (12 places) for each pump, check that there are no bubbles in the oil discharged, then tighten each plugs (12 places) temporarily.
11. Close the cap of the hydraulic tank.
12. Swing the upper structure slowly 180°.
13. Loosen suction tube plugs (9) (2 places), check that there are no bubbles in the oil discharged, then tighten plugs (9).
Tightening torque for plug (9): 59 – 78 N·m (6 – 8 kg·m)
14. Carry out the operations in Step 11 again, then swing the upper structure slowly 180° to return it to its original position.
15. Loosen plugs (1) – (8) (12 places) for each pump, check that there are no bubbles in the oil discharged, then tighten each plugs (12 places).
Tightening torque for plugs (1) – (8): 9.3 ± 0.5 N·m (0.95 ± 0.05 kg·m)
16. Stop the rear engine, then stop the front engine.
17. Loosen the oil filler cap slowly to release the pressure inside the hydraulic tank, then remove the oil filler cap and add hydraulic oil to the specified level.

BLEEDING AIR FROM MOTOR

Travel motor

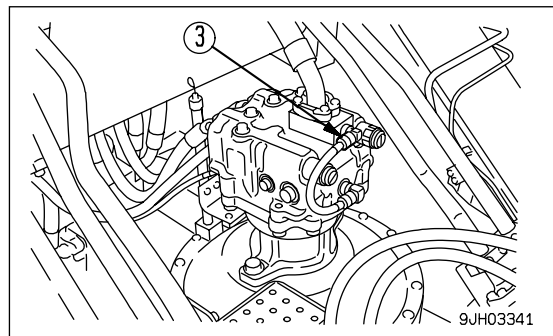
1. Start the engine and run at low idling.
2. Loosen plug (2) of the travel motor 1 – 2 turns.
Loosen the plugs for all four motors.
3. When no more cloudy white oil comes out from the tip of plug (2), the air bleeding is completed.
4. Tighten plug (2).
Tightening torque: $8.8 \pm 1 \text{ N}\cdot\text{m}$
($0.9 \pm 0.1 \text{ kg}\cdot\text{m}$)



Swing motor

1. Start the engine and run at low idling.
2. Loosen S port hose (3) of the swing motor.
3. When no more cloudy white oil comes out from S port hose (3) of the swing motor, tighten the hose.
This completes the air bleeding operation.

Carry out the air bleeding operation for the 2 front and rear motors.

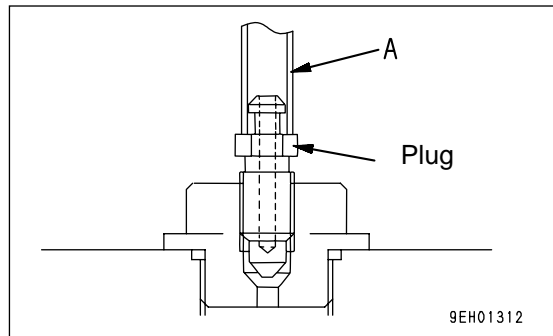


BLEEDING AIR FROM PILOT PIPING

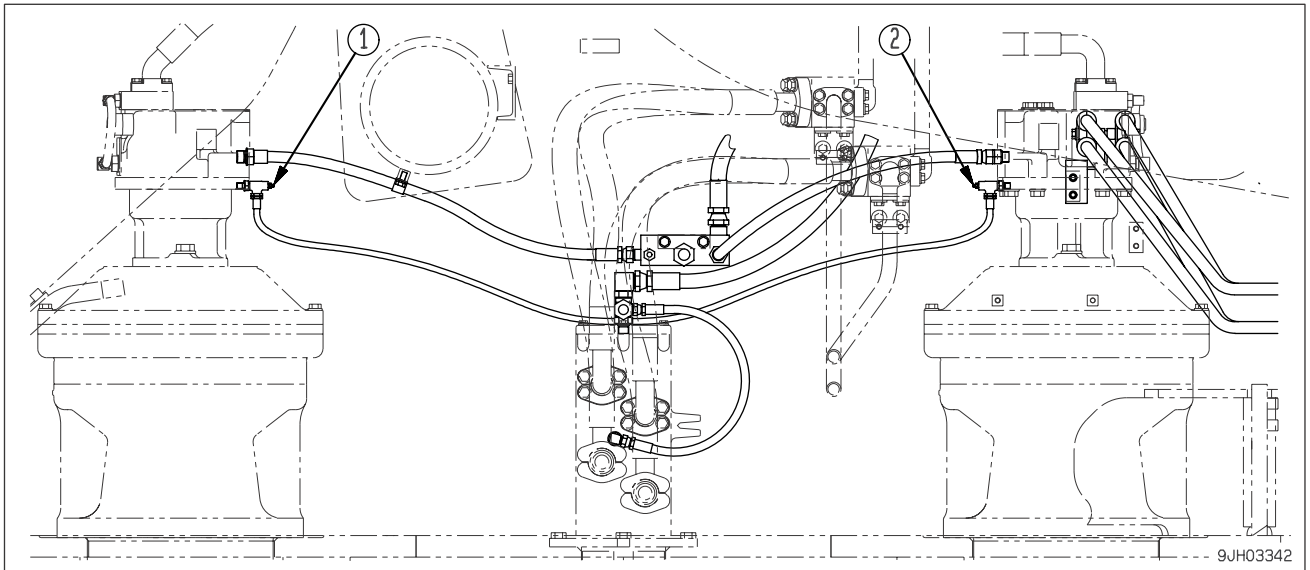
To bleed the air from the pilot piping, use the air bleed plugs installed in the following piping.

- Swing motor pilot piping
- Main valve pilot piping
- Travel motor pilot piping

To prevent oil from spraying out from the air bleed plug, install tube (A).

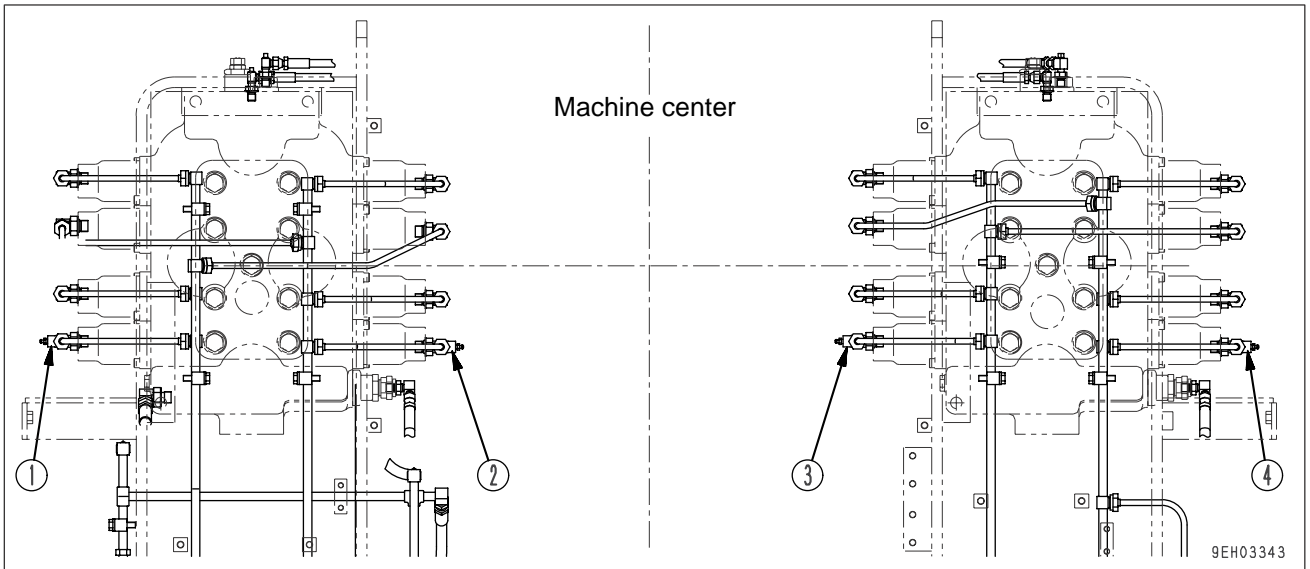


BLEEDING AIR FROM SWING MOTOR PILOT PIPING



1. Start the engine and run at low idling.
2. Loosen air bleed plugs (1) and (2) in the swing motor pilot piping 1 or 2 turns.
3. When no more cloudy white oil comes out from air bleed plugs (1) and (2) in the swing motor pilot piping, tighten the plugs.
This completes the air bleeding operation.

BLEEDING AIR FROM MAIN VALVE PILOT PIPING

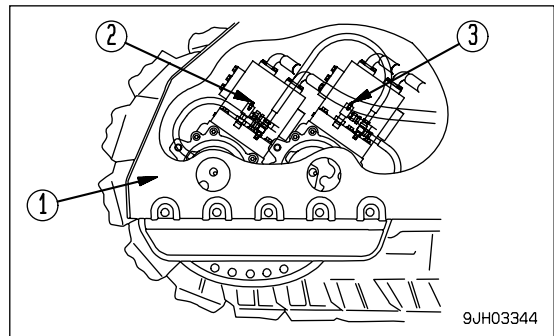


1. Start the engine and run at low idling.
2. Loosen air bleed plugs (1), (2), (3), and (4) in the main valve pilot piping 1 or 2 turns.
3. When no more cloudy white oil comes out from air bleed plugs (1), (2), (3), and (4) in the main valve pilot piping, tighten the plugs.
This completes the air bleeding operation.

BLEEDING AIR FROM TRAVEL MOTOR PILOT PIPING

(2 places each on left and right of machine)

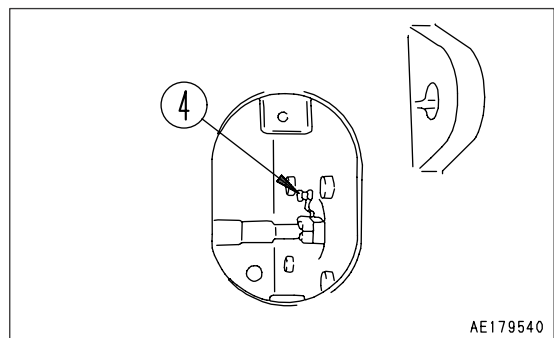
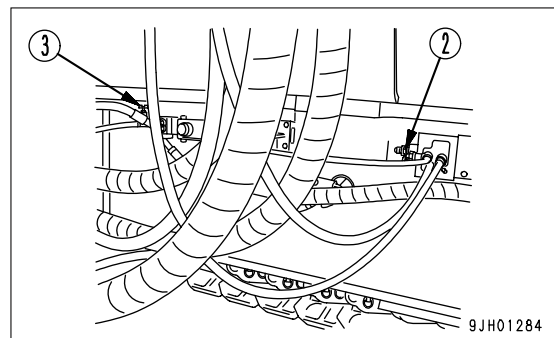
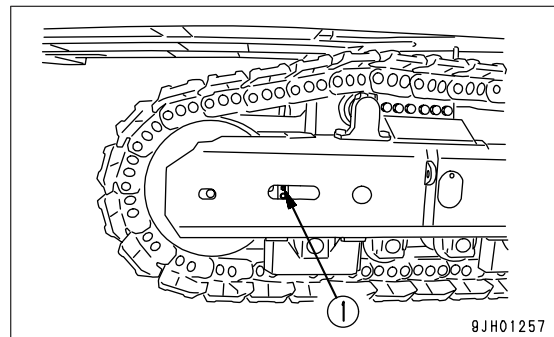
1. Remove cover (1).
2. Start the engine and run at low idling.
3. Loosen air bleed plugs (2) and (3) in the travel motor pilot piping 1 or 2 turns.
4. When no more cloudy white oil comes out from air bleed plugs (2) and (3) in the travel motor pilot piping, tighten the plugs.
This completes the air bleeding operation.



BLEEDING AIR FROM IDLER CUSHION CIRCUIT

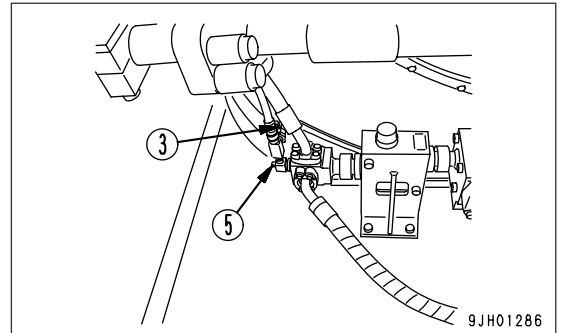
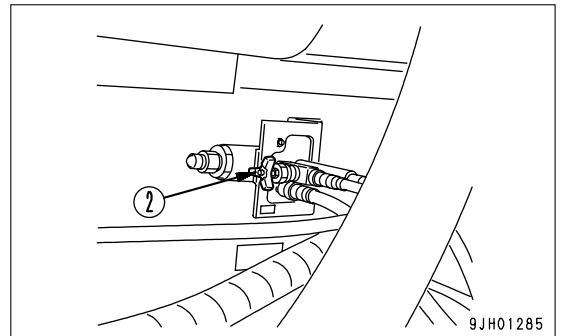
Bleed the air from the idler cushion circuit before pumping grease into the hydraulic charge grease cylinder.

1. Loosen grease fitting (1) of the grease cylinder 1 turn.
(2 places: left and right)
2. Open stop valve valves (2) and (3) on the inside of the axle fully.
3. Loosen air bleed plug (4) of the cushion cylinder approx. one turn. (left and right, 2 places)
4. Start the engine and run at idling for 2 to 3 minutes.
5. When no more cloudy white oil comes out from air bleed plug (4) of the cushion cylinder, close stop valve (3).
Leave stop valve (2) open.



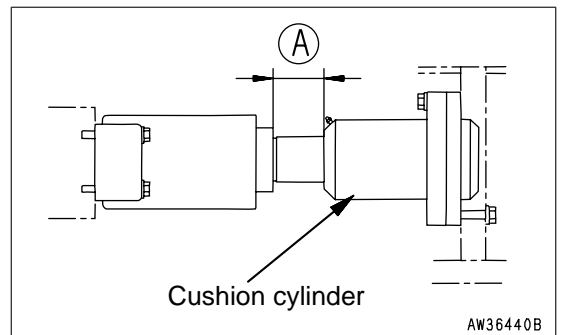
6. Operate the right travel lever 2 or 3 times to the FORWARD and REVERSE position.
7. Check that oil comes out from air bleed plugs (4) (left and right, 2 places) and (5), then close stop valve (2) and air bleed plugs (4) and (5).
8. Tighten grease fittings (1) (left and right, 2 places).
9. Finally, tighten air bleed plug (4).

Tightening torque: $81.3 \pm 6.9 \text{ N}\cdot\text{m}$
 $\{8.3 \pm 0.7 \text{ kgf}\cdot\text{m}\}$



REMARK

- Always tighten grease fitting (1) last. This completes bleeding of the air and pumping in of pressure oil.
- Check that all the stop valves and air bleed plugs are closed.
- Check that protrusion (A) of the cushion cylinder plunger is $135 \pm 5 \text{ mm}$.



BLEEDING AIR FROM WORK EQUIPMENT CIRCUIT

After changing the oil in the hydraulic tank or replacing the line filter, after reassembling the cylinders or piping, or after reassembling the pumps or suction piping, always bleed the air from the hydraulic circuit.

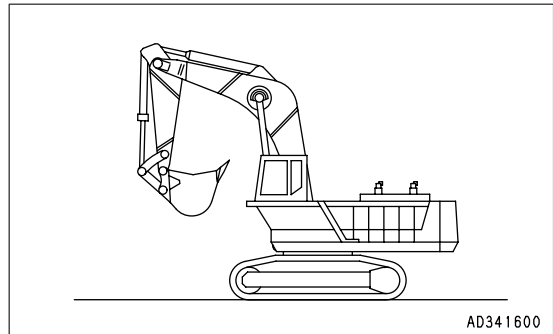
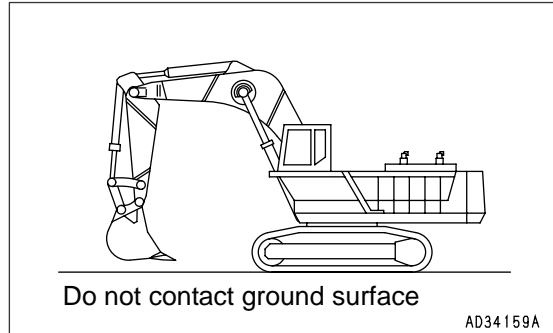
Run the engine at low idling and do as follows:

1. Operate each cylinder 4 – 5 times to a point 100 mm from the end of its stroke.

When operating for the first time, there is a large amount of air in the circuit, so the work equipment will not move for approx. 10 seconds. Be careful not to operate the lever to the full stroke.

2. Keep the engine at low idling and operate each cylinder from the point 100 mm from the end of its stroke slowly (take at least 10 seconds) to extend the cylinder to the end of its stroke. Hold the work equipment control lever for 3 minutes at the full stroke.
3. Run the engine at high idling and operate each cylinder from the point 100 mm from the end of its stroke slowly (take at least 10 seconds) to extend the cylinder to the end of its stroke. Hold the work equipment control lever for 1 minute at the full stroke.

- The operation in Steps 1. – 3. will bleed the air from inside the cylinders.
- If the engine is run immediately at high speed or the cylinder is operated to the end of its stroke, the air inside the cylinder may cause damage to the piston packing.



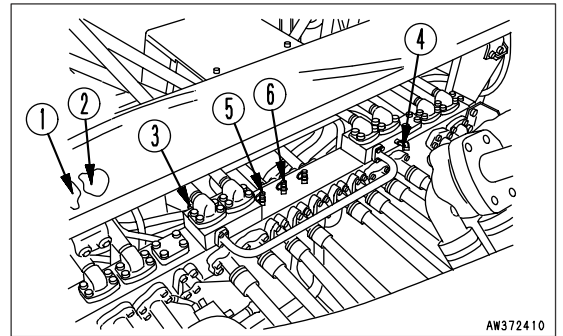
METHOD FOR RELEASING INTERNAL PRESSURE IN HYDRAULIC CIRCUIT

RELEASING PRESSURE FROM WORK EQUIPMENT CIRCUIT, SWING CIRCUIT, TRAVEL CIRCUIT

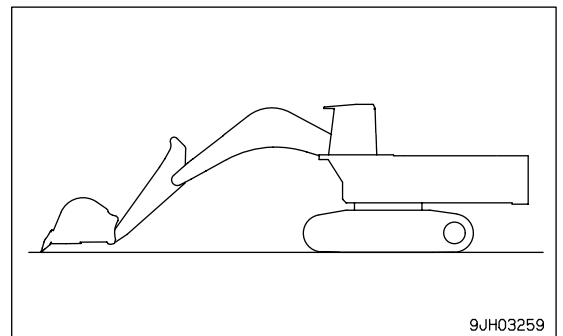
⚠ WARNING

- The hydraulic circuit is always under pressure, so release the pressure inside the circuit before inspecting or replacing the piping or hoses. If the pressure is not released, high-pressure oil will spurt out and may cause serious personal injury.
- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the internal pressure before removing the cap.
- When the piping for the work equipment circuits is removed, for safety, insert a hose with quick coupler into the coupler installed to each circuit to completely remove the remaining pressure.

1. Boom cylinder head end
2. Boom cylinder bottom end
3. Arm cylinder head end
4. Arm cylinder bottom end
5. Bucket cylinder head end
6. Bucket cylinder bottom end



1. Lower the work equipment to the ground in a stable flat place as shown in the diagram, then stop the engine.
 - Set the lock lever to the FREE position.
2. After stopping the engine, move each work equipment control lever to the end of its travel within 5 to 6 seconds.
 - Leave the starting switch ON.
3. Remove the cap of the hydraulic tank.
4. Start the engine, run it for approx. 10 seconds, then stop the engine again.
 - When running the engine, do not raise the speed above 1000 rpm.
 - Set the work equipment control levers to neutral.
5. After stopping the engine, move each work equipment control lever to the end of its travel within 5 to 6 seconds.
 - Repeat Steps 4 to 5 three times.

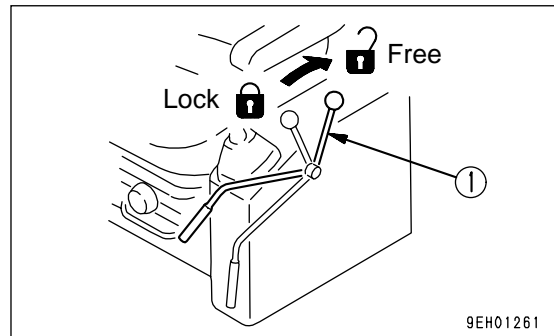


RELEASING PRESSURE IN ACCUMULATOR CIRCUIT

Pilot circuit

Stop the engine, set lock lever (1) to the FREE position, then move each work equipment control lever 3 to 4 times to the end of its travel. After 1 minute passes, the pressure is relieved.

- Do not loosen the piping less than 1 minute after releasing pressure.
- Loosen the hydraulic tank cap slowly before releasing the internal pressure. After releasing the internal pressure, tighten the cap.

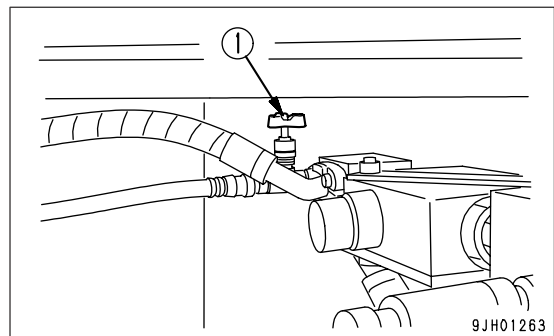
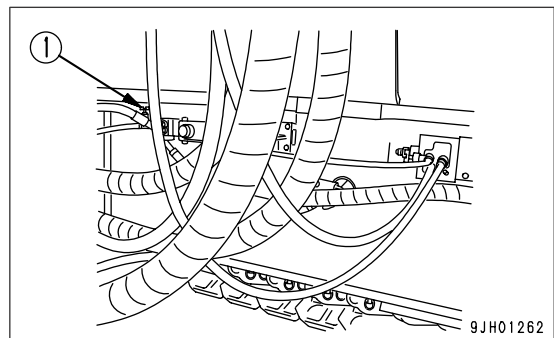


RELEASING INTERNAL PRESSURE IN HYDRAULIC IDLER CUSHION CIRCUIT

Slowly loosen stop valve (1) installed inside the axle and leave for at least one minute to release the internal pressure.

If the valve is loosened suddenly, high pressure will be generated in the tank circuit.

- Loosen the hydraulic tank cap before releasing the internal pressure. After releasing the internal pressure, tighten the cap.



CHECK BEFORE STARTING

For details of the following items, see "CHECKS BEFORE STARTING (PAGE 3-104)" in the OPERATION section.

- Check coolant level, add water
- Check oil level in engine oil pan, add oil
- Check fuel level, add fuel
- Check oil level in hydraulic tank, add oil
- Check oil level in PTO case, add oil check for clogging of air cleaner
- Check electric wirings
- Check function of horn
- Drain water, sediment from fuel tank
- Check CGC monitor

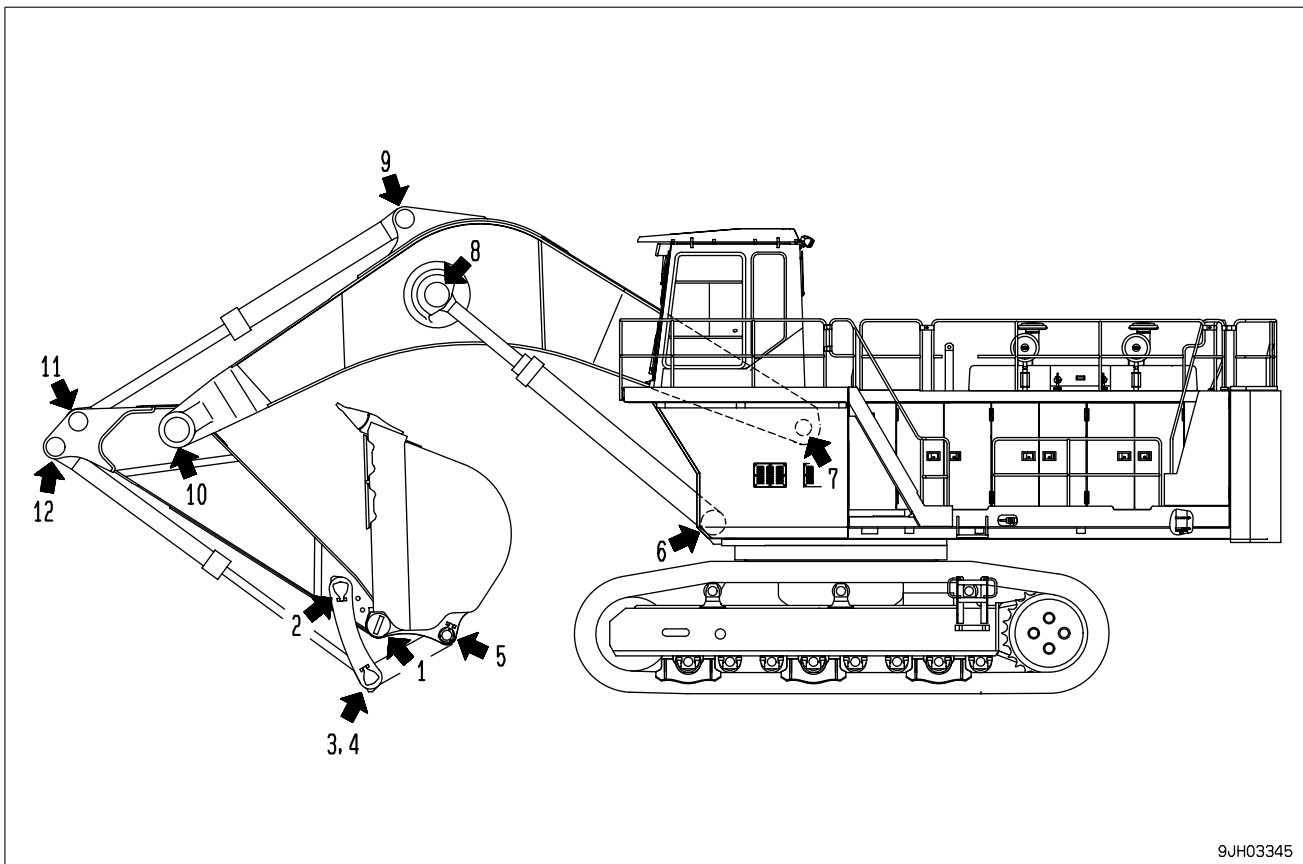
EVERY 10 HOURS MAINTENANCE

LUBRICATING

⚠ WARNING

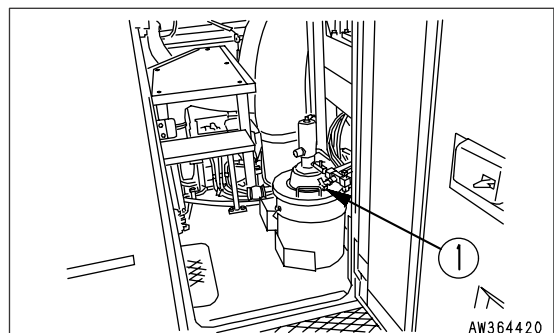
If any abnormal noise comes from the greasing points of the work equipment, apply grease regardless of the service interval.

There are two types of places for carrying out greasing: places greased manually using a grease gun and places greased automatically.

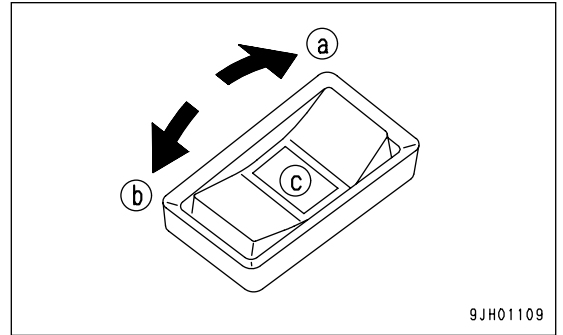


GREASING PLACES MANUALLY USING GREASE GUN

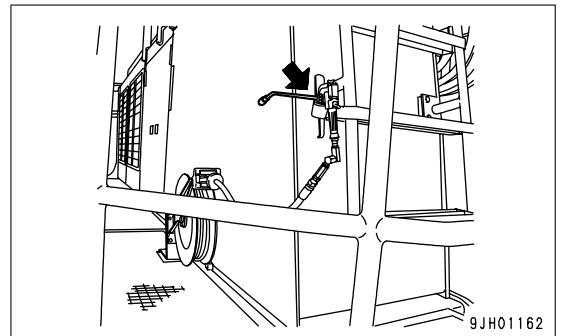
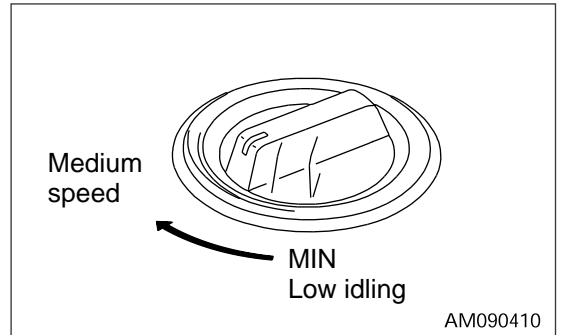
1. Start the engine, set to the greasing posture above, then lower the work equipment to the ground. For details, see "CHECKS BEFORE STARTING (PAGE 3-104)" and "STARTING ENGINE (PAGE 3-124)" and pay careful attention to safety during the operation.
2. Close stop valve (1) installed to the grease pump inside the room under the operator's cab.



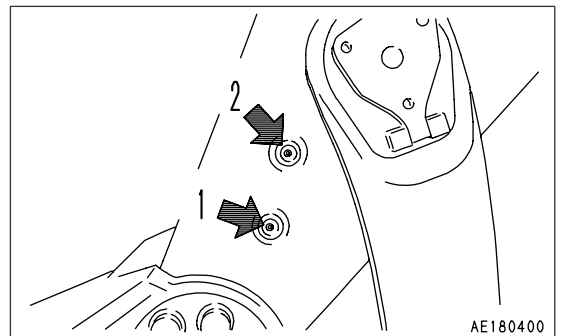
3. Push the greasing switch on the right side of the operator's seat inside the cab to START position (a), then release it.
 - During the greasing operation, the lamp at central portion (c) of the switch lights up.
 - Greasing can be carried out for 15 minutes each time the switch is operated.



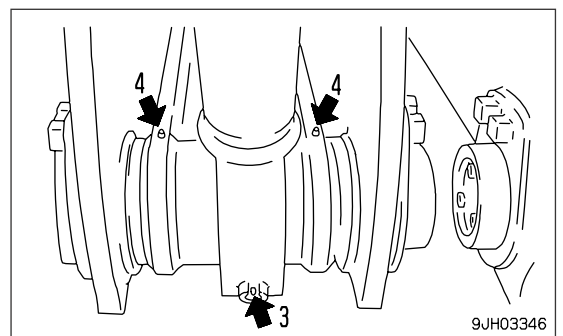
4. Using the grease gun, pull out the hose from the reel, then pump in the grease through the grease fittings at places 1) – 5) around the bucket.
 - During the greasing operation, set the fuel control dial at a position between low speed and mid-range speed.
 - It is more efficient if the greasing operation is carried out during the warming up operation for checks before starting.



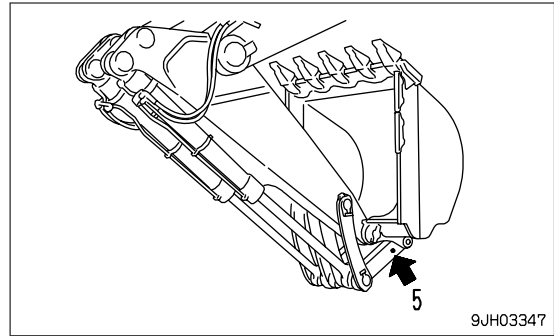
- 1) Arm-Bucket coupling pin (2 points)
- 2) Arm-Link coupling pin (2 points)



- 3) Bucket cylinder rod end pin (2 points)
- 4) Link coupling pin (4 points)

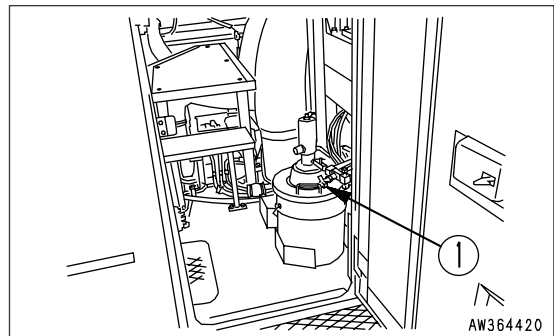


- 5) Bucket-Link coupling pin (2 points)

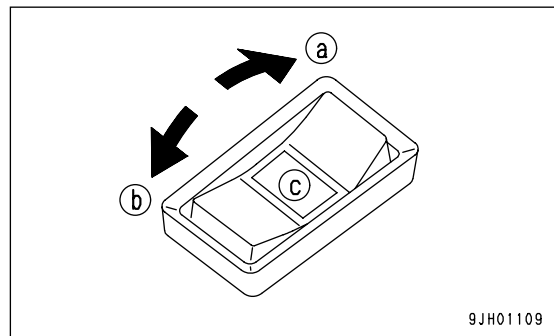


GREASING PLACES AUTOMATICALLY

- 1. After completing the manual greasing with the grease gun, open stop valve (1) installed to the grease pump inside the room under the operator's cab.



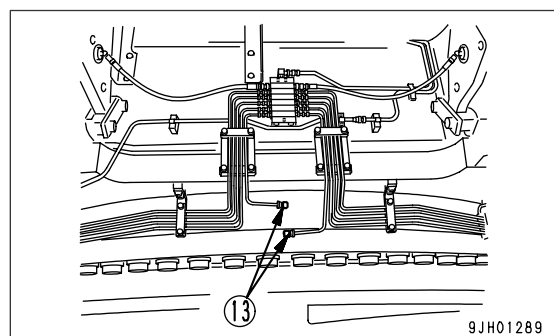
- 2. Push the greasing switch on the right side of the operator's seat inside the cab to START position (a), then release it.
 - During the greasing operation, the lamp at central portion (c) of the switch lights up.
 - Greasing can be carried out for 15 minutes each time the switch is operated.
- 3. If further greasing is necessary, repeat the operation from Step 2.



Automatic greasing is carried out for places 6) – 13).

- 6) Boom cylinder foot pin (2 points)
- 7) Boom foot pin (2 points)
- 8) Boom cylinder rod pin (2 points)
- 9) Arm cylinder foot pin (2 points)
- 10) Boom-Arm coupling pin (2 points)
- 11) Arm cylinder rod pin (2 points)
- 12) Bucket cylinder foot pin (2 points)

- 13) Swing circle (2 points)

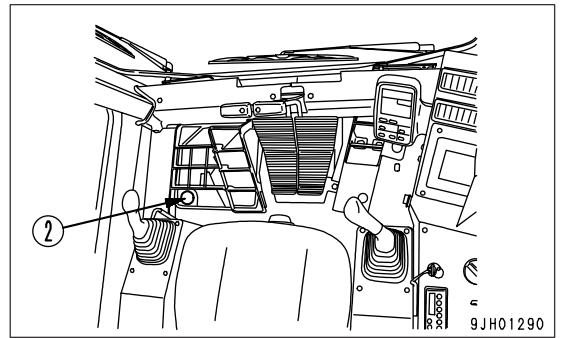


PRECAUTIONS WHEN GREASING

- During the greasing operation, grease pressure gauge (2) should be in the range from 4.9 – 19.6 MPa {50 – 200 kg/cm²}.

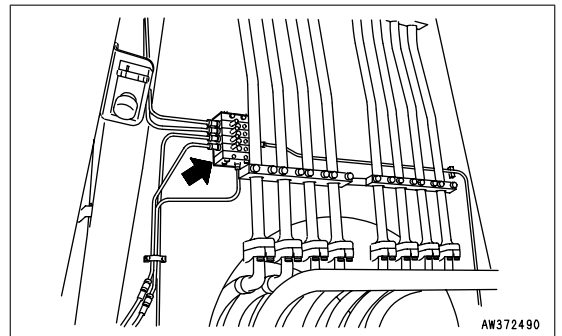
If the pressure goes below 4.9 MPa {50 kg/cm²}, it indicates that the grease can is empty. Replace the grease can.

For details of the method of replacing the grease can, see “HANDLING GREASE PUMP AND GREASE GUN (PAGE 3-97)”.

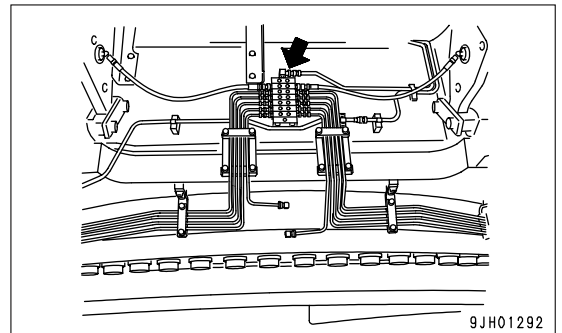


- If the pressure is above 19.6 MPa (200 kg/cm²), check the distributor indicator at the top face of the boom foot. If the plunger is protruding, that line is clogged, so check and repair.

For details of the method of replacing the grease can, see “HANDLING GREASE PUMP AND GREASE GUN (PAGE 3-97)”.



- If the pressure is more than 19.6 MPa {200 kg/cm², 2840 psi}, check the indicator of the distributor at the top surface of the boom foot, and if the plunger has been pushed out, there is clogging in that line, so carry out inspection and repairs.

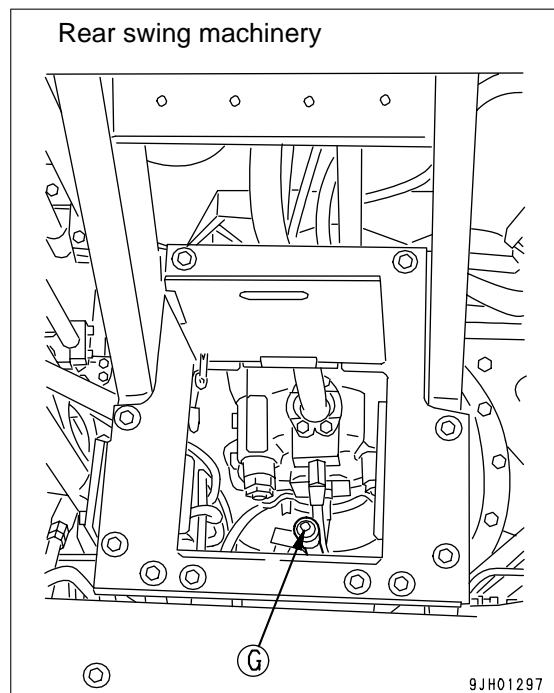
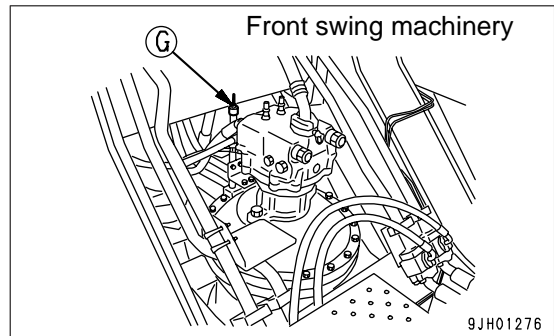


EVERY 100 HOURS MAINTENANCE

Maintenance for every 10 hours service should be carried out at the same time.

CHECK OIL LEVEL IN SWING MACHINERY CASE

1. Use dipstick (G) to check the oil level.
2. The oil level should be between the L and H marks. If necessary, add oil at the dipstick guide hole.



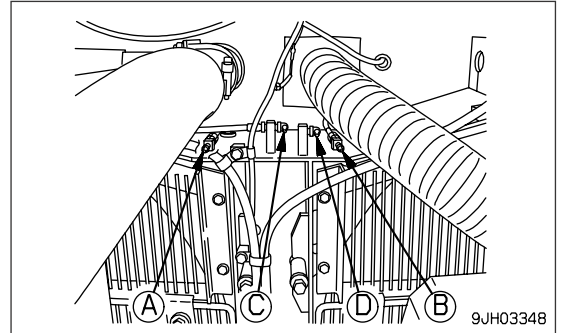
EVERY 250 HOURS MAINTENANCE

Maintenance for every 10 hours service should be carried out at the same time.

GREASING FAN PULLEY ASSEMBLY, TENSION PULLEY ASSEMBLY

Pump in the grease through grease fittings (A), (B), (C), and (D).

- Fan pulley assembly
 - (A): Grease fitting for front engine
 - (B): Grease fitting for rear engine
- Tension pulley assembly
 - (C): Grease fitting for front engine
 - (D): Grease fitting for rear engine

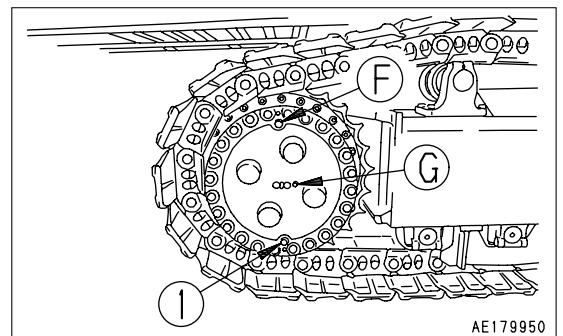


CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

⚠ WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- If there is still pressure remaining inside the case, the oil or plug may fly out. Loosen the plug slowly to release the pressure.

- Prepare a hexagonal wrench.
 1. Set the final drive so that TOP mark comes to the top and the mark and plug (P) are perpendicular to the ground.
 2. Using a hexagonal wrench, remove plug (F) and check that the oil level is within a range from the bottom of the plug hole to a point 10 mm below it.
 3. If the oil level is low, check again. Install plug (F), operate the travel lever, travel in FORWARD or REVERSE, and rotate the sprocket one turn. Carry out the inspection for Procedure 2 again.
 4. If the oil level is still too low, add engine oil through the hole in plug (F) until the oil overflows.
 5. After checking, install plug (F).



CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this check before operating the machine.

WARNING

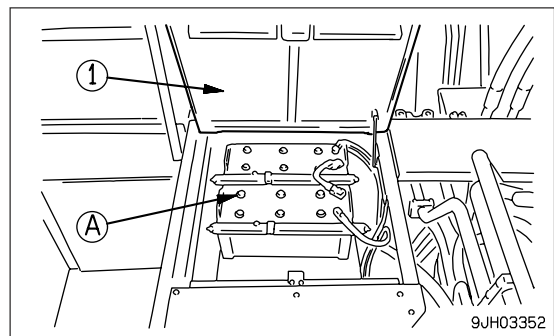
- Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may also cause an explosion.
- The battery generates flammable gas and there is danger of explosion, so do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amount of water and consult a doctor.
- When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.

NOTICE

When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.

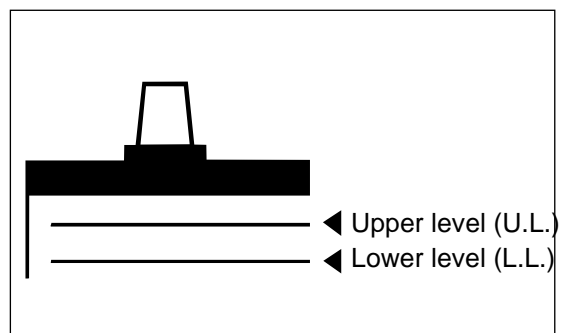
1. Open cover (1) at the rear left side of the machine. The batteries are installed at (A) part.



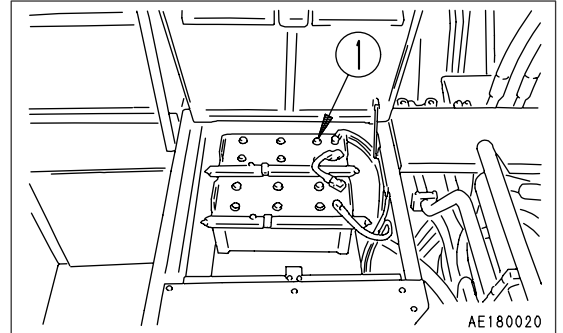
When Checking Electrolyte Level from side of Battery

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines. If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.



- If the electrolyte level is below the midway point between the U.L and L.L lines, remove cap (1) and add distilled water to the U.L line.
- After adding distilled water, tighten cap (1) securely.



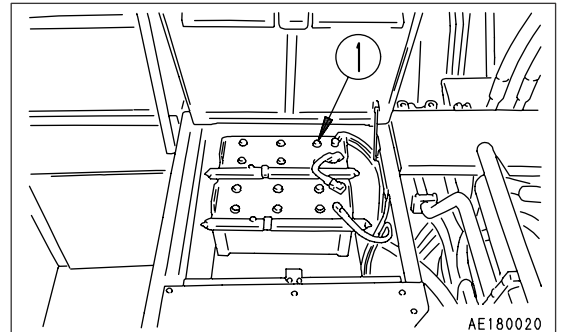
REMARK

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

When It is Impossible to Check Electrolyte Level from Side of Battery

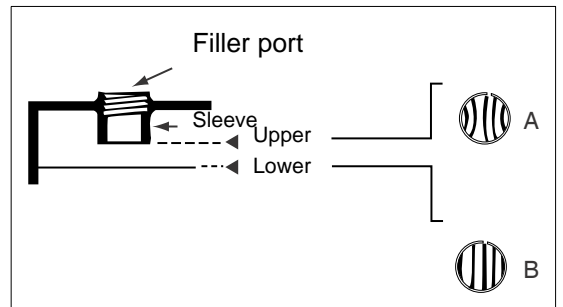
If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

- Remove cap (1) at the top of the battery, look through the water filler port, and check the electrolyte surface. If the electrolyte does not reach the sleeve, add distilled water so that the level reaches the bottom of the sleeve (UPPER LEVEL line) without fail.



Use the diagram below for reference, and check if the electrolyte reaches the bottom of the sleeve.

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



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

REMARK

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

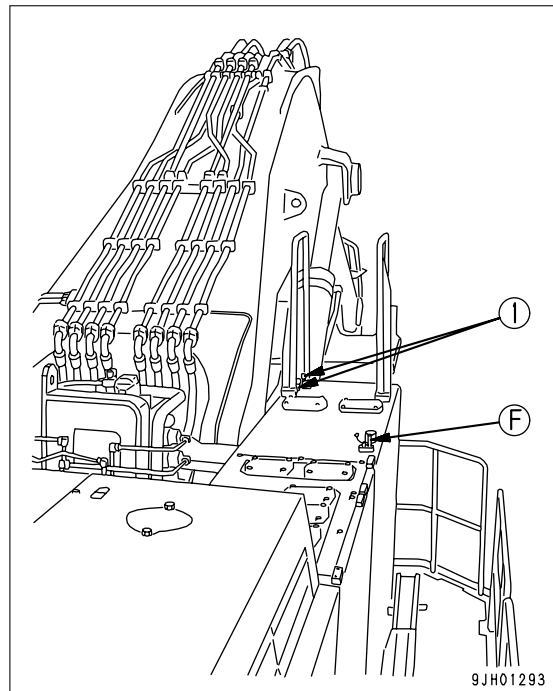
When It is Possible to Use Indicator to Check Electrolyte Level

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

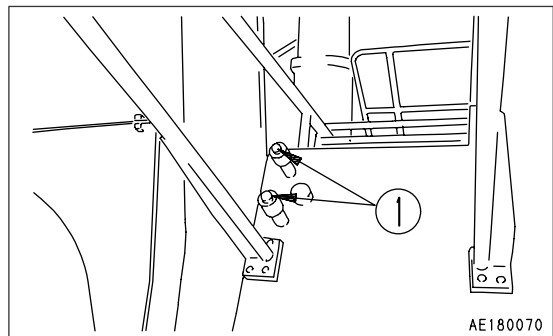
REPLACE FILTER ELEMENT OF HYDRAULIC TANK BREATHER

⚠ WARNING

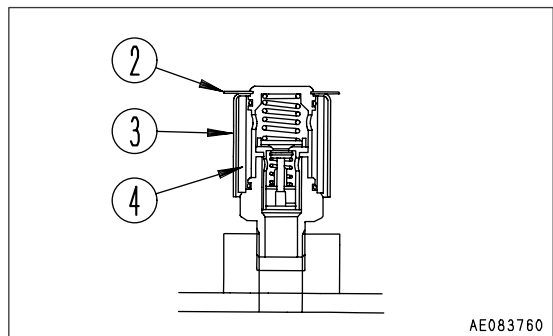
When replacing the element, turn the cap (F) of oil filler slowly to release the internal pressure.



1. Remove snap ring (2) of breather (1) and cover (3), then replace filter element (4) with a new part.



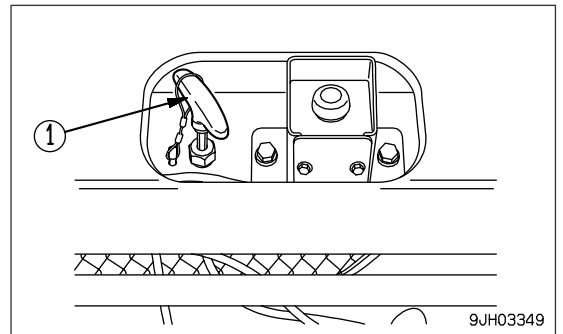
2. Install cover (3) and snap ring (2).



CHECK, WASH FUEL STRAINER

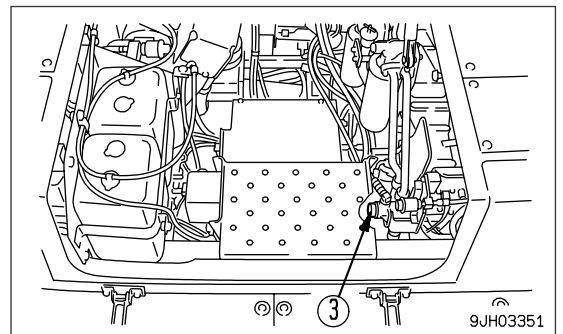
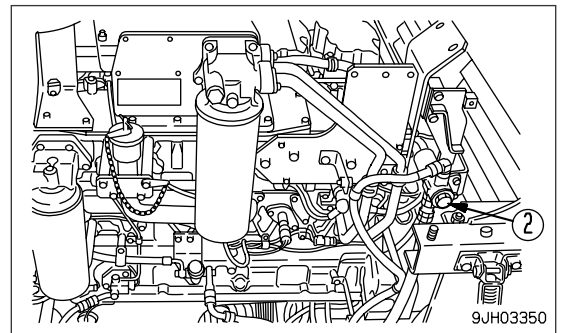
(Front engine, rear engine)

1. Operate fuel cut knob (1) installed at the side of the steps on the left side of the machine and close the fuel supply circuit from the fuel tank. For details of the method of closing the circuit, see "STOPPING THE ENGINE (PAGE 3-136)".



2. Open the engine hood, remove caps (2) and (3) of the strainer case, then wash the strainers and strainer case. The strainers form one part with caps (2) and (3).

- (2): Cap for front engine
- (3): Cap for rear engine

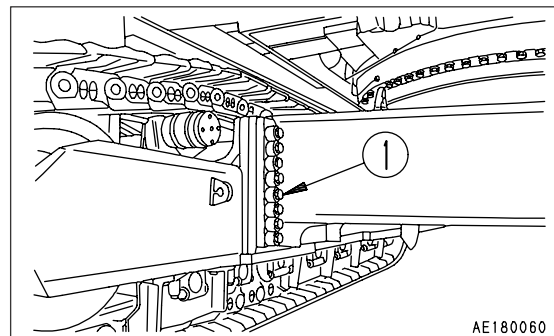
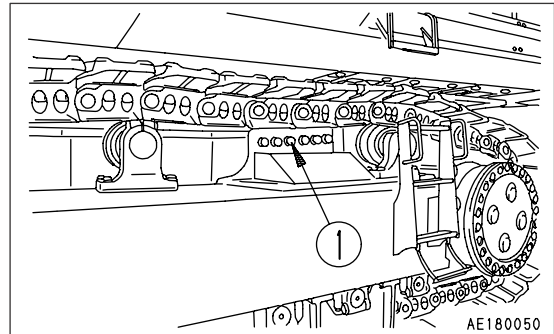


3. After checking and washing, install the strainers, then tighten cap (2), (3).
4. Operate fuel cut knob (1) and open the fuel supply circuit from the fuel tank. The procedure for opening the circuit is in the opposite order from the procedure when closing the circuit.

CHECK AND TIGHTEN TRACK FRAME AND AXLE CONNECTING BOLTS

Bolts (1) connecting the track frame and axle will break if they remain loose. If any loose bolts are found, please contact your Komatsu distributor to have them tightened.

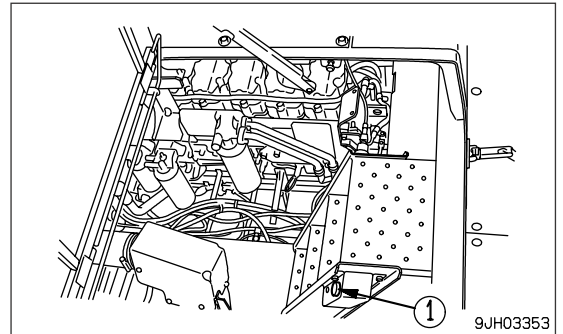
Tightening torque: 4658 ± 250 N·m
(475 ± 25 kg·m)



CHECK ALTERNATOR DRIVE BELT TENSION, ADJUST

⚠ WARNING

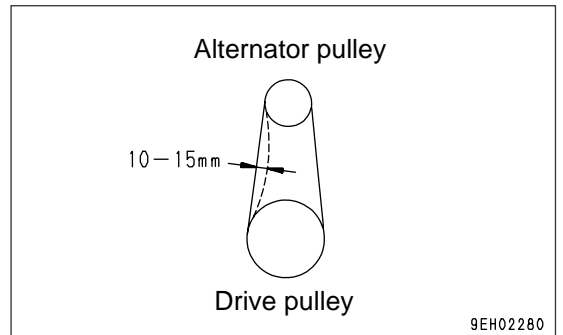
When carrying out inspection and adjustment, press engine stop switch (1) installed at the side of the center steps inside the engine room to set it to the engine stop position. For details of the method of operating engine stop switch (1), see Section “ENGINE STOP OPERATION INSIDE ENGINE ROOM (PAGE 3-138)”.



9JH03353

Inspection

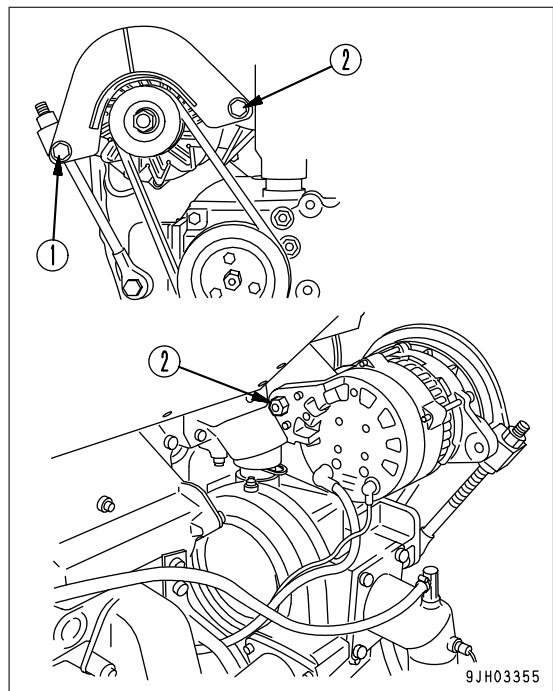
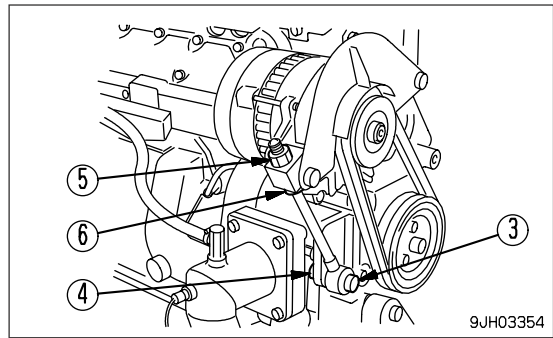
The standard deflection for the drive belt is 10 – 15 mm) when pressed with a thumb [at approx. 58.8 N (approx. 6 kgf)] at a point midway between the drive pulley and alternator pulley.



9EH02280

Adjustment

1. Loosen bolts and nuts (1) – (5) in number order, and move the alternator.
 - If nut (6) is tightened, the belt tension will increase; if nut (6) is loosened, the belt will become loose.
2. After adjusting the belt, tighten bolts and nuts (1) – (5) in reverse number order from (5) to (1). Finally, tighten nut (6).
 - Check each pulley for damage, wear of the V-groove, and wear of the V-belt. Check in particular that the V-belt does not contact the bottom of the V-groove.
 - If the V-belt is elongated and there is no more allowance for adjustment, or if the belt is cracked or cut, replace the belt.
 - When the V-belt has been replaced, adjust again after running for 1 hour.

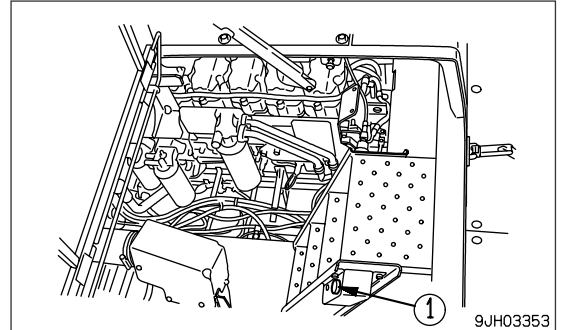


CHECK ADJUST TENSION OF AIR CONDITIONER COMPRESSOR BELT

There are two air conditioner compressors installed to the rear engine.

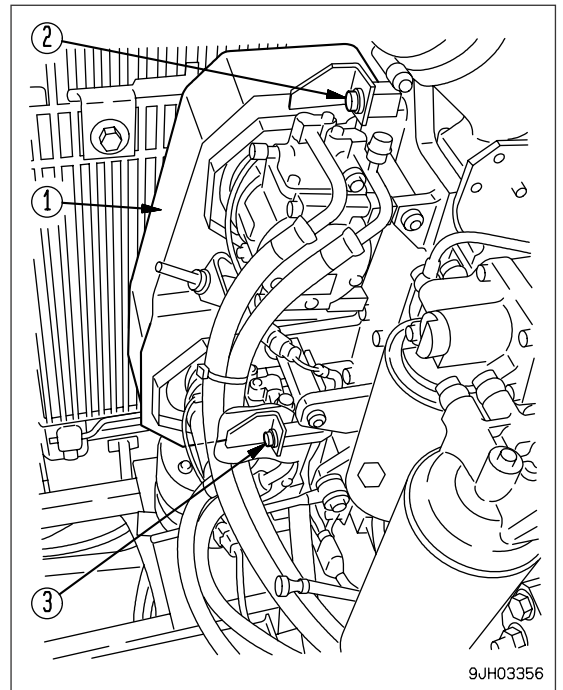
WARNING

When carrying out inspection and adjustment, press engine stop switch (1) installed at the side of the center steps inside the engine room to set it to the engine stop position. For details of the method of operating engine stop switch (1), see Section “ENGINE STOP OPERATION INSIDE ENGINE ROOM (PAGE 3-138)”.

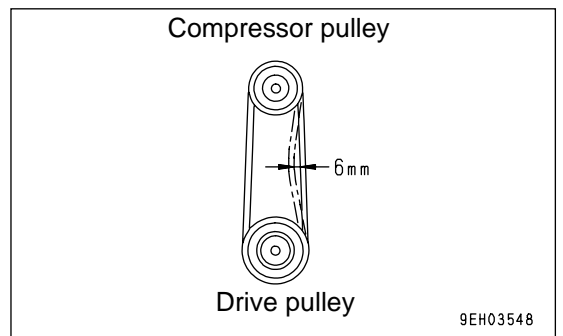


Checking

1. Remove bolts (2) and (3), then remove cover (1).

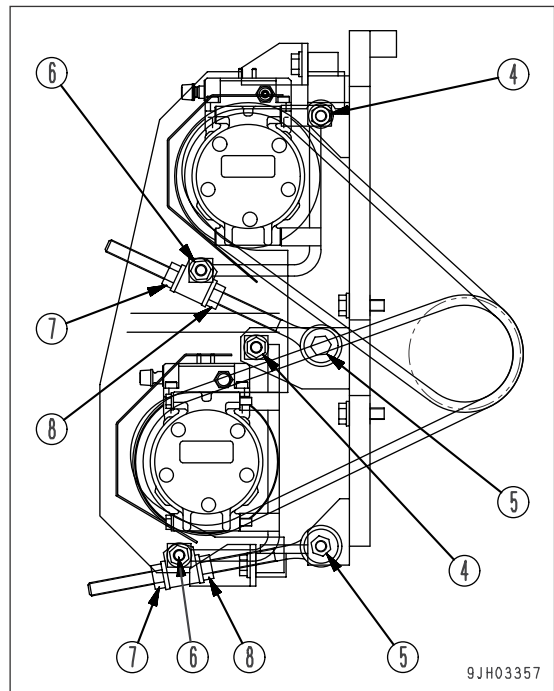


2. The standard deflection for the drive belt is approx. 6 mm (0.236 in) when pressed with a thumb [at approx. 58.8 N (approx. 6 kgf)] at a point midway between the drive pulley and air conditioner compressor pulley.



Adjusting

1. Loosen bolts and nuts (4) – (8) in number order, and move the compressor.
 - If bolt (8) is tightened, the belt tension will increase; if bolt (8) is loosened, the belt will become loose.
2. After adjusting the belt, tighten bolts and nuts (4) – (7) in reverse number order from (7) to (4). Finally, tighten nut (8).
 - Check each pulley for damage, wear of the V-groove, and wear of the V-belt. Check in particular that the V-belt does not contact the bottom of the V-groove.
 - If the V-belt is elongated and there is no more allowance for adjustment, or if the belt is cracked or cut, replace the belt.
 - When the V-belt has been replaced, adjust again after running for 1 hour.
3. Install cover (1).



EVERY 500 HOURS MAINTENANCE

Maintenance for every 10, 100 and 250 hours service should be carried out at the same time.

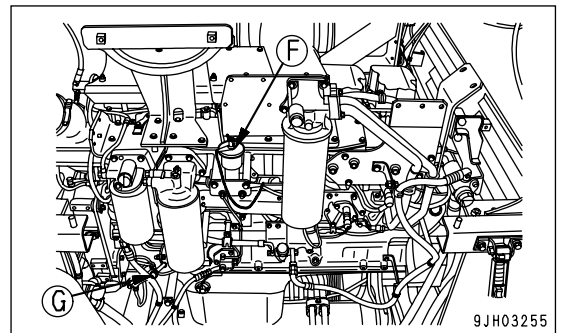
CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

WARNING

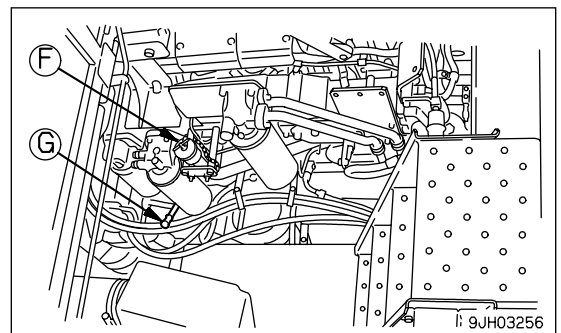
The parts and oil are at high temperature immediately after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.

NOTICE

- If the machine has been operated for six months but has not yet been operated for 500 hours, change the engine oil and replace the filter cartridge after six months.
 - When changing the engine oil and replacing the filter cartridge, carry out the operation for both the front engine and rear engine.
- Refill capacity: 110 liters (55 liters x 2)
 - Filter wrench
1. Open engine oil filler port (F).
 - Front engine



- Rear engine



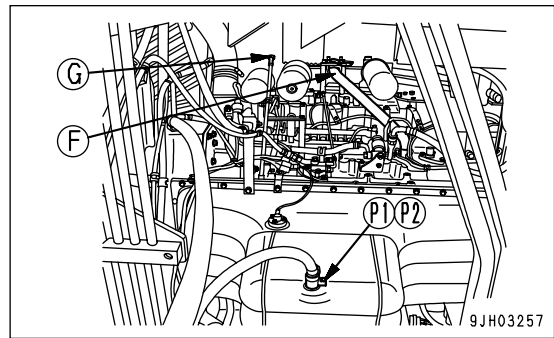
2. Loosen drain valves (P1) and (P2) of the oil pan.
The oil level will go down to drain valves (P3) and (P4).

P1: Drain valve in oil pan for front engine
 P2: Drain valve in oil pan for rear engine
 P3: External take-off drain valve for front engine
 P4: External take-off drain for rear engine

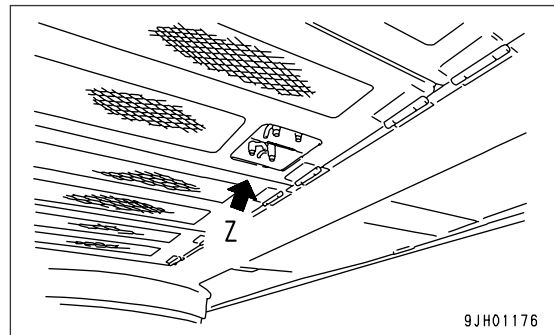
3. Open drain valve (P3) and (P4) from the drain control hole in the engine undercover and drain the oil. When doing this, be careful not to get oil on yourself.

- When draining the oil, put a container under drain valves (P3) and (P4) to catch the oil and prevent the oil from spraying or making the surrounding area dirty. After draining the oil, tighten drain valves (P3) and (P4). Push drain valves (P1), (P2), (P3), and (P4), then turn them to open or close them and operate the drain.

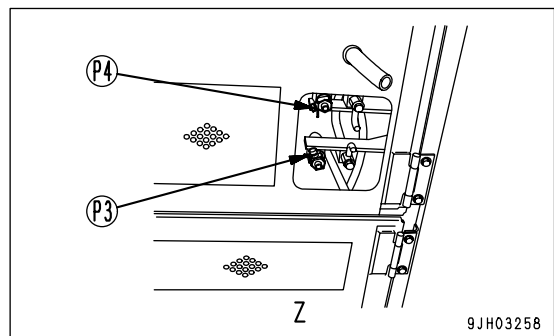
4. If the filter cartridge is removed immediately after stopping the engine, the oil will spill. After stopping the engine, wait for about 10 minutes before carrying out the replacement operation.



9JH03257



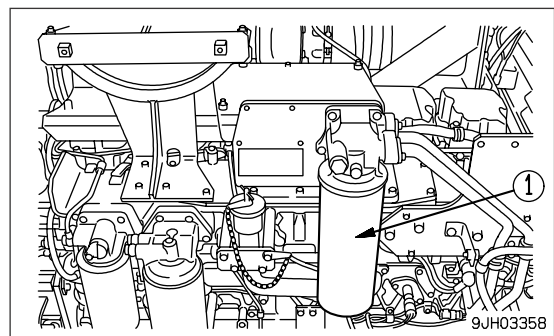
9JH01176



9JH03258

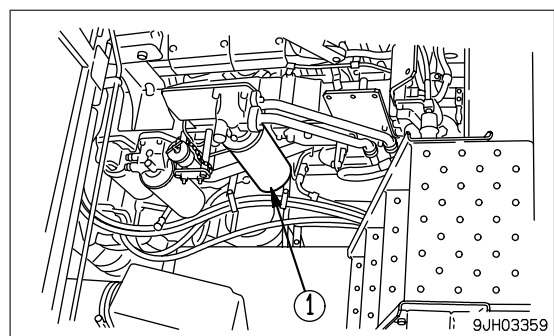
5. Using the filter wrench, turn filter cartridge (1) to the left to remove it.

- Front engine



9JH03358

- Rear engine



9JH03359

6. Clean the filter holder, fill the new filter cartridge with clean engine oil, coat the thread and packing surface of the new filter cartridge with clean engine oil (or coat it thinly with grease), then install it to the filter holder.

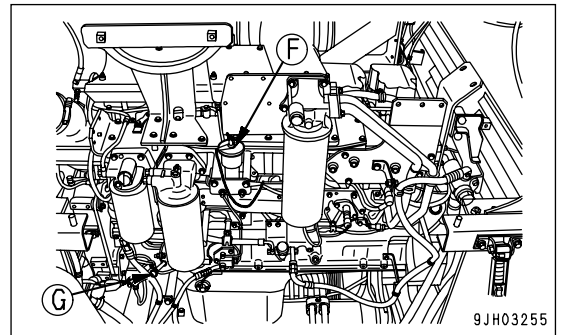
REMARK

Confirm that no remnants of old packing still adhere to the filter holder as this may result in oil leakage.

Check that there is no old packing affixed to the filter holder. If there is any old packing affixed to the filter, it will cause leakage of oil.

7. When installing, bring the packing surface into contact with the seal surface of the filter holder, then tighten a further 3/4 – 1 turn.
 - When tightening with a filter wrench, be extremely careful not to dent or damage the filter.

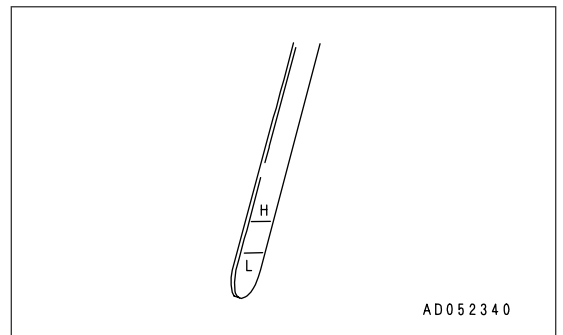
8. After replacing the filter cartridge, add engine oil through oil filler port (F) so that the oil level is between the H and L marks on dipstick (G).



9JH03255

9. Run the engine for a short time at low idling, then stop the engine. Check that the oil level gauge is between the H and L marks. For details, see "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-106)".

10. After checking, install oil filler port (F).



AD052340

REPLACE FUEL FILTER CARTRIDGE

(Front engine, rear engine: 1 place each)

WARNING

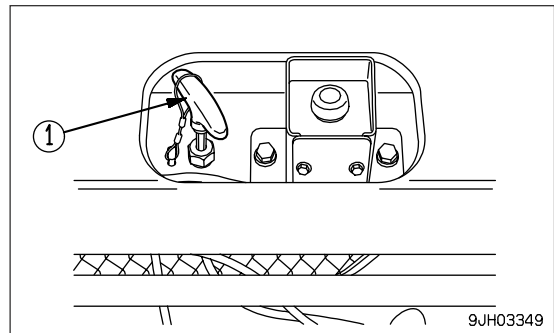
- After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any fire or flame close.

NOTICE

- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
- The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle. If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.

- Container to catch the oil
- Filter wrench

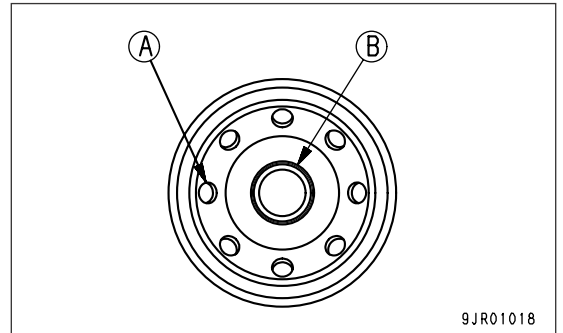
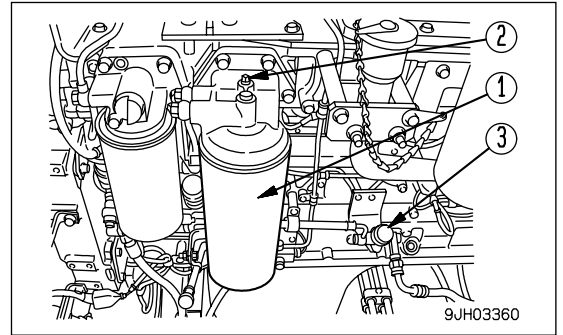
1. Operate fuel cut knob (1) installed at the side of the steps on the left side of the machine and close the fuel supply circuit from the fuel tank. For details of the method of closing the circuit, see "STOPPING THE ENGINE (PAGE 3-136)".



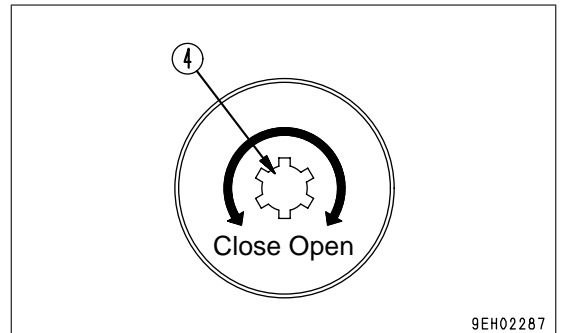
2. Set the container to catch the fuel under the filter cartridge.
3. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.
4. Clean the filter holder, fill the new filter cartridge with clean fuel, coat the packing surface thinly with engine oil, then install to the filter holder.

NOTICE

- When filling with fuel, use clean fuel and be careful not to let any dust or dirt get in. Portion (B) at the center is the clean side, so be particularly careful not to let any dust or dirt get in.
- When adding fuel, always add from small hole (A) at eight places on the dirty side.



When replacing with a new fuel filter, check that plug (4) is fitted securely in the bottom of the filter case.



5. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 1/2 to 3/4 of a turn.
If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten to the correct amount.
 - When tightening with a filter wrench, be extremely careful not to dent or damage the filter.
6. After replacing filter cartridge (2), loosen air bleed plug (3) of the filter cartridge, then operate fuel cut knob (1) and open the fuel supply circuit from the fuel tank. The procedure for opening the circuit is in the opposite order from the procedure when closing the circuit.
7. After completion of the replacement of fuel filter cartridge (1), bleed the air.

Bleed the air as follows.

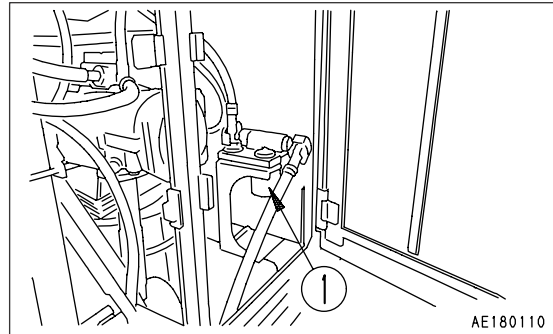
8. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
9. After replacing filter cartridge (1), loosen air bleed plug (2).
10. Loosen the knob of priming pump (3), move it up and down, and continue until no more bubbles come out with the fuel.
11. Tighten air bleed plug (2), push in the knob of priming pump (3), then tighten it.
Use a genuine Komatsu part for the fuel filter cartridge. After replacing the filter cartridge, run the engine, and check for any leakage of oil from the filter seal surface.

CLEAN PILOT FILTER STRAINER

⚠ WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove filter case (1) inside the gear pump chamber at the rear on the left side of the machine.
2. Take out the strainer, remove the dirt stuck to the strainer, then wash it in clean diesel oil or flushing oil. If the strainer is damaged, replace it with a new part.
3. Install the strainer, then install filter case (1).



AE180110

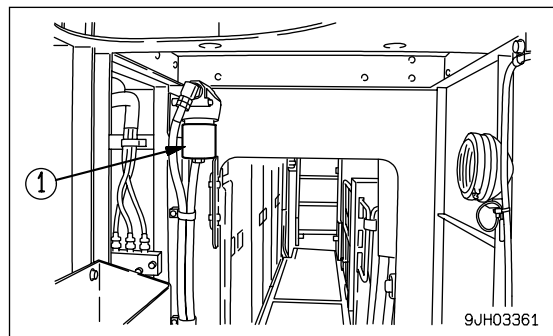
CLEAN HYDRAULIC FILTER STRAINER FOR AUTO GREASING DRIVE

(If equipped)

⚠ WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove filter case (1) inside the room under the cab.
2. Take out the strainer, remove the dirt stuck to the strainer, then wash it in clean diesel oil or flushing oil. If the strainer is damaged, replace it with a new part.
3. Install the strainer, then install filter case (1).



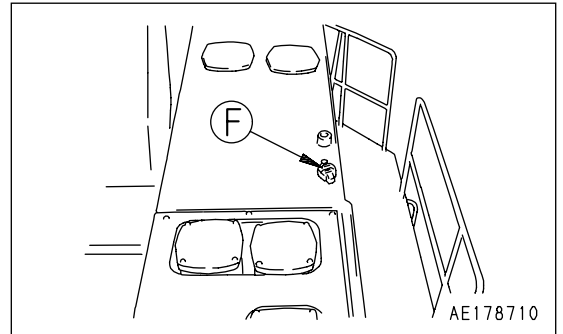
9JH03361

CHANGE HYDRAULIC FILTER ELEMENT

⚠ WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Open the cover at the top of the hydraulic tank, then remove the cap from oil filler port (F) to release the internal pressure.

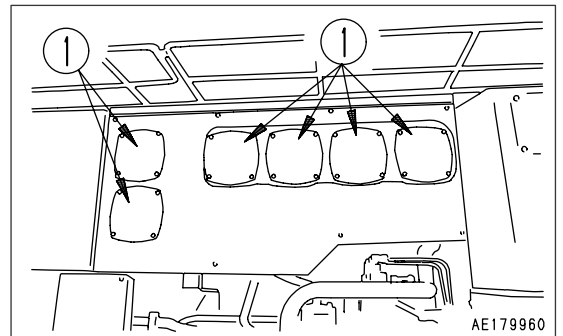


2. Loosen 4 bolts, then remove cover (1). When doing this, the cover may fly off under the force of spring (2), so push the cover down when removing the bolts.

3. Remove spring (2), valve (3), and strainer (5), then take out element (4).

- If there are any metal particles or foreign materials at the bottom of the strainer case or strainer (5), please contact your Komatsu distributor.

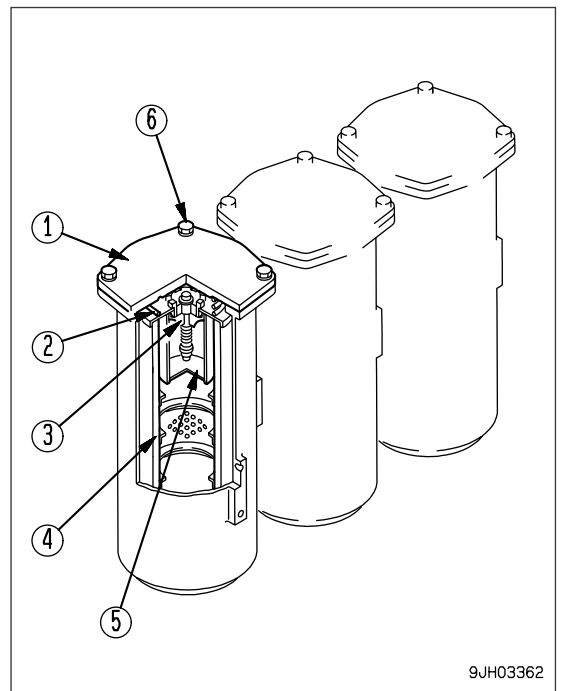
4. Wash the removed parts in flushing oil.
5. Install a new element in the place where all the element (4) was installed.
6. Set spring (2), valve (3), and strainer (5) on top of the element.
7. Set cover (1) in position, then push the cover down by hand and install it with the cover mounting bolts.



NOTICE

- After replacing the element, tighten mounting bolts (6) of cover (1) to the specified tightening torque.
Tightening torque: 98 – 123 N·m
{10.0 – 12.5 kgf·m}
- Do not use mounting bolts (6) more than 4 times. To ensure safety, replace the bolts with new parts. Even if the bolts have not been used 4 times, replace them with new parts if the thread hole is damaged.

8. Install the cap of oil filler port (F).
9. Start the engine. For details, see “STARTING ENGINE (PAGE 3-124)”. Run the engine at low idling for 10 minutes to bleed the air.
10. Stop the engine.



REMARK

Wait for at least 5 minutes before starting operations. This will release the bubbles in the oil inside the tank.

11. Check that there is no oil leakage and wipe up any oil that has been spilled.

CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS, FUEL COOLER AND AFTER COOLER FINS

⚠ WARNING

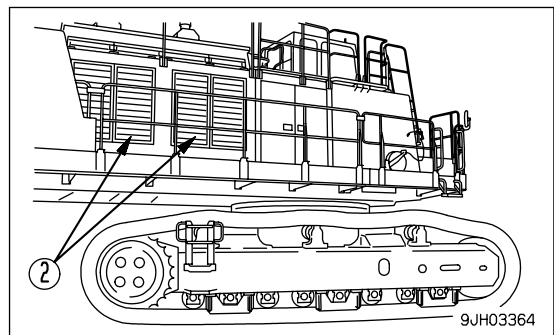
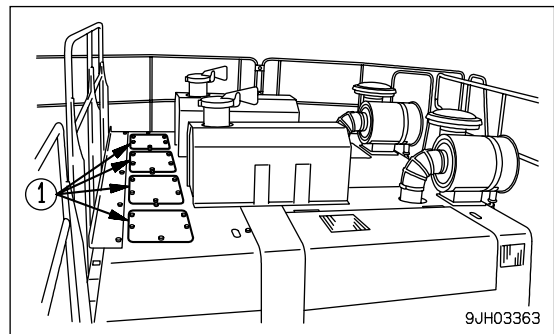
If compressed air, high-pressure water, or steam hit your body directly, or they cause dirt or dust to be blown up, there is a hazard of serious injury. Always use safety glasses, dust mask, or other protective equipment.

NOTICE

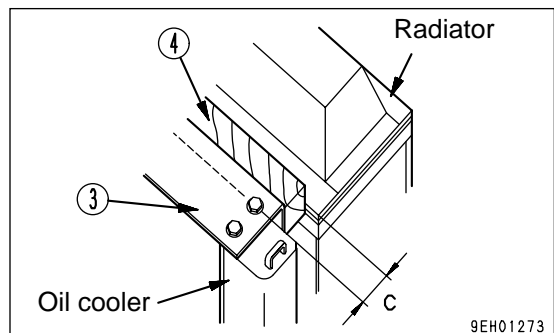
When using compressed air, if the nozzle is brought too near the fins, the fins may be damaged. Carry out the cleaning from a reasonable distance to prevent damage to the fins.

Do not direct the jet directly at the core. If the fins are damaged, it will cause leakage of water and overheating. On dusty jobsites, carry out this inspection every day, regardless of the maintenance interval.

1. Removed for covers (1) at the top of the engine hood, then open the door (2) at the rear on the right side of the machine. There are two doors (2) for the front engine and rear engine. Open both doors.

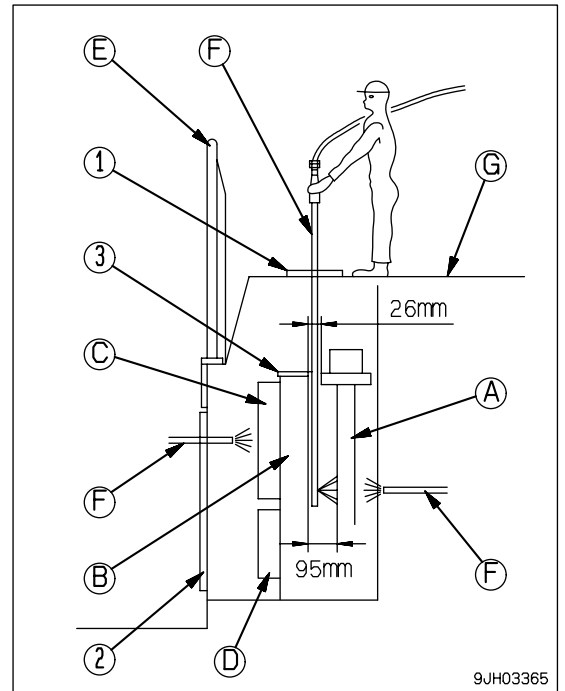


2. After removing covers (1), remove holder cover (3) and gap filler urethane rubber (4) from the holes.



3. Use compressed air to blow the mud, dirt, or leaves clogging the radiator fins, oil cooler fins, and aftercooler fins. At the same time, clean door (2) also. It is also possible to use steam or water instead of compressed air.

- A: Radiator core
- B: Oil cooler
- C: Aftercooler
- D: Fuel cooler
- E: Handrail
- F: Cleaning nozzle
- G: Top surface of hood



4. Inspect the rubber hoses and replace them if there are any cracks or if they have become brittle. Check also that there are no loose hose clamps.
 - Tightening torque for aftercooler hose clamp: $10.7 \pm 0.98 \text{ N}\cdot\text{m}$ $\{1.1 \pm 0.1 \text{ kgf}\cdot\text{m}\}$

CLEAN INTERNAL AND EXTERNAL AIR FILTERS OF AIR CONDITIONER SYSTEM

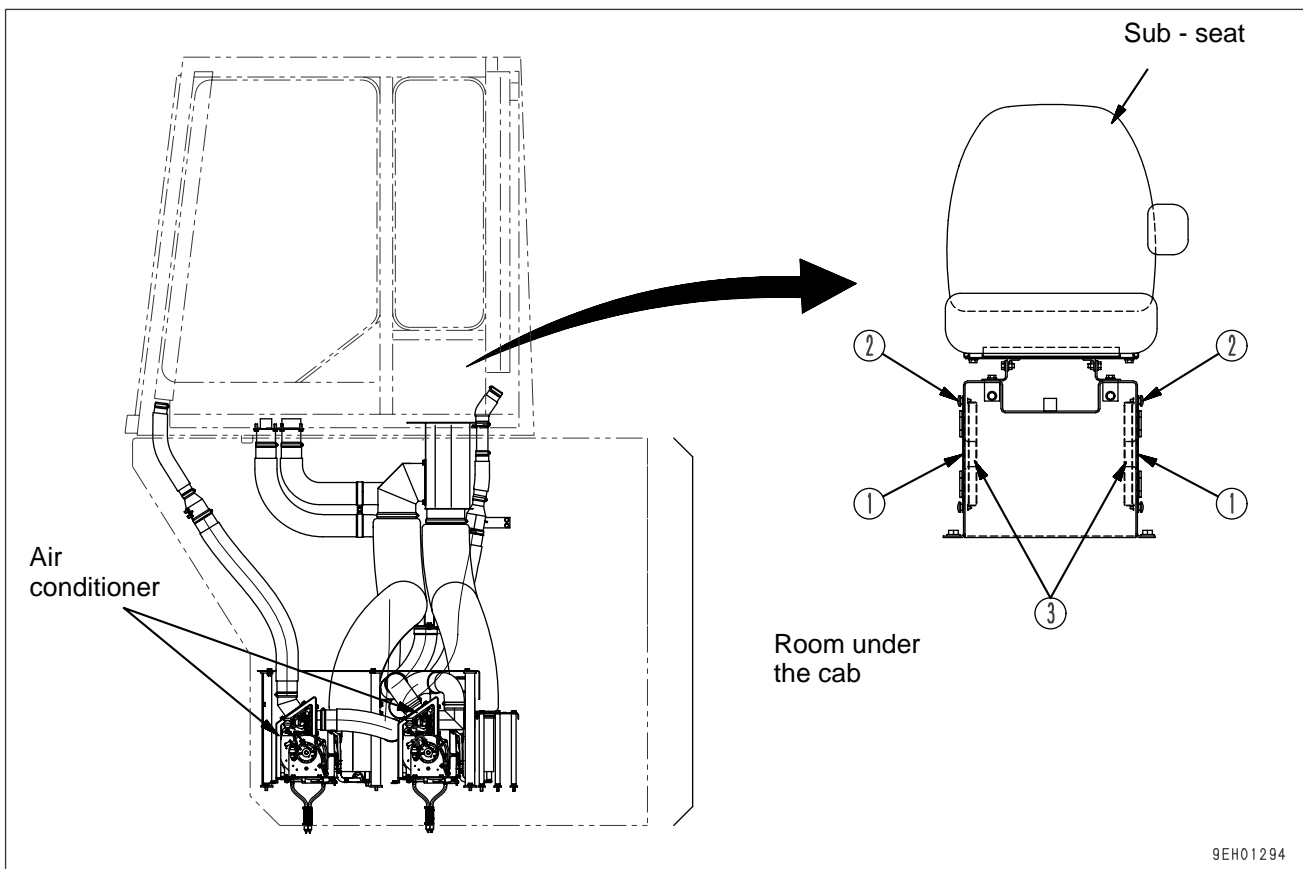
(ONLY FOR MACHINES EQUIPPED WITH AIR CONDITIONER)

⚠ WARNING

If compressed air, high-pressure water, or steam hit your body directly, or they cause dirt or dust to be blown up, there is a hazard of serious injury. Always use safety glasses, dust mask, or other protective equipment.

NOTICE

The guide for cleaning the filter is 500 hours, but if the machine is used on an extremely dusty jobsite, reduce the maintenance interval and clean the filter more frequently.



9EH01294

CLEANING RECIRCULATED AIR FILTER

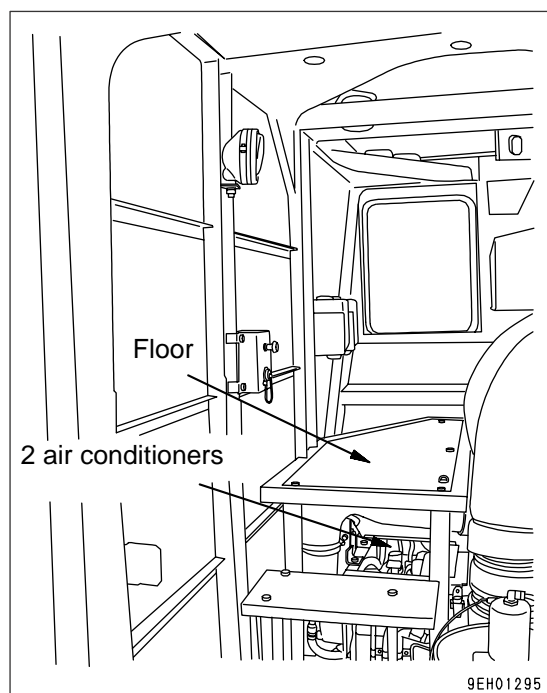
1. Loosen four screws (2) on both sides of box cover (1) under the assistant's seat, then open box cover (1). The recirculated air filter (3) is inserted in the rear of box cover (1).
2. Pull recirculated air filter (3) out towards you.
3. Cleaning recirculated air filter (3) with compressed air. If there is oil stuck to the filter or it is extremely dirty, wash it in a neutral solution. After washing, dry it fully before using it. If washing or blowing with compressed air does not remove the clogging of the filter, replace the filter with new part.

REMARK

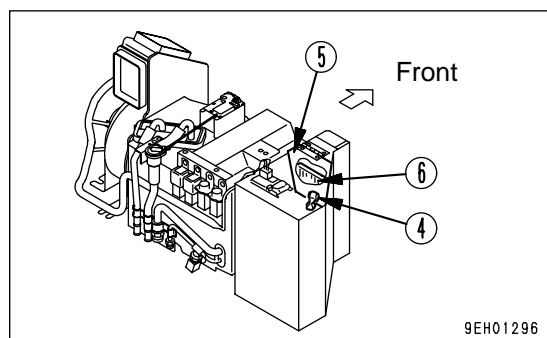
If the filter is clogged, the air flow is reduced and a muffled sound can be heard from the air conditioner unit.

CLEANING FRESH AIR FILTER

1. To air conditioner's are installed under the passage inside the room under the cab.



2. Remove cover stopper (4) of the air conditioner unit, open cover (5), then pull up fresh air filter (6) and remove it.
3. Clean filter (6) with compressed air. If there is oil stuck to the filter or it is extremely dirty, wash it in a neutral solution. After washing, dry it fully before using it. If washing or blowing with compressed air does not remove the clogging of the filter, replace the filter with new part.

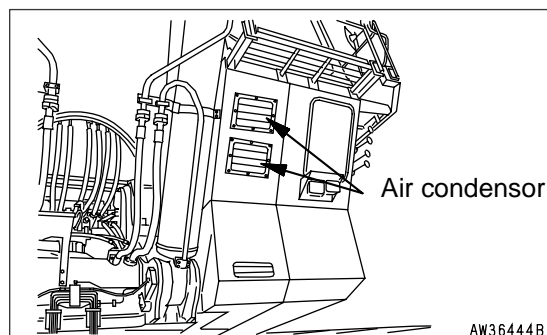


REMARK

If the filter is clogged, the air flow is reduced and a muffled sound can be heard from the air conditioner unit.

CLEANING AIR CONDITIONER CONDENSER

Remove the condenser at the front of the room under the cab from the inside, then wash it.



CLEAN STRAINER OF PTO LUBRICATING OIL FILTER

(Front engine, rear engine: 1 place each)

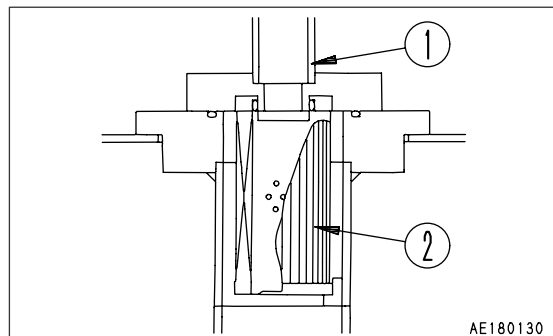
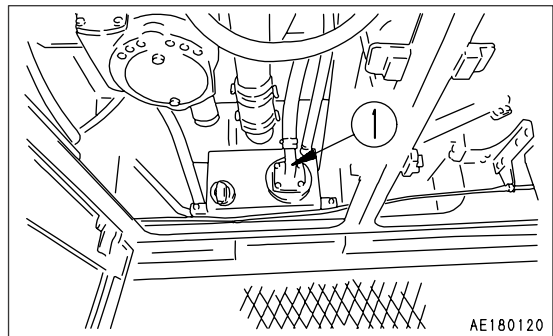
WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- If compressed air, high-pressure water, or steam hit your body directly, or they cause dirt or dust to be blown up, there is a hazard of serious injury. Always use safety glasses, dust mask, or other protective equipment.

1. Open the cover at the left rear side of the machine and remove tube (1).
2. Take out strainer (2), remove the dirt stuck to strainer (2), then wash it in flushing oil. If the strainer is damaged, replace it with a new part.
3. Install strainer (2), then install filter case (1).

NOTICE

install strainer (2) so that the side with the holes is facing up.



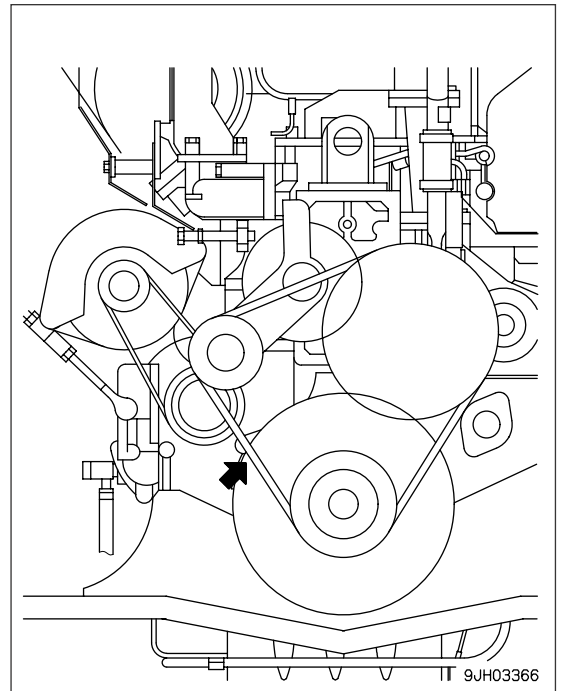
CHECK, REPLACE, ADJUST FAN BELT

(Front engine, rear engine: 1 place each)

Checking

Check the V-belt and when the following conditions exist, replace the V-belt:

- When the V-belt makes contact with the bottom of the groove in each pulley.
- When the V-belt is worn, and its surface is lower than the outer diameter of the pulley.
- When cracking and peeling of the V-belt occurs.
- An auto-tensioner is installed to maintain the tension of the V-belt constant regardless of any elongation of the V-belt, so there is no need to adjust the belt until it is replaced.
- If there is excessive whining of the belt, adjust the adjustment screw.
- For details of the procedure for replacing the fan belt, see "REPLACEMENT OF FAN BELT AND ADJUSTMENT OF AUTO TENSIONER (PAGE 4-42)".



CHECK, REPLACE HYDRAULIC PUMP DRAIN FILTER CARTRIDGE

(6 places)

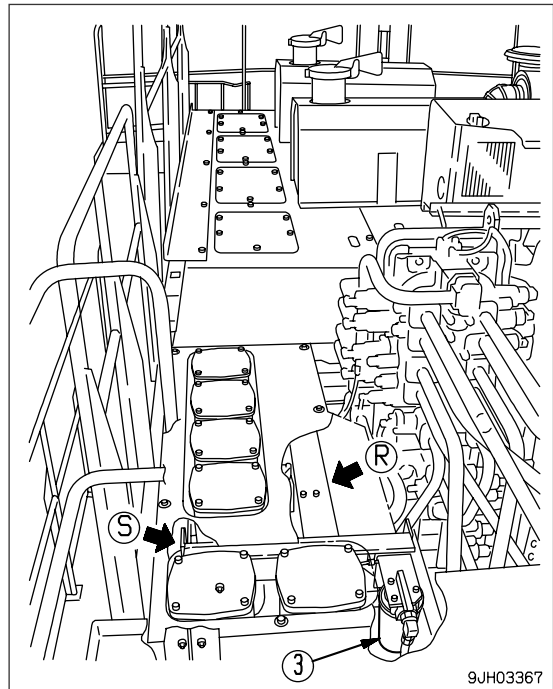
1. Using the filter wrench, turn filter cartridge (1) to the left and remove it.
2. Fill a new filter cartridge with hydraulic oil, coat the packing face with oil, then install it.
3. When installing, bring the packing surface into contact with the seal surface of the filter holder, then tighten it a further 1/2 – 3/4 turns.

NOTICE

When replacing the cartridge, check that there are no iron particles or foreign material accumulated at the bottom of the filter case or stuck to the circumference of the cartridge.

If there are any iron particles or foreign material, there is probably an abnormality in the hydraulic circuit.

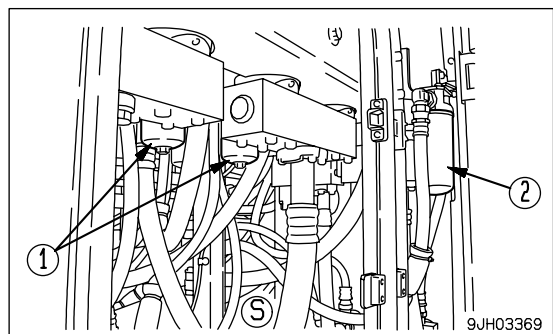
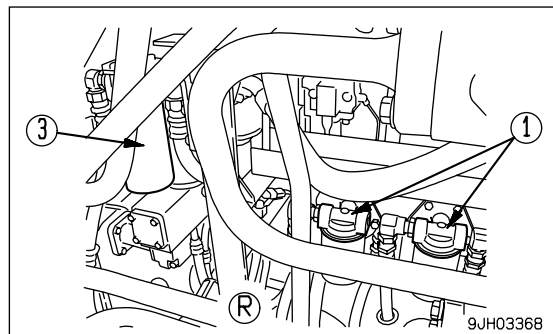
Please contact your Komatsu distributor for inspection and repairs.



REMARK

The drain filter cartridges consist of the following three types.

- (1): Hydraulic pump drain filter cartridge (6 places)
- (2): Swing motor drain filter cartridge (1 place)
- (3): Travel motor drain filter cartridge (1 place)



REPLACING SWING MOTOR DRAIN FILTER CARTRIDGE

(1 place)

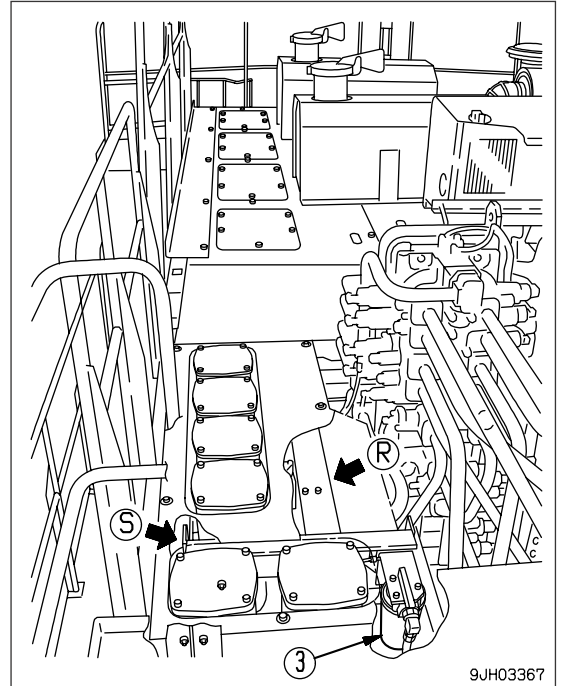
1. Using the filter wrench, turn filter cartridge (2) to the left and remove it.
2. Fill a new filter cartridge with hydraulic oil, coat the packing face with oil, then install it.
3. When installing, bring the packing surface into contact with the seal surface of the filter holder, then tighten it a further 1/2 – 3/4 turns.

NOTICE

When replacing the cartridge, check that there are no iron particles or foreign material accumulated at the bottom of the filter case or stuck to the circumference of the cartridge.

If there are any iron particles or foreign material, there is probably an abnormality in the hydraulic circuit.

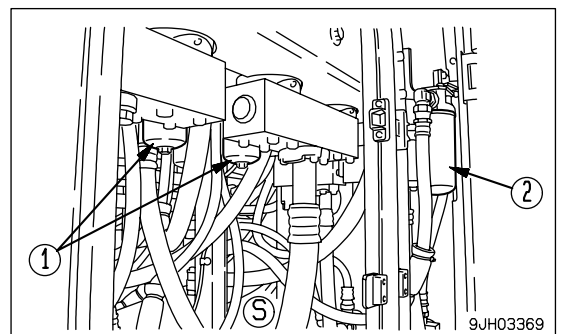
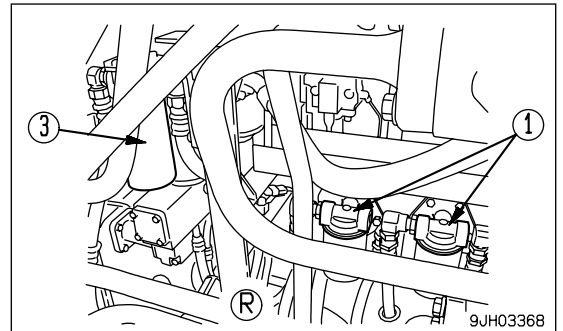
Please contact your Komatsu distributor for inspection and repairs.



REMARK

The drain filter cartridges consist of the following three types.

- (1): Hydraulic pump drain filter cartridge (6 places)
- (2): Swing motor drain filter cartridge (1 place)
- (3): Travel motor drain filter cartridge (1 place)



REPLACING TRAVEL MOTOR DRAIN FILTER CARTRIDGE

(1 place)

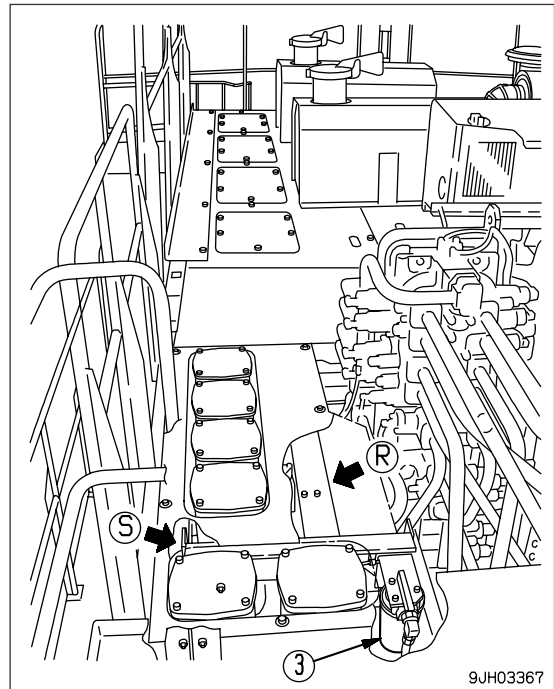
1. Using the filter wrench, turn filter cartridge (3) to the left and remove it.
2. Fill a new filter cartridge with hydraulic oil, coat the packing face with oil, then install it. When installing, bring the packing surface into contact with the seal surface of the filter holder, then tighten it a further 1/2 – 3/4 turns.

NOTICE

When replacing the cartridge, check that there are no iron particles or foreign material accumulated at the bottom of the filter case or stuck to the circumference of the cartridge.

If there are any iron particles or foreign material, there is probably an abnormality in the hydraulic circuit.

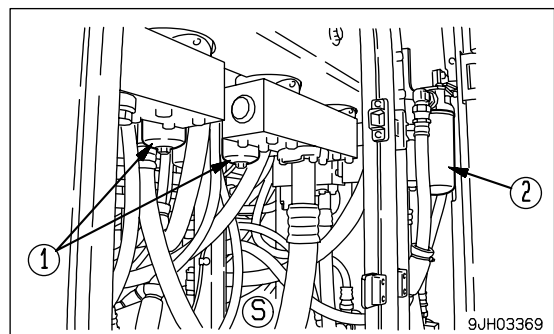
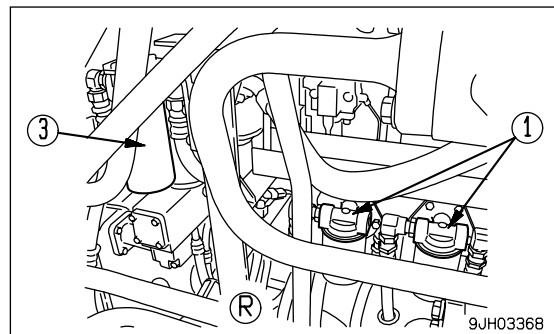
Please contact your Komatsu distributor for inspection and repairs.



REMARK

The drain filter cartridges consist of the following three types.

- (1): Hydraulic pump drain filter cartridge (6 places)
- (2): Swing motor drain filter cartridge (1 place)
- (3): Travel motor drain filter cartridge (1 place)



EVERY 1000 HOURS MAINTENANCE

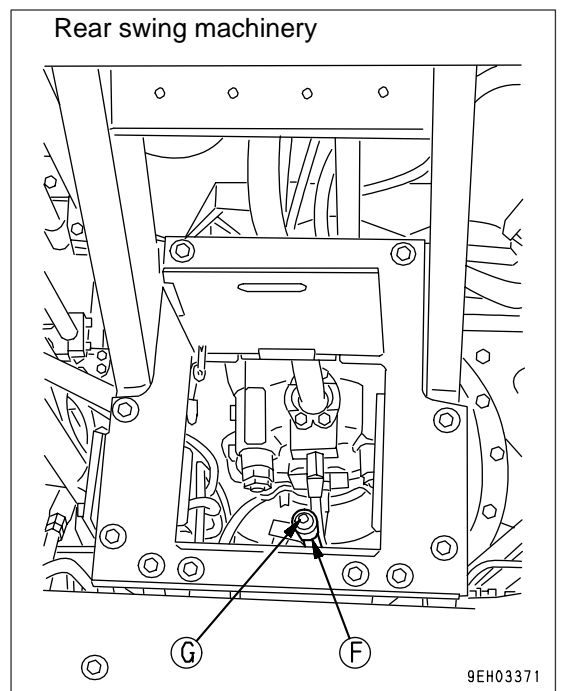
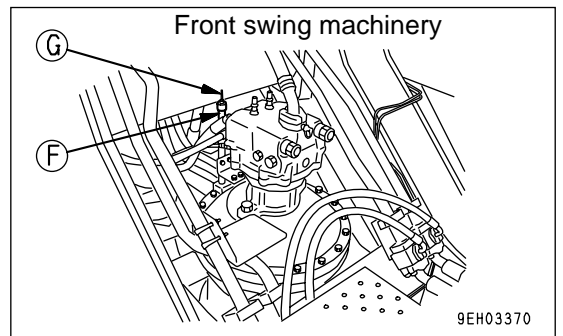
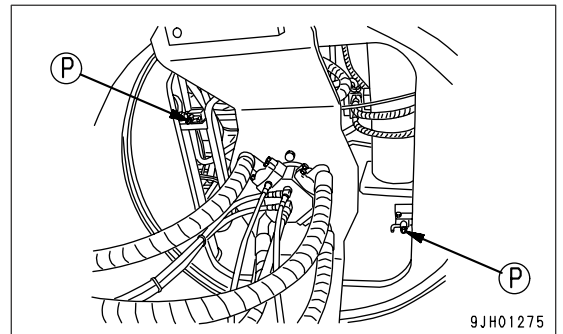
Maintenance for every 10, 100, 250 and 500 hours service should be carried out at the same time.

CHANGE OIL IN SWING MACHINERY CASE

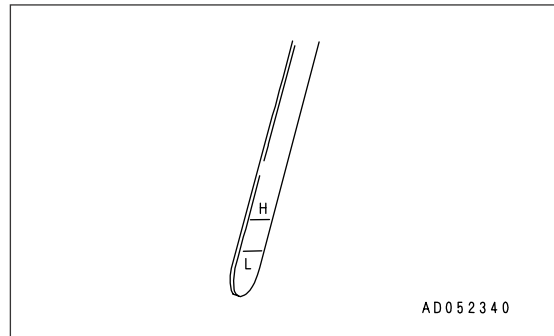
⚠ WARNING

The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.

- Refill capacity: 60 liters (30 liters x 2)
 1. Set a container under drain valve (P) under the machine to catch the oil.
 2. Loosen drain valve (P) under the machine, drain the oil, then tighten the drain valve again.
 - When draining the oil, be careful not to get oil over yourself.
 3. Remove dipstick (G), then add the specified amount of engine oil through dipstick guide (F).
 4. Wipe the oil of dipstick (G).
 5. Insert dipstick (G) fully into the dipstick guide again, then pull it out.



6. The oil level should be between H and L marks on the dipstick (G). If the oil does not reach the L mark, add engine oil through oil filler port (F).
7. If the oil is above the H mark, pull tube (1) out, then loosen plug (P). After draining the excess oil, check the oil level again. If the oil level is correct, wind in tube (1) and store it inside the hole.
8. Immediately after changing the oil, oil level is variable. So operate for one hour, then check the oil level again.



CHANGE OIL IN PTO CASE

⚠ WARNING

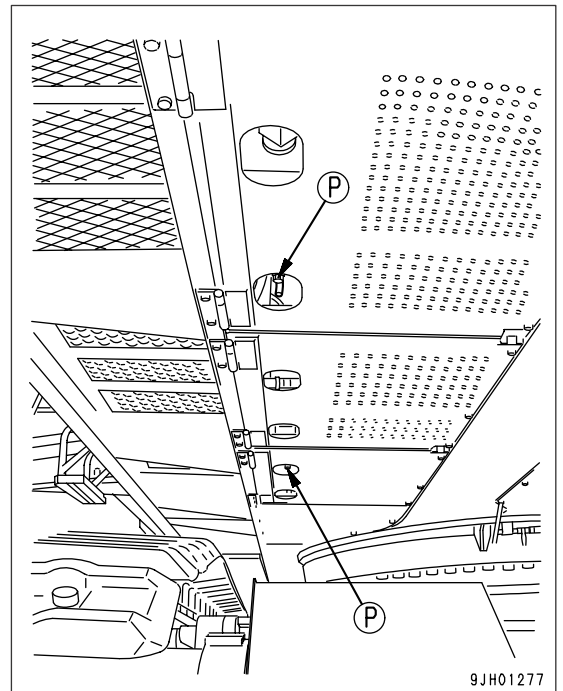
The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait the temperature to go down before starting the work.

NOTICE

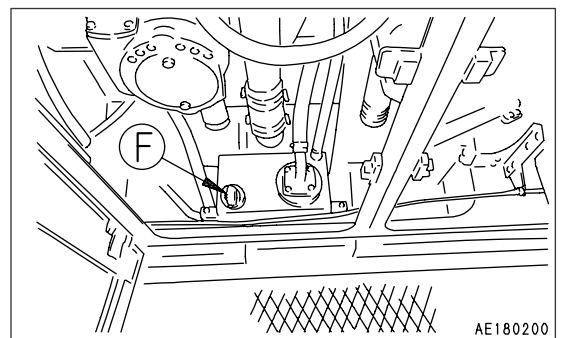
Park the machine on flat ground and stop the engine. After waiting for more than 30 minutes after stopping the engine, check the oil level.

- Refill capacity: 40 liters (20 liters x 2)
- 1. Drain oil from drain plug (P) at the bottom of the PTO case. After draining, tighten drain plug (P).

When draining the oil, be careful not to get oil over yourself.



- 2. Pour in the specified amount of engine oil through oil filler (F).



CHECK ALL TIGHTENING PARTS OF TURBOCHARGER

Contact your Komatsu distributor to have the tightening portions checked.

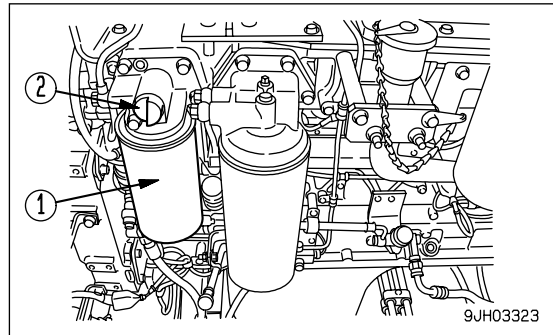
REPLACE CORROSION RESISTOR CARTRIDGE

WARNING

The oil is at high temperature after the engine has been operated, so never replace the cartridge immediately after finishing operations.

Wait for the oil to cool down before replacing cartridge.

- Container to catch coolant
 - Filter wrench
1. Turn valve (2) of corrosion resistor (1) to the CLOSE stopper position.
 2. Set a container under the cartridge to catch the coolant.
 3. Using a filter wrench, turn cartridge to the left to remove it.
 4. Clean the filter holder, coat the seal surface of the new cartridge thinly with engine oil, then install the cartridge.
 - Always use a genuine Komatsu part for the cartridge.
 5. When installing the cartridge, bring the packing surface into contact with the seal surface of the filter holder, then tighten a further 2/3 times.
If the filter cartridge is tightened too far, the gasket will be damaged and water will leak. If it is too loose, water will leak from the gap in the gasket, so always keep to the proper tightening angle.
 6. Turn valve (2) of corrosion resistor (1) to the OPEN stopper position.
 7. After replacing the cartridge, run the engine, and check for any leakage of water from the filter seal surface. If any water leakage is found, check the tightening of the filter cartridge.



INSPECTION OF WELDED STRUCTURE AFTER INITIAL 4000 HOURS SERVICE

(Color check)

Using the color check makes it easy to check visually for cracks in the welded structure. After the initial 4000 HOURS SERVICE, check the revolving frame, centre frame, boom, and arm every 1000 hours.

For details are of the color check, see "CHECK WELDED STRUCTURE (PAGE 4-100)" in the section for EVERY 4000 HOURS SERVICE.

EVERY 2000 HOURS MAINTENANCE

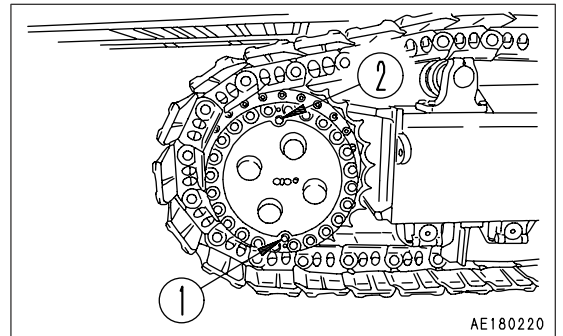
Maintenance for every 10, 100, 250, 500 and 1000 hours service should be carried out at the same time.

CHANGE OIL IN FINAL DRIVE CASE

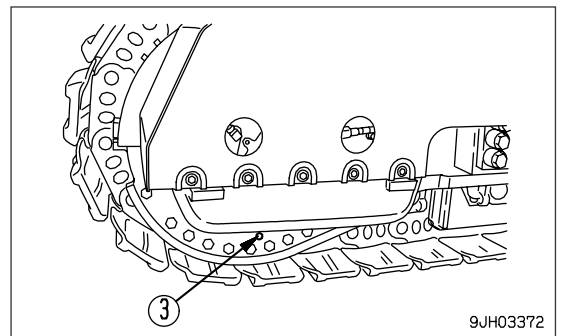
⚠ WARNING

- The oil is at high temperature after the engine is stopped. Wait for the temperature to go down before starting the operation.
- If there is pressure remaining inside the case, the oil or plug may fly out. Loosen the plug slowly to release the pressure.

- Refill capacity (each): 85 liters
- Handle
 1. Set so that plug (1) on the outside of the machine is at the lowest position.
 2. Set a container under plug (1) to catch the drained oil.
 3. Drain the oil from plug (1) at the lowest position, then tighten the plug again.
 4. Set a container under drain plug (3) on the inside of the machine to catch the drained oil.
 5. Drain the oil from drain plug (a), then tighten the plug again.
 6. Add the specified amount of engine oil through plug (2) at the top on the outside of the machine.



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CHANGE OIL IN HYDRAULIC TANK, WASH STRAINER

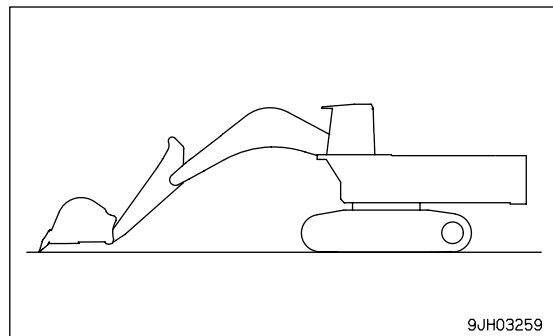
When using the standard specification hybrid hydraulic filter, see “EVERY 5000 HOURS MAINTENANCE (PAGE 4-103)”.

WARNING

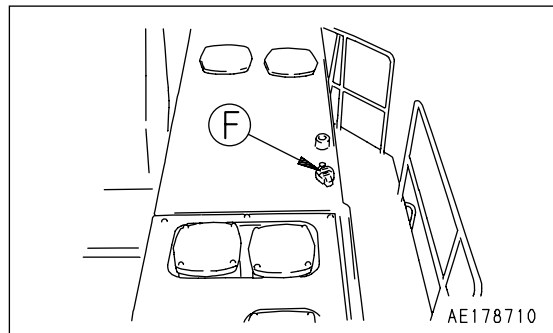
- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the hydraulic tank strainer.
- When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the internal pressure, then remove it carefully.
- When holder cover (1) of the strainer is removed, cover (1) may fly off under the force of spring (2), so loosen the 4 bolts gradually.

- Refill capacity: 1500 liters
- Prepare a handle for socket wrench set

1. If the work equipment is not in the condition shown in the diagram on the right, start the engine, run the engine at low speed, retract the arm and bucket cylinders, then lower the boom, set the bucket teeth in contact with the ground, and stop the engine.
2. Within 15 seconds after stopping the engine, turn the starting switch to the ON position, and operate the control levers (work equipment, travel) fully in each direction to release the internal pressure.
3. Set the safety lock lever to the LOCK position, then stop the engine.

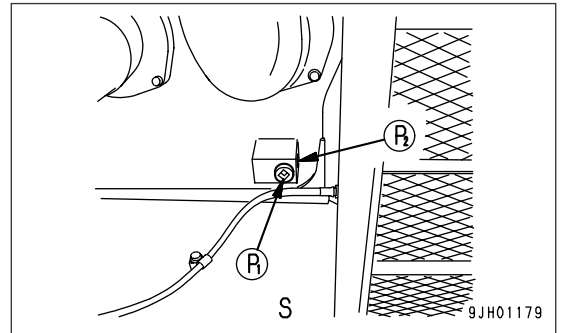
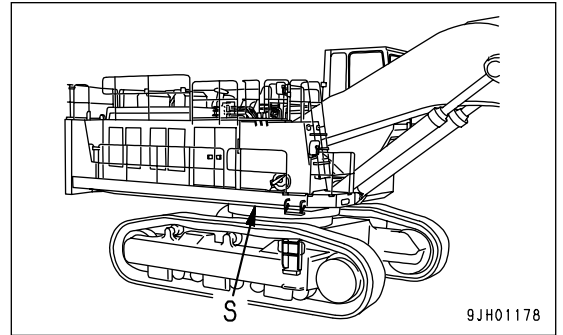


4. Remove the cap of oil filler (F).

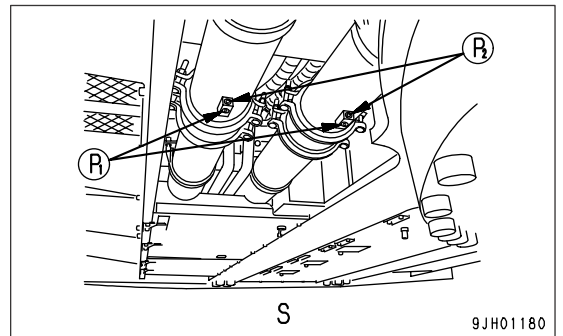


5. After removing drain plugs (P1) at the four places under the machine, loosen plug (P2). After draining the oil, tighten plug (P2), then install drain plugs (P1). When loosening drain plug (P2), be careful not to get oil over yourself.

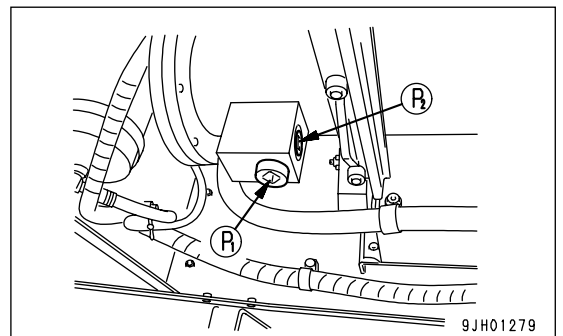
- Bottom of hydraulic tank (front right side of machine):
1 place



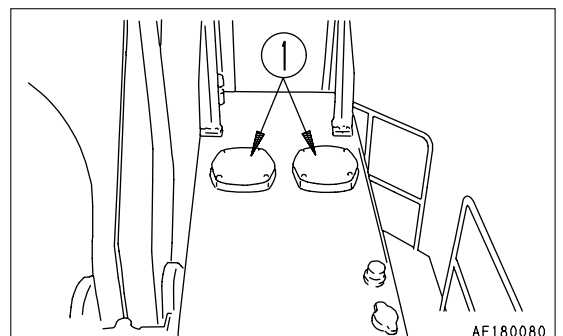
- Bottom of drain tube (centre of right side of machine):
2 places



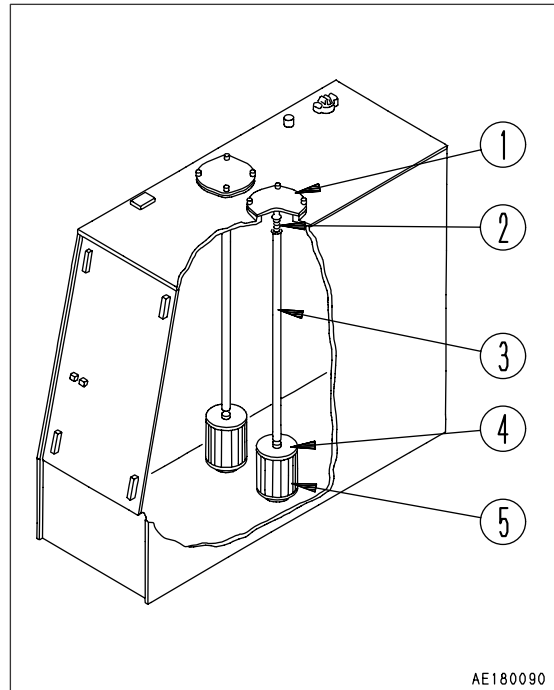
- Suction tube (rear of left side of machine): 1 place



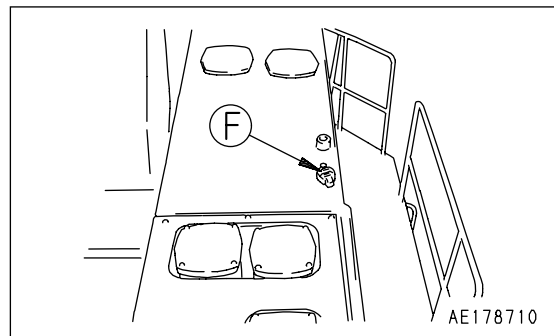
6. Remove cover (1) at the top of the hydraulic tank, pull up top of rod (3) from the top, and remove spring (2) and strainer (4).



7. Remove the dirt stuck to strainer (4), then wash it in clean diesel oil or flushing oil. If the strainer is damaged, replace it with a new part.
8. To install the strainer (4), insert it into protruding part (5) inside the tank and assemble it.



9. Add the specified amount of engine oil through oil filler port (F). Look at the oil level gauge and check that the oil is at the correct level.

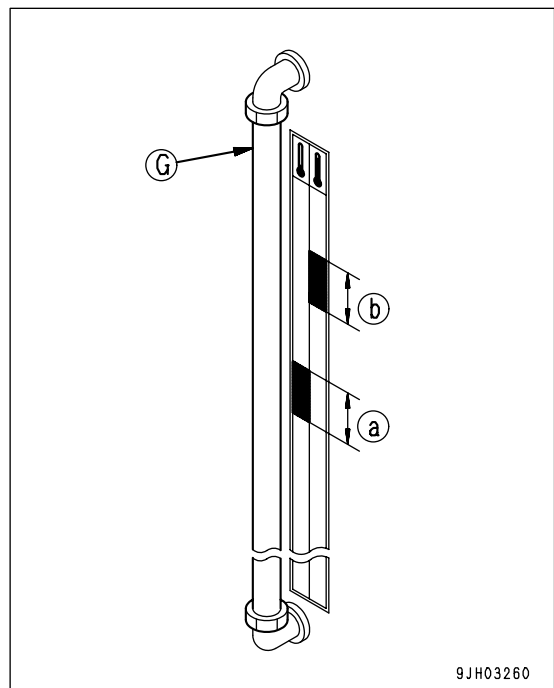


NOTICE

Do not add oil above the correct level. It will damage the hydraulic circuit and cause the oil to spurt out.

When checking that the hydraulic oil is at the correct level, do as follows.

- When the hydraulic oil is at normal temperature (15 – 30°C), the correct level is the blue range for gauge label (a) in the diagram on the right.
- When the hydraulic oil is hot (50 – 80°C), the correct level is the red range for gauge label (b) in the diagram on the right.

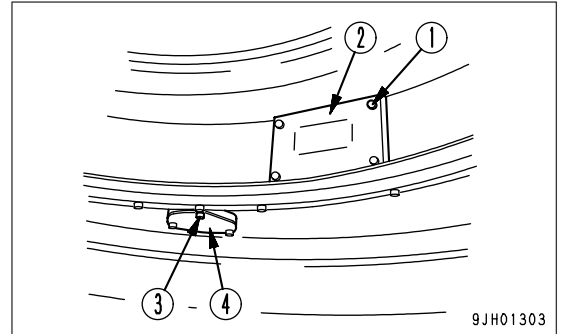


10. After changing the oil and replacing or cleaning the filter element strainer, bleed the air from the circuit.

CHECK SWING PINION GREASE LEVEL, ADD GREASE

- **Scale**

1. Remove (4) bolts (1) on the inside of track frame, then remove cover (2).
2. Insert a scale into the grease and check that the depth of the grease is approx. 158 mm. Add grease if necessary.
3. If the grease is particularly milky due to ingress of water, etc., then remove bolts (3) and cover (4) from the bottom of the track frame and remove the grease. Replace all of the grease with new grease.
The total amount of grease is 170 liters (153 kg).

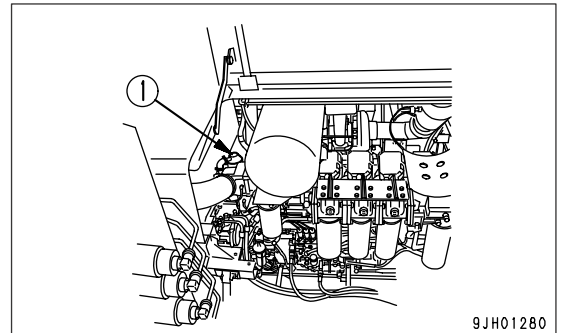


CLEAN ENGINE BREATHER

⚠ WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the engine breather.
- When using compressed air, there is a hazard that dirt may be blown up and cause serious injury. Always use safety glasses, dust mask, or other protective equipment.

1. Wipe away dust around the breather.
2. Remove breather (1).
3. Rinse the whole breather in diesel oil or flushing oil. Dry with compressed air, then install it.
4. Replace O-ring with new one. Coat a new O-ring with engine oil, set it, then install breather (1).



CLEAN, CHECK TURBOCHARGER

Excessive carbon or oil sludge adhering to turbocharger blower impeller may deteriorate normal performance of turbocharger and may sometimes damage it.

Ask your Komatsu distributor to clean the turbocharger and check rotation of the rotor impeller, or perform the following.

CHECK ALTERNATOR AND STARTING MOTOR

The brushes may be worn, or the bearing may have run out of grease, so contact your Komatsu distributor for inspection or repair.

When the engine is frequently started, ask for inspection every 1000 hours or every 6 months, whichever comes sooner.

CHECK ENGINE VALVE CLEARANCES, ADJUST

As special tool is required for removing and adjusting the parts, you shall request Komatsu distributor for service.

CHECK INJECTOR

Check the color of the exhaust gas visually. If there is any abnormality in the exhaust gas color, contact your Komatsu distributor for inspection.

For details, see "TROUBLESHOOTING (PAGE 3-168)".

EVERY 4000 HOURS MAINTENENCE

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

CHECK WATER PUMP

Check if there is oil leakage, water leakage, or clogging of the drain hole. If any abnormality is found, contact your Komatsu distributor for disassembly and repair or replacement.

CHECK VIBRATION DAMPER

There may be leakage from the damper, dents, or face runout, so please contact your Komatsu distributor for replacement.

CHECK FAN PULLEY AND TENSION PULLEY

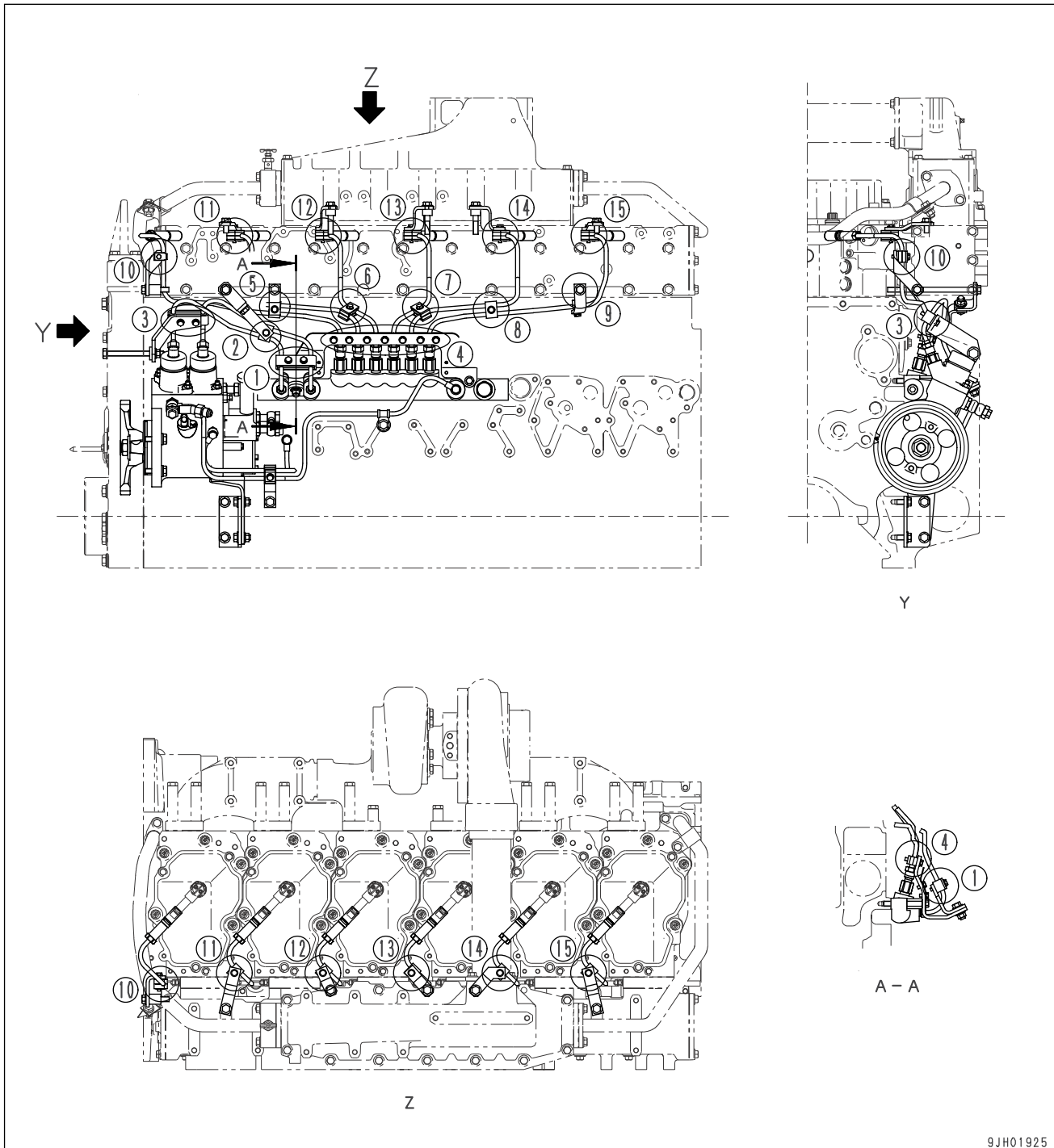
Inspect the pulley for play and grease leakage.
If any fault is detected, ask Komatsu distributor to disassemble and repair or replace.

REPLACE INJECTOR NOZZLE ASSEMBLY

Please contact your Komatsu distributor to have the injector nozzle assembly replaced.

CHECK FOR LOOSENESS OF HIGH-PRESSURE CLAMP, HARDENING OF RUBBER

Check that there is no looseness in the high-pressure clamp mounting bolts (1) – (15) in the drawing on the next page. Check visually and feel with your finger to check that the rubber has not hardened. If there is any problem, the problem part must be replaced. In such a case, please contact your Komatsu distributor.



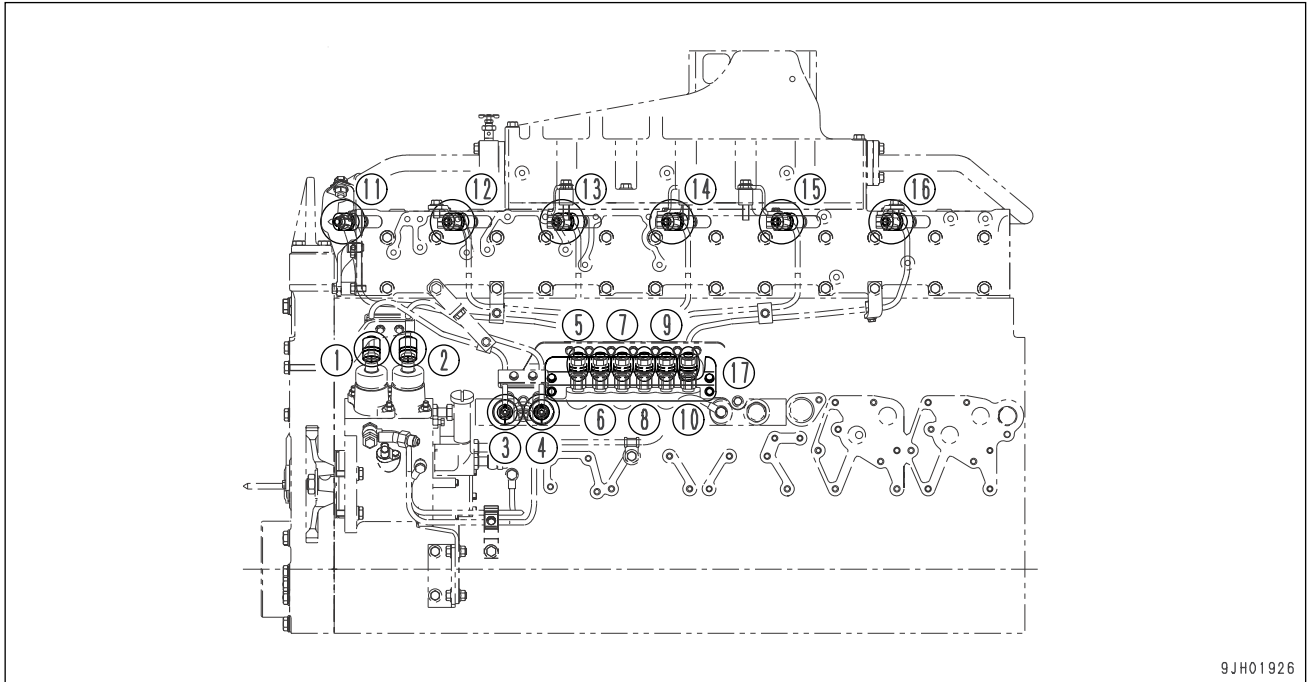
9JH01925

NOTICE

If the engine continues to be used when there are loose bolts, hardened rubber, or missing parts, there is danger of damage or breakage occurring due to vibration and wear at the connections of high-pressure piping. Always check that the proper high-pressure piping clamps are correctly installed.

CHECK FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

Fuel spray prevention caps (1) – (16) and fuel spray prevention cover (17) are protective parts installed to prevent fire caused by fuel leaking and spraying out on to high temperature parts of the engine. Check visually that there are no missing caps or loose bolts, and feel with your finger to check that the rubber has not hardened. If there is any problem, the problem part must be replaced. In such a case, please contact your Komatsu distributor.



9JH01926

CHECK, ADJUST AIR COMPRESSOR

(Installed to front engine)

Please ask your Komatsu distributor to carry out this operation.

CHECK WELDED STRUCTURE

(Color check)

Cracks in welded structures can be seen easily with a color check. Check the revolving frame, center frame, boom, and arm every 1000 hours.

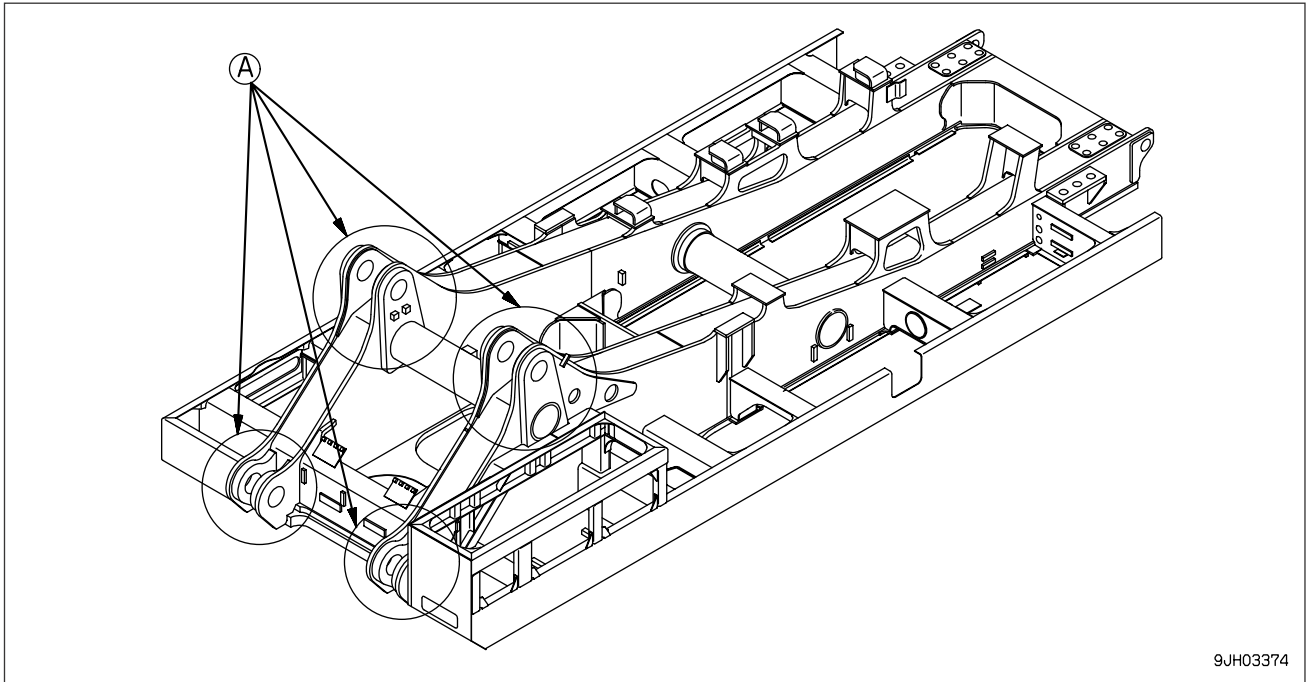
In particular, carry out a color check on the important check points (marked with a circle).

The procedure for the color check is as follows.

1. Prepare the materials needed for the color check. (Detergent, penetrating agent, developing solution)
2. Spray with detergent and wash to remove all the dirt and oil from the place to be checked.
3. After washing, dry the area, then spray with penetrating agent and leave for 5 – 20 minutes.
4. Spray with detergent, then clean the surface with a cloth.
5. Clean the surface again, then spray with developing solution.
6. Leave for 15 – 20 minutes, then check visually for cracks.
If there are any cracks, color can be seen.
7. If there are any cracks, carry out the repair procedure to repair.

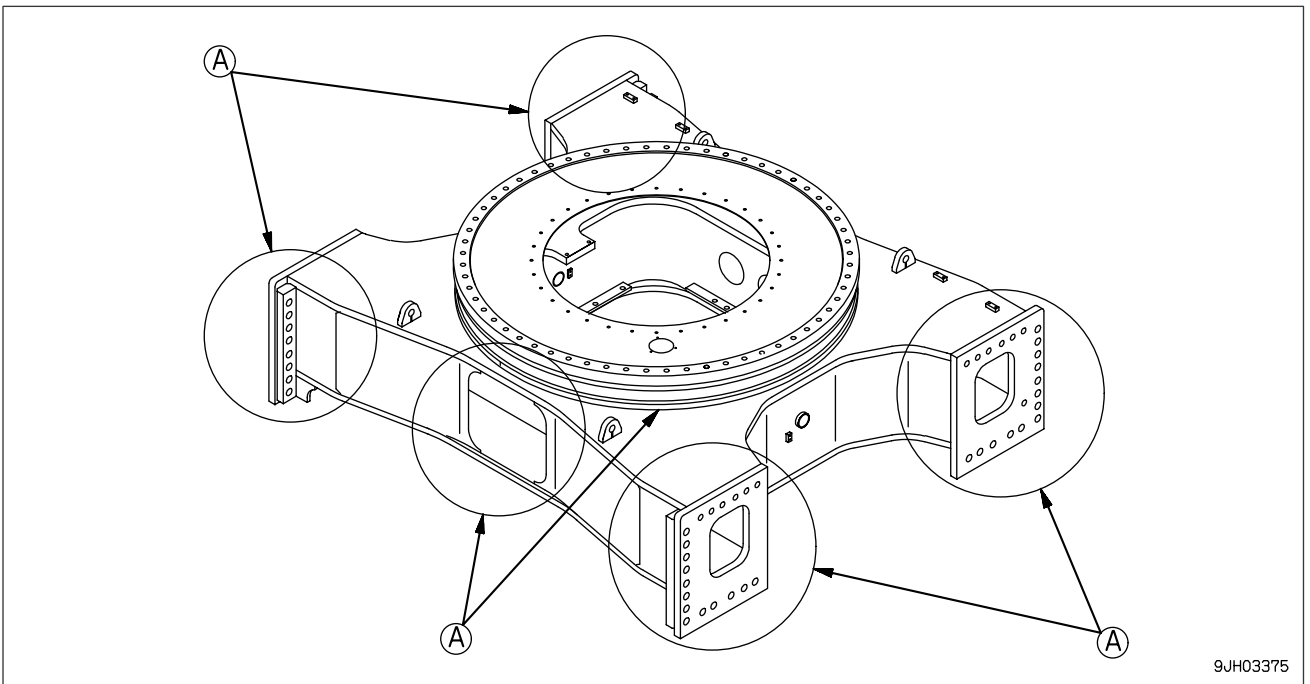
(A): IMPORTANT CHECK POINTS

- Revolving frame



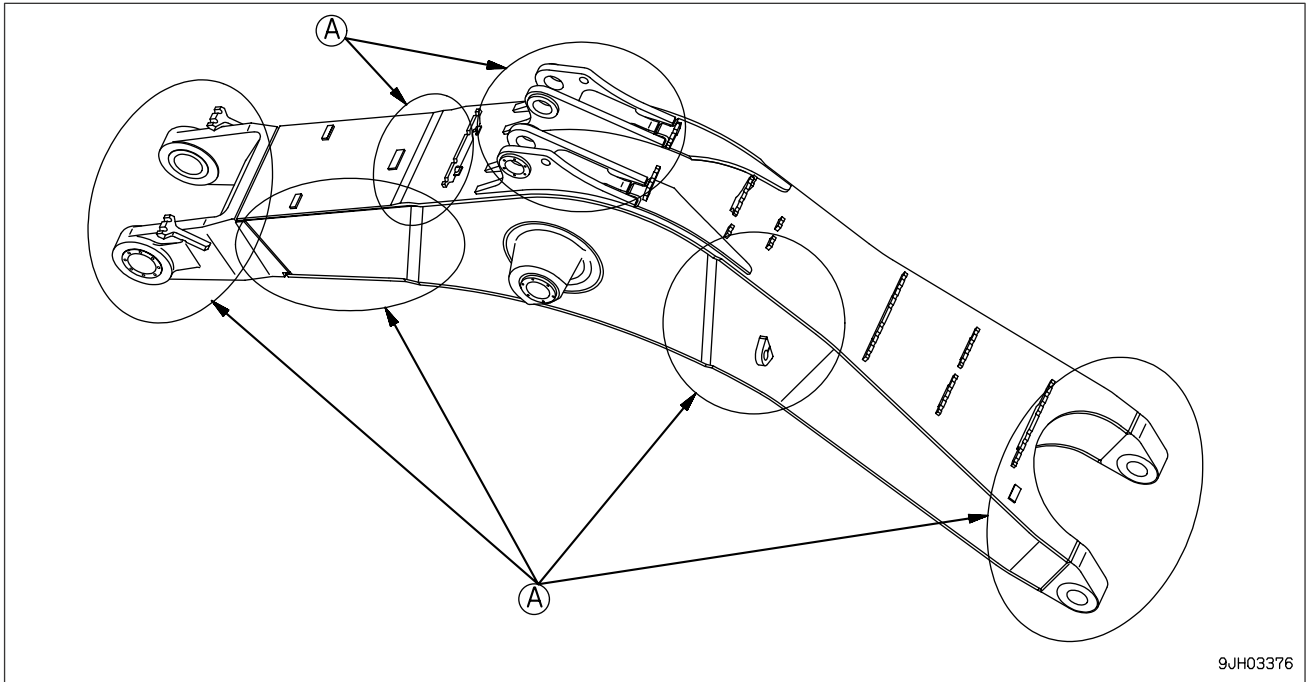
9JH03374

- Center frame

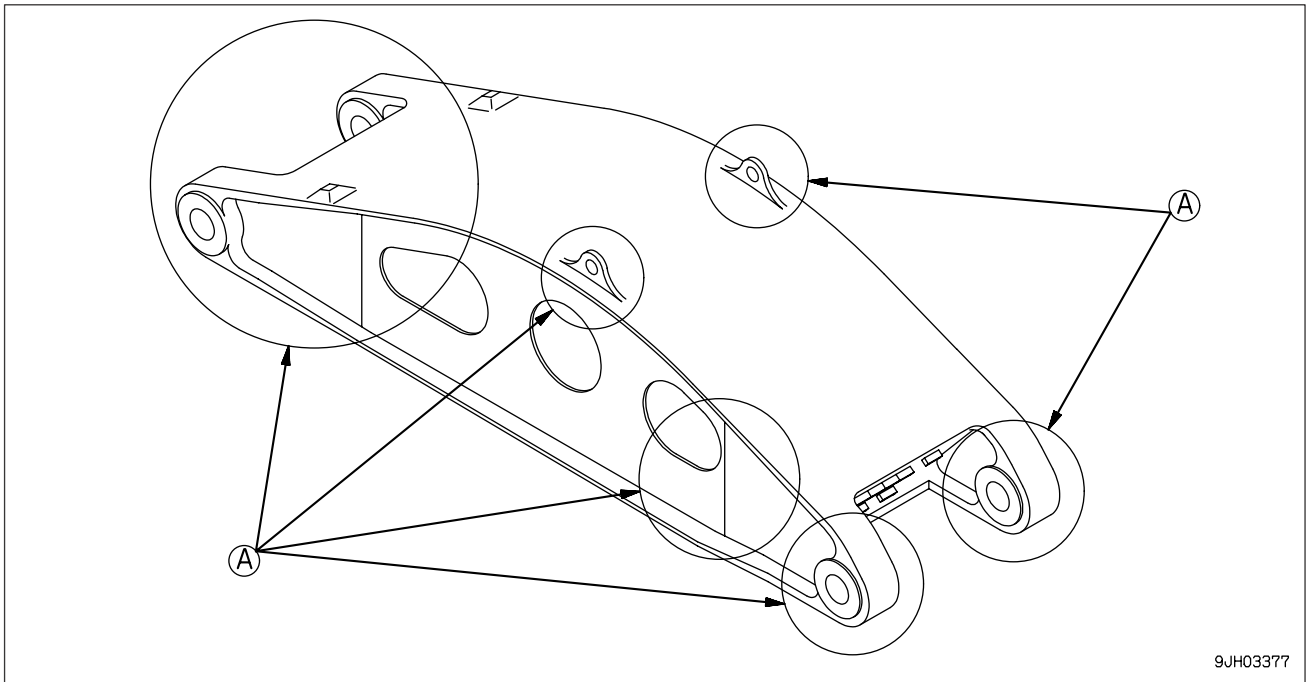


9JH03375

- Boom



- Arm



EVERY 5000 HOURS MAINTENANCE

Maintenance for every 10, 100, 250, 500 and 1000 hours service should be carried out at the same time.

CHANGE OIL IN HYDRAULIC TANK, CLEAN STRAINER

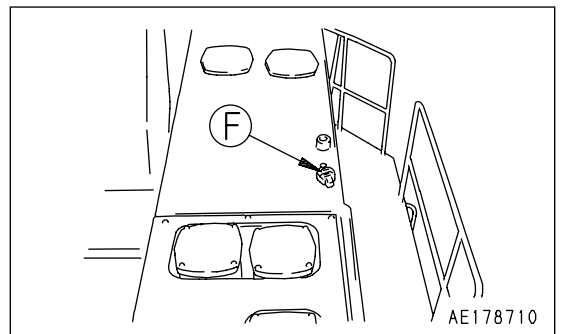
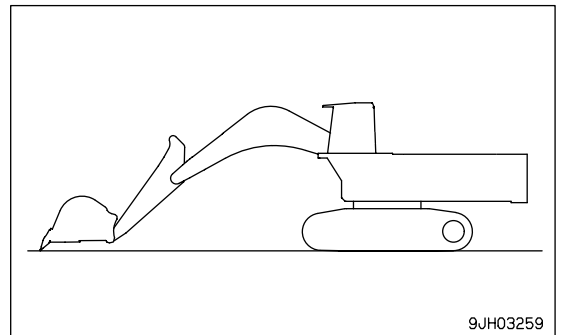
WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the hydraulic tank strainer.
- When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the internal pressure, then remove it carefully.
- When holder cover (1) of the strainer is removed, cover (1) may fly off under the force of spring (2), so loosen the 4 bolts gradually.

NOTICE

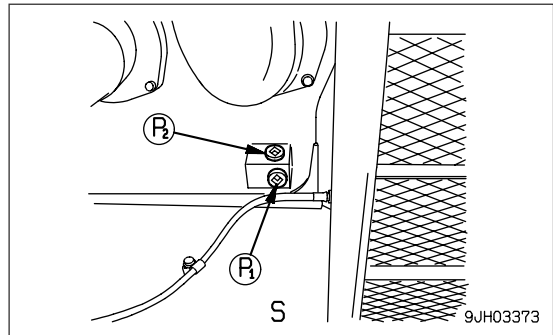
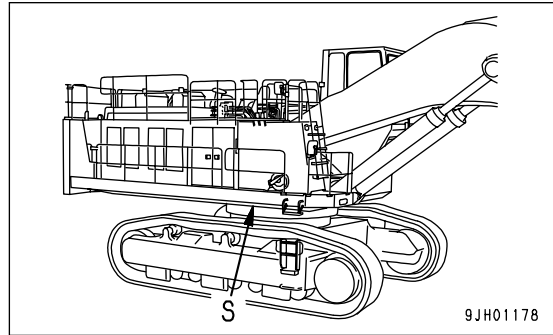
The applicable conditions when changing the oil and cleaning the strainer every 5000 hours are as follows.

- Always use Komatsu genuine oil.
 - Use a hydraulic hybrid filter element. For details of the first element, see “PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (PAGE 4-15)”.
 - Normally, the oil is used in an environment of 20°C Celsius or more.
- Refill capacity: 1500 liters
 - Prepare a handle for socket wrench set
1. If the work equipment is not in the condition shown in the diagram on the right, start the engine, run the engine at low speed, retract the arm and bucket cylinders, then lower the boom, set the bucket teeth in contact with the ground, and stop the engine.
 2. Within 15 seconds after stopping the engine, turn the starting switch to the ON position, and operate the control levers (work equipment, travel) fully in each direction to release the internal pressure.
 3. Set the safety lock lever to the LOCK position, then stop the engine.
 4. Remove the cap of oil filler (F).

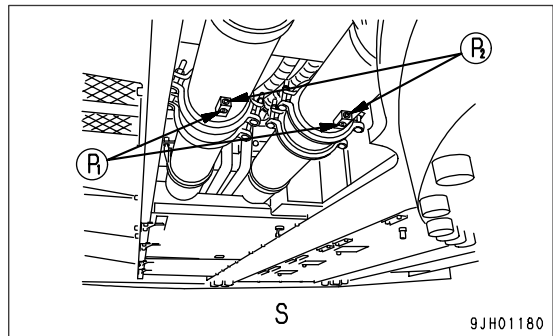


5. After removing drain plugs (P1) at the four places under the machine, loosen plug (P2). After draining the oil, tighten plug (P2), then install drain plugs (P1).
When loosening drain plug (P2), be careful not to get oil over yourself.

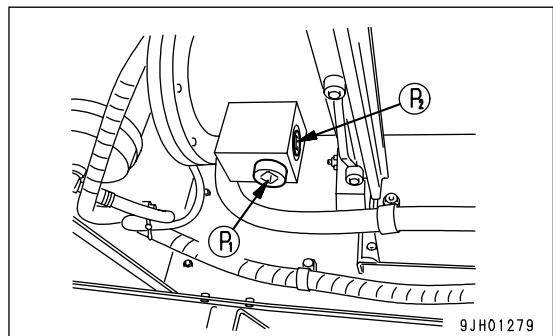
- Bottom of hydraulic tank (front right side of machine):
1 place



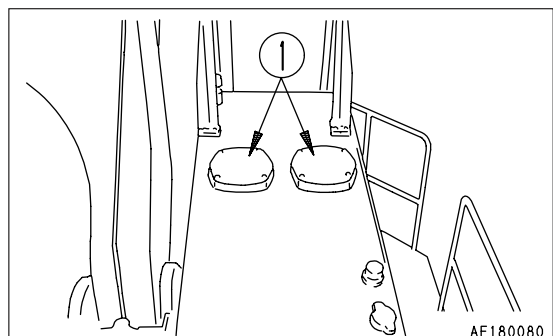
- Bottom of drain tube (centre of right side of machine):
2 places



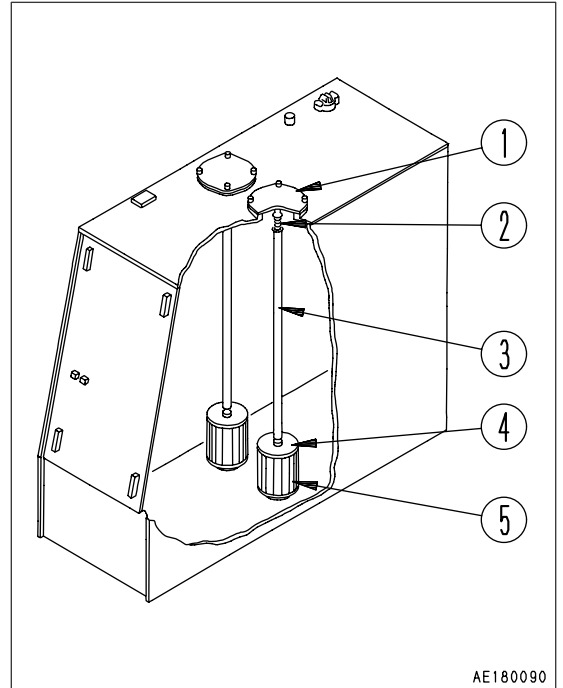
- Suction tube (rear of left side of machine): 1 place



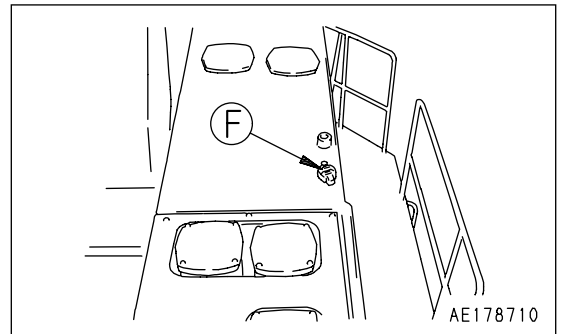
6. Remove cover (1) at the top of the hydraulic tank, pull up top of rod (3) from the top, and remove spring (2) and strainer (4).



- 7. Remove the dirt stuck to strainer (4), then wash it in clean diesel oil or flushing oil. If the strainer is damaged, replace it with a new part.
- 8. To install the strainer (4), insert it into protruding part (5) inside the tank and assemble it.



- 9. Add the specified amount of engine oil through oil filler port (F). Look at the oil level gauge and check that the oil is at the correct level.

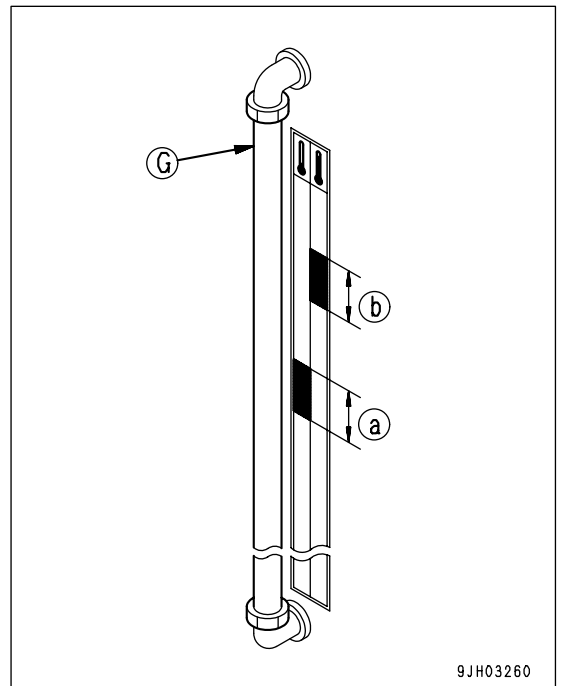


NOTICE

Do not add oil above the correct level. It will damage the hydraulic circuit and cause the oil to spurt out.

When checking that the hydraulic oil is at the correct level, do as follows.

- When the hydraulic oil is at normal temperature (15 – 30°C), the correct level is the blue range for gauge label (a) in the diagram on the right.
- When the hydraulic oil is hot (50 – 80°C), the correct level is the red range for gauge label (b) in the diagram on the right.



- 10. After changing the oil and replacing or cleaning the filter element strainer, bleed the air from the circuit.

EVERY 8000 HOURS MAINTENANCE

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

REPLACE HIGH-PRESSURE PIPING CLAMP

Please contact your Komatsu distributor to have the engine high-pressure clamp replaced.

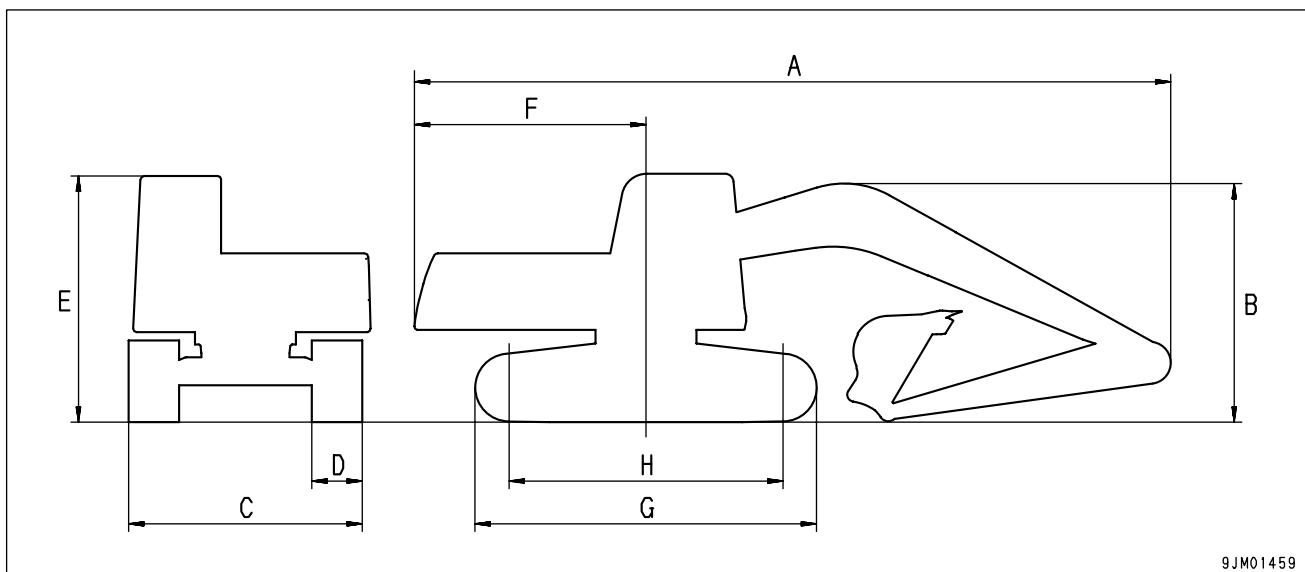
REPLACE FUEL SPRAY PREVENTION CAP

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

SPECIFICATIONS

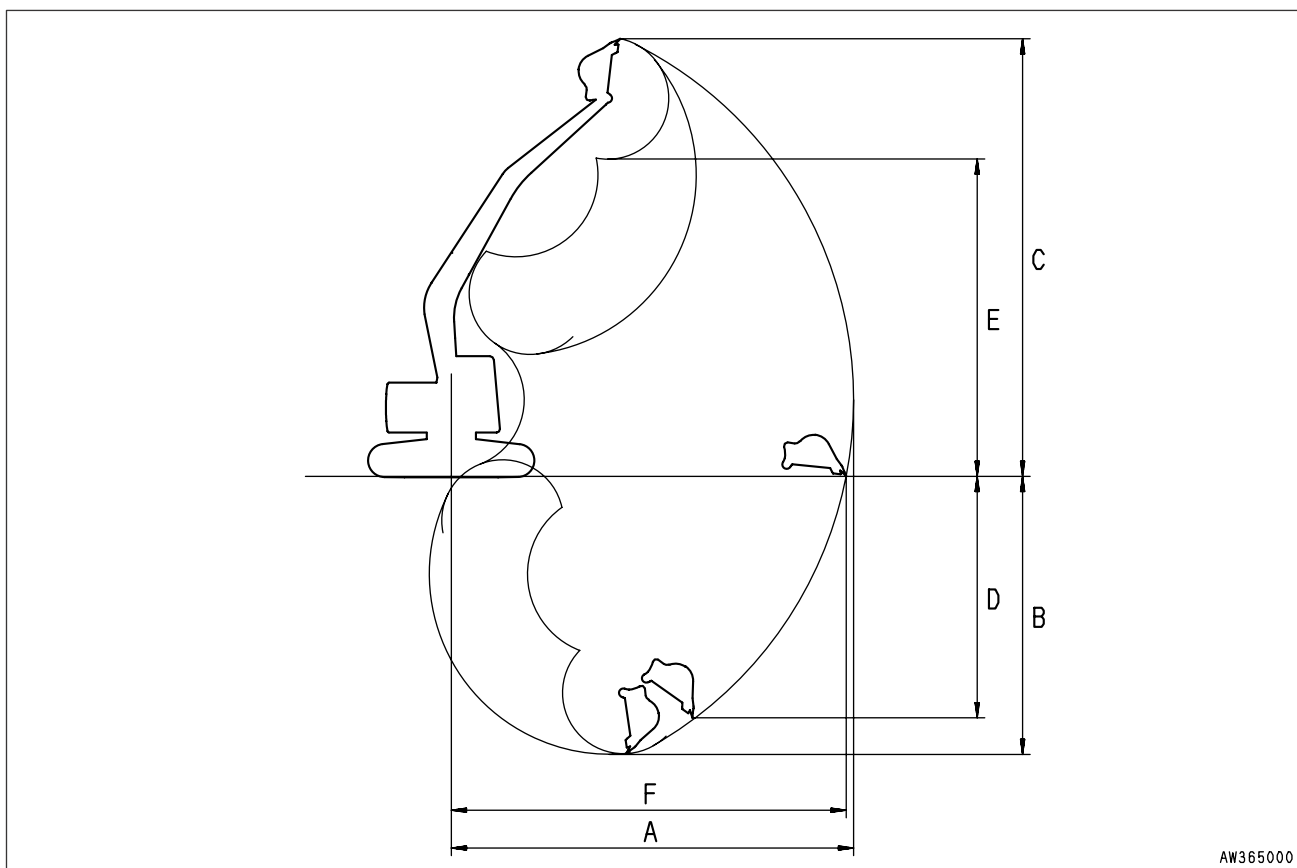
SPECIFICATIONS

	Item	Unit	PC1800-6		
	Operating weight (including 1 operator, 80 kg)	kg	180000		
	Bucket capacity	m ³	Width	Loading standard	Crushed rock standard
			12	11	10
	Name of engine	—	Komatsu SAA6D140 diesel engine x 2		
	Engine horsepower	kW (HP)/rpm	338 (454)/1800		
A	Overall length	mm	17185		
B	Overall height	mm	6745		
C	Overall width	mm	6015		
D	Track width	mm	810		
E	Height of cab	mm	6510		
F	Tail swing radius	mm	6235		
G	Length of track	mm	7436		
H	Tumbler center distance	mm	5780		
	Min. ground distance	mm	2080		
	Travel speed	km/h	2.7		
	Swing speed	rpm	4.5		



9JM01459

	Working ranges	Unit	PC1800-6
A	Max. digging reach	mm	15780
B	Max. digging depth	mm	9265
C	Max. digging height	mm	13380
D	Max. vertical wall depth	mm	2740
E	Max. dumping height	mm	8620
F	Max. reach at ground level	mm	15305



AW365000

MEMO

ATTACHMENTS AND OPTIONS

 **WARNING**

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

GENERAL PRECAUTIONS

PRECAUTIONS RELATED TO SAFETY

If attachments or options other than those authorized by Komatsu are installed, this will not only affect the life of the machine, but will also cause problems with safety.

When installing attachments not listed in this Operation and Maintenance Manual, contact your Komatsu distributor first.

If you do not contact Komatsu, we cannot accept any responsibility for any accidents or failures.

WARNING

General precautions

- Attachments are powerful tools. To prevent serious injury or damage, use the attachment correctly.
- Read the instruction manual for the attachment thoroughly, and do not use this attachment unless you are sure that you have understood the guides completely.
If you lose the instruction manual, always ask the manufacturer or attachment sales company for a new copy.
- Depending on the attachment, install the necessary front guard to the machine.
- Depending on the attachment, the impact noise may make it difficult for fellow workers to transmit instructions for the operation. Before starting operation, decide a leader and determine the signals to be used.
- Do not carry out swinging operations to the side with a heavy load on the attachment. This is particularly dangerous on slopes.
- Compared with a machine equipped with a bucket, a machine equipped with a breaker has a heavy load at the front of the work equipment and is unstable. To avoid the danger of tipping over, do not carry out operations with the attachment swung to the side.
- When an attachment is installed, the swing range and center of gravity of the machine are different, and the machine may move in an unexpected way. Be sure that you understand the condition of the machine properly.
- Before starting operations, set up a fence around the machine to prevent people from entering. Never operate the machine when there are people near the machine.
- To prevent serious accidents caused by misoperation, do not put your foot on the pedal except when operating the pedal.

⚠ WARNING**Precautions for removal and installation operations**

When removing or installing the attachment, always do as follows to ensure safety in the operation.

- Carry out the removal and installation operation on firm, level ground.
 - When carrying out the operation with two or more workers, determine the signals and follow these during the operation.
 - Always use a crane when you lift or carrying heavy objects (more than 25kg).
 - When removing heavy components, always support the component before removing it. When lifting with a crane, be particularly careful about the position of the center of gravity.
 - It is dangerous to carry out operations with a load left raised by a crane. Always prepare a stand and ensure that the condition is safe.
 - When leaving an attachment removed or when installing the attachment, make sure that it is in a stable condition and cannot fall over.
 - Never go under a load raised by a crane. Stay in a safe place where there is no danger if the load should fall.
-

NOTICE

Qualifications are required to operate a crane. Never allow the crane to be operated by an unqualified person.

For details of removal and installation operations, contact your Komatsu distributor.

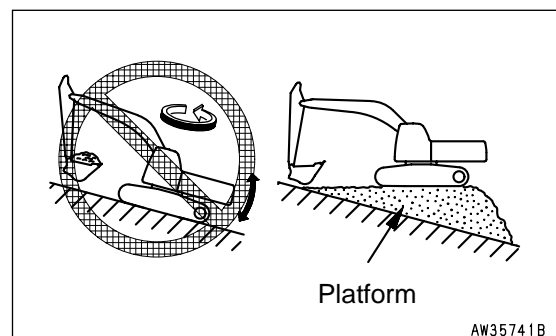
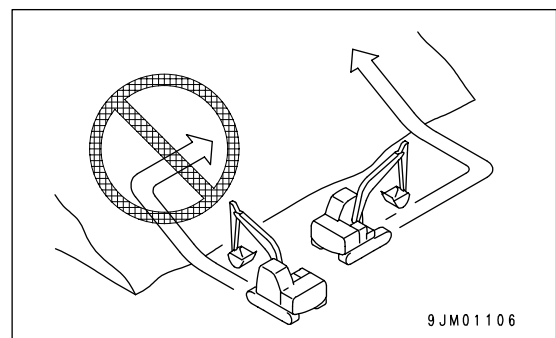
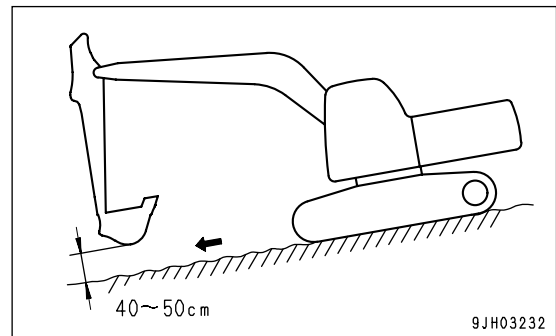
PRECAUTIONS WHEN INSTALLING ATTACHMENTS

WARNING

Long work equipment reduces the stability of the machine, so if the swing is operated on a slope, or when going down a steep hill, the machine may lose its balance and overturn.

The following operations are particularly dangerous, so never operate the machine in these ways.

- If heavy work equipment is installed, the overrun of the swing becomes greater (the distance from the point where the operator operates the control levers to stop the swing to the point where the upper structure stops completely), so there is danger of mistaking the distance and hitting something. Always operate so that there is an ample margin to the stopping point. Furthermore, the hydraulic drift also becomes larger (when the work equipment is stopped in mid-air, it will gradually move down under its own weight).
- Always follow the correct procedure when installing the boom and arm. If the correct procedure is not followed, this may lead to serious damage or injury, so consult your Komatsu distributor before carrying out installation.
- If long work equipment is installed, the working range will suddenly become larger, so there is danger of mistaking the distance and hitting something. Always operate the work equipment so that there is ample space from any obstacles in the area.



ATTACHMENT GUIDE

⚠ WARNING

- Please read the instruction manual for the attachment and the sections of this manual related to attachments and options.
- When installing any attachment or option, there may be problems with safety, so please contact your Komatsu distributor before installing.
- Installing attachments or options without consulting your Komatsu distributor may not only cause problems with safety, but may also have an adverse effect on the operation of the machine and the life of the equipment.
- Any injuries, accidents, or damage resulting from the use of unauthorized attachments or options will not be the responsibility of Komatsu.

COMBINATIONS OF WORK EQUIPMENT

⚠ WARNING

Depending on the type or combination of work equipment, there is danger that the work equipment may hit the cab or machine body.

When using unfamiliar work equipment for the first time, check before starting if there is any danger of interference, and operate with caution.

Select the combination of boom, arm, and bucket from the combinations shown in the table below.

	Boom		Standard boom 8.7 m	Long boom 11.4 m	Bucket width (mm)	
	Arm		Standard arm 3.9 m	Long arm 6.5 m	Excluding shroud	Including shroud
Work equipment	Bucket	12 m ³	●	X	—	2770
		11 m ³	●	X	—	2590
		10 m ³	(A)	○	2440	—
		8.5 m ³	(B)	○	2130	—
		5.6 m ³	(B)	●	1930	—

- : This shows the general operations.
- : This shows the light work.
- X: This shows that the impossible to use.
- (A): For heavy duty work (crushed rock specification)
- (B): For heavy duty work (rock bed specification)

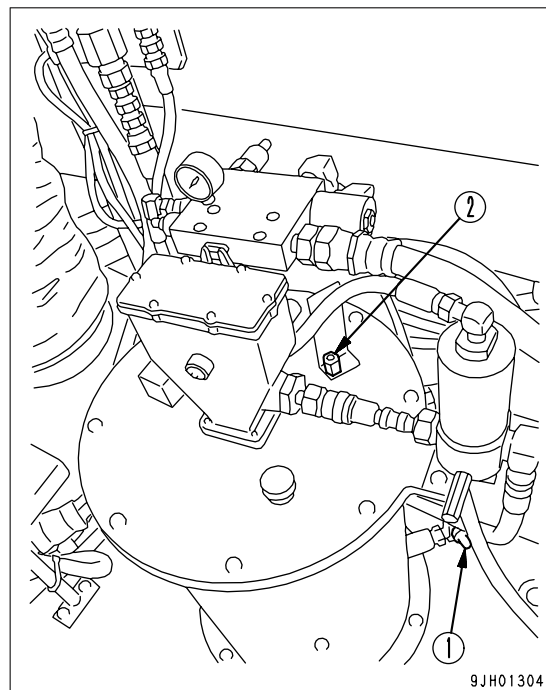
PROTECTIVE GUARD

Name		Specifications, use	
Protective guard	FOPS	This is to protect the operator. Always use it in places where there is danger from falling rock or other falling objects.	For details of weight, see "SPECIFICATIONS (PAGE 5-2)".
	Front guard	This is to protect the operator. Always use it in places where there is danger from flying soil or other flying objects.	

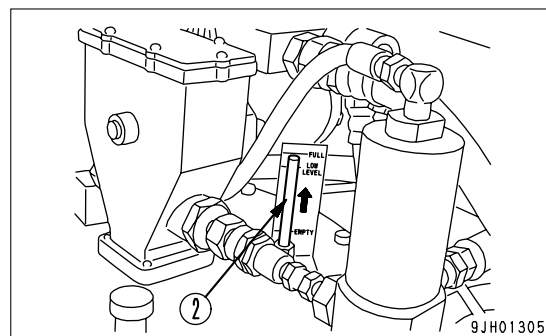
AUTO GREASING SYSTEM

Features

- Continuous centralised greasing can be carried out completely automatically during operation of the machine.
 - 5 min grease pump stopped → 1 min grease pump operated → momentary simultaneous centralised greasing → 5 min grease pump stopped
- It is possible to charge with grease without replacing the grease can. Grease nipple (1) is provided at the bottom of the grease can inside the room under the cab in order to charge with grease.
- Matter of charging
 - 1) Charge through grease nipple (1) using a grease gun. After greasing is started, oil level gauge rod (2) extends under the internal pressure.

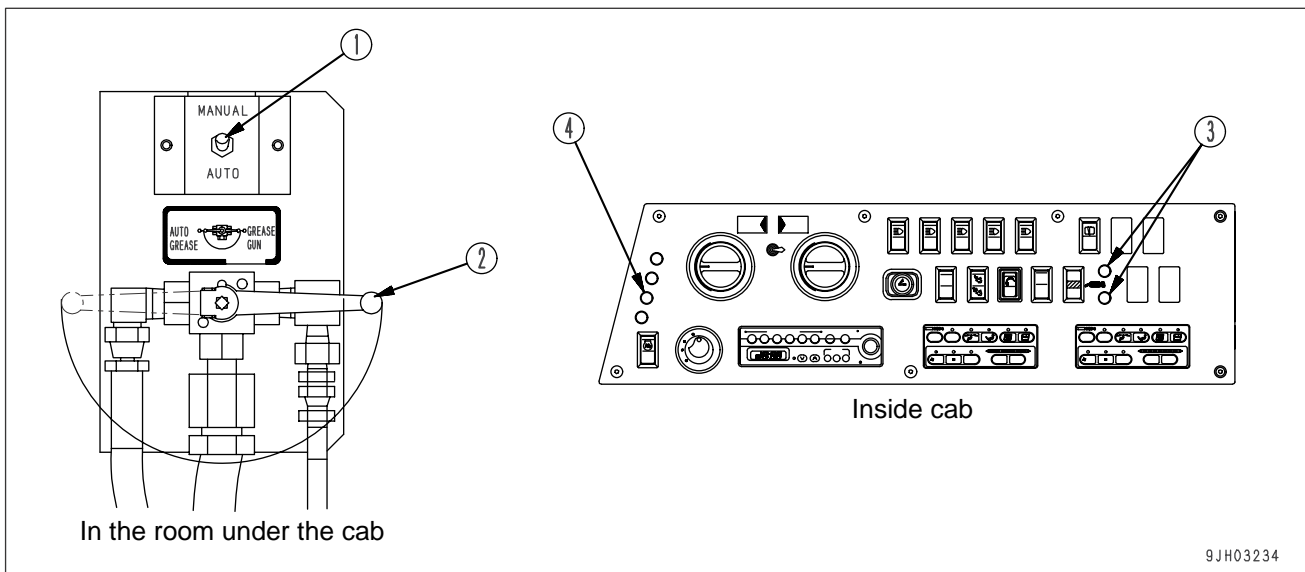


- 2) Charge with the grease gun until oil level gauge rod (2) reaches the FULL position.



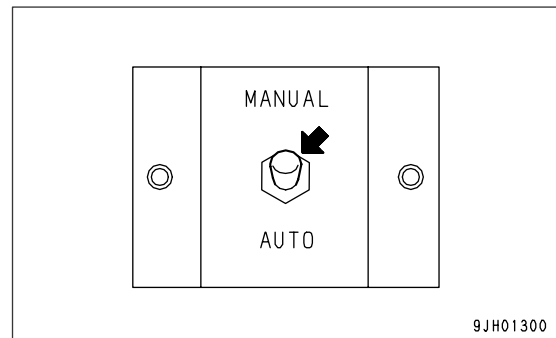
- In the same way as with the standard automatic greasing system, the following locations cannot be greased by automatic greasing. Carry out greasing with a grease gun. For details of greasing, see "EVERY 10 HOURS MAINTENANCE (PAGE 4-56)".
 - Arm-bucket connecting pin (2 places)
 - Arm-link connecting pin (2 places)
 - Bucket cylinder rod pin (2 places)
 - Link connecting pin (4 places)
 - Arm-bucket connecting pin (2 places)
 - Bucket-link connecting pin (2 places)

CONTROL DEVICES



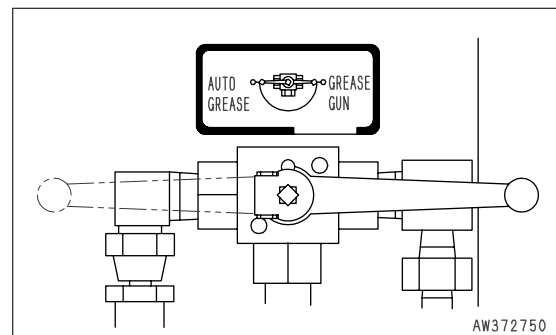
AUTO-GREASING SWITCH

This switch (1) is inside the base under the cab and is used to switch between automatic and manual greasing. Normally, keep this switch at the AUTO position. When using a grease gun, set the switch to MANUAL.



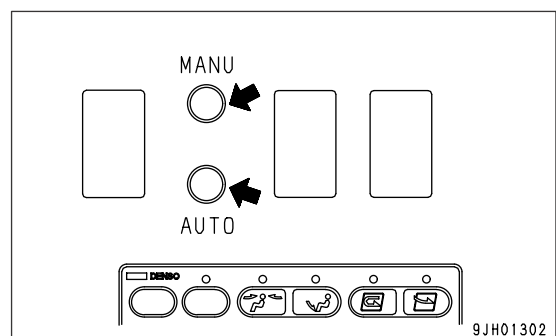
AUTO GREASE/GREASE GUN SELECTOR LEVER

This lever (2) is used to select automatic or manual greasing in the same way as the auto-greasing switch. Normally, keep this lever at the AUTO GREASE position. When using a grease gun, check first that the grease pump is not carrying out auto-greasing [if it is carrying out auto-greasing, wait until the grease pump stops (within approx. 1 minute)], then set the lever to the GREASE GUN position.



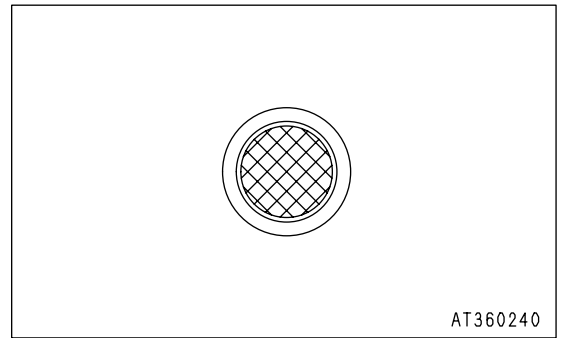
AUTO GREASING SELECTOR LAMP

This lamp (3) informs the operator if the auto-greasing system is in auto-greasing status or in manual greasing status. When it is in auto-greasing status, the green AUTO lamp lights up. When it is in manual greasing status, the green MANU lamp lights up.



AUTO-GREASING CAUTION LAMP

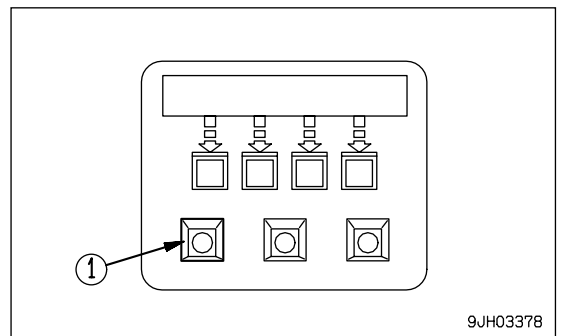
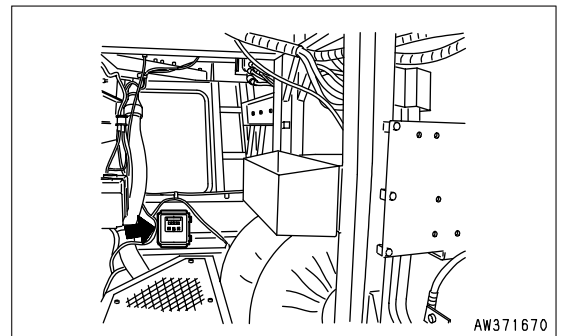
This lamp (4) lights up if an abnormality occurs in the auto-greasing system. Check the engine from the content of the display on the auto-greasing controller inside the cab base, then carry out repair work.



Set the auto-greasing controller to the OFF position when carrying out repair work. If the starting switch is turned OFF, the controller is also turned OFF.

REMARK

- To turn the auto-greasing controller OFF/ON, press power switch (1). Each time the power switch is pressed, it switches OFF → ON → OFF.
- If the engine has not been started, and the standing switches left at the ON position, CONTROLLER REST FAILURE is displayed on the auto-greasing controller display and the auto-greasing caution lamp lights up, but this does not indicate any abnormality. When the starting switch is turned OFF, the condition returns to normal.



Lamp	Controller display	Nature of abnormality	Cause
Lights up	Controller rest failure	Pressure inside grease piping does not rise when pump is working	<ul style="list-style-type: none"> ● Failure of pump ● Pump running empty ● Cracked grease piping, leakage
	Vent pressure SW alarm	Vent valve does not return, injector cannot be recharged	<ul style="list-style-type: none"> ● Failure of vent valve ● Crushed, clogged grease piping upstream from injector

Operation

Use the table below to select auto-greasing or manual greasing, and operate the switch lever securely. Normally, said the switch to the auto-greasing position.

No	Control devices	Selection of greasing method	
		Auto-greasing	Manual greasing (using grease gun)
1	Auto-greasing selector switch	Set to AUTO position	Set to MANUAL position
2	Grease circuit selector lever	Set to AUTO GREASE position	Set to GREASE GUN position
3	Auto-greasing selector lever	Check that green AUTO lamp lights up	Check that green MANUAL lamp lights up
4	Auto-greasing caution lamp	Red lamp lights up when abnormal	

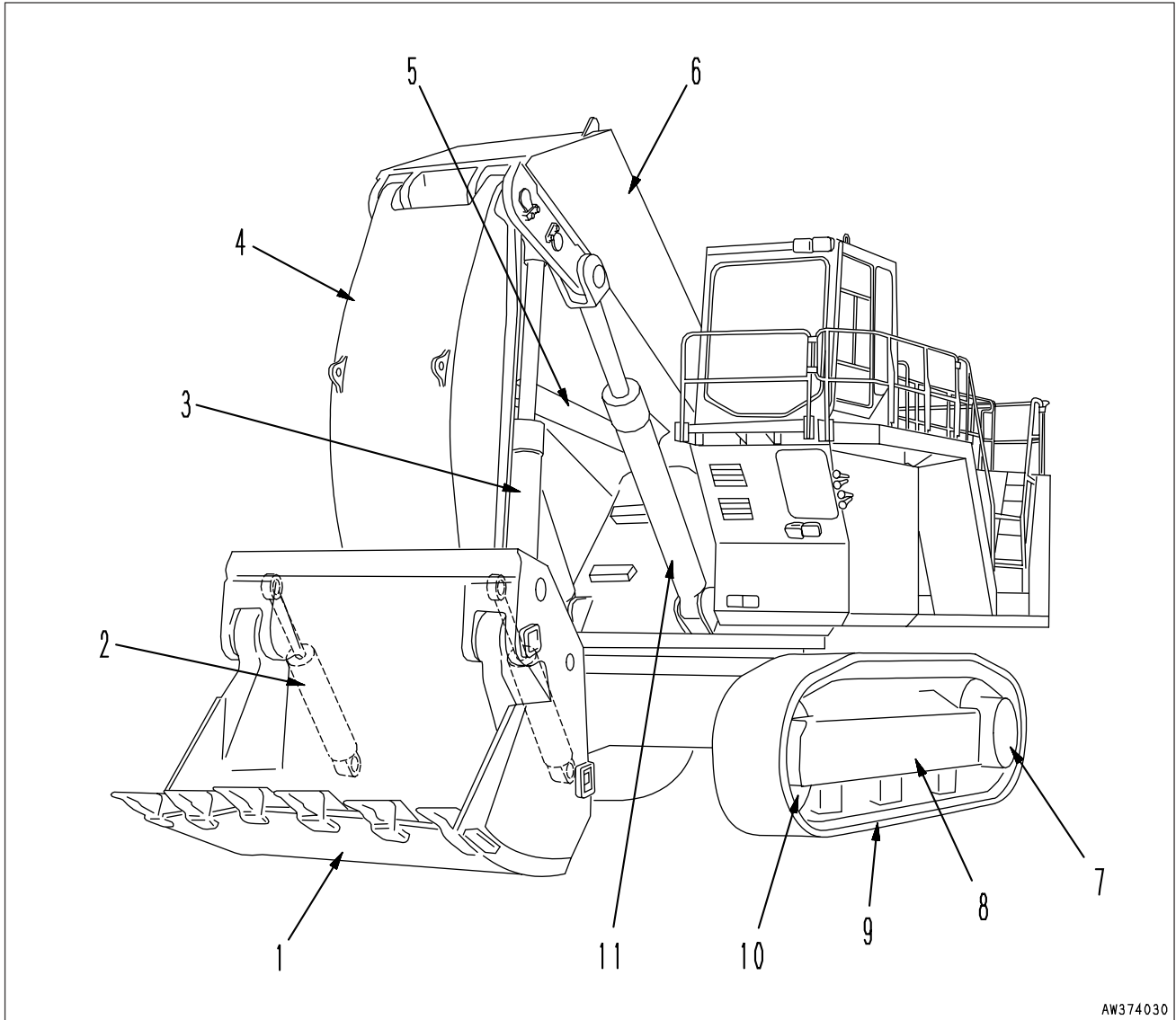
LOADING SHOVEL

WARNING

When using the loading specification machine, the method of operation differs in some places from when operating the backhoe specification machine. This section contains explanations only for the places that are different.

GENERAL VIEW

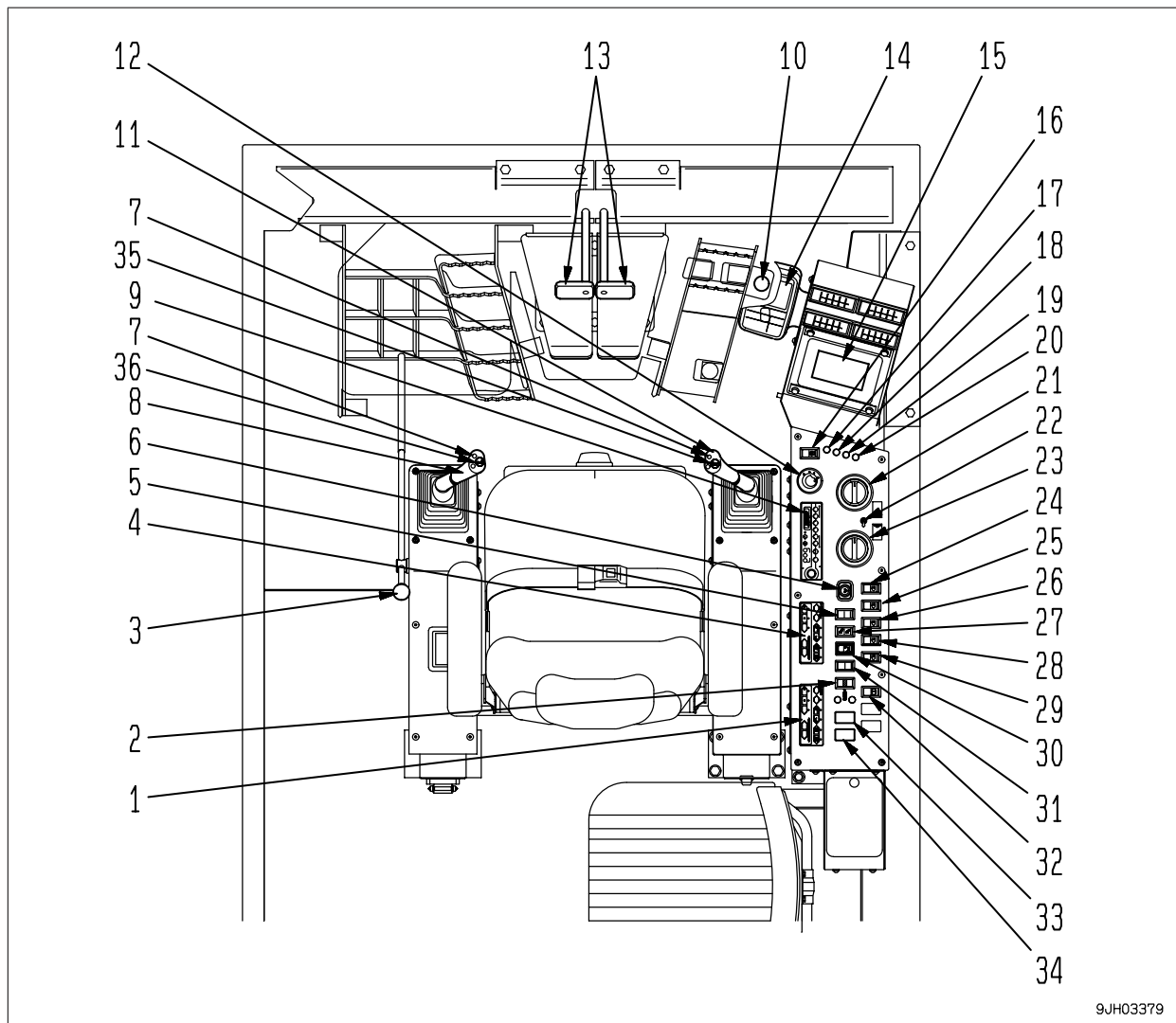
GENERAL VIEW OF MACHINE



AW374030

(1) Bucket	(7) Sprocket
(2) Bottom dump cylinder	(8) Track frame
(3) Bucket cylinder	(9) Track shoe
(4) Arm	(10) Idler
(5) Arm cylinder	(11) Boom cylinder
(6) Boom	

GENERAL VIEW OF CONTROLS AND GAUGES



9JH03379

- | | |
|---|---|
| (1) Air conditioner control panel 2 | (19) Ladder caution lamp |
| (2) Lubrication switch | (20) Trackcounter lamp |
| (3) Safety lock lever | (21) Fuel control dial (F. engine) |
| (4) Air conditioner control panel 1 | (22) Starter selector switch |
| (5) Swing parking brake switch | (23) Fuel control dial (R. engine) |
| (6) Cigarette lighter | (24) Lamp switch |
| (7) Left work equipment control lever | (25) Step light switch |
| (8) Car radio | (26) Room lamp switch |
| (9) Horn switch | (27) Machine push-up switch |
| (10) Right work equipment control lever | (28) Fog lamp switch (if equipped) |
| (11) Starting switch | (29) Rotating lamp switch (if equipped) |
| (12) Travel lever | (30) Shockless boom control switch |
| (13) Monitor | (31) Alarm buzzer stop switch |
| (14) Health monitor | (32) Wiper switch |
| (15) Preheating switch | (33) Automatic level crowding switch |
| (16) Engine emergency stop lamp | (34) Bucket angle compensation switch |
| (17) Auto-greasing caution lamp (if equipped) | (35) Bottom dump opening switch |
| (18) Ladder caution lamp | (36) Bottom dump closing switch |

EXPLANATION OF COMPONENTS

- Below provided are explanation of components necessary for operation of the machine. It is quite important to understand the operation of these controls as well as the meanings of the displays correctly for the right, safe and comfortable operation of the machine.
- For explanations on each control from (1) through (9) and (11) through (32) shown in the overall view of controls, see the operation manual of the backhoe shovel.

SWITCHES

AUTOMATIC LEVEL CROWDING/BUCKET ANGLE COMPENSATION SWITCH

(If equipped)

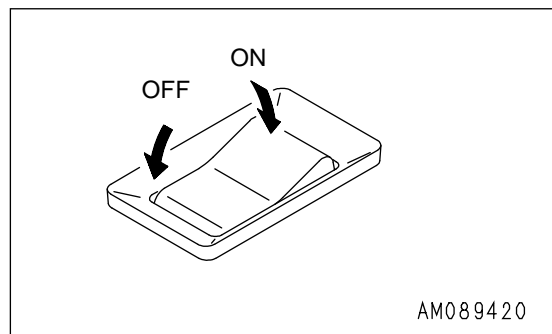
WARNING

If the bucket is loaded with this switch in the OFF position and the boom control lever is placed in the RAISE position, the load may fall off on the arm side, as the bucket moves in an arc. Operation must be performed with good care.

AUTOMATIC LEVEL CROWDING SWITCH

This switch (33) is for selecting either an arc digging or automatic level crowding.

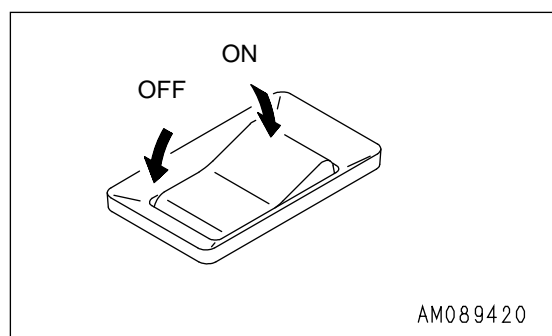
- ON: Automatic level crowding
 OFF: Arc digging
 ON position: Level digging can be done by operating the arm control lever just above the ground surface.



BUCKET ANGLE COMPENSATION SWITCH

This switch (34) is for selecting either with bucket angle compensation or without.

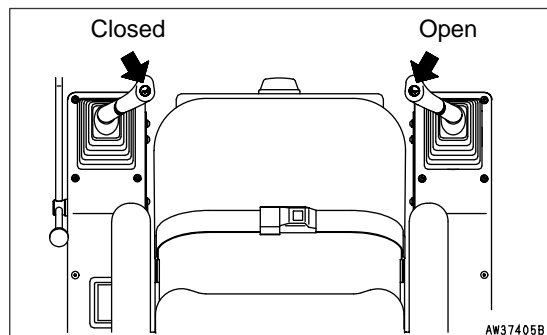
- ON: With bucket angle compensation
 OFF: Without bucket angle compensation
 ON position: The bucket is kept at a constant angle when the boom is in a raised position.



BOTTOM DUMP SWITCH

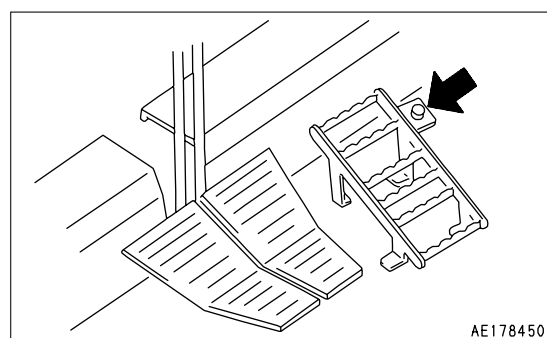
This switch serves to open and close the front bucket.

- If the button (35) at the tip of the left work equipment control lever is depressed, the bucket will close.
- If the button (36) at the tip of the right work equipment control lever is depressed, the front bucket will open.



HORN SWITCH

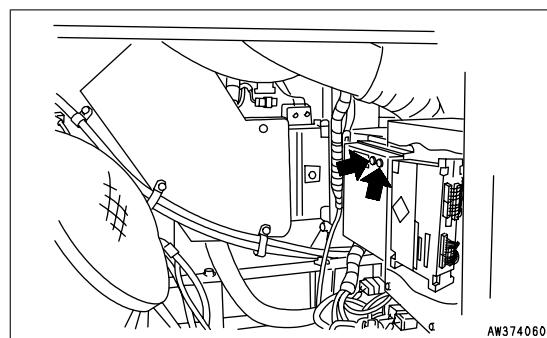
When the horn button (10) located at the right foot rest is depressed, the horn sounds.



CONTROL BOX

(If equipped)

Remove the under cover bottom the operator's cab, so that the control box can be seen. Through the monitor window installed to the cover of the box, red and green LEDs (Light Emitting Diodes) which indicate abnormalities can be seen.



Work equipment automatic control controller

Indication of LED				Condition of machine
Green	Red	Red	Red	
Goes off	Goes off	Goes off	Goes off	Arc digging mode
Lights	Goes off	Goes off	Goes off	Horizontal digging mode
Flashes	Goes off	Goes off	Goes off	Horizontal digging + bucket angle compensation mode
Lights or flashes	Lights	Goes off	Goes off	ARM OUT hydraulic switch actuated
	Goes off	Lights	Goes off	BOOM RAISE/LOWER hydraulic switch actuated
	Goes off	Goes off	Lights	ARM IN, BUCKET hydraulic switch actuated

OPERATIONS

OPERATION OF WORK EQUIPMENT

⚠ WARNING

- For machine with auto-deceleration device, if any lever is operated when in deceleration range, the engine speed will suddenly increase, so be careful when operating the levers.
- If work equipment control levers are jerked, the engine speed will suddenly increase, so be careful when operating the levers.

The work equipment is operated by left and right control levers, and the bottom dump switches.

The LEFT work equipment control lever controls SWING, ARM and bottom dump closing.

The RIGHT work equipment control lever controls BOOM, BUCKET and bottom dump opening.

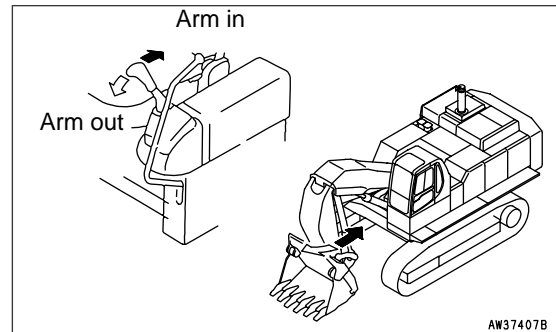
The levers and switches, and movement of the work equipment are as shown in the diagrams. If the levers and switches are released, they will return to the NEUTRAL position, and the work equipment will be held in position.

- If the work equipment control lever is returned to the neutral position when the machine is stopped, even if the fuel control lever is set to FULL, the auto-deceleration mechanism will act to reduce the engine speed to a mid-range speed (for the machine with auto-deceleration device).

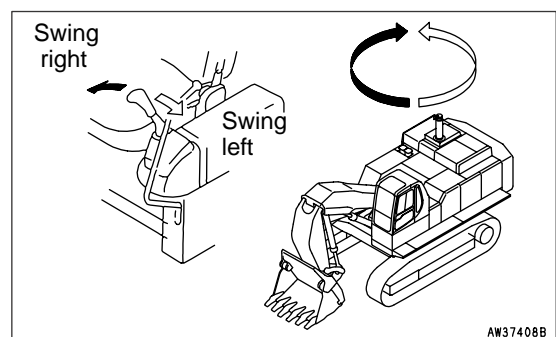
REMARK

If the levers are operated within 15 seconds after stopping the engine, it is possible to lower the work equipment to the ground. In addition, the levers can also be operated to release any remaining pressure inside the hydraulic cylinder circuit and to lower the boom after loading the machine on a trailer.

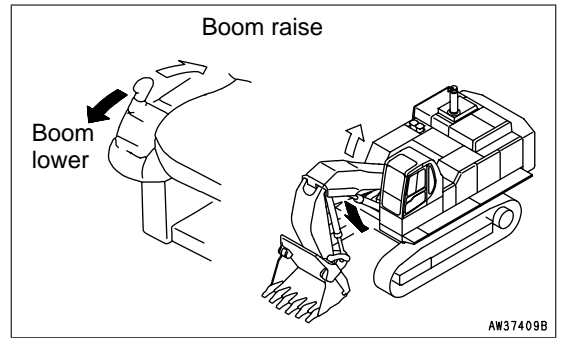
Arm operation



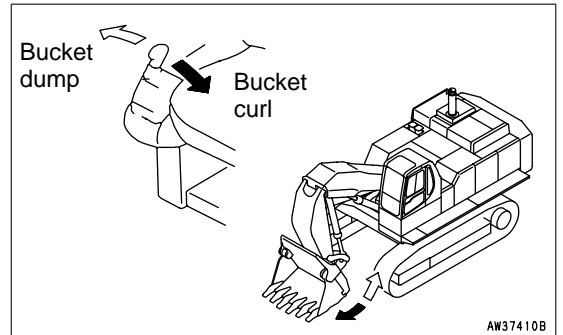
Swing operation



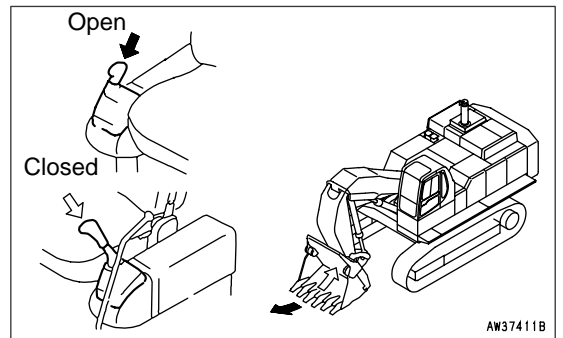
Boom operation



Bucket operation



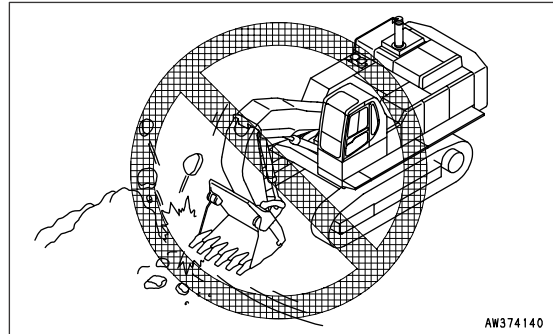
Bottom dump operation



PRECAUTIONS DURING OPERATION

It is prohibited to use the swing force for operations.

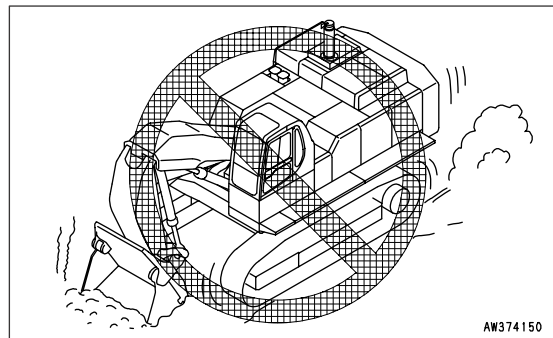
Be careful not to compact the soil or damage earth mounds as a result of the swinging force. When swinging, do not dig the bucket teeth into the soil.



AW374140

It is prohibited to use the travel force for operations.

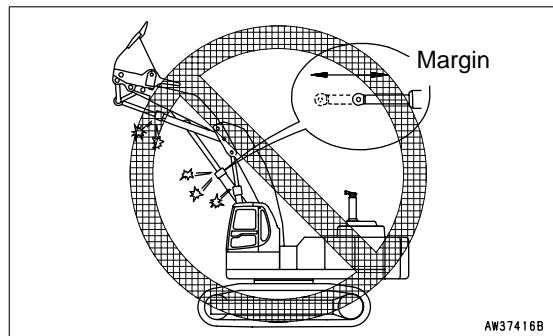
Do not move off and excavate with the bucket left dug into the ground.



AW374150

Do not carry out operations with the hydraulic cylinder at the end of its stroke.

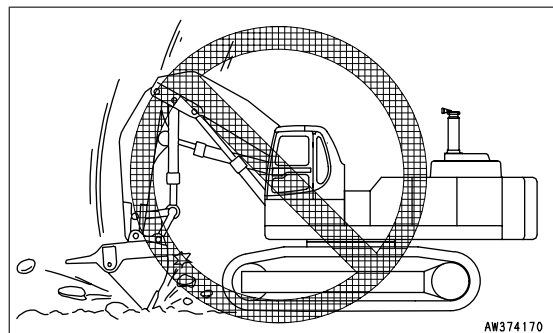
When working with the machine, do not move the cylinder to the end of its stroke but leave a small safety margin.



AW37416B

It is prohibited to use the dropping force of the bucket for operations.

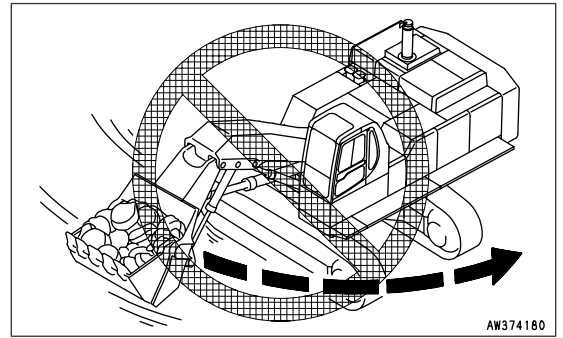
Do not use the dropping force of the bucket for digging. Do not use the dropping force of the bucket as a pickaxe, breaker, or pile driver.



AW374170

Be careful of stability when swinging.

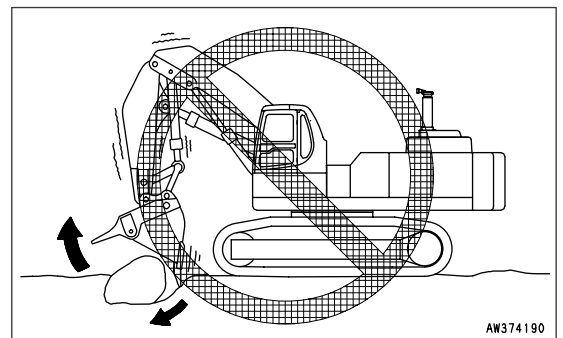
During swing operations, the stability of the machine differs to the front, rear, left and right, and there is danger that it may tip over.



AW374180

It is prohibited to use the tilt operation for digging.

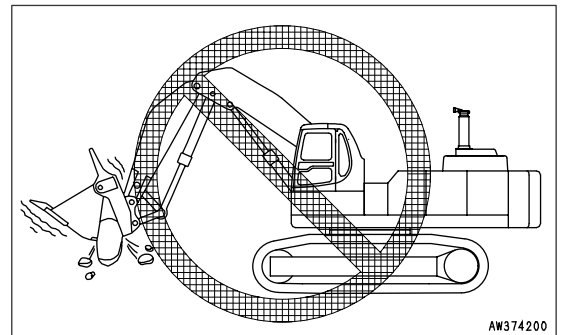
Do not set the teeth vertically when the bucket is pulled in, and then use the tilt operation to carry out digging.



AW374190

It is prohibited to grip rocks.

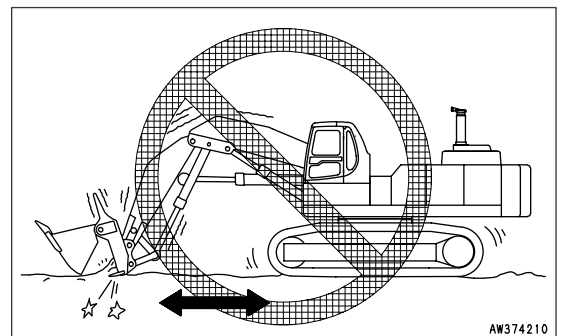
Do not use the bottom dump bucket to grip rocks.



AW374200

It is prohibited to use the bucket for leveling operations.

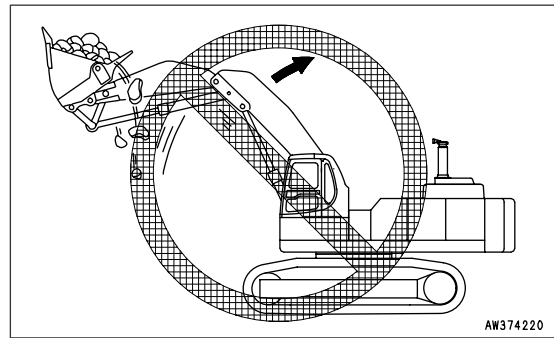
Using the rear bucket to carry out leveling operations will bring an excessive force to bear on the work equipment, so do not use the rear bucket in this way.



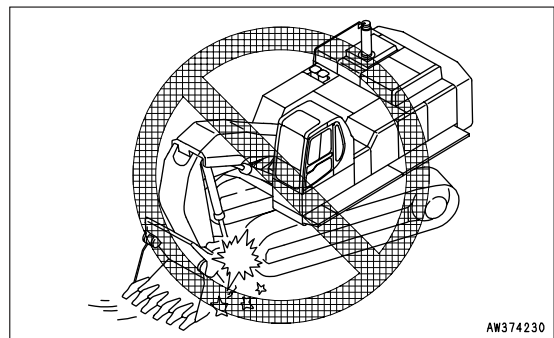
AW374210

Be careful not to spill the load.

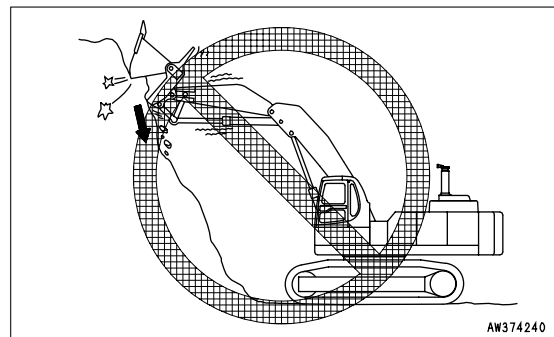
When the bucket is fully loaded, do not raise the boom fully. If the boom is raised fully, the load will spill to the rear and cause danger to the operator.

**Be careful not to hit the undercarriage.**

If the upper structure is set diagonally to the track frame when carrying out digging operations, the work equipment will hit the track links.

**Scraping-down operations are prohibited.**

Never use the front bucket of a bottom-dump bucket to scrap down rocks or soil.

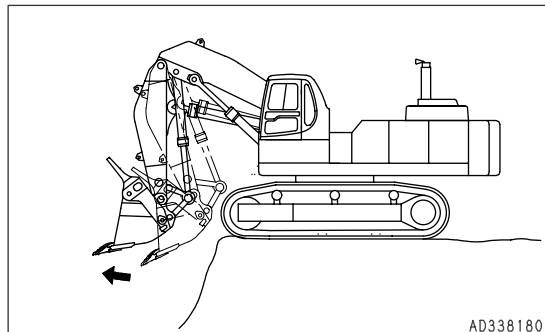
**Digging rocky ground**

It is better to excavate hard rocky ground after breaking it up by some other means. This will not only reduce damage to the machine but make for better economy.

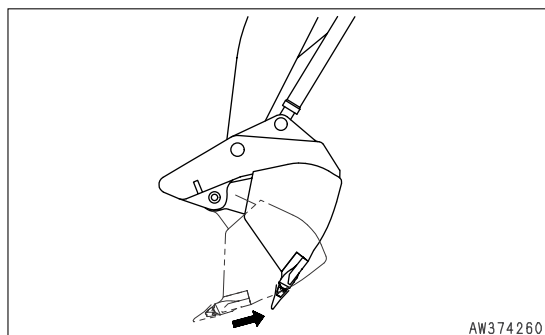
Phenomena that do not indicate failure

Note that the following phenomena are not faults:

- At the beginning and end of a swinging, a noise may sometimes be emitted from the brake valve.
- When descending a steep slope at low speed, a noise may sometimes be emitted from the travel motor.
- The arm may sometimes stop when the bucket teeth become more or less horizontal.



- The bottom dump of the bucket may sometimes stop at the bottom horizontal position when the bottom dump control lever changes from open to close.

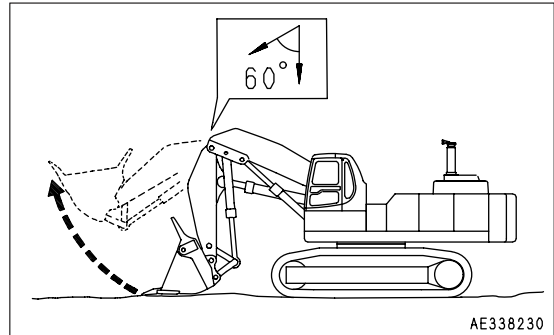


EXCAVATOR WORK

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

SHOVEL WORK

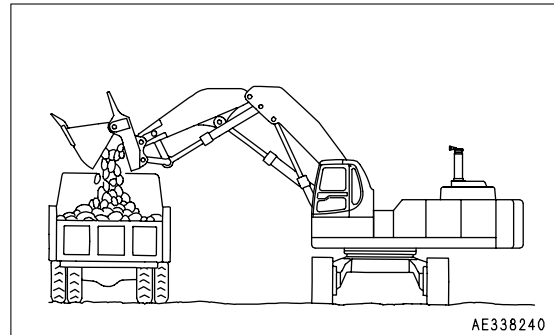
This is suitable for digging a place which is higher than the machine's position. It is most efficient if the arm's digging angle is from vertical to 60° forward, and the arm cylinder is used effectively.



LOADING WORK

About half the time taken for digging and loading operations is used for swinging.

The most efficient method of operation is to keep the swing angle as small as possible but conforming to topography. Loading is easier if the excavator is placed beside the dump truck for loading. This way means more earth can be loaded more effectively than by a loader working behind the truck.



PRECAUTIONS WHEN DISASSEMBLING MACHINE

RELEASING PRESSURE

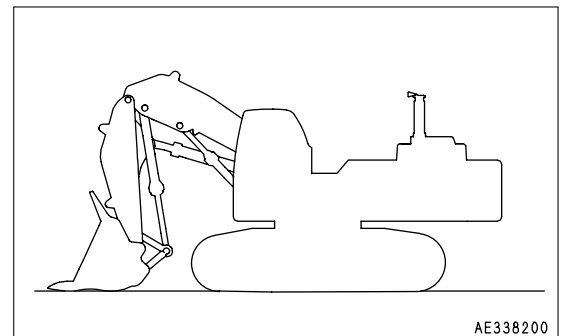
When disassembling the machine or removing the piping during inspection or maintenance, always release the pressure as follows.

RELEASING PRESSURE FROM WORK EQUIPMENT CIRCUIT, SWING CIRCUIT, TRAVEL CIRCUIT

WARNING

- The hydraulic system is constantly pressurized to a certain extent. Hence it is required to release the internal pressure first, when the piping and hoses are checked or replaced. Otherwise the highly pressurized oil will spurt out, causing a serious injury or property damage.
- The parts and oil are at high temperature after the engine is stopped, and may cause serious burn. Wait for the temperature to go down before starting operation.
- When the oil filler removed, oil may spurt out, so carefully turn the cap slowly to release the internal high pressure before removing the cap.

1. Lower the work equipment to the ground in a stable flat place as shown in the diagram, then stop the engine. Set the lock lever to the FREE position.
2. After stopping the engine, move each work equipment control lever to the end of its travel within 5 to 6 seconds. Leave the starting switch ON.
3. Remove the cap of the hydraulic tank.

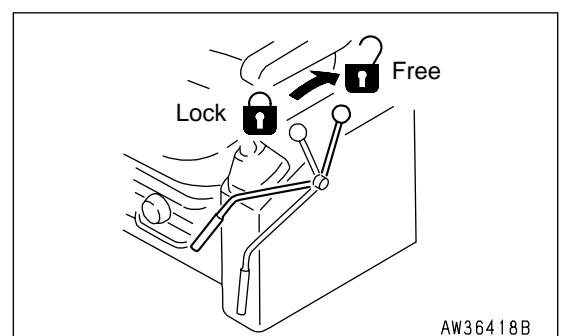


4. Start the engine, run it for approx. 10 seconds, then stop the engine again.
 - When running the engine, do not raise the speed above 1000 rpm.
 - Set the work equipment control levers to neutral.
5. After stopping the engine, move each work equipment control lever to the end of its travel within 5 to 6 seconds.
 - Repeat Steps 4 to 5 three times.

RELEASING PRESSURE IN ACCUMULATOR CIRCUIT

Stop the engine, set lock lever to the FREE position, then move each work equipment control lever 3 to 4 times to the end of its travel. After 1 minute passes, the pressure is relieved.

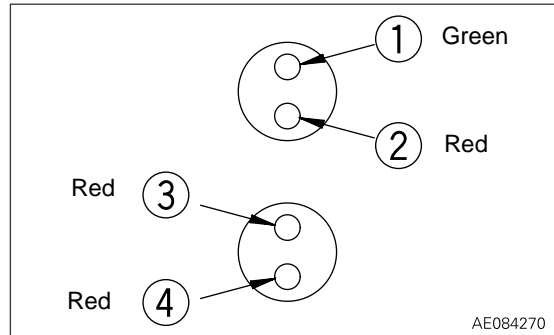
- Do not loosen the piping less than 1 minute after releasing pressure.



TROUBLESHOOTING

WORK EQUIPMENT AUTOMATIC CONTROL CONTROLLER

If the following abnormalities occur, lower the work equipment to the ground, and check the LED display on the controller. Then contact your Komatsu distributor for repairs. If there is thought to be any abnormality or cause not listed below, please contact your Komatsu distributor for repairs.



● When normal

Indication of LED				Condition of machine
① Green	② Red	③ Red	④ Red	
Goes off	Goes off	Goes off	Goes off	Arc digging mode
Lights	Goes off	Goes off	Goes off	Horizontal digging mode
Lights or flashes	Lights	Goes off	Goes off	ARM OUT hydraulic switch actuated
	Goes off	Lights	Goes off	BOOM RAISE/LOWER hydraulic switch actuated
	Goes off	Goes off	Lights	ARM IN, BUCKET hydraulic switch actuated

● When abnormal

Indication of LED				Condition of machine
① Green	② Red	③ Red	④ Red	
Goes off	Lights	Lights	Lights	Control box
Goes off	Lights	Goes off	Goes off	Boom EPC solenoid
Goes off	Goes off	Lights	Goes off	Bucket EPC solenoid
Goes off	Flashes	Lights	Lights	Boom angle sensor
Goes off	Lights	Flashes	Lights	Arm angle sensor
Goes off	Flashes	Goes off	Goes off	ARM OUT hydraulic switch actuated
Goes off	Goes off	Flashed	Goes off	BOOM RAISE/LOWER hydraulic switch actuated
Goes off	Goes off	Goes off	Flashed	ARM IN, BUCKET hydraulic switch actuated

TRANSPORTATION

The machine can be disassembled into upper swing structure, operator cab, track frame, platform, work equipment and counter-weight, and transported in pieces. It is recommended to consult with the Komatsu distributor in your region, when machine transport is required.

MACHINE CONFIGURATION FOR TRANSPORT

(PC1800 LOADING SHOVEL)

WARNING

- Never lift the machine with any worker on it.
- Always make sure that the wire rope used for lifting the machine is of ample strength for the weight of the machine.
- When lifting, be careful of the center of gravity and be sure to maintain the balance.

MAINTENANCE SCHEDULE

EVERY 10 HOURS MAINTENANCE

⚠ WARNING

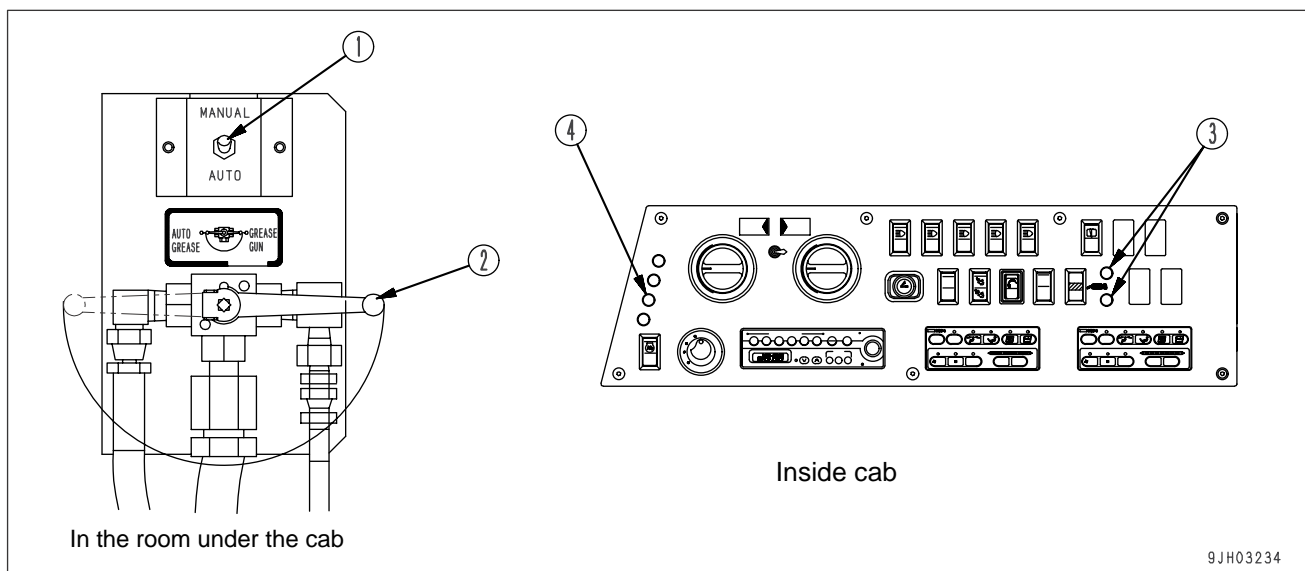
- If any abnormal noise comes from the greasing points of the work equipment, apply grease regardless of the service interval.
- An inadvertent touch on any of the control levers will let the work equipment or the machine move all of sudden and that will cause a serious injury or damage. When leaving the machine, be sure to set the safety lock lever to the locking position.

The work equipment is normally lubricated automatically, however, if noises are emitted from the pins, apply grease to the grease fitting of each injector manually. At the same time, it is recommended to contact the Komatsu distributor in your region, asking for checking the automatic lubrication system.

Manual lubrication can be performed in the following manner.

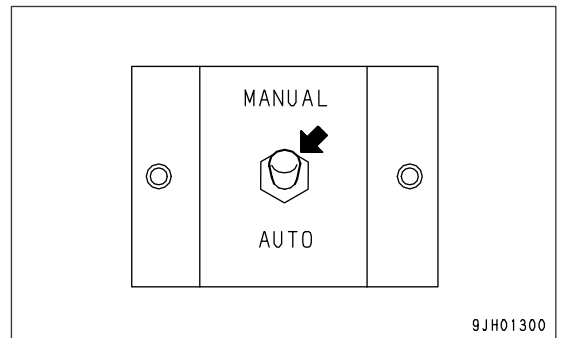
PREPARATIONS BEFORE LUBRICATION

1. Lower the work equipment to the ground in such way that lubrication can be carried out.
2. Be sure to set the safety lock lever to the Lock position.
3. Move the automatic lubrication selector switch to the AUTO side. Also move the grease circuit switching lever to the GREASE GUN side.



AUTOMATIC LUBRICATION SELECTOR SWITCH

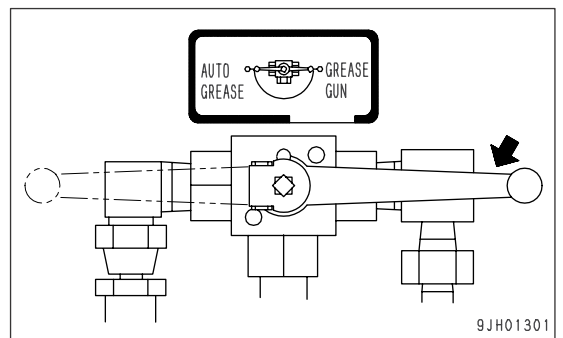
This switch (1) is for selecting automatic or manual lubrication system. Move the switch to the MANUAL side. It should be normally kept in the AUTO position.



9JH01300

GREASE CIRCUIT SELECTOR LEVER

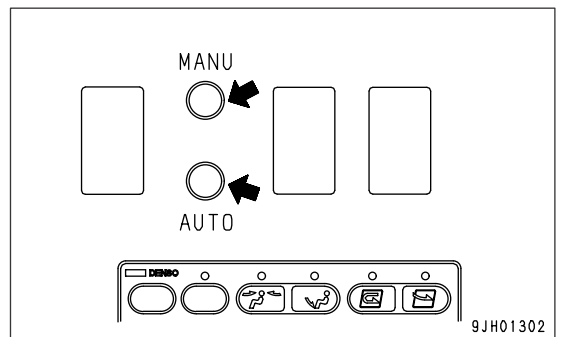
This lever (2) serves to select either automatic or manual grease circuit. It is usually to be kept at the AUTO GREASE side.



9JH01301

AUTOMATIC GREASE CIRCUIT SELECTOR LAMP

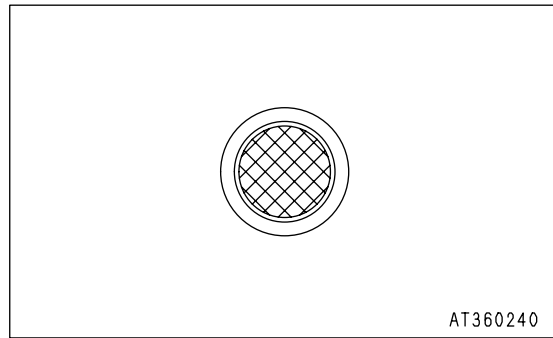
This lamp (3) serves to discern whether the automatic lubrication system is in the auto lubrication condition or in the greasing condition. Confirm that a green lamp at the MANU side is on.



9JH01302

AUTOMATIC LUBRICATION CAUTION LAMP

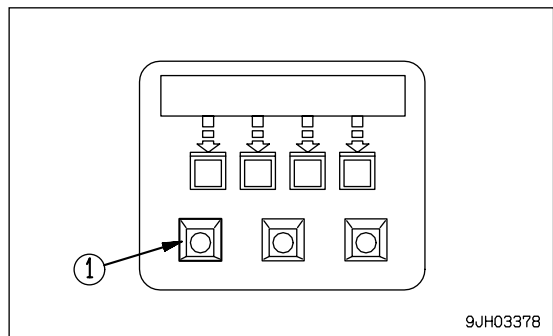
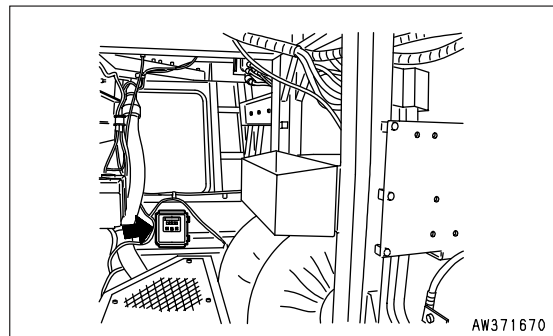
This red lamp (4) will switch on in case something abnormal takes place in the automatic lubrication system (both in auto-lubrication circuit and in manual greasing circuit). Check display of the automatic lubrication controller in the room under the cab, identify the cause and take actions for repairs.



Set the auto-greasing controller to the OFF position when carrying out repair work. If the starting switch is turned OFF, the controller is also turned OFF.

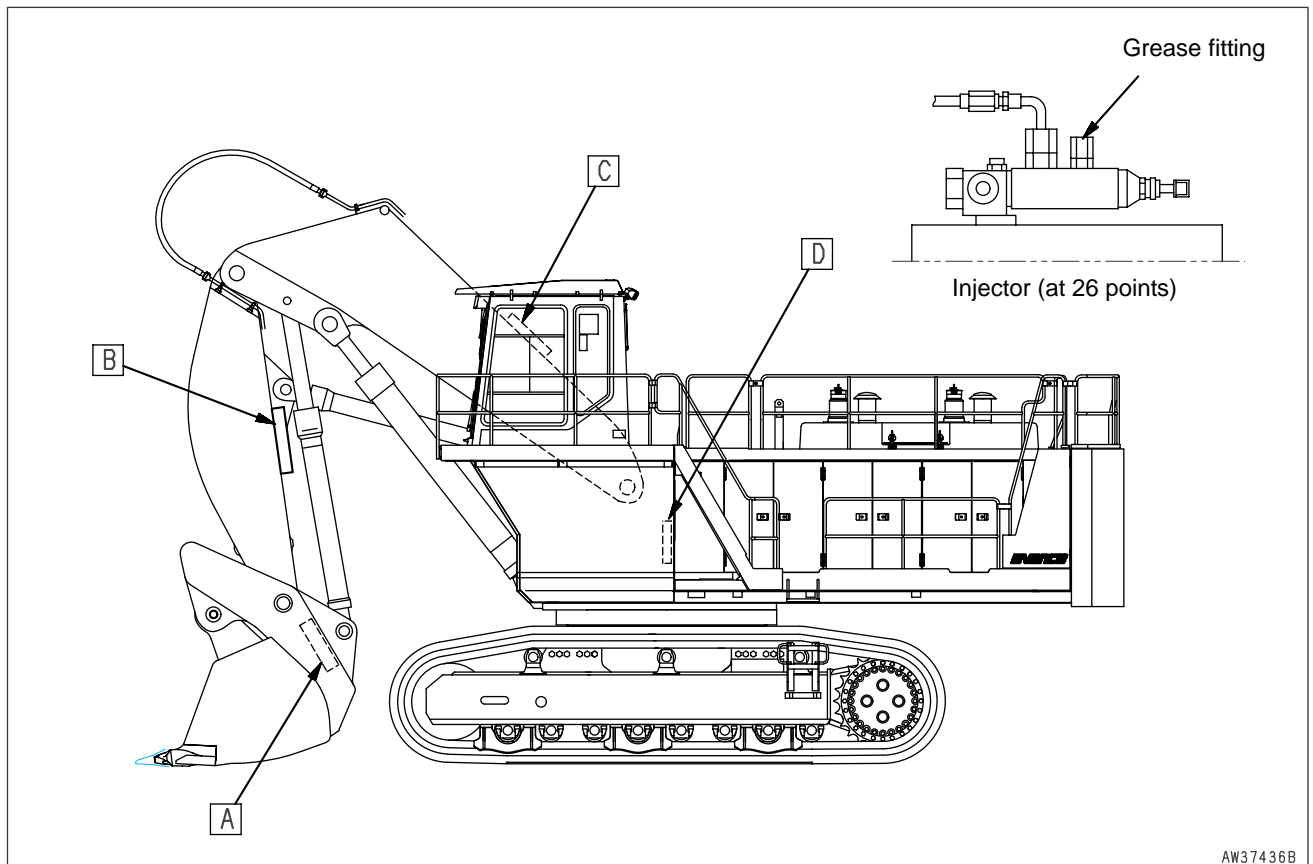
REMARK

- To turn the auto-greasing controller OFF/ON, press power switch (1). Each time the power switch is pressed, it switches OFF → ON → OFF.
- If the engine has not been studied, and the standing switches left at the ON position, CONTROLLER REST FAILURE is displayed on the auto-greasing controller display and the auto-greasing caution lamp lights up, but this does not indicate any abnormality. When the starting switch is turned OFF, the condition returns to normal.



LUBRICATION

1. Apply grease to the injector grease fittings, using a grease gun.
2. After having applied grease, wipe off the old grease that has been pushed out.

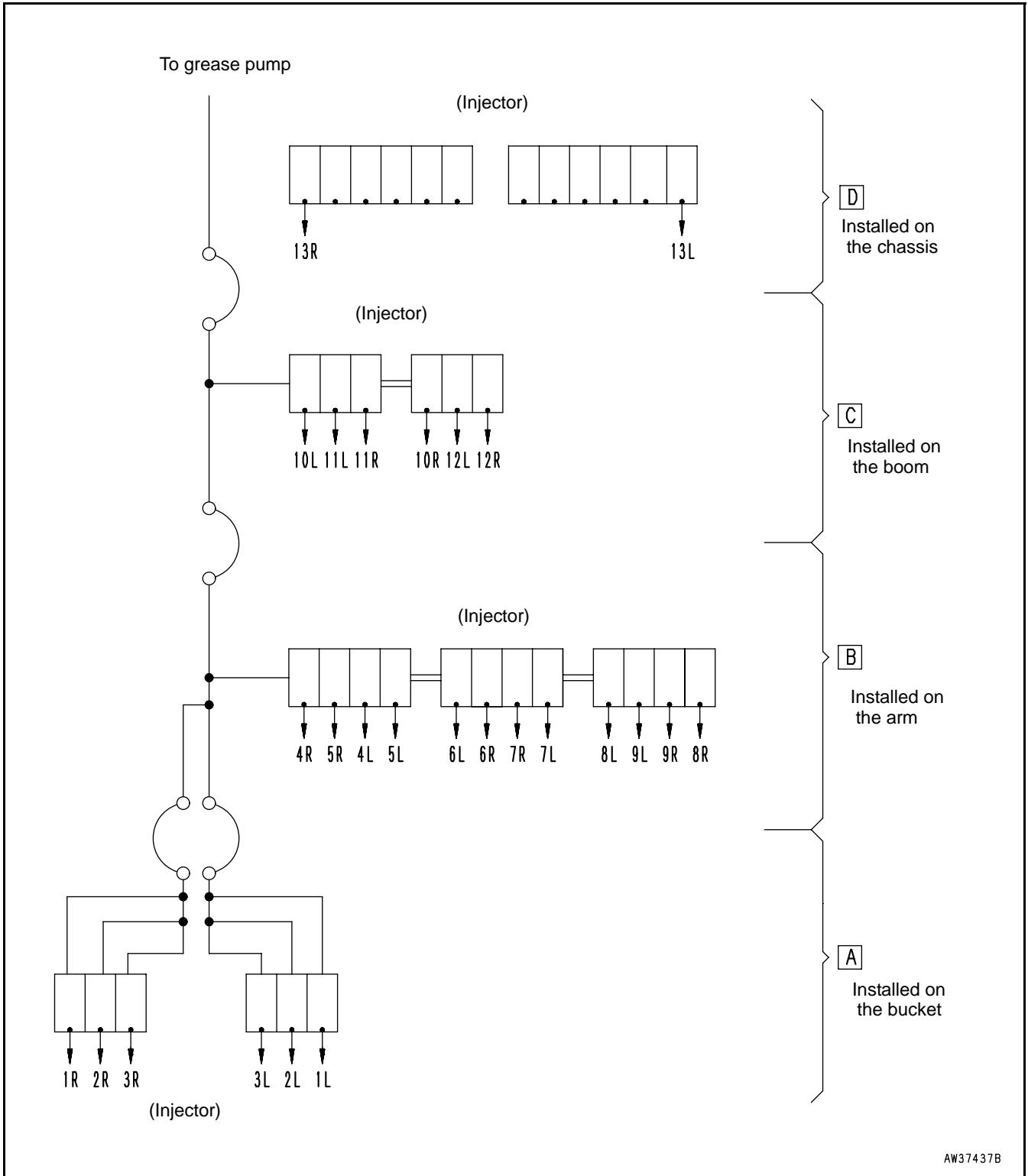


R: indicates a point on the right side

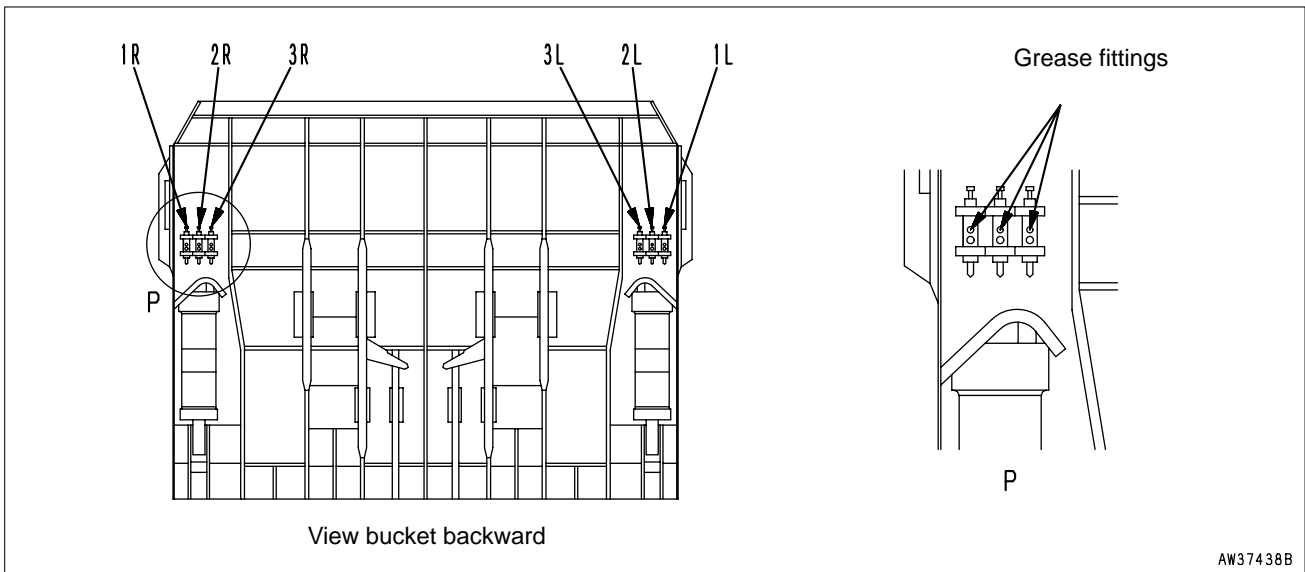
L: indicates a point on the left side

Injector installed location		Injector location subdivision	Lubrication point
(A)	Bucket	1R	F&R bucket connector pin (R.H)
		1L	F&R bucket connector pin (L.H)
		2R	Bottom dump cylinder head pin (R.H)
		2L	Bottom dump cylinder head pin (L.H)
		3R	Bottom dump cylinder bottom pin (R.H)
		3L	Bottom dump cylinder bottom pin (L.H)
(B)	Arm	4R	Arm top pin (1) (R.H)
		4L	Arm top pin (1) (L.H)
		5R	Arm top pin (2) (R.H)
		5L	Arm top pin (2) (L.H)
		6R	Arm cylinder head pin (R.H)
		6L	Arm cylinder head pin (L.H)
		7R	Bucket cylinder bottom pin (R.H)
		7L	Bucket cylinder bottom pin (L.H)
		8R	Boom top pin (R.H)
		8L	Boom top pin (L.H)
		9R	Bucket cylinder head (R.H)
		9L	Bucket cylinder head (L.H)
(C)	Boom	10R	Boom foot pin (R.H)
		10L	Boom foot pin (L.H)
		11R	Arm cylinder bottom pin (R.H)
		11L	Arm cylinder bottom pin (L.H)
		12R	Boom cylinder head pin (R.H)
		12L	Boom cylinder head pin (L.H)
(D)	Chassis	13R	Boom cylinder bottom pin (R.H)
		13L	Boom cylinder bottom pin (L.H)

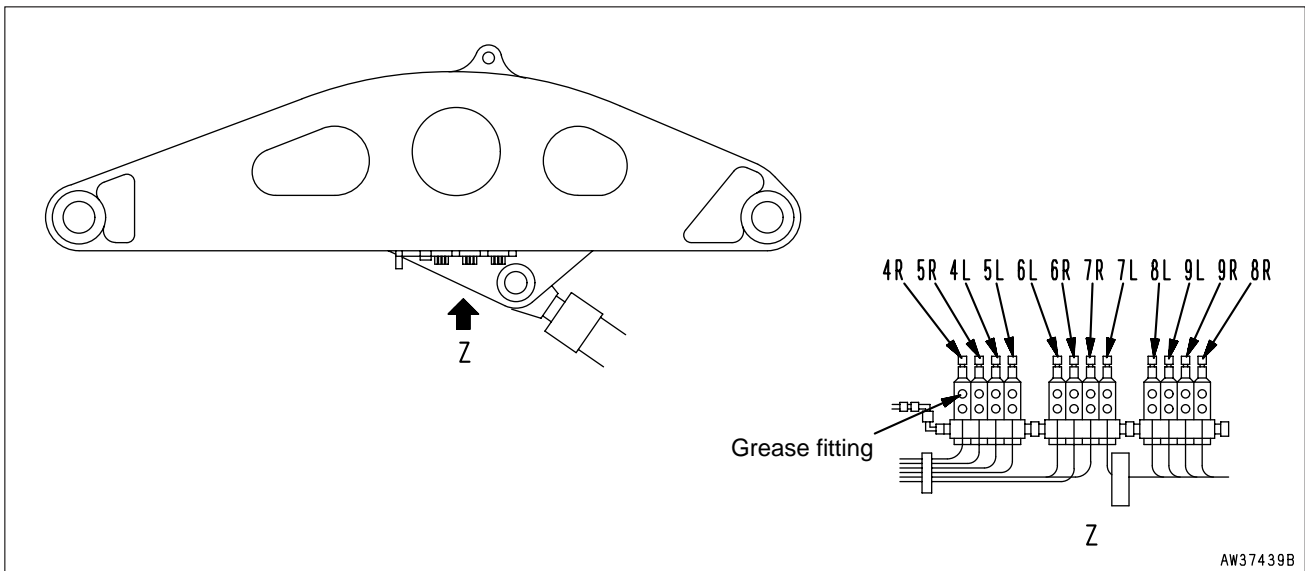
● Injector installation diagram



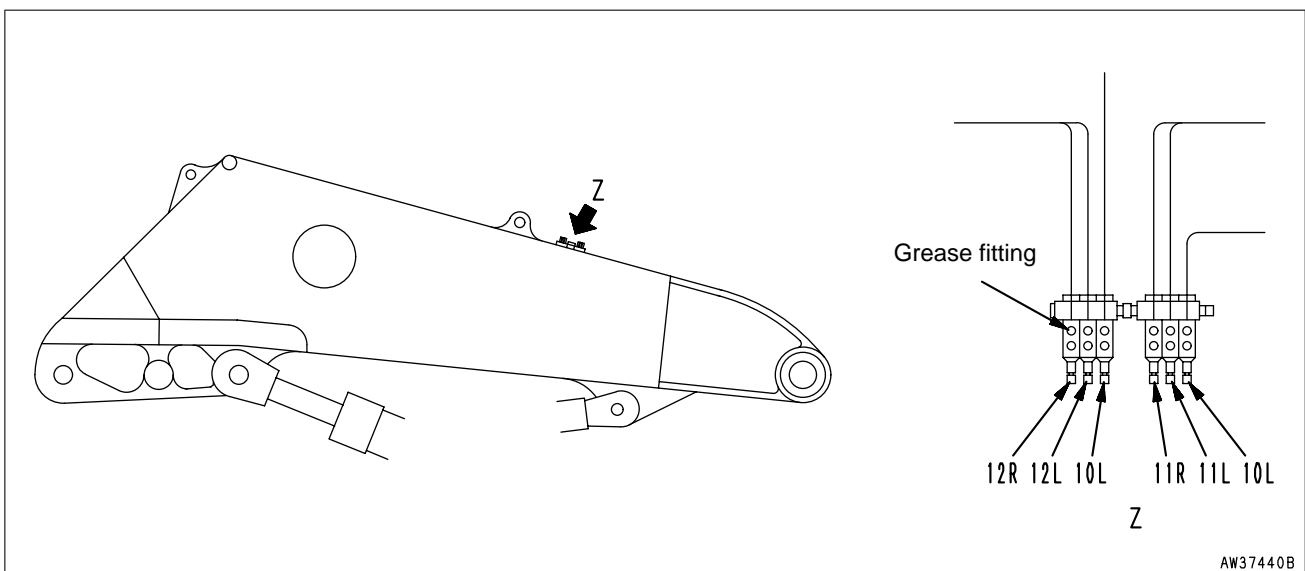
A: Injector installed on the bucket



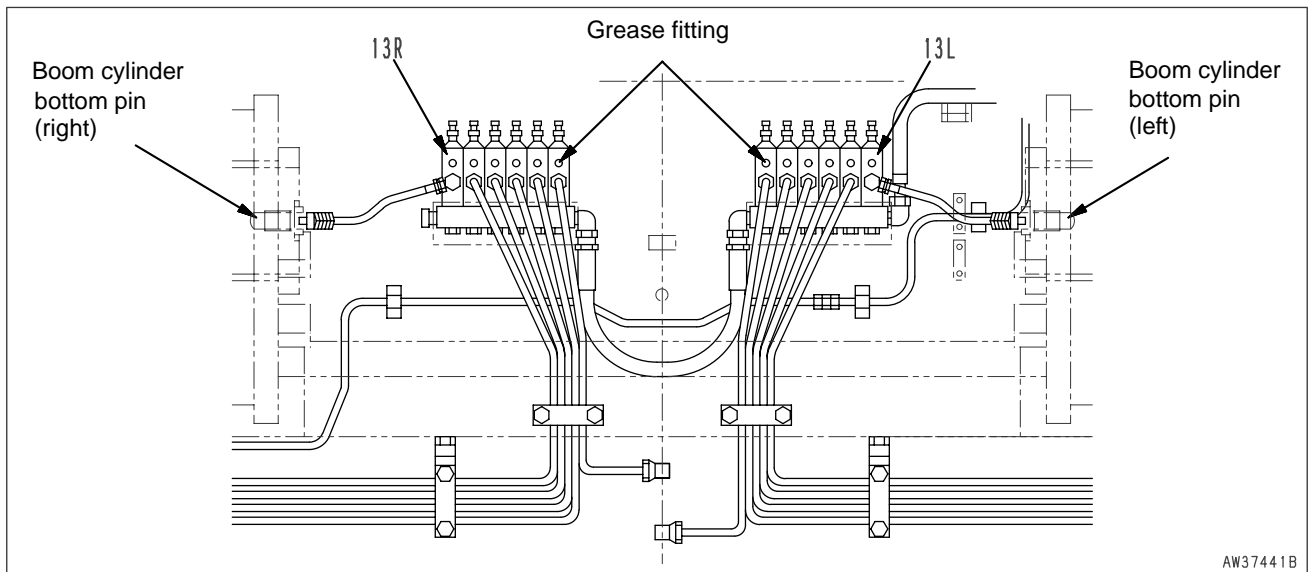
B: Injector installed on the arm



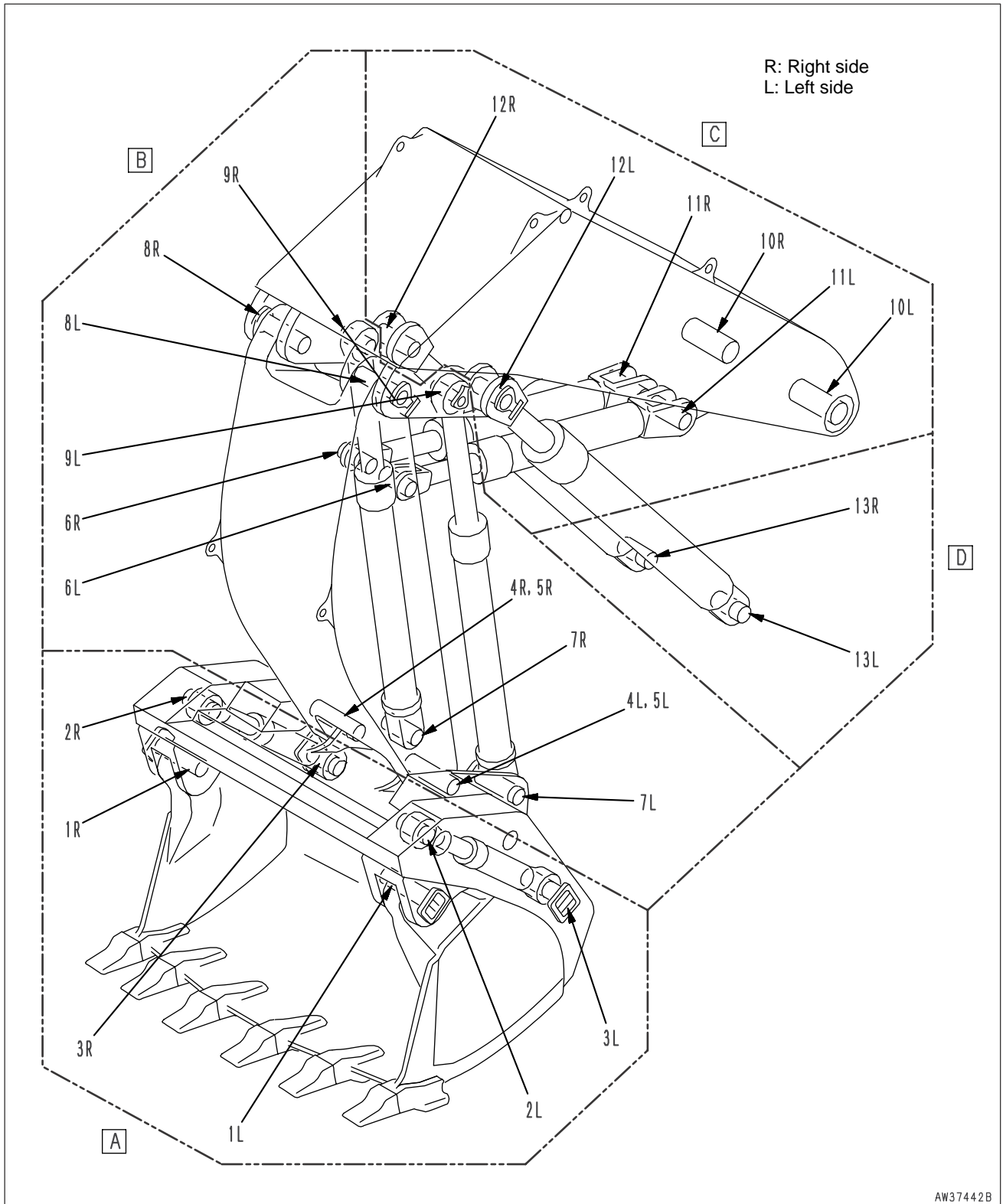
C: Injector installed on the boom



D: Injector installed on the chassis



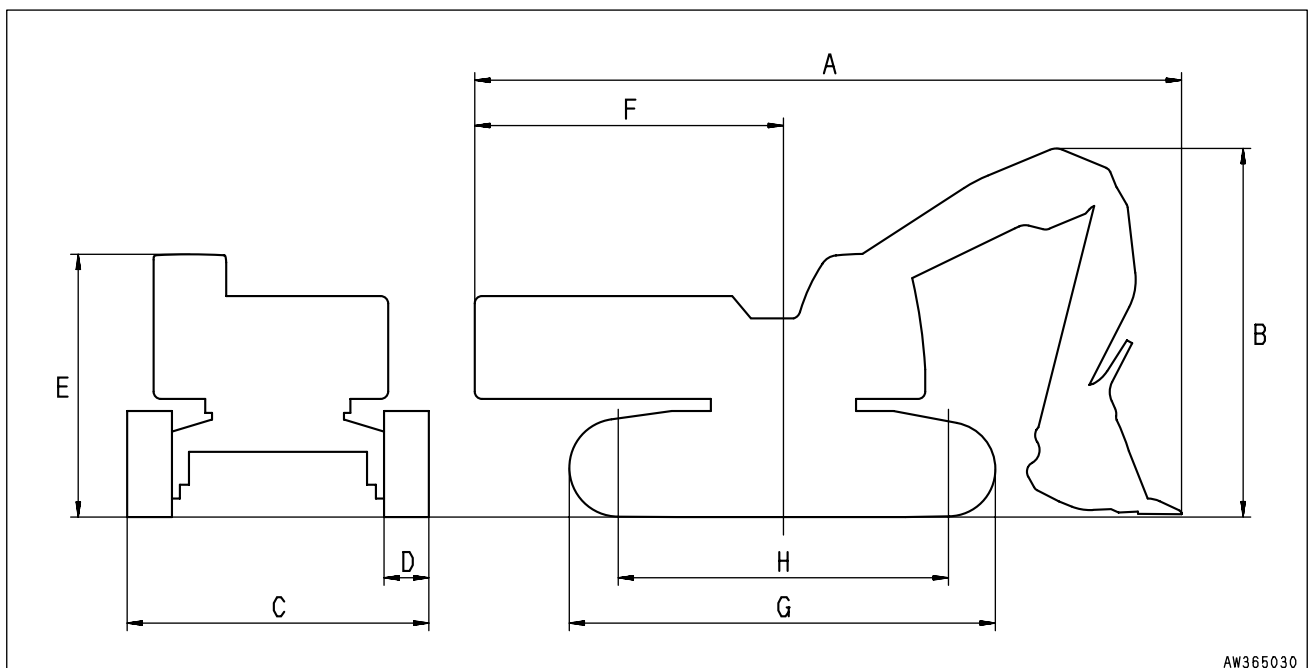
● Lubrication point diagram



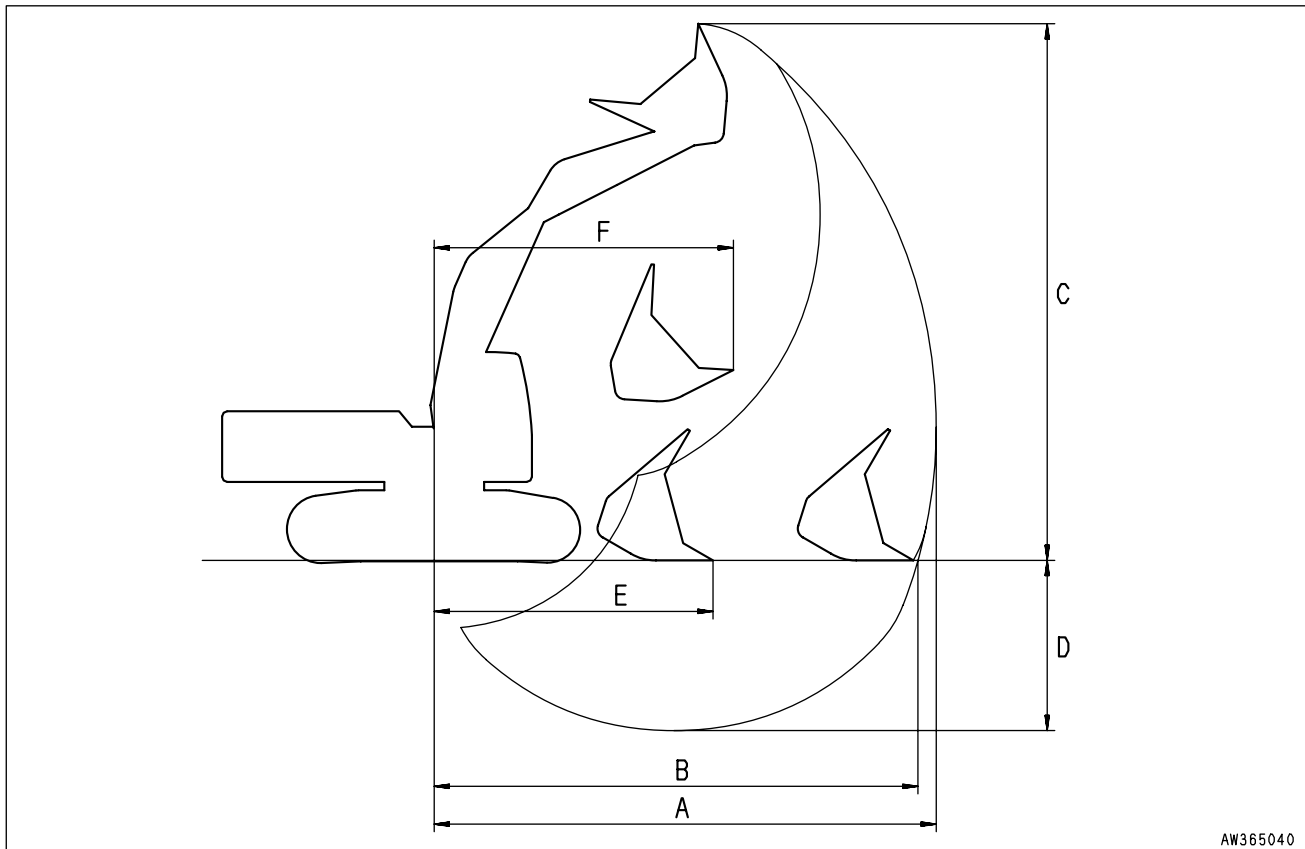
SPECIFICATION

PC1800-6 LOADING SHOVEL

	Item	Unit	PC1800-6
	Operating weight (including 1 operator, 80 kg)	kg	180000
	Bucket capacity (standard bucket)	SAE m ³	12
		CECE m ³	11
	Name of engine	—	Komatsu SAA6D140 diesel engine x 2
	Engine horsepower	kW (HP)/rpm	338 (454)/1800
A	Overall length	mm	13230
B	Overall height	mm	8180
C	Overall width	mm	6015
D	Track width	mm	810
E	Height of cab	mm	6510
F	Tail swing radius	mm	6235
G	Length of track	mm	7436
H	Tumbler center distance	mm	5780
	Min. ground distance	mm	2080
	Travel speed	km/h	2.7
	Swing speed	rpm	4.5



	Working ranges	Unit	PC1800-6
A	Max. digging reach	mm	13170
B	Max. digging depth	mm	11940
C	Max. digging height	mm	11420
D	Max. vertical wall depth	mm	3220
E	Max. dumping height	mm	7090
F	Max. reach at ground level	mm	7500



AW365040

COMBINATION OF WORK EQUIPMENT

⚠ WARNING

A certain combination of work equipment will cause the equipment to interfere with the cab or chassis. When using an inexperienced work equipment, make sure before start-up that no such interference will occur.

COMBINATION OF WORK EQUIPMENT

Select an appropriate combination of boom, arm and bucket from the table below.

- For the dimensions of A to F, see the specifications shown in the working range diagram

Work equipment	Boom	mm	5950
	Arm	mm	4450
	Bucket capacity	m ³	11
	Bucket width	mm	3220
	Loosen specific gravity of soil to be handled	2.0	X
		1.8	○
1.6		○	

○: Can be used

X: Cannot be used

MEMO

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PC1800-6 HYDRAULIC EXCAVATOR

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