

Operation & Maintenance Manual

PC350LL-7E0

LOGGING EXCAVATOR

SERIAL NUMBERS PC350LL-7E0 A50001 and up

ENGINE SAA6D114E-3

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INTRODUCTION

INTRODUCTION

FOREWORD

This manual describes procedures for operation, handling, lubrication, maintenance, checking, and adjustment. It will help the operator and maintenance personnel realize peak performance through effective, economical and safe machine operation and maintenance.

Keep this manual handy and have all personnel read it periodically. If this manual is lost or becomes dirty and can not be read, request a replacement manual from your local distributor.

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

Continuing improvements in the design of this machine can lead to changes in detail, which may not be reflected in this manual. Consult your local distributor or KOMATSU AMERICA CORP. for the latest available information on your machine or for questions regarding information in this manual.

This manual may contain attachments and optional equipment that are not available in your area. Consult your local distributor or KOMATSU MINING SYSTEMS for those items that you may require.

WARNING

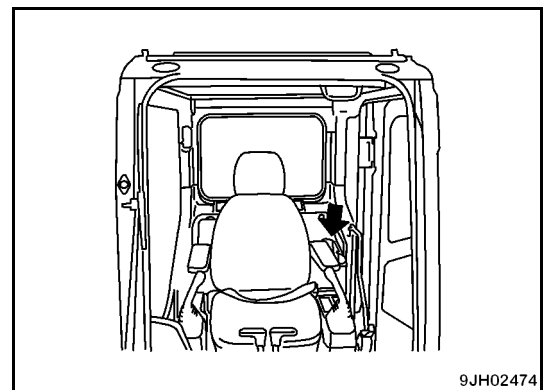
Improper operation and maintenance of this machine can be hazardous and could result in serious injury or death.

- Operators and maintenance personnel must read this manual thoroughly before operating or maintaining this machine.
- This manual should be kept near the machine for reference and periodically reviewed by all personnel who operate it.
- Some actions involved in operation and maintenance can cause a serious accident, if they are not performed in the manner described in this manual.
- The procedures and precautions given in this manual apply only to intended uses of the machine. If you use your machine for any unintended uses that are not specifically prohibited, you must be sure that it is safe for you and others. In no event should you or others engage in prohibited uses or actions as described in this manual.
- KOMATSU AMERICA CORP. 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 features 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 your local distributor or KOMATSU AMERICA CORP. before operating the machine.

The description of safety is given in SAFETY INFORMATION and in SAFETY section 1.

Storage location for the Operation and Maintenance Manual:

On left side of the operators seat.



9JH02474

SAFETY INFORMATION

Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines. To avoid accidents, read, understand and follow all precautions and warnings in this manual and on the machine before performing maintenance and machine operations.

The following signal words are used to inform you that there is a potentially hazardous situation that may lead to personal injury or damage. In this manual and on machine labels, different signal words are used to express the potential level of hazard.



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.



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



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.

Remark

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

Safety precautions are described in **SAFETY** section 1.

KOMATSU AMERICA CORP. cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore the safety message 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, you must be sure that you and others can do such procedures and actions safely and without damaging the machine. If you are unsure about the safety of some procedures, contact your local distributor or KOMATSU AMERICA CORP.

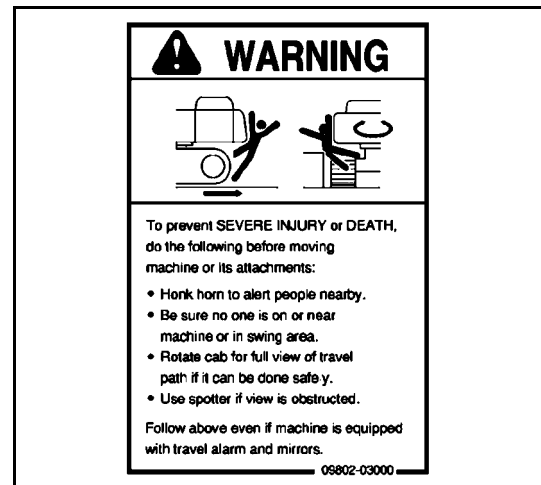
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- Safety labels

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

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

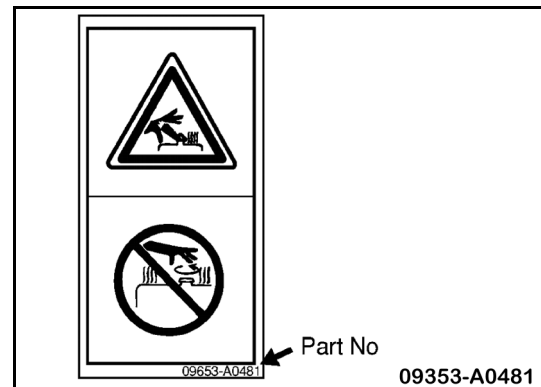
Example of safety label using words.



- Safety labels using pictogram

Safety pictograms use a picture to express a level of hazardous condition equivalent to the signal word. These safety pictograms use pictures in order to let the operator or maintenance worker understand the level and type of hazardous condition at all times.

Safety pictograms show the type of hazardous condition at the top or left side, and the method of avoiding the hazardous condition at the bottom or right side. In addition, the type of hazardous condition is displayed inside a triangle and the method of avoiding the hazardous condition is shown inside a circle.



Komatsu cannot predict every circumstance that might involve a potential hazard in operation and maintenance.

Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions.

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

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

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

INTRODUCTION

Intended Use

This Komatsu *ROAD BUILDER* or *FORESTRY MACHINE* is designed to be used mainly for the following work:

- Excavating operations
- Leveling operations
- Log loading
- Log stacking
- Ditch cleaning operations
- Loading operations
- Log unloading
- Log handling
- Demolition operations
- Stump handling
- Additional uses using KOMATSU approved attachments only.

For details on operating procedures, See “OPERATION” on page 2-1.

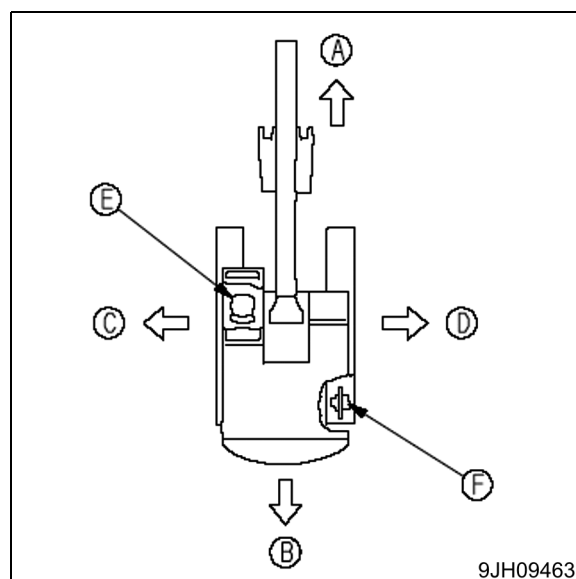
Features

1. This KOMATSU *ROAD BUILDER* or *FORESTRY MACHINE* is equipped with various controls based on an advanced electronics system.
 - The monitor panel greatly facilitates daily maintenance and self diagnostics.
 - Working mode, travel speed are selectable.
 - Digging and lifting force can be increased by Power-Max switch on left hand PPC control.
2. Adjustable wrist control levers make operations smooth and easy.
3. Air-conditioned operators cab assures comfortable operation.
4. Low noise level and smart urban-style design and coloring.
5. Superb operating performance provided by powerful engine and high-performance hydraulic pumps.
6. Low fuel consumption controlled by an electronic control system provides an environment-friendly machine.

Directional Reference of Machine

All views are taken from the operators seat facing forward

- A. Front
- B. Rear
- C. Left
- D. Right
- E. Operators seat
- F. Rear sprocket



INTRODUCTION

Breaking in a New Machine

Your machine has been thoroughly adjusted and tested before shipment. However, operating the machine under severe conditions at the beginning can adversely affect the performance and shorten the machine life. Be sure to break in the machine for the initial 100 hours, as indicated by the service meter.

During breaking in:

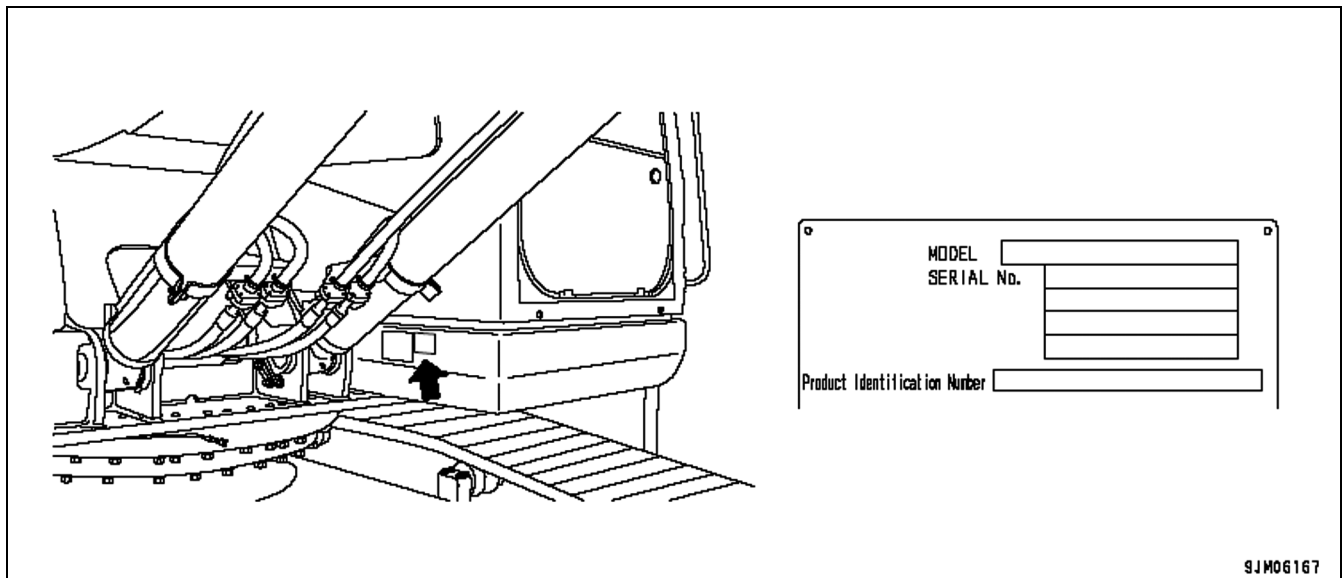
- After starting, let the engine idle for five minutes to allow proper engine warm up prior to actual operation.
- Avoid operation with heavy loads or at high speeds.
- Avoid sudden starts or acceleration, unnecessarily abrupt stops and sharp steering except in cases of emergency.

The precautions given in this manual for operating, maintenance, and safety procedures are only those that apply when this product is used for the specified purpose. If the machine is used for a purpose that is not listed in this manual, KOMATSU cannot bear any responsibility for safety. All consideration of safety related items in such operations is the responsibility of the user. Operations that are prohibited in this manual must never be carried out under any circumstance.

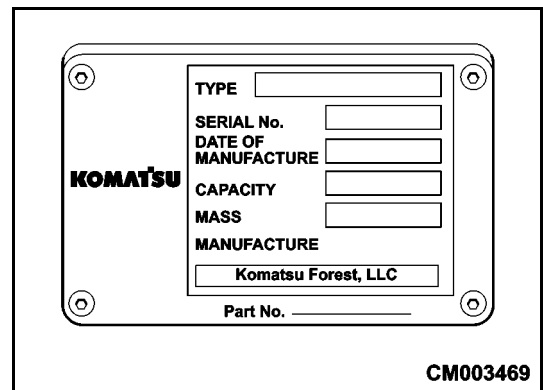
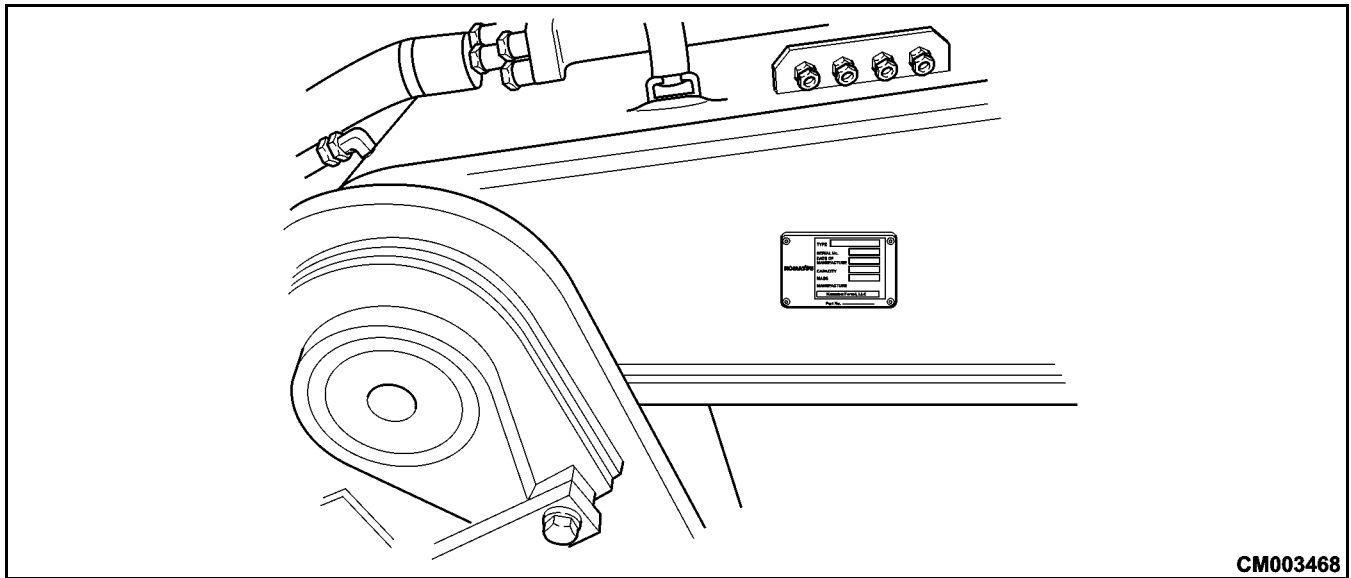
Plate Locations

Product Identification Number (Pin) / Machine Serial No. Plate

On the bottom right of the operator's cab



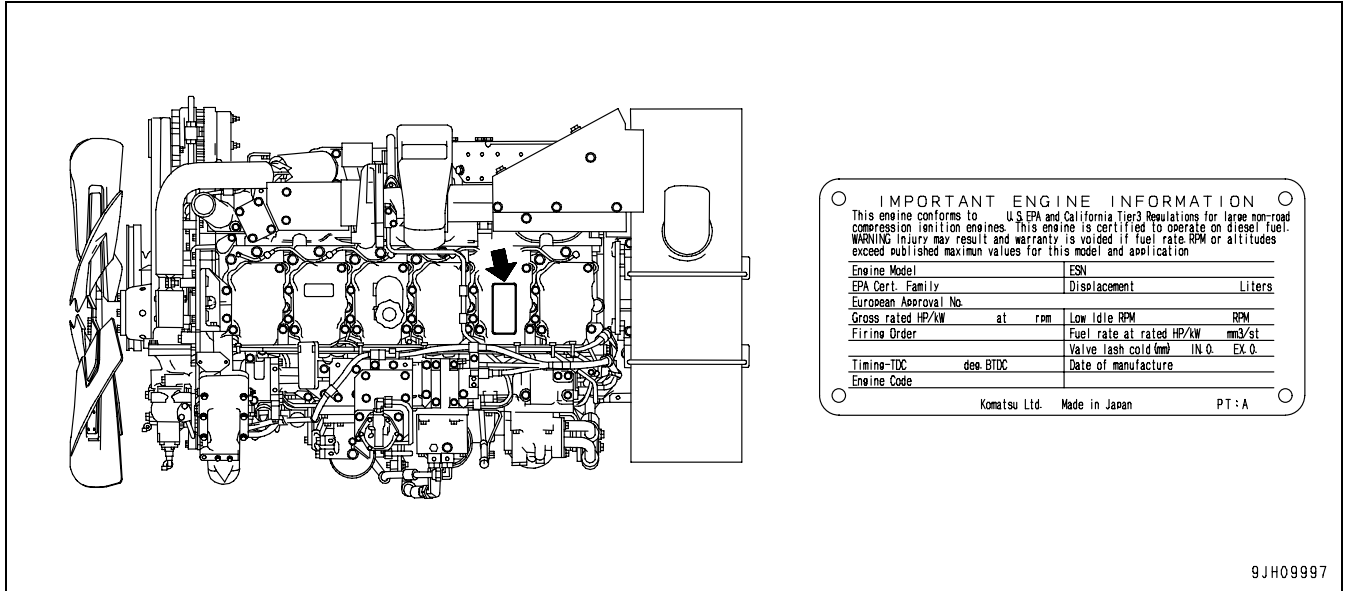
Komatsu Forestry Front S/N Plate



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Engine Serial Number Plate

The engine serial number is located on the upper side of the engine valve cover.



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

Service Meter Location

On top of the machine monitor

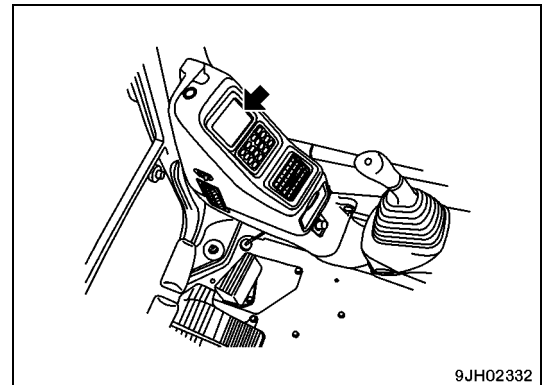


Table To Enter Serial Numbers And Distributor

Machine serial No.:
Engine serial No.:
Distributor name:
Address: Phone:
Service personnel for your machine:

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SAFETY

WARNING

Please read and make sure that you fully understand the precautions described in this manual and the safety labels on the machine. Read and follow all safety precautions. Failure to do so may result in serious injury or death.

SAFETY

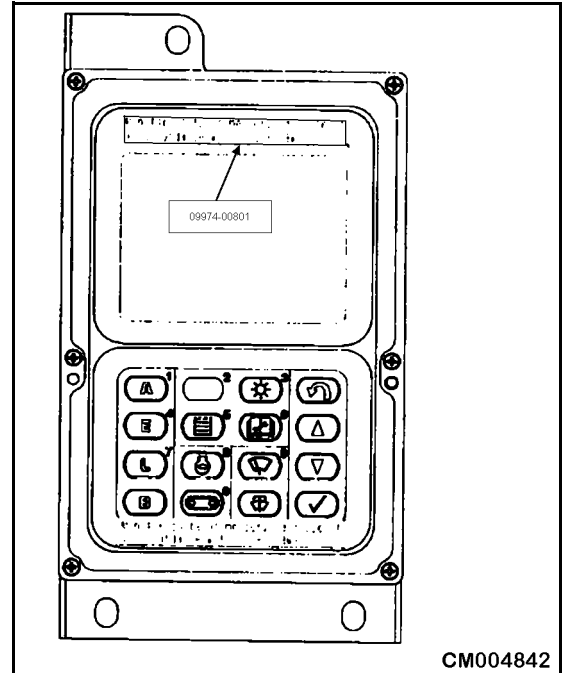
SAFETY AND WARNING DECALS

It is important that all safety and warning decals are in place, not damaged, covered up or removed. It is also important for the operator to be aware of the decal content and location.

Location of the Safety Decals

Monitor decal (09974-00801)

Contains mercury,
Dispose of in accordance with Local, State and Federal
Laws.



**Contains mercury. Dispose of in accordance with
Local, State and Federal Laws.**

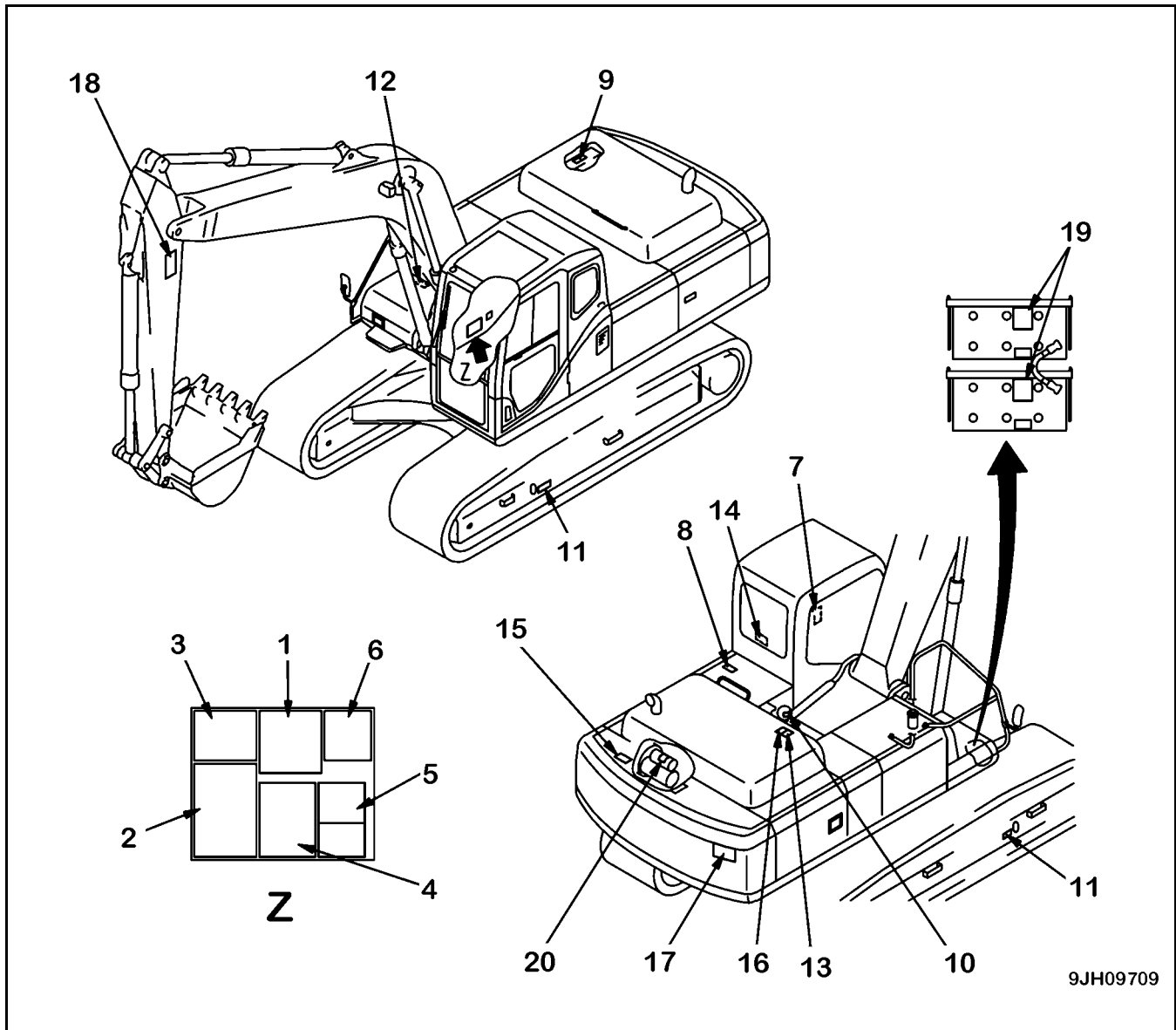
09974-00801

Normal Excavator Decals

Remark

See page 1-10 for unique safety decals for log loader and road builder excavators.

It is important that all safety and warning decals are in place, not damaged, covered up or removed. It is also important for the operator to be aware of the decal content and location.



- Your **Komatsu** Dealer can supply you with new replacement decals if the ones on the machine are damaged or missing.
- When replacing damaged or missing decals, be sure they are placed in the proper location.
- Additional safety or warning decals may be added to your machine if desired.

Safety Labels

1. Caution Before Operating Or Maintaining Machine (09651-03001)

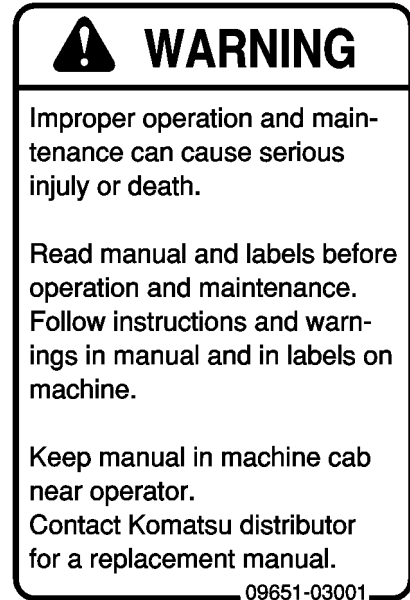
Improper operation and maintenance can cause serious injury or death

Read manual and tables before operation and maintenance.

Follow instructions and warnings in manual and in tables on machine.

Keep manual in machine cab near operator.

Contact Komatsu distributor for replacement manual.



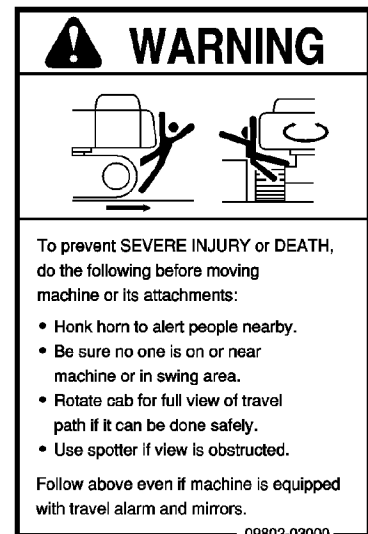
2. Caution Before Operating (09802-03000)

To prevent SEVERE INJURY or DEATH.

do the following before moving the machine or its attachments:

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

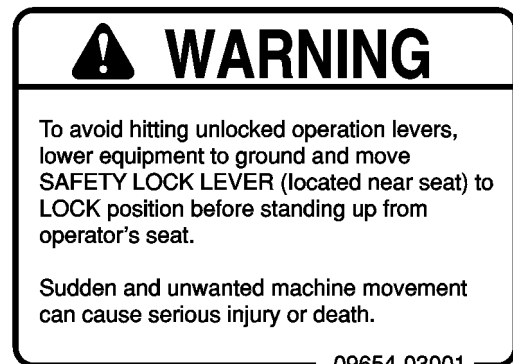
Follow above even if machine is equipped with travel alarm and mirrors.



3. Warning For Leaving Operator's Seat (09654-03001)

To avoid hitting unlocked operation levers, lower equipment to ground and move SAFETY LOCK LEVER (located near seat) to LOCK position before standing up from operators seat.

Sudden and unwanted machine movement can cause serious injury or death.



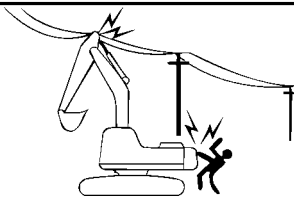
4. Warnings For High Voltage (09801-03001)

Hazardous voltage hazard.

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

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

⚠ DANGER



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

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

09801-03001

5. Caution For Operating Pattern (09822-03000)

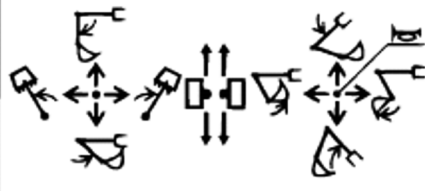
In order to prevent an accident resulting in injury or death caused by error-operation, confirm the machine motion and indicated operating pattern, when operating machines. Pay attention to the circumference and operate slowly when confirming the machine motion.

ISO pattern

⚠ WARNING

In order to prevent an accident resulting in injury or death caused by error-operation, confirm the machine motion and indicated operating pattern, when operating machines. Pay attention to the circumference and operate slowly when confirming the machine motion.

ISO pattern



09822-03000

SAFETY

6. Caution When Opening Or Closing Front Window (09839-03000)

To open or close the front or ceiling window, never stand up from the operator's seat before throwing the safety lock lever to the LOCK position.

Inadvertently touching any of the working equipment control levers might cause the machine to start moving all of a sudden, probably resulting in serious injury.



WARNING

To open or close the front or ceiling window, never stand up from the operator's seat before throwing the safety lock lever to the LOCK position.

Inadvertently touching any of the working equipment control levers might cause the machine to start moving all of a sudden, probably resulting in a serious injury.

09839-03000

7. Caution When Stowing Front Window (09803-03000)

When raising window, lock it in place with lock pins on both sides.

Falling window can cause injury.



WARNING

When raising window, lock it in place with lock pins on both sides.

Falling window can cause injury.

09803-03000

8. Caution For High-temperature Hydraulic Oil (09653-03001)

Hot oil hazard.

To prevent hot oil from spurting out:

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



WARNING

Hot oil hazard.

To prevent hot oil from spurting out:

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

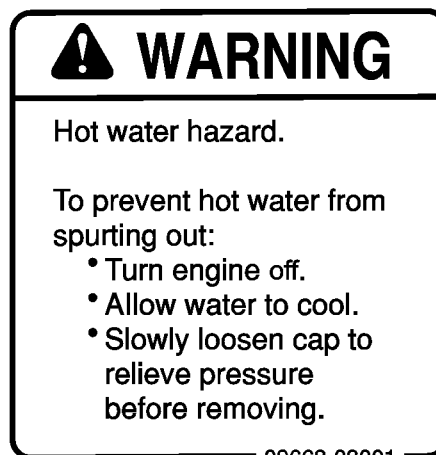
09653-03001

9. Caution With High-temperature Coolant (09668-03001)

Hot water hazard.

To prevent hot oil from spurting out:

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



09668-03001

10. Caution For Handling Accumulator (09659-53000)

Explosion hazard

- Keep away from flame.
- Do not weld or drill.

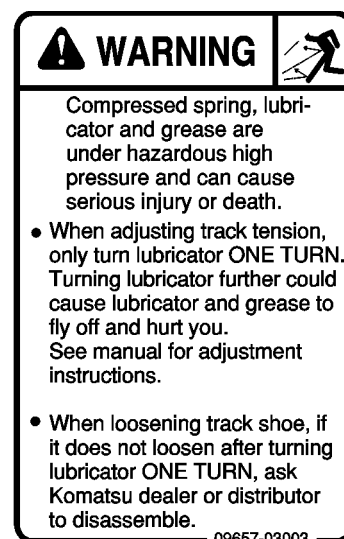


09659-53000

11. Caution For Check And Adjust Track Tension (09657-03003)

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

- When adjusting track tension, only turn lubricator ONE TURN. Turning lubricator further could cause lubricator and grease to fly off and hurt you. See manual for adjustment instructions.
- When lubricating track shoe, if it does not loosen after turning lubricator ONE TURN, ask Komatsu dealer or distributor to disassemble

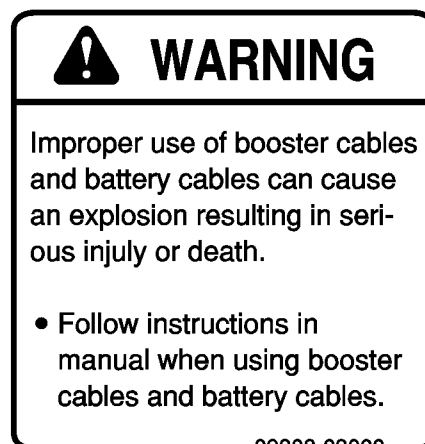


09657-03003

12. Caution For Handling Electric Wires (09808-03000)

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

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



09808-03000

SAFETY

13. Caution For Opening Engine Hood (09667-03001)

While engine is running:

1. Do not open cover.
2. Keep away from fan and fan-belt.



14. Explanation For Emergency Escape (20Y-00-31170)

PULL RING AND REMOVE RUBBER

PUSH CORNER OF GLASS STRONGLY



15. Safety Precautions (09805-23000)

KEEP AWAY FROM EDGE



16. Safety Precautions (09805-13000)

NEVER be on this hood



17. Prohibited To Enter Within Swing Range (09133-23000)

Keep off swing area



CNC1914

18. Beware Of Work Equipment (09134-A1681)

Decal indicates a hazard of being hit by the work equipment or machine.

Keep away from machine during operation.



19. Warning When Handling Battery (14X-98-11370)

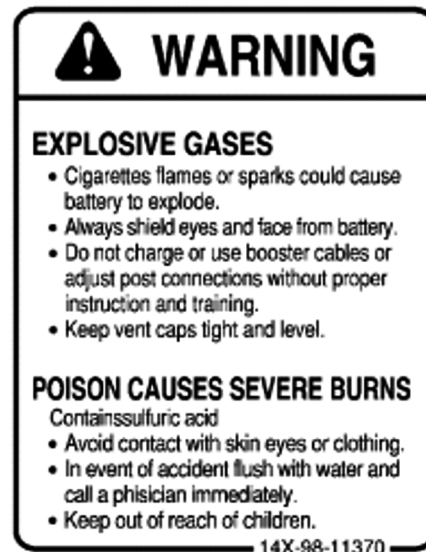
EXPLOSIVE GASSES

- Cigarettes flames or sparks could cause battery to explode.
- Always shield eyes and face from battery.
- Do not charge or use booster cables or adjust post connection without proper instructions and training.
- Keep vent caps tight and level.

POISON CAUSES SEVERE BURNS

Contains sulfuric acid

- Avoid contact with skin eyes or clothing.
- In event of accident flush with water and call a physician immediately.
- Keep out of reach of children.



20. Jump Start Prohibited (09842-A0481)

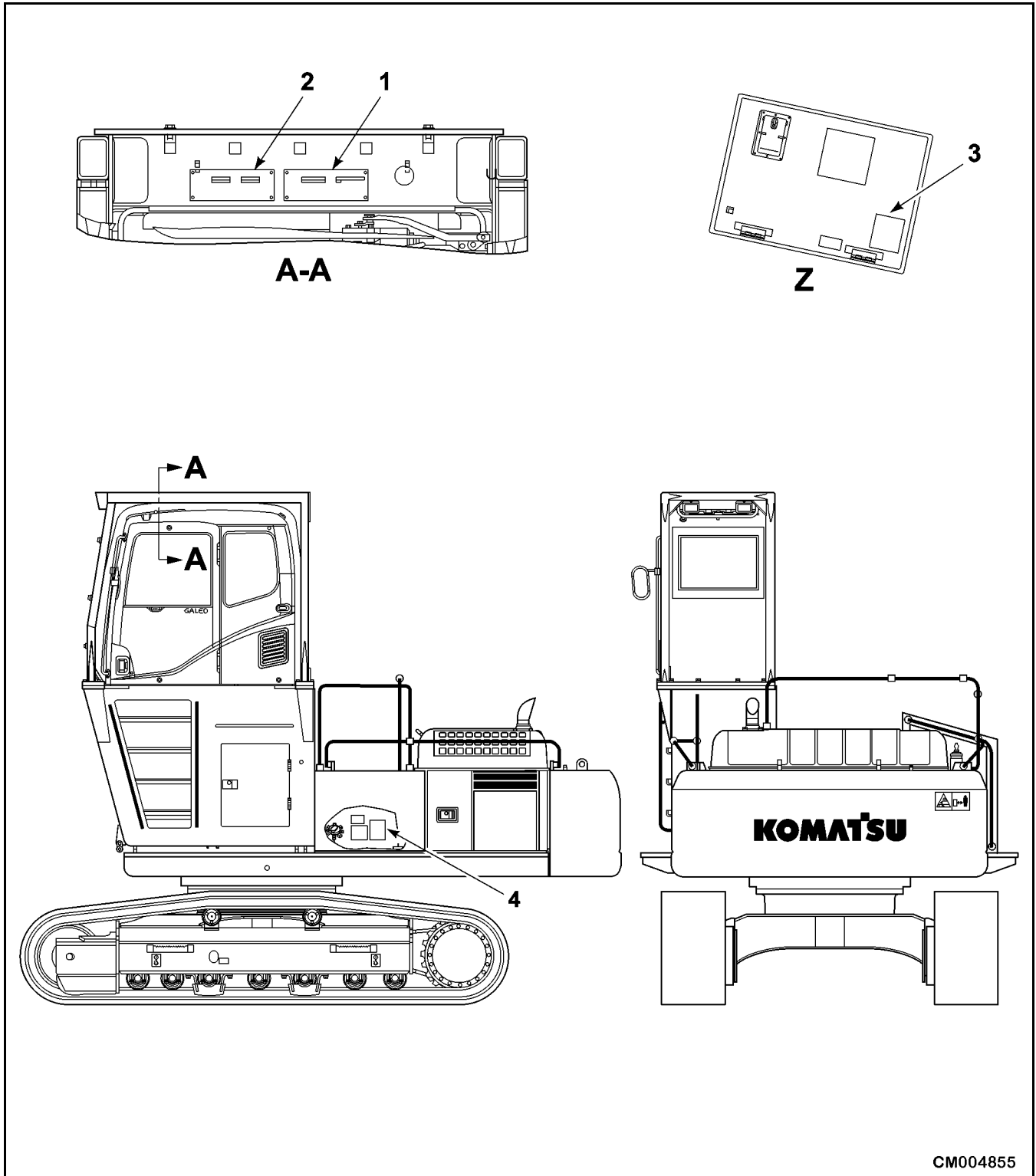
Start the engine only after sitting in the operators seat using the ignition switch.

Do not attempt to short circuit the starter motor to start the machine.

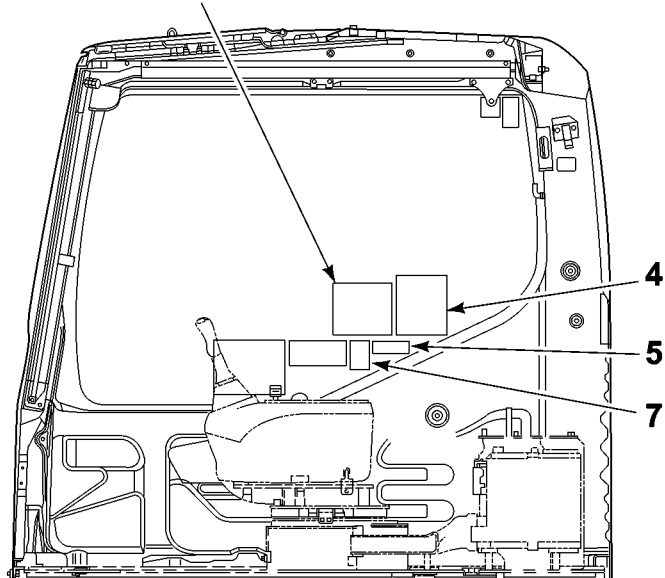
Doing so may cause serious injury or even death.



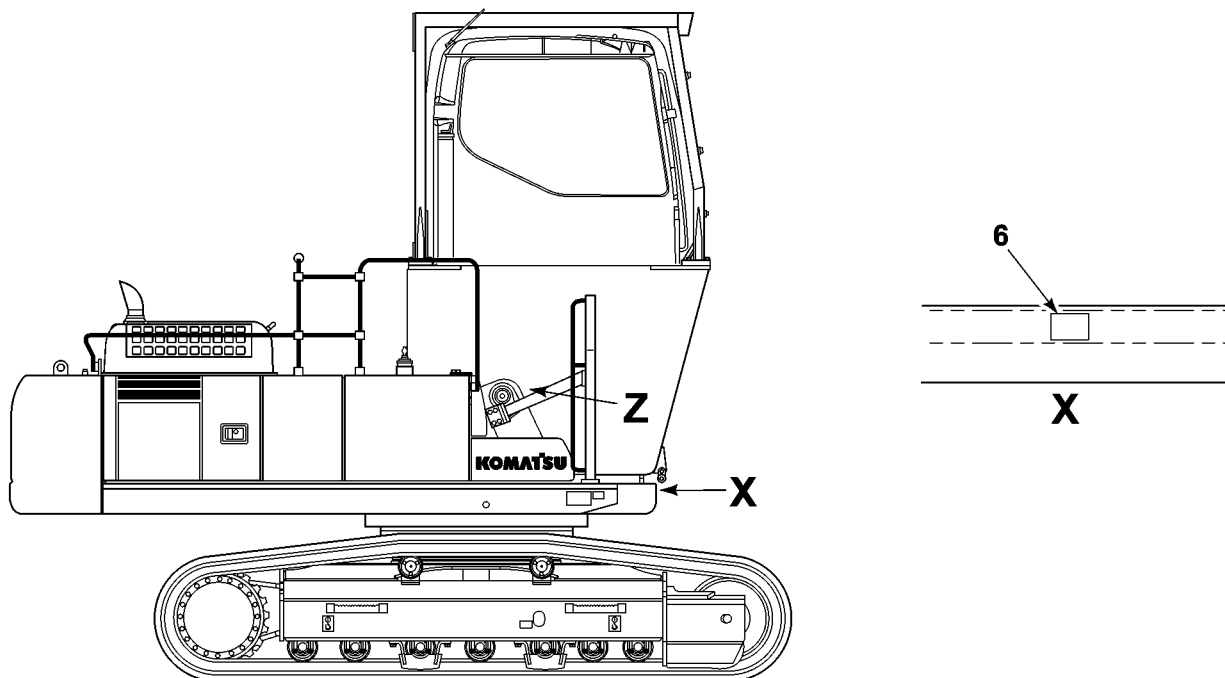
Unique Safety Decals for Log Loader and Road Builder Excavators



**ROAD BUILDER 9 OR
LOG LOADER 8**



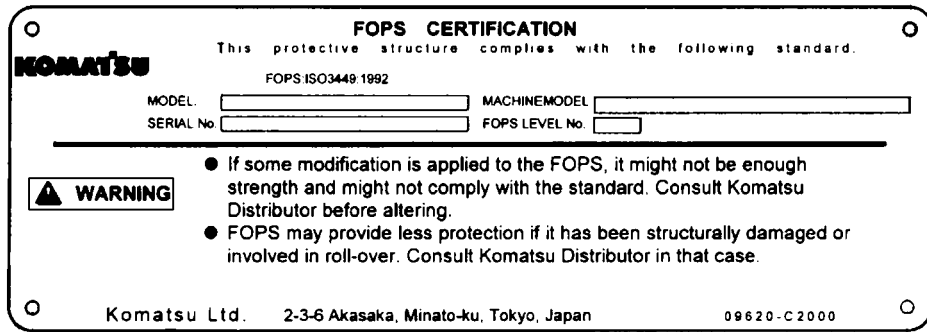
RIGHT SIDE OF OPERATOR CAB INTERIOR



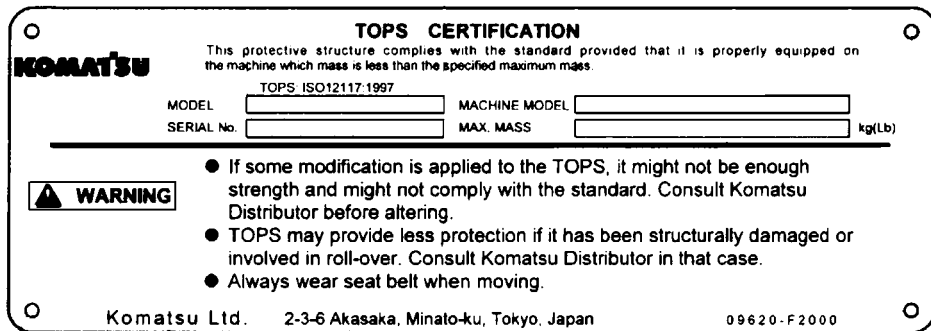
CM004856

SAFETY

1. FOPS plate (09620-C2000)

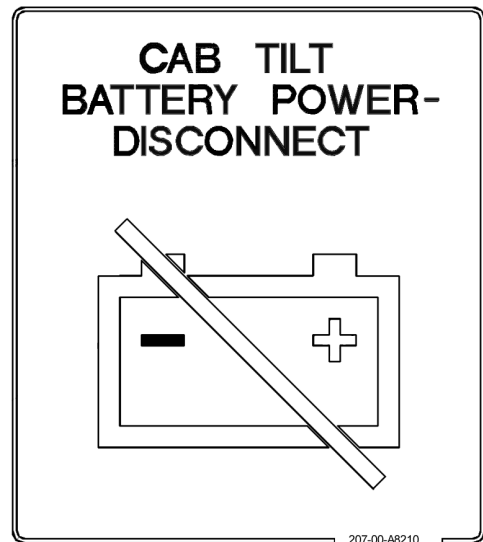


2. TOPS plate (09620-F2000)



3. Cab tilt battery power-disconnect (207-00-A8210)

(For 48 or 60 inch riser)



4. Cab tilting procedure (207-00-A8220)

(For 48 or 60 inch riser)

CAB TILTING PROCEDURE

1. PARK MACHINE ON LEVEL GROUND, LOWER ATTACHMENT, AND STOP THE ENGINE.
2. SECURE ANY LOOSE OBJECTS IN THE CAB AND RISER.
3. REMOVE THE SIX CAB RISER MOUNTING BOLTS AND INSTALL THEM IN THE STORAGE NUTS NEAR THE BOLT HOLES.
4. TURN ON THE CAB TILT BATTERY DISCONNECT SWITCH LOCATED IN THE BATTERY BOX.
5. OPEN THE LEFT SIDE MACHINE DOORS AND MOVE THE CAB TILT SWITCH TO THE DOWN POSITION TO TILT THE CAB FORWARD.
6. IF CAB IS TILTED FOR AN EXTENDED PERIOD OF TIME OR THE MACHINE WILL BE SHIPPED OVER ROUGH GROUND, INSTALL THE RIGID SHIPPING BAR.
7. RETURN CAB TO THE UPRIGHT POSITION BY MOVING THE CAB TILT SWITCH TO THE UP POSITION.
8. TURN OFF THE CAB TILT BATTERY DISCONNECT SWITCH.
9. REPLACE THE SIX CAB RISER MOUNTING BOLTS AND APPLY PROPER TORQUE.

207-00-A8220

5. To prevent injury or machine damage (207-00-A8230)

(For 48 or 60 inch riser)

WARNING

To prevent INJURY or MACHINE DAMAGE, do not operate machine with cab riser hold down bolts removed.

207-00-A8230

6. To prevent severe injury or death (207-00-A8240)

(For 48 or 60 inch riser)

WARNING

TO PREVENT SEVERE INJURY OR DEATH
KEEP A SAFE DISTANCE WHEN CAB TILT
FUNCTION IS IN USE.

207-00-A8240

SAFETY

7. To prevent severe injury or death (207-00-A8270)

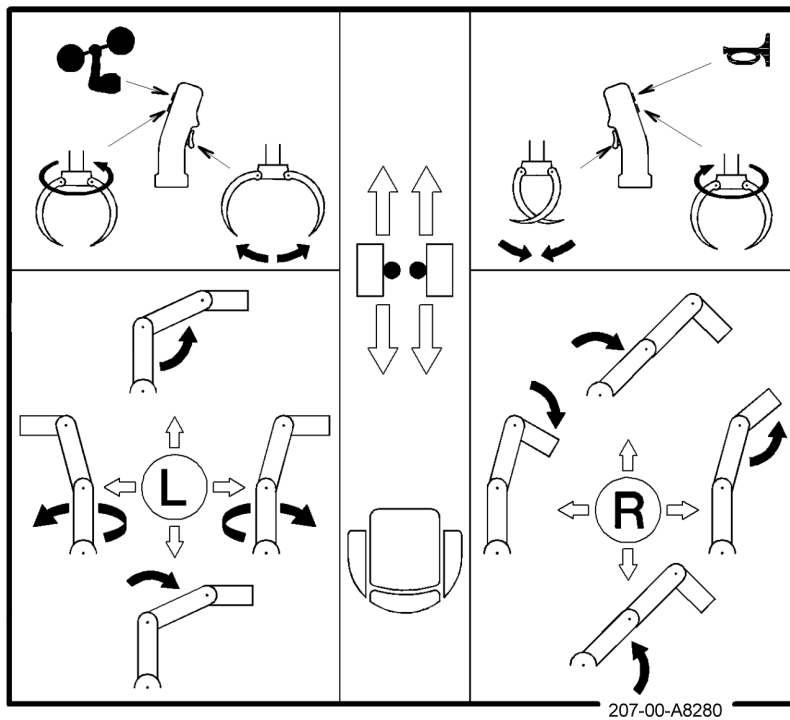
WARNING

To prevent SEVERE INJURY or DEATH, follow instructions below:

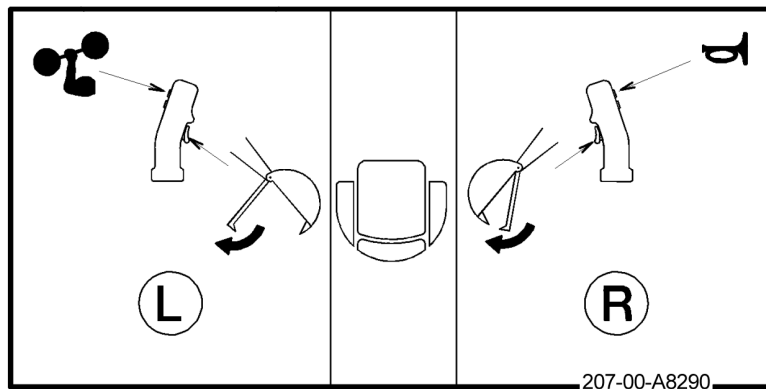
- Don't operate with windows open.
- Don't operate without window guards installed.

207-00-A8270

8. Log loader operation decal (207-00-A8280)



9. Road builder operation decal (207-00-A8290)



GENERAL SAFETY RULES AND PRECAUTIONS

General Safety Rules

Only trained and authorized personnel shall be allowed to operate and service this machine.

Before operating this machine it is important to study the operator's manual thoroughly and become familiar with all controls and safety decals. Keep this manual with your machine at all times for easy and quick reference.

Safety must always be the operator's most important concern. Never operate a machine that is unsafe or in poor operating condition.

Always perform a pre-operational check on your machine before operating it.

If the machine is equipped with a seat belt and rollover protective structure, OSHA law requires the operator remain within the confines of the rollover protective structure, with the seat belt fastened snugly around their waist before operating the machine.

OSHA law states if your equipment is designed for operation by one person, it is for one person only, never allow other personnel to ride on your machine.

Never leave your machine running and unattended. Always park the machine in a level area, lower any work equipment to the ground, set the parking brake, lock the controls and turn the engine off before exiting the operator's compartment.

Be sure that all personnel are at least 12 m (40 ft) away from any point on the machine before moving or operating the machine. Never allow anyone to stand near the machine while in operation. Remember, the larger the machine the more restricted your visibility will be.

If pedestrians are in the area proceed slowly and sound your horn. Keep in mind, pedestrians have the right away, and a loaded or smaller machine has the right away over an unloaded machine.

Never use your machine for tasks it was not designed for, damage to the machine or injury to the operator may result.

Follow all safety rules, precautions, and instructions when operating or performing maintenance on the machine.

It is the owner's and /or operator's responsibility to replace any safety or warning decals if they are defaced or removed from the machine.

Think before you act, study the job carefully. Careful operators and service personnel are the best insurance against accidents.

The operator of this machine must be alert, physically fit, and free from the influences of alcohol, drugs or medications that might affect their eyesight, hearing, or reactions.

When working with another person on a work site, or during traffic control, be sure all personnel involved understand all hand signals that are to be used.

When leaving a job site for long periods of time always lower all work equipment to the ground, neutralize work equipment controls and lock and secure your machine properly to avoid tampering by other personnel.

Never drive up to anyone standing in your path of travel. Always be sure all personnel are standing to the side when you approach them and acknowledge your approach.

Follow all rules relating to safety as outlined in this manual and by your company, never get involved in horseplay.

SAFETY

Unauthorized Modifications

If this machine is modified without permission from Komatsu, there is a danger that problems may occur with safety that may lead to serious personal injury.

Modifications may have an adverse effect on items such as machine strength and visibility.

Before making any modifications, please consult your Komatsu distributor. Komatsu cannot take any responsibility for accidents, failures, or damage caused by modifications not authorized by Komatsu.

General Safety at Job Site

- Before starting operations, thoroughly check the area for any unusual conditions that could be dangerous.
- Know your location to report an accident or fire. In case of an emergency, have a local emergency phone number available.
- Be careful when operating around or near open burning operations.
- Maintain the fire extinguisher on the machine and a second one at the job site.
- Keep the machine clean, especially from flammable materials such as trash, grease, oil or fuel.
- Keep all safety equipment in good working condition.
- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation.
- Do not operate where there is a hazard of landslides or falling rocks.
- If water lines, gas lines, or high-voltage electrical lines may be buried under the worksite, contact each utility company and have them identify their locations.
- Take action to prevent unauthorized people from approaching the job site.
- When working on public roads, position flagmen and erect barriers to ensure the safety of passing traffic and pedestrians.
- When traveling or operating in shallow water or on soft ground, check the shape and condition of the bedrock, and the depth and speed of flow of the water before starting operations.
- Conduct periodic safety training and familiarize all personnel with emergency procedures.

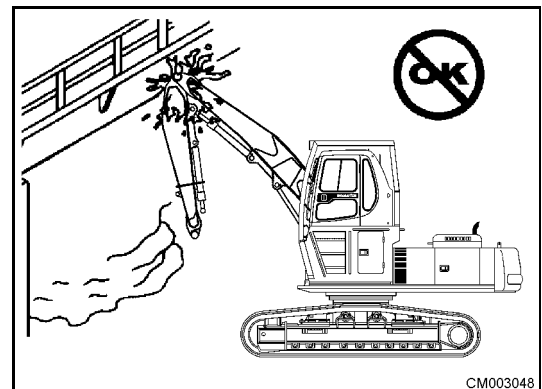
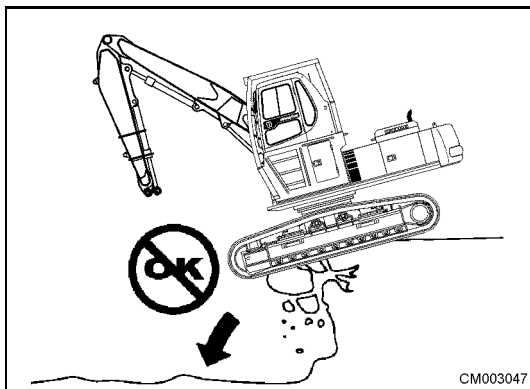
Working on Loose Ground

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 is loose after heavy rain or blasting or after earthquakes.

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.



Safety Features

Be sure all guards and covers are in place especially after servicing the machine.

Have guards or covers repaired immediately if they are damaged. See “Starting the Engine” on page 2-92.

Use safety equipment such as safety locks and seat belt properly.

Never remove any safety features. Always keep them in good operating condition.

Always secure the machine in a safe position: See “Parking Machine” on page 2-115.

Seat belt: See “Inside Operator’s Compartment” on page 1-22.

Improper use of safety features could result in serious bodily injury or death.

Be sure the machine has the correct equipment required by local rules and regulations.

Personal Protective Equipment

If your machine is equipped with safety equipment OSHA law requires this equipment to be used when operating your machine.

Avoid loose fitting clothing, jewelry and loose long hair. These can catch on controls or in moving parts and cause serious injury.

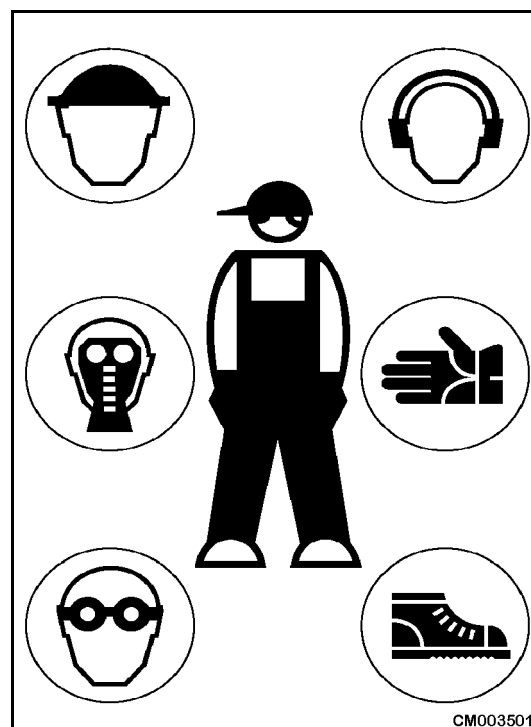
Wear a hard hat, safety glasses, safety shoes, mask or gloves when operating or maintaining the machine.

Always wear safety goggles, hard hat and heavy gloves, if your job involves driving pins with a hammer or cleaning the air cleaner element with compressed air.

Check to be sure no one is near your work area.

Check to be sure all personal protective equipment are in good condition before using.

If you will be subject to loud noise always wear ear protection.



Fire and Explosion Prevention

Fuel and oil are flammable. Fuel is particularly flammable and can be hazardous. Always observe the following:

- Keep any open flames, airborne sparks or burning embers away from flammable fluids.
- Stop the engine and do not smoke when refueling.
- Tighten all fuel and oil caps securely.
- Refueling or adding oil should be made in well ventilated areas.
- Clean up any fluid spills.



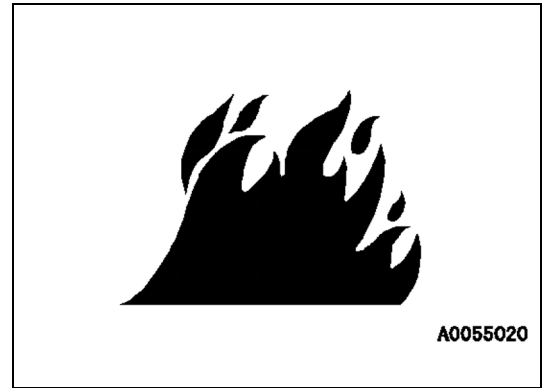
SAFETY

Fire Caused by Fuel or Oil

Fuel and oils 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.
- Always inspect around the entire fuel tank for leaks and seepage, clean or repair if needed.
- Inspect fuel system for leak or seepage, this includes fuel lines, filters and injection system, clean or repair if required.
- 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, wood chips, pieces of paper, wood dust, or any other flammable materials accumulated or affixed around the engine, exhaust manifold, muffler, air cleaner or battery, or inside the undercovers.
- Be aware that operations such as logging, mulching, clearing, and landfill work may cause trash and debris to accumulate on the machine. Always remove accumulated trash and debris on a daily basis.
- Clean the machine after servicing the hydraulic system, engine or fuel system.
- Operations near burn piles or other open burning may cause airborne sparks or glowing embers to cause a fire on the machine.

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 to the wire insulation.

- Tighten any loose connectors or wiring clamps.
- Repair or replace any damaged, pinched or chaffed wiring.
- After market radios or other electrical operated equipment in the cab must be fused close to the power supply.

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.
- Check for oil leaks daily and repair them immediately.

Windshield Washer Fluid

- Use an automotive type washer fluid in the windshield washer system.
- Never use flammable fluids in the windshield washer system

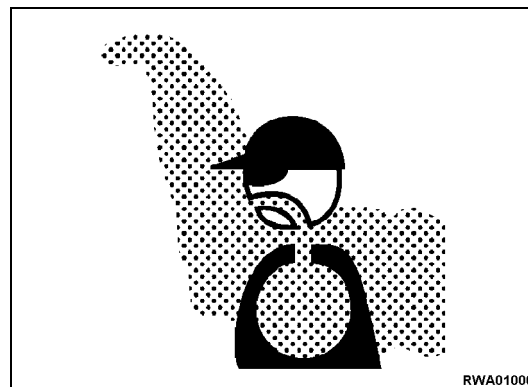
Action if Fire Occurs

- If a fire occurs, escape from the machine as follows:
- Do not attempt to move the machine or continue operations.
- Turn the start switch OFF to stop the engine.
- Use the handrails and steps to get off the machine.
- Immediately call for help.
- When using a fire extinguisher, always aim the extinguisher at the base of the fire.
- If an optional fire extinguishing system is in place be finality with it's operating procedures.

Dust Hazard Precautions

Dust can be hazardous to your health if inhaled. Komatsu does not use asbestos in its products. There is a danger imitation products may contain asbestos. If you have to handle materials containing asbestos fibers or other dust materials during demolition operations, always do as follows.

- Never use compressed air for cleaning.
- Use water to keep down the dust when cleaning.
- If there is a danger there may be asbestos dust in the air, operate the machine with the wind to your back whenever possible.
- Use an approved respirator.
- Do not allow any other person into the area during operation.

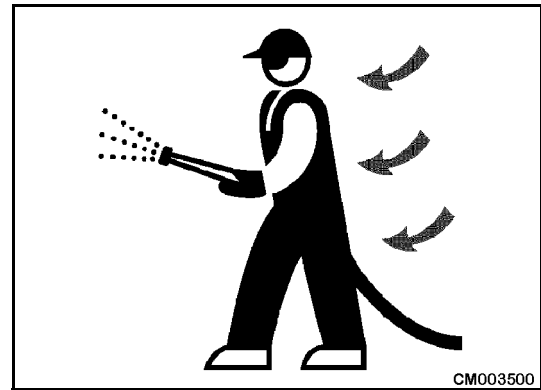


SAFETY

Asbestos Hazard Alert

Asbestos or silica based dust in the air can cause lung cancer if they are inhaled. There is danger of inhaling asbestos or silica based materials when working on jobsites doing demolition work or 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 or silica based 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.

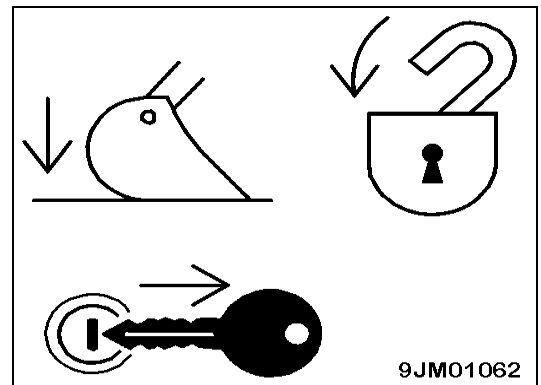
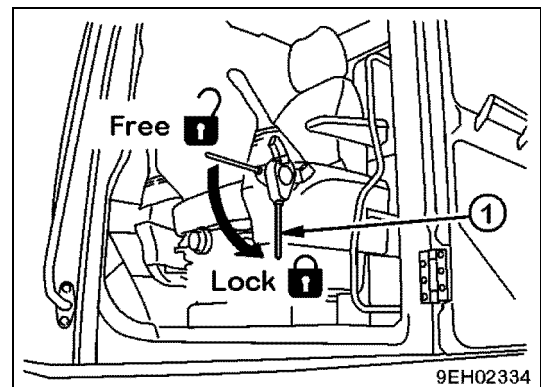


Keep Operator's Compartment Clean

- 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 on your shoes, your foot may slip and this may cause an accident.
- Do not leave parts or tools lying around the operator's compartment.
- 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 control levers when they are not locked, there is a hazard that the machine may suddenly move and cause serious injury or property damage.
- When leaving the machine, always lower the work equipment completely to the ground, set safety lock lever 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.



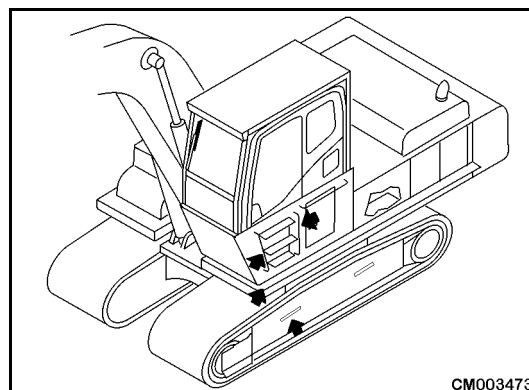
Mounting and Dismounting

When mounting or dismounting this machine, always be sure the work equipment is fully lowered to the ground and the engine is OFF.

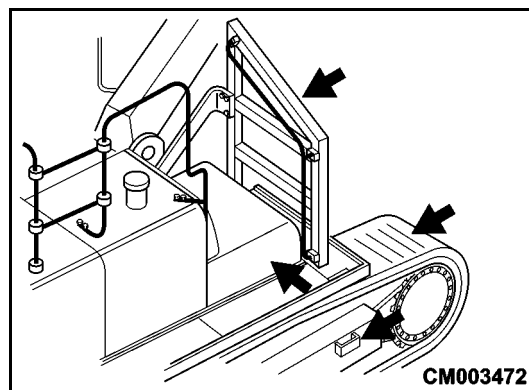
- Use all hand holds and step plates on your machine.
- Never jump off or on to the machine.
- Before getting on the machine, if there is any oil, grease, or mud on your shoes, rails, steps or platforms, wipe it off immediately, always keep these areas clean, and in good condition.

- Never get on or off a moving machine. These actions may lead to serious injury. Always bring the machine to a full stop.
- Be sure machine is at a full stop, equipment lowered and parking brake set before entering or exiting machine.
- Never use controls or non specified mounting points to get on the machine.
- Never climb on areas of the machine that are not designated walk areas.
- Never mount or dismount the machine with tools or similar objects in your hands.

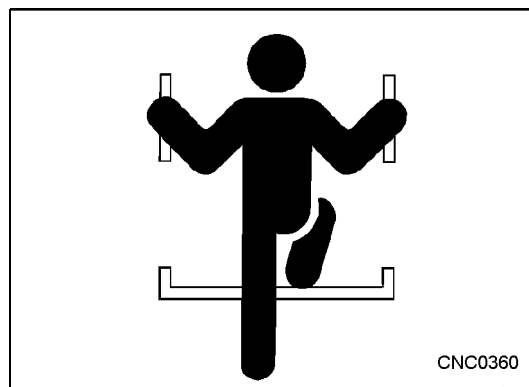
When getting on or off the machine, always face the machine and maintain a **Three Point Contact** (both feet and one hand or one foot and both hands) with the handrails, steps and platforms to ensure that you support yourself properly.



CM003473



CM003472

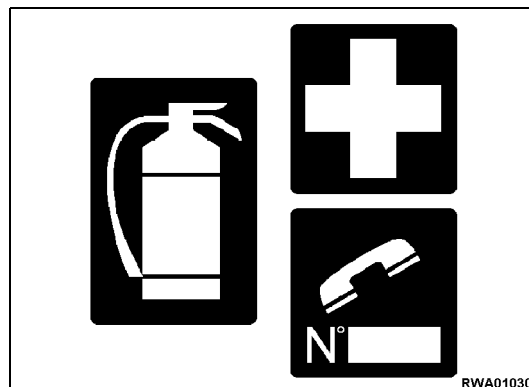


CNC0360

Fire Extinguisher and First Aid Kit

As a precaution if a fire or an injury should occur, always keep a fire extinguisher and first aid kit on your machine and do as follows:

- Be sure that fire extinguisher is in good condition and read the label on it to ensure you know how to use it.
- Keep a first aid kit in the storage area. Check the kit periodically and make any additions if necessary.
- Keep a list of emergency phone numbers in case of an accident.



RWA01030

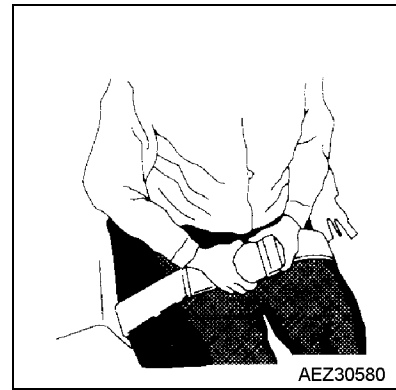
SAFETY

Inside Operator's Compartment

When entering the operator's compartment, always remove mud and oil from the soles of your shoes. If you operate the brake pedal with mud or oil on your shoes, your foot may slip and may cause an accident.

After using the ashtray, make sure matches or cigarettes are properly extinguished and be sure to close the lid. If the ashtray is left open, there is danger of fire. Do not leave lighters or aerosol cans lying around the operator's compartment.

Do not use cellular telephones inside the operator's compartment when driving or operating the machine.



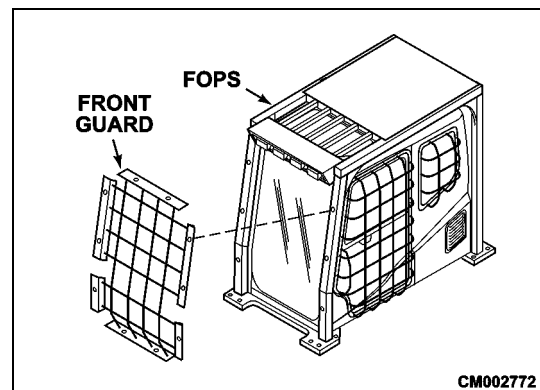
After market radios or other electrically operated equipment in the cab must be fused close to the power supply.

Never bring any dangerous objects such as flammable or explosive items into the operator's cab. To ensure safety, do not use the radio or music headphones when operating the machine. Keep the operator's compartment clean, never allow trash or tools to accumulate, these may hinder the operation of the controls or pedals.

When operating the machine, do not put your hands or head out of the window or beyond the protection of the OPG (Operators Protective Guard). Always use the seat belt equipped with your machine. Be sure the seat belt is fastened snugly around your waist before operating the machine.

Protection Against Falling or Flying Objects

- On job sites where there is danger that falling or flying objects may hit the operators cab, select a guard to match the operating conditions in order to protect the operator.
 - When carrying out cutting operations, install a front guard and top guard, and stick a laminated coating sheet to the front glass.
 - When carrying out the above operations, always close the front window. In addition, always ensure that everyone apart from the operator is a safe distance away and is not in danger from failing or flying objects. Be careful to keep all people at a good distance during cutting operations.
 - 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 job site.
 - Always contact your distributor for advice before starting operations. If the glass on the work equipment side is broken, replace it with new glass immediately. If you put your hand out, it may get caught in the work equipment and this may lead to serious personal injury.
 - The Komatsu FOPS fulfills the standards and regulations of all countries, but if it is damaged or deformed by failing objects or by the machine rolling over, its strength will be reduced and it will be unable to ensure its basic function.
- If such problems occur, please contact your distributor for advice about repairs.

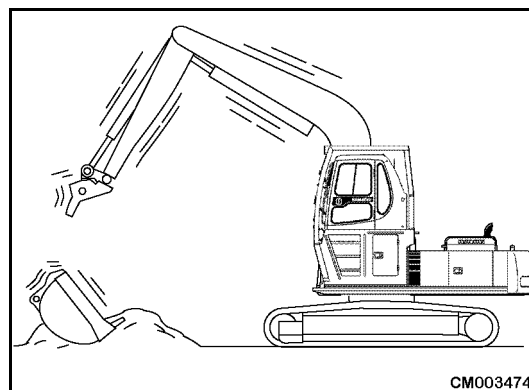


Precautions for Attachments

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

Quick Coupler Attachment

- Inspect all quick couplers to determine if they are subject to unexpected release hazards. Determine whether a manually installed locking pin and installation procedures have been provided by the manufacture.
- Follow the manufactures recommendations for maintenance and inspection of the quick coupler to prevent a malfunction of the quick coupler that could cause an unintended release of the attachment.
- Follow the manufactures installation procedures and recommendations on testing quick coupler attachments.
- Train and require all personnel to use and follow manufactures installation, use and maintenance procedures when using a quick coupler attachment.



Large Attachments and Combinations

When using an attachments that are larger than the standard digging bucket always be aware that these attachments may come in contact with the operators cab when the work equipment is retracted for travel purposes.

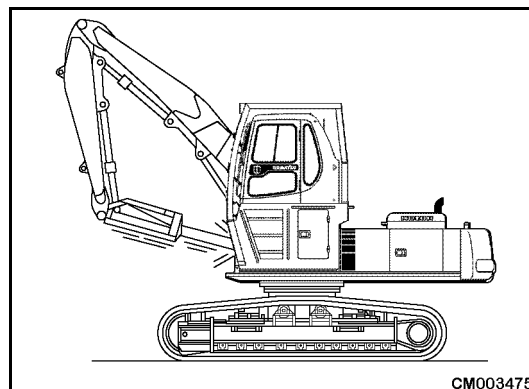
If you will be using a hoe-ram or breaker attachment never dry fire these attachments especially in the direction of the cab, the possibility of the tool bit ejecting from the breaker may damage the machine or injure the operator.

Depending on the type or combination of work equipment, there is a danger that the work equipment may hit the cab or other parts of the machine.

Before using unfamiliar work equipment, check if there is any danger of interference and operate with caution.

Never operate attachment or bucket near cab of machine.

Always be aware when operating on slopes or traveling, any attachment will change the center of gravity on the machine and increase the possibility of a rollover situation.



PRECAUTIONS BEFORE STARTING OPERATIONS

As an operator of the machine, you are responsible for the safe operation of the machine at all times regardless of the situation. Although KOMATSU cannot cover all operating conditions that pose a major hazard here are a few basic situations to avoid when using the excavator during work or travel operations. It is advised to study these and always be aware of them before starting your work operations. Failure to do so may result in damage to the machine or injury to the operator and other personnel.

Pre-operational Checks

Before starting your work operations it is important to perform a **Pre-operational Check** to be sure your equipment is in safe operating condition. If any problems are found during your Pre-operational Check, have them repaired immediately. Never operate a machine that is unsafe, damaged or in need of repair. Failure to perform a pre-operational check before starting work operations may result in damage to the machine or injury to the operator and other personnel.

Remark

It is important that a pre-operational check be performed at the beginning of your work shift, even if you are taking the machine operations over from another operator, always perform a pre-operational check before you start work.

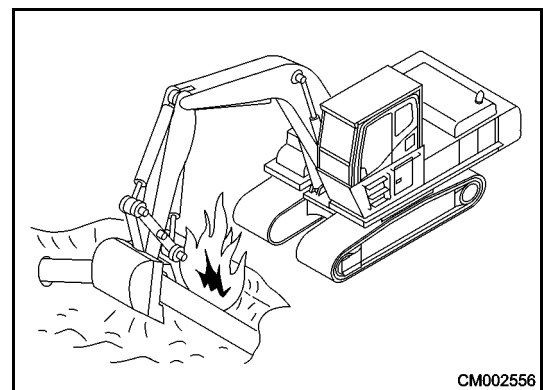
Starting Your Work Operations

- Before operating the machine, walk around it and check for people or objects that might be in the way.
- Do not start the engine if warning tags have been attached to the steering wheel or control levers.
- Sound your horn to warn others in the area before starting the engine or moving the machine.
- Operate the machine in a seated position only, with the seat belt fastened snugly around your waist.
- Do not allow anyone in the cab or on the machine during operations.
- Be sure all personnel are clear from your work site before starting any work operations.
- Inspect for damaged hoses which may leak or spray fluids.

Work Site Hazards

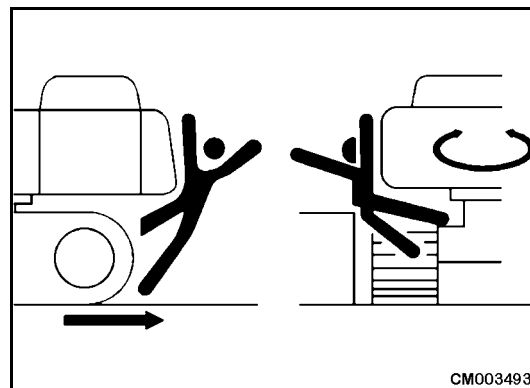
Before proceeding with any excavating operations it is important to be aware of the hazards involved with this operation. Below is a list outlining what to do to avoid some of these hazards.

- Before starting any excavating operations, contact all utility departments in your area and have them identify and mark any underground system locations, (gas lines, water lines, electrical lines, sewer lines, etc.).
- Check your work area for any unusual ground conditions.
- Make sure your work area is as level as possible and you will be able to maneuver your work equipment or machine easily.
- If you will be working near a high traffic area, (pedestrians or cars) have a dedicated worker available to direct traffic or install safety fencing around your work site.
- Always be aware of all your work site dangers or distractions.
- Always be aware of the worksite where open burning is allowed. Airborne sparks or glowing embers may cause fire on the machine.
- Operations such as logging, mulching, land clearing or landfill operations may cause trash and debris to accumulate on the machine. Remove debris or trash on a daily or more frequent basis as necessary to prevent fire.
- Always clean trash from the exhaust system compartments. The hot exhaust compartments may cause fire from contact with flammable material.
- Remove any leaves, wood chips, paper, wood dust or anything that could catch fire accumulated around the engine.

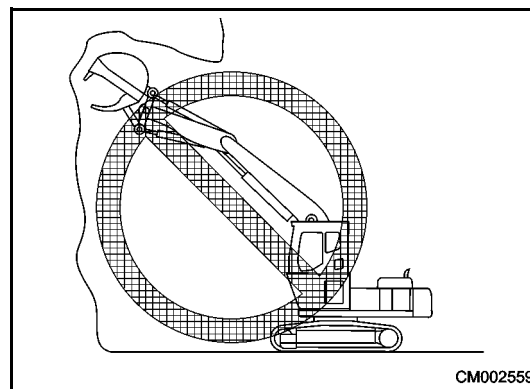


Avoiding Dangerous Situations

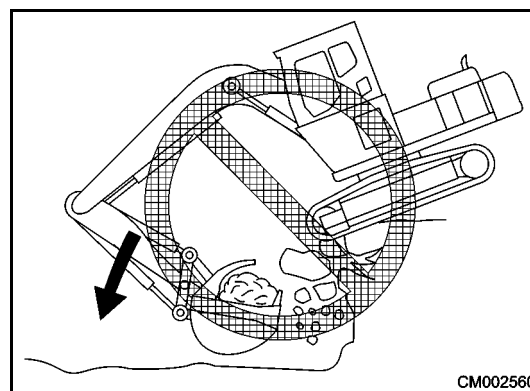
Always be aware of the swing circle area of the machine, especially in tight operating conditions. Never allow other personnel near your machine while in operation the possibility of hitting or pinning other personnel between the machine and another objects becomes greater the closer they are to your machine. Always maintain a clear and visible swing circle area during machine operations at all times.



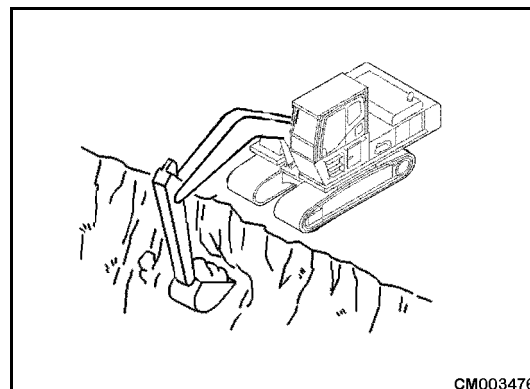
Never work under overhangs or excavated bank areas. These could collapse and damage the machine or injure the operator.



When excavating a trench, always be aware of the ground condition and never attempt to dig too close or under the machine, the possibility of the machine falling into the excavated site becomes greater the closer the excavation is to the machine.



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



SAFETY

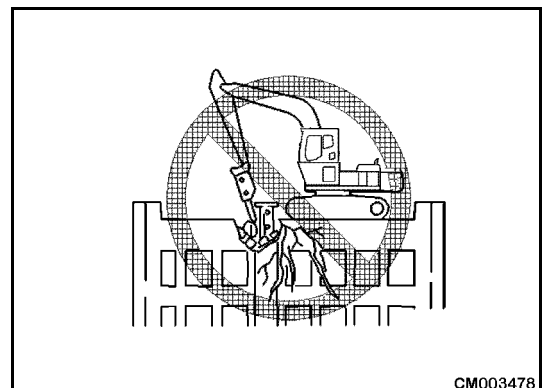
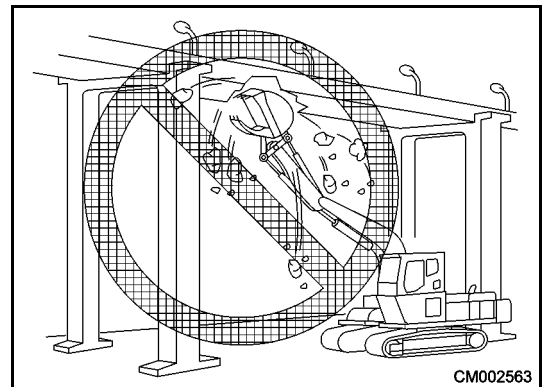
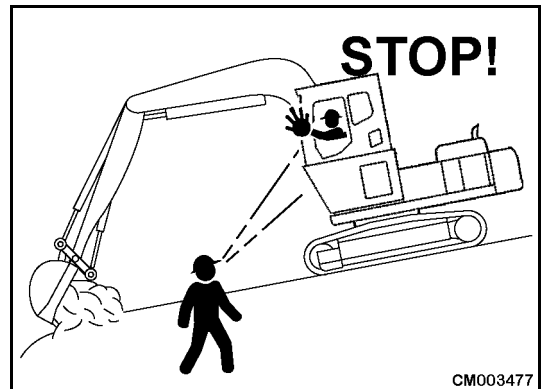
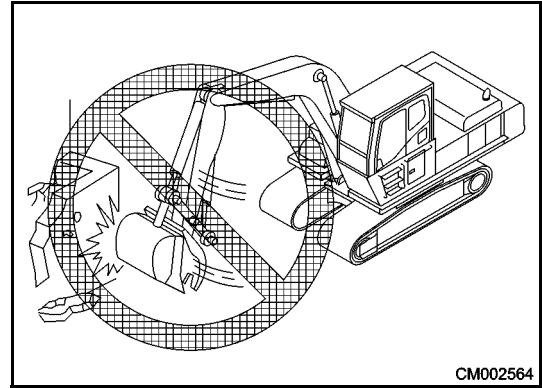
Always be aware of the work equipment distance when operating the machine especially in close quarter areas, the possibility of hitting objects with the bucket, boom or arm becomes greater when work operations are hurried. Never pass the work equipment over other personnel regardless of their locations, the possibility of falling objects may be fatal.

Never use the work equipment to strike an object damage to the machine or a rollover situation may result

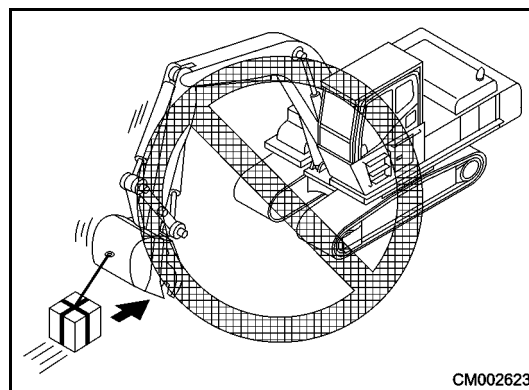
If someone should approach you while you are operating the machine, stop all operations immediately and signal them not to approach until the work equipment is lowered to the ground and it is safe for them to approach. Once they have approached, do not touch any of the machine controls until they are away from your work area and at a safe distance.

When carrying out demolition operations maintain a clear and safe location for the machine at all times, be aware of the falling objects drop zone. A collapsing building may cause serious damage to the machine or injure the operator always study the demolition procedure before performing the operation. Never allow anyone to stand near you during demolition operations.

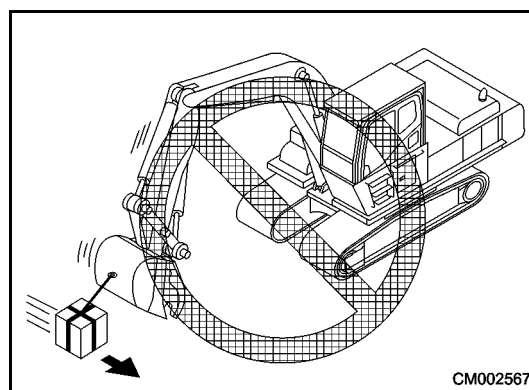
Do not carry out demolition work under the machine. This may cause a hazard as the machine could become unstable and tip over. When working on the top of buildings or other structures, check the support strength before starting operations. The support may collapse and cause serious injury or damage.



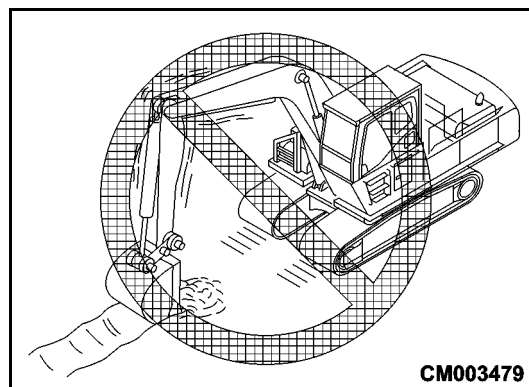
- Determine the signals to be used and place a signalman in position.
- To prevent the machine from tipping over or falling, carry out the operation on flat ground.
- To prevent the danger of contact with a raised load or the danger from a falling load, do not allow any worker inside the area.
- Do not exceed the specified lifting load.
- It is dangerous if the raised load hits any person or structure. When swinging or operating the work equipment, check carefully that the surrounding area is safe.



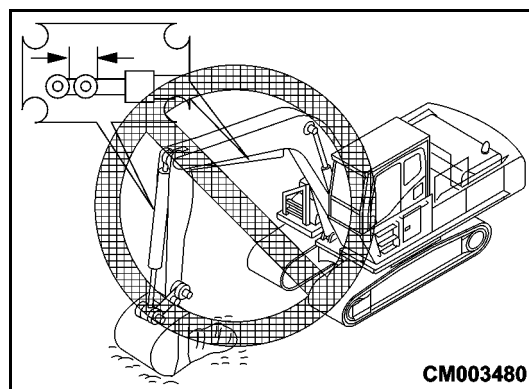
- Do not swing or operate the work equipment suddenly. There is danger that this may cause the load to sway and the machine to tip over.
- Do not leave the operator's seat when there is a raised load.
- Do not use the work equipment or swing to pull the load in any direction. There is danger that the hook may break and the load come off, causing the work equipment to move suddenly and cause personal injury.



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, cause loss of control or possibly injure the operator.

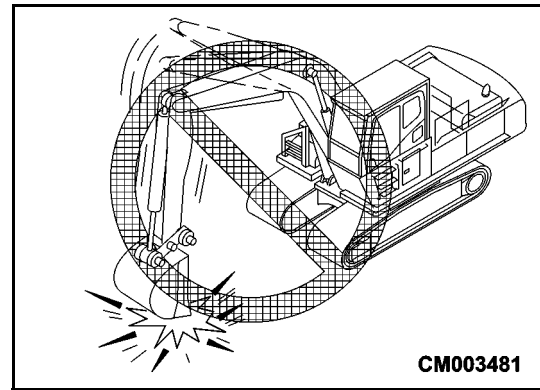


If the work equipment is used with the cylinder rod operated to its stroke end, and impact by some external force is applied, the hydraulic cylinders will be damaged and may causing personal injury. Avoid operations with the hydraulic cylinder fully retracted or fully extended.

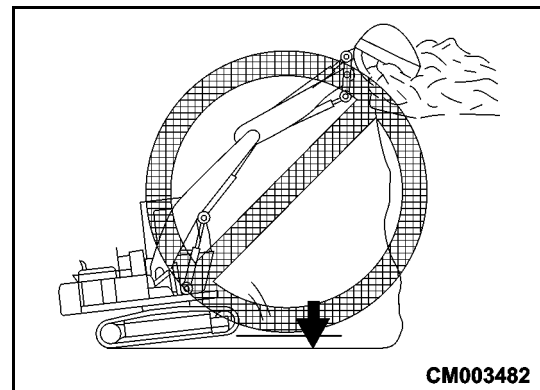


SAFETY

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 drastically reduce the life of the machine or could possibly cause injury to the operator.



Do not use the dropping force of the machine for digging or pulling materials from a high level. Damage to the machine or injury to the operator may result from falling material.

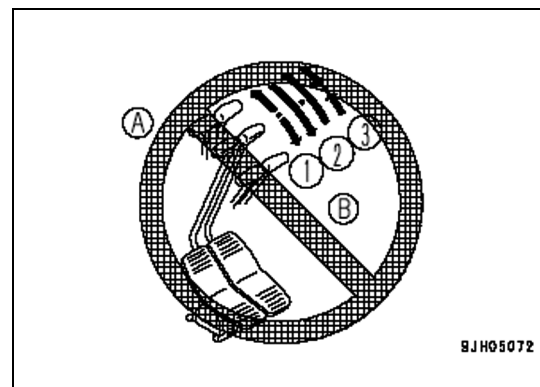


Digging Hard Rocky Ground

Do not attempt to directly excavate hard rocky ground with the work equipment. It is better to excavate it after breaking it up by some other means. This will not only save the machine from damage but will make for better economy.

Sudden Lever Shifting High Speed Travel

- Never carry out sudden lever shifting, this may cause sudden starting.
- Avoid sudden lever shifting from forward (A) to reverse (B) (or from reverse (B) to forward (A) snapping).
- Avoid sudden lever shifting change such as sudden stopping from near top speed (lever release operation).



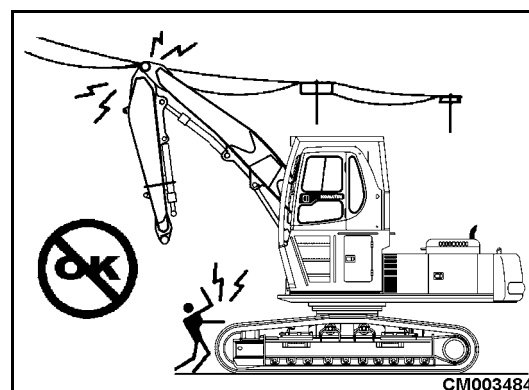
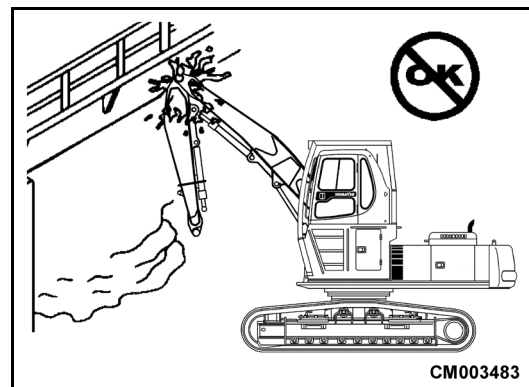
Working Clearances

It is always a good idea to be aware of your clearances around, in front, behind and especially above your work area or travel route.

Some basic safety precautions to prevent risk are:

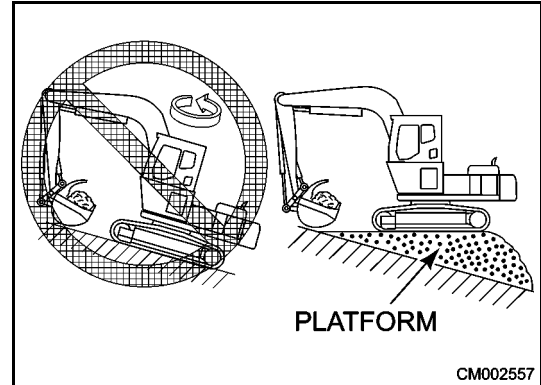
- When working or traveling in an area where clearances are a problem, travel at a slow cautious speed.
- If you are not sure of your clearances, request the aid of another person who can guide or warn you if you get too close to objects.
- Be aware of the dangers when working around overhead electrical lines, high humidity may pose an electrical hazard even if your machine clears the overhead power lines.
- If your machine should come in contact with overhead electrical lines, stop the machine and remain on the machine until the power company clears the lines and it is safe to get off or move the machine.
- If you must leave the machine, jump free of the machine (do not touch it) do not allow anyone on the ground to touch the machine.
- If low power lines pose a greater hazard, ask the power company to remove the lines until your work is finished.

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



Operations on Slopes

When working on slopes, there is a danger that the machine may lose its balance and roll over when the swing or work equipment is operated. This may lead to serious injury or property damage, always provide a stable place when carrying out these type of operations, and work 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.



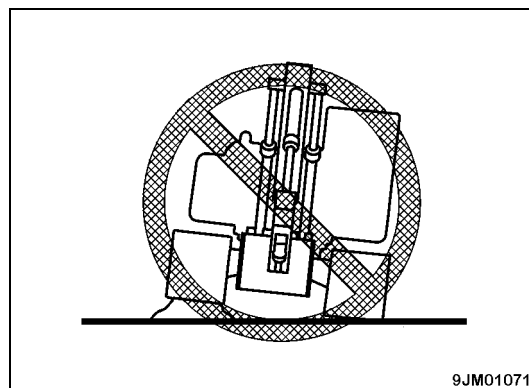
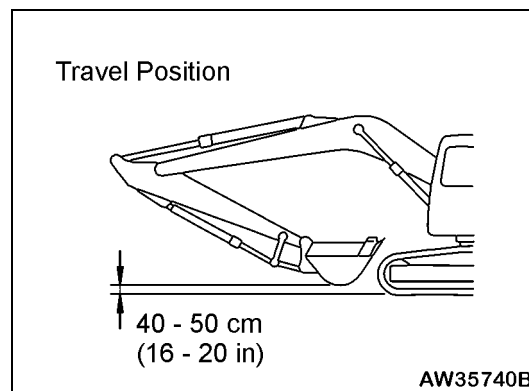
Operations on Snow

- 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.
- Frozen ground becomes soft when the temperature rises which may cause the machine to tip over.
- If the machine enters deep snow, 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.
- Be alert and careful when clearing snow. The road shoulder and objects buried in the snow beside the road may not be easily seen. The machine may hit covered objects and tip over.

RULES FOR ROAD TRAVEL

Traveling with your machine may pose some hazards. When traveling, always travel in a safe manor and remain alert at all times. A safety conscious operator is the most important insurance when traveling with the machine. Below are several situations and information the operator should be aware of:

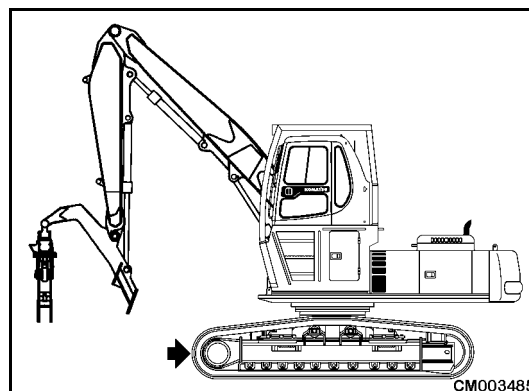
- When traveling on level ground, pull in the work equipment and keep it at a height of 40 to 50 cm (16 to 20 in) from the ground.
- When traveling on rough ground, travel at low speed and do not operate the steering suddenly since there is a danger that the machine may turn over. Also, be careful that the work equipment does not hit the ground surface and cause the machine to lose balance, damage the machine or other structures in the area.
- Always turn the auto-deceleration switch OFF (cancel) (if equipped) when traveling on rough ground or steep slopes. If the auto-deceleration is ON, the engine speed may accelerate and the travel speed may suddenly increase.
- Avoid traveling over obstacles or raised ground when possible. If the machine has to travel over an obstacle or uneven area, keep the work equipment close to the ground and travel at low speed. Never travel over obstacles which make the machine tilt sharply to one side.
- When traveling, always maintain a safe distance from people, structures, or other machines to avoid coming into contact with them.
- Check to be sure that bridges and structures are strong enough to support the weight of the machine before passing over them.
- When traveling on public roads, check with the relevant authorities and follow their instructions.
- When traveling in tunnels, under bridges, under electric wires, or other places with limited height, operate slowly and be extremely careful not to let the work equipment hit anything.



Traveling with Carriage Reversed

Traveling with the carriage reversed may pose several hazards, although not recommended. Below is a list of some basic rules to follow when traveling in reverse:

- Be aware that the travel controls will be working in the opposite direction.
- Before moving your machine check each control lever to verify its travel directional position.
- When operating in areas that may pose a hazard or has poor visibility, you may want to travel with the carriage in the normal position.

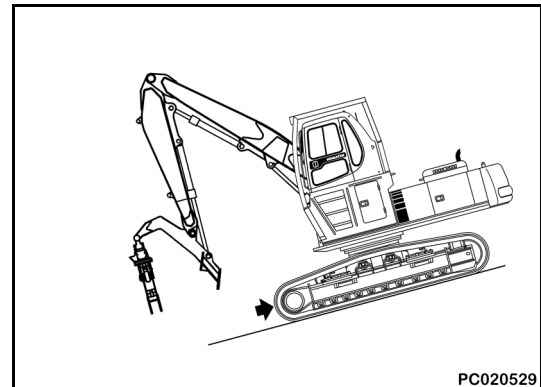
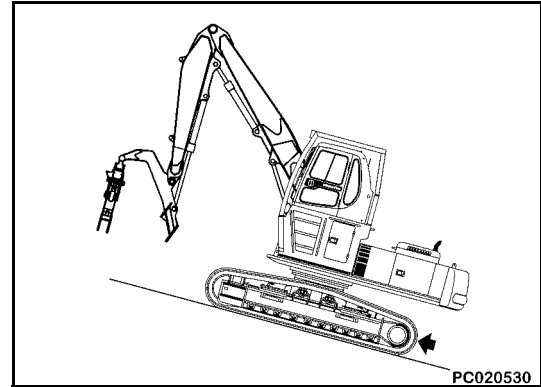


SAFETY

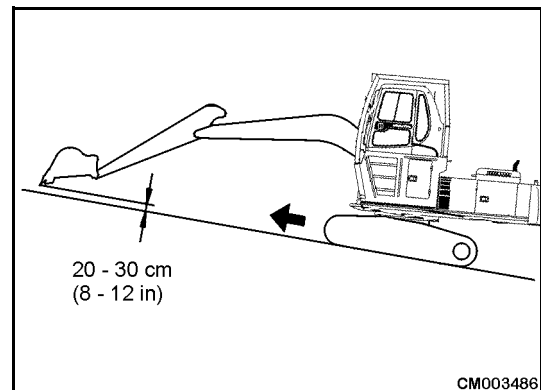
Travel on Slopes

Traveling on slopes may pose a hazard. In order to prevent tipping the machine or losing control it is important to follow some basic simple rules:

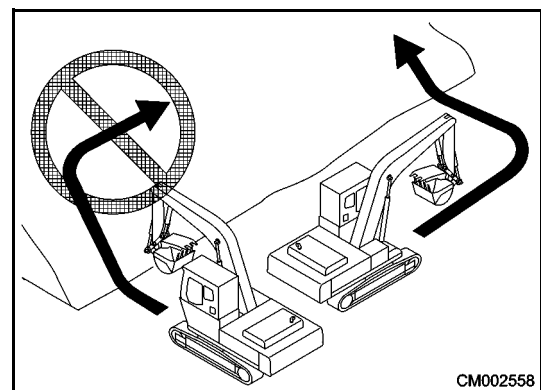
- Never turn the ignition key off when traveling up or down a slope. If the engine should stop, lower the work equipment to the ground immediately.
- Keep the work equipment approximately 20 to 30 cm (8 to 12 in) above the ground. In case of emergency, immediately lower the work equipment to the ground to help stop the machine.
- Face the operators cab uphill when traveling up slopes. When traveling down slopes, set the operator's cab facing downhill. Always check the firmness of the ground before traveling.



When traveling up a steep slope, extend the work equipment to the front to improve the balance. Keep the work equipment approximately 20 to 30 cm (8 to 12 in) above the ground, and travel at low speed. When traveling downhill, lower the engine speed, keep the travel at a low speed.



Always travel straight up or straight down a slope, traveling at an angle on a slope may cause the machine to tip or possibly rollover. Never turn on a slope, doing so may cause the machine to tip or rollover. Be extra cautious when traveling on grass or fallen leaves especially on a slope these hazards may cause the machine to slip.

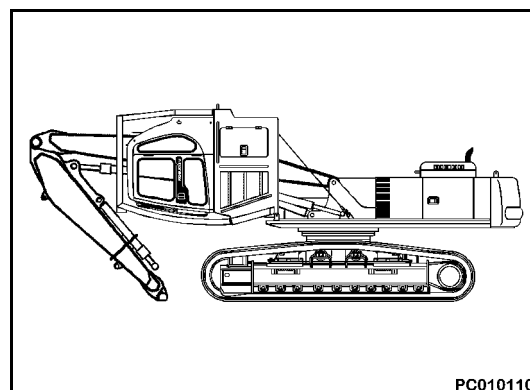
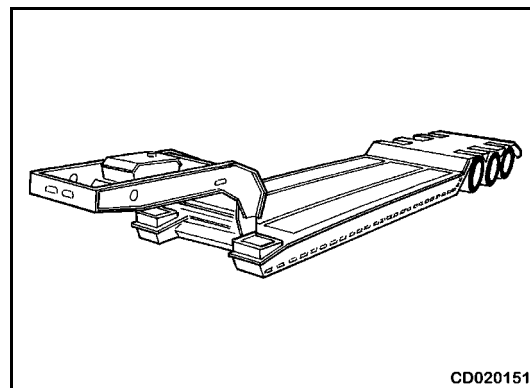


Shipping the Machine

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

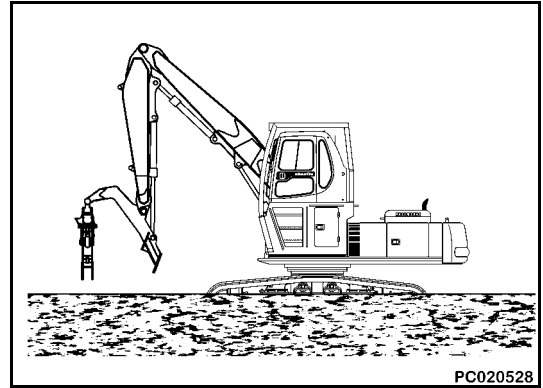
- Investigate all state and local laws governing the weight, width, and length of a load. If necessary, disassemble the work equipment. The width, height and weight of the load differ according to the work equipment, so take this into account when determining the shipping route.
- When passing over bridges 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.
- If the machine is equipped with the optional cab riser (48 inch and 60 inch tilting riser vs. 15 inch non-tilting riser), tilt the cab into its transportation position before transporting the machine. Additionally, if the shipping conditions require, replace the safety cable with the machine shipping bar before transporting the machine.

For details of the shipping procedure, See “TRANSPORTING THE MACHINE” on page 2-131.

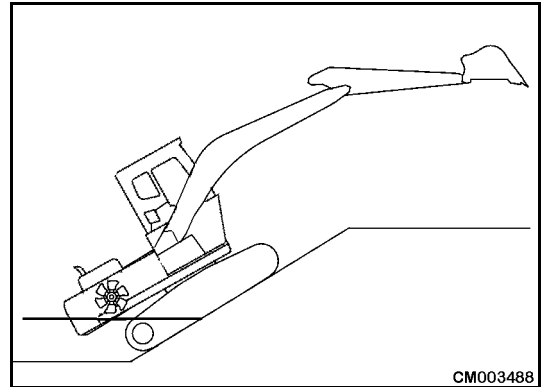


SAFETY

When traveling on soft ground or in shallow water check the condition of the bedrock, depth of the water and speed of the water flow before traveling in these conditions. Do not drive the machine in water deeper than the center carrier rollers (1).



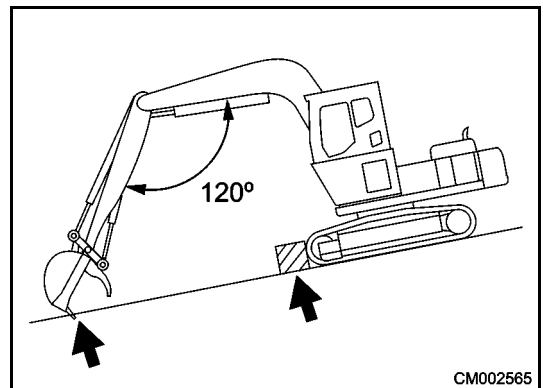
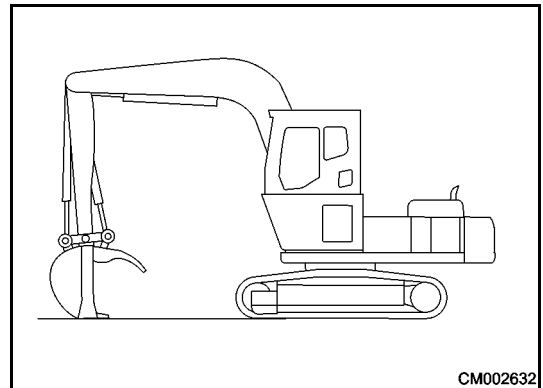
When driving the machine out of water, if the angle of the machine exceeds 15°, the rear of the upper structure will go under water, and water will be thrown up by the radiator fan. This may cause the fan to break. Be extremely careful when driving the machine out of water.



Parking the Machine

When parking the machine it is important to follow several basic safety rules. Keep in mind you are responsible for the security of the machine when it is parked. Below is a list of some basic rules to follow when parking your machine.

1. Always park the machine on a flat level location away from moving equipment, pedestrians or traffic.
2. Lower all work equipment on to the ground and neutralize all controls.
3. Remove the ignition key. See "Leaving Operator's Seat with Lock" on page 1-20. Be sure all access panels, cab, fuel and oil tanks are locked and secure to prevent tampering with the machine while unattended.
4. Avoid parking the machine on a slope of any kind. If you must park on a slope, park with the bucket facing down the slope and the tracks blocked to prevent any movement of the machine.

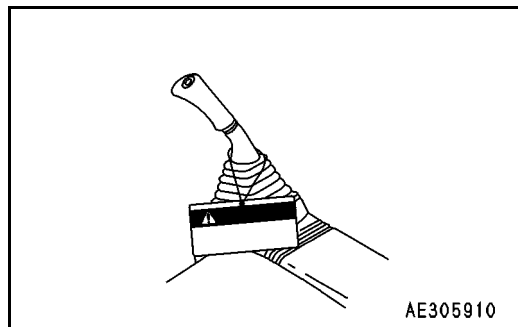


PRECAUTIONS DURING MAINTENANCE OPERATIONS

All maintenance performed on this machine must only be performed by trained and authorized personnel. When performing maintenance it is important to follow the outlined maintenance procedures and safety information outlined in this manual and in the Shop Manual for this machine.

Warning Tags

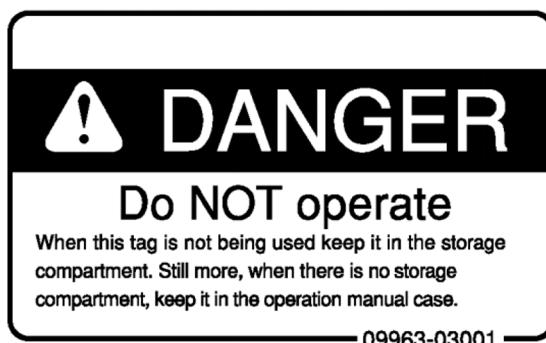
Before performing any maintenance operations on this machine, position the machine on level and firm surface.



Lock the equipment controls, remove the ignition key and tag the control levers (Part # 09963-03001).

Alert all personnel in your area that the machine is down for maintenance. If necessary, tag the machine around specific points to warn others that this machine is down for maintenance.

If the machine will be down for maintenance for a long period of time, be sure to check and see if the warning tags are still in place before you start your repair procedures the next day.

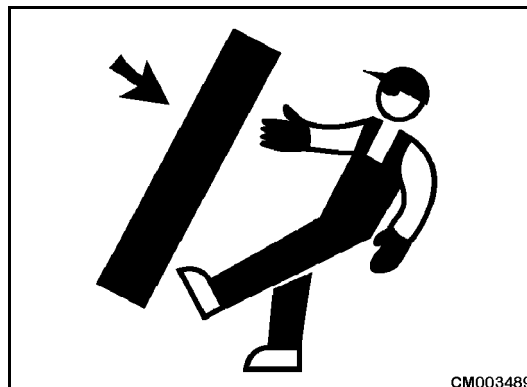


Equipment Storage

Always store optional or extra work equipment in a safe and secure location.

Store equipment in such a way that it cannot fall or cause injury to others.

Do not store materials, grease gun, oil and fuel containers in the battery compartment.



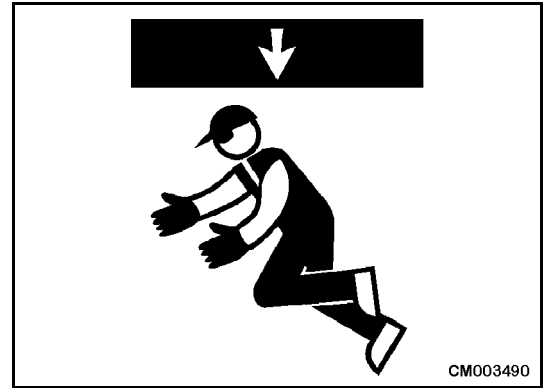
SAFETY

Working Under The Machine

Always use approved jack stands to support the machine when performing maintenance under the chassis.

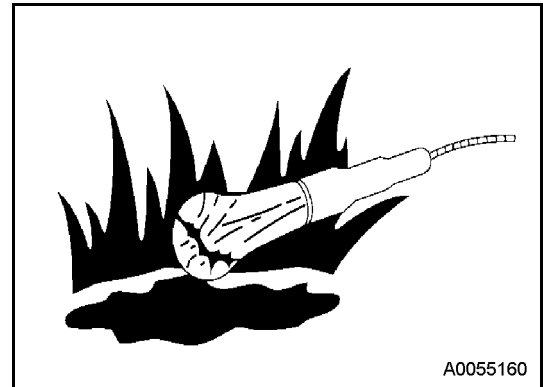
Never rely on hydraulic jacks or the machines work equipment to support the machine when working under or on the machine.

Always lower the work equipment to the ground after raising the machine for repairs.



Using Drop Lamps

Use only approved anti-explosion proof lamps when checking fuel, oil, or batteries. Non-approved lamps can cause an explosion or fire.



Keeping The Machine Clean

Never use flammable liquids to clean your machine. Use only approved non-flammable cleaning solvents to clean parts or the machine itself.

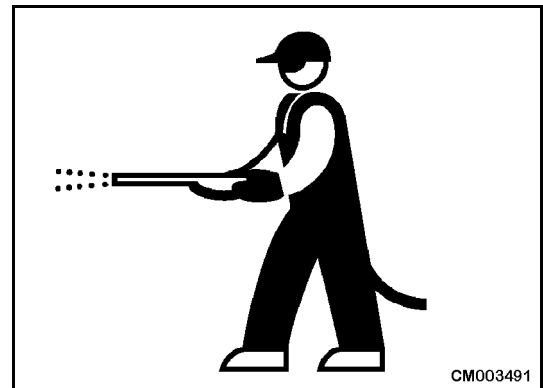
Avoid using high pressure steam cleaners or caustic soaps to wash the machine if possible. Steam cleaning or using caustic soaps may damage paint, wiring or sensitive electrical components.

Never use high pressure water or flood the inside of the operator's cab. Doing so may damage sensitive electrical components.

When pressure washing, use high pressure hot water and mild grease cutting soaps.

Always grease the machine after cleaning to push any water out of the pivot point connections.

Remove trash daily or more often as necessary. Never allow trash to accumulate on the machine.

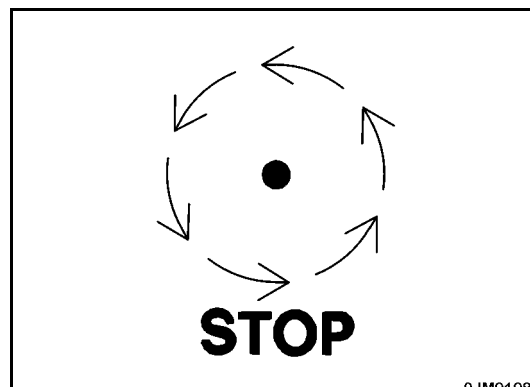


Performing General Maintenance Procedures

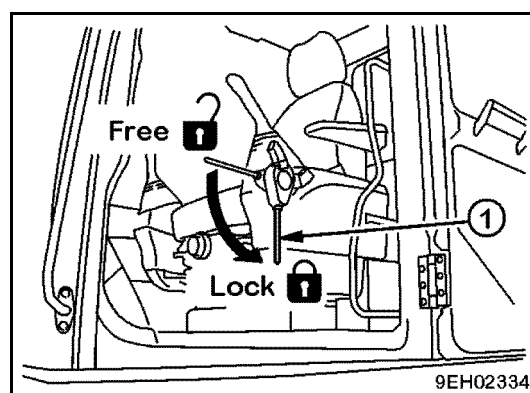
Stop the machine on firm, level ground.

Select a place where there is no danger of falling rocks, landslides, or flooding.

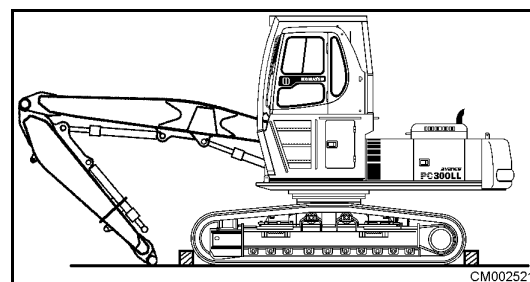
Lower the work equipment completely to the ground and stop the engine.



Turn the ignition switch to the ON position. Operate the work equipment control lever back and forth, left and right at the full stroke two to three times to eliminate the remaining internal pressure in the hydraulic circuit, and then lower the safety lock lever (1) to the LOCK position.



Place blocks under the track to prevent the machine from moving. Set the work equipment in a parked position and neutralize the controls.

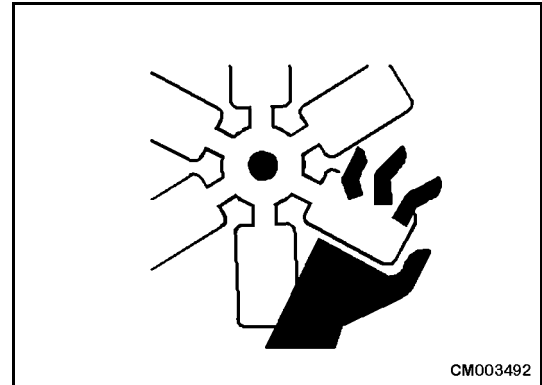


SAFETY

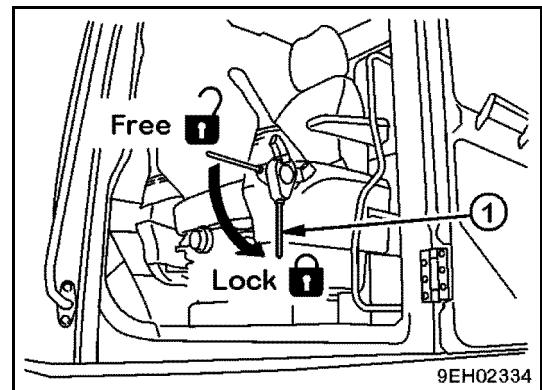
Running the Engine during Maintenance

To prevent injury, it is not recommended to do maintenance on the machine with the engine running. However, if maintenance must be done with the engine running, perform this work with at least two workers and follow the steps listed below.

Always be aware of rotating and moving parts when working on a machine with the engine running.



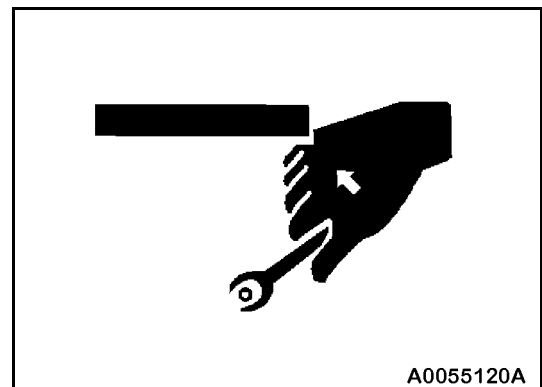
- One worker must always remain in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- Set safety lock lever (1) to the **LOCK** position.
- When working near the fan, fan belt, or other rotating parts, there is a possibility of being caught in moving parts, so be extremely careful.
- Do not touch any control levers. If a 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.



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.



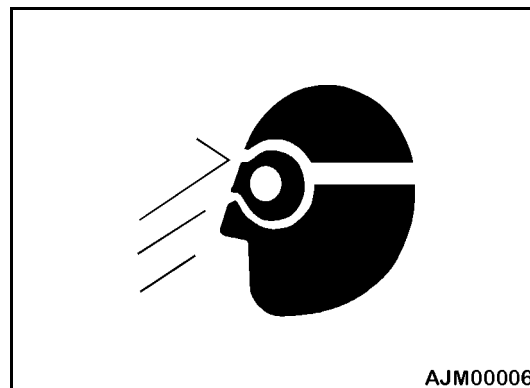
Welding, Grinding or Cutting

Welding must always be done by a qualified welder and in a place equipped properly. The danger of fire and electrocution exists when welding. Never allow any unqualified personnel to do welding.

When cutting, grinding or drilling it is advised to wear eye protection. Failure to do so may lead to an eye injury.

Remark

When welding on machine always remove battery cables before performing any welding procedures.



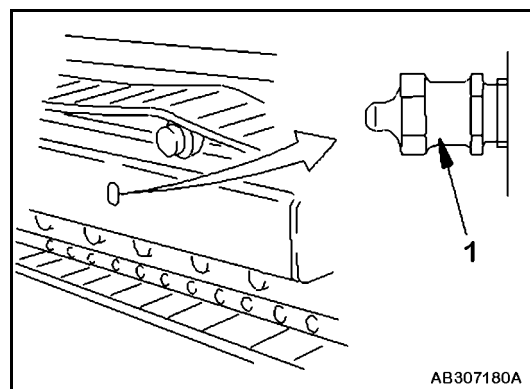
Adjusting Track Tension

Grease is pumped into the track tension adjustment system under high pressure.

If the specified procedure for maintenance is not followed when making adjustments, the grease drain plug (1) may fly out and cause serious injury or property damage.

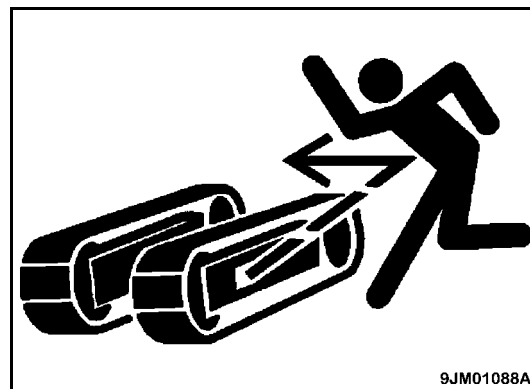
When loosening the grease drain plug (1) to loosen the track tension, never loosen it more than one turn. Loosen the grease drain plug slowly.

Never put your face, hands, feet, or any other part of your body close to the 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, if it is disassembled by mistake, the spring will fly out and cause serious injury or even death. Never disassemble the recoil spring.



When Using Hammer

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

If hard metal parts such as pins, bucket teeth, cutting edges, or bearings are hit with a hammer, there is a hazard that pieces might be scattered and cause injury. Always wear safety glasses and gloves.

When hitting pins or bucket teeth, there is a hazard that broken pieces might be sent flying and injure people in the surrounding area.

Always check that there is no one in the surrounding area.

There is a hazard that the pin hit with strong force may fly out and injure people in the surrounding area.

SAFETY

Rules for Refueling the Machine

Always clean up any spills. Grease, fuel, oil or coolant spills can pose a trip hazard if not mopped up immediately.

Be sure you are adding the correct fluids to the proper location. Mixing fluids can cause damage to internal components.

When refueling or adding any fluids, be sure you are in a well ventilated area. Never smoke or allow open flames near you while you are refueling the machine.

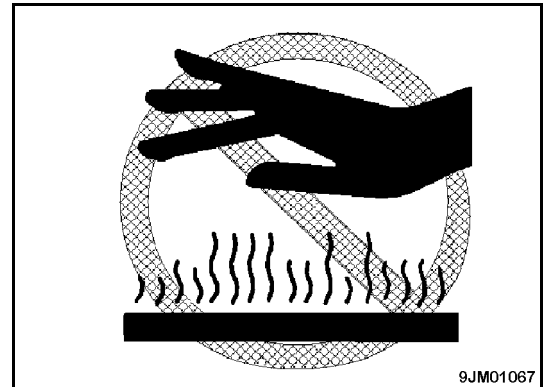
Never mix gasoline with diesel fuel. Gasoline is extremely flammable and could cause an explosion. Do not fill the fuel tank completely, leave room for the fuel to expand.



Cooling System Precautions

Never add coolant to a hot or warm engine. Always allow the engine time to cool down completely before opening the radiator cap.

Never dump used coolant on the ground, in a lake, stream or in a sewer system. EPA Law requires these fluids to be captured and recycled properly. Failure to do so is in violation of the law.



Battery Precautions

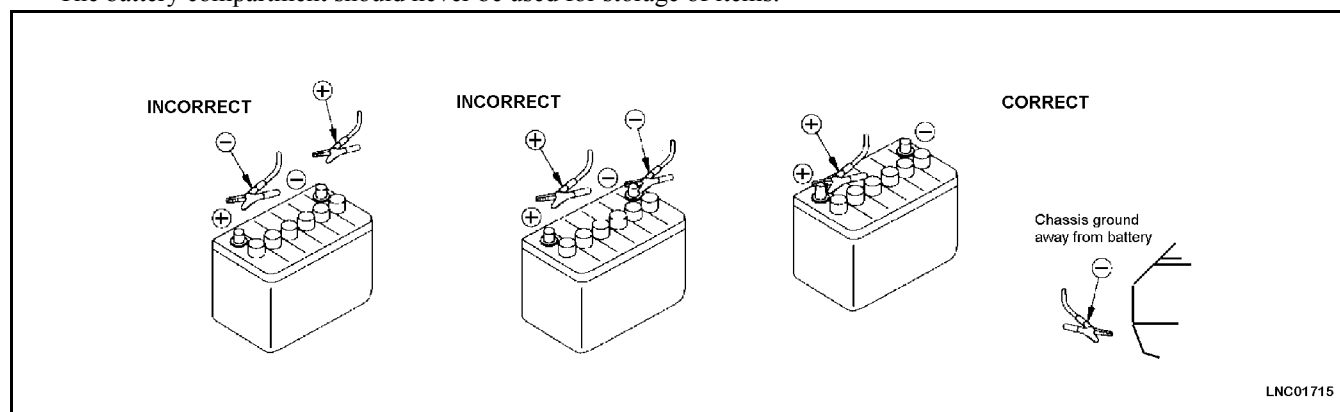
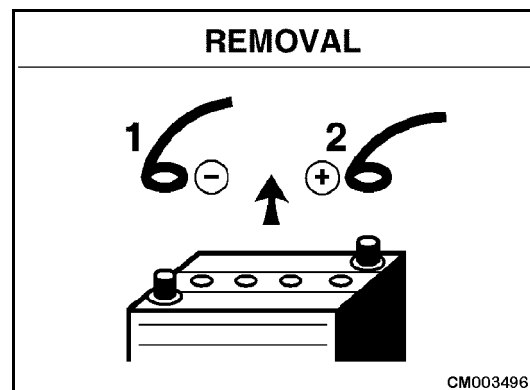
If any mistake is made in the method of connecting the booster cables, it may cause the battery to explode, so always do as follows.

When working on the electrical system, disconnect the negative (-) battery cable first then the positive (+) battery cable last.

On completion of work, reconnect the positive (+) cable first then the negative (-) cable last.

Starting Engine with Booster Cables

- When starting with a booster cable, carry out the starting operation with two workers (one worker sitting in the operator's seat and the other working with the battery). When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF position for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the booster cables. Disconnect the negative (-) cable (ground side) first when removing them.
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.
- Always wear safety glasses and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- Always cover battery terminals.
- The battery compartment should never be used for storage of items.



Starting Precautions

Never try to start the machine by tampering or shorting the starter terminals.

Accidental movements of the machine could cause injury or even death.



SAFETY

Always start the machine seated in the operators cab using the ignition switch.

WARNING

Never use a welder or a machine with a higher voltage system to jump start the machine. Using a higher voltage to jump-start a machine may damage the machines electrical system or cause an unexpected explosion or fire. Always jump-start a machine with equal voltages.

High Pressure Hoses

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, so always do as follows.

Do not carry out any 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.

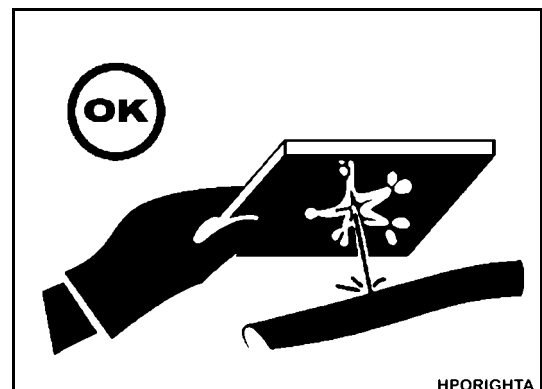
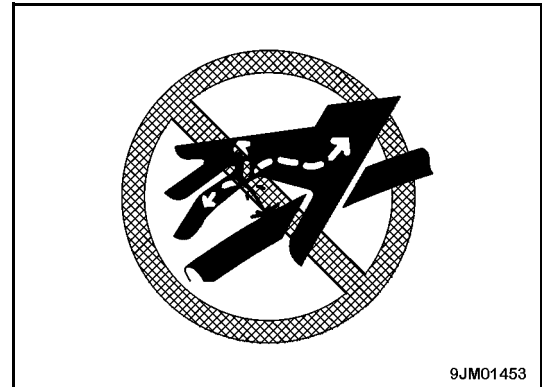
Safety Handling High-pressure Hoses

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

- Replace the hose if any of the following problems are found.
- Damaged or leaking hydraulic fitting.
- Frayed or cut covering or exposed reinforcement wire layer.
- Covering swollen in places.
- Twisted or crushed movable portion.
- Foreign material embedded in covering.

Precaution For High Fuel Pressure

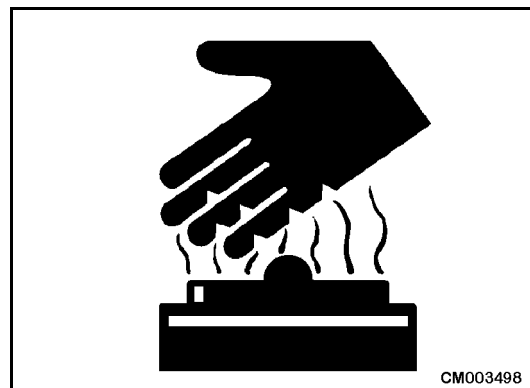
High pressure is generated inside the engine fuel piping when the engine is running. When carrying out inspection or maintenance of the fuel piping system, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before starting inspection or maintenance.



High Temperatures Areas

When you stop the machine at the end of a job, remember the engine coolant, oil, all engine parts, exhaust stack and the hydraulic system is still hot and under pressure. If you attempt to drain engine coolant, hydraulic fluid, or engine oil under these conditions, you expose yourself to various dangers, including the risk of serious burns.

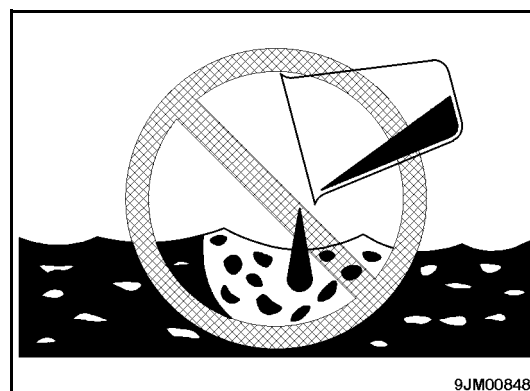
Carry out maintenance procedures described in this manual only when the machine has had time to cool down.



Disposal of Waste Materials

Never dump waste fluids in a sewer system, on the ground, in rivers, etc.

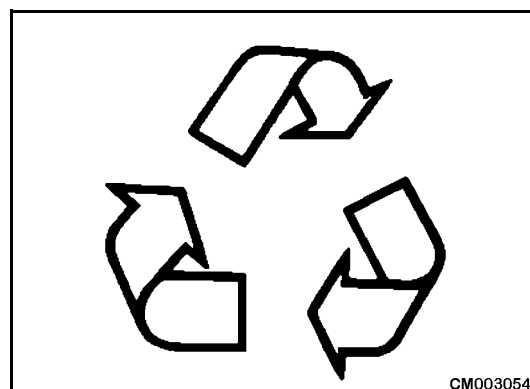
Always drain fluids from your machine into the appropriate containers. Never drain fluids directly onto the ground.



Mercury Containing Component(s)

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

Obey appropriate laws and regulations when disposing of harmful objects such as oil, fuel, filters, batteries, coolant, brake fluid and hydraulic oil. Recycle when ever possible.



SAFETY

Accumulator

This machine is equipped with an accumulator charged with high-pressure nitrogen gas. Before servicing the accumulator, observe the following precautions:

- Do not disassemble the accumulator.
- Do not expose the accumulator to high heat or an open flame.
- Do not weld on the accumulator.
- Do not drill or cut the accumulator.
- Do not strike or crush the accumulator.
- When replacing or disposing of the accumulator, always release the nitrogen pressure from the chamber.



Critical Parts

Periodically some parts must be replaced due to safety purpose. Even if these parts seem to be in good condition and operating properly they may fail at some point causing possible injury to the operator or pedestrian. Listed are some of the systems containing these components that may fail under extended use:

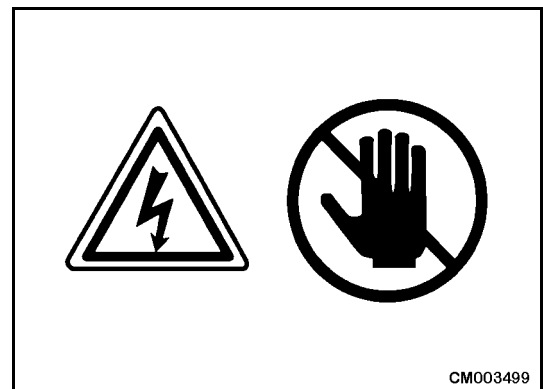
- Seat belts.
- Fuel supply and delivery hoses.
- Hydraulic system: main delivery hoses and tubing.
- Hydraulic hoses: all the hoses that feed and return the hydraulic fluid to and from the work equipment.

For additional information: See “WEAR PARTS LIST” on page 3-8.

High Voltage

When the engine is running or immediately after it has stopped, high voltage is generated at the injector terminal and inside the engine controller, so there is danger of electrocution.

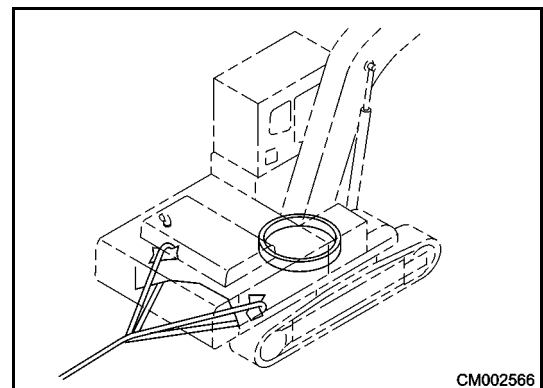
Never touch the injector terminal or the inside of the engine controller. If it is necessary to touch the injector terminal or the inside of the engine controller, please contact your Komatsu distributor.



Towing

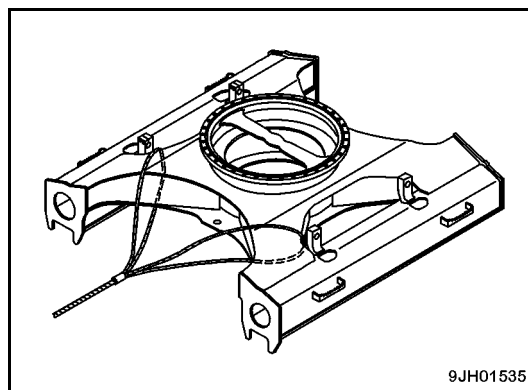
Safety Rules for Towing

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.

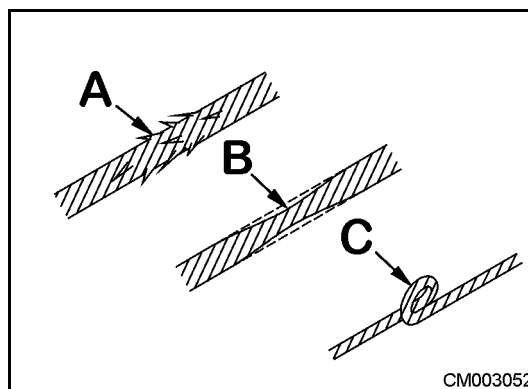


For towing, See “Towing the Machine” on page 2-145.

- Always wear leather gloves when handling wire rope.
- Attach the wire rope to the track frame.
- Never stand between the towing machine and the machine being towed while in motion.
- Never tow a machine on a slope.
- Always check that the wire rope used for towing has ample strength for the weight of the machine being towed.



- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.
- Always wear leather gloves when handling wire rope.
- Never tow a machine on a slope.
- During the towing operation, never stand between the towing machine and the machine being towed.
- Operate the machine slowly and be careful not to apply any sudden load to the wire rope.

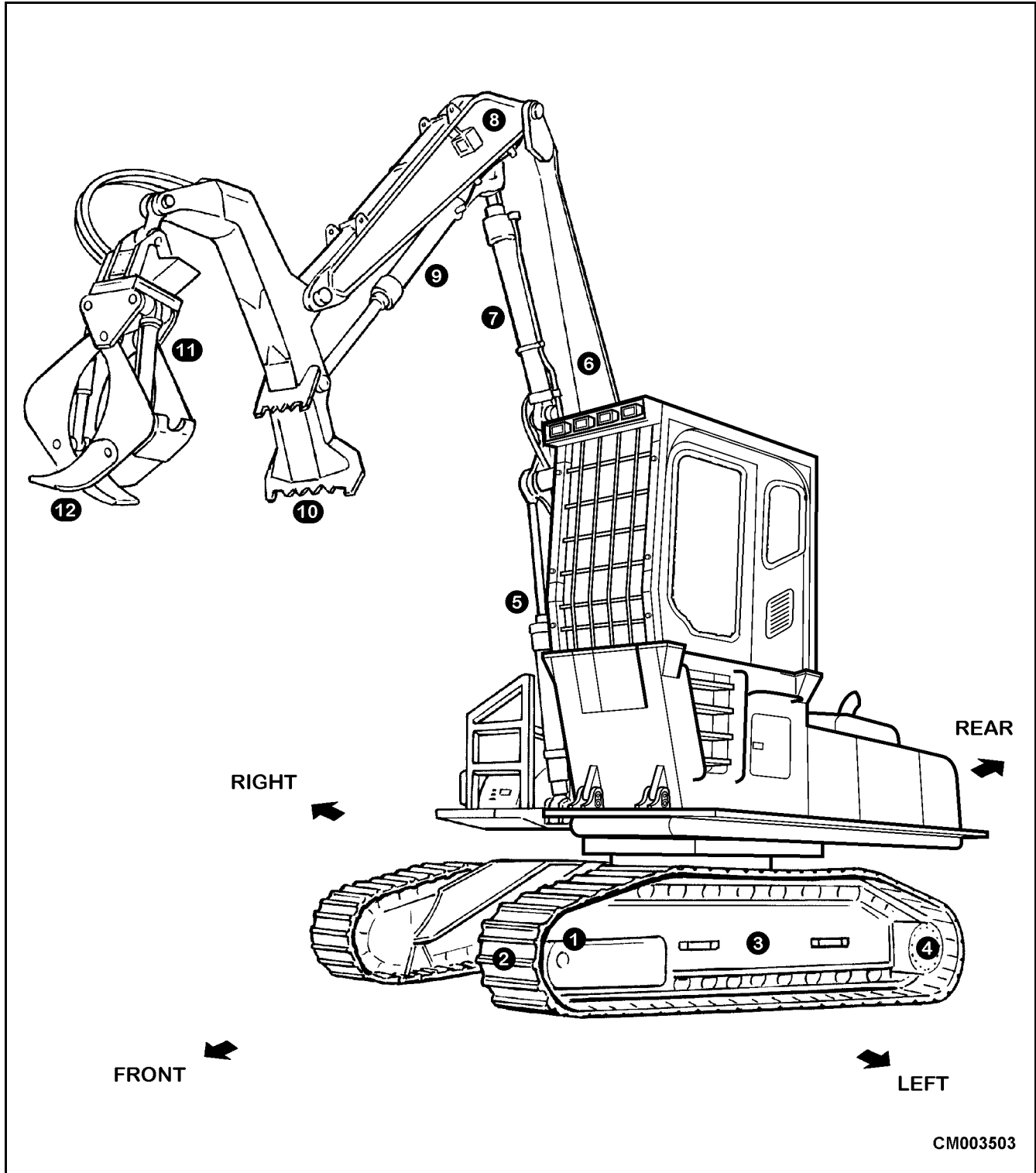


MEMORANDUM

OPERATION

GENERAL VIEWS

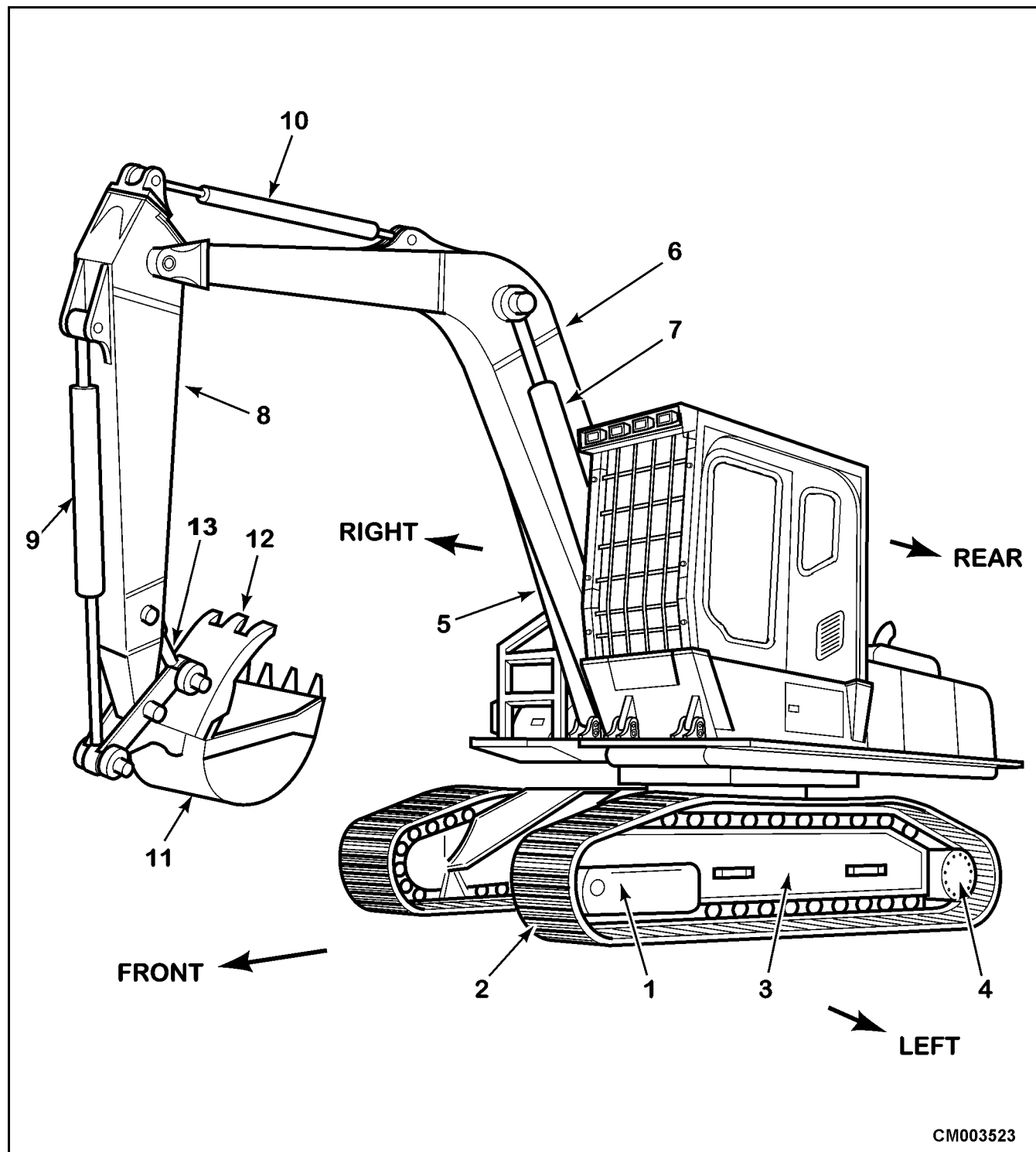
General View of Log Loader Machine



- | | | |
|-------------------|------------------|----------------------|
| 1. Idler | 5. Boom Cylinder | 9. Heel Cylinder |
| 2. Track shoe | 6. Boom | 10. Heel Rack |
| 3. Track Frame | 7. Arm Cylinder | 11. Grapple Cylinder |
| 4. Sprocket Drive | 8. Arm | 12. Grapple |

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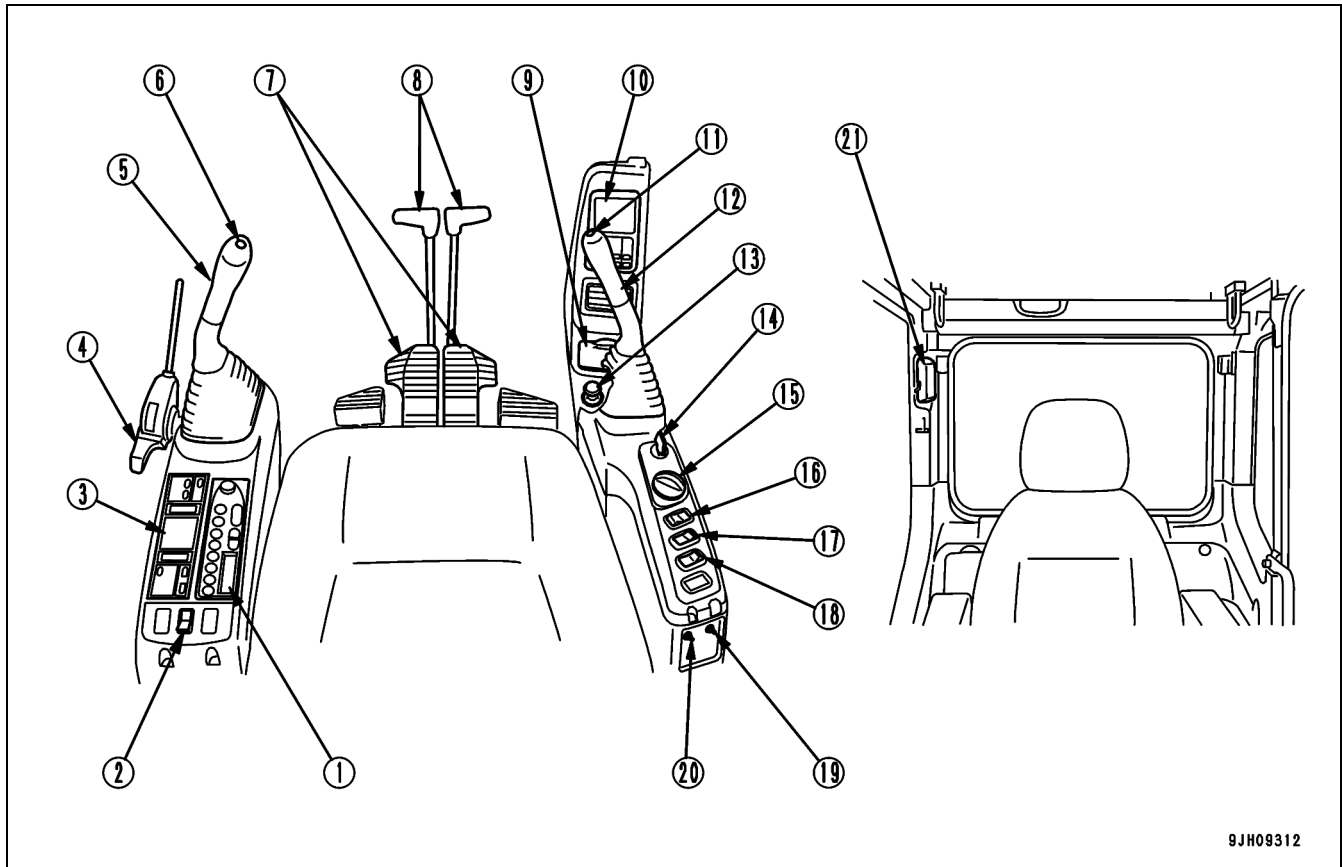
General View of Road Builder Machine



- | | | | |
|-------------------|------------------|--------------------|--------------------|
| 1. Idler | 5. Boom Cylinder | 9. Bucket Cylinder | 13. Thumb Cylinder |
| 2. Track shoe | 6. Boom | 10. Arm Cylinder | |
| 3. Track Frame | 7. Boom Cylinder | 11. Bucket | |
| 4. Sprocket Drive | 8. Arm | 12. Thumb | |

OPERATION

View Controls and Gauges

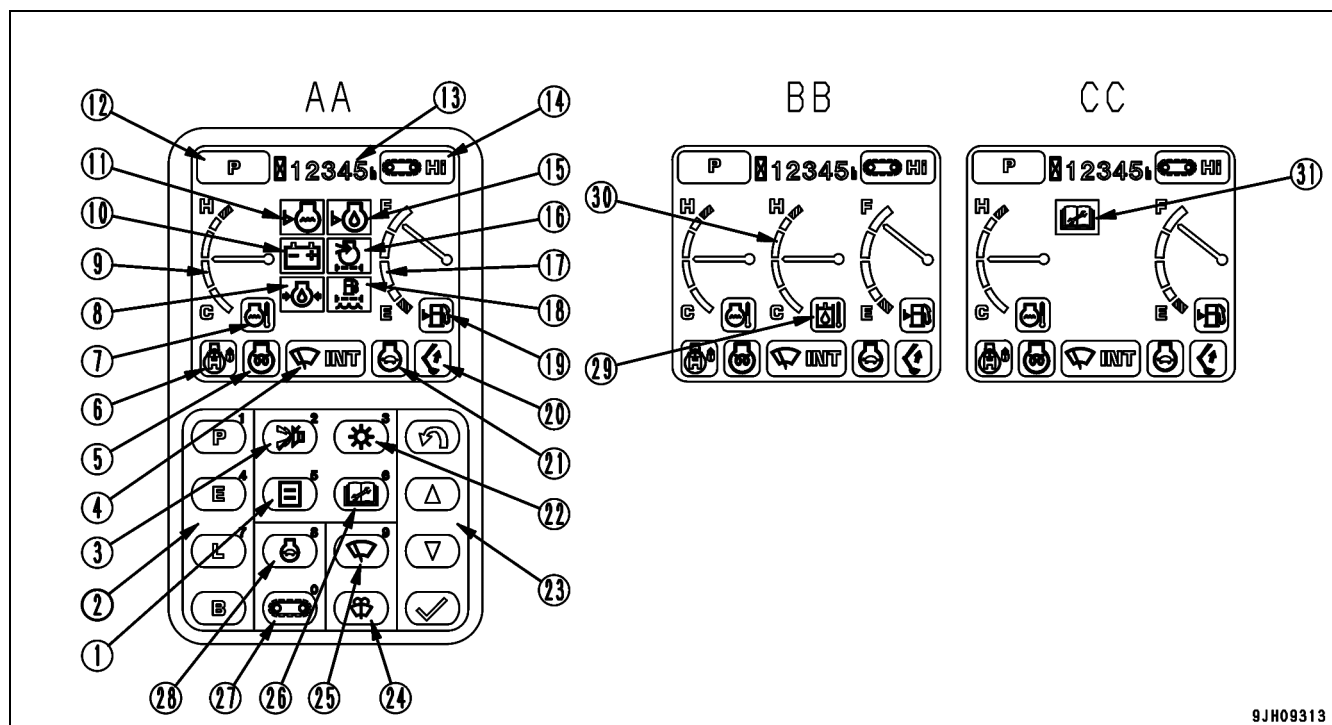


1. Radio
2. Revolving warning lamp (if equipped)
3. Air conditioner controls
4. Lock lever
5. L.H. PPC work equipment control lever
- 6A. Power Max switch
- 6B. Log loader, grapple rotate CCW or road builder switch is inactive
- 6C. Log loader, grapple open or road builder thumb open
7. Travel pedals
8. Travel levers
9. Ash tray
10. Machine monitor
- 11A. Horn button
- 11B. Log loader, grapple rotate CW or road builder switch is inactive
- 11C. Log loader, grapple open or road builder thumb close
12. R.H. PPC work equipment control lever
13. Cigarette lighter
14. Ignition switch
15. Engine speed control
16. Lamp switch
17. Swing lock switch
18. Machine push-up switch
19. Swing brake cancel switch
20. Emergency pump drive switch
21. Cab lamp switch

MACHINE MONITOR SYSTEM

The monitor system is the main control panel of the machine. This unit monitors all the functions relating to the machines operating system. It is important for the operator of this machine to study the monitor and become familiar with all these functions in order to achieve maximum performance from the machine. Failure to do so may lead to poor performance or premature failure of the machine.

Monitor Layout



AA: Screen with all lamps lighted

BB: Screen for normal operation

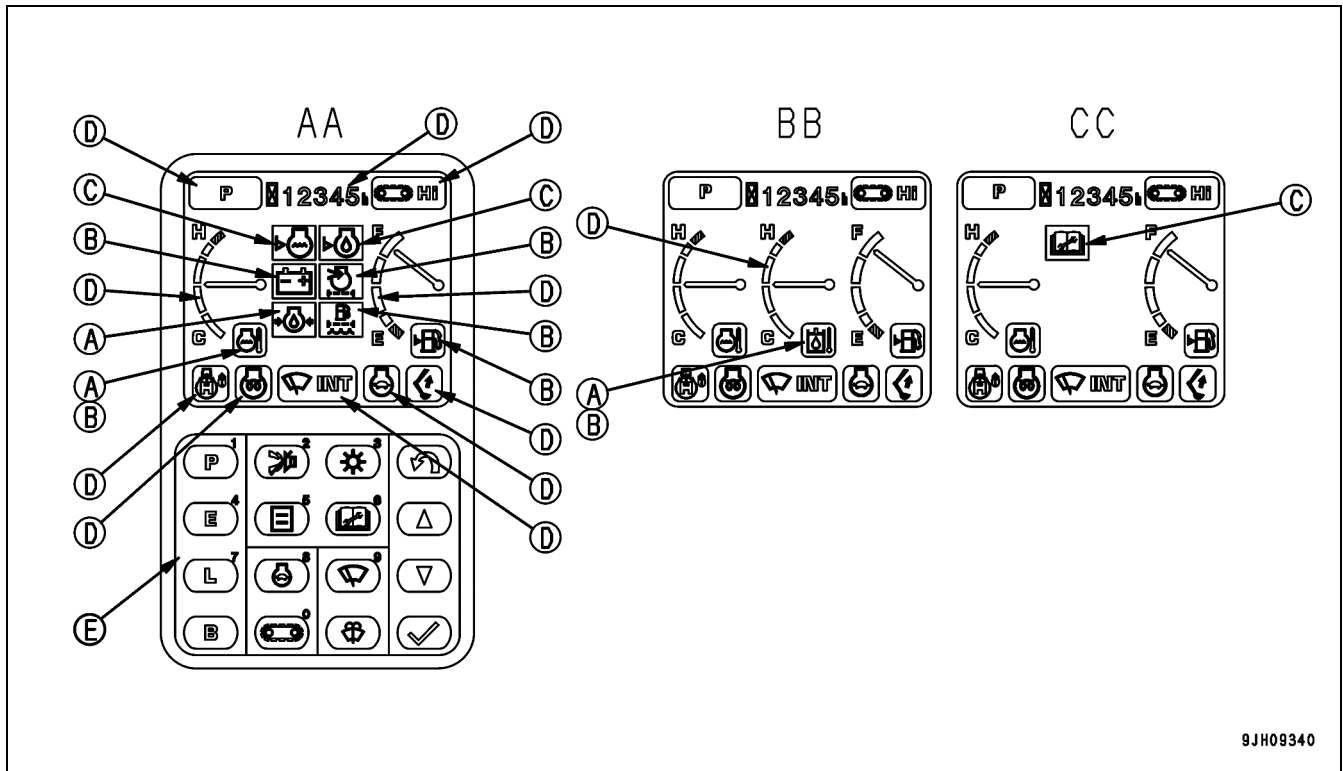
CC: Maintenance warning screen

- | | |
|---------------------------------------|--|
| 1. Selector switch | 17. Fuel gauge |
| 2. Working mode selector switch | 18. Water separator monitor |
| 3. Alarm buzzer stop switch | 19. Fuel level monitor |
| 4. Wiper switch | 20. One-touch power max. monitor |
| 5. Engine pre-heat monitor | 21. Auto-deceleration monitor |
| 6. Swing lock monitor | 22. Liquid crystal monitor adjustment switch |
| 7. Engine coolant temperature monitor | 23. Input control switch |
| 8. Engine oil pressure monitor | 24. Window washer switch |
| 9. Engine coolant temperature gauge | 25. Wiper switch |
| 10. Charge level monitor | 26. Maintenance switch |
| 11. Radiator coolant level monitor | 27. Travel speed selector switch |
| 12. Working mode monitor | 28. Auto-deceleration switch |
| 13. Service meter | 29. Hydraulic oil temperature monitor |
| 14. Travel speed monitor | 30. Hydraulic oil temperature gauge |
| 15. Engine oil level monitor | 31. Maintenance interval monitor |
| 16. Air cleaner clogging monitor | |

OPERATION

Basic Operation of Machine Monitor

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



AA: Screen with all lamps lit

BB: Screen for normal operation

CC: Maintenance warning screen

A. Emergency monitors

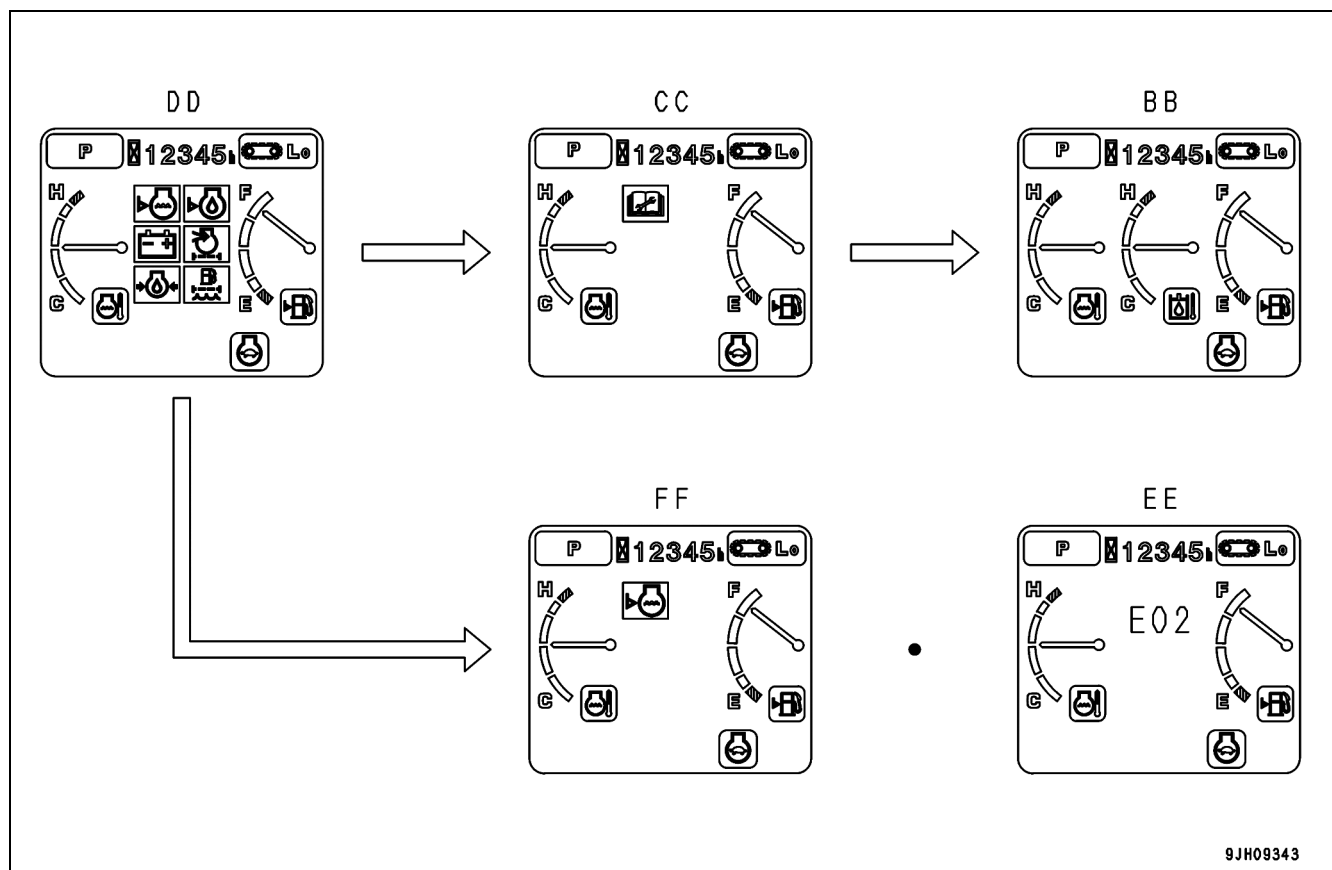
B. Caution monitors

C. Basic check monitors

D. Meter display portion

E. Monitor switches position

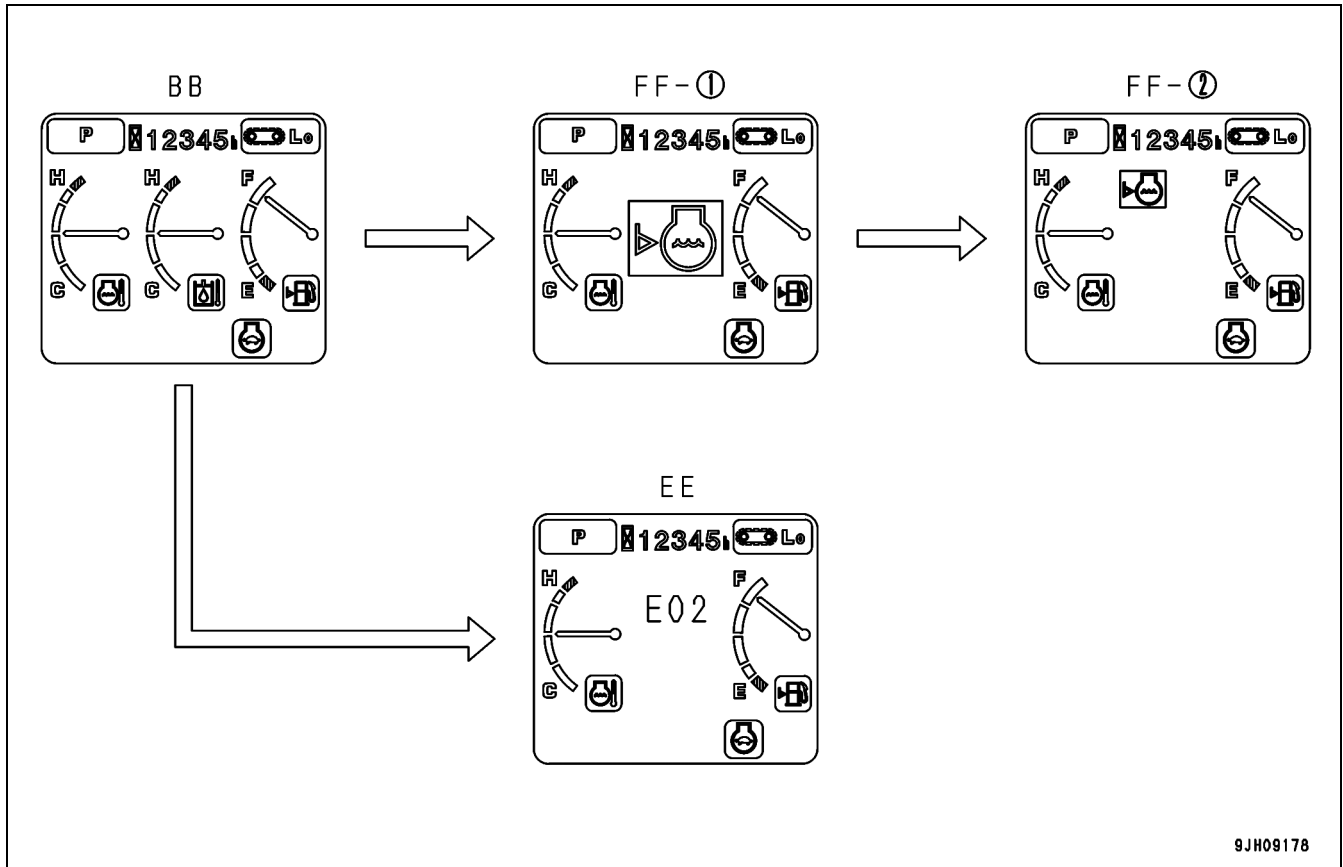
Abnormality Occurs when Starting the Engine



- If there is any abnormality when starting the engine, the check before starting screen DD changes to the maintenance interval warning screen CC, warning screen FF, or error screen EE.
- After displaying the check before starting screen DD for two seconds, the screen changes to the maintenance interval warning screen CC.
- After displaying the maintenance interval warning screen CC for 30 seconds, the screen returns to the normal screen BB.
- After displaying the check before starting screen DD for two seconds, the screen changes to the warning screen FF or error screen EE.

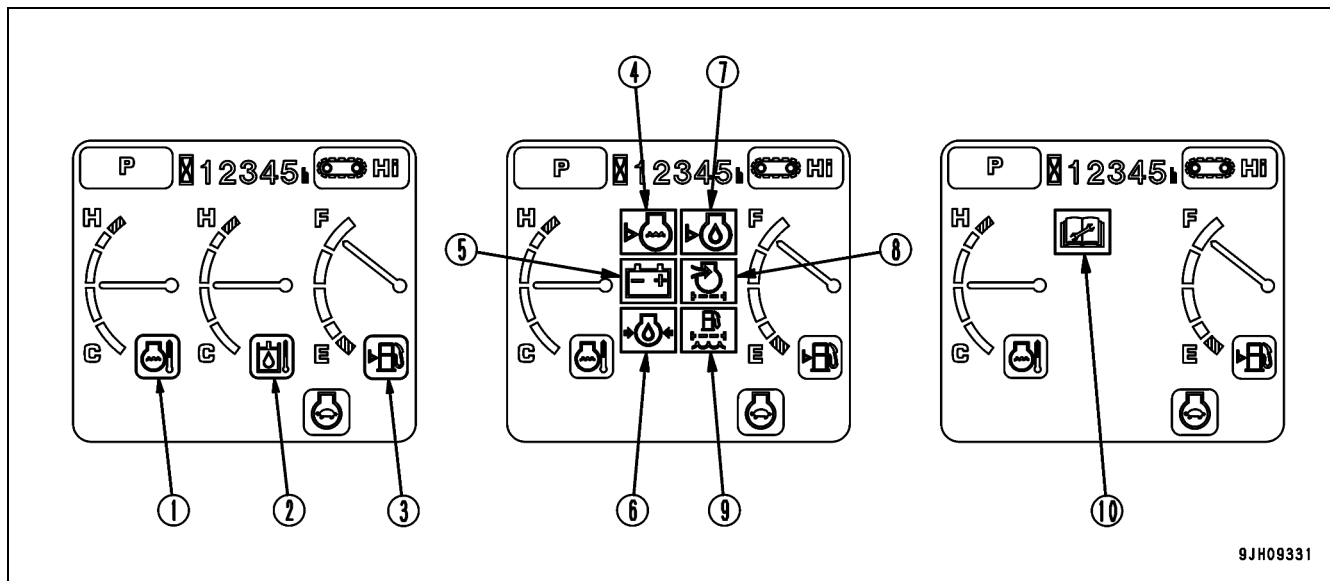
OPERATION

Abnormality Occurs During Operation



- If any abnormality occurs during operation, the normal operation screen BB changes to warning screen FF-(1) or the error screen EE.
- After displaying warning screen FF-(1) for two seconds, the screen automatically changes to warning screen FF-(2).

Color Warning or Alert System



9JH09331

	Type of monitor	Color when monitor lights up		
		When normal	When abnormal	At low temperature
1	Engine coolant temperature	Green	Red	White
2	Hydraulic oil temperature	Green	Red	White
3	Fuel level monitor	Green	Red	—
4	Radiator coolant level monitor	OFF	Red	—
5	Charge level monitor	OFF	Red	—
6	Engine oil pressure monitor	OFF	Red	—
7	Engine oil level monitor	OFF	Red	—
8	Air cleaner clogging monitor	OFF	Red	—
9	Water separator monitor	OFF	Red	—
10	Maintenance interval monitor	OFF	Red	—

MONITOR CHECK ITEMS

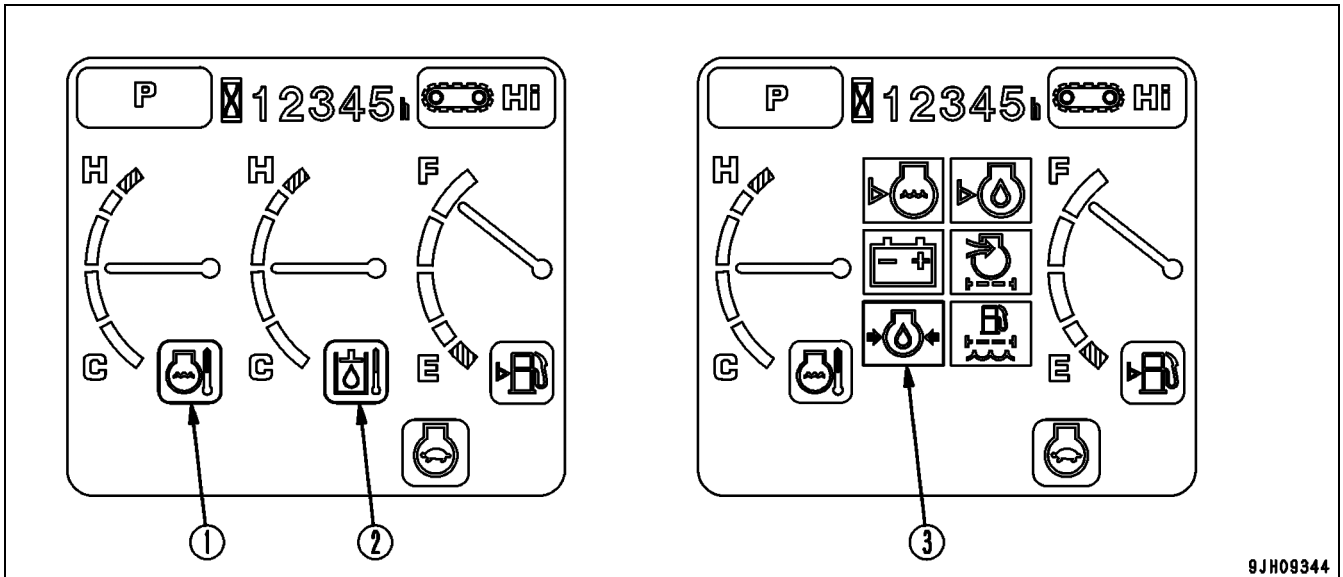
Below is a list of monitor items that must be checked during start-up and operation of the machine. It is important to understand what these alerts mean and how to deal with them. Failure to do so may lead to a system failure with in the machine.

Emergency Alerts



If the monitor lights up red, stop the engine immediately or run at low idle, check applicable location, then perform necessary actions.

These items should be observed while the engine is running. If there is a problem, the monitor for the abnormal location lights up red and buzzer sounds, if this happens perform actions immediately.



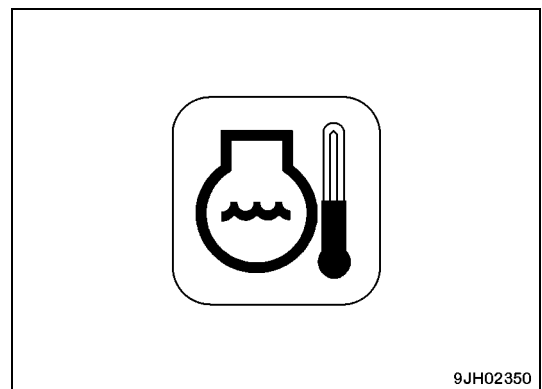
- 1. Engine coolant monitor
- 2. Hydraulic oil temperature monitor
- 3. Engine oil pressure monitor

Engine Coolant Temperature Monitor

Monitor (1) warns operator that the engine coolant temperature has risen.

If engine coolant temperature becomes abnormally high, monitor lights up red, overheat prevention system is automatically actuated, and the engine speed goes down.

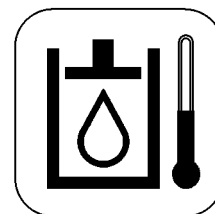
Stop operations and run engine at low idle until monitor (1) changes to green.



Hydraulic Oil Temperature Monitor

Monitor (2) warns operator that the hydraulic oil temperature has risen.

If monitor lights up red during operations, run engine at low idle or stop the engine and wait until the oil temperature goes down and monitor (2) changes to green.

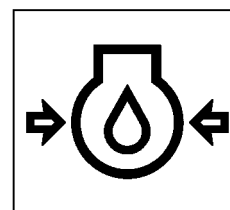


9JH02351

Engine Oil Pressure Monitor

Monitor (3) lights up red if the engine lubrication oil pressure goes below normal level.

If monitor lights up red, stop the engine immediately, check the lubrication system and level of oil in the engine oil pan.



9JH01670

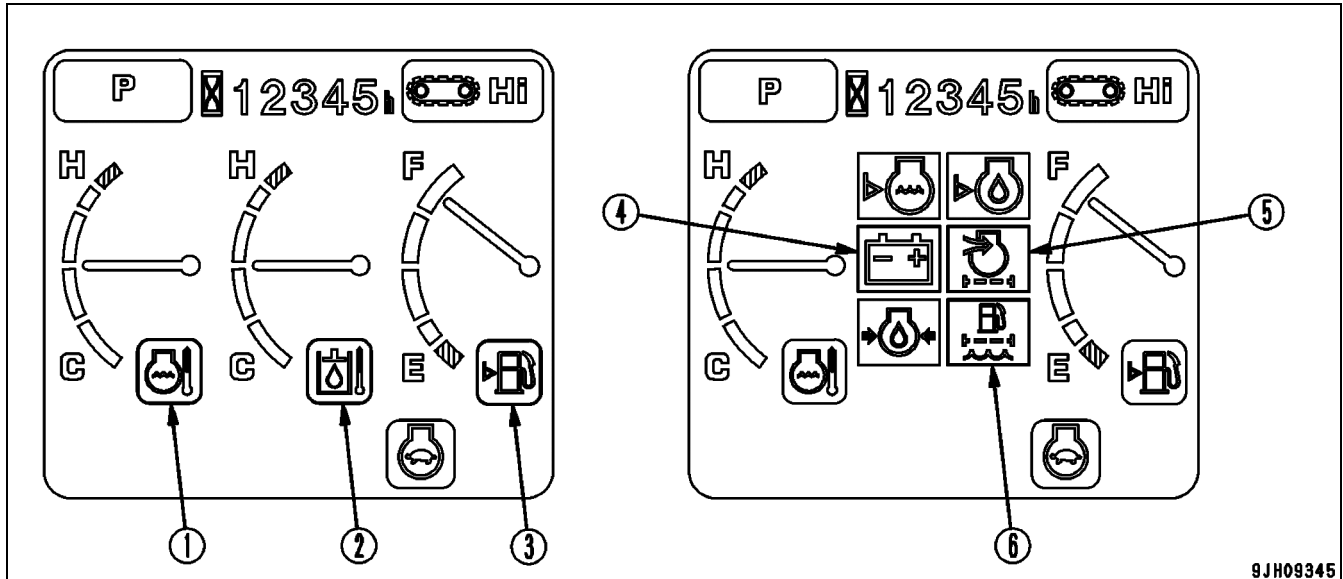
Warning Alerts

! WARNING

If the warning monitor lights up red, stop operations as soon as possible and carry out inspection and maintenance at the applicable location. If the warning is ignored, it may lead to failure.

These are items that should be observed while the engine is running. If any abnormality occurs, the screen displays the item that needs immediate action.

If there is an abnormality, the monitor for the abnormal location lights up red.

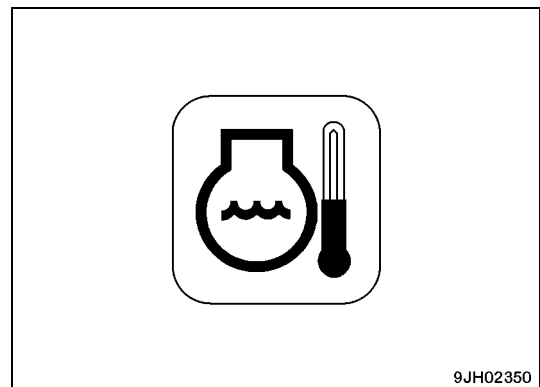


- 1. Engine coolant temperature monitor
- 2. Hydraulic oil temperature monitor
- 3. Fuel level monitor
- 4. Charge level monitor
- 5. Air cleaner clogging monitor
- 6. Water separator monitor

Engine Coolant Temperature Monitor

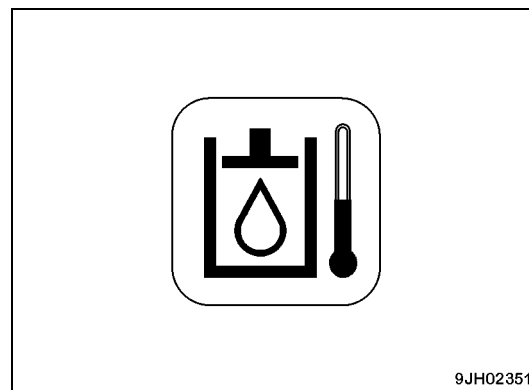
If this monitor (1) lights up white in low temperatures, carry out the warming-up operation. For details, See “Warming Up Engine” on page 2-96.

Continue the warming-up operation until monitor (1) changes to green.



Hydraulic Oil Temperature Monitor

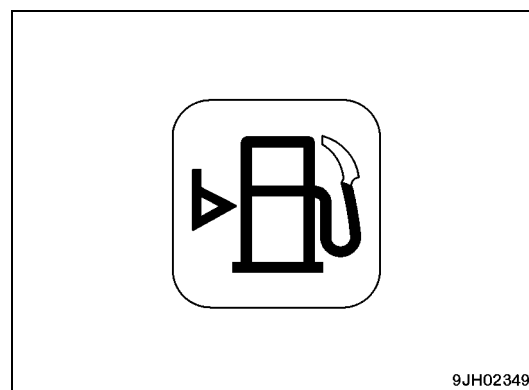
If this monitor (2) lights up white in low temperatures, carry out the warming-up operation. For details, See “Warming up Hydraulic Equipment” on page 2-98.



Fuel Level Monitor

This monitor (3) lights up to warn the operator that the level in the fuel tank is low.

If the remaining amount of fuel goes down to 41 ℓ (10.83 US gal), the light changes from green to red, so add fuel as soon as possible.



Charge Monitor

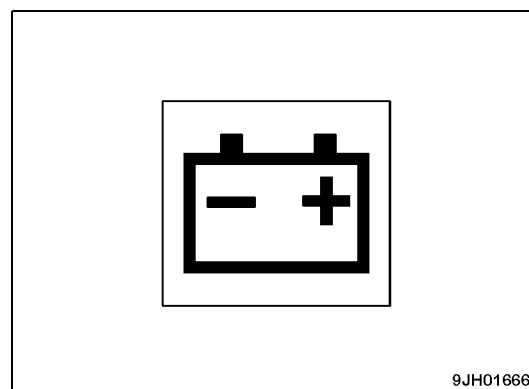
This monitor (4) warns the operator that there is an abnormality in the charging system when the engine is running. If the battery is not being charged properly while the engine is running, it lights up red.

If it lights up red, check for looseness of the V-belt. If any abnormality is found, take the necessary action. For details, See “Electrical System Problems” on page 2-154.

Remark

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

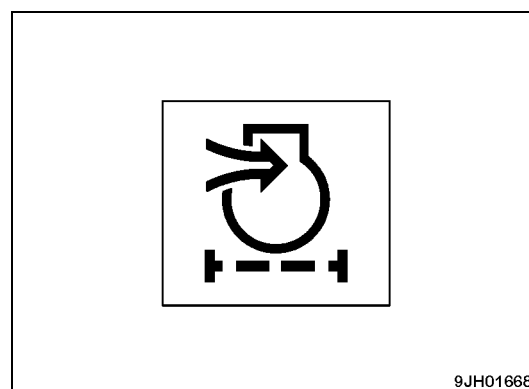
When the engine is started or stopped with the ignition switch at the ON position, the lamp may light up and the buzzer may sound momentarily, but this does not indicate any abnormality.



Air Cleaner Clogging Monitor

This monitor (5) warns the operator that the air cleaner is clogged.

If it lights up red, stop the engine and inspect and clean the air cleaner.



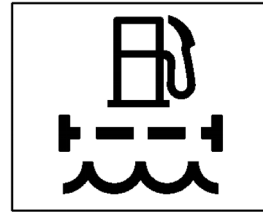
OPERATION

Water Separator Monitor

This monitor (6) shows that the water separator is full of water.

If the red lamp lights up, stop the engine and drain the water from the water separator.

For details of the method of draining the water from the water separator.



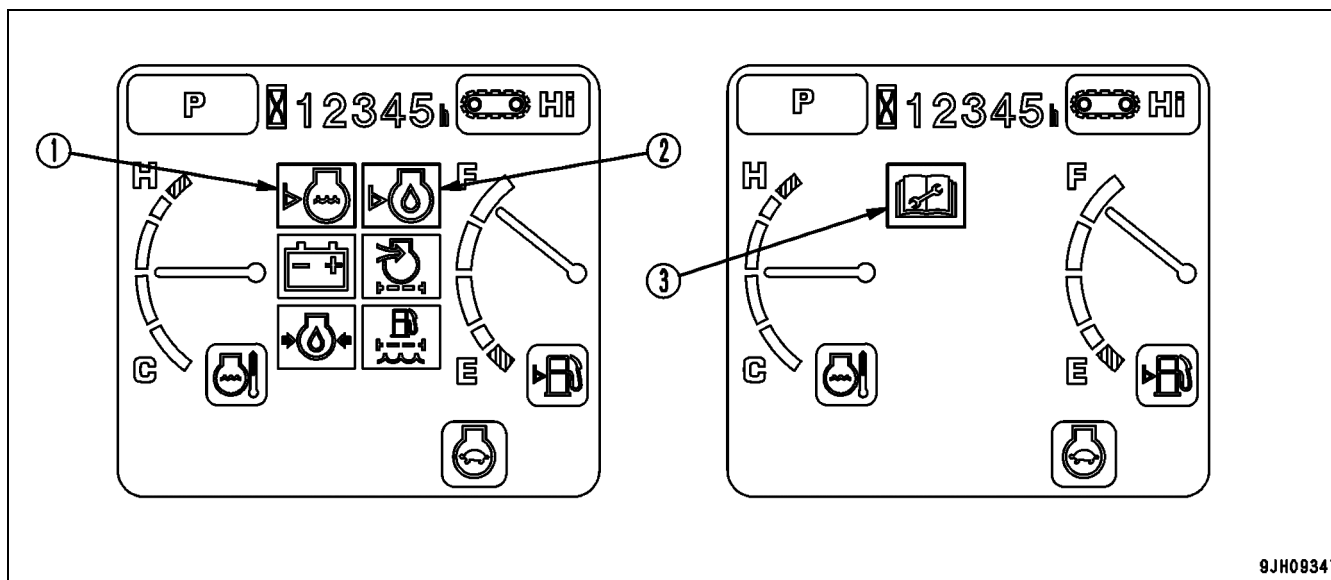
9JH09346

Check Alerts

! WARNING

These monitors DO NOT ensure that the machine is in good condition. When performing checks before starting (daily checks), do not simply rely on the monitors. Always dismantle the machine and check each item directly.

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



9JH09347

1. Coolant level monitor

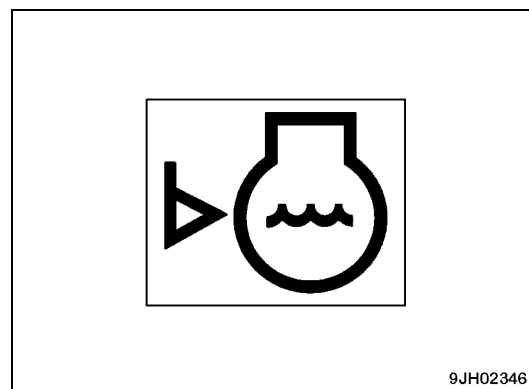
2. Engine oil level monitor

3. Maintenance interval monitor

Coolant Level Monitor

Monitor (1) warns the operator that there has been a drop in the radiator coolant level.

If the radiator coolant is low, the lamp lights up red, so check coolant level in the radiator and sub-tank, and add coolant.



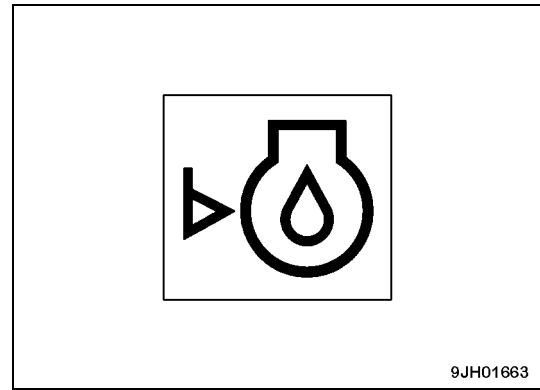
9JH02346

OPERATION

Engine Oil Level Monitor

Monitor (2) warns the operator that the oil level in the engine oil pan has dropped.

If oil level in the engine oil pan is low, the lamp lights up red, so check the oil level, and add oil.



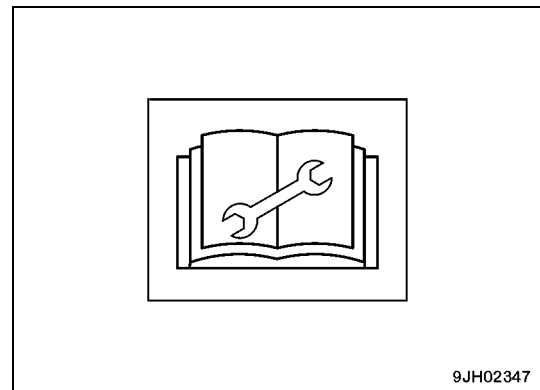
Maintenance Interval Monitor

Monitor (3) lights up to warn the operator that the set time has passed since maintenance was last performed.

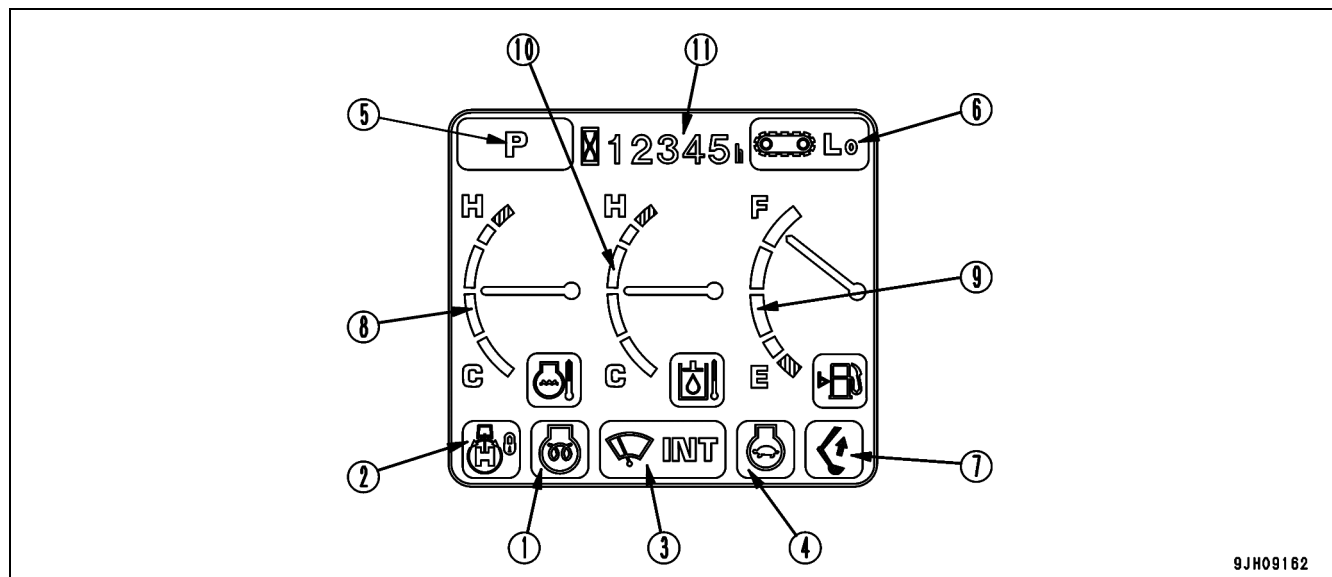
This monitor screen goes out after 30 seconds and returns to the normal operation screen.

For details on the method of checking the maintenance interval, see “MAINTENANCE” section.

If it is desired to change the maintenance interval settings, have your Komatsu distributor change the interval settings.



Meter Display



9JH09162

- | | |
|-------------------------------|-------------------------------------|
| 1. Engine pre-heating monitor | 7. One touch power up monitor |
| 2. Swing lock monitor | 8. Engine coolant temperature gauge |
| 3. Wiper monitor | 9. Fuel gauge |
| 4. Auto-deceleration monitor | 10. Hydraulic oil temperature gauge |
| 5. Working mode monitor | 11. Service meter |
| 6. Travel speed monitor | |

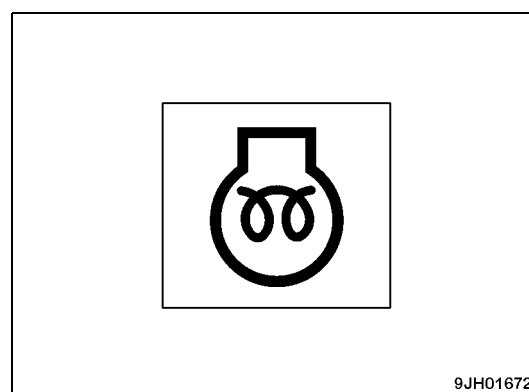
Pilot Displays

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

Engine Pre-heating Monitor

This monitor lamp (1) indicates the pre-heating time required when starting the engine at an ambient temperature below 0°C (32°F).

The monitor lamp lights when the ignition switch is turned to the HEAT position and flashes after about 30 seconds to show that the pre-heating is completed. (The monitor lamp will go off after about ten seconds.)



9JH01672

OPERATION

Swing Lock Monitor

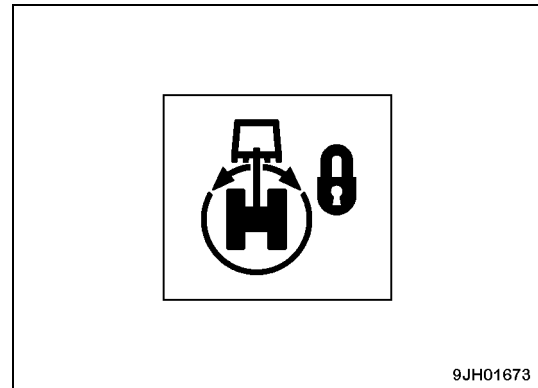
This monitor (2) informs the operator that the swing lock is being actuated.

Actuated: Lights up

When the swing lock switch is turned ON (ACTUATED), the monitor lamp lights up. This monitor flashes when the swing holding brake cancel switch is turned on.

Remark

The swing motor is equipped with a disc brake that mechanically stops the rotation. When the swing lock monitor lamp is lit up, the brake remains applied.



Wiper Monitor

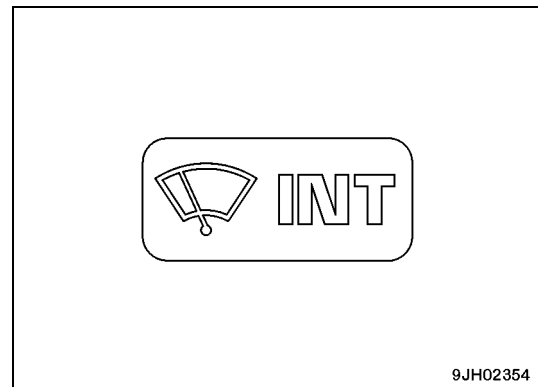
This monitor (3) indicates the operating status of the wiper.

The monitor display (when the wiper switch is operated) is as follows.

When ON lights up : Wiper moves continuously

When INT lights up : Wiper moves intermittently

OFF : Wiper stops



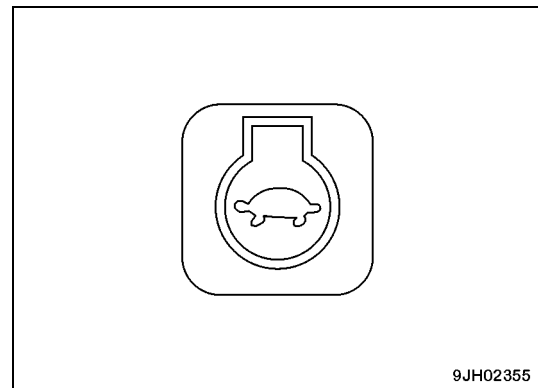
Auto-deceleration Monitor

This monitor (4) shows if the auto-deceleration function is being actuated.

The monitor display when the auto-deceleration switch is operated is as follows.

Auto-deceleration monitor **ON** : Auto-deceleration actuated

Auto-deceleration monitor **OFF** : Auto-deceleration canceled



Working Mode Monitor

This monitor (5) displays the set working mode.

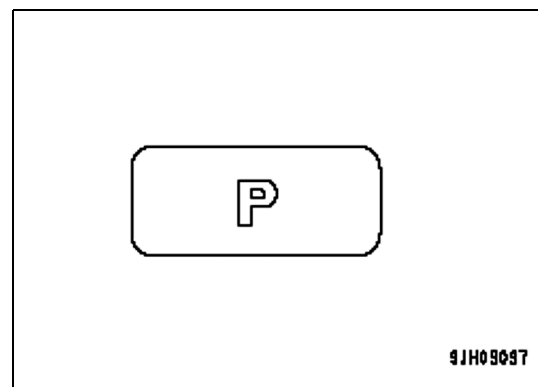
The monitor display when the working mode switch is operated is as follows.

P: P mode (for heavy-load operations)

E: E mode (for operations with emphasis on fuel economy)

L: L mode (for fine-control operations)

B: B mode (for breaker operations)

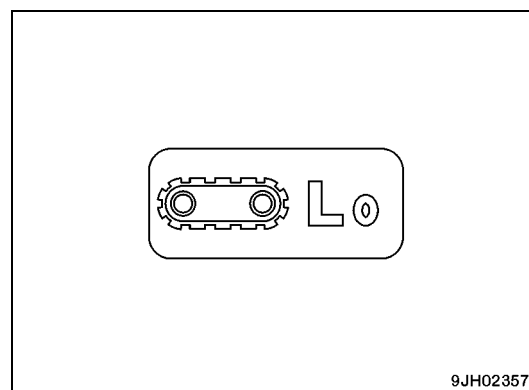


Travel Speed Monitor

This monitor (6) displays the set mode for the travel speed.

When the travel speed selector switch is operated the monitor displays one of the following selections.

- LO** : Low speed
- MI** : Medium speed
- HI** : High speed

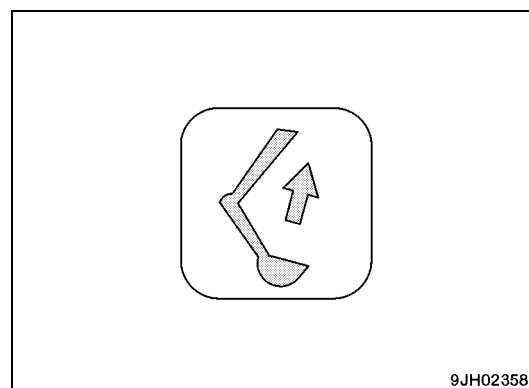


Power Max Monitor

This monitor (7) shows if the power max function is being actuated.

The monitor display (when the knob switch on the left control lever is operated) is as follows.

Monitor lights up: Digging power is increased while knob switch is kept pressed.

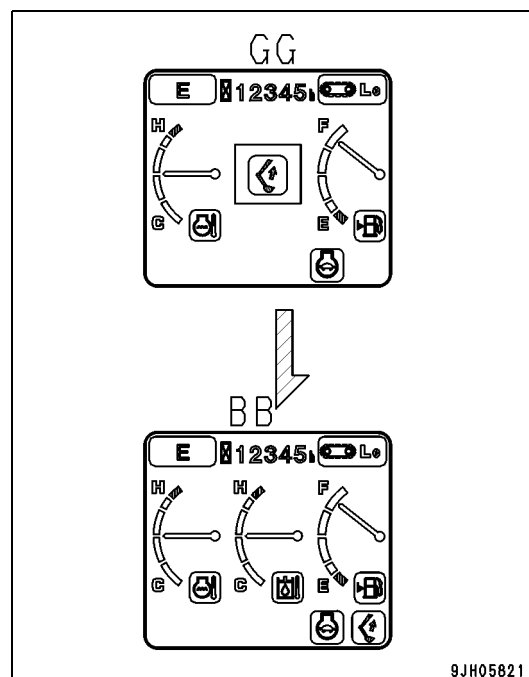


Remark

The digging power is increased while the knob switch is being pressed only for working modes P and E. Note that even if the knob switch is kept pressed, the increase in power ends after 8.5 seconds.

When the knob switch is pressed, the mode is displayed in the central portion of display (GG.) After 2 seconds, the monitor in the center goes out and the monitor display changes to screen (BB).

Monitor goes out: Power max function stopped



OPERATION

Gauges

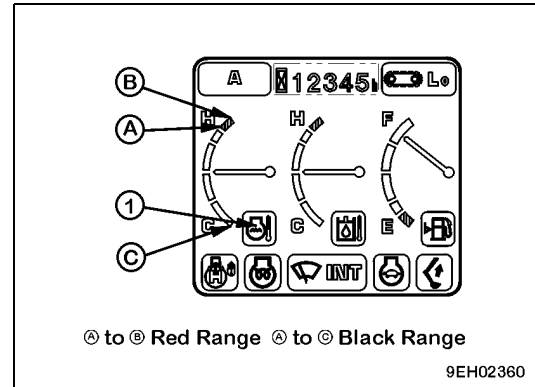
Engine Water Temperature Gauge

This meter (8) indicates the engine cooling water temperature.

During normal operations, the indicator should be in the black range. If the indicator enters the red range during operations, the overheat prevention system is actuated.

The overheat prevention system acts as follows.

- Red range position (A): Engine water temperature monitor (1) lights up red.
- Red range position (B): Engine speed is reduced to low idle, engine water temperature monitor lamp (C) lights up red, and the alarm buzzer sounds at the same time.



The overheat prevention system remains actuated until the indicator returns to the black range.

When the engine is started, if the indicator is at position (C), engine water temperature monitor (1) lights up white.

In this case, carry out the warm-up operation. For details, See “Warming Up Engine” on page 2-96.

Fuel Gauge

This meter (9) displays the level of fuel in the fuel tank.

During operations, the indicator should be in the black range.

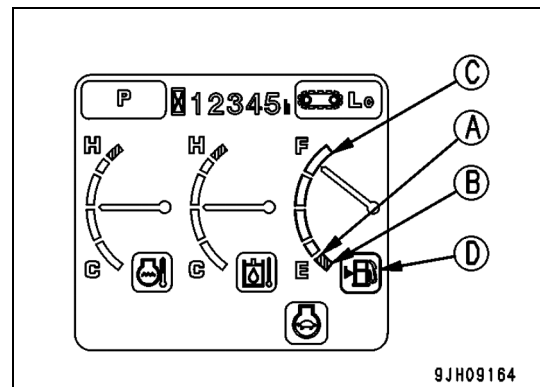
If the indicator enters red range (A) during operations, there are less than 100 ℓ (26.42 US gal) of fuel remaining in the tank, so check and add fuel.

Remark

If the indicator enters red range (B), there are less than 60 ℓ (15.85 US gal) of fuel remaining.

When the indicator is in the red range (A) to (B), fuel level monitor (D) lights up red.

The correct fuel may not be displayed for a short time when the ignition switch is turned ON, but this is not an abnormality.



Hydraulic Oil Temperature Gauge

This meter (10) displays the hydraulic oil temperature.

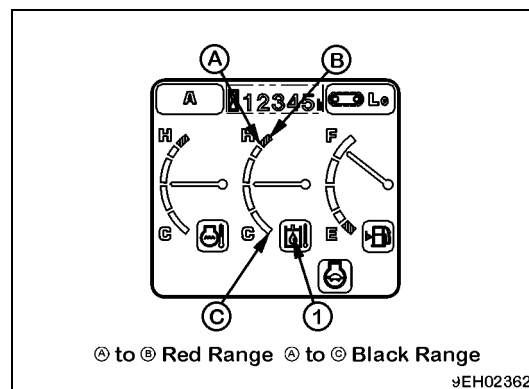
During operations, the indicator should be in the black range.

If the indicator enters red range (A) during operations, the hydraulic oil temperature has gone above 102°C (215.6°F). Stop the engine or run it at low idle and wait for the hydraulic oil temperature to go down.

Remark

When the indicator is in the red range (A) to (B), the hydraulic oil temperature is as follows.

- *When the indicator is in the red range (A) to (B), hydraulic oil temperature monitor (1) lights up red.*
- *If the indicator is at position (C) when the engine is started, the hydraulic oil temperature is more than 25°C (77°F), and hydraulic oil temperature monitor (1) lights up white. In this case, carry out the warm-up operation. For details, See “Warming up Hydraulic Equipment” on page 2-98.*



Remark

When the indicator is in the red range (A) to (B), the hydraulic oil temperature is as follows.

- *Red range position (A): More than 102°C (215.6°F)*
- *Red range position (B): More than 105°C (221°F)*

When the indicator is in the red range (A) to (B), fuel level monitor (D) lights up red.

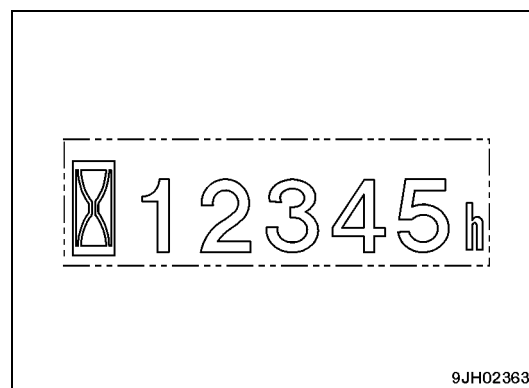
If the indicator is at position (C) when the engine is started, the hydraulic oil temperature is more than 25°C (77°F), and hydraulic oil temperature monitor (D) lights up white. In this case, carry out the warming-up operation. For details, See “Warming up Hydraulic Equipment” on page 2-98.

Service Meter

This monitor (11) displays the total time that the machine has been operated.

Use the time display to set the maintenance interval. When the ignition switch is ON, the service meter advances even if the machine is not moving.

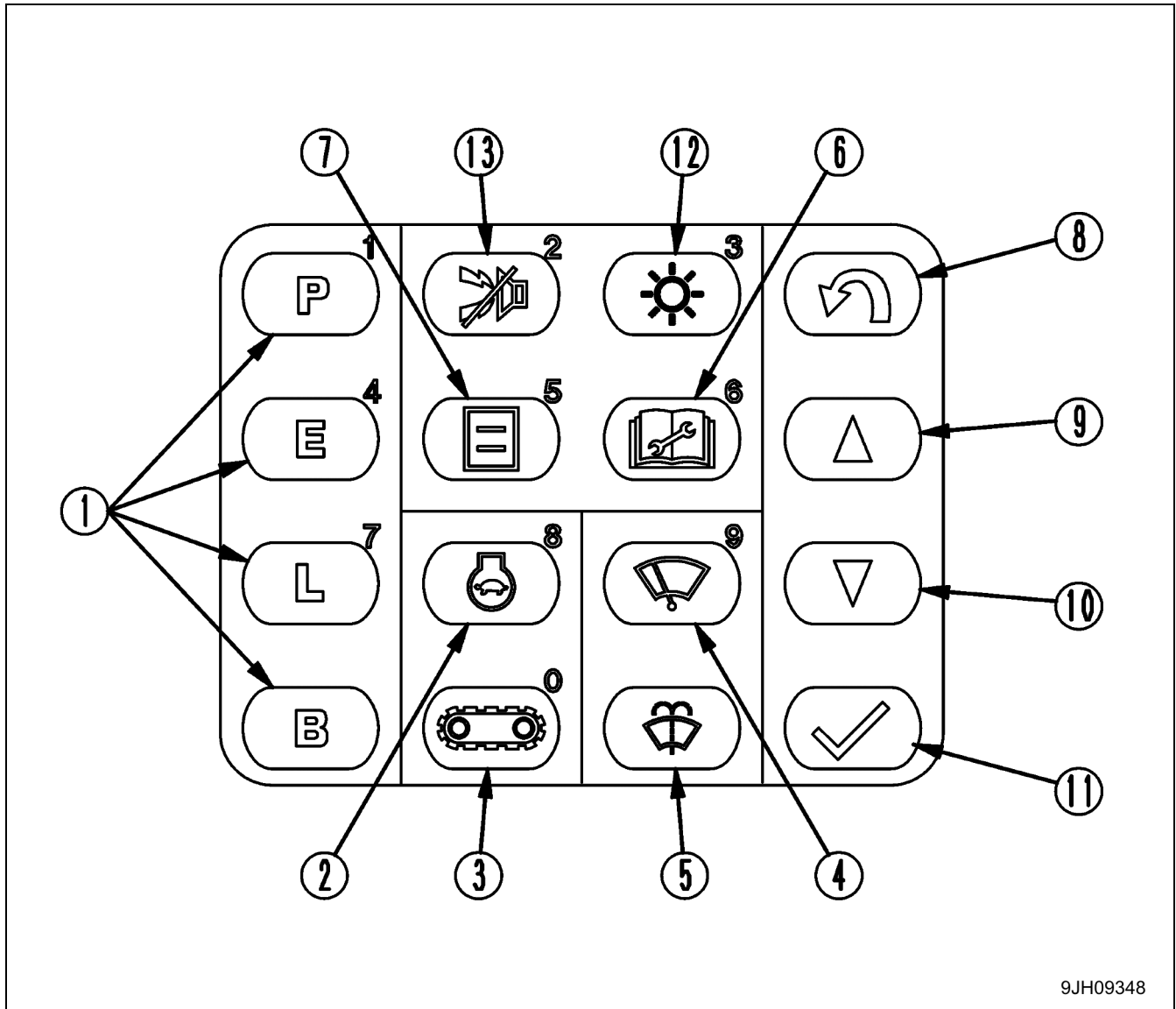
The service meter advances by one for every hour of operation, regardless of the engine speed.



MONITOR SWITCHES

These switches are contained in the monitor, they allow the operator the option of selecting the mode of operation for the machine. It is important to study the function of these switches and know when to use them in order to achieve the maximum performance from the machine.

Switch Layout View



- | | |
|--|--------------------------------------|
| 1. Working mode selector switch (basic switch) | 8. Back switch |
| 2. Auto-deceleration switch (selection switch) | 9. Up switch |
| 3. Travel speed switch | 10. Down switch |
| 4. Wiper switch | 11. Input confirmation switch |
| 5. Window washer switch | 12. Liquid crystal adjustment switch |
| 6. Maintenance switch | 13. Alarm buzzer stop switch |
| 7. Select switch | |

Working Mode Selector Switch

This switch (1) is used to set the power and movement of the work equipment.

Operations can be carried out more easily by selecting the mode to match the type of operation.

Remark

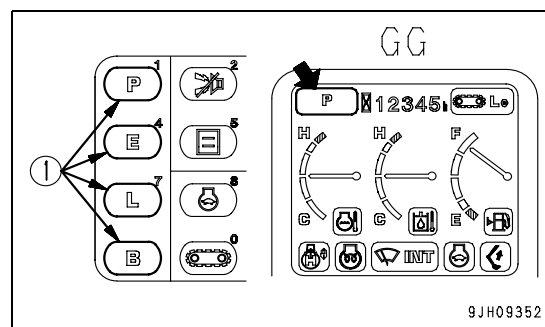
When using breaker, do not use the P mode. There is a danger the breaker may be damaged.

P mode : For heavy-load operations

E mode : For operations with emphasis on fuel economy

L mode : For fine-control operations

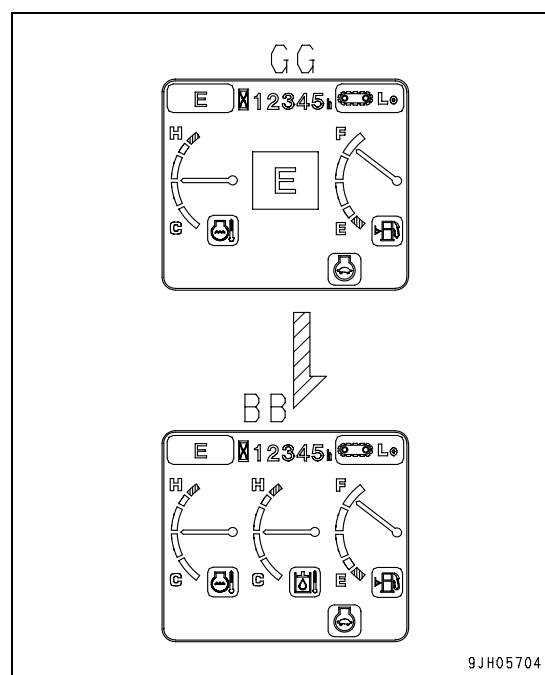
B mode : For breaker operations



- When the engine is started, the working mode is set automatically to P mode. When the switch is pressed, other modes are selectable. The monitor display GG on the monitor display portion changes for each mode.
- If it is desired to have the working mode set to start automatically in E, L, or B mode (default options setting), please ask your Komatsu distributor to change the setting.

Remark

When the mode selector switch is pressed, the mode is displayed in the center of the monitor display (GG), and the screen returns to the normal screen (BB) after two seconds. (The diagram on the right is an example of the display for the E mode.)



OPERATION

Auto-deceleration Switch

When this auto-deceleration switch button (2) is depressed, the auto-deceleration is actuated, if the control levers are in the neutral position, the engine speed is automatically lowered to reduce fuel consumption.

Monitor display **ON** : Auto-deceleration actuated

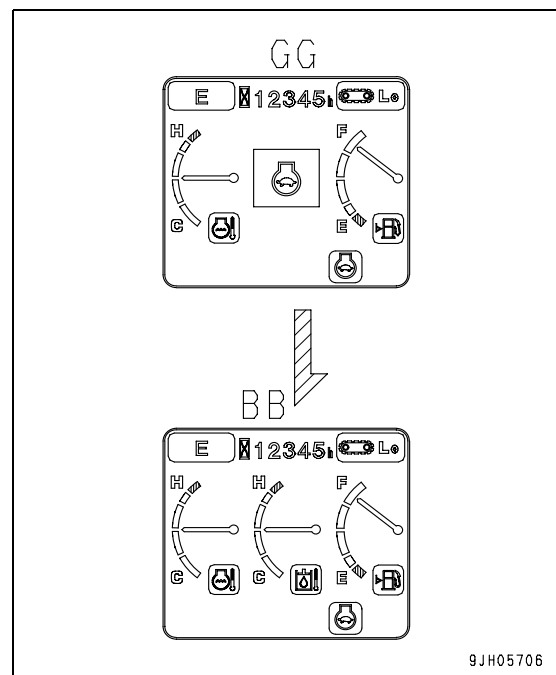
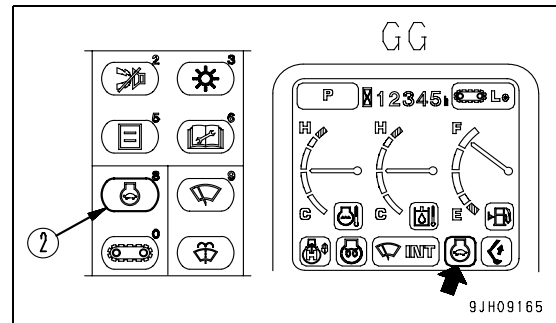
Monitor display **OFF** : Auto-deceleration canceled

Each time that the switch is pressed, the auto-deceleration switches between actuated and canceled.

- Auto-deceleration function
 - When the auto-deceleration function is ON, if the work equipment and travel levers are returned to the N position, the engine speed will drop after 4 seconds from the operating speed to idling speed.
 - This makes it possible to reduce fuel consumption.
 - If any lever is operated when the machine is in this condition, engine speed will return to the previous operating speed to make it possible to perform operations.

Remark

When the auto-deceleration switch is pressed and the auto-deceleration is actuated, the mode is displayed in the center of the monitor display (GG), and the screen returns to the normal screen (BB) after two seconds.



Travel Speed Selector Switch

! WARNING

- When loading or unloading from a trailer, always travel at low speed (with the travel speed selector switch (3) at the Lo position).
Never operate the travel speed selector switch (3) during the loading or unloading operation.
- If the travel speed is switched between high and low when the machine is traveling, the machine may deviate to one side, even when traveling in a straight line.
Stop the machine before switching the travel speed.

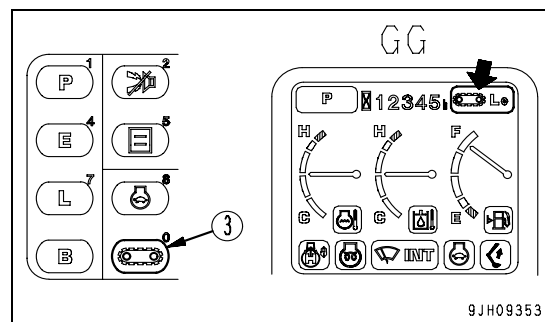
This switch (3) is used to set the travel speed to three stages.

- Lo lights up : Low-speed travel
- Mi lights up : Medium-speed travel
- Hi lights up : Hi-speed travel

When the engine is started, the speed is automatically set to Lo.

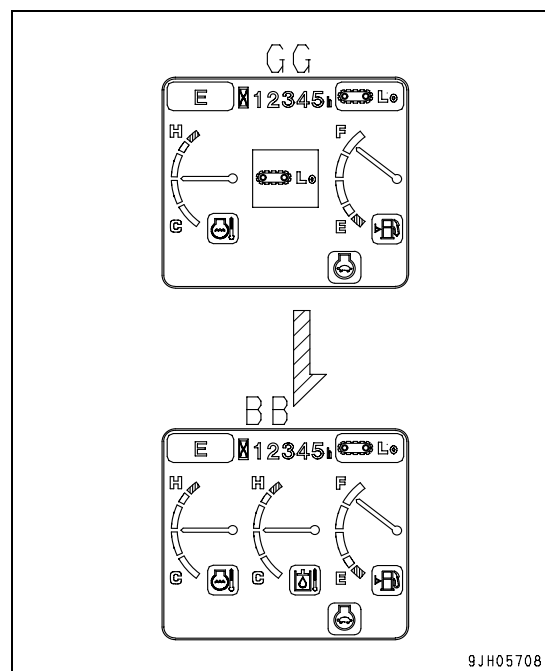
Each time that the switch is pressed, the display changes Lo → Mi → Hi → Lo in turn.

When traveling in high speed (Hi) or medium speed (Mi), if travel power is needed, such as when traveling on soft ground or on slopes, the speed automatically switches to low speed (Lo), there is no need to operate the switch. The monitor display (GG) stays at Hi or Mi.



Remark

Each time that the travel speed selector switch is operated, the mode is displayed in the center of the monitor display portion (GG), and the screen (BB) returns to the normal screen after two seconds.



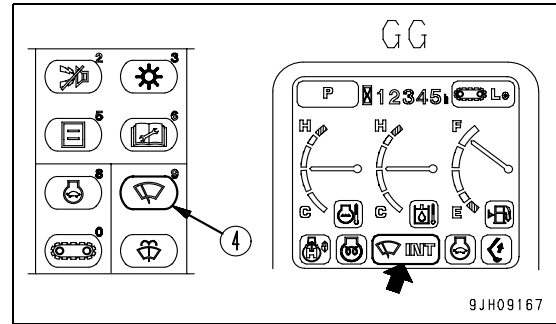
OPERATION

Wiper Switch

This switch (4) operates the wiper for the front glass.

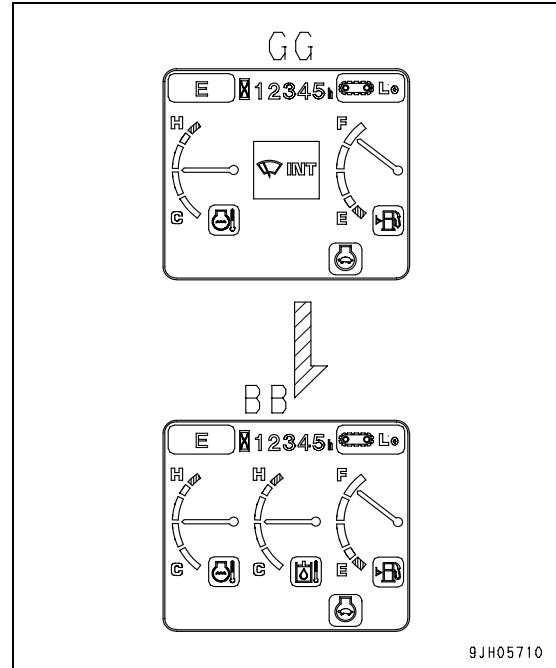
Each time the switch is pressed, it changes ON → INT → stop (OFF).

Display (GG) INT is illuminated	Wiper moves intermittently
Display (GG) ON is illuminated	Wiper moves continuously
Display (GG) OFF is illuminated	Wiper stops



Remark

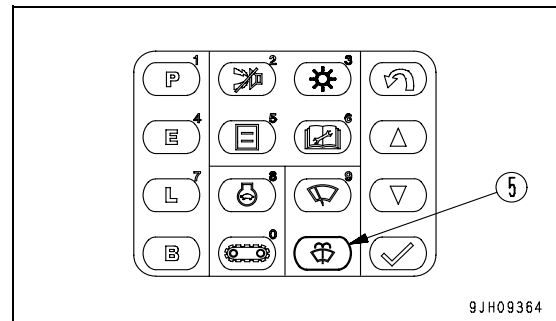
Each time the wiper switch is operated, the mode is displayed in the center of the monitor display (GG). The screen returns to the normal screen (BB) after two seconds.



Window Washer Switch

When this switch (5) is kept continuously pressed, window washer fluid is sprayed out on the front glass. When the switch is released, the spray stops.

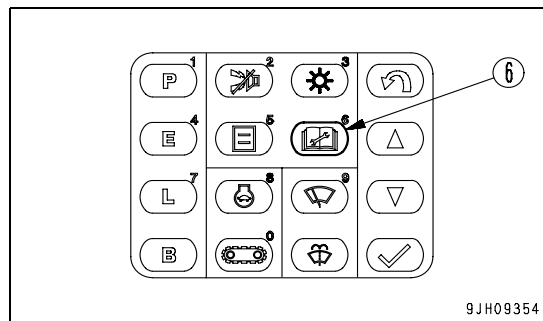
- If switch (5) is kept pressed when the wiper is stopped, the window washer fluid will spray out, and at the same time, the wiper will be actuated continuously. When switch (5) is released, the wiper will continue to operate continuously for two cycles, and will then stop.
- If the wiper is moving intermittently and switch (5) is kept pressed continuously, the window washer fluid will spray out, and at the same time, the wiper will be actuated continuously. When switch (5) is released, the wiper will continue to operate continuously for two cycles, and will then return to intermittent operation.



Maintenance Switch

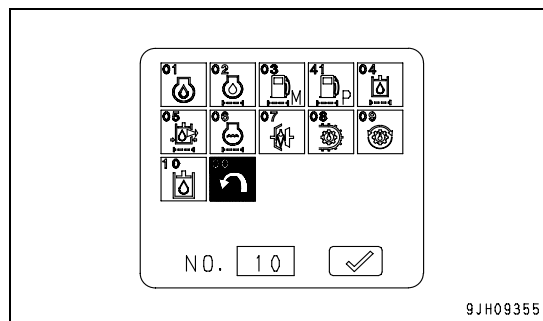
This switch (6) is used to check the time remaining to maintenance.

When this switch (6) is pressed, the screen on the monitor display changes to the maintenance screen shown in the diagram on the right.



The time remaining to maintenance is indicated by the color of each monitor display. After confirming the maintenance time, carry out the maintenance.

White display	More than 30 hours remaining to maintenance
Yellow display	Less than 30 hours remaining to maintenance
Red display	Maintenance time has already passed

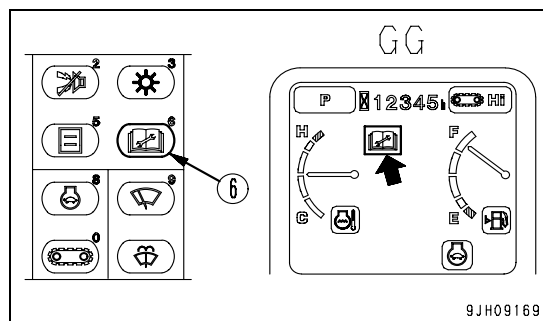


Remark

If the monitor display (GG) changes to the maintenance warning screen when the engine is started or when the machine is being operated, stop operations immediately. When this happens, the monitor corresponding to the maintenance warning screen will light up red.

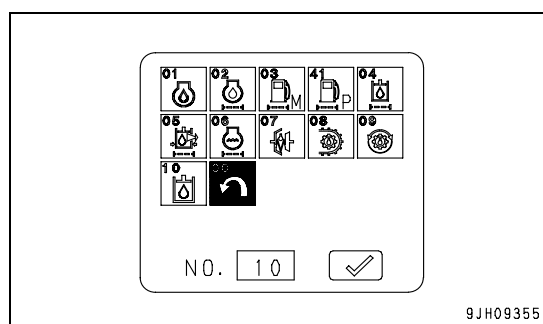
Press switch (6) to display the maintenance screen and check to be sure there is no abnormality in any other monitor.

If another monitor is lit up red on the maintenance screen, carry out maintenance for that item also.



The maintenance display items are as follows.

Monitor No.	Maintenance Item	Default set screen (H)
01	Change engine oil	500
02	Replace engine oil filter	500
03	Replace fuel filter	1000
41	Replace fuel pre-filter	500
04	Replace hydraulic oil filter	1000
05	Replace hydraulic tank breather	500
06	Replace corrosion resistor	1000
07	Check damper case oil level, add oil	1000
08	Change final drive case oil	2000
09	Change swing machinery case oil	1000
10	Change hydraulic oil	5000

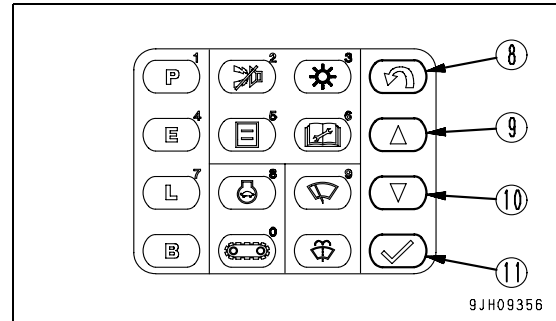


- If it is desired to change the setting for the maintenance interval, please contact your Komatsu distributor.

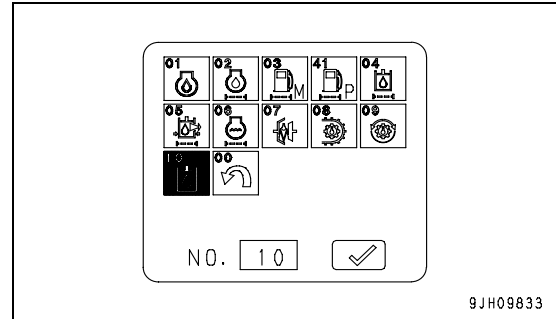
OPERATION

The method of checking the time remaining to maintenance is as follows.

1. Look at the maintenance screen, press up switch (9) or down switch (10) on the monitor switch portion, and select the item. (The color of the monitor for the selected item is inverted to black.)



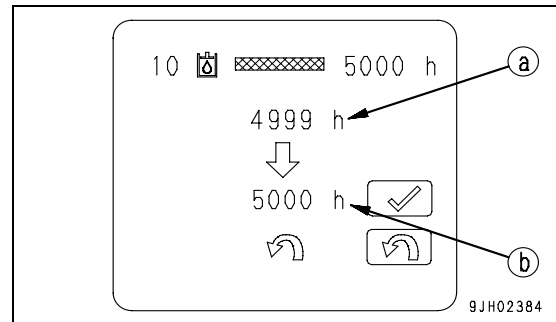
2. After selecting the monitor item, press input confirmation switch (11). The display screen will switch to the time remaining to maintenance. (Press back switch (8) to return to the previous screen.)



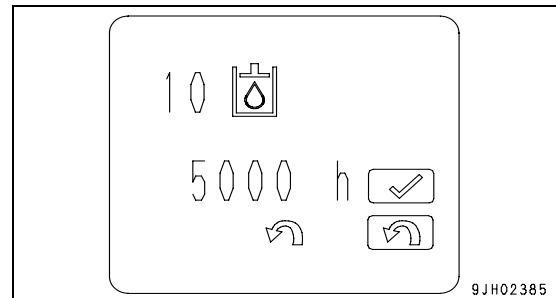
3. Check the time remaining to maintenance.
 - (a): Time remaining to maintenance
 - (b): Default setting for maintenance interval

When only checking the time remaining to maintenance, press back switch (8) twice. The screen will return to the normal operation monitor screen.

When canceling the time remaining to maintenance and returning to the default time setting, press input confirmation switch (11). The screen will switch to the default setting screen.



4. After checking the time on the default setting screen, press input confirmation switch (11). The screen will return to the maintenance screen. (Press back switch (8) to return to the previous screen.)



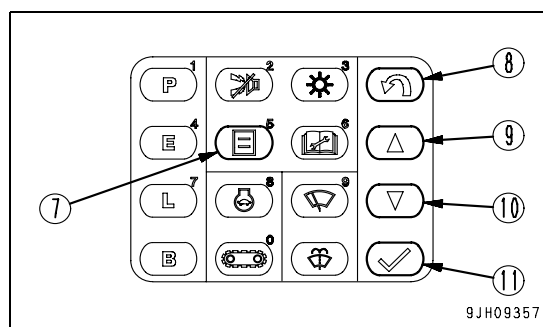
Select Switch

These switches (7) are used when adjusting the E mode set values or when adjusting the oil flow when an attachment is installed.

ADJUSTING E MODE SET VALUES

When the E mode set values are adjusted, the engine output is adjusted, making it possible to improve the fuel consumption in E mode.

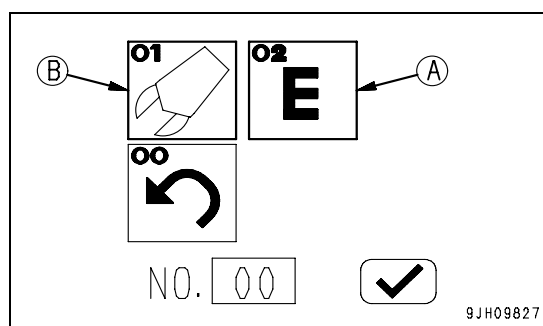
1. Press selector switch (7).



2. The monitor display screen switches to the selection screen shown on the right.

Use UP switch (9) and DOWN switch (10) to select the E mode set values (A), then press Enter switch (11) to accept the change.

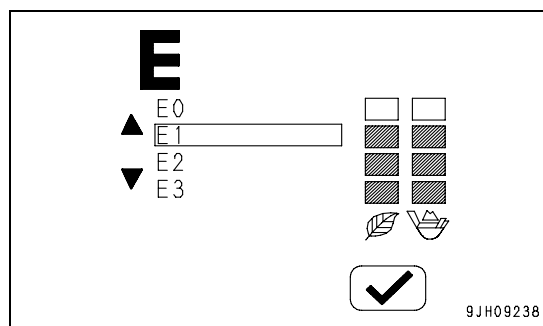
(The selected monitor is highlighted in black.)



3. The monitor display screen switches to the adjustment screen shown on the right.

Use UP switch (9) and DOWN switch (10) to select the set values. The relationship between fuel consumption and production is as follows.

- E0:** Default (maximum emphasis given to production over fuel consumption)
- E1:** Economy mode adjustment 1 (priority given to production)
- E2:** Economy mode adjustment 2 (priority given to fuel consumption)
- E3:** Economy mode adjustment 3 (maximum emphasis given to fuel consumption over production)



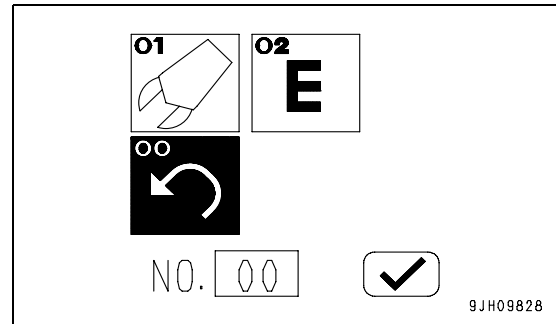
Remark

The closer the selection is made to E3, the better the fuel consumption becomes, but the production is reduced accordingly.

4. Press enter switch (11) to accept the set values.

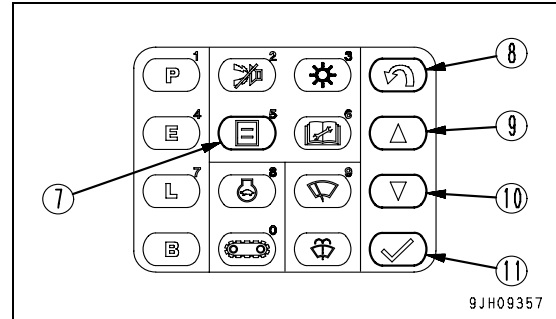
OPERATION

- The monitor display screen switches to the selection screen shown on the right.
Press return switch (8).
The monitor display screen returns to the standard screen.

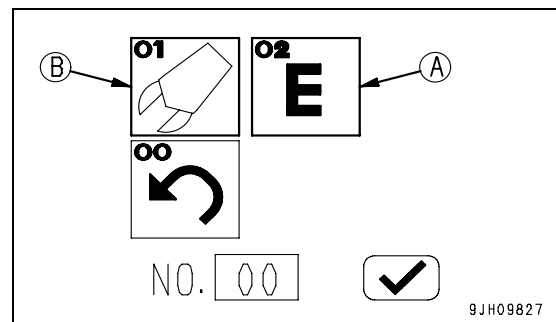


SETTING OIL FLOW

- Press selector switch (7).



- The monitor display screen switches to the selection screen shown on the right.
Use UP switch (9) and DOWN switch (10) to select the oil flow setting (B), then press Enter switch (11) to accept the change.
(The selected monitor is highlighted in black.)



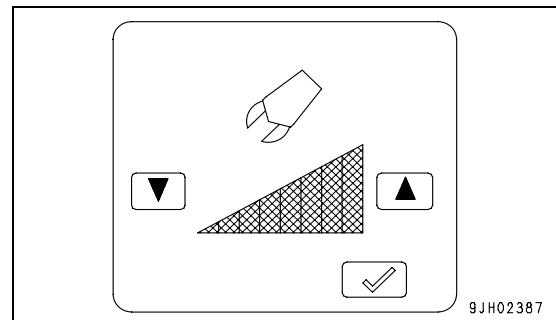
Remark

Oil flow setting (B) can be selected only on machines with an attachment installed.

When working mode is P mode or E mode

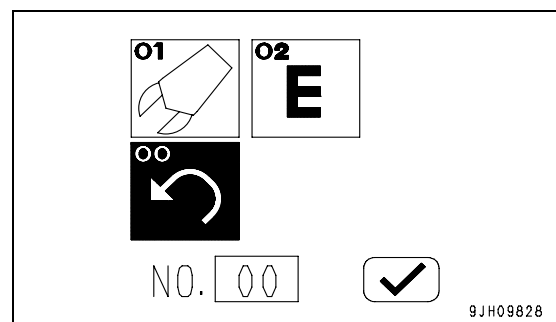
- The monitor display screen switches to the oil flow setting screen shown on the right.

Use UP switch (9) and DOWN switch (10) to select the desired oil flow. One segment is approximately 70 l/min. (18.49 US gal/min.)
Full oil flow: approximately 535 l/min (141.35 US gal/min.)
- After selecting the oil flow, press Enter switch (11) to accept the change.
- The monitor display screen switches to the selection screen shown on the right.
Press return switch (8).
The monitor display screen returns to the standard screen.



Remark

Even when the ignition switch is turned OFF, the oil flow set by the above operation remains as the set value when the engine is started next.

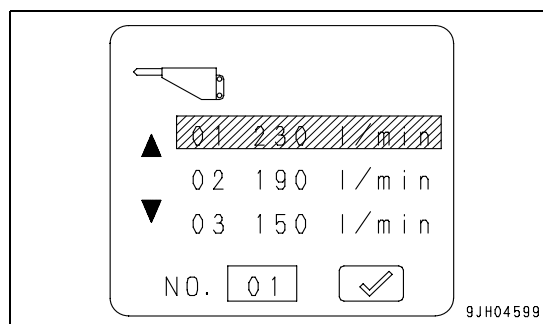


When working mode is B mode

1. The monitor display screen switches to the selection screen shown on the right.

Use UP switch (9) and DOWN switch (10) to select the desired oil flow.

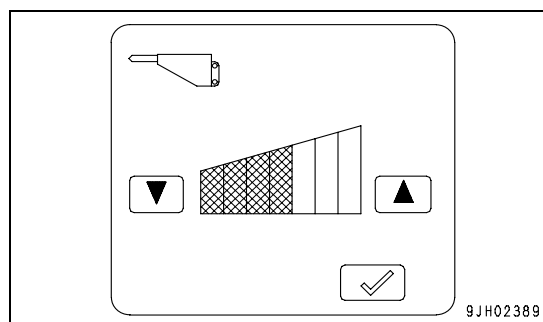
2. After selecting the oil flow, press Enter switch (11).



3. The monitor display screen switches to the oil flow setting screen shown on the right.

Use UP switch (9) and DOWN switch (10) to select the desired oil flow. One segment is approximately 20 l/min (5.28 US gal/min).

4. After fine adjustment of the oil flow is completed, press Enter switch (11) to accept the change.



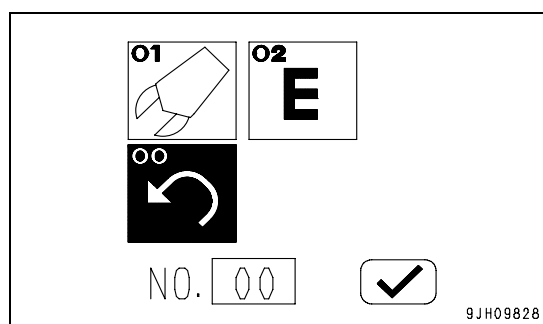
5. The monitor display screen switches to the selection screen shown on the right.

Press return switch (8).

The monitor display screen returns to the standard screen.

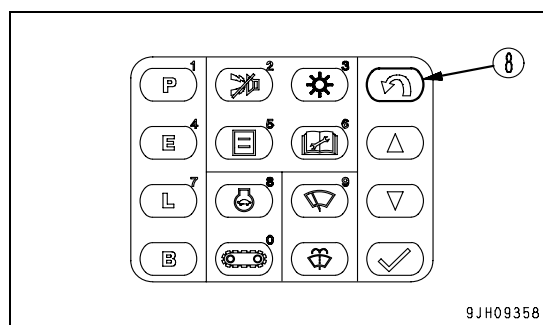
Remark

Even when the ignition switch is turned OFF, the oil flow set by the above operation remains as the set value when the engine is started next.



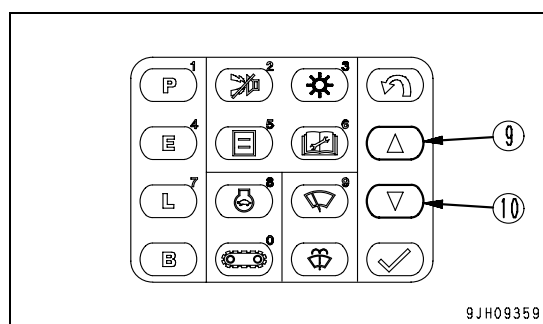
Back Switch

Press this switch (8) when in the maintenance mode, brightness/contrast adjustment mode, or select mode. The screen will return to the previous screen on the monitor display.



Up Switch, Down Switch

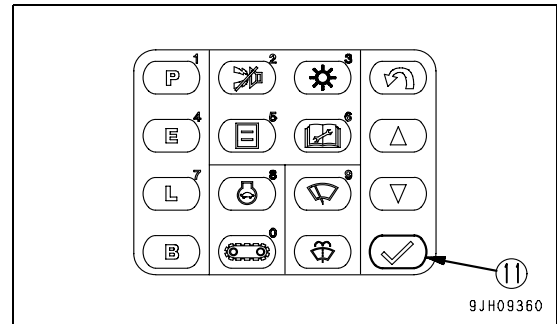
Press up switch (9) or down switch (10) when in the maintenance mode, brightness/contrast adjustment mode, or select mode to move the cursor on the monitor display (colors of selected monitor are inverted) up, down, left, or right.



OPERATION

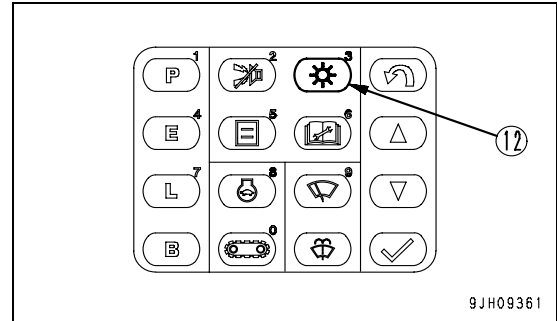
Input Confirmation Switch

Press this switch (11) to confirm the selected mode when in the maintenance mode, brightness/contrast adjustment mode, or select mode.



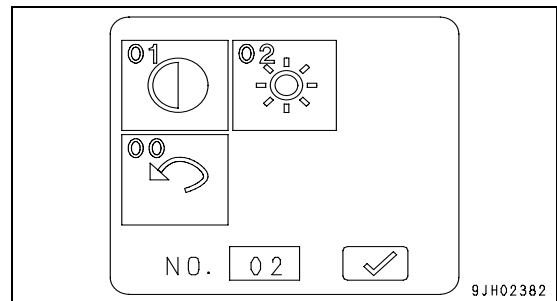
Liquid Crystal Adjustment Switch

Press switch (12) to adjust the brightness or contrast of the display monitor.

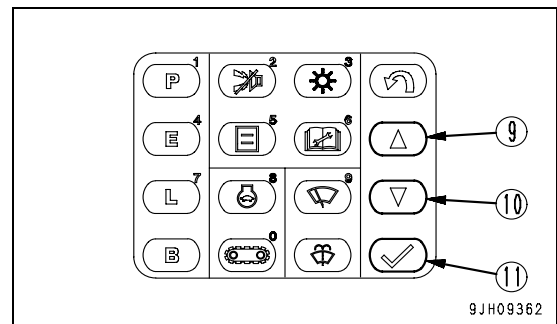


Adjusting Brightness

1. When monitor adjustment switch (12) is pressed, the monitor display screen changes to the brightness/contrast screen shown in the diagram on the right.

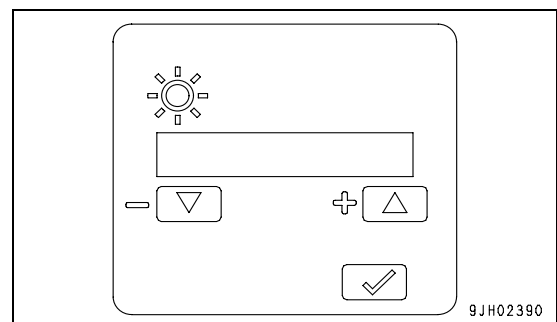


2. Use the brightness/contrast screen and press up switch (9) or down switch (10) to select brightness of the monitor. (The selected monitor is inverted to black.)



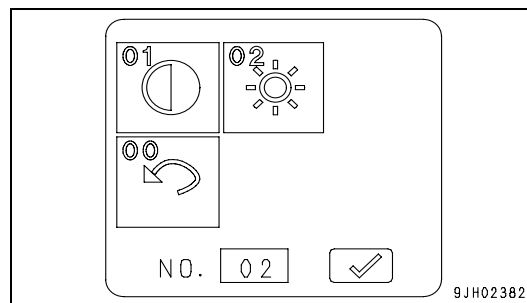
3. When the screen changes to the brightness adjustment screen, press up switch (9) or down switch (10) to adjust the brightness.

4. After completing adjustment of the brightness, press input confirmation switch (11).

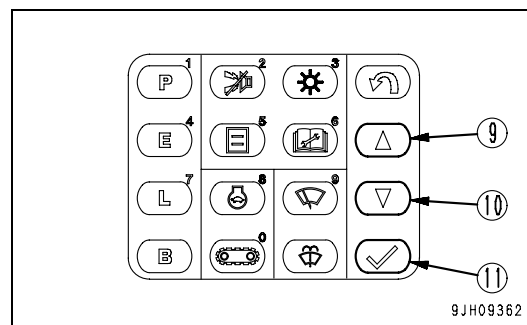


Adjusting Contrast

1. When monitor adjustment switch (12) is pressed, the monitor display screen changes to the brightness/contrast screen shown in the diagram on the right.

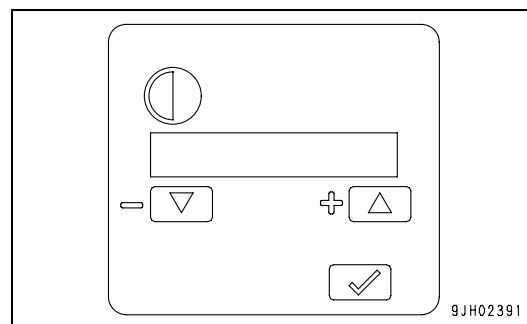


2. Use the brightness/contrast screen and press up switch (9) or down switch (10) to select the contrast monitor. (The selected monitor is inverted to black.)



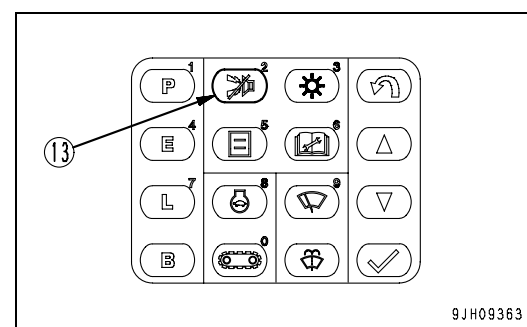
3. When the screen changes to the contrast adjustment screen, press up switch (9) or down switch (10) to adjust the contrast.

4. After completing adjustment of the contrast, press input confirmation switch (11).



Alarm Buzzer Stop Switch

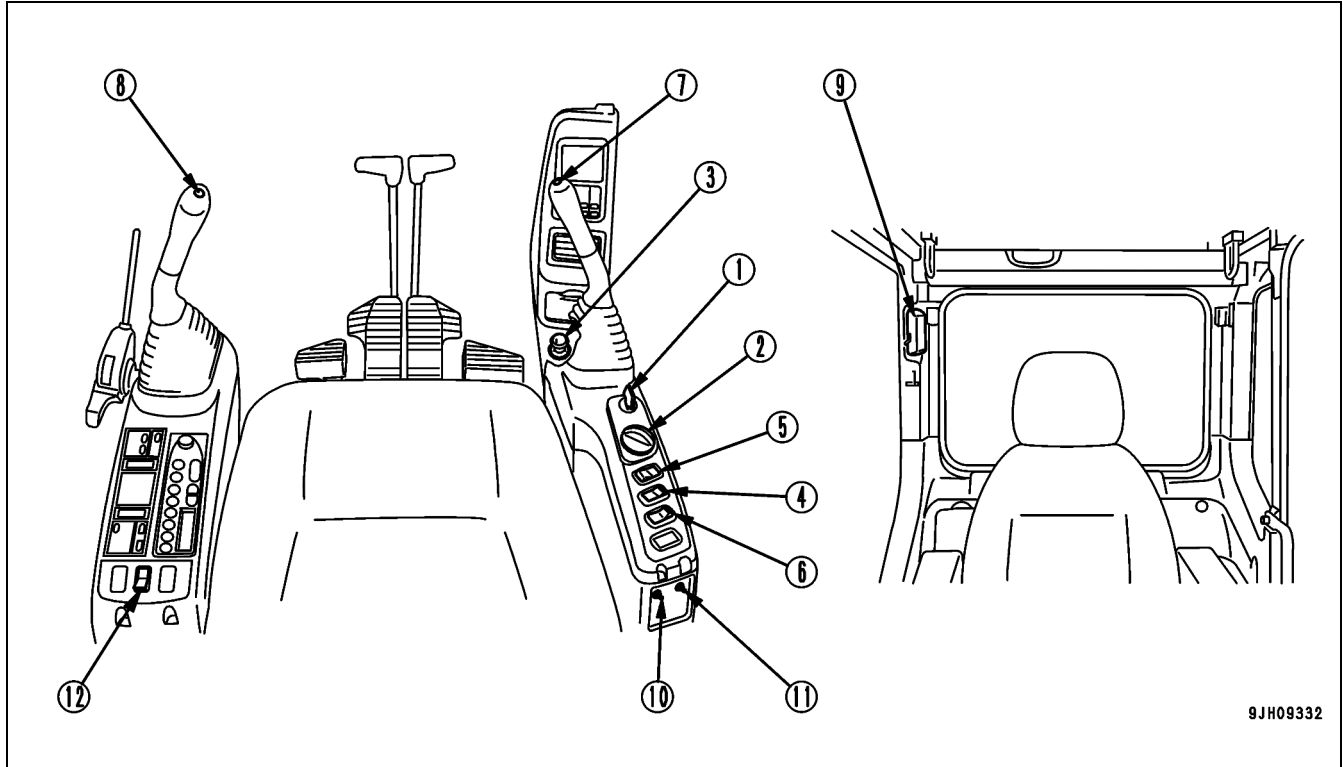
Use this switch (13) to stop the alarm buzzer when it is sounding during operation to indicate an abnormality in the warning item.



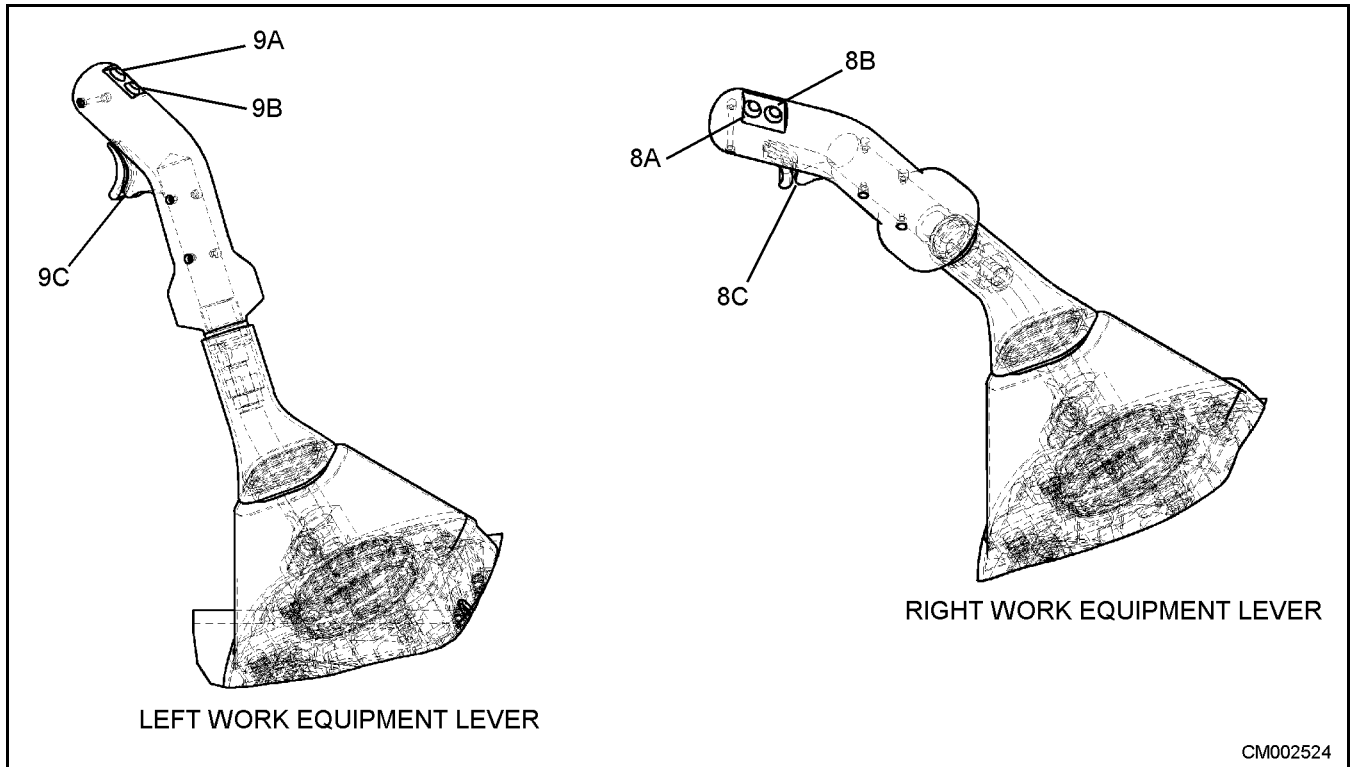
CONSOLE CONTROL SWITCHES

In addition to the monitor switches these control switches are located on the left and right console but work in conjunction with the monitor system.

Switch Layout View



- | | |
|---------------------------|---|
| 1. Ignition switch | 7. Horn button |
| 2. Fuel control dial | 8. One-touch power max. switch |
| 3. Cigarette lighter | 9. Cab lamp switch |
| 4. Swing lock switch | 10. Emergency pump drive switch |
| 5. Lamp switch | 11. Swing brake cancel switch |
| 6. Machine push-up switch | 12. Revolving warning lamp switch (if equipped) |



8A. Horn Switch

8B. Log Loader Grapple Rotation CW or Road Builder an inactive switch

8C. Log Loader Grapple Close or Road Builder Thumb Close

9A. Power Max switch

9B. Log Loader Grapple Rotation CCW or Road Builder an inactive switch

9C. Log Loader Grapple Open or Road Builder Thumb Open

OPERATION

Ignition Switch

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

-OFF position

The key can be inserted or withdrawn. The switches for the electric system except the room lamp, are all turned off and the engine is stopped.

-ON position

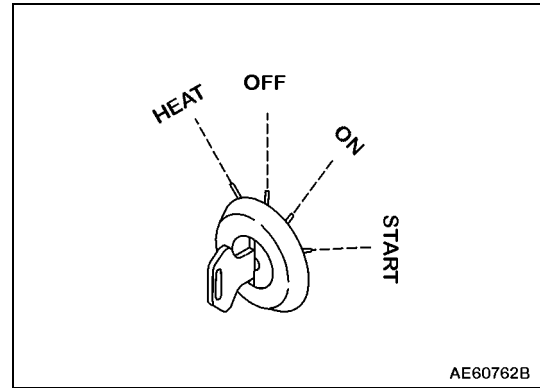
Electric current flows in the charging and lamp circuits. Keep the ignition switch key at the ON position while the engine is running.

-START position

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

-HEAT (preheat) position

When starting the engine in winter, set the key to this position. When the key is set to the HEAT position, the pre-heating monitor lights up. Keep the key at this position until the monitor lamp flashes. Immediately after the pre-heating monitor flashes, release the key. The key automatically returns to the OFF position. Then, start the engine by turning the key to the START position.



Engine Speed Control Dial

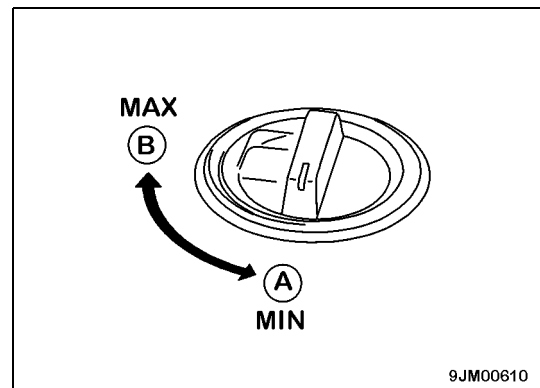
This dial (2) is used to control the engine speed and output.

A. Low idle (min) Turned fully to the left (counterclockwise)

B. High idle (max) Turned fully to the right (clockwise)

Remark

Even if the fuel control dial is turned several notches up from low idling position (a) or down from full speed position (b), there is a range where the engine speed does not change, but this is not an abnormality.

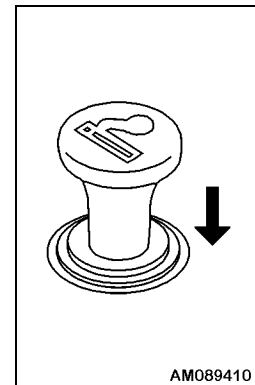


Cigarette Lighter

This switch (3) is used when lighting cigarettes.

When the cigarette lighter is pushed in, it will return to its original position after several seconds. Pull it out to use it.

If the cigarette lighter is removed, it can be used as the power source for the yellow hazard lamp. The capacity of the cigarette lighter is 85 W (24 V x 3.5 A).



Swing Lock Switch

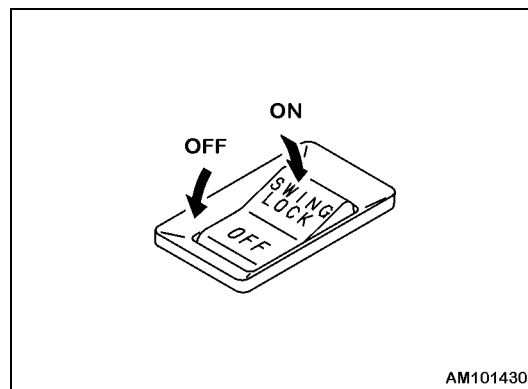
⚠ WARNING

When traveling or when not using the swing operation, apply the swing lock.

On slopes, even when the swing lock switch is at the ON position, the weight of the work equipment may cause the upper structure to swing if the swing control lever is operated in the downhill direction.

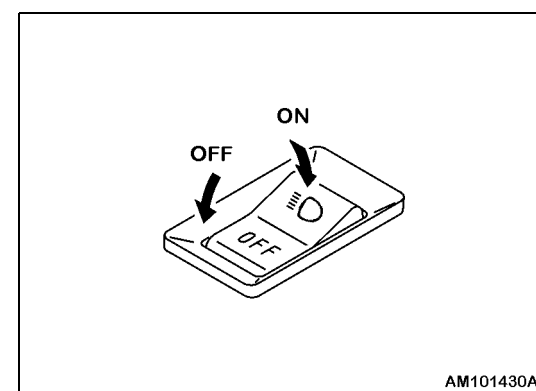
This switch (4) is used to lock the upper structure so that it cannot swing.

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 the control levers of the work equipment are at neutral; when any one of the control levers is operated, it is cancelled. The swing lock is actuated approximately 5 seconds after all the control levers are placed in the neutral position.



Lamp Switch

This switch (5) is used to light up the front lamps, working lamp, additional lamp at the top front of the cab, rear lamp, and monitor lighting.



Machine Push-up Switch

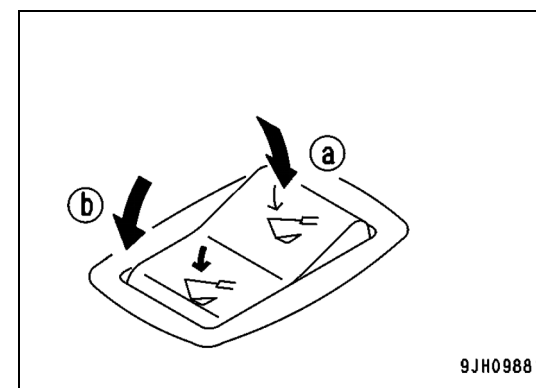
This switch (6) is used to switch the safety valve set pressure at the head end of the boom cylinder to two levels.

(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:

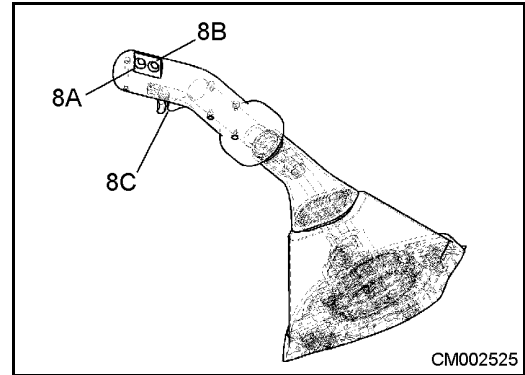
The thrusting force of the boom becomes more powerful, so it is easy to escape from soft ground.



OPERATION

Horn Switch

When the button (8A) on the right work equipment control lever is pressed, the horn will sound.



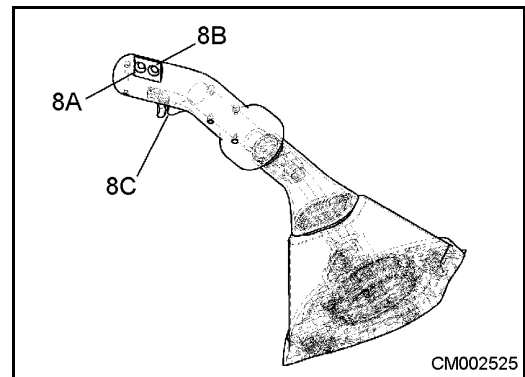
Log Loader Grapple Rotation CW Switch

Log loader grapple rotation clock wise switch (8B) is located on the right work equipment control lever or on

ROAD BUILDER - switch (8B) is inactive.

Log Loader Grapple Close Switch

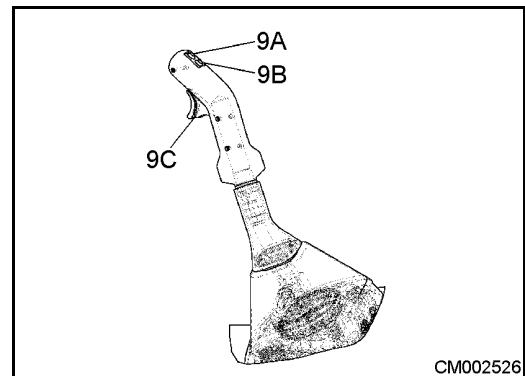
Log loader grapple close switch (8C) is located on the right work equipment control lever or on the ROAD BUILDER, thumb close switch (8C).



Power Max Switch

Switch (9A) is located (top one) on the left work equipment control lever is used to actuate the power max and slow down functions.

Press once (single click) and keep the switch pressed. The one touch power max. function is actuated for a maximum of 8.5 seconds in A and E mode.

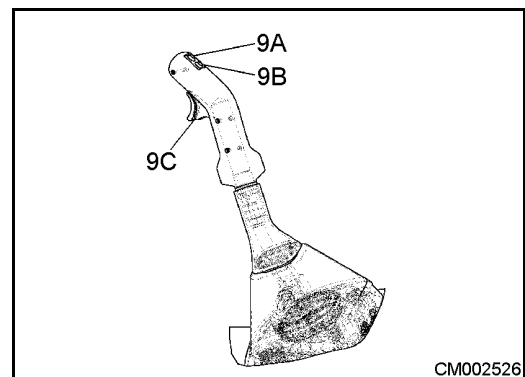


Log Loader Grapple Rotation CCW Switch

Log loader grapple rotation counter clock wise switch (9B) (bottom switch) is located on the left work equipment control lever and is used to rotate the grapple counter clock wise or on the ROAD BUILDER - switch (9B) is inactive.

Log Loader Grapple Open Switch

Log loader grapple open switch (9C) is located on the left work equipment control lever or on ROAD BUILDER thumb open switch (9C).



Cab Lamp Switch

Remark

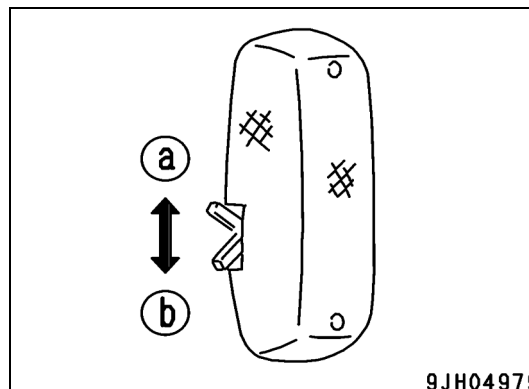
Be sure to switch the lamp to the OFF position after use. If the switch is left at the ON position, the battery will run down.

This switch (9) is used to light up the room lamp.

ON position..... Lights up

OFF position..... Goes out

It will also light up even when the engine is not running.



Emergency Pump Drive Switch

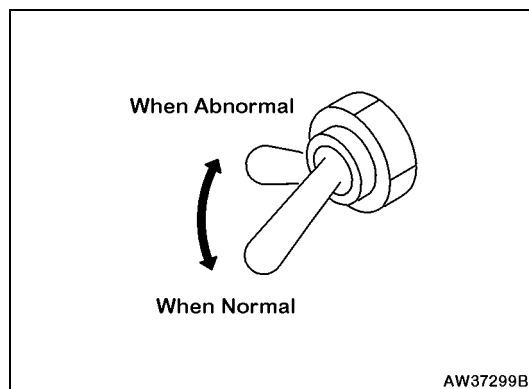
Remark

This switch is installed to make it possible to carry out operation temporarily if any abnormality should occur in the pump control system. It is not intended for permanent use. Repair the cause of the abnormality immediately.

This switch (10) is used to make it possible to carry out operations temporarily if any abnormality should occur in the pump control system (when the display shows E02).

When normal..... Move switch down

When abnormal..... Move switch up



If the display shows E02, move the switch up to make it possible to carry out work.

Swing Brake Cancel Switch

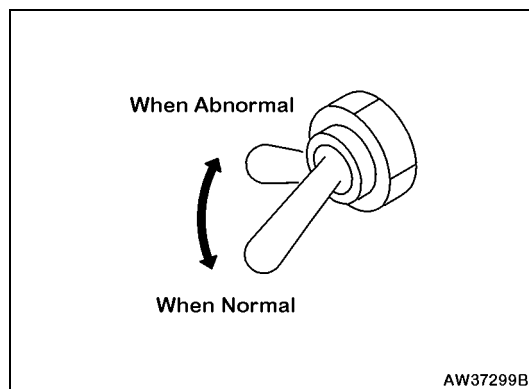
Remark

This switch is installed to make it possible to carry out operation temporarily if any abnormality should occur in the swing brake system. It is not intended for permanent use. Repair the cause of the abnormality immediately.

This switch (11) is used to make it possible to perform operations temporarily if any abnormality occurs in the swing brake system (when the display shows E03).

When normal..... Move switch down

When abnormal..... Move switch up

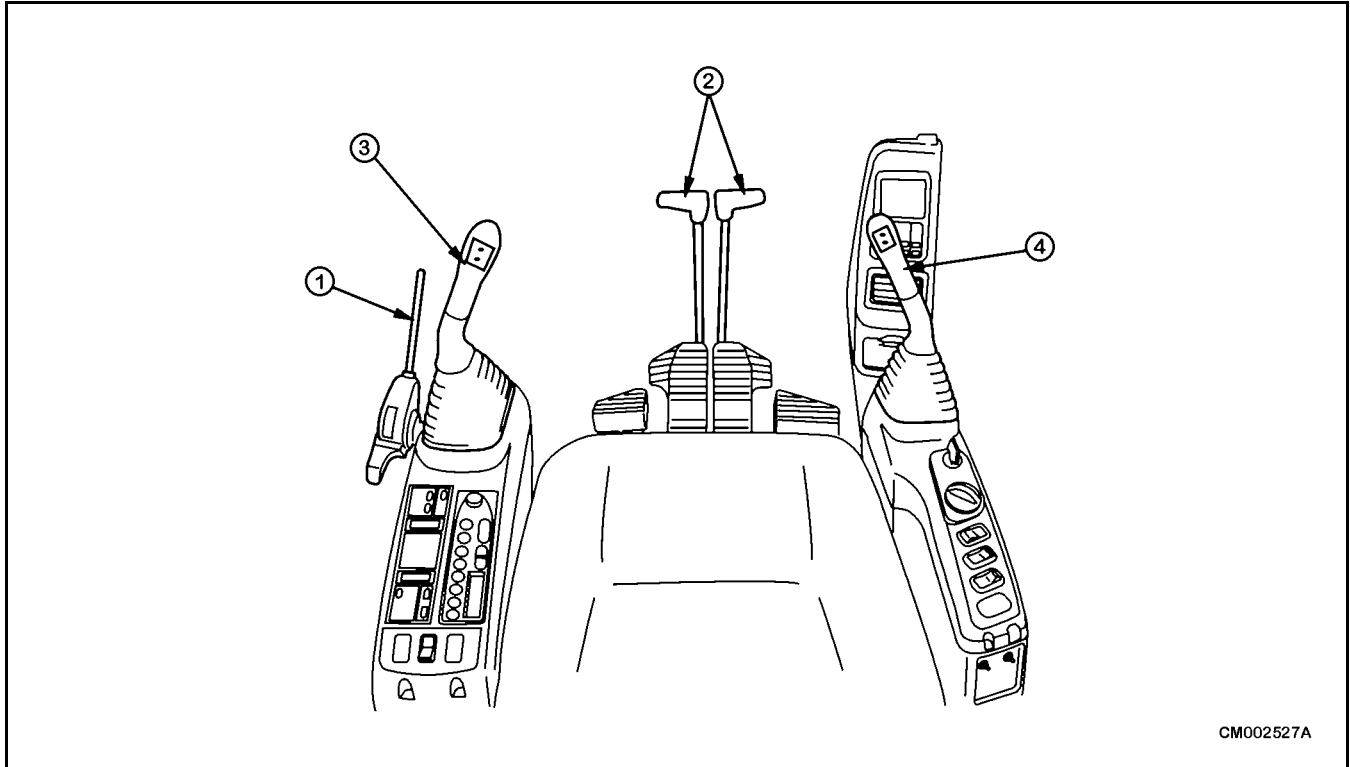


If the display shows E03, move the switch up to make it possible to carry out work.

CONTROL LEVERS AND PEDALS

The control levers and pedals are used to travel with the machine and operate the work equipment. It is important to become familiar with these functions as they relate to the movement of the machine and its work equipment. Failure to do so may lead to damage to the machine or surrounding property as well as injury to the operator or other personnel.

Lever Layout View



CM002527A

1. Safety lock lever
2. Travel levers (With pedals and auto-deceleration system)
3. Left work equipment control lever
4. Right work equipment control lever

Safety Lock Lever

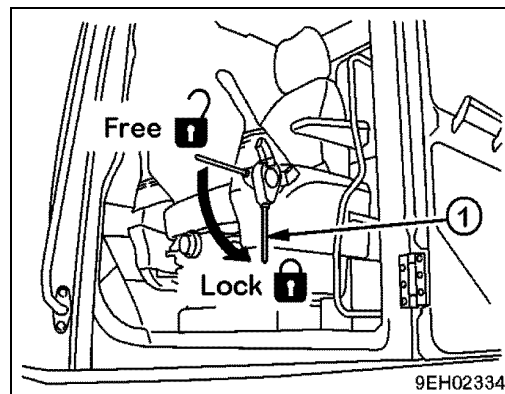
! WARNING

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 to be sure the condition of the lock 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.



Lock lever (1) is a device, which locks the work, swing, and travel equipment, and attachment (if equipped) control levers.

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

! 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.

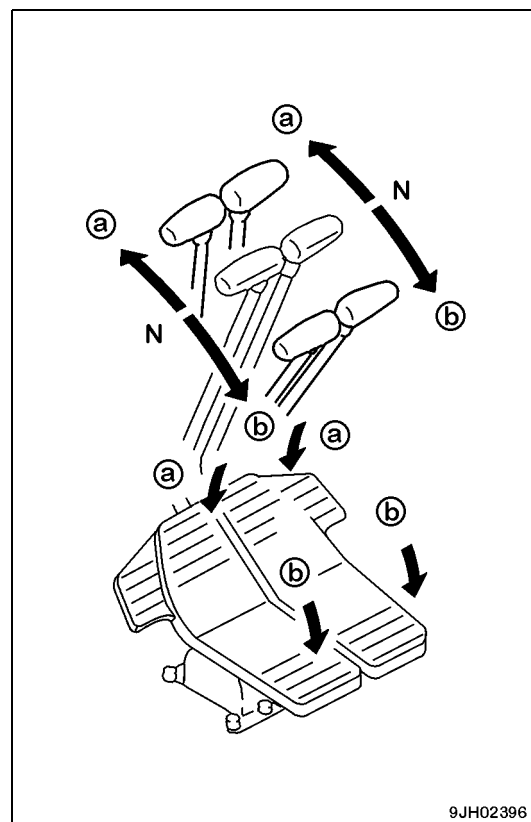
With the track frame facing to the rear, the machine will move in the reverse direction by forward traveling and in the forward direction by reverse traveling.

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.

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

(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

If the lever is shifted to the FORWARD or REVERSE position from the Neutral position, the alarm sounds to warn that the machine is starting to move.

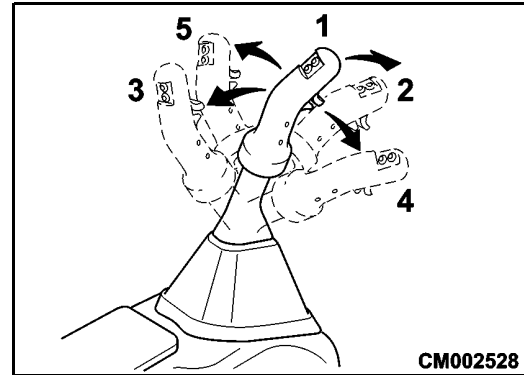
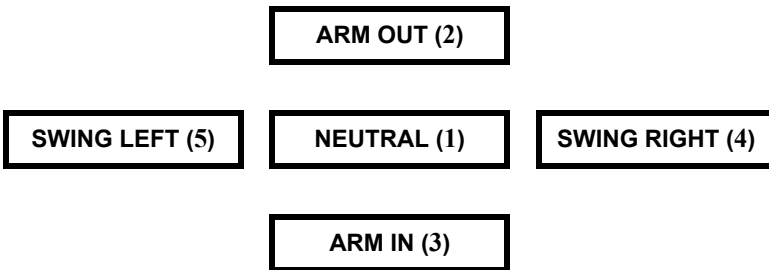
OPERATION

Work Equipment Control Lever

WARNING

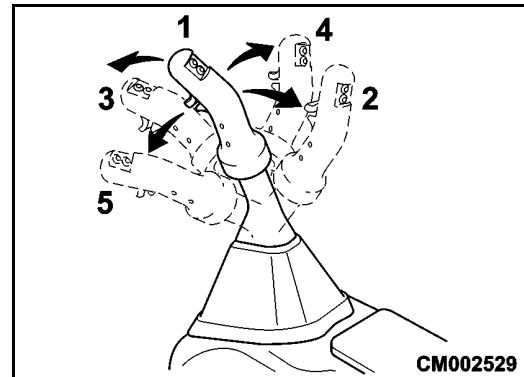
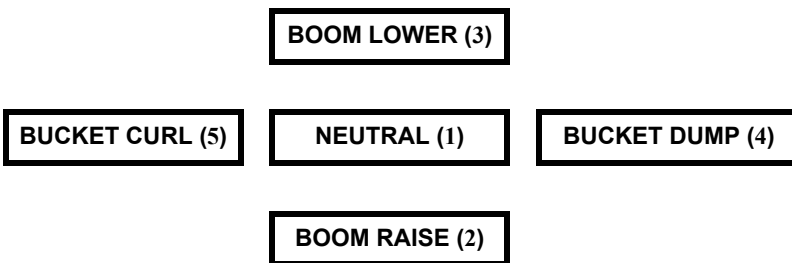
If any lever is operated when in the deceleration range, the engine speed will suddenly increase, so be careful when operating the levers.

The left equipment control lever (Road Builder and Log Loader) is used to operate the arm and upper structure.

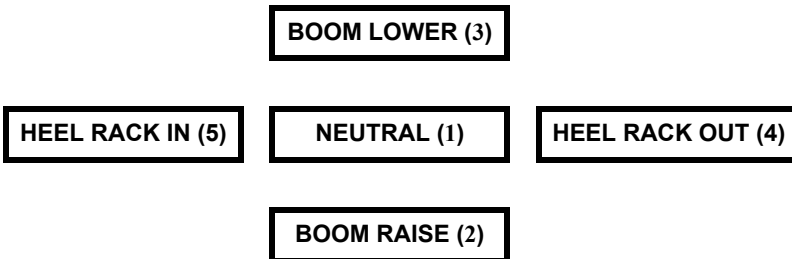


When the lever is in the neutral (1) position, the upper structure and the arm will be retained in the position in which they stop.

The Road Builder right equipment control lever is used to operate the boom and bucket.



The Log Loader right equipment control lever is used to operate the boom and heel rack..



When the lever is in the neutral (1) position, the boom and the bucket will be retained in the position in which they stop. For lever position two, three, four and five, the engine speed changes as follows because of the auto deceleration mechanism.

- When the travel lever and work equipment control levers are at neutral, even if the fuel control dial is above the mid range position, the engine speed will drop to a mid range speed. If any of the levers are operated, the engine speed will rise to the speed set by the fuel control dial.
- If all control levers are set to neutral, the engine speed will drop by ≈ 100 rpm, and after \approx four seconds, the engine speed will drop to the deceleration speed \approx (1400 rpm).

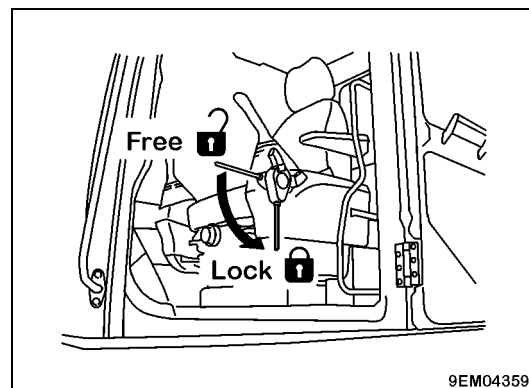
WINDOW SYSTEM

Ceiling Window

WARNING

When leaving the operator's compartment, set the safety lock lever securely to the LOCK position.

If the control levers are not locked, and they are touched by mistake, a serious accident may occur.



When Opening

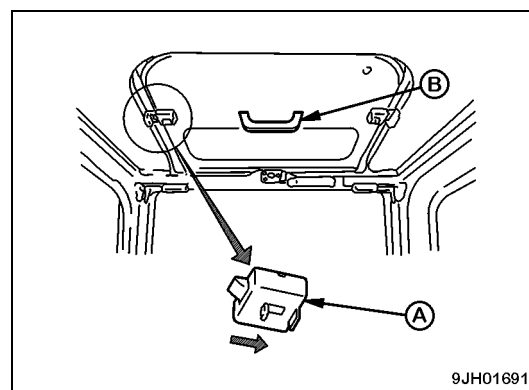
1. Lock the safety lock lever securely.
2. To open the ceiling window pull lock knob (A) located on front side. Grasp grip (B) and push up on the ceiling window to open it.

When Closing

Close the ceiling window by grasping grip (B) and lock it with lock knob (A). If the window cannot be locked, open and close the ceiling window again.

Remark

When an overhead guard (if equipped) or top guard (if equipped) is installed, the sun roof does not open.



OPERATION

Front Window

WARNING

When opening or closing the ceiling window, front window, bottom window, or door, always set the safety lock lever to the LOCK position. If the control levers are not locked and they are touched by accident, a serious accident may occur.

When opening or closing the window at the front of the cab, stop the machine on horizontal ground, lower the work equipment completely to the ground, stop the engine, then carry out the operation.

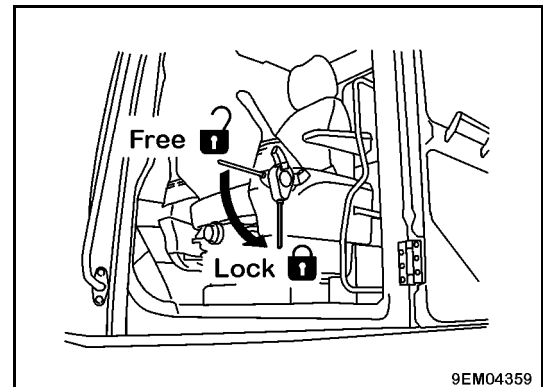
When opening the front window, hold the grip securely with both hands, pull up, and do not let go until the automatic lock catch is locked.

When closing the front window, the window will move quicker under its own weight. Hold the grips securely with both hands when closing it.

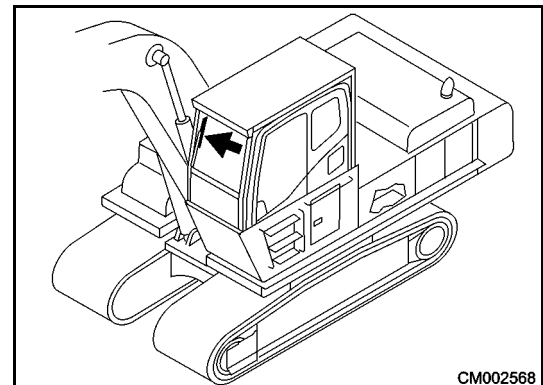
It is possible to stow (pull up) the front window in the roof of the operator's compartment.

When Opening

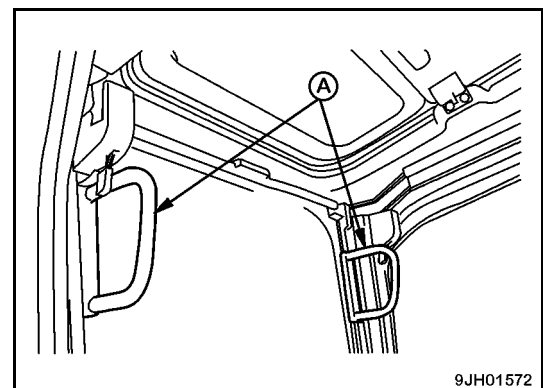
1. Place the work equipment on flat ground and stop the engine.
2. Securely lock the safety lock lever.

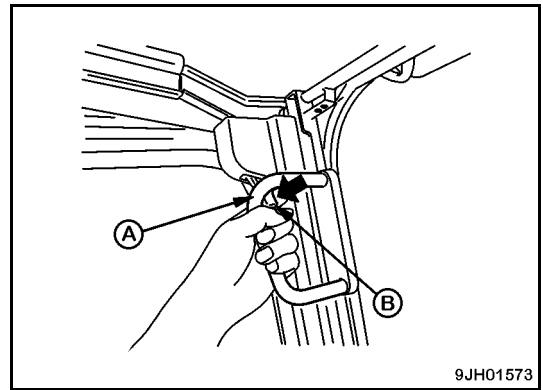


3. Check to be sure the wiper blade is stored in the right stay.

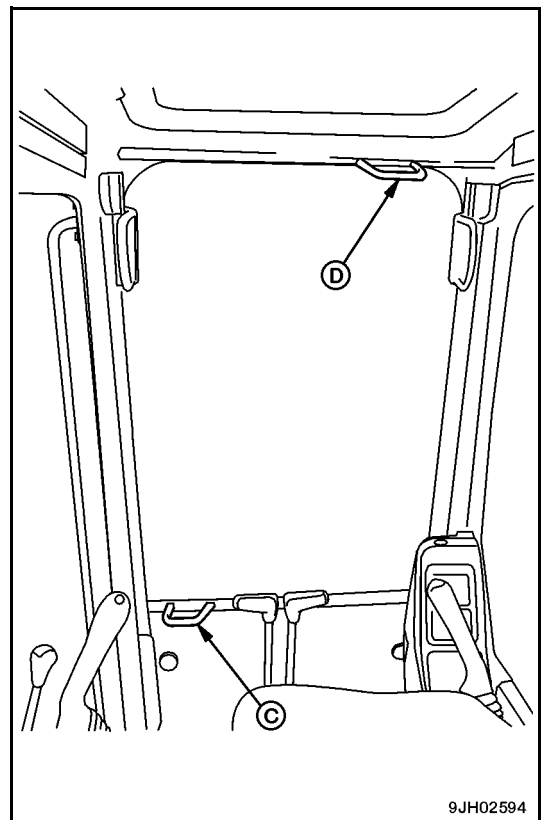


4. Grip knobs (A) at the top, bottom, left, and right of the front window, and pull lock lever (B) to release the lock at the top of the front window. The top of the front window will come out.

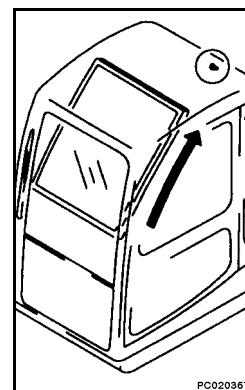




5. Hold lower knob (C) with your left hand from inside the operator's cab, and with your right hand, grip top knob (D)

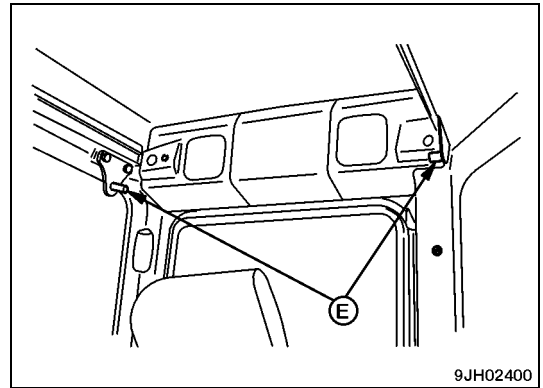


6. Pull it up, and firmly and evenly holding on to the window with both hands.



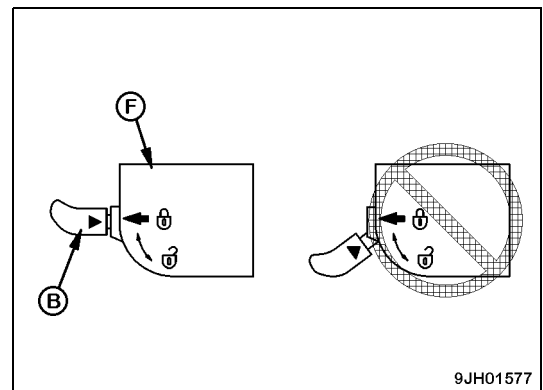
OPERATION

Push it against lock catch (E) at the rear of the cab to securely lock the window



7. Check to be sure lock lever (B) is secured at the LOCK position.

- The lock is engaged if the arrow on lock case (F) lines up with the arrow on lock lever (B). Check it visually.
- If the arrow on lock case (F) does not line up with the arrow on lock lever (B), the lock is not properly engaged. Repeat the operation in Step 5 to engage the lock.

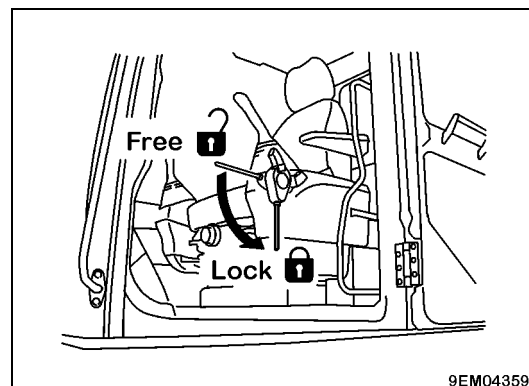


When Closing

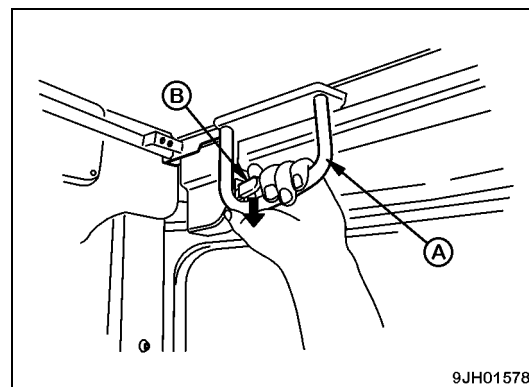
! WARNING

When closing the window, lower it slowly and be careful not to get your hand caught.

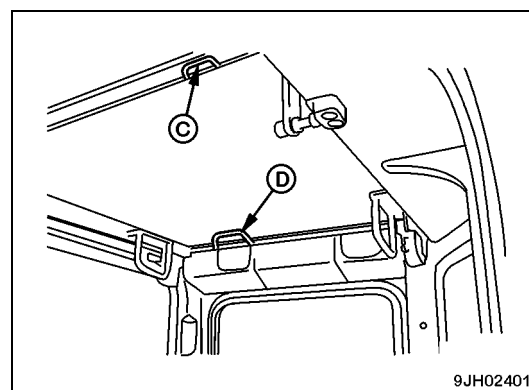
1. Place the work equipment on flat ground and stop the engine.
2. Securely lock the safety lock lever.



3. Grip left and right knobs (A), and pull down lock lever (B) to release the lock.

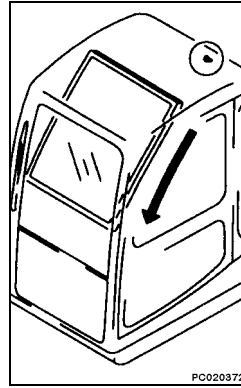


4. Grip knob (C) at the bottom of the front window with your left hand and knob (D) at the top with your right hand.

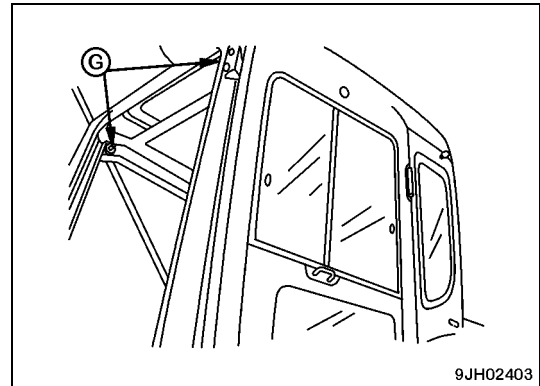


OPERATION

5. Push the window to the front, then lower it slowly.

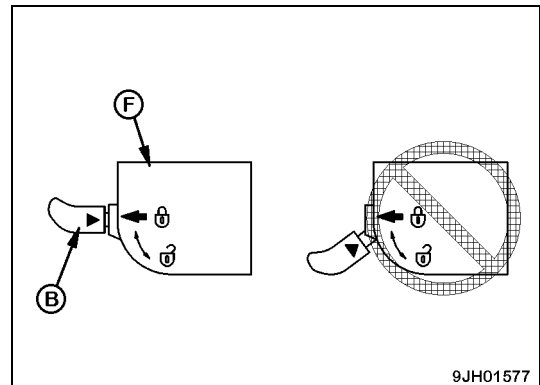


6. When the bottom of the window reaches the top of the bottom window, push the top of the window to the front to push it against left and right lock catches (G) and engage the locks.



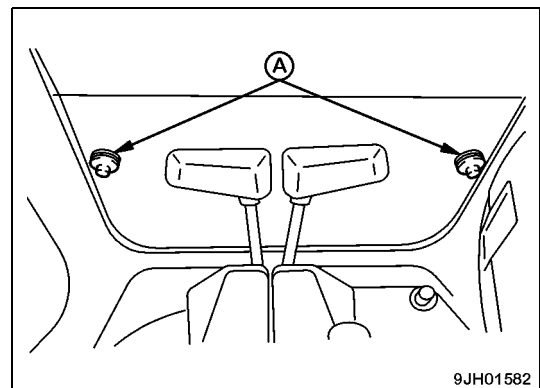
7. Check to be sure lock lever (B) is secured at the **LOCK** position.

- The lock is engaged if the arrow on lock case (F) lines up with the arrow on lock lever (B). Check it visually.
- If the arrow on lock case (F) does not line up with the arrow on lock lever (B), the lock is not engaged. Repeat the operation in Step 5 to engage the lock.

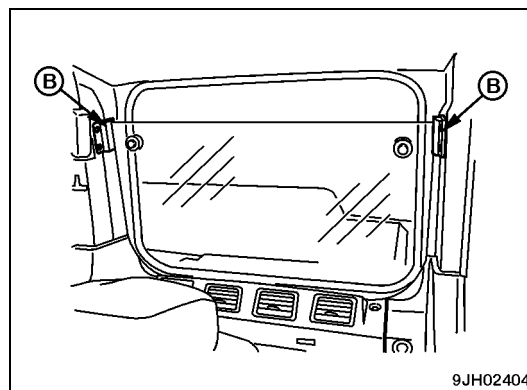


Removing Front Bottom Window

1. Open the front window, then hold grip (A), pull up, and remove the bottom window.

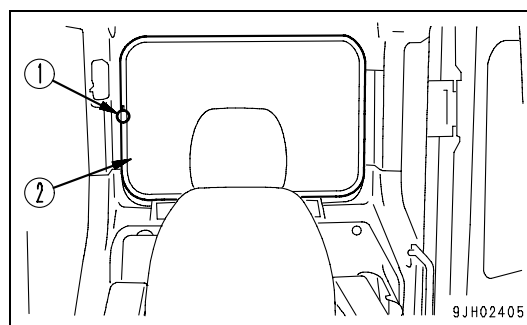


2. After removing the bottom window, store it at the rear of the operator's cab and lock it securely with left and right locks (B).
 - When removing, always hold the glass with one hand and release the lock with the other hand.



Cab Emergency Exit Window

- Use the rear window and use it as an emergency escape exit. Remove the rear window as follows:
 - A. Pull ring (1) and completely remove seal (2) from the rubber core.
 - B. With pressure push on corner of the window, the glass will fall outside.



Remark

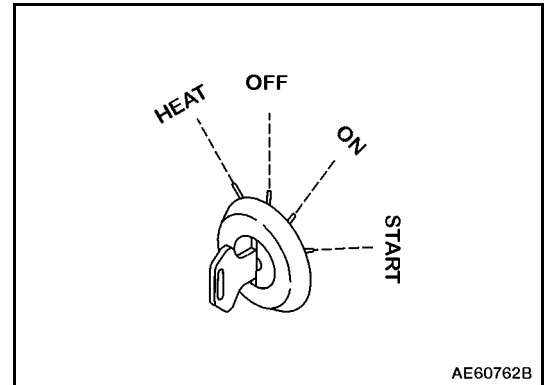
Do not remove the rear window except when using it as an emergency exit.

SAFETY LOCKS AND SECURITY

It is the operator or person performing maintenance on the machine who is responsible for the security of the machine and its work equipment. Failure to safely secure the machine may result in personal injury, injury to other personnel or tampering by unauthorized personnel. Always secure the machine when not in use.

Ignition Switch Key

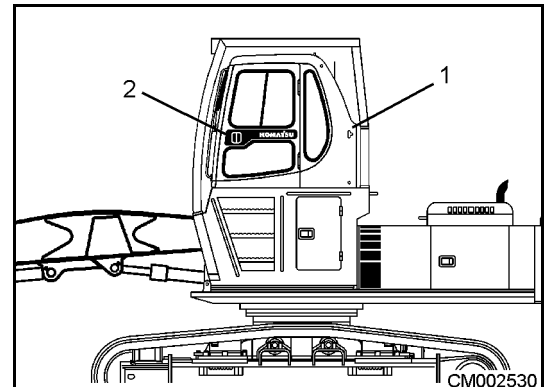
Always remove the ignition key when leaving the machine even for a moment. Failure to do so may result in access to machine by unauthorized personnel.



Door Lock

WARNING

- Before releasing the door lock, always stop the machine on flat ground.
- Never release the door lock on a slope. The door may suddenly close and cause injury.
- When releasing the door lock, do not extend your body or hands outside the machine and do not put your hands on the door frame. The door may suddenly close and cause injury.



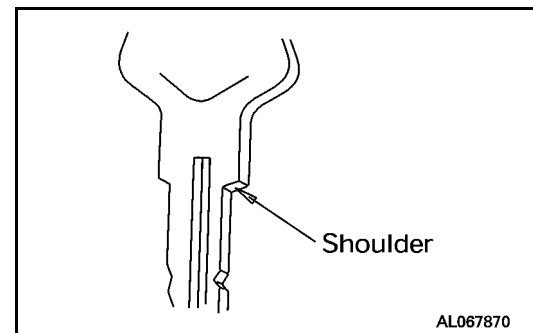
Use the door lock to fix the door in position after opening it.

1. Push the door against catch (1) to secure it in the open position.
2. To release the lock, press knob (2) down at the left side of the operator's seat to release the catch.
3. When securing the door, secure it firmly to the catch.

Cap, Cover with Lock

Locks are installed on 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.

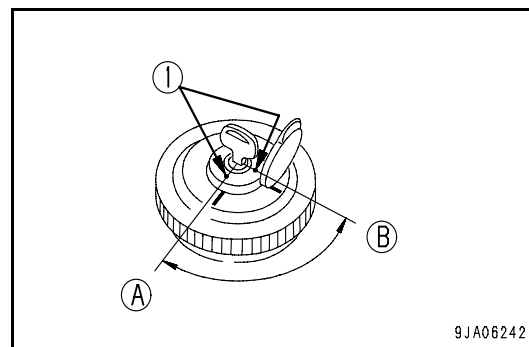


Opening and Closing Cap with Lock

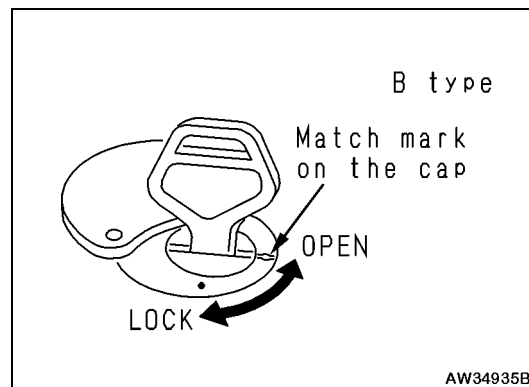
1. Opening the Cap
 - A. Insert the key into the key slot.
 - B. Turn the key clockwise, align the key groove with mark (1) on the cap, then open the cap.

-Position (A): **OPEN**

-Position (B): **LOCK**

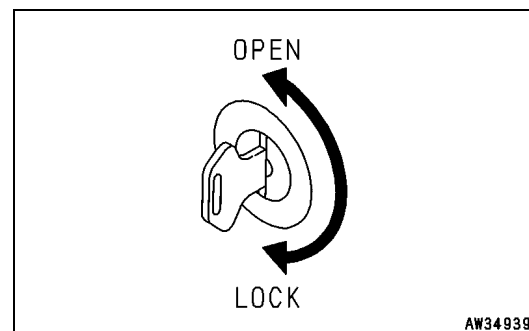


2. When locking
 - A. Screw in the cap, then insert the key in the key slot.
 - B. Turn the ignition switch key clockwise, then remove the key.



Opening and Closing Cover

1. To open the cover (locked cover)
 - A. Insert the key into the key slot.
 - B. Turn the key counterclockwise and open the cover by pulling the cover grip.
2. To lock the cover
 - A. Close the cover and insert the key into the key slot.
 - B. Turn the key clockwise and take the key out.



OPERATION

Lockable Areas

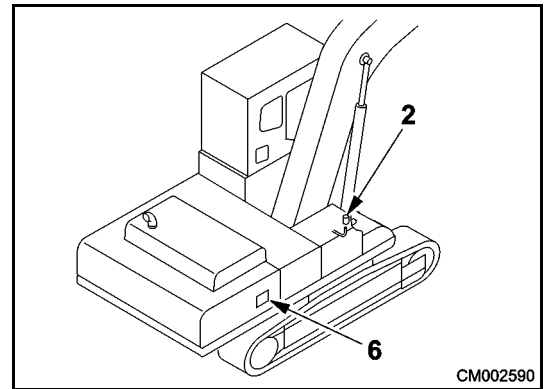
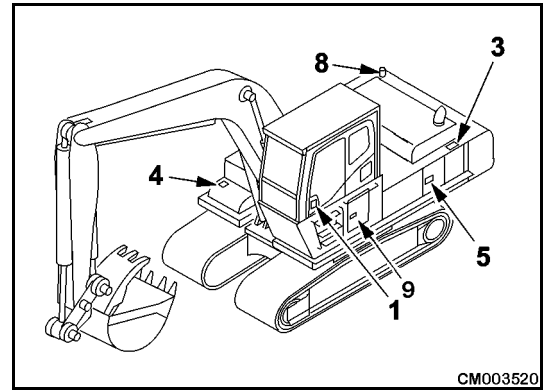
Always lock the following places.

- (1) Door of operator's cab
 - Always remember to close the windows.
- (2) Fuel tank filler port
- (3) Engine hood
- (4) Battery box cover

- (5) Left side door of the machine
- (6) Right side door of the machine
- (7) Hydraulic tank filler port
- (8) Option - extra fuel tank filler port
- (9) Riser service door

Remark

Use the ignition switch key to lock and unlock all these locks.



ADDITIONAL FEATURES AND ACCESSORIES

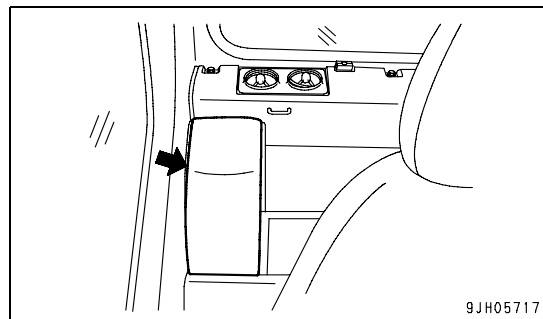
Some machines are equipped with these listed features and accessories, if your machine is equipped with the listed features or accessories it is important to know where they are located and how to operate them in order to obtain there maximum facilitation and comfort.

Hot and Cool Box

The box is at the rear right of the operator's seat. It is interconnected with the air conditioner: it warms when the heater is being used and cools when the air conditioner is being used.

Remark

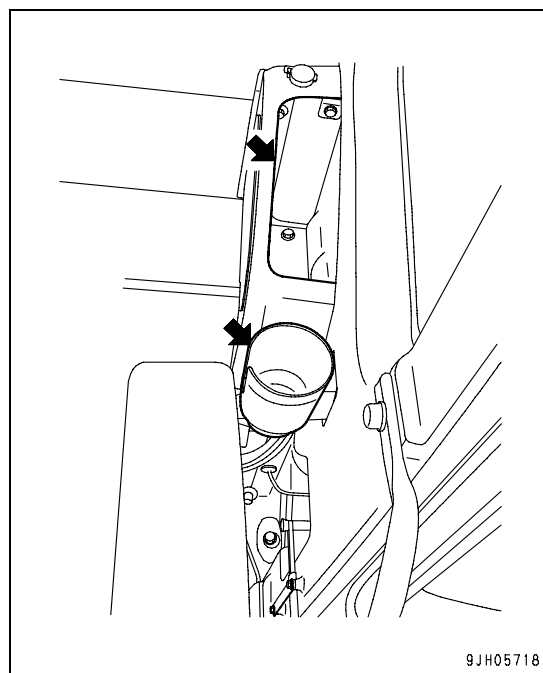
Be careful with drinks when using this feature, spilled liquids may damage the controller which is located under the hot and cold box.



Storage Box with Cup Holder

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

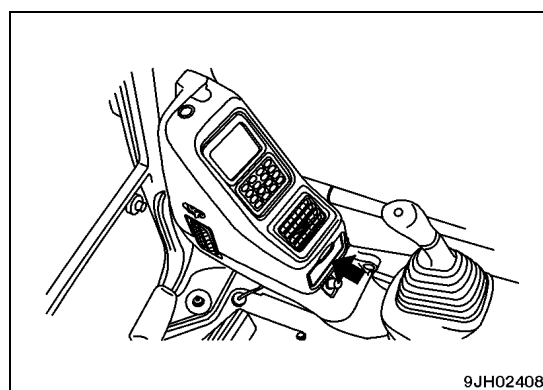
Keep the Operation and Maintenance Manual in this box so that it can be easy accessed whenever necessary.



Ashtray

This is under the machine monitor at the front right of the operator's compartment.

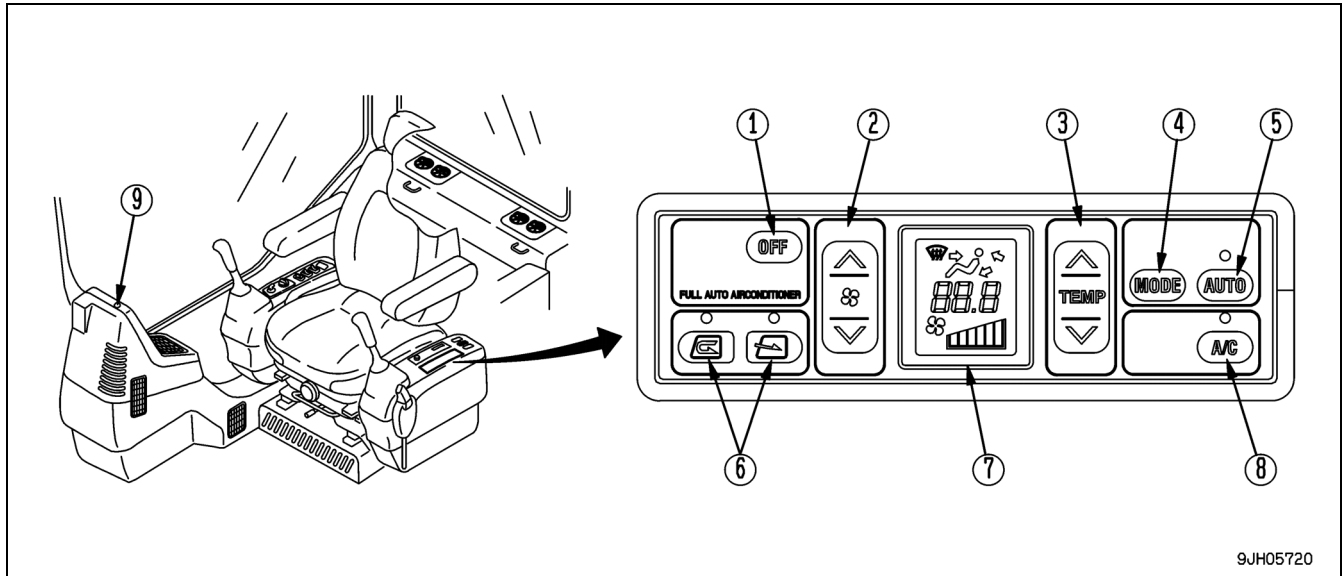
Always make sure that you extinguish your cigarette, then put it in the ashtray and close the lid.



OPERATION

Auto-temp Air Conditioner

General Description of Control Panel



- | | |
|-------------------------------|---------------------------------|
| 1. OFF switch | 6. FRESH/RECIRC selector switch |
| 2. Fan switch | 7. Display monitor |
| 3. Temperature control switch | 8. Air conditioner switch |
| 4. Vent selector switch | 9. Sunlight sensor |
| 5. Auto switch | |

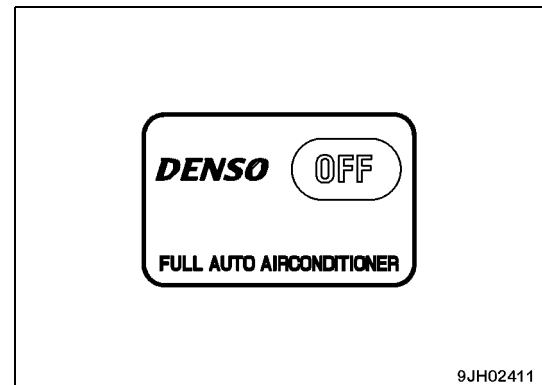
Off Switch

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

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

Remark

When switch (1) is turned to the OFF position, the lamp above FRESH/RECIRC selector switch (6) does not go out, but this is not a problem.

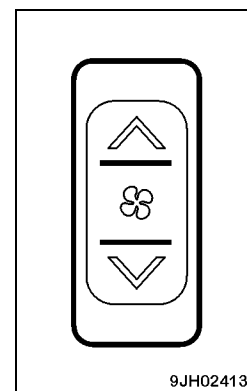


Fan Switch

This switch (2) is used to adjust the air flow.

The air flow can be adjusted to six levels.

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



Monitor Display And Air Flow

Liquid crystal display	Air flow
	Air flow "low"
	Air flow "medium 1"
	Air flow "medium 2"
	Air flow "medium 3"
	Air flow "medium 4"
	Air flow "high"

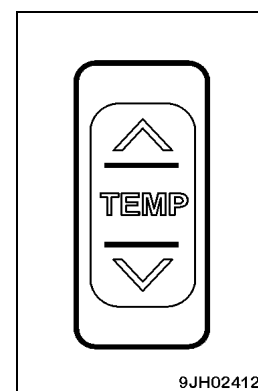
Temperature Set Switch

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

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

Monitor display and the function

Monitor display °C (°F)	Set temperature
18.0 (64.4)	Max. cooling
18.5 to 31.5 (65.3 to 88.7)	Adjusts temperature inside cab to set temperature
32.0 (89.6)	Max. heating



Remark

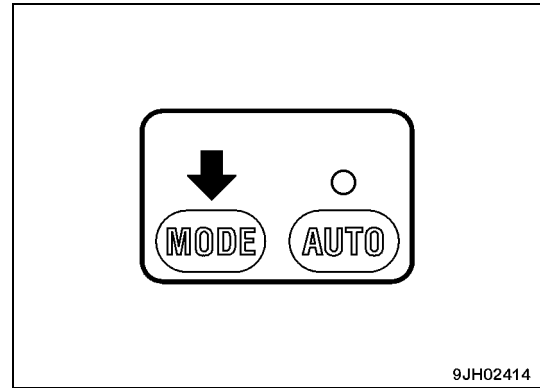
If the mode is set to auto mode and the temperature setting is set to 18.0°C (64.4°F) and 32.0°C (89.6°F), the air flow from the fan is always set to HIGH and does not change even when the set temperature is reached.

OPERATION

Vent Selector Switch

This switch (4) is used to select the vents.

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



9JH02414

(A): Rear vents (4 places)

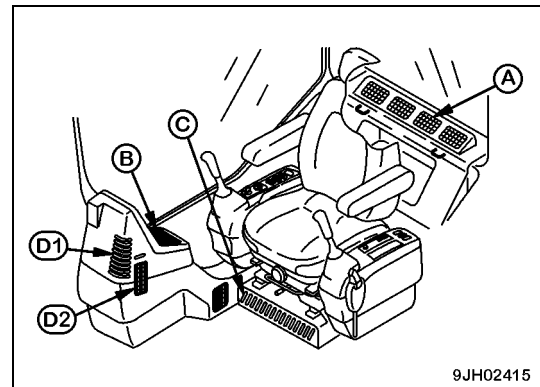
(B): Face vent (1 place)

(C): Foot vent (1 place)

(D1): Front window vent (1 place)

(D2): Front window vent (1 place)

- Front window vent (D2) can be opened or closed by hand.



9JH02415

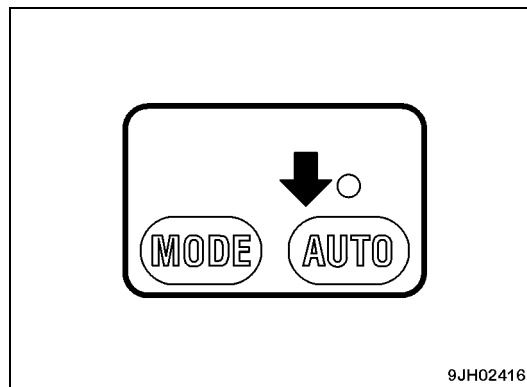
Liquid Crystal Display	Vent Mode	Vent				Remarks
		A	B	C	D	
LCD1	Front and rear vents, including defroster vent	✓	✓		✓	---
LCD2	Front, rear and foot vents, including defroster vent	✓	✓	✓	✓	---
LCD3	Foot vent			✓		---
LCD4	Front and foot vents, including defroster vent		✓	✓	✓	Cannot be selected for automatic operation
LCD5	Front vents, including defroster vent		✓		✓	Cannot be selected for automatic operation

Auto Switch

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

This switch also acts as the air conditioner main switch.

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



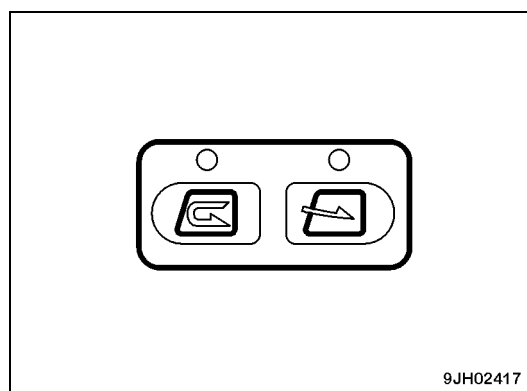
9JH02416

Recirc/fresh Selector Switch

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

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

RECIRC	The outside air is shut off and only the air inside the cab is circulated. Use this position to carry out rapid cooling of the cab or when the outside air is dirty.
FRESH	Outside air is taken into the cab. Use this position to take in fresh air or when carrying out demisting.

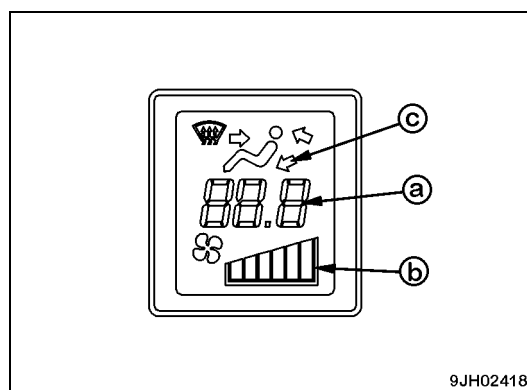


9JH02417

Display Monitor

This display monitor displays the status of temperature setting (a), air flow (b), and vents (c).

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



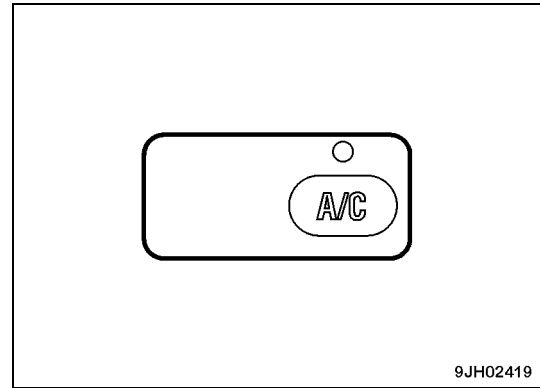
9JH02418

OPERATION

Air Conditioner Switch

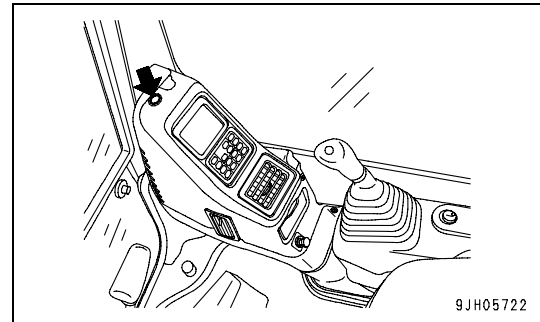
This switch (8) is used to turn the air conditioner (cooling, dehumidifying, heating) ON or OFF.

- When the fan is actuated (the display monitor shows (b)) and air conditioner switch (8) is pressed, the air conditioner is switched ON, the lamp at the top of the air conditioner switch lights up, and the air conditioner starts. When it is pressed again to the OFF position, the lamp at the top of the air conditioner switch goes out.
- The air conditioner cannot be operated while the fan is stopped.



Sunlight Sensor

This sensor (9) automatically adjusts the flow of air from the vents to match the strength of the sun's rays. In addition, it automatically detects changes in the temperature inside the cab caused by changes in the strength of the sun's rays beforehand and automatically adjusts the temperature.

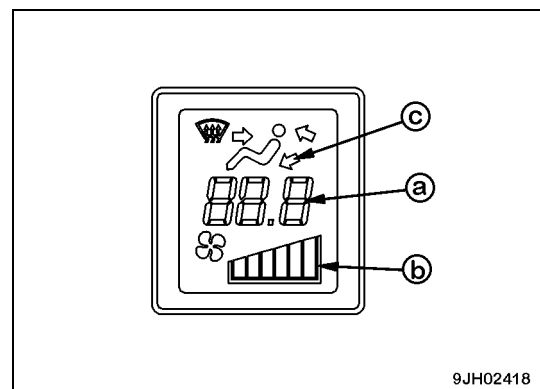
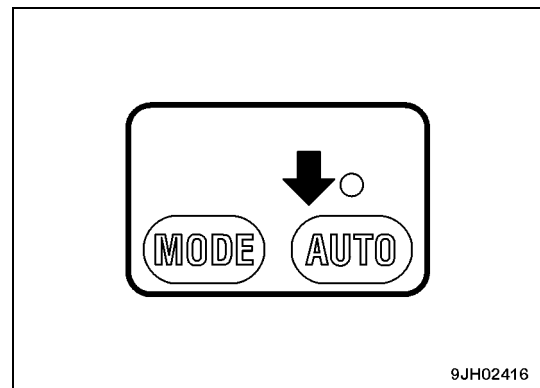


A/C System Operation

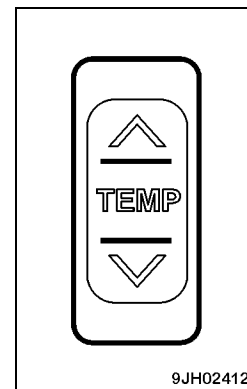
The air conditioner can be operated automatically or manually. Select the method of operation as desired.

Auto-temp Operation

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

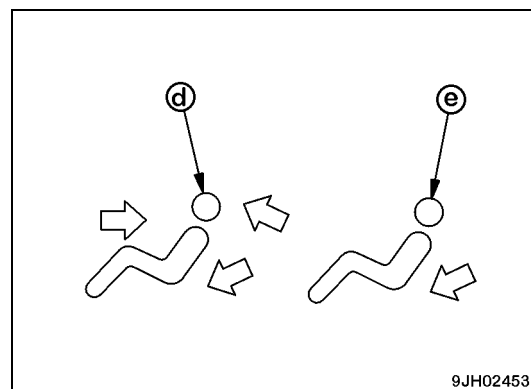


- Use temperature set switch (3) to set to the desired temperature. The air flow, combination of vents, and selection of fresh or recirculated air is automatically selected according to the set temperature, and the air conditioner is operated automatically to provide the set temperature.



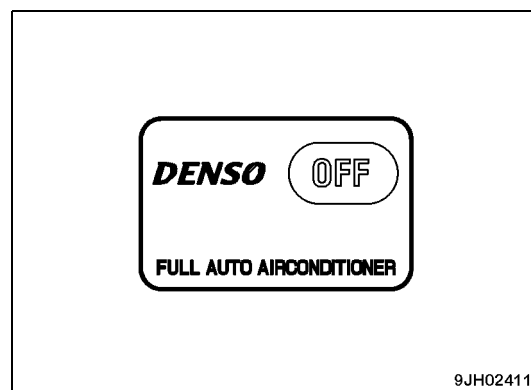
Remark

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



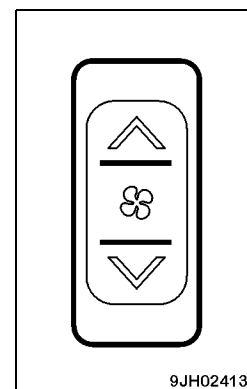
Stopping Auto-temp Operation

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



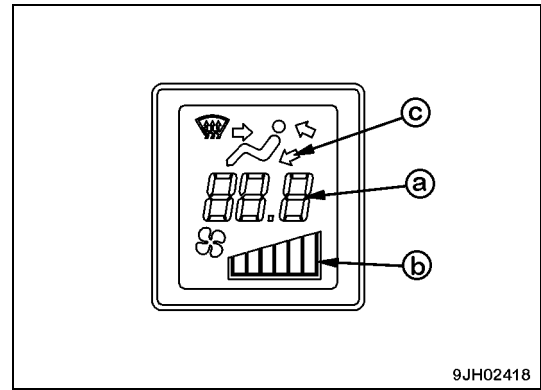
Manual Operation

- Press fan switch (2) and adjust the air flow.

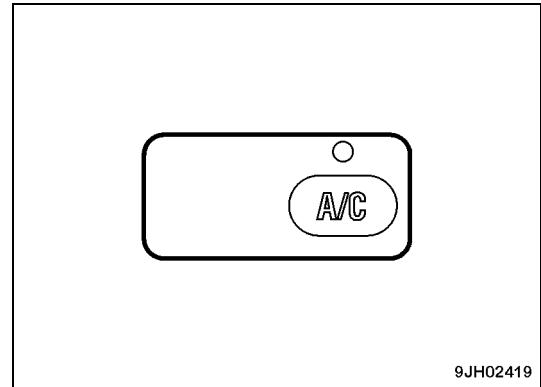


OPERATION

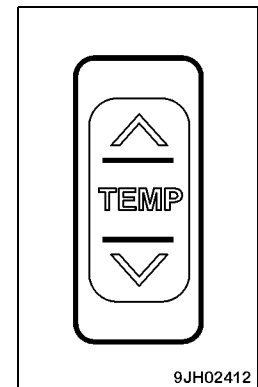
- When doing this, check to be sure temperature setting (a) and air flow (b) are displayed on the display monitor.



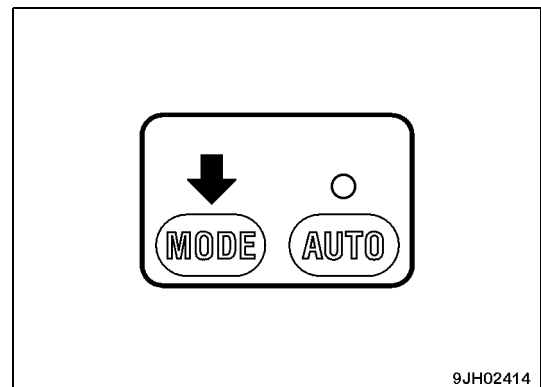
- Turn air conditioner switch (8) ON. Check to be sure the lamp at the top of the air conditioner switch lights up.



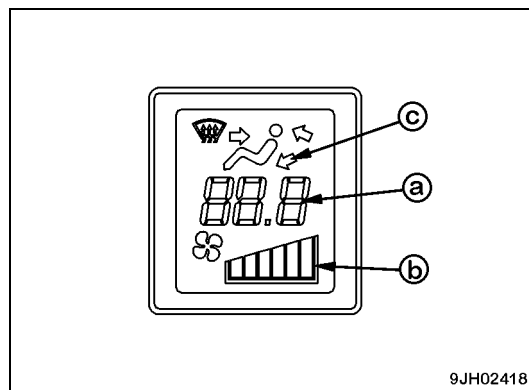
- Press the temperature setting switch and adjust the temperature inside the cab.



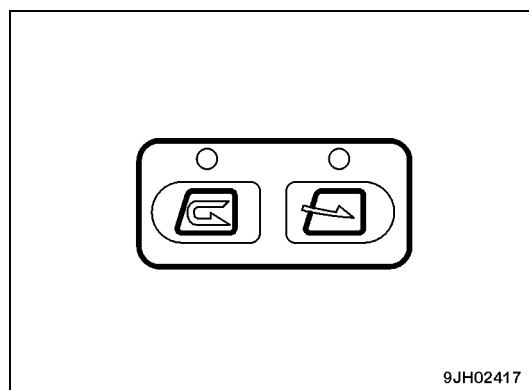
- Press vent selector switch (4) and select the desired vents.



- When this is done, the display for vent (c) of the display monitor changes according to the selection.

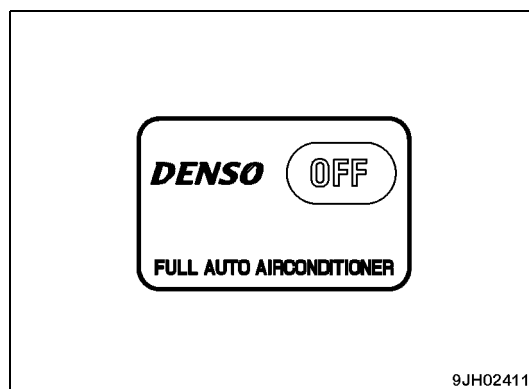


- Press RECIRC/FRESH selector switch (6) and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).



Stopping Manual Operation

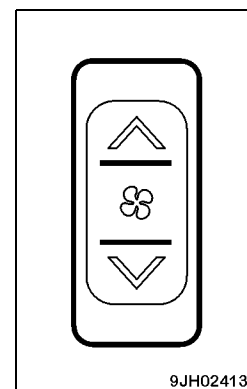
Press OFF switch (1). The displays for temperature setting (a) and air flow (b) on the display monitor, and the lamps above auto switch (5) and air conditioner switch (8) go out, and the operation stops.



Cold Air to Face and Warm Air to Feet Feature

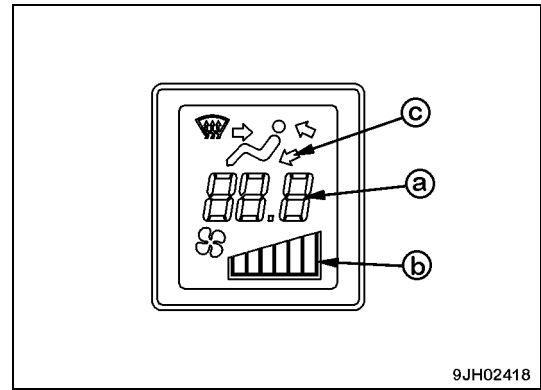
To operate with cold air blowing to the face and warm air blowing to the feet, set as follows.

- Press fan switch (2) and adjust the air flow.



OPERATION

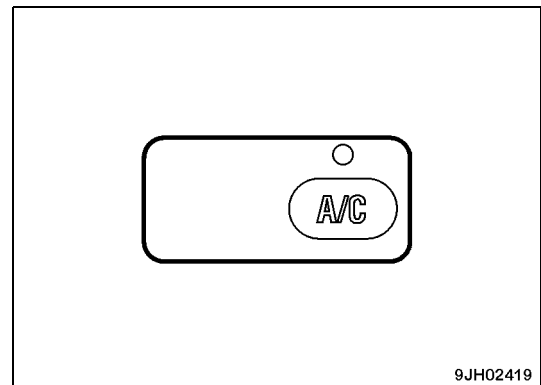
- When doing this, check to be sure temperature setting (a) and air flow (b) are displayed on the display monitor.



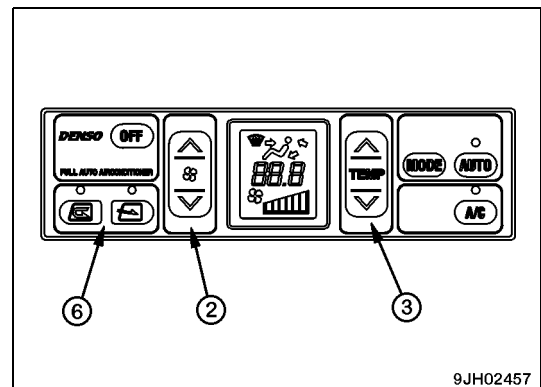
- Press vent selector switch (4) and set the vent display on the display monitor to the display shown in the diagram on the right.



- Turn air conditioner switch (8) ON. When this is done, the lamp above the air conditioner switch lights up.

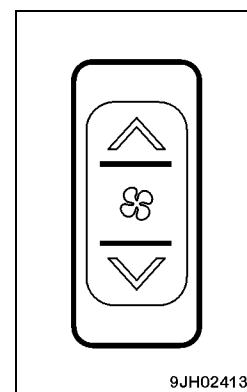


- Adjust fan switch (2), temperature setting switch (3) and FRESH/RECIRC selector switch (6) to the desired positions.



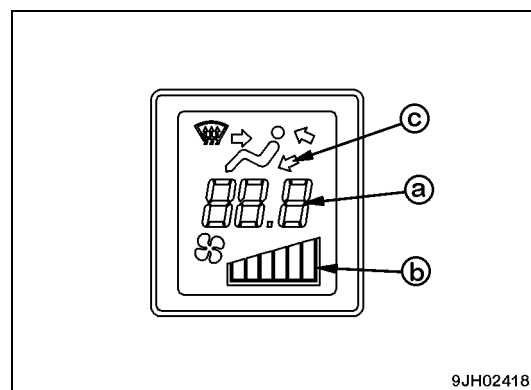
Defroster Operation

1. Press fan switch (2) and adjust the air flow.



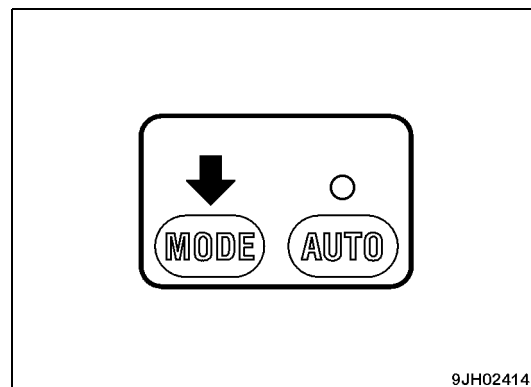
9JH02413

2. When doing this, check to be sure temperature setting (a) and air flow (b) are displayed on the display monitor.



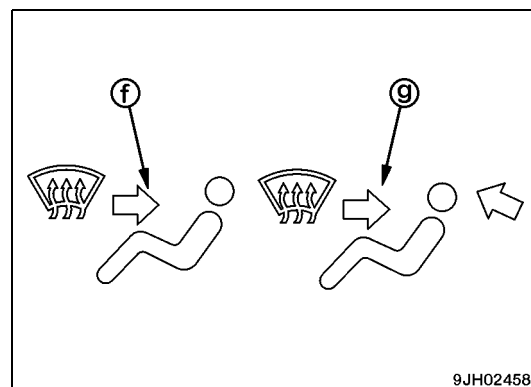
9JH02418

3. Press vent selector switch (4).



9JH02414

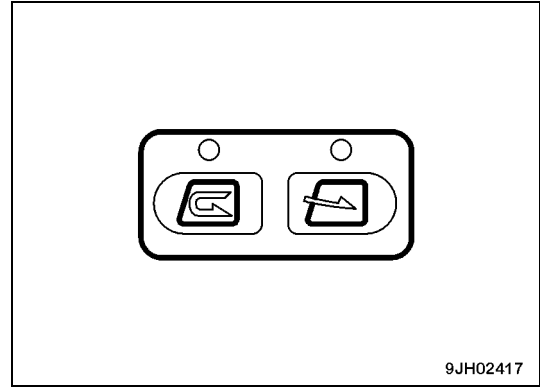
4. Set the vent display on the display monitor to the display shown in (f) or (g) in the diagram on the right.



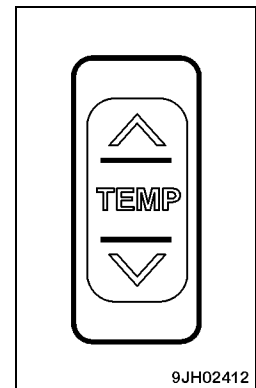
9JH02458

OPERATION

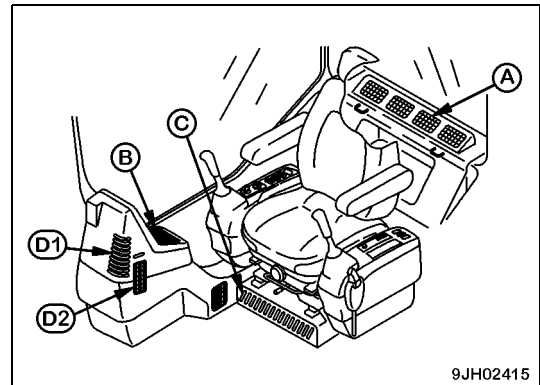
5. Press FRESH/RECIRC selector switch (6) and set it to take in fresh air.



6. Press temperature setting switch (3) and set the set temperature display on the display monitor to the maximum heating temperature of 32°C (89.6°F).

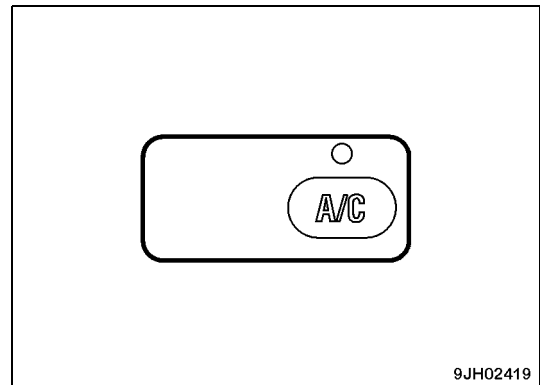


7. Adjust vents (A), (B), and (D2) so that the air blows onto the window glass. (Vents (C) and (D1) are fixed and cannot be adjusted.)



Remark

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



Precautions when using Air Conditioner

- When running the air conditioner, always start with the engine running at low speed. Never start the air conditioner when the engine is running at high speed. It will cause failure of the air conditioner.
- If water gets into the control panel or sunlight sensor, it may lead to unexpected failure, so be careful not to let water get on these parts. In addition, never bring any flame near these parts.
- For the auto function of the air conditioner to work properly, always keep the sunlight sensor clean and do not leave anything around the sunlight sensor that may interfere with its sensor function.

Ventilate the cab from time to time when using the cooler.

If you smoke when the cooler is on, the smoke may start to hurt your eyes, so open the window and carry out ventilation and cooling for a short time to remove the smoke.

When running the air conditioner for a long time, carry out ventilation and cooling together once each hour.

Be careful not to let the temperature in the cab get too low.

When the cooler is on, set the temperature so that it feels slightly cool when entering the cab 5 - 6°C (41 - 43°F) lower than the outside temperature). This temperature difference is considered to be the most suitable for your health. Adjust the temperature properly.

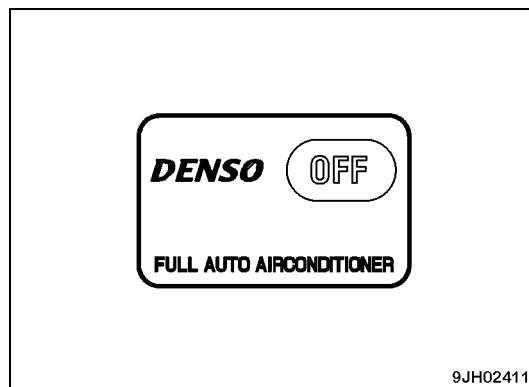
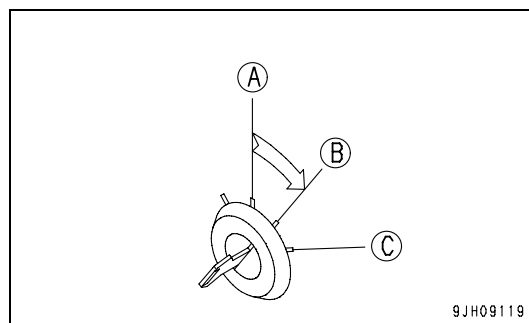
Maintain Machine Equipped with Air Conditioner

When carrying out inspection of a machine equipped with an air conditioner, See “Check and Adjust Air Conditioner” on page 3-37 and carry out inspection according to the table.

Self-diagnostic Function

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

1. Turn the ignition switch to the “ON” position.
2. Press OFF switch (1). The temperature setting and air flow display on the liquid crystal display portion go out and operation stops.

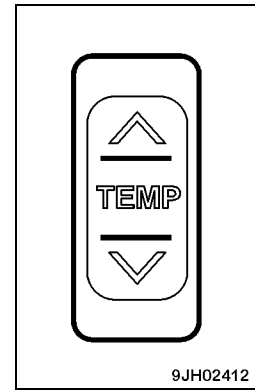


OPERATION

3. If the “^” and “v” parts of temperature setting switch (3) are kept pressed at the same time for at least 3 seconds, the troubleshooting mode is displayed on the liquid crystal display.

★ Monitor Display And Failure Model

Display	Failure mode
E--	No failure
E11	Open in recirculated air sensor
E12	Short circuit in recirculated air sensor
E15	Open in fresh air sensor
E16	Short circuit in coolant temperature sensor
E18	Short circuit in sunlight sensor
E43	Abnormality in vent damper
E44	Abnormality in air mix damper
E45	Abnormality in FRESH/RECIRC air damper



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

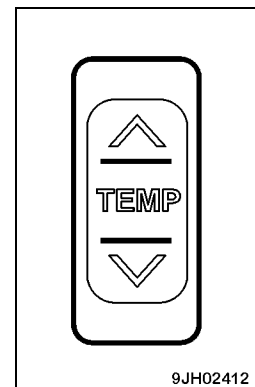
If any abnormality is detected by the self-diagnostic function, ask your KOMATSU distributor to carry out inspection and repair.

Temperature Display Function

It is possible to switch the set temperature display between °F and °C.

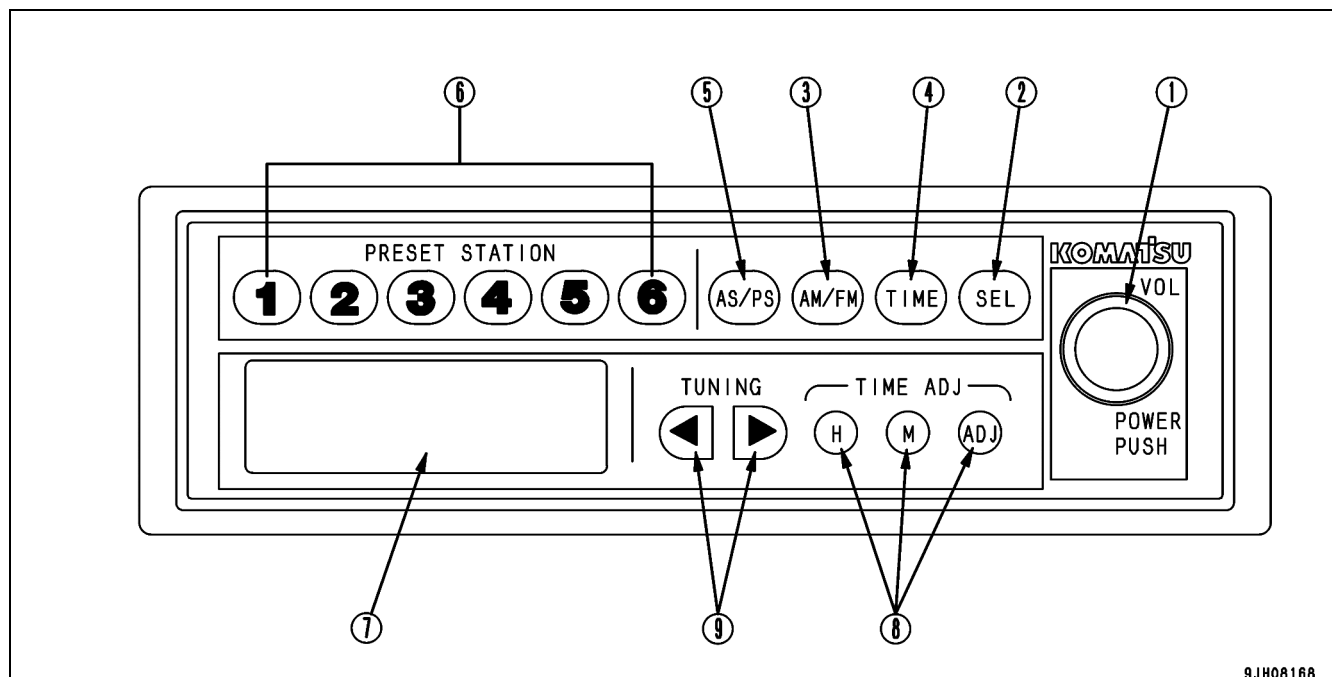
If the “^” and “v” portions of temperature setting switch (3) are pressed at the same time for more than 5 seconds while the fan is running, the temperature display will switch between °F and °C. (Note that the unit is not displayed.)

Degrees	Liquid crystal display range
°C	18 to 32
°F	63 to 91



Radio

Explanation of Features



- | | |
|--|---------------------------|
| 1. Power switch/Volume control knob/Balance knob | 6. Preset station buttons |
| 2. SEL button | 7. Display |
| 3. FM/AM selector button | 8. Time set buttons |
| 4. Display selector button | 9. Tuning button |
| 5. AS/PS button | |

Power Switch/Volume Control/Balance Knob

Press this knob (1) to turn the power for the radio on. The frequency is displayed on display (7). Press again to turn the power off.

Turn the knob to adjust the volume as follows.

- Turn CLOCKWISE to INCREASE volume
- Turn COUNTERCLOCKWISE to REDUCE volume

Sel Button

Each time this button (2) is pressed, the mode changes as follows: VOL (volume) → BAS (bass) → TRE (treble) → BAL (balance). The mode is displayed on display (7). For details of each mode, See “Preset Station Buttons (1, 2, 3, 4, 5, 6)” on page 2-68.

FM/AM Selection Button (AM/FM)

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

Each time the button is pressed, the band changes FM → AM → FM...

OPERATION

Display Selection Button (Time)

On this machine, priority is given to the frequency display. When the frequency is being displayed, press button (4) and the display will show the present time for 5 seconds. After 5 seconds pass, the display returns automatically to the frequency display. If any button other than TIME ADJ. (H, M, ADJ.) is pressed within 5 seconds, the display returns to the frequency display.

AS/PS Button

This button (5) actuates the auto store and preset scan functions.

- **Auto store**
If this button is pressed for more than 2 seconds during radio reception, a search is made automatically of the 6 station settings to find an unused preset number, and that frequency is stored in the preset memory.
- **Preset scan**
If this button is pressed within 2 seconds, it is possible to select one of the already preset stations. Wait for 6 sec. after pressing the button and then press the button again to select the next preset station. If it is impossible to receive the preset frequency, the selection advances after 1 second to the next preset station.

Preset Station Buttons (1, 2, 3, 4, 5, 6)

If this button (6) has been used to decide which stations to preset, it is possible to select the desired station at a touch. It is possible to preset 6 stations each for both AM and FM.

Display

In this display (7), receiving band, frequency, preset No. and time are shown.

Time Reset Button

Use this button (8) when adjusting the time.

- **H:** Hour
- **M:** Minute
- **ADJ:** Sets to 00 minutes

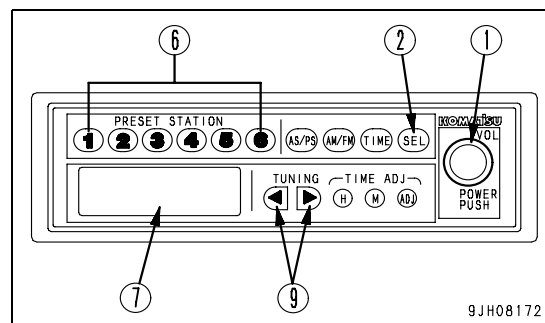
Tuning Button (Tuning) Manual Tuning (Manual)

Use this button (9) to change the frequency.

Controls on Radio

Preset Station Buttons

1. Press power switch (1) and display the frequency on display (7).
2. Use tuning button (9) to set to the desired frequency. There are two methods for tuning: auto tuning and manual tuning.
3. With the display (7) showing the desired frequency, keep the desired Preset button No pressed for at least 1.5 seconds. The reception sound will disappear, but when the presetting operation (saving to memory) is completed, the sound will appear again and the Preset No and frequency will be shown on the display to show that the presetting operation has been completed. After completing the presetting, press Preset button (6) and release it within approximately 1.5 seconds. This will make it possible to receive the channel preset to that button. One channel each for AM and FM can be preset to each Preset button.



Remark

It is also possible to save to the Preset button by using the auto store button.

Setting With Preset Button

1. Press power switch (1) and display the frequency on display (7).
2. Use tuning button (9) to set to the desired frequency. There are two methods for tuning: auto tuning and manual tuning.

- Manual Tuning

Press tuning button (9) until the frequency is displayed on display (7).

< button: Frequency moves down

> button: Frequency moves up

When the frequency reaches the top or bottom frequency, it automatically continues as follows: Top → Bottom, or Bottom → Top.

- Auto Tuning

Press tuning button (9) for at least 3 seconds. When a station is picked up, the tuning automatically stops. To search for the next station, press the tuning button again for at least 3 seconds.

< button: Frequency moves down

> button: Frequency moves up

If this button is pressed during auto tuning, the auto tuning will be cancelled and the setting will return to the frequency in use before the button was pressed.

Operating Mode

(BAS) Bass adjustment button:	When button (2) is pressed, BAS is displayed on display (7). If knob (1) is turned clockwise within 5 seconds, the bass sound is emphasized. If the knob is turned counterclockwise, the bass sound is reduced.
(TRE) Treble adjustment button:	When button (2) pressed, TRE is displayed on display (7). If knob (1) is turned clockwise within 5 seconds, the treble sound is emphasized. If the knob is turned counterclockwise, the treble sound is reduced.
(BAL) Balance adjustment button:	When button (2) is pressed, BAL is displayed on display (7). If knob (1) is turned clockwise within 5 seconds, the sound from the right speaker is increased. If the knob is turned counterclockwise, the sound from the left speaker is increased. When it is set to BAL 0, the sound from the left and right speakers is balanced.

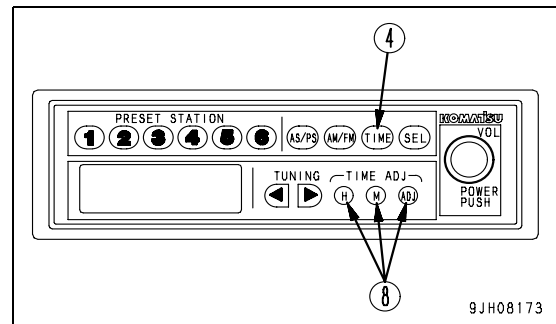
OPERATION

Remark

With each mode, the display is returned automatically to its original setting after 5 seconds.

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) to set to Hour or Minute.
 - **H** button: Adjusts the hour (each time the button is pressed, the time advances by one hour)
 - **M** button: Adjusts the minute (each time the button is pressed, the time advances by one minute)



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

- **ADJ** button: When the ADJ button is pressed, the time is reset as follows.
 - When display is 00 - 05 minutes, time is returned to 00 min. 00 sec. (No change in hour)
 - When display is 55 - 59 minutes, time is advanced to 00 min. 00 sec. (Hour advances)
 - When display is 06 - 54 minutes, time cannot be reset. (Time stays same)

- Example

-10:05 → 10:00

-10:59 → 11:00

-10:26 → 10:26

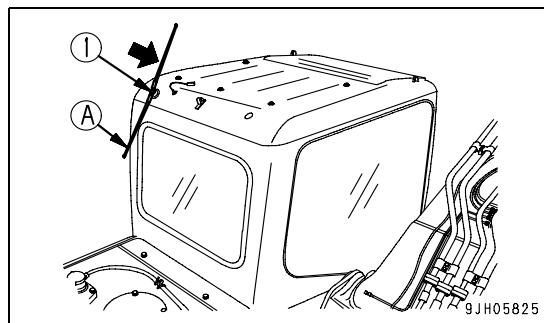
Use the **H**, **M**, and **ADJ** buttons to set to the correct time.

Antenna

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

Stow the antenna as follows.

1. Loosen antenna mounting bolt (1) and store the antenna at position).
2. Tighten bolt (1).



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.

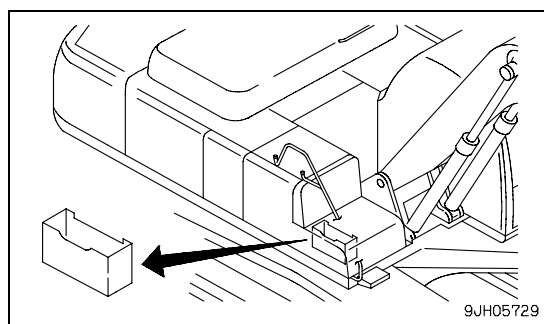
Do not wipe the scales or buttons with benzene, thinner, or any other solvent. Wipe with a soft dry cloth. Use a cloth soaked in alcohol if the equipment is extremely dirty.

When the battery is disconnected or replaced, settings for the preset buttons and clock are cleared, so all settings must be reprogrammed.

Toolbox

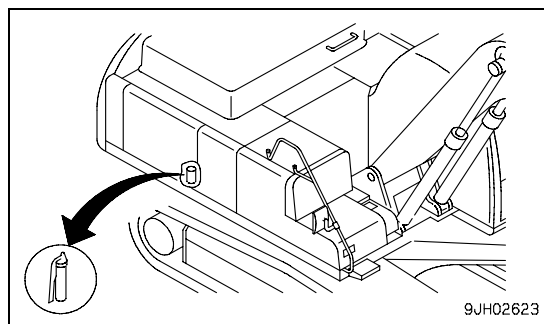
Used to keep the tools in this toolbox.

This is inside of the battery box cover on the right side of the machine.



Grease Gun Holder

This is inside the door at the rear right of the machine. When not using the grease gun, store it in its holder.



OPERATION

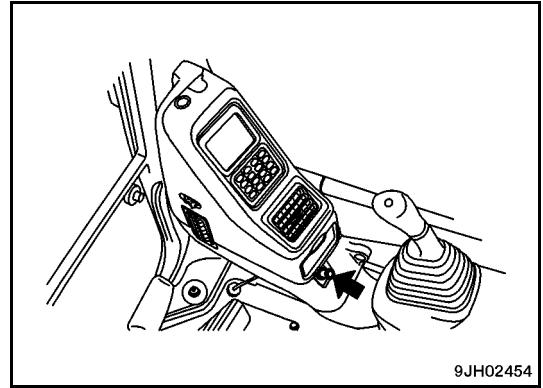
Auxiliary Power Ports

24 V Power Source

Remark

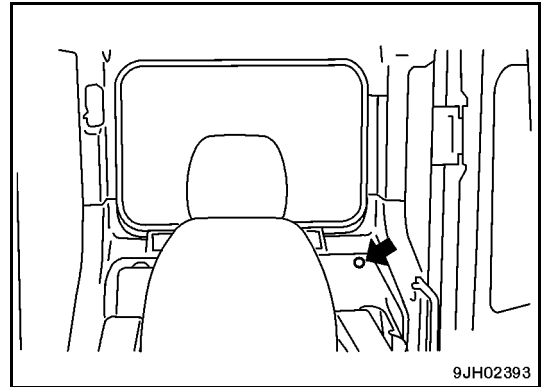
Only use this as the power source for 24 V equipment. It will cause damage to the equipment.

If the cigarette lighter is removed, it can be used as a power source. The capacity of the cigarette lighter is 85 W (24 V x 3.5 A).



12 V Power Source (If Equipped)

This power source can be used up to a capacity of 60 W (12 V x 5 A).



FUSES AND FUSE LINKS

Fuses

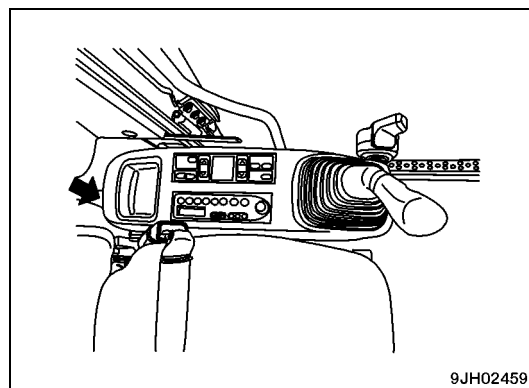
Remark

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

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

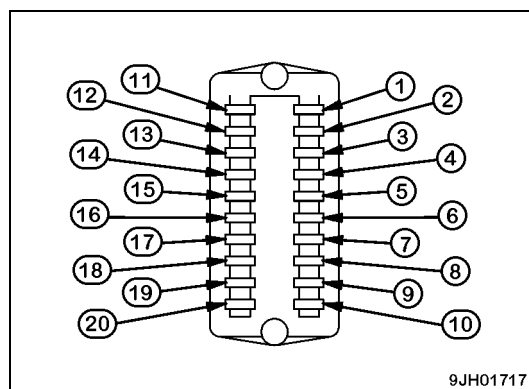
If the fuse becomes corroded, or white powder can be seen, or the fuse is loose in the fuse holder, replace the fuse.

Replace the fuse with another of the same capacity.



Fuse Capacities and Circuit Names

	Fuse capacity	Name of circuit
1	10 A	Pump controller
2	20 A	Electromagnetic valve
3	20 A	PPC hydraulic lock solenoid, monitor, wiper motor
4	10 A	Window washer, cigarette lighter
5	10 A	Horn
6	10 A	Electrical intake air heater
7	10 A	Rotating lamp
8	10 A	Light relay
9	10 A	Radio, speaker, left knob switch
10	10 A	Spare
11	20 A	Air conditioner unit
12	20 A	Spare
13	20 A	Light, light relay drive
14	10 A	Optional power source (1)
15	10 A	Optional power source (2), travel alarm, 12 V power port
16	10 A	Radio, cab lamp
17	10 A	Monitor (normal power source) Ignition switch
18	10 A	Spare
19	30 A	Engine controller
20	5 A	Engine controller ACC



OPERATION

Fusible Link

If the starting motor does not turn when the ignition switch is turned to the ON position, there is probably a disconnection in fusible link (1) or (2).

Open the battery box cover on the right side of the chassis, then check and replace the fusible link.

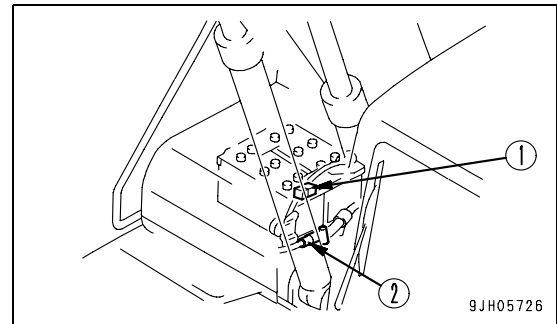
(1): Fusible link for 24 V power supply

(2): Fusible link for starting motor

Fusible link (2) is taped to the nearby wiring harness. When carrying out inspection or replacement, check the wiring harness number.

Remark

A fusible link refers to the large-sized fuse wiring installed in the high current flow portion of the circuit to protect electrical components and wiring from burning, in the same way as an ordinary fuse.



HANDLING THE 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.

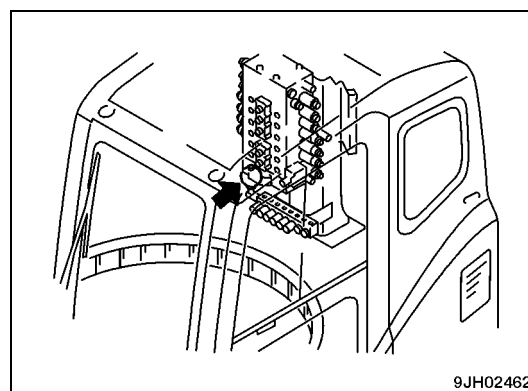
- The pressure in the control circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in a position where the oil spurting out can strike you. Loosen the bolts slowly.
- Do not disassemble the accumulator.
- Do not bring it near flame or dispose of it in fire.
- Do not 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.

The machine is equipped with an accumulator in the control circuit. The accumulator in the control circuit is a device to store pressure. When this accumulator is installed, it is possible to operate the control circuit for a short time even after the engine is stopped. Therefore, it is possible to lower the work equipment under its own weight by operating the control lever in the direction to lower the work equipment. The accumulator is installed in the position shown.

Releasing Pressure in Control Circuit

1. Lower the work equipment to the ground, then close the crusher or other attachment. Stop the engine.
2. Turn the key in the starting switch to the ON position again to let electric current flow in the circuits.
3. Set the safety lock lever to the free position, then operate the work equipment control levers and attachment control pedal backwards and forwards, and to the right and left to the full stroke to release the pressure in the control circuit.
4. 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 where the oil can strike you if it spurts out.



PRECAUTIONS BEFORE STARTING WORK OPERATIONS

Before starting your work operations it is important to perform several procedures to be sure your equipment is in a safe operating condition. It is also important to be aware of the hazards involved when operating your machine.

Pre-operational Checks

Before starting your machine and preceding with any work operations it is important to be sure your machine is safe to operate. Below is a list of some basic items to check before any work is to begin. If any problems are found during your Pre-operational Check, have them repaired immediately. Never operate a machine that is unsafe, damaged or in need of repair.

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 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 to be sure 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 coolant or oil around engine
Check to be sure there is no leakage of oil from the engine or leakage of coolant from the cooling system. If any abnormality is found, repair it.
4. Check for oil leakage from hydraulic equipment, hydraulic tank, hoses, joints
Check to be sure 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 the handrail, loose bolts
Repair any damage and tighten any loose bolts.
7. Check for damage to gauges, monitor, loose bolts
Check to be sure 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 to be sure 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 and mounting clamps
Check to be sure there is no abnormality in the seat belt or mounting clamps. If there is any damage, replace with new parts.
10. Check bucket with hook (if equipped) for damage.
Check the hook, catcher and hook foot for damage. If damage is found, contact your Komatsu distributor for repair.

Checks Before Starting

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

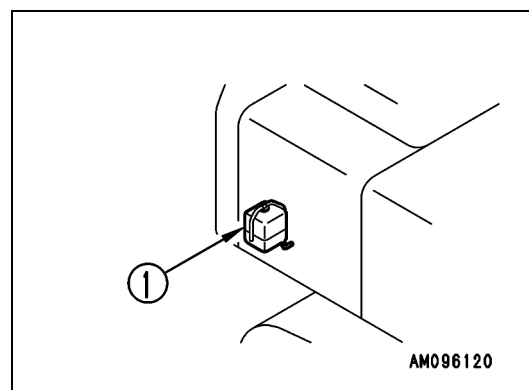
Check Coolant Level, Add Coolant

⚠ WARNING

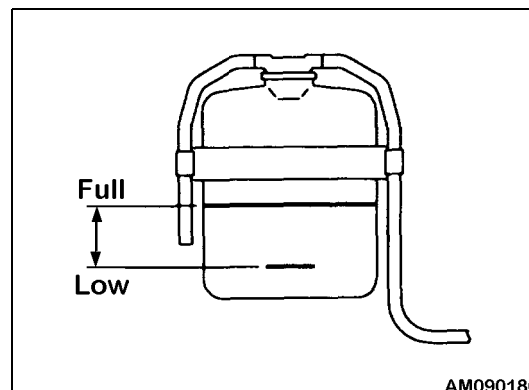
Do not open the radiator cap unless necessary. When checking the coolant, wait for the engine to cool down and check the sub tank.

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 danger 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 coolant in sub-tank (1) (shown in the diagram on the right) is between the FULL and LOW marks. If the coolant level is low, add coolant to the FULL level through the filler port of sub-tank (1).
2. After adding coolant, tighten the caps securely.

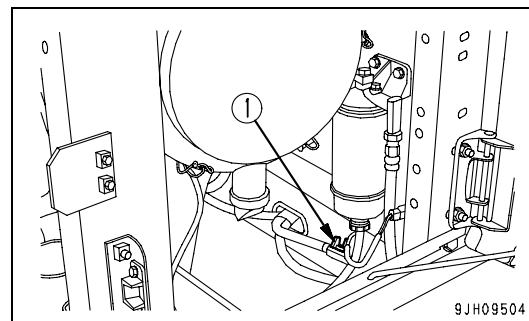


3. If the sub tank is empty, there is probably leakage of coolant. After inspecting, repair any abnormality immediately. If there is no abnormality, check the coolant level in the radiator. If the coolant level is low, add coolant to the radiator, then fill the reserve tank (1).



Drain Water and Sediment from Fuel Tank

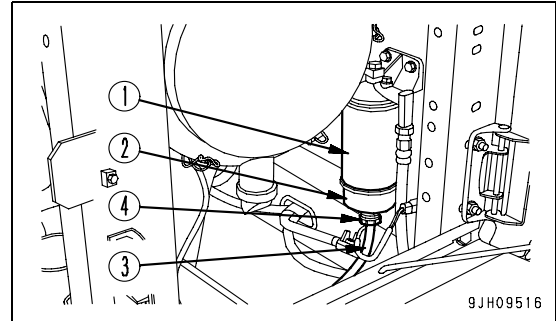
1. Open the door at the right of the machine.
2. Set a container under the drain hose to catch the drained fuel.
3. Open drain valve (1) and drain the water and sediment accumulated at the bottom together with the fuel.
4. When no more water and sediment comes out with the fuel, close drain valve (1).
5. Close the door.



OPERATION

Check And Drain Water Separator

1. Open the cover on the right side of the machine.
2. The water separator forms one unit with fuel pre-filter (1).
3. It is possible to judge the water level and amount of sediment by looking through transparent cap (2). If there is any water or sediment collected at the bottom, set a container to catch the drain water under drain hose (3).
4. Loosen drain valve (4) and drain the water.
5. When fuel starts to drain from drain hose (3), tighten drain valve (4) immediately.

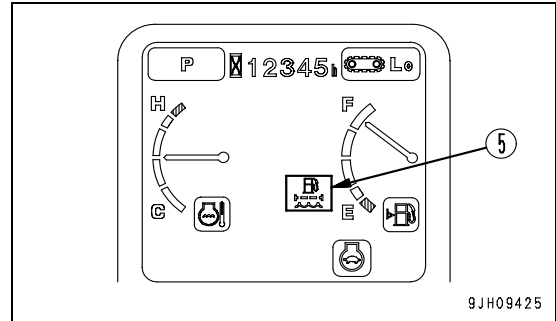


On this machine, a sensor is installed to detect if water is accumulated in transparent cap (2).

When the water separator monitor (5) lights up red on the machine monitor, it indicates that water is accumulated in transparent cap (2).

★ In this case also, use the procedure above to drain the water.

- If the water accumulated in transparent cap (2) freezes, the water separator monitor may not light up. After the engine is started, as the temperature around fuel pre-filter (1) increases, the frozen water will melt and the water separator monitor may suddenly light up. In cold areas, even if the water separator monitor does not light up, drain the water frequently.
- If the water inside transparent cap (2) freezes, check to be sure the frozen water has melted completely, then use the procedure above to drain the water.



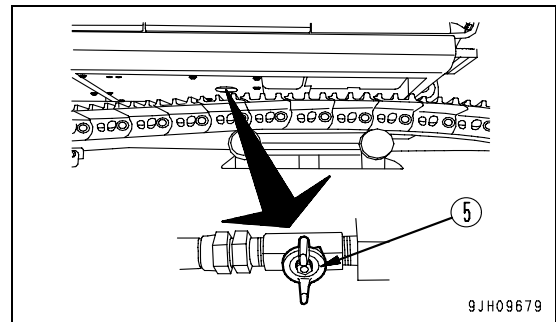
Remark

If transparent cap (2) is dirty and the contents cannot be easily seen, clean transparent cap (2) when replacing fuel pre-filter cartridge (1).

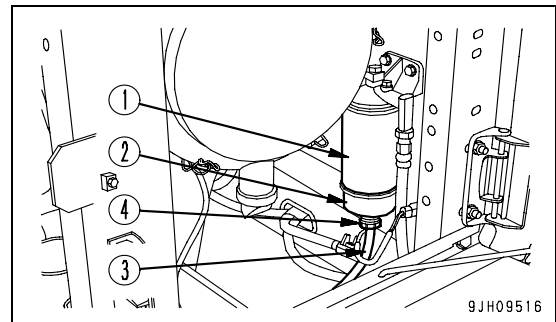
Adjustment of Drain Valve

If drain valve (4) is stiff, coat the O-ring portion of the drain valve with grease to make the movement smooth.

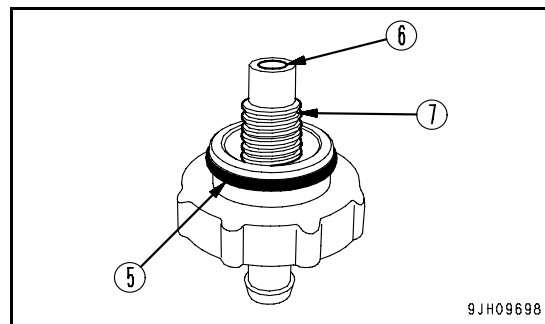
1. Turn valve (5) at the bottom of the fuel tank to the right to close it.



2. Set a fuel container under transparent cap (2), then remove drain valve (4).



3. Coat O-ring portion (5) with a suitable amount of grease.
When doing this, be careful not to let the grease get stuck to the drain valve water drain port (6) or drain valve thread (7).
4. Screw drain valve (4) into transparent cap (2).
5. Remove the fuel container.
6. Turn valve (5) at the bottom of the fuel tank to the left to open it.



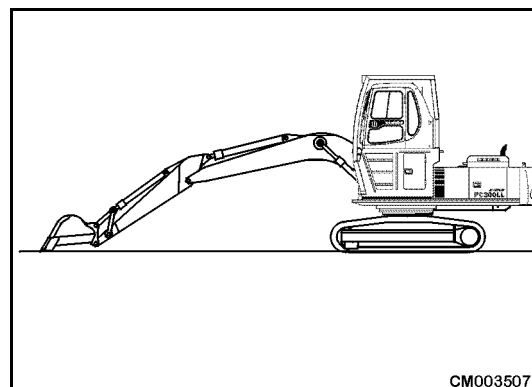
Check and Adding Oil to Hydraulic Tank

! WARNING

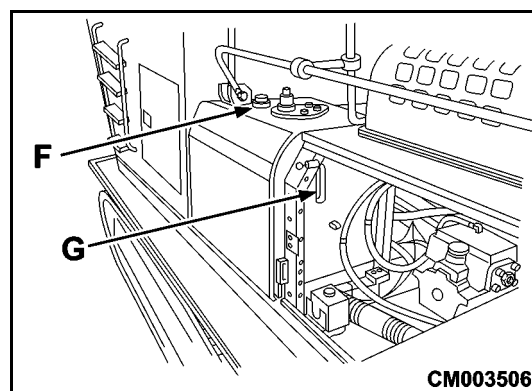
The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Set the work equipment in the posture shown in the diagram on the right, then check the oil level and add oil if necessary.
2. 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 cylinder rods fully, then lower the boom, set the bucket teeth in contact with the ground, and stop the engine.
3. Within 15 seconds after stopping the engine, move each control lever (for work equipment and travel) to the full stroke in all directions to release the internal pressure.



4. Check sight gauge (G). The oil level should be between the H and L marks.
5. If the level is below the L mark, add oil through oil filler (F) at the top of the hydraulic tank.



OPERATION

Remark

The oil level will vary depending upon the oil temperature. Accordingly, use the following as a guide:

Before starting operation: Between **H** and **L** levels

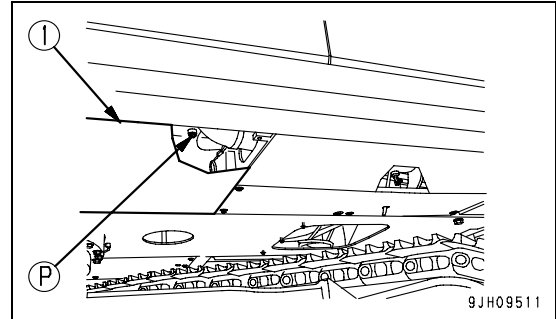
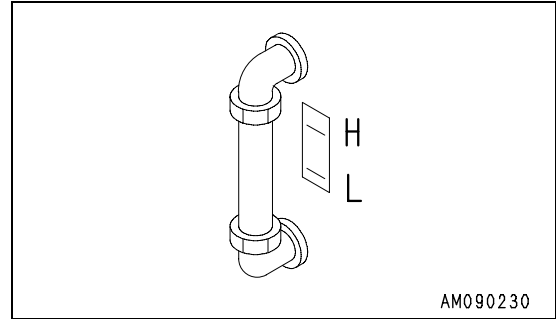
(Oil temperature 10 to 30°C (50 to 86°F))

Normal operation: Around **H** level

(Oil temperature 50 to 80°C (122 to 176°F))

- Do not add oil above the **H** line. This will damage the hydraulic circuit or cause the oil to spurt out.

If oil has been refilled, exceeding the **H** level, swing the upper structure until drain plug (P) beneath the hydraulic tank comes between the right and left track shoes and stop the engine. Wait for the oil to cool down sufficiently, then remove cover (1) and drain the excess oil through drain plug (P).



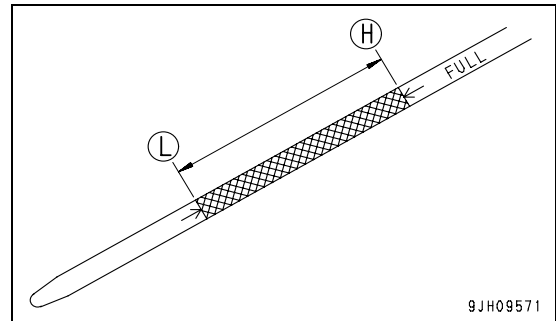
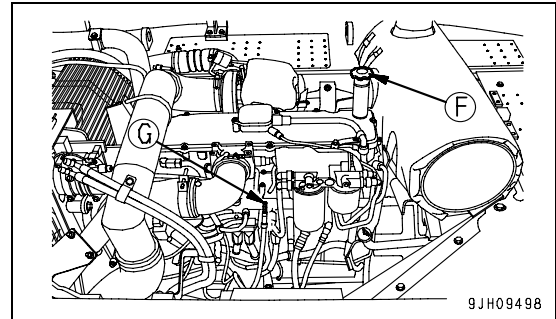
Check and Add Engine Oil

WARNING

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

- Open the engine hood on the machine.
- Remove dipstick (G), and wipe the oil off with a cloth.
- Fully insert dipstick (G) into filler pipe (F), then remove it.
- The oil level should be between the (H) and (L) marks on dipstick (G).

If the oil level is below the (L) mark, add oil through oil filler (F).

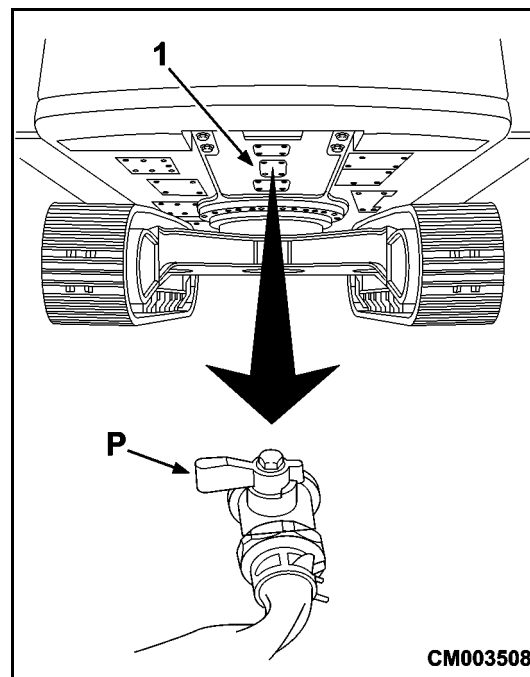


5. If the oil is above the (H) mark on the gauge, remove cover (1), drain the excess oil from drain valve (P) at the bottom of the engine oil pan, then check the oil level again.
6. If oil level is correct, securely tighten the oil filler cap and close the engine hood.

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 Electrical Wiring**

⚠ WARNING

If fuses are frequently blown or if there are traces of short-circuiting in the electrical wiring, contact your Komatsu distributor to locate the cause and make the repair. Keep the top surface of the battery clean and check the vent hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap to clear the vent hole.

Check that there is no damage to the fuses; that fuses of the specified capacity are used; that there is no disconnection or trace of short-circuiting in the electric wiring and no damage to the covering. Check for loosened terminals. If found, tighten them. Pay particular attention to the electric wiring when checking the battery, engine starting motor and alternator. Be sure to check to be sure there is no flammable material accumulated around the battery. If any is found, remove immediately.

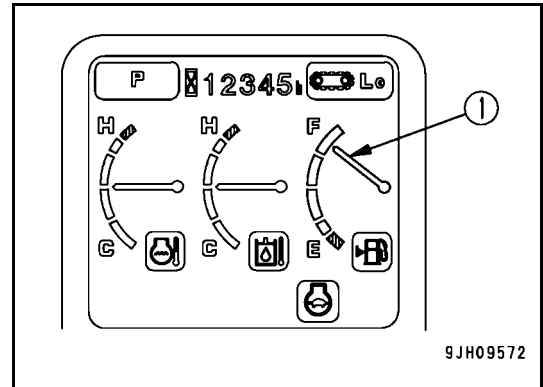
OPERATION

Check or Add Fuel

WARNING

When adding fuel, never spill the fuel or let it overflow. If any fuel has spilled, wipe it up immediately. If fuel has spilled over soil or sand, remove that soil or sand. Fuel is highly flammable and dangerous. Never bring flames near fuel.

1. Turn the engine ignition switch to the ON position and check the fuel level gauge (1) on the monitor panel for fuel level.

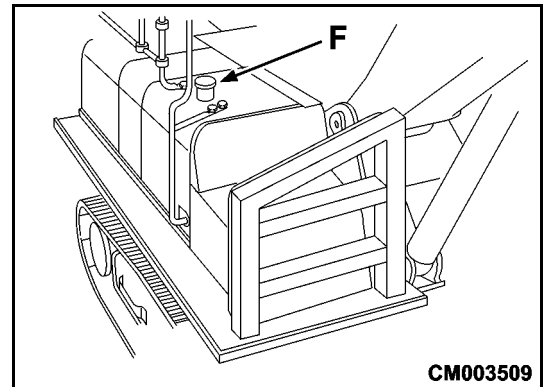


After checking, turn the switch back to the OFF position.

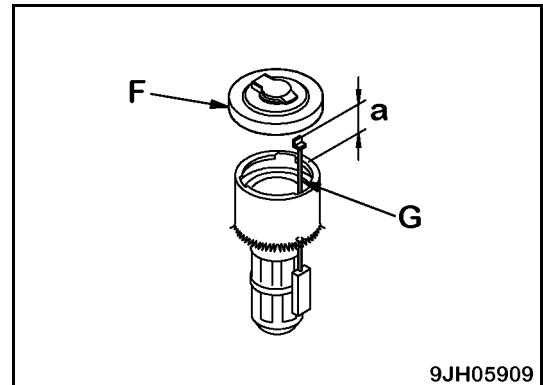
2. If fuel is found to be low, unscrew fuel filler cap (F) on the fuel tank and add fuel through the filler port until float gauge (G) comes up to the highest point. Fuel tank capacity: 605 ℓ (159.84 US gal)

Position of tip (a) of float gauge (G) when fuel tank is full: 50 mm (2 in)

3. After adding fuel, push float gauge (G) straight down with fuel filler cap (F).

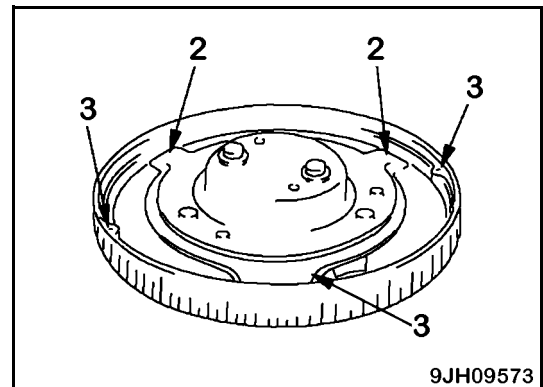


4. Be careful not to get float gauge (G) caught in the tab of fuel filler cap (F), and tighten fuel filler cap (F) securely.



Remark

If breather hole (3) on the cap is clogged, the pressure in the tank will drop and fuel will not flow. Clean the hole from time to time.

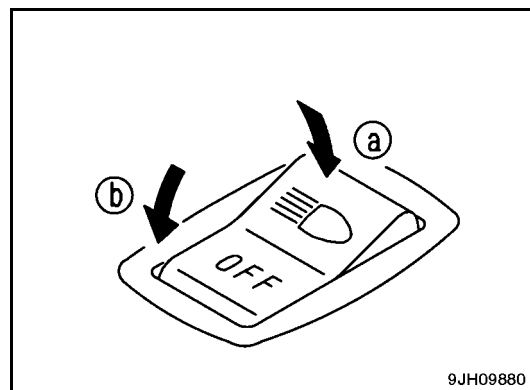


Check Work Lamps

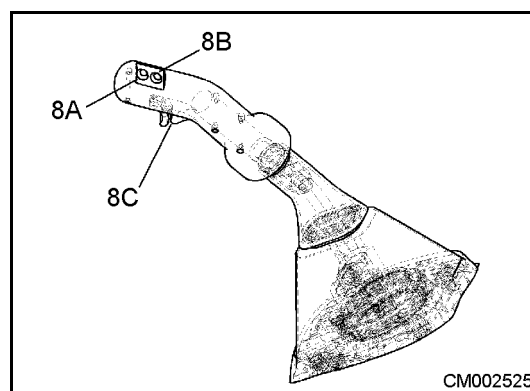
Check to be sure the working lamps and lamps inside the instruments light up properly. Check also that there is no dirt or damage.

If any lamp does not light up, the bulb is probably blown up or there is a disconnection, so ask your Komatsu distributor to carry out repairs.

1. Turn the ignition switch to the ON position.
2. Set the lamp switch to ON position (a) and check to be sure the working lamp lights up.

**Check Function of Horn**

1. Turn the ignition switch to the ON position.
2. Confirm that the horn sounds immediately when the horn button (8A) is pressed.
3. If the horn does not sound, contact your Komatsu distributor for repair.



OPERATION

Adjustments Before Operation

WARNING

Adjust the seat position before starting operations or after changing the operator. Adjust the seat so that the control levers and switches can be operated freely and easily with the operator's 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 in 16 stages

B: Adjusting reclining

Remark

The seat can be reclined to a large angle when the seat is pushed fully forward. However, 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 upright 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.

C: Adjusting seat tilt

1. Forward tilt; Push lever (3) up to adjust the angle of the front of the seat. (4 stages)
 - A. 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.
 - B. 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.
2. Rear tilt; Pull lever (4) up to adjust the angle of the rear of the seat. (4 stages)
 - A. 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.
 - B. 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°

3. Adjusting seat height; You can move the seat up or down by combining adjustments 1 and 2. After setting the forward tilt or rear tilt to the desired height, set the other to make the seat horizontal. Release the lever to secure the adjustment.

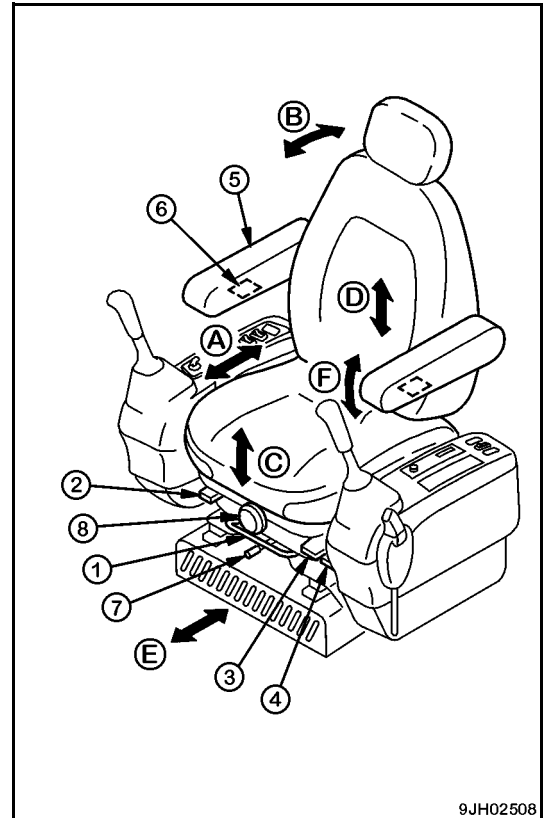
Height adjustment 60 mm

D: Adjusting armrest angle

Armrest (5) can be made to spring up by hand approximately 90°. To make fine vertical adjustments of the armrest angle, turn the bottom (6) of the armrest by hand.

Armrest adjustment angle 25°

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



9JH02508

E: Overall fore and aft adjustment of seat

Move lever (7) to the right, set the seat to the desired position, then release the lever. In this case, the operator's seat, left and right control levers, and safety lock lever adjust together.

Fore and aft adjustment 120 mm

F: Adjusting suspension

Turn the knob (8) 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

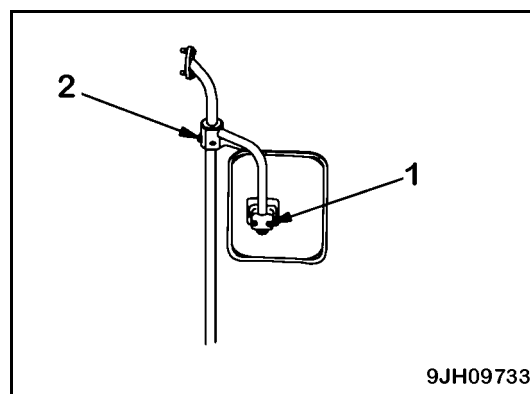
To obtain the optimum adjustment, turn the knob (8) so that the indicator of the weight display (kg) in the transparent portion of knob (8) is the same as the operator's weight.

Rear View Mirrors

Mirrors A, B

Adjust the mirror mount so that it is possible to see people (or objects with a height of 1 m (3.3 ft) or a diameter of 30 cm (12 in)) at the rear left and right of the machine.

If the movement of the mirror mount is stiff when adjusting the mirror, loosen mirror bolt (1) or (2).

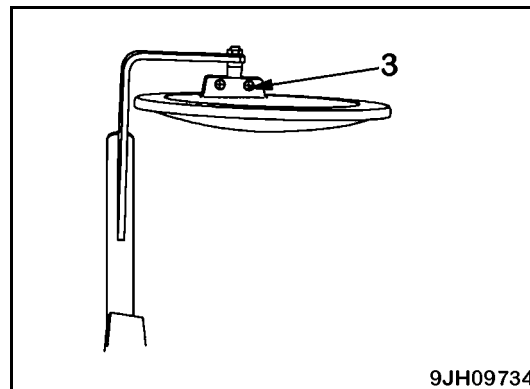


Mirrors D

Adjust so that it is possible to see the ground around the machine for 1 m from the operator's seat.

If the movement of the mirror is stiff when adjusting the mirror, loosen screw (3) of the mirror.

Install the mirror to the dimensions listed in the table below.



OPERATION

Recognition areas are also shown in the table for reference.

- Mirror A: Must be able to see hatched area (A)
- Mirror B: Must be able to see hatched area (B)
- Mirror D: Must be able to see hatched area (D)

X: 2220 mm (87.5 in)

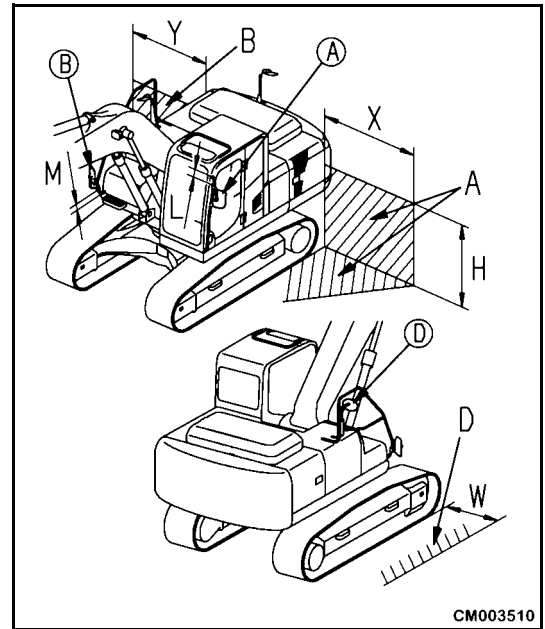
Y: 2650 mm (104.4 in)

H: 1600 mm (63.0 in)

W: 1000 mm (39.4 in)

L: 120 mm (4.7 in)

M: 40 mm (1.6 in)



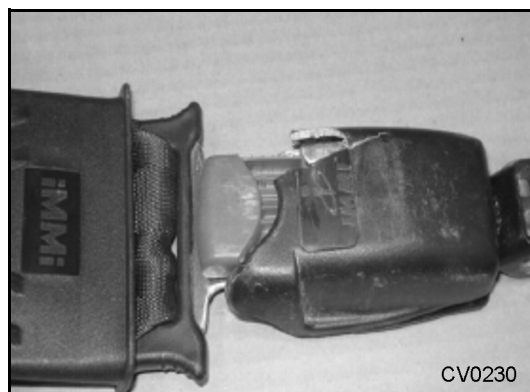
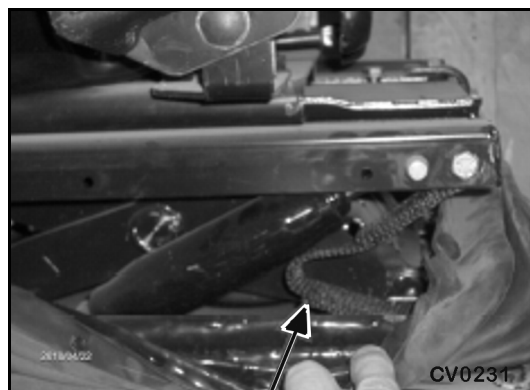
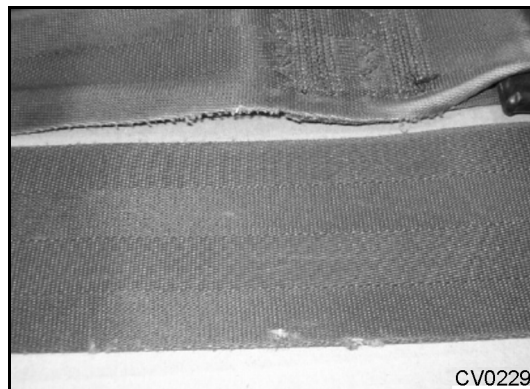
Seat Belt Inspection

! WARNING

Seat belts must be replaced immediately if there are any signs of wear or damage, no matter how recently they were last replaced.

A thorough inspection of the entire seat belt system should occur before starting the engine.

- Inspect the full length and both sides of the seat belt webbing for wear, abrasion, dirt, oil, mildew, paint or other damage. Replace immediately if worn or damaged.
 - If the webbing is cut, fraying, snagging, kinking, or roping, the seat belt must be replaced. Any of these conditions may limit belt retraction.
 - There may be internal and/or external tethers mounted on the suspension mechanism. Inspect these for fatigue as well as the integrity of the mounting hardware.
-
- Inspect the seat belt attachment and adjustment hardware for wear or damage.
 - Retractable and non-retractable buckle housings with damage from abrasions, rubbing, forceful impacts and age, must be replaced. These conditions may weaken the strength of the buckle.
 - Examine the seat belt buckle and retractor housing(s) for proper function.
 - Dirt, debris, lint, leaves, etc. may become encased inside of the retractor housing. With time, this condition may cause a seat belt malfunction.
 - Check the mounting structure integrity. Verify that the mounting bolts are secure. Tighten to specified torque, if necessary.
 - Check your records or the seat belt “Date of Installation” label (if equipped). Even if there are no signs of damage, the seat belt must be replaced either five years after the date of manufacture, or every three years after the start of usage, whichever comes first.
 - The manufactured date and “Install By” (if equipped) date may be found on the back of the buckle housing and/or on the seat belt webbing.
 - The location of the “Date of Installation” label (if equipped) may vary slightly, but most frequently it will be found on the plastic molding of the seat belt.



If your machine is equipped with a shoulder harness also, inspect the webbing, the shoulder loop web guide and the height adjuster for wear, damage and proper function capabilities

OPERATION

Seat Belt

WARNING

Before fitting the seat belt, check to be sure there is no abnormality in the belt or its mounting bracket. If it is worn or damaged, replace the seat belt.

Even if the seat belt appears normal, replace it every 3 years. The date of manufacture of the belt is shown on the back of the belt.

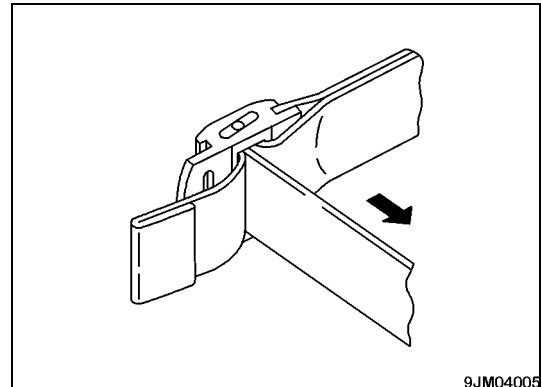
Always wear the seat belt during operations.

Fit the seat belt so that it is not twisted.

Fastening and Removing Seat Belt

This seat belt has a retractor, so it is not necessary to adjust the length.

- Fastening seat belt
Hold grip (2) and pull the belt out from the retractor (1), check to be sure the belt is not twisted, then insert tongue (3) into buckle (4) securely. Pull the belt lightly to check to be sure it is properly locked.
- Removing belt
Press button (5) in buckle (4), and remove tongue (3) from the buckle (4). The belt is automatically spooled, hold grip (2) and return the belt slowly to the retractor (1).

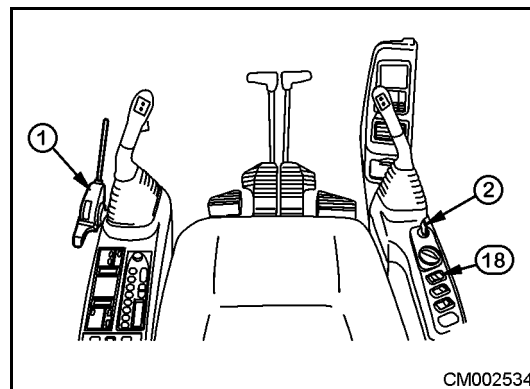


System “On” Checks

Remark

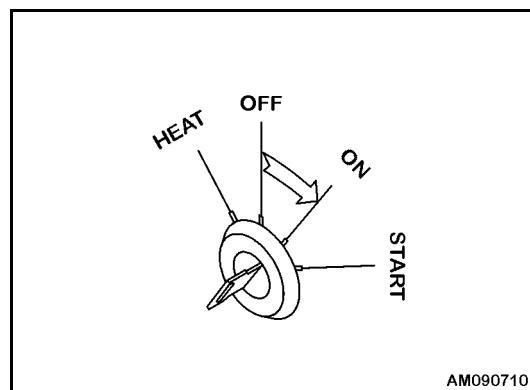
*Do not start the engine during **SYSTEM “ON” CHECKS***

1. Check safety lock lever (1) is in the **LOCK** position.
2. Check the position of each lever, be sure they are in neutral.



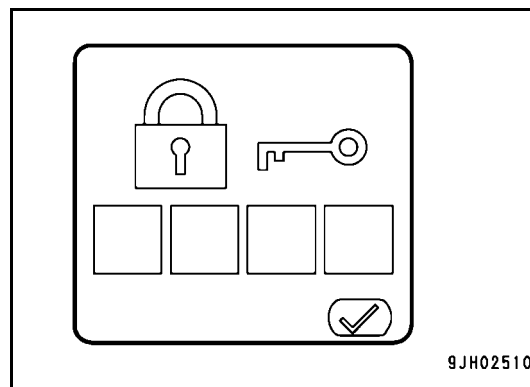
CM002534

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



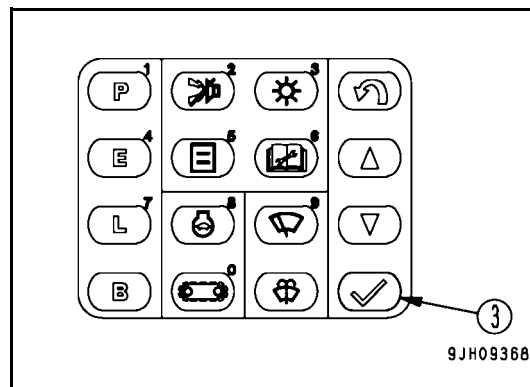
AM090710

- If a password has been set, the input display screen is shown on the monitor screen.



9JH02510

- After inputting the password, press input confirmation switch (3).

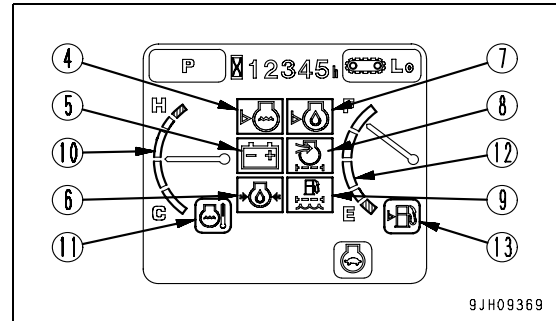


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OPERATION

4. The buzzer sounds for approximately 1 second, and the following monitors and meters light up for approximately three seconds.

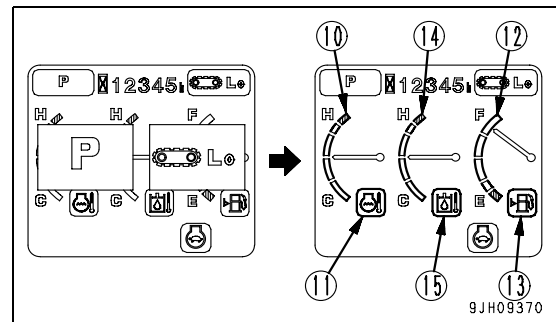
- Radiator water level monitor (4)
- Charge monitor (5)
- Engine oil pressure monitor (6)
- Engine oil level monitor (7)
- Air cleaner clogging monitor (8)
- Water separator monitor (9)
- Engine water temperature gauge (10)
- Engine water temperature monitor (11)
- Fuel gauge (12)
- Fuel level monitor (13)



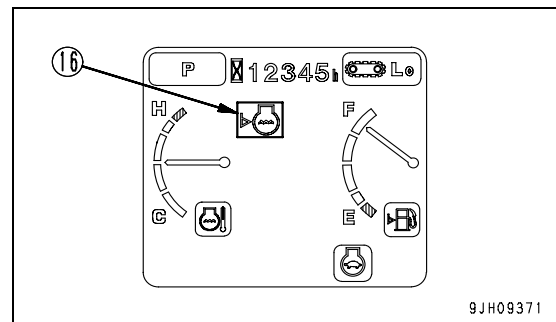
If the monitors do not light up or the buzzer does not sound, there is probably a failure in the monitor, so contact your Komatsu distributor for repairs.

After approximately three seconds, the screen switches to the working mode/travel speed display monitor. Then it switches to the normal screen.

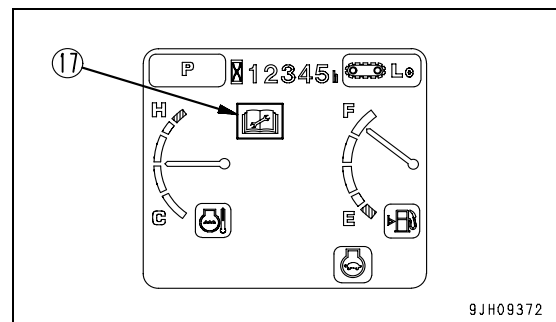
- Engine coolant temperature gauge (10)
- Engine coolant temperature monitor (11)
- Fuel gauge (12)
- Fuel level monitor (13)
- Hydraulic oil temperature gauge (14)
- Hydraulic oil temperature monitor (15)



5. If the hydraulic oil temperature gauge is out or caution lamp (16) stays lighted up red, immediately check the item that lights up red.



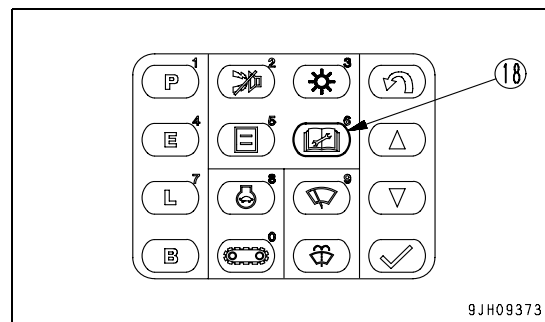
6. If there are any items where the maintenance time has passed, maintenance interval monitor (17) lights up for 30 seconds.



- Press maintenance switch (18), check the item, then carry out maintenance immediately.

Remark

For details of the method of checking the maintenance interval, see "MAINTENANCE Section" in the Detailed controls and gauges.



OPERATION

Starting the Engine

Normal or Cold Start Procedures

WARNING

- Start the engine only after sitting down in the operator's seat.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.
- Check to be sure 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.

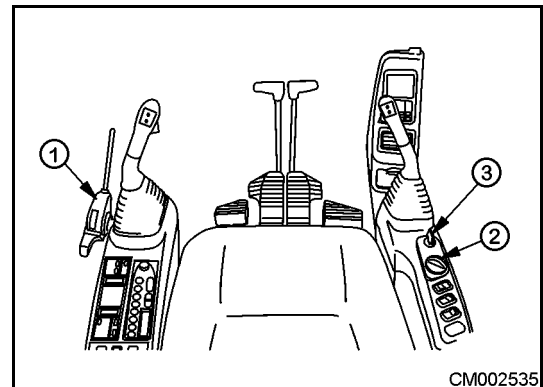
Remark

Before starting the engine, check to be sure fuel control dial (2) is at the low idling (MIN) position. If the fuel control dial is at the full speed (MAX) position, the engine will accelerate suddenly and cause damage to the engine parts.

Do not keep the key in ignition switch (3) at the START position continuously for more than 20 seconds.

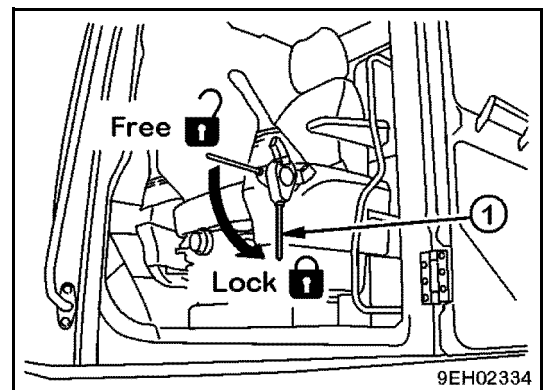
If the engine does not start, wait for at least two minutes, then start again from the beginning.

After the engine starts, wait for the engine oil pressure monitor to go out. Do not touch the control levers or control pedal while the engine oil pressure monitor is lit up.

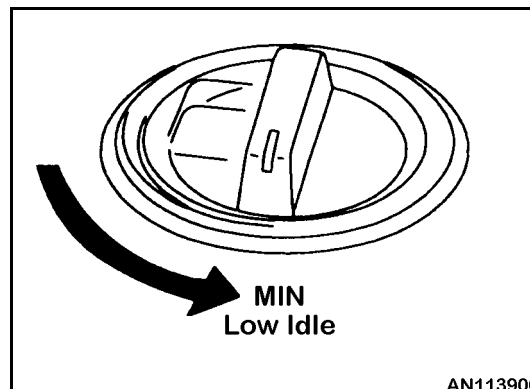


- ★ This machine is equipped with an engine automatic preheating device that functions to start the engine preheating automatically. If the ambient temperature is low, the preheating monitor will light up when the key in ignition switch (3) is turned to the ON position to inform the operator that preheating has been started automatically.

1. Check to be sure safety lock lever (1) is at LOCK position. If safety lock lever (1) is at the FREE position, the engine will not start. Set the control lever to the neutral position. When starting the engine, never touch the knob switch.

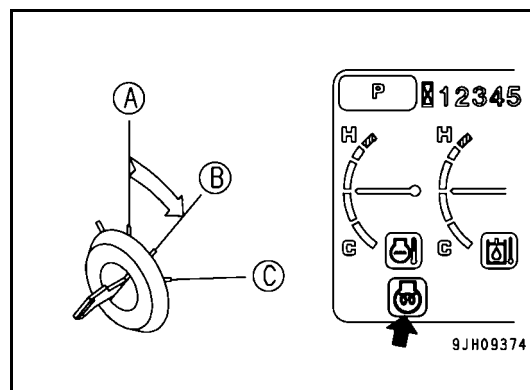


- Set fuel control dial (2) at the low idling (MIN) position. If it is at the high idling (MAX) position, always change it to the low idling (MIN) position.



AN113900

- Turn the key in ignition switch (3) to ON position (B).
If the ambient temperature is low, the preheating monitor lights up and automatic preheating is carried out. Keep the key in ignition switch (3) at the ON position until the preheating monitor goes out.



9JH09374

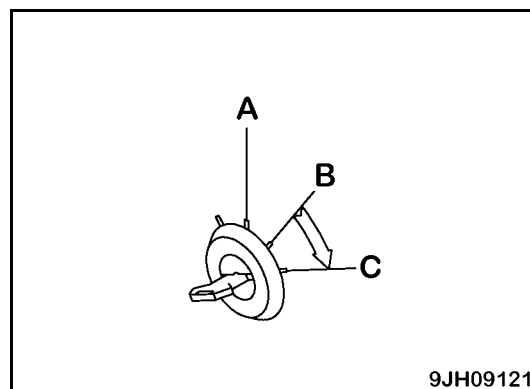
The time that the preheating monitor stays lit up depends on the ambient temperature as shown in the table on the right.

Ambient temperature	The time that the preheating monitor is lit up
-10°C (14°F)	15 seconds
-20°C (-4°F)	32 seconds
-25°C (-13°F)	40 seconds

- If the preheating monitor does not light up, or it lights up and then goes out to inform that the engine preheating has been completed, turn the key in ignition switch (3) to the START position (C) and start the engine.

Remark

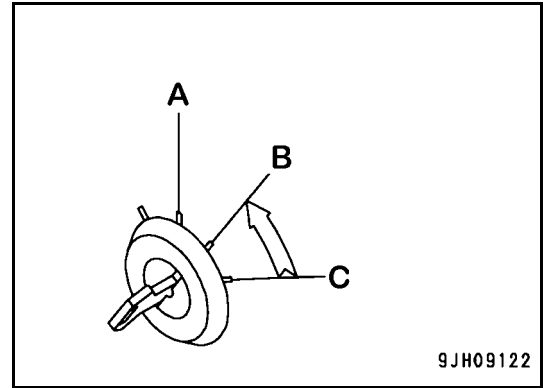
If the ambient temperature is low, the engine may not start even when the key in the ignition switch (3) is kept at the START position for 20 seconds. If this happens, wait for at least 2 minutes, then start again from the beginning.



9JH09121

OPERATION

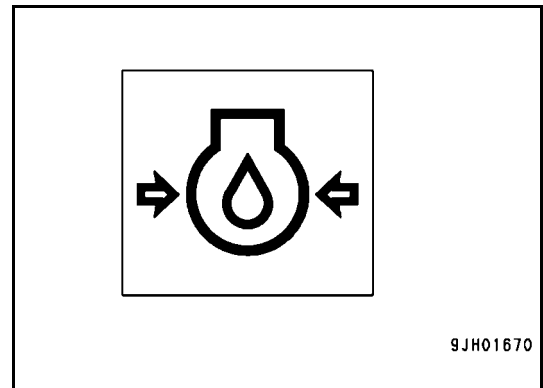
- After the engine starts, release the key in ignition switch (3). The key will automatically return to the ON position (B).



- Even after the engine is started, do not touch the work equipment control levers and the travel pedals, while the engine hydraulic pressure monitor lamp is still lighted.

Remark

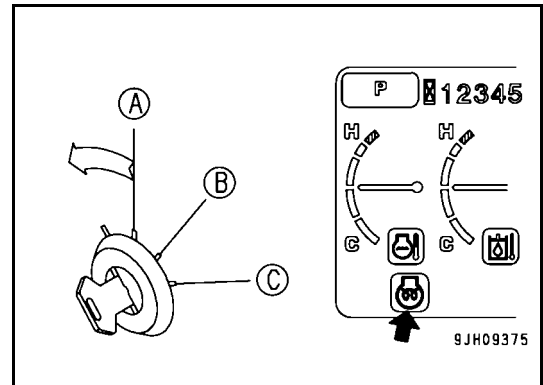
If the engine oil pressure monitor does not go out even after four to five seconds have passed, stop the engine immediately. Check the oil level, check for leakage of oil, and take the necessary action.



Remark

Regardless of the ambient temperature, it is possible to start the engine preheating manually.

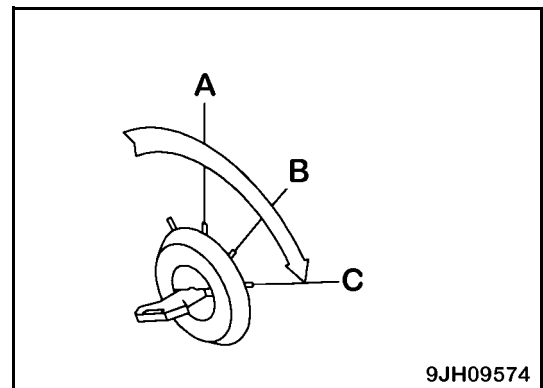
- Turn the key in ignition switch (3) to the left from OFF position (A). The preheating monitor lights up and engine preheating starts. (Preheating continues while the key in ignition switch (3) is held at the left position.)



Remark

During the preheating operation, the preheating monitor lights up to show that preheating is taking place.

- After approximately 18 seconds, the preheating monitor will go out to inform that the preheating has been completed.
- Turn the key in ignition switch (3) to START position (C). The engine will start.



Turbo Protect Function

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

- When the turbo protect function is actuated, the engine speed is held at less than 1000 rpm, regardless of the position of the fuel control dial.
- When the turbo protect function is canceled, the engine speed is set to the speed for the position of the fuel control dial.
- The relationship between the length of time of actuating the turbo protect function and the temperature of the engine coolant is as shown in the table.

Coolant temperature	Turbo protect time (sec.)
Above 10°C (50°F)	0
10 to -10°C (50 to -14°F)	Change 0 to 20
below -10°C (14°F)	20

OPERATIONS AND CHECKS AFTER STARTING ENGINE

WARNING

- **When starting the engine, check that the lock lever is securely at the LOCK position.**
- **If the lock lever is not locked securely and the control levers or control pedal are touched when the engine is started, the machine may move unexpectedly, and this may lead to serious personal injury.**

If any problems occur, turn the ignition switch to the “OFF” position.

If the work equipment is operated without warming up the machine sufficiently, the response of the work equipment to the movement of the control lever will be slow, and the work equipment may not move as the operator desires, so always perform the warm-up operation. Particularly in cold areas, be sure to perform the warm-up operation fully.

Breaking in the Machine

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

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

There are two types of warming-up operation: warming up the engine and warming up the hydraulic equipment. In addition, depending on the environment, the method of carrying out the warming-up operation may differ, so carry out the warming-up operation according to the items given in the appropriate section.

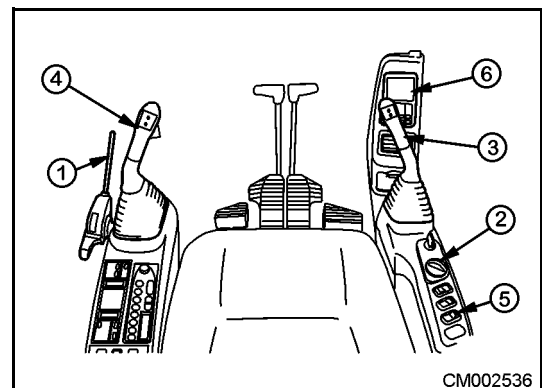
When only the engine is warmed up, the hydraulic equipment is not warmed up, so always carry out the warming-up operation for the hydraulic equipment separately from the warming-up operation for the engine. Warming up the hydraulic equipment thoroughly ensures that the hydraulic oil is warmed up and that warm hydraulic oil circulates in all the control circuits.

Warming Up Engine

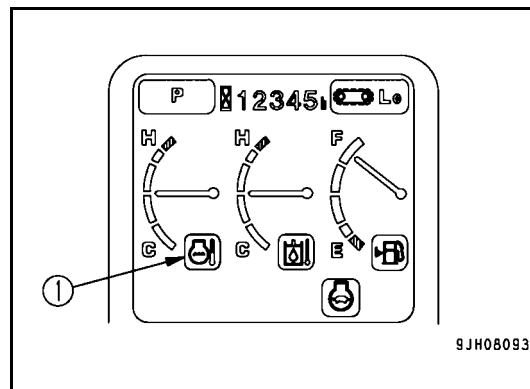
- Do not accelerate the engine suddenly until the warming-up operation has been completed.
- Do not run the engine at low idling or high idling under no load for more than 20 minutes. This will have an adverse effect on the environment, and will also have an adverse effect on the internal structure of the engine. If it is necessary to run the engine at idling for more than 20 minutes, apply a load from time to time or run at a mid-range speed.

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

1. This machine is equipped with an automatic engine warming-up system, so if the engine water temperature is below 30°C (86°F) after the engine is started, the engine warming-up operation starts automatically. When the engine automatic warming-up operation starts, the engine speed is maintained at a speed higher than the normal low idling speed. If the engine water temperature goes above 30°C (86°F) or if the warming-up operation has been continued for more than 10 minutes, the automatic warming-up operation is cancelled and the engine speed drops to the normal low idling speed.

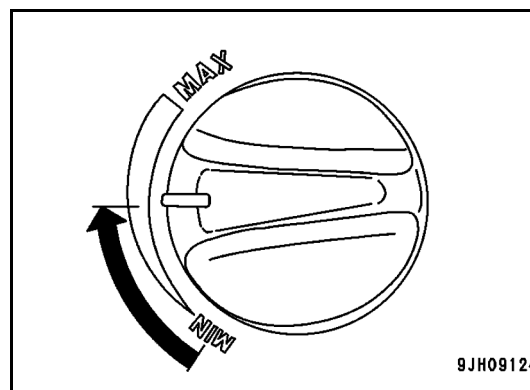


2. Check to be sure engine water temperature monitor (1) displays green. If it displays white, use the procedure in Step 3 to carry out additional warming up of the engine until the monitor displays green.



3. Turn fuel control dial (2) to a point midway between low idling (MIN) and full speed (MAX), run the engine at a mid-range speed, and run under no load until engine water temperature monitor (1) displays green.

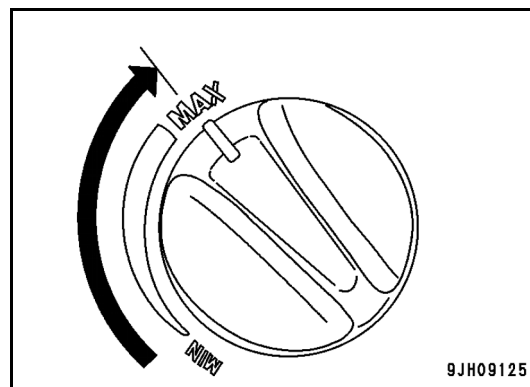
If the engine water temperature monitor displays green, the engine warming-up operation is completed. After checking that the engine water temperature monitor displays green, carry out the warming-up operation for the hydraulic equipment.



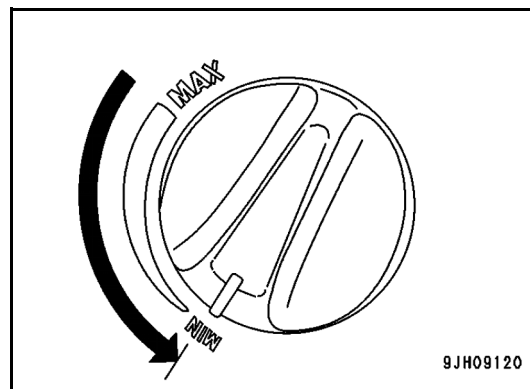
Canceling Automatic Warming-up Operation

If it becomes necessary in an emergency to cancel the automatic warming-up operation or to lower the engine speed to low idle, do as follows.

1. Turn fuel control dial (2) to the full speed (MAX) position and hold it for 3 seconds.



2. When fuel control dial (2) is returned to the low idle (MIN) position, the engine speed will drop.



OPERATION

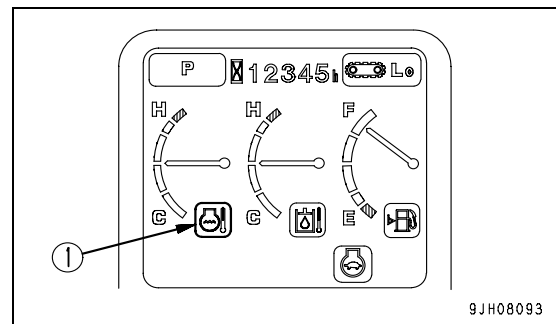
Warming up Hydraulic Equipment

! WARNING

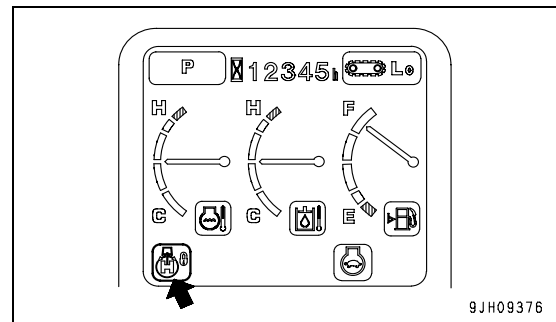
- Before carrying out the warming-up operation for the hydraulic equipment, turn the swing lock switch ON, check on the monitor that the swing lock is actuated, then start the warming-up operation.
- When warming up the hydraulic equipment, check to be sure there is no person or obstacle in the surrounding area, then sound the horn and start the operation.
- Carry out the warming-up operation for the hydraulic equipment until the hydraulic oil temperature monitor displays green.
- The warming-up operation for the hydraulic equipment is necessary not only for the circuit between the pump and cylinders and between the pump and motor, but also for all the control circuits. Do not carry out the operation just for one cylinder or motor, or the operation just in one direction. Carry out the operation in both directions for the work equipment (boom, arm, bucket), swing, travel, and attachment (if equipped).

1. Check to be sure engine water temperature monitor (1) displays green.

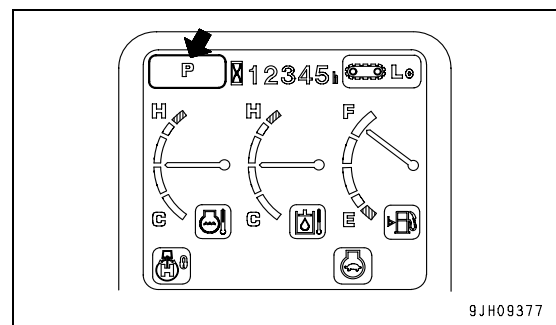
If it displays white, carry out additional warming up of the engine until engine water temperature monitor (1) displays green.



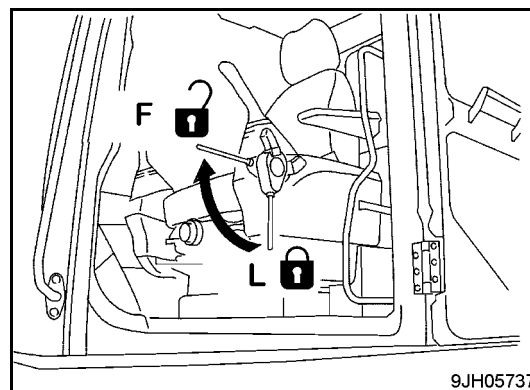
2. Turn swing lock switch (2) ON and check to be sure the swing lock monitor lights up.



3. To complete the warming-up operation of the hydraulic equipment more quickly, set the working mode to **P** mode (heavy-duty mode).



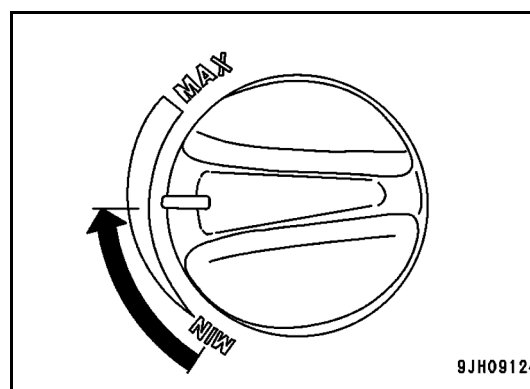
4. Move lock lever (3) slowly to the **FREE** position (F), then raise the bucket from the ground.



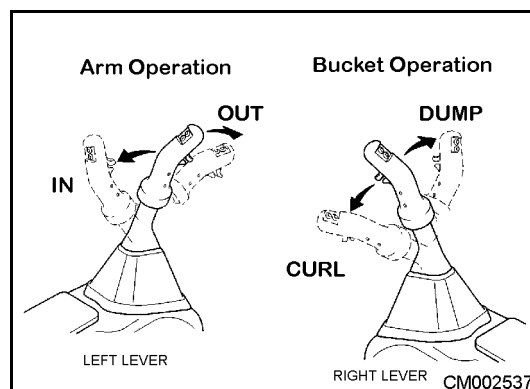
5. Turn fuel control dial (4) to a point midway between low idling (MIN) and full speed (MAX).

Remark

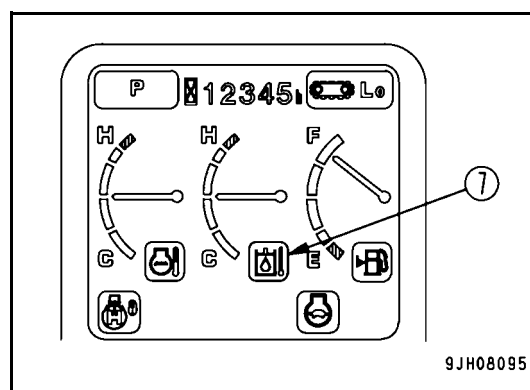
When the work equipment is retracted, take care that it does not interfere with the machine body or ground.



6. Move right work equipment control lever (3) slowly in the direction to **CURL** the bucket. Operate the lever to the end of its travel and hold it in position for 30 seconds.
7. Move right work equipment control lever (3) slowly in the direction to **DUMP** the bucket. Operate the lever to the end of its travel and hold it in position for 30 seconds.
8. Next, move left work equipment control lever (4) slowly in the direction **IN** to pull in the arm (B). Operate the lever to the end of its travel and hold it in position for 30 seconds.
9. Move left work equipment control lever (4) slowly in the direction **OUT**. Operate the lever to the end of its travel and hold it in position for 30 seconds.



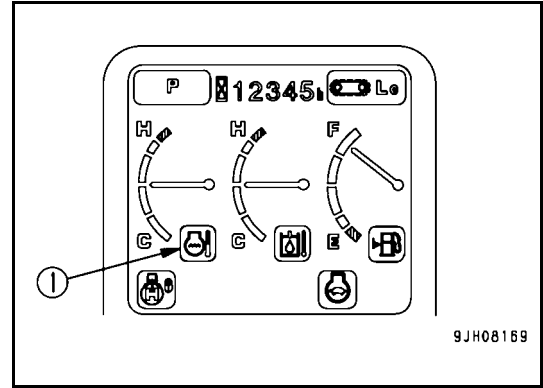
10. Repeat the operation in Steps 6 to 9 for five minutes.
11. Check hydraulic oil temperature monitor (7) is displaying green. If the hydraulic oil temperature monitor is not displaying green (it is displaying white), repeat Steps 6 to 10 until the display is green.



OPERATION

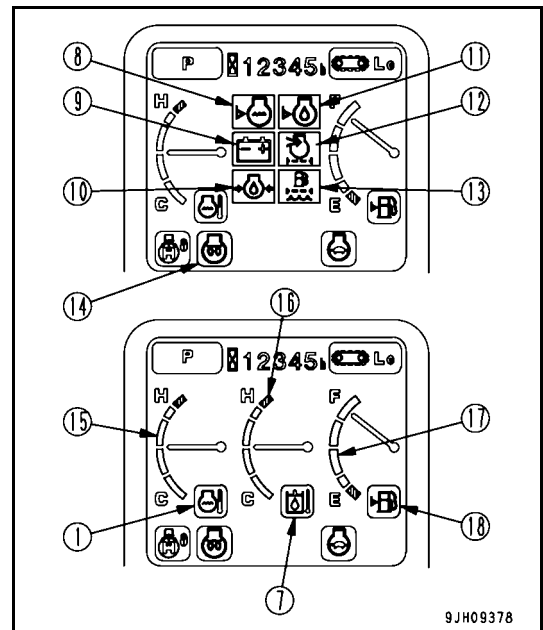
12. Check to be sure engine coolant temperature monitor (1) displays green.

If it displays white, carry out additional warming up of the engine until engine water temperature monitor (1) displays green.



13. Check to be sure the hydraulic oil temperature monitor and engine coolant temperature monitor are displaying green, then check to be sure all the gauges and caution monitors on the machine monitor are in the following status.

- Radiator coolant level monitor (8): OFF
- Charge level monitor (9): OFF
- Engine oil pressure monitor (10): ON
- Engine oil level monitor (11): OFF
- Air cleaner clogging monitor (12): OFF
- Water separator monitor (13): OFF
- Engine pre-heating monitor (14): OFF
- Engine coolant temperature gauge (15): Indicator in green range
- Engine water temperature monitor (1): Green display
- Hydraulic oil temperature gauge (16): Indicator in green range
- Hydraulic oil temperature monitor (7): Green display
- Fuel gauge (17): Indicator in green range
- Fuel level monitor (18): Green display

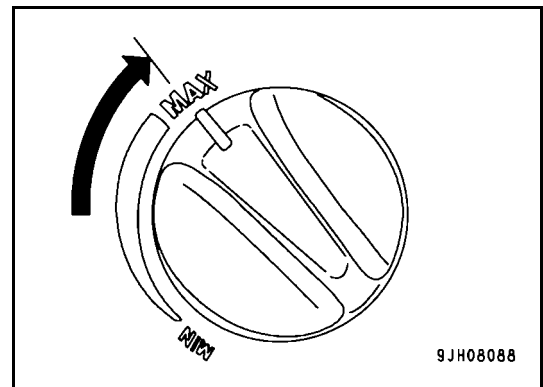


14. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.

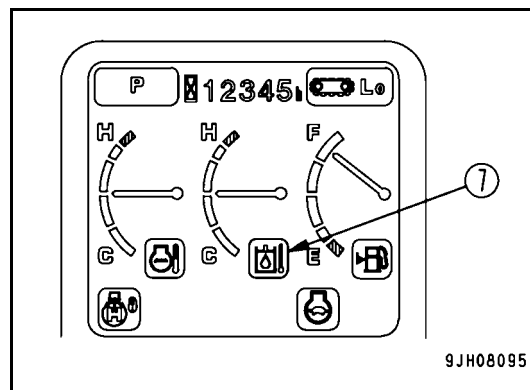
Remark

In cold temperatures (ambient temperature below 0°C), even when the hydraulic oil temperature monitor displays green, carry out additional Step 15 to warm up all the hydraulic equipment.

15. Turn fuel control dial (4) to the full speed (MAX) position, repeat Steps 6 to 9 for three to five minutes, then check again that the hydraulic oil temperature monitor is displaying green.



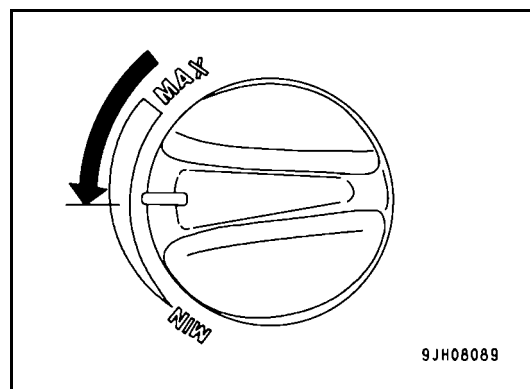
If it is not displaying green, repeat Steps 6 to 9 for three to five minutes until hydraulic oil temperature monitor (7) displays green.



★ For both normal temperatures and cold temperatures, carry out the following operation.

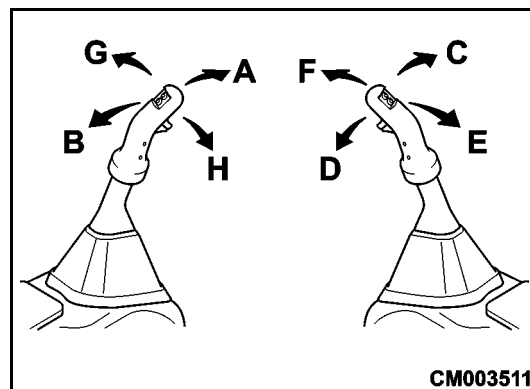
16. Check to be sure fuel control dial (4) is at a point midway between low idling (MIN) and full speed (MAX).

If it is not at the midway position, set it to the midway position and run the engine at a mid-range speed before operating.



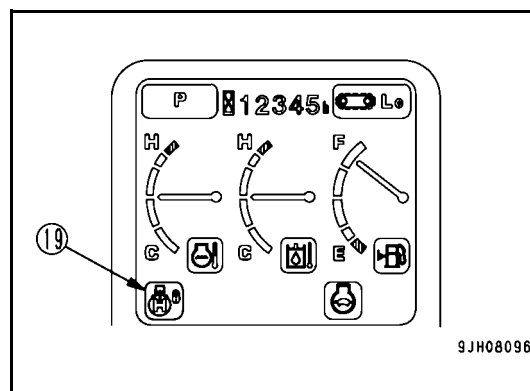
17. Before starting operations, repeat the following operations slowly three to five times to circulate warm oil through the control circuits.

- Boom operation RAISE (E) ↔ LOWER (F)
- Arm operation IN (B) ↔ OUT (A)
- Bucket operation CURL (D) ↔ DUMP (C)



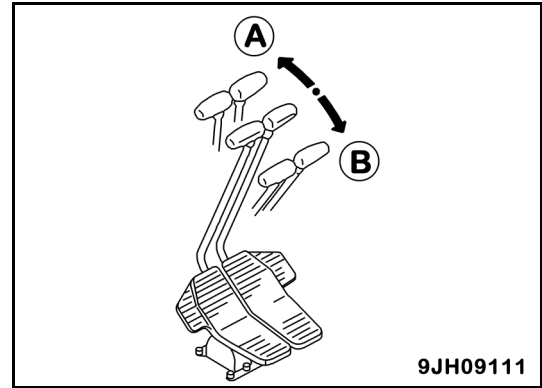
When carrying out swing operations, release swing lock switch (2), check to be sure swing lock monitor (19) goes out, then operate the swing.

- Swing operation Left (G) ↔ Right (H)



OPERATION

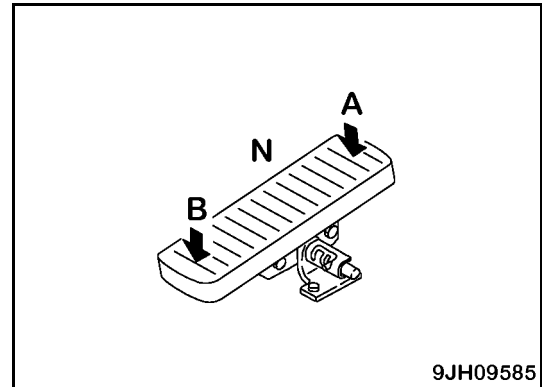
- Travel (Lo) operation FORWARD (A) ↔ REVERSE (B)



- Attachment operation One way (A) ↔ Other way (B)

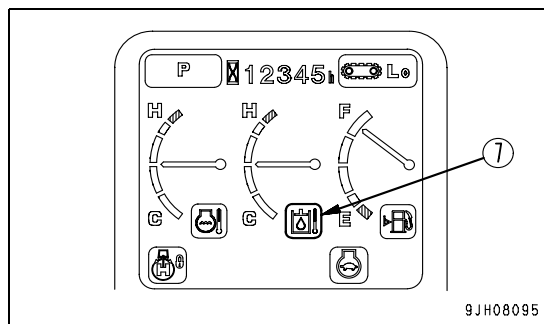
18. Check to be sure hydraulic oil temperature monitor (7) is displaying green.

- If the hydraulic oil temperature monitor is not displaying green (it is displaying white), repeat Steps 6 to 10 until the display is green.
- If the hydraulic oil temperature monitor displays green, the hydraulic equipment warming-up operation is completed.
- After confirming that the hydraulic oil temperature monitor displays green, carry out the following procedure.



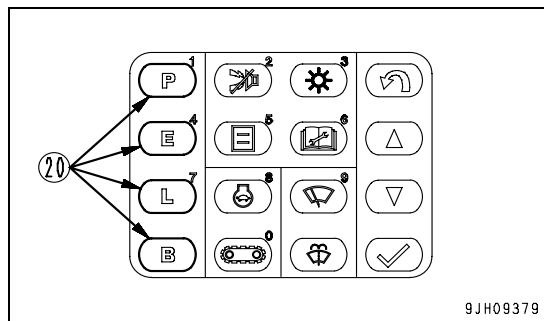
After Warming-up Operations

1. Check to be sure hydraulic oil temperature monitor (7) displays green.



2. Push working mode selector switch (20) of the machine monitor to select the working mode to be used.

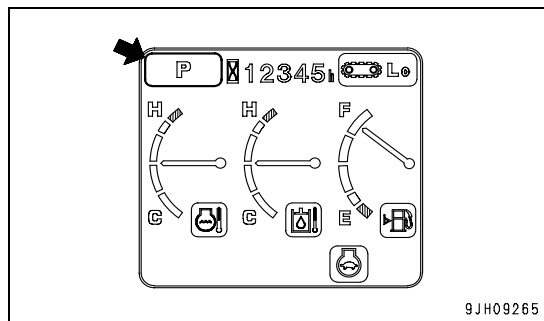
For details of the procedure for selecting the working mode, see “Working Mode Selector Switch (Basic Switch) (PAGE 3-22)”.



- Working mode monitor display

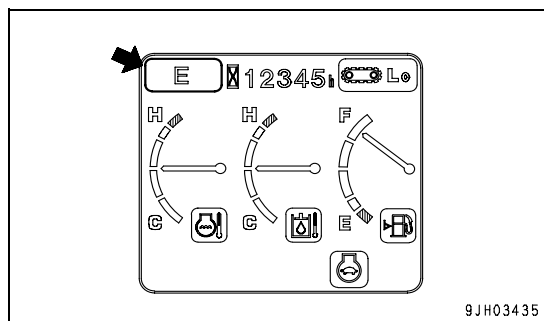
-P mode

For heavy-duty operations



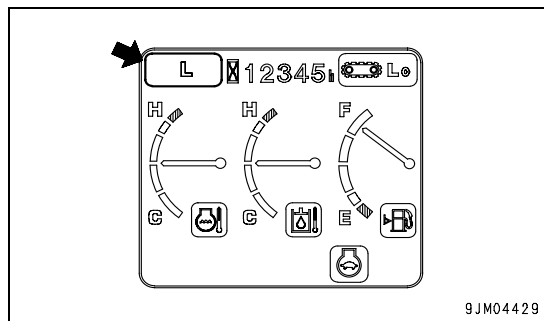
-E mode

For operations with emphasis on fuel economy



-L mode

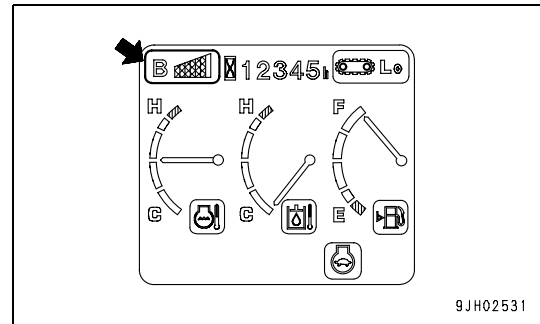
For operations requiring fine control



OPERATION

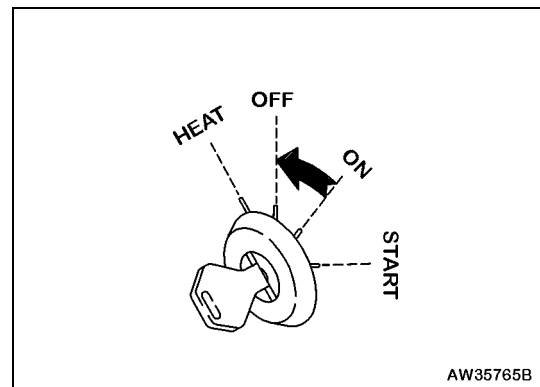
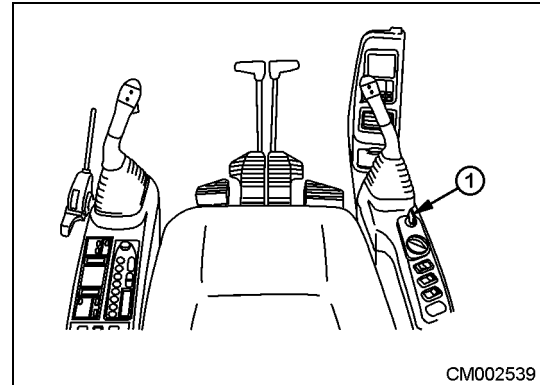
-**B** mode

For breaker operations



Stopping the Engine

- 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 five minutes to allow it to gradually cool down.
 2. Turn the key in ignition switch (1) to the OFF position and stop the engine.
 3. Remove the key from ignition switch (1).



Check After Shutting Off Engine

1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, and check 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.

Remark

After stopping the engine, if the ignition switch is turned to the ON or START position within approximately 10 seconds, to start the engine again, the monitor display is not reset. The previous screen (before the ignition switch was turned OFF) is displayed.

MOVING, STOPPING AND PARKING THE MACHINE

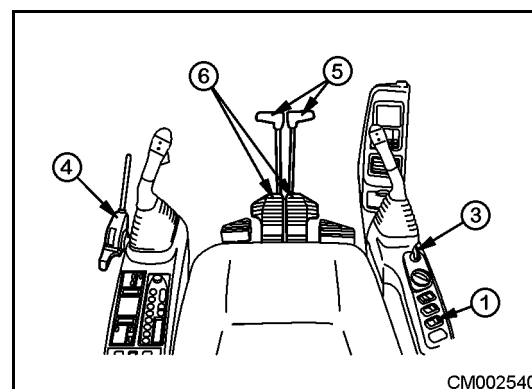
Before traveling or moving the machine, it is important to know all the control functions and relevant safety regulations for the area you will be traveling or moving the machine in. If you will be traveling on state or local roadways, observe all traffic safety laws. Travel at a safe controllable speed.

Preparations for Moving the Machine

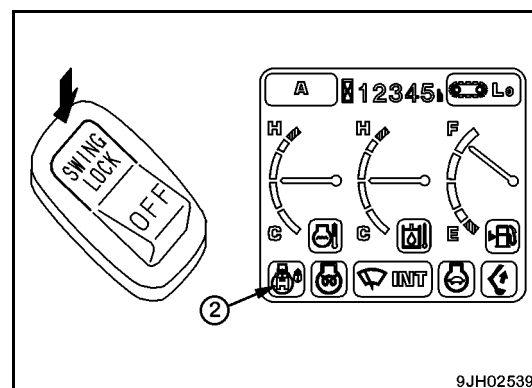
WARNING

- 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, check to be sure 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, check to be sure the warning equipment works properly.

1. Location of travel controls.

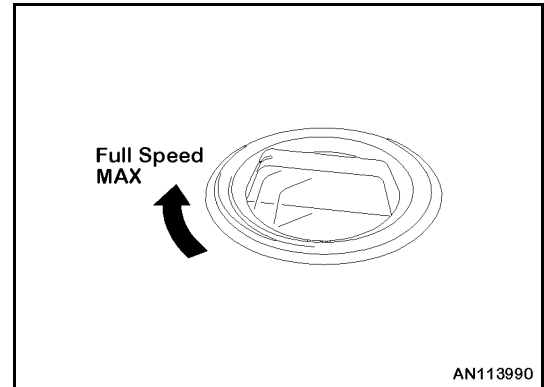


2. Set swing lock switch (1) to the ON (actuated) position and confirm that swing lock monitor lamp (2) lights up.



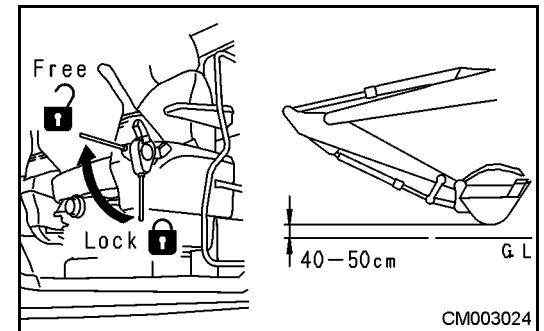
OPERATION

- Turn fuel control dial towards the full speed position to increase the engine speed.

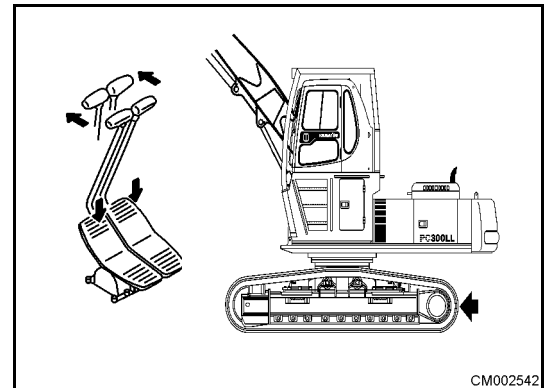


Moving Machine

- Set safety lock lever in the FREE position, fold the work equipment and raise it 40 to 50 cm (16 to 20 in) from ground.



- Operate right and left travel levers or right and left travel pedals as follows:
 - When the sprocket is at the rear of the machine.
Push travel levers forward slowly or depress the front part of travel pedals slowly to move the machine off.

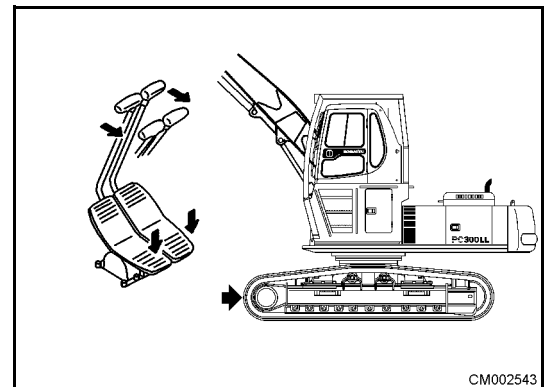


- When the sprocket is at the front of the machine.
Pull travel levers backward slowly or depress the rear part of travel pedals slowly to move the machine off.

- Check to be sure the alarm sounds. If the alarm does not sound, contact your Komatsu distributor for repairs.

Remark

In cold temperatures, if the machine travel speed is not normal, thoroughly perform the warming-up operation. In addition, if the undercarriage is clogged with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.



Turning the Machine

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.

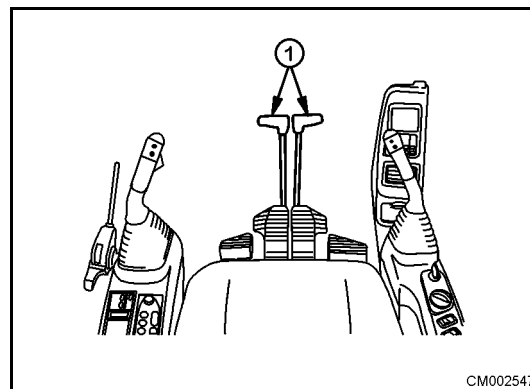
Use the travel levers to change direction. Avoid sudden changes of direction as far as possible. In particular, when carrying out counter-rotation (spin turn), stop the machine first before turning.

Operate the travel levers (1) as follows.

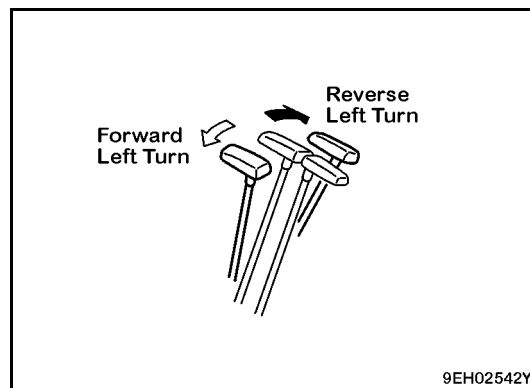
Turning the Machine When Stopped

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.



CM002547



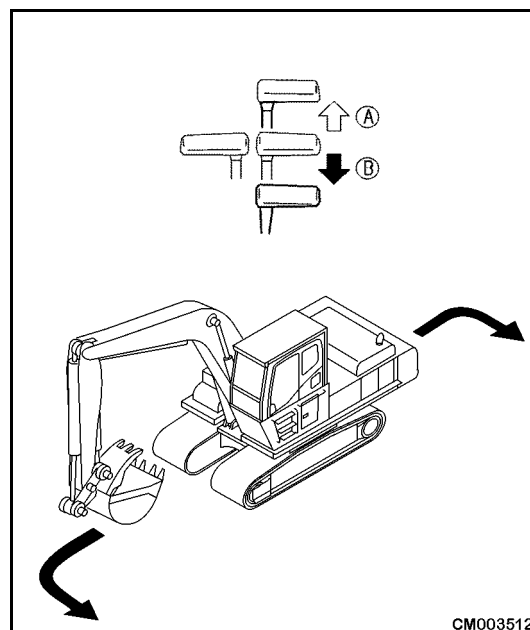
9EH02542Y

Remark

When turning to the right, operate the left travel lever in the same way.

(A): Forward left turn

(B): Reverse left turn



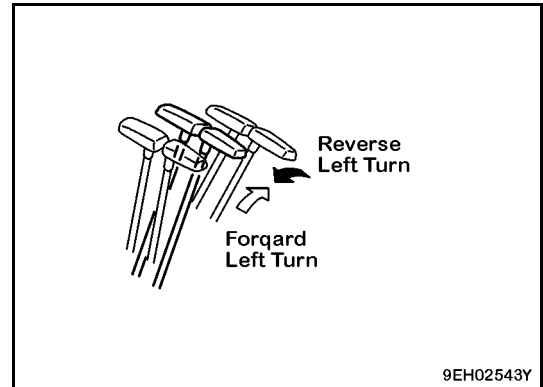
CM003512

OPERATION

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.

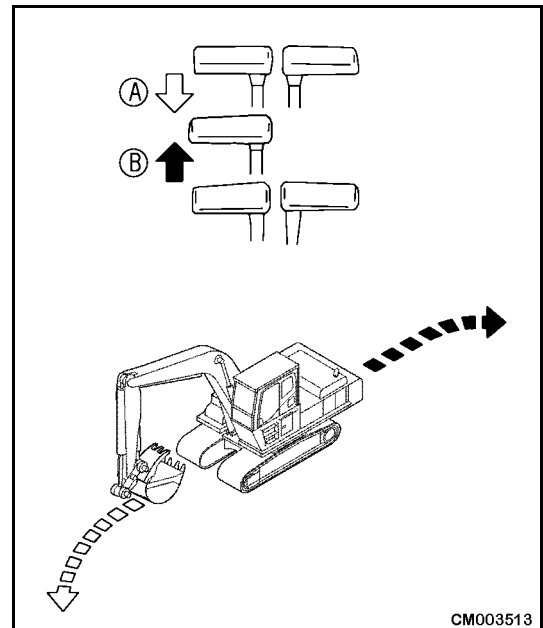


Remark

When turning to the right, operate the right travel lever in the same way.

(A): Forward left turn

(B): Reverse left turn

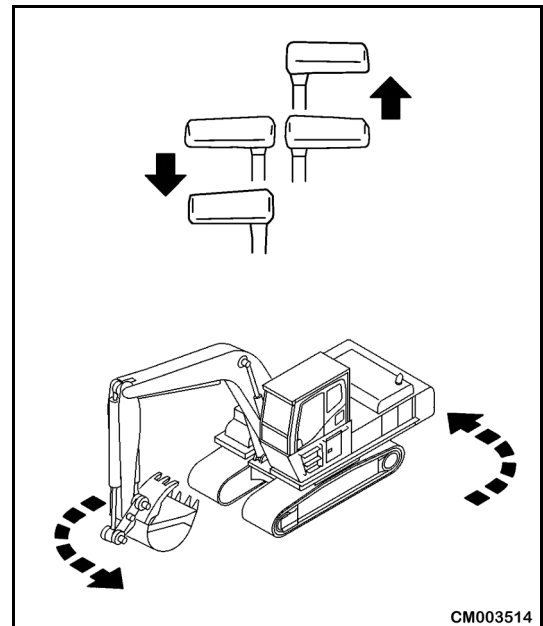


Counter-rotation Turn (Spin Turn)

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.

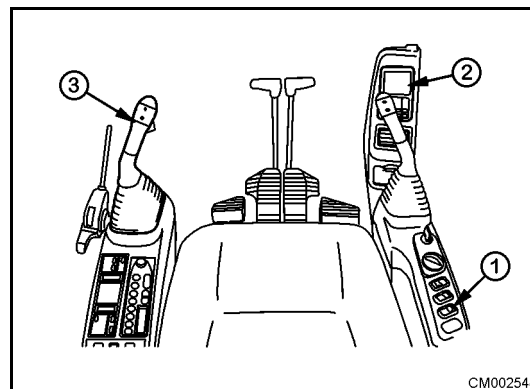


Swinging

⚠ WARNING

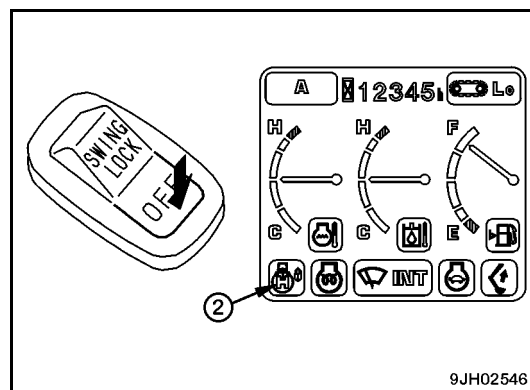
The rear of the machine extends outside the track width. Check to be sure the surrounding area is safe before swinging the upper structure.

Check to be sure swing lock monitor is not lit up.



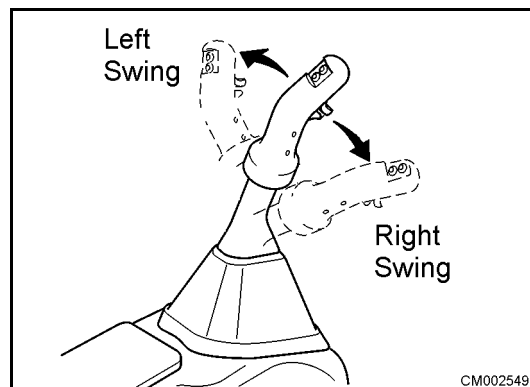
CM002548

1. Before starting the swing operation, turn swing lock switch (1) OFF and check to be sure swing lock monitor (2) has gone out.



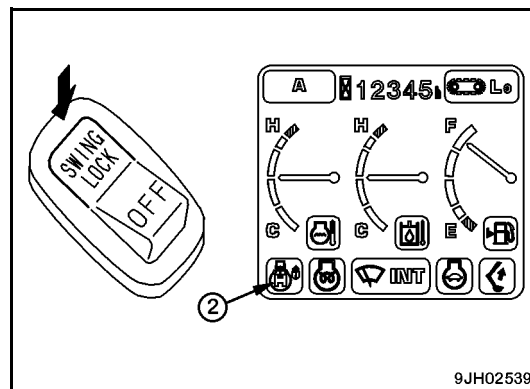
9JH02546

2. Operate left work equipment control lever (3) to operate the swing.
 - (A): Left swing
 - (B): Right swing



CM002549

3. When not using the swing, turn swing lock switch (1) ON. Check to be sure swing lock monitor (2) lights up.



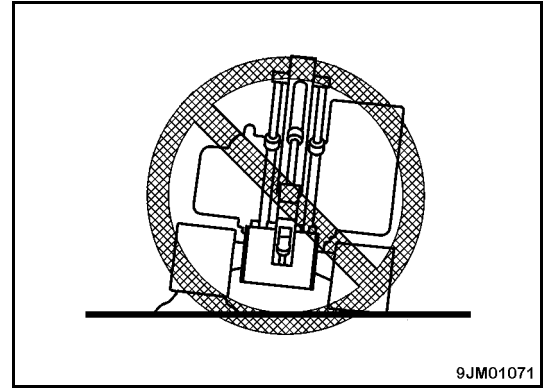
9JH02539

OPERATION

General Traveling

Traveling Over Obstacles

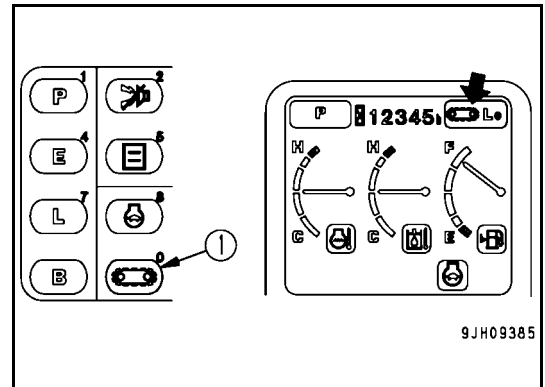
When traveling over obstacles such as boulders or tree stumps, the machine (in particular, the undercarriage) is subjected to a large shock. Reduce the travel speed and travel over the obstacle keeping it at the center of the tracks. Remove such obstacles if possible or avoid traveling over them.



High Speed Travel

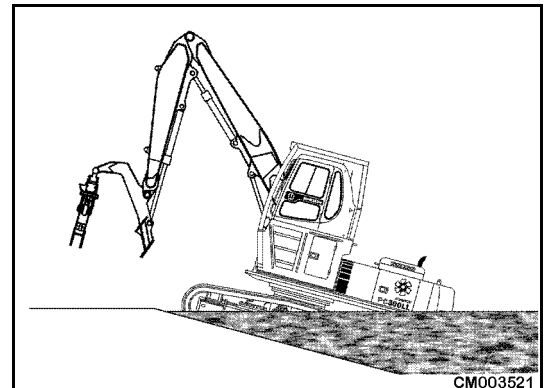
On uneven roadbeds such as rock beds or uneven roads with large rocks, travel at Lo speed. When traveling at high speed, set the idler in the forward direction.

- To switch the travel speed, press travel speed selector switch (1). The travel speed is displayed as **Lo**, **Mi**, or **Hi** on the monitor display.



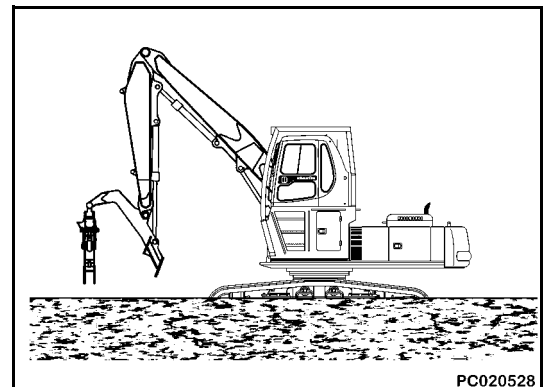
Permissible Water Depth

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 the center of carrier roller (1).

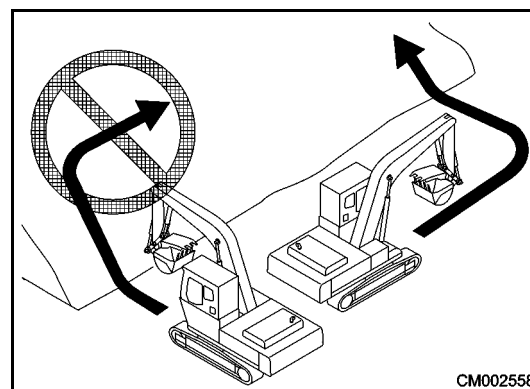
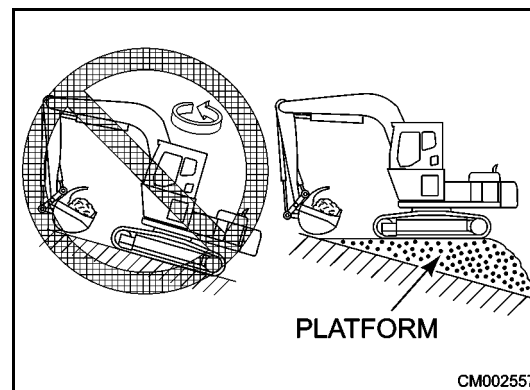
Grease the parts which have been under water for a long time until the used grease is projected out of the bearings (around the bucket pin, in particular).



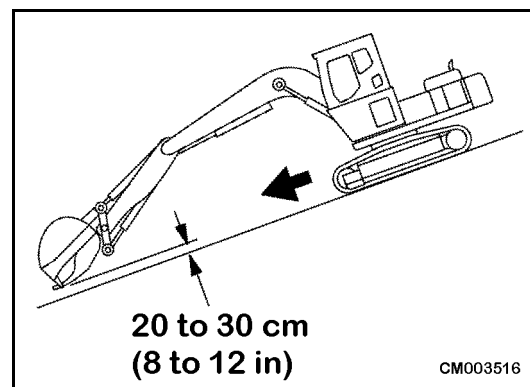
Traveling on Slopes

⚠ WARNING

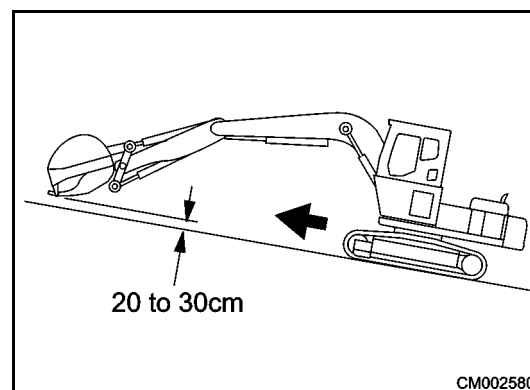
- Turning or operating the work equipment when working on slopes may cause the machine to lose its balance and turn over, so avoid such operations.
- It is particularly dangerous to swing downhill when the bucket is loaded.
- If such operations have to be performed, pile soil to make a platform (A) on the slope so the machine is kept horizontal during operation.
- Do not travel up or down steep slopes. There is a danger that the machine may turn over.
- When traveling, raise the bucket approximately 20 to 30 cm (8 to 12 in) from the ground.
- Do not travel downhill in reverse.
- 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.



- 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 a danger that the machine may turn over.
1. When traveling down steep hills, use the travel lever and fuel control dial 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.



OPERATION

- When traveling up a steep slope, extend the work equipment to the front to improve the balance, keep the work equipment approximately 20 to 30 cm (8 to 12 in) above the ground, and travel at low speed.

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 all the levers to the neutral position, lower the bucket to the ground 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.

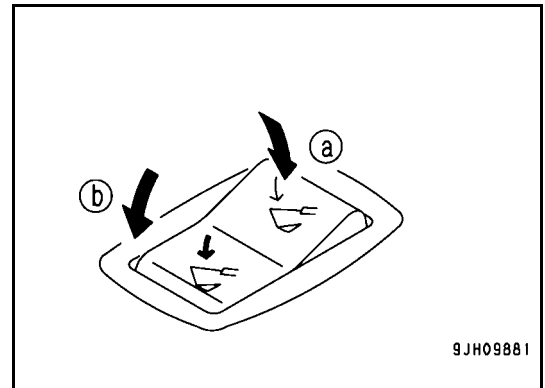
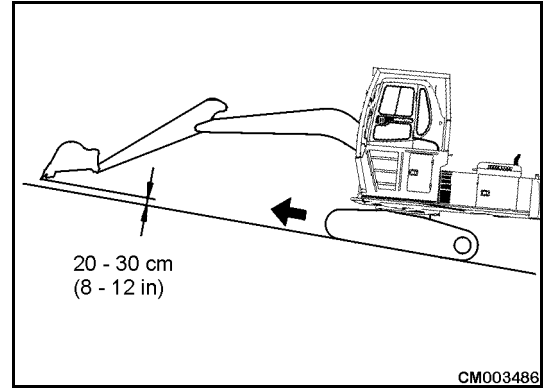
Be extremely careful when opening or closing the door on slopes. The weight of the door may cause the door to open or close suddenly.

Always set the door so that it is firmly locked in position, open or closed.

Escaping from Mud

Always operate carefully to avoid getting stuck in mud. If the machine does get stuck in mud, do as follows to get the machine out.

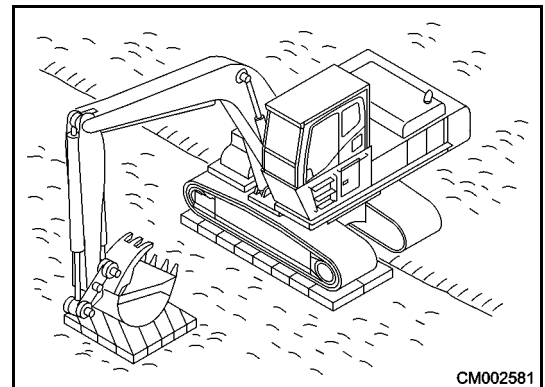
- Place the machine push-up switch in the high-pressure set position (b). This will increase the push power of the boom.



One Side of Track Stuck

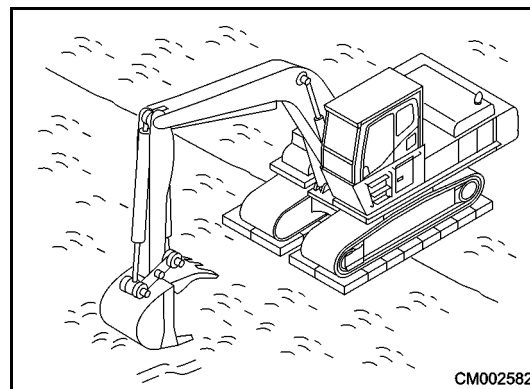
When using the boom or arm to raise the machine, always have the bottom of the bucket in contact with the ground. (Never push with the teeth). The angle between the boom and arm should be 90° to 110°. The same applies when using the inverting bucket.

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, also put a board under the bucket.



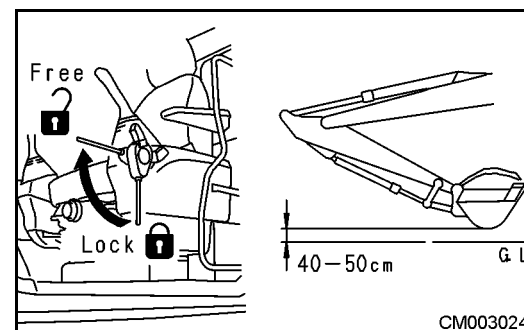
Both Sides of Tracks Stuck

If the tracks on both sides are stuck 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.



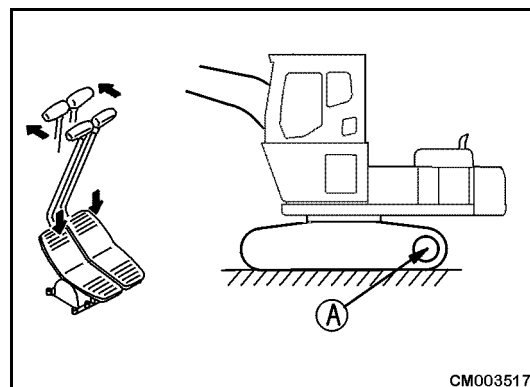
Moving Machine Backward

1. Set lock lever (4) in the FREE position (F), fold the work equipment, and raise it 40 to 50 cm (16 to 20 in) from the ground.



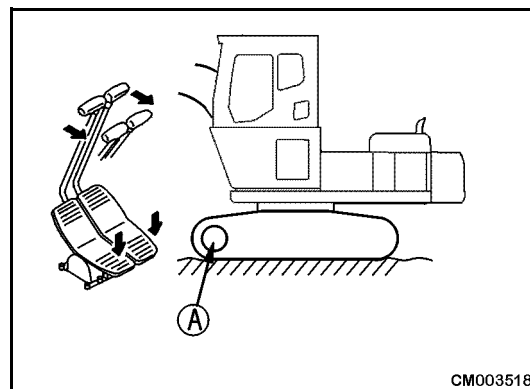
2. Operate the right and left travel levers (5), or the right or left travel pedals (6) as follows:

- When sprocket (A) is at the rear of the machine:
Slowly pull the levers (5) backward, or slowly depress the rear part of the pedals (6) to move the machine backward.



- When sprocket (A) is at the front of the machine:
Slowly push the levers (5) forward, or slowly depress the front part of the pedals (6) to move the machine backward.

3. Check that the travel alarm sounds properly. If the travel alarm does not sound, please contact your Komatsu distributor for repair.



Remark

In cold temperatures, if the machine travel speed is not normal, thoroughly perform the warming-up operation. In addition, if the undercarriage is clogged with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

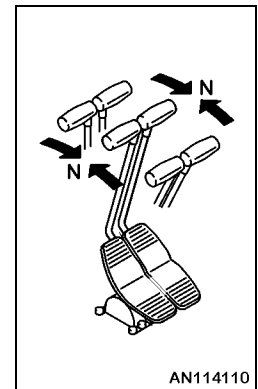
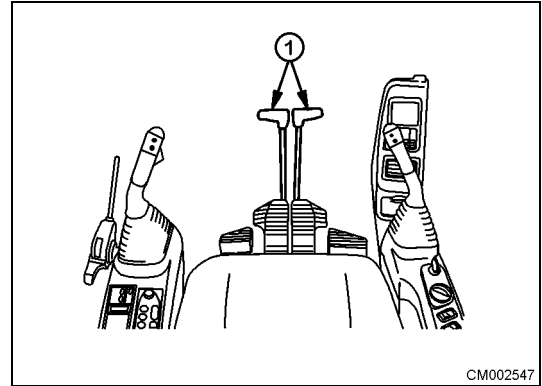
OPERATION

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.

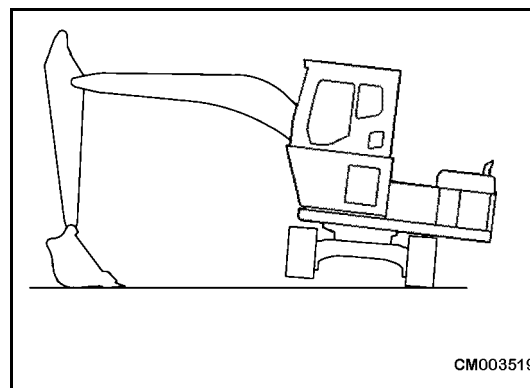


Parking Machine

Clearing The Machines Tracks

If the machine has been operating in extremely muddy areas especially during the colder seasons you may want to perform this procedure before parking the machine for the night.

- Performing idle-running of the tracks is dangerous, stay well away from the tracks.
 - To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, observe the following precautions.
 - Remove all the mud and water from the machine body. In particular, wipe the hydraulic cylinder rods clean to prevent damage to the seal caused by mud, dirt, or drops of water on the rod from getting inside the seal.
 - Park the machine on hard, dry ground.
 - If this is impossible, park the machine on boards. The boards prevent the tracks from freezing to the ground, and allow the machine to be moved the next morning.
 - Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
 - Fill the fuel tank to capacity. This minimizes moisture condensation in the tank when the temperature drops.
 - After operation in water or mud, remove water from undercarriage as described below to extend undercarriage service life.
1. Swing 90° with engine at low idle 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.



OPERATION

Parking

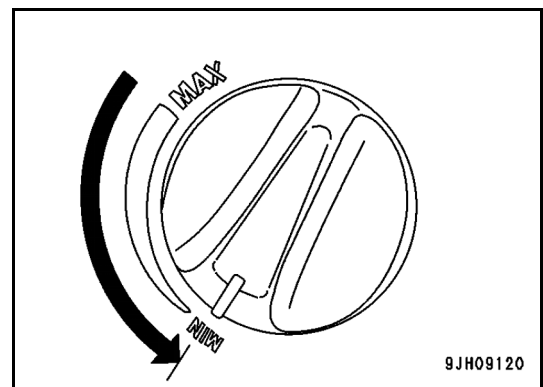
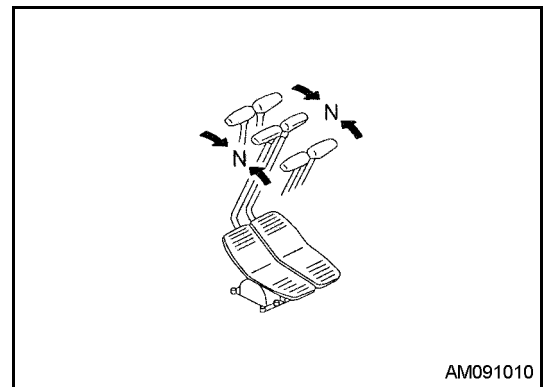
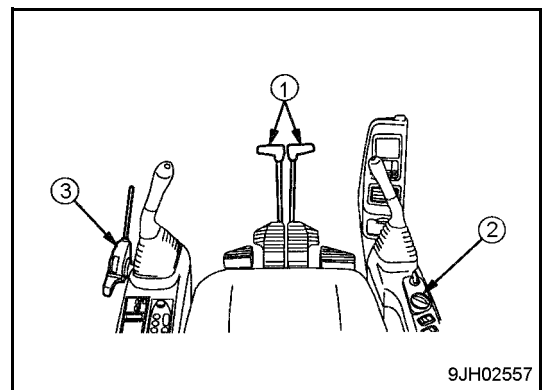
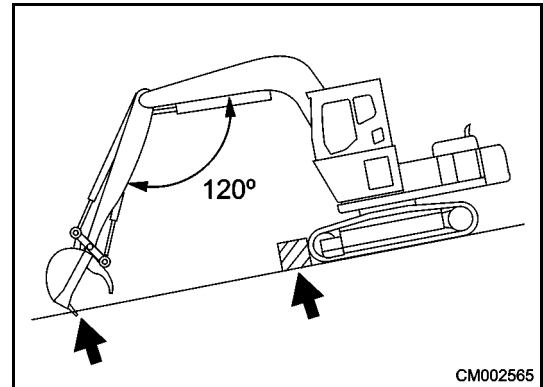
⚠ WARNING

- Avoid stopping suddenly. Give yourself ample room when stopping.
- When stopping the machine, select flat hard ground and avoid dangerous places.
- If it is unavoidably necessary to park the machine on a slope, insert blocks underneath the track shoes. As an additional safety measure, thrust the bucket into the ground.
- If the control lever is touched by accident, the machine may move suddenly, and this may lead to a serious accident.
- Before leaving the operator's compartment, always set the lock lever (3) securely to LOCK position.

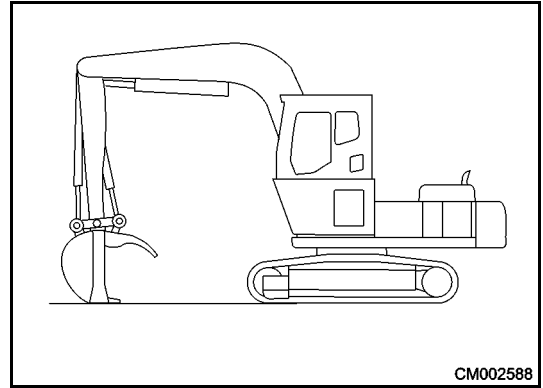
1. Put left and right travel levers (1) in the neutral position.

- The machine stops.

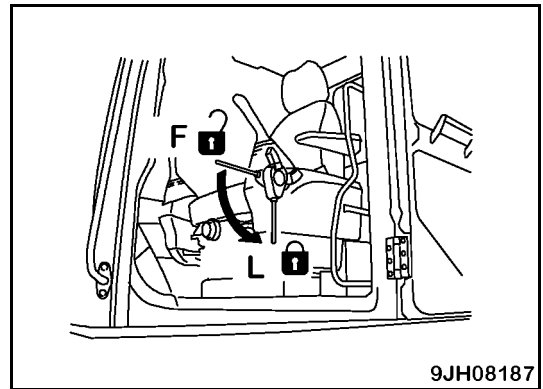
2. Turn fuel control dial (2) to low idling position (MIN) and lower the engine speed.



3. Lower the bucket horizontally until the bottom touches the ground.



4. Set lock lever (3) in the LOCK position (L).



OPERATION

Machine Inspection After Daily Work

Before Stopping Engine

Check the engine coolant temperature, engine oil pressure, and fuel level on the machine monitor.

Remark

After stopping the engine, if the ignition switch is turned within approximately 10 seconds to the ON or START position to start the engine again, the monitor display is not reset, and the screen before the ignition switch was turned OFF is displayed.

After Stopping Engine

Walk around the machine and check the work equipment, machine exterior, and undercarriage, also check for any leakage of oil or coolant. If any problems are found, repair them.

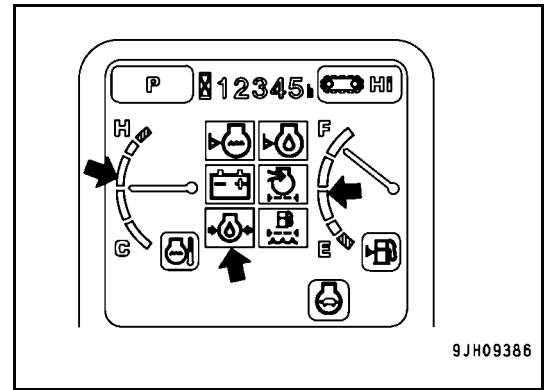
Fill the Fuel Tank

Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.

Remove any mud affixed to the undercarriage.

Remark

Always remove the ignition key from the ignition switch, lock all lockable areas, lower the work equipment to the ground and neutralize controls.



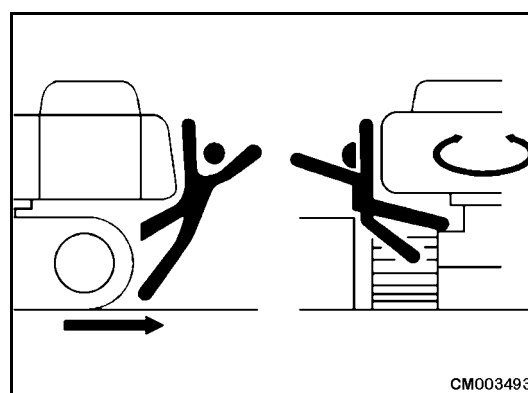
STARTING YOUR WORK OPERATIONS

Before starting any work operations it is important to be aware of several dangerous situations relating to a hydraulic excavator. Although KOMATSU cannot predict all dangerous situations, below is a list of some situations as an operator you must be aware of. For more information on safe operation of the machine, see section 1 SAFETY.

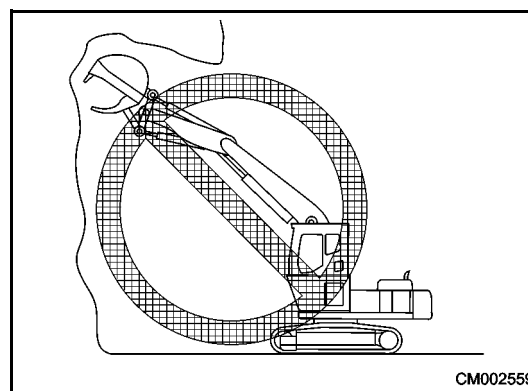
- Do not start the engine if warning tags have been attached to the control levers.
- Sound your horn to warn others in the area before starting the engine or operating the machine.
- Operate the machine in a seated position only, with the seat belt fastened snugly around your waist.
- Do not allow anyone in the cab or on the machine during operations.
- Check the work area to be sure all personnel are clear of the machine and your swing area.

Avoiding Dangerous Situations

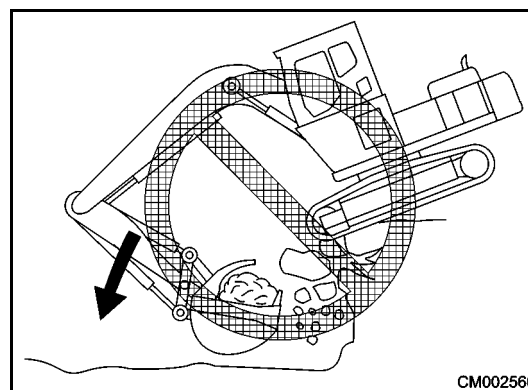
Always be aware of the swing circle area of the machine, especially in tight operating conditions. Never allow other personnel near your machine while in operation the possibility of hitting or pinning other personnel between the machine and another objects becomes greater the closer they are to your machine. Always maintain a clear and visible swing circle area during machine operations at all times.



Never work under overhangs or excavated bank areas. These could collapse and damage the machine or injure the operator.

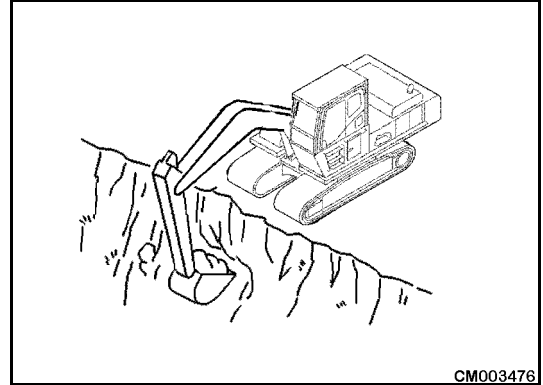


When excavating a trench, always be aware of the ground condition and never attempt to dig too close or under the machine, the possibility of the machine falling into the excavated site becomes greater the closer the excavation is to the machine.



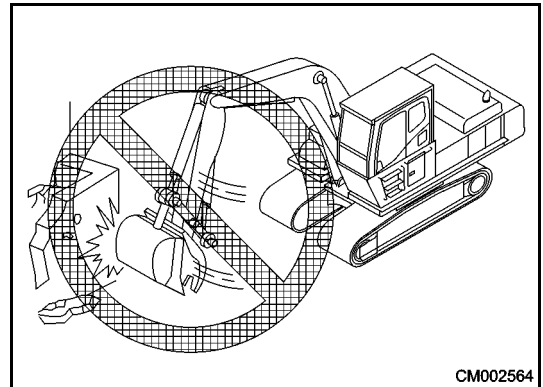
OPERATION

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

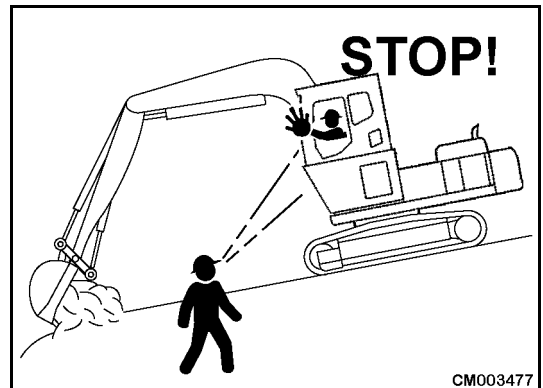


Always be aware of the work equipment distance when operating the machine especially in close quarter areas, the possibility of hitting objects with the bucket, boom or arm becomes greater when work operations are hurried. Never pass the work equipment over other personnel regardless of their locations, the possibility of falling objects may be fatal.

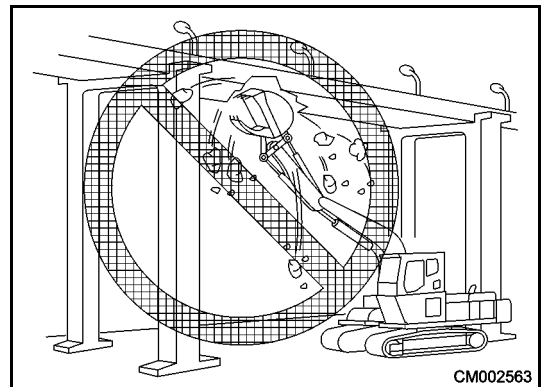
Never use the work equipment to strike an object damage to the machine or a rollover situation may result.



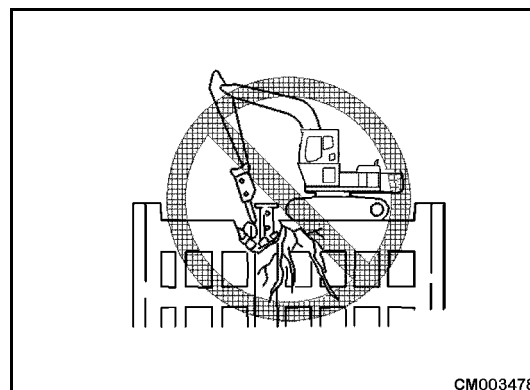
If someone should approach you while you are operating the machine, stop all operations immediately and signal them not to approach until the work equipment is lowered to the ground and it is safe for them to approach. Once they have approached, do not touch any of the machine controls until they are away from your work area and at a safe distance.



When carrying out demolition operations maintain a clear and safe location for the machine at all times, be aware of the falling objects drop zone. A collapsing building may cause serious damage to the machine or injure the operator always study the demolition procedure before performing the operation. Never allow anyone to stand near you during demolition operations.



Do not carry out demolition work under the machine. This may cause a hazard as the machine could become unstable and tip over. When working on the top of buildings or other structures, check the support strength before starting operations. The support may collapse and cause serious injury or damage.



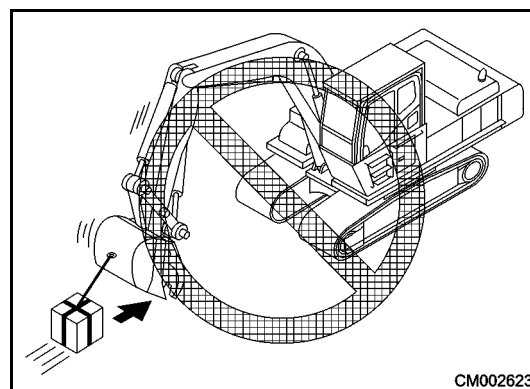
Determine the signals to be used and place a signalman in position.

To prevent the machine from tipping over or falling, carry out the operation on flat ground.

To prevent the danger of contact with a raised load or the danger from a falling load, do not allow any worker inside the area.

Do not exceed the specified lifting load.

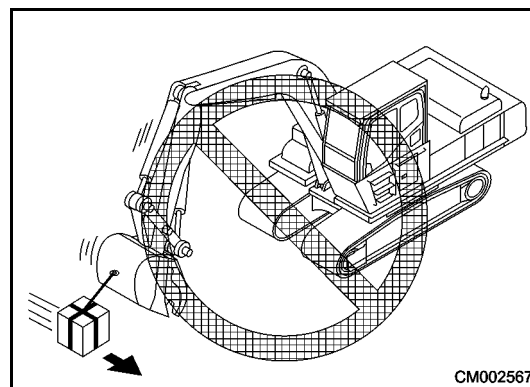
It is dangerous if the raised load hits any person or structure. When swinging or operating the work equipment, check carefully that the surrounding area is safe.



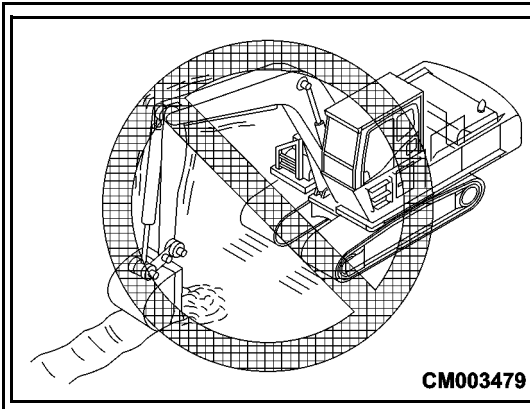
Do not swing or operate the work equipment suddenly. There is danger that this may cause the load to sway and the machine to tip over.

Do not leave the operator's seat when there is a raised load.

Do not use the work equipment or swing to pull the load in any direction. There is danger that the hook may break and the load come off, causing the work equipment to move suddenly and cause personal injury.

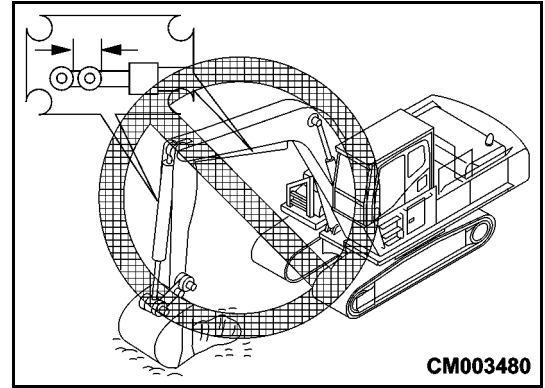


Do not dig the bucket into the ground and use the travel force to carry out excavation. This will damage the machine or work equipment, cause loss of control or possibly injure the operator.

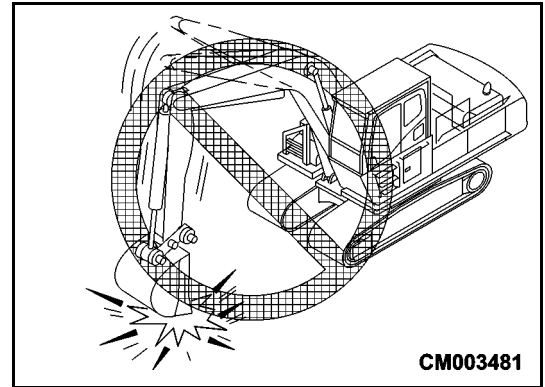


OPERATION

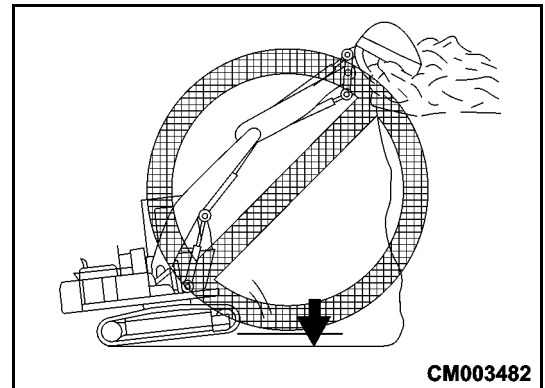
If the work equipment is used with the cylinder rod operated to its stroke end, and impact by some external force is applied, the hydraulic cylinders will be damaged and may causing personal injury. Avoid operations with the hydraulic cylinder fully retracted or fully extended.



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 drastically reduce the life of the machine or could possibly cause injury to the operator.



Do not use the dropping force of the machine for digging or pulling materials from a high level. Damage to the machine or injury to the operator may result from falling material.

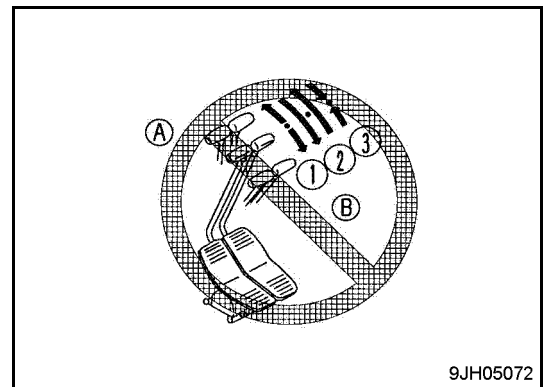


Digging Hard Rocky Ground

Do not attempt to directly excavate hard rocky ground with the work equipment. It is better to excavate it after breaking it up by some other means. This will not only save the machine from damage but will make for better economy.

Sudden Lever Shifting High Speed Travel

- Never carry out sudden lever shifting, this may cause sudden starting.
- Avoid sudden lever shifting from forward (A) to reverse (B) (or from reverse (B) to forward (A) snapping).
- Avoid sudden lever shifting change such as sudden stopping from near top speed (lever release operation).



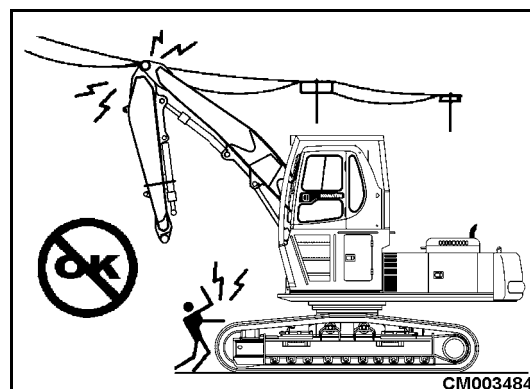
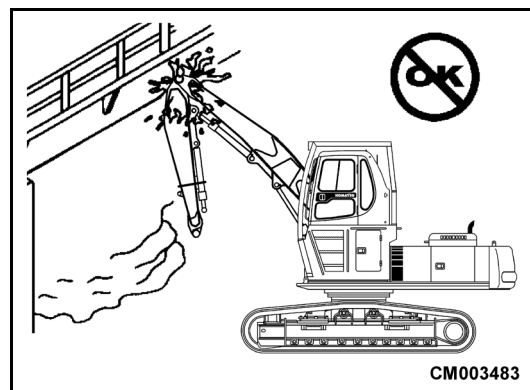
Working Clearances

It is always a good idea to be aware of your clearances around, in front, behind and especially above your work area or travel route.

Some basic safety precautions to prevent risk are:

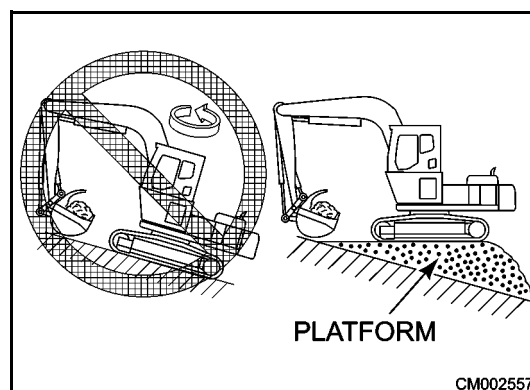
- When working or traveling in an area where clearances are a problem, travel at a slow cautious speed.
- If you are not sure of your clearances, request the aid of another person who can guide or warn you if you get too close to objects.
- Be aware of the dangers when working around overhead electrical lines, high humidity may pose an electrical hazard even if your machine clears the overhead power lines.
- If your machine should come in contact with overhead electrical lines, stop the machine and remain on the machine until the power company clears the lines and it is safe to get off or move the machine.
- If low power lines pose a greater hazard, ask the power company to remove the lines until your work is finished.

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



Operations on Slopes

When working on slopes, there is a danger that the machine may lose its balance and roll over when the swing or work equipment is operated. This may lead to serious injury or property damage, always provide a stable place when carrying out these type of operations, and work 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.



Operations on Snow

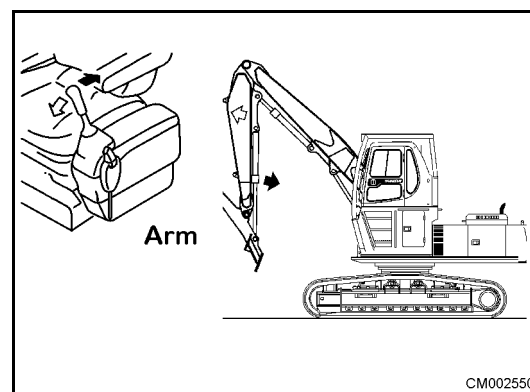
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- Frozen ground becomes soft when the temperature rises which may cause the machine to tip over.
- If the machine enters deep snow, 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.
- Be alert and careful when clearing snow. The road shoulder and objects buried in the snow beside the road may not be easily seen. The machine may hit covered objects and tip over.

Work Equipment Overview

WARNING

If the lever is operated when the engine speed has been lowered by the auto-deceleration function, the engine speed will suddenly rise, operate the levers carefully.

- Use the control levers to operate the work equipment.
- Note that when the levers are released, they return to the HOLD position and the work equipment is held in that position.

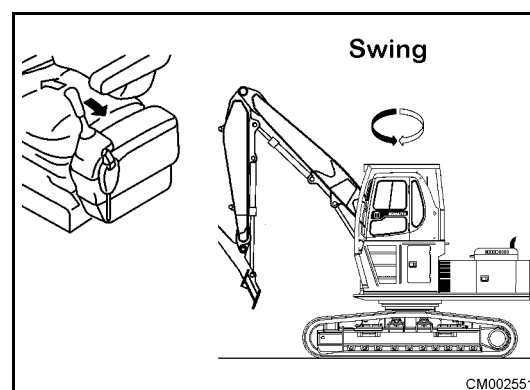


Arm Control

Move the left work equipment control lever to the front or rear to operate the arm in or out.

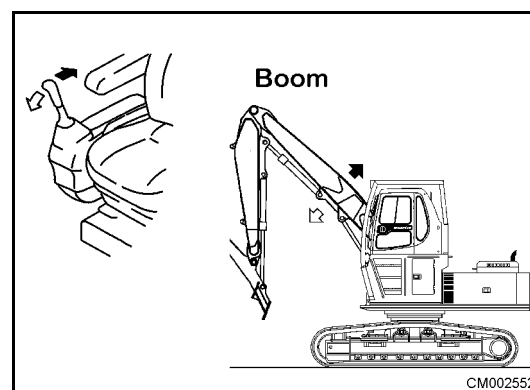
Swing Control

Move the left work equipment control lever to the left or right to swing the upper structure.



Boom Control

Move the right work equipment control lever to the front or rear to operate the boom up or down.

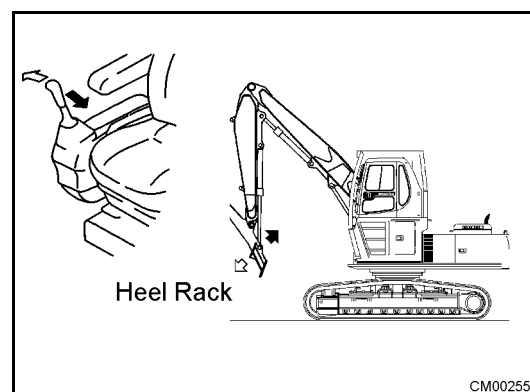


Bucket or Heel Rack Control

Move the right work equipment control lever to the left or right to operate the bucket dump or curl; heel rack in or out.

If the work equipment control levers are returned to the neutral position when the machine is stopped, even if the fuel control dial is set to FULL, the auto-deceleration mechanism will act to reduce the engine speed to a mid-range speed.

The control circuit on this machine is equipped with an accumulator. Even if the engine is stopped, if the ignition switch key is turned to the ON position within 15 seconds after stopping the engine, and the lock lever is set to the FREE position, it is possible to use the control lever operation to lower the work equipment to the ground. This procedure can also be used for releasing the remaining pressure in the hydraulic cylinder circuits or for lowering the boom after loading the machine onto a trailer.



OPERATION

Operating Modes

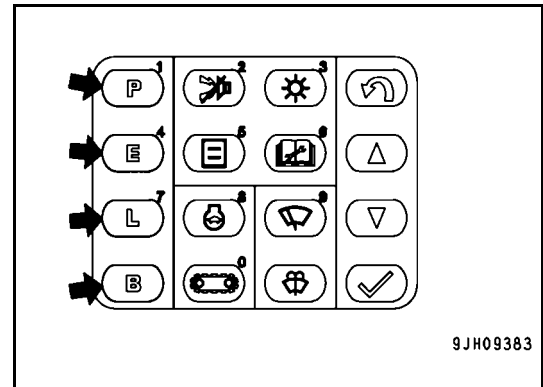
Working Mode

By using the working mode selector switch to select a working mode that matches the operating condition, it is possible to carry out operations efficiently.

Use the following procedure to make effective use of each working mode.

When the ignition switch is turned ON, the working mode is set to **P** mode (digging).

Use the working mode switch to set the most efficient mode to match the type of work.



Working mode	Applicable operations
P mode	Normal digging, loading operations (Operations with emphasis on productivity)
E mode	Normal digging, loading operations
L mode	When positioning work equipment exactly (fine-control operations)
B mode	Breaker operations

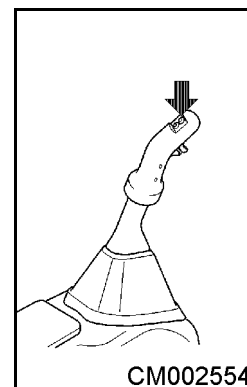
Remark

If breaker operations are carried out in the heavy digging mode, the hydraulic equipment may be damaged. Operate the breaker only in B mode.

One-touch Power Max. Switch

The one-touch power max. switch can be used during operations to increase the power. Make effective use of this function whenever necessary in combination with the working mode.

1. Press the left knob switch and keep it pressed. The power is increased for up to 8.5 seconds, while the switch is being pressed. The increased power is automatically canceled after 8.5 seconds.
 - This function is not actuated when the working mode is set to L mode or B mode.



Excavating Procedures

WARNING

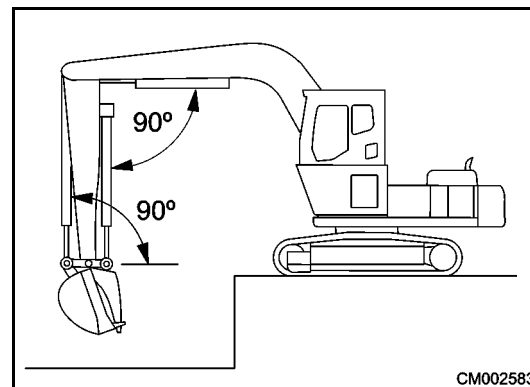
Be careful when excavating a deep trench, the machine is capable of excavating the surface underneath the tracks thus causing the machine to fall into the excavated trench. Always be aware of this.

Work Equipment Angles

An excavator is suitable for excavating at a position lower than the machine.

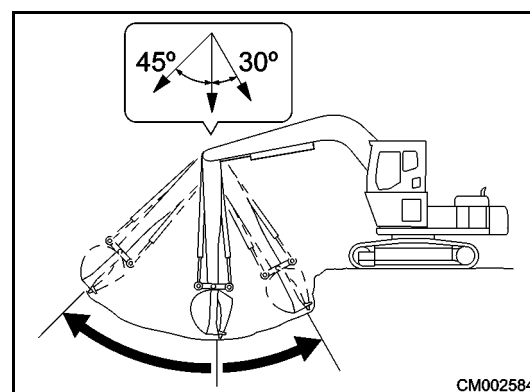
When the condition of the machine is as shown, each cylinder's maximum pushing excavation force is obtained when the bucket cylinder and link, arm cylinder and arm are at 90°.

When excavating, use this angle to effectively 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.

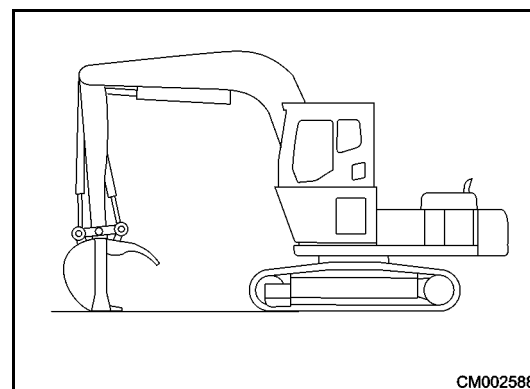
There may be some differences depending on the excavation depth, but try to stay within the above range rather than operating the cylinder at the end of its stroke.



Ditching Work

Ditching work can be performed efficiently by attaching a bucket to match the width of the ditch. Then, setting the tracks parallel to the line of the ditch to be excavated.

To excavate a wide ditch, first dig out both sides and then finally remove the center portion.

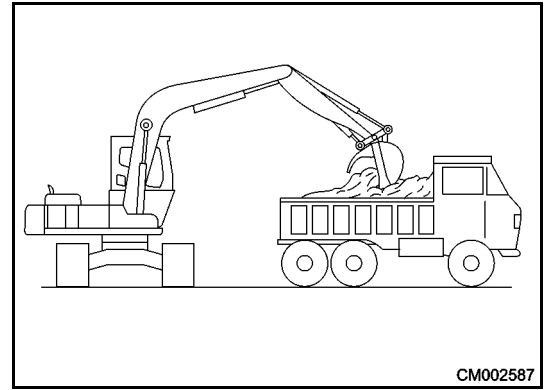


OPERATION

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.



Severe Job Conditions

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 and bucket several times, then grease again.

REPLACING WORK IMPLEMENTS

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 to be sure 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.

Bucket Replacement

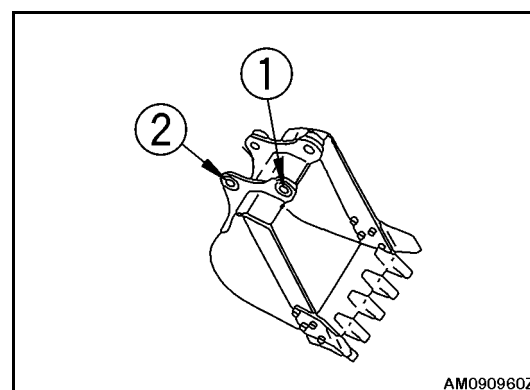
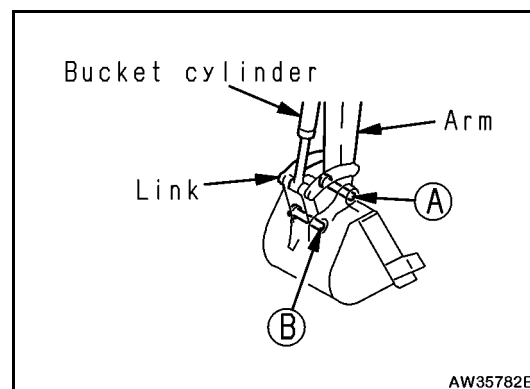
1. Place the bucket in contact with a flat surface.

When removing the pins, place the bucket so that it is in light contact with the ground. If the bucket is lowered firmly to the ground, the resistance will be increased and it will be difficult to remove the pins.

Remark

After removing the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.

2. Remove the double nut from the stopper bolt of each pin of the arm and link, remove the bolts, then take out arm pin (A) and link pin (B), and remove the bucket.
3. Align the arm with holes (1) and the link with holes (2), then coat with grease and install pins (A) and (B).



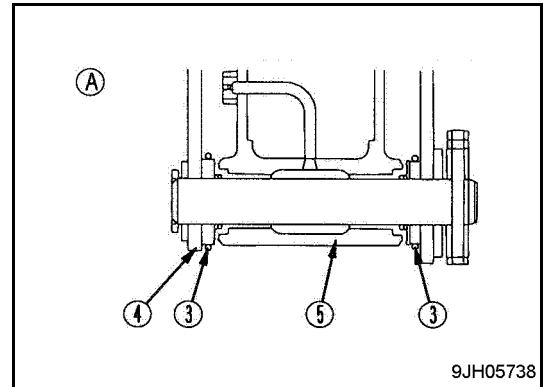
OPERATION

Remark

Carry out installation in the reverse order to removal.

When installing the bucket: For arm pin part (A), fit an O-ring at the position on the bucket shown in the diagram on the right. After inserting the pin, fit it into the proper groove. For link pin part (B), install the bucket with the O-ring fitted in the proper groove.

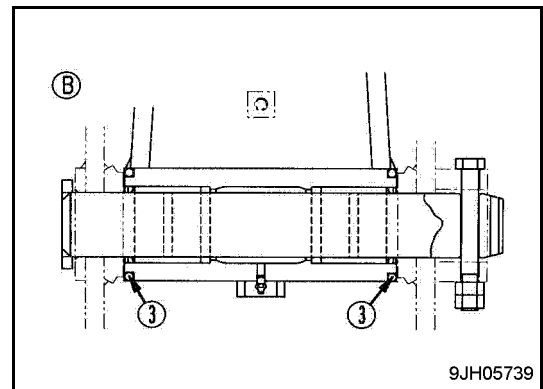
4. Install the stopper bolts and nuts for each pin, then grease the pin.



Remark

Lubricate with grease thoroughly until the grease comes out from the end face.

When replacing the bucket, replace the dust seal if it has been damaged. If a damaged seal is used without being replaced, sand and dirt may enter the pin portion and cause abnormal wear of the pin.



TRANSPORTING THE MACHINE

Before transporting the machine be sure what you are using to transport the machine is capable of supporting the weight of the machine. Be sure it is wide enough and rated for the load.

Loading and Unloading a Trailer

Select the trailer to match the weight and dimensions given in See “SPECIFICATIONS” on page 4-2.

Note that the value for the weight and transportation dimensions given in SPECIFICATIONS may differ according to the type of shoe or type of arm or other attachments.

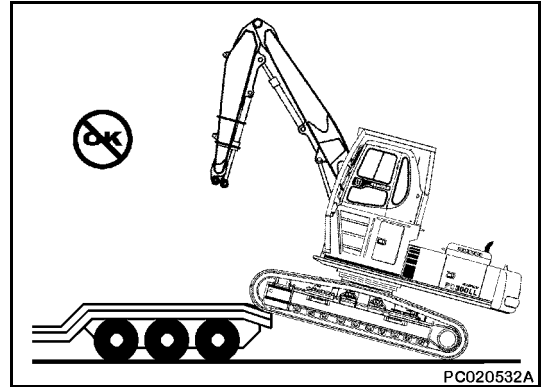
WARNING

- **Always turn the auto deceleration switch OFF (cancel) during loading and unloading operations. If the auto deceleration switch is left ON, the machine may suddenly start moving.**
 - **Always drive the machine at low speed when loading or unloading the machine on a trailer. Do not operate the travel speed selector switch.**
 - **Run the engine at low idle, set to low speed, and operate the machine slowly when loading or unloading.**
 - **Do not load or unload the machine during the automatic warm up operation. If the automatic warm up operation is canceled during the loading or unloading operation, the speed will suddenly change.**
 - **Use ramps with ample width, length, thickness, and strength and install them at a maximum slope of 15°. When using piled soil, compact the piled soil fully and take action to prevent the slope face from collapsing.**
 - **To prevent the machine from slipping on the ramps, remove all mud and dirt from the machine tracks before starting to load. Be sure that the ramp surface is clean and free of water, snow, ice, grease, or oil.**
 - **Never correct your steering on the ramps. There is danger that the machine may turn over. If necessary, drive off the ramps, correct the direction, then enter the ramps again.**
 - **When on the ramps, do not operate any levers except the travel lever.**
 - **The center of gravity of the machine will change suddenly at the joint between the ramps and the track or trailer, and there is danger of the machine losing its balance. Travel slowly over this point.**
 - **The trailer is unstable, so pull in the work equipment and swing slowly when swinging the upper structure on the trailer.**
-

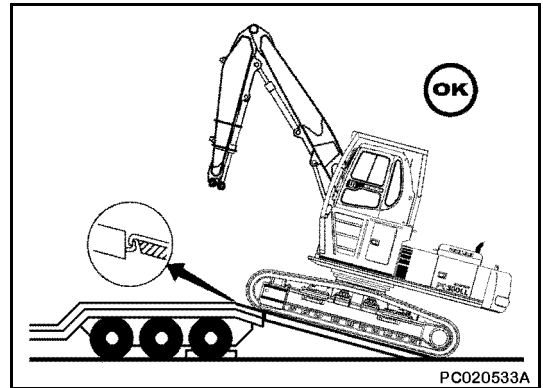
OPERATION

Loading the Machine

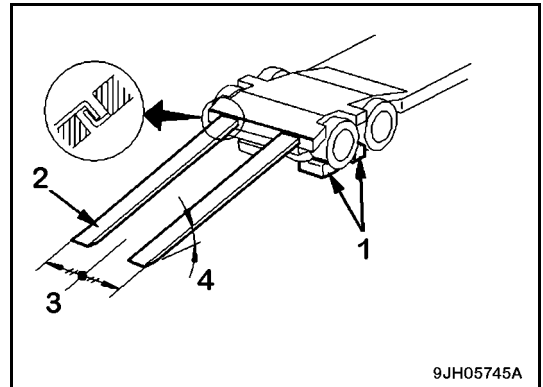
1. Never lift the machine on to the trailer body with the work equipment, loss of control or a rollover situation may result.



2. Always load on level stable ground using the properly sized ramps with the trailer wheels chocked. Maintain a safe distance from the edge of the road.



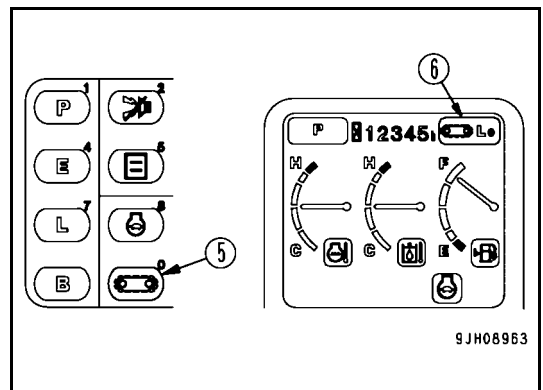
3. Properly apply the brakes on the trailer and put blocks under the tires to ensure that the trailer does not move. Then fix the ramps in line with the centers of the trailer and the machine.



4. Make sure that both ramps are at the same level. Make the slope of the ramps a maximum of 15°. Set the distance between the ramps to match the center of the tracks.

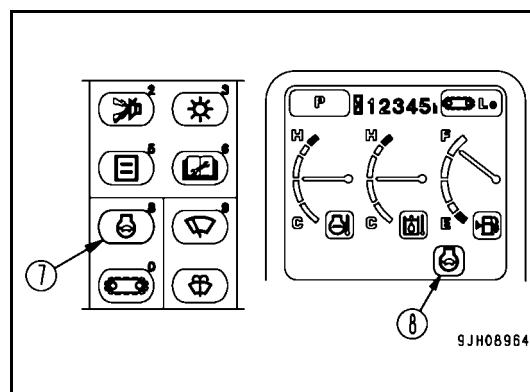
5. Set the travel speed selector switch (6) to the **LOW** position.

- To switch the travel speed, press travel speed selector switch (5). The travel speed is displayed as **Lo**, **Mi**, or **Hi** on the monitor display (6).

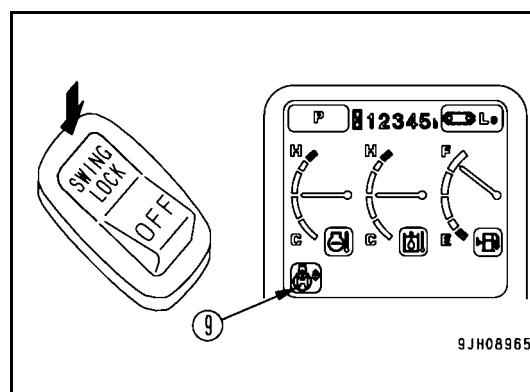


6. Turn auto deceleration switch (7) **OFF** and operate the fuel control dial to set the engine speed to low idle.

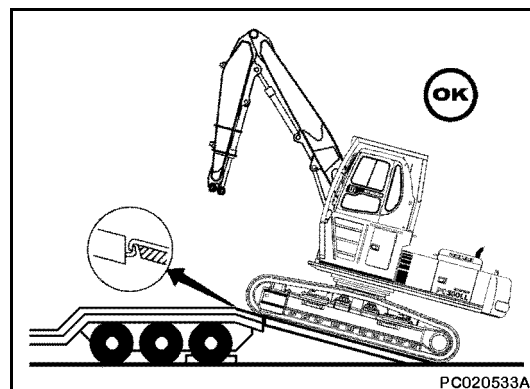
- Each time auto deceleration switch (7) is pressed, it switches **OFF** → **ON** → **OFF** in turn.
- When auto deceleration switch (7) is turned OFF, the display monitor (8) goes out.



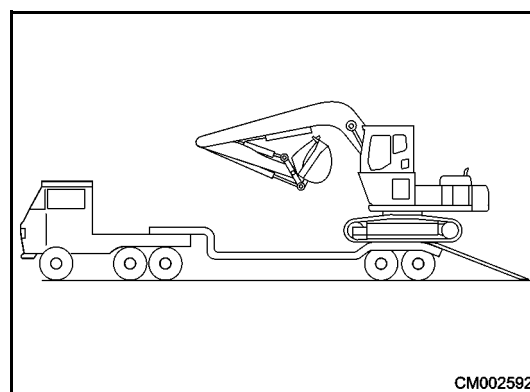
- Turn the swing lock switch **ON** to apply the swing lock.
- When the swing lock switch is turned **ON**, display monitor (9) lights up.



7. If the machine is equipped with work equipment, set the work equipment at the front, and travel forward to load it; if it has no work equipment, travel in reverse to load it. Follow instructions and signals of a conductor particularly when traveling in reverse.

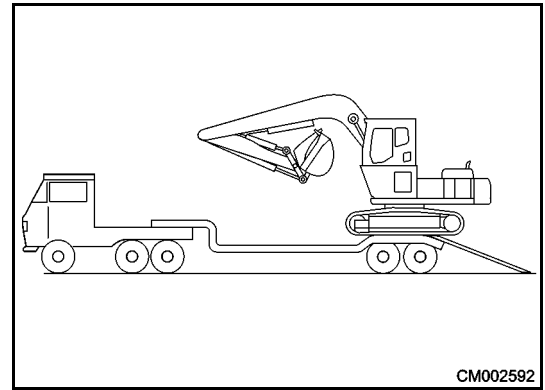


8. Before moving onto the ramps, make sure that the machine is positioned in a straight line with the ramps and that the center line of the machine matches that of the trailer. Align the direction of travel with the ramps and travel slowly. Lower the work equipment as far as possible without causing interference. When on the ramps, operate only the travel lever. Do not operate any other lever.

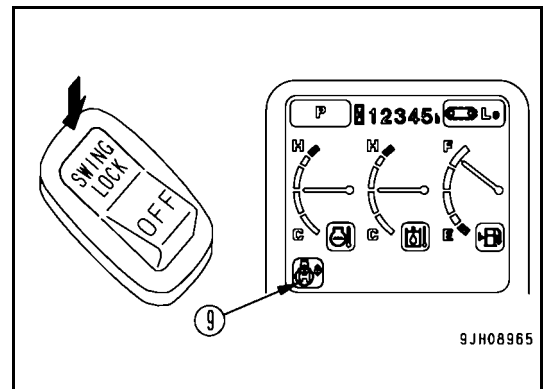


OPERATION

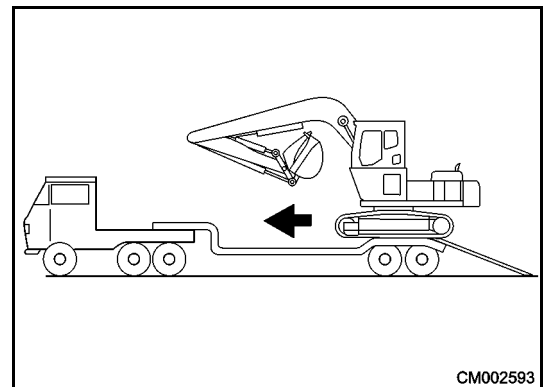
9. When loading or unloading a machine with the work equipment installed, at the point where the tracks are on both the ramps and the ground surface, turn the swing lock switch OFF, then swing the upper structure slowly 180°. After doing that, drive slowly in reverse and load the machine onto the trailer.



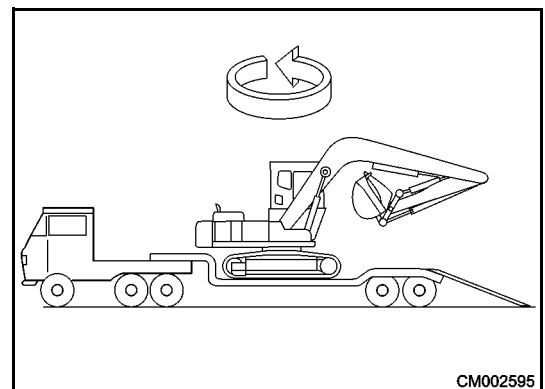
10. Turn the swing lock switch ON to apply the swing lock. When the swing lock switch is turned ON, display monitor (9) lights up.



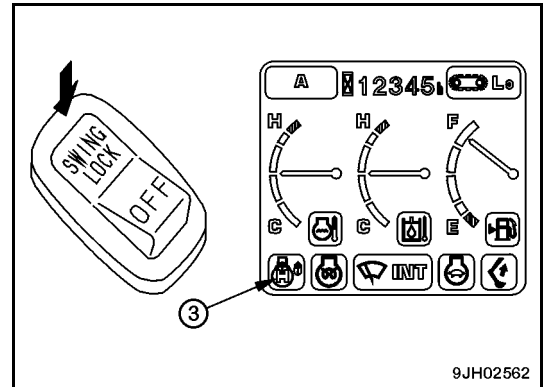
11. When the machine travels over the rear wheels of the trailer, it becomes unstable, drive slowly and carefully. (Never operate the steering.)
12. At the moment the machine passes the rear wheels, it tilts forward, be careful not to let the work equipment hit the trailer body. Drive the machine forward to the specified position, then stop the machine.



13. Turn the swing lock switch OFF to cancel the swing lock, then swing the upper structure slowly 180°.



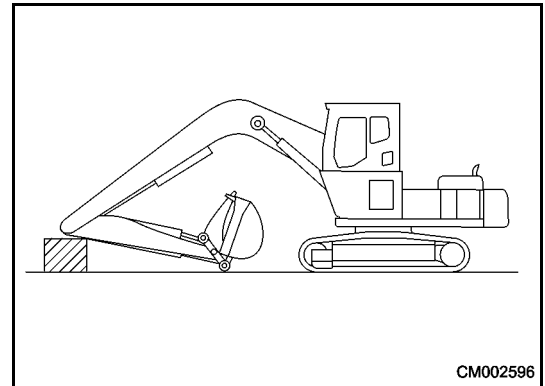
14. Turn the swing lock switch ON to lock swing lock.
 - When the swing lock switch is turned ON, display monitor (3) lights up.
15. Lower the work equipment on top of wooden blocks.



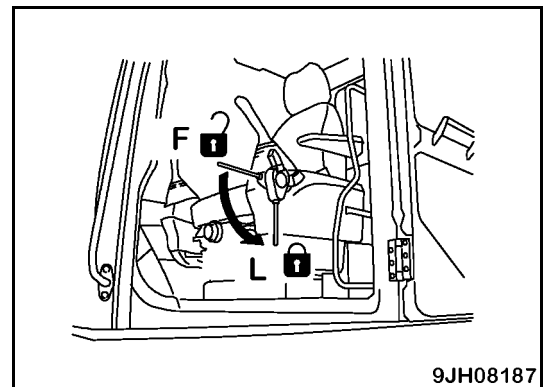
OPERATION

Securing Machine

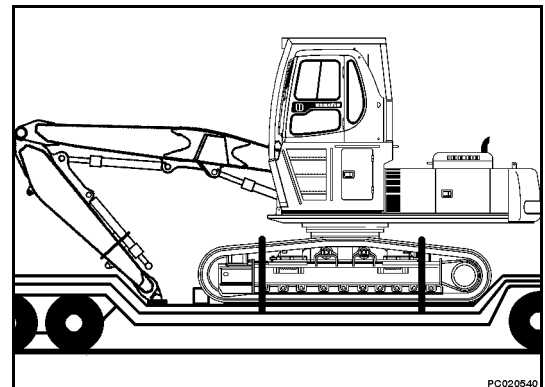
- Stow the antenna and reassemble the mirrors so that they are within the width of the machine.
- To prevent damage to the bucket cylinder during transportation, fit a wooden block at one end of the bucket cylinder to prevent it from touching the floor.
- Load the machine onto a trailer as follows:
 1. Extend the bucket and arm cylinders fully, then lower the boom slowly.



2. Set the lock lever securely to the LOCK position (L).
3. Stop the engine, then remove the key from the ignition switch.
4. Close all doors, windows, and covers. Lock the covers, caps, and doors fitted with locks.

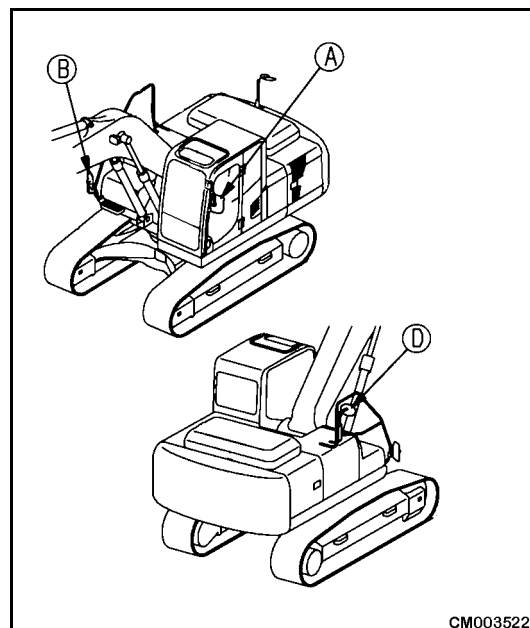


5. Place blocks under both ends of the tracks to prevent the machine from moving during transportation, and secure the machine with chains or wire rope of suitable strength.
6. Be particularly careful to secure the machine in position so it does not slip to the side.



Removing, Installing Mirrors

If they are damaged, or are to be removed for shipment, or are to be installed again, use the following procedure.



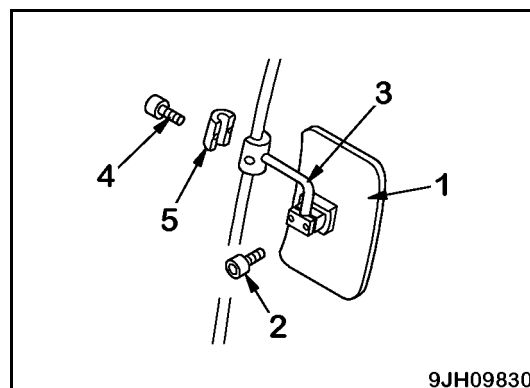
CM003522

Removal

1. Loosen locknut (2) of mirror (1), then remove mirror (1) from support (3). Loosen bolt (4), then remove support (3) and clamp (5) from the handrail.

Installation

1. Install support (3) and clamp (5) to the handrail, then tighten bolt (4). Install mirror (1) to support (3), then tighten locknut (2).



9JH09830

OPERATION

Machines with Cab Riser

WARNING

- The following procedure is for tilting a riser cab into its transportation position. This procedure is to be performed only after the machine is loaded onto its trailer and the engine is turned off.
- Tilting of the riser cab is only for the purpose of transporting the machine and must not be used for any other purpose. Do not operate the machine with the cab riser bolts removed, or the cab partially or fully tilted.
- Tilting of the riser cab is required to meet maximum height requirement when transporting the machine.

1. Open the cab riser door and secure with the door prop rod. Loosen and remove the six cab riser mounting bolts. Install the riser bolts into the bolt storage nuts. Do not over tighten the bolts, apply minimal torque with a wrench.

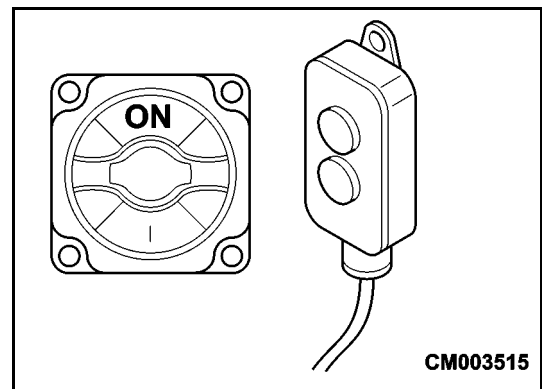
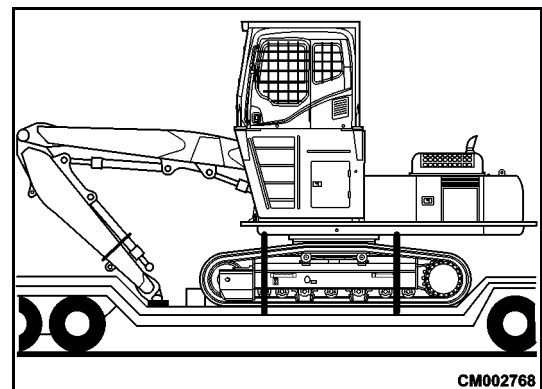
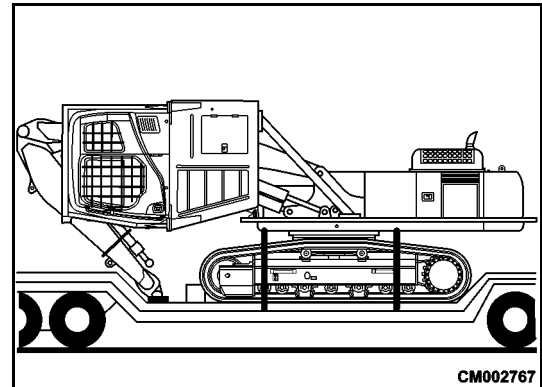
WARNING

- Make sure the cab front window is securely in its closed position, remove any loose objects from the cab, close and securely latch the cab door, remove any loose objects from inside the riser, and close and securely latch the riser door. Failure to do any of these tasks can result in damage to the cab or riser and personal injury.
- Do not stand in front of the cab and riser when tilting. Failure to do so can result in personal injury or death.

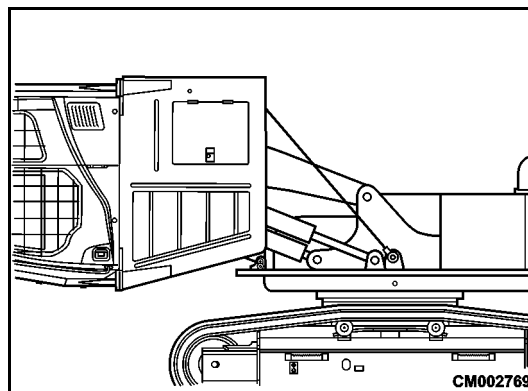
2. Turn the cab riser power disconnect switch located in the battery box to the ON position.
3. Open the left machine doors and move the cab tilt switch to the CAB TILT position.

Remark

The switch is a momentary switch and must be held in the CAB TILT position to activate the cab tilting process.



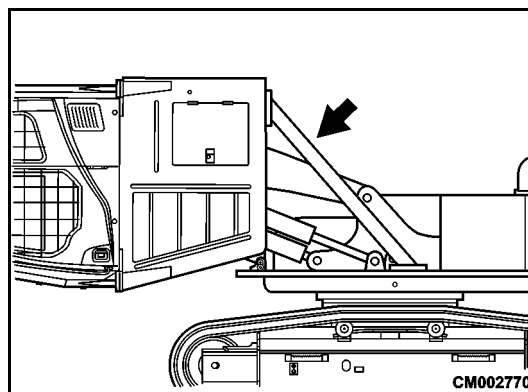
4. Tilt the cab until it is approximately horizontal and the movement stops. In the shipping position, the safety cable must be taut with tension.
5. Lock both the cab door and the riser door. Turn the riser power disconnect switch to the OFF position.
6. The cab portion of the machine is now ready for shipping.



Additional Riser Preparation for Extended Distances or Rough Ground Conditions

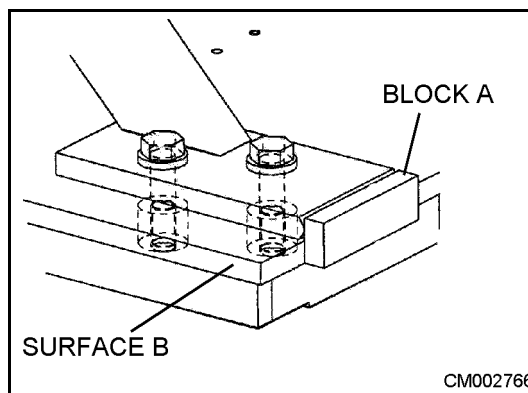
Remark

When the cab is full tilted forward, the tilt cylinder exerts a force to keep the riser tilted, while the safety cable is taut and thus pulls the cab upright. The combination of these two forces keeps the cab and riser from moving. Over extended periods of time or when traveling over excessively rough ground, the pressure in the tilt circuit could lower and thus reduce the cylinder force on the cab. If this occurs the cab could be allowed to bounce during transportation causing damage to the machine. To avoid this potential situation, follow the procedure listed below.



1. Install the cab shipping bar with hardware. The cab tilt switch will need to be activated to position the cab to allow the bar to be installed. Block A must contact Surface B. Tighten bolts to 565 N•m (420 lbf ft)

Cab shipping bar	20Y-46-A1620
Mounting bolt (4)	01010-82080
Flat washer (6)	01643-32060
Hex nut (2)	01580-12016



2. Lock both the cab door and the riser cab door. Turn the cab riser power disconnect switch to the OFF position.

OPERATION

Unloading the Machine

Machines with Cab Riser

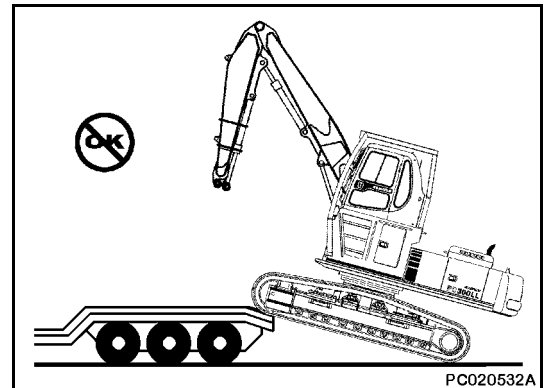
WARNING

Do not stand in front of the operator's cab and riser when tilting. Failure to do so can result in personal injury or death

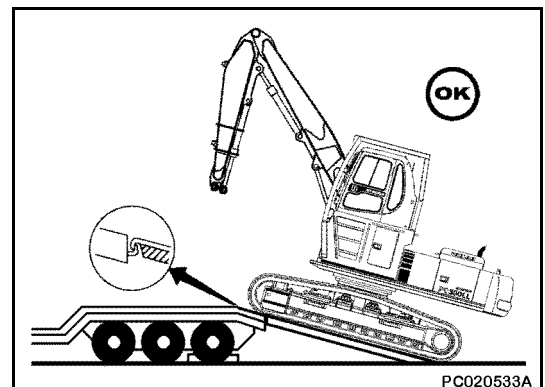
1. Turn the cab riser power disconnect switch to the ON position. If the cab riser shipping bar is installed, remove it and install the cab safety cable and its hardware.
2. Activate the cab tilt switch to the CAB UPRIGHT position. Raise cab until it is in the vertical position and movement stops.
3. Unlock and open the riser door and secure with the door prop rod. Loosen and remove the cab riser mounting bolts and washers from the storage nuts in the riser. Install the bolts and washers in the cab riser mounting locations and tighten the bolts. Turn the cab riser power disconnect switch to the OFF position.

Normal Unloading Procedure

1. Never lift the machine off the trailer body with the work equipment, loss of control or a rollover situation may result.

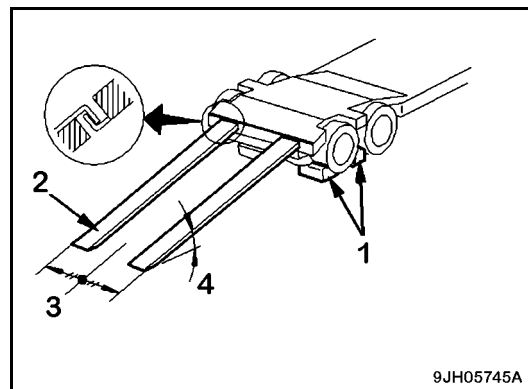


2. Always unload on level stable ground using the properly sized ramps with the trailer wheels chocked. Maintain a safe distance from the edge of the road.

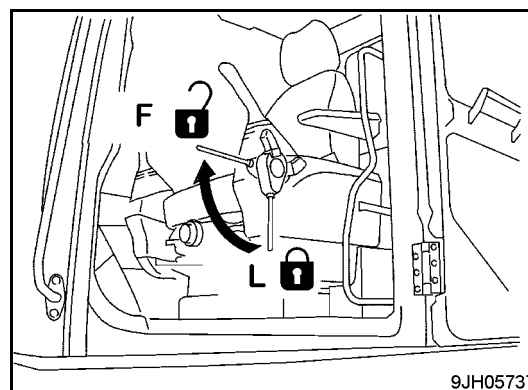


3. Load and unload on firm level ground only. Maintain a safe distance from the edge of a road.
4. Apply the trailer brakes securely, then put blocks (1) under the tires to prevent the trailer from moving.

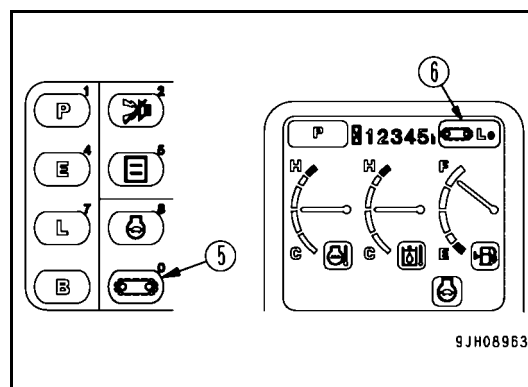
Set left and right ramps (2) parallel to each other and equally spaced to the left and right of center (3) of the trailer. Set the angle of installation (4) a maximum of 15°. If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.



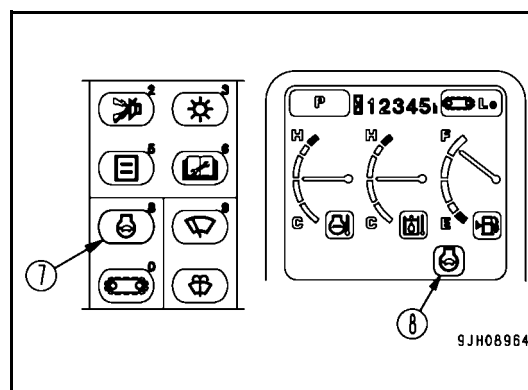
5. Remove the chains and wire ropes fastening the machine.
6. Start the engine. Warm the engine up fully.
7. Set the lock lever to **FREE** position (F).



8. Turn the travel speed selector switch to low speed travel (Lo lamp lights up).
 - Press travel speed selector switch (5) to set the travel speed. The travel speed (**Lo, Mi, Hi**) is displayed on monitor display (6).

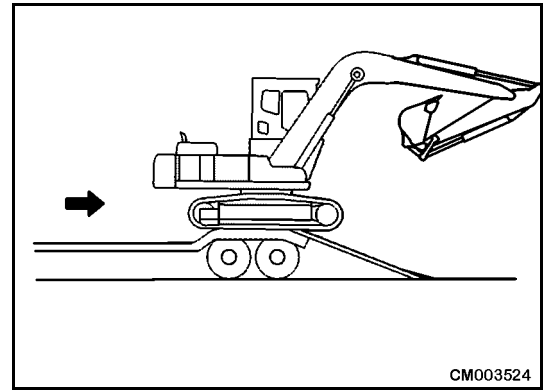


9. Turn auto-deceleration switch (7) **OFF** and operate the fuel control dial to set the engine speed to low idling.
 - Each time auto-deceleration switch (7) is pressed, it switches **OFF** → **ON** → **OFF** in turn.
 - When auto-deceleration switch (7) is turned OFF, display monitor (8) goes out.



OPERATION

10. Raise the work equipment, pull in the arm under the boom, then move the machine slowly.
11. When the machine is horizontal on top of the rear wheels of the trailer, stop the machine.



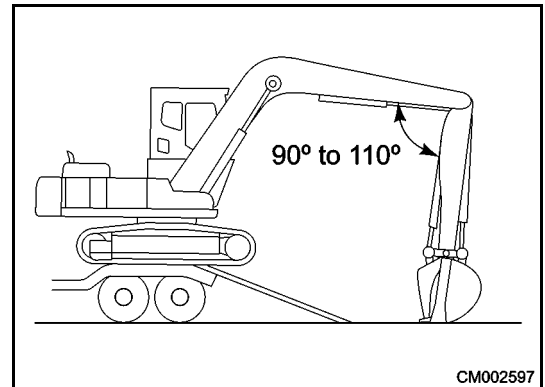
Remark

When unloading the machine, always keep the arm and boom at an angle of 90° - 110° .

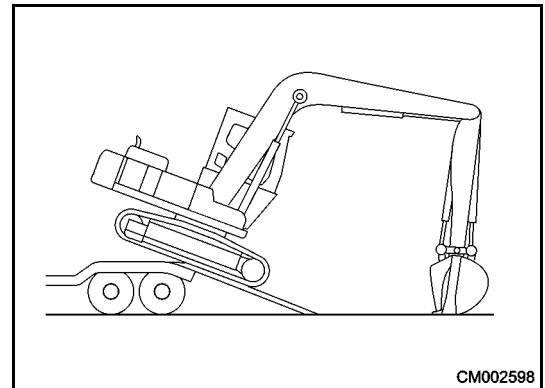
If the machine is unloaded with the arm pulled in, it will cause damage to the machine.

When moving onto the ramps, do not thrust the bucket into the ground.

This will cause damage to the hydraulic cylinders.



12. When moving from the rear of the trailer on to the ramps, set the angle of the arm and boom to 90° to 110° , lower the bucket to the ground, then move the machine slowly.
13. When moving down the ramps, operate the boom and arm slowly to lower the machine carefully until it is completely off the ramps.



Lifting the Machine

⚠ WARNING

- The operator carrying out the lifting operation using a crane must be a properly qualified crane operator.
- Never raise the machine with any worker on it.
- Always make sure that the wire rope is of ample strength for the weight of this machine.
- When lifting, keep the machine horizontal.
- When carrying out lifting operations, set the lock lever to the **LOCK** position to prevent the machine from moving unexpectedly.
- Never enter the area under or around a raised machine.

Never try to lift the machine in any posture other than the posture given in the procedure below or using lifting equipment other than in the procedure below.

There is a hazard that the machine may lose its balance.

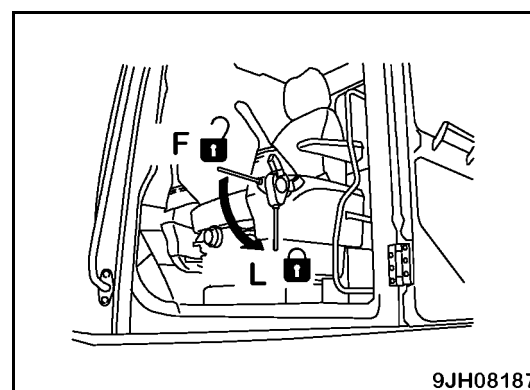
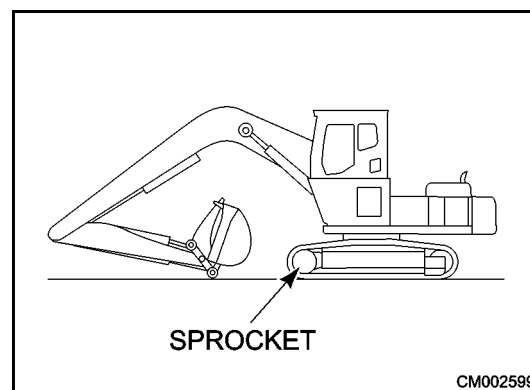
Remark

The lifting method differs according to the attachments and options installed. In such cases, please contact your Komatsu distributor for information.

For details of the weight, see See “SPECIFICATIONS” on page 4-2.

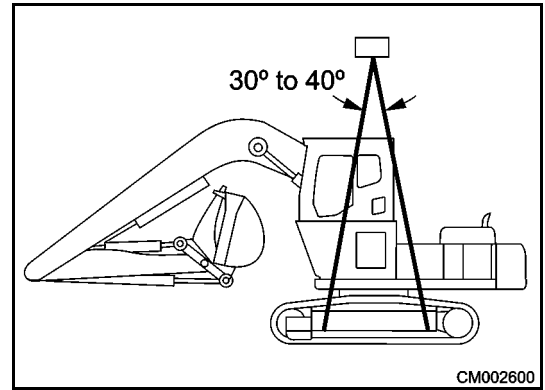
When lifting the machine, carry out the operation on flat ground as follows.

1. Swing the upper structure so that the work equipment is at the sprocket end (1).
2. Extend the bucket cylinder and arm cylinder fully, then lower the work equipment to the ground as shown using the boom cylinder.
3. Set the lock lever securely in the **LOCK** position (L)
4. Stop the engine, check to be sure there is nothing around the operator's compartment, then get off the machine. Close the cab door and front glass securely.



OPERATION

5. Pass wire ropes between the 1st and 2nd track rollers from the front and between the 1st and 2nd track rollers from the rear. For machines equipped with a full roller guard for the track roller, pass the wire rope under the track.
6. Set the lifting angle of the wire rope to 30° to 40°, then lift the machine slowly.
7. After the machine comes off the ground, check carefully that the machine is balanced, then lift slowly.

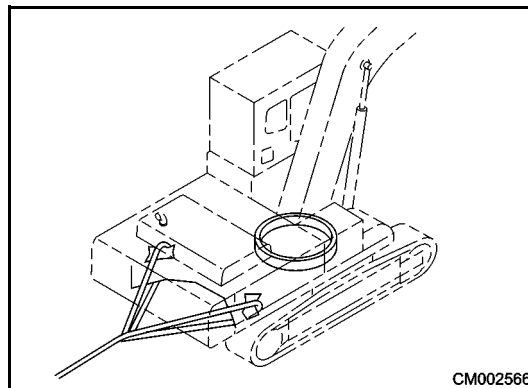


Towing the Machine

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.

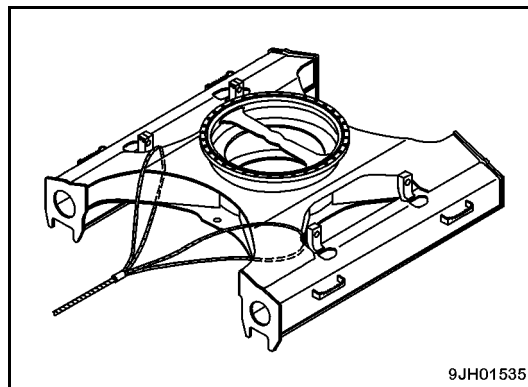


Place pieces of wood between wire ropes and body to prevent damage to ropes and body.

At this time, never use the hook for light-weight towing.

Remark

This is for emergencies only.



Lightweight Towing Hook

WARNING

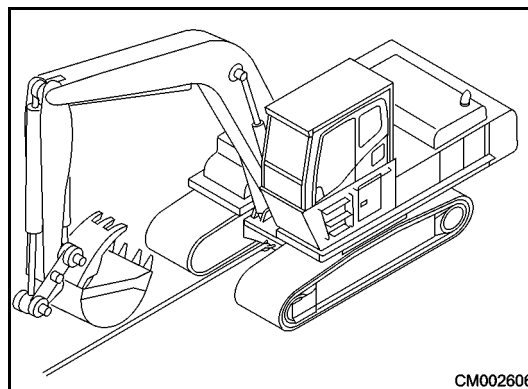
The shackle must always be used.

Hold the rope level and direct it straight to the track frame.

Move the machine slowly.

The track frame has been equipped with a hook to pass the shackle for towing light objects.

Permissible towing load: Maximum 108,000 N (24,280 lbf)



Remark

Keep in mind, towing the machine is only to be performed in emergency situations only.

COLD WEATHER OPERATION

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

Fuel and Lubricants

Change to fuel and oil with low viscosity for all components. For details of the specified viscosity, See “RECOMMENDED FUEL, COOLANT, AND LUBRICANT” on page 3-9.

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.

- Use only Komatsu approved coolant whenever available, for permanent type antifreeze coolant usage, See “Clean Inside of Cooling System” on page 3-24
- Never use methanol, ethanol or propanol based antifreeze.
- Never use straight water in the cooling system.
- Avoid using any water leak preventing agent, whether 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” on page 3-24.

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.

Battery electrolyte is toxic, do not dump electrolyte into a body of water or on the ground.

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.

Electrolyte temp	20°C	0°C	-10°C	-20°C
Rate of charge				
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

- Because the battery capacity drops markedly in low temperatures, cover the battery or remove it from the machine. Keep it in a warm place overnight, and install it again the next morning.
- If the electrolyte level is low, add distilled water in the morning before beginning work. To prevent fluid in the battery from freezing in the night, do not add the water after the day's work.

OPERATION

Monitor

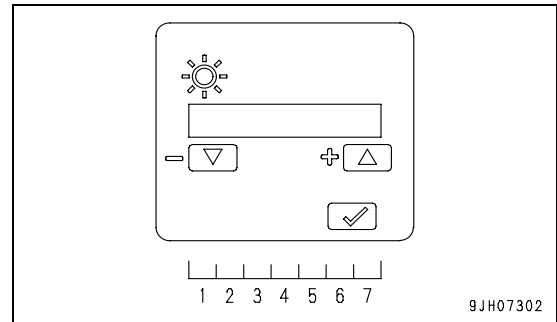
A feature of the liquid crystal monitor is that the screen becomes dark and is difficult to read in cold weather (particularly with the ignition switch ON).

In this case, adjust the brightness and contrast of the screen.

For details, See “Back Switch” on page 2-31”.

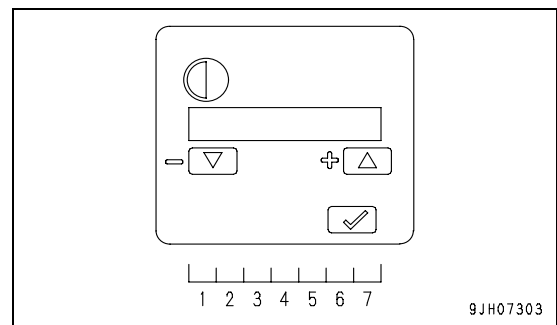
If the screen is dark, increase the brightness and contrast (extend the scale in the +E direction) to make the screen brighter and easier to read.

- Brightness



- Contrast
- Guideline for bar display for brightness and contrast in cold weather

Ambient temperature	Brightness	Contrast
-10°C (14°F)	7 (max)	5 - 4
-20°C (-4°F)	7	7 - 6



Precautions On Particular Jobsites

- When carrying out digging operations in water, if the work equipment mounting pin goes into the water, grease it every time it comes out of the water.
- For heavy-duty operations and deep digging, grease the work equipment mounting pins every time before each 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 ignition switch key to the OFF position.

The battery generates hydrogen gas, so there is danger of explosion.

Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.

Battery electrolyte is diluted sulfuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, wash it off immediately with large amounts of water. If it gets into 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, be extremely careful.

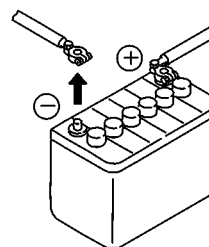
If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.

When installing the terminals, install them tightly.

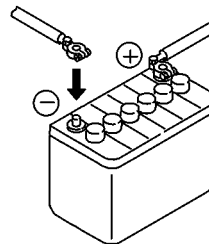
When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.

Green rust around the terminals is a cause of self-discharge of the battery. Clean 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.



9EA00023

OPERATION

Removal and Installation of Battery

After fastening the battery in position, check to be sure it does not move. If it moves, check and retighten it.

- When removing, remove from the ground side terminal first (normally the (-) terminal).
Be careful not to touch the positive (+) 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, attach the battery securely with the battery mounting clamp.

Torque of bolts 9.8 to 14.7 N•m (7.2 to 10.8 lbf ft)

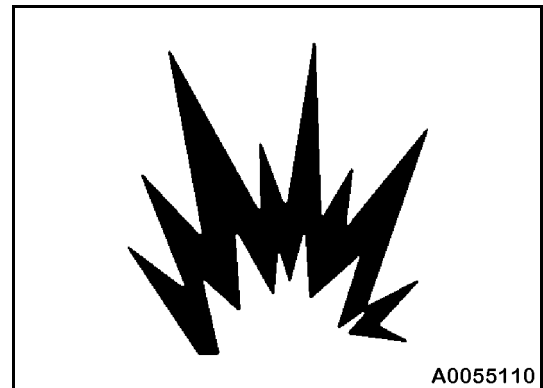
Battery Charges

When charging the battery, there is danger that the battery may explode if it is mishandled. Follow the instructions in See “Electrical System Problems” on page 2-154 and the instruction manual supplied with the charger, and be sure to observe the following precautions.

1. 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.
2. 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 connect the clips securely.
3. Set the charging current to 1/10 of the value of the rated battery capacity; when doing 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.

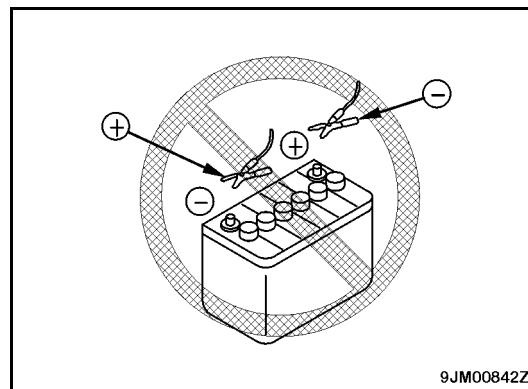
4. If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source.
There is a danger that this will ignite the battery electrolyte and cause the battery to explode.
5. Do not use or charge the battery if the battery electrolyte level is below the LOWER 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 a machine that has been started. To avoid hydrogen explosion, do not allow the cable ends to contact each other or the machine.

Remark

The starting system for this machine uses 24 Volts. For the normal machine, use a 24 V 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 to be sure the safety lock lever is in the LOCK position.

Check to be sure each lever is in the NEUTRAL position.

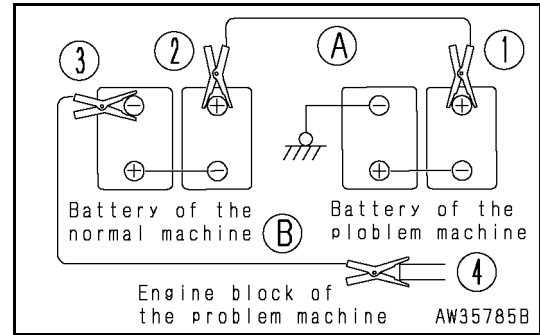
OPERATION

Booster Cable Connection

Keep the ignition switch of the normal machine and problem machine 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 ignition 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

WARNING

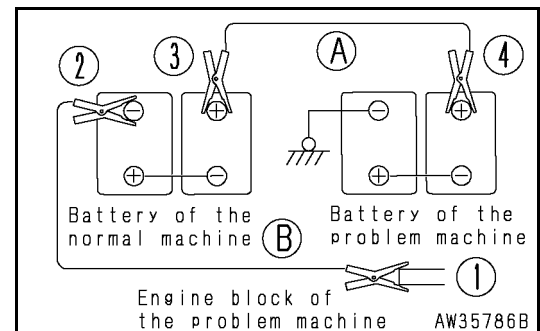
Always check to be sure the safety lock lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Also check to be sure all the control levers are at the HOLD or neutral position.

1. Make sure the clips are firmly connected to the battery terminals.
2. Start the engine of the normal machine and keep it running at high idling speed.
3. Turn the ignition 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 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.



GENERAL TROUBLESHOOTING

After Running Out Of Fuel

When starting the engine again after running out of fuel, fill with fuel, then bleed the air from the fuel system before starting the engine.

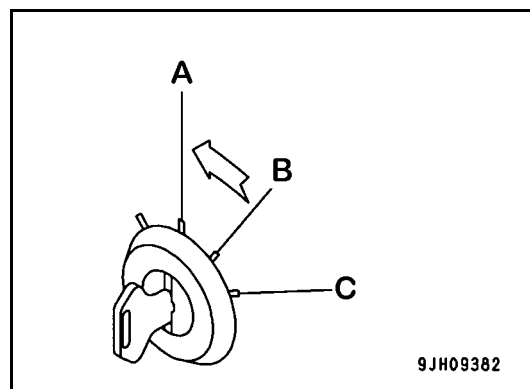
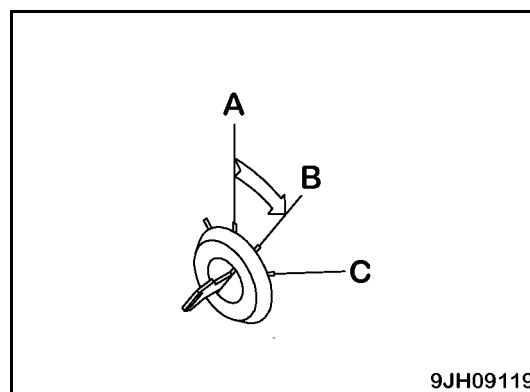
Procedure For Bleeding Air

1. Insert the key in the starting switch and turn the key to the ON position (B).

The electric priming pump is actuated.

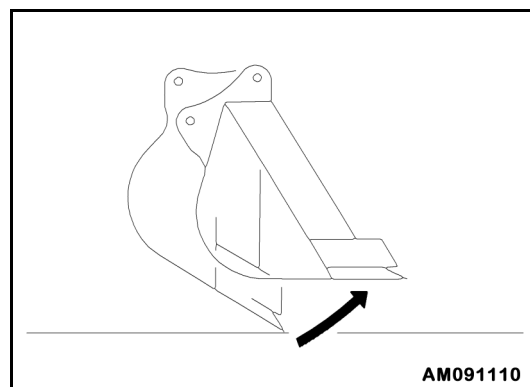
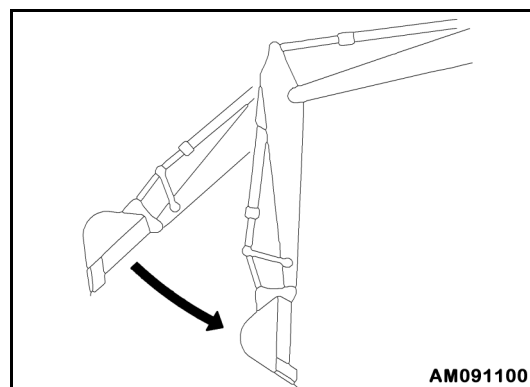
2. Hold the key at the ON position (B) for 30 seconds, then return it to OFF position (A) and wait for 10 seconds.
3. Repeat Steps 1 and 2 four times.
4. Turn the key in the starting switch to the START position and start the engine.

When doing this, do not crank the starting motor continuously for more than 20 seconds. If the engine does not start, wait for at least two minutes, then try again. Perform this operation a maximum of four times.



Phenomena That Are Not Failures

- When the arm is pulled in, the speed of movement will drop momentarily when the arm reaches vertical (more or less).
- The arm speed will drop momentarily when the bucket teeth are more or less horizontal.
- Bucket or arm shakes during heavy-duty digging operations.
- 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 brake valve.



OPERATION

Electrical System Problems

- (): 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	<ul style="list-style-type: none">• Defective wiring, deterioration of battery	<ul style="list-style-type: none">• (Check, repair loose terminals, disconnections, replace battery)
Lamp flickers while engine is running	<ul style="list-style-type: none">• Loose fan belt	<ul style="list-style-type: none">• Check fan belt tension, replace
Charge level monitor does not go out even when engine is running	<ul style="list-style-type: none">• Defective alternator• Defective wiring	<ul style="list-style-type: none">• (Replace)• (Check, repair)
Abnormal noise is generated from alternator	<ul style="list-style-type: none">• Defective alternator	<ul style="list-style-type: none">• (Replace)
Starting motor does not turn when ignition switch is turned to START position	<ul style="list-style-type: none">• Defective wiring• Defective starting motor• Insufficient battery charge	<ul style="list-style-type: none">• (Check, repair)• (Replace)• Charge
Drive in starting motor keeps going and out	<ul style="list-style-type: none">• Insufficient battery charge• Defective safety relay	<ul style="list-style-type: none">• Charge• (Replace)
Starting motor turns engine sluggishly	<ul style="list-style-type: none">• Insufficient battery charge• Defective starting motor	<ul style="list-style-type: none">• Charge• (Replace)
Starting motor disengages before engine starts	<ul style="list-style-type: none">• Defective wiring, defective ring gear pinion• Insufficient battery charge	<ul style="list-style-type: none">• (Check, repair)• Charge
Pre-heating monitor does not light	<ul style="list-style-type: none">• Defective wiring• Defective heater relay• Defective monitor	<ul style="list-style-type: none">• (Check, repair)• (Replace)• (Replace)
Oil pressure monitor does not light up when engine is stopped (ignition switch at ON position)	<ul style="list-style-type: none">• Defective monitor• Defective caution lamp switch	<ul style="list-style-type: none">• (Replace)• (Replace)
Outside of the electrical heater is not warm when touched by hand	<ul style="list-style-type: none">• Defective wiring• Open in electrical heater• Defective heater relay	<ul style="list-style-type: none">• (Check, repair)• (Replace)• (Replace)

Chassis Problems

- (): 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
Pump generates abnormal noise (sucking in air)	<ul style="list-style-type: none"> • Clogged element in hydraulic tank strainer, lack of oil 	<ul style="list-style-type: none"> • Clean, See "Every 2000 Hours Maintenance" on page 3-69
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, replace • CleanAdd oil to specified level
Track comes off	<ul style="list-style-type: none"> • Track too loose 	<ul style="list-style-type: none"> • Adjust track tension
Abnormal wear of sprocket		
Boom raises slowly or does not raise	<ul style="list-style-type: none"> • Lack of hydraulic oil 	<ul style="list-style-type: none"> • Add oil to specified level
Does not swing	<ul style="list-style-type: none"> • Swing lock switch still applied 	<ul style="list-style-type: none"> • Turn swing lock off

OPERATION

Engine Problems

- (): 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 • Defective engine oil pressure sensor • Defective monitor 	<ul style="list-style-type: none"> • Add oil to specified level • Replace cartridge • (Check, repair) • (Replace sensor) • (Replace)
Steam spurts out from top of radiator (pressure valve)	<ul style="list-style-type: none"> • Cooling water level low, leakage of coolant • Loose fan belt • Dirt or scale accumulated in cooling system 	<ul style="list-style-type: none"> • Check, add water • Check fan belt tension, adjust, replace • Change coolant, flush inside of cooling system
Radiator water level monitor lights up	<ul style="list-style-type: none"> • Clogged radiator fins or damaged fins • Defective thermostat • Loose radiator filler cap (high-altitude operations) • Defective water level sensor • Defective monitor 	<ul style="list-style-type: none"> • Clean or repair • (Replace thermostat) • Tighten cap or replace packing • (Replace sensor) • (Replace sensor)
Engine does not start when starting motor is turned	<ul style="list-style-type: none"> • Lack of fuel • Air in fuel system • Defective fuel injection pump or defective nozzle • Starting motor cranks engine sluggishly • Preheating monitor does not light up • Poor compression • Defective valve clearance 	<ul style="list-style-type: none"> • Add fuel • Repair place where air is sucked in • (Replace pump or nozzle) • See "Electrical System Problems" • See "Electrical System Problems" • (Adjust valve clearance)
Exhaust gas is white or blue	<ul style="list-style-type: none"> • Too much oil in oil pan • Improper fuel 	<ul style="list-style-type: none"> • Set oil to specified level • Change to specified fuel
Exhaust gas occasionally turns black	<ul style="list-style-type: none"> • Clogged air cleaner element • Defective nozzle • Defective compression • Defective turbocharger 	<ul style="list-style-type: none"> • Clean or replace (Replace nozzle) • (See defective compression above) • Clean or replace turbocharger
Combustion noise occasionally make breathing sound	<ul style="list-style-type: none"> • Defective nozzle 	<ul style="list-style-type: none"> • (Replace nozzle)

Problem	Main causes	Remedy
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	Pump control system error	When emergency pump drive switch is at the up (emergency) position, normal operations become possible, but have inspection carried out immediately. (H)
E03	Swing brake system error	Turn the swing prolix switch ON to cancel the brake. When applying the swing brake, operate the swing lock switch manually. Depending on the cause of the failure, it may be impossible to release the brake. In any case, have the system inspected immediately by your Komatsu distributor. (H)
E10	Engine controller power source error Engine controller drive system circuit error (engine stooped)	Have inspection carried out immediately.
E11	Engine controller system error (output reduced to protect engine)	Operate machine to a safe posture and have inspection carried out immediately.
E14	Abnormally in throttle system	Operate machine to a safe posture and have inspection carried out immediately.
E15	Engine sensor (coolant temperature, fuel pressure, oil pressure) error	Operations are possible, but have inspection carried out immediately.
E0E	Network error.	Operate machine to a safe posture and have inspection carried out immediately
In the case where the monitor will not display error codes and work equipment operation and swing operation cannot be carried out.		Have the machine inspected immediately by your Komatsu distributor.

★ For details of handling the emergency pump drive switch, swing holding brake cancel switch, and emergency work equipment actuation switch, see “CONSOLE CONTROL SWITCHES” on page 1-34.

OPERATION

Telephone When Error Occurs

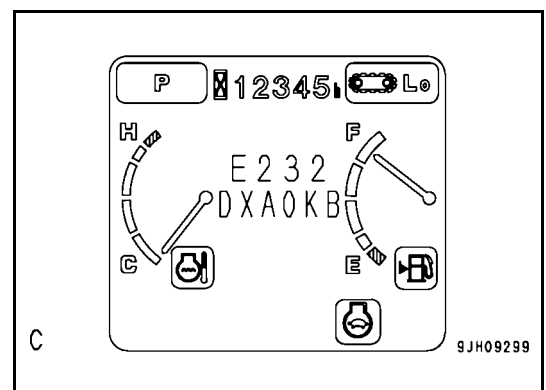
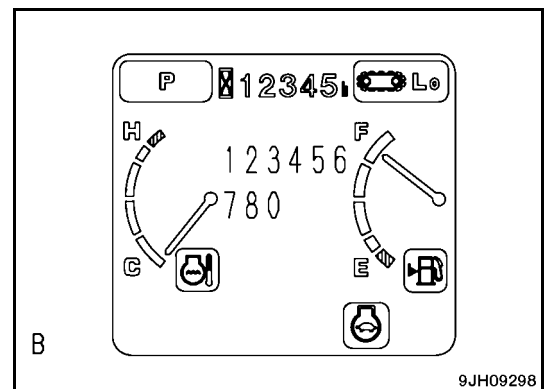
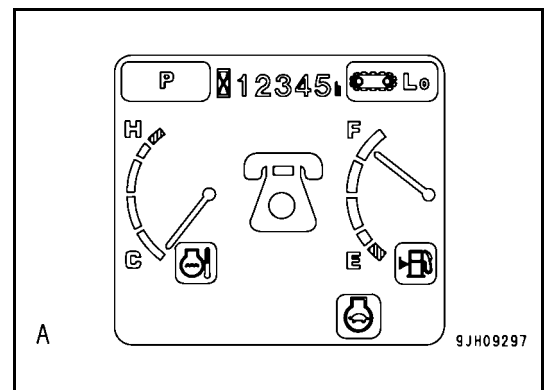
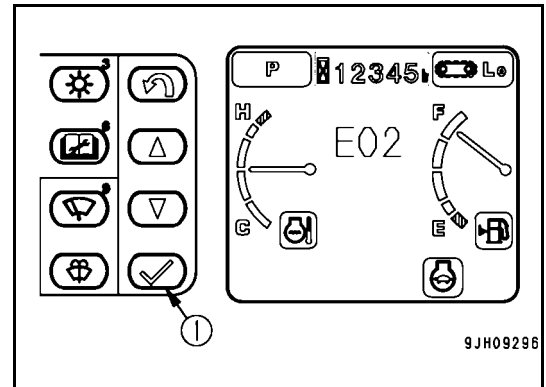
If an error screen is displayed on the monitor, the screen changes as follows each time input confirmation switch (1) is pressed.

Error screen → screen A → screen B → screen C → error screen

Check the point of contact telephone number on screen B.

Remark

If the point of contact telephone number has not been registered, screen B is not displayed. If it is necessary to register the point of contact telephone number, ask your Komatsu distributor to register it.

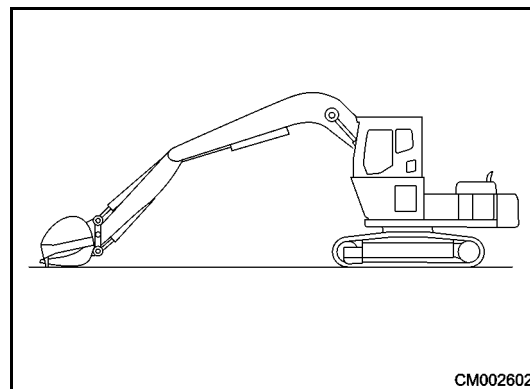


LONG TERM STORAGE

Before Storage

Remark

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.

1. 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.
2. Completely fill the fuel tank, lubricate and change the oil before storage.
3. Apply a thin coat of grease to the metal surface of the hydraulic piston rods.
4. Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
5. If the ambient temperature is expected to drop below 0°C (32°F), add antifreeze to the cooling water.
6. Lock each control lever and pedal with the lock lever and pedal lock.
7. Set the stop valve to the LOCK position on machines which can install attachments. Install a plug in the elbow.
8. Set the selector valve on the machines which can install attachments to the “Where no attachment is mounted” position.
9. To prevent corrosion, be sure to fill the cooling system with Supercoolant (AF-NAC) or permanent type antifreeze (density between 30% and 68%). Permanent type antifreeze usage, See “Clean Inside of Cooling System” on page 3-24 for requirements.

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 to 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, charge the battery.

For machines equipped with an air conditioner, run the air conditioner.

Rotate the tracks.

After Storage

Remark

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.

1. Wipe off all the grease coating the hydraulic cylinder rods.
2. Add oil and grease to all places.
3. 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.

Starting Machine

When starting the engine after long-term storage, cancel the automatic warming-up operation as follows.

1. Turn the ignition 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 three seconds, then return it to the low idling (MIN) position and start the engine.

MAINTENANCE

MAINTENANCE INFORMATION

Do not perform any inspection and/or 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.

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, report to the person in charge, and correct situation.

Fuel Strainer

If your machine is equipped with a fuel strainer, do not remove it while fueling.

Welding Instructions

- Turn off the engine ignition switch.
- Do not apply more than 200 V continuously.
- Connect grounding cable within 1 m (3.3 ft) from the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may malfunction or fail.
- Avoid seals or bearings from being between the area to be welded and the position of grounding point.
- 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, be careful not to drop nuts, bolts, or tools inside the machine.
If such things are dropped inside the machine, it will cause damage, machine malfunction, and will lead to failure. If you drop anything inside the machine, remove it immediately.
- Do not put unnecessary things in your pockets. Carry only things which are necessary for inspection.

Selecting Fuel and Lubricants to Match Ambient Temperature

It is necessary to use fuel and lubricants that match the ambient temperature.

For details, "RECOMMENDED FUEL, COOLANT, AND LUBRICANT" on page 3-9.

Dusty Jobsite

When working at dusty worksites, do as follows:

1. Check the clogging of the air cleaner more frequently with the dust indicator. Clean the air cleaner element more frequently.
2. Clean the radiator core frequently to avoid clogging.
3. Clean and replace the fuel filter frequently.
4. Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
5. 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 servicing the machine with the inspection cover open, lock it in position securely with a lock bar. If inspection or maintenance is done out with the inspection cover open and not locked in position, there is the possibility that it may suddenly be 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 "Bleeding Air From Hydraulic System" on page 3-41.

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 perform the checks after inspection and maintenance, unexpected problems may occur, and this may lead to serious injury or property damage. Always do as follows.

1. Checks after operation (with engine stopped)
 - A. Have any inspection and maintenance points been forgotten?
 - B. Have all inspection and maintenance items been carried out correctly?
 - C. Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside the machine and get caught in the linkage mechanism.
 - D. Is there any water or oil leaks? Have all the bolts been tightened?
2. Checks when operating engine
 - A. For details of the checks when operating the engine, "GENERAL SAFETY RULES AND PRECAUTIONS" on page 1-15 and pay careful attention to safety.
 - B. Are the inspection and maintenance items working properly?
 - C. Is there any oil leakage when the engine speed is raised and load is applied to the oil pressure?

LUBRICANTS, COOLANT AND FILTERS**Outline of Service**

Always use Komatsu genuine parts for replacement parts, grease or oil.

When changing the oil or adding oil, do not mix different types of oil. When changing the type of oil, drain all the old oil and fill completely with the new oil. Always replace the filter at the same time. (There is no problem if the small amount of oil remaining in the piping mixes with the new oil.)

Unless otherwise specified, when the machine is shipped from the factory, it is filled with the oil and coolant listed in the table below.

Item	Type
Engine oil pan	Engine oil EO 15W40DH (Komatsu genuine parts)
Damper case	Power train oil TO30 (Komatsu genuine parts)
Swing machinery case	
Final drive case	
Hydraulic oil system	Power train oil TO10 (Komatsu genuine parts)
Radiator	Supercoolant AF-NAC (density: 50%) (Komatsu genuine parts)

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 it deteriorates with use.
Use oil that matches the grade and temperature for use given in the Operation and Maintenance Manual.
Even if the oil is not dirty, change the oil after the specified interval.
- Oil corresponds to blood in the human body, so be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
The majority of problems with machines 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.
- 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, replace the related filters. When replacing the engine oil filter, fill the new filter with fresh, clean specified oil before installing.
- We recommend periodic analysis of the oil to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.

Fuel

- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified in the Operation and Maintenance Manual.
- Fuel may congeal depending on the temperature when it is used (particularly in low temperature below -15°C (5°F). It is necessary to use the fuel that is suitable for the temperature.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.
- If there is any foreign material in the fuel tank, wash the tank and fuel system.

Remark

Always use diesel oil for the fuel.

To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device. This device requires high precision parts and lubrication, so if low viscosity fuel with low lubricating ability is used, the durability may drop markedly.

Coolant and Water for Dilution

- The coolant has the important function of preventing corrosion as well as preventing freezing. Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential. Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for two years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available. For details, "Clean Inside of Cooling System" on page 3-24. If machine is not equipped with a corrosion resistor, Komatsu Supercoolant must be used.
- When diluting the antifreeze coolant, use distilled water or tap water (soft water). Natural water, such as a river water or well water (hard water), contains large amounts of minerals (calcium, magnesium, etc.), and this makes it easier for scale to form inside the engine or radiator. Once scale is deposited inside the engine or radiator, it is extremely difficult to remove. It also causes overheating due to poor heat exchange, so when you dilute the coolant, we recommend that you use water with an overall hardness of less than 100 PPM.
- When using antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- Antifreeze coolant is flammable, so be sure to keep it away from flame.
- The ratio of Supercoolant (AF-NAC) to water differs according to the ambient temperature. For details of the ratio when mixing, "Clean Inside of Cooling System" on page 3-24. Supercoolant (AF-NAC) may be supplied in premix. In this case, never add diluting water.
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating, and will also cause problems with corrosion due to air entering the coolant.

Grease

- Grease is used to prevent binding and noise at the joints.
- The nipples not included in the MAINTENANCE section are nipples used when overhauling, so they do not need to be greased periodically.
- If any part becomes stiff or generates noise after being used for a long time, grease it.
- 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.

MAINTENANCE

Carrying Out KOWA (Komatsu Oil Wear Analysis)

KOWA is a maintenance service that makes it possible to prevent machine failures and downtime. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other abnormalities.

Periodic use of KOWA makes the following possible:

1. It enables abnormalities to be detected early, leading to reduction of repair costs and machine downtime.
2. 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.

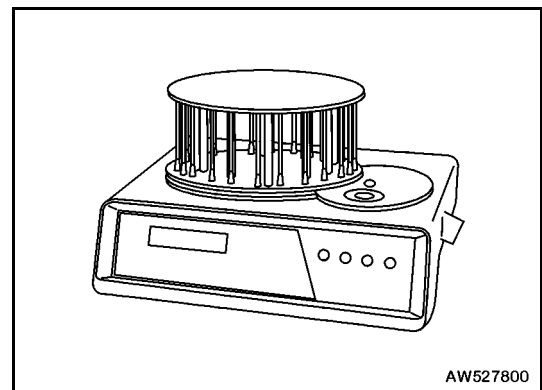
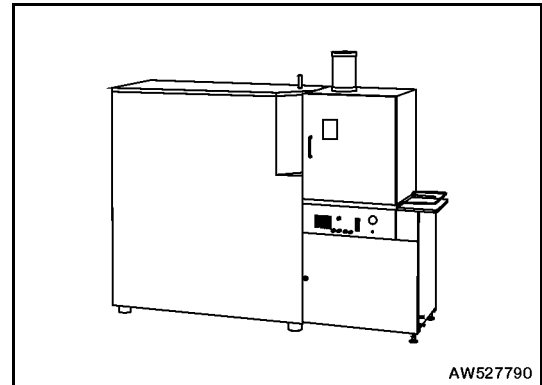
Oil Sampling

- Sampling interval
250 hours: Engine
500 hours: Other components
- Precautions when sampling
 - Make sure that the oil is well mixed before sampling.
 - Take samples regularly at regular intervals.
 - Do not take oil samples 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 be at the side. (To prevent moisture from being sucked in.)
If drum cans have to be stored outside, cover them with a waterproof tarp or canvas, 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. Replace with new filters.
- When replacing oil filters, check if any metal particles are stuck 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.
- 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.
- Minimum service relating to the electric system is a 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. 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, ignition switch, or battery relay.

Handling Hydraulic System

- During and after operations, the hydraulic system is at high temperature. During operations, it is also under high pressure, so pay careful attention to the following when carrying out inspection and maintenance of the hydraulic system.
- Stop the machine on level ground, lower the bucket to the ground, and set it so that there is no pressure on the cylinder circuit.
- Stop the engine.
- Immediately after operations, the hydraulic oil and lubricating oil are under pressure and at high temperature, so wait for the temperature to cool before starting maintenance.
- Even when the temperature cools, there may still be internal pressure. When loosening plugs, screws, or hose connections, do not stand directly in front. Loosen them gradually to release any internal pressure before removing.
- When carrying out inspection or maintenance of the hydraulic circuits, bleed the air to release the internal pressure.
- Minimal inspection or maintenance consists of checking the hydraulic oil level, replacing the filters, and changing the hydraulic oil.
- When removing high-pressure hoses, check to be sure the O-ring is not damaged. If it is damaged, replace it.

MAINTENANCE

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 as scheduled in order to use the machine economically.

For part change, Komatsu genuine parts should be used (excellent quality).

When ordering parts, please check the part number in the parts book and write them in the table below.

The parts in parentheses are to be replaced at the same time.

Item	Part Name	Qty	Replacement frequency
Fuel pre-filter	Cartridge (incl. O-ring)	1	Every 500 hours
Engine oil filter	Cartridge	1	Every 500 hours
Hydraulic tank vent	Element	1	Every 500 hours
Fuel main filter	Cartridge	1	Every 1000 hours
Hydraulic oil filter	Element (O-ring)	1 (1)	Every 1000 hours
Corrosion resistor (if equipped)	Cartridge	1	Every 1000 hours
Additional vent for hydraulic tank	Element	1	Every 1000 hours
Air conditioner RECIRC filter	Filter	1	Every one year
Air conditioner FRESH filter	Element	1	Every one year
Air cleaner	Element assembly	1	—
Additional filter for breaker (if equipped)	Element (O-ring) (O-ring)	1 (1) (1)	—
Bucket	Vertical pin type Tooth (Pin) (Lock)	5 (5) (5)	—
	Horizontal pin type Tooth (Pin)	5 (5) (5)	—
	Side cutter type Cutter (left) Cutter (right)	1 1	—
	Shroud type Shroud Pin	2 (4)	—
	Ripper bucket Tooth Pin	5 5	—
Seat belt		1	Every 3 years after the start of usage or 5 years after the date of manufacture or at first sign of wear or damage

RECOMMENDED FUEL, COOLANT, AND LUBRICANT

- Komatsu genuine oils are adjusted to maintain the reliability and durability of Komatsu construction equipment and components.
- In order to keep your machine in the best conditioner for long periods of time, it is essential to follow the instructions in this Operation and Maintenance Manual.
- Failure to follow these recommendations may result in shortened life or excess wear of the engine, power train, cooling system, and/or other components.
- Commercially available lubricant additives may be good for the machine, but they may also cause harm. Komatsu does not recommend any commercially available lubricant additive.
- Use the oil recommended according to the ambient temperature in the chart below.
- Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.
- When starting the engine in ambient temperatures below 0°C (50°F), do not use SAE30, even if the daytime temperature rises to 10°C (32°F). Always use multigrade oil such as the recommended SAE10W30 or SAE15W40.
- If the machine is operated at a temperature below -20°C (-4°F), a separate device is needed, so consult your Komatsu distributor.
- When the fuel sulfur content is less than 0.5%, change the engine oil according to the period inspection table given in this Operation and Maintenance Manual.
- If the fuel sulfur content is more than 0.5%, change the oil according to the following table.

Fuel sulfur content	Engine oil change interval
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

MAINTENANCE

Reservoir	Fluid Type	Ambient Temperature									Recommended Komatsu Fluids
		-22	-4	14	32	50	68	86	140	122F°	
		-30	-20	-10	0	10	20	30	40	50C°	
Engine oil pan	Engine oil	SAE 0W30EOS and HTHS 3.5min. (Note 1)									Komatsu EOS0W30
		SAE 5W40EOS and HTHS 3.5min. (Note 2)									Komatsu EOS5W40
		SAE 10W30DH									Komatsu EO10W30DH API CH-4 API CI-4
		SAE 15W40DH									Komatsu EO15W40DH API CH-4 API CI-4
		SAE 30DH									Komatsu EO20DH
Swing machinery Final drive case Damper case	Power train oil (Note 2)	TO 30									TO30
Hydraulic system	Power train oil	TO 10									TO 10
	Hydraulic oil	HO46-HM									HO46-HM
Grease	Hyper grease (Note 3)	G2-TE									G2-TE
	Lithium grease (Note 3)	G2-L1									G2-L1
Engine Cooling system	Super- coolant AF-NAC	AF-NAC (Note 4)									AF-NAC
Fuel tank	Diesel fuel	No.2-D									ASTM N0. 2-D
		No. 1-D									ASTM No. 1-D

- API: American Petroleum Institute
- SAE: Society of Automotive Engineers
- ASTM: American Society of Testing and Material

		Engine oil pan	Swing machinery case	Final drive case (each)	Damper case	Hydraulic system	Cooling system	Fuel tank
Specified capacity	liter	38	13.4	12	1.07	373	32	605
	US gal	10.04	3.54	3.17	0.28	99	8.45	159.84
Refill capacity	liter	35	13.4	12	-	196	-	-
	US gal	9.25	3.54	3.17	-	52	-	-

Remark

Always Use Diesel Oil For The Fuel.

To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device. This device requires high precision parts and lubrication, so if low viscosity fuel with low lubricating ability is used, the durability may drop markedly.

Note 1: SAE0W30EOS and SAE5W40EOS must be fully synthetic and HTHS (High-Temperature High-Shear Viscosity 150°C) must be equal to or higher than 3.5 cP. Komatsu EOS0W30 and EOS5W40 are the most suitable oils. If these oils are not available, contact your Komatsu distributor.

Note 2: Power train oil has different properties from engine oil. Be sure to use the recommended oils.

Note 3: Hyper white grease (G2-TE) has a high performance.

When it is necessary to improve the lubricating ability of the grease in order to prevent squeaking of pins and bushings, the use of G2-TE is recommended.

Note 4: Supercoolant (AF-NAC)

1. The coolant has the important function of preventing corrosion as well as preventing freezing. Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential. Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for two years or 4000 hours. Komatsu Supercoolant (AF-NAC) is required for machines without corrosion resistor.
2. For details of the ratio when diluting super coolant with water, "Clean Inside of Cooling System" on page 3-24. When the machine is shipped from the factory, it may be filled with coolant containing 30% or more Supercoolant (AF-NAC). In this case, no adjustment is needed for temperatures down to -10°C (14°F). (never dilute with water)
3. To maintain the anticorrosion properties of Supercoolant (AF-NAC), always keep the density of Supercoolant between 30% and 68%.

Recommended Products Other Than Komatsu Genuine Oils

When using commercially available oils other than Komatsu genuine oil, or when checking the latest specifications, refer to the Komatsu web page or consult your Komatsu distributor.

TIGHTENING TORQUE SPECIFICATIONS

⚠ WARNING

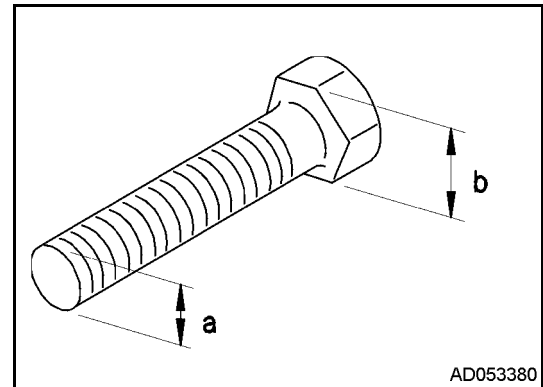
If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation. Pay careful attention when tightening parts.

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.

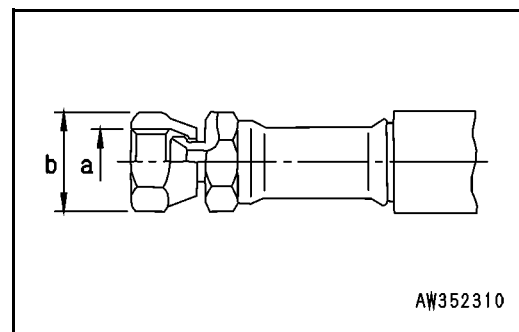
If it is necessary to replace any nut or bolt, use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter a(mm)	Width across flat b(mm)	Tightening torque			
		Target value		Service limit	
		N•m	lbft	N•m	lbft
6	10	13.2	9.8	11.8 - 14.7	8.7 - 10.8
8	13	31	23.1	27 - 34	20.3 - 25.3
10	17	66	48.5	59 - 74	43.4 - 54.2
12	19	11	83.2	98 - 123	72.3 - 90.4
14	22	177	130.2	157 - 196	115.7 - 144.7
16	24	279	206.1	245 - 309	180.8 - 227.8
18	27	382	282.1	343 - 425	253.2 - 314.6
20	30	549	405.0	490 - 608	361.7 - 448.4
22	32	745	549.7	662 - 829	488.2 - 611.2
24	36	927	683.5	824 - 1030	607.6 - 759.5
27	41	1320	976.5	1180 - 1470	868.0 - 1085.0
30	46	1720	1265.8	1520 - 1910	1121.1 - 1410.4
33	50	2210	1627.4	1960 - 2450	1446.6 - 1808.3
36	55	2750	2025.2	2450 - 3040	1808.3 - 2242.2
39	60	3280	2423.1	2890 - 3630	2133.7 - 2676.2



Apply the following table for Hydraulic Hose.

Thread diameter a(mm)	Width across flat b(mm)	Tightening torque			
		Target value		Service limit	
		N•m	lbft	N•m	lbft
14	19	29.4	21.7	27.5 - 39.2	20.3 - 28.9
18	24	78.5	57.3	58.8 - 98.1	43.4 - 72.3
22	27	117.7	86.8	88.3 - 137.3	65.1 - 101.3
24	32	147.1	108.5	117.7 - 176.5	86.8 - 130.2
30	36	215.7	159.1	176.5 - 245.2	130.2 - 180.8
33	41	255.0	188.1	215.7 - 284.4	159.1 - 209.8



PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

To ensure safety at all times, the machine must have periodic maintenance. To further improve safety, the parts listed in the table below should be replaced on a consistent basis. These parts are closely related to safety and fire prevention.

The material of these parts change as time passes, or they easily wear or deteriorate. Because it is difficult to judge the condition of the parts simply by periodic inspection, they should be replaced after a specified period of time regardless of their appearance. This is necessary to ensure that they 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, replace the O-rings, gaskets, and other such parts at the same time.

Ask your Komatsu distributor to replace the safety critical parts.

MAINTENANCE

Safety Related Critical Parts

No.	Safety critical parts for periodic replacement	Qty	Replacement interval
1	Fuel return hose (engine - fuel tank)	1	Every two years or 4000 hours, whichever comes sooner
2	Fuel supply hose (fuel tank - engine)	1	
3	Fuel hose (fuel filter to pump)	1	
4	Fuel hose (water separator - engine)	1	
5	Pump outlet hose (pump - control valve)	2	
6	Front/rear pump branch hose	2	
7	Work equipment hose (boom cylinder inlet port)	4	
8	Work equipment hose (bucket cylinder line, boom foot)	2	
9	Work equipment hose (bucket cylinder inlet port)	2	
10	Work equipment hose (bucket cylinder inlet port, 4.0n arm)	2	
11	Work equipment hose (arm cylinder line, boom foot)	2	
12	Work equipment hose (arm cylinder inlet port)	2	
13	Attachment additional line hose (boom foot)	2	
14	Attachment additional line hose (boom intermediate)	2	
15	Attachment additional line hose (boom top)	2	
16	Swing line hose (swing motor inlet port)	2	
17	Main suction hose	1	
18	Gear pump suction hose	1	
19	Heater hose	2	
20	Travel line hose (control valve - swivel joint)	4	
21	Travel line hose (swivel joint - travel motor)	4	
22	Accumulator (for control circuit)	1	
23	High pressure piping clamp	10	Every 8000 hours
24	Missing fuel spray prevention cap	1	
25	Seat belt	1	Every 3 years after the start of usage or 5 years after the date of manufacture or at first sign of wear or damage

MAINTENANCE SCHEDULE

If the machine is equipped with a hydraulic breaker, the maintenance schedule for some parts will be different.

Maintenance Schedule Chart

MAINTENANCE PROCEDURE	3-18
Initial 1000 Hours Maintenance (Only after the First 1000 Hours)	3-18
When Required	3-19
Check, Clean And Replace Air Cleaner Element	3-19
Clean Inside of Cooling System	3-24
Check and Tighten Track Shoe Bolts	3-27
Check and Adjust Track Tension	3-28
Replace Bucket Teeth (Vertical Pin Type)	3-30
Replace Bucket Teeth (Horizontal Pin Type)	3-33
Replace Bucket Side Cutter, Shroud	3-34
Adjust Bucket Clearance	3-35
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Check and Adjust Air Conditioner	3-37
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Check Before Starting	3-43
Every 50 Hours Maintenance	3-44
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Check Oil Level in Final Drive Case, Add Oil	3-48
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Check, Adjust Tension of Air Conditioner Compressor Belt	3-51
Every 500 Hours Maintenance	3-52
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Replace Fuel Pre-filter Cartridge	3-53
Check Swing Pinion Grease Level, Add Grease	3-56
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Replace Vent Element in Hydraulic Tank	3-61
Every 1000 Hours Maintenance	3-62
Replace Fuel Main Filter Cartridge	3-62
Replace Hydraulic Oil Filter Element	3-64
Change Oil in Swing Machinery Case	3-65
Check Oil Level in Damper Case, Add Oil	3-66
Check all tightening points of Engine Exhaust Pipe Clamps	3-66
Replace Corrosion Resistor Cartridge (If equipped)	3-67
Check Fan Belt and Alternator Drive Belt Tension, Replace	3-67
Replace Hydraulic Tank Additional Vent Element	3-68
Check Nitrogen Gas Charge Pressure in Accumulator (For Breaker)	3-68

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Every 2000 Hours Maintenance	3-69
Change Oil in Final Drive Case	3-69
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Checking Charge Pressure in Accumulator (For Control Circuit)	3-71
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Check Alternator, Starting Motor	3-74
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Check Vibration Damper	3-74
Every 4000 Hours Maintenance	3-75
Check Water Pump	3-75
Replace Accumulator (For Control Circuit)	3-76
Check High-pressure Piping Clamp, Hardening Of Rubber	3-77
Check Fuel Spray Prevention Cap, Hardening Of Rubber	3-77
Every 5000 Hours Maintenance	3-78
Change Oil In Hydraulic Tank	3-78
Every 8000 Hours Maintenance	3-79
Replace High-pressure Piping Clamp	3-79
Replace Fuel Spray Prevention Cap	3-79

Maintenance Interval for Hydraulic Breaker

For machine equipped with a hydraulic breaker, the hydraulic oil deteriorates faster than for normal bucket digging operations, so set the maintenance intervals as follows.

Replace Hydraulic Filter Element

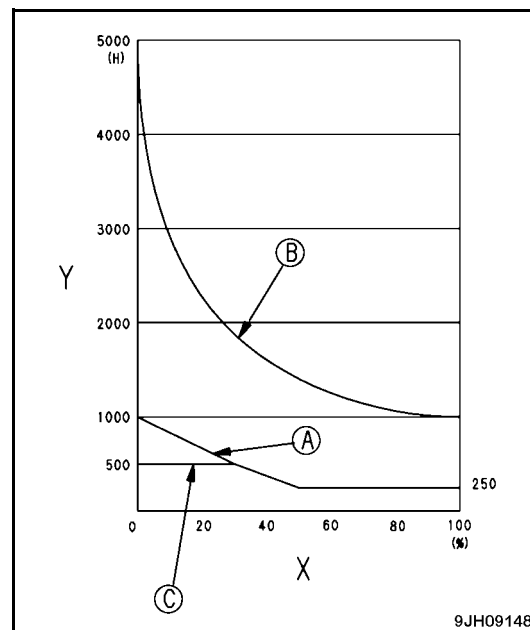
On a new machine, replace the element after the first 100 to 150 hours, then carry out further replacement of the element according to the table on the right.

Change Oil In Hydraulic Tank

Change the oil according to the table on the right.

Replacing Additional Filter Element for Breaker (If Equipped)

Use a guideline of 250 hours for use of the breaker (operating ratio for the breaker: 50% or more), and replace the element according to the table on the right.



X: Breaker operating ratio (%)

Y: Replacement interval (H)

(A): Hydraulic filter element

(B): Hydraulic oil

(C): Additional filter element

Remark

Breaker operating ratio 100% means that only the breaker is used Breaker operating ratio 0% means that the breaker is not used.

MAINTENANCE PROCEDURE

Initial 1000 Hours Maintenance (Only after the First 1000 Hours)

Carry out the following maintenance only after the first 1000 hours of operation on new machines.

- Check engine valve clearance, adjust

Special tools are needed for inspection and maintenance, so contact your Komatsu distributor. For details of the method of replacing or maintaining, see the section on EVERY 2000 HOURS SERVICE.

When Required

Check, Clean And Replace Air Cleaner Element

WARNING

If inspection, cleaning, or maintenance is done with the engine running, dirt will enter the engine and cause damage to the engine. Stop the engine before carrying out these operations.

Flying dirt could cause personal injury when using compressed air. Wear protective glasses, dust mask, or other protective equipment.

It is dangerous to pull the outer element out from the air cleaner body 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.

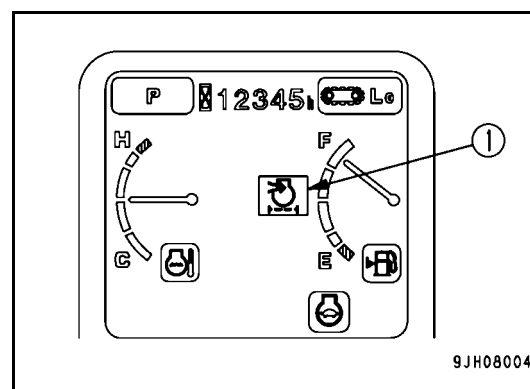
- Do not clean the air cleaner element until the air cleaner clogging monitor on the monitor panel flashes. If the element is cleaned frequently before the clogging monitor flashes, the air cleaner will not be able to display its performance fully, and the cleaning efficiency will also go down.
- In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.
- 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.

Checking

If air cleaner clogging monitor (1) of the monitor panel flashes, clean the air cleaner element.

Replacing

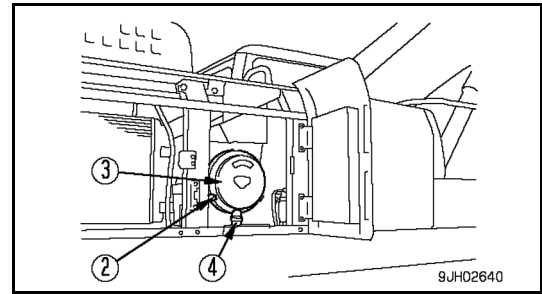
- Replacing element, O-ring
If one year has passed since installing the element or if air cleaner clogging monitor (1) on the monitor panel flashes immediately after the element is cleaned, replace the outer element, inner element, and O-ring.
- Replacing evacuator valve
Replace it if it is damaged or the rubber is markedly deformed.



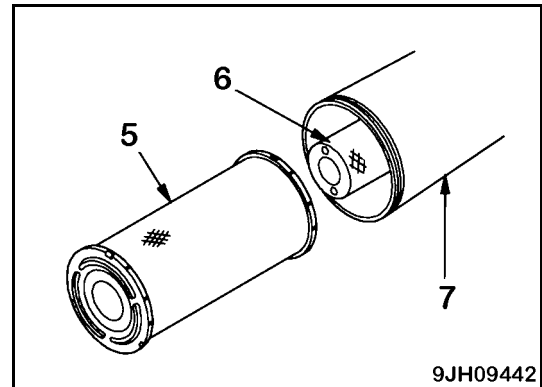
MAINTENANCE

Cleaning or Replacing Outer Element

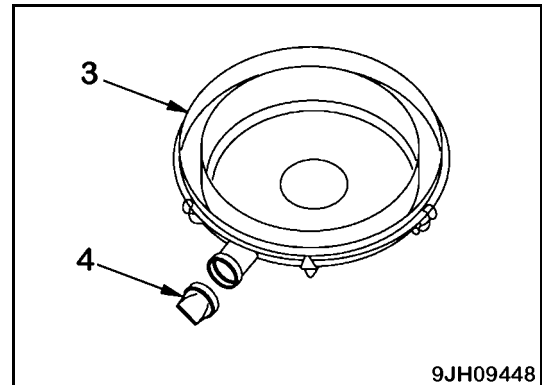
- Before and after cleaning the element, do not leave or keep it in direct sunlight.
- Open the right door of the machine, remove six hooks (2), then remove cover (3).
- Never remove the inner element (6). It will allow dirt to enter and cause failure of the engine.
- Do not use a screwdriver or other tool.



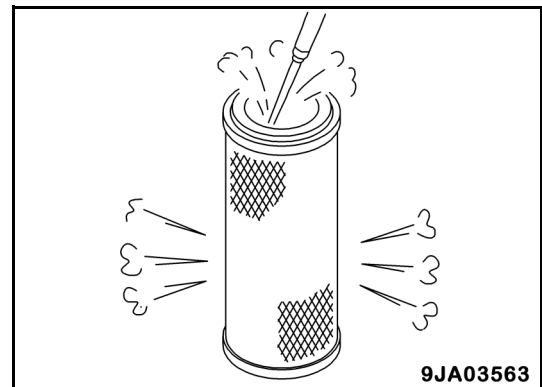
1. Hold the outer element (5), rock it lightly up and down and to the left and right, and rotate the element to the left and right to pull it out.
2. When the outer element (5) has been removed, check to be sure the inner element has not come out of position and is not at an angle. If it is at an angle, insert your hand and push it in straight.



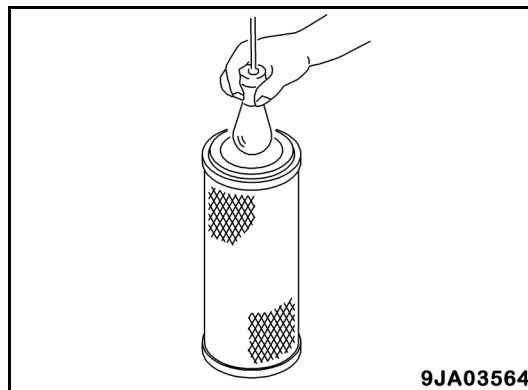
3. After removing the outer element (5), cover the inner element (6) with a clean cloth or tape to prevent dirt or dust from entering.
4. Wipe off or brush off the dirt stuck to cover (3) and the inside of the air cleaner body (7).
5. Remove any dirt or dust that is accumulated to evacuator valve (4) installed to cover (3).



- When cleaning the element, do not hit or beat it against anything.
6. Direct dry compressed air less than 7 kgf/cm (99.4 psi) to the outer element from inside along its folds, then direct it from outside along its folds and again from inside.
 - A. Replace the outer element which has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.
 - B. Replace both inner and outer elements when the monitor (1) lights up soon after installing the cleaned outer element even though it has not been cleaned six times.

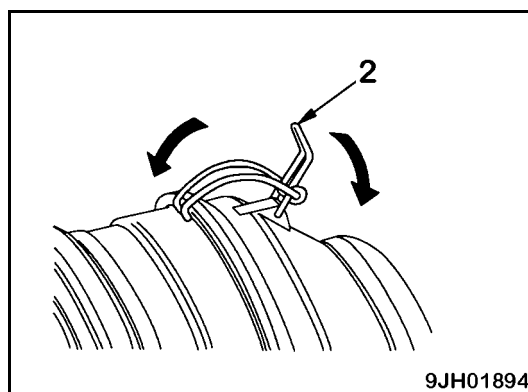


7. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.
8. Remove the cloth or tape covering inner element (6).
 - Do not use an element whose folds or gasket or seal are damaged.
 - If the element or O-ring are cleaned and used again after they have been used for more than one year, it will cause problems.
 - Do not use them again.
9. Check to be sure there is no dirt or oil stuck to the seal portion of the new element or cleaned element. Wipe off any dirt or oil.
10. Push the outer element in straight with your hand when installing it to the air cleaner body.

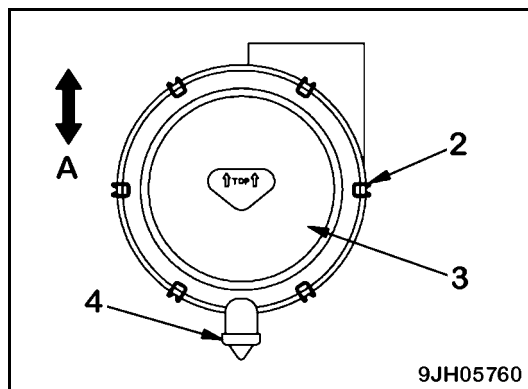


If the outer element is held and rocked lightly up and down and to the left and right while pushing it in, the outer element can be inserted easily.

- When inserting the element, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is assembled by force to hook (2), there is danger that the hook and air cleaner body may be damaged, so be careful when assembling.



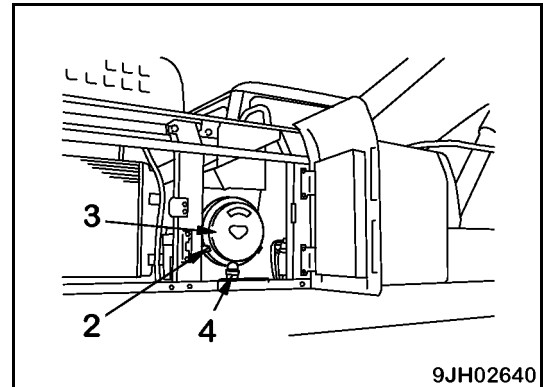
11. Install cover (3) as follows.
 - A. Align cover (3) with the element.
 - B. Hook the tip of hook (2) to the protruding part of the air cleaner body and lock it in position.
 - C. When locking hooks (2) in position, apply the hooks in turn on opposite sides (top, bottom, left, right) in the same way as when tightening bolts.
 - D. Always install cover (3) so that the evacuator (4) is facing ground (A).
 - E. When cover (3) is installed, check to be sure the clearance between the air cleaner body and cover (3) is not too large.
 - F. If it is too large, install again.



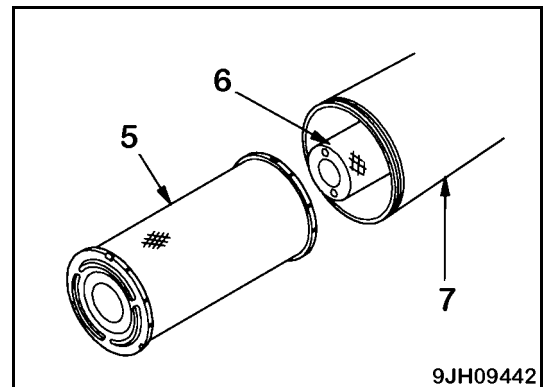
MAINTENANCE

Replacing Element

1. Open the right door of the machine, remove six hooks (2), then remove cover (3).



2. Hold the outer element (5), rock it lightly up and down and to the left and right, and rotate the element to the left and right to pull it out.
3. Do not remove inner element (6) when doing this.
4. When the outer element (5) has been removed, check to be sure the inner element has not come out of position and is not at an angle. If it is at an angle, insert your hand and push it in straight.

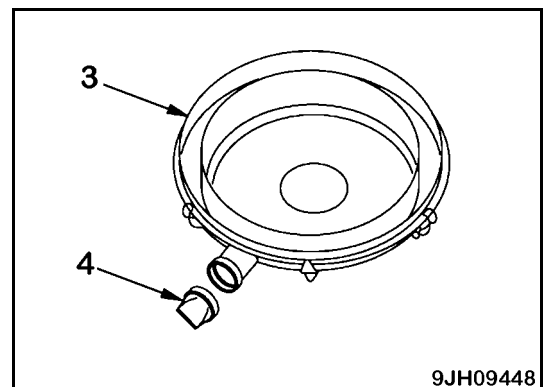


5. Wipe off or brush off the dirt stuck to cover (3) and the inside of the air cleaner body (7).
6. Remove any dirt or dust that is accumulated to evacuator valve (4) installed to cover (3).

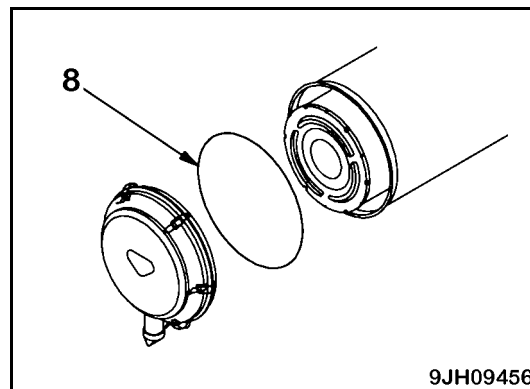
The inner element must not be cleaned and used again. When replacing the outer element, replace the inner element at the same time.

- If the inner element is not installed properly and the outer element and cover are installed, there is danger that the outer element will be damaged.
- The seal portion on imitation parts lacks precision, and allows the entry of dust, which leads to damage of the engine. Do not use such imitation parts.

7. Remove inner element (6), then quickly install the new inner element.
8. Insert the inner element securely so that it does not move.
9. Push the new outer element (5) in straight with your hand when installing it to the air cleaner body.
10. If the element is held and rocked lightly up and down and to the left and right while pushing it in, the element can be inserted easily.



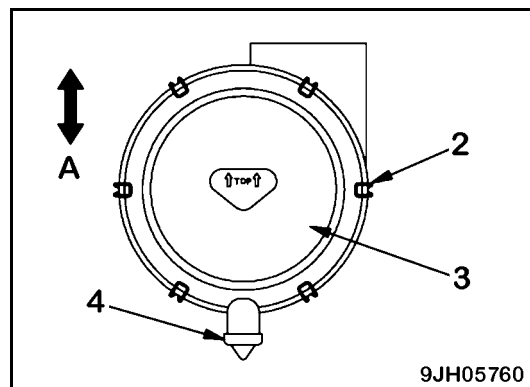
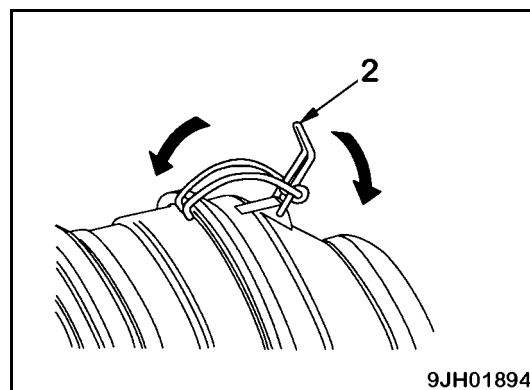
11. Replace O-ring (8) of cover (3) with a new part.



- When inserting the element, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is assembled by force to hook (2), there is danger that the hook and air cleaner body may be damaged, so be careful when assembling.

12. Install cover (3) as follows.

- Align cover (3) with the element.
- Hook the tip of hook (2) to the protruding part of the air cleaner body and lock it in position.
- When locking hooks (2) in position, apply the hooks in turn on opposite sides (top, bottom, left, right) in the same way as when tightening bolts.
- Always install cover (3) so that the evacuator (4) is facing ground (A).
- When cover (3) is installed, check to be sure the clearance between the air cleaner body and cover (3) is not too large.
- If it is too large, install again.



MAINTENANCE

Clean Inside of Cooling System

WARNING

Immediately after the engine is stopped, the coolant is hot and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a danger of burns. Wait for the temperature to cool, then turn the cap slowly to release the pressure before removing it.

Cleaning is done with the engine running. When getting up or leaving the operator's seat, set the safety lock lever to the LOCK position.

For details of starting the engine, "Pre-operational Checks" on page 2-76.

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.

Antifreeze coolant	Interval of cleaning inside of cooling system and changing antifreeze coolant	Replacing corrosion resistor (If equipped)
Komatsu supercoolant (AF-NAC)	Every two years or every 4000 hours whichever comes first	Unnecessary
Permanent type antifreeze (All-season type, *)	Every year (autumn) or every 2000 hours whichever comes first.	**Every 1000 hours and when cleaning the inside of the cooling system and when changing coolant.

*Permanent type antifreeze shall meet the requirements of ASTM D-4985.

**If machine is not equipped with corrosion resistor, Komatsu supercoolant must be used.

Stop the machine on level ground when cleaning or changing the coolant.

The coolant has the important function of preventing corrosion as well as preventing freezing.

Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.

Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for two years or 4000 hours.

Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.

When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor.

When no corrosion resistor is used, use the special cover (600-411-9000). Please consult your Komatsu distributor about the method of installing.

To maintain the anticorrosion properties of Supercoolant (AF-NAC), always keep the density of Supercoolant between 30% and 68%.

When deciding the ratio of antifreeze to water, check the lowest temperature in the past, and decide from the mixing table given below.

It is actually better to estimate and temperature about 10°C (18°F) lower when deciding the mixing ratio.

The mixing ratio depends on the ambient temperature, but it should always be a minimum of 30% by volume (antifreeze/total amount of coolant x 100).

The freezing temperature of undiluted antifreeze is -15°C (5°F). Do not store undiluted antifreeze at a temperature of below -15°C (5°F).

Mixing Rate Of Water And Antifreeze

Min. ambient temperature	°C	-10	-15	-20	-25	-30	-35	-40
	°F	14	5	-4	-13	-22	-31	-40
Amount of antifreeze	liters	9.6	11.5	13.1	14.7	16.0	17.3	18.6
	US gal	2.54	3.04	3.46	3.88	4.23	4.57	4.91
Amount of distilled water	liters	22.4	20.5	18.9	17.3	16.0	14.7	13.4
	US gal	5.92	5.42	4.99	4.57	4.23	3.88	3.54
Volume ratio (%)		30	36	41	46	50	54	58

WARNING

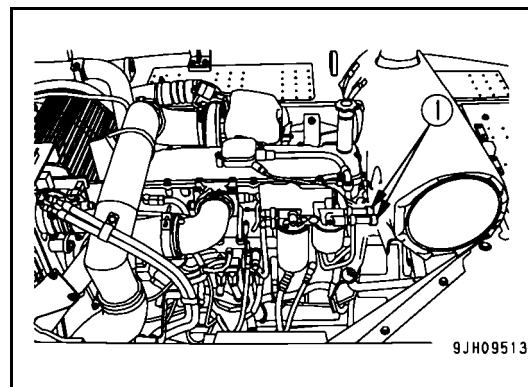
Antifreeze is toxic. When removing the drain plug, be careful not to get coolant containing antifreeze on you. If it gets in your eyes, flush your eyes with large quantities of fresh water and see a doctor at once.

We recommend use of an antifreeze density gauge to control the mixing proportions.

Prepare a container whose capacity is larger than the specified coolant volume to catch drained coolant.

Prepare a hose to supply antifreeze coolant and water.

1. Stop the engine and turn valve (1) of the corrosion resistor fully to the right to close it. (Only machines equipped with corrosion resistor)



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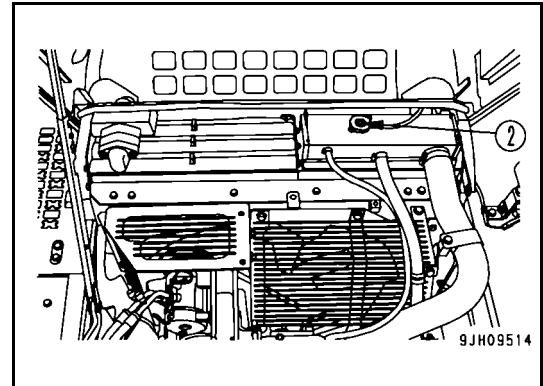
MAINTENANCE

- Be sure the cooling system and coolant are cold, do not run the engine to warm the coolant.

Remark

Always drain the coolant when the engine and coolant is cold.

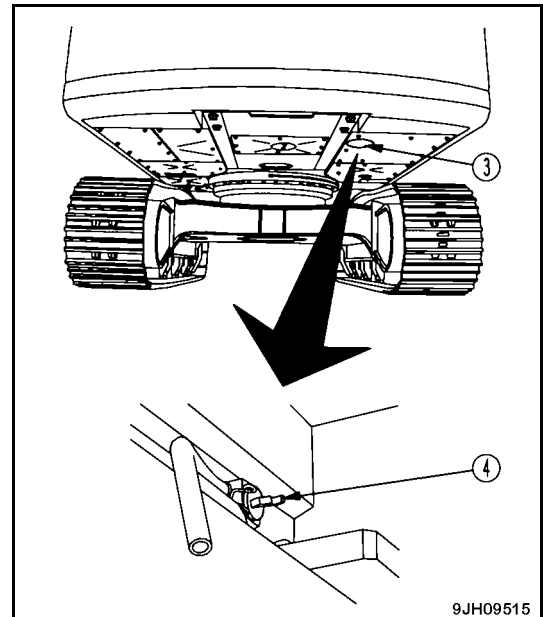
- Remove radiator cap (2), turn it until it contacts the stopper, then remove it.



- Remove the cover (3), then set the container under drain valve (4) to catch the coolant mixture.
- Open drain valve (4) at the bottom of the radiator and drain the coolant.
- After draining the antifreeze solution, close drain valve (4), then fill with clean water. After the radiator is filled with water, start and run the engine at low idle speed. After the water temperature rises above 90°C (194°F), run the engine for about 10 minutes.
- Stop the engine and allow the engine to cool down completely. Open drain valve (4) to drain the water.
- After draining the water, flush the cooling system again.

For the cleaning, use only approved Komatsu Cooling System Flush, (Restore and Restore Plus by Fleet guard) follow the instruction on the flushing solution.

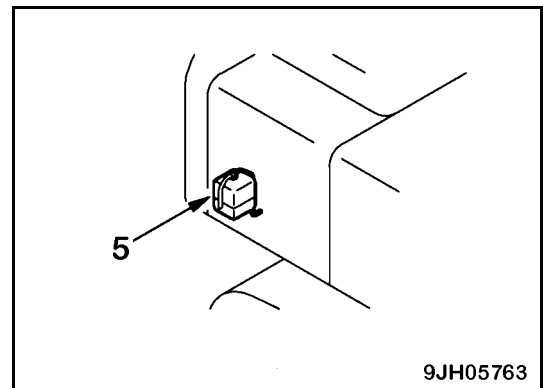
- Close drain valve (4).
- Install the cover (3).
- Replace the corrosion resistor, then turn the valve (1) fully to the left to open it. (Only machines equipped with corrosion resistor)



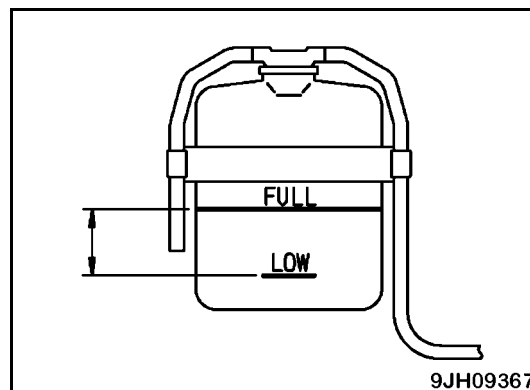
- Add coolant mixed with antifreeze until it overflows from the water filler. Decide the proportions of antifreeze and water according to the table for the mixing rate of water and antifreeze.

Run the engine at low idling for 5 minutes to remove the air from the water, then run at high idling for 5 minutes. (Leave radiator cap (2) removed when doing this.)

- Drain the coolant from sub-tank (5), clean the inside of the sub-tank, then add water until the coolant level is between the FULL and LOW marks.



14. Stop the engine, wait for approximately 3 minutes, then add coolant until the coolant level is near the coolant filler port, and tighten the cap. Check the coolant level and add coolant if necessary.

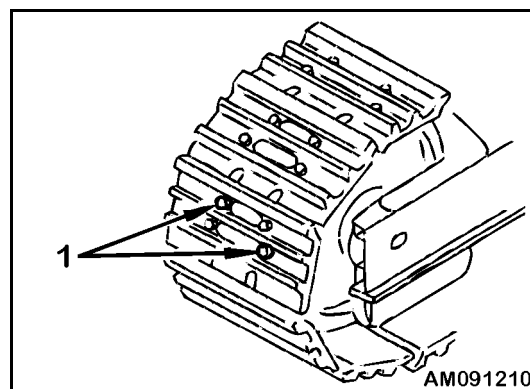


Check and Tighten Track Shoe Bolts

If the machine is used with loose track shoe bolts (1), they will break, so tighten any loose bolts immediately.

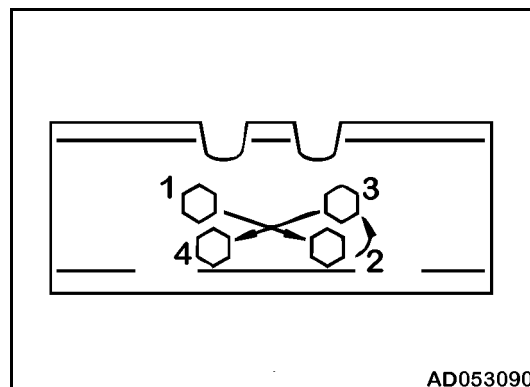
Tightening Track Shoe Bolts

1. First tighten to a torque of $392 \pm 39 \text{ N}\cdot\text{m}$ ($289 \pm 28 \text{ ft}\cdot\text{lb}$) then check to be sure the nut and shoe are in close contact with the link contact surface.
2. After checking, tighten further $120^\circ \pm 10^\circ$.



Order For Tightening

Tighten the bolts in the order shown in the diagram on the right. After tightening, check to be sure the nut and shoe are in close contact with the link mating surface.



MAINTENANCE

Check and Adjust Track Tension

! WARNING

For details of starting the engine and operating the work equipment, "Starting the Engine" on page 2-92, "Warming Up Engine" on page 2-96, and "Work Equipment Overview" on page 2-125.

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.

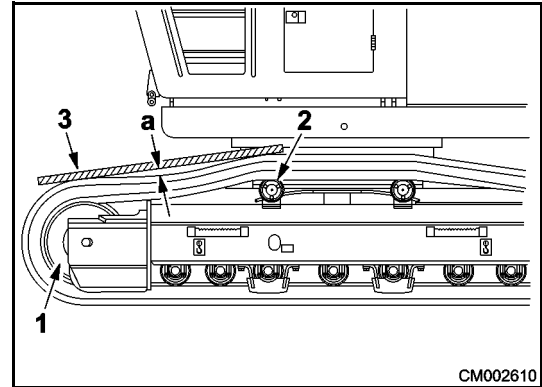
Stop the machine on firm, horizontal ground when carrying out the inspection and maintenance.

Checking

1. Run the engine at low idle, move the machine forward a distance equal to the length of track on the ground, then stop the machine.
2. Choose wooden block (3) that will reach from idler (1) to carrier roller (2), then place 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 $a = 10$ to 30 mm (0.4 to 1.2 in).

- If the track tension is not at the standard value, adjust it in the following manner.



Adjustment

! WARNING

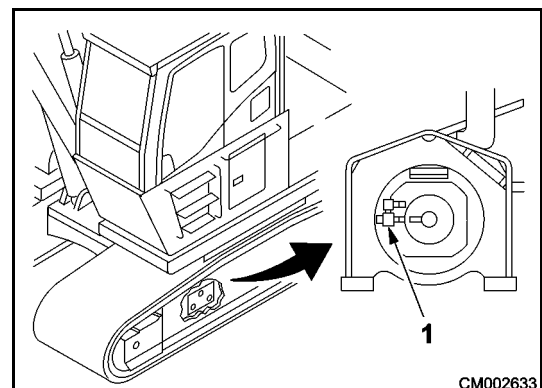
There is danger of plug (1) flying out under the high internal pressure of the grease. Never loosen plug (1) more than one turn.

Never loosen any part other than plug (1). Never put your face in the mounting direction of plug (1).

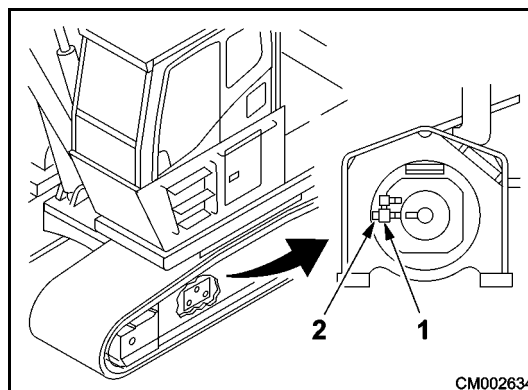
If the track tension cannot be loosened with the procedure given here, please contact your Komatsu distributor.

Increasing Track Tension

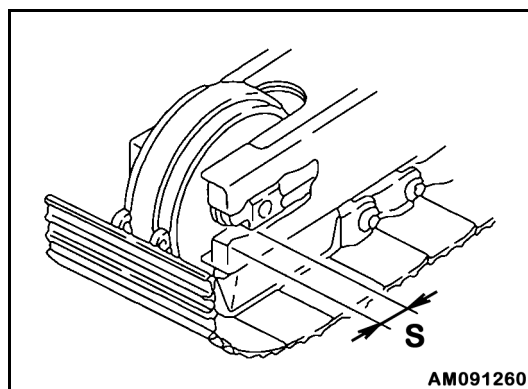
1. Prepare a grease pump.



2. Pump in grease through grease fitting (2) with a grease pump. (Grease fitting (2) forms one part with plug (1).)
3. To check if the tension is correct, run the engine at low idle, move the machine slowly forward (by an amount equal to the length of track on ground), then stop the machine.
4. Check the track tension again, and if the tension is not correct, adjust it again.



5. Continue to pump in grease until dimension (S) becomes zero (0). If the tension is still loose, the pin and bushing are excessively worn, so they must be either turned or replaced. Contact your Komatsu distributor for repairs.



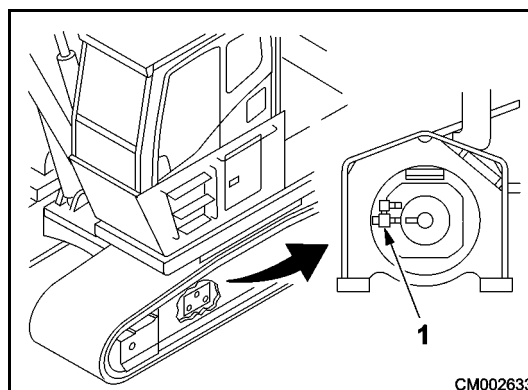
Loosening Track Tension

! 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.

- A. Loosen plug (1) gradually to release the grease.
- B. Turn plug (1) a maximum of one turn.
- C. If the grease does not come out smoothly, move the machine forwards and backwards a short distance.
- D. Tighten plug (1).
- E. To check if the tension is correct, run the engine at low idle, move the machine slowly forward (by an amount equal to the length of track on ground), then stop the machine.
- F. Check the track tension again, and if the tension is not correct, adjust it.



MAINTENANCE

Replace Bucket Teeth (Vertical Pin Type)

Replace the point before the adapter starts to wear.

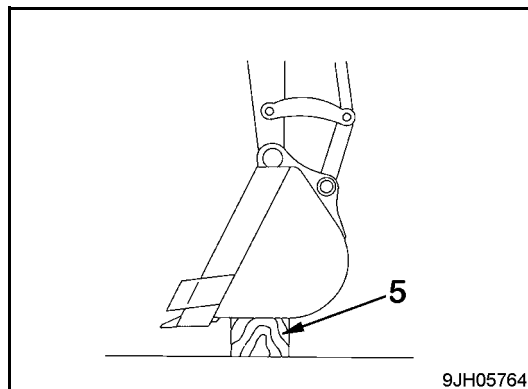
WARNING

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.

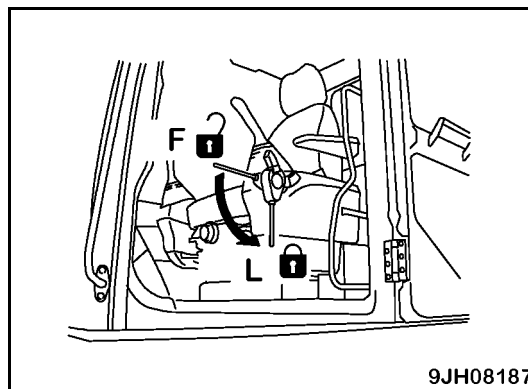
If the locking pin is knocked out with excessive force, there is a danger that the pin may fly out. Check to be sure there is no one in the surrounding area.

Pieces will often fly during the replacement operation, so always wear safety glasses, gloves, and other protective equipment.

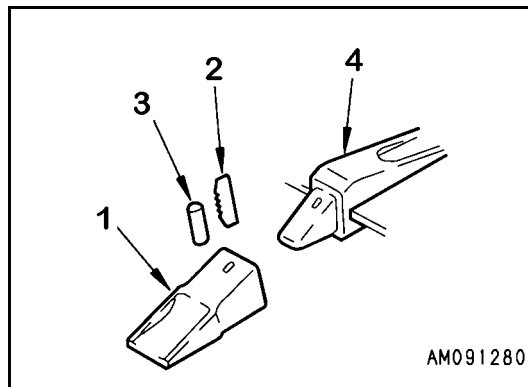
1. To make it possible to knock out the pin of tooth (1), set the bottom surface of the bucket on a block, check to be sure the work equipment is in a stable condition, then



2. Set the safety lock lever to the LOCK position. Set so that the bottom face of the bucket is horizontal.

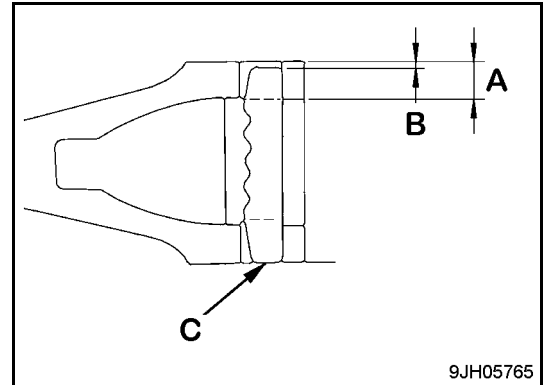


3. Use a hammer and drift to knock out lock pin (2). (If the drift is set against rubber pin lock (3) when it is hit, the rubber pin lock may break. Set it against the back of the pin.)
4. After removing lock pin (2) and rubber pin lock (3), check them.

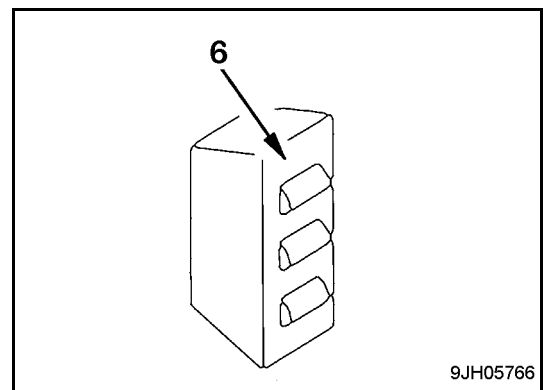


If the lock pins and rubber pin locks with the following defects are used, the teeth may come off the bucket. Replace them with new ones.

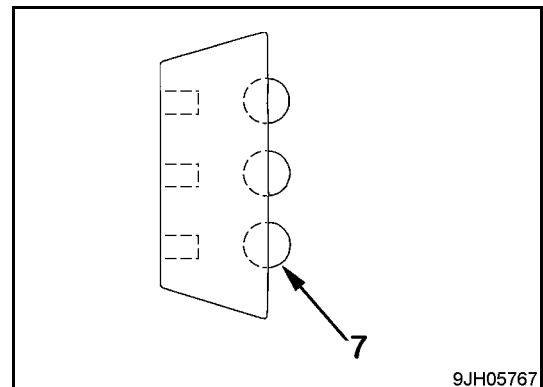
- The lock pin is too short.
Dimension (B) is 1/3 or more of dimension (A) when locking pin (2) is aligned with bottom face (C).



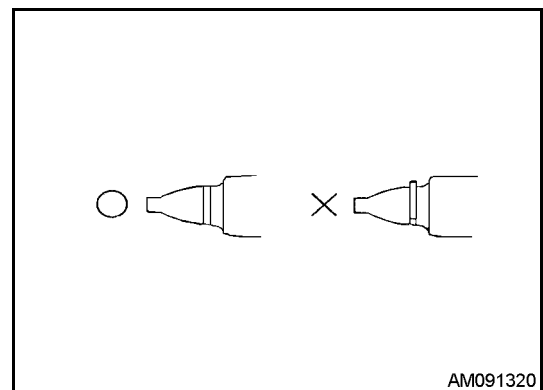
- The rubber (6) of the rubber pin lock is torn, and the steel balls may come out.



- The steel balls (7) are buried when they are pressed by hand.
5. Clean the adapter surface (4) and remove the soil with a knife.

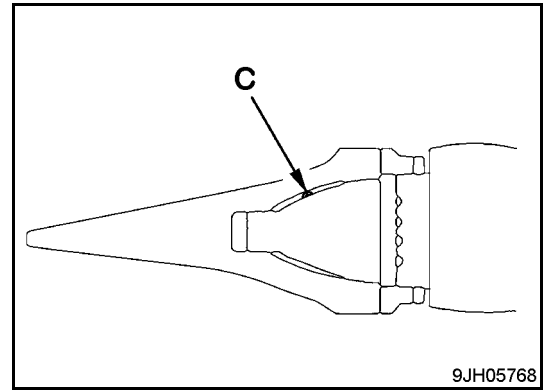


6. Use your hand or a hammer to push the rubber in lock (3) into the adapter hole. When doing this, be careful that the rubber pin lock does not fly off of the adapter surface.
7. Clean the inside of teeth, then install it to adapter (4). If there is mud stuck to it or if there are protrusions, the teeth will not enter the adapter properly, and there will not be proper contact at the mating portion.

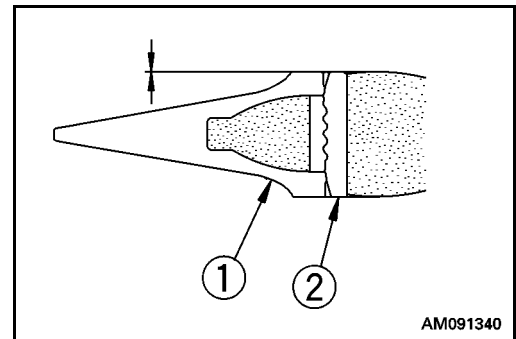


MAINTENANCE

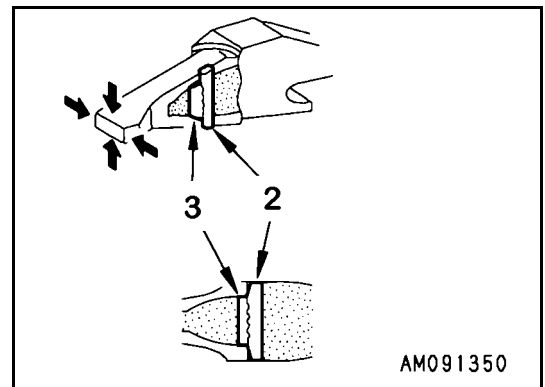
8. Fit teeth (1) to adapter (4), and confirm that when the pointer is pressed firmly, the rear face of the hole for the pin of the teeth (1) is at the same level as the rear face of the hole for the pin of the adapter. If the rear face of the hole for the pin of teeth (1) is protruding to the front from 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).



9. 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).
10. After replacing a bucket tooth, always check the following.
- A. After the lock pin has been knocked in completely, check to be sure it is secured by the point and surface.



- B. Lightly hit lock pin (2) in the reverse direction from which it was hit in.
- C. Lightly hit the tip of the point from above and below, and hit its sides from right and left.
- D. Confirm that rubber in lock (3) and lock pin (2) are set as shown in the figure.



Remark

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 teeth before the wear reaches the adapter.

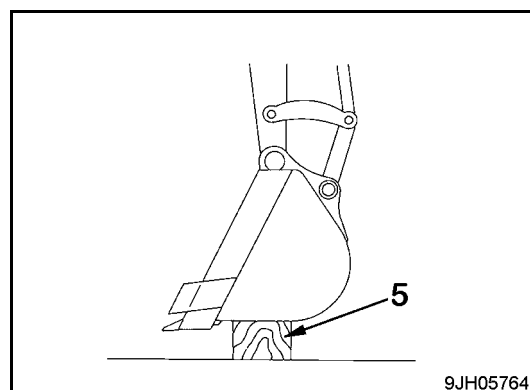
WARNING

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.

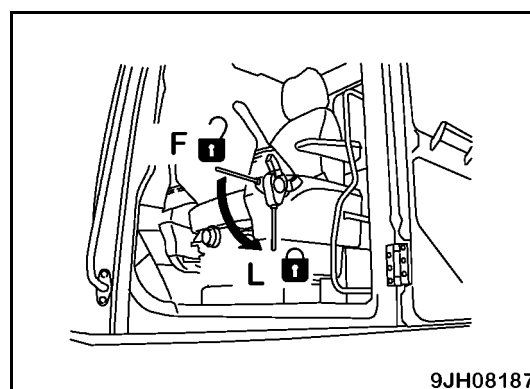
If the locking pin is knocked out with excessive force, there is a danger that the pin may fly out. Check to be sure there is no one in the surrounding area.

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 pin (1) of tooth (2), put block (5) under the bottom of the bucket, and set so that the bottom surface of the bucket is horizontal.



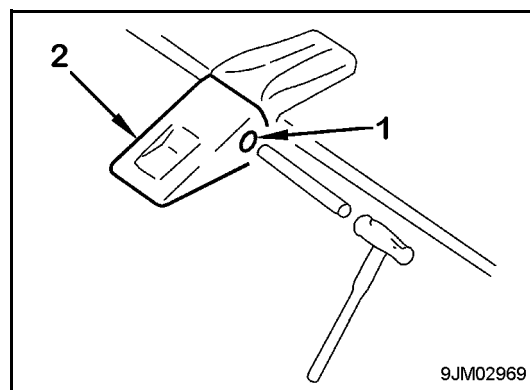
2. Check to be sure the work equipment is in a stable condition, then set the lock lever to the **LOCK** position.



3. Place a bar on the head of pin (1), hit the bar with a hammer to knock out the pin, then remove tooth (2).

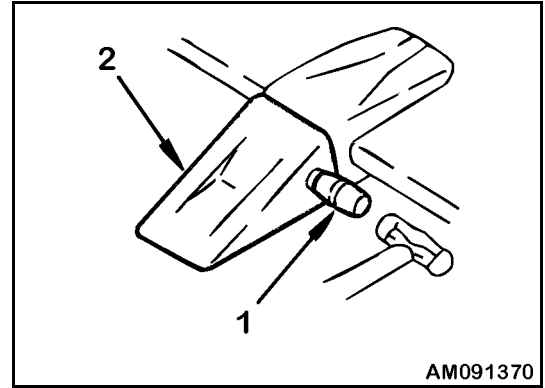
Remark

If the bucket teeth cannot be safely removed by this method, have your Komatsu distributor replace the bucket teeth.



MAINTENANCE

4. 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.

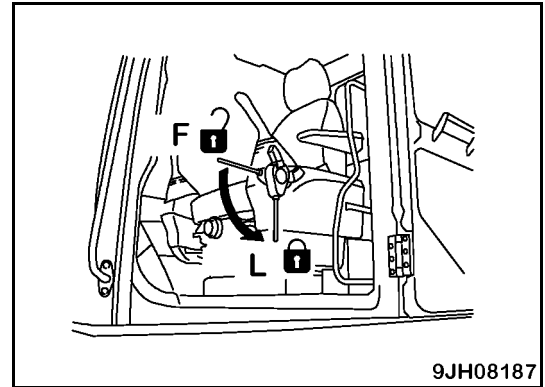


Replace Bucket Side Cutter, Shroud

WARNING

It is dangerous if the work equipment is mistakenly moved when replacing the bucket side cutters and shroud.

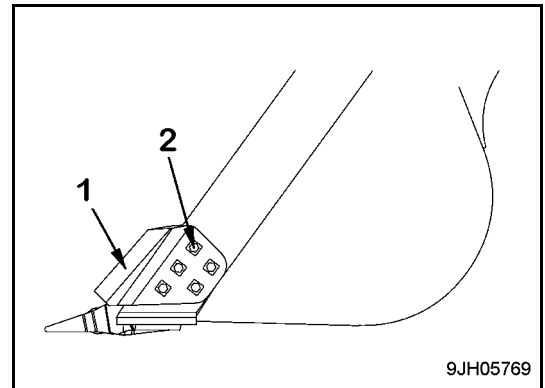
Set the work equipment in a stable condition, stop the engine, then set lock lever securely to the LOCK position (L).



Side Cutters

Loosen mounting bolts (2), then remove side cutter (1). Replace the side cutter, bolts, and nuts with new parts.

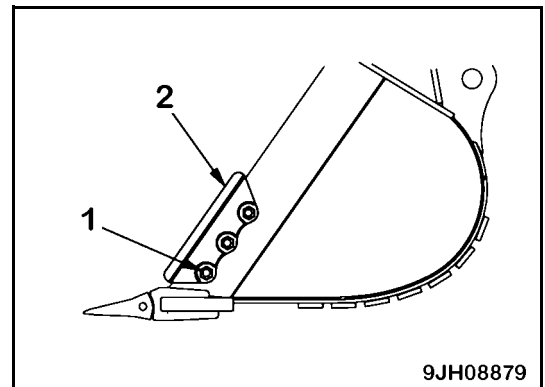
Torque of bolt: 1370 - 1670 N•m (1010 - 1232 ft/lb)



Shroud

Loosen the mounting bolts (1) and remove the shroud (2). Replace the nuts, bolts, and washers with new parts.

Tightening torque of bolt: "TIGHTENING TORQUE SPECIFICATIONS" on page 3-12

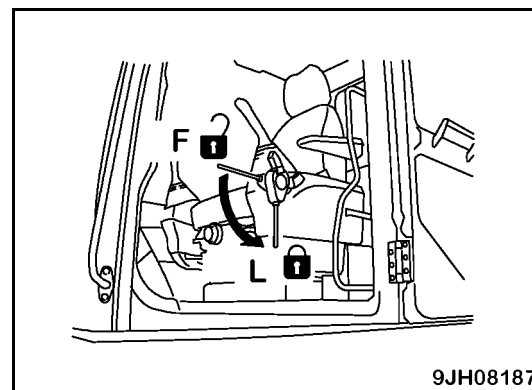


Adjust Bucket Clearance

WARNING

It is dangerous if the work equipment is mistakenly moved when adjusting the bucket clearance.

Set the work equipment in a stable condition, stop the engine, then set safety lock lever securely to the LOCK position (L).



Arm (6)

Bucket (7)

1. Set the work equipment in the position shown in the diagram on the right, then stop the engine and set the lock lever to the LOCK position.

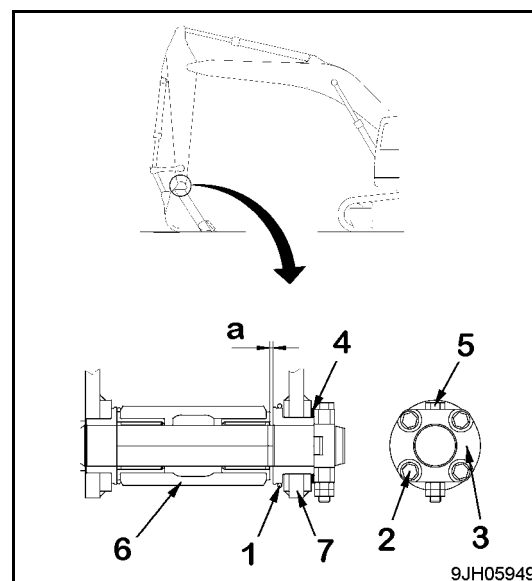
2. Shift O-ring (1) and measure the amount of play "a".

Measurement is easier if you move the bucket to one side so that all the play can be measured at one place (the left side in the diagram). Use a clearance gauge for easy and accurate measurement.

3. Loosen 4 plate mounting bolts (2), and loosen plate (3).

The shim is a split type, so the operation can be carried out without removing the bolts.

4. Remove shim (4) corresponding to the amount of play "a" measured above.



[Example]

In the case of play of 3 mm (0.118 in), remove two 1.0 mm (0.039 in) shims and one 0.5 mm (0.020 in) shim. Play becomes 0.5 mm (0.020 in). For shim (4), two types of 1.0 mm (0.039 in) and 0.5 mm (0.020 in) are used.

When play "a" is smaller than one shim, do not carry out any maintenance.

5. Tighten the four bolts (2).

If the bolts (2) are too stiff to tighten, pull out pin stopper bolt (5) for easier tightening.

MAINTENANCE

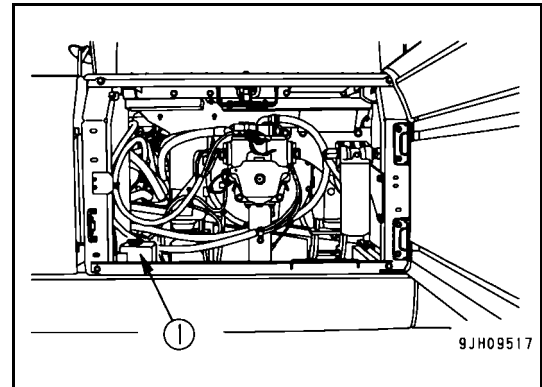
Check Window Washer Fluid Level, Add Fluid

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 ambient 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 (14° F)
Winter in cold region	Pure washer fluid 1/2: water 1/2	- 20° C (-4° F)
Winter in extremely cold region	Pure washer fluid	-30° C (-22° F)

Pure washer fluid comes in two types: for -10° C (14° F) (for general use) and for -30° C (-22° F) (cold regions).

Use pure washer fluid according to operation area and season.

Check and Adjust Air Conditioner

- For air conditioner service, contact your Komatsu dealer.

Inspection and maintenance items	Contents	Maintenance interval
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

Remark

Be careful when pressure washing the condenser fins, the high pressure water may damage the fins.

MAINTENANCE

Cleaning Cab Floor

WARNING

When setting the machine at an angle, use strong blocks to stabilize the machine and be extremely careful when doing this.

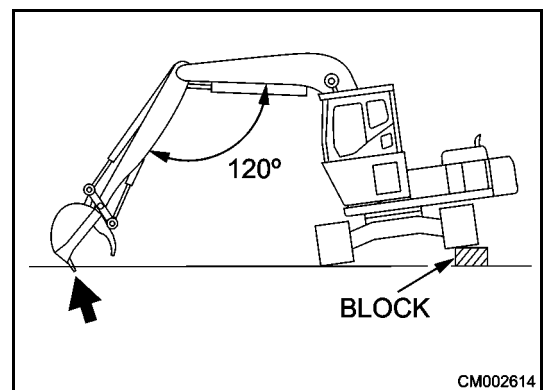
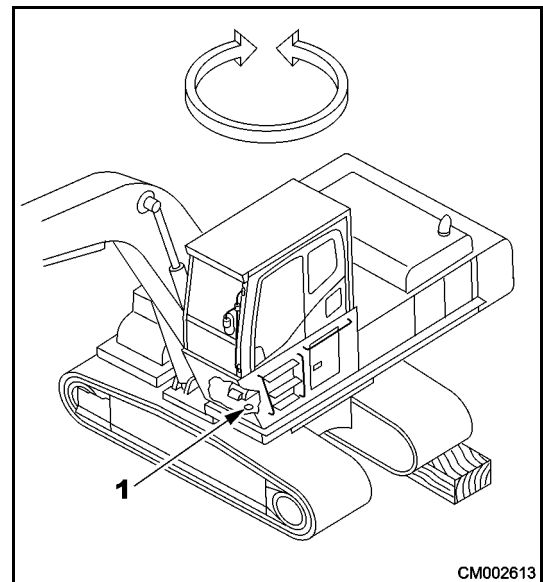
If the control levers are touched by mistake, the work equipment or machine may suddenly move, and this may lead to a serious accident. Set the safety lock lever securely to the LOCK position before getting up from the operator's seat.

- When cleaning the floor, be careful not to get water on the monitor and connectors inside the operator's cab.
- Never spray water above the pedestal of the operator's seat (2).

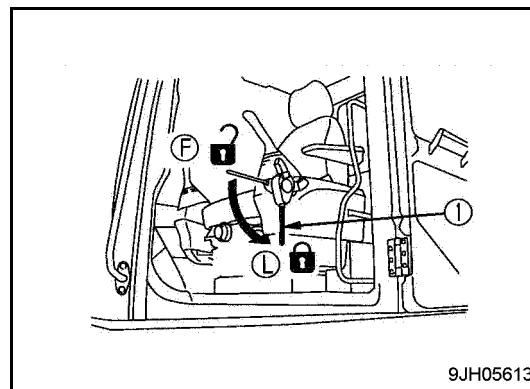
With the washable floor, it is possible to flush out the dirt on the cab floor directly with water.

Washing

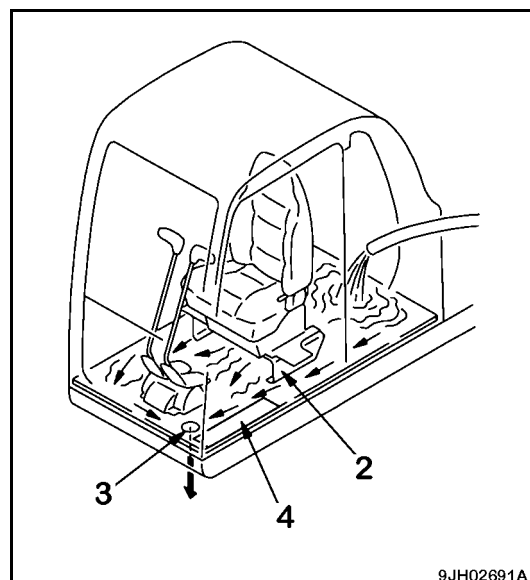
1. Set the machine at an angle.
2. Swing the upper structure slowly so that the water drain holes (3) in the cab floor are at a low position.
3. Lower the work equipment to the ground and set the machine in a stable condition.



4. Set the safety lock lever to the LOCK position, then stop the engine.
5. Remove the floor mat holder plate (4).
6. Remove the floor mat.
7. Remove the cap from water drain port (3).



8. Flush out the dirt on the floor directly with water through water drain hole (1).
9. After completing the washing operation, install cap in drain port (3) the floor mat and holder plate (4).



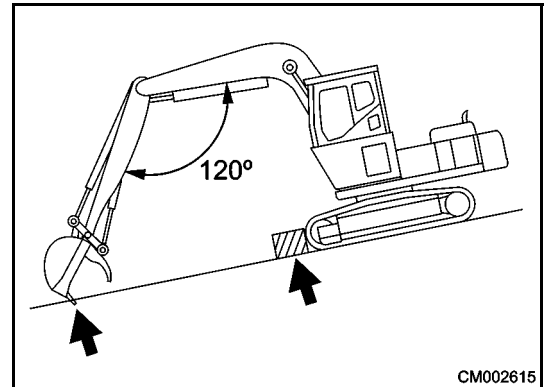
MAINTENANCE

Setting Machine at an Angle

Using A Slope

WARNING

- Select a solid and smooth slope.
 - Always put blocks under the track to prevent the machine from moving, and dig the work equipment into the ground.
-
1. Stop the machine so that the work equipment is on the downhill side.
 2. Put blocks under the track and dig the work equipment into the ground.

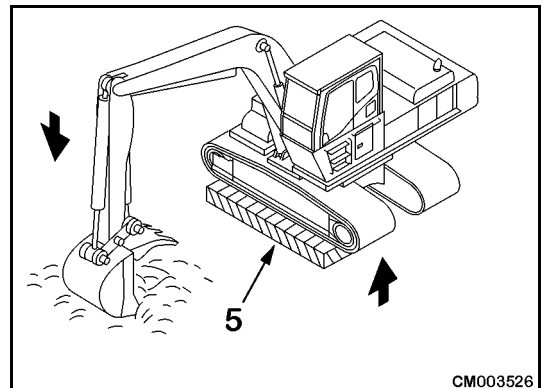
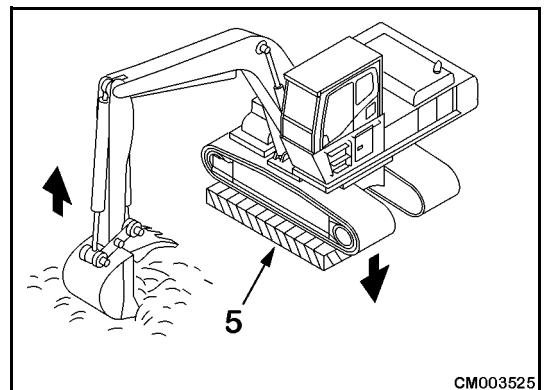


Using A Block

WARNING

- Select a firm flat place.
 - Put strong blocks (5) under the undercarriage to stabilize the machine and be extremely careful when carrying out the operation.
-

1. Raise the chassis with the boom and arm.
2. When doing this, operate the levers slowly.
3. Insert block (5) under the raised track to make the machine stable.
4. Raise the boom slowly and lower the machine. When doing this, check to be sure the machine is always stable.

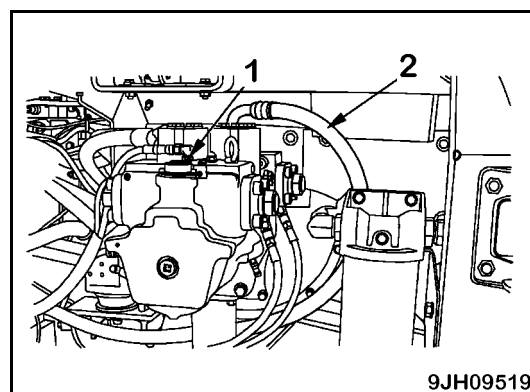


Bleeding Air From Hydraulic System

For details, "Starting the Engine" on page 2-92.

1. Bleeding air from pump

- A. Loosen air bleed plug (1) and check if oil oozes out.
- B. If the oil does not ooze out, remove the drain hose from the hydraulic pump case and fill the pump case completely with hydraulic oil through drain port (2). Hold the removed hose firmly, keeping the fitting higher than the oil level in the hydraulic tank so that oil will not spill out of the hose.
- C. After air bleeding is completed, first tighten air bleed plug (1) and then install the drain hose.



- If the drain hose is installed first, oil will spurt out of air bleed plug (1). If the pump is run when the pump case is not full of oil, there will be abnormal generation of heat, and this will lead to premature failure of the pump.
- ### 2. Starting engine
- Start the engine. For details, "Starting the Engine" on page 2-92.
- Run the engine at low idle for ten minutes after starting, then start operations.

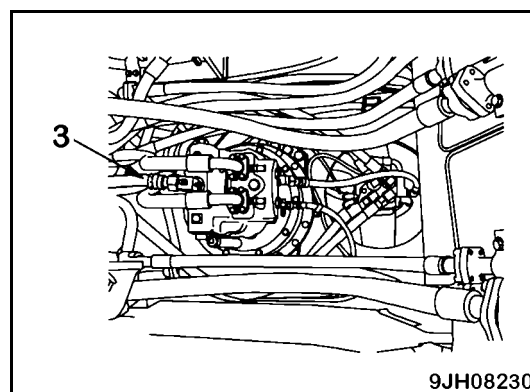
3. Bleeding air from cylinders

- A. Run the engine at a low idle and extend and retract the cylinders four to five times to a point 100 mm (3.9 in) from the end of the stroke. (Be careful not to operate to the end of the stroke.)
- B. Next, operate each cylinder three to four times to the end of its stroke.
- C. Finally, operate each cylinder four to five times to the end of its stroke to completely remove the air.

- 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. Do not operate the swing at this time.

4. Bleeding air from swing motor

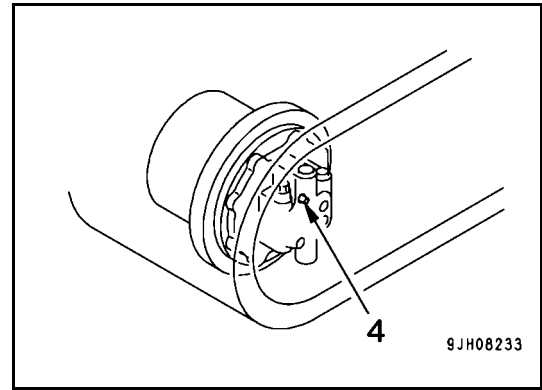
- A. Run the engine at low idling, loosen hose (3) at port S, and check to be sure oil oozes out from port S hose (3).
 - Do not operate the swing under any circumstances.
- B. If oil does not ooze out, stop the engine, remove port S hose (3), and fill the inside of the motor case with hydraulic oil.
- C. After completely bleeding the air, tighten port S hose (3).
- D. Run the engine at low idle and slowly swing at least two times uniformly to the left and right. This will automatically bleed the air.



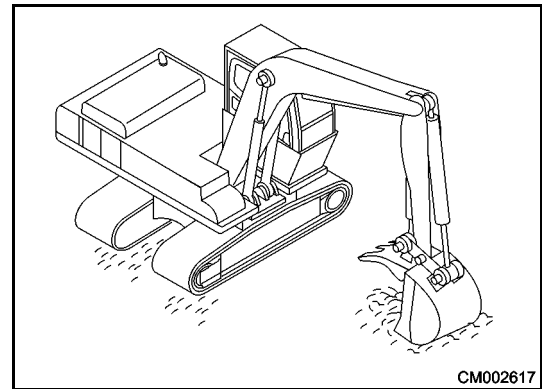
- If the air is not bled from the swing motor, the motor bearings may be damaged.
- When replacing the travel motor safety valve, please contact your Komatsu distributor to have it replaced and to have the air bled.

MAINTENANCE

5. Bleeding air from travel motor
(Bleed the air only when the oil inside the travel motor case has been drained.)
 - A. Run the engine at low idling, loosen air bleeder (4), and tighten it when oil flows out.



- B. Run the engine at low idle and swing the work equipment 90° to bring it to the side of the track.
 - C. Jack up the machine until the track is raised slightly from the ground. Rotate the track under no load for two minutes.
 - D. Repeat this procedure on both the left and right sides.
 - E. Bleeding air from attachment (when installed)



If a breaker or other attachment has been installed, run the engine at low idle and operate the attachment pedal (approximately ten times) until the air has been bled from the attachment circuit.

- If the method of bleeding the air from the attachment itself is specified by the manufacturer, bleed the air according to the specified procedure.
- After completing the air bleeding operation, stop the engine, and leave the machine for five minutes before starting operations.
- This will remove the air bubbles in the oil inside the hydraulic cylinders.
- Check to be sure there is no leakage of oil and wipe off any oil that has been spilled.
- After completing the air bleeding operation, inspect the oil level, and if the oil level is low, add oil.

Check Before Starting

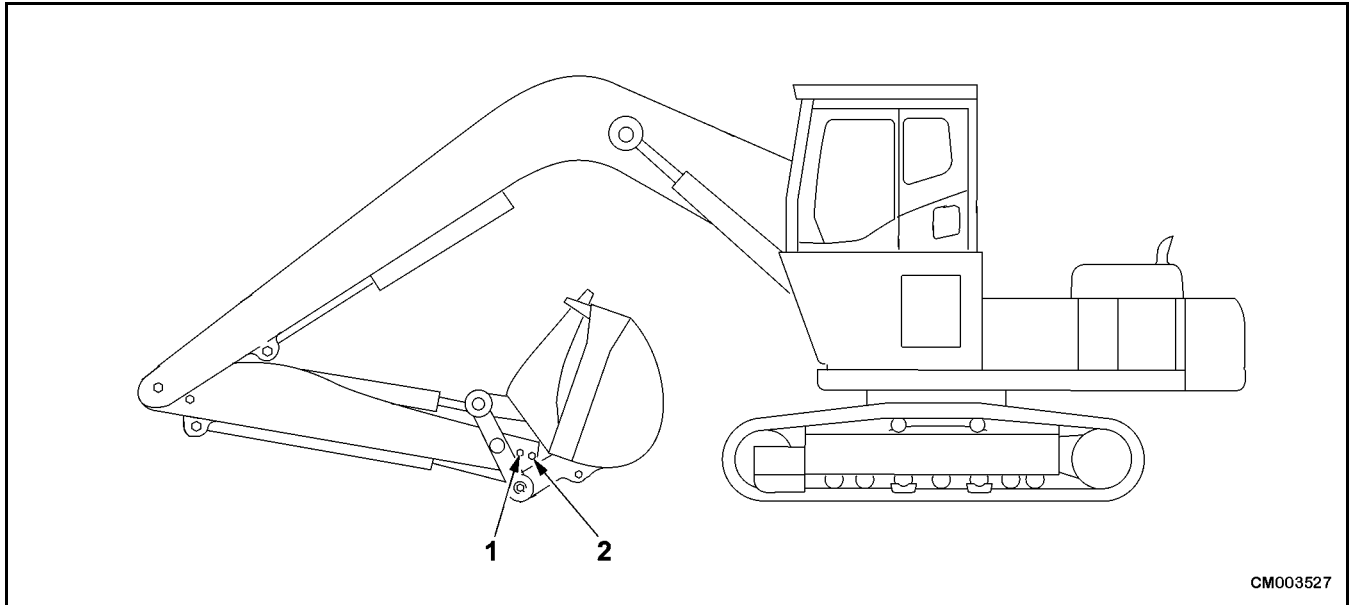
For details of the following items:

- Check coolant level, add coolant
- Drain water and sediment from fuel tank
- Check for water and sediment in water separator, drain water
- Check oil level in hydraulic tank, add oil
- Check oil level in engine oil pan, add oil
- Check electric wiring
- Check fuel level, add fuel
- Check working lamp switch
- Check function of horn

MAINTENANCE

Every 50 Hours Maintenance

Lubricating Road Builder

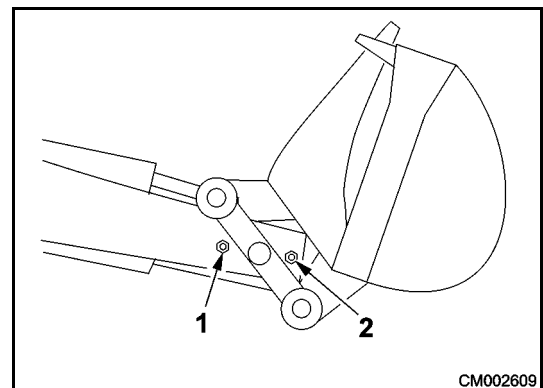
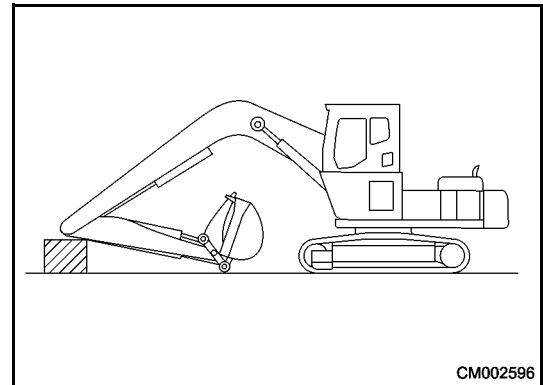


Remark

If any abnormal noise is generated from these points carry out greasing procedures regardless of interval timing. For new machines, grease every ten hours for the first 50 hours of operation.

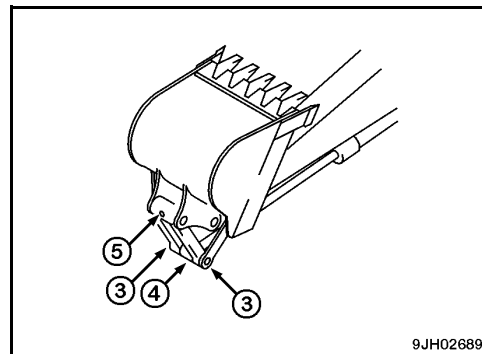
Always grease the pins before and after using in wet locations.

- Set the work equipment in the greasing posture below, then stop the engine.
- Using a grease pump, pump in grease through the grease fittings shown by the arrow.
- After greasing, wipe off any old grease that was pushed out.



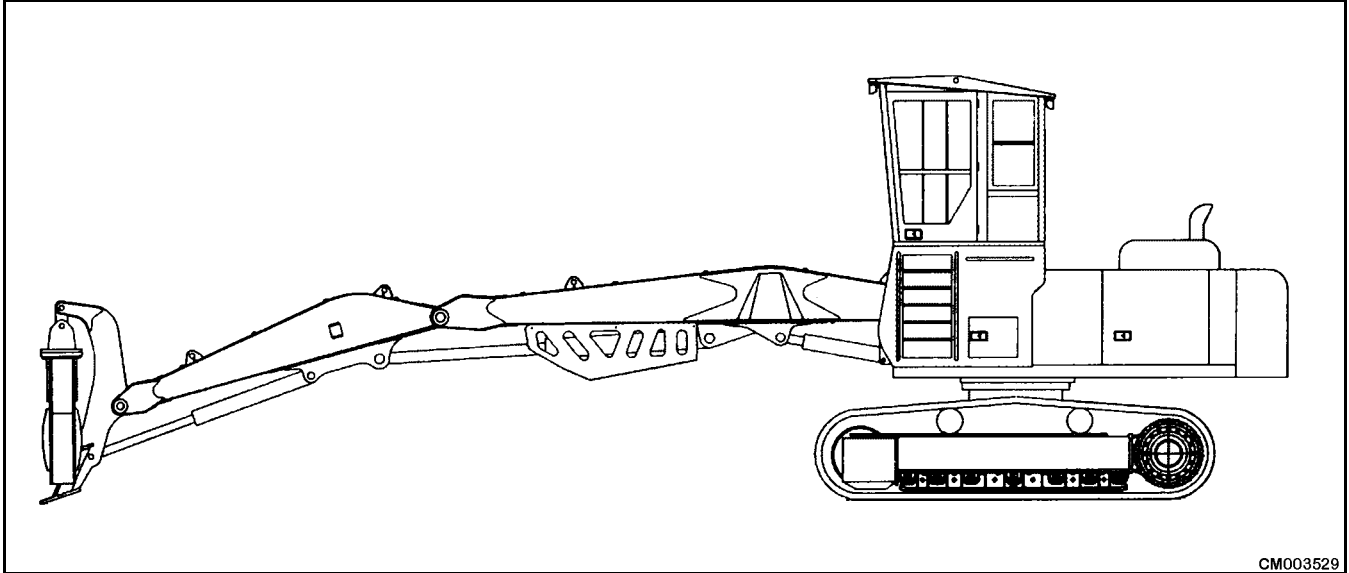
Locations

1. Arm-Link coupling pin (1 point)
2. Arm-Bucket coupling pin (1 point)
3. Link coupling pin (2 places)
4. Bucket cylinder rod pin (1 place)
5. Bucket-Link coupling pin (1 place)

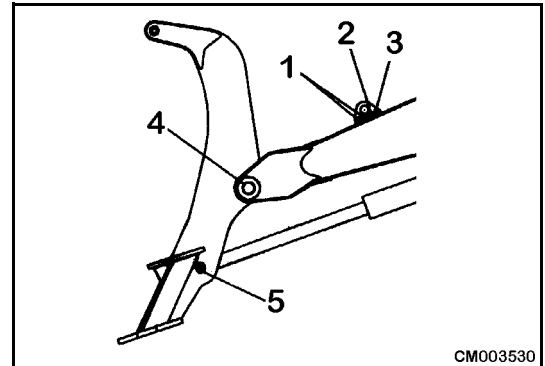


MAINTENANCE

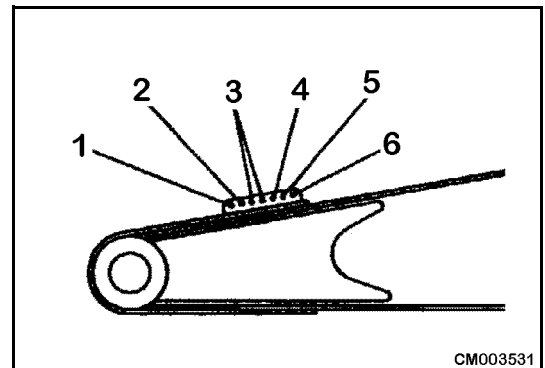
Lubricating Log Loader



1. Arm to main boom (2 places)
2. Arm cylinder rod pin (1 place)
3. Heel cylinder base pin (1 place)
4. Heel to arm pin (2 places)
5. Heel cylinder rod pin (1 place)



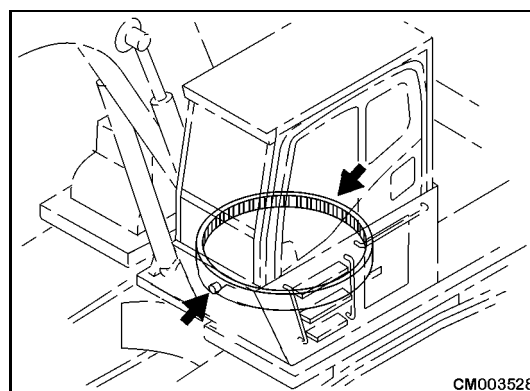
1. Boom cylinder base pin, LH (1 place)
2. Boom cylinder base pin, RH (1 place)
3. Main boom foot pin (2 places)
4. Boom cylinder rod pin, RH (1 place)
5. Boom cylinder rod pin, LH (1 place)
6. Arm cylinder base pin (1 place)



Every 250 Hours Maintenance

Lubricate Swing Circle

1. Lower the work equipment to the ground.
2. Using a grease gun, pump in grease through the grease fittings shown by arrows. (2 places)
3. After greasing, wipe off any old grease that was pushed out.



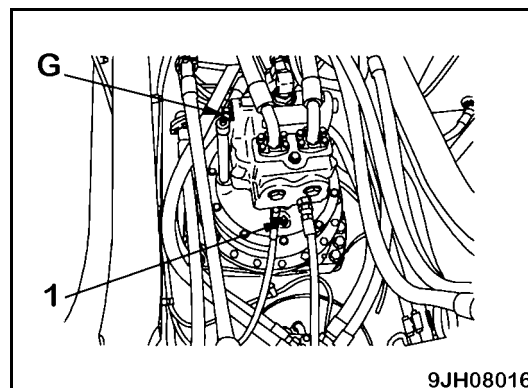
CM003528

Check Oil Level in Machinery Case, Add Oil

WARNING

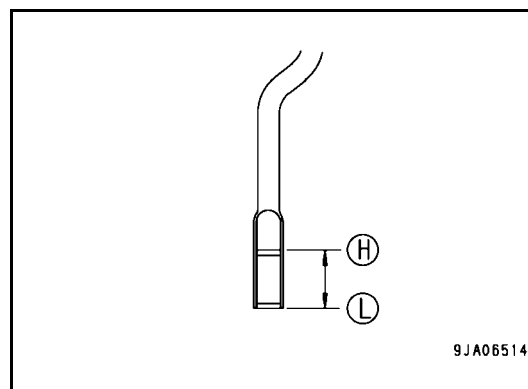
The parts and oil are hot after the engine is stopped, and may cause serious burns. Wait for the temperature to cool before starting the operation.

1. Remove dipstick (G) and wipe the oil from the dipstick with a cloth.
2. Fully insert dipstick (G) into the filler pipe.
3. When dipstick (G) is pulled out, if oil level is between the (H) and (L) marks of the gauge, oil level is proper.



9JH08016

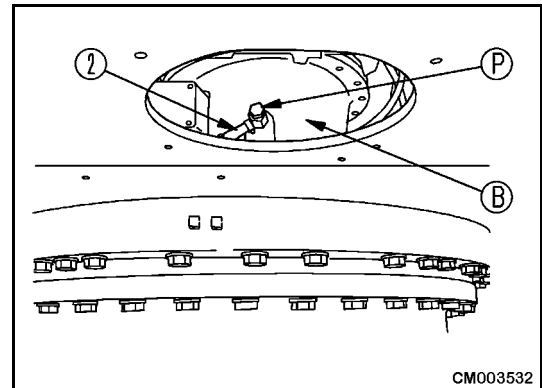
4. After replacing the filter cartridge, add engine oil through oil filler port so that the oil level is between the (H) and (L) marks on dipstick (G).
5. If the oil level is above the (H) mark on dipstick (G), loosen drain valve (P) and drain the excess oil.



9JA06514

MAINTENANCE

- When draining the oil, first pull hose (2) out from inspection hole (B), then turn the drain valve to the OPEN position.
6. After checking oil level or adding oil, insert the dipstick into the hole and install air bleeding plug (1).



Check Oil Level in Final Drive Case, Add Oil

WARNING

The parts and oil are hot after the engine is stopped, and may cause serious burns. Wait for the temperature to cool before starting the operation.

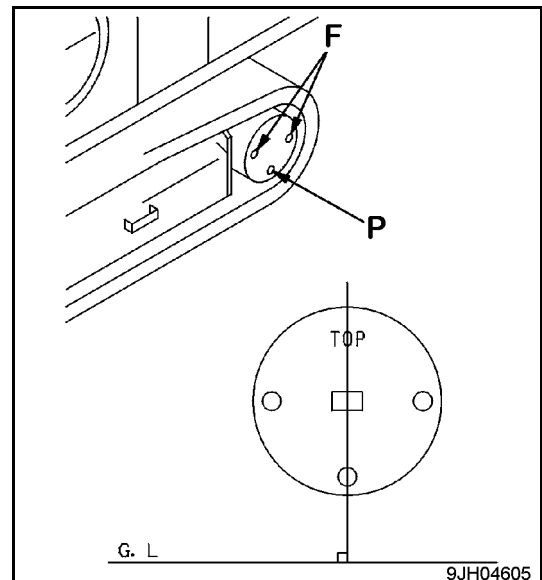
If there is still pressure remaining inside the case, the oil or plug may fly out. Loosen the plug slowly to release the pressure.

- 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 to be sure the oil level is within a range from the bottom of the plug hole to a point 10 mm (0.4 in) below it.
 3. If the oil level is too low, install plug (F), operate the travel levers, and drive forward or in reverse to rotate the sprocket one turn. Then repeat Step 2 to check 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).

Torque for plugs: $68.6 \pm 9.9 \text{ N}\cdot\text{m}$ ($50.6 \pm 7.2 \text{ ft}\cdot\text{lb}$)

Remark

There are two plugs (F). Add oil through the one easier to fill and through which no internal gears are seen.



Check Level of Battery Electrolyte

Perform this inspection before operating the machine.

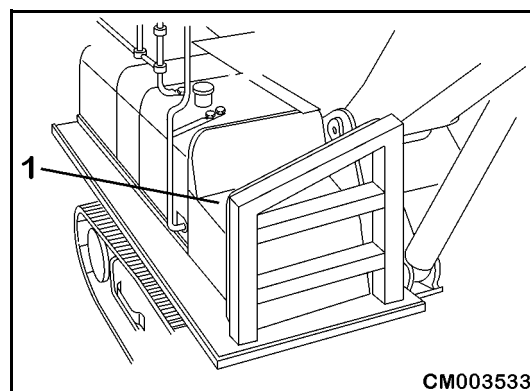
⚠ WARNING

- 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. 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.
- When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.

- When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.

Open cover (1) at the front right side of the machine. The battery is inside.

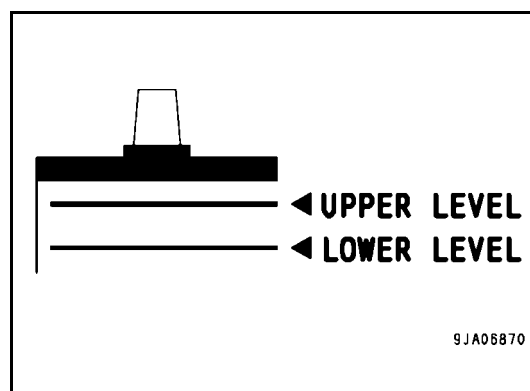


When Checking Electrolyte Level From Side Of Battery

1. If it is possible to check the electrolyte level from the side of the battery, check as follows.

Use a wet cloth to clean the area around the electrolyte level lines and check to be sure 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.



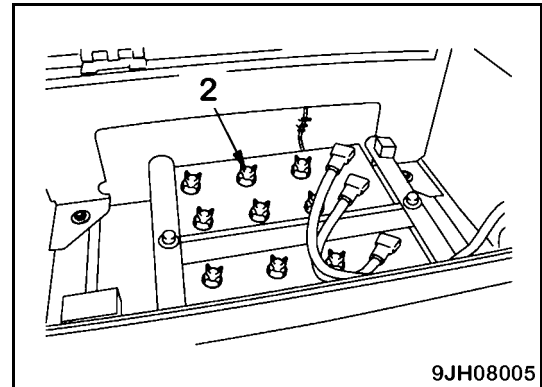
MAINTENANCE

- If the electrolyte level is below the midway point between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines, remove cap (2) and add distilled water to the U.L. line.
- After adding distilled water, tighten cap (2) securely.

Remark

If distilled water is added to above the UPPER LEVEL (U.L.) line, use a syringe to lower the level to the UPPER LEVEL (U.L.) line.

Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

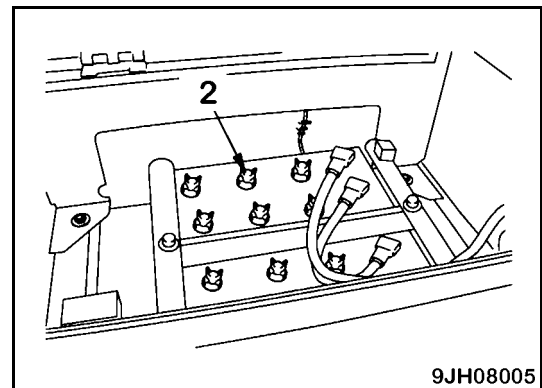


9JH08005

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 (2) at the top of the battery, look through the water filler port (3), and check the electrolyte surface. If the electrolyte does not reach the sleeve (4), add distilled water so that the level reaches the bottom of the sleeve (UPPER LEVEL line) without fail.
 - Suitable level: Electrolyte level is up to bottom of sleeve, so surface tension causes electrolyte surface to bulge and poles appear bent.
 - Low: Electrolyte level is not up to bottom of sleeve, so poles appear straight and not bent.
- After adding distilled water, tighten cap (2) securely.

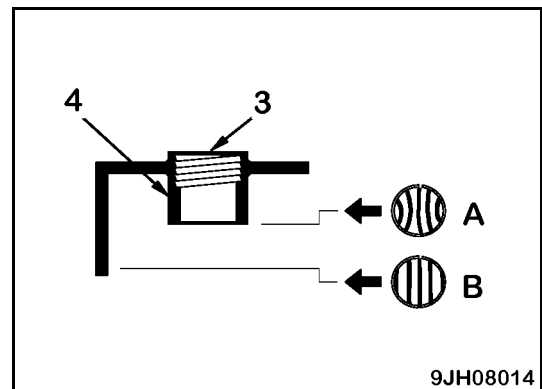


9JH08005

Remark

If distilled water is added to above the bottom of the sleeve, use a syringe 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.

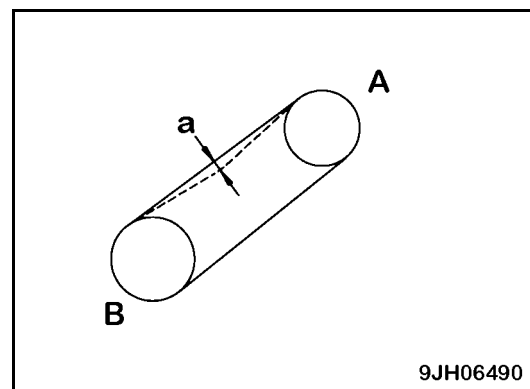


9JH08014

Check, Adjust Tension of Air Conditioner Compressor Belt

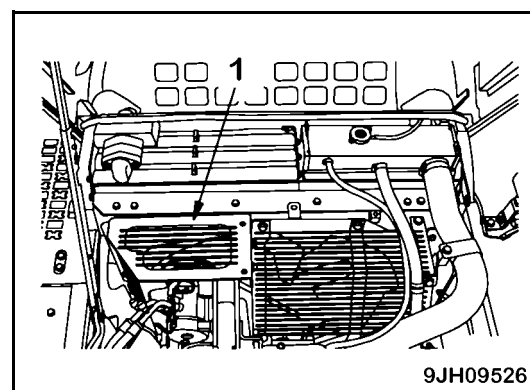
Checking

The deflection of the belt should be 6 to 9 mm (0.23 to 0.35 in) when pressed with a finger force of approximately 58.8 N (6 kgf) at mid-point (a) between the crankshaft pulley (B) and the compressor pulley (A).



Adjustment

1. Remove guard (1).

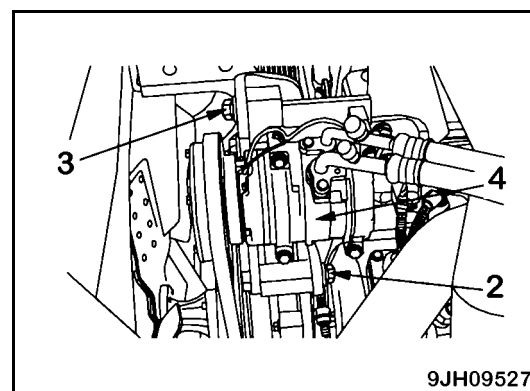


2. Loosen bolts (2) and (3), then move compressor (4) to adjust.

Remark

When the bolts (2) and (3) are loosened, compressor (4) can move, using the mounting position of bolt (2) as a fulcrum.

3. When the position of the compressor is determined, tighten bolts (2) and (3) to hold it in position.
- Check each pulley for damage, wear of the V-groove, and wear of the V-belt. In particular, be sure to check to be sure the V-belt is not touching the bottom of the V-groove.
 - In case any of the following occurs, ask the Komatsu distributor in your territory to replace the belts with new ones.
 - The fan belt has elongated, leaving little allowance for adjustment.
 - A cut or crack is found on the belt.
 - Slipping or creaking sound is heard coming from the belt.
 - When the new V-belt is set, readjust it after one hour of operation.



MAINTENANCE

Every 500 Hours Maintenance

- Maintenance for every 50 and 250 hours service should be carried out at the same time.

Lubricating

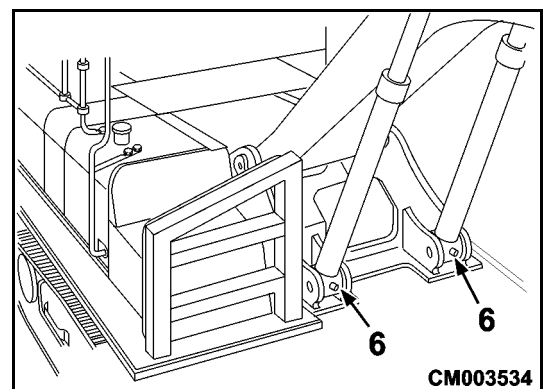
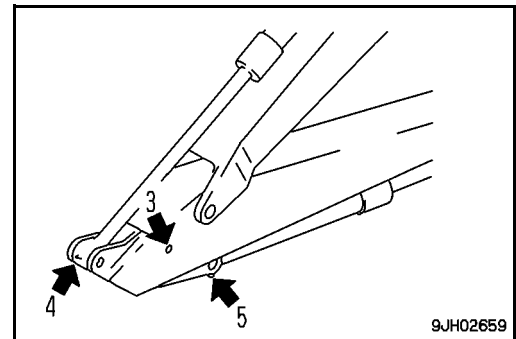
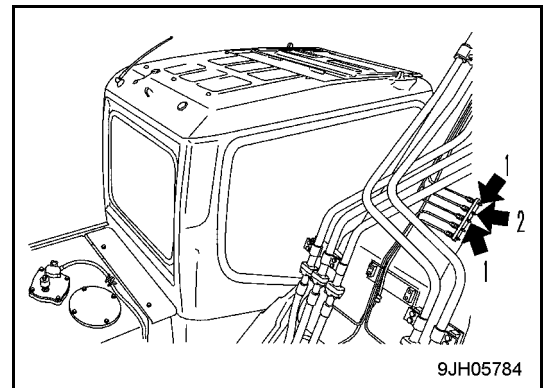
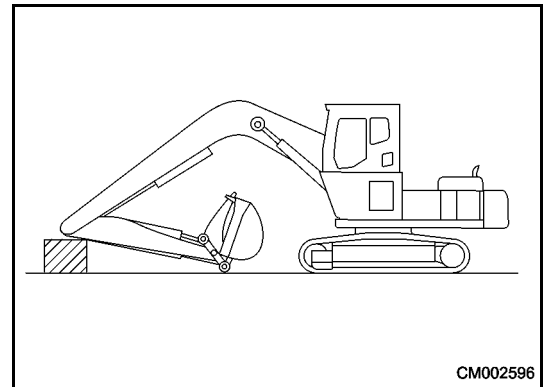
- During the initial 50 hours breaking-in period for a new machine, carry out lubrication every 10 hours.
- If digging operations have been carried out in water (such as digging holes), always carry out greasing for the pins that were under water.
- For heavy-duty operations, such as hydraulic breaker work, carry out lubrication every 100 hours.

1. Set the machine to the greasing posture shown on the right, lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.

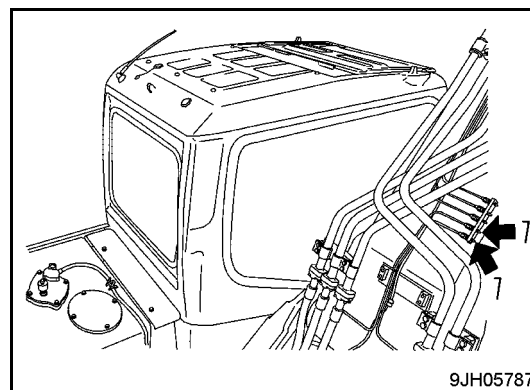
- (1) Boom cylinder rod pin (2 places)
- (2) Arm cylinder foot pin (1 place)

- (3) Boom-Arm coupling pin (1 place)
- (4) Arm cylinder rod end (1 place)
- (5) Bucket cylinder foot pin (1 place)

- (6) Boom cylinder foot pin (2 places)



(7) Boom foot pin (2 places)



9JH05787

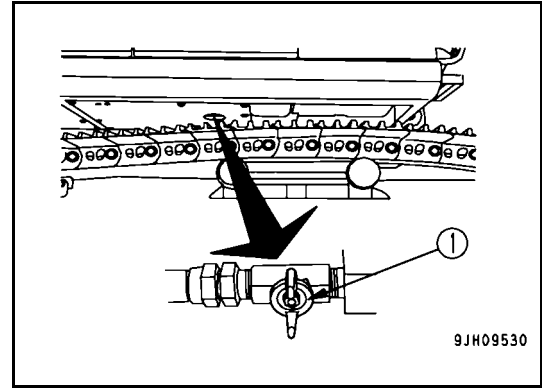
Replace Fuel Pre-filter Cartridge

WARNING

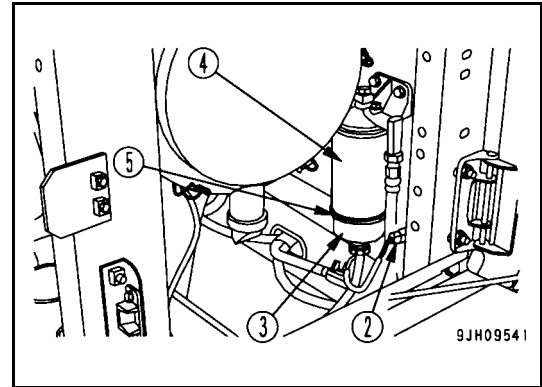
- After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.
 - High pressure is generated inside the engine fuel piping system when the engine is running.
 - When replacing the filter, wait for at least thirty seconds after stopping the engine to let the internal pressure go down before replacing the filter.
 - Do not bring any fire or flame close.
-
- 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

MAINTENANCE

1. Turn valve (1) at the bottom of the fuel tank to the right to close it.



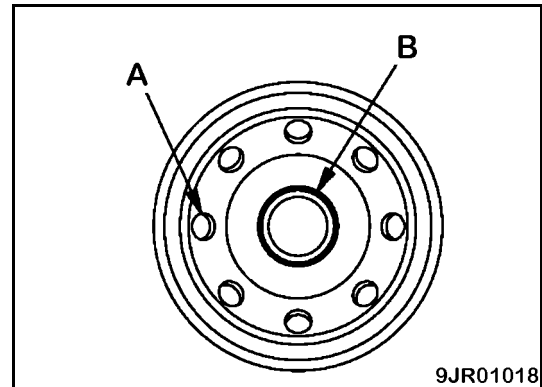
2. Open the cover on the right side of the machine.
3. Set the container to catch the fuel under the pre-filter cartridge.
4. Remove connector (2). Wrap the removed connector in a vinyl bag to prevent water from getting on it.
5. Using a filter wrench, turn transparent cap (3) to the left to remove it. (This cap is used again.)
6. Using a filter wrench, turn cartridge (4) to the left to remove it.
7. Install transparent cap (3) to the bottom of the new filter cartridge. (When doing this, always replace O-ring (5).)
8. When installing, bring the packing surface into contact with the seal surface of filter cartridge (4), then tighten a further 1/4 -1/2 turns.



If the transparent cap is tightened too much, the O-ring will be damaged and this will cause leakage of fuel; if it is not tightened enough, fuel will leak through the gap at the O-ring. To prevent these problems, always tighten securely to the fixed tightening angle.

9. Clean the filter holder, fill the new filter cartridge with clean fuel, coat the packing surface thinly with oil, then install to the filter holder.

- When adding fuel, do not remove cap (B). Always add fuel from the eight small holes (A) on the dirty side.
- After adding fuel, remove cap (B) and install the fuel filter.
- Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (B) when adding fuel. Be careful not to let dirt or dust get into center portion on the clean side.



10. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.

If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten the correct amount.

When tightening with a filter wrench, be extremely careful not to dent or damage the filter.

11. Check to be sure the drain plug at the bottom of transparent cap (3) is tightened securely.
12. Remove the vinyl bag covering connector (2), then connect connector (2).

Remark

If water gets on the connector (2), the sensor may malfunction and the water separator monitor may light up.

When removing connector (2), be extremely careful not to let water get on the connector.

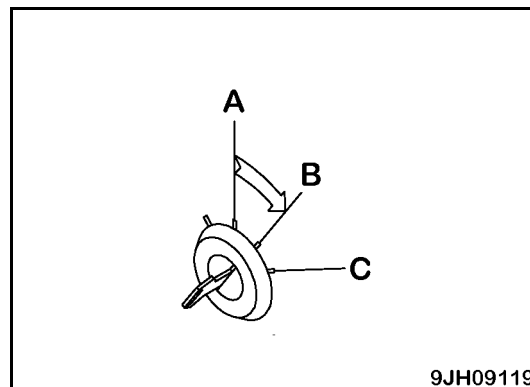
If water gets on connector (2), dry it completely before connecting it.

13. Turn valve (1) at the bottom of the fuel tank to the left to open it.
14. After completing the replacement of filter cartridge (4), bleed the air.

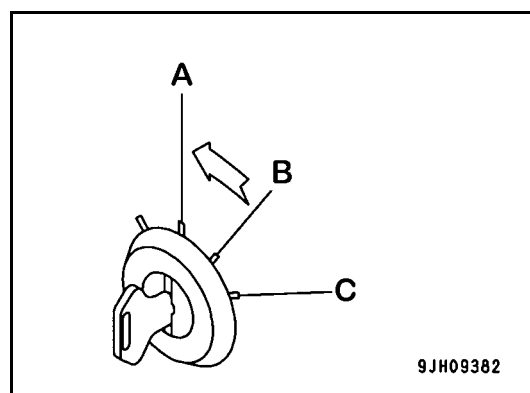
Bleed the air as follows:

15. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
16. Insert the key in the ignition switch and turn the key to the ON position (B).

The electric priming pump is actuated.



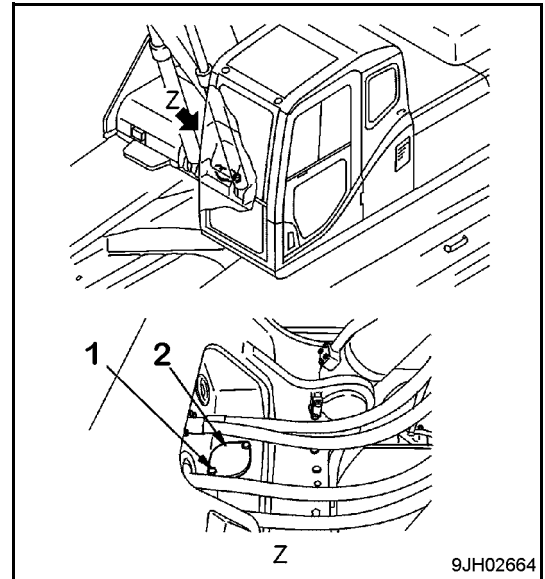
17. Hold the key at the ON position (B) for thirty seconds, then return it to OFF position (A) and wait for ten seconds.
18. Repeat Steps 16 and 17 four times.
19. Start the engine, check to be sure there is no leakage of fuel from the filter seal surface or water separator mounting surface, then run for approximately 10 minutes at low idling.



MAINTENANCE

Check Swing Pinion Grease Level, Add Grease

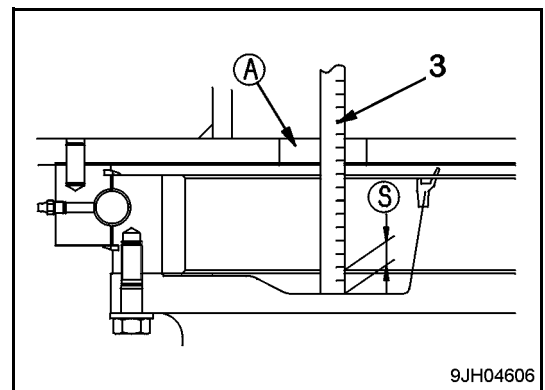
- Prepare a scale.
1. Swing three times each to the left and right, then stop the machine.
 2. Remove bolts (1) (2 bolts) on the top of the revolving frame and remove cover (2).



3. Insert scale (3) through inspection and maintenance hole (A) into the grease, and check to be sure height (S) of the grease is at least 54 mm (2.1 in). If the grease level is low, add grease.
4. Check if the grease is milky white. If it is milky white, it is necessary to change the grease. Please contact your Komatsu distributor.

Total grease capacity: 33 l (8.7 US gal)
Grease weight: 29.7 kg (65 lb)

5. Install cover (2) with bolts (1).



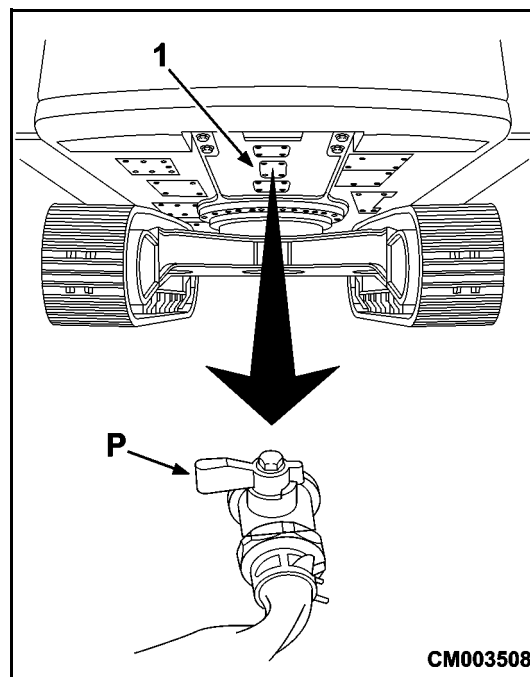
Changing Engine Oil and Replacing Engine Oil Filter Cartridge

! WARNING

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

- Refill capacity: 35 ℓ (9.25 US gal)
- Filter wrench

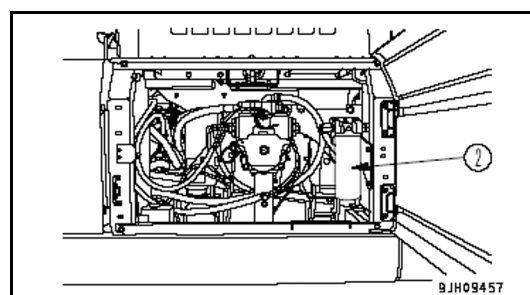
1. Remove cover (1) under the machine and put a container under drain valve (P) to catch the drained oil.
2. To prevent getting oil on yourself, lower the lever on drain valve (P) slowly, drain the oil, then raise the lever to close the valve.



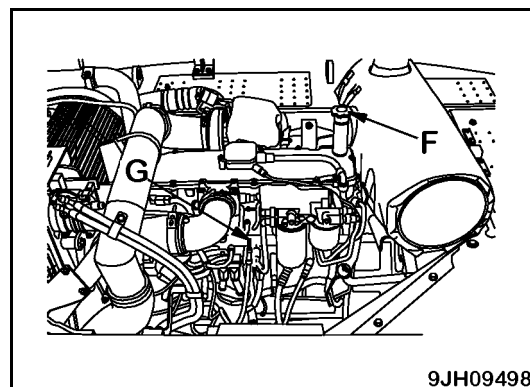
3. Open the cover at the rear right, then use a filter wrench to turn filter cartridge (2) to the left to remove it.
4. Clean the filter holder, fill the new filter cartridge with clean engine oil, coat the thread and packing surface of the new filter cartridge with clean engine oil (or coat it thinly with grease), then install it to the filter holder.

Remark

Check to be sure there is no old packing stuck to the filter holder. If there is any old packing stuck to the filter, it will cause leakage of oil.

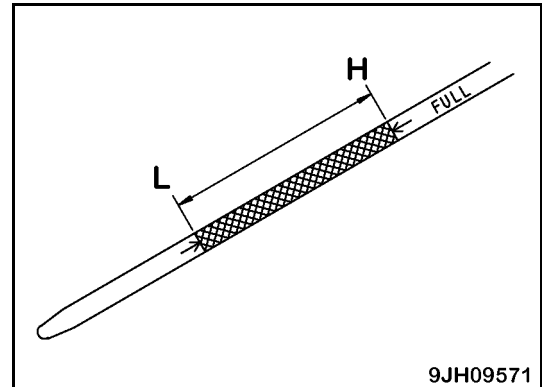


5. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it a further 3/4 to one turn.
6. After replacing the filter cartridge, open the engine hood and add engine oil through oil filler (F) to between the (H) and (L) marks on dipstick (G).



MAINTENANCE

7. Run the engine at idling for a short time, then stop the engine and check again that the oil level is between the (H) and (L) marks on dipstick (G).
8. Install cover (1).



Clean/Inspect Radiator, Oil Cooler, Aftercooler and Condenser Fins

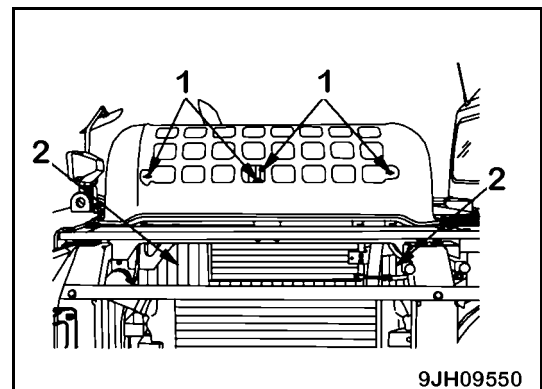
! WARNING

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.

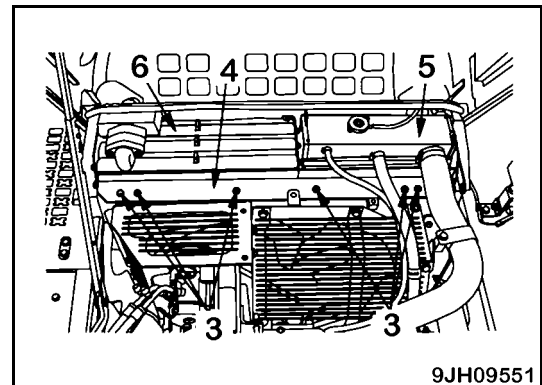
Remark

When using compressed air for cleaning, blow it keeping some distance to avoid damaging the fins. Damage on the fins can cause water leakage and overheating. In a dusty job site, check the fins every day, regardless of the maintenance interval.

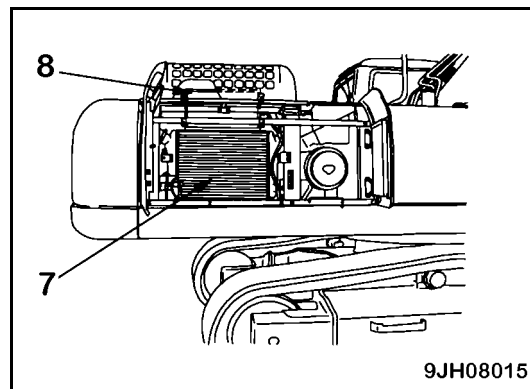
1. Open the engine hood.
2. Loosen screw (1) and pull up net (2).
3. Clean net (2) (it is to be installed again, as instructed in the step 8).



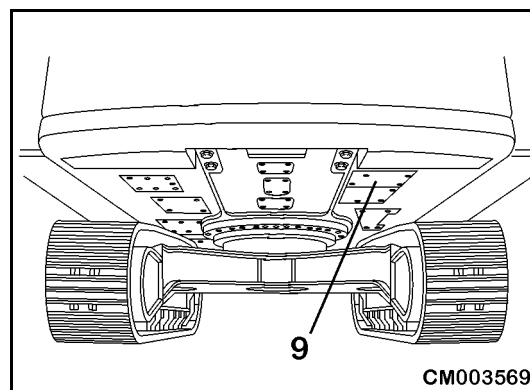
4. Remove six bolts (3), then move bracket (4) to the side and make a gap between radiator fins (5) and oil cooler fins (6).
5. Inspect the front and rear of radiator fins (5), oil cooler fins (6), after-cooler fins (7) and condenser fins (8) for dirt, dust, dry leaves, etc. Blow them away with compressed air, if any. Steam or water may be used instead of compressed air.



6. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by aging. In addition, check the hose clamps for looseness.



7. Remove undercover (9) and blow the mud, dirt, and leaves that have been cleaned off to the outside.
8. Push in cleaned net back to the original place and secure it with screw.
9. Secure bracket with bolt.



MAINTENANCE

Clean Air Conditioner Fresh/Recirc Filters

⚠ WARNING

If compressed air is used, there is danger that dirt may fly and cause personal injury.

Always wear protective glasses, dust mask, and other protective equipment.

- As a guideline, the filters should be cleaned every 500 hours, but on dusty jobsites, clean the filters more frequently.

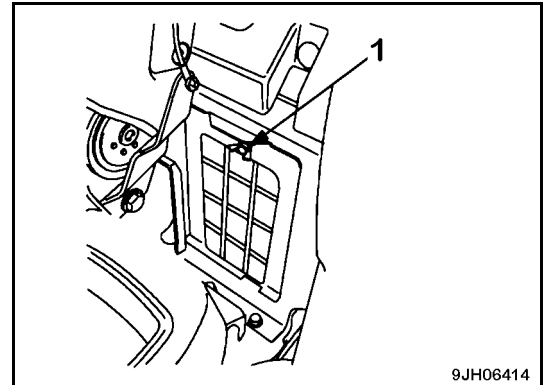
Remark

If the filter becomes clogged, the air flow will be reduced, and there will be an abnormal noise from the air conditioner unit.

Cleaning Recycling Air Filter

- Remove wing bolts (1) from the inspection window at the bottom rear left on the inside of the operator's cab, then take out the recirculated air filter.
- Clean the filter with compressed air. If there is oil on the filter, or if the filter is extremely dirty, wash it in a neutral agent. After rinsing it in water, dry it thoroughly before using it again.

Replace the filter with a new part every year. If the clogging of the filter cannot be removed by blowing with air or washing in water, replace the filter immediately.

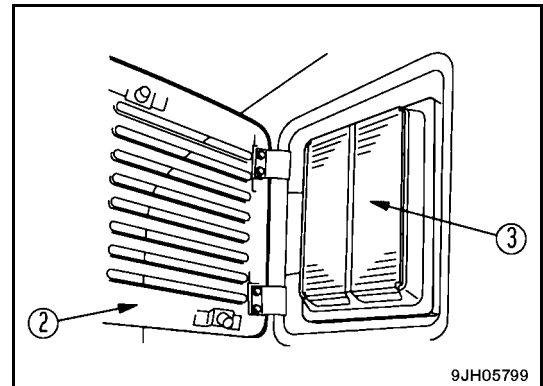


Cleaning Fresh Air Filter

- Use the ignition switch key to open cover (2) at the rear left of the operator's cab, then open cover (2) by hand and remove filter (3) inside the cover.
- Clean the filter with compressed air. If there is oil on the filter, or if the filter is extremely dirty, wash it in a neutral agent. After rinsing it in water, dry it thoroughly before using it again.

Replace the filter with a new part every year. If the clogging of the filter cannot be removed by blowing with air or washing in water, replace the filter immediately.

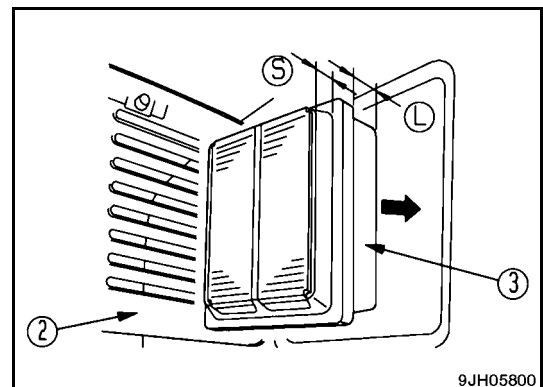
- After cleaning, return filter (3) to its original position and close the cover. Use the ignition switch key to lock the cover. Do not forget to remove the ignition switch key.



Remark

The **FRESH** filter must be installed facing in the correct direction.

When installing, insert the long (L) end of filter (3) into the filter case first. If the short (S) end is installed first, cover (2) will not close.



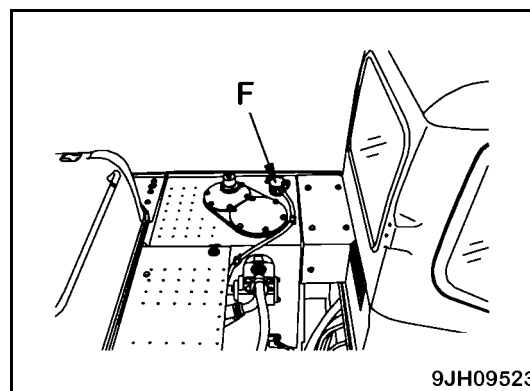
Replace Vent Element in Hydraulic Tank

WARNING

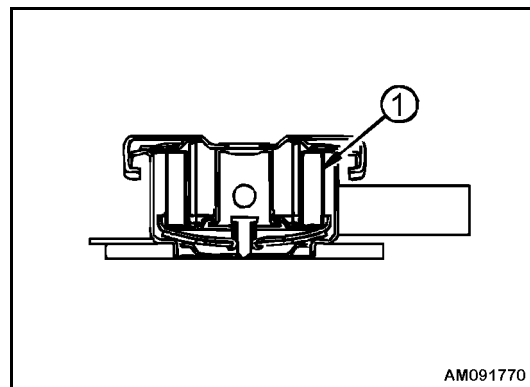
The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove the cap of oil filler (F) at the top of the hydraulic tank.



2. Replace element (1) inside the cap.



MAINTENANCE

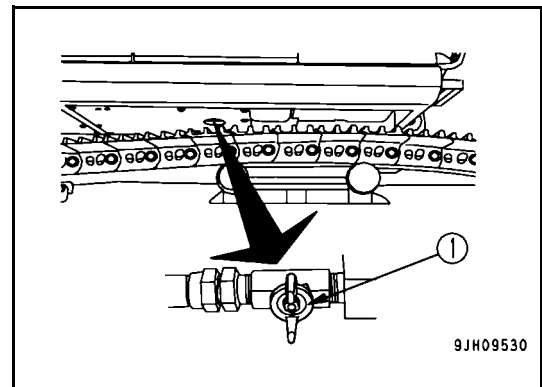
Every 1000 Hours Maintenance

Maintenance for every 250 and 500 hours service should be carried out at the same time.

Replace Fuel Main Filter Cartridge

WARNING

- **After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.**
 - **High pressure is generated inside the engine fuel piping system when the engine is running.**
 - **When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
 - **Do not bring any fire or flame close.**
 - **Be careful when opening the air bleed plug in the filter head. It is still under pressure and fuel may spurt out.**
-
- 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. Turn valve (1) at the bottom of the fuel tank to the right to close it.

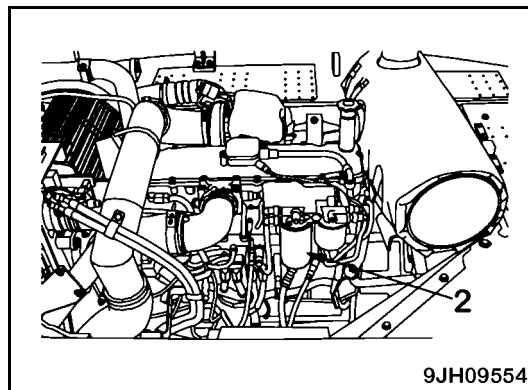


2. Set the container to catch the fuel under the filter cartridge.
3. Using a filter wrench, turn filter cartridge (2) counterclockwise to remove it.
4. Clean the filter holder, coat the packing surface of the new filter cartridge thinly with oil, then install the filter cartridge to the filter holder.

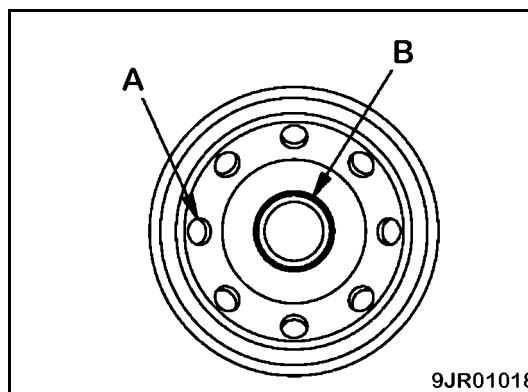
Remark

Do not fill the new filter cartridge with fuel.

Remove cap (B) and install the filter cartridge.



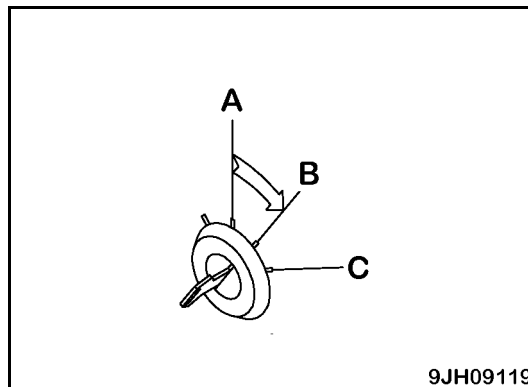
5. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.
If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten the correct amount.
6. Turn valve (1) at the bottom of the fuel tank to the left to open it.
7. After completing the replacement of filter cartridge (2), bleed the air.



Bleed the air as follows:

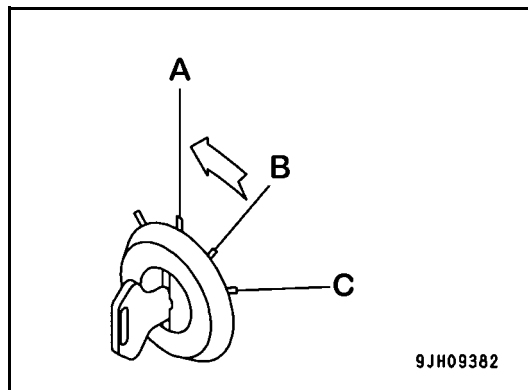
8. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
9. Insert the key in the ignition switch and turn the key to the ON position (B).

The electric priming pump is actuated.



10. Hold the key at the ON position (B) for 30 seconds, then return it to OFF position (A) and wait for 10 seconds.
11. Repeat Steps 9 and 10 four times.
12. After replacing the filter cartridge, start the engine and check for leakage of fuel from the filter seal surface. If any fuel is leaking, check the tightening condition of the filter cartridge. If there is still leakage of fuel, repeat.

Steps 1 - 3 to remove the filter cartridge, and check the packing surface for damage or embedded foreign material. If the packing is damaged or there is embedded foreign material, replace the cartridge with a new part and repeat Steps 4 - 12 to install.



MAINTENANCE

Replace Hydraulic Oil Filter Element

WARNING

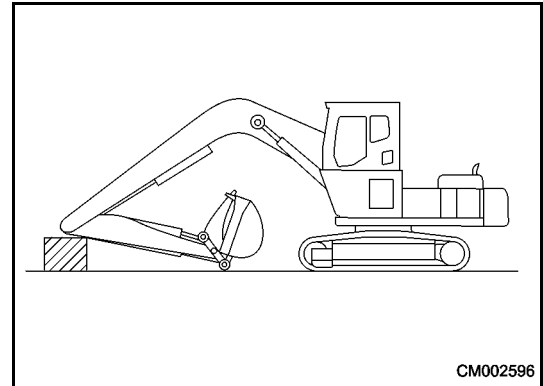
The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

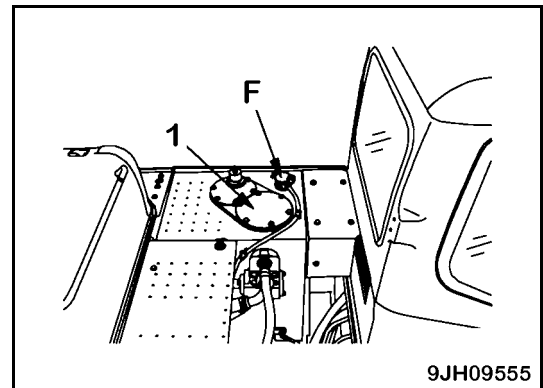
Remark

If the machine is equipped with a hydraulic breaker, the hydraulic oil will deteriorate much faster than during normal bucket operations.

1. Set the work equipment on the hard and flat ground in the maintenance posture as shown in the figure, then lower it to the ground and stop the engine.



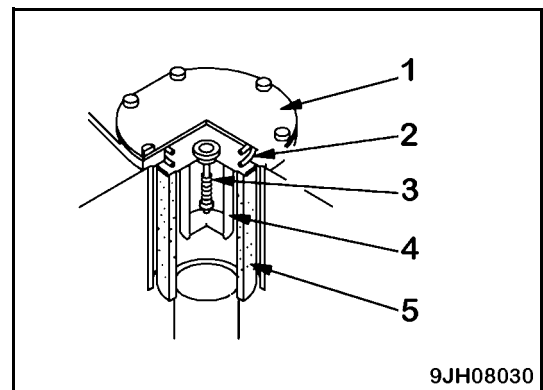
2. Remove the cap from oil filler (F), and release the internal pressure.
3. Loosen 6 bolts, then remove cover (1). When doing this, the cover may fly out under the force of spring (2), so hold the cover down when removing the bolts.
4. After removing spring (2), valve (3) and strainer (4), take out element (5).
 - Inspect the bottom of the filter case for dirt, and remove it, if any. Take good care then not to let fall the dirt into the hydraulic tank.



Remark

If the mounting bolts of cover (1) loosened in Step 3 are left for approximately 5 minutes, the internal pressure inside the case will be released, so if the element is removed when the oil in the element has drained out, the amount of dripping oil will be reduced.

5. Clean the removed parts in diesel oil.
6. Install the new element in the place where old element (5) was installed.
7. Set valve (3), strainer (4) and spring (2) on top of the element.
8. Set cover (1) in position, push it down by hand, and install the cover with the mounting bolts.
9. Screw in the oil filler cap and install the cover.
10. To bleed the air, start the engine and run the engine at low idle for 10 minutes.
11. Stop the engine.



Remark

Wait for at least five minutes after stopping the engine to eliminate bubbles in the oil inside the tank.

12. Check for oil leakage and wipe off any spilled oil.

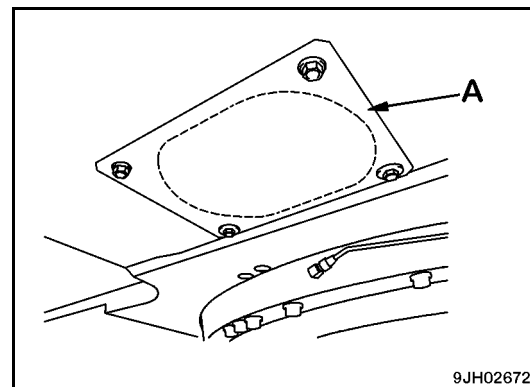
Change Oil in Swing Machinery Case

WARNING

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

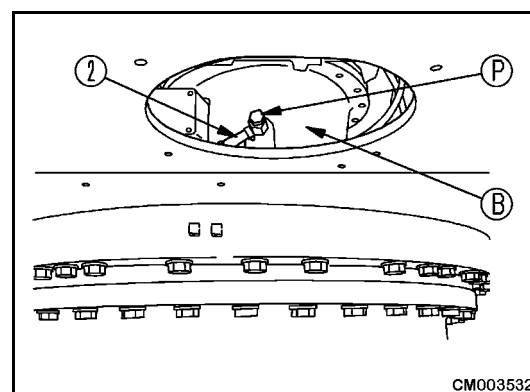
- Refill capacity: 13.4 ℓ (3.54 US gal)

1. Remove cover (A) of the inspection hole. (Only demolition specification machine).

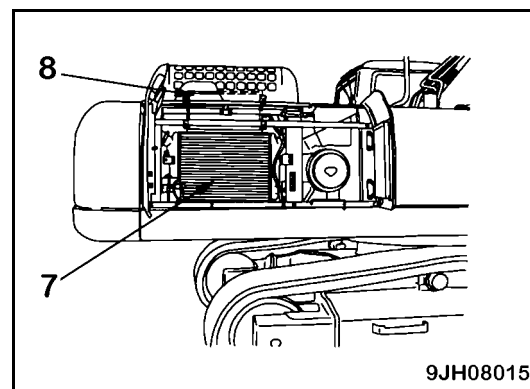


2. Set a container under drain valve (P) under the machine body to catch the oil.
3. Loosen drain valve (P) under the body, drain the oil, then tighten the drain valve again.

- When draining the oil, first pull hose (2) out from inspection hole (B), then turn the drain valve to the OPEN position.



4. Remove dipstick (G) and air bleed plug (1).
5. Add the replacement amount of oil through the insertion guide for dipstick (G).
6. Check the oil level.
7. Install air bleed plug (1).



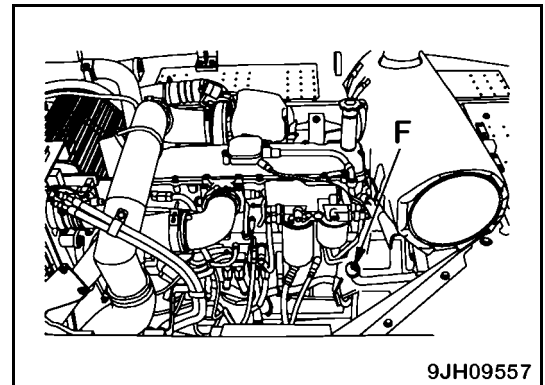
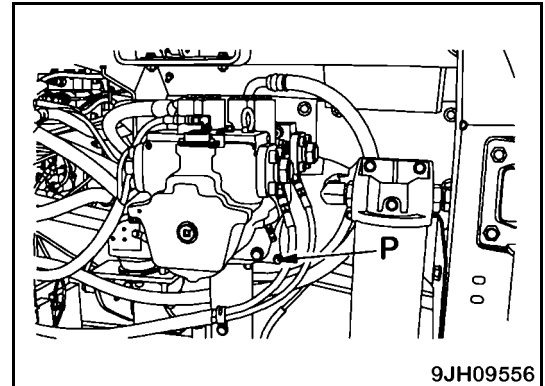
MAINTENANCE

Check Oil Level in Damper Case, Add Oil

WARNING

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

- 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 door on the left side of the machine.
 2. Remove plug (P) and check to be sure the oil is up to near the bottom of the plug hole. If the oil level is low, remove cap (F) and add oil through the oil filler port to the bottom of the hole of plug (P).
 - If excess oil is supplied, drain it to the specified amount to avoid overheating.
 3. Install plug (P) and cap (F).
 4. Close the door.



Check all tightening points of Engine Exhaust Pipe Clamps

Contact your Komatsu distributor to check the tightening of the clamps between the air cleaner - turbocharger - after cooler - engine.

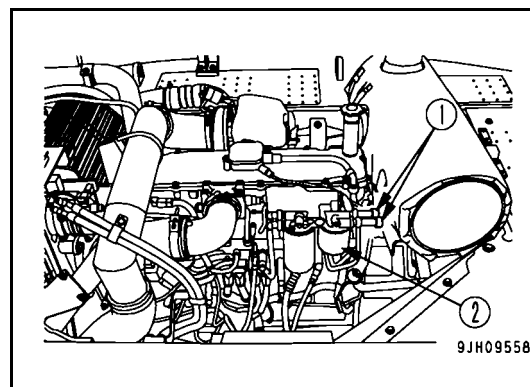
Replace Corrosion Resistor Cartridge (If equipped)

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.

1. Turn valve (1) at the top of the corrosion resistor fully to the right to close it.
2. Using a filter wrench, turn cartridge (2) to the left to remove it.
3. Install a new filter cartridge after coating oil on its sealing face.
 - In the installation, turn the cartridge by two-thirds of one turn after the packing surface comes to contact with the sealing face of the cartridge stand.
 - A genuine Komatsu filter cartridge is recommended for use.
4. Turn valve (1) fully to the left to open it.
5. Run the engine and check to be sure there is no leakage of water from the seal surface.



Check Fan Belt and Alternator Drive Belt Tension, Replace

- Special tools are required for inspection and replacement of the fan belt. Contact your Komatsu distributors for inspection and replacement.

Remark

An installed auto fan belt tension adjuster, "Auto Tensional Fan Belt", dispenses with the belt deflection adjustment.

MAINTENANCE

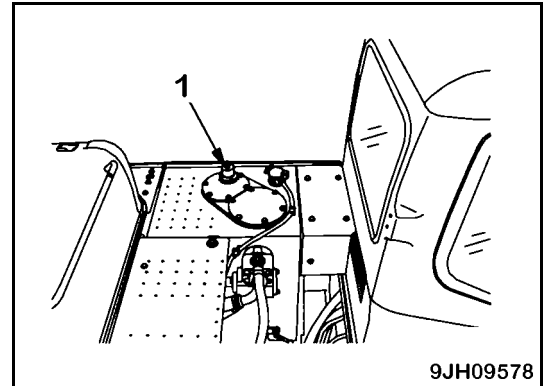
Replace Hydraulic Tank Additional Vent Element

WARNING

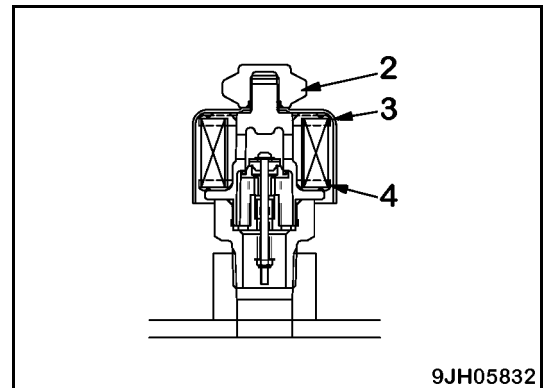
The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove screw (2) of vent assembly (1) at the top of the hydraulic tank, then remove cover (3).



2. Replace filter element (4) with a new element.
3. Install cover (3) and screw (2).



Check Nitrogen Gas Charge Pressure in Accumulator (For Breaker)

(If equipped)

A special tool is needed for inspecting and charging with nitrogen gas. Have your Komatsu distributor inspect and charge the accumulator.

Every 2000 Hours Maintenance

Maintenance for every 250, 500 and 1000 hours service should be performed at the same time.

Change Oil in Final Drive Case

WARNING

The oil is hot after the engine is stopped. Wait for the temperature to cool 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): 12.0 ℓ (3.17 US gal)
 - Flex handle wrench and socket.
1. Set the final drive so that the TOP mark comes to the top and the mark and plug (P) are perpendicular to the ground.
 2. Set a container under plug (P) to catch the oil.
 3. Remove plugs (P) and (F) with the wrench and drain the oil.

Remark

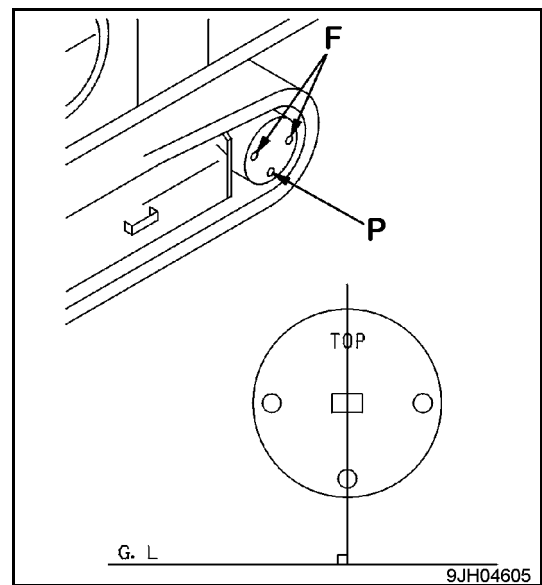
Check the O-rings in the plugs for damage. If necessary, replace with new ones.

4. Tighten plug (P).
5. Add engine oil through the plug hole (F).
6. When the oil overflows from the plug hole (F), install plug (F).

Plug (P) torque: 68.6 ± 9.8 N•m (50.6 ± 7.2 lbf ft)
 Plugs (F) torque: 68.6 ± 9.8 N•m (50.6 ± 7.2 lbf ft)

Remark

There are two plugs (F). Add oil through the one easier to fill oil and through which no internal gears are seen.



MAINTENANCE

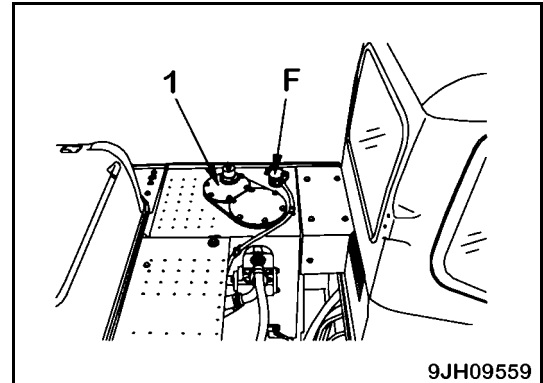
Clean Hydraulic Tank Strainer

WARNING

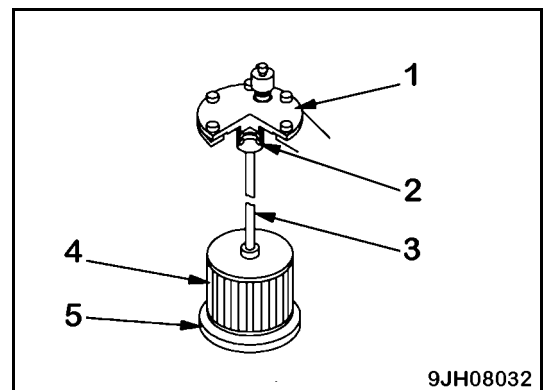
The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove the cap from oil filler (F), and release the internal pressure.
2. Loosen 6 bolts, then remove cover (1). When doing this, the cover may fly out under the force of spring (2), so push the cover down when removing the bolts.
3. Hold the top of rod (3) and pull up to remove spring (2) and strainer (4).
4. Remove any dirt stuck to strainer (4), then wash it in clean diesel oil or flushing oil. If strainer (4) is damaged, replace it with a new part.



5. When installing, insert strainer (4) into protruding part (5) of the tank, and assemble.
6. Assemble so that the protruding part at the bottom of cover (1) holds spring (2), then tighten with the bolt.



Checking Charge Pressure in Accumulator (For Control Circuit)

WARNING

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

The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when carrying out the operation. In addition, loosen the bolts slowly when carrying out the operation.

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

Remark

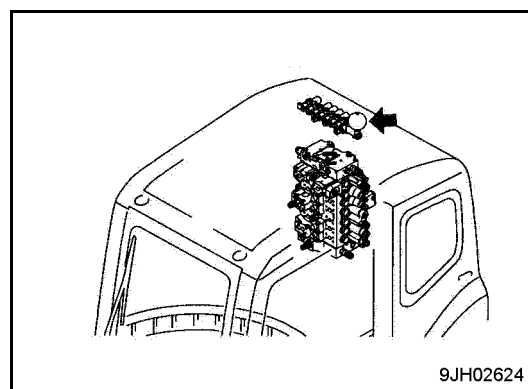
If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it will become impossible to release the remaining pressure inside the hydraulic circuit if a failure occurs on the machine.

Function Of Accumulator

The accumulator stores the pressure in the control circuit. Even after the engine is stopped, the control circuit can be operated, so the following actions are possible.

- If the control lever is operated in the direction to lower the work equipment, it is possible for the work equipment to go down under its own weight.
- The pressure in the hydraulic circuit can be released.

The accumulator is installed to the position shown in the diagram on the right.



MAINTENANCE

Checking Function of Accumulator

WARNING

When carrying out the inspection, check first that there is no person or obstacle in the surrounding area.

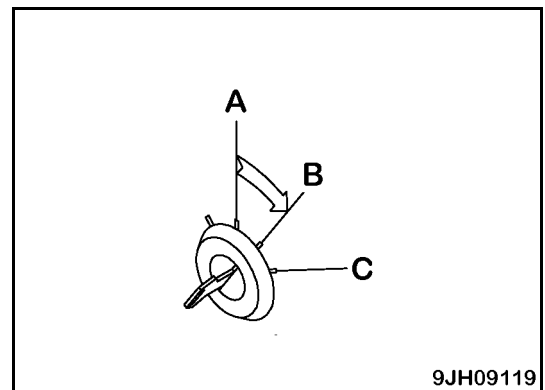
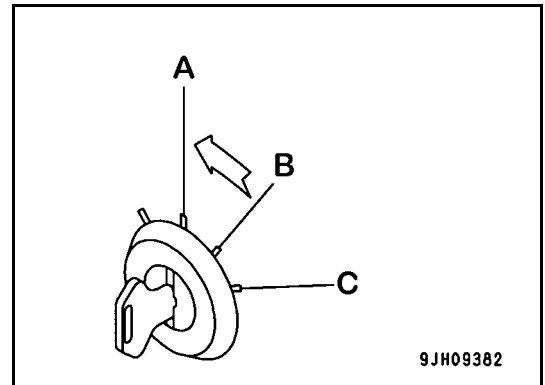
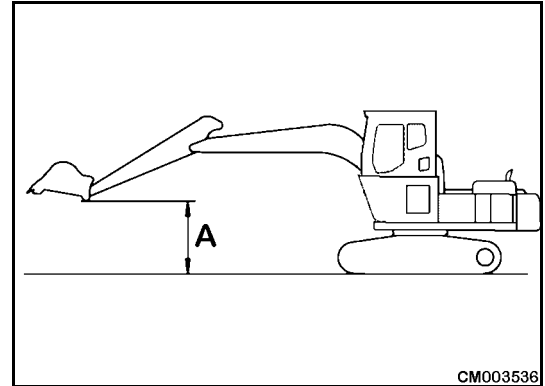
- Check the nitrogen gas charge pressure as follows.
 1. Stop the machine on firm, level ground.
 2. Hold the work equipment in the maximum reach posture (arm fully out, bucket fully dumped) at a height (A) 1.5 m (4 ft 11 in) from the ground.

Carry out Steps 3 - 5 within 15 seconds.

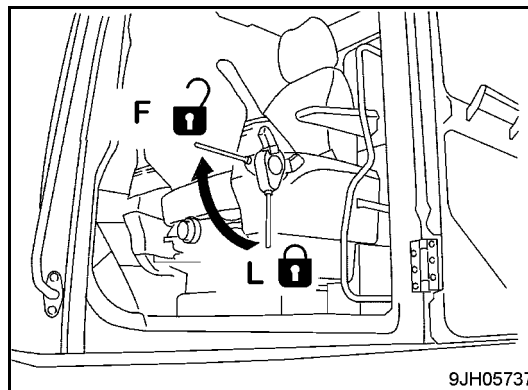
When the engine is stopped, the pressure in the accumulator gradually goes down. For this reason, the check can only be carried out immediately after the engine is stopped.

3. Keep the work equipment at the maximum reach, turn the ignition switch to the OFF position (A), and stop the engine.

4. Turn the ignition switch to the ON position (B).



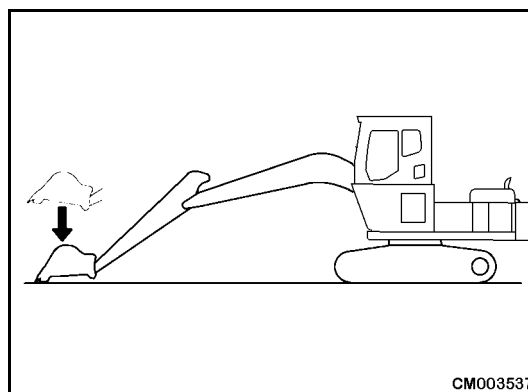
- With the lock lever at the FREE position (F), operate the work equipment control levers fully in the LOWER direction and check to be sure the work equipment is lowered to the ground.



- If the work equipment goes down under its weight and contacts the ground, the accumulator is normal.

If the work equipment does not go down or stops in midway, the charged pressure of the gas in the accumulator for the hydraulic circuit has probably dropped. Contact your Komatsu distributor for inspection.

- This completes the inspection. After completion of the inspection, set the lock lever to the LOCK position and turn the ignition switch to the OFF position.

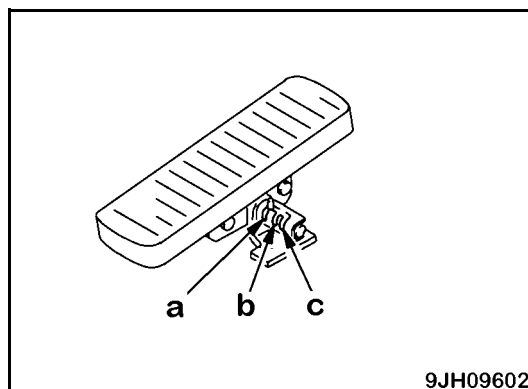


Releasing Pressure in Hydraulic Circuit

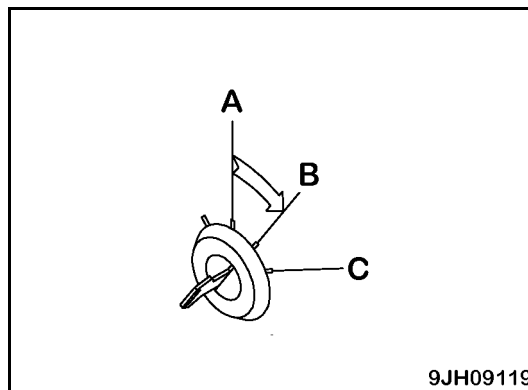
- Place the work equipment on the ground. Close the crusher attachment jaws, etc.
- Operate the work equipment lock lever to the LOCK position.
- Insert the lock pin for the attachment control pedal in position (c) where it is possible to operate the pedal. (If equipped)

Carry out Steps 4 - 6 within 15 seconds.

When the engine is stopped, the pressure in the accumulator gradually goes down. For this reason, the check can only be carried out immediately after the engine is stopped.

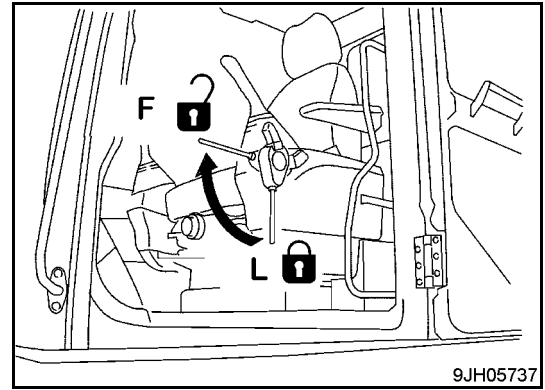


- Stop the engine.
- Turn the ignition switch to the ON position (B).

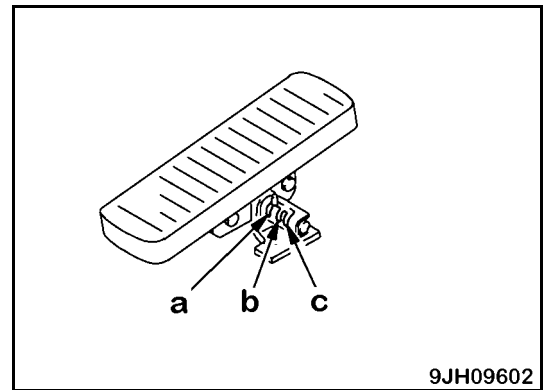


MAINTENANCE

- Set lock lever to FREE position (F), then operate the work equipment control levers and the attachment control pedal (if equipped) fully to the front, rear, left, and right to release the pressure in the control circuit.



- Set the lock lever to the LOCK position, then turn the ignition switch to the OFF position.
- Insert the lock pin in position (a) so that the attachment control pedal cannot be operated. (If equipped)



Check Alternator, Starting Motor

The brushes may be worn or the bearing may have run out of grease, contact your Komatsu distributor for inspection and repairs.

If the engine is started frequently, have this inspection carried out every 1000 hours.

Check Engine Valve Clearance, Adjust

Special tools are needed for the inspection and maintenance, so please contact your Komatsu distributor to have this work carried out.

Check Vibration Damper

Check to be sure there are no cracks or peeling in the outside surface of the rubber.

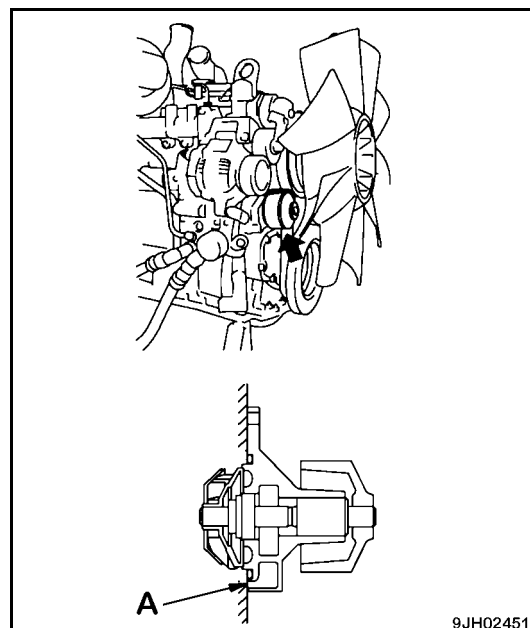
If any cracks or peeling are found, contact your Komatsu distributor to have the parts replaced.

Every 4000 Hours Maintenance

Maintenance for every 250, 500, 1000 and 2000 hours service should be performed at the same time.

Check Water Pump

Since the pulley may have play, oil may leak, water may leak and the drain hole (A) may be clogged, contact your Komatsu distributor for inspection, overhaul or replacement.



MAINTENANCE

Replace Accumulator (For Control Circuit)

- Replace the accumulator every 2 years or every 4000 hours, whichever comes first.

WARNING

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

The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when carrying out the operation. In addition, loosen the bolts slowly when carrying out the operation.

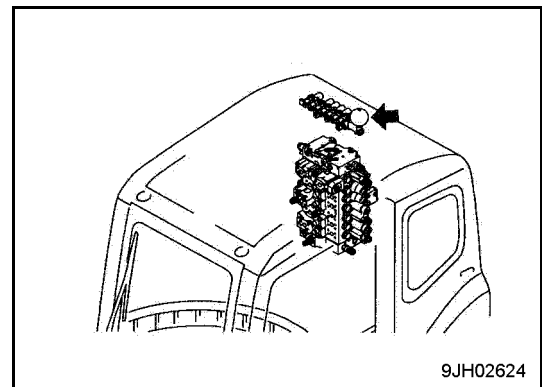
- Do not disassemble the accumulator.
 - Do not bring it near flame or dispose of it in fire.
 - Do not make holes in it or weld it.
 - Do not hit it, roll it, or subject it to any impact.
 - **When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor to have this work carried out.**
-
- If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it will become impossible to release the remaining pressure inside the hydraulic circuit if a failure occurs on the machine.

Function Of Accumulator

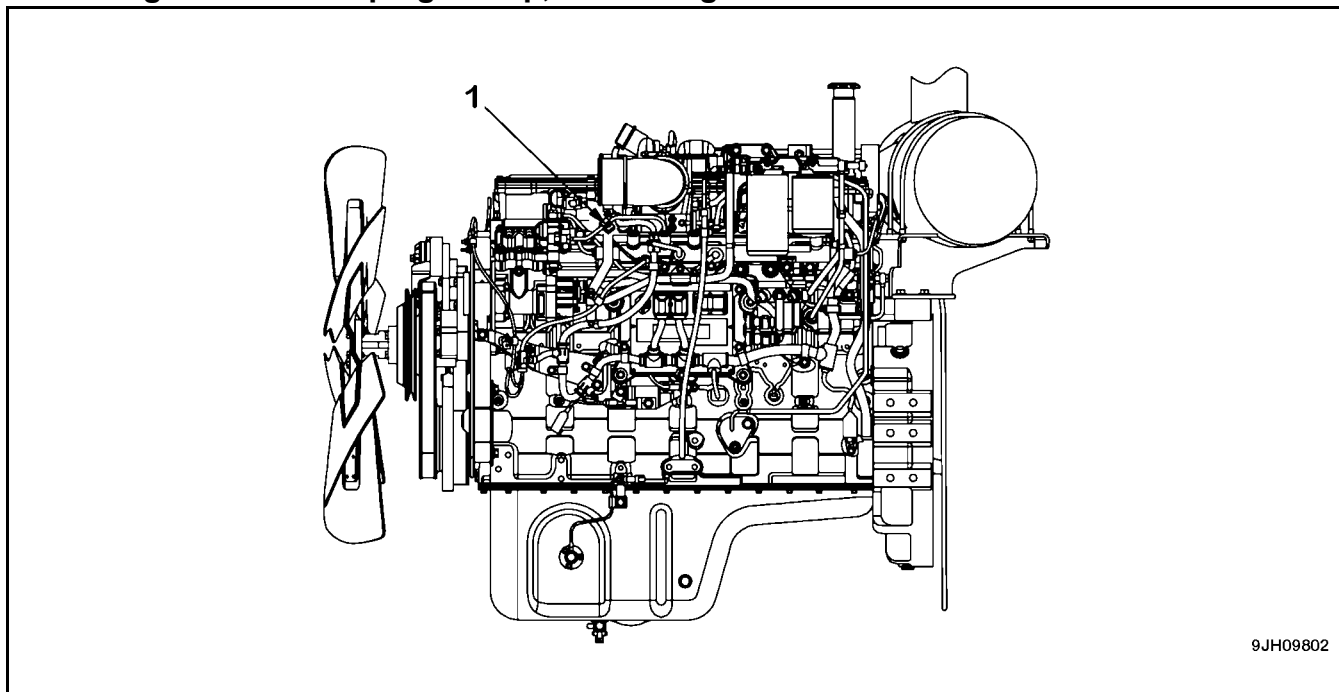
The accumulator stores the pressure in the control circuit. Even after the engine is stopped, the control circuit can be operated, so the following actions are possible.

- If the control lever is operated in the direction to lower the work equipment, it is possible for the work equipment to go down under its own weight.
- The pressure in the hydraulic circuit can be released.

The accumulator is installed to the position shown in the diagram on the right.



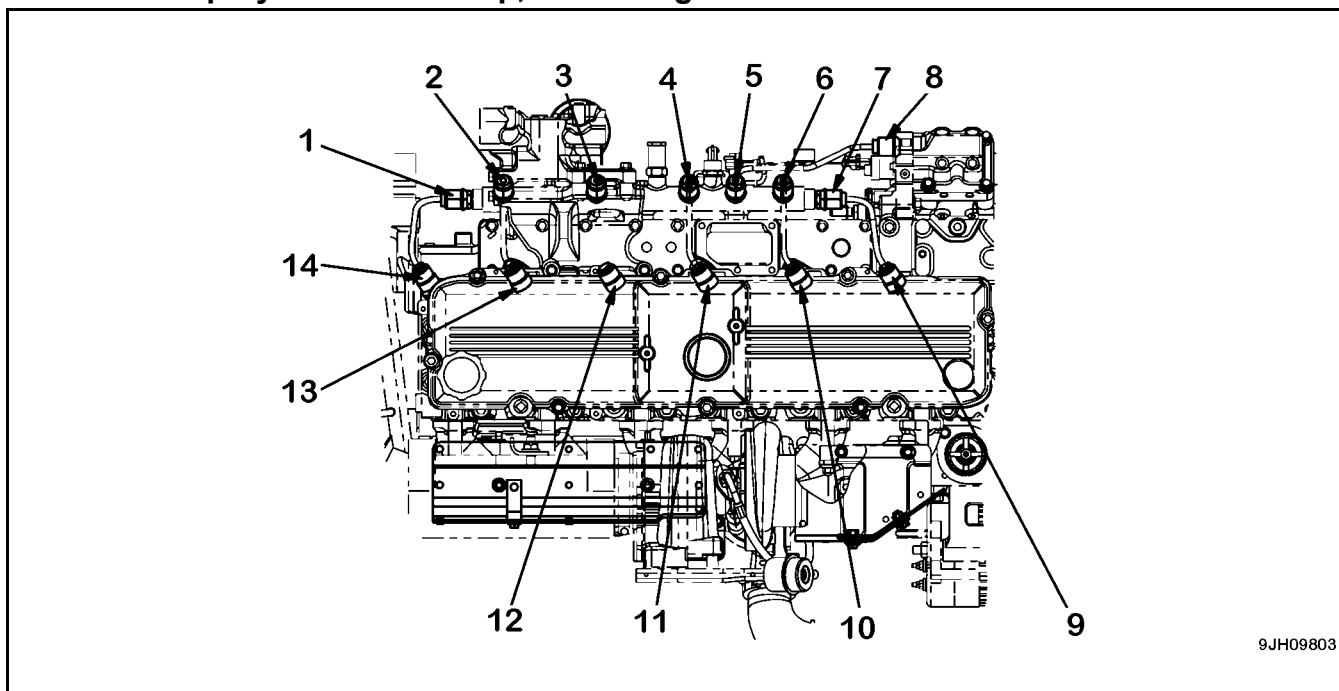
Check High-Pressure Piping Clamp, Hardening Of Rubber



9JH09802

Check clamp (1) visually and touch by hand to check to be sure there are no loose bolts or hardening of the rubber. If there are any loose bolts or hardened rubber, please contact your Komatsu distributor for replacement.

Check Fuel Spray Prevention Cap, Hardening Of Rubber



9JH09803

Check to be sure there are no missing fuel spray prevention caps (1) - (14) and that there is no hardening of the rubber. If there are any missing caps or hardened rubber, please contact your Komatsu distributor for replacement.

MAINTENANCE

Every 5000 Hours Maintenance

Maintenance for every 250, 500, and 1000 hours service should be performed at this time.

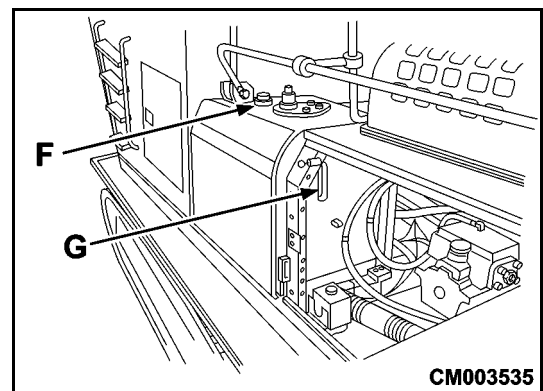
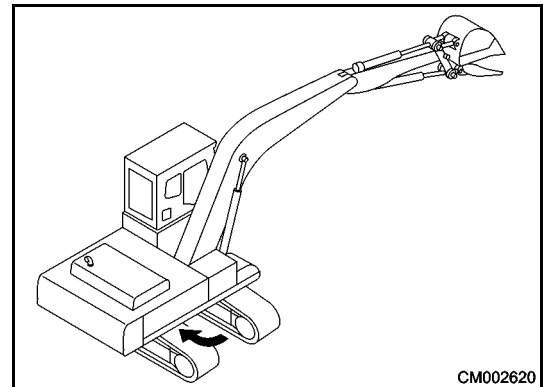
Change Oil In Hydraulic Tank

WARNING

The parts and oil are hot after the engine is stopped and may cause serious burns. Wait for the temperature to cool before changing the oil in the hydraulic tank.

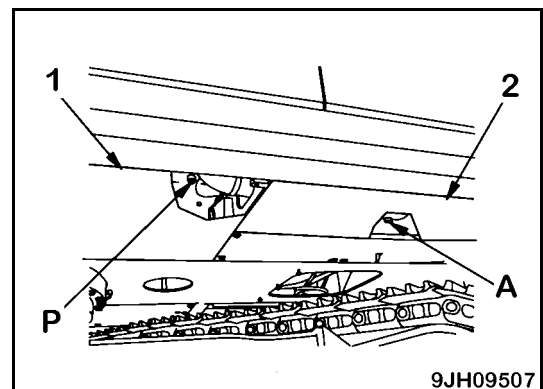
When the oil filler cap is removed, oil may spurt out so turn the cap slowly to release the internal pressure, then remove it carefully.

- If the machine is equipped with a hydraulic breaker, the hydraulic oil will deteriorate much faster than during normal bucket operations.
 - Refill, capacity: 188 ℓ (49.67 US gal)
 - Prepare a flex handle (for the socket wrench).
- 1. Swing the upper structure so that hydraulic tank drain plug (P) and drain plug (A) at the bottom of the pump suction tube are in the middle between the left and right tracks.
- 2. Retract the arm and bucket cylinders, then lower the boom and put the teeth in contact with the ground.
- 3. Set the lock lever to the LOCK position and stop the engine.
- 4. Remove the cap of oil filler port (F) at the top of the hydraulic tank.
- 5. Remove the undercover(1) and (2).
- 6. Set the oil container under the drain plug under the machine.
Using the flex handle, remove drain plug (P), (A) and drain the oil.
Check the O-ring installed to plug (P), (A), and if it is damaged, replace the O-ring. After draining the oil, tighten drain plug (P), (A).



Torque of drain plug (P) and (A): 58.8 - 78.5 N•m (43.3 - 57.9 lbf/ft)

- When removing drain plug (P), (A), be careful not to get oil on yourself.
 - First, remove drain plug (P) at the bottom of the tank, then remove drain plug (A) at the suction tube. If they are removed in this order, almost the same amount of oil can be drained.
7. Add the replacement amount of oil through oil filler (F). Check to be sure the oil level is between the H and L lines on the sight gauge (G).
 8. Install the undercover (1) and (2).
 9. Bleed air from the hydraulic circuit.



Every 8000 Hours Maintenance

Maintenance for every 100, 250, 500, 1000, 2000 and 4000 hours service should be carried out at the same time.

Replace High-pressure Piping Clamp

Contact your Komatsu distributor to have the engine high-pressure clamps replaced.

Replace Fuel Spray Prevention Cap

Contact your Komatsu distributor to have the fuel spray prevention cap replaced.

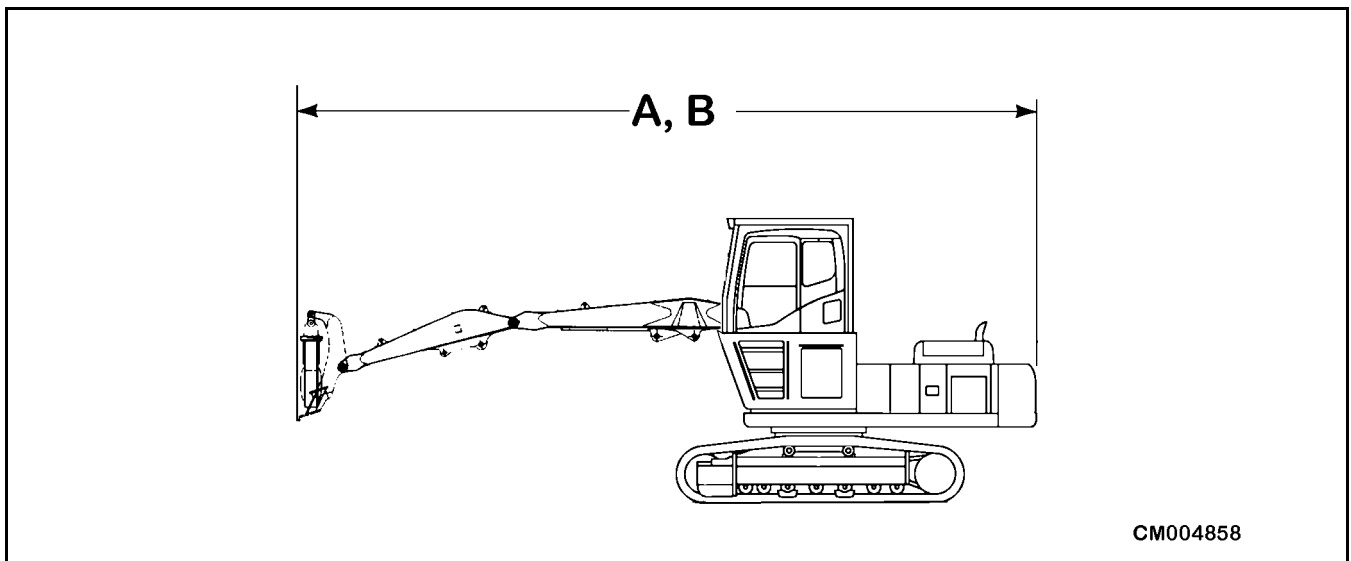
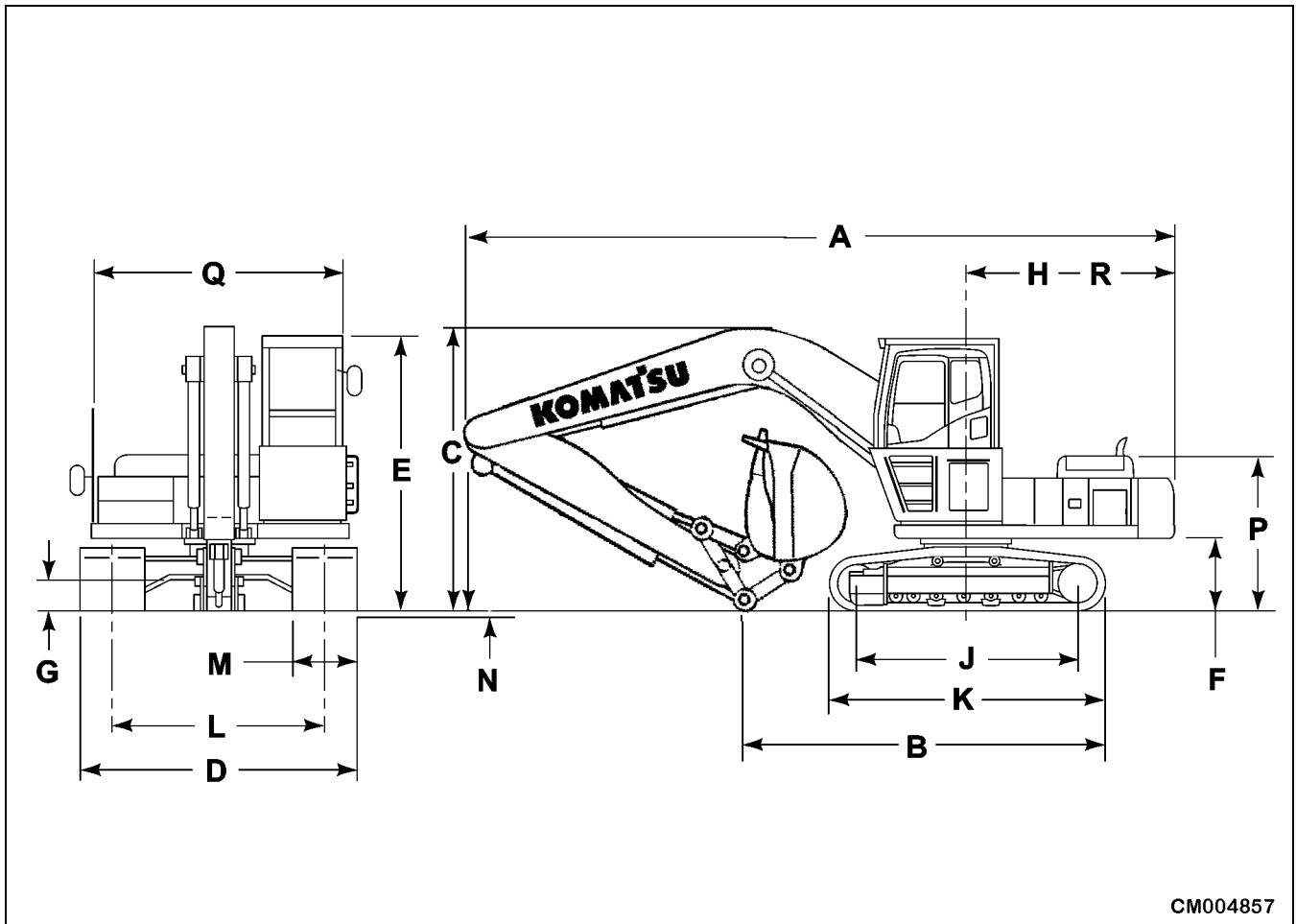
MEMORANDUM

SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS

Dimensions



SPECIFICATIONS

Item		Unit	PC350LL-7E0 Road Builder* w/3185 mm Arm	PC350LL-7E0 Log Loader**
	Operating weight	kg	44723	45151
	Bucket capacity	m ³	0.88 to 2.00	
	Diesel engine	---	KOMATSU SAA6D114E-3 In-Line six	
	Engine horsepower	kW (HP) @ rpm	184 (247) @ 1950	
	Work equipment		6470 (21' 3") Boom 3185 (10' 5") Arm	42' Komatsu Forest Front w/o Grapple
A	Overall length		11049 (36' 3")	15692 (51' 6")
B	Length on ground - transport		5756 (18' 11")	15692 (51' 6")
C	Overall height		4018 (13' 2")	4844 (15' 11")
D	Overall [crawler] width		3632 (11' 11")	
E	Height of cab:		---	---
	15 in. Riser		P4018 (13' 2")	4006 (13' 2")
	48 in. Riser		4856 (15' 11")	☆4844 (15' 11")
	48 in. Riser-Tilted Transport Position		3667.5 (12' 0")	☆3655.5 (12' 0")
	60 in. Riser		5161	5149
	60 in. Riser-Tilted Transport Position		3667.5 (12' 0")	3655.5 (12' 0")
F	Ground clearance, counterweight	mm (ft & in)	1467.5 (4' 10")	1455.5 (4' 9")
G	Ground clearance, minimum		773 (2' 6")	761 (2' 6")
H	Tail swing radius		3450 (11' 4")	
J	Track length on ground		3996 (13' 1")	
K	Length of track		5044 (16' 7")	5026 (16' 6")
L	Track gauge		2932 (9' 7")	
D	Width of crawler		3632 (11' 11")	
M	Shoe width		700 (2' 4")	
N	Grouser height		46 (1.8")	37 (1.5")
	Shoe plate thickness		25 (11.8")	13 (0.5")
P	Machine cab height (engine hood)		2896 (9' 6")	2884 (9' 6")
Q	Machine cab width		3521 (11' 7")	
R	Distance, Swing center to rear end		3403 (11' 2")	
	Travel speed			
	Low	km/h	2.9	2.9
	Medium		4.0	4.0
	High		5.0	5.0

SPECIFICATIONS

	Swing speed	rpm	7.5	7.5
--	-------------	-----	-----	-----

☆ Standard configuration.

* **Road Builder** includes high-wide track frame, 700 mm double grouser shoe, heavy counterweight, battery box guard, cab riser (15 inch), 1.4 m³ (1.83 yd³) bucket, thumb on bucket.

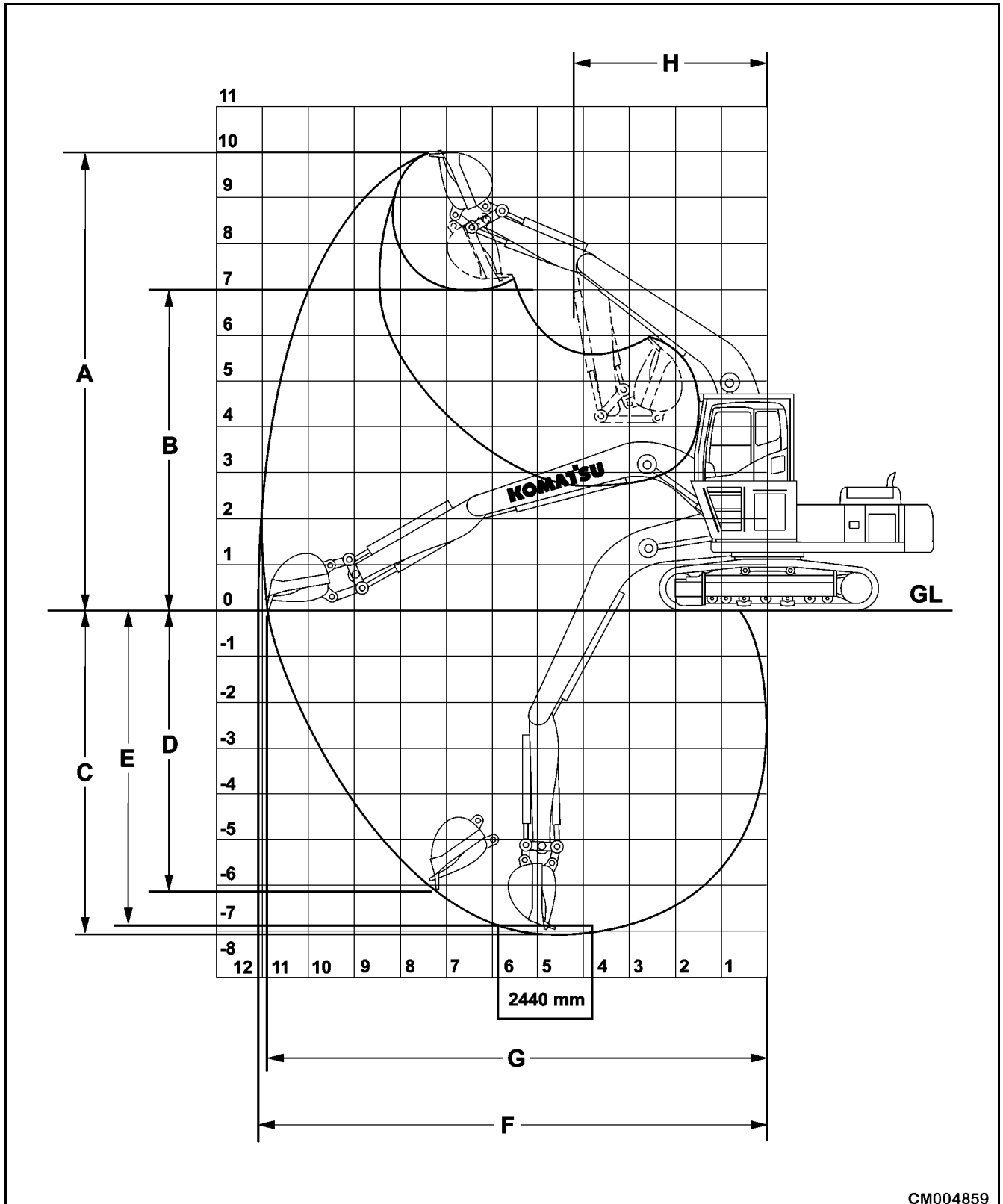
** **Log Loader** includes high-wide track frame, 700 mm triple grouser shoe, heavy counterweight, battery box guard, cab riser (48 inch), Komatsu Forest 42 ft Heel Rack Front, No Grapple.

MEMORANDUM

SPECIFICATIONS

Working Range

Road Builder

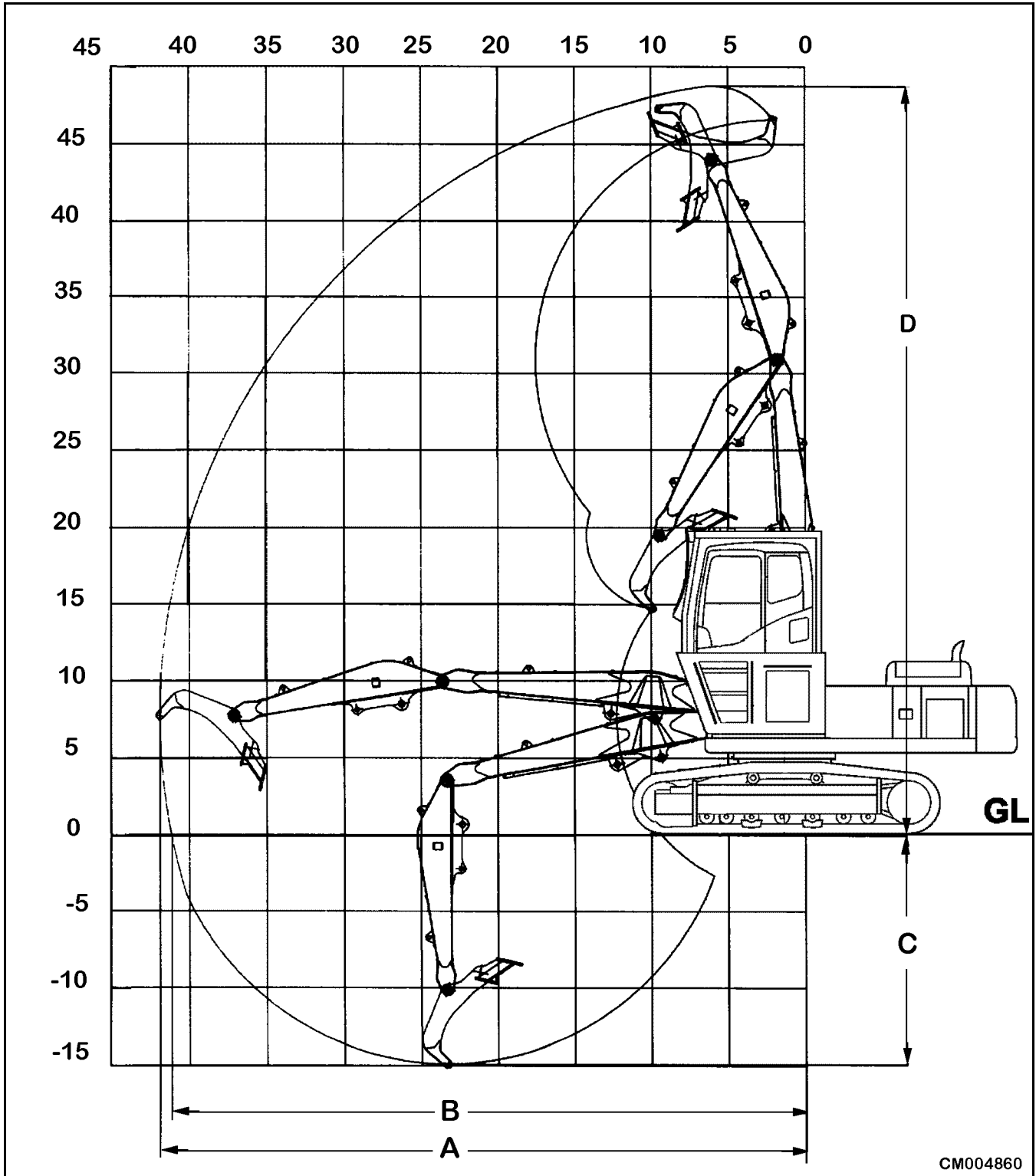


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		Working ranges	Unit	PC350LL-7E0 ROAD BUILDER	
				3185 mm Arm	
A		Max digging height	mm		10390
B		Max dumping height			7360
C		Max digging depth			7080
D		Max vertical wall depth			6145
E		Max digging depth			6845
F		Max digging reach			11090
G		Max reach at ground level			10830
H		Min swing radius			4320
SAE		Bucket digging force	kN	@ power max	200
		Arm crowd force			165
ISO		Bucket digging force			227
		Arm crowd force			171

SPECIFICATIONS

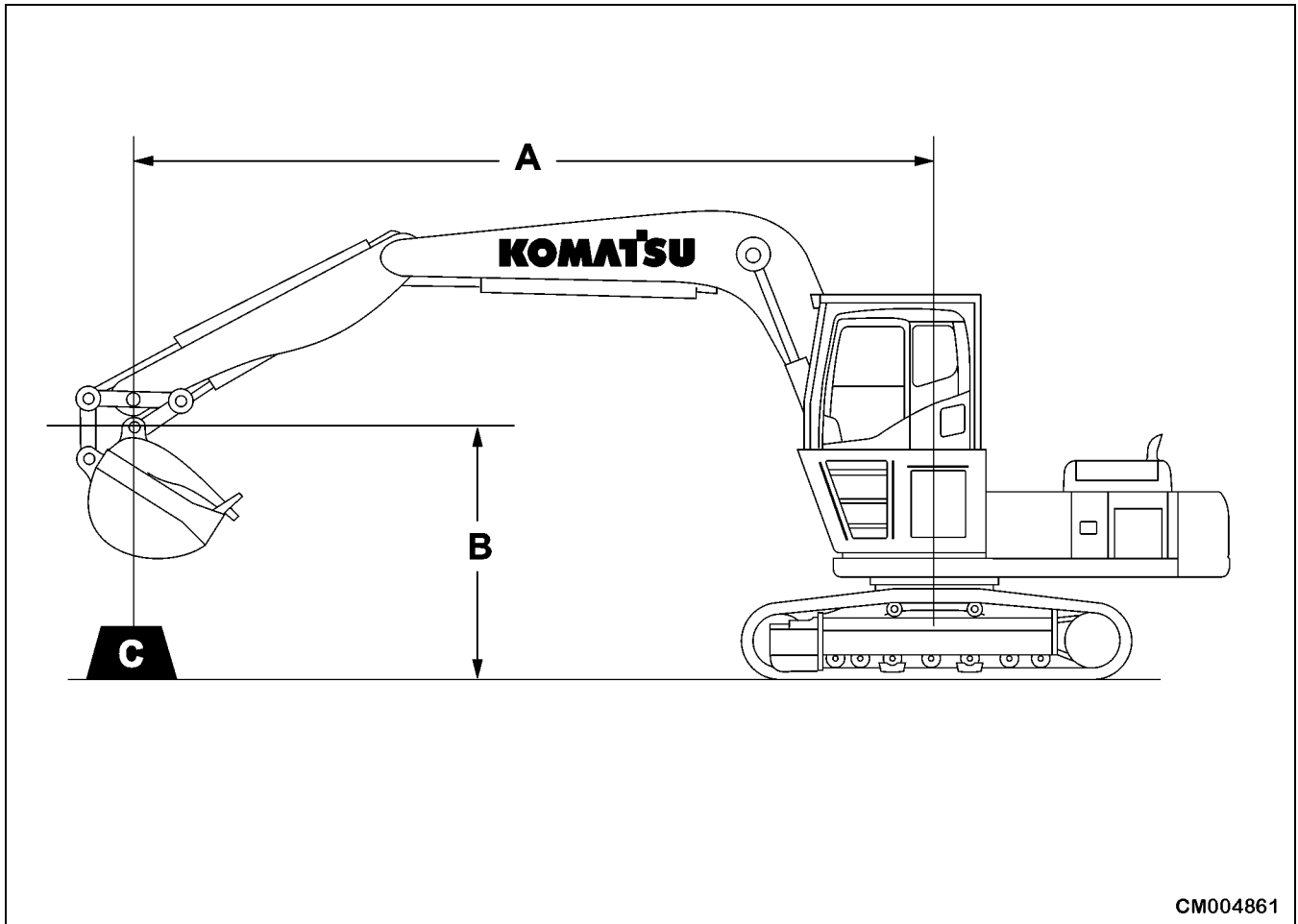
Log Loader



Working ranges		Unit	PC350LL-7E0 LOG LOADER
			42 ft Komatsu Forest Front
A	Max reach	mm	12767
B	Max reach at ground level		12544
C	Max depth		4546
D	Max height		14838

SPECIFICATIONS

Lifting Capacity



CM004861

Equipment

Boom	6470 mm
Bucket	1.4 m ³
Bucket weight	997 kg
Bucket thumb weight	748 kg
Track shoes	700 mm double
Mode	Lifting
Counterweight	Heavy
Cab riser	15 in

Description

A	Reach from swing center
B	Bucket hook height
C	Lifting capacity
Cf	Rating over front
Cs	Rating over side
◇	Rating at maximum reach

PC350LL-7E0 Road Builder

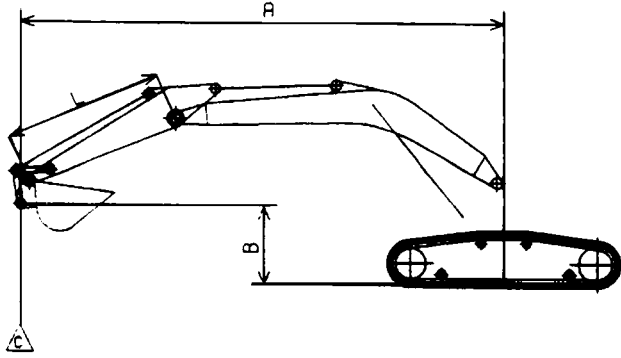
Arm: 3185 mm

Shoe: 700 mm Double Grouser

Bucket with thumb: 1.4 m³ (1.83 yd³)

(SAE heaped) Weight: 997 kg (2198 lb)

LIFTING CAPACITY



L : 3187mm
 A : REACH FROM SWING CENTER
 B : BUCKET HOOK HEIGHT
 C : LIFTING CAPACITY

CF: RATING OVER FRONT
 CS: RATING OVER SIDE
 ● : RATING AT MAXIMUM REACH

UNIT:LB(KG)

A \ B	MAX	● MAX		30Ft(9.1)		25Ft(7.6)		20Ft(6.1)		15Ft(4.6)		10Ft(3.0)	
		CF	CS	CF	CS	CF	CS	CF	CS	CF	CS	CF	CS
25Ft (7.6)	26Ft (8.0)	10550 (4750)	10550 (4750)			13750 (6250)	13750 (6250)						
20Ft (6.1)	29Ft (8.8)	10450 (4750)	10450 (4750)			15000 (6800)	15000 (6800)						
16Ft (4.6)	31Ft (9.3)	10850 (4900)	10850 (4900)	13400 (6050)	13400 (6050)	16250 (7350)	16250 (7350)	19250 (8750)	19250 (8750)				
10Ft (3.0)	31Ft (9.6)	11700 (5300)	11700 (5300)	15050 (6800)	14200 (6450)	17750 (8050)	17750 (8050)	22200 (10050)	22200 (10050)	30900 (14000)	30900 (14000)		
5Ft (1.5)	31Ft (9.6)	13050 (5900)	12900 (5850)	15550 (7050)	13900 (6300)	19000 (8600)	18600 (8400)	24650 (11150)	24650 (11150)	34950 (15850)	34950 (15850)		
0Ft (0.0)	31Ft (9.3)	15150 (6850)	13300 (6050)	15500 (7050)	13700 (6200)	19650 (8900)	18150 (8200)	25650 (11600)	25450 (11500)	35850 (16250)	35850 (16250)	19600 (8900)	19600 (8900)
-5Ft (-1.5)	29Ft (8.8)	15450 (7000)	14550 (6600)			19100 (8650)	17950 (8100)	25150 (11400)	25100 (11400)	34250 (15500)	34250 (15500)	31550 (14300)	31550 (14300)
-10Ft (-3.0)	26Ft (7.9)	15600 (7050)	15600 (7050)			16700 (7550)	18700 (7650)	22650 (10250)	22650 (10250)	30350 (13750)	30350 (13750)	41350 (18750)	41350 (18750)
-15Ft (-4.6)	22Ft (6.6)	14900 (6750)	14900 (6750)					17050 (7700)	17050 (7700)	23350 (10600)	23350 (10600)	30600 (13850)	30600 (13850)
-20Ft (-6.1)													

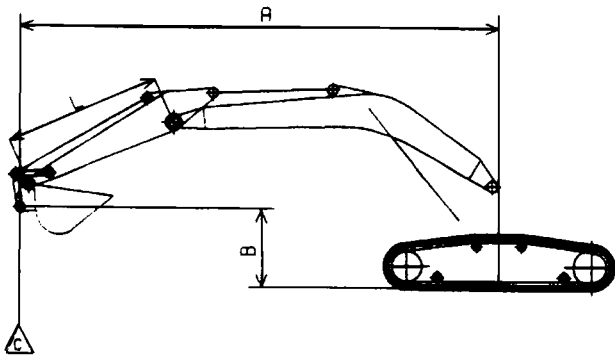
* LOAD IS LIMITED BY HYDRAULIC CAPACITY RATHER THAN TIPPING. RATINGS ARE BASED ON ISO STANDARD No.10567
 RATED LOADS DO NOT EXCEED 87% OF HYDRAULIC LIFT CAPACITY OR 75% OF TIPPING LOAD.

CM003541

● Continued on next page.

SPECIFICATIONS

LIFTING CAPACITY



L : 3187mm
 A : REACH FROM SWING CENTER
 B : BUCKET HOOK HEIGHT
 C : LIFTING CAPACITY

CF:  RATING OVER FRONT

CS:  RATING OVER SIDE

⊗ : RATING AT MAXIMUM REACH

UNIT: LB(KG)

B \ A	MAX	5Ft (1.5)											
		CF	CS	CF	CS	CF	CS	CF	CS	CF	CS	CF	CS
25Ft (7.6)													
20Ft (6.1)													
16Ft (4.6)													
10Ft (3.0)													
5Ft (1.5)													
0Ft (0.0)													
-5Ft (-1.5)		⊗22400 (10150)	⊗22400 (10150)										
-10Ft (-3.0)		⊗33850 (15350)	⊗33850 (15350)										
-15Ft (-4.6)													
-20Ft (-6.1)													

* LOAD IS LIMITED BY HYDRAULIC CAPACITY RATHER THAN TIPPING. RATINGS ARE BASED ON ISO STANDARD No.10567
 RATED LOADS DO NOT EXCEED 87% OF HYDRAULIC LIFT CAPACITY OR 75% OF TIPPING LOAD.

CM003544

PC350LL-7E0 Komatsu Forest Lift Chart

Work equipment: 42 ft, Shoe: 700 mm Triple Grouser, Counterweight: Heavy, Cab Riser: 48 inch, Mode: lifting

Boom Length: 7061 mm

L : 4178 mm LENGTH ARM

A : REACH FROM SWING CENTER

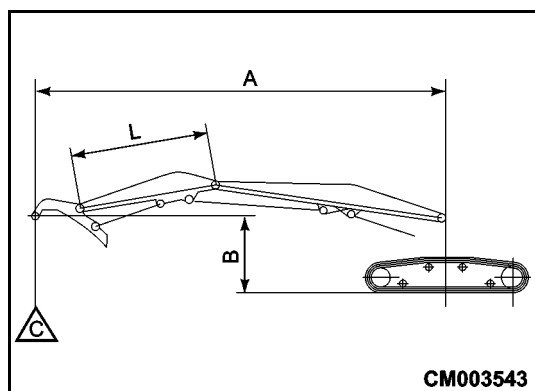
B : GRAPPLE MOUNT PIN HEIGHT

C : LIFTING CAPACITY

CF :  RATING OVER FRONT

CS :  RATING OVER SIDE

❖ : RATING AT MAXIMUM REACH



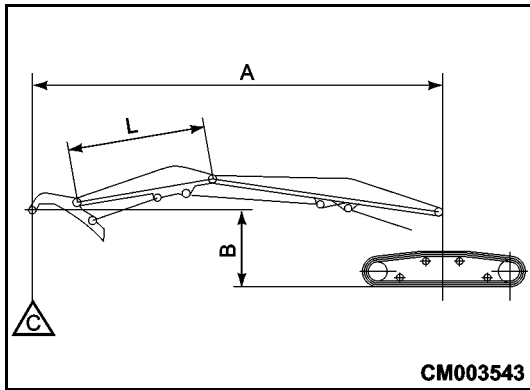
UNIT: lb (kg)

A	MAX	❖ MAX		10ft (12.2)		35ft (10.7)		30ft (9.1)		25ft (7.6)	
		CF	CS	CF	CS	CF	CS	CF	CS	CF	CS
40ft (12.2)	25ft (7.7)	*26150 (11850)	22150 (10050)							*26950 (12200)	22450 (10150)
35ft (10.7)	31ft (9.31)	21600 (9800)	16400 (7400)					22450 (10150)	17050 (7750)	*26950 (11950)	23400 (10600)
30ft (9.1)	34ft (10.5)	17950 (8100)	13600 (6150)					22950 (10400)	17500 (7950)	*25900 (11750)	23650 (10700)
25ft (7.6)	37ft (11.4)	15850 (7200)	11950 (5400)			17750 (8050)	13500 (6100)	22950 (10400)	1750 (7950)	*26300 (11950)	23550 (10650)
20ft (6.1)	39ft (12.0)	14600 (6600)	10950 (4950)			17750 (8050)	13500 (6100)	22750 (10300)	17350 (7850)	*27450 (12450)	23150 (10500)
15ft (4.6)	40ft (12.3)	13850 (6250)	10400 (4700)			17550 (7950)	13300 (6000)	22400 (10150)	17000 (7700)	*28950 (13100)	22500 (10200)
10ft (3.0)	41ft (12.5)	13500 (6100)	100100 (4550)	14100 (6350)	10550 (4800)	17350 (7850)	13100 (5900)	21950 (9950)	16550 (7500)	28950 (13100)	21750 (9850)
5ft (1.5)	41ft (12.5)	13500 (6100)	10100 (4550)	14000 (6350)	10500 (4750)	17100 (7750)	12850 (5800)	21500 (9750)	16150 (7300)	28150 (12750)	21000 (9500)
0ft (0.0)						16900 (7650)	12650 (5750)	21100 (9550)	15800 (7150)	27500 (12450)	20400 (9250)
-5ft (-1.5)						*16750 (7600)	12600 (5700)	20900 (9450)	15600 (7050)	27150 (12300)	20050 (9100)
-10ft (-3.0)								*18000 (8150)	15550 (7050)	*23500 (10650)	19950 (9050)
-15ft (-4.6)											

* Load is limited by hydraulic capacity rather than tipping. Ratings are based on SAE standard No. J2417.
Rated loads do not exceed 87% of hydraulic lift capacity or 75% of tipping load.

● Continued on next page.

SPECIFICATIONS



Boom Length: 7061 mm
 L : 4178 mm LENGTH ARM
 A : REACH FROM SWING CENTER
 B : BUCKET HOOK HEIGHT
 C : LIFTING CAPACITY

CF :  RATING OVER FRONT

CS :  RATING OVER SIDE

❖ : RATING AT MAXIMUM REACH

UNIT: lb (kg)

A	MAX	20ft (6.1)		15ft (4.6)	
		CF	CS	CF	CS
40ft (12.2)	25ft (7.7)	*31250 (14150)	*31250 (14150)		
35ft (10.7)	31ft (9.31)	*29300 (13250)	*29900 (13250)		
30ft (9.1)	34ft (10.5)	*28900 (13100)	*28900 (13100)		
25ft (7.6)	37ft (11.4)	*29750 (13500)	*29750 (13500)		
20ft (6.1)	39ft (12.0)	*31850 (14450)	*31850 (14450)		
15ft (4.6)	40ft (12.3)	*34800 (15800)	31750 (14400)	*33650 (15250)	*33650 (15250)
10ft (3.0)	41ft (12.5)	*37800 (17150)	30350 (13750)	*50550 (77900)	47450 (71500)
5ft (1.5)	41ft (12.5)	*39550 (17900)	29000 (13150)	*31250 (14150)	*31250 (14150)
0ft (0.0)		38500 (17450)	28000 (12700)	*19450 (8800)	*19450 (8800)
-5ft (-1.5)		*35650 (16150)	27450 (12450)	*22850 (10350)	*22850 (10350)
-10ft (-3.0)		*29600 (13400)	27300 (12400)		
-15ft (-4.6)					

* Load is limited by hydraulic capacity rather than tipping. Ratings are based on SAE standard No. J2417.
 Rated loads do not exceed 87% of hydraulic lift capacity or 75% of tipping load.

OPTIONS, ATTACHMENTS

GENERAL PRECAUTIONS

Install only Komatsu authorized attachments and options; those not authorized by Komatsu authorized will affect the life of the machine and could cause safety problems.

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.

Precautions Related to Safety

- 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 the attachment unless you are sure that you have understood the guidelines completely.
If you lose the instruction manual, 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 upon a leader and determine the signals to be used.
- Do not perform swinging operations to the side with a heavy load on the attachment. This is particularly dangerous on slopes.
- A machine equipped with a breaker instead of a bucket has a heavier load at the front of the work equipment and is unstable. To avoid the danger of tipping over, do not perform operations with the attachment swung to the side.
- When an attachment is installed, the swing range and center of gravity of the machine is different, and the machine may move in unexpected ways. Be sure that you understand the condition of the machine with a particular attachment.
- Place a fence around the machine to prevent people from entering the work area, before beginning operations. Never operate the machine when there are people near by.

To prevent serious mishaps caused by accidental operation, do not rest your foot on the pedal unless the pedal is locked. Use the foot pedal only when traveling or operating attachments.

Precautions for Attachment Removal and Installation

- When removing or installing the attachment, do as follows to ensure safety.
- Remove and install attachments on firm, level ground.
- When working with two or more workers, determine the signals and follow these during the operation.
- Use a crane when you lift or carry heavy objects (more than 25 kg or 55 lb).
- When removing heavy components, 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 leave a load raised by a crane. Prepare a stand and ensure that the condition is safe.
- When removing or installing an 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.

Remark

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 Using Large Implements

When long or heavy work equipment is installed, remember the following precautions. Before starting operations, move the machine to a safe place and carry out a test operation to make sure that you fully understand the movement, center of gravity, and working range of the machine.

- Do not swing the work equipment if the machine is at an angle. If the work equipment is swung with the machine at an angle, there is danger that the machine will tip over.
- Always maintain a safe distance from obstacles in the surrounding area when operating. If long work equipment is installed, the working range becomes larger.
- If heavy work equipment is installed, pay careful attention to the following precautions.
- The swing overrun (the distance the work equipment moves before completely stopping after the swing brake is applied) will be greater. There is danger of hitting objects if the swing overrun is miscalculated, so allow extra space to the swing position when swinging.
- The hydraulic drift of the work equipment (the amount of the work equipment moves down under its own weight when it is stopped in a raised position) also becomes greater. Do not stop the work equipment in a raised position; always lower it to the ground.
- Do not swing, lower, or stop the work equipment suddenly. There is danger that the machine may tip over. Do not suddenly extend or retract the boom cylinder. The shock may cause the machine to tip over.

Handling Bucket with Hook

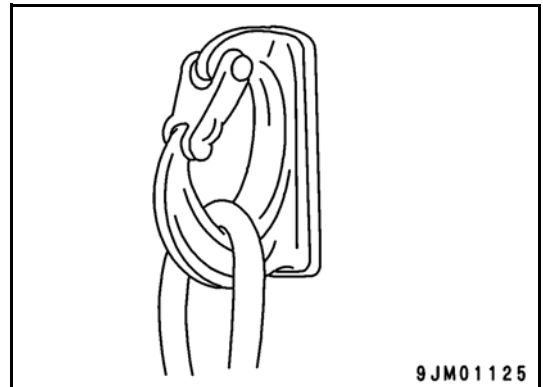
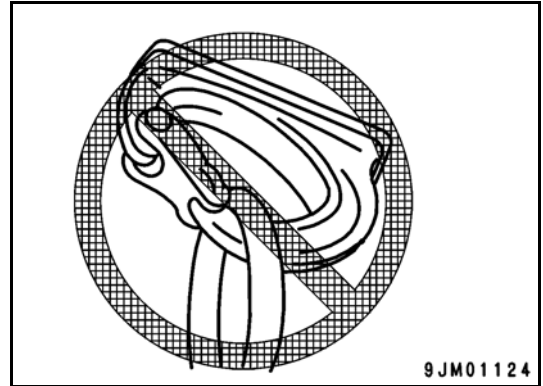
Hook Condition

Check that there is no damage to the hook, stopper, or hook mount. If there is any problem, contact your Komatsu distributor.

Prohibited Operations

Operations with Care

- When carrying out lifting operations, reduce the engine speed and use the L mode (for fine-control operations).
 - Depending on the posture of the work equipment, there is the danger that the wire or load may slip off the hook.
 - Always be careful to maintain the correct hook angle to prevent this from happening.
-
- Never travel the machine while lifting a load.
 - If the bucket with hook is turned and used for operations, it will hit the arm during dumping operations, be careful when using it.
 - If you are planning to newly install a hook, contact your Komatsu distributor.



COMBINATIONS OF WORK EQUIPMENT

⚠ 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. 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.

This table lists the combination of attachments which can be installed to the long arm and short arm.

○ Up to 1588 kg/m³

◇ Up to 1134 kg/m³

☆ Up to 1361 kg/m³

□ Up to 907 kg/m³

	Komatsu Bucket	Capacity m ³	Lip Width mm	Weight kg	No. of Teeth	Arm	
						3185 mm	4020 mm
1	MHD w/Parabolic or Series 5 Teeth	0.85	762	1066	4	○	○
2	MHD w/Parabolic or Series 5 Teeth	1.08	914	1156	4	○	○
3	MHD w/Parabolic or Series 5 Teeth	1.32	1067	1294	5	○	○
4	MHD w/Parabolic or Series 5 Teeth	1.54	1219	1394	5	☆	○
5	MHD w/Parabolic or Series 5 Teeth	1.78	1372	1524	6	◇	□
6	SHD w/Parabolic or Series 5 Teeth	0.94	762	1349	4	○	○
7	SHD w/Parabolic or Series 5 Teeth	1.16	914	1452	4	○	○
8	SHD w/Parabolic or Series 5 Teeth	1.40	1067	1605	5	○	○
9	SHD w/Parabolic or Series 5 Teeth	1.64	1219	1719	5	○	◇
10	SHD w/Parabolic or Series 5 Teeth	1.90	1372	1878	6	☆	□
11	SHD w/KVX M48 Teeth	0.94	762	1280	3	○	○
12	SHD w/KVX M48 Teeth	0.94	762	1309	4	○	○
13	SHD w/KVX M48/52 Teeth	0.94	762	1309	3	○	○
14	SHD w/KVX M48 Teeth	1.16	914	1382	3	○	○
15	SHD w/KVX M48 Teeth	1.16	914	1412	4	○	○
16	SHD w/KVX M48/52 Teeth	1.15	914	1473	3	○	○
17	SHD w/KVX M48 Teeth	1.40	1067	1528	4	○	○
18	SHD w/KVX M48 Teeth	1.40	1067	1557	5	○	○
19	SHD w/KVX M48/52 Teeth	1.44	1067	1667	3	○	○
20	SHD w/KVX M48/52 Teeth	1.44	1067	1731	4	○	○
21	SHD w/KVX M48 Teeth	1.64	1219	1640	4	○	○
22	SHD w/KVX M48 Teeth	1.64	1219	1669	5	○	○
23	SHD w/KVX M48/52 Teeth	1.74	1219	1854	4	○	○
24	SHD w/KVX M48 Teeth	1.90	1372	1786	5	☆	◇
	Komatsu 'H' Series Bucket	Capacity m³	Lip Width mm	Weight kg	No. of Teeth	Arm	
						3185 mm	4020 mm
1	HD w/Parabolic or Series 5 Teeth	0.88	762	1029	4	○	○
2	HD w/Parabolic or Series 5 Teeth	1.11	914	1123	4	○	○
3	HD w/Parabolic or Series 5 Teeth	1.35	1067	1246	5	○	○
4	HD w/Parabolic or Series 5 Teeth	1.58	1219	1313	5	☆	◇
5	HD w/Parabolic or Series 5 Teeth	1.82	1372	1425	6	◇	□
6	SHD w/Parabolic or Series 5 Teeth	0.84	762	1157	4	○	○
7	SHD w/Parabolic or Series 5 Teeth	1.07	914	1249	4	○	○
8	SHD w/Parabolic or Series 5 Teeth	1.30	1067	1394	5	○	○

OPTIONS, ATTACHMENTS

9	SHD w/Parabolic or Series 5 Teeth	1.54	1219	1504	5	☆	◇
10	SHD w/Parabolic or Series 5 Teeth	1.78	1372	1572	6	◇	□

SELECTION OF TRACK SHOES

Select suitable track shoes to match the operating conditions.

- Confirm the category from the list of uses in **Table 1**, then use **Table 2** to select the shoe.
- Categories **B** and **C** are wide shoes, so there are limitations on their use. When using these shoes, check the precautions, then investigate and study fully the conditions of use to confirm that these shoes are suitable.
- When selecting the shoe width, select the narrowest shoe possible that will give the required flotation and ground pressure. If a wider shoe than necessary is used, the load on the track will increase, and this will cause the shoes to bend, links to crack, pins to break, shoe bolts to come loose, and various other problems.

Table 1

Category	Use	Precautions when using
A	Rocky ground, river beds, normal soil	On rough ground with large obstacles such as boulders or fallen trees, travel at low speed.
B	Normal soil, soft ground	These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. Travel at Hi or Mi speed only on flat ground, and if it is impossible to avoid going over obstacles, shift down and travel at half speed in Lo.
C	Extremely soft or swampy ground	Use the shoes only in places where the machine sinks and it is impossible to use A or B shoes. These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. Travel at Hi or Mi speed only on flat ground, and if it is impossible to avoid going over obstacles, shift down and travel at half speed in Lo.

Table 2

	Specifications	Category
Standard	700 mm triple grouser	B
Optional	600 mm double grouser	A
Optional	600 mm triple grouser	A
Optional	700 mm double grouser	B
Optional	800 mm triple grouser	C