TEN00189-01

Operation & Maintenance Manual

HYDRAULIC
EXCAVATOR

GALEO

PC138US -8
PC138USLC-8

SERIAL NUMBERS PC138US- 20001 and up
PC138USLC- 20001

ecot3

NOTICE

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

⚠ WARNING

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

KOMATSU

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FOREWORD

CALIFORNIA

Proposition 65 Warning

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

CALIFORNIA

Proposition 65 Warning

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

Wash hands after handling.

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FOREWORD

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

⚠ WARNING

Before beginning operation or maintenance, operators and maintenance personnel must always observe the following points.

- **Read this manual thoroughly and understand its contents fully.**
- **Read the safety messages and safety labels given in this manual carefully so that they should be understood fully.**

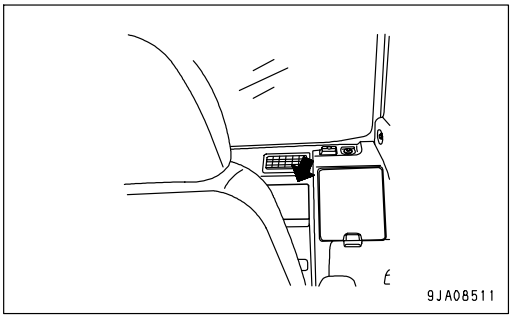
Keep this manual at the storage location for the Operation and Maintenance Manual given below so that all personnel involved in working on the machine can consult it periodically.

In case this manual should be lost or damaged, immediately contact Komatsu or your Komatsu distributor to obtain a new copy.

When you sell the machine, make sure that this manual should be provided to the new owner together with the machine.

In this manual, measurements are expressed in international standard units (SI). For the reference purpose, weight units used in the past are also displayed in ( ).

Storage location for the Operation and Maintenance Manual:
Magazine box at rear of cab



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EMISSION CONTROL WARRANTY

EMISSION CONTROL WARRANTY STATEMENT (APPLIES TO CANADA ONLY)

1. **Products Warranted**

Komatsu America International Company, Komatsu Mining Systems Inc. and Komatsu Utility Corporation (collectively "Komatsu") produce and/or market products under brand names of Komatsu, Dresser, Dressta, Haulpak and Galion. This emissions warranty applies to new engines bearing the Komatsu name installed in these products and used in Canada in machines designed for industrial off-highway use. This warranty applies only to these engines produced on or after January 1, 2000. This warranty will be administered by Komatsu distribution in Canada.

2. **Coverage**

Komatsu warrants to the ultimate purchaser and each subsequent purchaser that the engine is designed, built and equipped so as to conform, at the time of sale by Komatsu, with all U.S. Federal emission regulations applicable at the time of manufacture and that it is free from defects in workmanship or material which would cause it not to meet these regulations within five years or 3,000 hours of operation, whichever occurs first, as measured from the date of delivery of the engine to the ultimate purchaser.

3. **Limitations**

Failures, other than those resulting from defects in materials or workmanship, are not covered by this warranty. Komatsu is not responsible for failures or damage resulting from what Komatsu determines to be abuse or neglect, including, but not limited to: operation without adequate coolant or lubricants; over fueling; over speeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the engine. Komatsu is also not responsible for failures caused by incorrect fuel or by water, dirt or other contaminants in the fuel. Komatsu is not responsible for non-engine repairs, "downtime" expense, related damage, fines, all business costs or other losses resulting from a warrantable failure.

KOMATSU IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

This warranty, together with the express commercial warranties, are the sole warranties of Komatsu. **THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICUALR PURPOSE.**

GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS

ÉNONCÉ DE GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS (APPLICABLE AU CANADA SEULEMENT):

1. **Produits garantis**:

Komatsu America International Company, Komatsu Mining Systems Inc. et Komatsu Utility Corporation (collectivement Komatsu) produisent et/ou font la mise en marché de produits portant les noms de marque Komatsu, Dresser, Dressta, Haulpak et Galion. Cette garantie sur les émissions s'applique à tous les nouveaux moteurs portant le nom Komatsu, installés dans ces produits et utilisés au Canada dans des machines conçues pour utilisation industrielle non-routière. Cette garantie s'applique seulement sur les moteurs produits à partir du 1er Janvier 2000. Cette garantie sera administrée par la distribution de Komatsu au Canada.

2. **Couverture:**

Komatsu garantit à l'acheteur ultime et chaque acheteur subséquent que le moteur est conçu, construit et équipé en toute conformité, au moment de la vente par Komatsu, avec toutes les Réglementations fédérales américaines sur les émissions applicables au moment de la fabrication et qu'il est exempt de défauts de construction ou de matériaux qui auraient pour effet de contrevenir à ces réglementations en dedans de 5 ans ou 3000 heures d'opération, mesuré à partir de la date de livraison du moteur au client ultime.

3. **Limitations:**

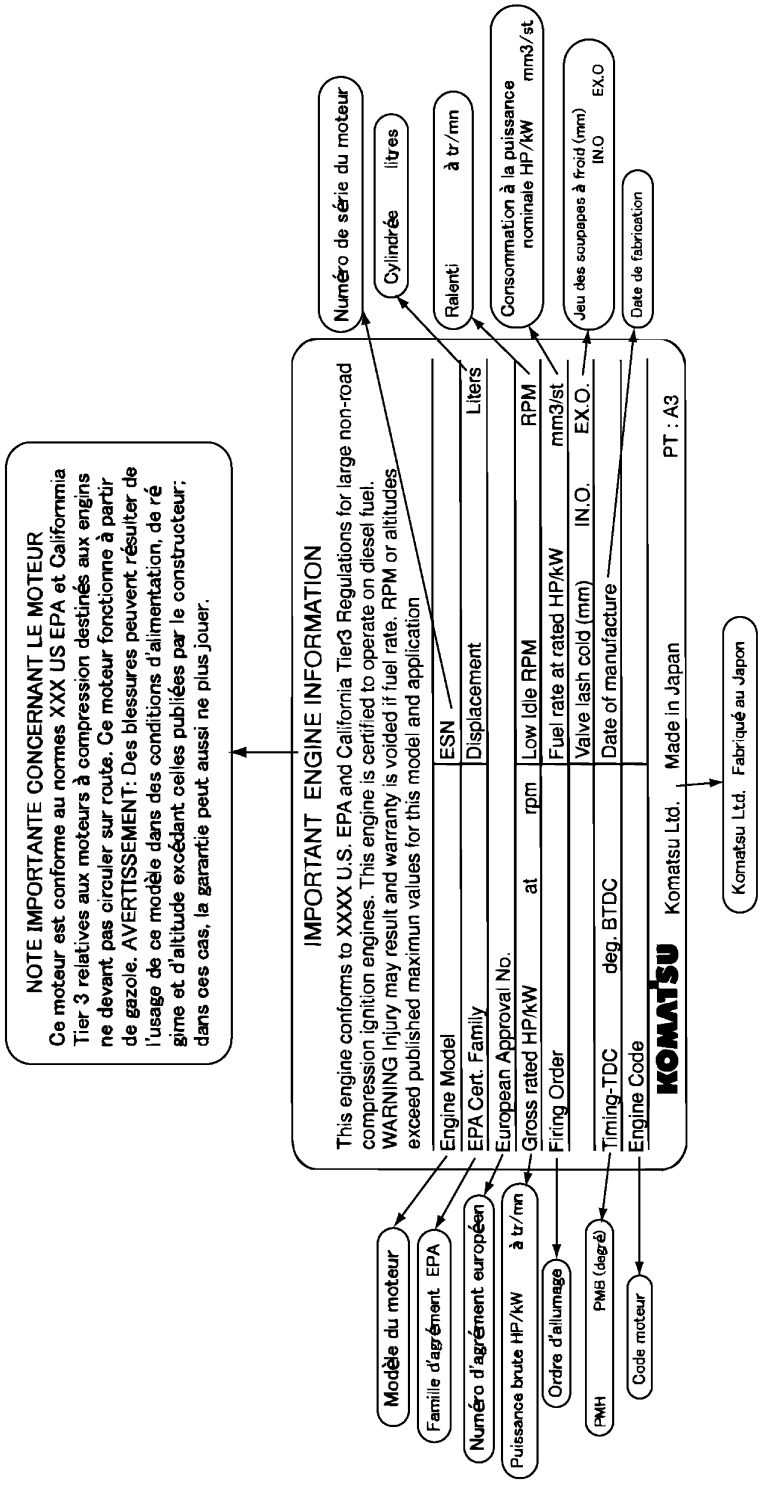
Les bris, autres que ceux résultant de défauts de matériaux ou de construction, ne sont pas couverts par cette Garantie. Komatsu n'est pas responsable pour bris ou dommages résultant de ce que Komatsu détermine comme étant de l'abus ou négligence, incluant mais ne se limitant pas à: l'opération sans lubrifiants ou agent refroidissants adéquats; la suralimentation d'essence; la survitesse; le manque d'entretien des systèmes de lubrification, de refroidissement ou d'entrée; de pratiques non-propices d'entreposage, de mise en marche, de réchauffement, de conditionnement ou d'arrêt; les modifications non-autorisées du moteur. De plus, Komatsu n'est pas responsable de bris causés par de l'essence inadéquate ou de l'eau, des saletés ou autres contaminants dans l'essence. Komatsu n'est pas responsable des réparations non-reliées au moteur, des dépenses encourues suite aux temps d'arrêts, des dommages relatifs, amendes, et de tout autre coût d'affaires ou autres pertes résultant d'un bris couvert par la garantie.

KOMATSU N'EST PAS RESPONSABLE DES INCIDENTS OU DOMMAGES CONSÉQUENTS.

Cette garantie, ainsi que les garanties expresses commerciales, sont les seules garanties de Komatsu. **IL N'Y A AUCUNE AUTRE GARANTIE, EXPRESSE OU SOUS-ENTENDUE, MARCHANDABLE OU PROPICE A UNE UTILISATION PARTICULIÈRE.**

CEKQ000600 - Komatsu America International Company 12/99

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ENGINE DATEPLATE - ENGLISH / FRENCH

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SAFETY INFORMATION

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

Signal words

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

⚠ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. This word is used also to alert against unsafe practices that may cause property damage.

Example of safety message using signal word

⚠ WARNING

When standing up from the operator's seat, always place the lock lever in the LOCK position.
If you accidentally touch the control levers when they are not locked, this may cause a serious injury or death.

Other signal words

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

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

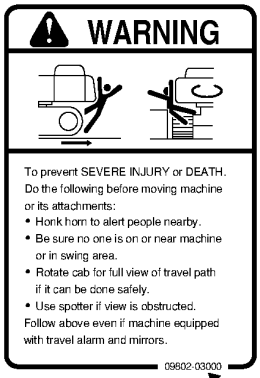
REMARKS This word is used for information that is useful to know.

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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.

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

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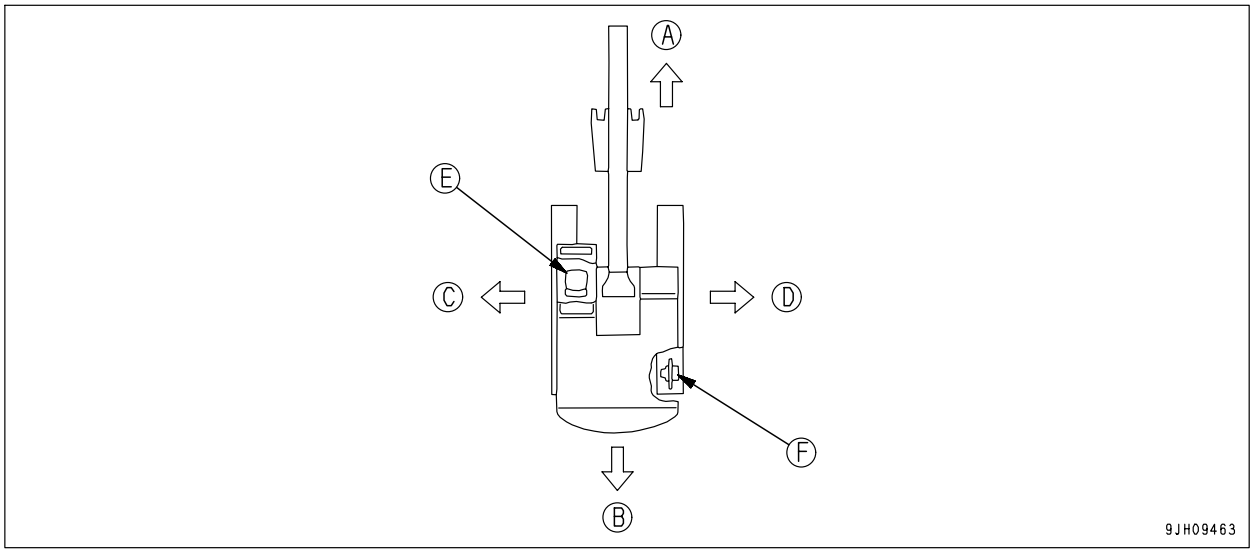
INTRODUCTION

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

- Digging work
- Leveling work
- Ditching work
- Loading work
- Demolition work

See the section "RECOMMENDED APPLICATIONS (PAGE 3-168)" for further details.

DIRECTIONS OF MACHINE



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

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

BREAKING-IN THE NEW MACHINE

NOTICE

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

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

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

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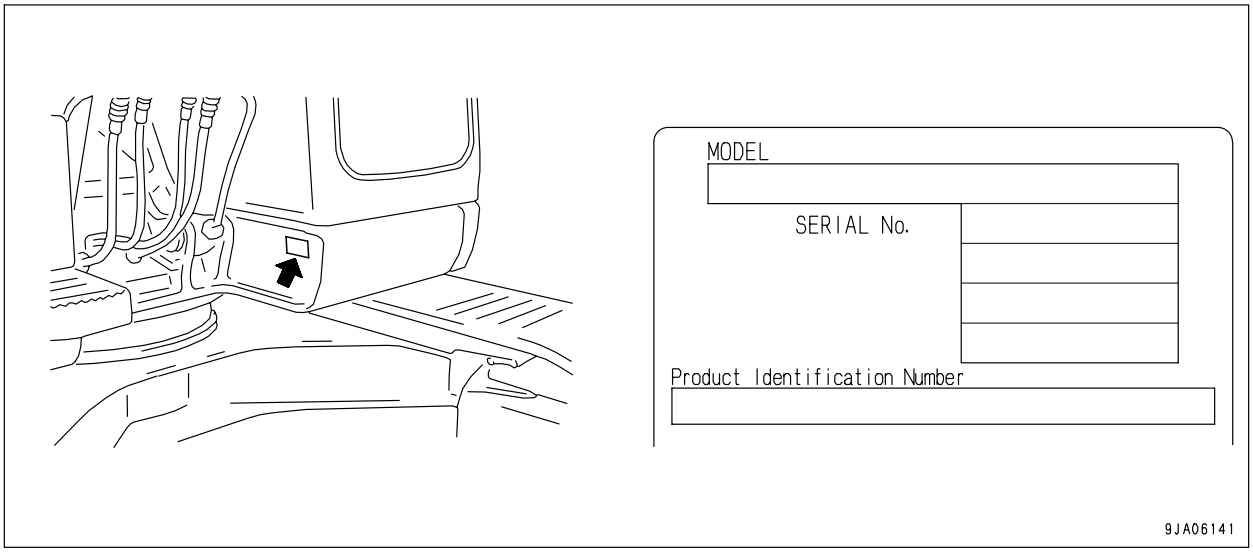
PRODUCT INFORMATION

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

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

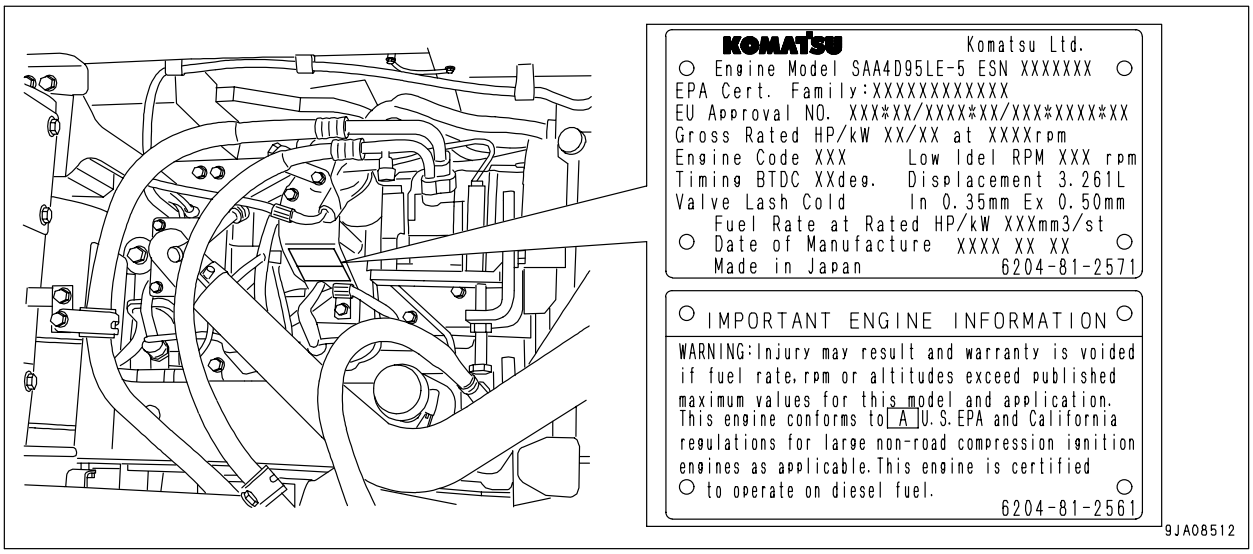
On the bottom right of the operator's cab

The design of the nameplate differs according to the territory.



EPA REGULATIONS, ENGINE NUMBER PLATE

This is on the fuel main filter bracket.

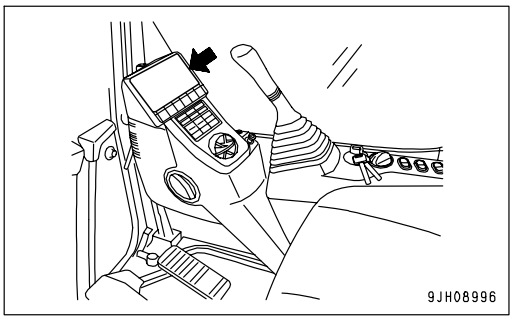


EPA: Environmental Protection Agency, U.S.A.

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SERVICE METER LOCATION

On top of the machine monitor



YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR

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

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SAFETY

⚠ WARNING

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

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SAFETY

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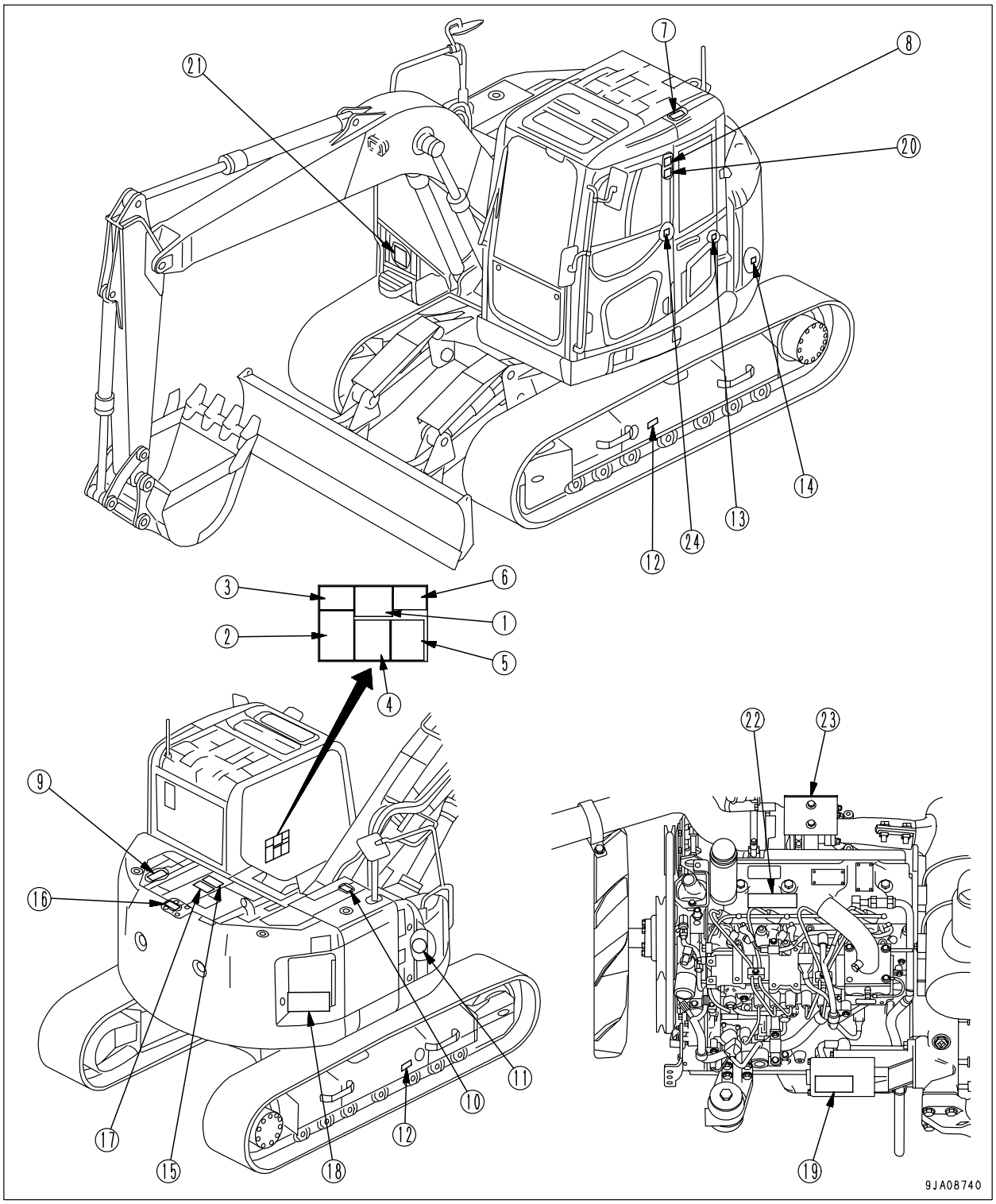
SAFETY LABELS

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

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

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LOCATION OF SAFETY LABELS



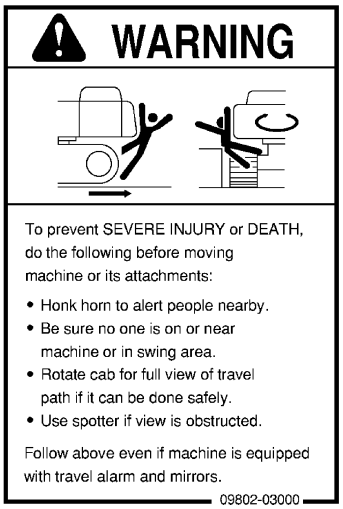
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SAFETY LABELS

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



(2) Caution before operating (09802-03000)

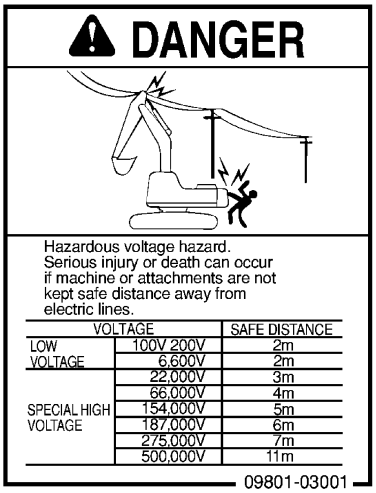


(3) Caution for leaving operator's seat (09654-03001)

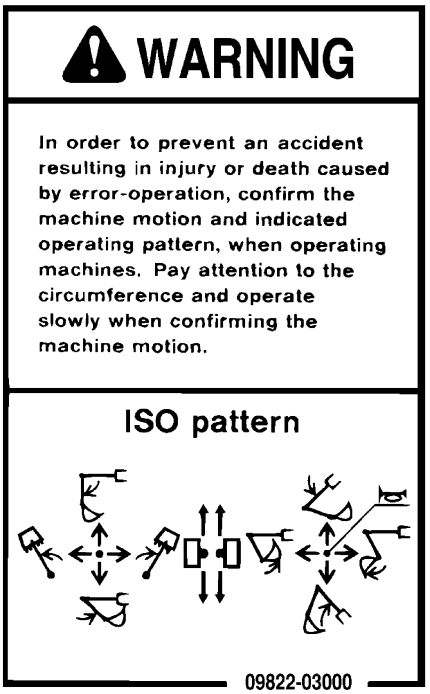


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(4) Caution for going close to electric cables (09801-03001)

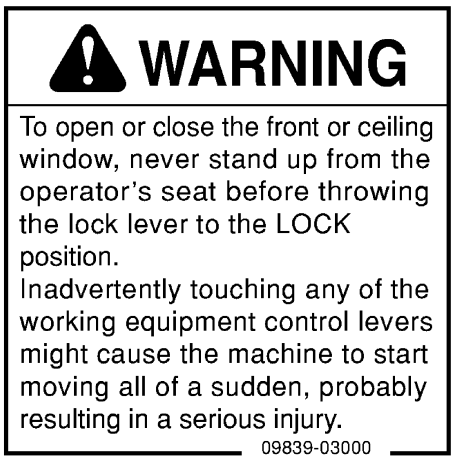


(5) Caution for operating pattern (09822-03000)
Standard machine



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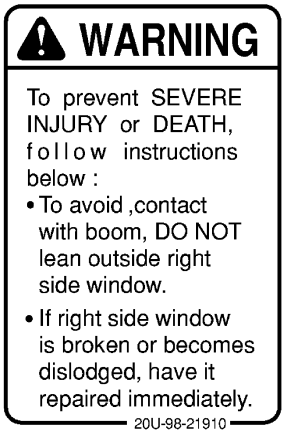
(6) Caution when opening or closing front window (09839-03000)



(7) Caution when stowing front window (09803-03000)



(8) Caution when window comes out or breaks (20U-98-21910)



(9) Caution with high-temperature coolant (09668-03001)

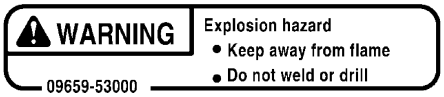


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(10) Caution with high-temperature hydraulic oil (09653-03001)



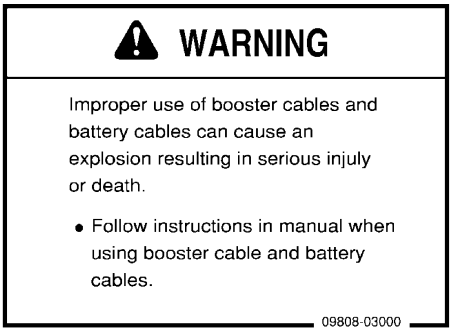
(11) Caution when handling accumulator (09659-53000)



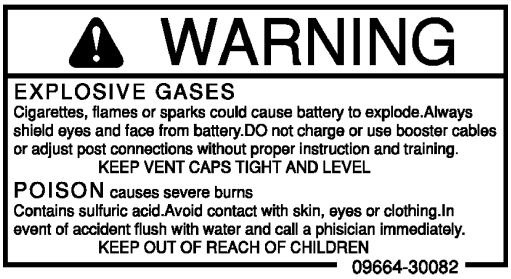
(12) Caution when adjusting track tension (09657-03003)



(13) Caution when handling cable (09808-03000)



(14) Caution when handling battery (09664-30082)



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(15) Stop rotation during inspection and maintenance (09667-03001)



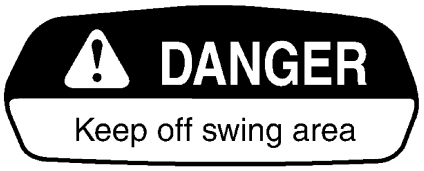
(16) Caution against falling (09805-03000)



(17) Caution against falling (09805-13000)



(18) Prohibition to enter swing range (09133-23000)



(19) Jump start prohibited (09842-A0481)
This safety label is fixed to the engine starting motor.

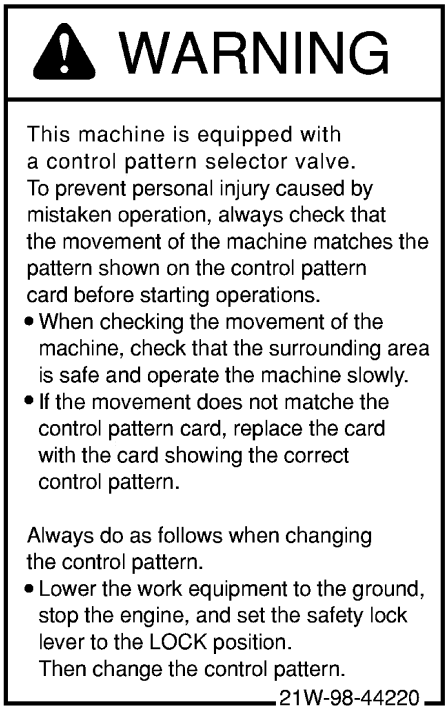


Start the engine only after sitting down in the operator's seat.

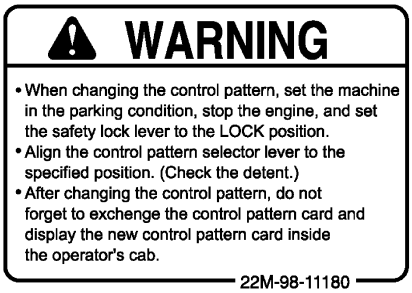
Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.

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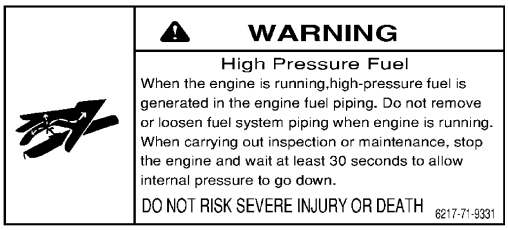
(20) Caution for control pattern (21W-98-44220)
Machine equipped with control pattern selector valve



(21) Caution when changing control pattern (22M-98-11180)
Machine equipped with control pattern selector valve



(22) Caution for high-pressure fuel (6217-71-9331)



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(23) Caution for high temperature (09817-A0753)



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

Never touch when hot.

(24) Caution when swinging or traveling in reverse



The safety labels, (1) through (6) are a single seal. In replacement, place an order for it with Part No. 22U-00-21290.

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GENERAL PRECAUTIONS

SAFETY RULES

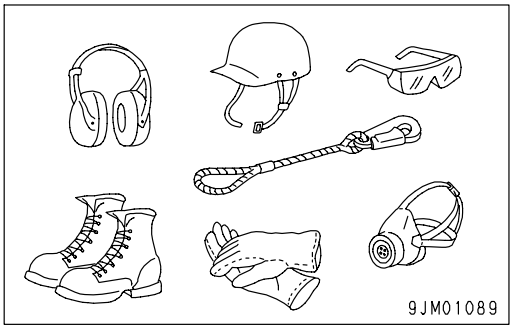
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine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

IF PROBLEMS ARE FOUND

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

WORKING WEAR AND PERSONAL PROTECTIVE ITEMS

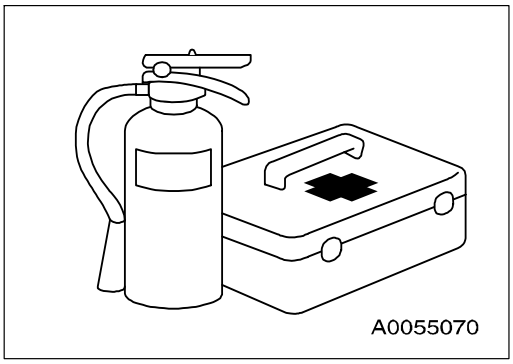
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get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



FIRE EXTINGUISHER AND FIRST AID KIT

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

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



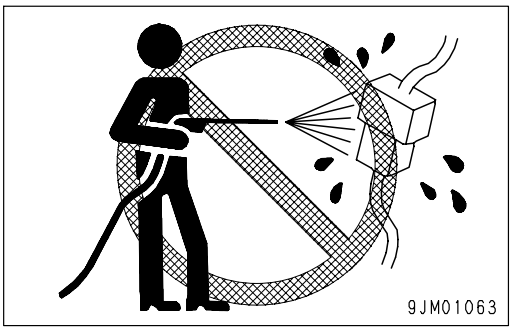
SAFETY EQUIPMENT

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

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KEEP MACHINE CLEAN

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

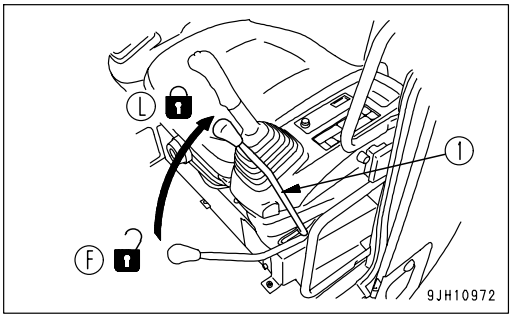


KEEP OPERATOR'S COMPARTMENT CLEAN

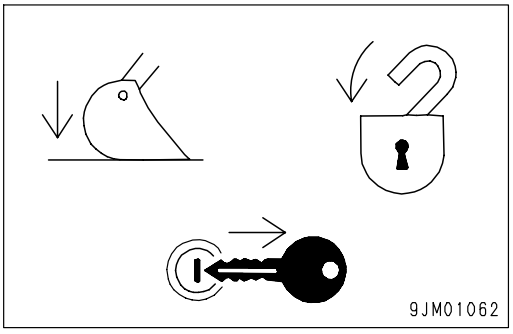
- When entering the operator's compartment, always remove all mud and oil from the soles of your shoes. If you operate the pedal with mud or oil affixed to your shoes, your foot may slip and this may cause a serious accident.
- Do not leave parts or tools lying around the operator's compartment.
- Do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

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), always lower the work equipment completely to the ground, set lock lever (1) securely to the LOCK position (L), then stop the engine. If you accidentally touch the control levers or control pedals 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 lock lever (1) securely to the LOCK position (L), then stop the engine. Use the key to lock all the equipment. Always remove the key, take it with you, and keep it in the specified place.

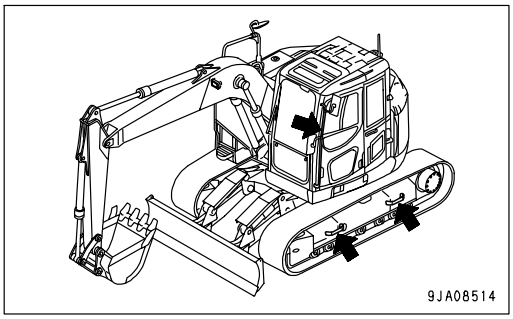


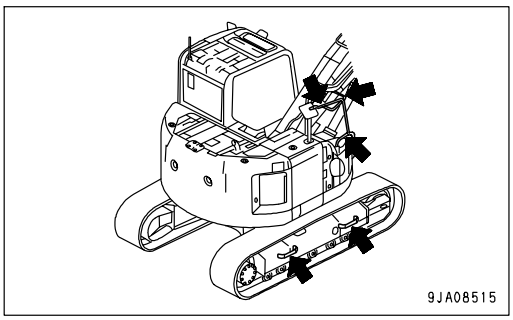
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HANDRAILS AND STEPS

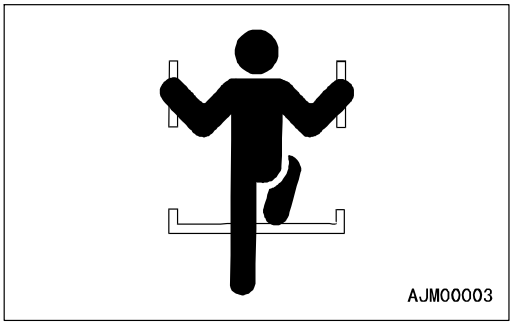
To prevent personal injury caused by slipping or falling off the machine, always do as follows.

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





- To ensure safety, always face the machine and maintain three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps (including the track shoe) to ensure that you support yourself.
- Do not grip the control levers, or lock lever when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- Before getting on or off the machine, check the handrails and steps (including the track shoe). If there is any oil, grease, or mud on the handrails or steps (including the track shoe), wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.
- Do not get on or off the machine while holding tools in your hand.



PRECAUTIONS WHEN WORKING IN HIGH PLACES

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

MOUNTING AND DISMOUNTING

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

NO PERSONS ON ATTACHMENTS

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

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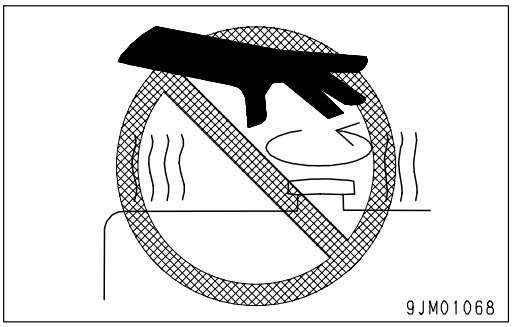
DO NOT GET CAUGHT IN ARTICULATED PORTION

The clearance around the work equipment will change according to the movement of the link. If you get caught, this may lead to serious personal injury. Do not allow anyone to approach any rotating or telescoping part.

BURN PREVENTION

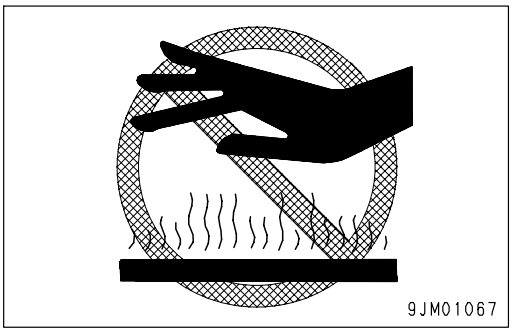
Hot coolant

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



Hot oil

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

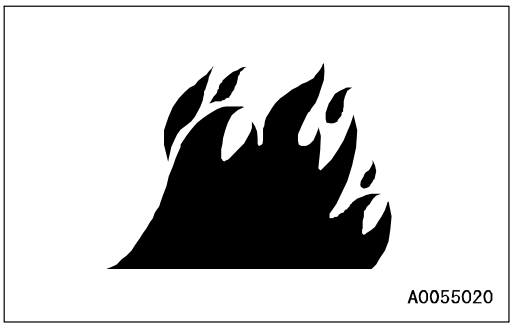


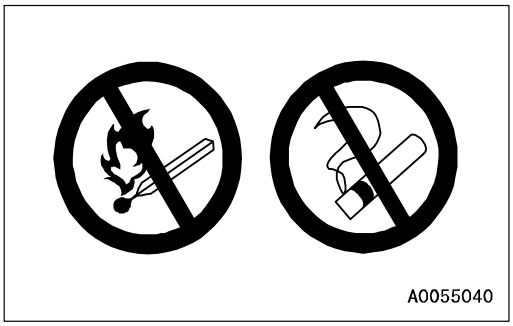
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FIRE PREVENTION AND EXPLOSION PREVENTION

- **Fire caused by fuel or oil**

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


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

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

  Short circuits in the electrical system can cause fire.
  - Always keep electric wiring connections clean and securely tightened.
  - Check the wiring every day for looseness or damage. Tighten any loose connectors or wiring clamps. Repair or replace any damaged wiring.

- **Fire coming from hydraulic line**

  Check that all the hose and tube clamps, guards, and cushions are securely fixed in position.
  If they are loose, they may vibrate during operation and rub against other parts. This may lead to damage to the hoses, and cause high-pressure oil to spurt out, leading to fire damage or serious injury.

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

ACTION IF FIRE OCCURS

If a fire occurs, escape from the machine as follows.
- Turn the start switch OFF to stop the engine.
- Use the handrails and steps to get off the machine.

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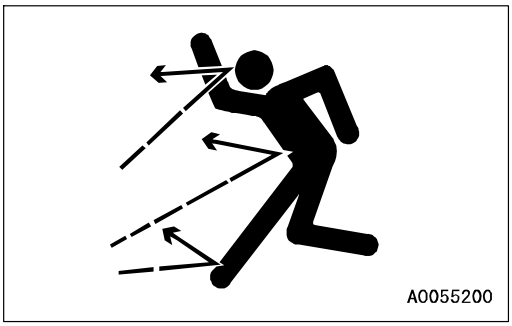
WINDSHIELD WASHER FLUID

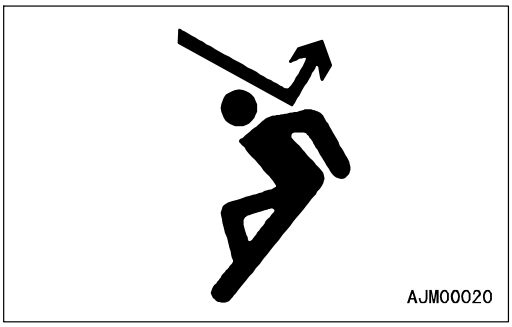
Use an ethyl alcohol base washer liquid.
Methyl alcohol base washer liquid may irritate your eyes, so do not use it.

FALLING OBJECTS, FLYING OBJECTS AND INTRUDING OBJECTS PREVENTION

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

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





ATTACHMENT INSTALLATION

- When installing optional parts or attachments, there may be problems with safety or legal restrictions. 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.

ATTACHMENT COMBINATIONS

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

CAB WINDOW GLASSES

- If a pane of the cab window on the work equipment side is broken, the work equipment may directly hit the operator. In that case, stop the machine immediately and replace the broken pane with new one.
- The ceiling window is made of organic glass (polycarbonate), and as such it is apt to break easily when receiving damage on the surface, thereby deteriorating its protective characteristic. If there is a crack or damage caused by a fallen rock, or when any sign of them is noticed, replace it with a new window.

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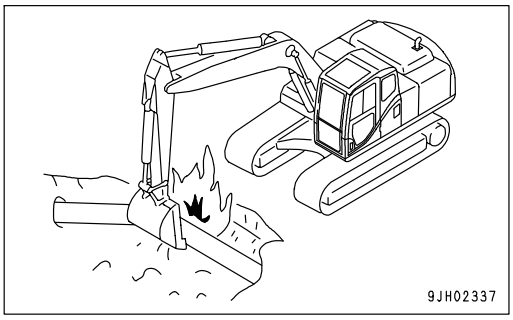
UNAUTHORIZED MODIFICATIONS

If this machine is modified without permission from Komatsu, there is danger that problems may occur with safety and that this may lead to serious personal injury. Modifications may have an adverse effect on items such as machine strength and visibility. Before making any modifications, please consult your Komatsu distributor. Komatsu cannot take any responsibility for accidents, failures, or damage caused by modifications not authorized by Komatsu.

SAFETY AT JOBSITE

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

- When carrying out operations near combustible materials such as thatched roofs, dry leaves or dry grass, there is a hazard of fire, so be careful when operating.
- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation. Do not operate where there is a hazard of landslides or falling rocks.
- If water lines, gas lines, or high-voltage electrical lines may be buried under the worksite, contact each utility and identify their locations. Be careful not to sever or damage any of these lines.
- Take action to prevent unauthorized people from approaching the jobsite.
  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.



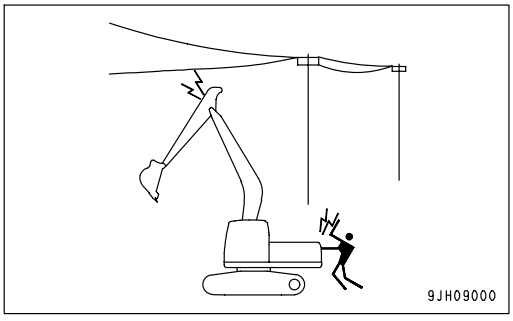
WORKING ON LOOSE GROUND

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

DISTANCE TO HIGH VOLTAGE CABLES

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

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



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

Voltage of Cables	Safety Distance
100 V - 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)

- If the machine should come too close or touch the electric cable, to prevent electric shock, the operator should not leave the operator's compartment until it has been confirmed that the electricity has been shut off. Also, do not let anyone near the machine.

ENSURE GOOD VISIBILITY

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

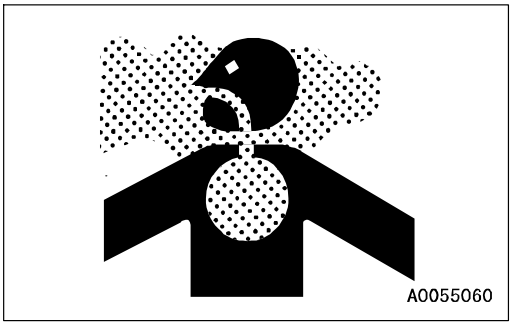
When operating or traveling in places with poor visibility, if it is impossible to confirm the condition of the job side or obstacle is in the area around the machine, there is danger that the machine may suffer damage or the operator may suffer serious personal injury. When operating or traveling in places with poor visibility, always observe the following items strictly.

- If the visibility cannot be sufficiently assured, position a flagman if necessary. The operator should pay careful attention to the signs and follow the instructions of the flagman.
- The signals should be given only by one flagman.
- When working in dark places, turn on the working lamps and front lamps of the machine, and if necessary, set up additional lighting in the area.
- Stop operations if there is poor visibility, such as in fog, snow, rain, or sand storms.
- Check the mirrors on the machine before starting operations every day. Clean off any dirt and adjust the view to ensure good visibility.
- In areas where it is impossible to confirm the area behind the machine and observation cameras have been set up, clean off any dirt from the lens and make sure that the camera gives a clear view of the rear. If a rear-view camera has been installed to show the area to the rear of the machine, clean off any dirt from the lens and make sure that the camera gives a clear view of the rear. If there is any problem with the camera and the rear view cannot be displayed, contact your Komatsu distributor as soon as possible and ask for repairs to be carried out.

VENTILATION FOR ENCLOSED AREA

Exhaust fumes from the engine can kill.

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



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SIGNALMAN'S SIGNAL AND SIGNS

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

EMERGENCY EXIT FROM OPERATOR'S CAB

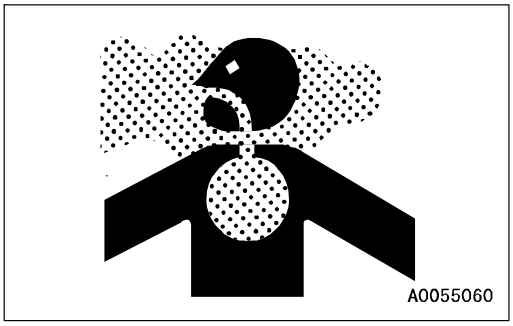
If for any reason, it becomes impossible to open the cab door, use the hammer supplied to break the window and use it as an emergency escape.

For details, see "EMERGENCY ESCAPE HAMMER (PAGE 3-84)" in this manual.

- When escaping, remove all the pieces of glass from the window frame first and be careful not to cut yourself on the glass. Be careful also not to slip on the broken pieces of glass on the ground.

ASBESTOS DUST HAZARD PREVENTION

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



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

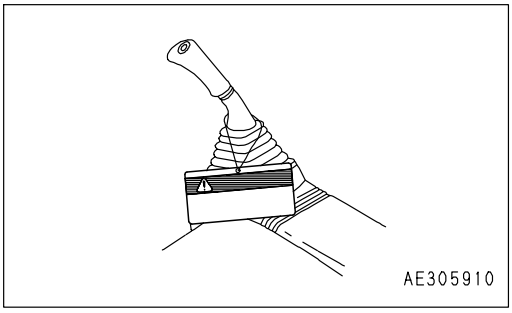
This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.

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SAFETY MACHINE OPERATION

STARTING ENGINE

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

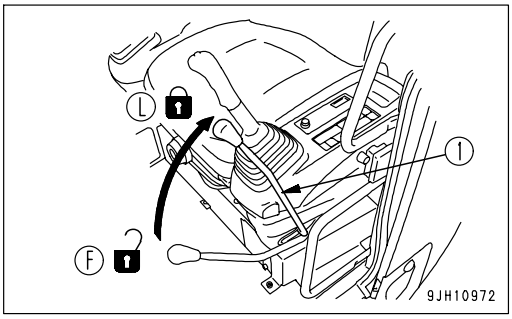




CHECKS BEFORE STARTING ENGINE

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

- Remove all dirt from the surface of the window glass to ensure a good view.
- Remove all dirt from the surface of the lens of the working lamps, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check the operation of the instruments and gauges, check the angle of the mirror, and check that the control levers are all at the Neutral position.
- Before starting the engine, check that lock lever (1) is in LOCK position (L).
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat
- Check that there are no persons or obstacles above, below, or in the area around the machine.



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SAFETY RULES FOR STARTING ENGINE

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

STARTING ENGINE IN COLD WEATHER

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

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OPERATION

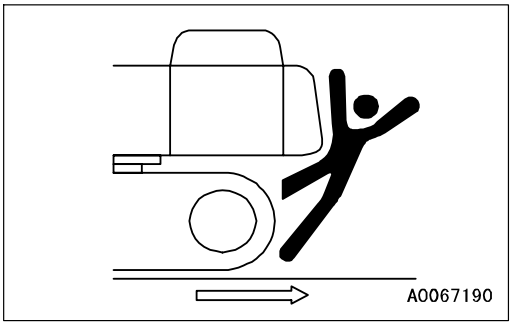
CHECKS BEFORE OPERATION

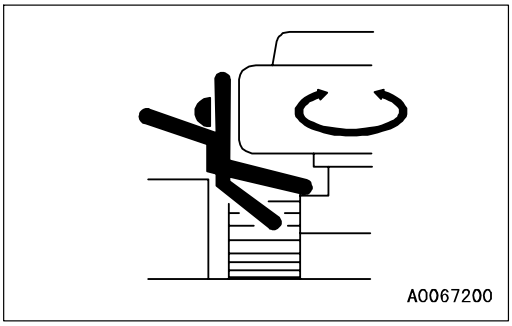
When carrying out the checks, move the machine to a wide area where there are no obstructions, and operate slowly. Do not allow anyone near the machine.

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

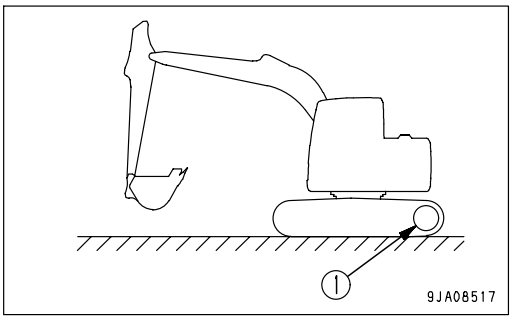
SAFETY RULES FOR CHANGING MACHINE DIRECTIONS

- Always operate the machine only when seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Check that the travel alarm works properly.
- Always lock the door and windows of the operator's compartment in position (open or closed).
  On jobsites where there is a hazard of flying objects or of objects entering the operator's compartment, check that the door and windows are securely closed.
- If there is an area to the rear of the machine which cannot be seen, position a signal person. Take special care not to hit other machines or people when turning or swinging the machine.
- Before travelling, sound the horn to warn people in the area.
- Before travelling, check again that there is no one in the surrounding area, and that there are no obstacles.





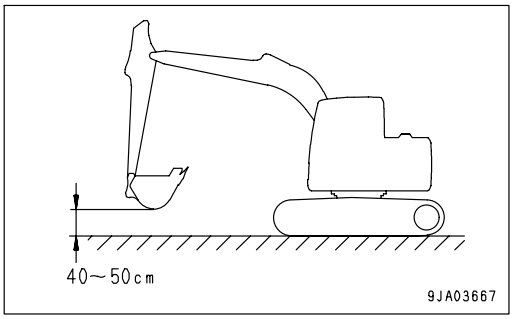
- Before traveling, set the machine so that sprocket (1) is behind the operator's seat.
  If sprocket (1) is in front of the operator's cab, the machine moves in the opposite direction from the operation of the lever (front and rear travel is reversed, left and right steering is reversed). Be extremely careful when operating the machine in this situation.



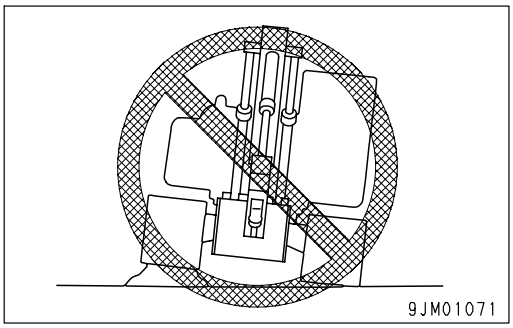
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SAFETY RULES FOR TRAVELING

- It is dangerous to drive too fast, or to start suddenly, stop suddenly, or to turn sharply.
- When traveling on level ground, keep the work equipment at a height of 40 to 50 cm (16 to 20 in) from the ground.
- If the work equipment blocks the view and it is difficult to travel in safety, raise the work equipment to a greater height.
- When traveling on rough ground, travel at low speed and do not operate the steering suddenly. There is danger that the machine may turn over. The work equipment may hit the ground surface and cause the machine to lose its balance, or may damage the machine or structures in the area.
- When traveling on rough ground or steep slopes, if the machine is equipped with auto-deceleration, always turn the auto-deceleration switch OFF (cancel).



- Avoid traveling over obstacles when possible. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. Never travel over obstacles which make the machine tilt strongly to one side.
- When traveling or carrying out operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the work equipment hit anything.

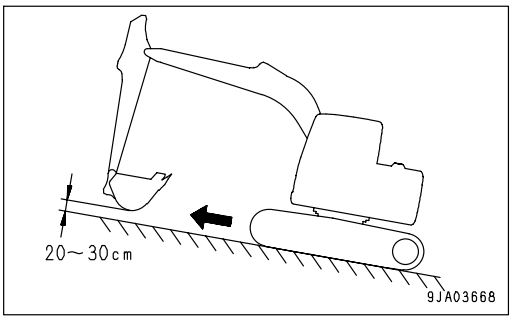


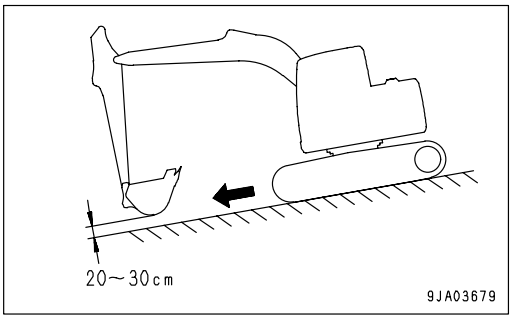
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TRAVELING ON SLOPES

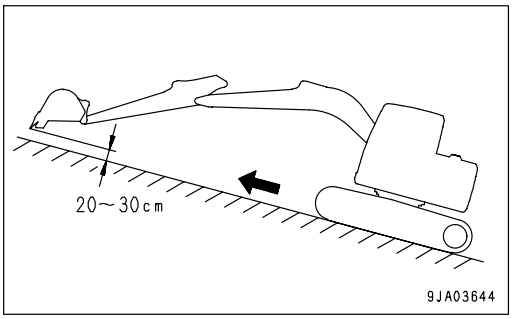
To prevent the machine from tipping over or slipping to the side, always do as follows.

- Keep the work equipment approx. 20 to 30 cm (8 to 12 in) above the ground. In case of emergency, lower the work equipment to the ground immediately to help stop the machine.
- When travel up slopes, set the operator's cab facing uphill, when travel down slopes, set the operator's cab facing downhill. Always check the firmness of the ground under the front of the machine when traveling.

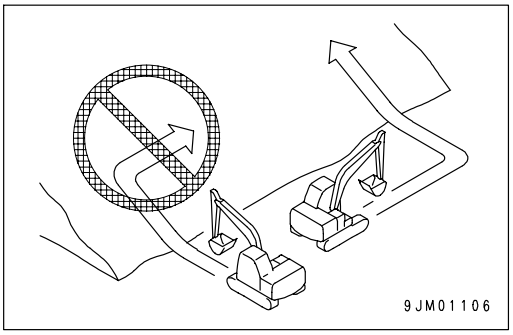




- When traveling up a steep slope, extend the work equipment to the front to improve the balance, keep the work equipment approximately 20 to 30 cm (8 to 12 in) above the ground, and travel at low speed.



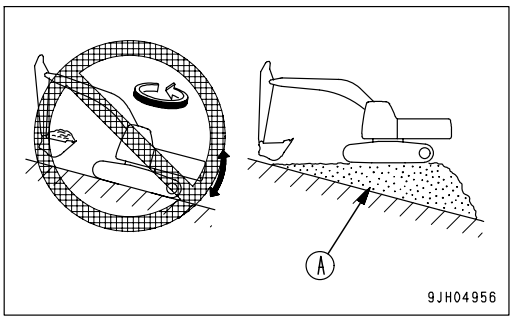
- When traveling downhill, lower the engine speed, keep the travel lever close to the neutral position, and travel at low speed.
- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down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



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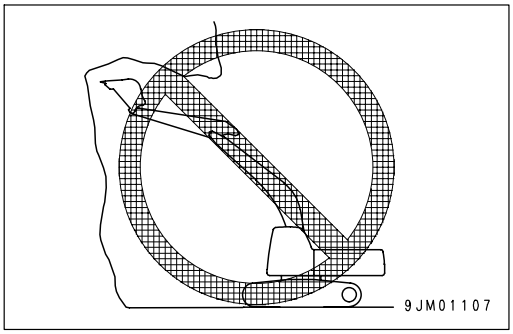
OPERATIONS ON SLOPES

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

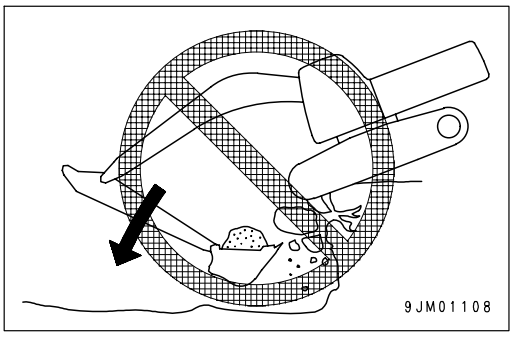


PROHIBITED OPERATIONS

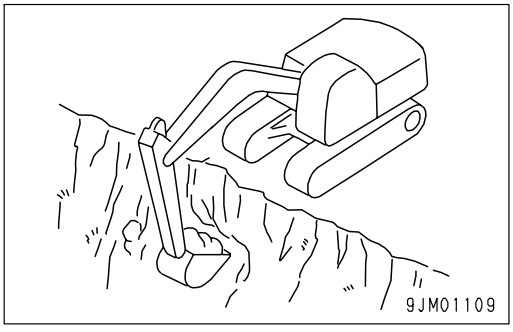
- Never dig the work face under an overhang. There is a hazard that rocks may fall or that the overhang may collapse and fall on top of the machine.



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

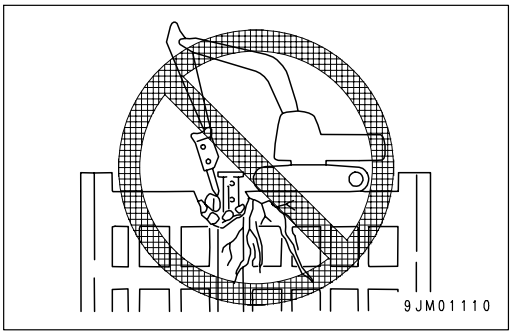


- To make it easier to escape if there is any problem, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when carrying out operations.

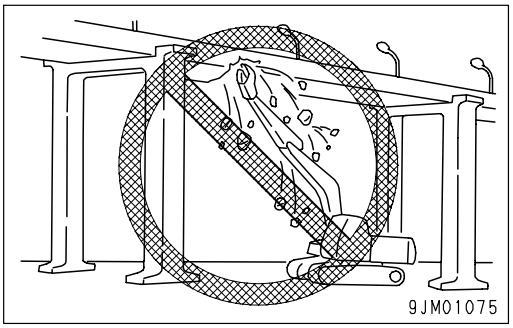


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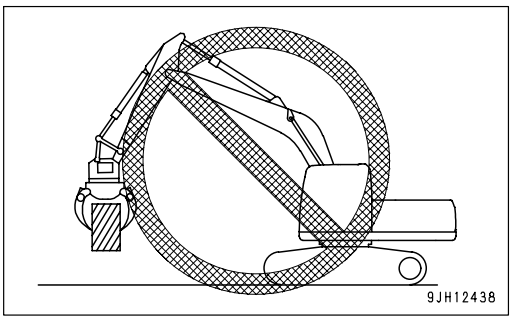
- Do not carry out demolition work under the machine. There is a hazard that the machine may become unstable and tip over.
- When working on or from the top of buildings or other structures, check the strength and the structure before starting operations. There is a hazard of the building collapsing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



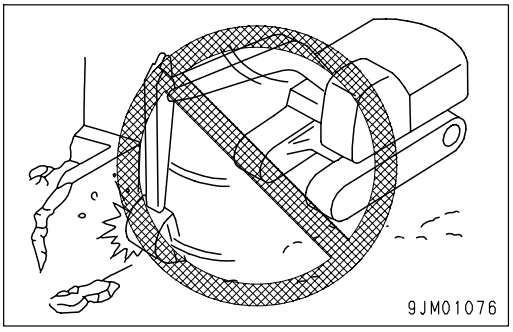
- When carrying out demolition work, do not carry out demolition above your head. There is a hazard of broken parts falling or of the building collapsing and causing serious injury or property damage.



- In the operation using the fork or grapple, do not attempt to pick up an object with their tips.
  There is a danger of damage to the machine or personal injury, as the picked - up object can easily slip off.



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



- When using a breaker or other heavy work equipment, there is a hazard of the machine losing its balance and tipping over. When operating on flat ground as well as on slopes.
  - Do not suddenly lower, swing, or stop the work equipment.
  - Do not suddenly extend or retract the boom cylinder. There is a hazard that impact will cause the machine to tip over.

- Do not pass the bucket over the head of other workers or over the operator's seat of dump trucks or other hauling equipment. The load may spill or the bucket may hit the dump truck and cause serious injury or property damage.

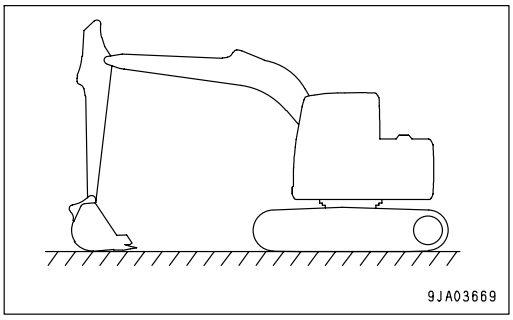
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OPERATIONS ON SNOW

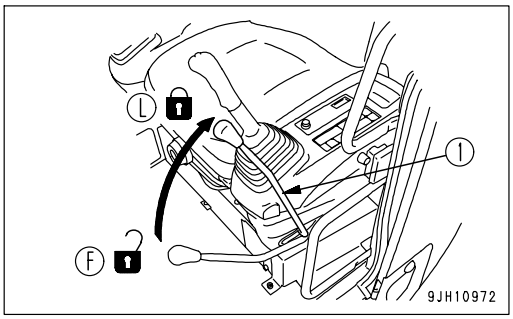
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes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

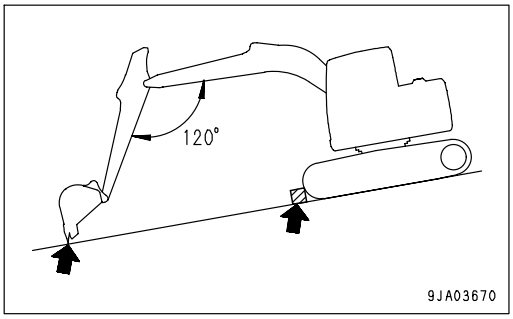
PARKING MACHINE

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



- When leaving the machine, set lock lever (1) to the LOCK position (L), then stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from moving the machine. Always remove the key, take it with you, and leave it in the specified place.
- If it is necessary to park the machine on a slope, always do as follows.
  - Set the bucket on the downhill side, then dig it into the ground.
  - Put blocks under the tracks to prevent the machine from moving.





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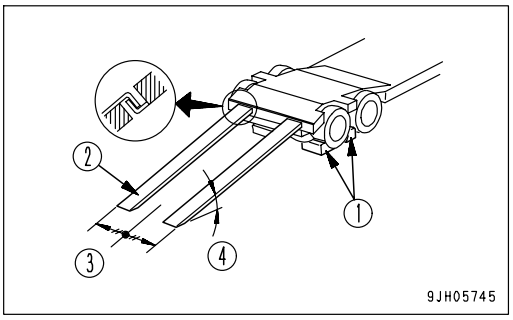
TRANSPORTATION

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

LOADING AND UNLOADING

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

- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of the road or cliff.
- Never use the work equipment to load or unload the machine. There is danger that the machine may fall or tip over.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.



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

- Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from machine-tracks. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Turn the auto-decelerator switch OFF (auto-deceleration function released).
- Run the engine at low speed and travel slowly.
- When on the ramps, do not operate any lever except for the travel lever.
- Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.
- The center of gravity of the machine will change suddenly at the joint between the ramps and the track or trailer, and there is danger of the machine losing its balance. Travel slowly over this point.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- When swinging the upper structure on the trailer, the trailer is unstable, so pull in the work equipment and swing slowly.
- For machines equipped with a cab, always lock the door after boarding the machine. If this is not done, the door may suddenly open during transportation.
  Refer to "TRANSPORTATION (PAGE 3-178)".

SHIPPING THE MACHINE

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

- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- For details of the shipping procedure, see "TRANSPORTATION (PAGE 3-178)" in the OPERATION section.

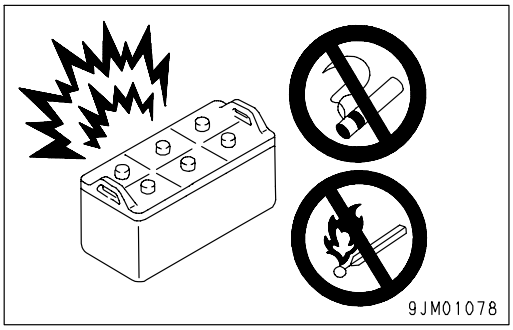
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BATTERY

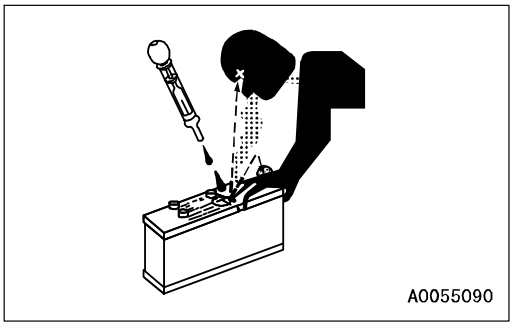
BATTERY HAZARD PREVENTION

Battery electrolyte contains sulphuric acid, and batteries generate flammable hydrogen gas, which may explode. Mistaken handling can lead to serious injury or fire. For this reason, always observe the following precautions.

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



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



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

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

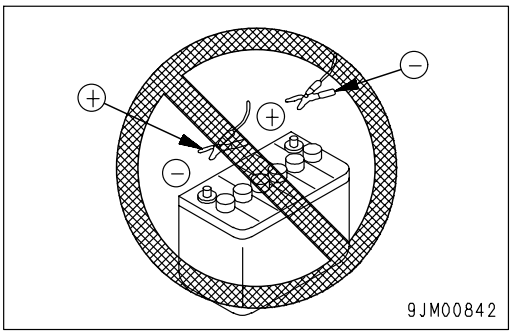
- Do not let tools or other metal objects make any contact between the battery terminals. Do not leave tools or other metal objects lying around near the battery.
- When disconnecting the battery terminals, wait for approx. one minute after turning off the engine starting switch key, and be sure to disconnect the grounding terminal (negative (-) terminal) first. Conversely, when connecting them, begin with the positive (+) terminal and then the grounding (-) terminal. Make sure that all the terminals are connected securely.
- Flammable hydrogen gas is generated when the battery is charged, so remove the battery from the chassis, take it to a well-ventilated place, and remove the battery caps before charging it.
- Tighten the battery caps securely.
- Install the battery securely to the determined place.

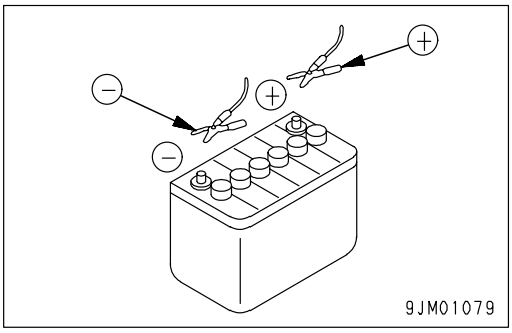
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STARTING ENGINE WITH BOOSTER CABLES

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

- When starting with a booster cable, carry out the starting operation with two workers (one worker sitting in the operator's seat and the other working with the battery).
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF position for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the booster cables. Disconnect the negative (-) cable (ground side) first when removing them.
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.
- Always wear safety glasses and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- For details of the starting procedure when using booster cables, see "Starting Engine with Booster Cables (PAGE 3-199)" in the OPERATION section.





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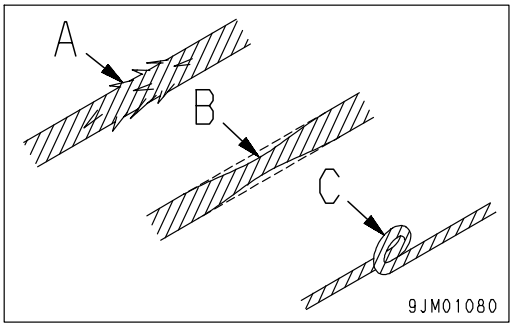
TOWING

SAFETY RULES FOR TOWING

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

For towing, see "TOWING THE MACHINE (PAGE 3-194)".

- Always be sure to check carefully that the capacity of the wire rope used for towing is ample for the weight of the towed machine.
- 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.
- Move the machine slowly and be sure not to apply any sudden load on the wire rope.

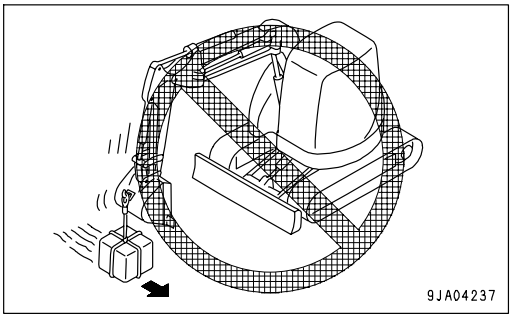


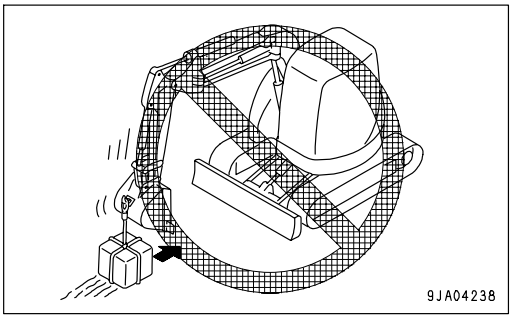
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LIFTING OBJECTS WITH BUCKET

SAFETY RULES FOR LIFTING OBJECTS

- 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.
  For details of the maximum lifting load permitted for this machine, see "BUCKET WITH HOOK (PAGE 6-4)".
- 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.



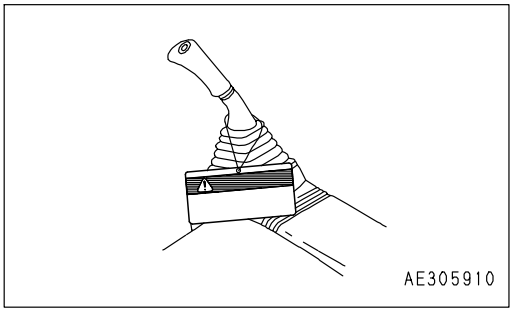


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SAFETY MAINTENANCE INFORMATION

WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to the work equipment control lever in the operator's cab to alert others that you are performing service or maintenance on the machine. Attach additional warning tags around the machine if necessary.
  Warning tag Part No. 09963-03001
  Keep this warning tag in the tool box while it is not used. If there is no toolbox, keep the tag in the operation manual pocket.
- If others start the engine, or touch or operate the work equipment control lever while you are performing service or maintenance, you could suffer serious injury or property damage.





KEEP WORK PLACE CLEAN AND TIDY

- Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely. If the work place is not kept claen and tidy, there is the danger that you will trip, slip, or fall over and injure yourself.
- When cleaning the ceiling window which is made of organic glass (polycarbonate), use tap water and avoid use of organic solvents for cleaning. An organic solvent like benzene, toluene or methanol can invite a chemical reaction like dissolution and decomposition on the window glass, deteriorating polycarbonate in use.

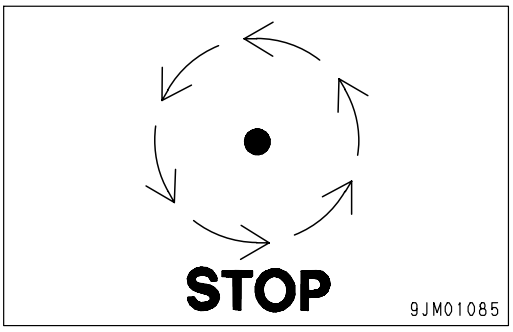
APPOINT LEADER WHEN WORKING WITH OTHERS

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

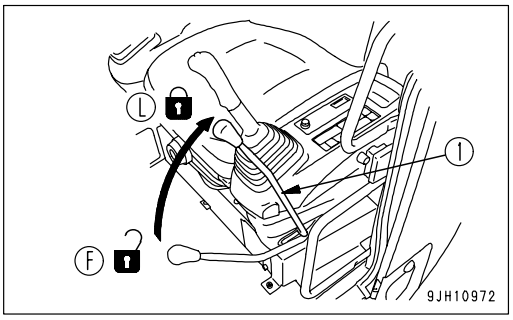
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STOP ENGINE BEFORE CARRYING OUT MAINTENANCE

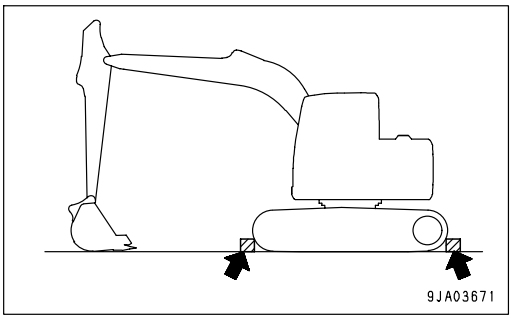
- Stop the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground and stop the engine.



- Turn the starting switch to the ON position. Operate the work equipment control lever back and forth, left and right at the full stroke 2 to 3 times to eliminate the remaining internal pressure in the hydraulic circuit, and then push up lock lever (1) to the LOCK position (L).
- Check that the battery relay is off and main power is not conducted. (Wait for approx. one minute after turning off the engine starting switch key and press the horn switch. If the horn does not sound, it is not activated.)



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

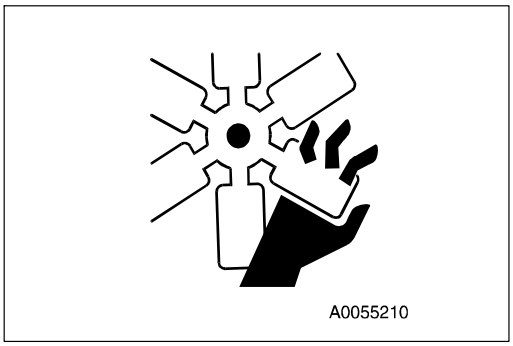


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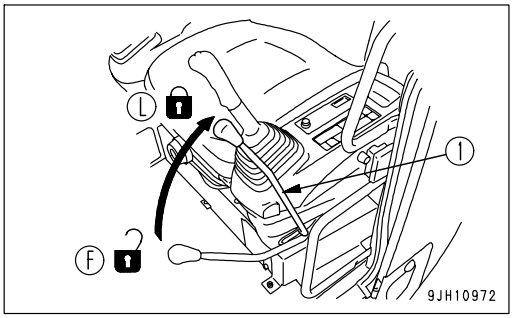
TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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

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

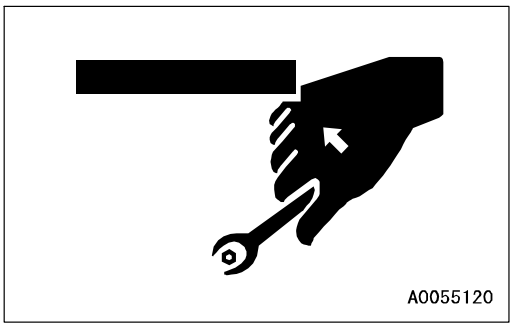


- Set lock lever (1) to the LOCK position (L) to prevent the work equipment from moving.
- Do not touch any control levers or control pedals. If any control levers or control pedals must be operated, always give a signal to the other workers to warn them to move to a safe place.



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.



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ACCUMULATOR, GAS SPRING

The accumulator and gas springs is charged with high-pressure nitrogen gas. When handling the accumulator, careless procedure may cause an explosion which could lead to serious injury or property damage. For this reason, always observe the following precautions.

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

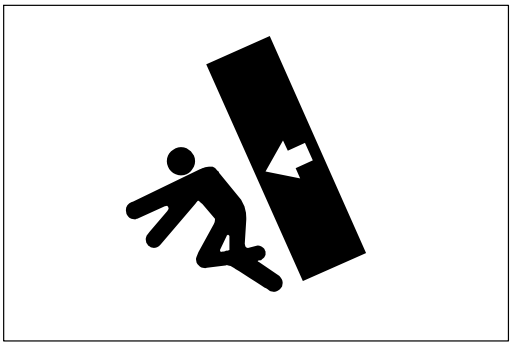


PERSONNEL

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

ATTACHMENTS

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



WORK UNDER THE MACHINE

- If it is necessary to go under the work equipment or the machine to carry out service and maintenance, support the work equipment and machine securely with blocks and stands strong enough to support the weight of the work equipment and machine.
- It is extremely dangerous to work under the machine if the track shoes are lifted off the ground and the machine is supported only with the work equipment. If any of the control levers is touched by accident, or there is damage occurring to the hydraulic piping, the work equipment or the machine will suddenly drop. This is extremely dangerous. Never work under the work equipment or the machine.



NOISE

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

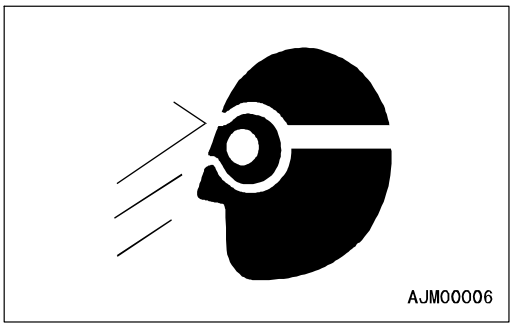
If the noise from the machine is too loud, it may cause temporary or permanent hearing problems.

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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.

WELDING WORKS

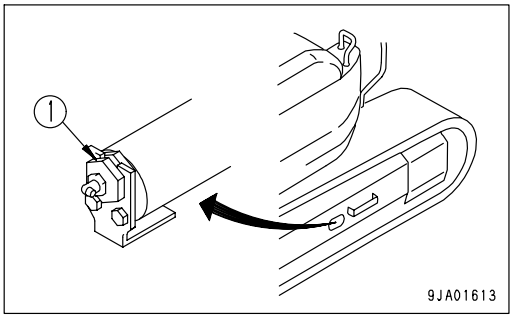
Welding operations must always be carried out by a qualified welder and in a place equipped with proper equipment. There is a hazard of gas, fire, or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

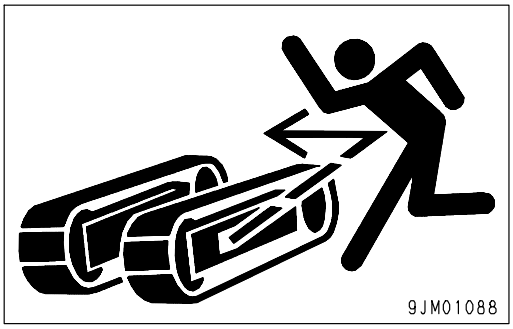
REMOVING BATTERY TERMINALS

When repairing or welding the electrical system, wait for approx. one minute after turning off the engine starting switch key, and then disconnect the negative (-) terminal of the battery to stop the flow of electricity.

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

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





DO NOT DISASSEMBLE RECOIL SPRINGS

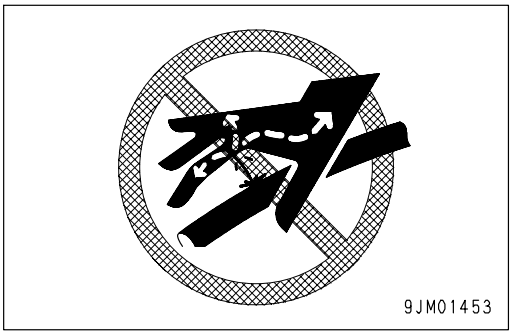
Never attempt to disassemble the recoils spring assembly. It contains a spring under high pressure which serves as a shock absorber for the idler. If it is disassembled by mistake, the spring will fly out and cause serious injury. When it becomes necessary to disassemble it, ask your Komatsu distributor to do the work.

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SAFETY RULES FOR HIGH-PRESSURE OIL

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

- Release the pressure in the hydraulic circuit. For details, see "METHOD OF RELEASING PRESSURE IN HYDRAULIC CIRCUIT (PAGE 4-74)". 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.



PRECAUTION FOR HIGH FUEL PRESSURE

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

SAFETY HANDLING HIGH-PRESSURE HOSES

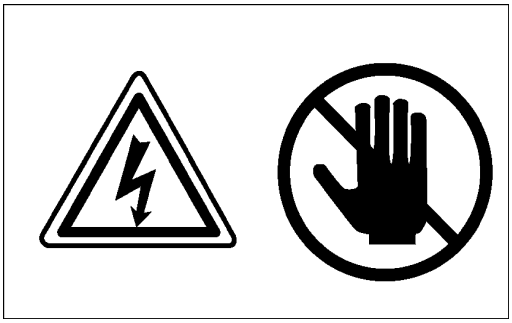
- If oil or fuel leaks from high-pressure hoses, it may cause fire or defective operation, which may lead to serious injury. If any loose bolts are found, stop work and tighten to the specified torque. If any damaged hoses are found, stop operations immediately and contact your Komatsu distributor.

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 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.

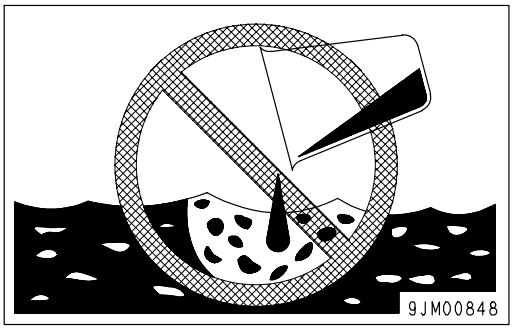


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WASTE MATERIALS

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

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



AIR CONDITIONER MAINTENANCE

If air conditioner refrigerant gets into your eyes, it may cause blindness; if it touches your skin, it may cause frostbite. Never touch refrigerant.

COMPRESSED AIR

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

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

- For using the machine safely for an extended period of time, replace safety-critical parts like hoses and seat belts periodically.
  Replacement of safety-critical parts: See "SAFETY CRITICAL PARTS (PAGE 4-13)".
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety-critical parts if any defect is found, even when they have not reached the time specified interval.

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OPERATION

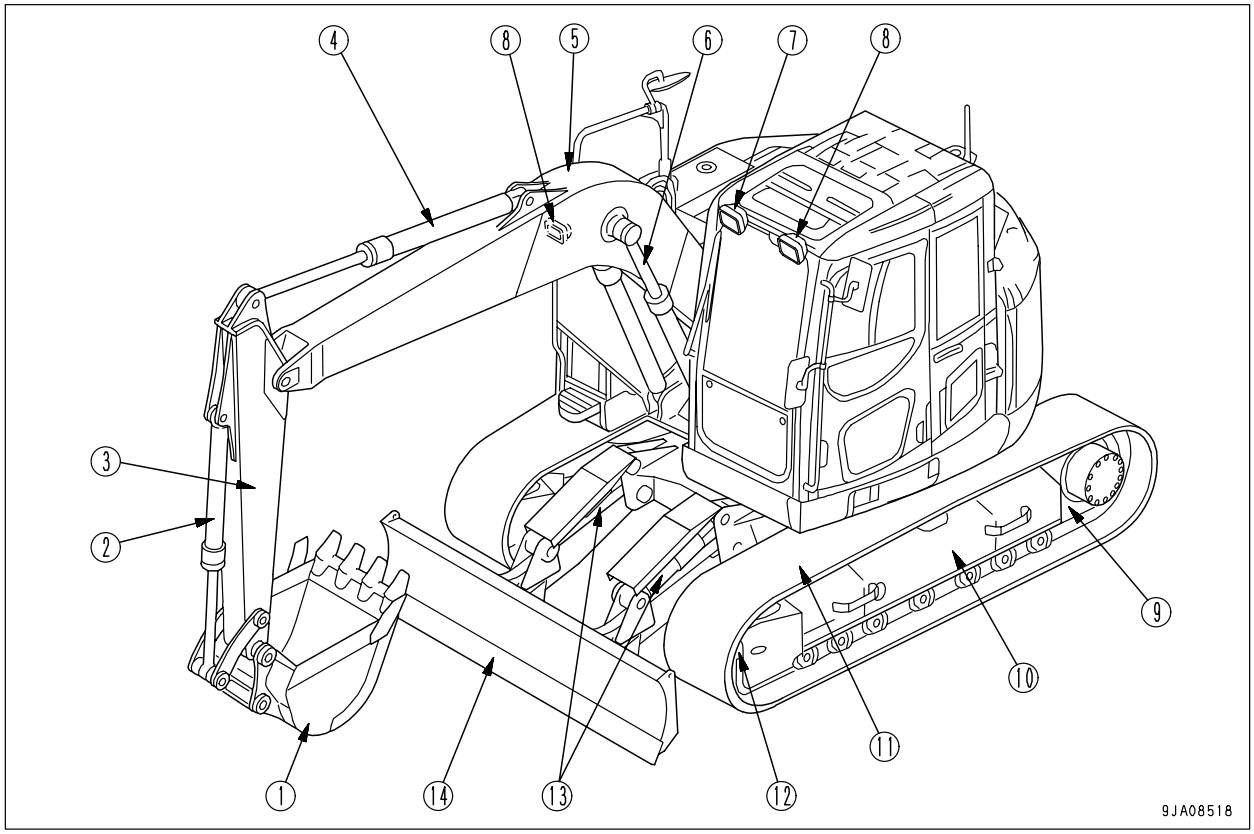
⚠ WARNING

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

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MACHINE VIEW ILLUSTRATIONS

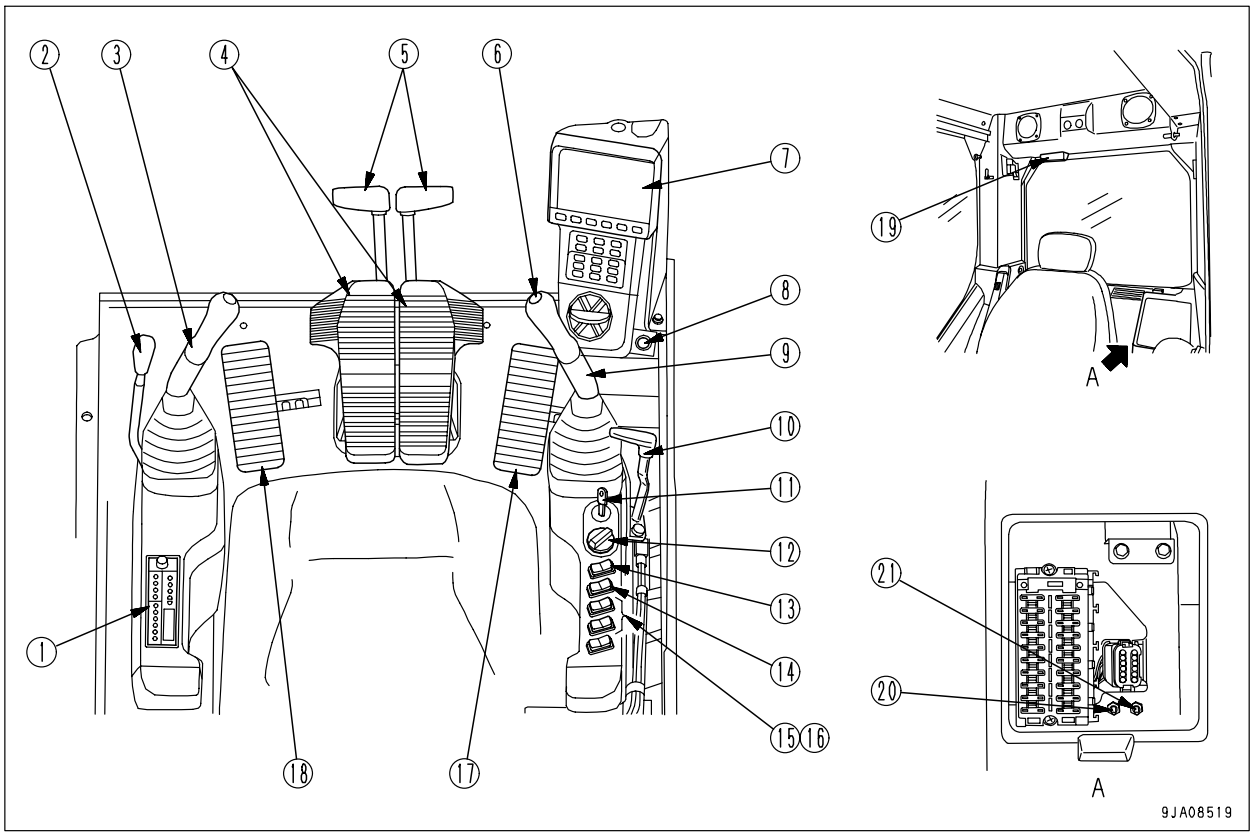
OVERALL MACHINE VIEW



(1) Bucket
(2) Bucket cylinder
(3) Arm
(4) Arm cylinder
(5) Boom
(6) Boom cylinder
(7) Additional lamp (if equipped)
(8) Working lamp
(9) Sprocket
(10) Track frame
(11) Track shoe
(12) Idler
(13) Blade cylinder (blade specification)
(14) Blade (blade specification)

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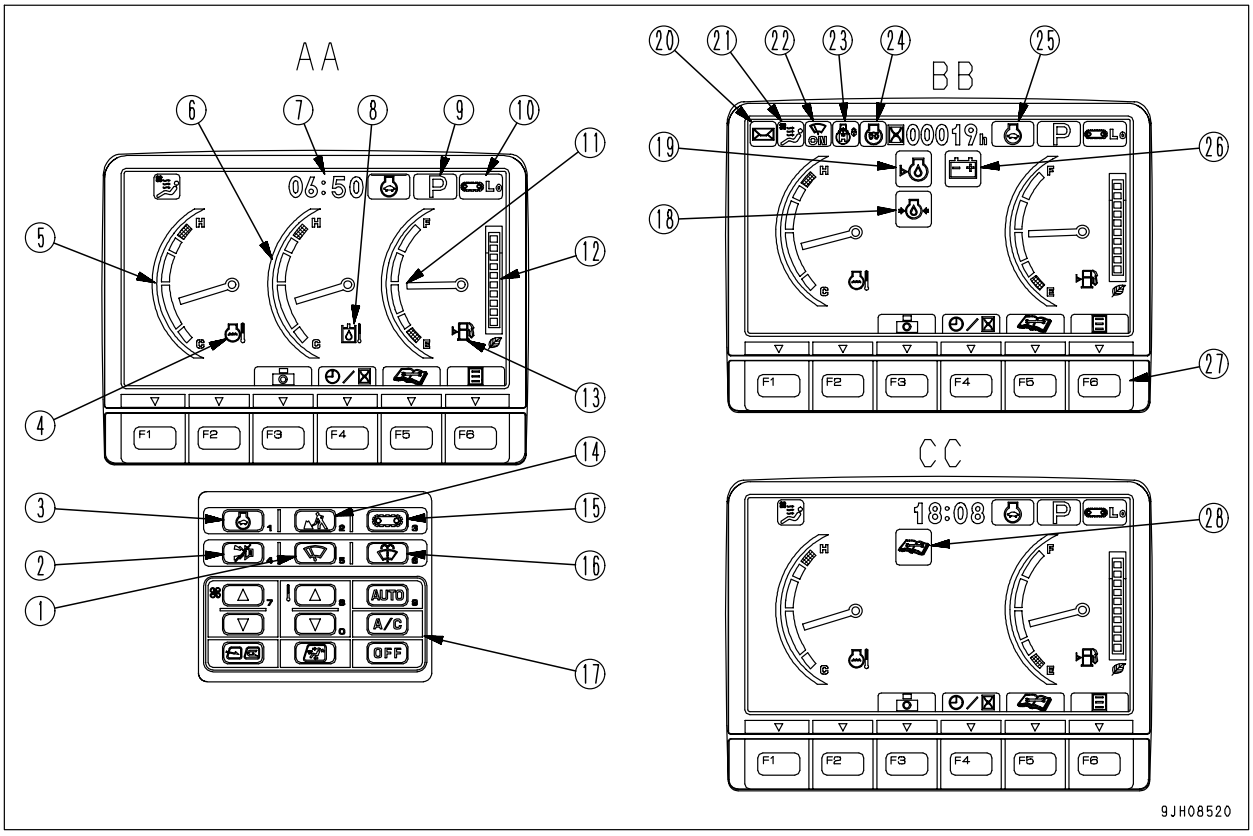
CONTROLS AND GAUGES



(1) Radio
(2) Lock lever
(3) Left work equipment control lever
(4) Travel pedals
(5) Travel levers
(6) Horn switch
(7) Machine monitor
(8) Cigarette Lighter
(9) Right work equipment control lever
(10) Blade control lever (blade specification)
(11) Starting switch
(12) Fuel control dial
(13) Lamp switch
(14) Swing lock switch
(15) Revolving warning lamp switch (if equipped)
(16) Roof glass wiper switch (if equipped)
(17) Attachment control pedal (if equipped)
(18) Attachment control pedal (if equipped)
(19) Room Lamp Switch
(20) Emergency pump drive switch
(21) Swing parking brake release switch

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Machine monitor



AA: Screen for standard
BB: Screen with all lamps lighted up
CC: Maintenance time warning screen

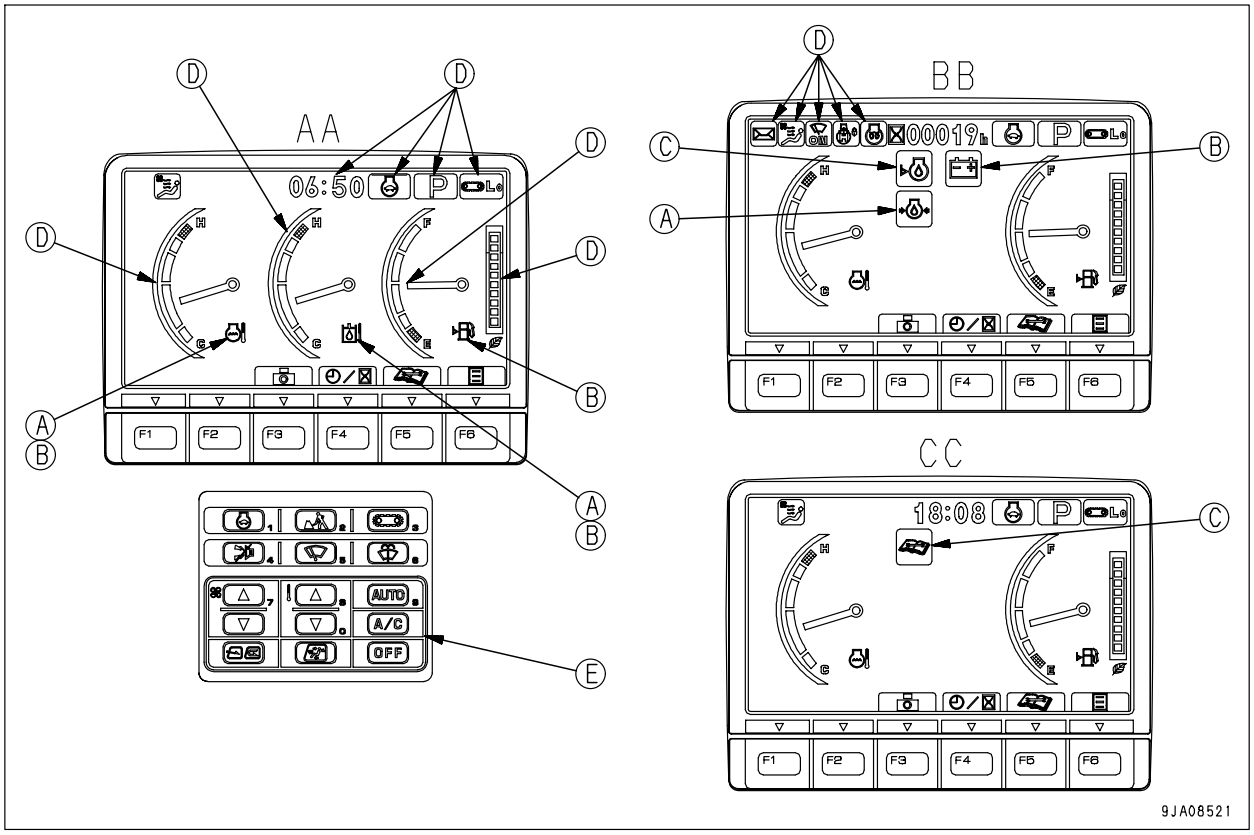
(1) Wiper switch
(2) Buzzer cancel switch
(3) Auto-deceleration switch
(4) Engine coolant temperature monitor
(5) Engine coolant temperature gauge
(6) Hydraulic oil temperature gauge
(7) Service meter, Clock
(8) Hydraulic oil temperature monitor
(9) Working mode monitor
(10) Travel speed monitor
(11) Fuel gauge
(12) ECO gauge
(13) Fuel level monitor
(14) Working mode selector switch
(15) Travel speed selector switch
(16) Window washer switch
(17) Air conditioner control switches
(18) Engine oil pressure monitor
(19) Engine oil level monitor
(20) Message monitor
(21) Air conditioner monitor
(22) Wiper monitor
(23) Swing lock monitor
(24) Engine pre-heating monitor
(25) Auto-deceleration monitor
(26) Charge level monitor
(27) Function switches (F1 to F6)
(28) Maintenance interval monitor

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DETAILED CONTROLS AND GAUGES

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.

MONITORING SYSTEM



AA: Screen for standard
BB: Screen with all lamps lighted up
CC: Maintenance time warning screen

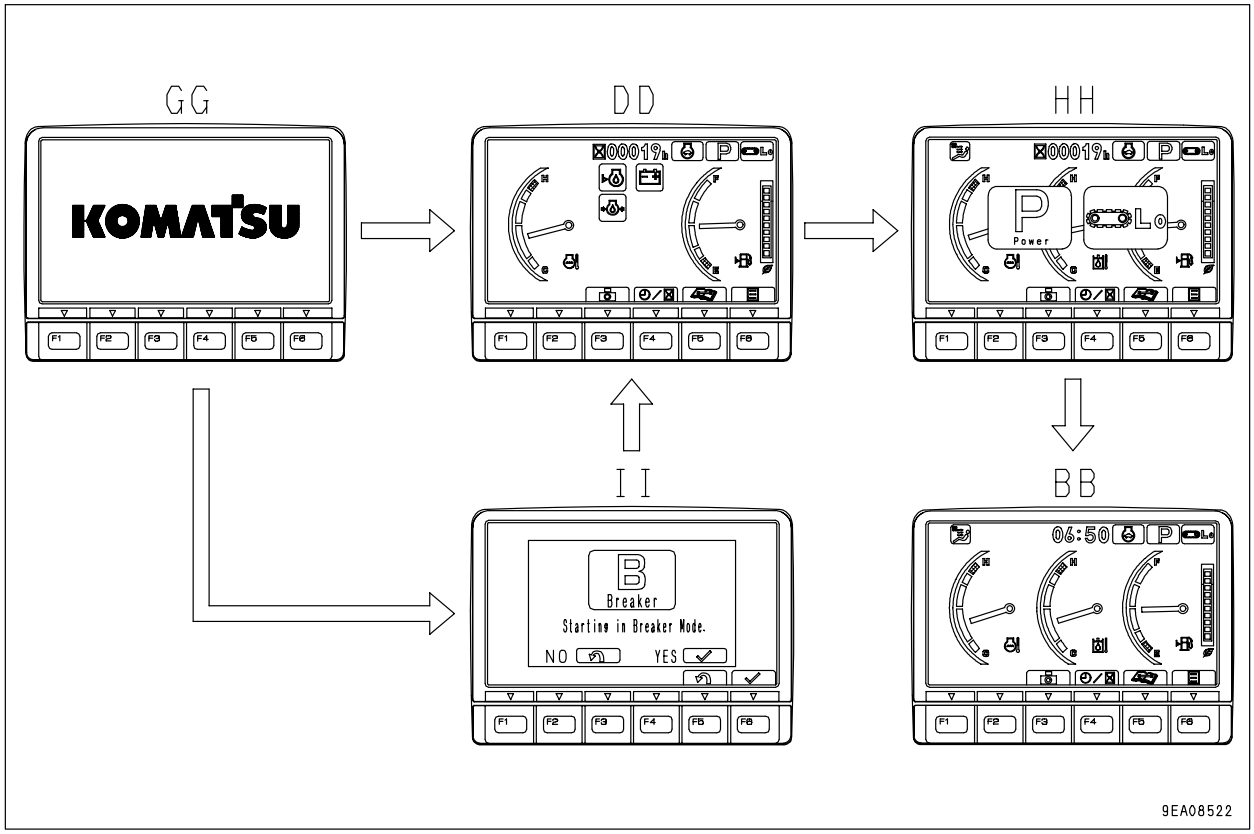
(A) Emergency monitors
(B) Caution monitors
(C) Basic check monitors
(D) Meter display portion,pilot display
(E) Monitor switches portion

REMARK
One of the features of liquid crystal display panels is that there may be black spots (spots that do not light up) or white spots (spots that stay lighted up) on the screen. If there are fewer than 10 black or white spots, this is not a failure or a defect.

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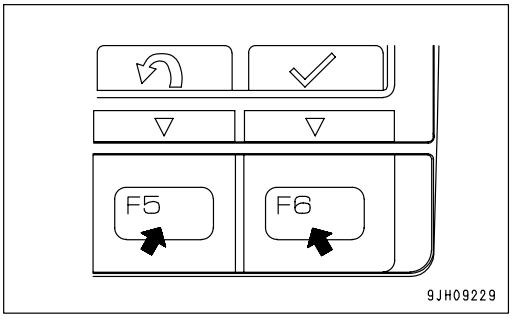
Basic Operation of Machine Monitor

Starting Engine When Situation is Normal



- When the starting switch is turned to the ON position, the opening screen GG is displayed.
- After the opening screen GG is displayed for 2 seconds, the screen switches to the check before starting screen DD.
- After the check before starting screen DD is displayed for 2 seconds, the screen switches to the working mode/travel mode display screen HH.
- After the working mode/travel mode display screen HH is displayed for 2 seconds, the screen switches to standard screen BB.
- If the working mode when the engine is started is B mode, the opening screen GG is displayed for 2 seconds, and the screen then switches to the breaker mode confirmation screen II.

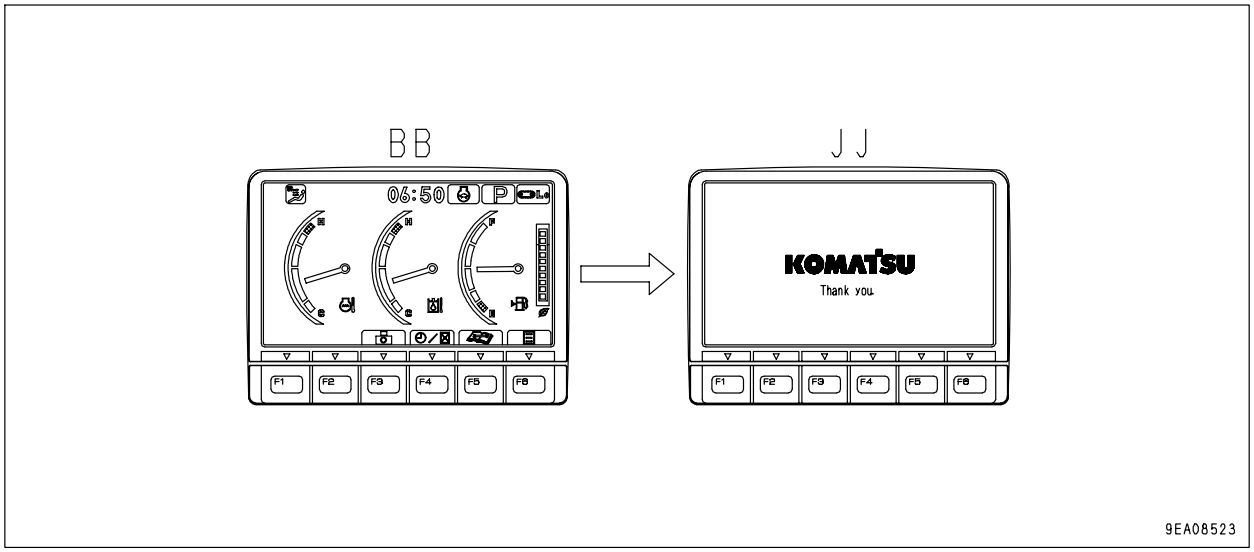
When starting in B mode, press switch F6. If you do not want to start B mode, press switch F5. In this case, the system starts with E mode.



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REMARK
When the engine is started, the battery voltage may suddenly drop depending on the temperature and the battery condition. If this happens, the display on the machine monitor may momentarily go out, but this does not indicate any abnormality.

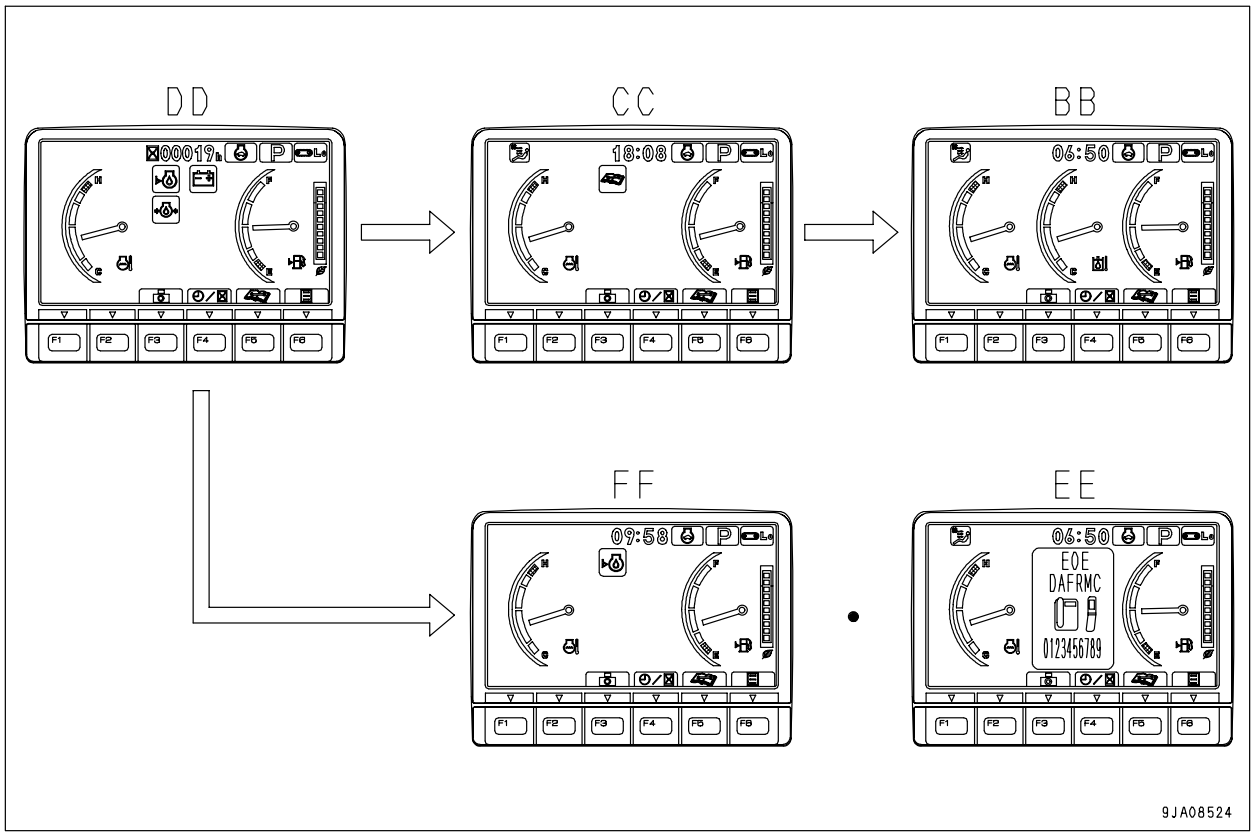
Stopping Engine When Situation is Normal



- When the starting switch is turned to the ON position, ending screen JJ is displayed for 5 seconds, then on the display goes out.

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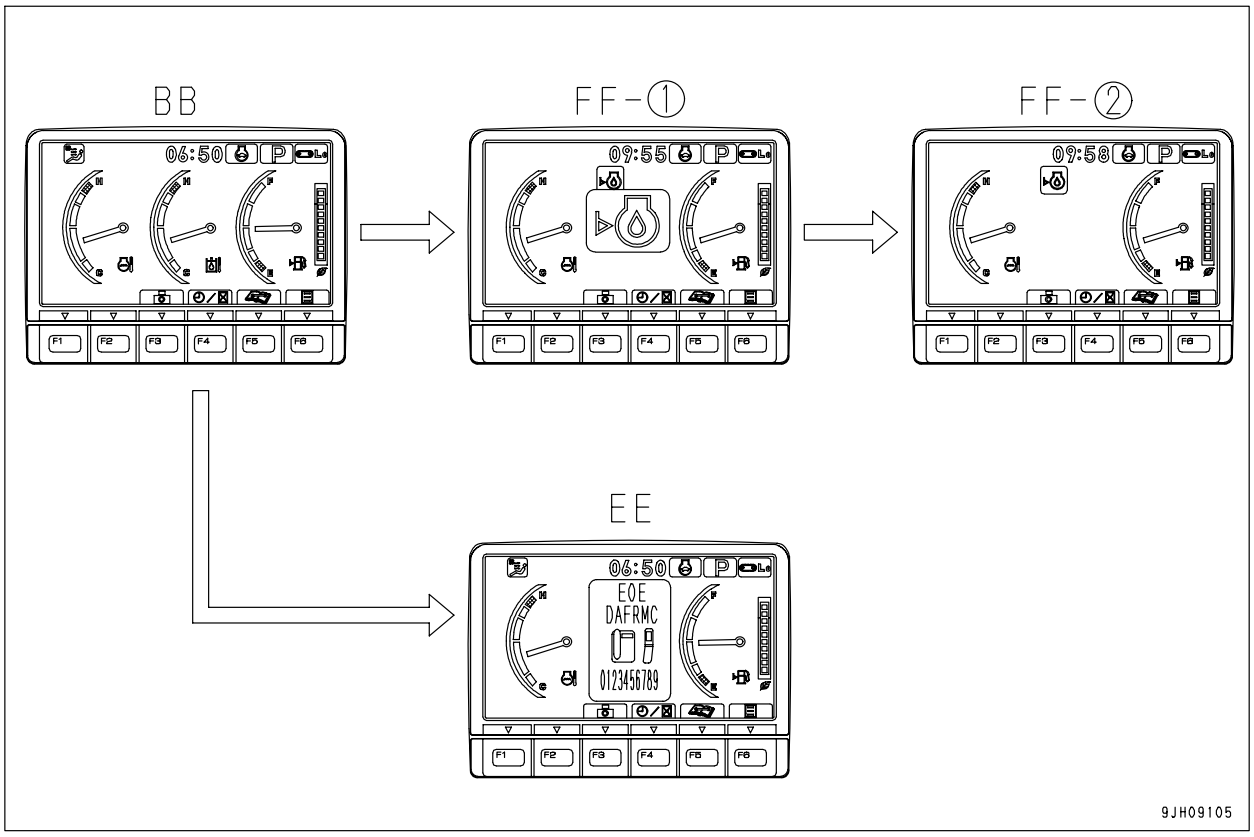
If There Is Abnormality When Starting Engine



- 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 2 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 standard screen BB.
- After displaying the check before starting screen DD for 2 seconds, the screen changes to the warning screen FF or error screen EE.

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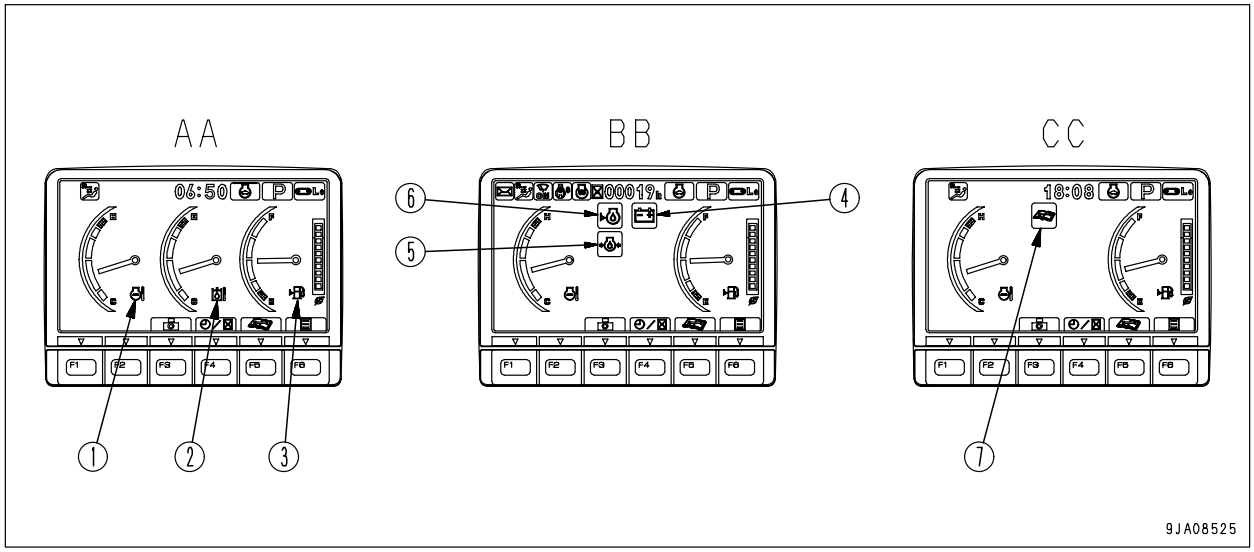
If Any Abnormality Occurs During Operation



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

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REMARK
The colors lighting up the monitors related to the emergency stop items, caution items, and basic check items are as follows.



AA: Screen for standard
BB: Screen with all lamps lighted up
CC: Maintenance time warning screen

	Type of monitor	Color when monitor lights up		
		When normal	When abnormal	At low temperature
(1)	Engine coolant temperature monitor	Blue	Red	White
(2)	Hydraulic oil temperature monitor	Blue	Red	White
(3)	Fuel level monitor	Blue	Red	-
(4)	Charge level monitor	OFF	Red	-
(5)	Engine oil pressure monitor	OFF	Red	-
(6)	Engine oil level monitor	OFF	Red	-
(7)	Maintenance interval monitor	OFF	Red	-

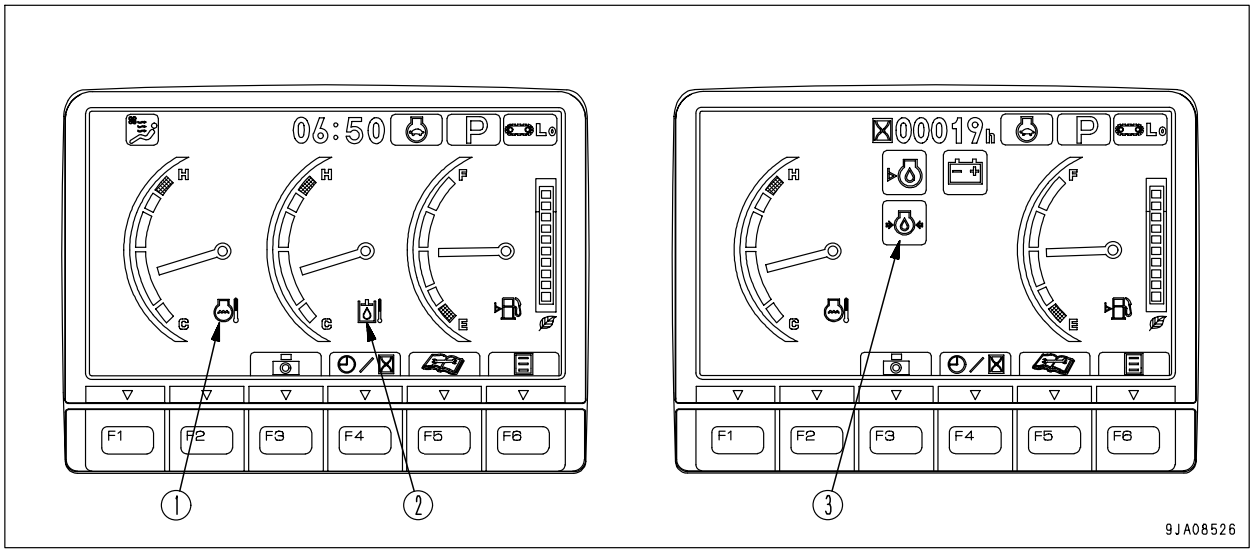
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Emergency Monitors

CAUTION

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

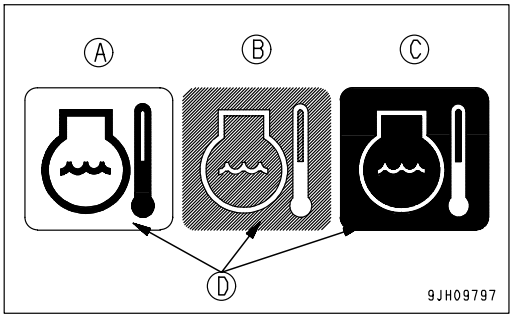
These items should be observed while the engine is running. If there is a problem, the monitor for the abnormal location lights up red and buzzer sounds, perform action immediately.



(1) Engine coolant temperature 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 the engine coolant temperature becomes abnormally high, the monitor shows abnormal display (C). The overheat prevention system is automatically actuated and the engine speed drops.
Stop operations and run the engine at low idling until monitor (1) shows normal display (B).



Display (A) at low temperatures: Monitor background (D) is white
Display (B) at correct temperatures: Monitor background (D) is blue
Display (C) when condition is abnormal: Monitor background (D) is red

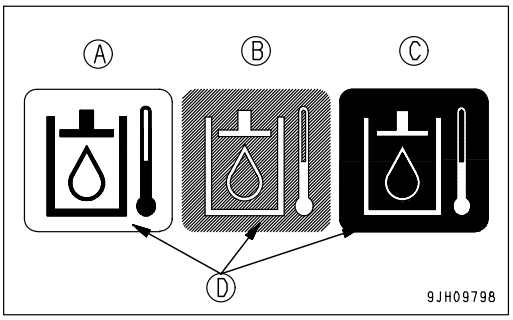
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Hydraulic Oil Temperature Monitor

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

If the hydraulic oil temperature becomes abnormally high, abnormality display (C) is shown.

Stop operations and stop the engine or run it at low idling until the monitor changes to normal display (B).



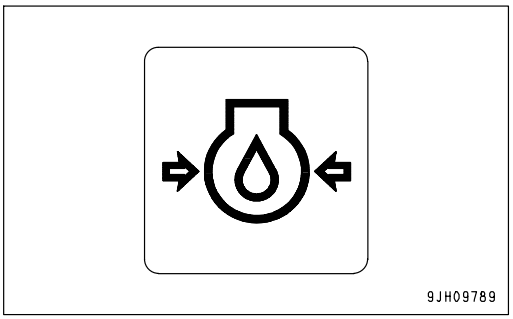
Display (A) at low temperatures: Monitor background (D) is white

Display (B) at correct temperatures: Monitor background (D) is blue

Display (C) when condition is abnormal: Monitor background (D) is red

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.



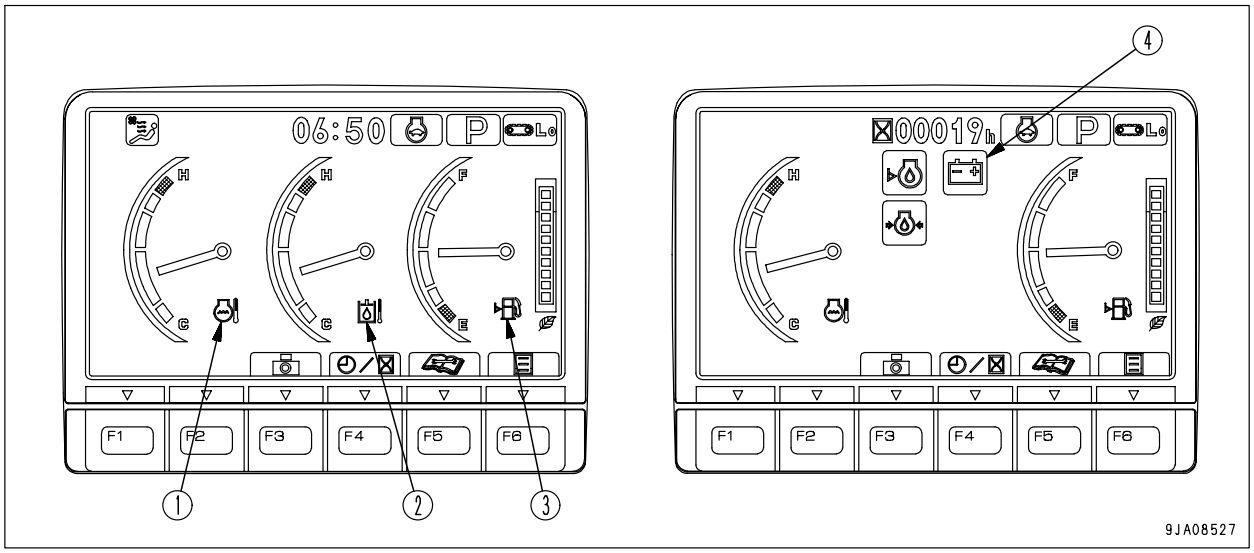
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Caution Monitors

CAUTION

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

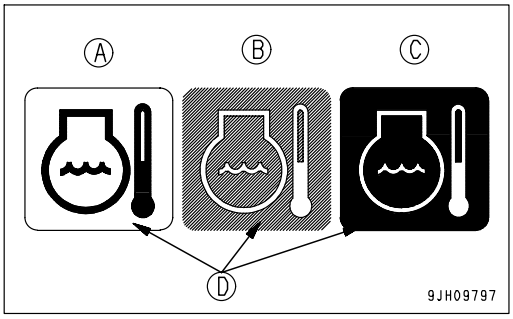
These are items that should be observed while the engine is running. If any abnormality occurs, the screen displays the item that needs immediate action.
If there is an abnormality, the monitor for the abnormal location lights up red.



(1) Engine coolant temperature monitor
(2) Hydraulic oil temperature monitor
(3) Fuel level monitor
(4) Charge level monitor

Engine Coolant Temperature Monitor

If this monitor (1) shows low-temperature display (A), carry out the warm-up operation. For details, see "Engine Warm Up (PAGE 3-139)".
Monitor (1) will show normal display (B), so carry out the warm-up operation for the engine.

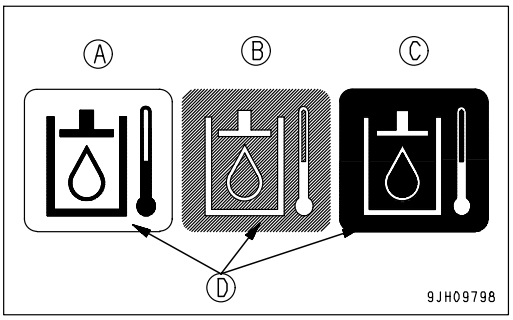


Display (A) at low temperatures: Monitor background (D) is white
Display (B) at correct temperatures: Monitor background (D) is blue
Display (C) when condition is abnormal: Monitor background (D) is red

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Hydraulic Oil Temperature Monitor

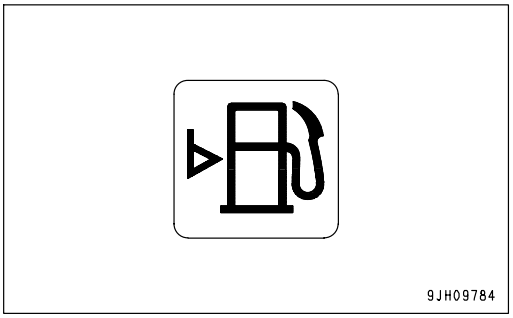
If this monitor (2) shows low-temperature display (A), carry out the warm-up operation. For details, see "Hydraulic Equipment Warm Up (PAGE 3-141)".
Carry out the warm-up operation for the hydraulic equipment until monitor (2) shows normal display (B).



Display (A) at low temperatures: Monitor background (D) is white
Display (B) at correct temperatures: Monitor background (D) is blue
Display (C) when condition is abnormal: Monitor background (D) is red

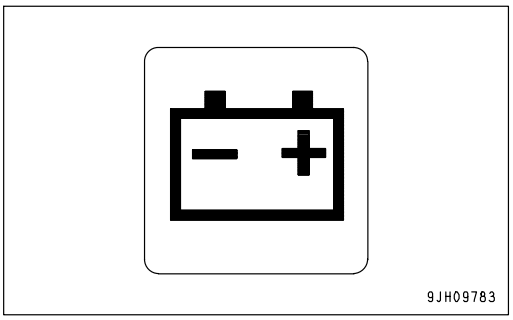
Fuel Level Monitor

This monitor (3) lights up to warn that the operator that the level in the fuel tank is low.
When the remaining fuel level reaches approx. 33 liters (8.72 US gal), the monitor lamp lights up red, so add fuel as soon as possible.



Charge Level 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, monitor (1) lights up red.
If monitor lights up red, check the V-belt for looseness. If any abnormality is found, perform the necessary actions. For details, see "OTHER TROUBLE (PAGE 3-201)".



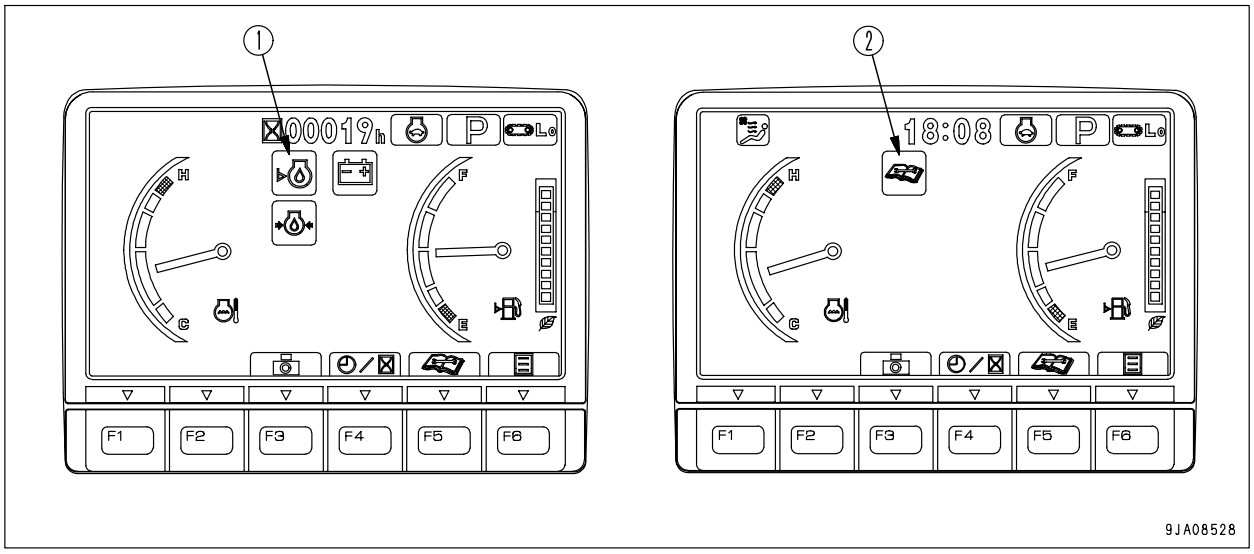
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Basic Check Monitors

CAUTION

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

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.

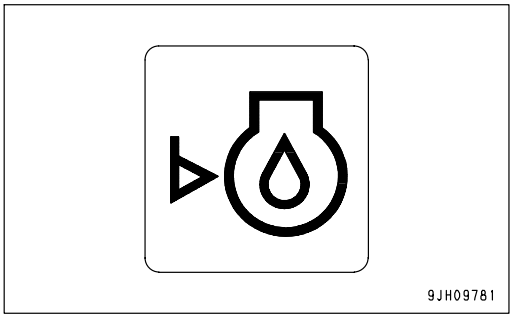


(1) Engine oil level monitor

(2) Maintenance interval monitor

Engine Oil Level Monitor

Monitor (1) 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.



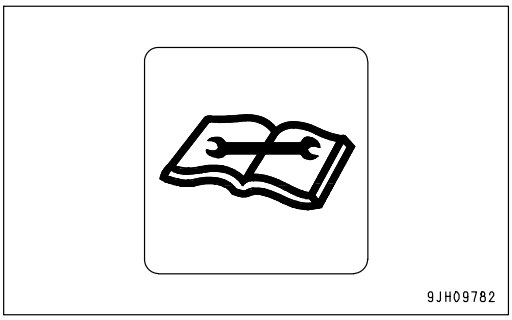
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Maintenance Interval Monitor

This monitor (2) lights up when the maintenance time gets close and remains lighted after the maintenance time has already passed.

- Lighted yellow: The maintenance time is due within 30 hours.
- Lighted red: The maintenance time has already passed.

This monitor lights up when the starting switch is turned to the ON position. It goes off after 30 seconds and the display changes to the normal screen.

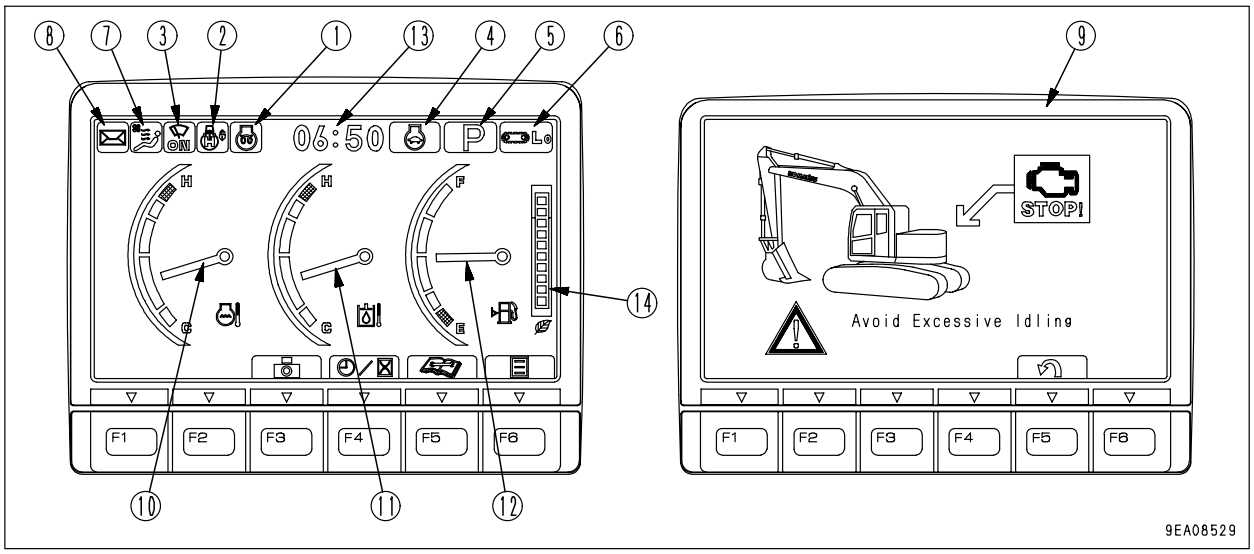


REMARK

- For details of the method of confirming the maintenance interval, see "Maintenance Selector Switch (PAGE 3-38)".
- If it is desired to change settings for the maintenance interval, have your Komatsu distributor change the settings.

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Meter Display Portion



Pilot display
(1) Engine pre-heating monitor
(2) Swing lock monitor
(3) Wiper monitor
(4) Auto-deceleration monitor
(5) Working mode monitor
(6) Travel speed monitor
(7) Air conditioner monitor
(8) Message monitor
(9) Idle stop guidance

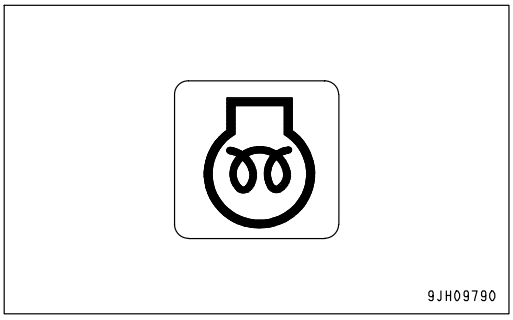
Gauge and Meter
(10) Engine coolant temperature gauge
(11) Hydraulic oil temperature gauge
(12) Fuel gauge
(13) Service meter, clock
(14) ECO gauge

Pilot Display

- The pilot display at the top of the screen consists of the pilot lamps to confirm the actuation of each function.
- When the starting switch is turned ON, the pilot lamp lights up when the display items are functioning.

Engine Pre-heating Monitor

This monitor (1) is displayed when preheating the engine before starting the engine in temperatures below 0°C (32°F).
In cold weather, when the starting switch is turned to the HEAT position, the preheating monitor lights up. After lighting up for approx. 30 seconds, it starts to flash to inform the operator that the preheating has been completed. After flashing for approx. 10 seconds, the monitor goes out.



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Swing Lock Monitor

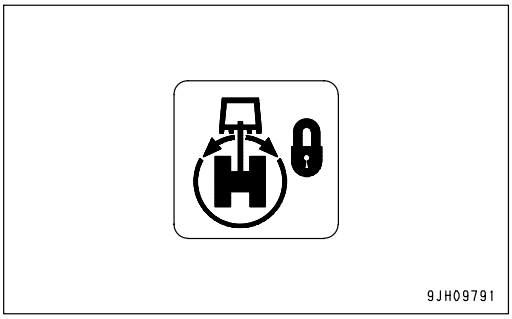
This monitor (2) informs the operator that the swing lock is being actuated.

Actuated: Lights up

When the swing lock switch is turned ON (ACTUATED), the monitor lamp lights up.

This lamp lights up when the swing parking brake release switch is set to the FREE position.

- For details of the positions of the swing holding brake release switch, see "CONTROLS AND GAUGES (PAGE 3-3)".



REMARK

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

Wiper Monitor

Monitor (3) indicates operating ststus of the wiper.

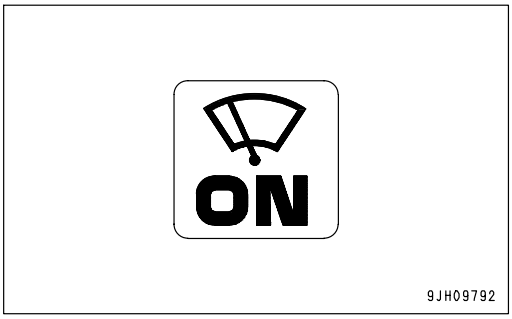
The monitor display when wiper switch is operated, as follows.

When ON lights up: Wiper moves continuously

When INT lights up: Wiper moves intermittently

OFF: Wiper stops

- For details of the positions of the wiper switch, see "CONTROLS AND GAUGES (PAGE 3-3)".



Auto-deceleration Monitor

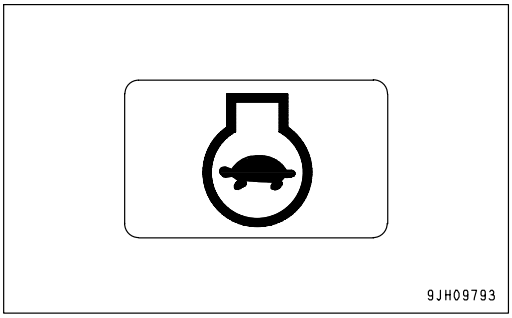
Monitor (4) shows if the auto-deceleration is being actuated.

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

Auto-deceleration monitor ON: Auto-deceleration actuated

Auto-deceleration monitor OFF: Auto-deceleration canceled

- For details of the positions of the auto-deceleration switch, see "CONTROLS AND GAUGES (PAGE 3-3)".

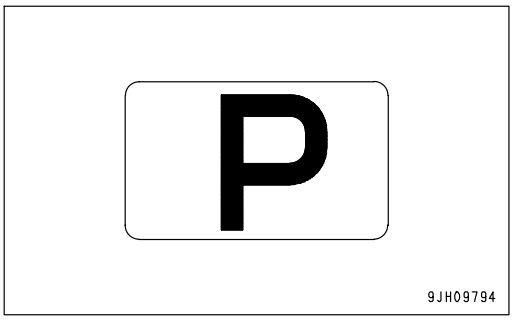


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Working Mode Monitor

This monitor (5) displays the setting of the working mode.
The monitor display is as follows according to the operation of the working mode switch.
P: P mode (for heavy-load operations)
E: E mode (for operations with emphasis on fuel consumption)
L: L mode (for fine control operations)
B: B mode (for breaker operations)
ATT: ATT mode (for crusher operations)

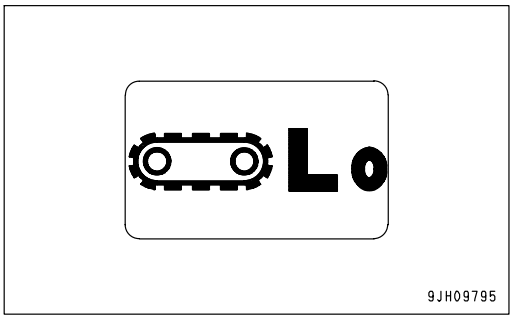
- For details of the positions of the working mode switch, see "CONTROLS AND GAUGES (PAGE 3-3)".



Travel Speed Monitor

This monitor (6) shows the setting for the travel speed.
The monitor display is as follows according to the operation of the travel speed selector switch.
Lo: Low-speed travel
Hi: High-speed travel

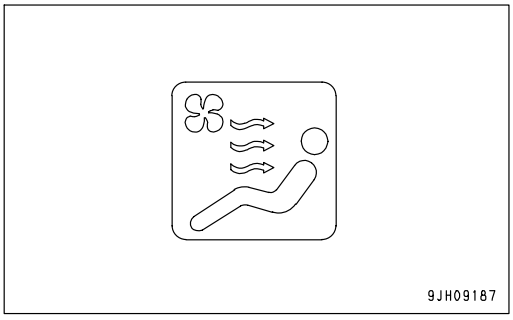
- For details of the positions of the travel speed selector switch, see "CONTROLS AND GAUGES (PAGE 3-3)".



Air Conditioner Monitor

This monitor (7) displays the working status of the air conditioner.

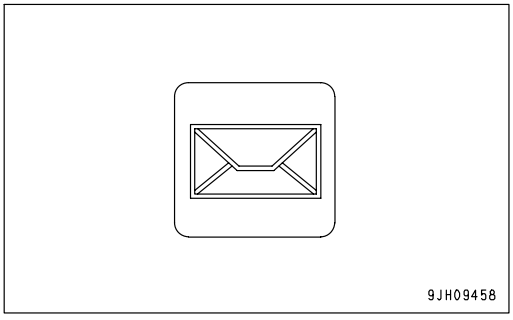
Monitor lighted up: Air conditioner ON
Monitor off: Air conditioner OFF



Message Monitor

This monitor (8) lights up to inform the operator that a message has been received from Komatsu.
To read the message, see "Message Display (PAGE 3-55)" for details.

Lighted up green: There is unread message
Lighted up blue: There is message awaiting reply
OFF: There are no messages

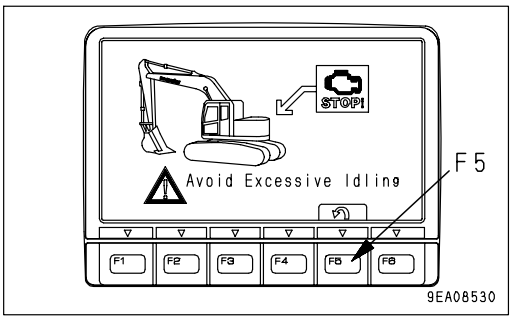


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Idle Stop Guidance

If the levers are not operated for more than five minutes, and the engine is idling, the idling stop message is displayed on the monitor. When waiting for work or stopping work for a short periods, stop the engine to reduce unnecessary fuel consumption.

- The idling stop message screen returns to the standard screen any lever is operated again or when function switch F5 (Back) is pressed.

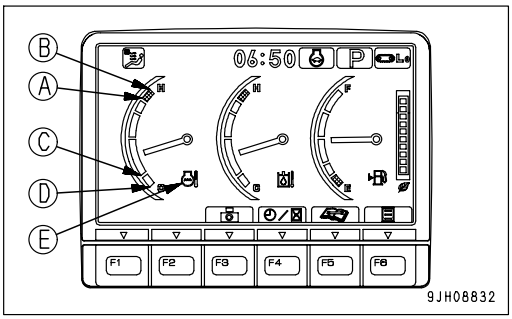


Gauges and Meter

Engine Coolant Temperature Gauge

This meter (10) shows the engine coolant temperature.
During normal operations, the indicator should be in the green range. If the indicator goes beyond red range (A) during operations, the overheat prevention system is actuated.

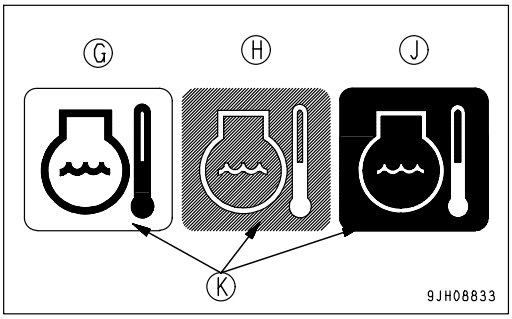
- (A) - (B): Red range
- (A) - (C): Green range
- (C) - (D): White range



The overheat prevention system is actuated as follows.
Red range (A) position: Engine coolant temperature monitor (E) shows abnormality display
Red range (B) position: Engine speed changes to low idling, engine coolant temperature monitor (E) shows abnormality display, alarm buzzer sounds at same time
The overheat prevention system continues to work until the indicator enters the green range.

When the engine is started, if the indicator is at position (C), engine coolant temperature monitor (E) shows the low-temperature display.
If this happens, carry out the warm-up operation. For details, see "Engine Warm Up (PAGE 3-139)".

Display (G) at low temperatures: Monitor background (K) is white
Display (H) at correct temperatures: Monitor background (K) is blue
Display (J) when condition is abnormal: Monitor background (K) is red



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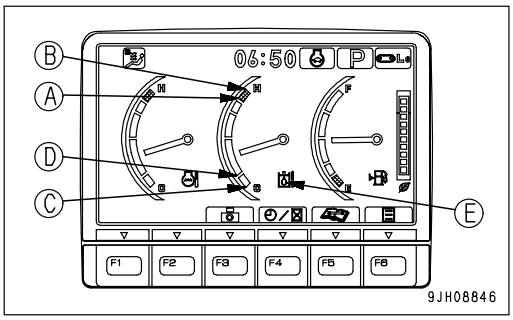
Hydraulic Oil Temperature Gauge

This meter (11) shows the hydraulic oil temperature.

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

If the indicator enters the red range (A) during operations, the hydraulic oil temperature is 102°C (215.6°F) or more. Run the engine at low idling or stop it and wait for the hydraulic oil temperature to go down.

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



REMARK

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

Red range (A) position: 102°C (215.6°F) or more

Red range (B) position: 105°C (221°F) or more

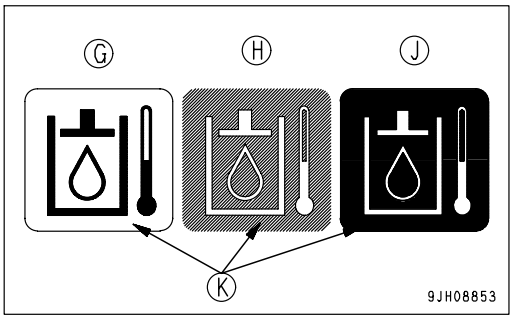
When the indicator is in red range (A) - (B), hydraulic oil temperature monitor (E) shows the abnormality display.

When the engine is started, if the indicator is at position (C) and the hydraulic oil temperature is 20°C (68°F), hydraulic oil temperature monitor (E) shows the low-temperature display. If this happens, carry out the warm-up operation. For details, see "Hydraulic Equipment Warm Up (PAGE 3-141)".

Display (G) at low temperatures: Monitor background (K) is white

Display (H) at correct temperatures: Monitor background (K) is blue

Display (J) when condition is abnormal: Monitor background (K) is red



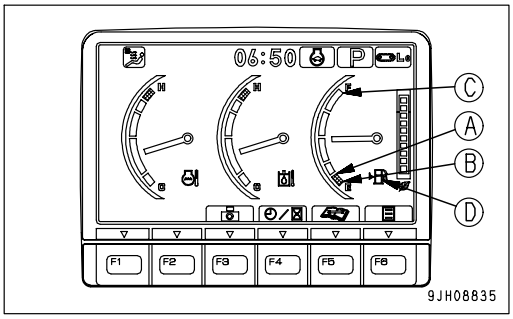
Fuel Gauge

This meter (12) shows the amount of fuel remaining in the fuel tank.

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

If the indicator starts to enter red range (A) during operation, there is less than 52 liters (13.74 US gal) of fuel remaining, so carry out inspection and add fuel.

- (A) - (B): Indicates red range
- (A) - (C): Indicates green range



REMARK

When the indicator reaches red range (B), there is less than 33 liters (8.72 US gal) of fuel remaining.

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

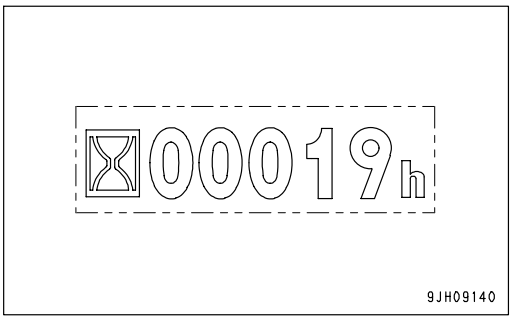
The correct fuel level may not be displayed for a short time when the starting switch is turned ON, but this is not an abnormality.

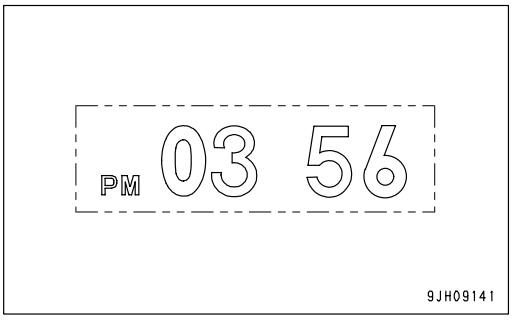
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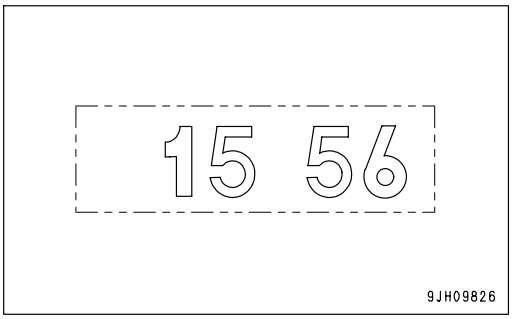
Service Meter, Clock

This meter (13) shows the total hours of operation of the machine or the present time.

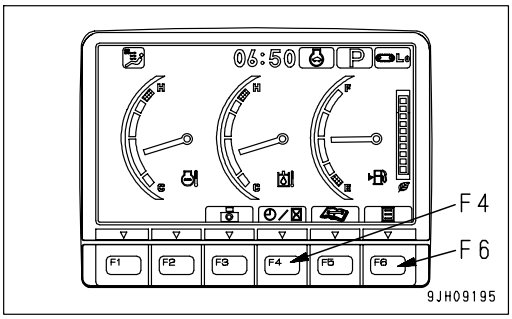
When the engine is running, the service meter advances even if the machine is not moving. The service meter advances 1 for every hour that the machine is working, regardless of the engine speed.







- When the standard screen is being displayed, if function switch F4 is pressed, it is possible to switch between the clock display and the service meter display.
- Clock display (12-hour or 24-hour displays are available)
  To set or correct the time, press function switch F6 (user mode switch).

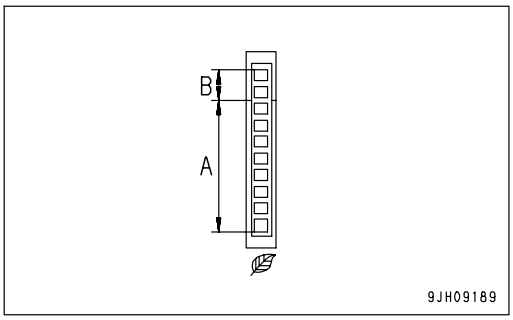


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ECO Gauge

This gauge (14) shows the working load status.

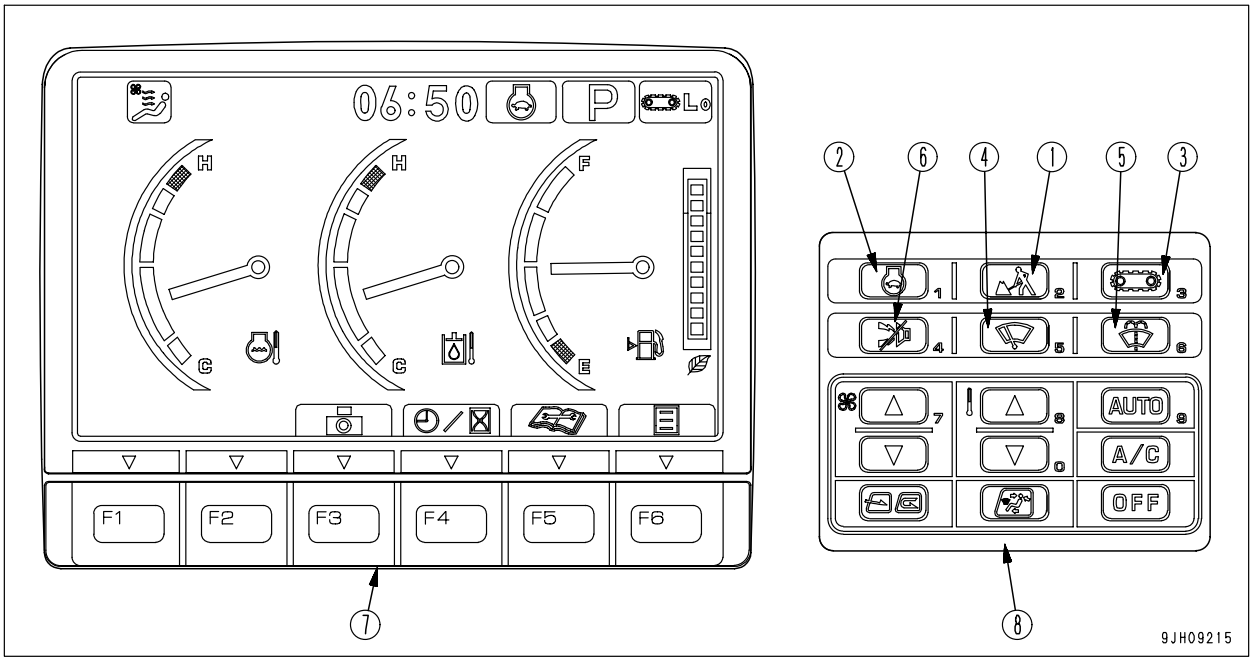
When the gauge is in green range A, the work load is light to medium. When the gauge is in orange range B), the load is heavy.



- When the gauge enters the orange range, there is no abnormality on the machine, but to protect the environment, reduce the engine output to a point where there is no adverse effect on the operation. Generally, carry out energy-saving operations in the green range. Reducing the frequency of travel also helps to save energy. Consider the best way of saving energy.

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Monitor Switches Portion



(1) Working mode selector switch
(2) Auto-deceleration switch
(3) Travel speed selector switch
(4) Wiper switch
(5) Window washer switch
(6) Buzzer cancel switch
(7) Function switches
(8) Air conditioner switch

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Working Mode Selector Switch

Use this switch (1) to set the movement or power of the work equipment.

The operation becomes easier if the mode is selected to match the content of the operation.

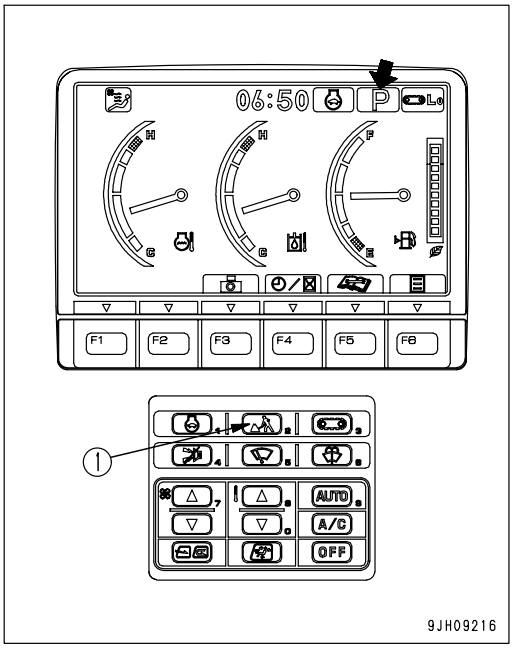
P mode: For heavy-load operations

E mode: For operation with emphasis on fuel consumption

L mode: For fine control operations

B mode: For breaker operations

ATT mode: For double-acting circuit attachment, such as crusher (attachment-ready machines)



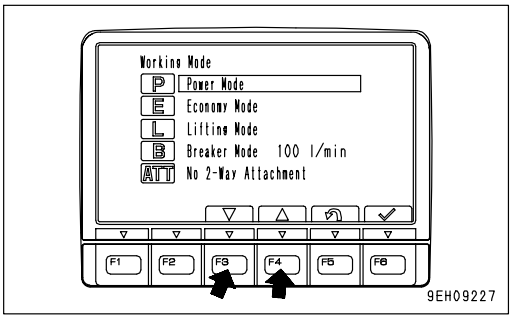
- When the monitor first appears, it is automatically set to the mode in use when it was started the previous time.
- Press switch (1) to display the working mode selection screen. For each set mode, the pilot monitor at the top right of the monitor display shows P, E, L, B, ATT.
- For machines ready for attachment, the attachment mode is added to the display.
  For details of the method for handling machines ready for attachment, see the ATTACHMENTS AND OPTIONS Section.
- If you want to have automatic setting of the P, E, L, B or ATT mode when starting (optional default setting), please ask your Komatsu distributor to change the setting.

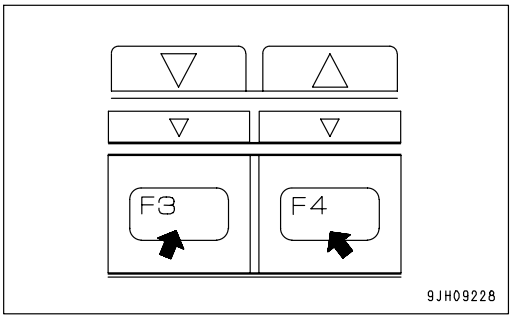
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Procedure for operation

1. If working mode selector switch (1) is pressed, the Working Mode screen is displayed on the monitor.
2. Press function switches F3 or F4 at the bottom of the screen or working mode selector switch (1) to change the mode selection one at a time.

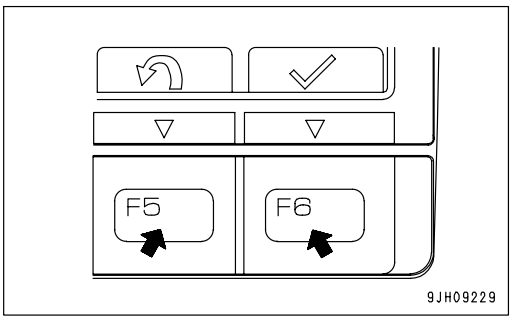
   • If no switch is touched for more than five seconds, the selected working mode is automatically set as the working mode and the screen changes to Steps 3 and Steps 4.





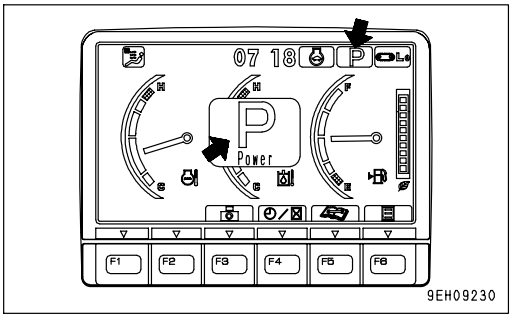
REMARK

To return to the standard screen without changing the working mode, press function switch F5.

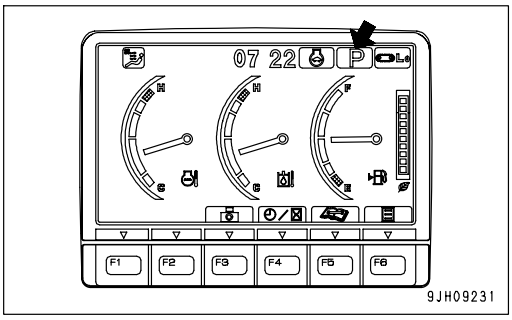


3. After selecting the desired mode, press function switch F6 and the mode is displayed in the center of the monitor display. (Example: If power mode is selected: P)

4. After two seconds, the pilot monitor display at the top right of the screen is highlighted in orange.



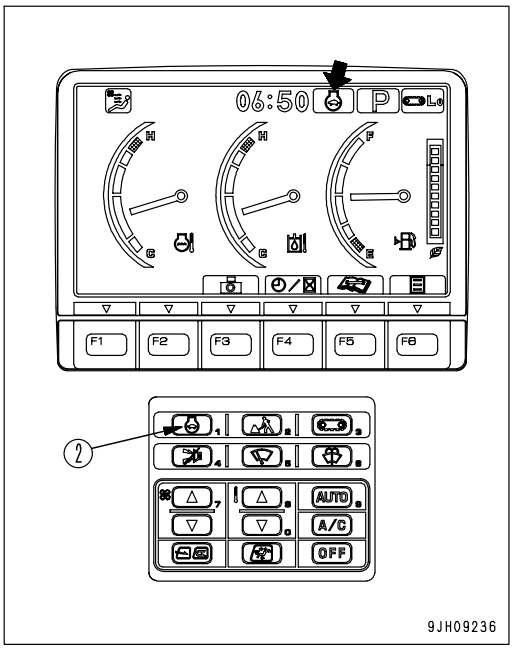
• After two seconds, the screen returns to the standard screen. The monitor display highlighted in orange in Steps 4 returns to blue.



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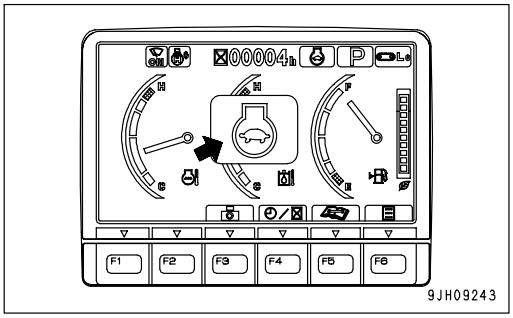
Auto-deceleration Switch

If the control levers are at neutral, this switch (2) automatically lowers the engine speed and turns on the function to reduce fuel consumption.
Auto-deceleration monitor ON: Auto-deceleration ON
Auto-deceleration monitor OFF: Auto-deceleration OFF
Each time the switch is pressed, the auto-deceleration is switched between ON and OFF.

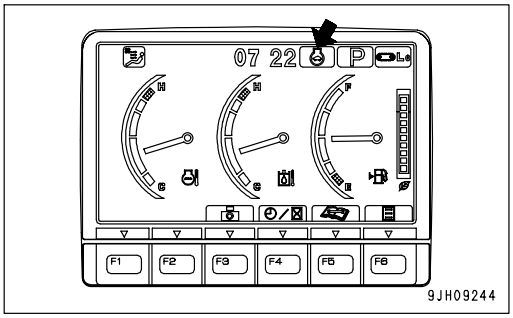


- Auto-deceleration function
  When the auto-deceleration function is ON, if the work equipment and travel levers are returned to the N position, the engine speed will drop after 4 seconds from the operating speed to idling speed.
  This makes it possible to reduce fuel consumption.
  If any lever is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

1. When auto-deceleration switch (2) is pressed and the auto-deceleration function is turned ON, the mode is displayed in the center of the monitor display, and after two seconds, the screen returns to the standard screen.



2. On the standard screen, the Auto-deceleration monitor lights up.
   (When the auto-deceleration is OFF, it does not light up.)



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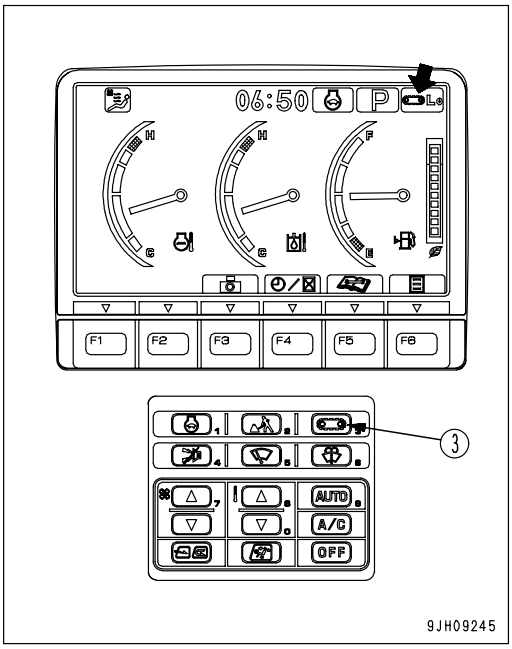
Travel Speed Selector Switch

WARNING

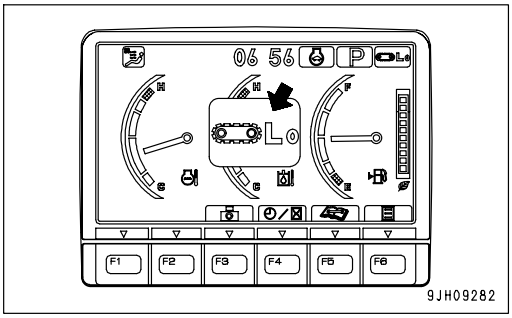
- **When loading or unloading the machine on a trailer, always travel at low speed (set to Lo). Never operate the travel speed selector switch when traveling.**
- **If the Hi-Lo switch is operated when the machine is traveling, the machine may deviate to one side even when it is traveling in a straight line. Always stop the machine before changing the travel speed.**
- **The area at the rear of the machine is a blind spot. Always use the rear view camera to check the area at the rear of the machine before traveling in reverse.**

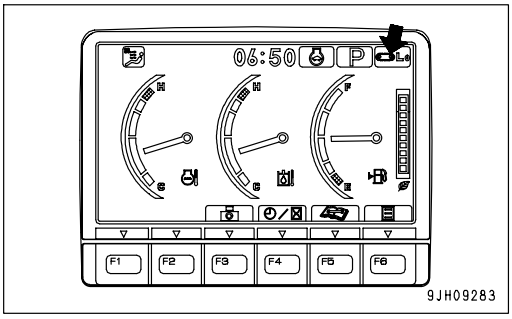
This switch (3) is used to set the travel speed to 2 stages.
Lo lights up : Low-speed travel
Hi lights up : Hi-speed travel
When the engine is started, the speed is automatically set to Lo.
Each time that the switch is pressed, the display changes Lo → Hi → Lo in turn.

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



REMARK
Each time travel speed selector switch (3) is switched, the mode is displayed on the monitor display, and after two seconds, the screen returns to the standard screen.





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Wiper Switch

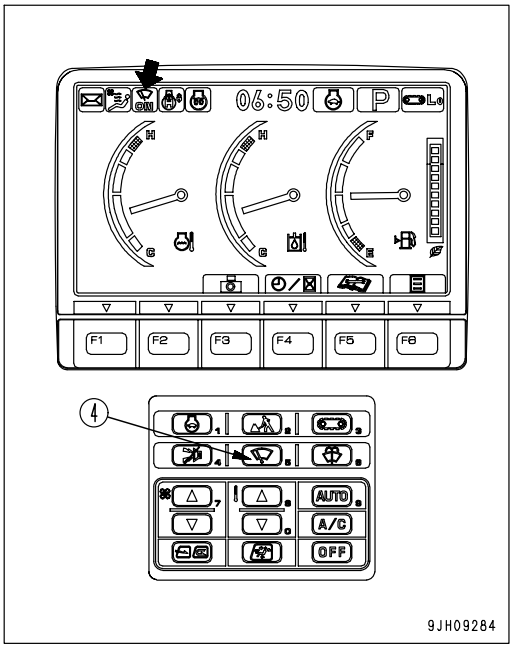
This switch (4) actuates the front window wiper.

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

Wiper monitor INT lighted up: Wiper operates intermittently

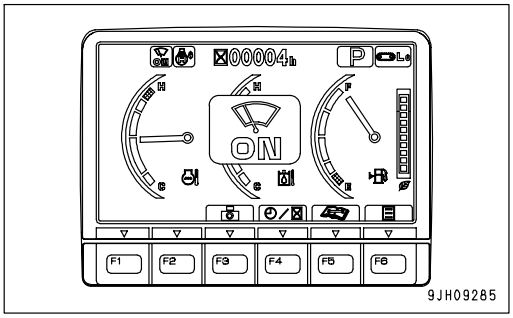
Wiper monitor ON lighted up: Wiper operates continuously

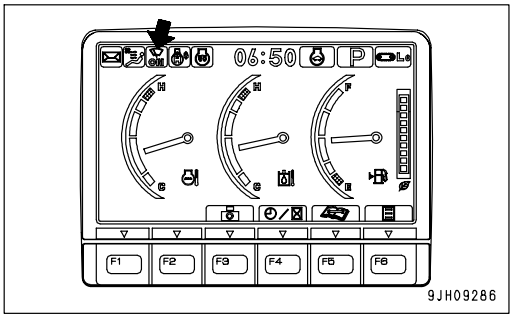
Wiper monitor OFF: Wiper stops



REMARK

Each time wiper switch (4) is pressed, the mode is displayed in the center of the monitor display, and after two seconds, the screen returns to the standard screen.



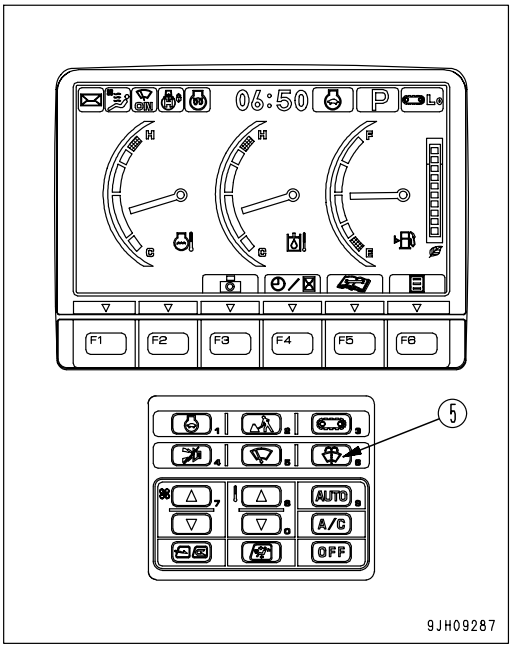


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Window Washer Switch

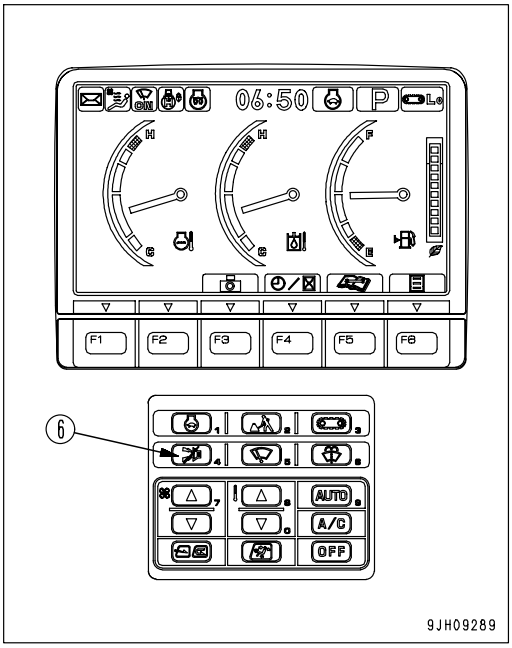
This switch (5) is kept continuously pressed, window washer fluid is sprayed out on the front glass. When the switch is released, the spray stops.

- If switch (5) is kept pressed when the wiper is stopped, the window washer fluid will spray, and at the same time, the wiper will be actuated continuously. When switch (5) is released, the wiper will continue to operate for 2 cycles, then stop.
- If the wiper is moving intermittenly and switch (5) is kept pressed continuously, window washer fluid will spray, and at the same time, the wiper will be actuated continuously. When switch (5) is released, the wiper will continue to operate for 2 cycles, then return to intermittent operation.



Buzzer Cancel Switch

When this switch (6) is pressed, the warning buzzer for the abnormal warning item stops.



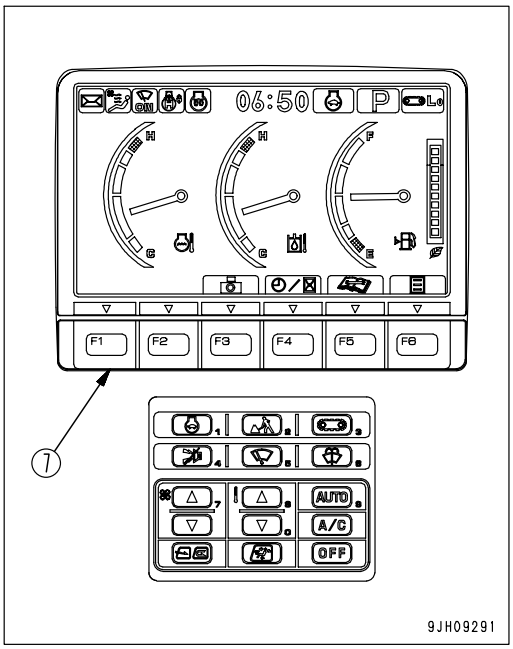
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Function Switches

Function switches (7) consist of 6 switches (F1 to F6). The function of each switch differs according to the content of each screen.
When the monitor display shows the standard screen, the functions are displayed as follows.

F3: Camera screen selector switch (if equipped)
F4: Service meter/time display selector switch
F5: Maintenance mode switch
F6: User mode switch
F1 and F2 are auxiliary switches for expanded functions.

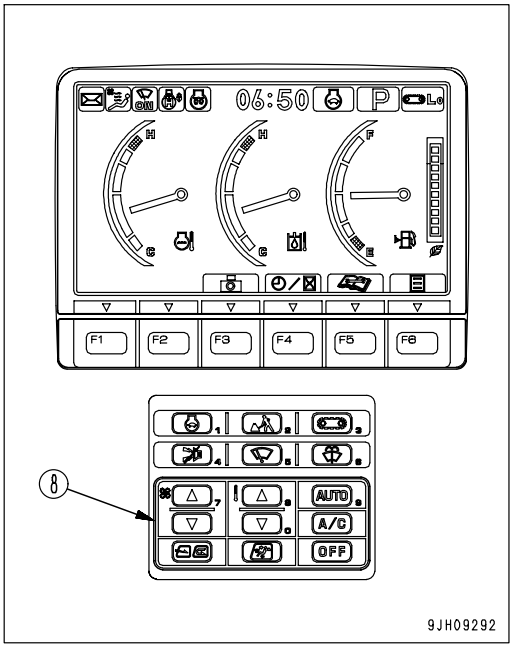
For explanation of each switch, see "Handling Function Switches (PAGE 3-32)".



Air Conditioner Switch

The air conditioner switches (8) consist of 9 switches.

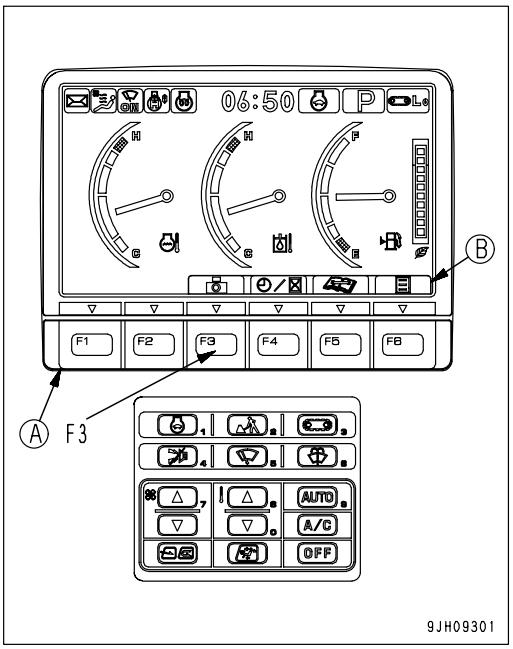
For explanation of each switch, see "AIR CONDITIONER CONTROLS (PAGE 3-90)".



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Handling Function Switches

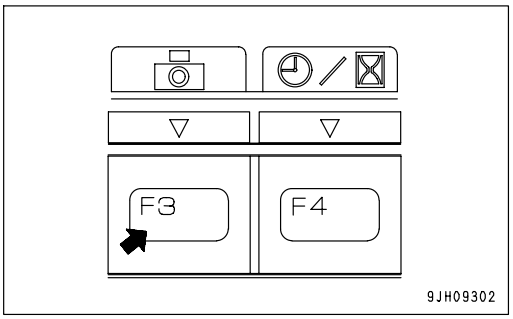
- The function switches (A) at the bottom of the monitor display consist of 6 switches (F1 - F6). The function of each switch differs according to the content of each screen.
- The function of switches (A) on each screen can be confirmed by guidance icons (B) displayed on top of each switch.
- If there is no display in guidance icon (B), even if switch (A) is pressed, it will not function.
- Even if guidance icon (B) is pressed, it will not function. Press switch (A) immediately below the guidance icon display to operate the function.



The operation of the function switches if the initial screen is the standard screen is as follows.

Camera Screen Selector Mode Switch

On machines with a camera, press switch F3 to switch to the camera screen display.

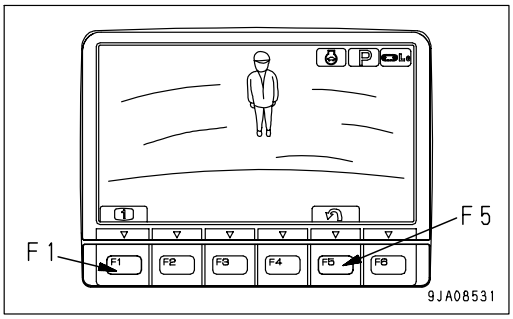


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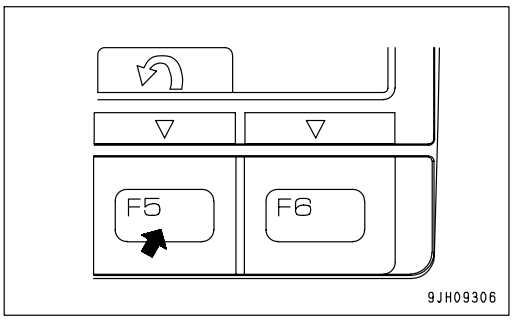
Operating Camera Screen Display

The following explains the method used to display the camera image on the monitor.

- On the standard screen, if switch F3 is pressed, the image display screen is displayed.



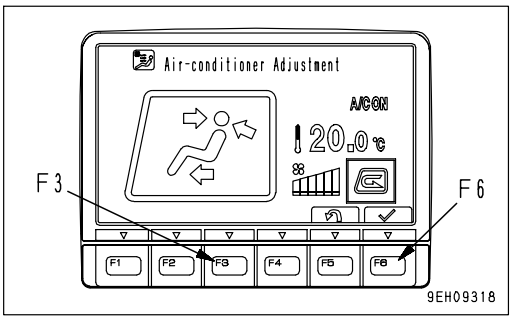
- Press switch F5 to return to the standard screen.

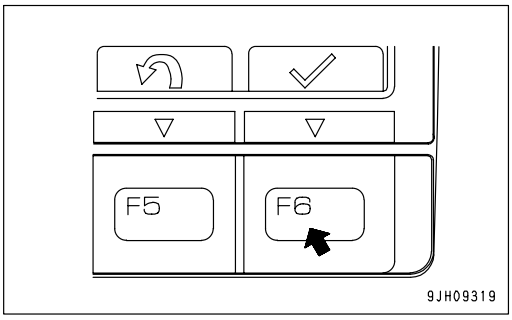


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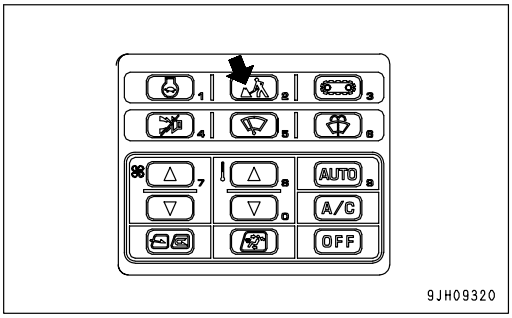
Other Mode Operations When Displaying Camera Image

- Even during the camera display, it is possible to operate other modes.
- The air conditioner can be operated.
  If the air conditioner switch is operated, the screen switches to the air conditioner control screen. If the screen switches to the air conditioner control screen, press switch F6 to return to the camera image screen. In addition, if no operation is carried out for 5 seconds after the screen switches to the air conditioner control screen, the screen automatically returns to the camera image screen.
  For details of the operation of the air conditioner, see "AIR CONDITIONER CONTROLS (PAGE 3-90)".

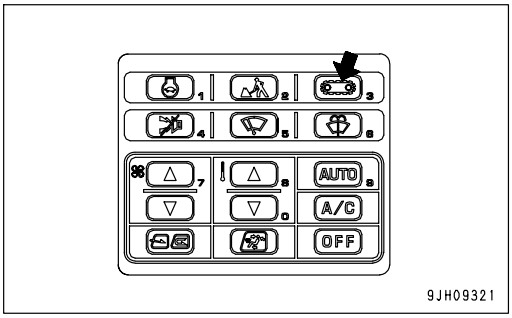




- It is possible to change the working mode by pressing the working mode selector switch.
  For details of the method of using the working mode selector switch, see "Working Mode Selector Switch (PAGE 3-25)".
  When the working mode is changed, the screen returns automatically to the camera image screen. When this happens, the pilot monitor display at the top right of the monitor screen is highlighted in yellow for 2 seconds, then returns to blue.



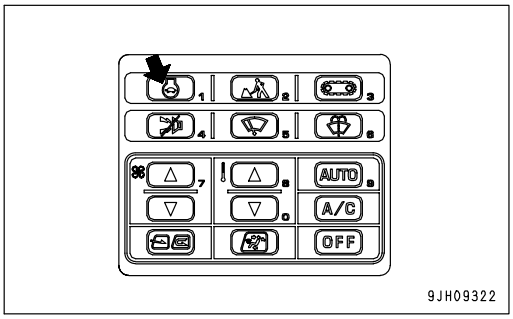
- It is possible to change the travel speed by pressing the travel speed selector switch.
  For details of the method of using the travel speed selector switch, see "Travel Speed Selector Switch (PAGE 3-28)".
  When the travel speed is changed, the pilot monitor display at the top right of the monitor screen is highlighted in yellow for 2 seconds, then returns to blue.



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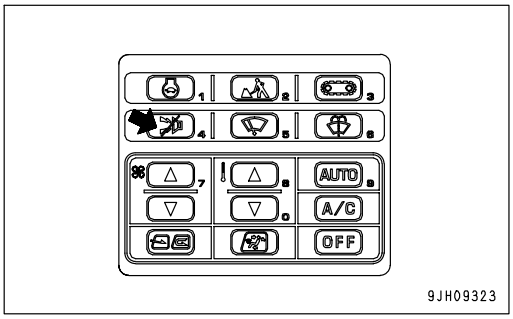
- Press the auto-deceleration switch to turn the auto-deceleration function ON/OFF.

  Even if the auto-deceleration switch is pressed, the camera image display screen does not switch to another screen or return to the standard screen display.



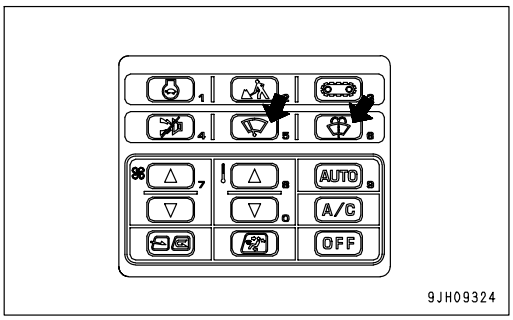
- It is possible to press the buzzer cancel switch to stop the alarm buzzer for the warning item where there is an abnormality.

  Even if the buzzer cancel switch is pressed, the camera image display screen does not switch to another screen or return to the standard screen display.



- Press the wiper switch and washer switch to operate the wipers and washer.

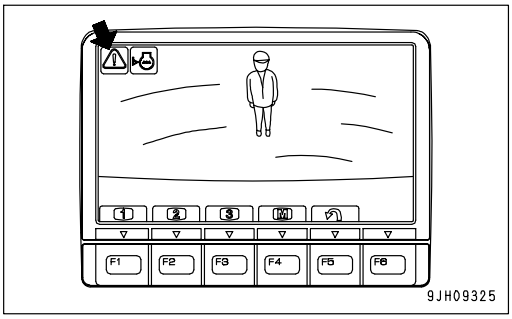
  Even if the wiper switch or washer switch is pressed, the camera image display screen does not switch to another screen or return to the standard screen display.

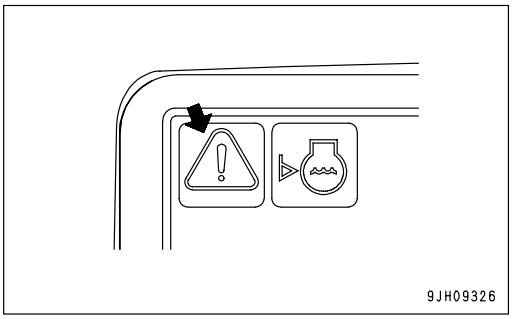


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Action When Warning is Generated When Displaying Camera Image

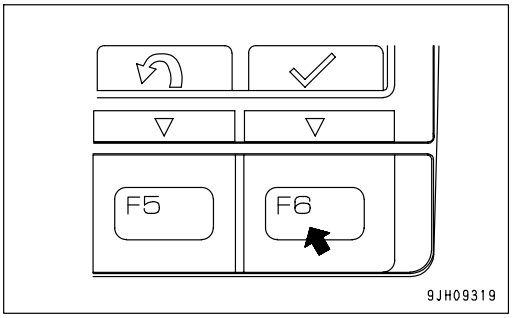
- If an error or alarm occurs while the camera image is being displayed, the error monitor or alarm monitor is displayed at the top left of the screen and flashes.



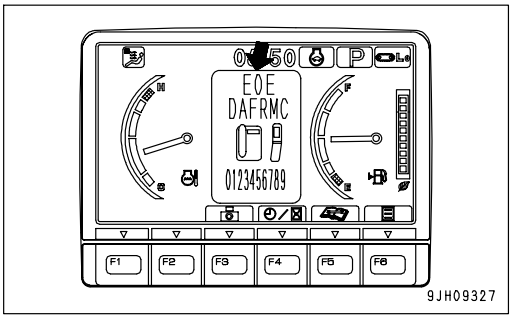


- If the error monitor or alarm monitor is displayed, press switch F6, return to the standard screen, and check the content of the error or alarm display.

  When the error monitor is flashing, if no lever is operated for more than 10 seconds, the screen automatically returns to the standard screen.
  When the screen returns to the standard screen, the error monitor at the top left of the screen goes out and the error or alarm is displayed in the center of the screen.
- If an error monitor is displayed, move the machine, set it in a safe posture, then have inspection carried out immediately.



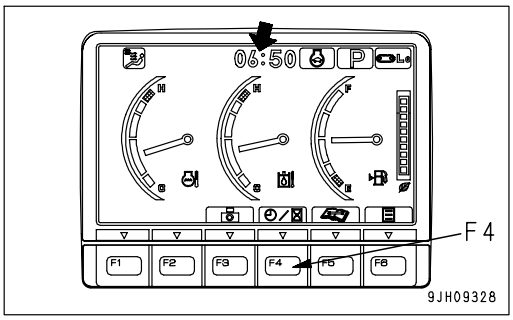
For details of the content of the warning displays, see "Basic Check Monitors (PAGE 3-15)", "Caution Monitors (PAGE 3-13)", "Emergency Monitors (PAGE 3-11)" and "TROUBLES AND ACTIONS (PAGE 3-193)".

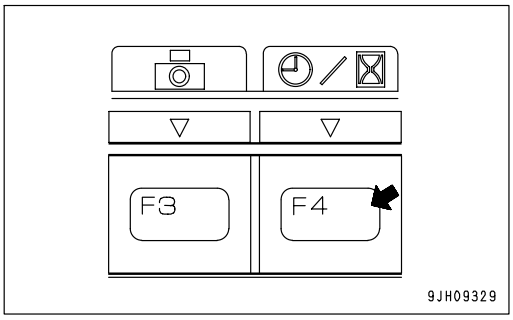


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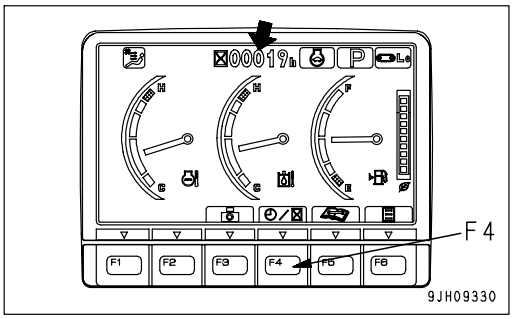
Service Meter/Clock Display Selector Switch

On the standard screen, it is possible to press switch F4 to switch the service meter and clock display at the top of the monitor display.





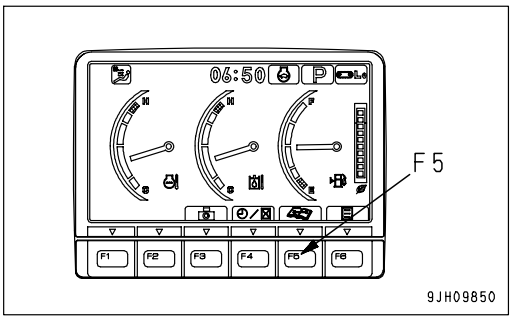
- When the time is being displayed, press switch F4 to switch to the service meter display.
  When the service meter is being displayed, press switch F4 to switch to the time display.

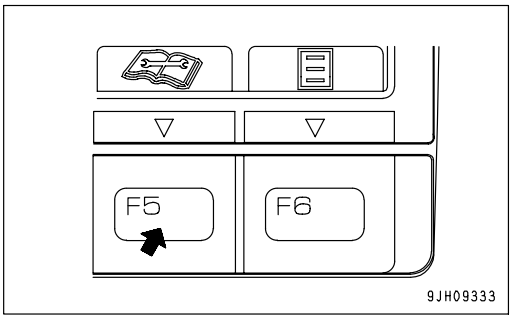


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Maintenance Selector Switch

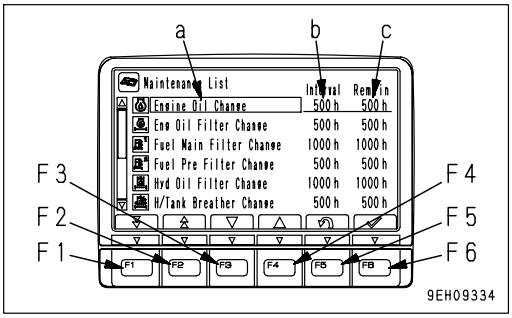
When switch F5 is pressed on the standard screen, the monitor display screen switches to the maintenance mode screen.





The items on the maintenance display are as follows.

a	b
Engine oil change	500
Engine oil filter change	500
Fuel main filter change	1000
Fuel pre-filter change	500
Hydraulic oil filter change	1000
Hydraulic tank breather change	500
Damper case service	1000
Final drive case oil change	1000
Swing machinery case oil change	1000
Hydraulic oil change	5000



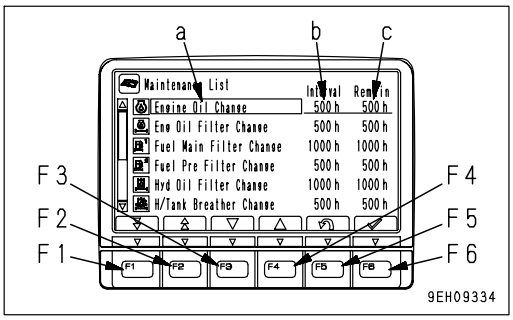
a: Maintenance items
b: Default maintenance interval settings (h)
c: Time remaining until maintenance (h)

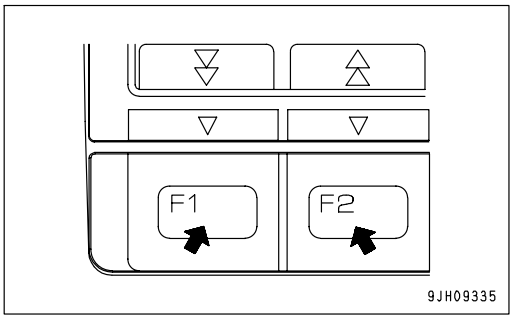
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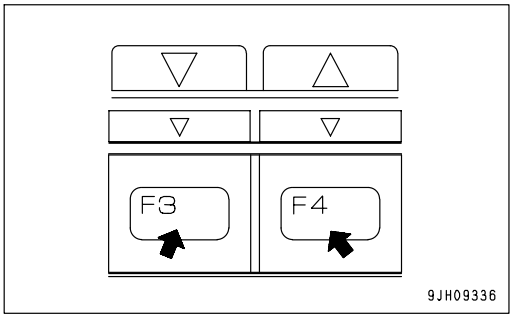
Operations on Maintenance List Screen

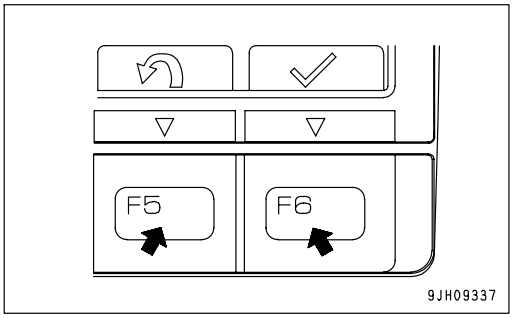
On the maintenance list screen, it is possible to carry out the following operations with switches F1 to F6.

F1: Displays next page. When on the last page, it displays the first page.
F2: Displays previous page. When on the first page, it displays the last page.
F3: Moves to next item (1 line down). When on the last line, it moves to the first line on the next page.
F4: Moves to previous item (1 line up). When on the first line, it moves to the last line on the previous page.
F5: Returns to standard screen.
F6: If this switch is kept pressed, the screen changes to the screen for resetting the remaining time for the selected item (item highlighted in yellow).









REMARK

When resetting the remaining time, keep switch F6 pressed for at least 1.5 seconds. If switch F6 is not kept pressed for at least 1.5 seconds, the switch operating sound can be heard, but the screen does not switch to the screen for resetting the remaining time.

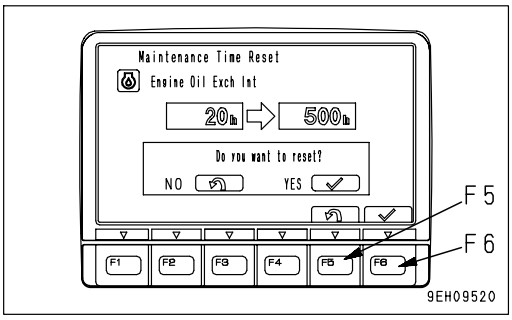
- If no switch is operated for 30 seconds on the maintenance list screen, the screen automatically returns to the standard screen.
- On the maintenance list screen, if the time remaining until maintenance for any item is less than 30 hours, the remaining time display is highlighted in yellow. If the time remaining until maintenance becomes 0 hours, the remaining time display is highlighted in red.
- If you want to change the setting for the maintenance interval, please consult your Komatsu distributor.

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Operations on Maintenance Interval Reset Screen

On the maintenance list screen, if switch F6 is kept pressed for at least 1.5 seconds, the screen changes to the maintenance time reset screen.
Reset the remaining time on this screen.

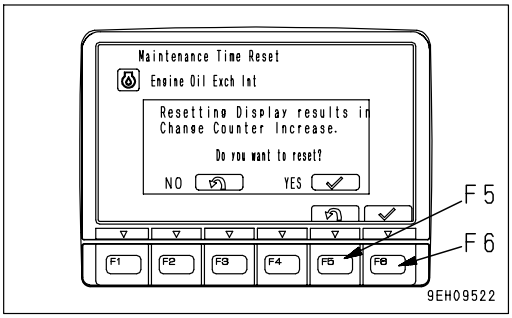
1. Press switch F6 when the reset screen is in the condition shown in the diagram on the right. The screen switches to the reconfirmation screen.



REMARK

- It is desired to cancel the reset, press switch F5. The screen returns to the maintenance list screen.
- On the reset screen, if no switch is operated for more than 30 seconds, the screen automatically switches to the maintenance list screen.

2. The reconfirmation screen shown on the right is displayed.
3. If switch F6 is pressed again, the remaining time is reset and the screen switches to the maintenance list screen.



REMARK

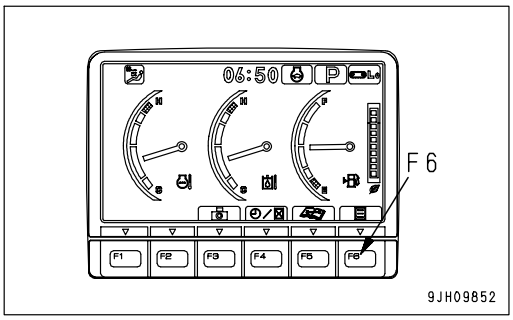
- It is desired to cancel the reset, press switch F5. The screen returns to the maintenance list screen.
- On the reconfirmation screen, if no switch is operated for more than 30 seconds, the screen automatically switches to the maintenance list screen.

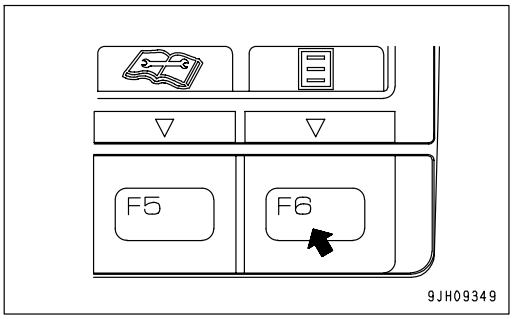
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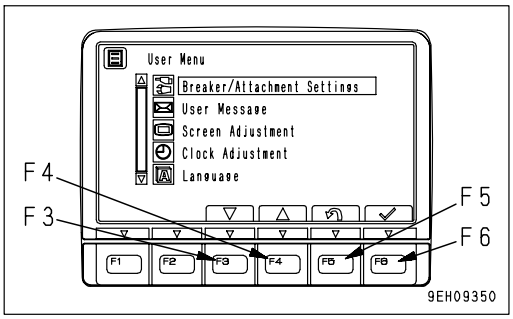
User Mode Selector Switch

When the switch F6 is pressed, the monitor display screen switches to the setting mode screen for the machine.

- On the User Menu screen, it is possible to carry out the following operations with switches F3 to F6.

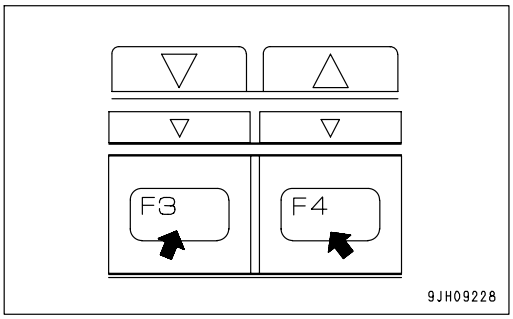






F3: Moves to next item (1 line down). When on the last line, it moves to the first line on the next page.

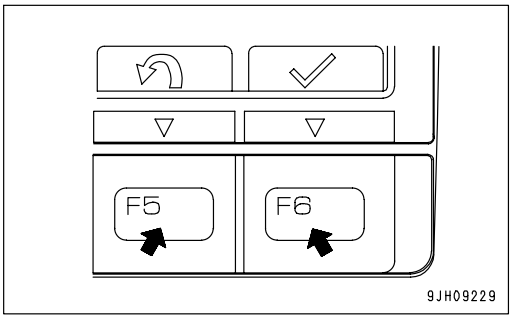
F4: Moves to previous item (1 line up). When on the first line, it moves to the last line on the previous page.



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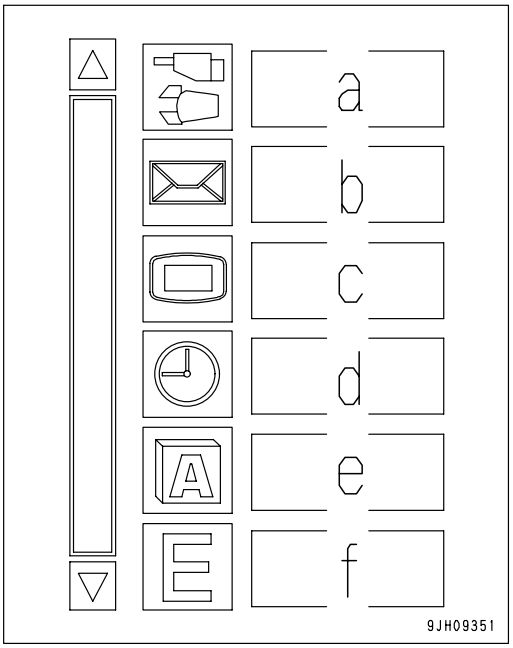
F5: Returns to standard screen.
F6: Switches to setting screen for selected item.

- If no switch is operated for 30 seconds on the user menu screen, the screen automatically returns to the previous screen.



- The following items can be set.

a: Breaker/attachment setting
(machines ready for installation of attachment)
b: Message display
(machines equipped with KOMTRAX)
c: Screen adjustment
d: Clock adjustment
e: Language selection
f: Economy mode adjustment

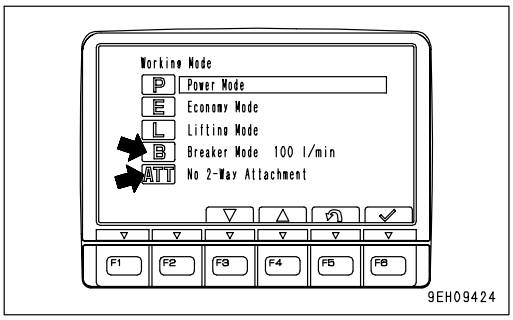


The operation for setting a to f is as follows.

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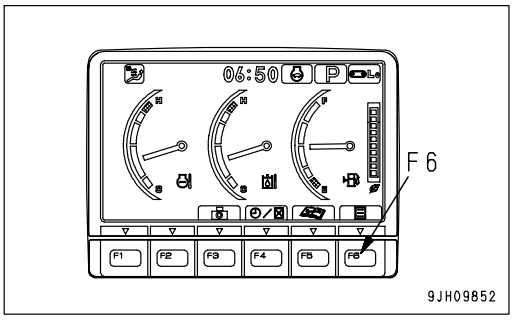
Breaker/Attachment Setting

- On machines ready for attachment, it is possible on the breaker/attachment setting menu to adjust the oil flow in B mode and ATT mode to match the attachment.
  For machines that have no attachment, the breaker/attachment setting mode is not displayed.

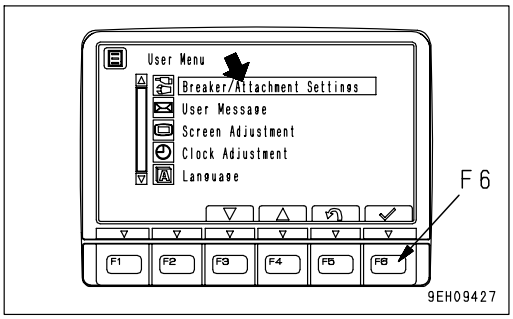


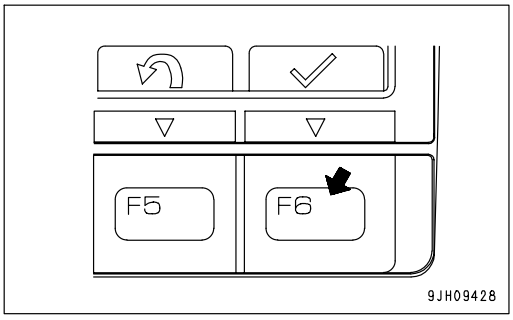
Changing Breaker Mode Setting

1. On the standard screen, press switch F6.



2. Select Breaker/Attachment Settings on the user menu, then press switch F6.



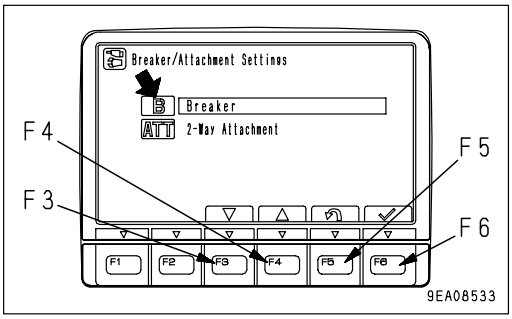


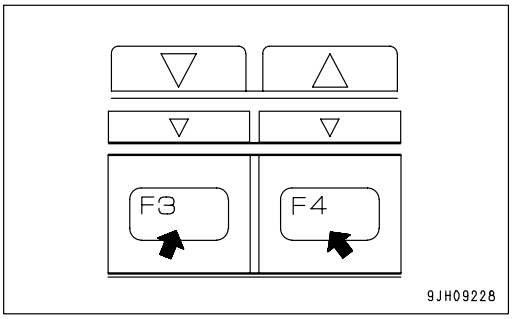
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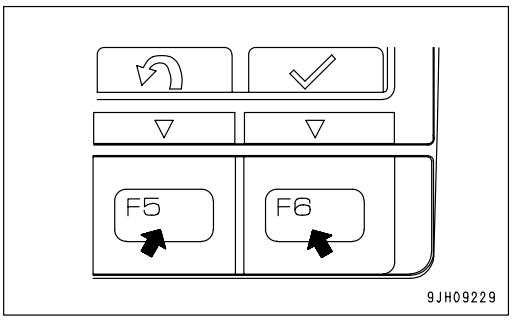
3. On the working mode selection screen shown on the right, select B Breaker and press switch F6.

   • On the working mode selection screen shown on the right, it is possible to carry out the following operations with switches F3 to F6.

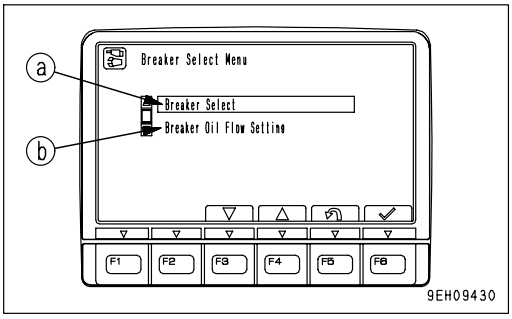
   F3: Moves to next item (1 line down).
   F4: Moves to previous item (1 line up).
   F5: Returns to user menu screen.
   F6: Switches to setting screen for selected item.







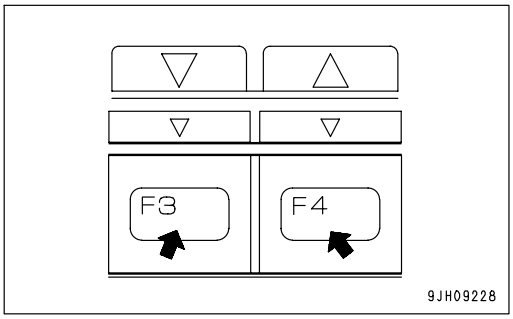
4. The screen switches to the Breaker Select Menu.
   • Breaker setting selection menu
     In breaker Select (a), the oil flow to be set in B mode can be set to one of two set values.
   • Breaker flow setting menu
     In the breaker flow setting (b), the oil flow to be set in B mode can be changed.

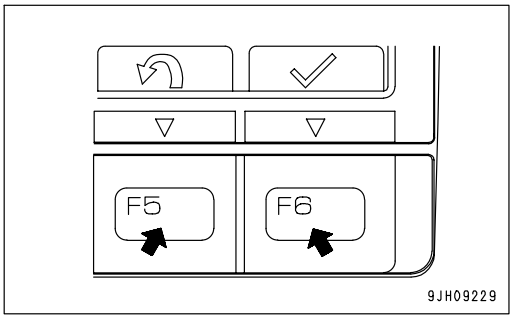


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On the Breaker Select Menu screen, it is possible to carry out the following operations with switches F3 - F6.

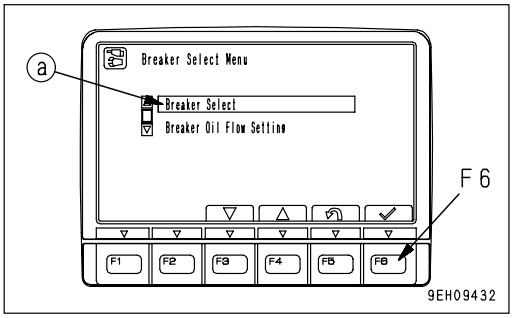
F3: Moves to next item (1 line down).
F4: Moves to previous item (1 line up).
F5: Returns to previous screen.
F6: Switches to setting screen for selected item.

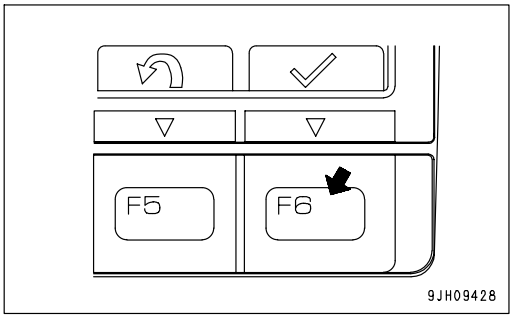




Changing breaker setting selection

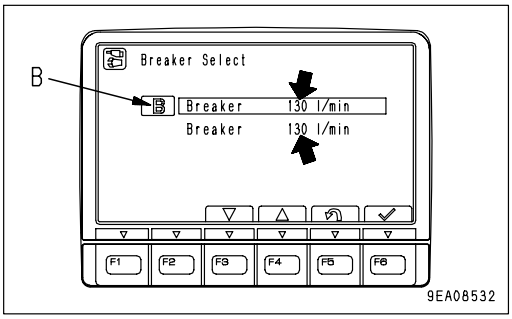
1. Select breaker setting selection (a) on the breaker setting menu screen, then press switch F6.





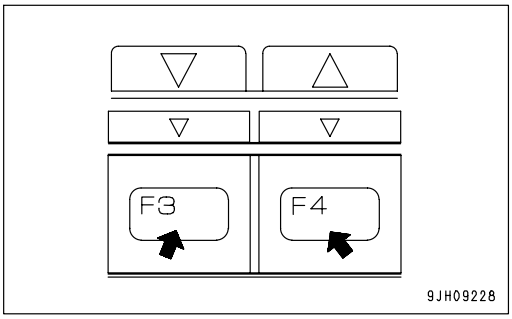
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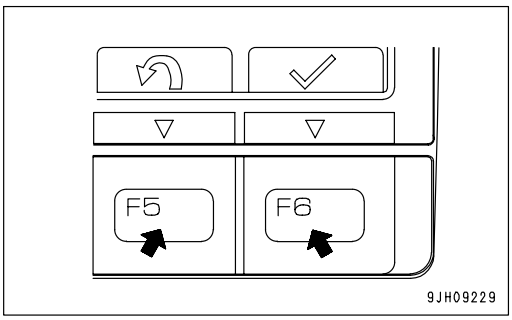
2. On the Breaker Select screen, select one of the two set values for the oil flow, then press switch F6.
   - The default values for the flow setting are both set to 130 liter/min, as shown in the illustration on the right.
     To select the oil flow setting, follow the procedure given in "Changing breaker flow setting (PAGE 3-47)".
   - The present oil flow set for B mode is marked with a B in front of the item name as shown in the illustration on the right.



- On the Breaker Select Menu and breaker setting selection menu, it is possible to carry out the following operations with switches F3 - F6.

F3: Moves to next item (1 line down).
F4: Moves to previous item (1 line up).
F5: Returns to previous screen.
F6: Switches to setting screen for selected item.

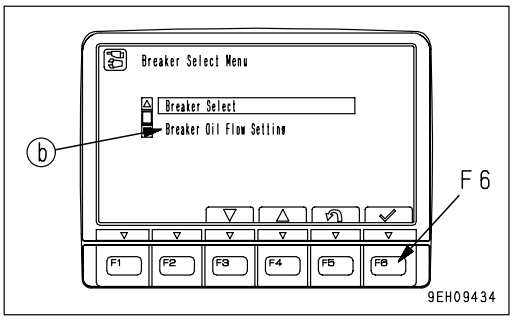


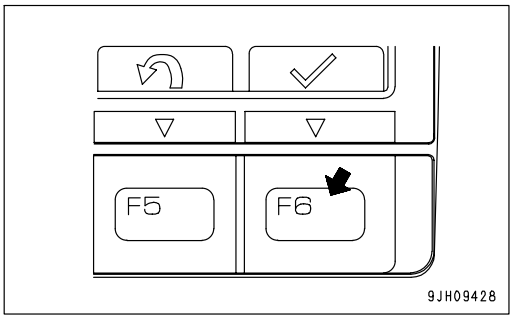


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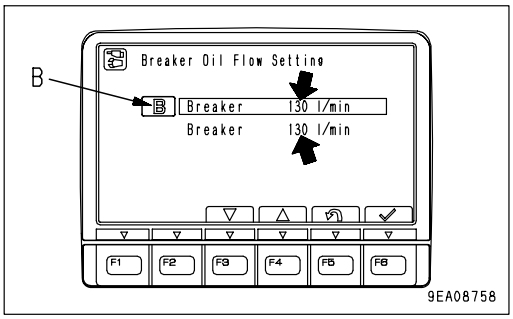
Changing breaker flow setting

1. Select breaker flow setting (b) on the Breaker Select Menu screen, then press switch F6.





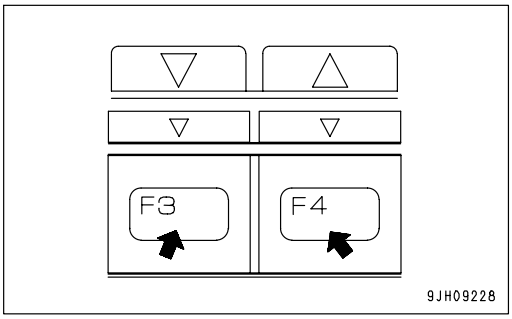
2. On the Breaker Oil Flow Setting screen, select one of the two set values for the oil flow, then press switch F6.
   - The default values for the oil flow setting are both set to 130 liter/min, as shown in the illustration on the right.
     The present oil flow set for B mode is marked with B in front of the item name as shown in the illustration on the right.

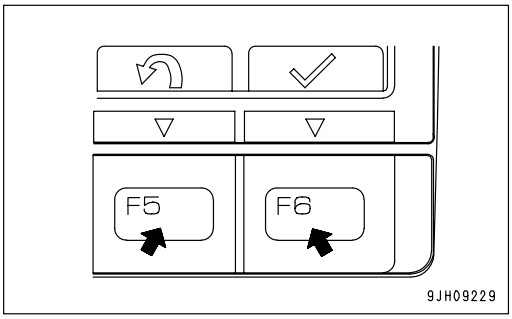


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- On the Breaker Select Menu and Breaker Oil Flow Setting screen, it is possible to carry out the following operations with switches F3 - F6.

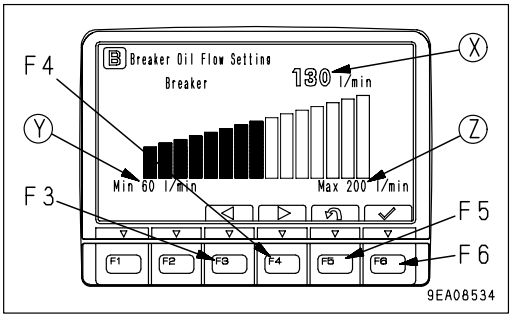
F3: Moves to next item (1 line down).
F4: Moves to previous item (1 line up).
F5: Returns to previous screen.
F6: Switches to setting screen for selected item.

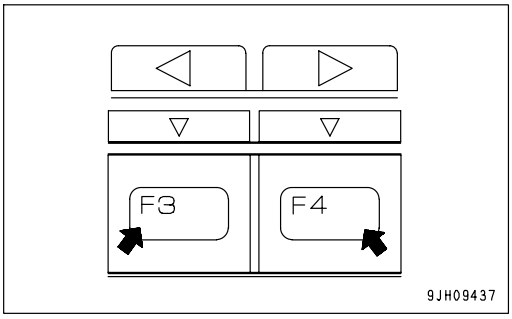


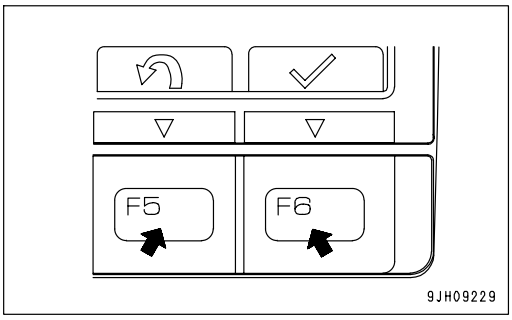


3. On the Breaker Oil Flow Setting screen, change the set oil flow.
   - After using switches F3 or F4 to change to a suitable oil flow, press switch F6 to accept the change in the oil flow and return to the previous screen.
   - When switch F5 is pressed, no change is made in the oil flow and the screen returns to the previous screen.

   (X): Present oil flow setting
   (Y): Min. adjusted oil flow
   (Z): Max. adjusted oil flow



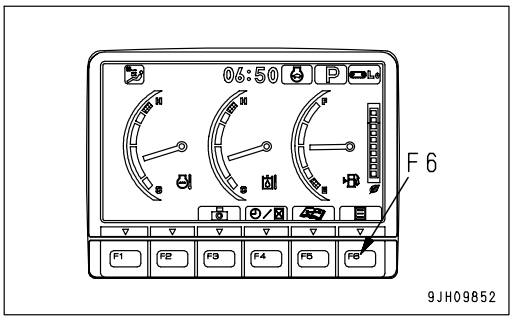




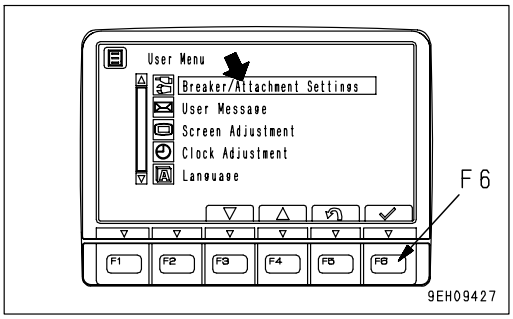
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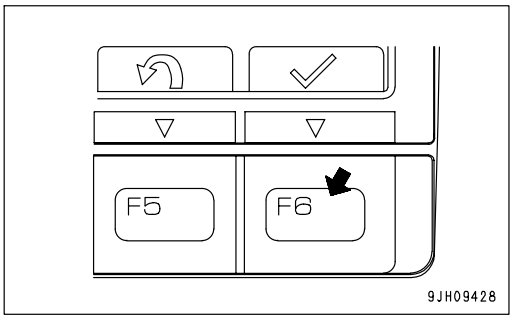
Changing Attachment Mode Setting

1. On the standard screen, press switch F6.



2. Select Breaker/Attachment Settings on the user menu, then press switch F6.



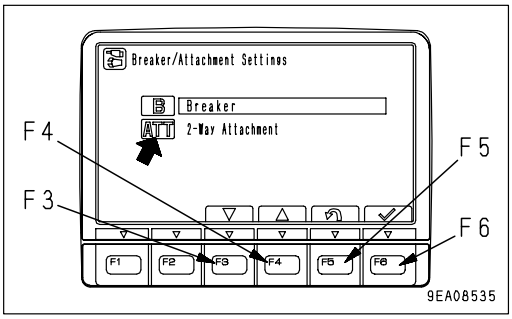


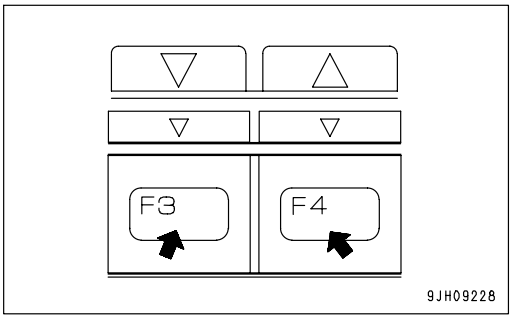
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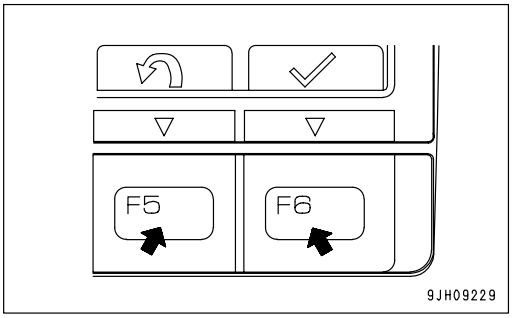
3. On the working mode selection screen shown on the right, select ATT 2-Way Attachment, then press switch F6.

   • On the working mode selection screen shown on the right, it is possible to carry out the following operations with switches F3 to F6.

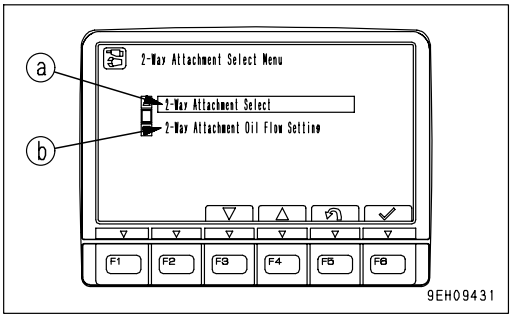
   F3: Moves to next item (1 line down).
   F4: Moves to previous item (1 line up).
   F5: Returns to user menu screen.
   F6: Switches to setting screen for selected item.







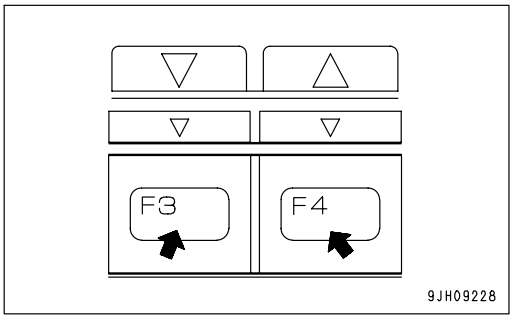
4. The screen switches to the 2-Way Attachment Select menu.
   • 2-Way Attachment Select menu
     In 2-Way Attachment Select (a), the oil flow to be set in ATT mode can be set to one of two set values.
   • 2-Way Attachment Oil Flow Setting menu
     In 2-Way Attachment Oil Flow Setting (b), it is possible to change the oil flow set for the ATT mode.

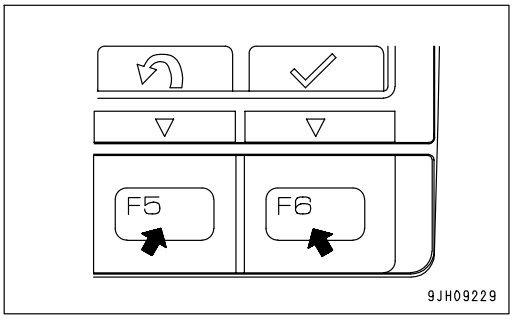


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On the 2-Way Attachment Select Menu screen, it is possible to carry out the following operations with switches F3 - F6.

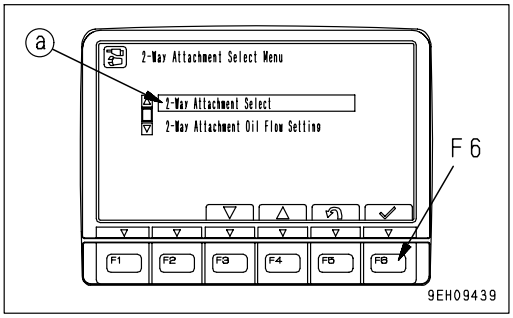
F3: Moves to next item (1 line down).
F4: Moves to previous item (1 line up).
F5: Returns to previous screen.
F6: Switches to setting screen for selected item.

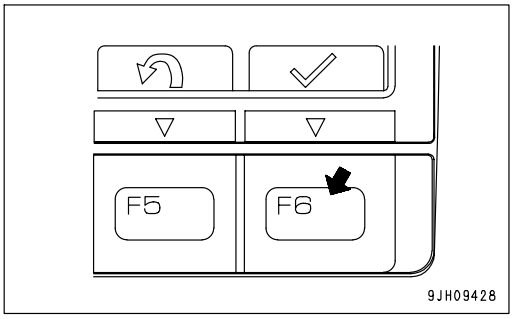




Changing attachment setting selection

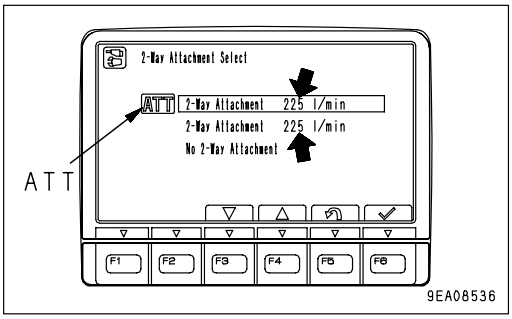
1. Select attachment setting selection (a) on the attachment setting menu screen, then press switch F6.



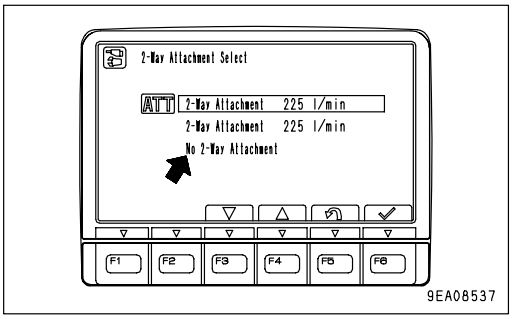


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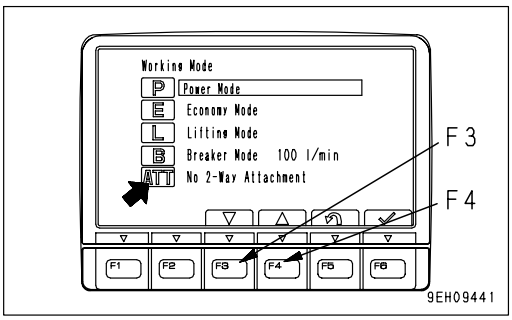
2. On the 2-Way Attachment Select Menu, select one of the two set values for the oil flow, then press switch F6.
   - The default values for the oil flow setting are both set to 225 liters/min, as shown in the illustration on the right.
     To change the oil flow setting, follow the procedure given in "Changing attachment flow setting (PAGE 3-53)".
   - The present oil flow set for ATT mode is marked with ATT in front of the item name as shown in the illustration on the right.



   - If No 2-Way Attachment is selected, it becomes impossible to select the attachment mode on the working mode selection screen.

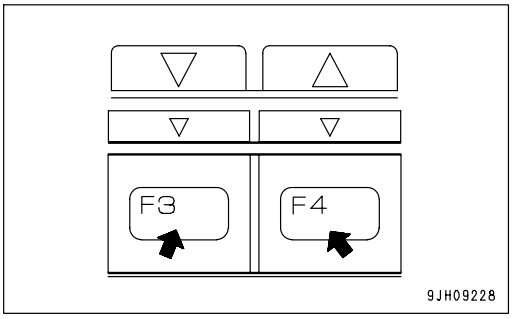


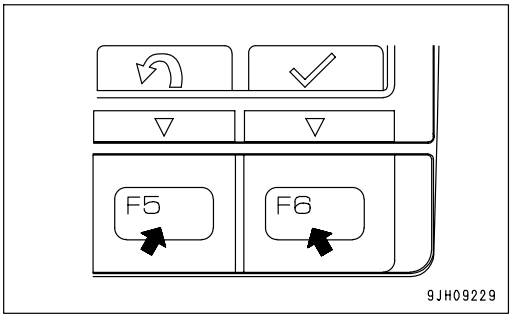
On the working mode selection screen, it is not possible to select No 2-Way Attachment.



   - On the 2-Way Attachment Select Menu screen and 2-way attachment select menu, it is possible to carry out the following operations with switches F3 - F6.

F3: Moves to next item (1 line down).
F4: Moves to previous item (1 line up).
F5: Returns to previous screen.
F6: Switches to setting screen for selected item.

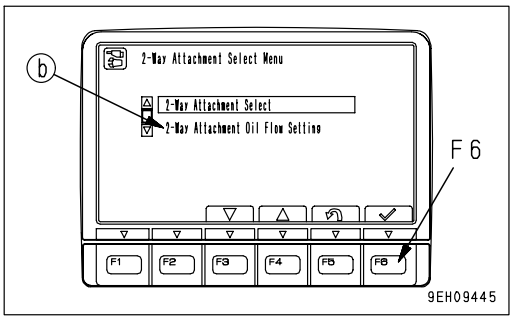


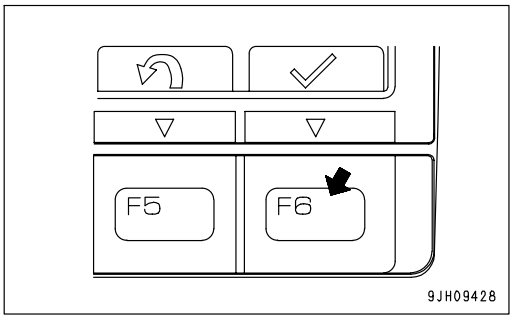


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Changing attachment flow setting

1. Select 2-Way Attachment Oil Flow Setting (b) on the 2-Way Attachment Select menu screen, then press switch F6.

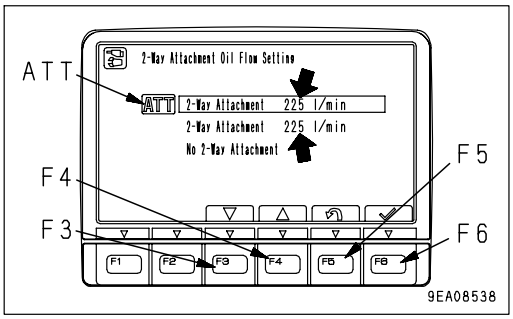




2. On the 2-Way Attachment Select Oil Flow Setting screen, select one of the two set values for the oil flow, then press switch F6.

   - The default values for the oil flow setting are both set to 225 liters/min, as shown in the illustration on the right.

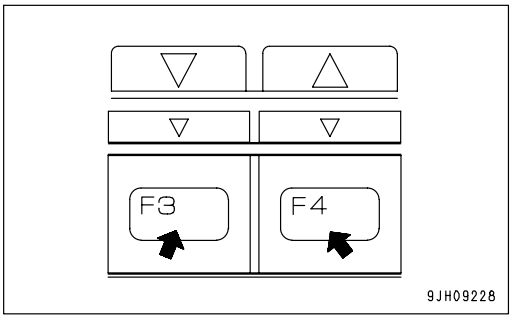
     The present oil flow set for ATT mode is marked with ATT in front of the item.
   - "No 2-Way Attachment" cannot be selected

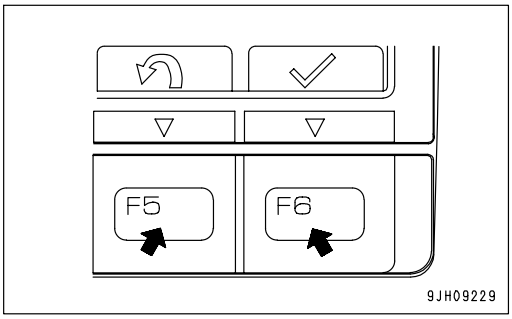


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- On the 2-Way Attachment Select Menu screen and 2-Way Attachment Select Menu screen, it is possible to carry out the following operations with switches F3 - F6.

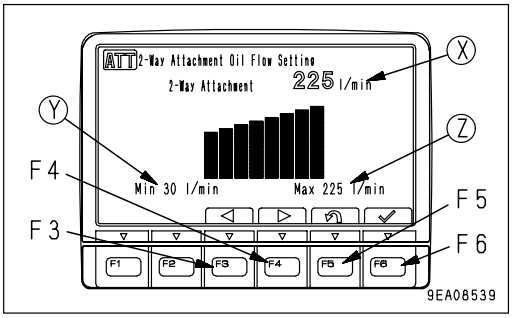
F3: Moves to next item (1 line down).
F4: Moves to previous item (1 line up).
F5: Returns to previous screen.
F6: Switches to setting screen for selected item.

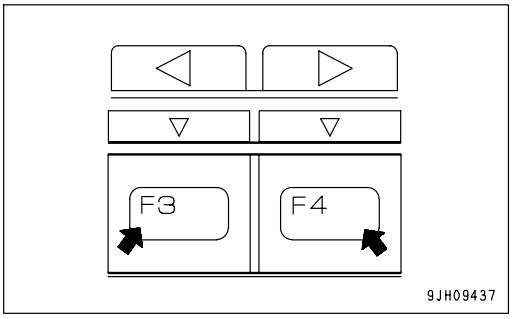


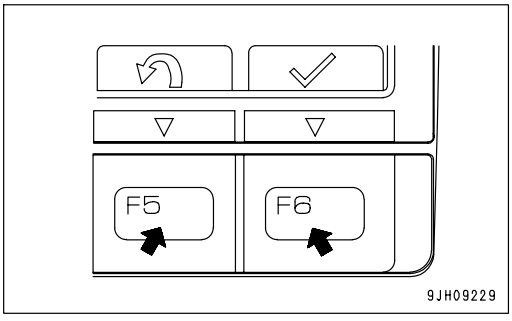


3. On the 2-Way Attachment Oil Flow Setting menu, it is possible to change the oil flow setting.
   - After using switches F3 or F4 to change to a suitable oil flow, press switch F6 to accept the change in the oil flow and return to the previous screen.
   - When switch F5 is pressed, no change is made in the oil flow and the screen returns to the previous screen.

   (X): Present oil flow setting
   (Y): Min. adjusted oil flow
   (Z): Max. adjusted oil flow





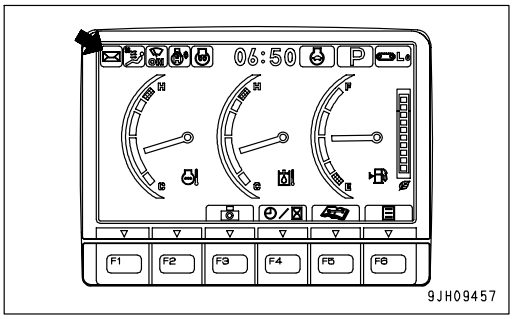


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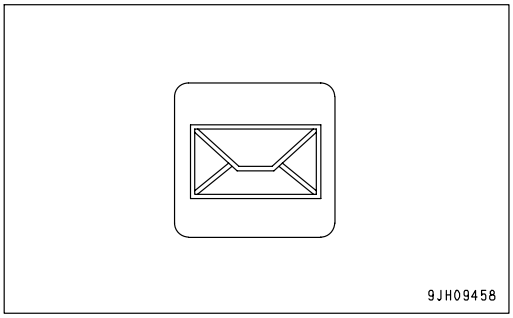
Message Display

(Machines equipped with KOMTRAX)

On machines equipped with KOMTRAX, it is possible to see the messages from your Komatsu distributor on this message display menu. When there are any messages, the messages monitor at the top left of the monitor standard screen lights up.



- It is possible to judge the following from the lighting up condition of the message monitor.



Lighted up green: There is unread message
Lighted up blue: There is message awaiting reply
OFF: There are no messages

REMARK

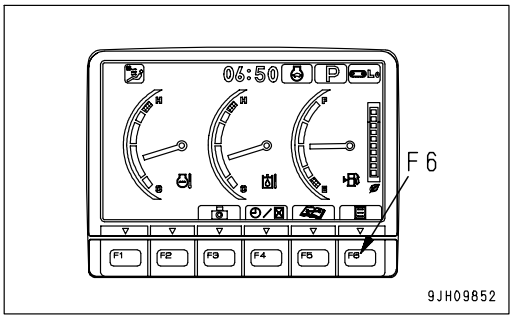
When the messages monitor is lighted up blue, open the message. The display shows that the reply to the message has not been sent to your Komatsu distributor.

REMARK

At present, there is no territory where it is possible to the use the message service.

In territories where it is not possible to use the message service, the message display menu functions as follows.

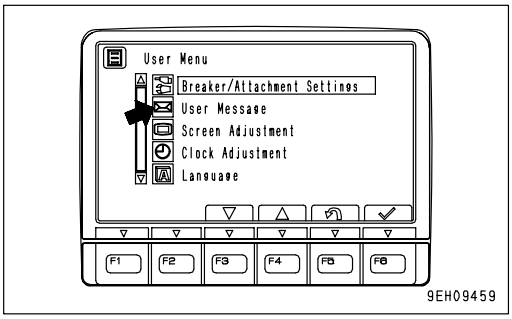
1. On the standard screen, press switch F6.

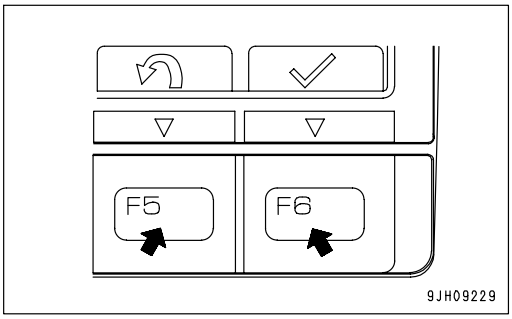


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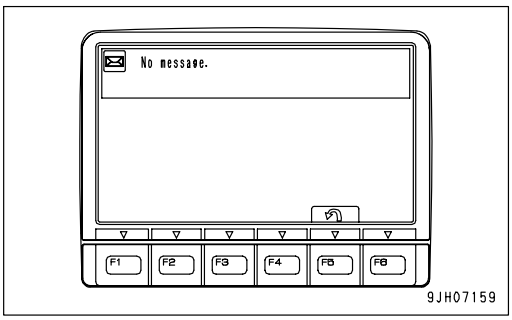
2. Select "User Message" on the User Menu, then press switch F6.

   • If you press switch F5, the screen returns to the user menu screen.





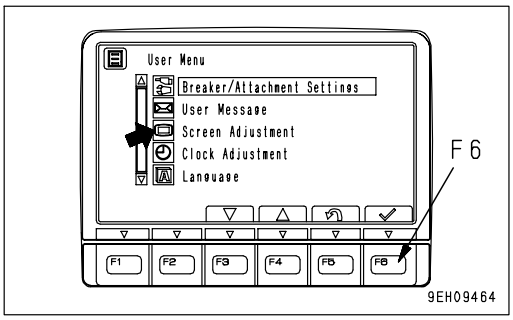
3. "No message" is displayed on the screen.
   Press switch F5 to return to the standard screen.



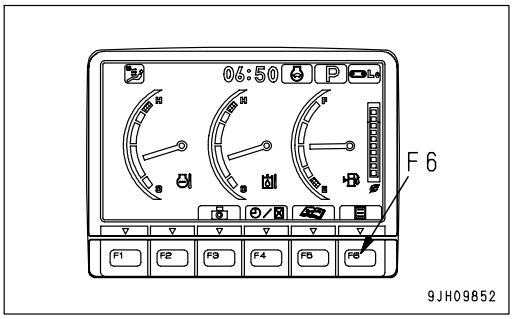
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Adjusting Screen

Use this screen adjustment menu to adjust the brightness, contrast, and back light of the screen.

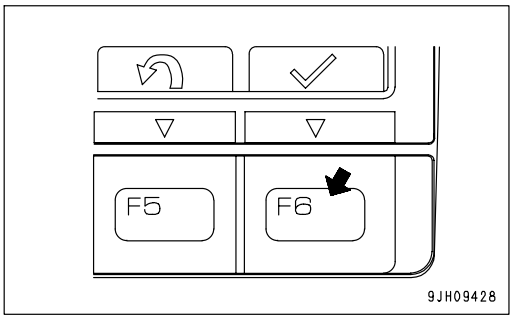


1. On the standard screen, press switch F6.



2. Select screen adjustment on the user menu, then press switch F6. The screen switches to the selection menu screen for screen adjustment.

   - On machines equipped with cameras, it is possible to adjust the brightness, contrast, and back light of the cameras screen on this menu.



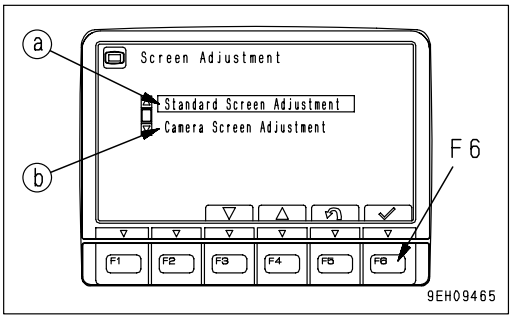
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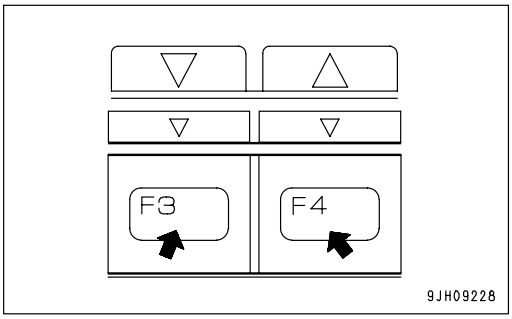
3. Select item to be adjusted (a) or (b) from the selection menu screen for screen adjustment, then press switch F6. The screen switches to the setting screen for the selected item.

   (a): Standard screen adjustment
   (b): Camera screen adjustment (only machines equipped with camera)

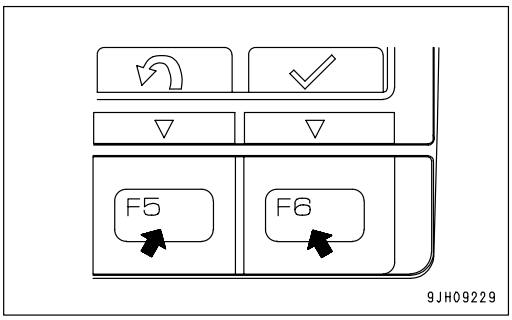
   - On the mode selection screen shown on the right, it is possible to carry out the following operations with switches F3 to F6.

   F3: Moves to next item (1 line down).
   F4: Moves to previous item (1 line up).
   F5: Returns to user menu screen.
   F6: Switches to setting screen for selected item.



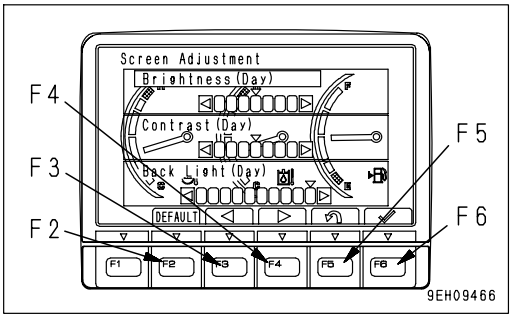


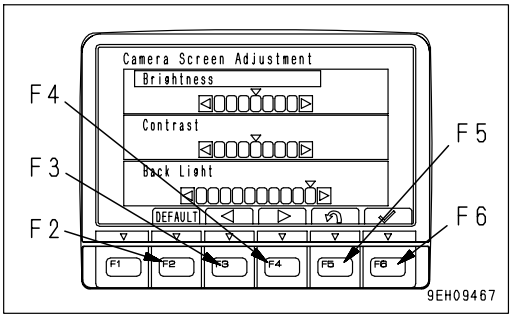
REMARK
If the machine is not equipped with a camera, the selection menu for screen adjustment is not displayed.
If screen adjustment is selected from the user menu, the adjustment screen in Step 4 is displayed.



4. Use switches F2 to F6 to adjust the brightness, contrast, and back light of the selected screen.

   1) Adjustment screen for standard screen
      - If the light switch is at night mode ON, and the standard screen is adjusted, it is possible to adjust the brightness of the monitor screen (night mode).
      - If the light switch is at day mode ON or OFF, and the standard screen is adjusted, it is possible to adjust the brightness of the monitor screen (day mode).
   2) Adjusting camera screen
      - The background when adjusting the camera image is the image for the No. 1 camera.
      - When displaying the camera screen, the screen may become dark if the image is on snow. In such cases, we recommend adjustment of the screen.

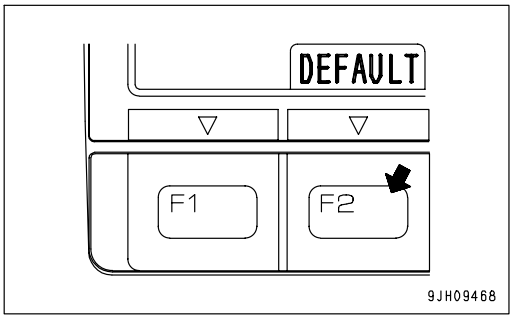


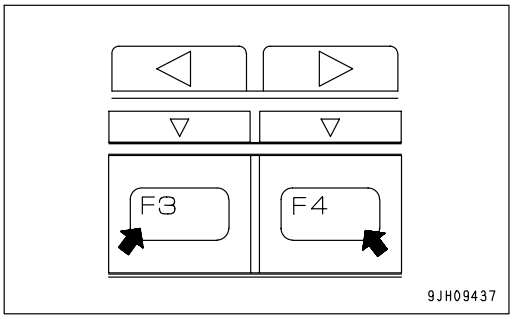


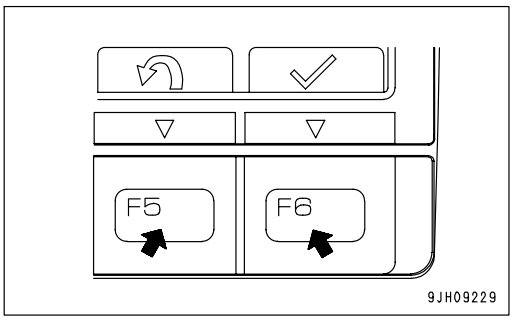
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On the screen for Items 1) and 2), it is possible to carry out the following operations with switches F2 to F6.

F2: Resets all adjusted values to default value
F3: Indicator of selected item moves 1 segment to left.
F4: Indicator of selected item moves 1 segment to right.
F5: Returns to user menu.
F6: Accepts change and switches to next item setting.



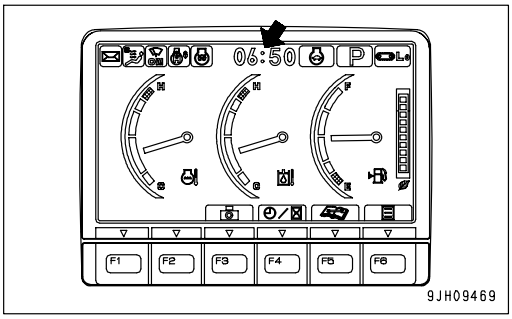




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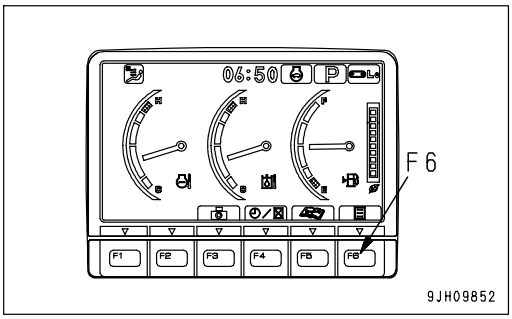
Clock Adjustment

On this clock adjustment menu, it is possible to change the setting of the clock displayed on the pilot monitor of the standard display.





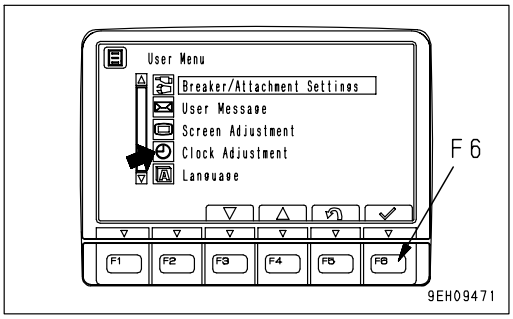
1. On the standard screen, press switch F6.

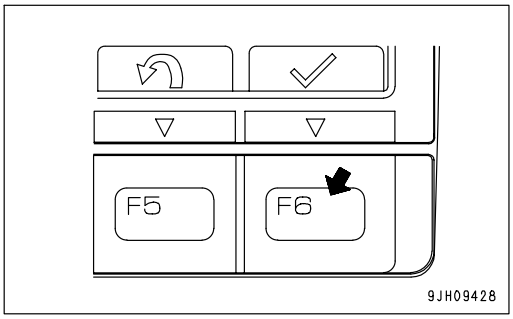


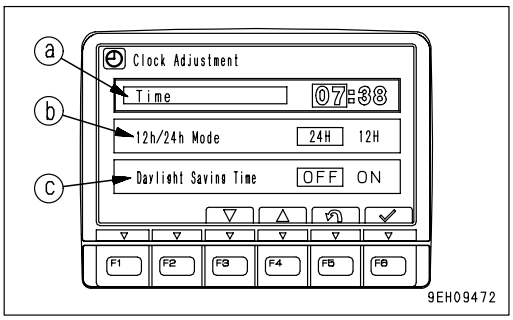
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2. Select "Clock Adjustment" on the user menu, then press switch F6. The screen switches to the time adjustment selection menu screen.

   • The following three items can be changed.
   (a) Clock setting
   (b) 12/24 hour display mode
   (c) Daylight saving time







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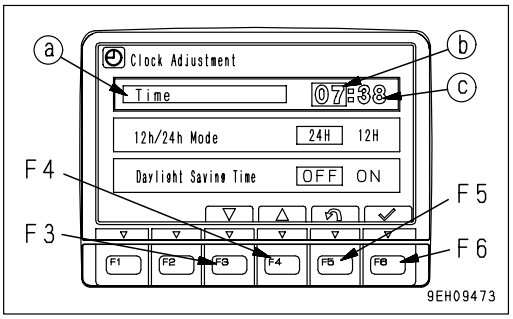
3. On the clock adjustment selection screen, it is possible to carry out the following operations with switches F3 to F6.

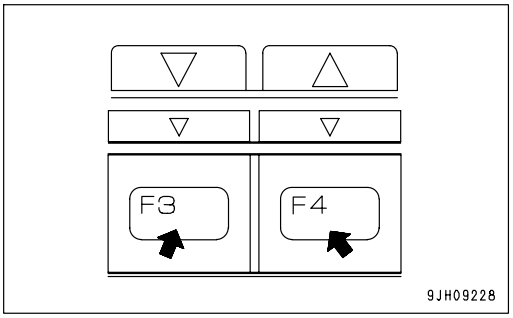
- Time

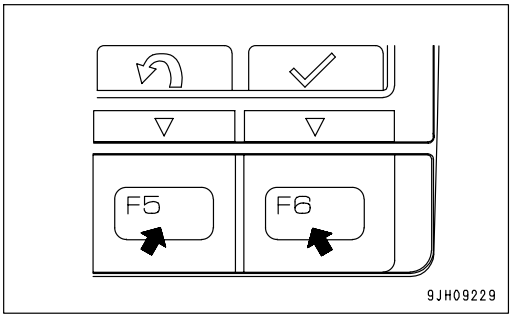
  Adjust the hour setting.

  1) If "Time" (a) is not highlighted in yellow, press switch F6 to highlight "Time" (a) in yellow. When this is done, hour display (b) changes to orange.
  Adjust hour display (b) with the switches as follows. If it is not necessary to change the hour setting, press switch F6.

  F3: Time advances 1 hour.
  F4: Time goes back 1 hour.
  F5: Cancels change and returns to user menu.
  F6: Accepts change and goes to setting for minutes.



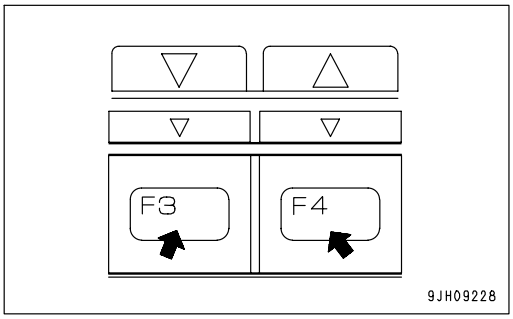


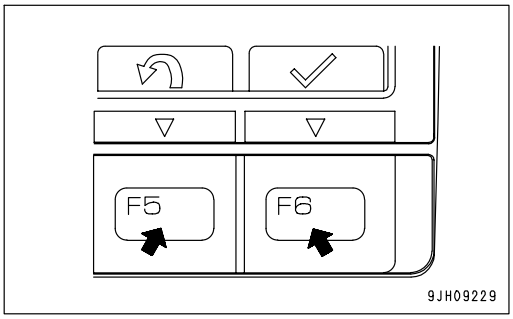


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2) When minute display (c) is highlighted in orange, operate the switches as follows to adjust minute display (c).
If it is not necessary to change the minute setting, press switch F6. If the time has been changed, always press switch F6.

F3: Time advances 1 minute.
F4: Time goes back 1 minute.
F5: Cancels change and returns to user menu.
F6: Accepts change and goes to setting for 12/24 hour display mode.

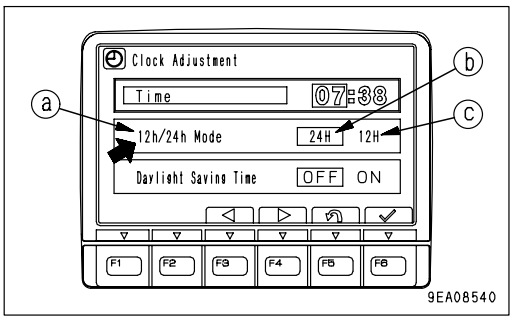




• 12h/24h Mode
Choose either a 12-hour display (am/pm) or a 24-hour display.

(b): 24-hour display
(c): 12-hour display (am/pm)

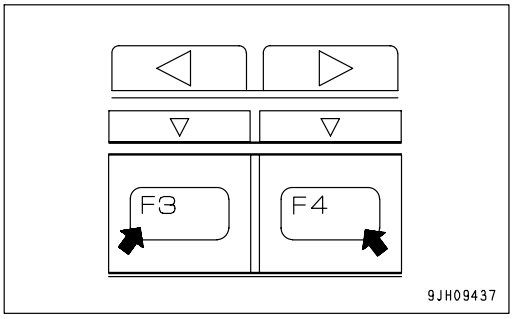
1) If "12h/24h Mode" (a) is not highlighted in yellow, press switch F6 to highlight "12h/24h Mode" (a) in yellow.
2) Change the "12h/24h mode" with the switches as follows.

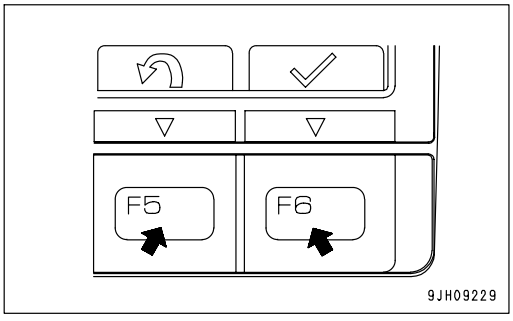


The selected display mode (b) or (c) is highlighted in green.

F3: Moves 1 item to left.
F4: Moves 1 item to right.
F5: Cancels change and returns to user menu.
F6: Accepts change and goes to setting for "Daylight Saving Time".

If the setting has been changed, always press switch F6.

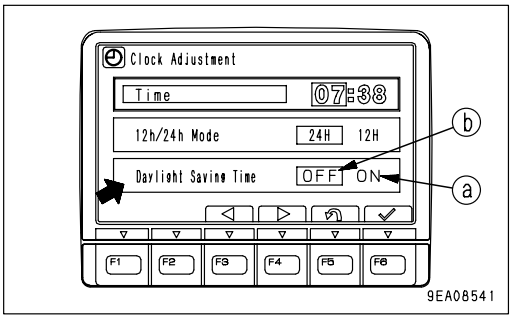




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• Daylight Saving Time (Summer time)

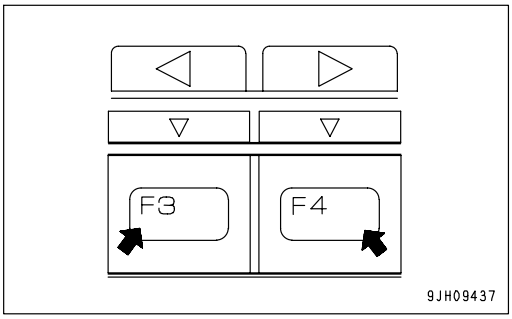
1) If daylight saving time is turned ON (a), the clock display becomes 1 hour earlier. If daylight saving time is turned OFF (b), the clock display returns to the set time.



The selected display mode is highlighted in green.

2) Change the daylight saving time with the switches as follows.

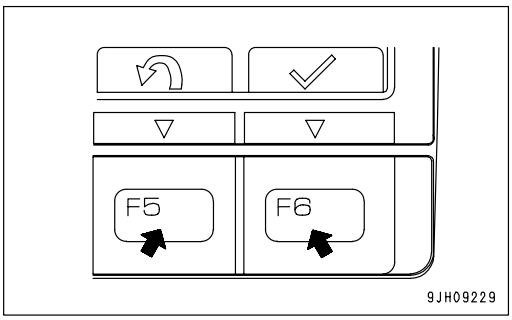
F3: Moves 1 item to left.
F4: Moves 1 item to right.
F5: Cancels change and returns to user menu.
F6: Accepts change and goes to setting for "Time".



If the setting has been changed, always press switch F6.

REMARK

Daylight saving time or summer time means moving the clock forward 1 hour to take advantage of the fact that the sun rises early in summer. This system is used in many countries during the summer.



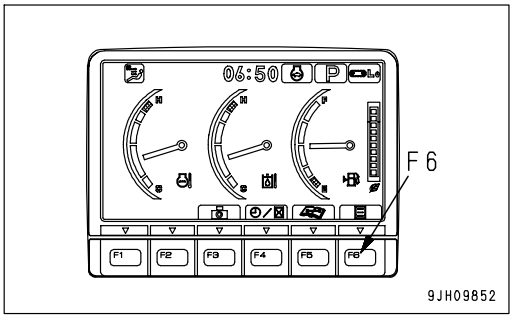
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Language Selection

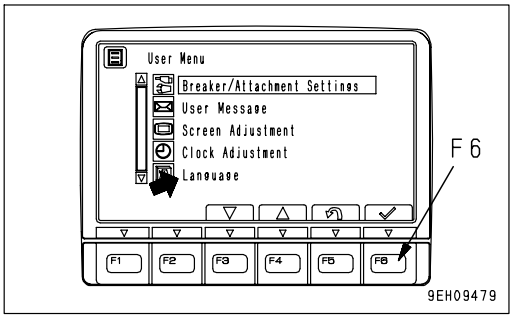
On this language selection menu, it is possible to select the language used on the monitor display.

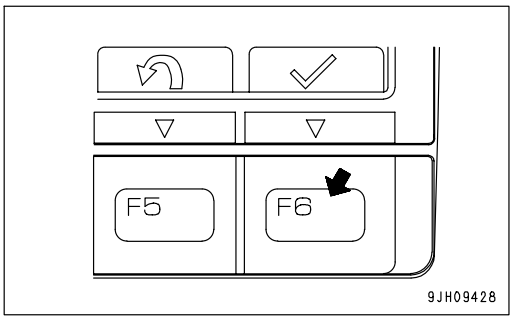
- The languages that can be selected are as follows.
  Japanese, English, Chinese, French, Spanish, Portuguese, Italian, German, Russian, Turkish, Indonesian, Thai

1. On the standard screen, press switch F6.



2. Select "Language" on the user menu, then press switch F6.
   The screen switches to the language selection menu screen.



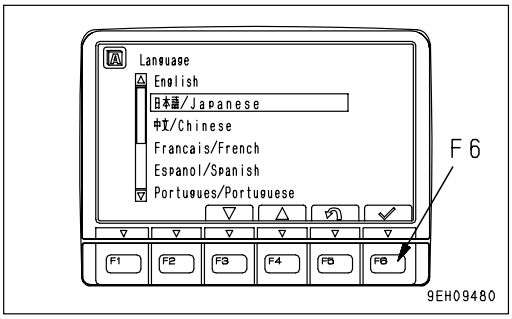


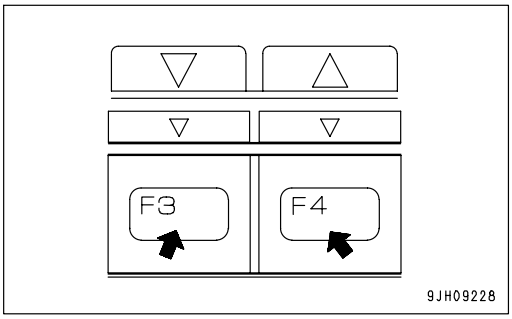
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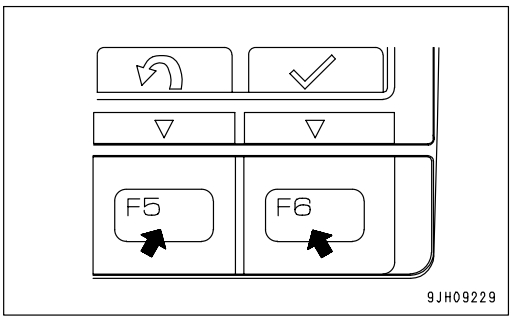
3. Select the language to use for the display, then press switch F6. The screen display changes to the selected language.

   • On the language selection screen, it is possible to carry out the following operations with switches F3 to F6.

   F3: Moves to item below.
   F4: Moves to item above.
   F5: Cancels change and returns to user menu screen.
   F6: Accepts change and returns to user menu screen.



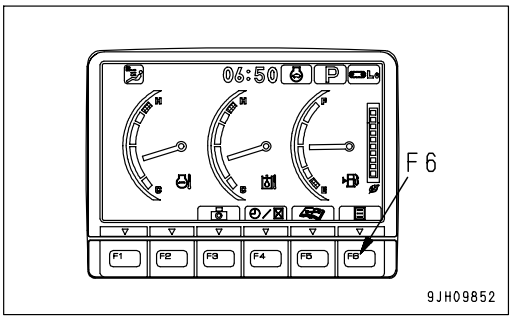




Adjusting Economy Mode

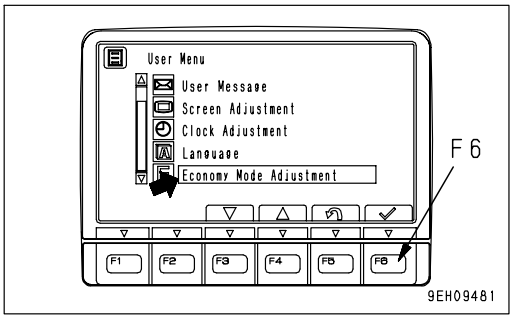
With this economy mode, the engine output can be adjusted to improve the fuel consumption in E mode.

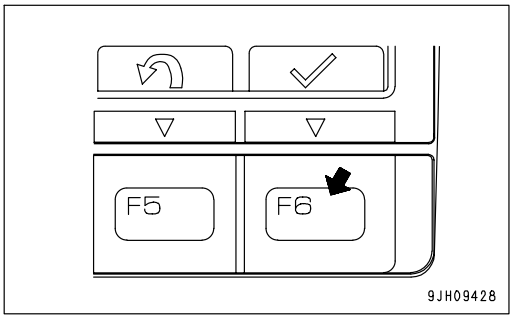
1. On the standard screen, press switch F6.



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2. Select "Economy Mode Adjustment" on the user menu, then press switch F6.
   The screen switches to the economy mode adjustment selection menu screen.

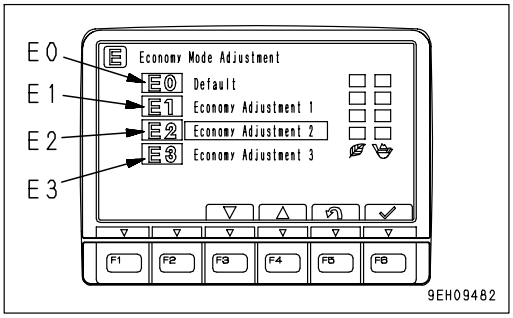


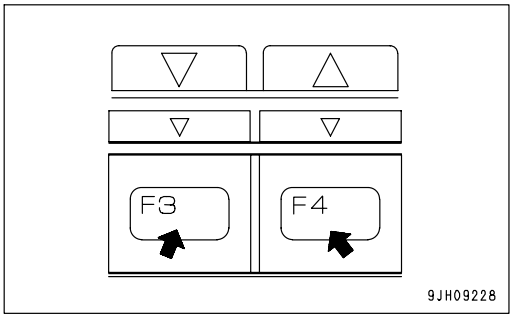


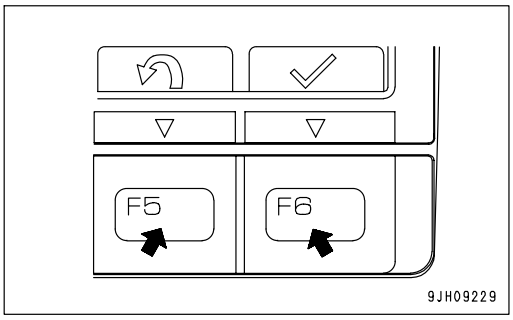
3. Select the desired E mode from the economy mode adjustment selection menu.
   The levels that can be set are as follows.
   E0: Default
   E1: Economy Adjustment 1
   E2: Economy Adjustment 2
   E3: Economy Adjustment 3

   - The higher the selection is made from E0 to E3, the better the fuel consumption becomes, but the production is reduced accordingly.
   - When the machine is shipped, it is set to E0.
   - On the Economy Mode Adjustment menu screen, it is possible to carry out the following operations with switches F3 - F6.

   F3: Moves to item below.
   F4: Moves to item above.
   F5: Cancels change and returns to user menu screen.
   F6: Accepts change and returns to user menu screen.

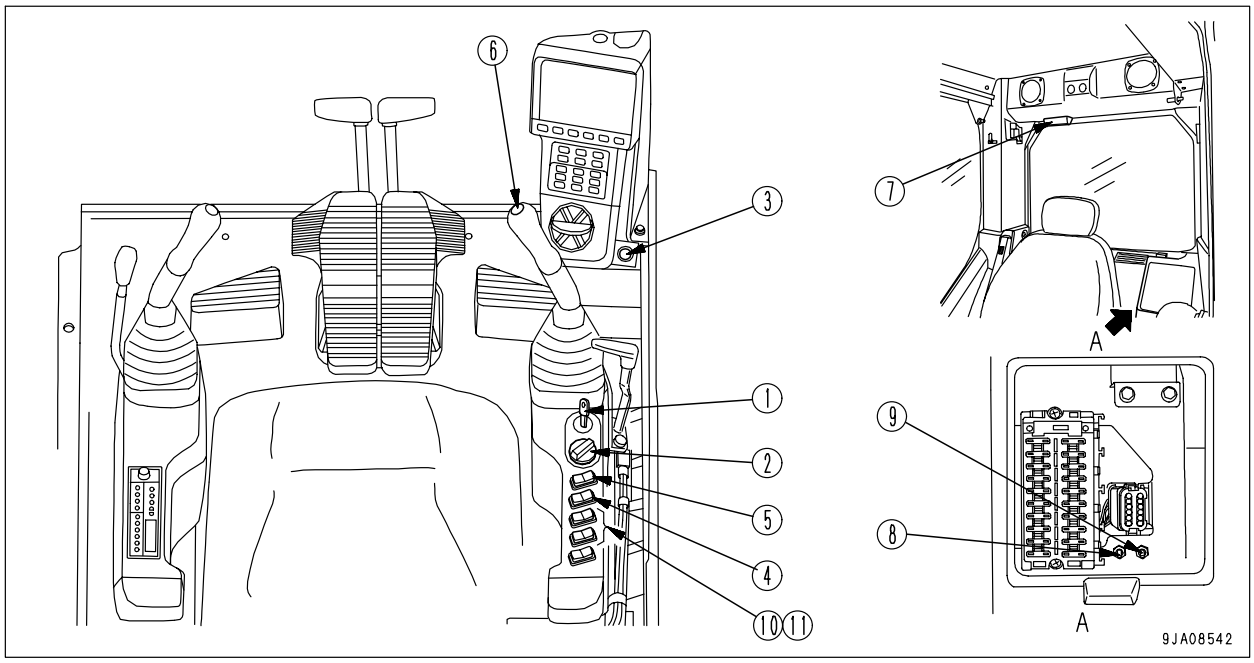






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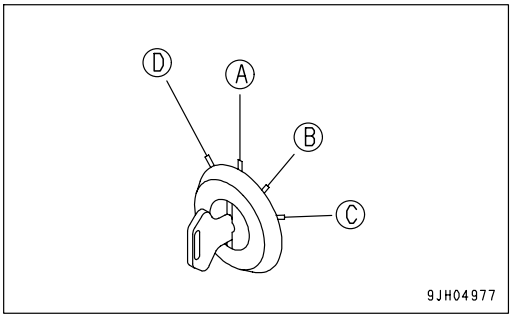
SWITCHES



(1) Starting switch
(2) Fuel control dial
(3) Cigarette lighter
(4) Swing lock switch
(5) Lamp switch
(6) Horn switch
(7) Room lamp switch
(8) Emergency pump drive switch
(9) Swing parking brake releasel switch
(10) Revolving warning lamp switch (if equipped)
(11) Roof glass wiper switch (if equipped)

Starting Switch

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



(A): OFF position
The key can be inserted or withdrawn. Switches for the electrical system (except room lamp), are all turned off and the engine is stopped.

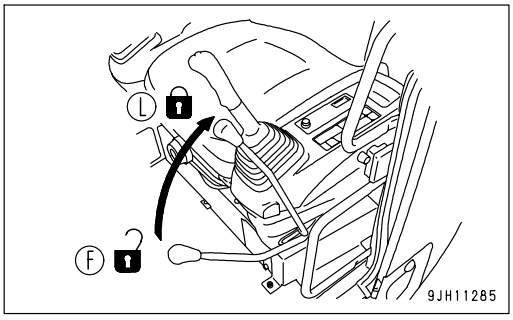
(B): ON position
Electric current flows through the charging and lamp circuits. Keep starting switch key in the ON position while the engine is running.

(C): 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 (B).

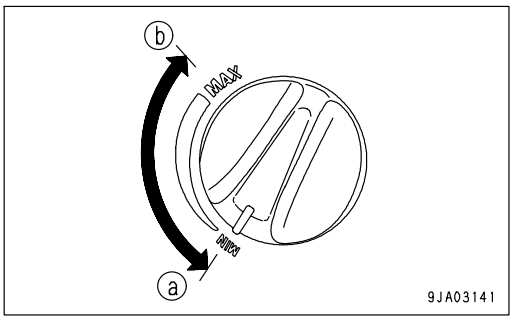
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(D): HEAT position
Set to this position when starting the engine in cold weather.
When the starting key is turned to HEAT position (D), the preheating monitor lights up. Keep the key in this position until the preheating monitor flashes. When the preheating monitor flashes, release the key immediately. When the key is released, it will return automatically to OFF position (A), so turn it immediately to START position (C) and start the engine.

REMARK
The engine does not start, if the lock lever is not in the LOCK position (L). Make sure first that the lock lever is in the LOCK position (L), and then turn the engine starting switch.

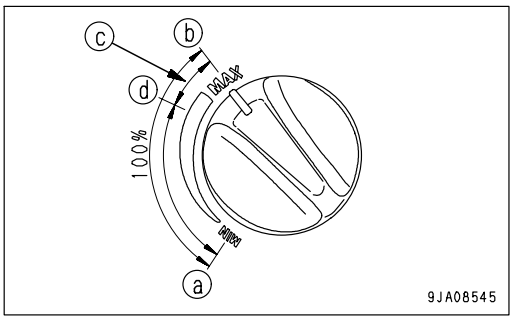


Fuel Control Dial
Use this dial (2) to control the engine rotating speed and output.
(a) Low idling (MIN): Turn dial fully to left
(b) Full speed (MAX): Turn dial fully to right



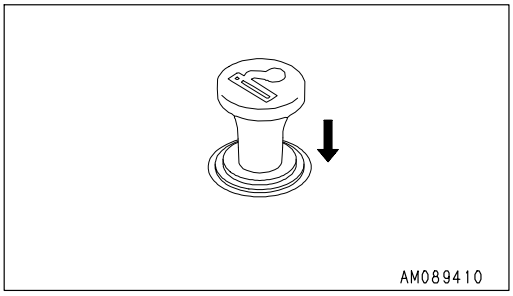
REMARK
On this machine, the engine is electronically controlled to give the optimum matching with the main pump. There is an area without any feeling on the dial, but this is not an abnormality.

Range (c): No feeling (engine speed constant)
P mode: 22%
E mode: 30%
Position (d): High idling



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, so pull it out to use it.
If the cigarette lighter is removed, the socket can be used as an 85W (24V x 3.5A) power source.

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



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Swing Lock Switch

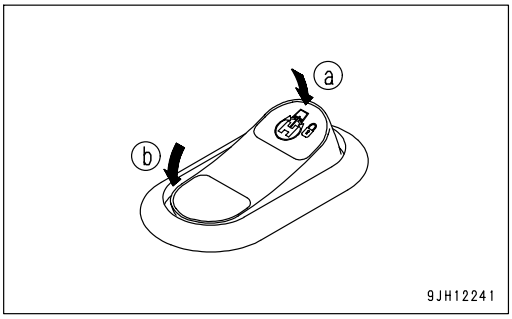
WARNING

- **When not using the swing operation, e.g. when traveling, put the swing lock switch to the OFF position.**
- **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.

(a) 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.

(b) OFF position (canceled): The swing lock is released, when operating the swing control lever, allowing the upper structure to swing.



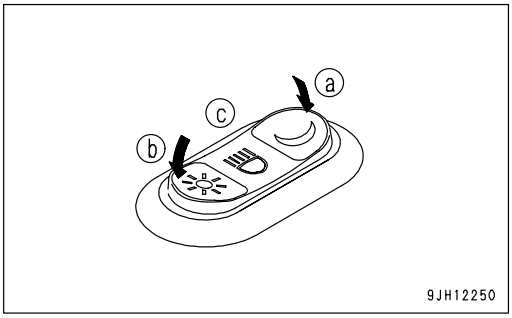
Lamp Switch

This switch (5) is used to light up the working lamp and monitor lighting.

(a) Night position: Lamps light up and monitor illumination is set to night mode

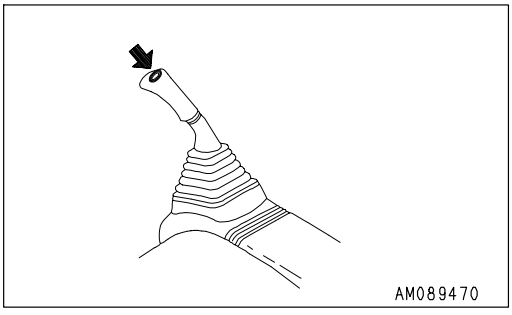
(b) Day position: Lamps light up and monitor illumination is set to day mode

(c) OFF position: Lamps go out.
(The monitor illumination is set to day mode.)



Horn Switch

Use this switch (6) to sound the horn.
Press the switch on the right work control lever to sound the horn.

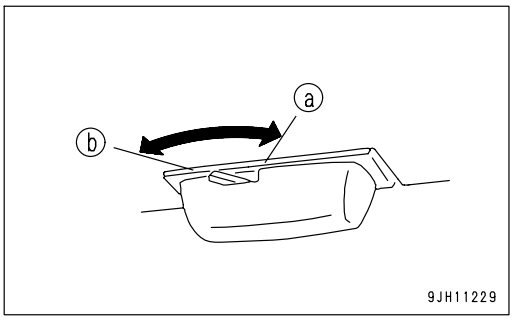


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Room Lamp Switch

NOTICE

It is possible to turn on the interior cab room lamp even when starting switch is in the OFF position, do not forget to turn it off.

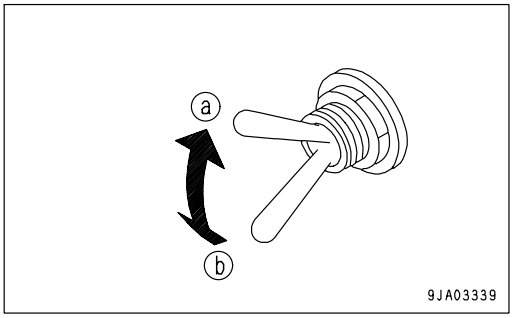


Use this switch (7) to light up the room lamp.
(a) ON position: Lamp lights up
(b) OFF position: Lamp goes out
The room lamp lights up even when the starting switch is at the OFF position

Emergency Pump Drive Switch

NOTICE

- **This switch is provided to enable you to carry out operation temporarily, when any problem occurs on the pump control system. Do not use it except in emergency. Furthermore, remove the cause of the problem immediately.**
- **If this switch is depressed and moved to the EMERGENCY position by mistake, thereby engaging the machine in the work, while the machine is in normal condition, an "E02" mark is shown in the display.**
  If "E02" is displayed during the work, check that the switch is in the NORMAL position.



This switch (8) is used to make it possible to carry out operations temporarily if any problem should occur in the pump control system (when the display shows "E02").

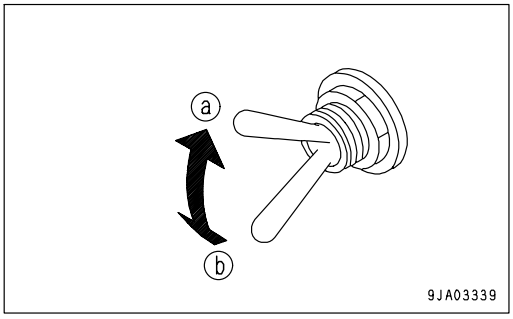
(a) EMERGENCY: When abnormal (move switch up)
(b) NORMAL: When normal (move switch down)

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

Swing Parking Brake Release Switch

NOTICE

This switch makes it possible to perform swing operations for a short even when there is a problem in the swing parking brake electric system. DO NOT use this switch except in emergencies. Repair the problem as soon as possible.



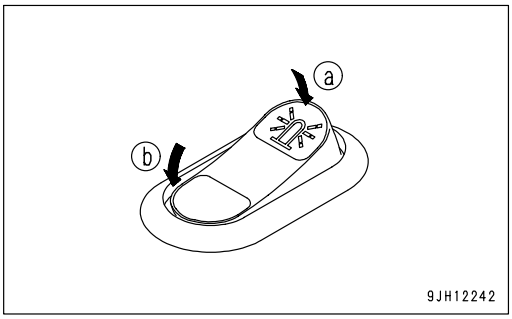
This switch (9) is used to make it possible to carry out operations temporarily if any problem should occur in the swing parking brake system (when the display shows "E03").

(a) FREE: When abnormal (move switch up)
(b) NORMAL: When normal (move switch down)

- If the display shows "E03", move the switch up to the FREE position, to make it possible to carry out work.
- When pushing this switch up to the FREE position, the swing lock monitor lamp begins to flash.

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Revolving Warning Lamp Switch
(If equipped)
Use this switch (10) to light up the yellow rotating lamp on top of the cab.
(a) ON: Lamps light up
(b) OFF: Lamps go off

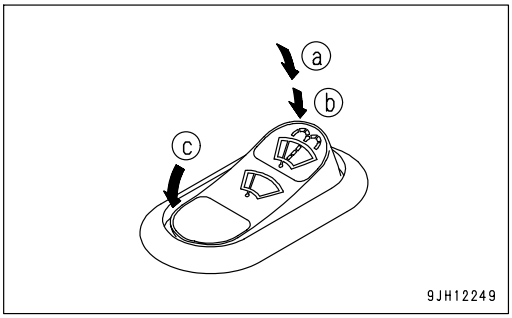


Roof Glass Wiper Switch
(If equipped)
Use this switch (11) to operate the wiper and spray out washer fluid for the glass in the cab roof.

Wiper position (a): Roof glass wiper is actuated

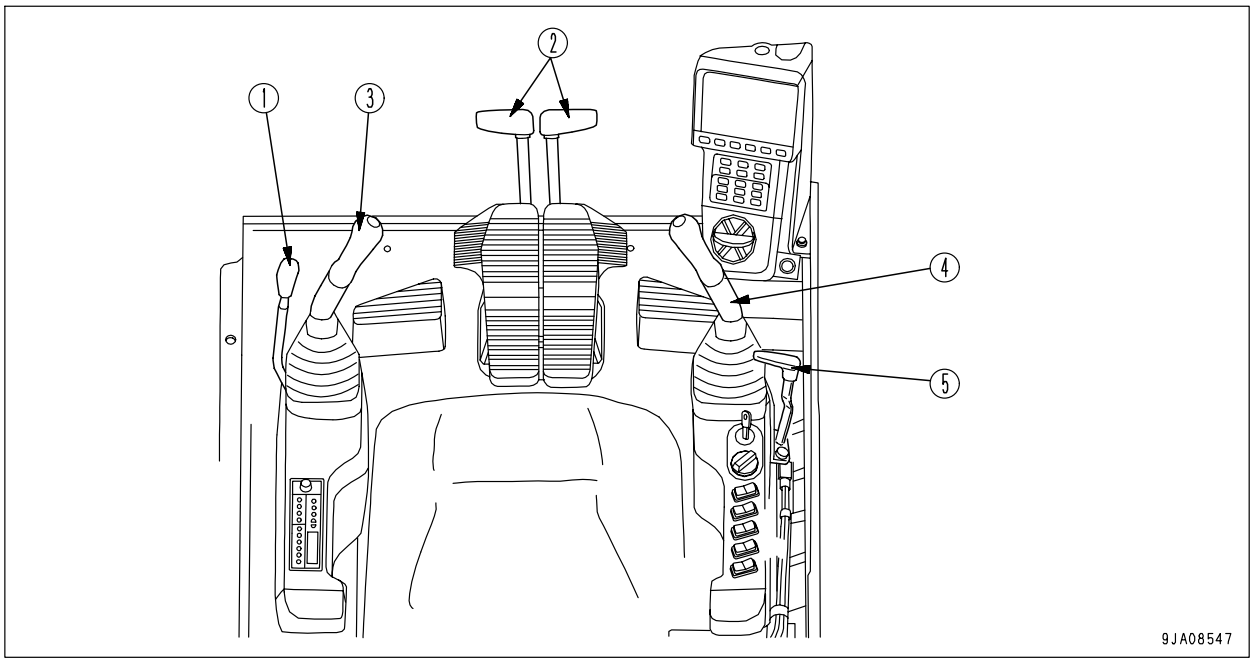
Washer position (b) is as:
When the switch is kept pressed, washer fluid is sprayed out onto the roof glass and the wiper is actuated.
When the switch is released, it returns to position (a). The washer fluid stops, and only the roof glass wiper continues to be actuated.

Stop position (c): Roof glass wiper stops



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CONTROL LEVERS AND PEDALS



(1) Lock lever
(2) Travel levers
(with pedal and auto-deceleration system)
(3) Left work equipment control lever
(with auto-deceleration system)
(4) Right work equipment control lever
(with auto-deceleration system)
(5) Blade control lever (blade specification)

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Lock Lever

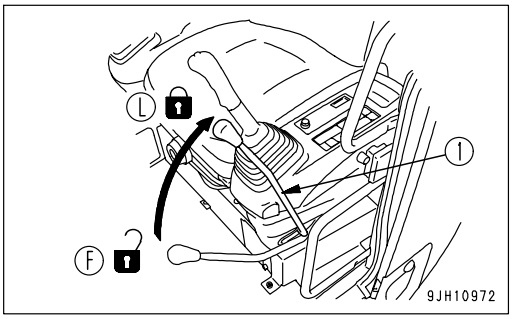
WARNING

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

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

(L) LOCK position: Even when levers or attachment control pedal (if equipped) are operated, machine does not move

(F) FREE position: Machine moves according to operation of levers or attachment control panel (if equipped)



REMARK

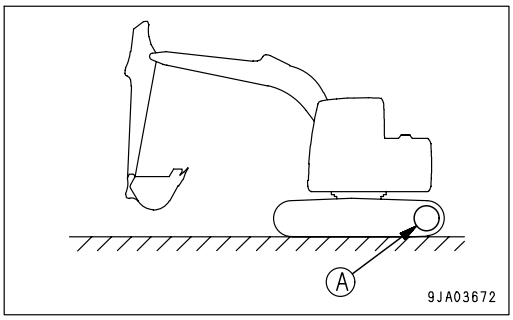
This lock lever is of hydraulic lock type. Accordingly, when it is in the lock position (L), the control levers or control pedals move but the machine does not move.

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Travel Levers

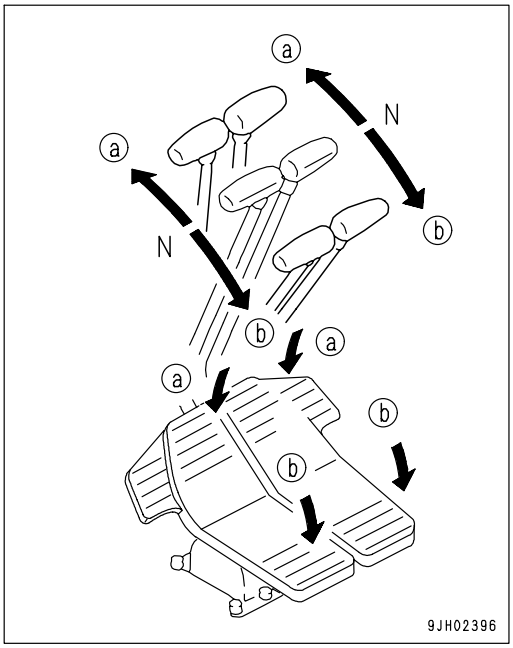
WARNING

- **Do not rest your foot on the pedal. If you carry out operations with your foot on the pedal, the machine may suddenly start if pressure is applied by mistake to the pedal, and this may lead to serious personal injury. Be extremely careful when using the pedal for travel and steering operations, and do not put your foot on the pedal when it is not necessary.**
- **When the track frame is facing the rear, the direction of operation of the steering lever is the opposite to the direction of movement of the machine (forward/reverse, left/right turn).**
  When operating the travel lever, always check if the track frame is facing the front or the rear. (When the sprocket (A) is at the rear, the track frame is facing the front.)



This lever (2) is used to change the direction of travel between forward and reverse. ( ) shows the pedal operation.
(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.



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Work Equipment Control Lever

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

Swing operation

(a) Swing to right

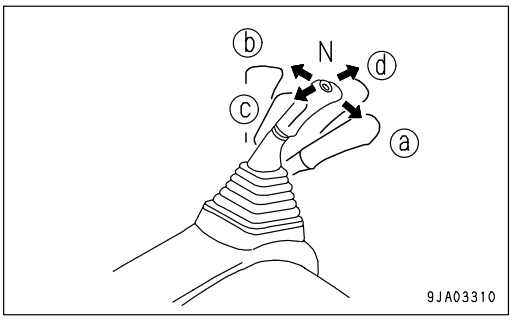
(b) Swing to left

Arm operation

(c) Arm IN

(d) Arm OUT

N (Neutral): The upper structure and arm are held in that position when they come to a stop and do not move.



This right work equipment control lever (4) is used to operate the arm and upper structure.

Boom operation

(e) RAISE

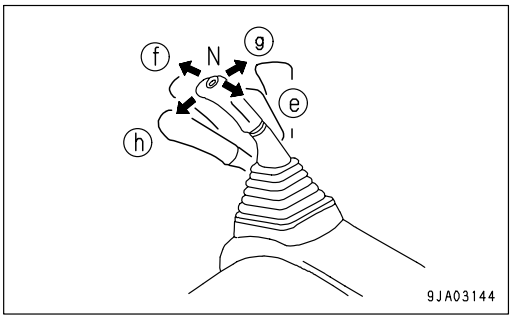
(f) LOWER

Bucket operation

(g) DUMP

(h) CURL

N (Neutral): The boom and bucket are held in that position when they come to a stop and do not move.



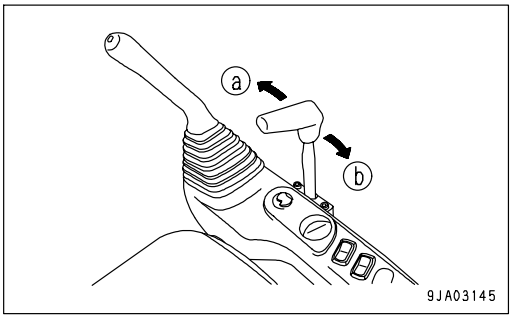
Blade Control Lever

(Only machines with blade specification)

Use this lever (5) to operate the blade.

(a): LOWER

(b): RAISE



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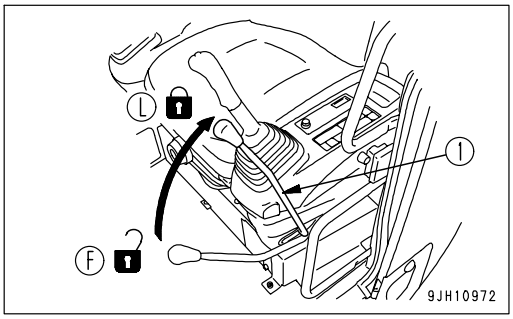
SUN ROOF

WARNING

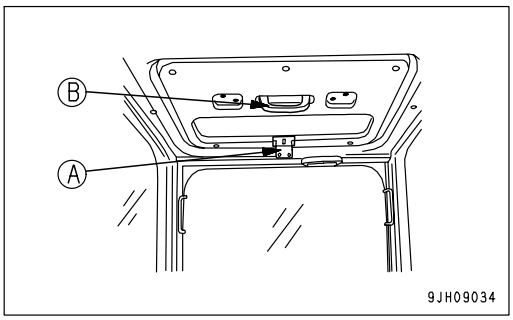
When leaving the operator's seat, set the lock lever securely to the LOCK position.
If the lock lever is at the FREE position and the control levers or control pedals is touched by mistake, this may lead to a serious accident.

Opening

1. Set the lock lever (1) securely to the LOCK position (L).



2. Push up lock (A) in the front center of the roof window and check that the lock is released. Then hold grip (B) and push up the roof window.



Closing

Hold grasping grip (B), lower the ceiling window, and apply lock (A). If the lock cannot be applied, open the ceiling window, then pull it in again and apply the lock.

WINDSHIELD

WARNING

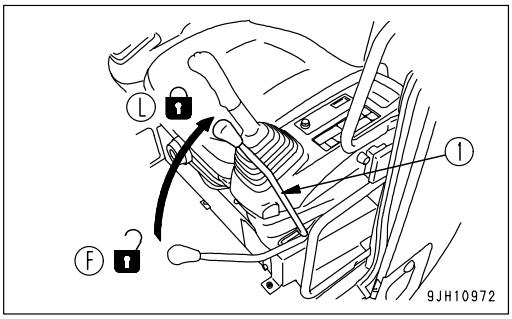
- **When opening or closing the front window, bottom window, or door, always set the lock lever to the LOCK position. If the lock lever is at the FREE position and the control levers or control pedals is touched by mistake, this may lead to a serious accident.**
- **When opening or closing the front window, 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.

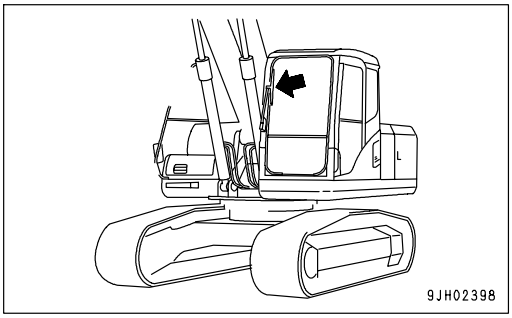
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Opening

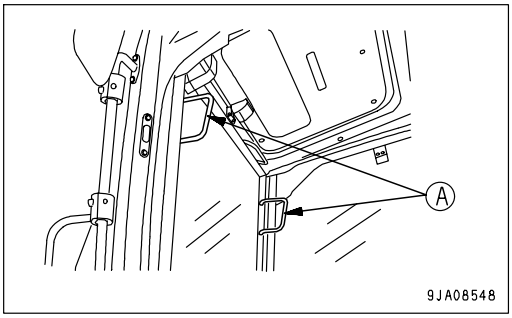
1. Stop the machine on level ground, lower the work equipment completely to the ground, then stop the engine.
2. Set the lock lever (1) securely to the LOCK position (L).

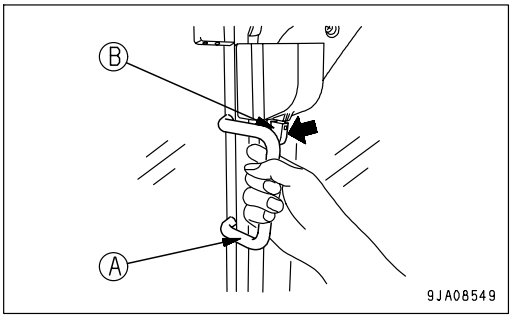


3. Check that the wiper blade is stowed in the right stay.



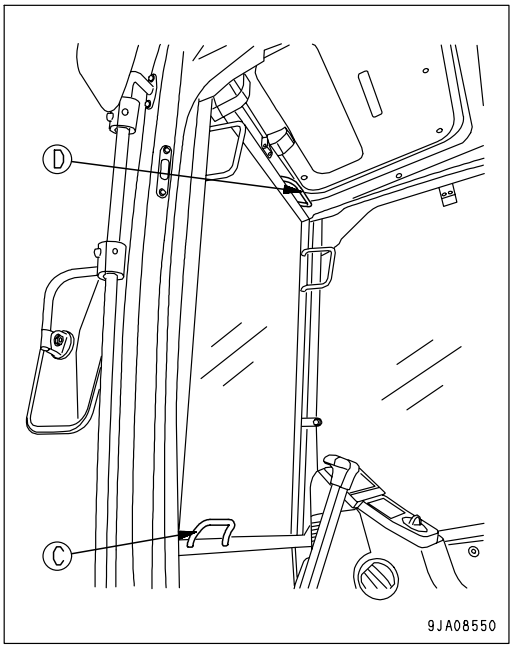
4. Hold 2 grips (A) on the left and right top sides of the front window, and pull the 2 levers (B) to release the locks at the top of the front window. The top of the front window will come out.

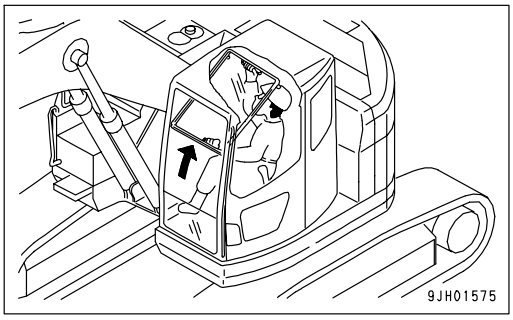


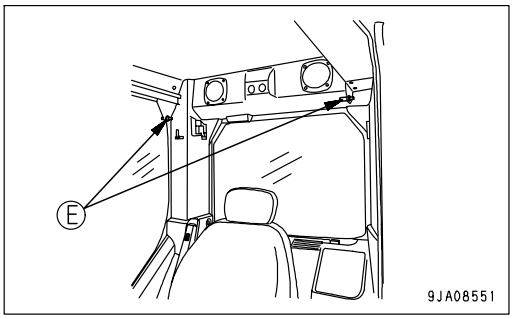


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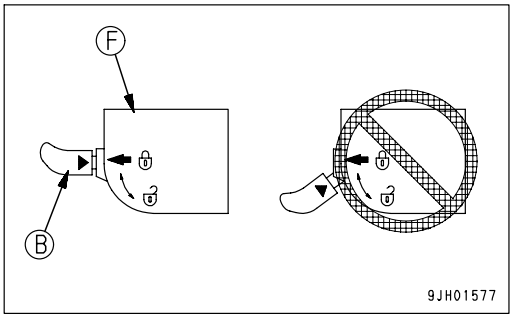
5. Hold lower knob (C) with your left hand from inside the operator's cab, and with your right hand, grip top knob (D), pull it up, and push it against lock catch (E) at the rear of the cab securely to lock the window.







6. Check that lever (B) is securely at the LOCK position.
   - The lock is engaged if the arrow on lock case (F) matches the position of the arrow on lever (B). Check visually.
   - If the arrow on lock case (F) does not match the position of the arrow on lever (B), the lock is not engaged. Repeat the operation in Step 5 to engage the lock.



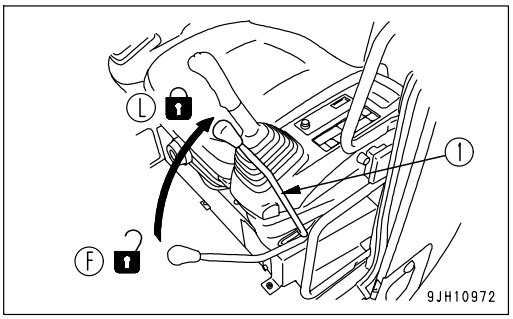
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Closing

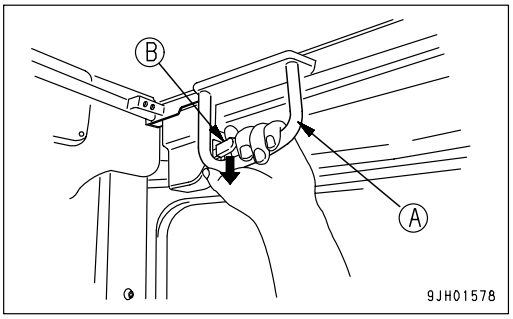
WARNING

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

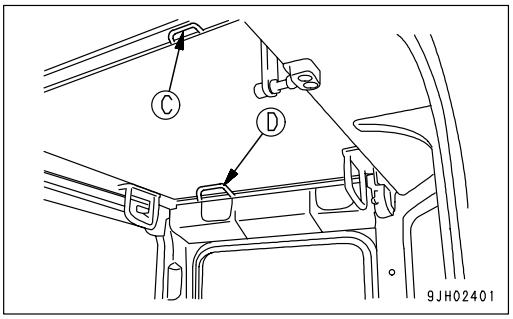
1. Stop the machine on level ground, lower the work equipment completely to the ground, then stop the engine.
2. Set the lock lever (1) securely to the LOCK position (L).

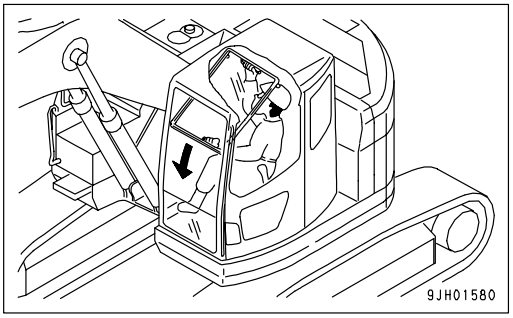


3. Grip left and right handles (A), and pull down lever (B) to release the lock.



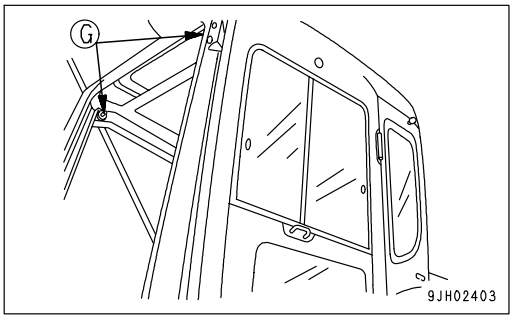
4. Grip handle (C) at the bottom of the front window with your left hand and handle (D) at the top with your right hand, push to the front, then lower slowly.



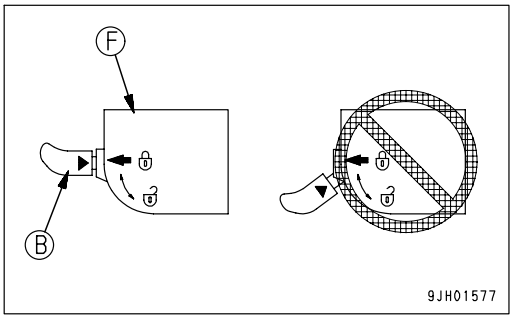


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5. When the bottom of the window reaches the top of the bottom window, push the top of the window to the front to push it against left and right lock catches (G) and engage the lock.



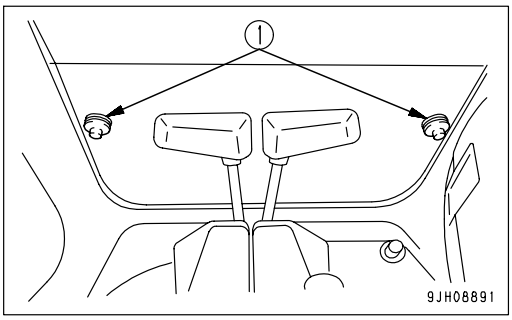
6. Check that lever (B) is securely at the LOCK position.
   - The lock is engaged if the arrow on lock case (F) matches the position of the arrow on lever (B). Check visually.
   - If the arrow on lock case (F) does not match the position of the arrow on lever (B), the lock is not engaged. Repeat the operation in Step 5 to engage the lock.



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Removing Lower Windshield

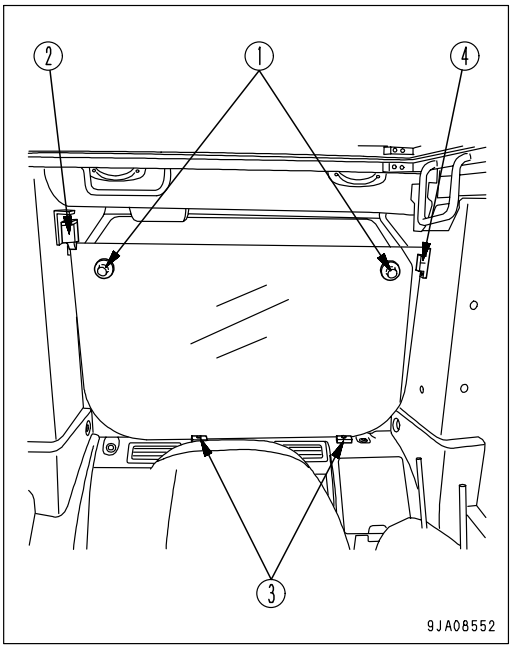
1. Open the front window, then hold grip (1), pull up, and remove the bottom window.



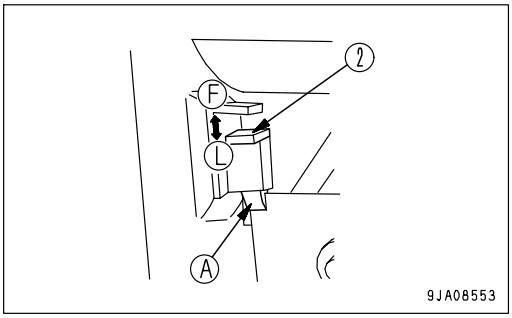
2. After removing the bottom window, store it at the rear of the operator's cab and lock it securely with lock (2). The procedure for stowing is as follows.

   1) Set it with the protruding part of grip (1) on the glass on the inside and insert the bottom of the glass into the groove in seat (3).

   2) Insert the top right of the glass into the groove in seat (4).



   3) Push lock (2) to the free position (F). Tooth (A) will come up, so push the glass against it, then release lock (2) and secure the top of the glass.
   When lock (2) is released, it will return to LOCK position (L) and tooth (A) will go down.



NOTICE

When stowing the glass, lock it securely and check that there is no play. If there is play or the lock is not properly applied, there is danger that the glass may fall.

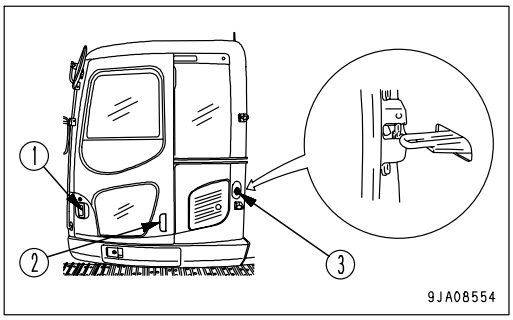
   4) When removing the bottom window from the stowing position, carry out the stowing procedure in the reverse order.

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SLIDING DOOR

CAUTION

- **Be sure to check that the sliding door is locked in position both when it is open and when it is closed.**
- **Always stop the machine on level ground when opening or closing the door.**
  If the door is opened or closed on a slope, there is danger that the operating effort will suddenly change. Do not open or close the door on slopes.
- **When opening or closing the door, always use door handle (1) and knob (2).**
- **Be careful not to get your hands caught between the front pillar or center pillar.**
- **If there is anyone inside the cab, call out to that person before opening or closing the door.**



Door Lock

When closing the door, pull the handle back to remove lock (3), then pull the door to the front.

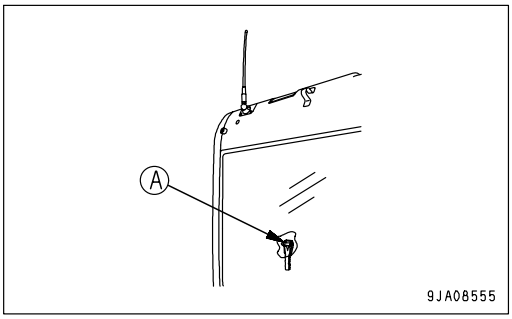
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EMERGENCY ESCAPE HAMMER

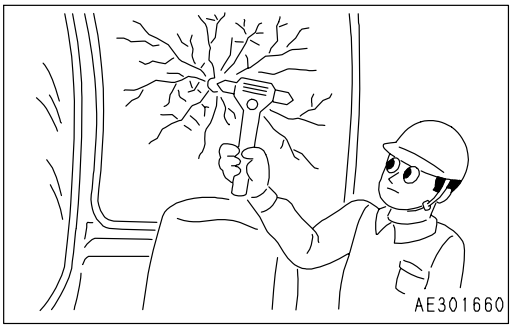
CAUTION

- **If it is necessary to break the window glass with the hammer, be extremely careful not to injure yourself on the flying pieces of broken glass.**
- **To prevent injury, remove the broken pieces of glass remaining in the frame before escaping through the window. Be careful also not to slip on the broken pieces of glass.**

If it should become impossible to open the cab door for any reason, and it is necessary to make an emergency escape from the operator's compartment, use hammer (A) to escape.



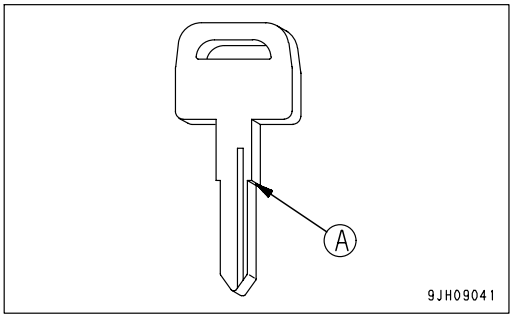
To escape from the operator's cab, use hammer (A) to break the glass and escape through the window.



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CAP WITH LOCK

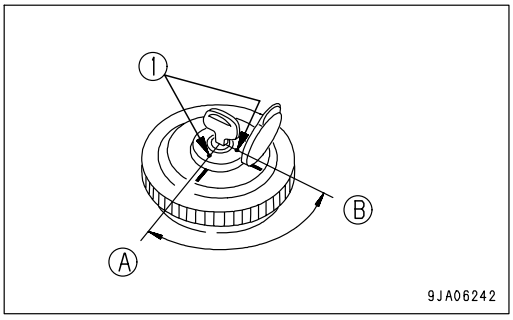
Use the starting switch key to open and close the locks on the caps and covers.
For details of the locations of the caps and covers with locks, see "LOCKING (PAGE 3-175)".
Insert the key as far as it will go to the shoulder (A). If the key is turned before it is inserted all the way, it may break.



Opening and Closing Caps with Lock

Opening the Cap

1. Insert the key into the key slot.
2. Turn the key clockwise, align the key groove with mark (1) on the cap, then open the cap.
   Position (A): OPEN
   Position (B): LOCK



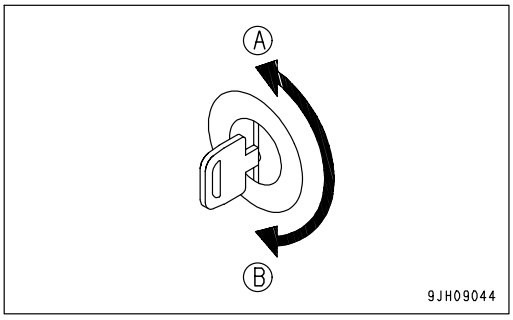
Locking the Cap

1. Turn the cap until tight, then insert the key into the key slot.
2. Turn the starting switch key to LOCK position (B), then remove the key.

Opening and Closing Covers with Lock

Opening the Cover

1. Insert the key into the key slot.
2. Turn the key counterclockwise and open the cover by pulling the cover grip.
   (A): Open
   (B): Lock



Locking the Cover

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

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ENGINE HOOD

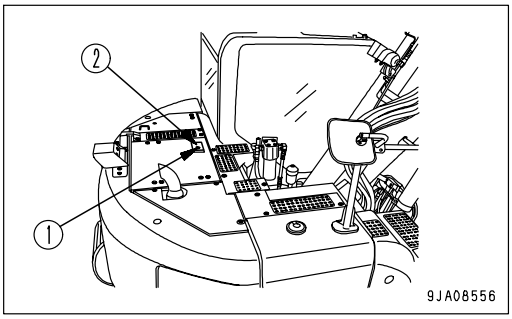
CAUTION

When carrying out inspection and maintenance inside the engine hood, always use the hood support lever to hold the engine hood open.

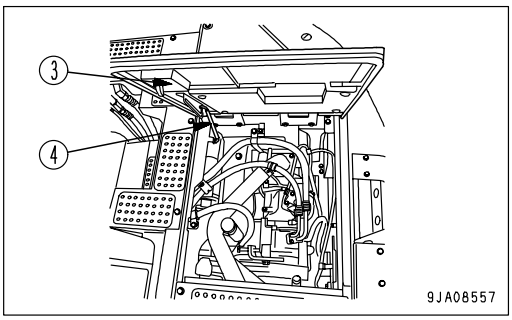
NOTICE

Always keep the hood locked except when opening it.

1. Release lock (1) of the engine hood.
   (For details see "Opening and Closing Covers with Lock (PAGE 3-85)".)
2. Locking can be released by pulling engine hood release lever (2).



3. Pull up engine hood (3) and put engine hood support lever (4) in the position to secure the engine hood.
4. When closing engine hood (3), lower engine hood support lever (4) slowly to the sliding position and then lock the hood securely.
5. Do not forget to lock the engine hood.



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CAB REAR COVER

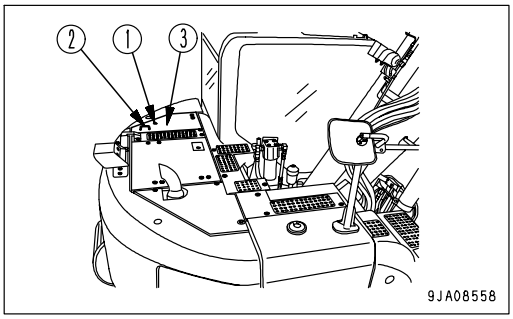
CAUTION

When carrying out inspection and maintenance inside the cover, always use the cover support lever to hold the cover open.

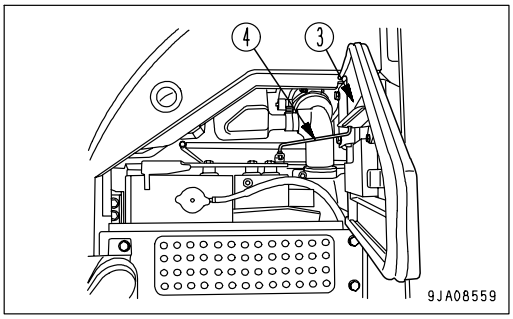
NOTICE

Except when opening the cover for some reason, always keep the cover locked.

1. Release lock (1) of the cover.
   (For details see "Opening and Closing Covers with Lock (PAGE 3-85)".)
2. Pull knob (2) and open cover (3).



3. After opening the cover, set cover support lever (4) to hold the cover in position.
4. When closing cover (3), set cover support lever (4) to the slide position, and lower the cover slowly.
5. Lock the cover.



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PUMP ROOM DOOR, BATTERY ROOM DOOR

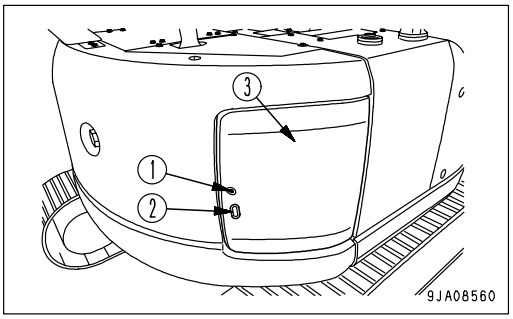
CAUTION

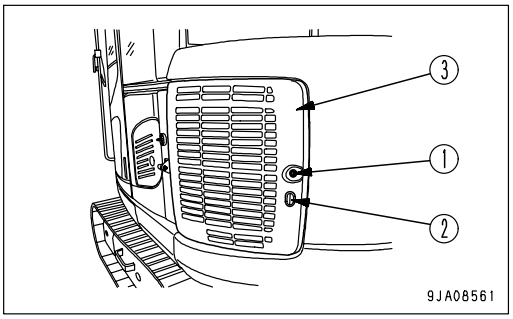
When carrying out inspection and maintenance inside the door, always use the stopper to hold the door open.

NOTICE

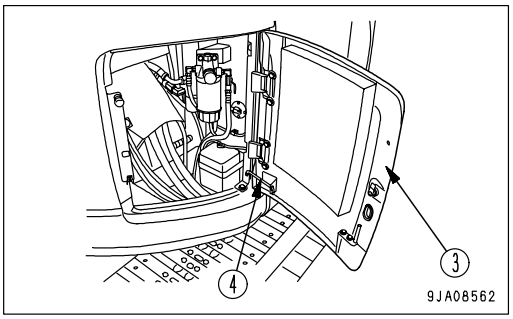
Always keep the door locked except when opening it.

1. Release lock (1) of door.
   (For details see "Opening and Closing Covers with Lock (PAGE 3-85)".)
2. Put a finger in hook (2) and pull door (3) open.



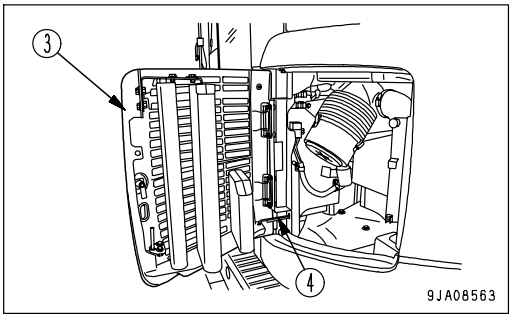


3. Insert rod (4) in the groove to secure the door.
4. When closing door (3), pull up rod (4) and remove it from the groove.
5. Do not forget to lock the door.



REMARK

The pump room door is on the right side of the machine; the battery room door is on the left side of the machine.



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DOOR AT FRONT OF TOOL BOX

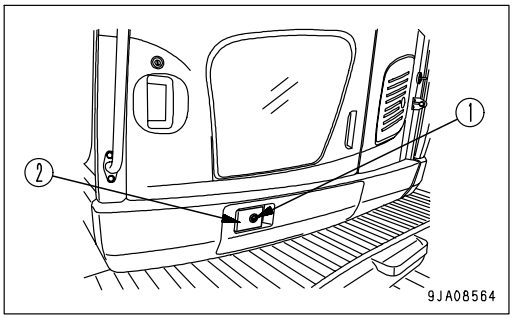
CAUTION

When carrying out inspection and maintenance inside the door, always use the stopper to hold the door open.

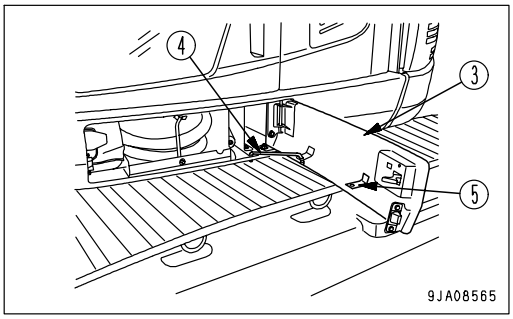
NOTICE

Always keep the door locked except when opening it.

1. Release lock (1) of door.
   (For details see "Opening and Closing Covers with Lock (PAGE 3-85)".)
2. Pull door lever (2) to release the lock.



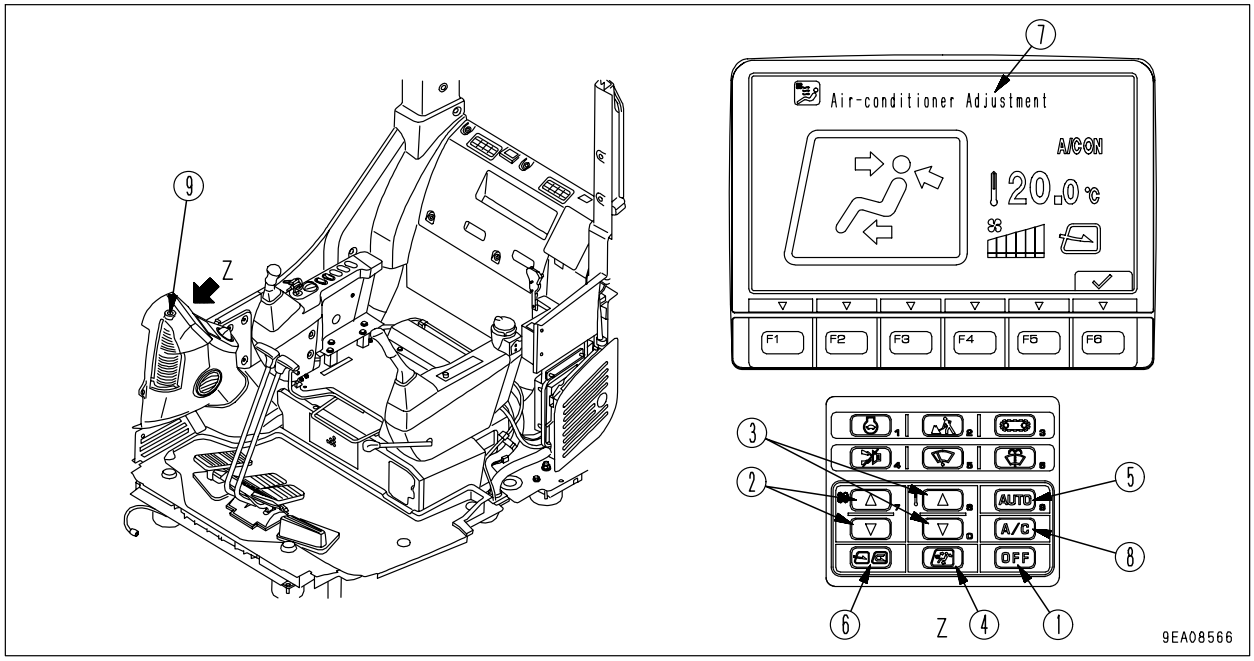
3. Pull door (3) to open it, remove door support lever (4) from spring catch (5), then insert the L-shaped portion in the hole in the frame.
4. To close door (3), lift up door support lever (4), fix it to spring catcher (5) and close it.
5. Do not forget to lock the door.



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AIR CONDITIONER CONTROLS

Air Conditioner Control Panel



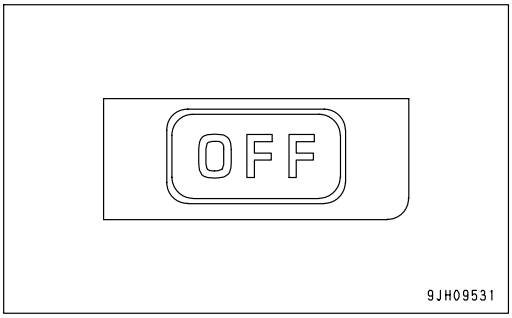
(1) OFF switch
(2) Fan switch
(3) Temperature control switch
(4) Vent selector switch
(5) Auto switch
(6) FRESH/RECIRC selector switch
(7) Display monitor
(8) Air conditioner switch
(9) Sunlight sensor

OFF Switch

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

REMARK

Even if this switch (1) is pressed, the monitor screen does not switch to the air conditioner adjustment screen.

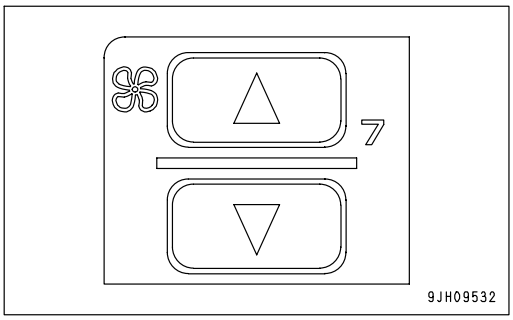


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Fan Switch

Switch (2) is used to adjust the air flow.
The air flow can be adjusted to six levels.

- Press the △ switch to increase the air flow; press the ▽ switch to decrease the air flow.
- During auto operation, the air flow is automatically adjusted.



Monitor display and air flow

A: Liquid crystal dispiay
B: Air flow
a: Air flow "low"
b: Air flow "medium 1"
c: Air flow "medium 2"
d: Air flow "medium 3"
e: Air flow "medium 4"
f: Air flow "high"

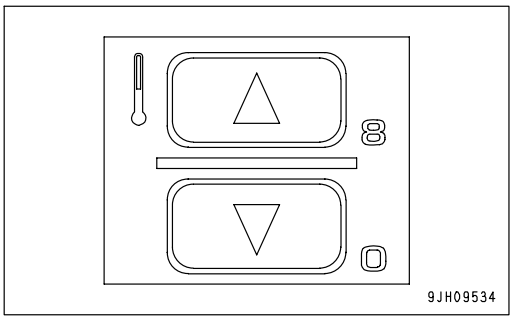
A	B
	a
	b
	c
	d
	e
	f

Temperature Control Switch

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

- Press the △ switch to raise the set temperature; press the ▽ switch to lower the set temperature.

- The temperature is generally set at 25°C (77°F).
- The temperature can be set in stages of 0.5°C (0.9°F).



<Monitor display and the function>

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

REMARK

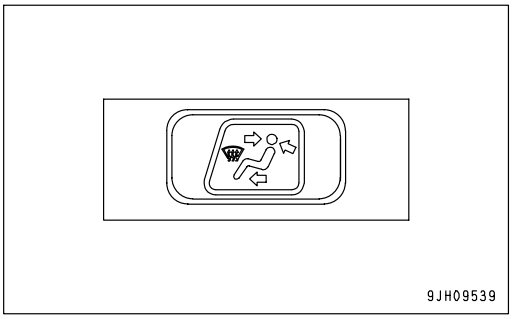
If the mode is set to auto mode and the temperature setting is set to 18.0 °C (64.4 °F) or 32.0 °C (89.6 °F), the air flow from the fan is always set to HIGH and does not change even when the set temperature is reached.

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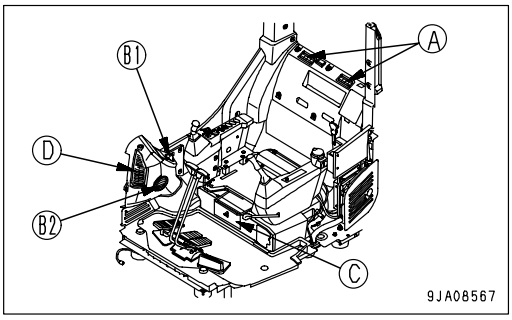
Vent Selector Switch

Switch (4) is used to select the vents.

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



(A): Rear vent (2 places)
(B1): Face vent (1 place)
(B2): Foot vent (1 place)
(C): Foot vent (1 place)
(D): Front window glass vent (2 places)



Liquid crystal display	Vent mode	Vent Ⓐ	Ⓑ	Ⓒ	Ⓓ	Remarks
	Front and rear vents	○	○			-
	Front, rear and foot vents	○	○	○		-
	Foot vent			○		-
	Foot vent Defroster vent	○		○	○	Cannot be selected for automatic operation
	Defroster vent	○			○	Cannot be selected for automatic operation

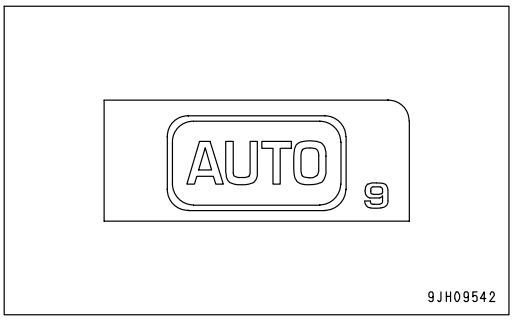
Note 1: Air blows out from vents marked ○

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Auto Switch

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

- Press switch (5), then use temperature control switch (3) to set the temperature, and run the air conditioner under automatic control.
- When switching from automatic operation to manual operation, it is possible to use the switches to select the vents and air source (RECIRC/FRESH).



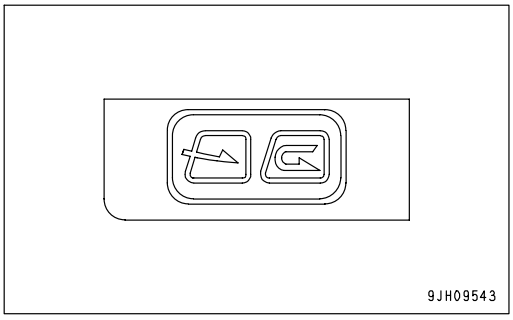
REMARK

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

FRESH/RECIRC Selector Switch

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

- During automatic operation, the selection of inside air (RECIRC) and outside air (FRESH) is performed automatically.

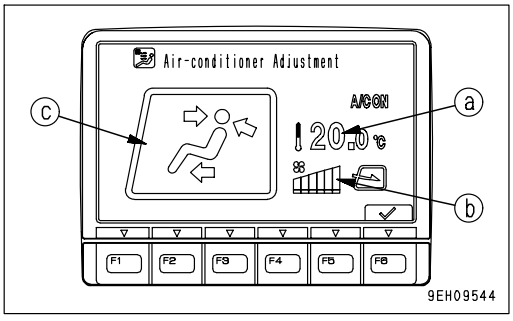


RECIRC	Outside air is shut off and only air inside the cab is circulated. Use this setting to perform rapid cooling of the cab or when outside air is dirty.
FRESH	Outside air is taten into the cab. Use this setting to take in fresh air when performing demisting.

Display Monitor

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

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

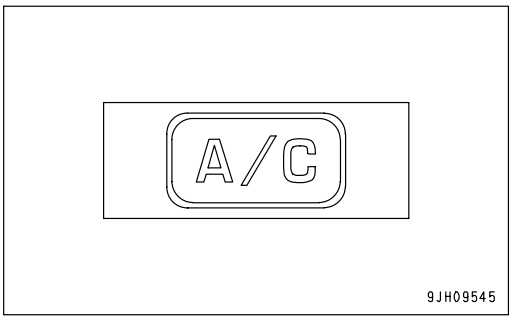


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Air Conditioner Switch

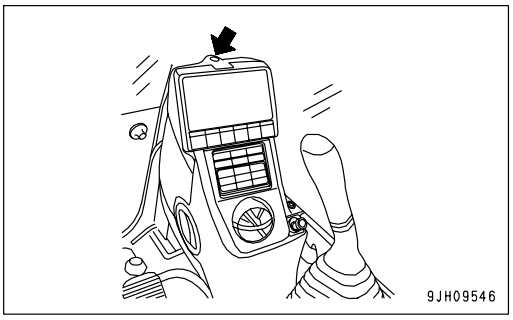
Switch (8) is used to turn the air conditioner (cooling, dehumidifying, heating) ON or OFF.

- Press air conditioner switch (8) when the fan is operating (when display (b) is shown on the display monitor). The air conditioner is switched ON and starts to work. Press the switch again to stop the air conditioner.
- Air conditioner cannot be operated while the fan is off.



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.



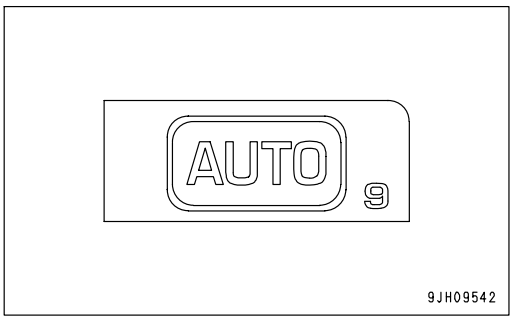
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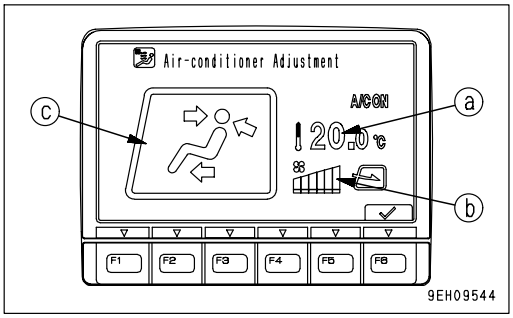
Method of Operation

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

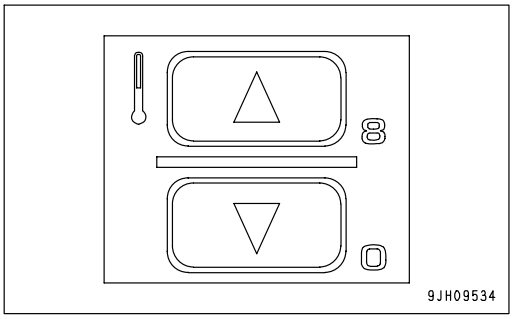
Automatic Operation

1. Turn auto switch (5) ON.
   - The monitors for the set temperature (a) and air flow (b) are also displayed.



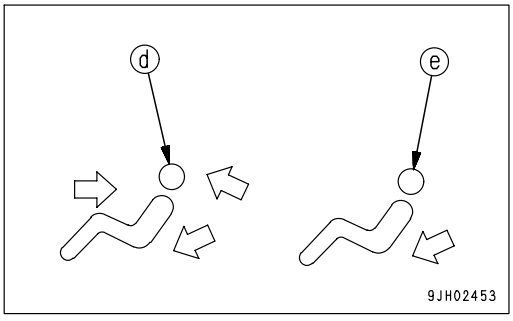


2. Use temperature set switch (3) to set to the desired temperature. The air flow, combination of vents, and selection of fresh or recirculated air is automatically selected according to the set temperature, and the air conditioner is operated automatically to provide the set temperature.



REMARK

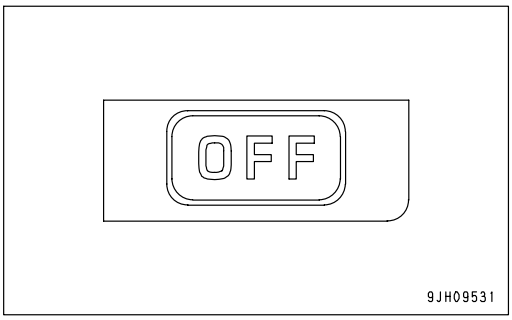
When vent display monitor (c) displays (d) or (e), and engine coolant temperature is low, the air flow is automatically limited to prevent cold air from blowing out.



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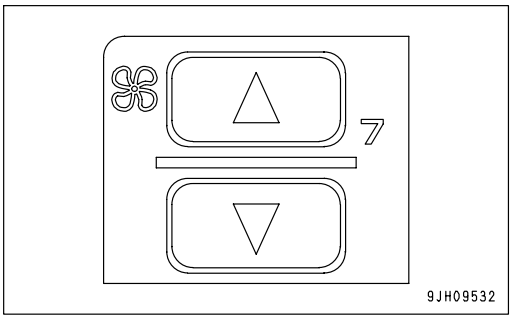
Stopping Automatic Operation

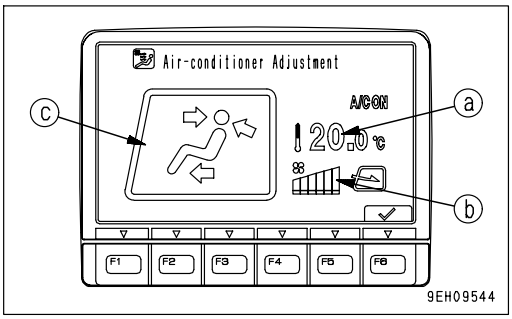
Press OFF switch (1). Operation stops.



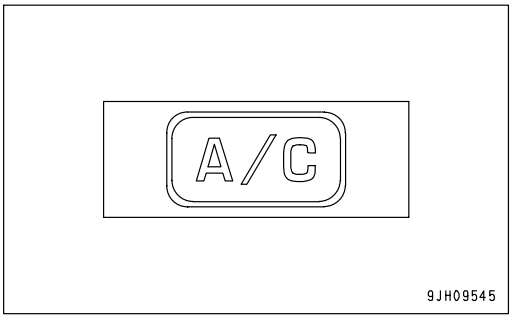
Manual Operation

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



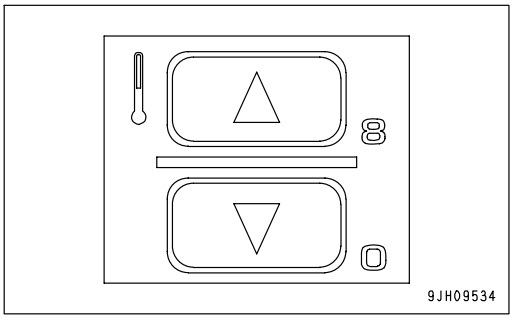


2. Turn air conditioner switch (8) ON.

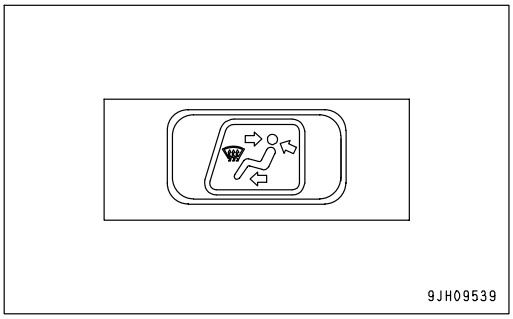


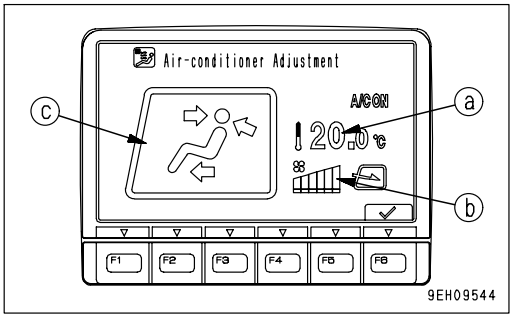
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3. Press temperature setting switch (3) and adjust temperature inside the cab.

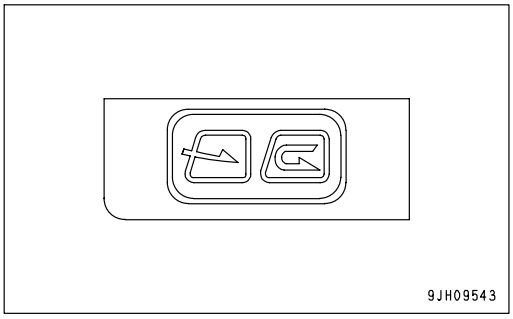


4. Press vent selector switch (4) and select the desired vents. When this is done, the display for vent (c) of the display monitor changes according to the selection.





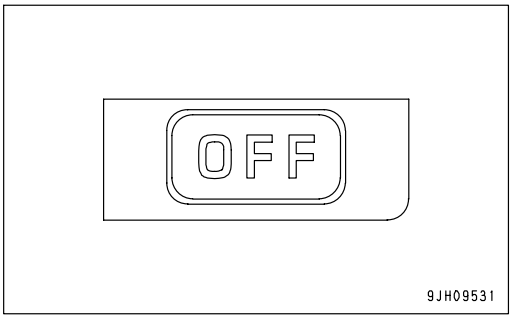
5. Press RECIRC/FRESH selector switch (6) and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).



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Stopping Manual Operation

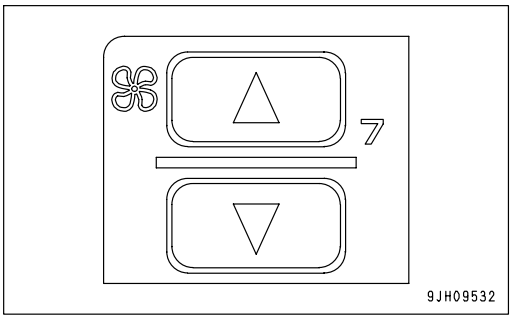
Press OFF switch (1). Operation stops.

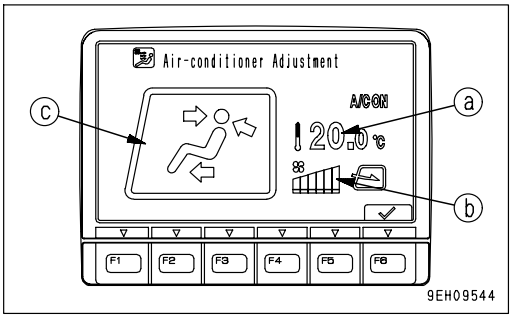


Operation with Cold Air to Face and Warm Air to Feet

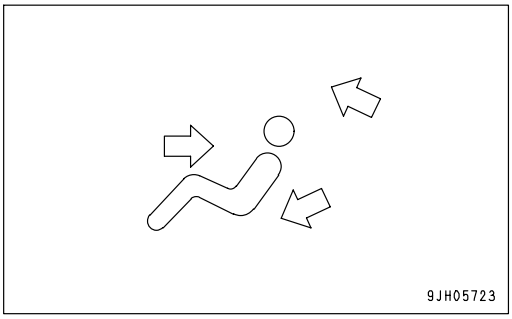
To operate with cold air blowing to the face and warm air blowing to the feet, set as follows.

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



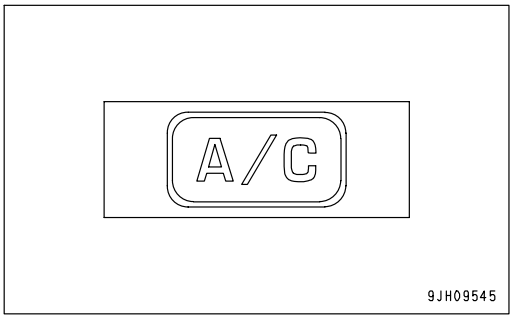


2. Press vent selector switch (4) and set the vent display on the display monitor to the display shown in the diagram on the right.

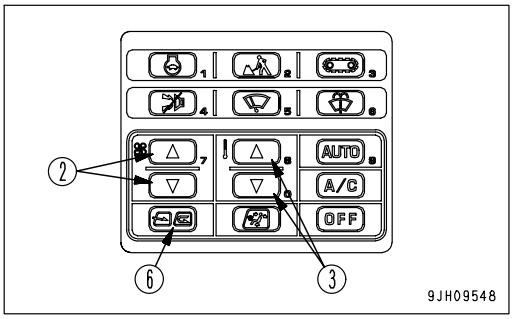


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3. Turn air conditioner switch (8) ON.



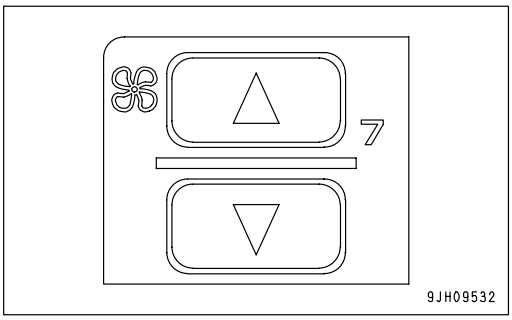
4. Adjust fan switch (2), temperature setting switch (3) and RECIRC/FRESH selector switch (6) to the desired positions.

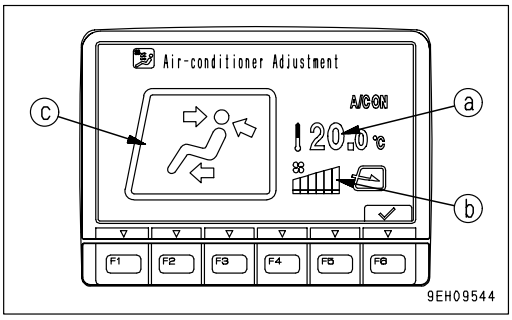


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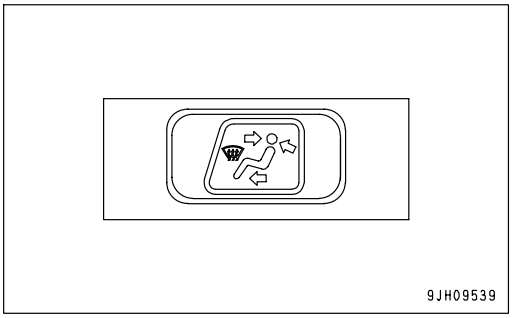
Defroster Operation

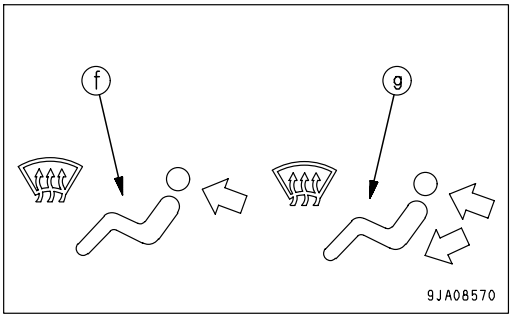
1. Press fan switch (2) and adjust the air flow. When doing this, check that temperature setting (a) and air flow (b) are displayed on monitor (7).





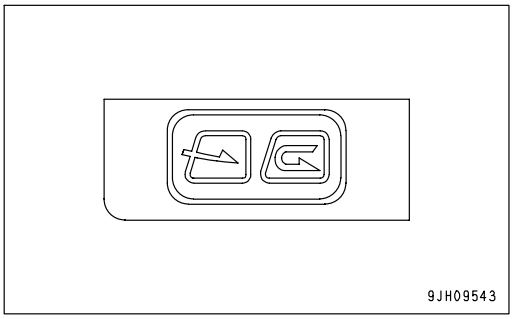
2. Press vent selector switch (4) and set vent display on the display monitor to (f) or (g) as shown in diagram on the right.



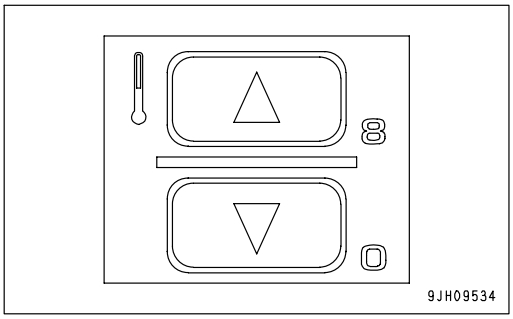


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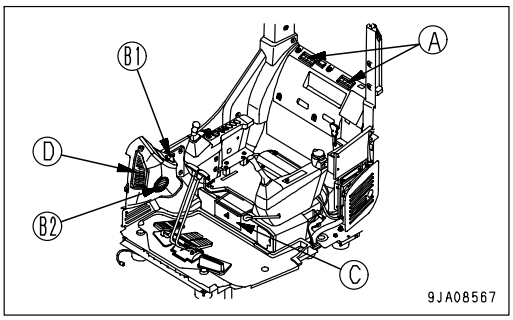
3. Press RECIRC/FRESH selector switch (6) and set it to take in fresh air.



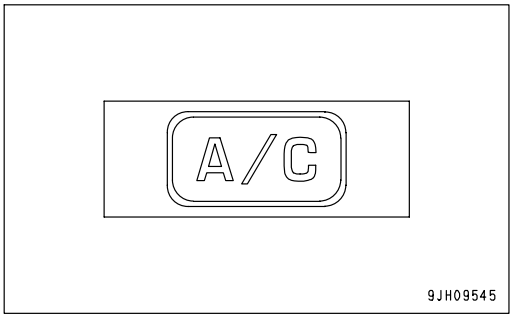
4. Press temperature setting switch (3) and set temperature on the display (7) monitor to maximum heating.



5. Adjust vents (A), (B1), and (B2) so that the air blows onto the window glass.
(Vents (C) and (D) are fixed and cannot be adjusted.)



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.



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Use Air Conditioner with Care

NOTICE

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

Ventilation

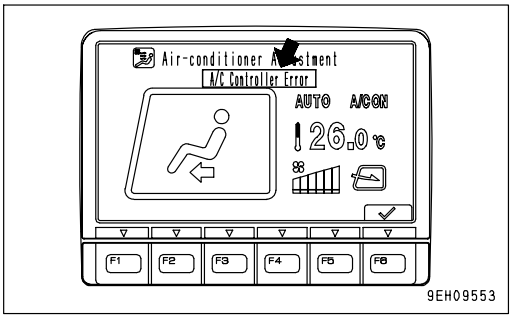
- When running the air conditioner for a long time, turn the lever to the FRESH position once an hour to carry out ventilation and cooling.
- If you smoke when the air conditioner is on, the smoke may start to hurt your eyes, so open the window and turn the lever to FRESH for a while to remove the smoke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

Temperature Control

When the cooler is on, set the temperature so that it feels slightly cool when entering the cab (5 or 6 °C (9 or 10.8 °F) lower than the outside temperature). This temperature difference is considered to be the most suitable for your health, so always be careful to adjust the temperature properly.

Inspection and maintenance of Air Conditioner Equipped Machine

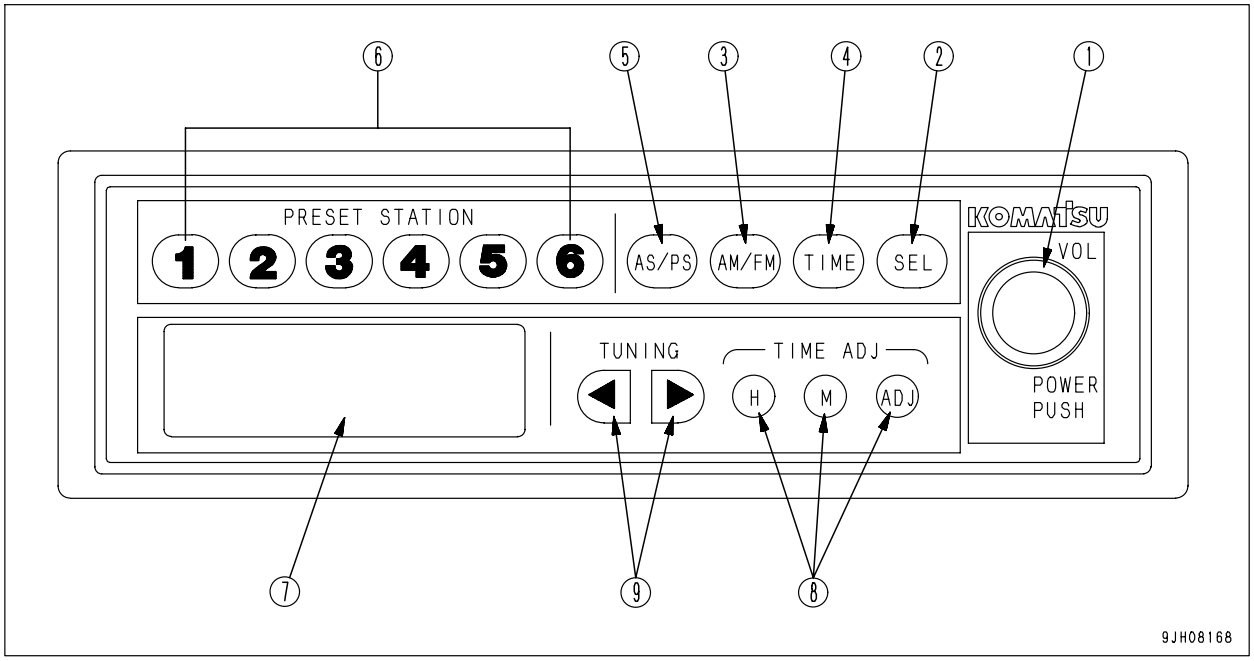
- When carrying out inspection and maintenance on machines equipped with an air conditioner, carry out the inspection and maintenance according to the chart. For details, see "CHECK AND MAINTENANCE AIR CONDITIONER (PAGE 4-36), CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST (PAGE 4-54), CLEAN AIR CONDITIONER FRESH/RECIRC FILTERS (PAGE 4-62)".
- When the air conditioner is not being used every day, to prevent loss of the film of oil at various parts, run at the engine at low speed from time to time and carry out cooling or dehumidifying heating for several minutes.
- If the temperature inside the cab is low, the air conditioner may not work. In this case, circulate fresh air to warm the inside of the cab. When the air conditioner switch is turned ON, the air conditioner will work.
- If any abnormality is detected in any equipment or sensor used on the air conditioner, "A/C Controller Error" is displayed on the air conditioner monitor screen. If "A/C Controller Error" is displayed, please ask your Komatsu distributor to carry out inspection and repair.



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RADIO

Control Panel



(1) Power switch, Volume control knob, Balance control knob
(2) SEL button
(3) FM/AM selection button
(4) Display selection button
(5) AS/PS button
(6) Preset station buttons (1,2,3,4,5,6)
(7) Display
(8) Time reset button
(9) Tuning button

Power switch, Volume control knob, Balance control knob
Press this knob (1) to turn the power for the radio on. The frequency is displayed on display (7). Press the knob again to turn the power off.
Turn the knob clockwise to increase the volume; press counterclockwise to reduce the volume. The range for the volume is VOL 0 - VOL 40.

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 "Method of Operating Mode (PAGE 3-106)".

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 . . .

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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. For details of the method of adjusting the time, see "Setting Correct Time (PAGE 3-106)".

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

- Auto store
  If this button is kept pressed for at least 2 seconds during radio reception, it will automatically search for six available AM and FM stations each, starting with the lowest frequency and going up to the highest frequency. These frequencies can then be saved 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.
For details of the method of presetting the stations, see "Method of Setting with Preset Button (PAGE 3-105)".

REMARK
The preset button can be used to save the frequency manually. To save the frequency automatically, use the Auto store button.

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

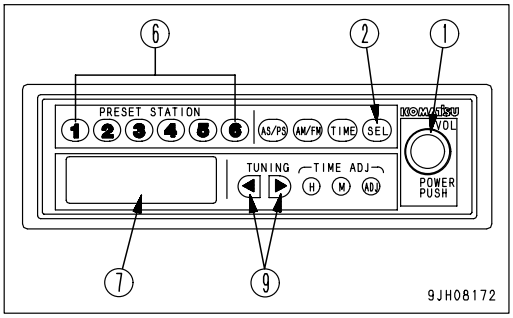
Time Reset Button
Use this button (8) when adjusting the time. For details of the method of adjusting the time, see "Setting Correct Time (PAGE 3-106)".
H: Hour
M: Minute
ADJ: Sets to 00 minutes

Tuning Button (TUNING)
Use this button (9) to change the frequency.
For further details, see "Method of Tuning (PAGE 3-105)"

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Controls of Radio

Method of 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.
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 approx. 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.

Method of Tuning

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.

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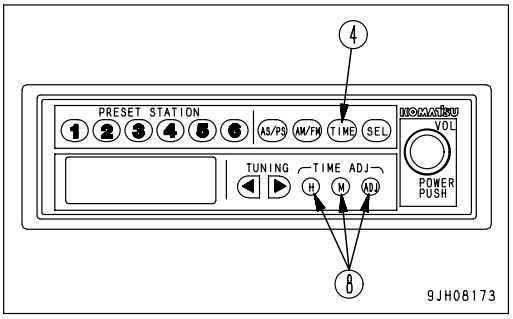
Method of Operating Mode

- (BAS) Bass adjustment: 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: 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: 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.

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 select 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.

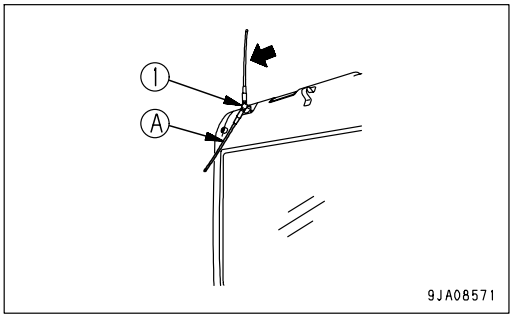
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Antenna

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 (A).
2. After storing the antenna, 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 solvent such as benzene or thinner. Wipe with a dry soft cloth. If the dirt cannot be removed easily, soak the cloth with alcohol.
- When the battery is disconnected or replaced, settings for the preset buttons and clock are cleared, so all settings must be reprogramed.

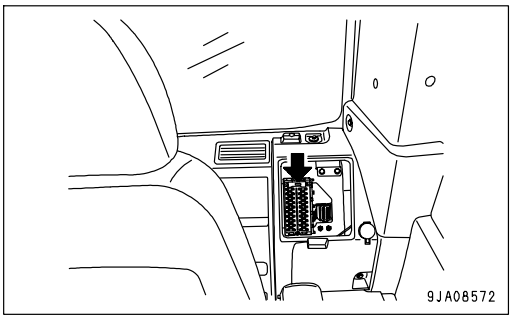
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FUSE

NOTICE

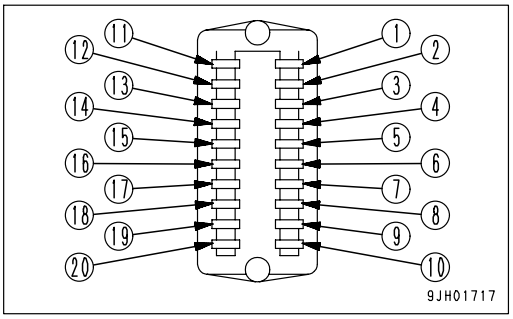
Before replacing a fuse, be sure to turn off the starting switch.

- The fuse holder is inside the cover at the left rear of the cab.
- The fuses protect the electrical equipment and wiring from burning out.
- If the fuse is corroded or covered with white powder, or the fuse is loose in the fuse holder, replace the fuse.
- When replacing the fuse, always replace it with a fuse of the same capacity.



Fuse Capacities and Circuit Names

No.	Capacity	Circuit name
(1)	10A	Emergency actuation circuit
(2)	30A	Electromagnetic valve
(3)	15A	Cigarette lighter
(4)	10A	Window washer
(5)	10A	Horn
(6)	5A	Working lamp relay, horn relay
(7)	10A	Revolving lamp (if equipped)
(8)	20A	Working lamp
(9)	10A	Radio, speaker
(10)	5A	Air conditioner
(11)	20A	Air conditioner unit
(12)	10A	Optional equipment power supply (1)
(13)	10A	Optional equipment power supply (2), 12V power supply
(14)	10A	Spare
(15)	5A	Air conditioner
(16)	10A	Radio backup, room lamp
(17)	20A	Monitor, controller, starting switch
(18)	30A	Engine controller
(19)	5A	Engine controller
(20)	5A	PPC oil pressure lock solenoid

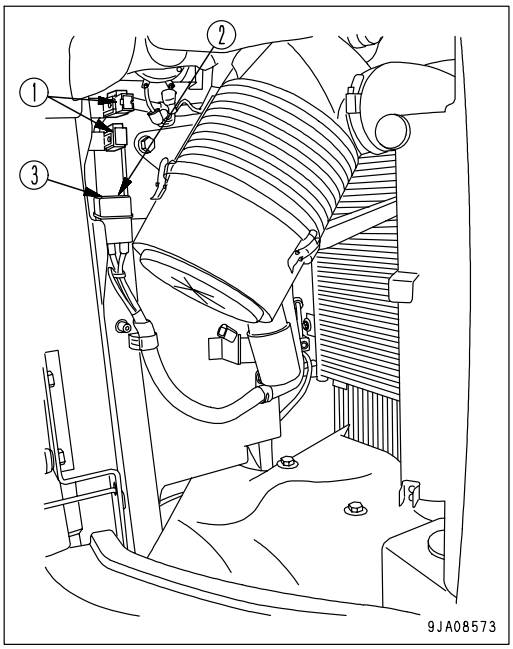


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FUSIBLE LINK

If any of the following problems have occurred, there is probably a disconnection in the fusible link. Open the battery room door on the left side of the machine, and check and replace.

- If the starting motor does not turn even when the starting switch is turned to the START position, there is probably a disconnection in the fusible link (1).
- If the battery is discharged, there is probably a disconnection in the fusible link (2).
- In cold weather, if the starting switch is turned to the HEAT position and preheating is carried out, but the engine is difficult to start, there is probably a disconnection in fusible link (3).



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.

No.	Capacity	Circuit name	Connector No.	Part No.
(1)	45A	Permanent power supply	F02	20T-06-81230
(1)	45A	Permanent power supply	F03	
(2)	50A	Alternator (35A)	F05	417-06-22610
	120A	Alternator (60A) (if equipped)		421-06-22830
(3)	120A	Preheating	F06	

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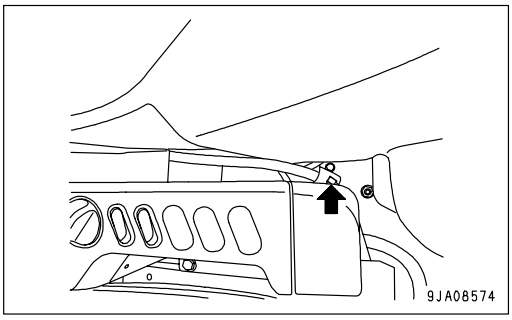
AUXILIARY ELECTRIC POWER

NOTICE

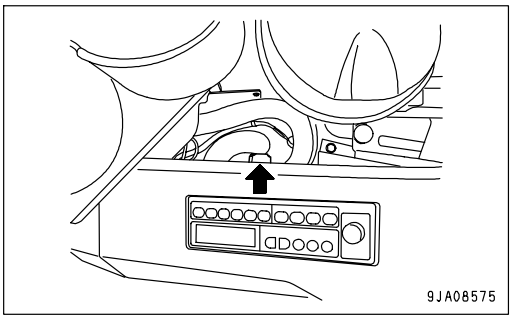
When installing electrical equipment not supplied by Komatsu, make sure that the equipment is 24 V specification with a maximum of 240 W (10 A or equivalent). When installing electrical equipment with a larger capacity, please consult your Komatsu distributor.

On both the left and right sides under the floor console, there are power takeoff connectors for optional equipment fixed to the wiring and held in position by tape. Remove the tape when using them.
Use these connectors for taking off the power supply for components not supplied by Komatsu.

Left connector No: M10



Right connector No: M09



See the table below for the connection type of each connector. (Both left and right)

	M type housing (2-terminal)		Terminal		
	Body	Rear holder	AVS 0.5	AVS 0.85 - 2	AVS 3
Komatsu part No.	08056-00211	08056-00230	08056-00050	08056-00051	08056-00052

REMARK

Power may be sourced from the cigarette lighter, too. For the details, see the section of "Cigarette Lighter (PAGE 3-69)" in this manual.

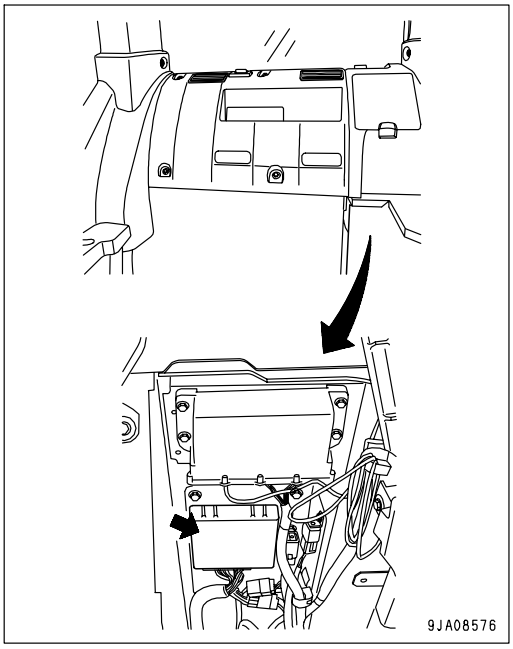
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CONTROLLERS

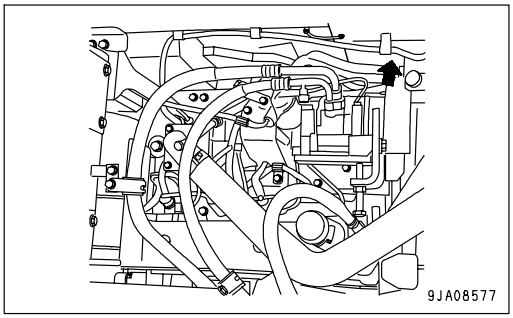
NOTICE

- **Do not let water, mud, or juice spill on the controller. This will cause failures.**
- **If any problem occurs in the controller, do not repair it by yourself. Please contact your Komatsu distributor for repairs.**

The chassis controller and KOMTRAX controller are installed inside the rear cover at the rear of the operator's cab.



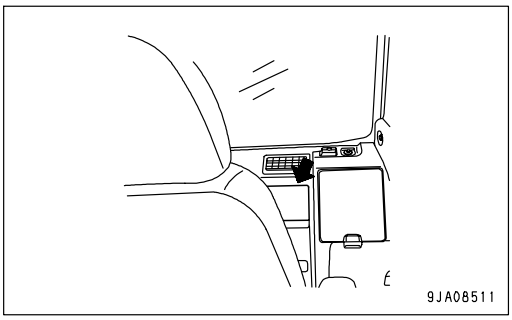
The engine controller is installed to the exterior finish frame at the rear of the engine.



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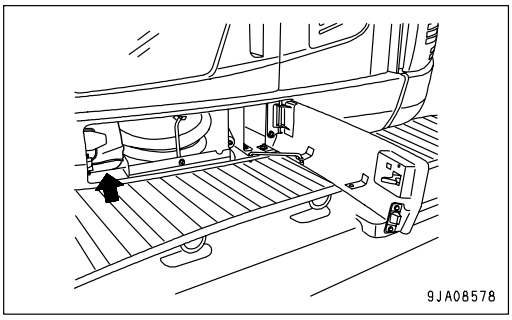
OPERATION MANUAL STORAGE

A magazine box is provided on the left side of the operator's seat for safekeeping the operation and maintenance manual and oil chart.
Always keep the Operation and Maintenance Manual in this pocket so that it is possible to read it at any time.



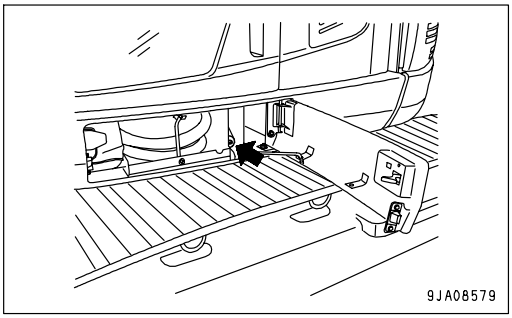
TOOL BOX

Open the door at the front of the tool box. The standard tool compartment is inside.
Put the tools in the supplied tool bag and store them in the tool compartment.



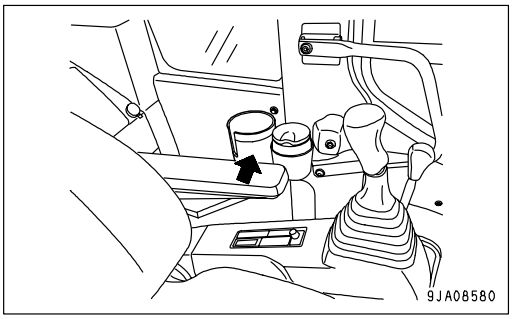
GREASE PUMP HOLDER

Open the door at the front of the tool box. The compartment to stow the grease pump is inside.
Pass the nozzle through the hole at the end, and push the grease gun holder fully in to store it.



CUP HOLDER

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

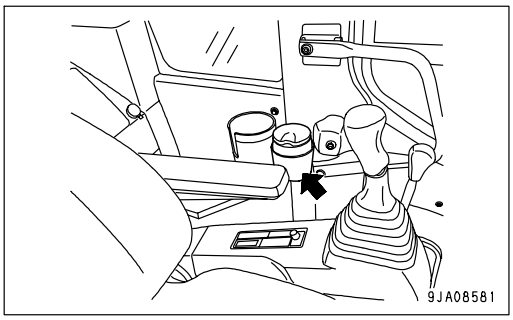


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ASHTRAY

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

Always extinguish your cigarette before putting it in the ashtray, then be sure to close the lid.

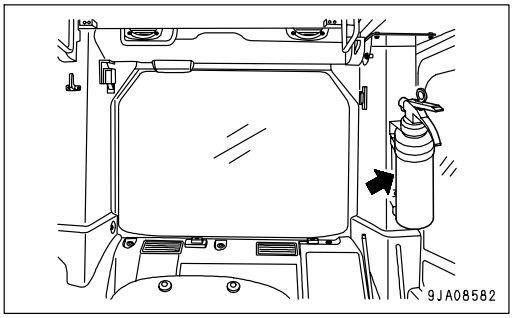


FIRE EXTINGUISHER

(If equipped)

A fire extinguisher is prepared at the rear part inside the operator's cab.

The directions are described on the nameplate affixed to it. Just in case, carefully read and grasp them beforehand.



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MACHINE OPERATIONS AND CONTROLS

BEFORE STARTING ENGINE

Walk-around Checks

Before starting the engine, walk around the machine and look at the underside of chassis for anything unusual like loose bolts and nuts, leakage of fuel, oil and coolant. Also check the condition of the work equipment and the hydraulic system.
Also check for loose wiring, play, and collection of dust at places that reach high temperature.

⚠ WARNING

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

If the machine is at an angle, reposition it level before checking.
Perform the following inspections and cleaning every day before starting engine for the day's work.

1. Check for damage, wear, play in work equipment, cylinders, linkage, and hoses.
   Check that there are no cracks, excessive wear, or play in the work equipment, cylinders, linkage, or hoses. If any problem is found, repair it.

2. Remove dirt and debris from around the engine, battery, and radiator.
   Check for dirt accumulated around the engine and radiator. Also check for flammable material (dry leaves, twigs, etc.) around the battery, engine muffler, turbocharger, or other high temperature engine parts. If any dirt or flammable materials are found, remove them.
   For the removal of dust and dirt accumulated on the radiator fins, see "CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS,FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS (PAGE 4-61)".

3. Check for coolant and oil leakage around the engine
   Check for oil leakage from the engine and coolant leaks from the cooling system. If any problem is found, repair it.

4. Check for leakage from fuel line.
   Check that there is no leakage of fuel or damage to the hoses and tubes. If any problem is found, carry out repairs.

5. Check for oil leakage from hydraulic equipment, hydraulic tank, hoses, and joints
   Check for oil leakage. If any problem is found, repair the area where oil is leaking.

6. Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers.
   If any problem is found, repair it.

7. Check for problems in handrails, steps, loose bolts.
   If any problem is found, repair it. Tighten any loose bolts.

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8. Check for problems in gauges and monitor
   Check that there is no problem in the gauges and monitor in the operator's cab. If any problem is found, replace the parts. Clean off any dirt on the surface.

9. Checking window for damage and displacement
   Check the window for any damage or displacement. If it is found broken or displaced, repair it. In particular, repairs must be made immediately, once stopping the machine, if the window is broken or displaced during operation. Do not attempt to continue to operate the machine without repair.

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

11. Check bucket with hook (if equipped) for damage.
    Check for damage to the hook, guide, and hook mount. If any problem is found, contact your Komatsu distributor for repairs.

12. Check, clean rear-view monitor
    Check that there is no problem with the rear-view monitor. If any problem is found, contact your Komatsu distributor and ask for repairs to be carried out.

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Checks Before Starting

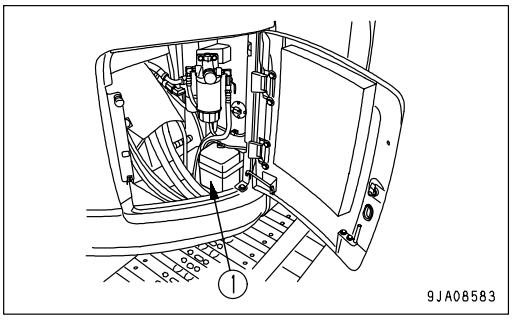
Always check the items in this section before starting the engine each day.

Check Coolant Level, Add Coolant

WARNING

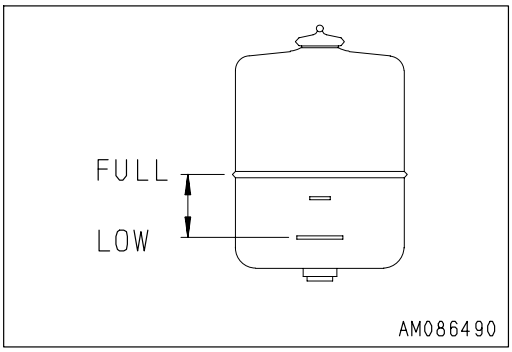
- **Do not open the radiator cap unless necessary. When checking the coolant, always wait for the engine to cool down and check the sub tank.**
- **Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to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

1. Open the engine hood on the machine and check that the coolant level is between the FULL and LOW marks on radiator sub-tank (1) (shown in the diagram on the right).
   If the water level is low, add water through the water filler of sub-tank (1) to the FULL level.
2. After adding coolant, tighten the cap securely.



NOTICE

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



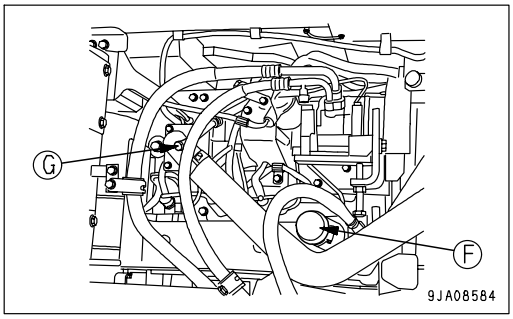
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Check Oil Level in Engine Oil Pan, Add Oil

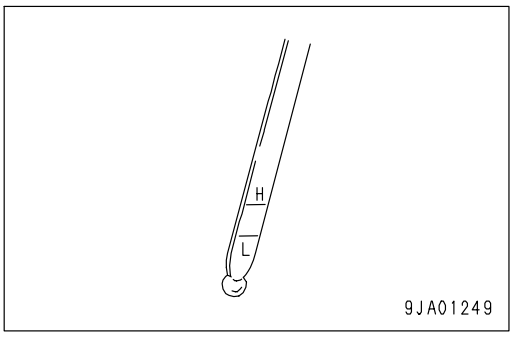
WARNING

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

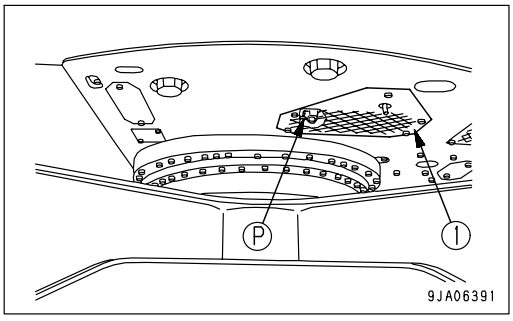
1. Open engine hood.
2. Remove dipstick (G) and wipe the oil off with a cloth.
3. Fully insert dipstick (G) into filler pipe (F), then remove it.



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



5. If the oil lever is above the H mark, remove undercover (1), drain the excess engine oil from drain valve (P), then check the oil level again.
6. If the oil level is correct, tighten the oil filler cap securely and close the engine hood.



REMARK

- If the machine is at an angle, reposition it to level before checking.
- When checking the oil level after the engine has been operated, allow the engine to cool for 15 minutes before checking.

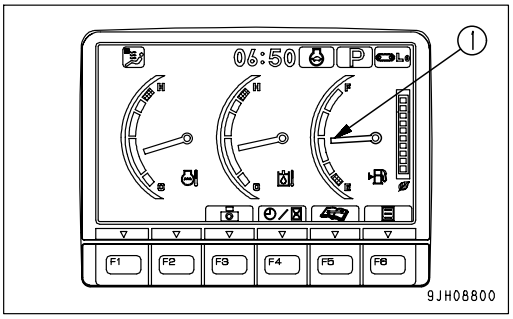
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Check Fuel Level, Add Fuel

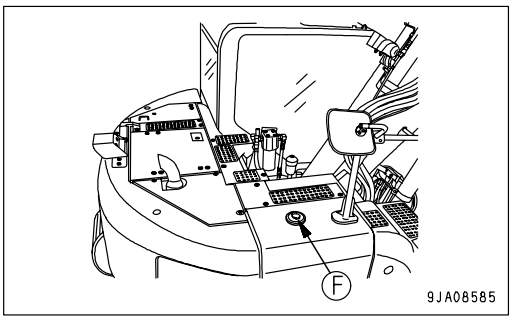
⚠ WARNING

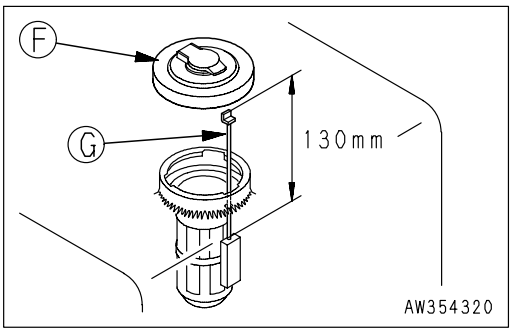
When adding fuel, never spill the fuel or let it overflow. It will cause fire.
If any fuel has spilled, wipe it up completely. If fuel has spilled over soil or sand, remove that soil or sand.
Fuel is highly flammable and dangerous. Never bring flames near fuel.

1. Turn the engine starting 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.

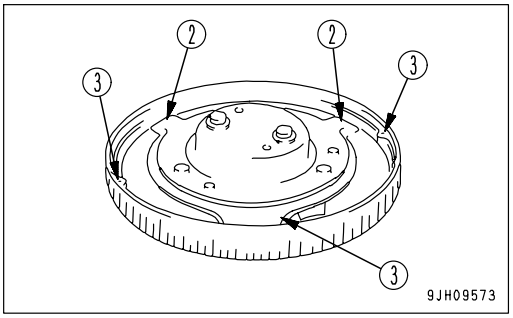


2. If fuel is found to be low, unscrew fuel filler cap (F) on the fuel tank and add fuel through the filler port until float gauge (G) comes up to the highest point.
   Specified fuel amount in fuel tank: 195 liters (51.52 US gal)
   Position of tip of float gauge (G) when tank is full: Approx. 130 mm (5.1 in) from top surface of fuel tank
3. After adding fuel, push float gauge (G) straight down with fuel filler cap (F). 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.



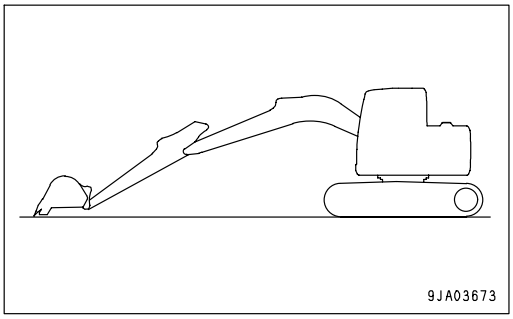
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Check Oil Level in Hydraulic Tank, Add Oil

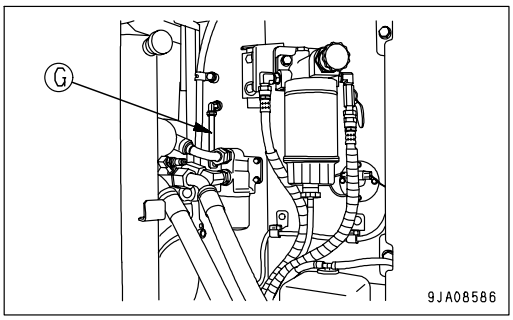
WARNING

- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.**

1. If the work equipment is not in the position 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.
2. Turn the starting switch to the ON position.
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.



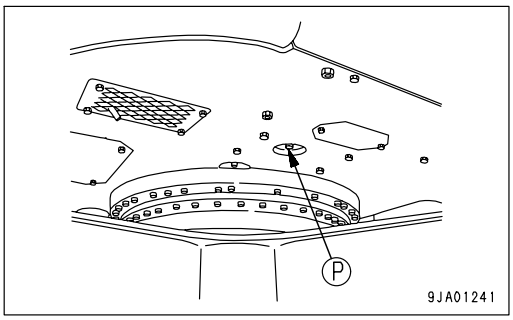
4. Open the door of the pump room on the right side of the machine, and check sight gauge (G). The oil level should be between the H and L lines.



NOTICE

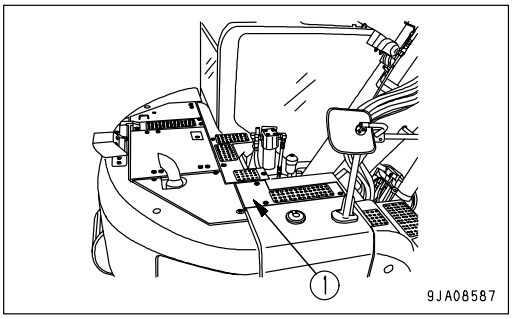
Do not add oil above the H line. This will damage the hydraulic circuit or cause the oil to spurt out.

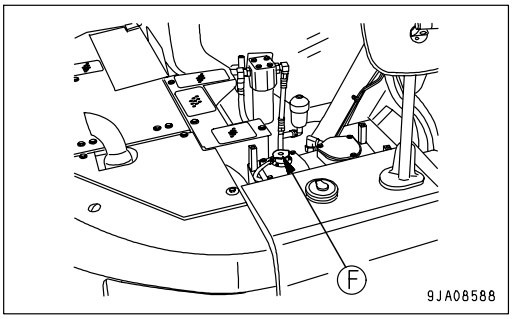
If oil has been added above the H level, stop the upper structure so that the drain plug (P) under the hydraulic tank will be between both tracks, and stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from drain plug (P).



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

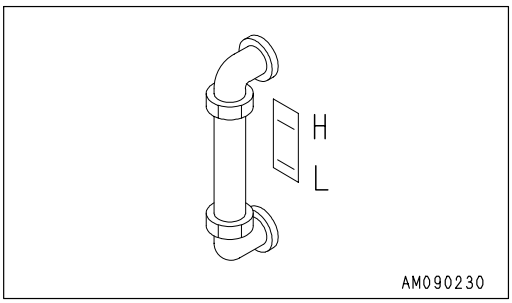




REMARK

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

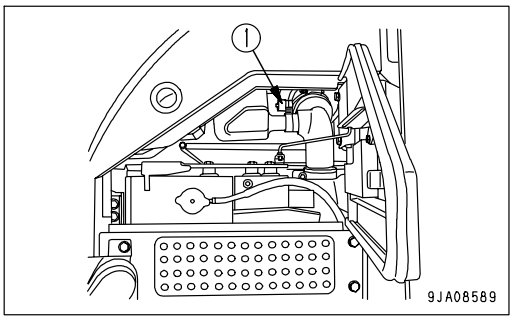
- Before starting operation: Between H and L levels (Oil temperature 10 to 30°C (50 to 86°F))
- Normal operation: Around H level (Oil temperature 50 to 80°C (122 to 176°F))

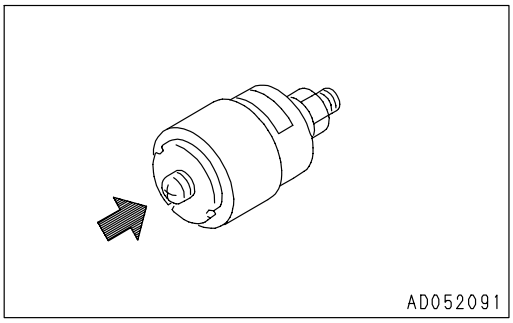


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Check Dust Indicator

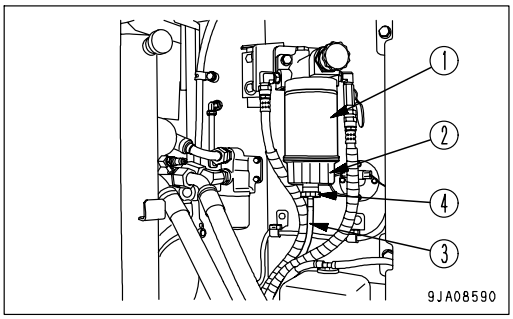
1. Open the cover at the rear of the cab and check that the red piston is not showing in the part of dust indicator (1) shown by the arrow.
2. If the red piston has appeared, clean or replace the element immediately.
   For details of the method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-17)".
3. After checking, cleaning, or replacing the air cleaner element, press the knob of dust indicator (1) to return the red piston to its original position.





Check for Water and Sediment in Water Separator, Drain Water

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



NOTICE

If the water inside transparent cap (2) freezes, check that the frozen water has melted completely, then use the procedure above to drain the water.

REMARK

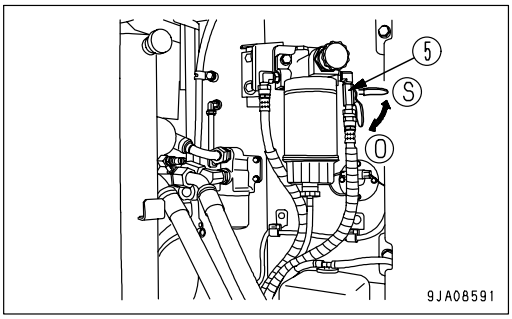
- If transparent cap (2) is dirty or it is difficult to see the inside, clean transparent cap (2) when replacing fuel pre-filter cartridge (1).
- When the drain valve (4) has been removed during the cleaning operation, coat the O-ring with grease and tighten until it contacts the bottom.

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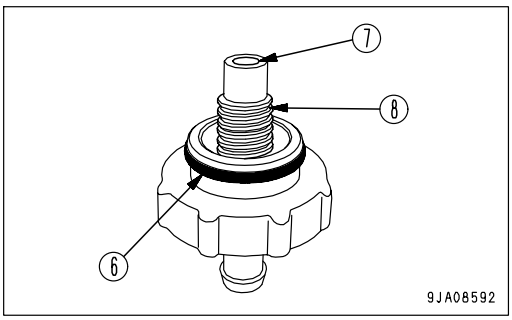
Adjustment of Drain Valve

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

1. Set valve (5) at the side of fuel pre-filter cartridge (1) to the shut position (S).
2. Set the container to catch the fuel under the pre-filter cartridge.
3. Loosen drain valve (4), then drain all the water and sediment in the transparent cap (2) and also the fuel accumulated in filter cartridge (1).
4. Check that nothing more comes out from drain hose (3), then remove drain valve (4).



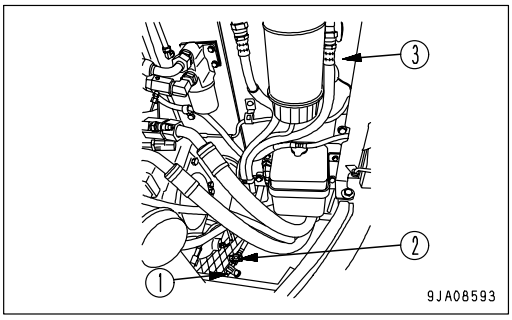
5. Coat O-ring portion (6) with a suitable amount of grease. When doing this, be careful not to let the grease get stuck to the drain valve water drain port (7) or drain valve thread (8).



6. Tighten drain valve (4) by hand until it contacts the bottom of transparent cap (2).
7. Remove the fuel container.
8. Set valve (5) to the Open position (O).

Drain Water And Sediment from Fuel Tank

1. Open the pump room door on the right side of the machine.
2. Set a container under drain hose (1) to catch the drained fuel.
3. Open fuel drain valve (2) at the rear of fuel tank (3) and drain the water and sediment accumulated at the bottom of the tank.
4. When only clean fuel comes out, close drain valve (2).
5. Close the pump room door on the right side of the machine.



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Check Electric Wiring

CAUTION

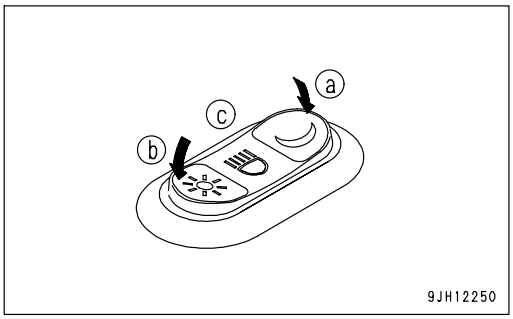
- **If fuses are frequently blown or if there are traces of short-circuiting on the electrical wiring, promptly ask your Komatsu distributor to locate the cause and make the repair.**
- **Keep the top surface of the battery clean and check the breather hole in the battery cap. If it is clogged with dirt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

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

Check Working Lamp Switch

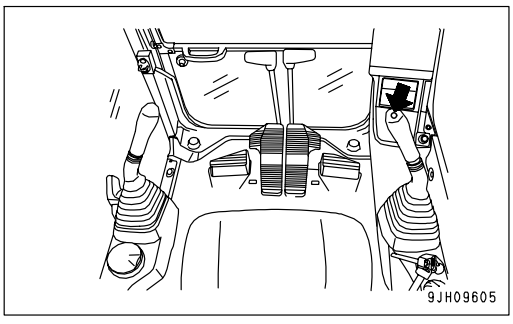
Check that the working lamps and lamps inside the instruments light up properly. Check also that there is no dirt or damage.
If any lamp does not light up, the bulb is probably blown up or there is a disconnection, so ask your Komatsu distributor to carry out repairs.

1. Turn the starting switch to the ON position.
2. Turn the lamp switch ON (night mode (a), and day mode (b)) and check that the working lamp lights up.



Check Function of Horn

1. Turn the key in the starting switch to the ON position.
2. Confirm that the horn sounds immediately when the horn button is pressed.
   If the horn does not sound, contact your Komatsu distributor for repair.



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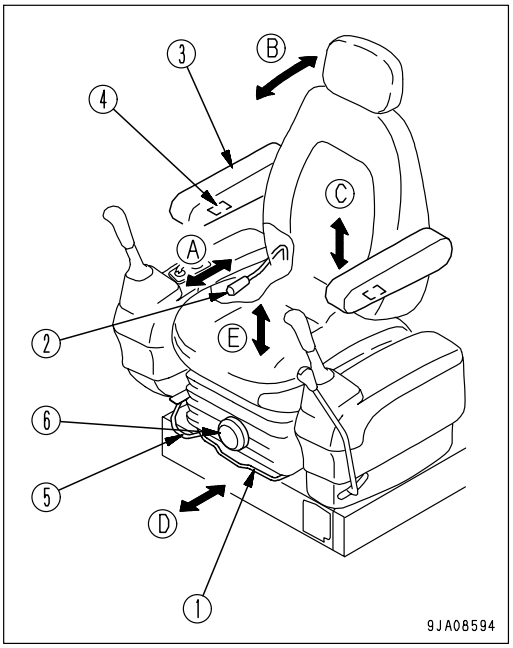
Adjustment

WARNING

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

Seat Adjustment

(A) Fore-and-aft adjustment
Pull up lever (1). After the seat is set to the desired position, release the lever.
Adjustable distance:100 mm (3.3 in) in 10 steps



(B) Adjusting reclining

REMARK
The seat can be reclined more when the seat is pushed to the front. The amount of reclining decreases as the seat is pushed back, so when moving the seat back, return the seatback to the upright position.

Pull up lever (2) and set the backrest to a position that is comfortable for operation, then release the lever.
Sit with your back against the seat backrest when adjusting. If your back is not against the backrest, the backrest may suddenly move forward.

(C) Adjusting armrest angle
Armrest (3) can be made to spring up by hand approx. 90°.
In addition, by turning the dial (4) at bottom of armrest by hand it is possible to make fine vertical adjustment of the armrest angle.
Armrest adjustment angle: 25°.

REMARK
If the seat back is tipped to the front without raising the armrest (3), the armrest will rise automatically.

(D) Overall fore-and-aft adjustment of seat
Move lever (5) to right. After the seat is set to the desired position, release the lever (5). In this case, the operator's seat, left and right control levers, and lock lever all slide together.
Amount of adjustment: 120 mm (12 stages)

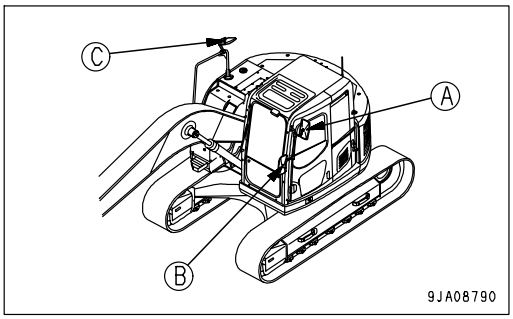
(E) Adjusting suspension
(Suspension seat)
Adjust the weight adjusting dial to your own weight by turning knob (6) under the operator's seat.
The weight can be adjusted to 50 to 120 kg (110 to 265 lb).
If you want to make the seat softer, turn the weight adjustment to a lower weight; if you want to make the seat harder, adjust to a higher weight. When operating on uneven surfaces, adjust the seat to a harder setting.

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Rearview Mirrors

WARNING

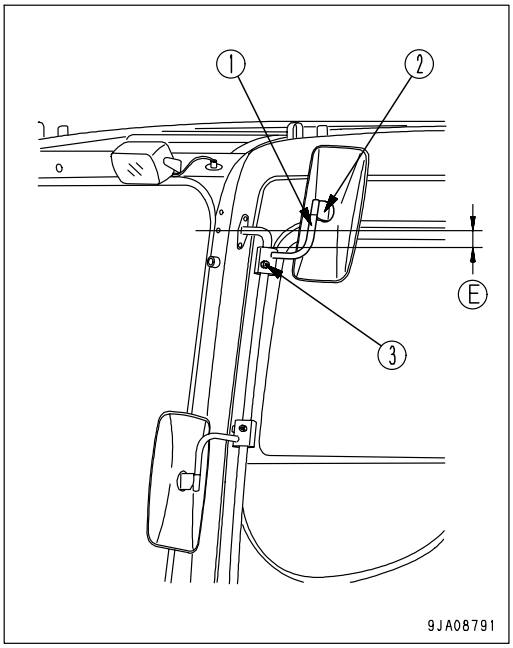
Be sure to adjust the mirrors before starting work. If they are not adjusted properly, you cannot secure the visibility and may be injured or may injure someone seriously.



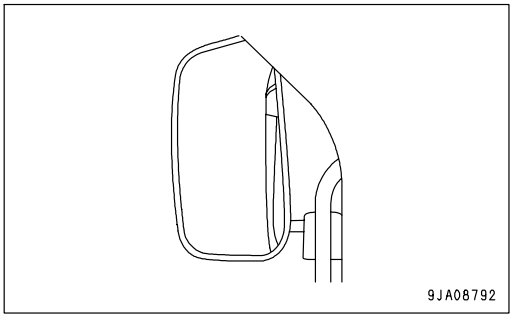
Mirror (A)

Adjust the mirror mount so that it is possible to see people at the rear left of the machine.

- Install the side view mirror in the location indicated in the figure at right.
  (E): 42.5 mm (1.7 in)
- Fix mirror securing stay (1) the way the side view mirror stretches outward to the maximum.
- If the side view mirror does not move smoothly when adjusting its angle, loosen mirror securing bolt (2) and mirror securing stay bolt (3).
  Tightening torque of bolt (2): 15.7 - 19.6 Nm
  (1.6 - 2.0 kgm, 11.6 - 14.5 lbft)



- When adjusting the side view mirror angle, make an adjustment so that the side of the machine comes into view on the mirror as shown in the figure at right.

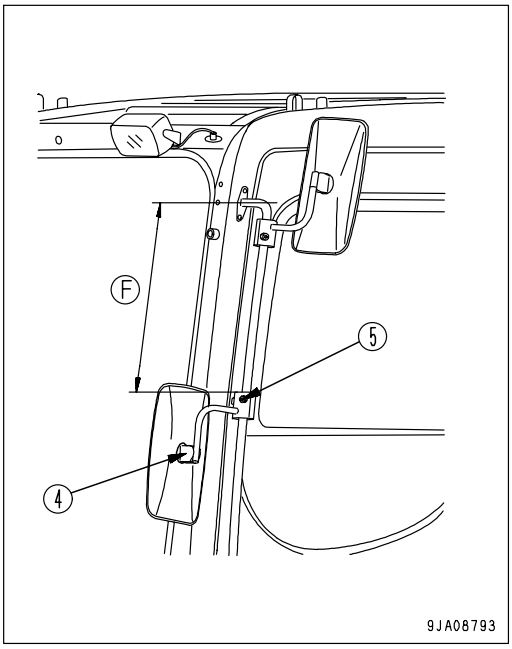


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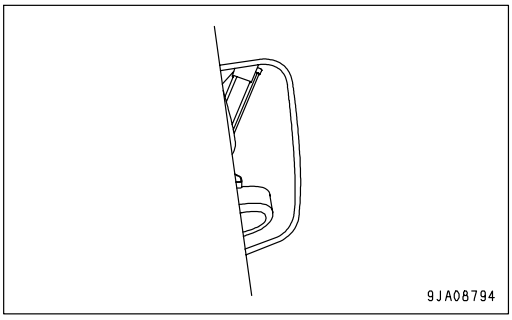
Mirror (B)

When installing the mirror, adjust so that people standing at the front right edge of the machine can be seen.

- Install the side view mirror in the location indicated in the figure at right.
  (F): 454 mm (17.9 in)
- If the side view mirror does not move smoothly when adjusting its angle, loosen mirror securing bolt (4) and mirror securing stay bolt (5).
  Tightening torque of bolt (4): 15.7 - 19.6 Nm
  (1.6 - 2.0 kgm, 11.6 - 14.5 lbft)



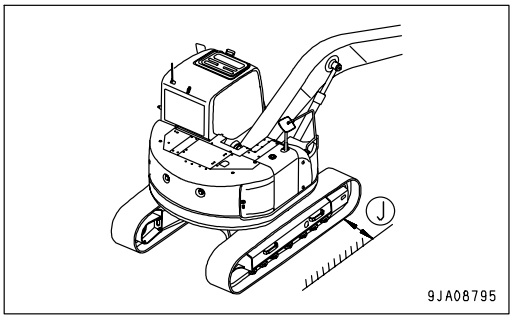
- When adjusting, set so that the front right portion of the machine appears in the mirror as shown in the diagram on the right.



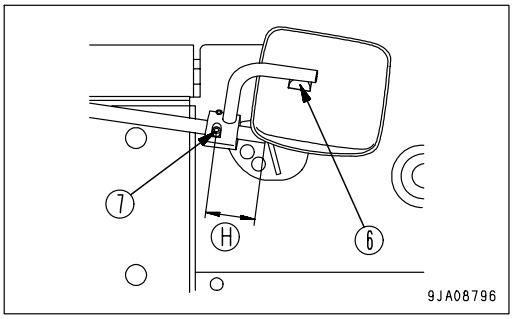
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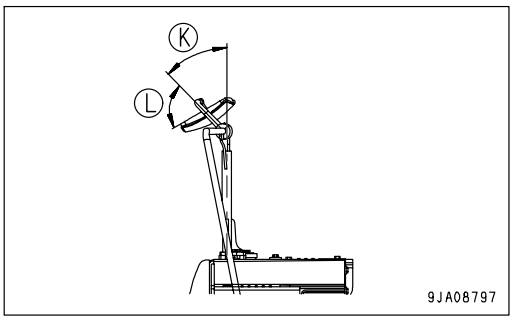
Mirrors (C)

When adjusting the mirror, adjust so that people standing within an area of 1 m around the machine can be seen from the operator's seat.
(J):1 m (3 ft 3 in)



- When installing the mirrors, install in the position shown in the diagram on the right.
  (H): 95 mm (3.7 in)
  (K): 45°
  (L): 75°
- When adjusting mirror (C), if the movement is stiff, loosen mirror bolt (6) and stay mounting bolt (7) before adjusting.
  Tightening torque of bolt (6): 15.7 - 19.6 Nm
  (1.6 - 2.0 kgm, 11.6 - 14.5 lbft)

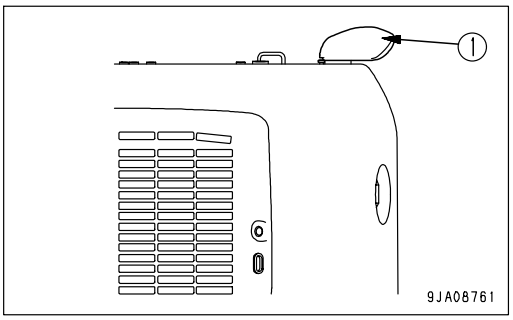


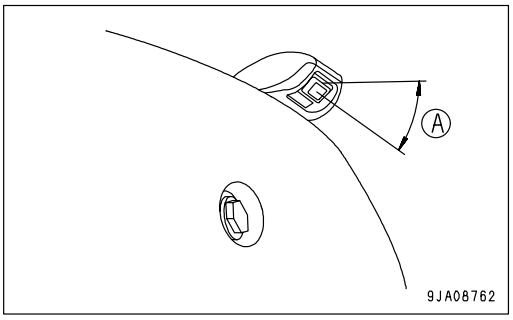


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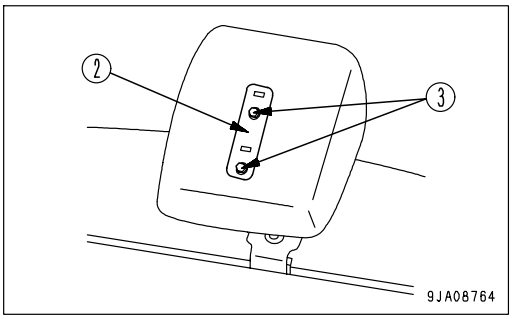
Adjusting Angle of Rear View Camera

If the image on the monitor is not aligned correctly, remove cover (1) and adjust the mounting angle (A) of the rear view camera.
Amount of adjustment of angle (A): Within a range of 35°-80°



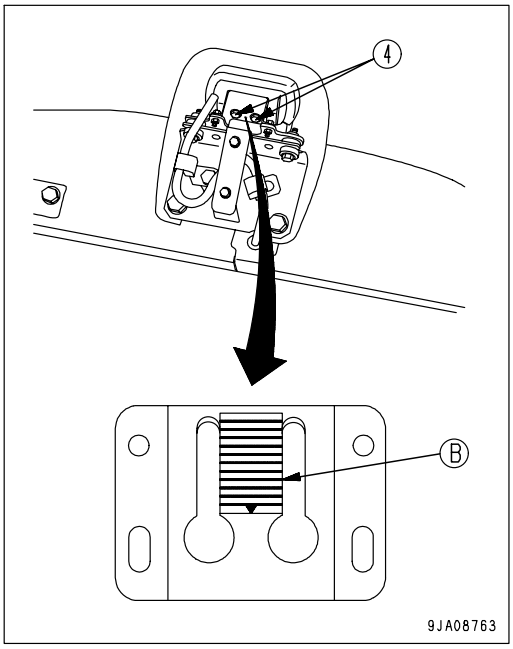


1. When removing cover (1), insert a flat-headed screwdriver into the hole of cover (2), push the tooth on the inside, and remove the cover.
2. Remove 2 bolts (3).
3. Remove cover (1).



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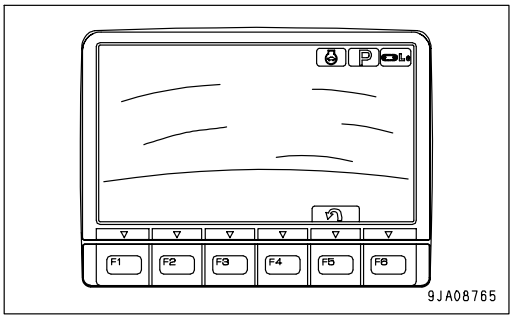
4. Loosen mounting bolt (4) of the camera and adjust mounting angle (A) of the camera so that the center line of mounting bolt (4) is aligned with fourth-from-bottom scale (B).



REMARK
Part of the machine is shown on the monitor screen.

5. After adjusting, tighten bolt (4).

   Tightening torque: 3-5 Nm (0.3-0.5 kgm, 2.2-3.6 lbft)



6. Install covers (1) and (2).

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Wind-in Type Seat Belt

WARNING

- **Before fitting the seat belt, check that there is no problem in the belt mount bracket or mounting belt. If it is worn or damaged, replace the seat belt.**
- **Even if no problem can be seen in the belt, replace the seat belt every 3 years. The date of manufacture of the belt is shown on the back of the belt.**
- **Always wear the seat belt during operation.**
- **Fit the seat belt so that it is not twisted.**

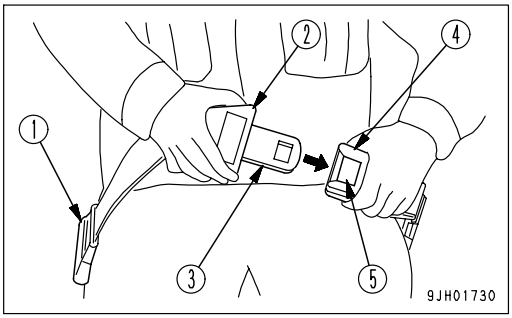
Fastening and Removing Seat Belt

This seat belt has a wind-in device, so it is not necessary to adjust the length.

Fastening seat belt

Hold grip (2) and pull the belt out from wind-in device (1), check that the belt is not twisted, then insert tongue (3) into buckle (4) securely.

When doing this, pull the belt lightly to check that it is properly locked.



Removing belt

Press button (5) in buckle (4), and remove tongue (3) from buckle (4).

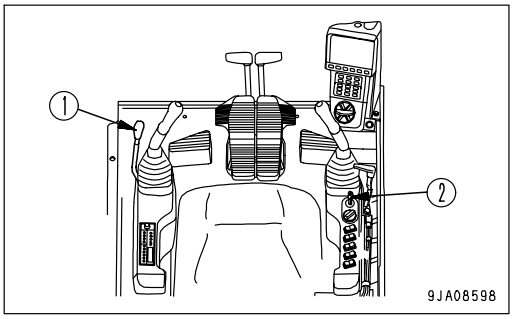
The belt is automatically wound in, so hold grip (2) and return the belt slowly to wind-in device (1).

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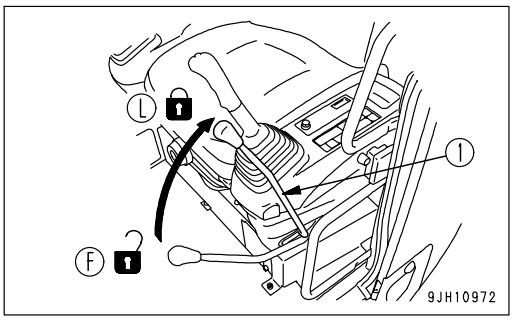
Operations Before Starting Engine

WARNING

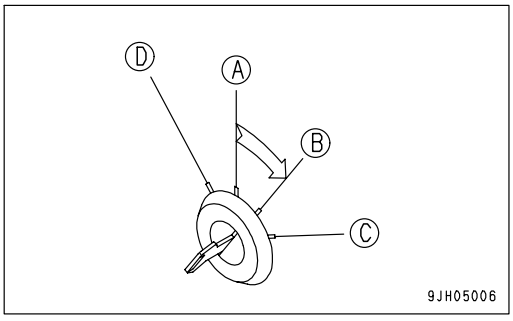
When starting the engine, check that the lock lever is securely at the LOCK position.
If the lock lever is not locked securely and the control levers or control pedal are touched when the engine is started, the machine may move unexpectedly, and this may lead to serious personal injury.



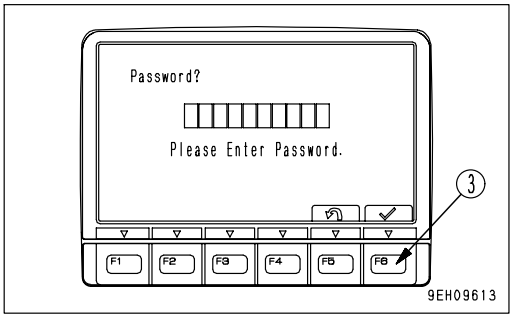
1. Check that lock lever (1) is at the LOCK position (L).
2. Check that each control lever and control pedal is at the Neutral position.
   If the control levers and control pedal are not being touched, they will be at the Neutral position.



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



- If a password has been set, the input display screen will be displayed on the monitor screen.
  After inputting the password, press Enter switch F6 (3).

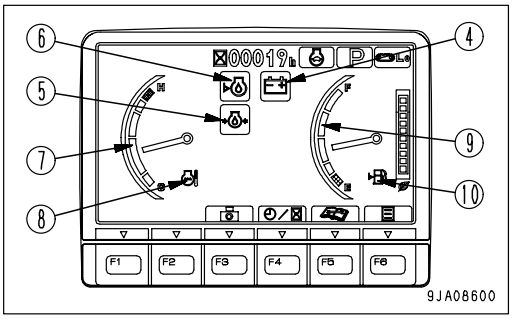


REMARK
For details of the method of setting, changing, or canceling the password, see separate "PROCEDURE FOR SETTING, CHANGING, OR CANCELING PASSWORD".

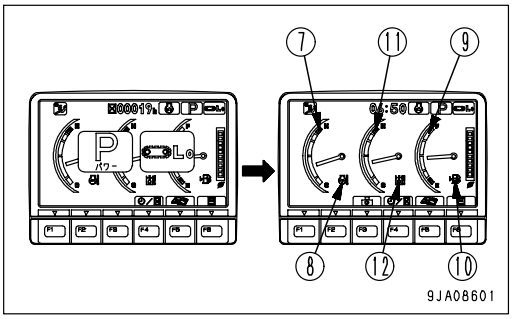
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1) The buzzer sounds for approx. 2 seconds, then the monitor or meter lights up for approx. 2 seconds.
   - Charge level monitor (4)
   - Engine oil pressure monitor (5)
   - Engine oil level monitor (6)
   - Engine coolant temperature gauge (7)

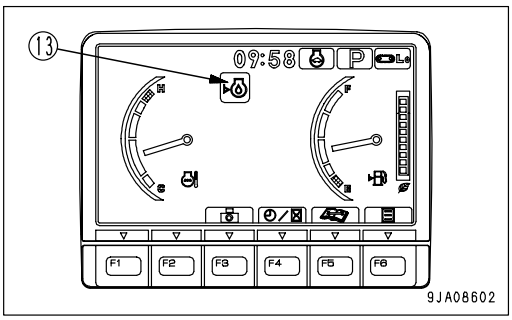
   If any monitor does not light up or the buzzer does not sound, there is probably a failure in the monitor, so please contact your Komatsu distributor for repairs.



2) After approx. 2 seconds, the screen will change to the working mode/travel speed display monitor. Next, it will switch to the standard screen.
   - Engine coolant temperature gauge (7)
   - Engine coolant temperature monitor (8)
   - Fuel gauge (9)
   - Fuel level monitor (10)
   - Hydraulic oil temperature gauge (11)
   - Hydraulic oil temperature monitor (12)

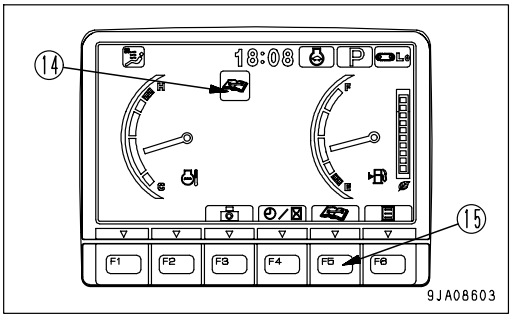


3) If the hydraulic oil temperature gauge is out or caution lamp (13) stays lighted up red, immediately check the item that lights up red.



4) If the maintenance interval has passed, maintenance interval monitor (14) lights up for 30 seconds. Press maintenance switch F5 (15), check the item, and carry out maintenance immediately.

   For details of the method of checking the maintenance interval, see "Maintenance Selector Switch (PAGE 3-38)" in the explanation for each component.



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STARTING ENGINE

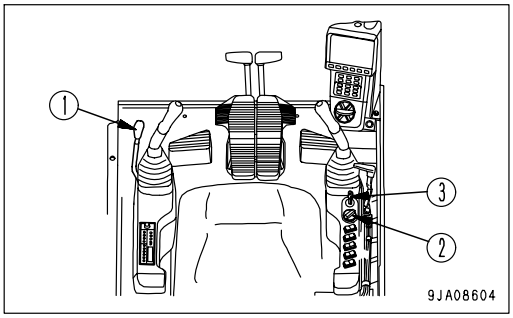
Normal Starting

WARNING

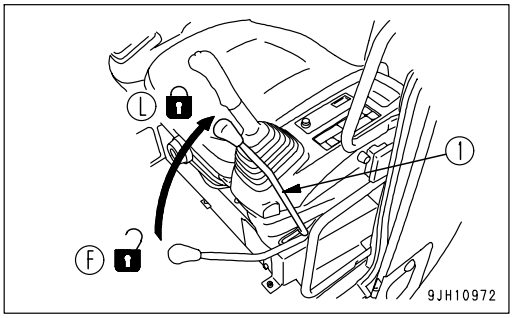
- **Sit down in the operator's seat before starting the engine.**
- **Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause serious bodily injury or fire.**
- **Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.**
- **Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.**

NOTICE

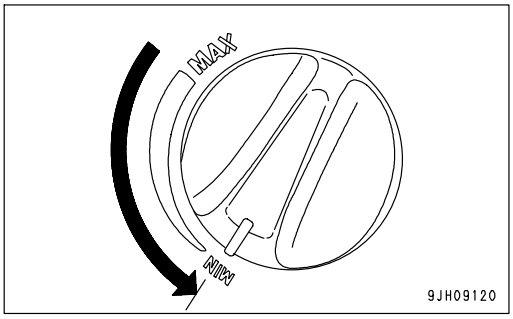
- **Do not try to start the engine with the fuel adjustment dial set near the full engine rotation. Otherwise the engine parts may be damaged.**
- **Do not keep the starting motor rotating continuously for more than 20 seconds.**
  If the engine will not start, wait for at least 2 minutes before trying to start the engine again.



1. Check the lock lever (1) is in the LOCK position (L). If the lock lever is in the FREE position (F), the engine does not start.

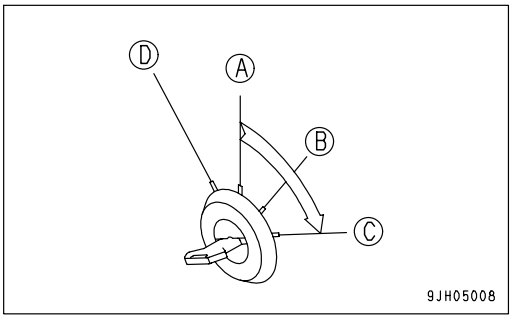


2. Set fuel control dial (2) at the low idle position.

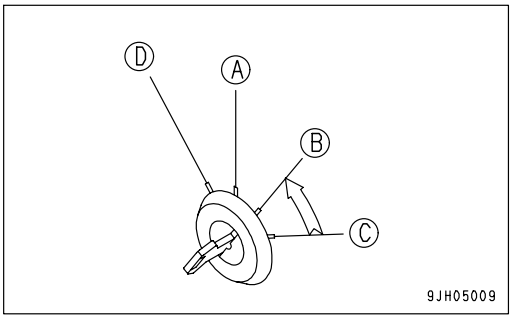


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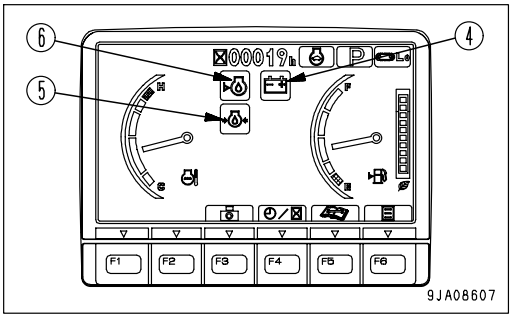
3. Turn the key in starting switch (3) to START position (C). The engine will start.



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



5. Keep the engine idle for the initial 15 seconds right after it has been started, and do not operate any control lever or the fuel adjustment dial during that time.
6. Check that battery charge monitor (4), engine oil pressure monitor (5), and engine oil level monitor (6) are off.



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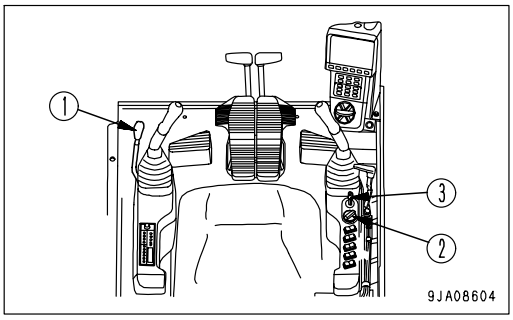
Starting Engine in Cold Weather

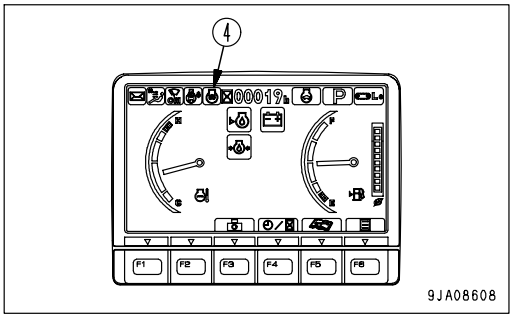
WARNING

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

NOTICE

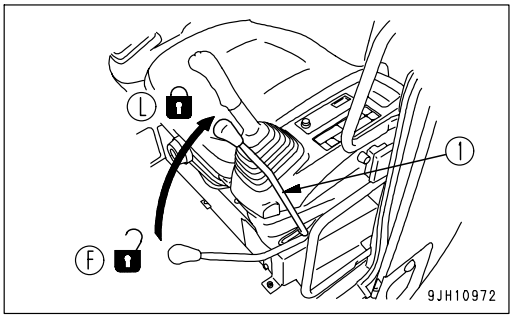
- **Do not try to start the engine with the fuel adjustment dial set near the full engine rotation. Otherwise the engine parts may be damaged.**
- **Do not keep the starting motor rotating continuously for more than 20 seconds.**
  If the engine fails to start, wait for about 2 minutes and repeat from Step 4.





When starting in low temperatures, do as follows.

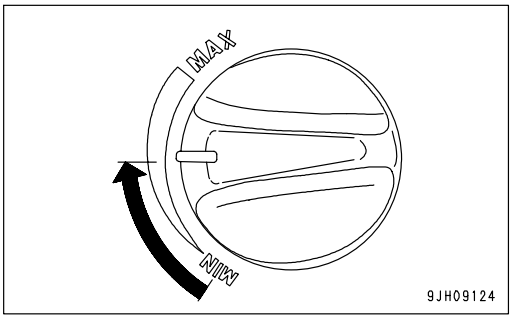
1. Check the lock lever (1) is in the LOCK position (L). If the lock lever is in the FREE position (F), the engine does not start.



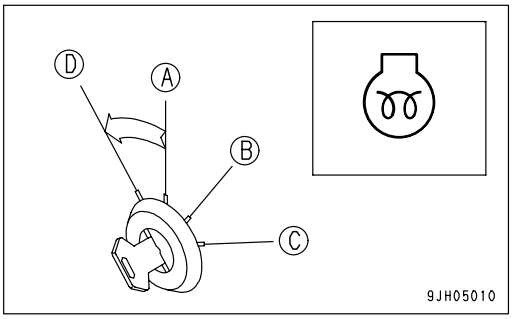
2. Before starting the engine, check that fuel control dial (2) is at the low position.

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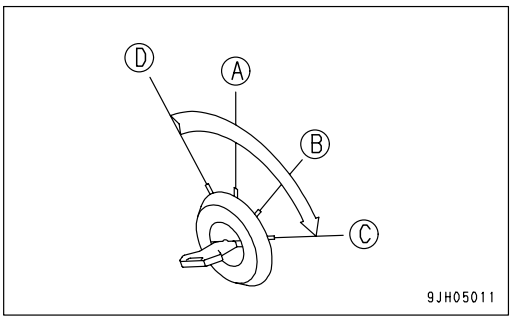
3. Turn fuel control dial (2) to the center position between LOW IDLE and HIGH IDLE.



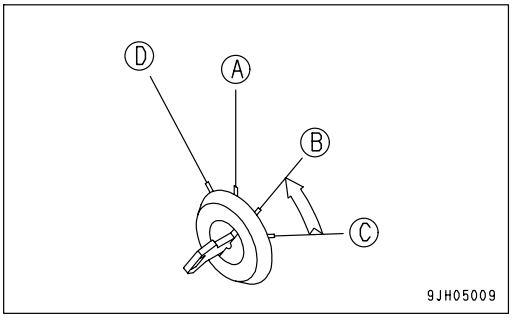
4. Hold the key in starting switch (3) at HEAT position (D) and check that preheating monitor (4) lights up.
   After approx. 30 seconds, preheating monitor (4) will flash for 10 seconds to inform the operator that the preheating has been completed.



5. When engine pre-heating monitor (4) goes off, turn the key in stating switch (3) to the START position (C) to start the engine.



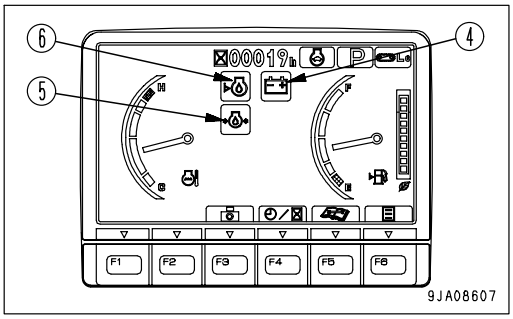
6. When the engine starts, release the key in starting switch (3). The key will automatically return to ON position (B).



7. Keep the engine idle for the initial 15 seconds right after it has been started, and do not operate any control lever or the fuel adjustment dial during that time.

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8. Check that battery charge monitor (4), engine oil pressure monitor (5), and engine oil level monitor (6) are off.



Turbo protect function

The turbo protect function is a function to protect the turbocharger by keeping the engine speed at less than 1100 rpm immediately after the engine is started.

- When the turbo protect function is actuated, the engine speed is held at less than 1100 rpm, regardless of the position of the fuel control dial.
- When the turbo protect function is actuated, the engine speed is held at less than 1100 rpm, even if the fuel control dial is operated.
- 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.

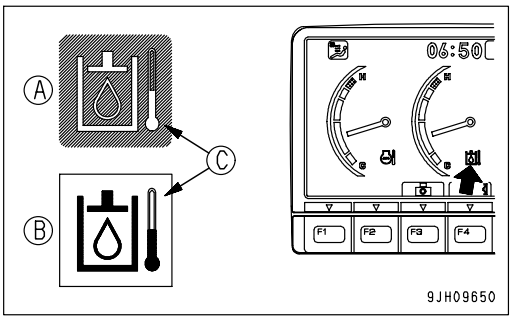
Coolant temperature	Turbo protect time (sec.)
Above 10˚C (50˚F)	0
10 to -30˚C (50 to -22˚F)	Change 0 to 20
below -30˚C (22˚F)	20

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AFTER STARTING ENGINE

WARNING

- **To stop the engine in emergencies or when the actuation of the engine is abnormal or there is any other trouble, turn the key in the starting switch to the OFF position.**
- **Do not carry out operations or operate the levers or pedal suddenly while the hydraulic oil is at low temperature. Always carry out the warm-up operation for the hydraulic equipment until the hydraulic oil temperature monitor displays the correct temperature.**
  (When the hydraulic oil temperature is low, the low temperature display shown on the right is given.
  (A) Display when temperature is correct: Monitor background (C) is blue
  (B) Display when temperature is low: Monitor background (C) is white)
- **If the warm-up operation for the hydraulic equipment is not carried out thoroughly, and the machine is moved, the reaction of the control levers and pedals will be slow and the movement may not be what the operator intended. Always warm up the hydraulic equipment. In particular, in cold areas, always warm up the hydraulic equipment thoroughly.**



There are two types of warm-up operation: warm up the engine and warm up the hydraulic equipment. In addition, depending on the environment, the method of carrying out the warm-up operation may differ, so carry out the warm-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 warm-up operation for the hydraulic equipment separately from the warm-up operation for the engine. Warm up the hydraulic equipment thoroughly ensures that the hydraulic oil is warmed up and that warm hydraulic oil circulates in all the control circuits.)

Checking of Engine Startability and Noise

When starting the engine, check that the engine causes no abnormal noise and that it starts up easily and smoothly. Check also that there is no abnormal noise when the engine is idling or when the revolution rises slightly.

- When there is an abnormal noise at the engine startup and if that condition continues, the engine may be damaged. In that case, ask your Komatsu distributor to check the engine as soon as possible.

Checking of Engine Acceleration and Deceleration

When stopping the machine during the operation, check that there is no irregular engine revolution or that the engine does not stop suddenly.
Check also that the engine speed rises smoothly when the fuel control dial is turned to the full (Max).

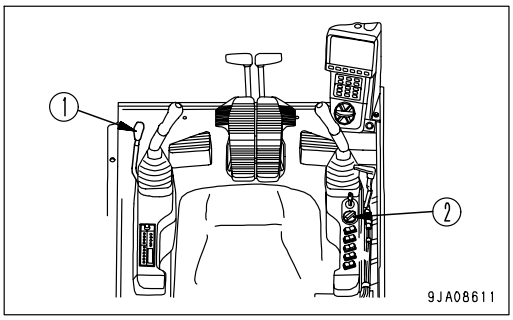
- Carry out these checks in a safe place, watching out for danger in the surroundings.
- When the engine performs very badly at low idling and in the acceleration and if that condition continues, the engine may be damaged or confuse the operator's sense of driving or lower the braking efficiency, and as a result lead to an unexpected accident. In that case, ask your Komatsu distributor to check the engine as soon as possible.

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Engine Warm Up

NOTICE

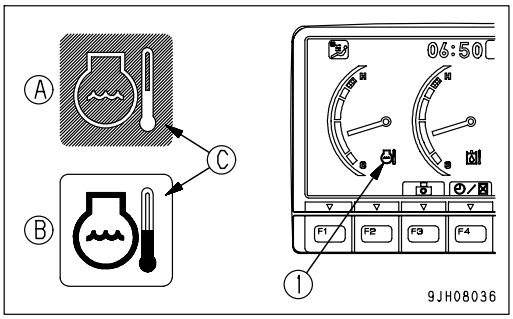
- **Do not accelerate the engine suddenly until the warm-up operation has been completed.**
- **Do not run the engine at low idling or high idling under no load for more than 20 minutes. This will have an adverse effect on the environment, and will also have an adverse effect on the internal structure 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.**



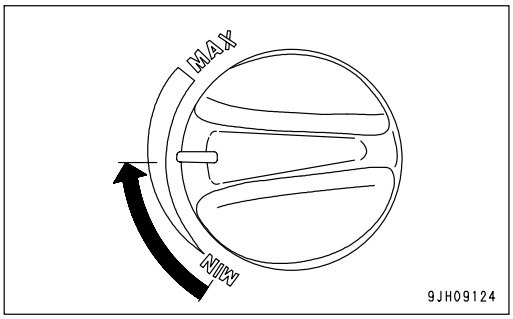
After the engine starts, do not start operating the machine immediately. First, carry out the following operations and checks.

1. This machine is equipped with an automatic engine warm-up system, so if the engine water temperature is below 30 °C after the engine is started, the engine warm-up operation starts automatically. When the engine automatic warm-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 or if the warm-up operation has been continued for more than 10 minutes, the automatic warm-up operation is cancelled and the engine speed drops to the normal low idling speed.

2. Check that engine coolant temperature monitor (1) displays the correct temperature.
   If it displays low temperature, use the procedure in Step 3 to carry out additional warm up of the engine until the monitor displays the correct temperature.
   (A) Display when temperature is correct: Monitor background (C) is blue
   (B) Display when temperature is low: Monitor background (C) is white

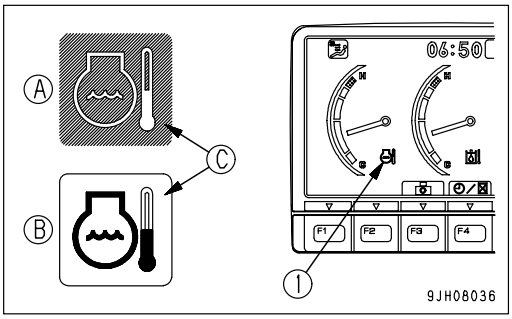


3. Turn fuel control dial (2) to a point midway between low idling (MIN) and full speed (MAX), run the engine under no load at a mid-range speed until engine coolant temperature monitor (1) displays the correct temperature.



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(A) Display when temperature is correct: Monitor background (C) is blue
(B) Display when temperature is low: Monitor background (C) is white



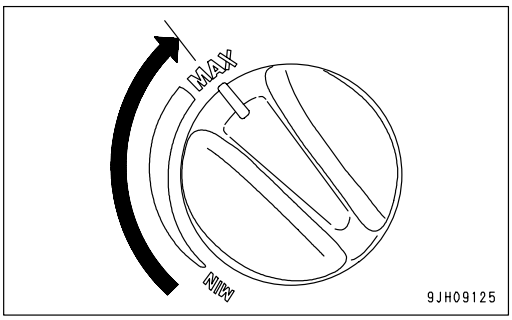
If the engine coolant temperature monitor displays the correct temperature, the engine warm-up operation is completed.
After checking that the engine coolant temperature monitor displays the correct temperature, carry out the warm-up operation for the hydraulic equipment.

NOTICE

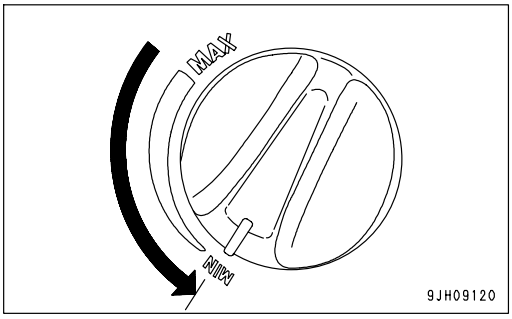
Canceling automatic warm-up operation

If it becomes necessary in an emergency to cancel the automatic warm-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.

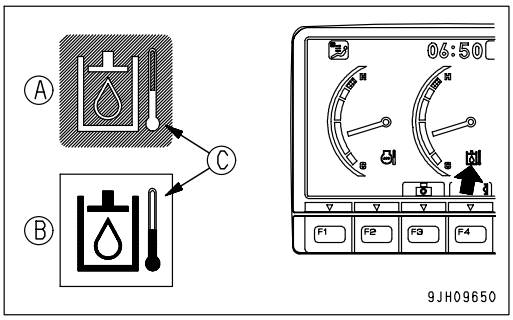


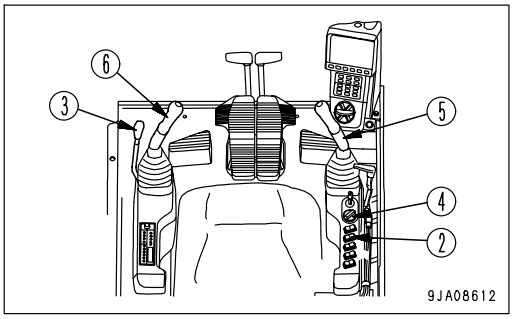
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Hydraulic Equipment Warm Up

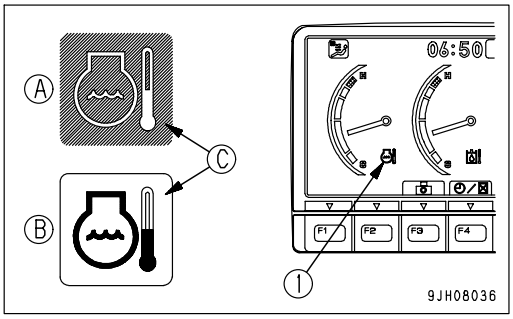
WARNING

- **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 that 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 the correct temperature. (When the hydraulic oil temperature is low, the low temperature display shown in the diagram on the right is given.**
  (A) Display when temperature is correct: Monitor background (C) is blue
  (B) Display when temperature is low: Monitor background (C) is white)
- **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 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 all directions for all the work equipment (boom, arm, bucket), swing, travel, and attachment (if equipped).**



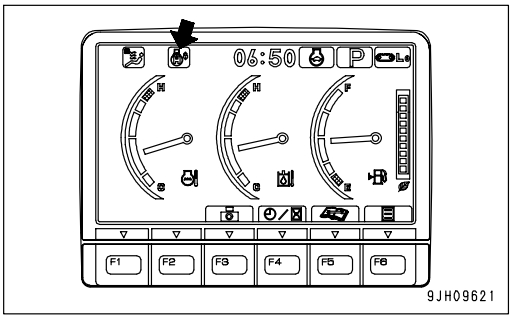


1. Check that engine coolant temperature monitor (1) displays the correct temperature.
   (A) Display when temperature is correct: Monitor background (C) is blue
   (B) Display when temperature is low: Monitor background (C) is white
   If it displays low temperature, carry out additional warm up of the engine until engine coolant temperature monitor (1) displays the correct temperature.
   For details of the procedure, see "Engine Warm Up (PAGE 3-139)".

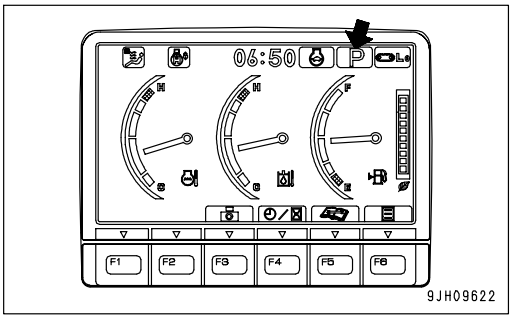


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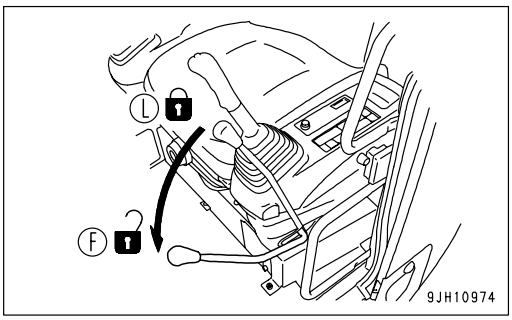
2. Turn swing lock switch (2) ON and check that the swing lock monitor lights up.



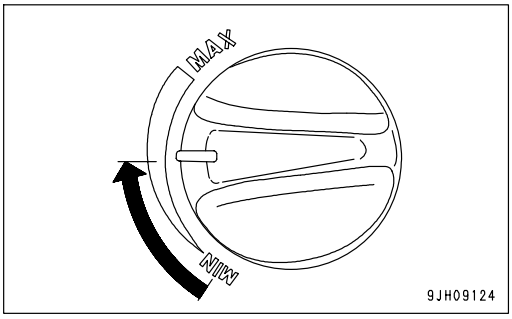
3. To complete the warm-up operation of the hydraulic equipment more quickly, set the working mode to P mode (heavy-duty mode).
   For details of the procedure for setting the working mode, see "Working Mode Selector Switch (PAGE 3-25)".



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



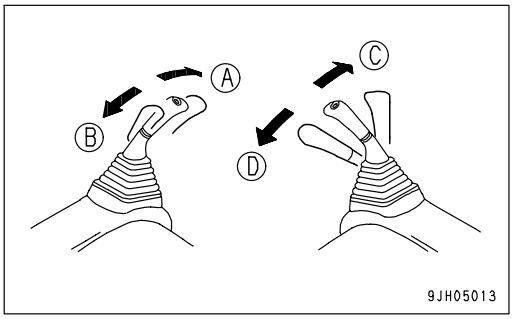
5. Turn fuel control dial (4) to a point midway between low idling (MIN) and full speed (MAX).



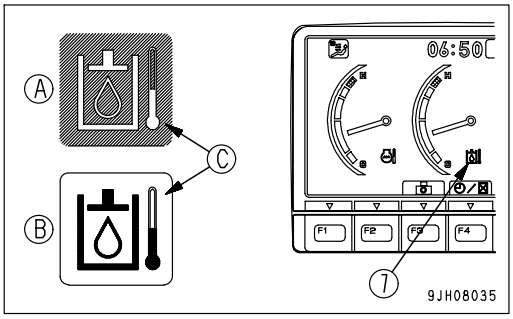
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NOTICE

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

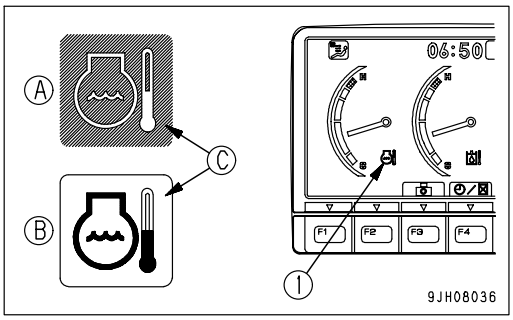


6. Move right work equipment control lever (5) slowly in the direction to pull in the bucket (D). Operate the lever to the end of its travel and hold it in position for 30 seconds.
7. Move right work equipment control lever (5) slowly in the direction to push out the bucket (C). Operate the lever to the end of its travel and hold it in position for 30 seconds.
8. Next, move left work equipment control lever (6) slowly in the direction 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 (6) slowly in the direction to push out the arm (A). 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 5 minutes.



11. Check that hydraulic oil temperature monitor (7) is displaying the correct temperature.
    If the hydraulic oil temperature monitor is not displaying the correct temperature (it is displaying low temperature), repeat Steps 6 to 10 until the display is the correct temperature.

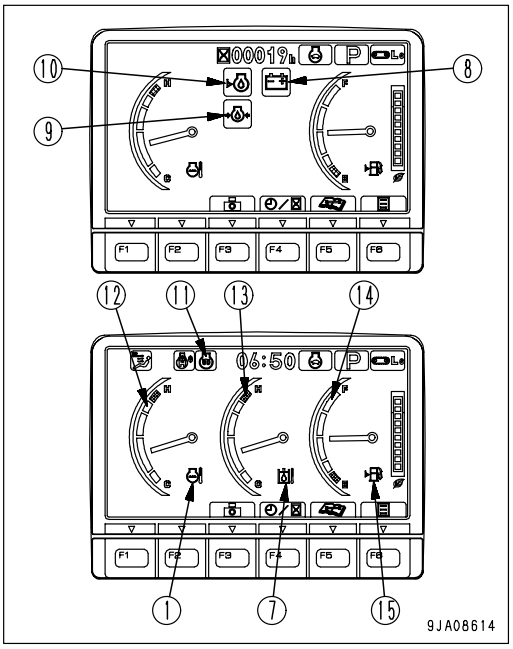
    (A) Display when temperature is correct: Monitor background (C) is blue
    (B) Display when temperature is low: Monitor background (C) is white



12. Check that engine coolant temperature monitor (1) displays the correct temperature.
    (A) Display when temperature is correct: Monitor background (C) is blue
    (B) Display when temperature is low: Monitor background (C) is white
    If it displays low temperature, carry out additional warm up of the engine until engine coolant temperature monitor (1) displays the correct temperature.
    For details of the procedure, see "Engine Warm Up (PAGE 3-139)".

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13. Check that the hydraulic oil temperature monitor and engine coolant temperature monitor are displaying the correct temperature, then check that all the gauges and caution monitors on the machine monitor are in the following status.
    - Engine coolant temperature monitor (1): Displays correct temperature
    - Hydraulic oil temperature monitor (7): Displays correct temperature
    - Charge level monitor (8): OFF
    - Engine oil pressure monitor (9): ON
    - Engine oil level monitor (10): OFF
    - Engine pre-heating monitor (11): OFF
    - Engine coolant temperature gauge (12): Indicator in green range
    - Hydraulic oil temperature gauge (13): Indicator in green range
    - Fuel gauge (14): Indicator in green range
    - Fuel level monitor (15): Displays appropriate level

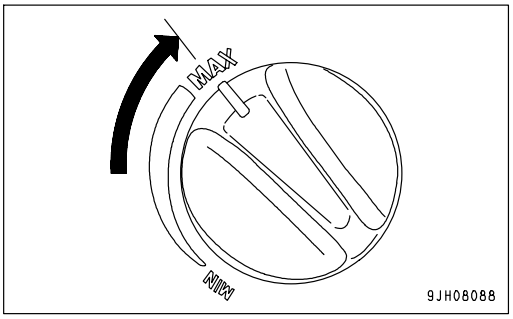


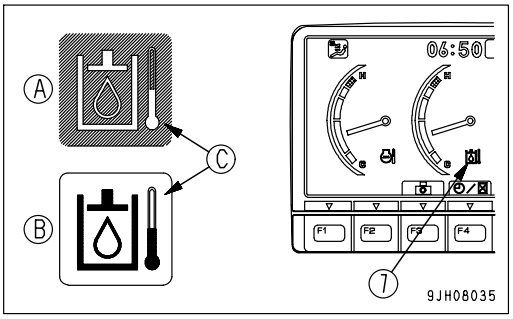
14. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.

In cold temperatures (ambient temperature below 0 °C (32 °F)), even when the hydraulic oil temperature monitor displays the correct temperature, 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 3 to 5 minutes, then check again that the hydraulic oil temperature monitor is displaying the correct temperature.
    If it is not displaying the correct temperature, repeat Steps 6 to 9 for 3 to 5 minutes until hydraulic oil temperature monitor (7) displays the correct temperature.

    (A) Display when temperature is correct: Monitor background (C) is blue
    (B) Display when temperature is low: Monitor background (C) is white

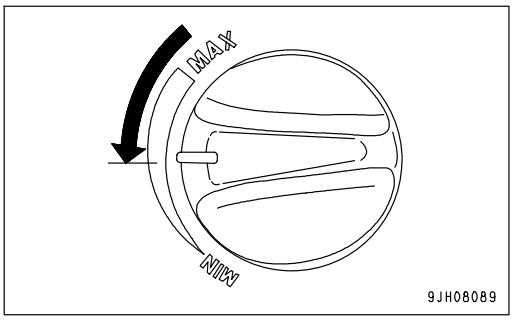




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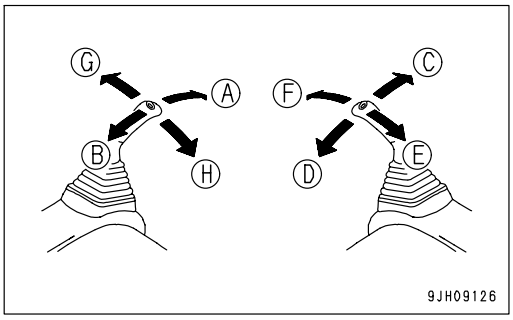
For both normal temperatures and cold temperatures, carry out the following operation.

16. Check that 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.



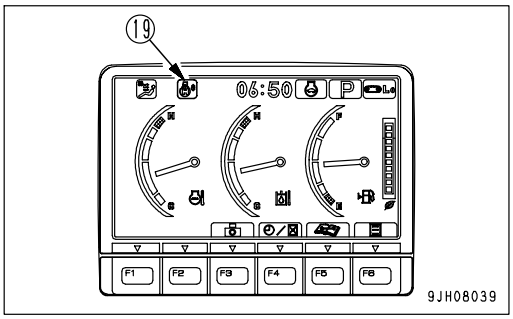
17. Before starting operations, repeat the following operations slowly 3 to 5 times to circulate warm oil through the control circuits.

    - Boom operation RAISE (E) ←→ LOWER (F)
    - Arm operation IN (B) ←→ OUT (A)
    - Bucket operation CURL (D) ←→ DUMP (C)

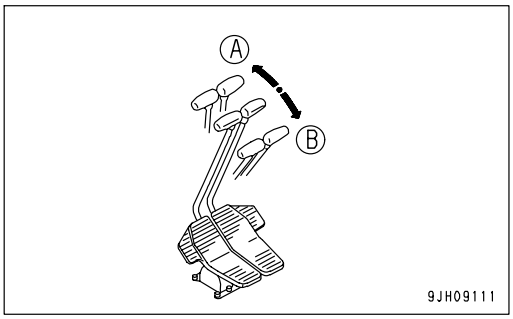


    When carrying out swing operations, release swing lock switch (2), check that swing lock monitor (19) goes out, then operate the swing.

    - Swing operation Left (G) ←→ Right (H)

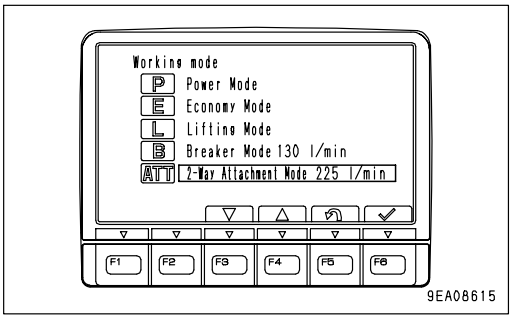


- Travel (Lo) operation FORWARD (A) ←→ REVERSE (B)

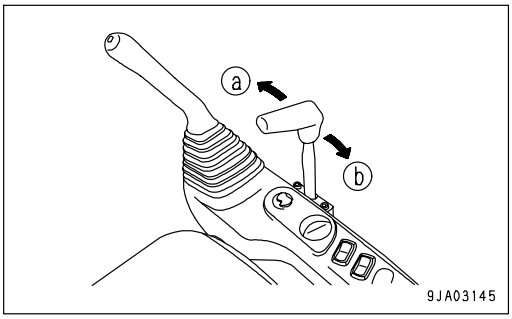


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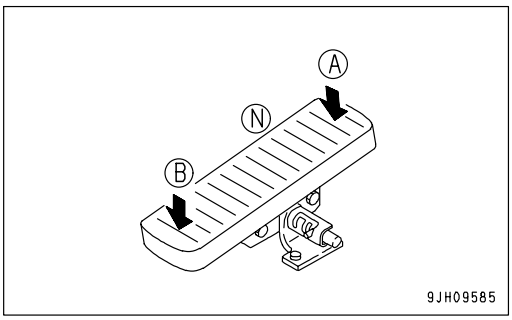
When operating the blade (blade specification) or an attachment (if equipped), change the working mode to the attachment mode before starting.



- Blade operation LOWER (a) ←→ RAISE (b)

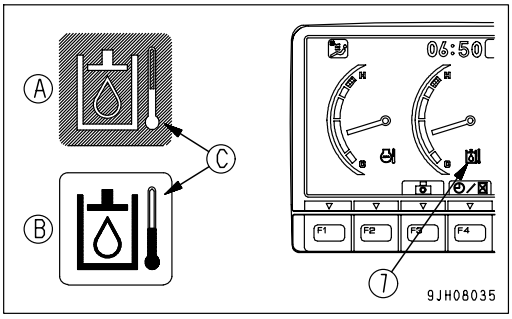


- Attachment operation One way (A) ←→ Other way (B)



18. Check that hydraulic oil temperature monitor (7) is displaying the correct temperature.
    If the hydraulic oil temperature monitor is not displaying the correct temperature (it is displaying low temperature), repeat Steps 6 to 10 until the display is the correct temperature.

    (A) Display when temperature is correct: Monitor background (C) is blue
    (B) Display when temperature is low: Monitor background (C) is white



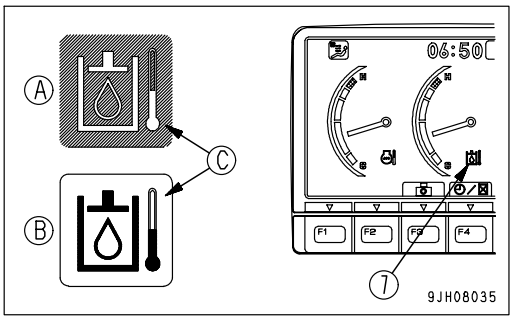
If the hydraulic oil temperature monitor displays the correct temperature, the hydraulic equipment warm-up operation is completed.
After confirming that the hydraulic oil temperature monitor displays the correct temperature, carry out the following procedure.

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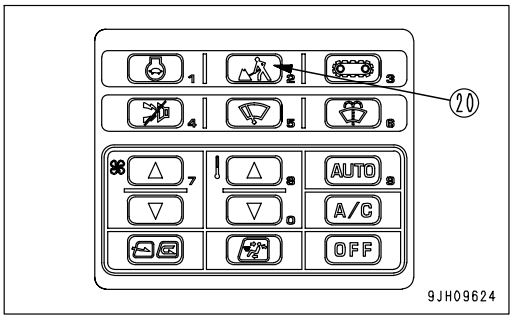
Operation After Completion Of Warm-Up Operation

1. Check that hydraulic oil temperature monitor (7) displays the correct temperature.

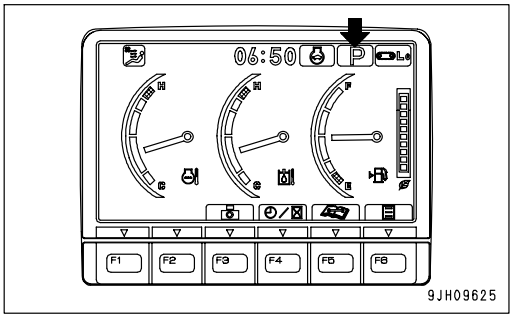
   - (A) Display when temperature is correct: Monitor background (C) is blue
   - (B) Display when temperature is low: Monitor background (C) is white



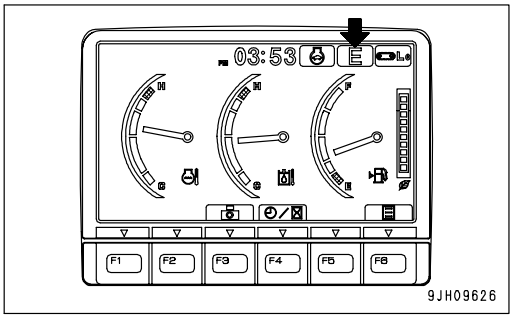
2. Push working mode selector switch (20) of the machine monitor to select the working mode to be used.
   For details of the procedure for selecting the working mode, see "Working Mode Selector Switch (PAGE 3-25)".



- Working mode monitor display
  1) P mode
     For heavy-duty operations

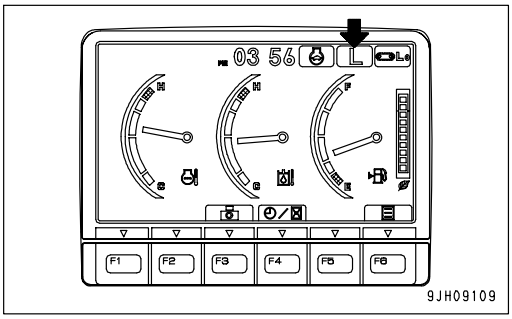


  2) E mode
     For operations with emphasis on fuel economy

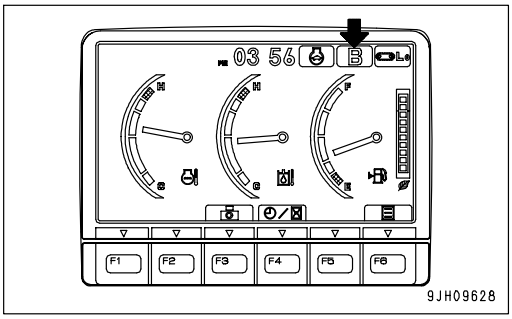


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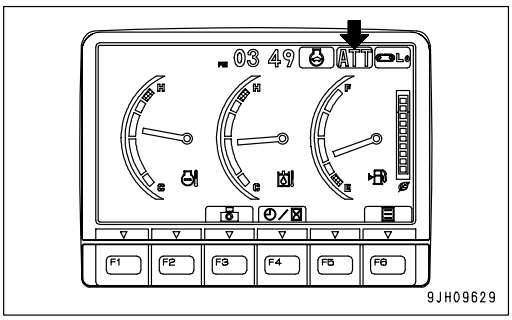
3) L mode
For operations requiring fine control



4) B mode
For breaker operations



5) ATT mode
For operations with crusher or other double-acting action attachment

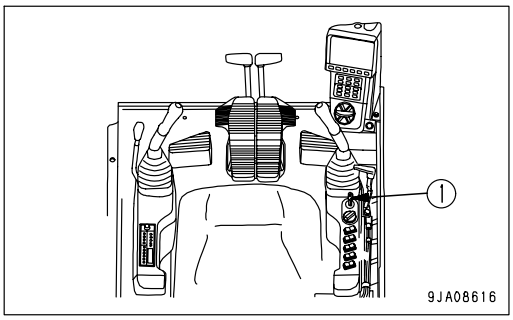


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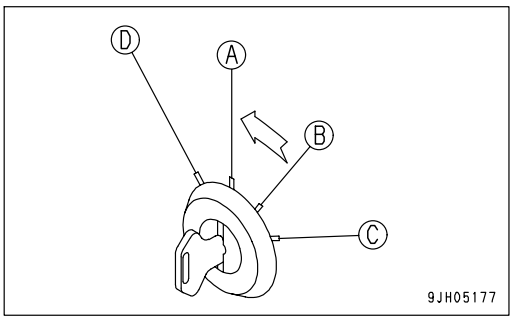
STOPPING THE ENGINE

NOTICE

If the engine is stopped abruptly, service life of component parts of the engine may be considerably reduced. Do not stop the engine abruptly except in an emergency. If the engine has overheated, do not try to stop it abruptly but run it at medium speed to allow it to cool down gradually, and then stop it.



1. Run the engine at low idle for about 5 minutes to cool down gradually.
2. Turn the key in starting switch (1) to the OFF position (A) and stop the engine.
3. Remove the key from starting switch (1).

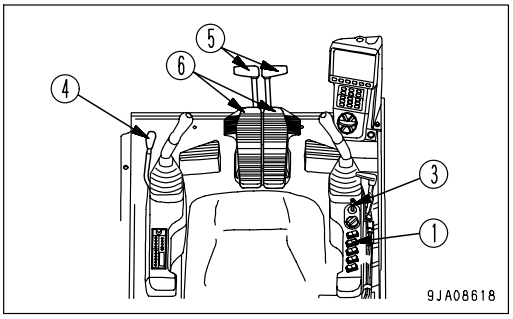


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MACHINE OPERATION

WARNING

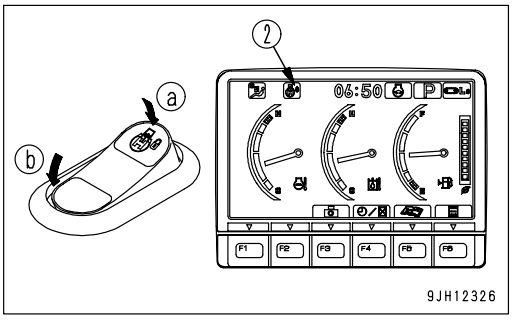
- **Before operating the travel lever or travel pedal, check the direction that the track frame is facing. When the track frame is facing the rear (when the sprocket is at the front), the direction of operation of the travel lever and travel pedal is the opposite to the direction of movement of the machine (forward/reverse, left/right).**
- **Before starting the machine off, check that the area around the machine is safe, and sound the horn.**
- **Do not allow anyone to enter the area around the machine.**
- **Remove any obstacles from the travel path.**
- **The area at the rear of the machine is a blind spot. Always use the rear view camera to check the area at the rear of the machine before traveling in reverse.**
- **When the auto-deceleration is being used, if the travel lever or travel pedal are operated, the engine speed will suddenly rise, so be careful when operating the travel lever or travel pedal.**
- **When traveling, check that the travel alarm works properly.**



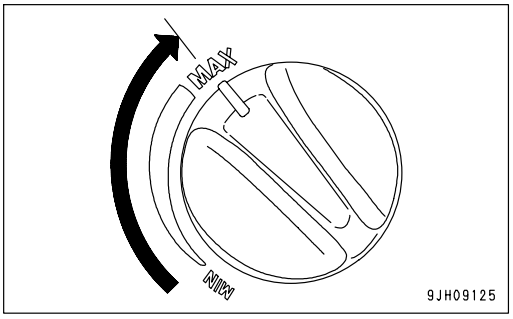
Preparations for Moving the Machine

1. Set swing lock switch (1) to the ON (actuated) position and confirm that swing lock monitor lamp (2) lights up.

   (a): ON position
   (b): OFF position



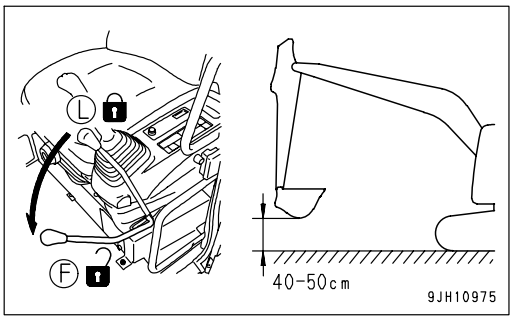
2. Turn fuel control dial (3) towards the full speed (MAX) position to increase the engine speed.



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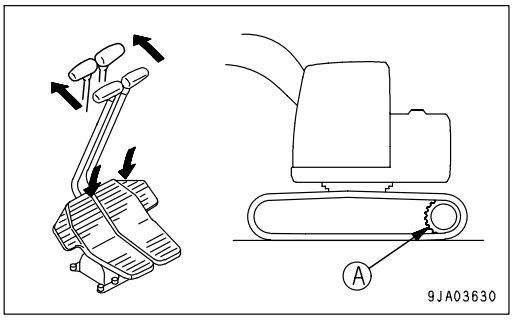
Moving Machine Forward

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.

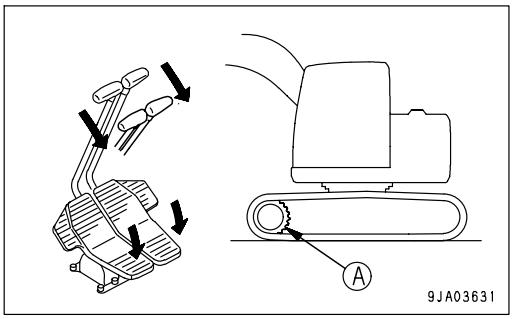


2. Raise the blade. (Blade specification only)
3. Operate right and left travel levers (5) or right and left travel pedals (6) as follows.

- When sprocket (A) is situated at the rear of the machine;
  Start the machine either by pushing lever (5) forward slowly or by stepping on the front part of pedal (6) slowly.



- When sprocket is situated at the front of the machine;
  Start the machine either by pulling lever (5) back slowly or by stepping on the rear part of pedal (6) slowly.



4. Check that the travel alarm sounds properly. If the travel alarm does not sound, please contact your Komatsu distributor for repair.

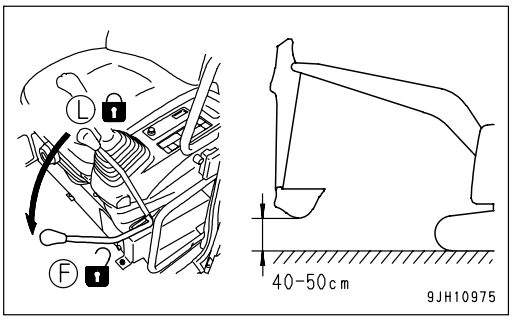
REMARK

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.

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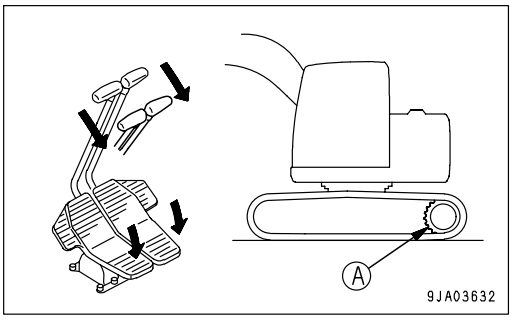
Moving Machine Backward

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.

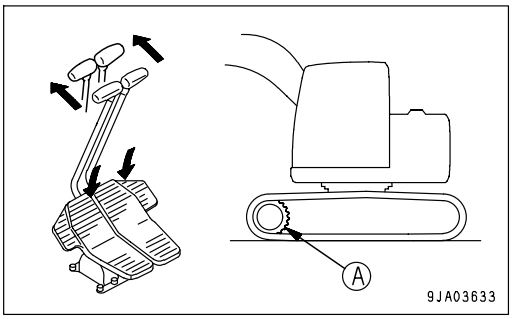


2. Raise the blade. (Blade specification only)
3. Operate right and left travel levers (5) or right and left travel pedals (6) as follows.

- When sprocket is situated at the rear of the machine;
  Start the machine either by pulling lever (5) back slowly or by stepping on the rear part of pedal (6) slowly.



- When sprocket (A) is situated at the front of the machine;
  Start the machine either by pushing lever (5) forward slowly or by stepping on the front part of pedal (6) slowly.



4. Check that the travel alarm sounds properly. If the travel alarm does not sound, please contact your Komatsu distributor for repair.

REMARK

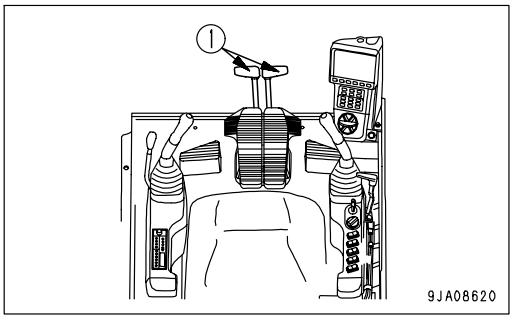
In cold temperatures, if the machine travel speed is not normal, thoroughly perform the warming-up operation.
In addition, if the undercarriage is clogged with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

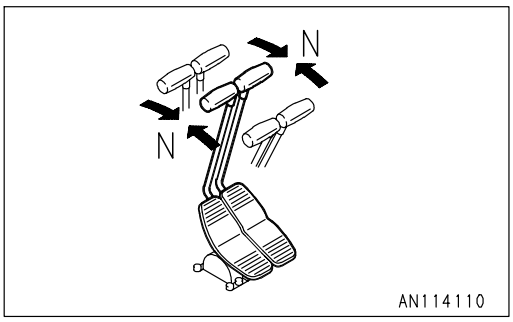
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Stopping Machine

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.





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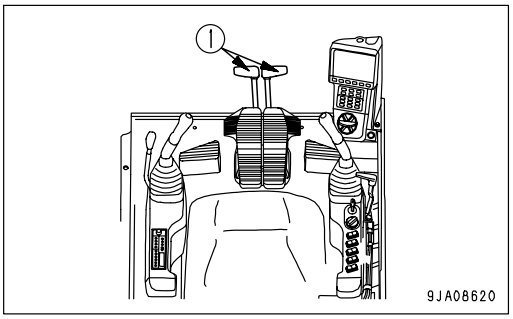
STEERING THE MACHINE

Steering

WARNING

Before operating the travel levers, check the direction of the track frame (the position of the sprocket). If the sprocket is at the rear, the machine moves in the reverse direction to the operation of the travel levers.

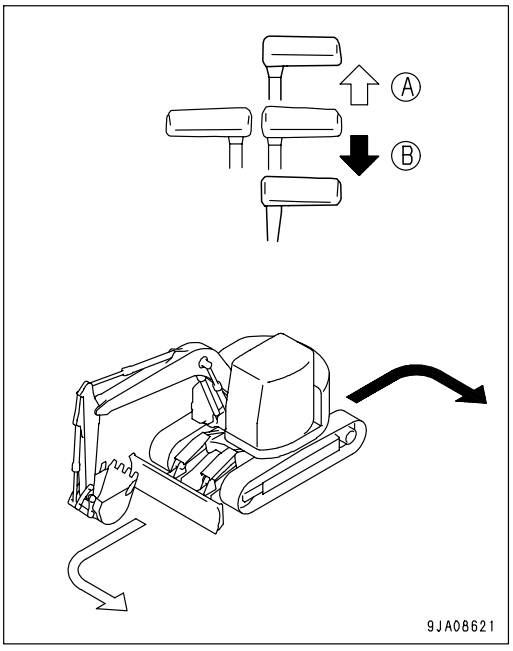
Use the travel levers to change direction.
Avoid sudden changes of direction as much as possible. Especially when performing counter-rotation (spin turn), stop the machine before turning.
Operate two travel levers (1) as follows.



Steering the Machine when Stopped

When turning to the left:
Push the right travel lever forward to turn to the left when traveling forward; and pull it back to turn left when traveling in reverse.
(A): Forward left turn
(B): Reverse left turn

REMARK
When turning to the right, operate the left travel lever in the same way.



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Changing Direction of the Machine

When turning to the left:

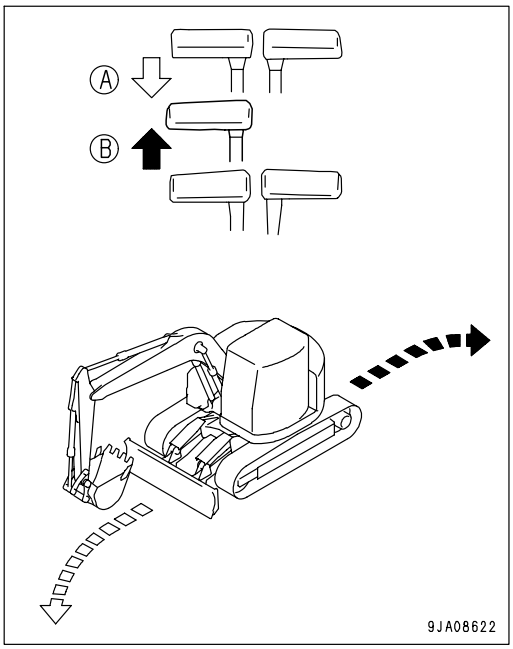
If the left travel lever is returned to the neutral position, the machine will turn to the left.

(A): Forward left turn

(B): Reverse left turn

REMARK

When turning to the right, operate the right travel lever in the same way.

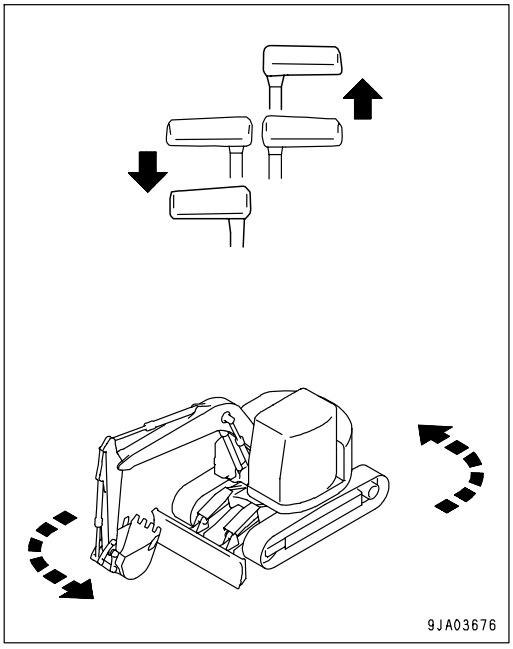


Counter-rotation Turn (Spin Turn)

When using counter-rotation (spin turn) to turn left, pull the left travel lever back and push the right travel lever forward.

REMARK

When using counter-rotation to turn right, pull the right travel lever back and push the left travel lever forward.

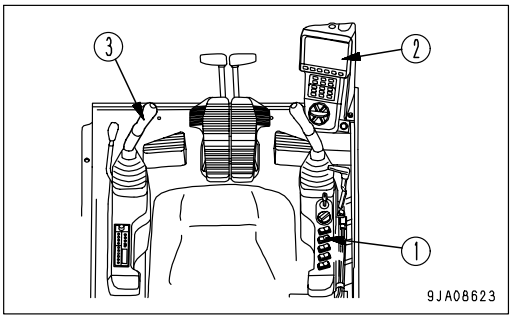


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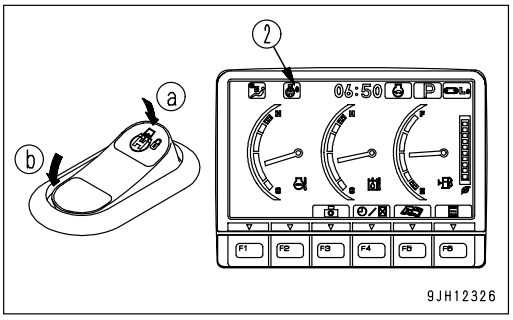
SWINGING

WARNING

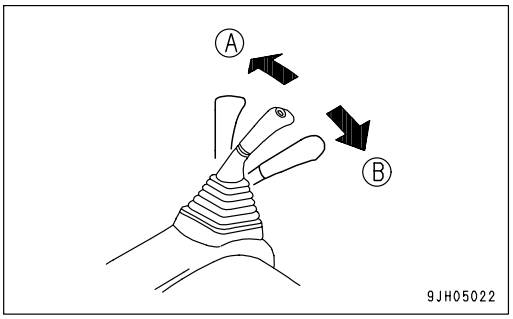
- **The rear of the machine extends outside the track width. Before swinging, check with the rear-view monitor and mirrors, and also check visually that the surrounding area is safe.**
- **When the auto-deceleration has been actuated and the engine speed is low, if the control lever is operated, the engine speed will suddenly rise, so be careful when operating.**



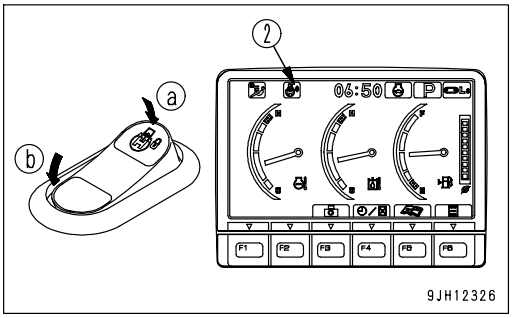
1. Before starting the swing operation, turn swing lock switch (1) OFF and check that swing lock monitor (2) has gone out.
   (a): ON position
   (b): OFF position



2. Operate left work equipment control lever (3) to swing the upper structure.
   (A): Left swing
   (B): Right swing



3. When not using the swing, turn swing lock switch (1) ON. Check that swing lock monitor (2) lights up.
   (a): ON position
   (b): OFF position



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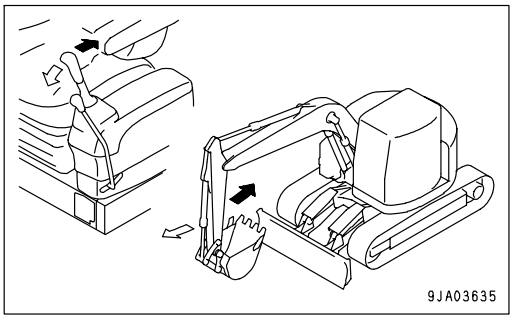
WORK EQUIPMENT CONTROLS AND OPERATIONS

WARNING

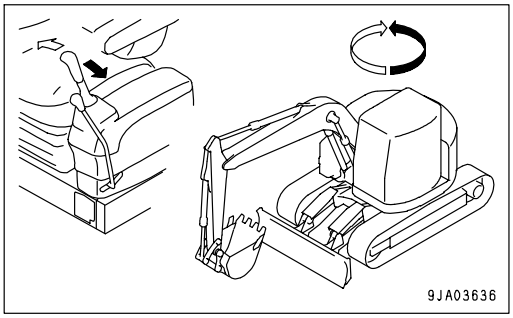
If the lever is operated when the engine speed has been lowered by the auto-deceleration function, the engine speed will suddenly rise, operate the levers carefully.

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.

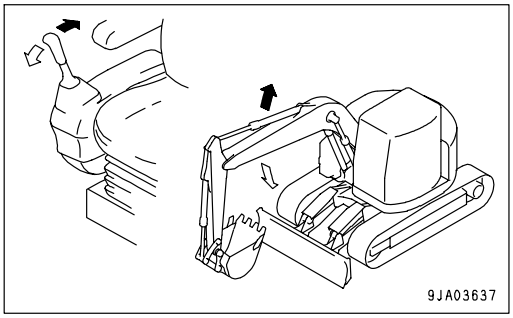
- Arm control
  Move the left work equipment control lever to the front or rear to operate the arm.



- Swing control
  Move the left work equipment control lever to the left or right to swing the upper structure.

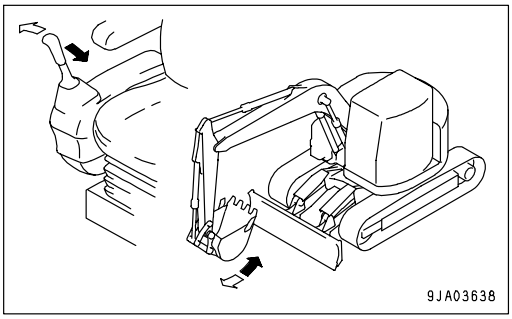


- Boom control
  Move the right work equipment control lever to the front or rear to operate the boom.

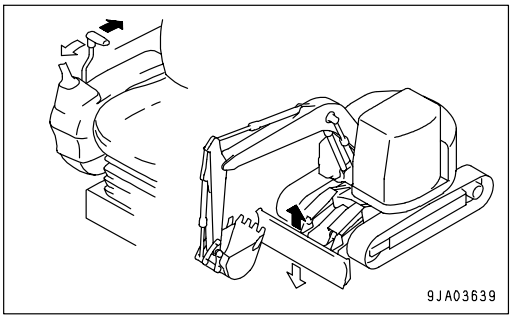


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- Bucket control
  Move the right work equipment control lever to the left or right to operate the bucket.



- Blade control (blade specification)
  Move the lever on the right side of the operator's seat to the front or rear to operate the blade.



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.

REMARK
The control circuit on this machine is equipped with an accumulator. Even if the engine is stopped, if the starting 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 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.

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WORKING MODE

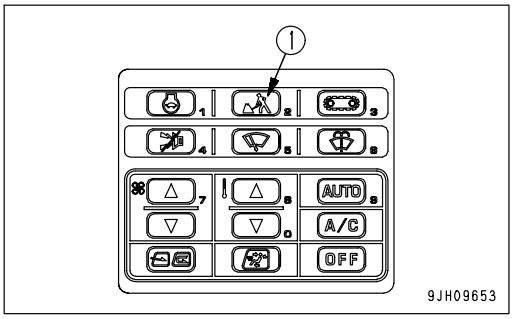
Working Mode

Use working mode selector switch (1) to select the working mode that matches the operating conditions or purpose. This will make it possible to carry out operations efficiently.

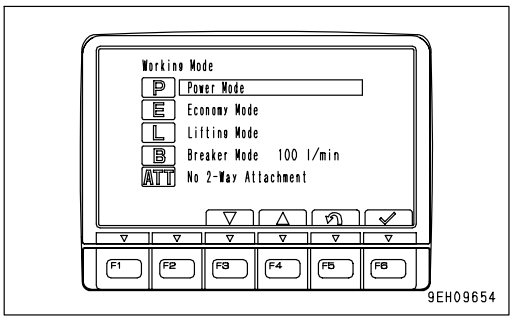
Use the following procedure to select the most efficient working mode.

When the starting switch is turned ON, the working mode is set to the mode that was in operation when the starting switch was last turned OFF.

Use the working mode switch to set the mode to the most efficient mode to match the type of work.



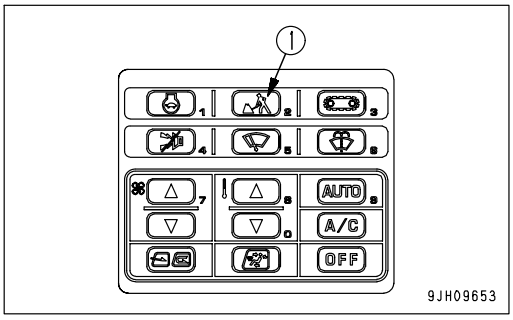
Working mode	Applicable operations
P mode	Normal digging or loading operations (operations with emphasis on production)
E mode	Normal digging or loading operations (operations with emphasis on fuel consumption)
L mode	Aligning position (fine control operations)
B mode	Breaker operations
ATT mode	Operations with the crusher or other double-acting action attachment



NOTICE

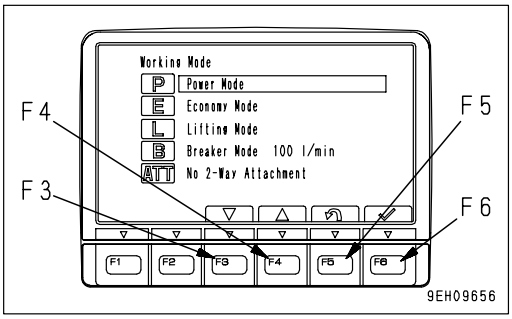
If breaker operations are carried out in a mode other than the breaker mode, there is danger of breakage of the hydraulic equipment. Do not carry out breaker operations in any mode except the breaker mode.

1. If working mode selector switch (1) is pressed, the working mode selection screen is displayed on the monitor.

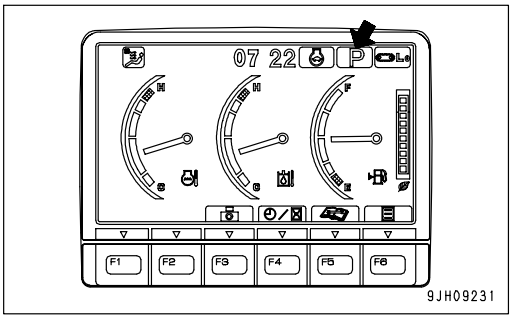


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2. Press switches F3 or F4 at the bottom of the screen or the working mode selector switch to select the appropriate mode.



3. After selecting the desired mode, press switch F6 to accept the change. The screen returns to the standard screen.
   If switch F5 is pressed, the screen returns to the standard screen without changing the mode.
   - If a working mode is selected, and nothing is done for 5 seconds, the selected working mode is automatically accepted and the screen returns to the standard screen.
   - If a working mode is selected and working mode switch (1) is kept pressed, the selected mode is accepted and the screen returns to the standard screen.



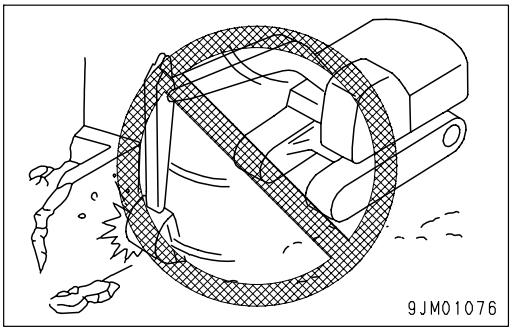
PROHIBITED OPERATIONS

WARNING

- **If it is necessary to operate the work equipment control lever when the machine is traveling, stop the machine, then operate the control lever.**
- **If any lever is operated when the auto-deceleration is being actuated, the engine speed will suddenly increase, so be careful when operating.**

Operations Using Swing Force

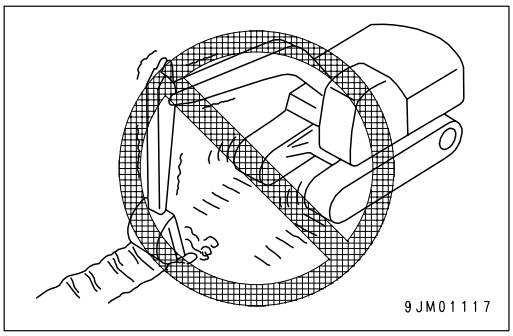
Do not use the swing force to compact soil or break objects. This is not only dangerous, but will also drastically reduce the life of the machine.



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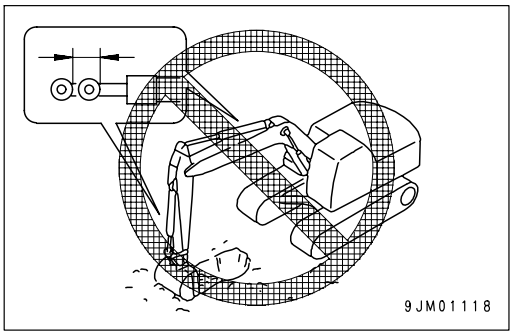
Operations Using Travel Force

Do not dig the bucket into the ground and use the travel force to carry out excavation. This will damage the machine or work equipment.



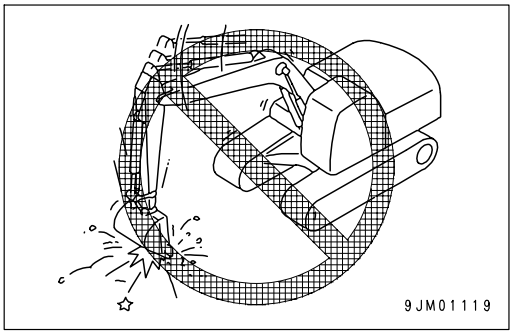
Prohibition of Operations Using Hydraulic Cylinders to Stroke Ends

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



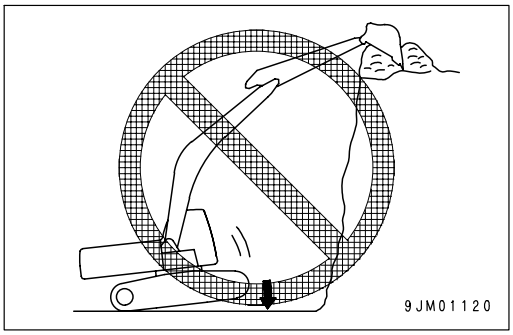
Operations Using Bucket Dropping Force

Do not use the dropping force of the machine for digging, or use the dropping force of the bucket as s pickaxe, breaker, or pile driver. This will drastically reduce the life of the machine.



Operations Using Machine Dropping Force

Do not use the dropping force of the machine for digging.



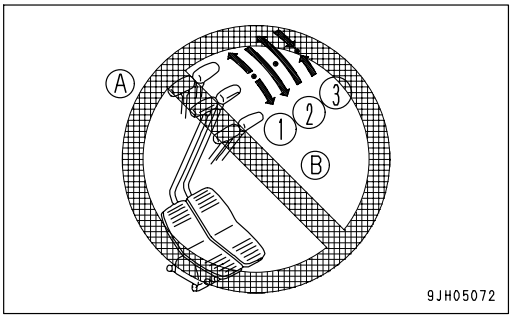
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Digging Hard Rocky Ground

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

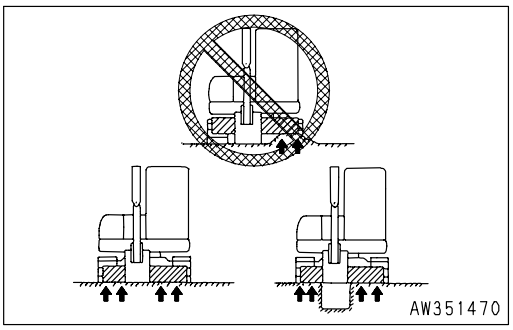
Sudden Lever or Pedal Shifting High Speed Travel

(1) Do not operate the levers and pedals suddenly or take any other action to move the machine quickly.
(2) Do not operate the levers or pedals suddenly from FORWARD (A) to REVERSE (B) (or from REVERSE (B) to FORWARD (A)).
(3) Do not operate the levers or pedals suddenly (do not release them suddenly) to stop the machine when traveling at high speed.



Support Blade on Both Sides

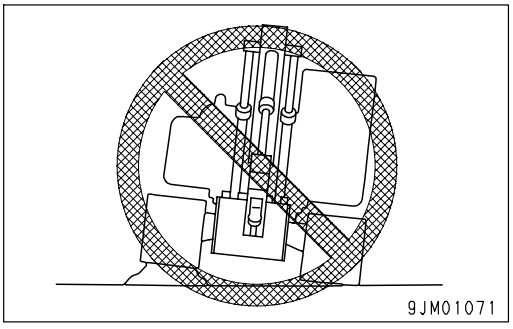
(Only machines with blade specification)
When using the blade as an outrigger, never suport the machine with only one end of the blade.



GENERAL OPERATION INFORMATION

Traveling

Traveling over boulders, tree stumps, or other obstacles will cause a big shock to the chassis (and in particular to the tracks), and this will cause damage to the machine. For this reason, always remove any obstacles or travel around them, or take other steps to avoid traveling over such obstacles as far as possible.
If there is no way to avoid traveling over an obstacle, reduce the travel speed, keep the work equipment close to the ground, and try to travel so that the center of the track passes over the obstacle.

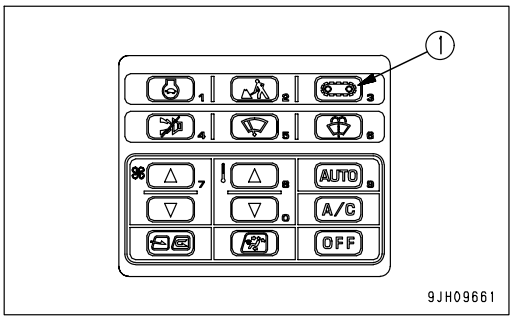


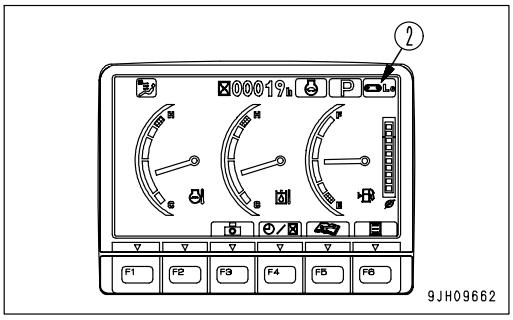
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High Speed Travel

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.

- Press travel speed selector switch (1) to change the travel speed. The travel speed (Lo, Hi) is displayed on travel speed monitor (2).

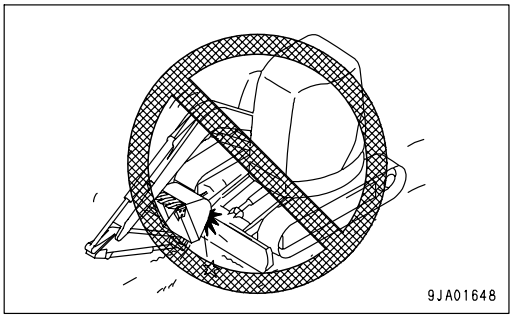




Folding in Work Equipment

(Only machines with blade specification)

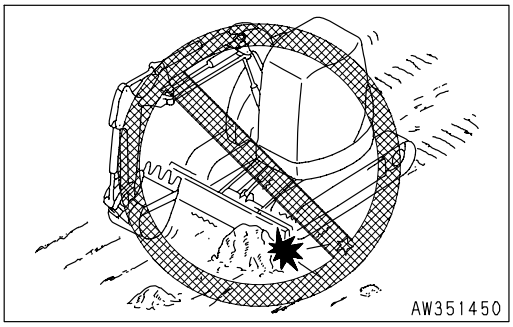
When folding in the work equipment to the travel or transportation posture, be careful not to let the bucket hit the blade.



Avoid Hitting Blade

(Only machines with blade specification)

Be careful not to hit the blade against rocks or boulders. This will cause premature damage to the blade or cylinders.

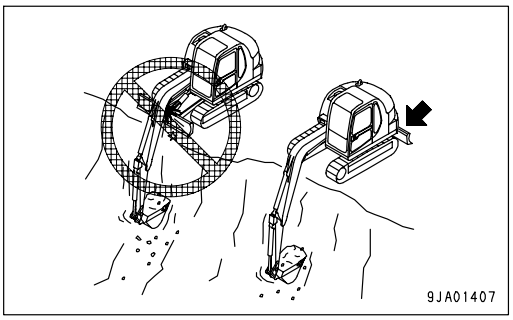


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Blade During Backhoe Operations

(Only machines with blade specification)

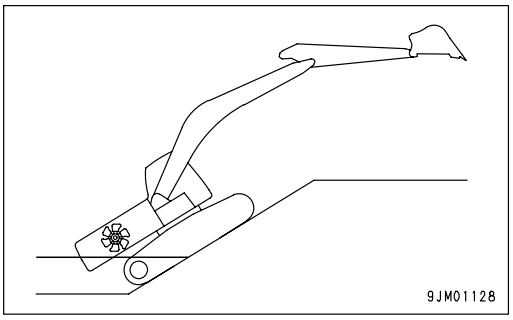
When carrying out deep digging operations with the blade at the front, be careful not to the boom cylinder hit the blade. Always position the blade at the back unless it is needed at the front.



Permissible Water Depth

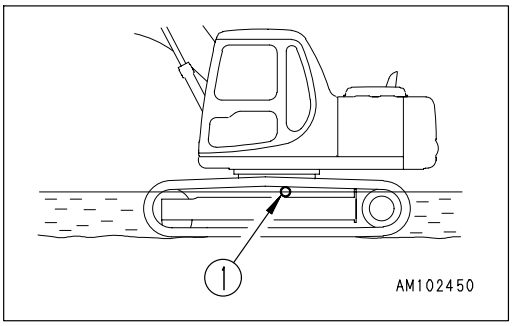
CAUTION

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



Do not drive the machine in water deeper than the center of carrier roller (1).

Supply grease to the parts which have been under water for a long time until the used grease is projected out of the bearings (around the bucket pin, in particular).

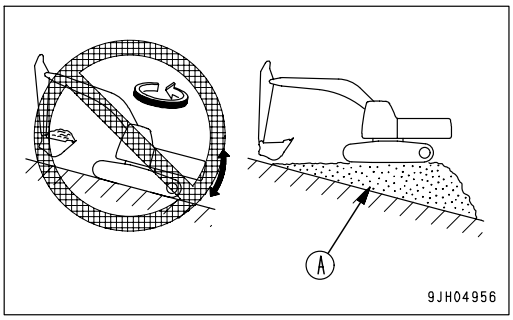


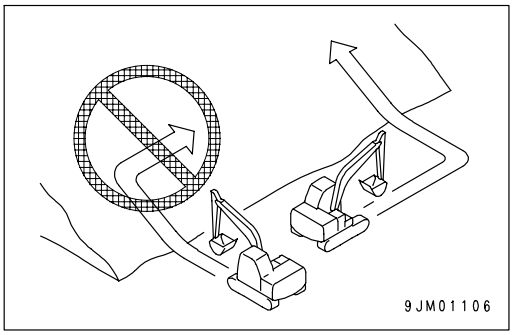
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TRAVELING ON SLOPES

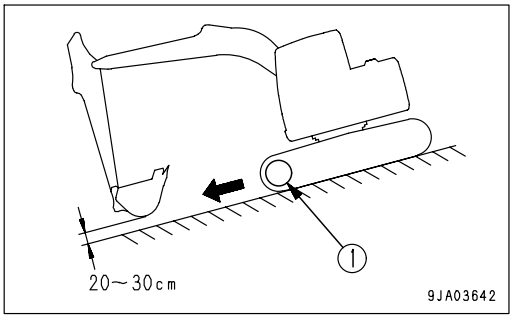
WARNING

- **Turning or operating the work equipment when working on slopes may cause the machine to lose it 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 approx. 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 danger that the machine may turn over.**



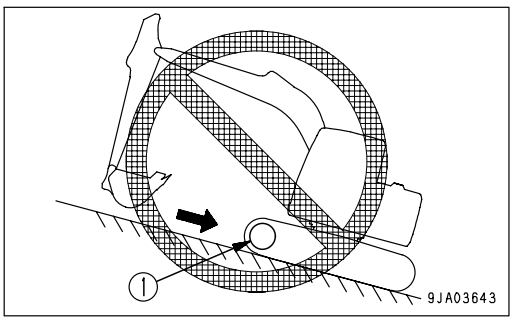


1. When traveling down steep hills, use the travel lever and fuel control dial to keep the travel speed low. When traveling down a steep hill of more than 15°, with the sprocket (1) side down, and set the work equipment to the posture shown in the diagram on the right, and lower the engine speed.



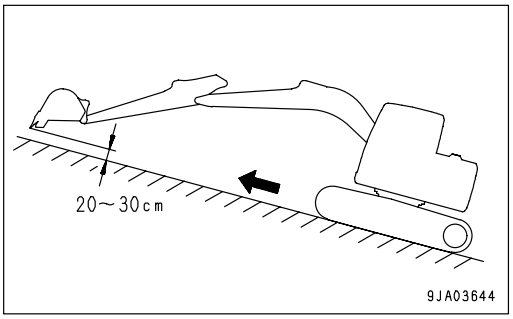
REMARK

Travel down fills with the sprocket (1) side down.
If the machine travels down with the sprocket (1) side up, the track tends to become loose, and that can cause skipping pitches.



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2. When traveling up a steep hill of more than 15°, set the work equipment to the posture shown in the diagram on the right.



Traveling Downhill

Put the travel lever in the neutral position. This will cause the brake to be automatically applied.

Engine Stopped on Slope

If the engine stops when traveling uphill, move the travel levers to the neutral position, lower the bucket to the ground, stop the machine, then start the engine again.

Cab Doors on Slope

- 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.
- Do not open or close the sliding door on slopes when traveling or operating. The operating effort may change suddenly.
  Always keep the sliding door locked.
- Be extremely careful when opening or closing the sliding door when the machine is stopped on a slope. There is danger that the weight of the door may cause it to open or close suddenly.

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ESCAPE FROM MUD

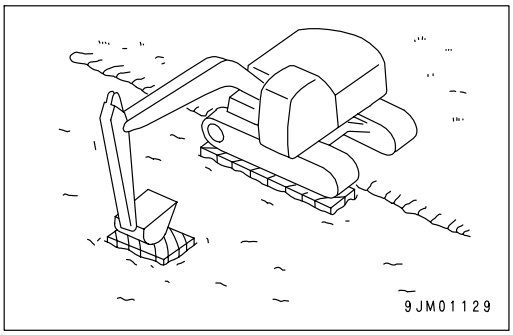
Always operate carefully to avoid getting stuck in mud. If the machine does get stuck in mud, do as follows to get the machine out.

Track on One Side Stuck

NOTICE

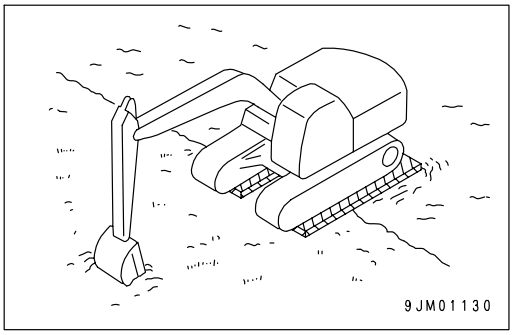
When using the boom or arm to raise the machine, always have the bottom of the bucket in contact with the ground. (Never push with the teeth). The angle between the boom and arm should be 90° to 110°.
The same applies when using the inverting bucket.

When only one side is stuck in mud, use the bucket to raise the track, then lay boards or logs and drive the machine out.



Tracks on Both Sides Stuck

If the track on both sides are in mud and the machine slips and cannot move, use the procedure given above to lay logs or timber. dig the bucket into the ground at the front, operate the arm in the same way as when digging, and set the travel lever to FORWARD to pull the machine out.



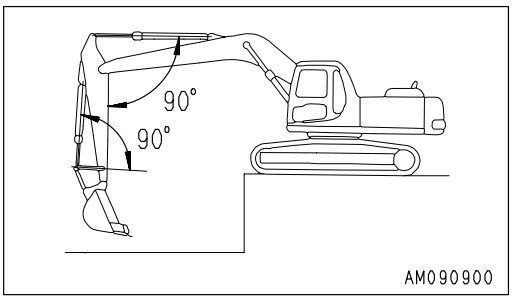
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RECOMMENDED APPLICATIONS

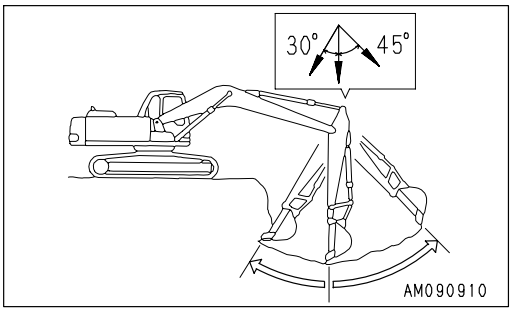
In addition to the following, it is possible to further increase the range of applications by using various attachments.

Backhoe Work

A backhoe is suitable for excavating at a position lower than the machine.
When the condition of the machine is as shown in the diagram at right, each cylinder's maximum pushing excavation force is obtained when the bucket cylinder and link, arm cylinder and arm are at 90°.
When excavating, use this angle effectively to optimize your work efficiency.

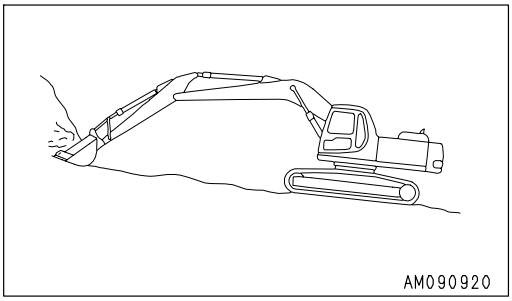


The range for excavating with the arm is from a 45° angle away from the machine to a 30° angle toward the machine.
There may be some differences depending on the digging depth, not try to keep within the above range rather than operating to the end of the cylinder stroke.



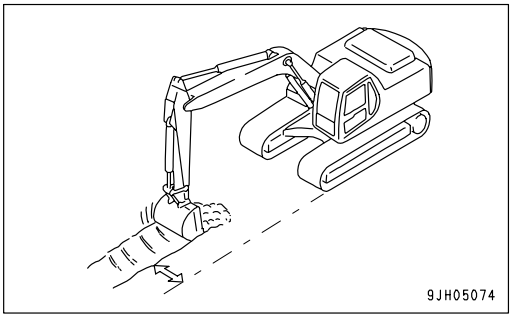
Shovel Work

A shovel is suitable for excavating at a position higher than the machine. Shovel work is performed by attaching the bucket in the reverse direction.



Ditching Work

Ditching work can be performed efficiently by attaching a bucket which matches the digging operation and then setting the tracks parallel to the line of the ditch to be excavated.
To excavate a wide ditch, first dig both sides and then finally remove the center portion.

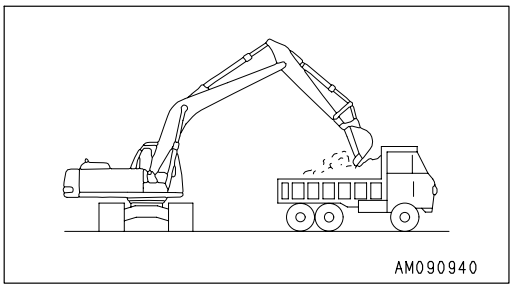


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Loading Work

In places where the swing angle is narrow, work efficiency can be enhanced by locating the dump truck in a place easily visible to the operator.

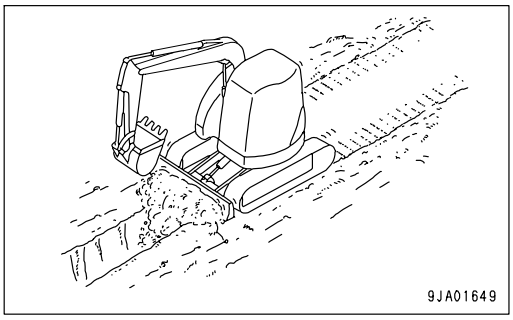
Loading dump trucks is easier and the loading capacity is greater if the hydraulic excavator loads from the rear of the dump truck rather than from the side.



Refill and Finishing Work

(Only machines with blade specification)

When refilling after excavation and when smoothing the ground surface, use the blade.



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BUCKET REPLACEMENT AND INVERSION

WARNING

- **When pins are knocked in with a hammer, pieces of metal may fly and cause serious injury. When carrying out this operation, always wear goggles, hard hat, gloves, and other protective equipment.**
- **When the bucket is removed, place it in a stable condition.**
- **If pins are hit with a strong force, there is a hazard that the pin may fly out and injure people in the surrounding area. Make sure that there is no one in the surrounding area before starting the operation.**
- **When removing the pins, do not stand behind the bucket. In addition, be extremely careful not to put your foot under the bucket while standing at the side for the work.**
- **When removing or inserting pins, be extremely careful not to get your fingers caught.**
- **Never insert your fingers into the pin holes when aligning the holes.**

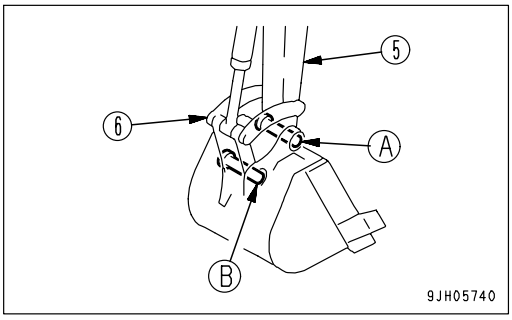
Stop the machine on a firm and flat surface and do the work. When performing joint work, appoint a lead and follow that person's instructions and signals.

Replacement

1. Place the bucket in contact with a flat surface.

REMARK

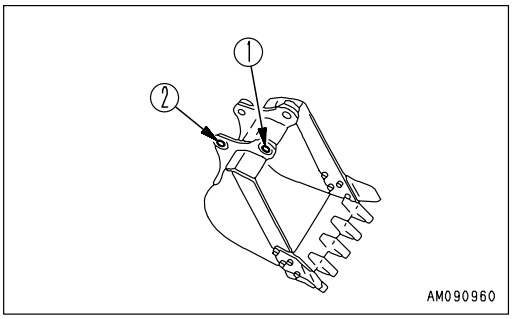
When removing the pins, place the bucket so that it is in light contact with the ground.
If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.



NOTICE

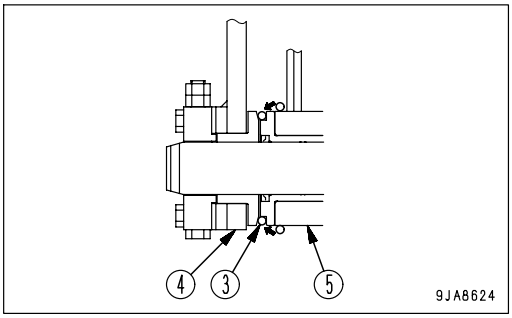
After removing the pins, make sure that mud or sand does not get on them. Dust seals are fitted at both ends of the bushings, be careful not to damage them.

2. Remove the double nut on the stopper bolt for arm pin (A) and link pin (B), remove the bolt, pull out arm pin (A) and link pin (B), and then remove the bucket.
3. Align the arm (5) with holes (1) of the replacement bucket and the link (6) with holes (2), then insert grease-coated pins (A) and (B) into hole (1) and hole (2) respectively.



REMARK

- Carry out installation in the reverse order to removal.
- When installing the bucket (4), the O-rings (3) are easily damaged, fit the O-rings (3) on the boss of the arm (5) end as shown in the diagram.When knocking the pin, move the O-ring (3) down to the regular groove.



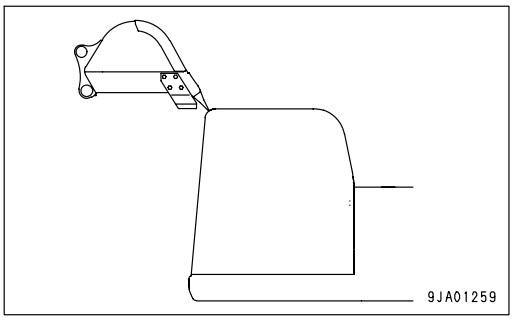
4. Install the stopper bolts and nuts for each pin, then grease the pin.

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Inversion

WARNING

When reversing a bucket, there is the danger that the bucket tooth tip overruns the normal trajectory and interferes with the cab, thus causing a serious trouble. Pay good attention to the work when reversing a bucket so that the bucket and the cab may not interfere with each other.

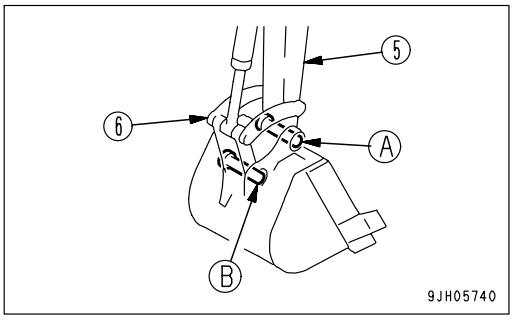


1. Place the bucket in contact with a flat surface.

REMARK

When removing the pins, place the bucket so that it is in light contact with the ground.

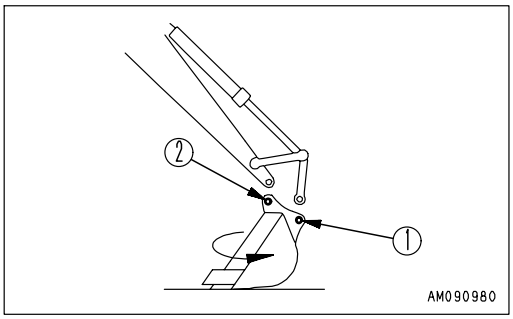
If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.



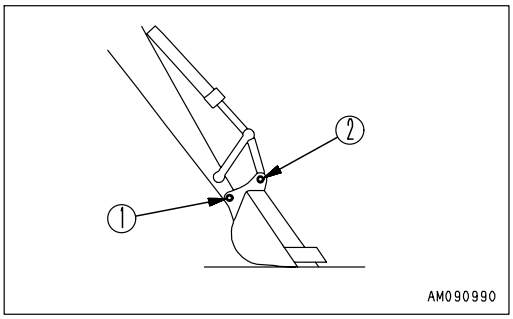
NOTICE

After removing the pins, make sure that mud or sand does not get on them. Dust seals are fitted at both ends of the bushings, be careful not to damage them.

2. Remove the double nut on the stopper bolt for arm pin (A) and link pin (B), remove the bolt, pull out arm pin (A) and link pin (B), and then remove the bucket.



3. Turn the removed bucket. After turning the bucket, align the arm (5) with link (6) mounting hole (1), then align the link (6) with arm (5) mounting hole (2) and install.
4. Insert grease-coated pins (A) and (B) into hole (1) and hole (2) respectively.

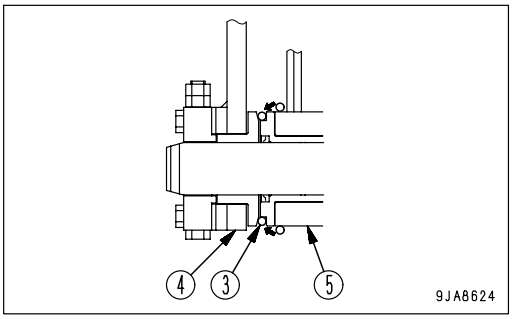


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REMARK

Install the O-ring (3) into retaining hole (1) of the arm (5) and bucket (4).

When installing the bucket (4), the O-rings (3) are easily damaged, so fit the O-rings (3) on the boss of the arm (5) end as shown in the diagram on the right. When knocking in the pins, move the O-ring (3) down to the regular groove.



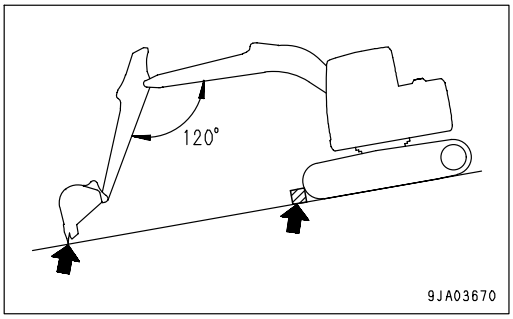
5. Install the stopper bolts and nuts for each pin, then grease the pin.

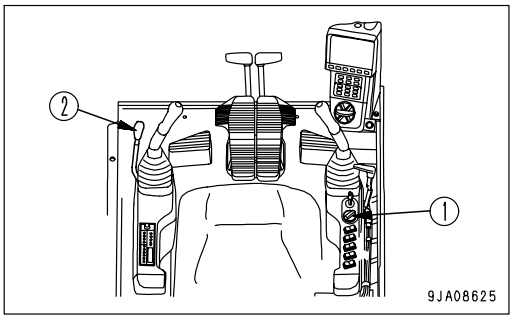
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PARKING MACHINE

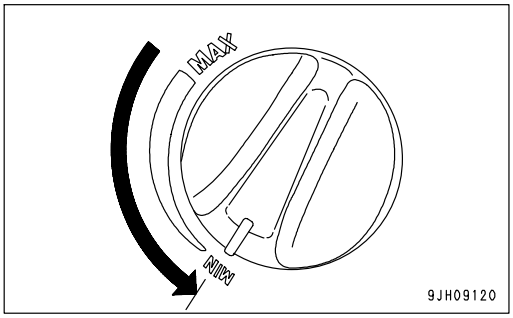
WARNING

- **Park the machine on the firm, level ground.**
  Avoid parking the machine on slopes.
  If it is unavoidably necessary to park the machine on a slope, put blocks under the tracks and dig the work equipment into the ground surface to stop the machine from moving.
- **If the control levers are touched by accident, the machine may move suddenly, and this may lead to a serious accident. Before standing up from the operator's seat, always set the lock lever securely to the LOCK position.**
- **Set the blade on the downhill side and lower it to the ground. (Blade specification only)**

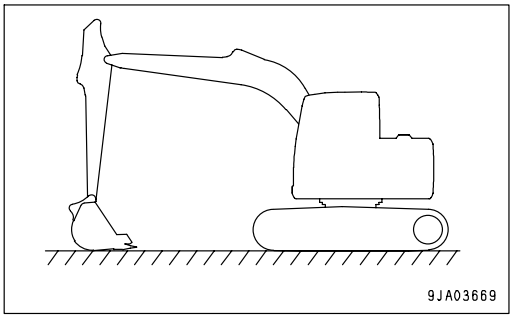




1. Stop the machine. For details, see "Stopping Machine (PAGE 3-153)".
2. Turn fuel control dial (1) to low idling position (MIN) and lower the engine speed.

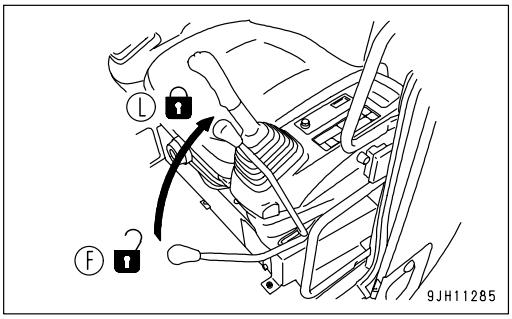


3. Lower the bucket horizontally until the bottom touches the ground.
4. Lower the blade to the ground. (Only machines with blade specification)



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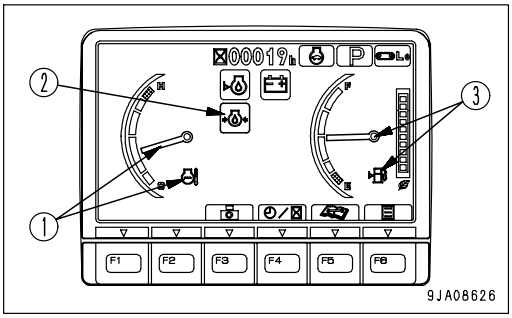
5. Set lock lever (2) to LOCK position (L) and stop the engine. For details of the procedure for stopping the engine, see "STOPPING THE ENGINE (PAGE 3-149)".



MACHINE INSPECTION AFTER DAILY WORK

Before Stopping Engine

Use the machine monitor to check engine coolant temperature (1), engine oil pressure (2), and fuel level (3).



After Stopping Engine

1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, also check for any leakage of oil or coolant. If any problems are found, repair them.
2. Fill the fuel tank.
3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.
4. Remove any mud affixed to the undercarriage.

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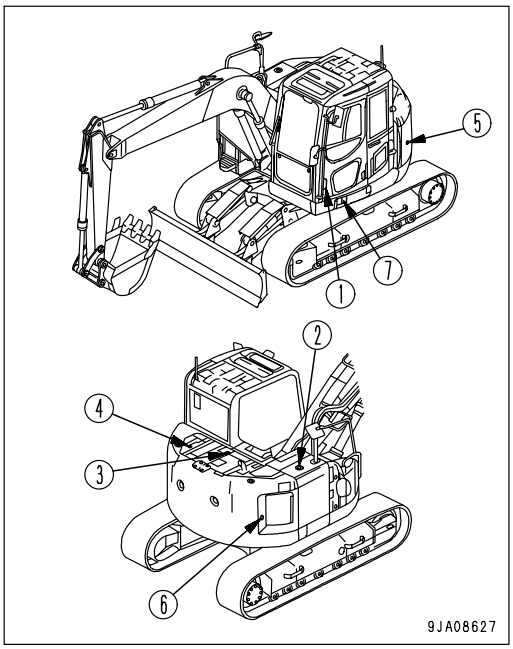
LOCKING

Always lock the following places.

(1) Door of operator's cab
Always remember to close the window.
(2) Fuel tank filler port
(3) Engine hood
(4) Cover at rear of cab
(5) Battery room door
(6) Pump room door
(7) Door at front of tool box

REMARK

Use the starting switch key to lock and unlock all these places.



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ROAD LINERS

(Machine equipped with road liner)

Road Liners Information

Road liner have excellent properties that are not found in steel shoes. However, if they are used in the same way as steel shoes, full use cannot be made of their advantages.

Be sure to operate without straining the rubber shoes in a way that matches the condition of the jobsite and the nature of the work.

Comparison of Road Liners and Metal Shoes

	Road liner	Steel shoe
Little vibration	◎	Δ
Smooth travel (No creaks)	○	○
Little noise	◎	Δ
No damage to paved surface	◎	Δ
Easily damage	○	◎
Strong drawber pull	◎	◎

◎: Excellent

○: Good

Δ: Average

Considering the properities of the material used, rubber shoes and road liners offer various advantages. How-ever, thier weak point is lack of strength. Therefore, it is important to understand the advantages of rubber shoes and road liners, and to follow the precautions regarding handling and prohibited work. This will extend the life of the rubbershoes and road liners and will enable the machine to display the advantages of rubber shoes and road liners to the maximum. Before using rubber shoes and road liner, always read "Using Road Liners (PAGE 3-177)".

Warranty for Road Liners

It is important to inspect and maintain the tracks at the correct tension. Furthermore, these shoes must not be used near objects where they are likely to suffer damage, such as the corners of steel plates, U-shaped ditch liners, blocks, on crushed rock or the sharp edges of rocks, iron beams, or scrap iron.

Any damage resulting from the customer's mistaken use of the machine shall not be included in the scope of the warranty.

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Using Road Liners

Prohibited Works

Do not carry out the following types of work.

- Carrying out operations and steering on crushed rock, extremely rough hard rock, steel beams, scrap iron, or near the edges of steel plates will cause damage to the rubber shoes and road liners.
- In places such as river beds where there are large numbers of large and small boulders, the stones may get caught and damage the rubber shoes and road liners or make the shoes come off. If dozing operations are carried out when the shoes are slipping, this will reduce the life of the rubber shoes and road liner.
- Be careful not to get oil, fuel, or chemical solvent on the rubber shoes and road liners. If such a substance shold get on the shoes, remove it immediately. Furthermore, do not travel on road surfaces where oil has collected.
- When putting the machine into long-term storage (3 months or more), store the machine indoors where it is protected from direct sunlight or rain.
- Do not use the machine in high-temperature areas, such as areas where there is burning wood, steel plates that have been left under the hot sun, or places where asphalt has been laid.
- When the rubber parts of the road liner are so worn or broken that the head of the mounting bolts are scratched, replace the shoe immediately. If the bolt heads are broken, the bolt cannot be removed.
- When installing road liners, always install them to all links on both sides. If they are installed to only one part of the links, their durability will be greatly reduced.

Long Life Operations

Be careful of the following points when carrying out work.

- Avoid carrying out counterrotation turns on concrete surfaces. There is danger that the concrete surface will scrape off the rubber from the shoe.
- Avoid making sudden changes in direction. This may cause premature wear or damage to the rubber shoes and road liners.
- Avoid operating the steering when traveling over places where there is a big difference in height. When traveling over obstacles or places where there is a difference in height, drive the machine at right angles to the obstacle to prevent the shoes from coming off.
- If the machine has been raised using the bucket, lower it slowly.
- Avoid doing work with materials that produce oil when crushed (soy beans, corn, or remains of vegetables squeezed for oil); or wash the machine after use.
- Avoid handling materials that will attack the adhesion of the steel core, such as salt, ammonium sulphate, potassium chloride, potassium sulphate, or calcium superphosphate; or wash the machine after use.
- The adhesion of the core will be attacked by salt, so avoid using the machine in coastal areas.
- When handling salt, sugar, wheat, or soy beans, if there is any deep cut in the rubber shoes and road liners, these substances may get into the lugs or cut portion of the rubber. Always repair the rubber before use.
- Do not carry out work that involves scraping against walls or concrete embankments.
- Road liners slip extremely easily on snow or frozen roads. Be careful not to slip when traveling or working on slopes.
- The properties of road liners change when working in extermely cold places, and this will reduce the life of the rubber shoes and road liners.
- Because of the properties of rubber, use the road liners within a range of -25°C to +65°C (-13°F to +149°F).
- When carrying out bucket operations, be careful not to damage the road liners with the bucket.

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TRANSPORTATION

When transporting the machine, observe all related laws and regulations, and be careful to assure safety.

TRANSPORTATION PROCEDURE

Select the method of transportation to match the weight and dimensions given in "SPECIFICATIONS (PAGE 5-2)". Note that the weight and dimensions given in SPECIFICATIONS may differ according to the type of shoe or arm, or other attachments.

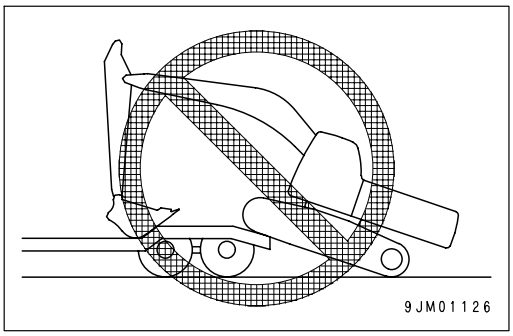
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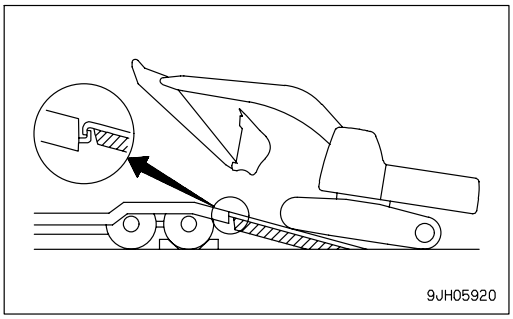
LOADING AND UNLOADING WITH TRAILER

WARNING

Always obey the following when loading or unloading the machine from a trailer.

- **Select firm, level ground when loading or unloading the machine. Maintain a safe distance from the edge of the road.**
- **Always turn the auto-deceleration switch OFF (cancel). If the auto-deceleration switch is left ON, the machine may suddenly move.**
- **Always set the travel speed switch to low speed (Lo), run the engine at low idling, and operate the machine slowly when loading or unloading.**
- **In cold areas, carry out the warming-up operation thoroughly and make sure that the engine speed is stable before carrying out the loading or unloading operation.**
- **Never correct your steering on the ramps. There is danger that the machine may tip over. If necessary, drive off the ramps or back on to the trailer and correct the direction.**
- **It is dangerous to use the work equipment for loading and unloading operations. Always use ramps.**
- **When on the ramps, do not operate any lever except the travel lever.**
- **The center of gravity of the machine will change suddenly at the joint between the ramps and the trailer, and there is danger of the machine losing its balance. Travel slowly over this point.**
- **If it is necessary to swing the work equipment on the trailer platform, the footing is unstable, so be extremely careful that the machine does not tip over. If the work equipment is installed to the machine, pull the work equipment in, and operate slowly to prevent the machine from losing its balance.**
- **Position a flagman to give guidance to prevent the machine from coming off the ramps and to ensure safety in the operation.**
- **Always check that the sliding door of the cab is at the LOCK position, regardless of whether the door is open or closed. If the door is opened or closed when the machine is on the ramps or on the trailer platform, there is danger that the operating effort for opening or closing the door may suddenly change.**





Always observe the following precautions strictly for the ramps and trailer platform.

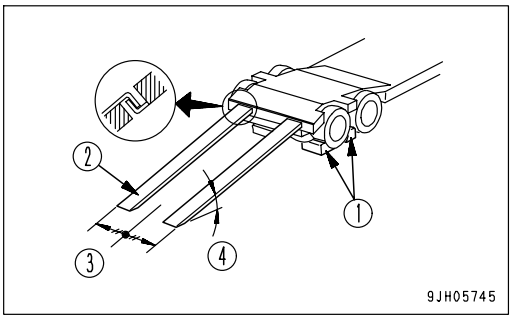
- **Use ramps with ample width, length, thickness, and strength and install them securely at a maximum slope of 15°. When using piled soil, compact the piled soil fully and take action to prevent the slope face from collapsing.**
- **Remove all mud and dirt from the machine tracks and ramps before starting in order to prevent the machine from slipping on the ramps. Be sure that the ramp surface is clean and free of water, snow, grease, oil, or ice. These may cause the machine to slip.**

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When loading or unloading, always use ramps or a platform. Proceed as follows.

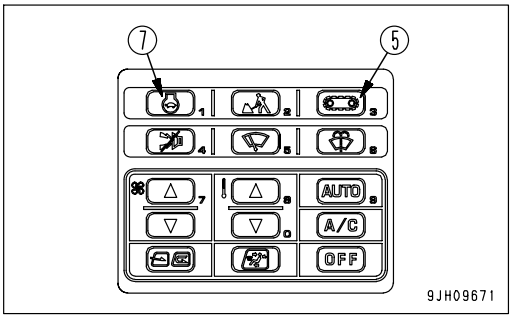
Loading

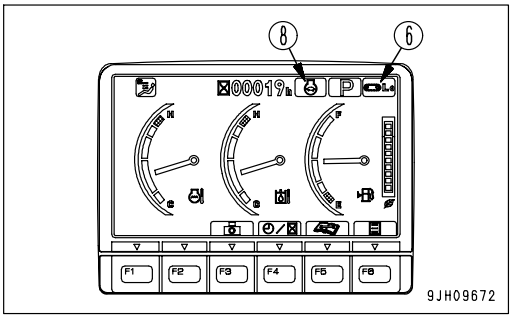
1. Load and unload on firm level ground only.
   Maintain a safe distance from the edge of a road.
2. Apply the trailer brakes securely, then put blocks (1) under the tires to prevent the trailer from moving.
   - Set left and right ramps (2) parallel to each other and equally spaced to the left and right of center (3) of the trailer. Make angle of installation (4) a maximum of 15°. If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.



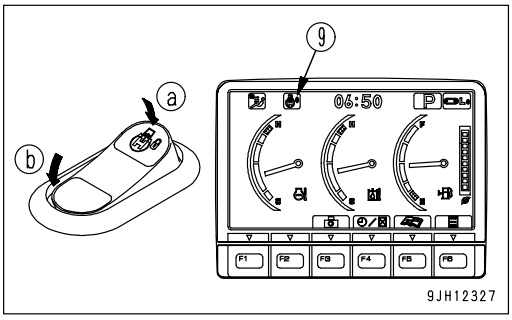
3. Turn the travel speed selector switch to low speed travel (Lo lamp lights up).
   - Press travel speed selector switch (5) to switch the travel speed. The travel speed (Lo, Hi) is displayed on the travel speed monitor (6).

4. 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, the auto-deceleration monitor (8) goes out.



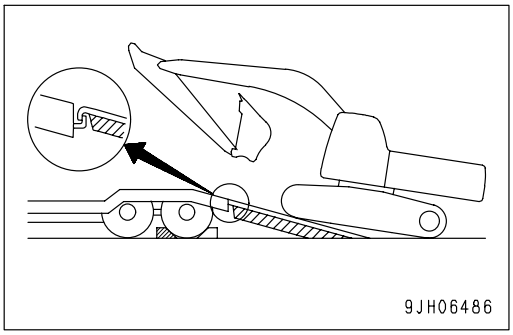


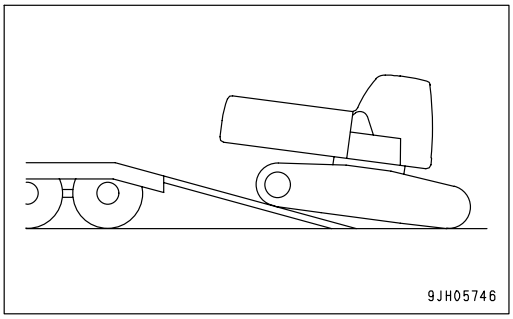
5. Turn the swing lock switch ON to apply the swing lock.
   - When the swing lock switch is turned to the ON position, the swing lock monitor (9) lights up.
     (a): ON position
     (b): OFF position



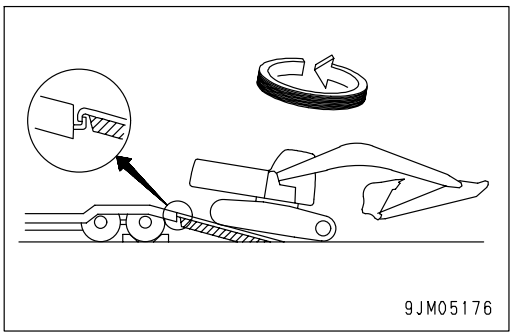
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6. If the machine is equipped with work equipment, set the work equipment at the front, and travel forward to load it; if it has no work equipment, travel in reverse to load it.
   Follow instructions and signals of a conductor particularly when traveling in reverse.
7. Before moving onto the ramps, make sure that the machine is positioned in a straight line with the ramps and that the centerline 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.

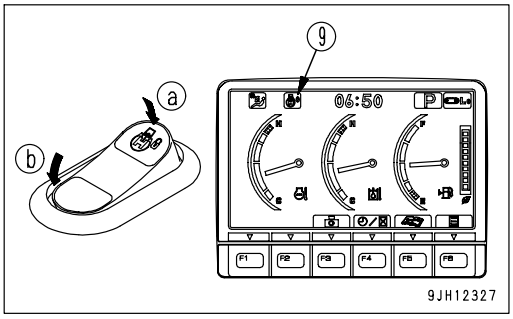




8. When loading or unloading a machine with the work equipment installed, at the point where the tracks are on both the ramps and the ground surface, turn the swing lock switch OFF, then swing the upper structure slowly 180°.
   After doing that, drive slowly in reverse and load the machine onto the trailer.

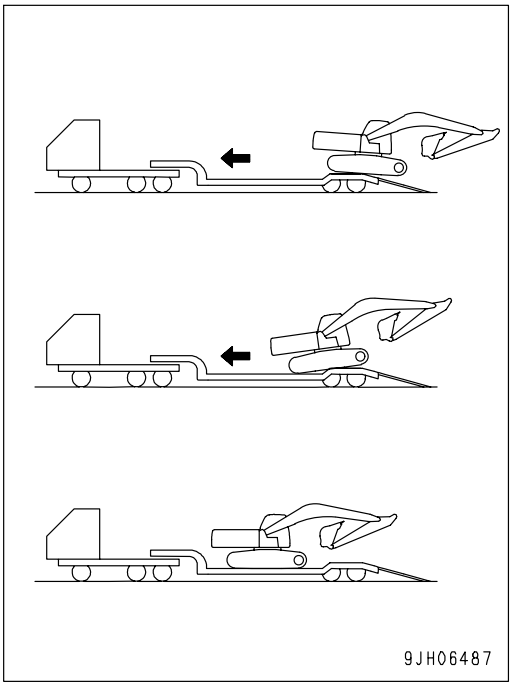


9. Turn the swing lock switch ON to apply the swing lock.
   - When the swing lock switch is turned to the ON position, pilot monitor display (9) lights up.
     (a): ON position
     (b): OFF position



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10. When the machine travels over the rear wheels of the trailer, it becomes unstable, drive slowly and carefully. (Never operate the steering.)
11. 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.
12. Lower the work equipment on top of wooden blocks.



Securing Machine

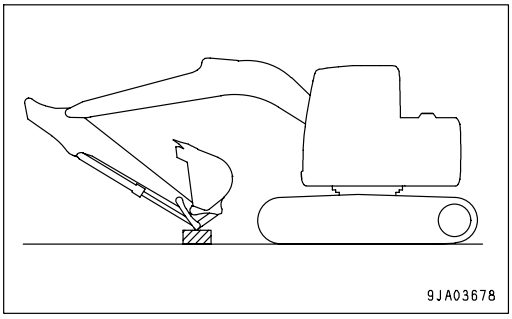
After placing the machine on the specified position of the trailer, secure it according to the following procedure.

NOTICE

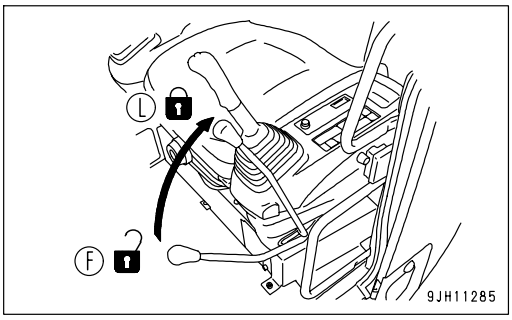
- **Stow the radio antenna. Reassemble the mirrors so that they are within the width of the machine.**
- **To prevent damage to the bucket cylinder during transportation, put a wooden block under the tip of the bucket link to prevent the bucket cylinder from touching the floor.**

Load the machine onto a trailer as follows:

1. Lower the blade. (Only machines with blade specification)
2. Extend the bucket and arm cylinders fully, then lower the boom slowly.

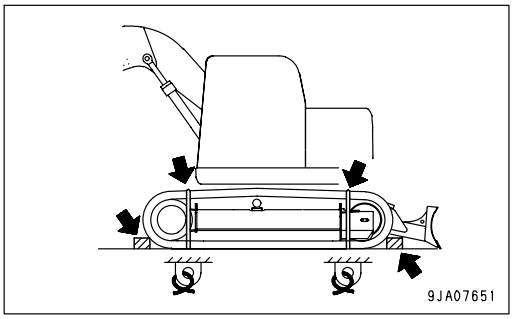


3. Set the lock lever securely to the LOCK position (L).
4. Stop the engine, then remove the key from the starting switch.
5. Close all doors, windows, and covers.
   Lock the covers, caps, and doors fitted with locks.



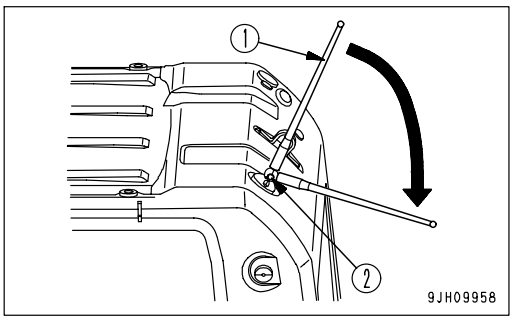
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6. Place blocks under both ends of the tracks to prevent the machine from moving during transportation, and secure the machine with chains or wire rope of suitable strength.
   Be particularly careful to secure the machine in position so that it does not slip to the side.
   When securing the machine, put blocks between the wire rope and the machine to prevent damage to the rope or machine.



Stowing Radio Antenna

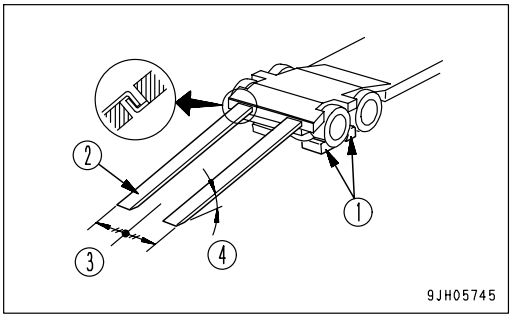
- Loosen bolt (2) of radio antenna (1) at the rear of the cab, lower the antenna, then tighten bolt (2) again to secure radio antenna (1) in position.
- When unloading the machine from the trailer and operating it, follow the opposite procedure from stowing to set radio antenna (1) vertical, then secure it in position with bolt (2).



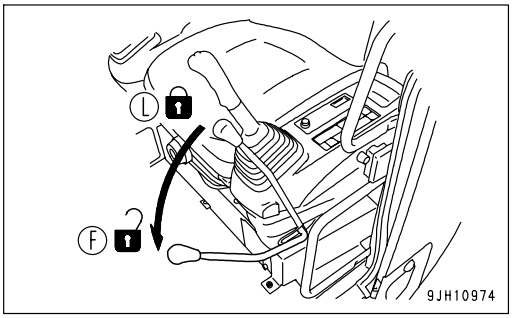
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Unloading

1. Load and unload on firm level ground only. Maintain a safe distance from the edge of a road.
2. Apply the trailer brakes securely, then put blocks (1) under the tires to prevent the trailer from moving.
   - Set left and right ramps (2) parallel to each other and equally spaced to the left and right of center (3) of the trailer. Make angle of installation (4) a maximum of 15°. If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.

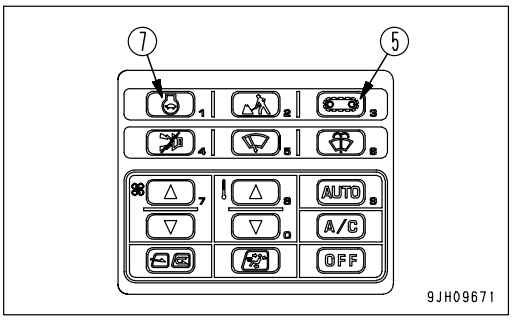


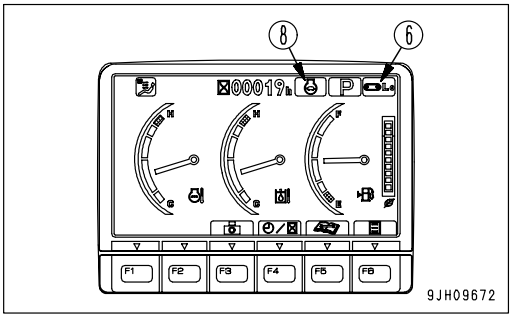
3. Remove the chains and wire ropes fastening the machine.
4. Start the engine.
   Warm the engine up fully.
5. Set the lock lever to FREE position (F).



6. Turn the travel speed selector switch to low speed travel (Lo lamp lights up).
   - Press travel speed selector switch (5) to switch the travel speed. The travel speed (Lo, Hi) is displayed on the travel speed monitor (6).

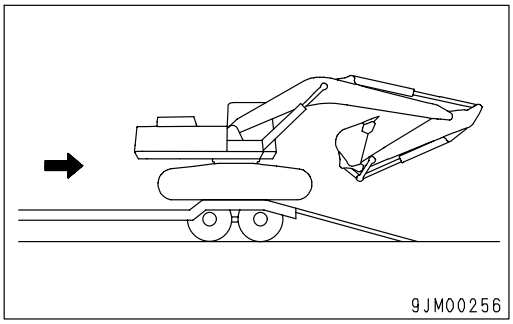
7. Turn auto-deceleration switch (7) OFF and operate the fuel control dial to set the engine speed to low idling.
   - Each time auto-deceleration switch (7) is pressed, it switches OFF → ON → OFF in turn.
   - When auto-deceleration switch (7) is turned OFF, the auto-deceleration monitor (8) goes out.





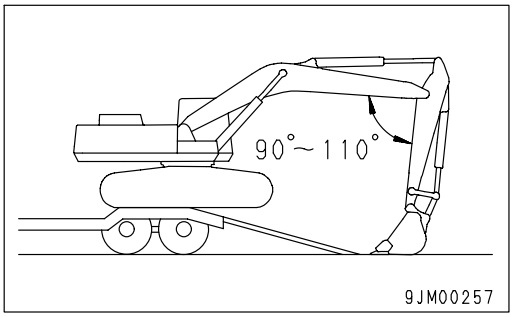
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8. Raise the work equipment, pull in the arm under the boom, then move the machine slowly.
9. When the machine is horizontal on top of the rear wheels of the trailer, stop the machine.

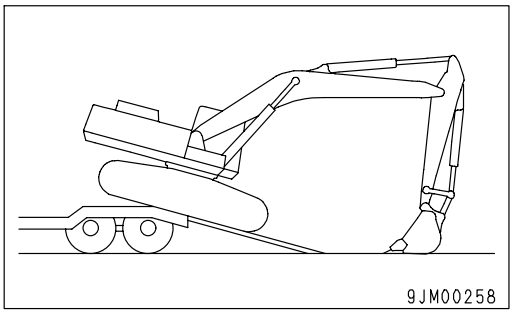


NOTICE

- **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.**



10. 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.
11. When moving down the ramps, operate the boom and arm slowly to lower the machine carefully until it is completely off the ramps.



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LIFTING MACHINE

WARNING

- **The operator carrying out the lifting operation using a crane must be a properly qualified crane operator.**
- **Never raise the machine with any worker on it.**
- **Always make sure that the wire rope is of ample strength for the weight of this machine.**
- **When lifting, keep the machine horizontal.**
- **When carrying out lifting operations, set the lock lever to the LOCK position to prevent the machine from moving unexpectedly.**
- **Never go in the area under or around the machine when it is raised.**
- **There is a hazard that the machine may lose its balance.**
  Always use the posture given in the procedure below and use the proper lifting equipment to lift the machine.

NOTICE

This method of lifting applies to the standard specification machine.

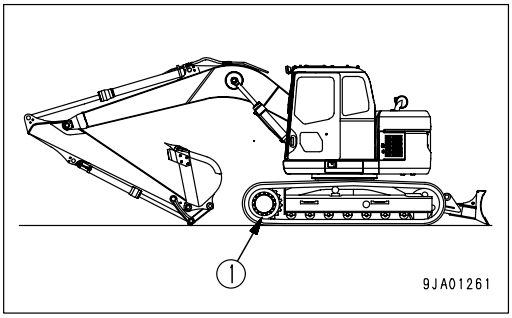
The method of lifting differs according to the attachments and options installed.

For details of the procedure for machines that are not the standard specification, please consult your Komatsu distributor.

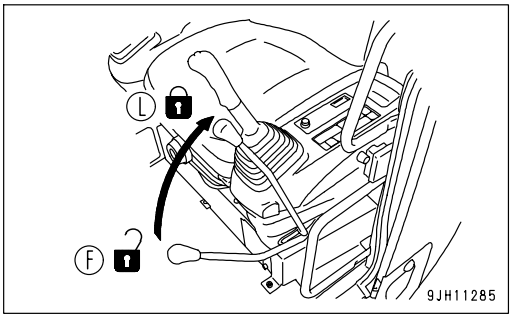
For weight, see "SPECIFICATIONS (PAGE 5-2)".

When lifting the machine, carry out the operation on flat ground as follows.

1. With a machine of blade specifications, turn the upper structure so that the work equipment will be on the side of sprocket (1).
2. Extend the bucket cylinder and arm cylinder fully, then lower the work equipment to the ground as shown in the diagram on the right using the boom cylinder.
3. Lower the blade to the ground. (Only machines with blade specification)



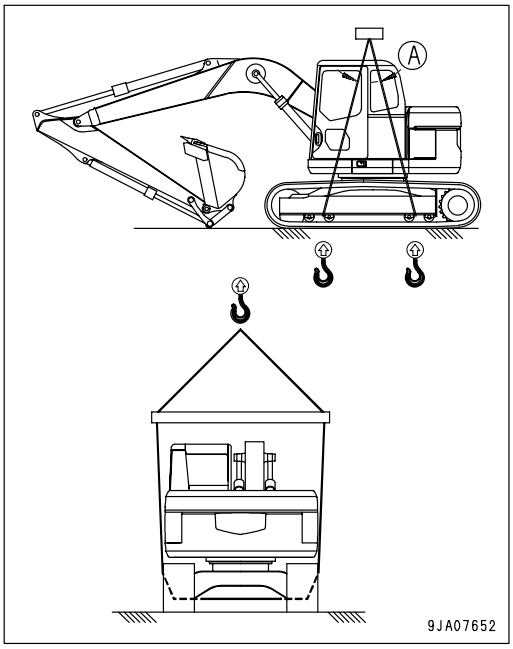
4. Set the lock lever securely to the LOCK position (L).



5. Stop the engine, check that there is nothing around the operator's compartment, then get off the machine. Close the cab door and front glass securely.

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6. Pass wire ropes between the 1st and 2nd track rollers from the front and between the 1st and 2nd track rollers from the rear.
7. Put blocks between the wire rope and the machine to prevent damage to the rope or machine.
8. Set the lifting angle (A) of the wire rope to 30° to 40°, then lift the machine slowly.
9. After the machine comes off the ground, check the hook condition and the lifting posture, and then lift slowly.



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COLD WEATHER OPERATION

COLD WEATHER OPERATION INFORMATION

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

Fuel and Lubricants

Change to fuel and oil with low viscosity for all components. For details of the specified visicosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-9)".

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 amounts of fresh water and see a doctor at once.**
- **When changing the coolant or when handling coolant containing antifreeze that has been drained when repairing the radiator, please contact your Komatsu distributor or request a specialist company to carry out the operation. Antifreeze is toxic. Do not let it flow into drainage ditches or spray it onto the ground surface.**
- **Antifreeze is flammable. Do not bring any flame close. Do not smoke when handling antifreeze.**

NOTICE

- **Use Komatsu Supercoolant (AF-NAC) wherever available, or use permanent type antifreeze coolant.**
- **Never use methanol, ethanol, or propanol-based antifreeze.**
- **Do not use any water leakage prevention agent, either alone, or in combination with antifreeze.**
- **Do not mix one brand of antifreeze with a different brand.**
- **When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor. For details, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-21)".**

For details of the antifreeze mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-21)".

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Battery

WARNING

- **The battery generates flammable gas. Do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.**
- **Battery electrolyte dissolves paint. If it gets on the bodywork, wash it off immediately with water.**
- **If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is danger that the battery may explode.**
- **Battery electrolyte is toxic. Do not let it flow into drainage ditches or spray it on to the ground surface.**

When the ambient temperature drops, the capacity of the battery will also drop. If the battery charge ratio is low, the battery electrolyte may freeze. Maintain the battery charge as close as possible to 100%. Insulate it against cold temperature to ensure the machine can be started easily the next morning.

REMARK

Measure the specific gravity and calculate the charging rate from the following conversion table.

Charging Rate (%) \ Electrolyte Temperature (°C)	20	0	-10	-20
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

- As the battery capacity drastically drops in low temperatures, cover or remove the battery from the machine, store the battery in a warm place, and install it again the next morning.
- If the electrolyte level is low, add distilled water in the morning before beginning work. Do not add water after the day's work to prevent diluted electrolyte in the battery from freezing during the night.

AFTER DAILY WORK COMPLETION

WARNING

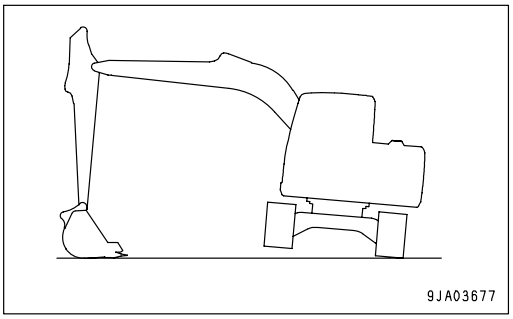
Performing idle-running of the tracks is dangerous, stay well away from the tracks.

To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, observe the following precautions.

- Remove all the mud and water from the machine body. In particular, wipe the hydraulic cylinder rods clean to prevent damage to the seal caused by mud, dirt, or drops of water on the rod from getting inside the seal.
- Park the machine on hard, dry ground.
  If this is impossible, park the machine on boards.
  The boards prevent the tracks from freezing to the ground, and allow the machine to be moved the next morning.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
- Fill the fuel tank to capacity. This minimizes moisture condensation in the tank when the temperature drops.
- After operation in water or mud, remove water from undercarriage as described below to extend undercarriage service life.

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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.



AFTER COLD WEATHER SEASON

When the season changes and the weather becomes warmer, do as follows.

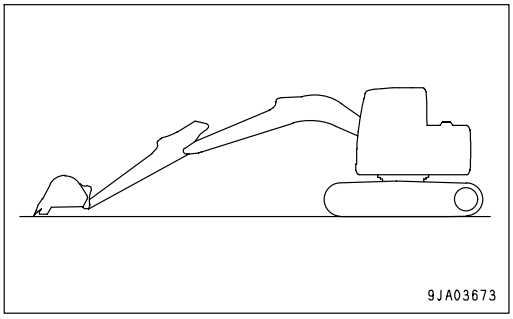
- Replace the fuel and oil for all parts with oil of the viscosity specified.
  For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-9)".

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LONG TERM STORAGE

BEFORE STORAGE

NOTICE
To protect the hydraulic cylinder piston rod while in storage, keep the work equipment in the posture shown at right.
(This prevents rust from developing on the piston rod)



When keeping in long-term storage (more than one month), store as follows.

- Clean and wash all parts, then store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with a sheet.
- Completely fill the fuel tank. This prevents moisture from collecting.
- Lubricate and change the oil before storage.
- Coat the exposed portion of the hydraulic cylinder piston rod with grease.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
- Lock each control lever and pedal with the lock lever and lock cover.
- Set the stop valve to the LOCK position on machines ready for attachments. Install the blind plugs to the elbows.
- Set the selector valve on the machines which can install attachments to the "Crusher or general attachment" position.
- To prevent corrosion, be sure to fill the cooling system with Supercoolant (AF-NAC) or permanent type antifreeze (density between 30% and 68%).

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DURING STORAGE

WARNING

If it is necessary to perform the rust-prevention operation while the machine is indoors, open the doors and windows to improve ventilation and prevent gas poisoning.

- During storage, operate and move the machine for a short distance once a month so that a new film of oil will coat moving parts. At the same time, also charge the battery.
- When operating the work equipment, wipe off all the grease from the hydraulic cylinder rods.
- If the machine is equipped with an air conditioner, operate the air conditioner for 3 to 5 minutes once a month to lubricate all parts of the air conditioner compressor. Always run the engine at low idle when doing this. In addition, check the refrigerant level twice a year.

AFTER STORAGE

NOTICE

If the machine has been stored without carrying out the monthly rust-prevention operation, consult your Komatsu distributor before using it.

When using the machine after long-term storage, do as follows before using it.

- Wipe off the grease from the hydraulic cylinder rods.
- Add oil and grease at all lubrication points.
- When the machine is stored for a long period, moisture in the air will mix with the oil. Check the oil before and after starting the engine. If there is water in the oil, change all the oil.

STARTING MACHINE AFTER LONG-TERM STORAGE

When starting the engine after long-term storage, carry out the warming-up operation thoroughly. For details, see "Engine Warm Up (PAGE 3-139)".

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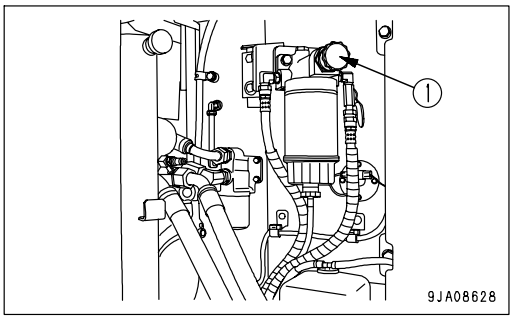
TROUBLES AND ACTIONS

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. Loosen the knob of feed pump (1), pull it out, then pump it in and out until the movement becomes heavy.



REMARK

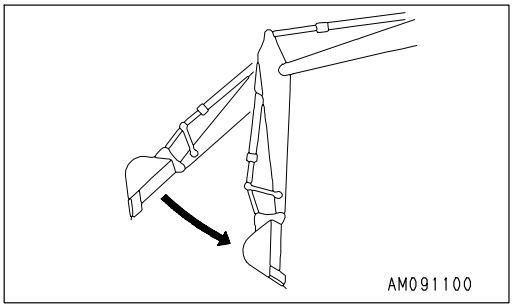
It is not necessary to remove the plug at the top of the fuel pre-filter and fuel main filter.

2. Push in the knob of feed pump (1) and tighten it.
3. 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 2 minutes, then try again. Perform this operation a maximum of 4 times.

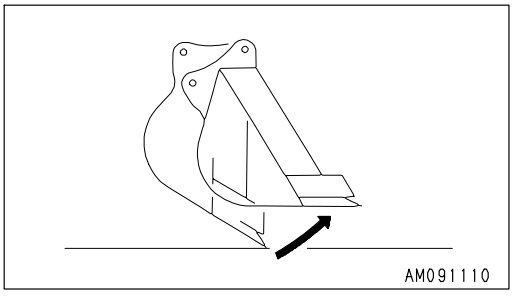
PHENOMENA THAT ARE NOT FAILURES

Note that the following phenomena are not failures:

- When the arm control lever is operated to the IN position and the work equipment is lowered under no load from a high position, the arm speed will drop momentarily when the arm is more or less at the vertical position.



- When the bucket control lever is operated to the CURL position and the work equipment is lowered under no load from a high position, the bucket speed will drop momentarily when the bucket teeth are more or less at the horizontal position.
- The bucket or arm will fluctuate by itself 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.

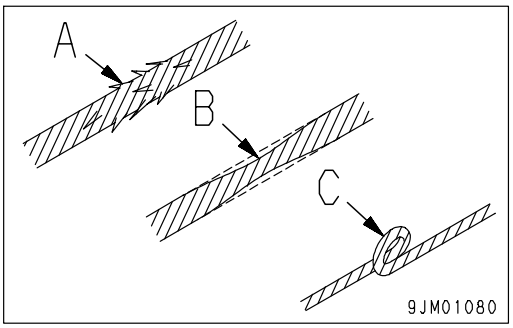
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TOWING THE MACHINE

WARNING

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

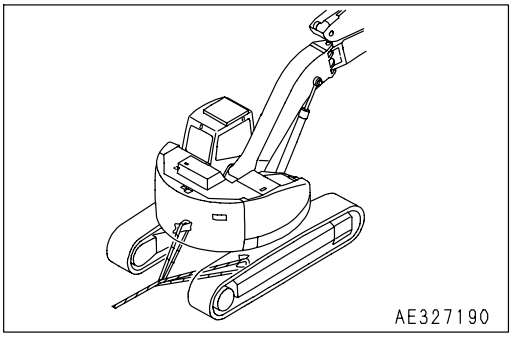
- **Always check that the wire rope used for towing has ample strength for the weight of the machine being towed.**
- **Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.**
- **Always wear leather gloves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

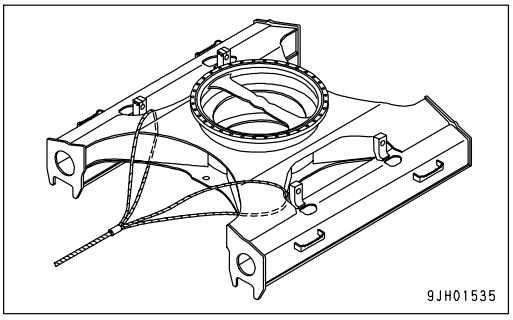


NOTICE

The maximum towing capacity for this machine is 9,710 kg (95,200 N).
Always carry out towing operations within the maximum towing capacity.

- 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.
- Hold the wire rope level and direct it straight to the track frame.
- When towing a machine, travel at a speed of less than 1 km/h for a distance of only a few meters to a place that is suitable for carrying out repairs.
  This is for use only in emergencies.





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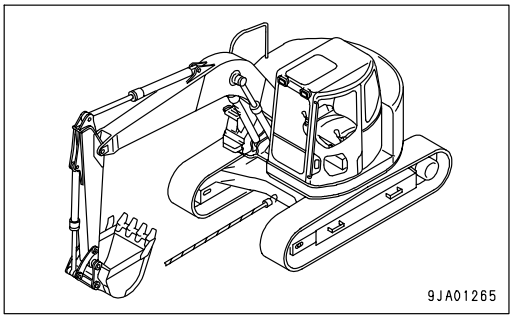
LIGHTWEIGHT TOWING HOOK

WARNING

- **The shackle must always be used.**
- **Hold the wire rope level and direct it straight to the track frame.**
- **Move the machine slowly and be careful not to apply any sudden load to the wire rope.**

There is a hole in the track frame to fit the shackle when towing light objects.

Permissible towing load: Max. 65,700 N (6,700 kg)



SEVERE JOB CONDITION

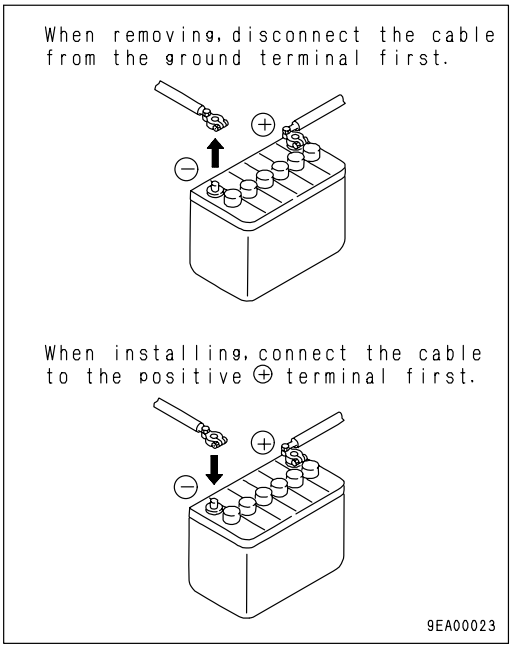
- When carrying out digging operations in water, if the work equipment mounting pin goes into the water, carry out greasing every time the operation is carried out.
- For heavy-duty operations and deep digging, carry out greasing of the work equipment mounting pins every time before operation.
  After greasing, operate the boom, arm and bucket several times, then grease again.

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DISCHARGED BATTERY

⚠ WARNING

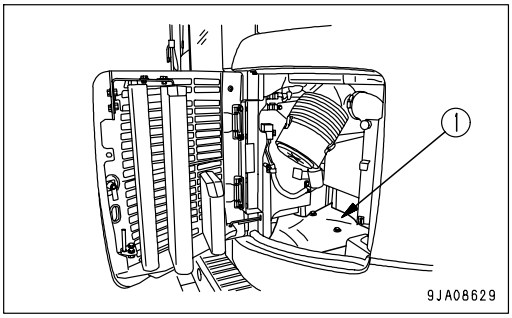
- **It is dangerous to charge a battery when mounted on a machine. Make sure that it is dismounted before charging.**
- **When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.**
- **The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.**
- **Battery electrolyte is dilute sulfuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, immediately wash it off with a large amount of water. If it gets in your eyes, wash it out with fresh water and consult a doctor.**
- **When handling batteries, always wear safety glasses and rubber gloves.**
- **When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, install the positive (+) terminal first.**
  If a tool touches the positive terminal and the chassis, there is danger that it will cause a spark, so be extremely careful.
- **If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.**
- **When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.**



Battery Removal and Installation

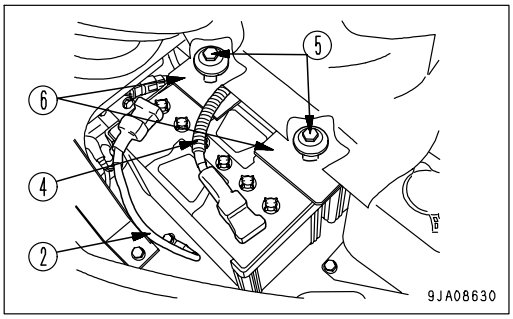
Removal of Battery

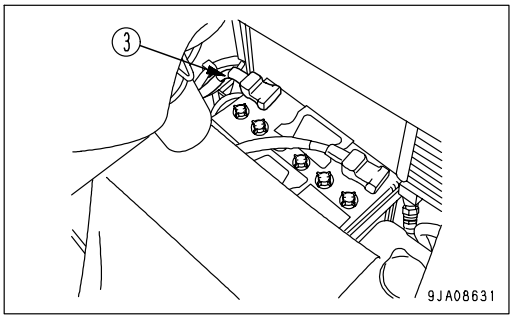
1. Open the battery room door, then move vinyl cover (1) (installed on top of the battery).



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2. Remove cable (2) from the negative (-) terminal (ground).
3. Remove connection cable (4) and cable (3) from the pos-itive (+) terminal.
4. Remove 2 mounting bolts (5), then remove mounting holder (6) and vinyl cover (1).
5. Pull the battery to the outside of the machine.





Installing of Battery

NOTICE

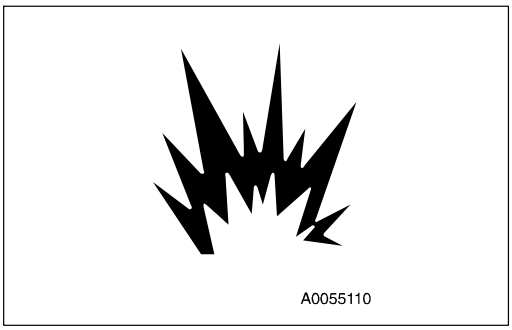
After securing the battery, check that it does not move. If it moves, tighten it again securely.

1. Place the battery in the specified position.
2. Fix the battery securely with mounting holder (6) and mounting bolts (5). When securing the battery in place, install vinyl cover (1).
   Permissible tightening torque for mounting bolts: 9.8-19.6 Nm (1-2 kgm, 7.2-14.5 lbft)
3. Install cable (3) at the positive (+) terminal end.
4. Connect connection cable (4) from the (+) terminal.
5. Connect cable (2) to the negative (-) terminal end (ground).

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Battery Charges

When charging the battery, if the battery is not handled correctly, there is a hazard that the battery may explode. Always follow the instructions of "DISCHARGED BATTERY (PAGE 3-196)" and the instruction manual accompanying the charger, and do as follows.



- Set the voltage of the charger to match the voltage of the battery to be charged. If the correct voltage is not selected, the charger may overheat and cause an explosion.
- Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to attach the clips securely.
- Set the charging current to 1/10 of the value of the rated battery capacity; when carrying out rapid charging, set it to less than the rated battery capacity.
  If the charger current is too high, the electrolyte will leak or dry up, and this may cause the battery to catch fire and explode.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a danger that this will ignite the battery electrolyte and cause the battery to explode.
- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.

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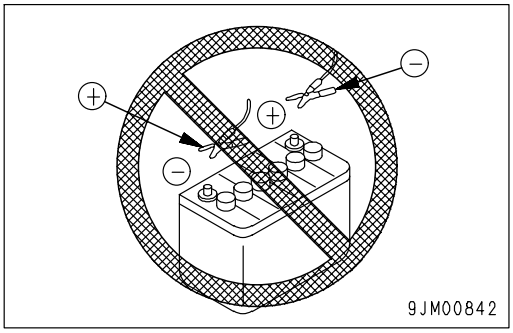
Starting Engine with Booster Cables

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.
- Be careful not to make a mistake when connecting a booster cable. In the last connection (to the upper structure frame), a spark will be caused, connect the cable to a spot as far away from the battery as possible. (Avoid the work equipment, however, because it is not a good conductor)
- When removing the booster cable, exercise good care so that the booster cable clips may not contact each other, or they contact the chassis.



NOTICE

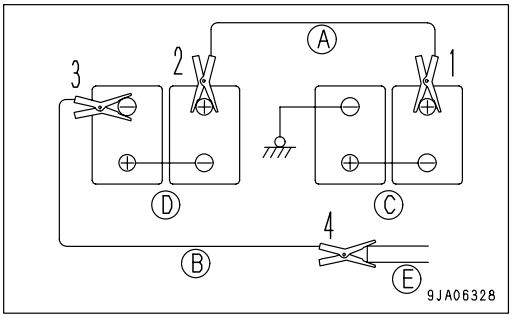
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the engine to be started. The starting system for this machine uses 24 V. For the normal machine, also use a 24 V battery.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check that the lock levers of both machines are in the LOCK position.
- Check that each lever is in the NEUTRAL position.

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Booster Cable Connection

Keep the starting switch of the normal machine and problem machine in the OFF position.
Connect the booster cable as follows, in the order of the numbers marked in the diagram.

1. Connect the clip of booster cable (A) to the positive (+) terminal of battery (C) on the problem machine.
2. Connect the clip at the other end of booster cable (A) to the positive (+) terminal of battery (D) on the normal machine.
3. Connect the clip of booster cable (B) to the negative (-) terminal of battery (D) on the normal machine.
4. Connect the other clip of booster cable (B) to the revolving frame (E) of the problem machine.



Starting the Engine

CAUTION

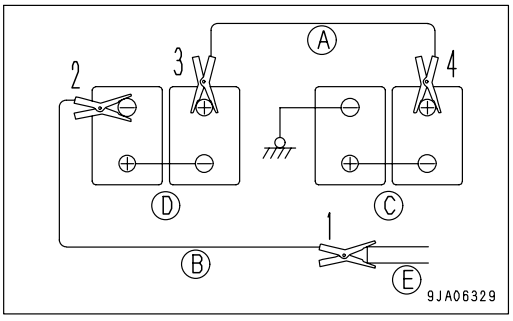
Always check that the lock lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Check also that all the control levers are at the HOLD or neutral position.

1. Make sure the clips are firmly connected to the battery terminals.
2. Start engine of the normal machine and run it at high idle speed.
3. Turn the starting switch of the problem machine to the START position and start the engine.
   If the engine doesn't start at first, try again after 2 minutes or so.

Booster Cable Disconnection

After the engine has started, disconnect the booster cables in the reverse of the order in which they were connected.

1. Remove one clip of booster cable (B) from the revolving frame (E) of the problem machine.
2. Remove the clip of booster cable (B) from the negative (-) terminal of battery (D) on the normal machine.
3. Remove the clip of booster cable (A) from the positive (+) terminal of battery (D) on the normal machine.
4. Remove the clip of booster cable (A) from the positive (+) terminal of battery (C) on the problem machine.



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OTHER TROUBLE

Electrical System

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of problems or causes which are not listed below, contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed	• Defective wiring, deterioration of battery	(• Check, repair loose terminals, disconnections, replace battery)
Lamp flickers while engine is running	• Loose fan belt	(• Replace fan belt, Check tension)
Charge level monitor does not go out even when engine is running	• Defective alternator • Defective wiring	(• Replace) (• Check, repair)
Abnormal noise is generated from alternator	• Defective alternator	(• Replace)
Starting motor does not turn when starting switch is turned to ON	• Defective wiring • Defective starting motor • Insufficient battery charge	(• Check, repair) (• Replace) • Charge
Pinion of starting motor keeps going and out	• Insufficient battery charge • Defective safety relay	• Charge (• Replace)
Starting motor turns engine sluggishly	• Insufficient battery charge • Defective starting motor	• Charge (• Replace)
Starting motor disengages before engine starts	• Defective wiring, defective ring gear pinion • Insufficient battery charge	(• Check, repair) • Charge
Engine pre-heating monitor does not light	• Defective wiring • Defective heater relay • Defective monitor	(• Check, repair) (• Replace) (• Replace)
Oil pressure monitor does not light up when engine is stopped (starting switch at ON position)	• Defective monitor • Defective caution lamp switch	(• Replace) (• Replace)
Outside of electrical heater is not warm when touched by hand	• Defective wiring • Disconnection in electric heater • Defective operation of heater	(• Check, repair) (• Replace) (• Replace)
Travel alarm does not sound when travel lever is operated	• Defective wiring • Defective alarm • Defective travel PPC pressure sensor	(• Check for loose connector terminals or disconnection, repair) (• Replace) (• Replace)
Rear-view monitor does not show image	• Defective wiring • Defective camera • Defective monitor	(• Check for loose, missing connectors or disconnection, repair) (• Replace) (• Replace)
Starting motor turns but engine does not start	• Defective engine controller power supply circuit • Defective relay • Defective connector at engine end	(• Replace) (• Replace) (• Check for loose, missing connectors or disconnection, repair)

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Chassis

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of problems or causes which are not listed below, contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Speed of travel, swing, boom, arm, bucket is slow	• Lack of hydraulic oil	• Add oil to specified level, see CHECK BEFORE STARTING
Pump generates abnormal noise (sucking in air)	• Clogged element in hydraulic tank strainer, lack of oil	• Clean, see EVERY 2000 HOURS SERVICE
Excessive rise in hydraulic oil temperature	• Loose fan belt • Dirty oil cooler • Lack of hydraulic oil	(• Check fan belt tension, replace) • Clean, see EVERY 500 HOURS SERVICE • Add oil to specified level, see CHECK BEFORE STARTING
Track comes off	• Track too loose	• Adjust track tension, see WHEN REQUIRED
Abnormal wear of sprocket		
Boom rises slowly, does not rise	• Lack of hydraulic oil	• Add oil to specified level, CHECK BEFORE STARTING
Does not swing	• Swing lock switch still applied	• Turn swing lock switch OFF

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Engine

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of problems or causes which are not listed below, contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Engine oil pressure monitor lights up	• Oil level low in oil pan (sucking air in) • Clogging oil filter cartridge • Defective tightening of oil pipe, pipe joint, oil leakage from damaged point • Defective engine oil pressure sensor • Defective monitor	• Add oil to specified level, see CHECK BEFORE STARTING • Replace cartridge, see EVERY 500 HOURS SERVICR (• Check, repair) (• Replace sensor) (• Replace monitor)
Steam spurts out from top of radiator (pressure valve)	• Coolant level low, leakage of water • Loose fan belt • Dirt scale accumulated in cooling system	• Check, add coolant, repair, see CHECK BEFORE STARTING • Adjust fan belt tension, see EVERY 500 HOURS SERVICE • Change coolant, flush inside of cooling system, see WHEN REQUIRED
Engine water temperature gauge indicator is in red range	• Clogging radiator fins or damages fins • Defective thermostat • Loose radiator filler cap (high altitude operations) • Defective monitor	• Clean or repair, see EVERY 500 HOURS SERVICE (• Replace thermostat) • Tightening cap or replace packing (• Replace monitor)
Engine dose not start when starting motor is turned	• Lack of fuel • Air in fuel system • Defective fuel injection pump or defective nozzle • Starting motor cranks engine sluggishly • Pre-heating monitor dose not light up • Defective compression (• Defective valve clearance)	• Add fuel, see CHECK BEFORE STARTING • Repair place where air in sucked in, see EVERY 500 HOURS SERVICE (• Replace pump or nozzle) • See ELECTRICAL SYSTEM • See ELECTRICAL SYSTEM (• Adjust valve clearance)
Exhaust gas is white or blue	• Too mach oil in oil pan • Improper fuel	• Add oil to specified level, see CHECK BEFORE STARTING • Change to specified fuel
Exhaust gas sometimes becomes black	• Clogging air cleaner element • Defective nozzle • Defective compression • Defective turbocharger	• Clean or replace, see WHEN REQUIRED (• Replace nozzle) (• See "Defective compression") (• Clean or replace turbocharger)
Combustion noise occasionally make breathing sound	• Defective nozzle	(• Replace nozzle)

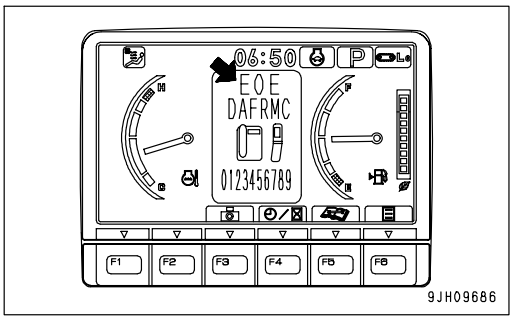
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Problem	Main causes	Remedy
Abnormal noise generated (combustion or mechanical)	• Low grade fuel being used • Overheating • Damage inside muffler • Excessive valve clearance	• Change to specified fuel • See "Engine water temperature gauge indicator is in red range" above (• Replace muffler) (• Adjust valve clearance)
Engine stops while in work	• Clogged pre-filter, main filter • Defective engine and fuel line	• Replace filter cartridge (• Check, repair)

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Electronic Control System

When the user code is shown on the display portion of the machine monitor, take the respective measures shown in the self-diagnosis chart below.



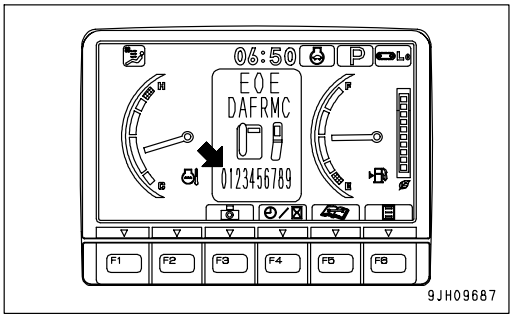
Machine Monitoring System

Monitor display	Failure mode	Action
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. (*)
E03	Swing brake system error	Move the swing brake cancel switch up to release the brake. When applying the swing brake, operate the swing lock switch manually. Depending on the cause of the problem, it may not be possible to release it. In any case, have inspection carried out immediately.(*)
E10	Engine controller power source error Engine controller drive system circuit error (engine stopped)	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	Abnormality in throttle system	Operate machine to a safe posture and have inspection carried out immediately.
E15	Engine sensor (coolant temperature, fuel pressure, oil pressure) system 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.

(*): For details of handling the emergency pump drive switch and swing brake cancel switch, see "Emergency Pump Drive Switch (PAGE 3-71)" and "Swing Parking Brake Release Switch (PAGE 3-71)".

Point of Contact to Telephone when Error Occurs

If an error screen is displayed on the monitor, the telephone number for the point of contact is displayed at the bottom of the error screen.



REMARK

If no point of contact telephone number has been registered, no telephone number is displayed.

It is necessary to register the telephone number, please ask your Komatsu distributor to carry out the registration.

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MAINTENANCE

⚠ WARNING

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

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MAINTENANCE INFORMATION

Do not perform any inspection and maintenance operation that is not found in this manual.

Service Meter Reading

Check the service meter reading every day to see if the time has come for any necessary maintenance to be performed.

Komatsu Genuine Replacement Parts

Use Komatsu genuine parts specified in the Parts Book as replacement parts.

Komatsu Genuine Lubricants

For lubrication of the machine, use the Komatsu genuine lubricants. Moreover use oil of the specified viscosity according to the ambient temperature.

Windshield Washer Fluid

Use automobile window washer fluid, and be careful 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 quantity of metal particles or foreign materials are found, always report to the person in charge, and carry out suitable action.

Fuel Strainer

Do not remove the strainer from the filler port when adding fuel.

Welding Instructions

- Cut off power. Wait for approx. one minute after turning off the engine starting switch key, and then disconnect the negative (-) terminal of the battery.
- Do not apply more than 200 V continuously.
- Connect grounding cable within 1 m (3.3 ft) of the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may malfunction.
- If a seal or bearing happens to come between the part being welded and grounding point, change the grounding point to avoid such parts.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

Do not Drop Things Inside Machine

- When opening inspection windows or the oil filler port of the tank to carry out inspection, be careful not to drop nuts, bolts, or tools inside the machine.
  If such things are dropped inside the machine, it may cause damage and/or malfunction of the machine, and will lead to failure. If you drop anything inside the machine, always remove it immediately.
- Do not put unnecessary things in your pockets. Carry only things which are necessary for inspection.

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Dusty Jobsite

When working at dusty worksites, do as follows:

- Inspect the dust indicator frequently to see if the air cleaner is dirty or clogged.
- Clean the radiator core frequently to avoid clogging.
- Clean and replace the fuel filter frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
- When inspecting or changing the oil, move the machine to a place that is free of dust to prevent dirt from getting into the oil.

Avoid Mixing Lubricants

If a different brand or grade of oil has to be added, drain the old oil and replace all the oil with the new brand or grade of oil. Never mix different brand or grade of oil.

Locking the Inspection Covers

Lock inspection cover securely into position with the lock bar. If inspection or maintenance is performed with inspection cover not locked in position, there is a danger that it may be suddenly blow shut by the wind and cause injury to the worker.

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 (PAGE 4-43)".

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 sharply. If they are installed so, their service life will be shortened extremely and they may be damaged.

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 the following:

- Checks after operation (with engine stopped)
  - Have any inspection and maintenance points been forgotten?
  - Have all inspection and maintenance items been performed correctly?
  - Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside the machine and get caught in the lever linkage mechanism.
  - Are there any leakage of coolant or oil? Have all nuts and bolts been tightened?
- Checks when operating engine
  - For details of the checks when operating the engine, see "TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-37)" and pay careful attention to safety.
  - Are the inspection and maintenance items working properly?
  - Is there any leakage of fuel or oil when the engine speed is raised?

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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 EO15W40DH (Komatsu genuine parts)
Damper case	Powertrain oil TO30 (Komatsu genuine parts)
Swing machinery case	
Final drive case	
Hydraulic oil system	Powertrain oil TO10 (Komatsu genuine parts)
Radiator	Supercoolant AF-NAC (density: 30% or above) (Komatsu genuine parts)

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.
  Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in the Operation and Maintenance Manual. Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
  The majority of problems with the machine are caused by the entry of such impurities.
  Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
  Having too much oil or too little oil are both causes of problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, please contact your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend you have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.
- When using commercially available oil, it may be necessary to reduce the oil change interval.
  We recommend that you use the Komatsu oil clinic to carry out a detailed checks of the characteristics of the oil.

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FUEL

- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified for the temperature in the Operation and Maintenance Manual.
  - If the fuel is used at temperatures lower than the specified temperature (particularly at temperatures below -15 °C (5°F), the fuel will solidify.
  - If the fuel is used at temperatures higher than the specified temperature, the viscosity will drop, and this may result in problems such as a drop in output.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.
- If there is any foreign material in the fuel tank, wash the tank and fuel system.

NOTICE

Always use diesel oil for the fuel.

To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device. This device requires high precision parts and lubrication, so if low viscosity fuel with low lubricating ability is used, the durability may drop markedly.

COOLANT AND WATER FOR DILUTION

- The coolant has the important function of preventing corrosion as well as preventing freezing.
  Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.
  Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.
- When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor. For details, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-21)".
- When diluting the antifreeze coolant, use distilled water or tap water (soft water).
  Natural water, such as a river water or well water (hard water), contains large amounts of minerals (calcium, magnesium, etc.), and this makes it easier for scale to form inside the engine or radiator. Once scale is deposited inside the engine or radiator, it is extremely difficult to remove. It also causes overheating due to poor heat exchange, so when you dilute the coolant, we recommend that you use water with an overall hardness of less than 100 PPM.
- When using antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- Antifreeze coolant is flammable, so be sure to keep it away from flame.
- The ratio of Supercoolant (AF-NAC) to water differs according to the ambient temperature.
  For details of the ratio when mixing, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-21)".
  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.

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GREASE

- Grease is used to prevent seizure and noises at the joints.
- This construction equipment is used under heavy-duty conditions. Always use the recommended grease and follow the change intervals and recommended ambient temperatures given in this Operation and Maintenance Manual.
- The nipples not included in the maintenance section are nipples for overhaul, so they do not need grease. If any part becomes stiff after being used for long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing. Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

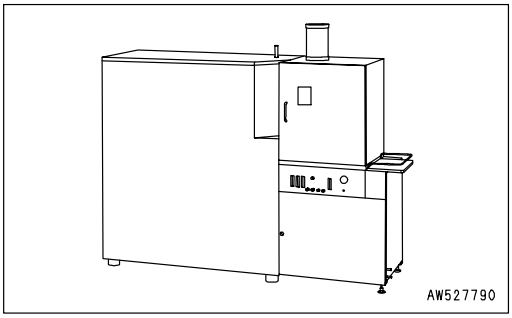
CARRYING OUT KOWA (Komatsu Oil Wear Analysis)

KOWA is a maintenance service that makes it possible to prevent machine failures and downtime. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other problems.

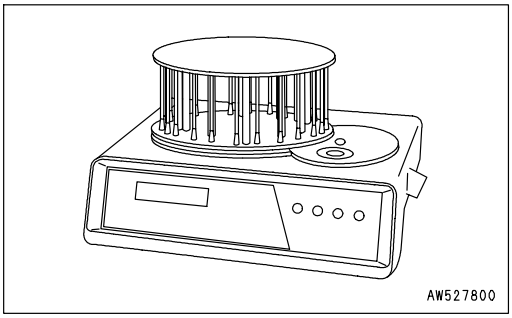
We strongly recommend you to use this service. The oil analysis is carried out at actual cost, so the cost is low, and the results of the analysis are reported together with recommendations which will reduce repair costs and machine downtime.

KOWA ANALYSIS ITEMS

- Measurement of density of metal wear particles
  This uses an ICP (Inductively Coupled Plasma) analyzer to measure the density of iron, copper, and other metal wear particles in the oil.



- Measurement of quantity of particles
  This uses a particle quantifier index measurement machine to measure the quantity of iron particles of 5μ or more, enabling early detection of failures.



- Others
  Measurements are made of items such as the ratio of water in the oil, density of the antifreeze coolant, ratio of fuel in the oil, and dynamic viscosity, enabling a highly precise diagnosis of the machine's health.

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OIL SAMPLING

- Sampling interval
  250 hours: Engine
  500 hours: Other components
- Precautions when sampling
  - Make sure that the oil is well mixed before sampling.
  - Perform sampling at regular fixed intervals.
  - Do not perform sampling on rainy or windy days when water or dust can get into the oil.

For further details of KOWA, please contact your Komatsu distributor.

STORING OIL AND FUEL

- Keep indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, put the drum on its side so that the filler port of the drums is at the side to prevent moisture from being sucked in.
  If drums have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

FILTERS

- Filters are extremely important safety parts. They prevent impurities in the fuel and air circuits from entering important equipment and causing problems.
  Replace all filters periodically. For details, see the Operation and Maintenance Manual.
  However, when working in severe conditions, replace the filters at shorter intervals according to the oil and fuel (sulfur content) being used.
- Never try to clean the filters (cartridge type) and use them again. Always replace with new filters.
- When replacing oil filters, check if any metal particles are attached to the old filter. If any metal particles are found, contact your Komatsu distributor.
- Do not open packs of spare filters until just before they are to be used.
- Always use Komatsu genuine filters.

ELECTRIC SYSTEM MAINTENANCE

- It is extremely dangerous if the electrical equipment becomes wet or the covering of the wiring is damaged. This will cause an electrical short circuit and may lead to malfunction of the machine. Do not wash the inside of the operator's cab with water. When washing the machine, be careful not to let water get into the electrical components.
- Service relating to the electric system is checking fan belt tension, checking damage or wear to the fan belt and checking battery fluid level.
- Never install any electric components other than those specified by Komatsu.
- External electro-magnetic interference may cause malfunction of the control system controller, before installing a radio receiver or other wireless equipment, contact your Komatsu distributor.
- When working at the seashore, carefully clean the electric system to prevent corrosion.
- When installing electrical equipment, connect it to the special power source connector.
  Do not connect the optional power source to the fuse, starting switch, or battery relay.

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WEAR PARTS

Replace wear parts such as the filter element or air cleaner element at the time of periodic maintenance or before they reach the wear limit. The wear parts should be replaced correctly in order to ensure more economic use of the machine. When replacing parts, always use Komatsu genuine parts.
As a result of our continuous efforts to improve product quality, the part number may change, so inform your Komatsu distributor of the machine serial number and check for the latest part number when ordering parts.

WEAR PARTS LIST

The parts in parentheses are to be replaced at the same time.

Item	Part No.	Part Name	Q'ty	Replacement frequency
Engine oil filter	600-211-2110	Cartridge	1	EVERY 500 HOURS SERVICE
Fuel pre-filter	885-3319-421	Cartridge Clear ball	1	
Hydraulic tank breather	20Y-60-21470	Element	1	
Hydraulic oil filter	14X-60-31150 (07000-12135)	Element (O-ring)	1 (1)	EVERY 1000 HOURS SERVICE
Fuel main filter	885-3319-922	Element	1	
Air cleaner	600-185-2100	Element assembly	1	-
Electric heater	6204-11-4850	Gasket	2	-
Bucket	205-70-74272 (205-70-74281) (205-70-74291)	Vertical pin type (Pin) (Lock)	4 (4) (4)	-
	205-70-19570 (09244-02496)	Horizontal pin type (Pin)	4 (4)	
	202-70-63161 202-70-63171 (208-32-11231) (01803-02228)	Side cutter (Left) Side cutter (Right) (Bolt) (Nut)	1 1 (8) (8)	
Reinforced blade (if equipped)	12F-70-31281 21Y-71-11221 (02090-11060) (02290-11016)	Edge (center portion) Edge (left, right) (Bolt) (Nut)	1 2 (24) (24)	-

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RECOMMENDED FUEL, COOLANT, AND LUBRICANT

- Komatsu genuine oils are adjusted to maintain the reliability and durability of Komatsu construction equipment and components.
  In order to keep your machine in the best conditioner for long periods of time, it is essential to follow the instructions in this Operation and Maintenance Manual.
- Failure to follow these recommendations may result in shortened life or excess wear of the engine, power train, cooling system, and/or other components.
- Commercially available lubricant additives may be good for the machine, but they may also cause harm. Komatsu does not recommend any commercially available lubricant additive.
- Use the oil recommended according to the ambient temperature in the chart below.
- Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.
- When starting the engine in temperatures below 0°C (32°F), be sure to use the recommended multi-grade oil, even if the ambient temperature may become higher during the course of the day.
- If the machine is operated at a temperature below -20°C (-4°F), a separate device is needed, so consult your Komatsu distributor.
- When the fuel sulfur content is less than 0.5%, 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.

Sulfur content (%)	Oil change interval
Less than 0.5	500 hours
0.5 - 1.0	250 hours
1.0 and up	Not recommendable (*)

* If these fuels are used, there is danger that serious trouble may occur because of early deterioration of the engine oil or early wear of the internal parts of the engine. If the local situation makes it necessary to use these fuels, always remember the following.
  1) Be sure to check Total Basic Number (TBN) of oil frequently by TBN handy checker etc., and change oil based on the result.
  2) Always be aware that oil change interval is extremely shorter than standard.
  3) Be sure to carry out periodic engine inspection by distributor's expert since change interval of periodic replacement parts and overhaul interval are also shorter.

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USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius -22 -4 14 32 50 68 86 104 122°F -30 -20 -10 0 10 20 30 40 50°C	Recommended Komatsu Fluids
Engine oil pan	Engine oil	(Note.1)	Komatsu EOS0W30
		(Note.1)	Komatsu EOS5W40
			Komatsu EO10W30-DH
			Komatsu EO15W40-DH
			Komatsu EO30-DH
Swing machinery case Final drive case PTO gear case	Powertrain oil (Note.2)		TO30
Hydraulic system	Powertrain oil		TO10
	Hydraulic oil		HO46-HM
Grease fitting	Hyper grease (Note.3)		G2-T, G2-TE
	Lithium EP grease		G2-LI
Cooling system	Supercoolant AF-NAC (Note.4)		AF-NAC
Fuel tank	Diesel fuel		ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
			ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

- ASTM: American Society of Testing and Material

		Engine oil pan	Swing machinery case	Final drive case (each)	PTO gear case	Hydraulic system	Fuel tank	Cooling system
Specified capacity	Liters	11.5	2.5	2.1	0.75	120	195	12.4
	US gal	3.04	0.66	0.55	0.20	31.68	51.48	3.28
Refill capacity	Liters	11	2.5	2.1	0.75	69	-	-
	US gal	2.91	0.66	0.55	0.20	18.22	-	-

NOTICE

Always use diesel oil for the fuel.

To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device. This device requires high precision parts and lubrication, so if low viscosity fuel with low lubricating ability is used, the durability may drop markedly.

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Note 1: HTHS (High-Temperature High-Shear Viscosity 150°C), specified by ASTM D4741 must be equal to or higher than 3.5 mPa-S. Komatsu EOS0W30 and EOS5W40 are the most suitable oils.

Note 2: Powertrain oil has different properties from engine oil. Be sure to use the recommended oils.

Note 3: Hyper grease (G2-T, G2-TE) has a high performance.
When it is necessary to improve the lubricating ability of the grease in order to prevent squeaking of pins and bushings, the use of G2-T or G2-TE is recommended.

Note 4: Supercoolant (AF-NAC)
1) Coolant has the important function of anticorrosion as well as antifreeze.
Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.
Komatsu machines are supplied with Komatsu Supercoolant AF-NAC. Komatsu Supercoolant AF-NAC has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours.
Komatsu Supercoolant AF-NAC is strongly recommended wherever available.
2) For details of the ratio when diluting super coolant with water, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-21)".
Supercoolant AF-NAC may be supplied in premix. In this case, always top off with premix solution. (never dilute with water)
3) To maintain the anticorrosion properties of Supercoolant AF-NAC, always keep the density of Supercoolant between 30% and 68%.

RECOMMENDED BRANDS, RECOMMENDED QUALITY FOR PRODUCTS OTHER THAN KOMATSU GENUINE OIL

When using commercially available oils other than Komatsu genuine oil, consult your Komatsu distributor.

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TIGHTENING TORQUE SPECIFICATIONS

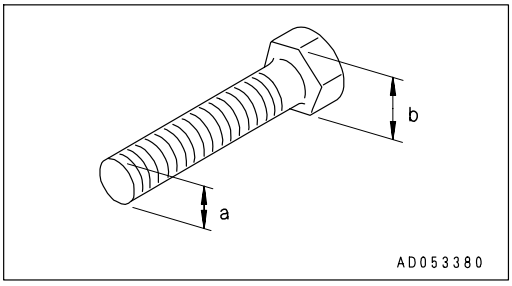
TIGHTENING TORQUE LIST

CAUTION

If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation.
Always pay careful attention when tightening parts.

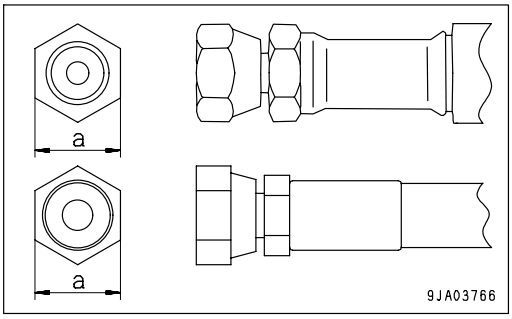
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		Nm	kgm	lbft	Nm	kgm	lbft
6	10	13.2	1.35	9.8	11.8-14.7	1.2-1.5	8.7-10.8
8	13	31	3.2	23.1	27-34	2.8-3.5	20.3-25.3
10	17	66	6.7	48.5	59-74	6.0-7.5	43.4-54.2
12	19	113	11.5	83.2	98-123	10.0-12.5	72.3-90.4
14	22	172	17.5	126.6	153-190	15.5-19.5	112.1-141
16	24	260	26.5	191.7	235-285	23.5-29.5	170.0-213.4
18	27	360	37	267.6	320-400	33.0-41.0	238.7-296.6
20	30	510	52.3	378.3	455-565	46.5-58.0	336.3-419.5
22	32	688	70.3	508.5	610-765	62.5-78.0	452.1-564.2
24	36	883	90	651	785-980	80.0-100.0	578.6-723.3
27	41	1295	132.5	958.4	1150-1440	118.0-147.0	853.5-1063.3
30	46	1720	175.0	1265.8	1520-1910	155.0-195.0	1121.1-1410.4
33	50	2210	225.0	1627.4	1960-2450	200.0-250.0	1446.6-1808.3
36	55	2750	280.0	2025.2	2450-3040	250.0-310.0	1808.3-2242.2
39	60	3280	335.0	2423.1	2890-3630	295.0-370.0	2133.7-2676.2



Apply the following table for Hydraulic Hose.

Hose nominal number	Width across flat a (mm)	Tightening torque					
		Target valve			Service limit		
		Nm	kgm	lbft	Nm	kgm	lbft
02	19	44	4.5	32.5	35-54	3.5-5.5	25.3-47.0
03	22	74	7.5	54.2	54-93	5.5-9.5	39.8-68.7
	24	78	8.0	57.9	59-98	6.0-10.0	43.4-72.3
04	27	103	10.5	75.9	84-132	8.5-13.5	61.5-97.6
05	32	157	16.0	115.7	128-186	13.0-19.0	94.0-137.4
06	36	216	22.0	159.1	177-245	18.0-25.0	130.2-180.8



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SAFETY CRITICAL PARTS

For using the machine safely for an extended period of time, you must periodically replace the safety critical and fire prevention-related parts listed in the table of important parts.
Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.
Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.
If any of the hose clamps show deterioration like deformation or cracking, replace the clamps at the same time as the hoses.
Also perform the following checks with hydraulic hoses which need to be replaced periodically. Tighten all loose clamps and replace defective hoses, as required.
When replacing hoses, always replace O-rings, gaskets, and other such parts at the same time.
Have your Komatsu distributor replace the critical parts.

SAFETY CRITICAL PARTS LIST

No.	Safety critical parts for periodic replacment	Q'ty	Replacement interval
1	Fuel hose (fuel tank - injection pump)	2	Every 2 years or 4000 hours, whenever comes sooner
2	Fuel return hose (return - fuel cooler inlet port)	1	
3	Fuel cooler return hose (fuel cooler outlet port - fuel tank)	1	
4	Turbocharger lubricating hose	1	
5	Engine oil filter hose (engine - oil filter)	2	
6	Pump outlet hose (pump - control valve delivery hose)	1	
7	Pump outlet hose (pump - control valve PP hose)	1	
8	Pump outlet hose (pump - control valve LS hose)	1	
9	Work equipment hose (boom cylinder inlet port)	4	
10	Work equipment hose (bucket cylinder line - boom foot)	2	
11	Work equipment hose (bucket cylinder inlet port)	2	
12	Work equipment hose (arm cylinder line - boom foot)	2	
13	Work equipment hose (arm cylinder inlet port)	2	
14	Attachment additional line hose (boom foot)	2	
15	Attachment additional line hose (boom top)	2	
16	Swing line hose (swing motor inlet port)	2	
17	Main suction hose	1	
18	Air conditioner heater hose	2	
19	Seat belt	1	Every 3 years
20	Engine high-pressure piping clamps	1set	Every 8000 hours
21	Fuel spray prevention cap	1set	

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MAINTENANCE SCHEDULE

If the machine is equipped with a hydraulic breaker, the maintenance schedule for some parts will be different. For details, see "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (PAGE 4-16)" to confirm the correct maintenance schedule when carrying out maintenance.

MAINTENANCE SCHEDULE CHART

WHEN REQUIRED

CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT ---- 4- 17
CLEAN INSIDE OF COOLING SYSTEM ---- 4- 21
CHECK AND TIGHTEN TRACK SHOE BOLTS ---- 4- 25
CHECK AND ADJUST TRACK TENSION ---- 4- 26
CHECK ROAD LINERS ---- 4- 28
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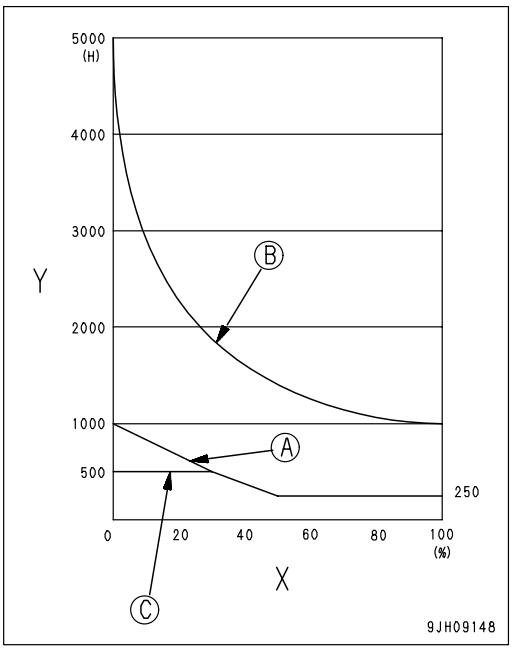
MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER

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,Pilot 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

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MAINTENANCE PROCEDURE

WHEN REQUIRED

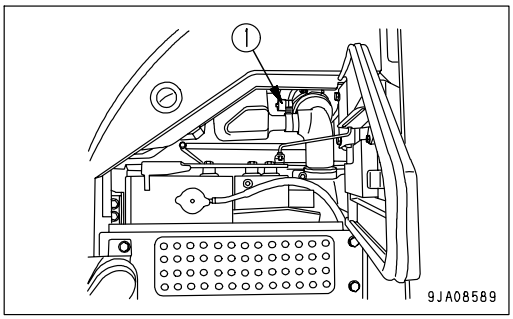
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

⚠ WARNING

- **If inspection, cleaning, or maintenance is carried out with the engine running, dirt will get into the engine and damage it. Always stop the engine before carrying out these operations.**
- **When using compressed air, there is danger that dirt may be blown around and cause serious injury. Always use protective glasses, dust mask, and other protective equipment.**

Checking

Open the rear cover of cab and check dust indicator (1). If a red piston shows in the transparent window, clean the air cleaner element.



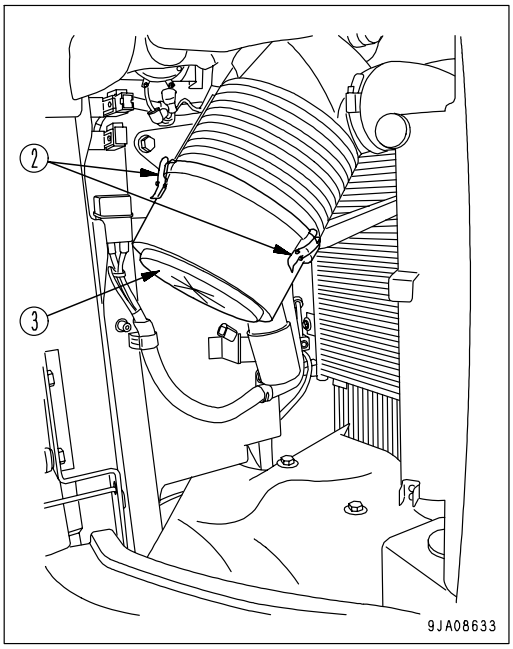
NOTICE

Do not clean the air cleaner element before the red piston in dust indicator (1) appears.

If the air cleaner element is cleaned frequently before the red piston in the dust indicator appears, the air cleaner cannot provide the proper performance and the cleaning efficiency is lowered.

Cleaning Outer Element

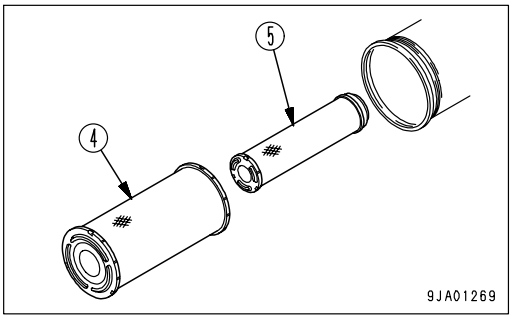
1. Open the battery room door on the left side of the machine, remove clips (2) at 3 places, then take out cover (3).



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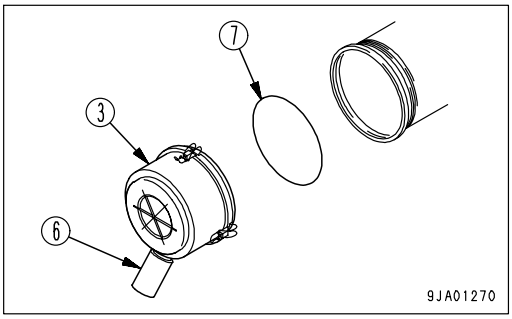
NOTICE
Never remove inner element (5). If it is removed, dust will enter and cause engine trouble.

2. Remove outer element (4).



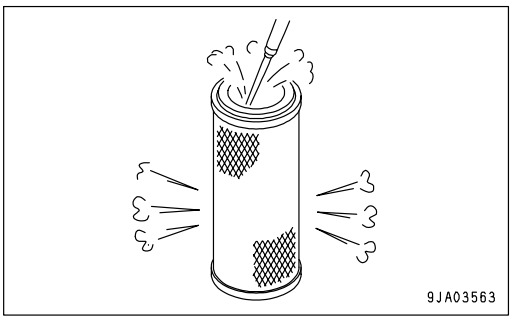
NOTICE
When cleaning cover (3), do not remove evacuator valve (6).

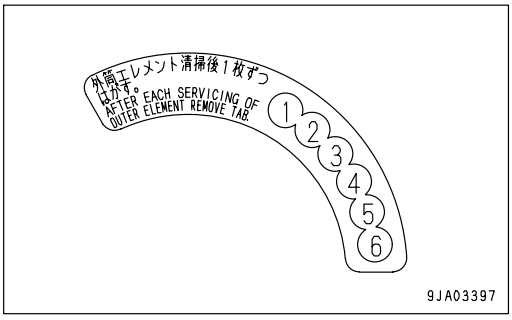
3. Clean the inside of the air cleaner body and the cover (3).



NOTICE
The inner element must not be used again even after cleaning. When replacing the outer element, replace the inner element at the same time.

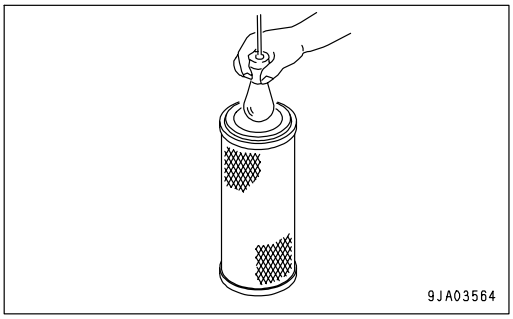
4. Direct dry compressed air (Max. 0.69 MPa (7 kg/cm^2, 99.4 PSI)) from the inside of the outer element along its folds. Then direct the compressed air from the outside along the folds, and again from the inside.
   1) Replace any outer element which has been cleaned 6 times or used for 1 year. Replace the inner element at the same time.
   2) Replace both inner and outer elements when the dust indicator red piston appears soon after installing the cleaned outer element even though it has not been cleaned 6 times.
   3) Remove one seal from the element whenever the element has been cleaned.





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5. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.



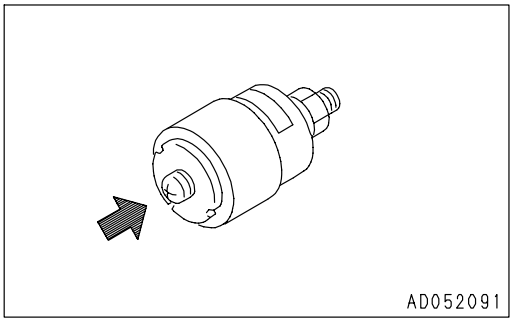
NOTICE

When cleaning the element, do not hit it or beat it against something.
Do not use an element whose folds or gasket or seal are damaged.
Wrap unused element and store them in a dry place.

⚠ CAUTION

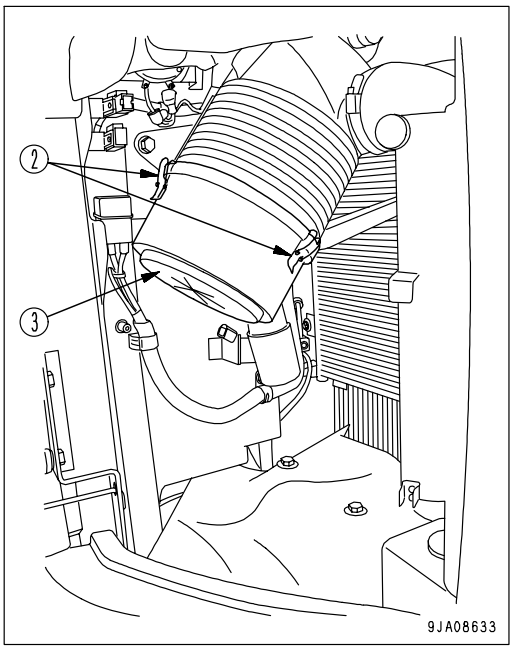
When installing the cover (3), check O-ring (7) and replace it if there are any scratches or damage.

6. Set the cleaned outer element in position, then secure cover (3) with mounting clips (2).
7. Press the button of dust indicator (1) to return the red piston to its original position.



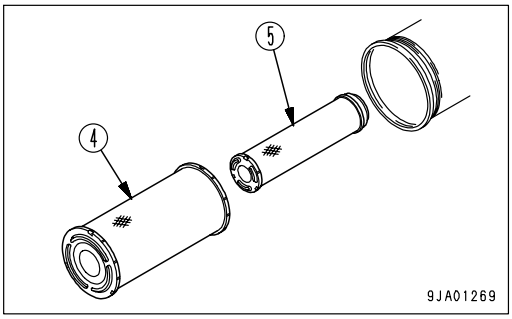
Replacing Element

1. Open the battery room door on the left side of the machine, remove clips (2) at 3 places, then take out cover (3).



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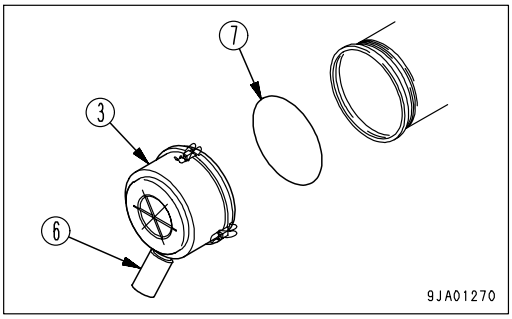
2. Remove outer element (4).
   Do not remove inner element (5) at this time, however.



NOTICE

When cleaning cover (3), do not remove evacuator valve (6).

3. Clean the inside of the air cleaner body and the cover (3).

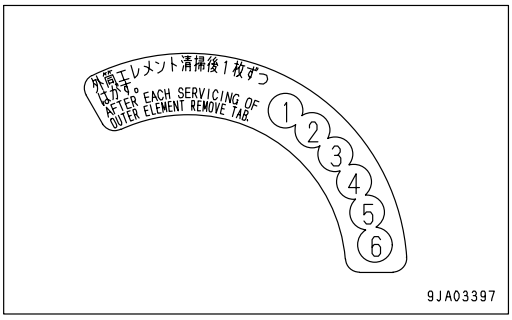


4. Remove inner element (5), then install a new inner element immediately.

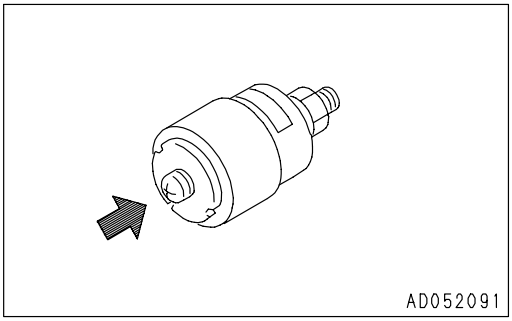
⚠ CAUTION

When installing the cover (3), check O-ring (7) and replace it if there are any scratches or damage.

5. Set the cleaned outer element in position, then secure cover (3) with mounting clips (2).
6. Replace the seal attached to cover (3) with new one.



7. Return the red piston in the dust indicator (1) to its original position.



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CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a hazard of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure before removing it.**
- **Cleaning is carried out with the engine running. When standing up or leaving the operator's seat, set the lock lever to the LOCK position.**
- **For details of starting the engine, see "BEFORE STARTING ENGINE (PAGE 3-114)" and "STARTING ENGINE (PAGE 3-133)" in the OPERATION section.**
- **The engine is operated when washing, so it is dangerous if the machine moves when you are standing behind it. Never stand behind the machine when the engine is running.**

Stop the machine on level ground when cleaning or changing the coolant.

Clean the inside of the cooling system, change the coolant according to the table below.

Antifreeze coolant	Interval of cleaning inside of cooling system and changing antifreeze coolant
Komatsu supercoolant (AF-NAC)	Every two years or every 4000 hours whichever comes first
Permanent type antifreeze (All-season type, *)	Every year (autumn) or every 2000 hours whichever comes first

*: Permanent type antifreeze shall meet the requirements of ASTM D3306-03.

The coolant has the important function of preventing corrosion as well as preventing freezing.
Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.
Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.

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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. atmospheric temperature	°C	Above-10	-15	-20	-25	-30
	°F	Above14	5	-4	-13	-22
Amount of antifreeze	liter	3.7	4.3	5.0	5.6	6.2
	US gal	0.98	1.14	1.32	1.48	1.64
Amount of water	liter	8.7	8.1	7.4	6.8	6.2
	US gal	2.30	2.14	1.96	1.80	1.64
Volume ratio (%)		30	35	40	45	50

⚠ WARNING

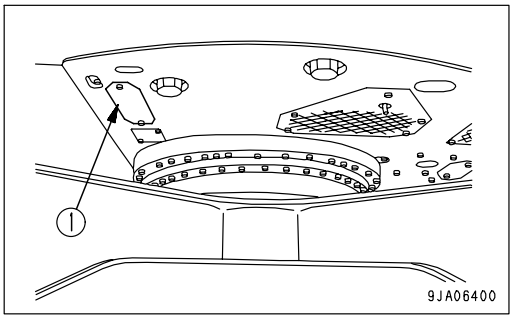
- **Antifreeze is flammable, so keep it away from flame.**
  Antifreeze is toxic. When open the drain valve, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.
- **When changing the coolant or draining the coolant from the radiator before carrying out repairs, ask a specialist company to handle any coolant containing antifreeze, or contact your Komatsu distributor. Antifreeze is toxic, so never pour it into drainage water ditches or drain it onto the ground surface.**

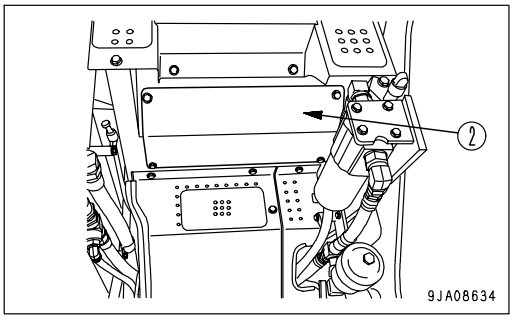
Use antifreeze and appropriate water for diluting. (for details, see "COOLANT AND WATER FOR DILUTION (PAGE 4-5)")
We recommend use of an antifreeze density gauge to control the mixing proportions.
Prepare a container whose capacity is larger than the specified coolant volume to catch drained coolant.
Prepare a hose to supply antifreeze coolant and water.

- Prepare a container with a capacity of at least 15 liter (3.96 US gal) to catch the coolant.

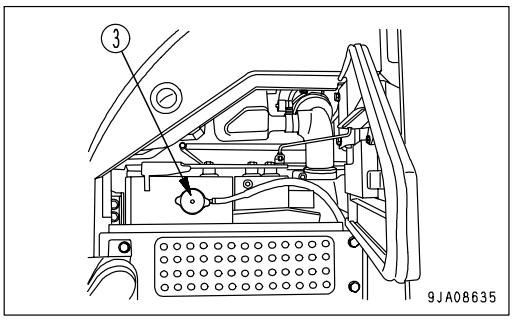
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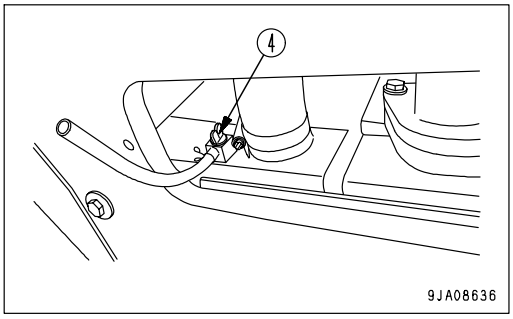
1. Stop the engine.
2. Remove undercover (1) and cover (2) between the hydraulic tank and operator's cab, then put a container in position to catch the coolant.

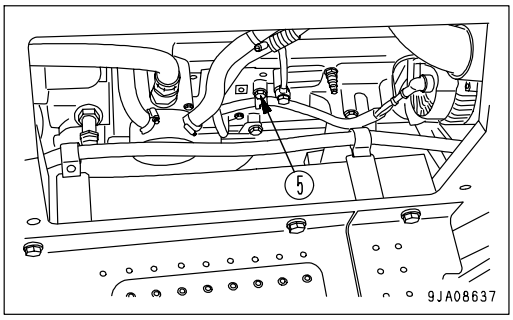




3. Check that the cooling water temperature has gone down enough to make it possible to touch the radiator cap surface by hand, then turn radiator cap (3) slowly until it contacts the stopper to release the pressure.
4. Following this, push radiator cap (3), turn it until it contacts the stopper, then remove it.
5. Open drain valve (4) at the bottom of the radiator and drain the water.
   Remove drain plug (5) in the cylinder block and drain the water.
6. After draining the water, close drain valve (4) and tighten drain plug (5), then fill with city water.
7. When the radiator is full, start the engine, and run it at low idle. Keep the engine running at low idle for 10 minutes until the water temperature reaches more than 90°C (194°F).
8. Stop the engine, then open drain valve (4) and remove drain plug (5) to drain the water.
9. Close drain valve (4). Wind seal tapes onto drain plug (5), then tighten it.
10. Install covers (1) and (2).
11. Fill with super coolant and tap water through the water filler up to the bottom of the filler.
    For details of the mix ratio for super coolant and water, see MIX RATIO CHART FOR WATER AND SUPER COOLANT.
12. To bleed the air from the cooling system, run the engine at low idle for 5 minutes, and for a further 5 minutes at high idle. (When doing this, leave the radiator cap off.)

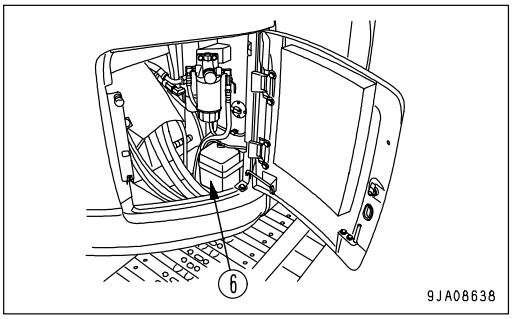


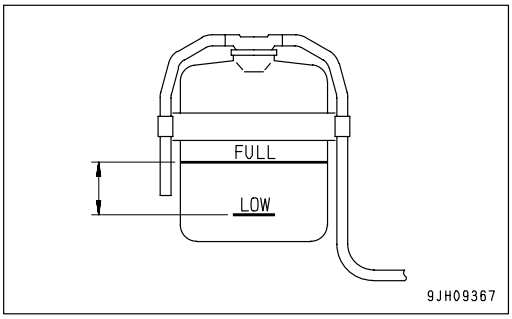




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13. Drain the water from sub tank (6), wash the inside of the sub tank, then add cooling water to a point midway between the FULL and LOW marks.
14. Stop the engine and tighten the cap. Check the coolant level, and add water if the level is low.

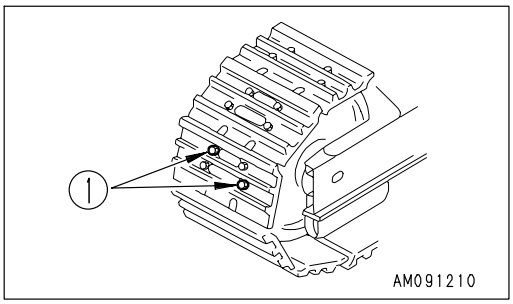


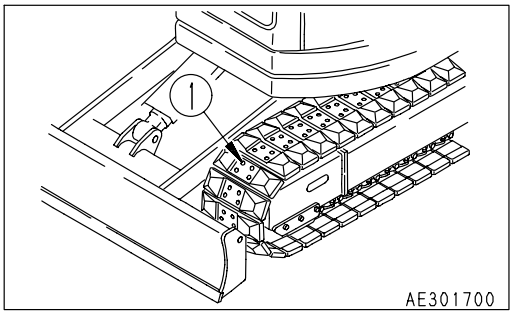


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CHECK AND TIGHTEN TRACK SHOE BOLTS

If the machine is used with track shoe bolts (1) loose, they will break, so tighten any loose bolts immediately.



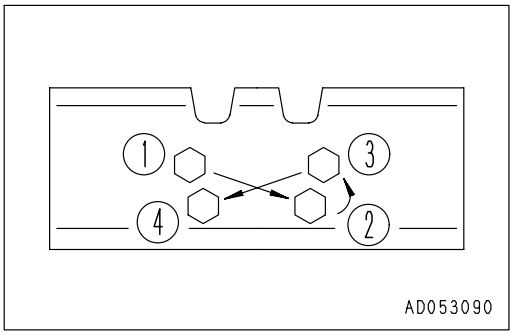


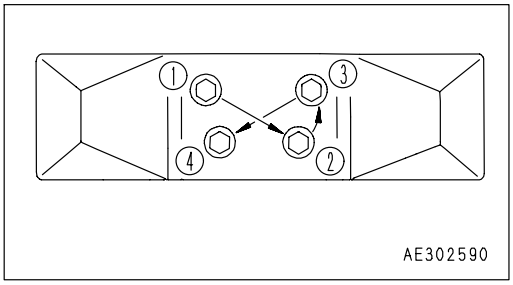
Tightening

1. First tighten to a tightening torque of 196 ± 19.6 Nm (20 ± 2 kgm, 144.7 ± 14.5 lbft) then check that the nut and shoe are in close contact with the link contact surface.
2. After checking, tighten the angle of the shoe bolts a further 90° ± 10° for steel shoes (120° ± 10° for swamp shoes) and 60° ± 10° for road liners.

Order for Tightening

Tighten the bolts in the order shown in the diagram on the right. After tightening, check that the nut and shoe are in close contact with the link mating surface.





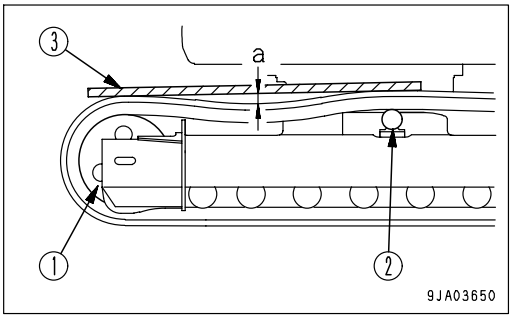
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CHECK AND ADJUST TRACK TENSION

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 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
     Deflection "a" should be 10 to 30 mm (0.4 to 1.2 in).

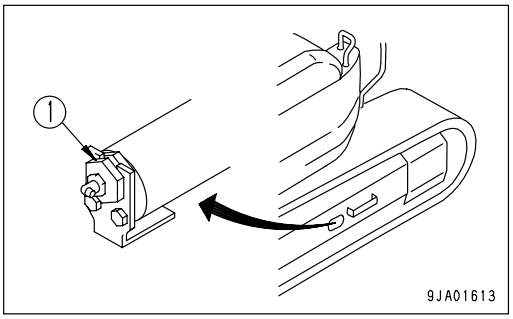


If the track tension is not at the standard value, adjust it in the following manner.

Adjustment

WARNING

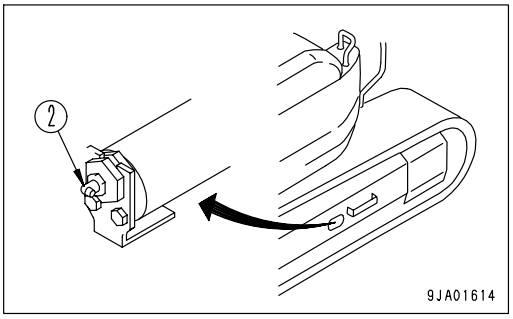
There is danger of plug (1) flying out under the high internal pressure of the grease. Never loosen plug (1) more than 1 turn.
Never loosen any part other than plug (1). Never put your face in the mounting direction of plug (1).
If the track tension cannot be loosened with the procedure given here, please contact your Komatsu distributor.



Increasing Track Tension

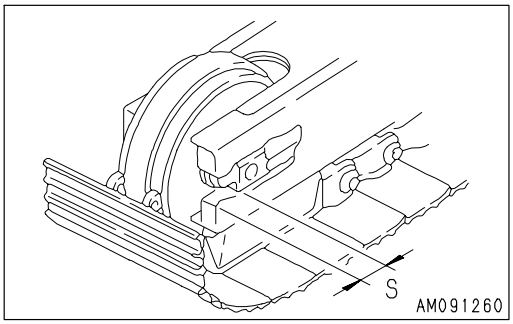
Prepare a grease pump.

1. Pump in grease through grease fitting (2) with a grease pump.
2. To check that the track tension is correct, run the engine at low idle, move the machine forward a distance equal to the length of track on ground, then stop the machine.
3. Check the track tension again, and if the tension is not correct, adjust it again.



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4. 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. Please contact your Komatsu distributor for repairs.

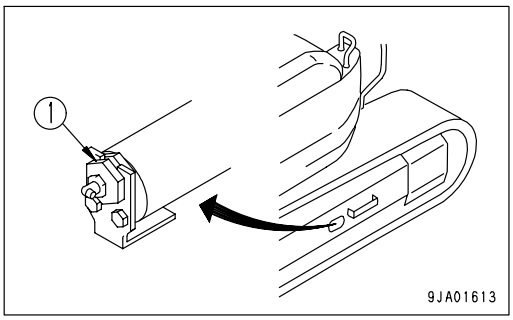


Loosening Track Tension

WARNING

It is extremely dangerous to release the grease by any method except the procedure given below.
If track tension is not relieved by this procedure, contact your Komatsu distributor for repairs.

1. Loosen plug (1) gradually to release the grease.
2. When loosening plug (1), turn it a maximum of one turn.
3. If the grease does not come out smoothly, move the machine forwards and backwards a short distance.
4. Tighten plug (1).
5. To check that the track tension is correct, run the engine at low idle, move the machine forward a distance equal to the length of track on ground, then stop the machine.
6. Check the track tension again, and if the tension is not correct, adjust it again.



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CHECK ROAD LINERS

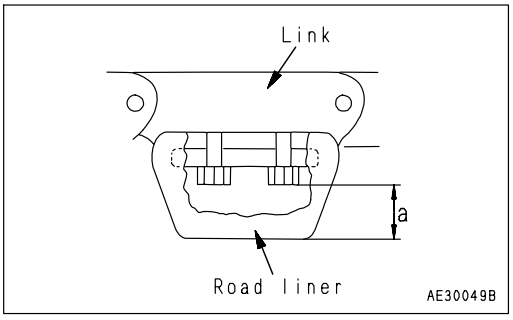
(Machine equipped with road liner)

If the road liners are in the following condition, they must be repaired or replaced, so please contact your Komatsu distributor for repairs or replacement.

Lug Height

If lug height "a" is reduced by wear, the drawbar pull will drop.
If "a" is less than 5 mm (0.2 in), replace with a new part.

When making judgement whether to replace, repair, or contiune using road liner, please contact your Komatsu distributor.



REPLACE ROAD LINERS

(Machine equipped with road liner)

- When replacing all the road liner for the machine, please contact your Komatsu distributor to have the replacement carried out.
- When replacing only part of the road liner, use the special road liner removal tool. Please order the tool from your Komatsu distributor.

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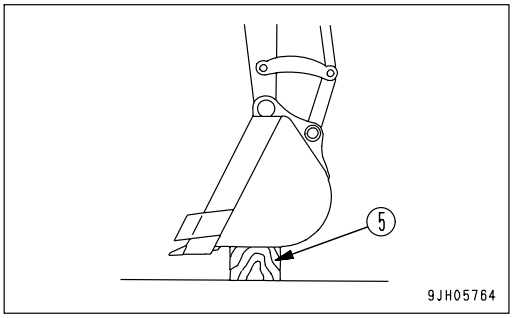
REPLACE BUCKET TEETH (VERTICAL PIN TYPE)

Replace the bucket teeth before the adapter starts to wear.

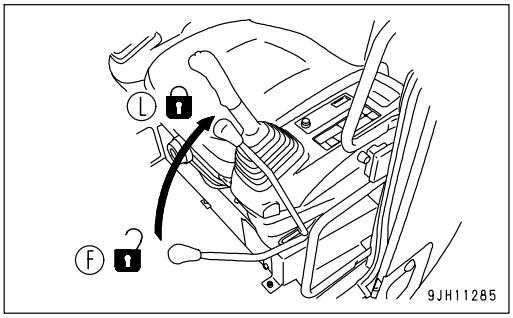
WARNING

- **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 set the lock lever securely to the LOCK position.**
- **The pins can be knocked out only with strong force, so there is a hazard that the pin may fly out. Check that there is no one in the surrounding area.**
- **There is a hazard that fragments will fly during the replacement work, so always wear protective equipment like safety glasses and gloves.**

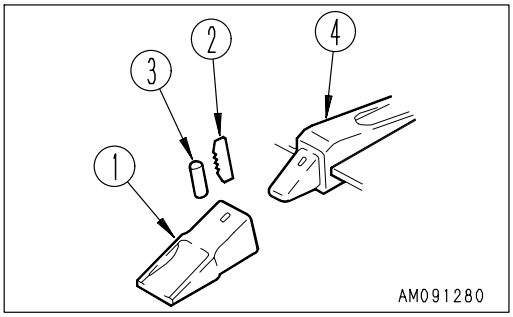
1. To make it possible to knock out pin of tooth (1), put block (5) under the bottom of the bucket, and set so that the bottom surface of the bucket is horizontal.



2. Check that the work equipment is in a stable condition, then set the lock lever to the LOCK position (L).



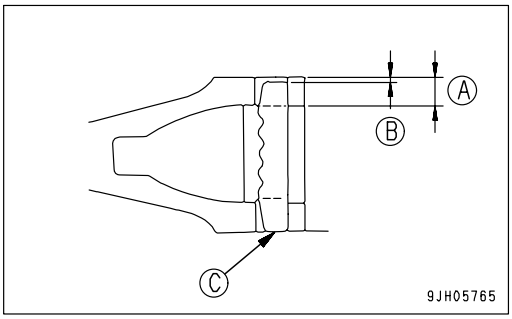
3. Use a hammer and drift to knock out lock pin (2). (If the drift is set against rubber pin lock (3) when it is hit, the rubber pin lock may break. Set it against the back of the pin.)
4. After removing lock pin (2) and rubber pin lock (3), check them.



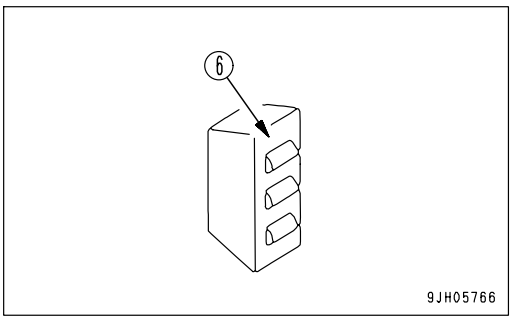
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If lock pin (2) and rubber pin lock (3) are used in the condition below, it will cause tooth (1) to come off during operation. Always replace them with new parts.

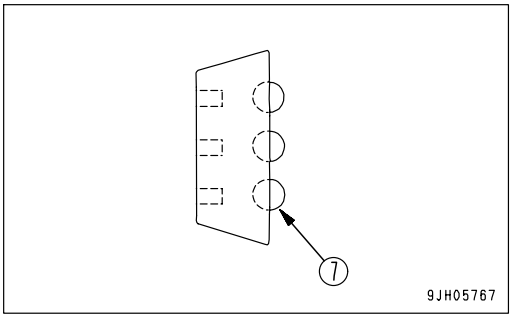
- The lock pin (2) is too short.
  Dimension (B) is 1/3 or more of dimension (A) when locking pin (2) is aligned with bottom face (C).



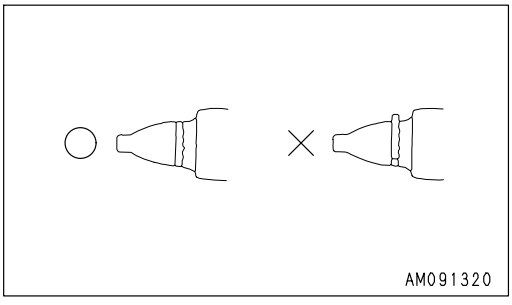
- Rubber (6) of the rubber pin lock is cut and the steel ball is about to come out.



- Steel ball (7) sinks in when it is pushed by hand.



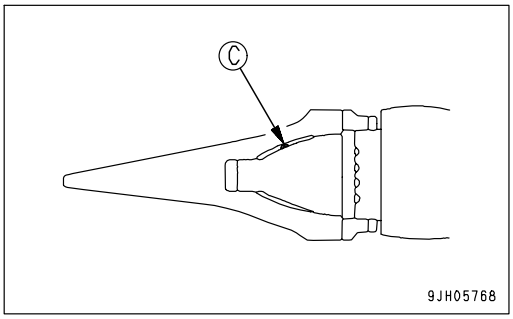
5. Clean the surface of adapter (4) and remove the soil with a knife.
6. Use your hand or a hammer to push rubber pin lock (3) into the hole of the adapter (4).
   When doing this, be careful that the rubber pin lock (3) does not fly out from the adapter surface.



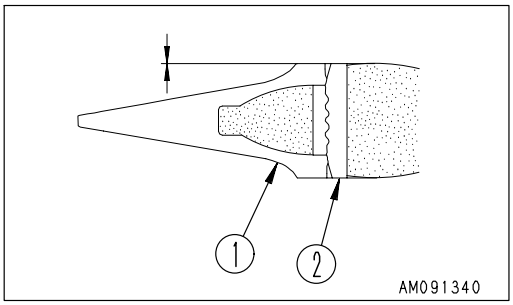
7. Clean the inside of teeth (1), then install it to adapter (4). If there is mud affixed to it or if there are protrusions, the teeth (1) will not enter the adapter properly, and there will not be proper contact at the mating portion.

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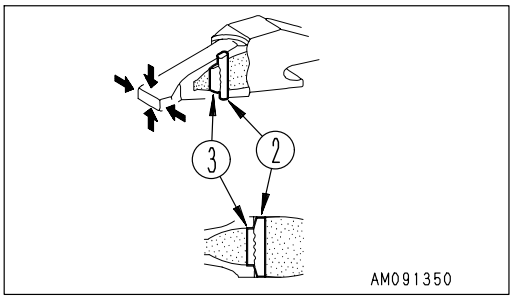
8. Fit tooth (1) to adapter (4), and confirm that when the pointer is pressed strongly, the rear face of the hole for the pin of the teeth (1) is at the same level as the rear face of the hole for the pin of the adapter (4).
   If the rear face of the pin hole of tooth (1) protrudes in front of the rear face of the pin hole of adapter (4), do not knock the pin in.
   If this happens, there is something (C) preventing the tooth (1) from fitting completely in adapter (4), locate the problem and remove the obstruction. When tooth (1) fits completely in adapter (4), knock in lock pin (2).



9. Insert lock pin (2) in the pin hole in the tooth (1), and knock it in so that the top surface of lock pin (2) is the same height as the surface of tooth (1).



10. After replacing a bucket tooth, always check the following.
    1) After the lock pin (2) has been knocked in completely, check that it is secured by the teeth (1) and surface.
    2) Lightly hit lock pin (2) in the reverse direction from which it was hit in.
    3) Lightly hit the tip of the teeth (1) from above and below, and hit its sides from right and left.
    4) Confirm that rubber pin lock (3) and lock pin (2) are set as shown in the figure.



REMARK

If the tooth is turned, the wear will become uniform. This will extend the service life of the tooth and reduce the frequency of replacement.

When replacing the tooth, replace the rubber pin lock and lock pin with new parts at the same time. This will prevent the tooth from falling out.

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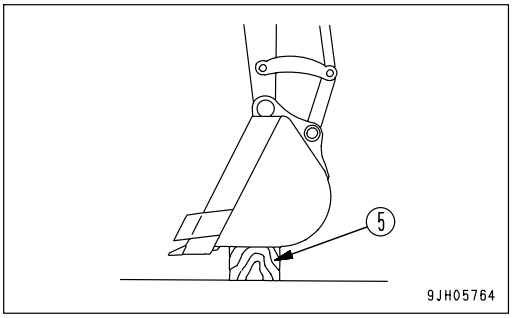
REPLACE BUCKET TEETH (HORIZONTAL PIN TYPE)

Replace the bucket teeth before the adapter starts to wear.

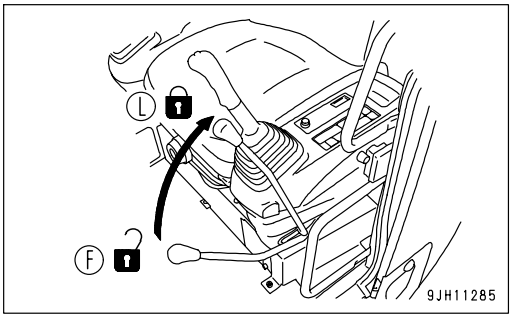
WARNING

- **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 set the lock lever securely to the LOCK position.**
- **The pins can be knocked out only with strong force, so there is a hazard that the pin may fly out. Check that there is no one in the surrounding area.**
- **There is a hazard that fragments will fly during the replacement work, so always wear protective equipment like safety glasses and gloves.**

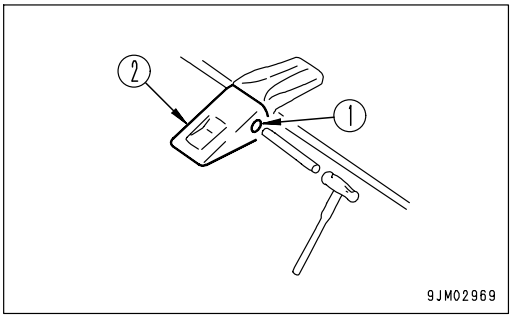
1. To make it possible to knock out pin (1) of tooth (2), put block (5) under the bottom of the bucket, and set so that the bottom surface of the bucket is horizontal.



2. Check that the work equipment is in a stable condition, then set the lock lever to the LOCK position (L).



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).

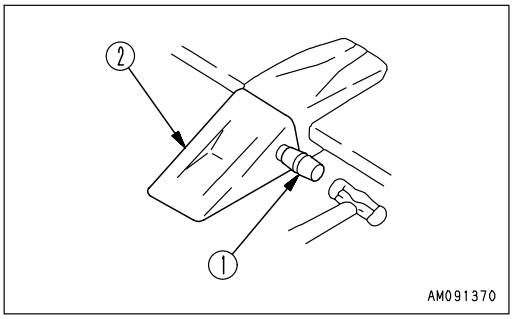


REMARK

- If the bucket teeth cannot be safely removed by this mothod, have your Komatsu distributor replace the bucket teeth.

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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.

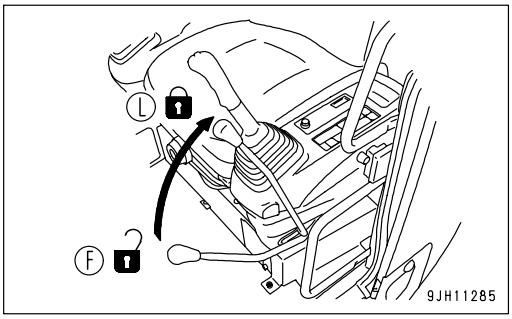


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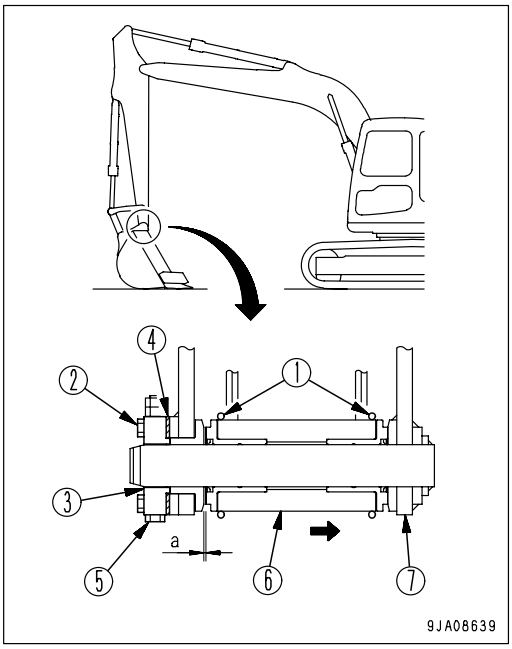
ADJUST BUCKET CLEARANCE

WARNING

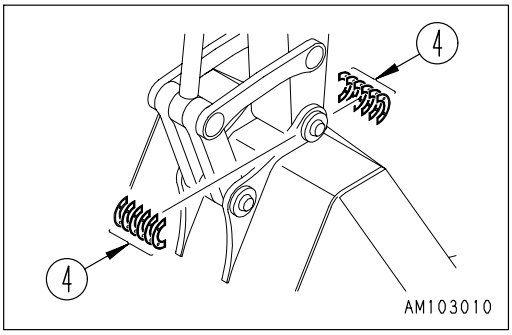
It is dangerous if the work equipment is mistakenly moved when adjusting the bucket clearance.
Set the work equipment in a stable condition, stop the engine, then set safety lock lever securely to the LOCK position (L).



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 (L).
2. Shift O-ring (1) of the linkage and measure the amount of clearance "a".
   Measurement is easier of you move the bucket to one side (right side of the diagram) or the other so all the clearance can be measured in one place.
   Use a gap (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 clearance "a" measured above.
   [Example]
   In the case of clearance 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 clearance 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.



(6) Arm
(7) Bucket

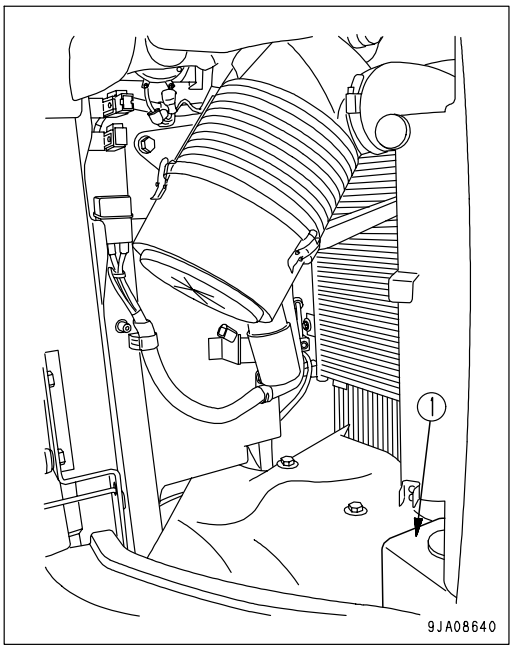


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CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

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

The proportion differs according to the ambient temperature, so dilute the washer fluid with water to the following proportions before adding.

Area, season	Proportions	Freezing temperature
Normal	Washer fluid 1/3: water 2/3	-10˚C (14˚F)
Winter in cold area	Washer fluid 1/2 : water 1/2	-20˚C (-4˚F)
Winter in extremely cold area	Pure washer fluid	-30˚C (-22˚F)

There are two types depending on the freezing temperature:
-10°C (14°F) (general use) and -30°C (-22°F) (cold area use), select according to the area and season.

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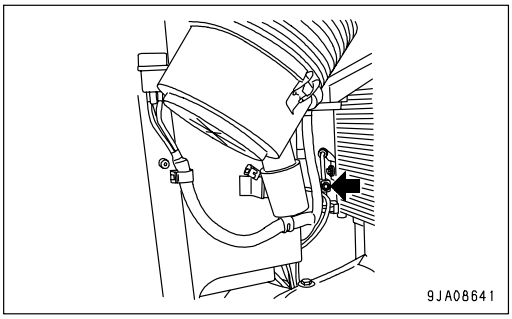
CHECK AND MAINTENANCE AIR CONDITIONER

Check Level of Refrigerant (gas)

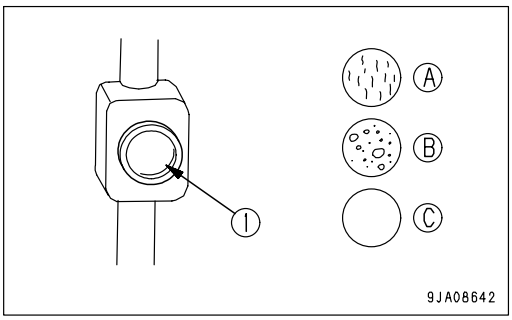
WARNING

If the refrigerant used in the air conditioner gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the refrigerant. Never loosen any part of the refrigerant circuit.
Do not bring any flame close to any point where the refrigerant gas is leaking.

If the refrigerant (gas) level is low, the cooling effect will become poor. When the engine is running at full throttle and the cooler is running at high speed, look at the sight glass (1) (inspection window) in the refrigerant hose mouthpiece to check the condition of the refrigerant gas (Freon 134a) flowing in the refrigerant circuit.
(A) No bubbles in refrigerant flow: Suitable
(B) Some bubbles in flow (bubbles pass continuously):
Lack of refrigerant
(C) Colorless, transparent: No refrigerant



REMARK
When there are bubbles, the refrigerant gas level is low, so contact your Komatsu distributors to have refrigerant added. If the air conditioner is run with the refrigerant gas level low, it will cause damage to the compressor.



Inspection During Off Season
Even during the off-season, operate the air conditioner for 3 to 5 minutes once a month to maintain the oil film at all parts of the compressor.

Inspection and Maintenance Items

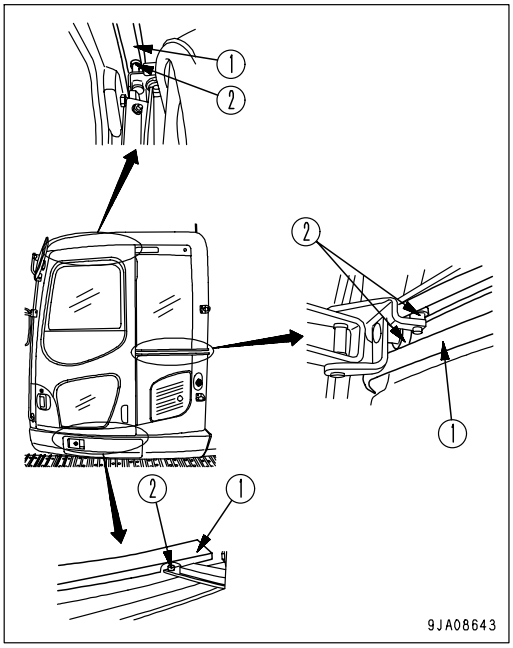
Check, maintenance items	Content of check, maintenance	Guideline for maintenance interval
Refrigerant (gas)	Charge amount	Twice a year (spring, autumn)
Air conditioner condenser	Clogged fins	Every 500 hours
Compressor	Operating condition	Every 4000 hours
V-belt	Damage, tension	Every 250 hours
Blower motor, fan	Operating condition (does it make abnormal noise?)	When required
Control mechanism	Operating condition (does it function normally?)	When required
Piping mounts	Mounting condition, looseness at tightening or connecting portions, leakage of gas, damage	When required

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CHECK, CLEAN AND LUBRICATE CAB SLIDE DOOR RAIL AND ROLLER

Checking

When opening or closing the slide door, it may sometimes not slide smoothly due to mud stuck to the rail. In that case clean and lubricate slide door rail (1) and roller (2) at three points.



Cleaning

1. Open and close the door, and use a brush to remove any dirt from rail (1).
2. Use a cloth to wipe off any dirt from rail (1).

Greasing

NOTICE

Do not use high-viscosity oil for the lubricant. Use grease only.

1. Spray rail (1) and roller (2) thoroughly with lubricant.
2. After spraying with lubricant, slide the door and check that the door opens and closes smoothly.
   If the movement is not smooth, contact your Komatsu distributor for repair.

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REPLACE BREAKER CIRCUIT ADDITIONAL OIL FILTER ELEMENT

(If equipped)

WARNING

- **After the engine is stopped, the parts and oil are at high temperature, so there is danger of burns. Wait for the temperature to go down before starting the operation.**
- **When removing the cap from oil filler port (F), turn it slowly to release the internal pressure, then remove it carefully.**

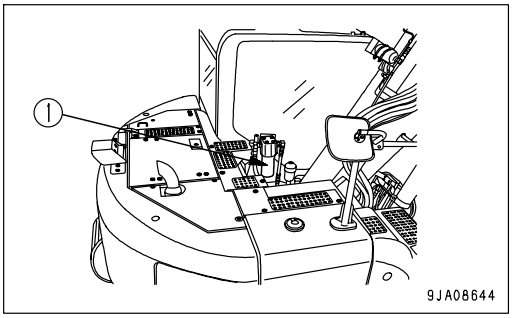
NOTICE

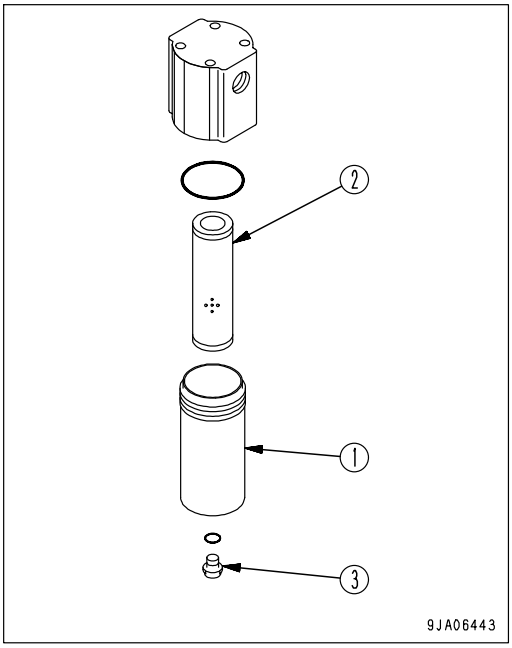
For details of the replacement interval for the element, "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (PAGE 4-16)".

- Prepare a container to catch the oil.

1. Place a container under the filter element to catch the oil.
2. Turn filter case (1) to the left to remove it, then take out element (2).
3. Remove plug (3) from filter case (1).
4. Clean the parts that were removed and install new element (2).
5. When installing filter case (1) and plug (3), tighten to the tightening torque given below.

   Tightening torque
   Case (1): 58.8 to 78.5 Nm (6 to 8 kgm, 43.4 to 57.9 lbft)
   Plug (3): 39.2 to 49.0 Nm (4 to 5 kgm, 28.9 to 36.2 lbft)





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WASH WASHABLE FLOOR

With the washable floor, it is possible to flush out the dirt on the cab floor directly with water.

WARNING

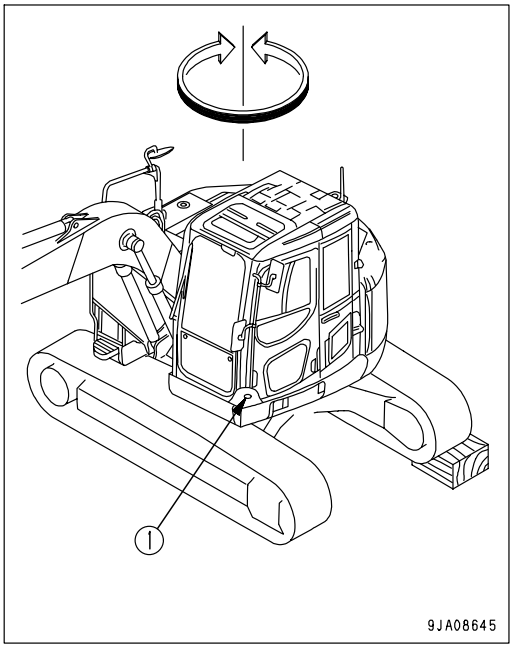
- **When setting the machine at an angle, use strong blocks to stabilize the machine and be extremely careful when carrying out the operation.**
- **If the control levers are touched by mistake, the machine may suddenly move, and this may lead to a serious accident. Always set the lock lever securely to the LOCK position before standing up from the operator's seat.**

NOTICE

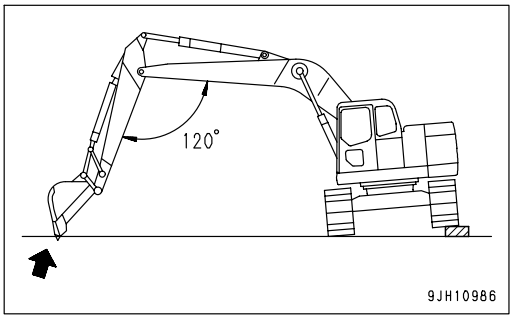
While cleaning the cab floor, take care so that the connector, air conditioner main body and filters may not be splashed with water.

Method of Washing

1. Set the machine at an angle.
   For details, see "Method of Setting Machine at Angle (PAGE 4-40)"
2. Swing the upper structure slowly so that water drain holes (1) in the cab floor are at a low position.

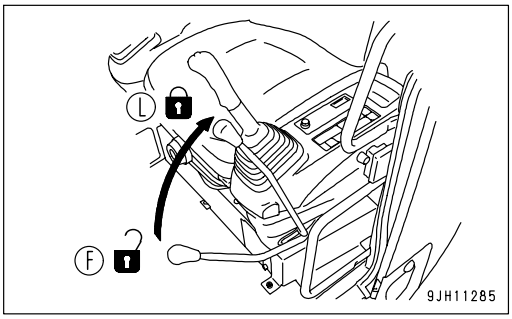


3. Lower the work equipment to the ground and set the machine in a stable condition.



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4. Set the lock lever to the LOCK position (L) and stop the engine.



5. Remove the floor mat.
6. Flush out the dirt on the floor directly with water through water drain hole (1).
7. After completing the washing operation, install the floor mat.

Method of Setting Machine at Angle

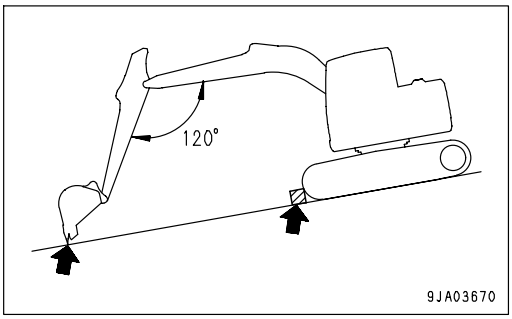
Method Using Slope

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.



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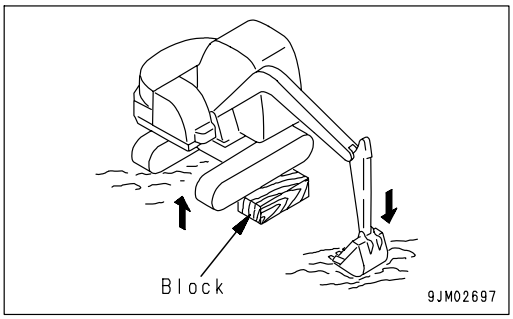
Method Using Block

WARNING

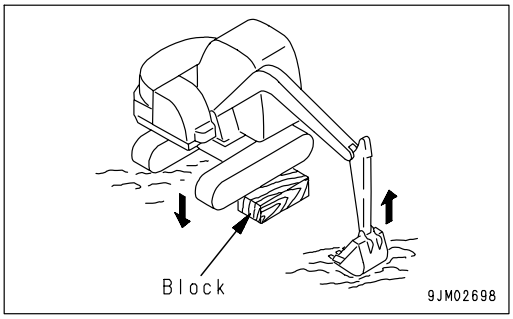
Select a firm flat place.

Put strong blocks 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.
   When doing this, operate the levers slowly.
2. Insert a block securely between the ground surface and the raised track and make sure that the machine is stable.



3. Raise the boom slowly and lower the machine.
   When doing this, check that the machine is always stable.



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CHECK GAS SPRING

WARNING

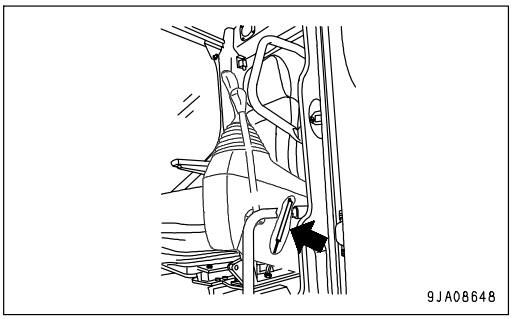
The gas spring is charged with high-pressure nitrogen gas, so mistaken operation may cause an explosion, which will lead to serious injury or damage. When handling the gas spring, always do as follows.

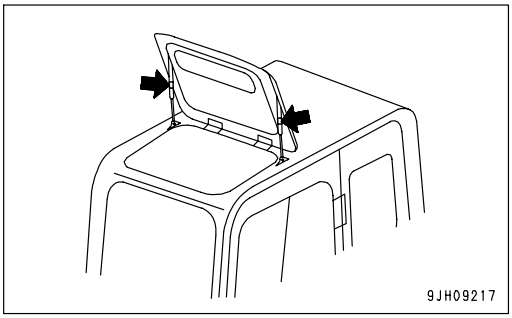
- **Do not disassemble the accumulator.**
- **Do not bring it near flame or dispose of it in fire.**
- **Do not make holes in it or weld it.**
- **Do not hit it, roll it, or subject it to any impact.**
- **When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor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

There are gas springs at two places: inside the left console and at the cab roof window (left and right, 2 places).

In the following cases, please ask your Komatsu distributor to carry out inspection, repair, and replacement.

- When pulling up the lock lever or when opening the cab roof window, and it cannot be opened with light operating effort.
- When the lock lever cannot hold the window at the LOCK position and the cab roof window cannot be held open.
- When oil or gas is found to be leaking from the gas spring.





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BLEEDING AIR FROM HYDRAULIC SYSTEM

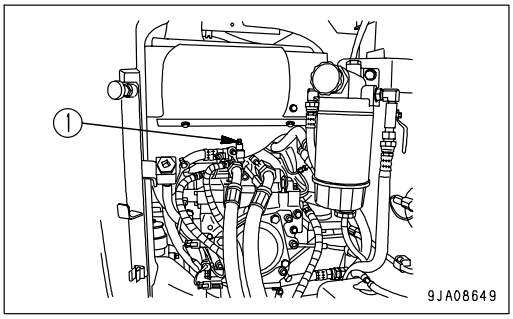
For details, see "STARTING ENGINE (PAGE 3-133)". If it is necessary to refer to the items for starting the engine, moving the machine off, steering, or stopping, see the OPERATION section.

1. Bleeding air from pump

NOTICE

If the pump is operated without filling the pump case with hydraulic oil, there is danger that the pump may be prematurely damaged. Be sure to bleed the air completely.

1) Open the pump room door on the right side of the machine.
2) Loosen air bleed plug (1) installed to the drain port and check that oil oozes out.
3) After completion of the air bleeding operation, tighten the air bleed plug (1).



NOTICE

If the engine is run at high speed immediately after startup or a cylinder is pushed up to its stroke end, air taken inside the cylinder may cause damage to the piston packing.

2. Starting engine
   Start the engine, referring to "STARTING ENGINE (PAGE 3-133)".
   Run the engine at low idle for 10 minutes after starting, then start operations.
3. Bleeding air from cylinders
   1) Run the engine at low idle, and extend and retract each cylinder 4 to 5 times, taking care that a cylinder is not moved to the end of its stroke. (Stop the cylinder approx. 100 mm (3.9 in) short of its stroke end)
   2) Next, operate each cylinder 3 to 4 times to the end of its stroke.
   3) Finally, operate each cylinder 4 to 5 times to the end of its stroke to completely remove the air.

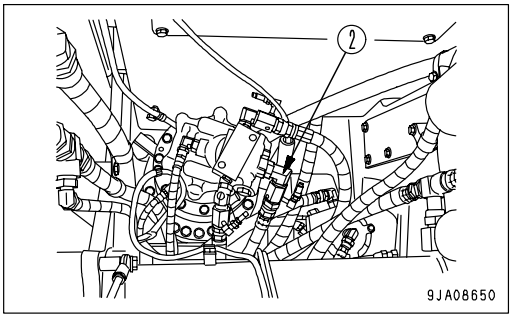
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4. Bleeding air from swing motor
   (Carry out only if the oil inside the swing motor case has been drained.)

NOTICE

If the air is not bled from the swing motor, the motor bearings may be damaged.

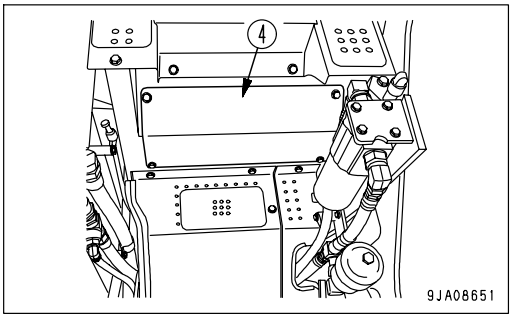
1) Remove cover (4) between the hydraulic tank and the operator's cab.
2) Run the engine at low idling, loosen mouthpiece (2) at the motor S port, and check that oil oozes out from mouthpiece (2) of the motor S port.



NOTICE

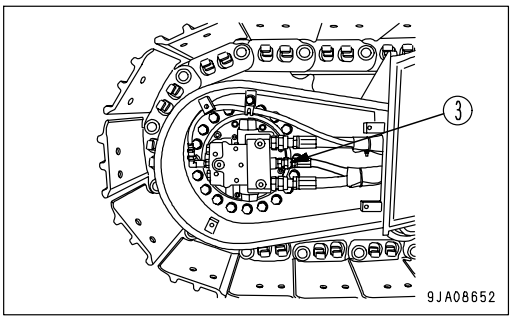
Do not operate the swing under any circumstances.

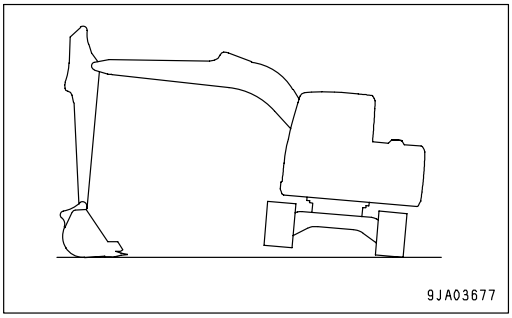
3) If no oil oozes out, stop the engine, remove mouthpiece (2) from the motor S port, then fill the inside of the motor case with hydraulic oil.



4) After completing the air bleed operation, tighten mouthpiece (2) of the motor S port.
5) Run the engine at low idle, and slowly swing the upper structure at least 2 times uniformly to the left and right.

5. Bleeding air from travel motor
   (only when oil inside travel motor case has been drained)
   1) Run the engine at low idle, remove hose (3) from port C, then when the oil has flowed out, tighten it again.
   2) Run the engine at low idle and swing the work equipment 90° to bring it to the side of the track.
   3) Jack up the machine until the track is raised slightly from the ground.Rotate the track under no load for 2 minutes. Repeat this procedure on both the left and right sides, and rotate the track equally both forward and in reverse.





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6. Bleeding air from attachment (when installed)

NOTICE

If the attachment maker specifies an air bleeding procedure for the attachment itself, follow the specified procedure to bleed the air.

If a breaker or other attachment has been installed, run the engine at low idle and operate the attachment pedal repeatedly (approx. 10 times) until the air has been bled from the attachment circuit.

NOTICE

- **After completing the air bleeding operation, stop the engine, and leave the machine for 5 minutes before starting operations. This will remove the air bubbles in the oil inside the hydraulic cylinders.**
- **Check that there is no leakage of oil and wipe off any oil that has been spilled.**

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CHECK BEFORE STARTING

For details of the following items, see "Checks Before Starting (PAGE 3-116)" in the OPERATION section.

- Check coolant level, add coolant
- Check oil level in engine oil pan, add oil
- Check fuel level, add fuel
- Check oil level in hydraulic tank, add oil
- Check dust indicator
- Check for water and sediment in water separator, drain water
- Drain water and sediment from fuel tank
- Check electric wiring
- Check working lamp switch
- Check function of horn

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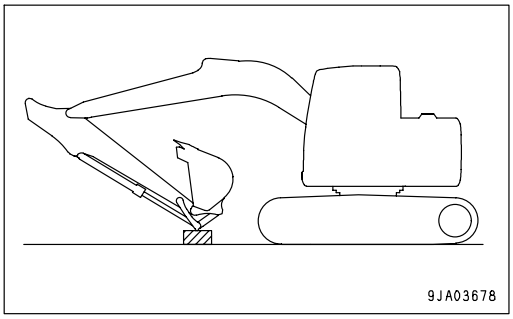
EVERY 100 HOURS MAINTENANCE

LUBRICATING

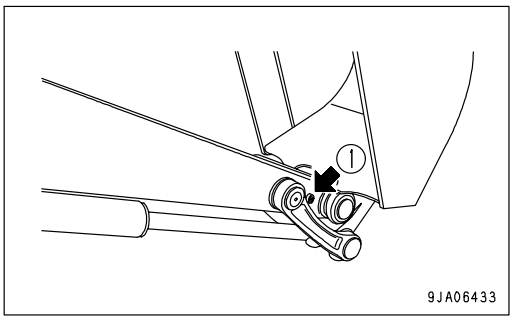
NOTICE

- **If any abnormal noise is generated from any greasing point, carry out greasing regardless of the greasing interval.**
- **Carry out greasing every 10 hours for the first 50 hours on a new machine.**
- **After the machine was subjected to jobs in the water, be sure to grease the wet pins.**

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) Arm-Bucket coupling pin (1 place)



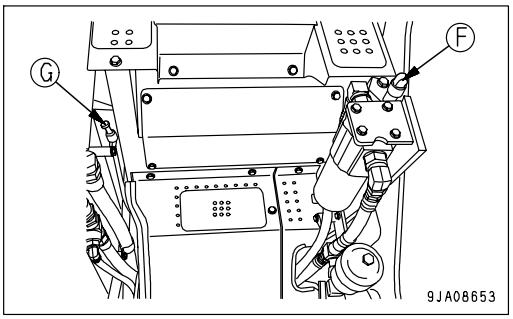
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CHECK SWING MACHINERY CASE OIL, ADD OIL

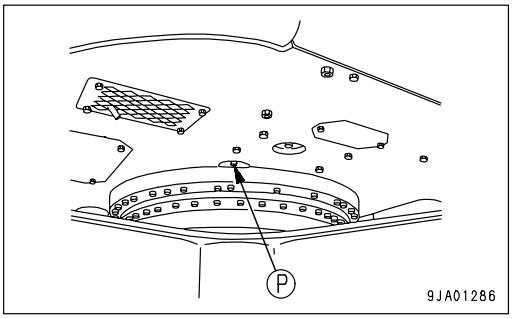
WARNING

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

1. 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.
4. If the oil is not up to the L mark on dipstick (G), remove the from oil filler port (F) and add oil.



5. If the oil level exceeds the H mark on the oil level gauge, loosen drain plug (P) to drain the excess oil, after swinging the upper structure so that drain plug (P) comes between the right and left tracks.
6. After checking oil level or adding oil, insert the dipstick into the hole and install oil filler cap.



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EVERY 250 HOURS MAINTENANCE

CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

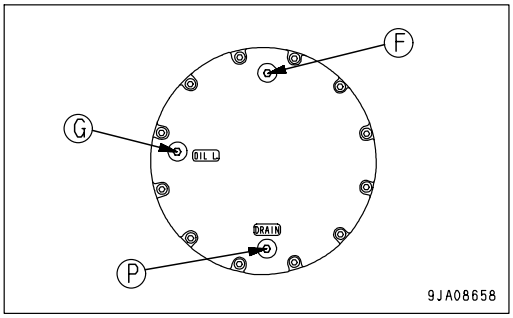
WARNING

- **The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.**
- **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 container to catch drained oil.
- Prepare a hexagon wrench.

The diagram on the right shows the left final drive case.

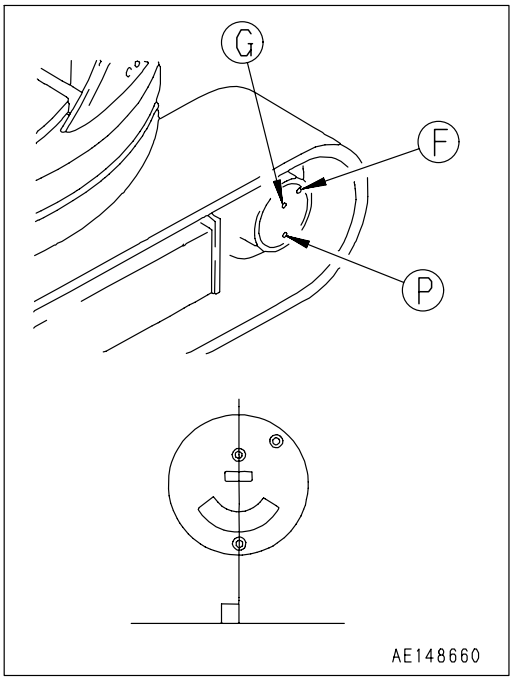
1. Set so that plug (F) is at the top, with plug (F) and plug (P) prependicular to the ground.
2. Using a hexagonal wrench, remove plug (G) and check that the oil level is within a range from the bottom of the plug hole to a point 10 mm (0.4 in) below it.
3. If the oil level is low, add oil through the hole of plug (F). Add oil until oil overflows from the hole of plug (G).
4. After checking, install plugs (F) and (G).



Large-capacity Final Drive

(If equipped for PC138US)

1. Set so that plug (G) is at the top, with plug (G) and plug (P) perpendicular to the ground.
2. Remove plug (G) with a hexagonal wrench. Oil level shouldbe near the bottom of the plug hole (G).
3. If the oil level is low, use a hexagonal wrench to remove plug (F), then add oil through the hole of plug (F). Add oil until the oil overflows from the hole in plug (G).
4. After checking the oil level, install plugs (F) and (G).



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CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this procedure before operating the machine.

WARNING

- **Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may cause an explosion.**
- **The battery generates flammable gas and there is danger of explosion, do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.**
- **When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.**

NOTICE

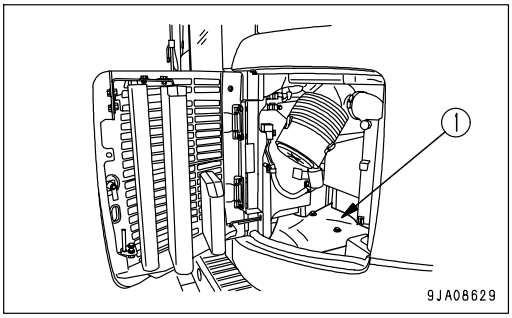
If there is a fear that the battery water may freeze after refilling with purified water (e.g. commercially available replenishment water for a battery), do the replenishment before the day's work on the next day.

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.

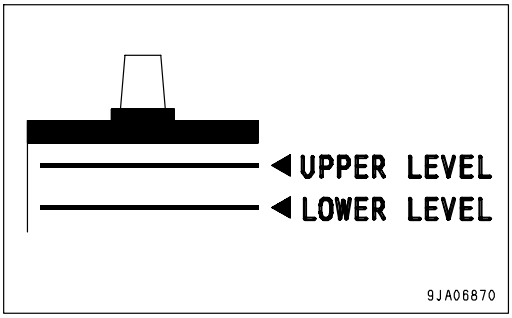
When Checking Electrolyte Level from Side of Battery

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Open the battery room door, then move vinyl cover (1) (installed on top of the battery).

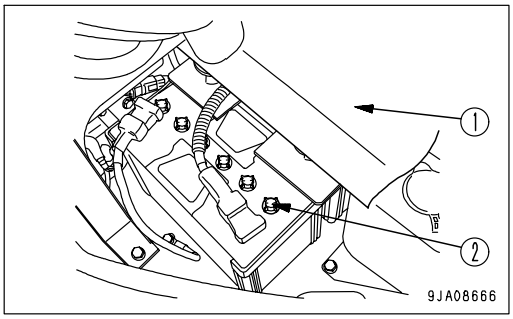


2. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines.
   If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.



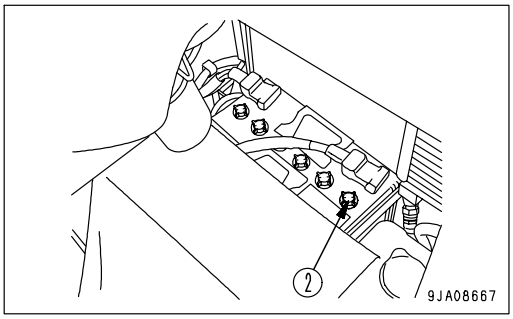
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3. If the electrolyte level is below the midway point between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines, remove cap (2) and add distilled water to the U.L. line.
4. After adding distilled water, tighten cap (2) securely.



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.

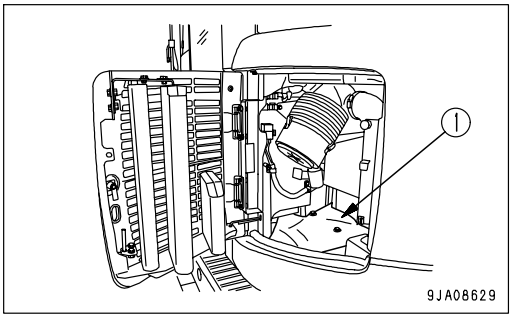


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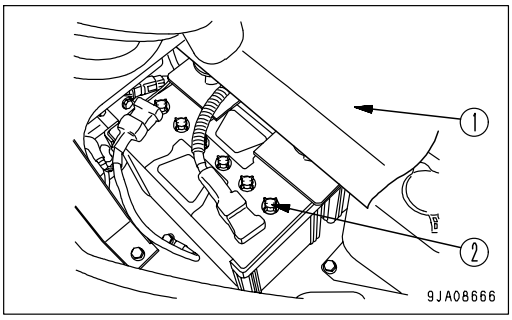
When it is Impossible to Check Electrolyte Level from Side of Battery

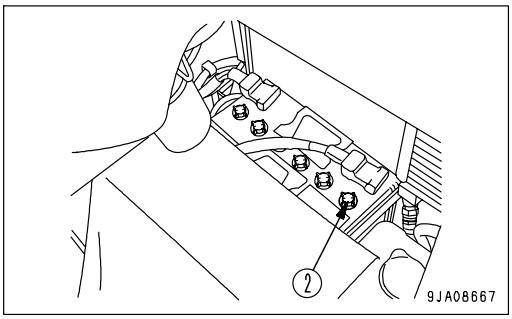
If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

1. Open the battery room door, then move vinyl cover (1) (installed on top of the battery).



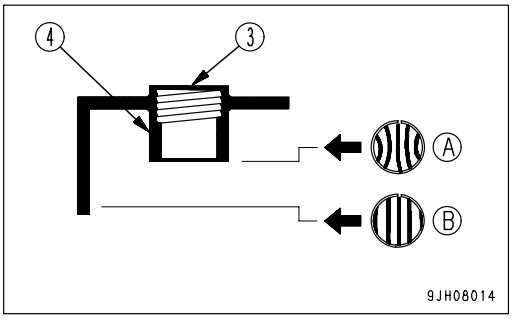
2. Remove cap (2) at the top of the battery, look through the water filler port (3), and check the electrolyte surface. If the electrolyte does not reach the sleeve (4), add distilled water so that the level reaches the bottom of the sleeve (UPPER LEVEL line) without fail.





- (A) Suitable level: Electrolyte level is up to bottom of sleeve, so surface tension causes electrolyte surface to bulge and poles appear bent.
- (B) Low: Electrolyte level is not up to bottom of sleeve, so poles appear straight and not bent.

3. After adding distilled water, tighten cap (2) securely.



REMARK

If water is added to above the bottom tip of the sleeve, use a pipette to remove electrolyte. Neutralize the removed electrolyte with sodium bicarbonate, then flush it away with a large amount of water. If necessary, contact your Komatsu distributor or your battery maker.

When it is Possible to Use Indicator to Check Electrolyte Level

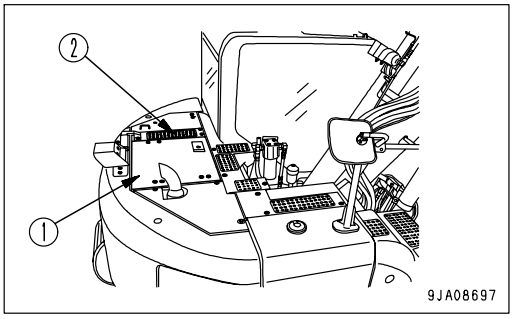
If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

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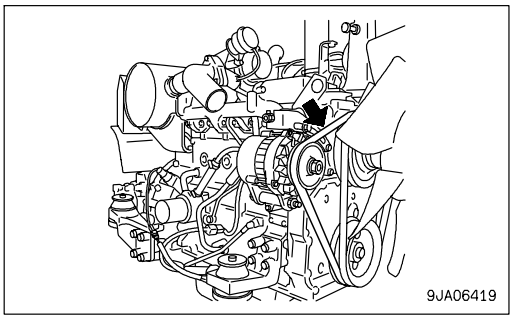
CHECK AND ADJUST COOLING FAN BELT TENSION

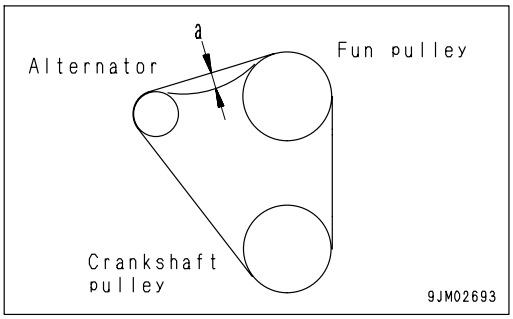
Checking

1. Open the engine hood (1) and remove or Step (2).



2. Deflection a should be 7-10 mm (0.3-0.4 in) when the belt is pressed with the thumb with a force of approx. 58.8 N (6 kg) at a point midway between the alternator pulley and fan pulley.

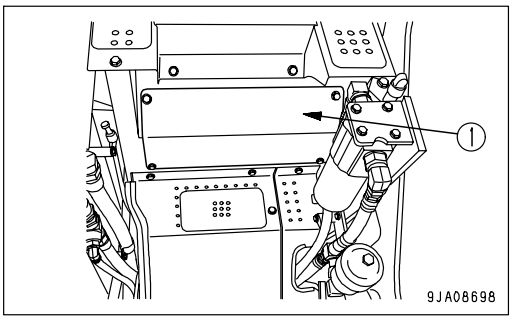


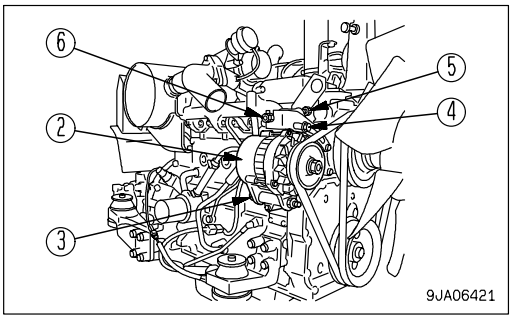


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Adjustment

1. Remove cover (1) between the hydraulic tank and the operator's cab.
2. Loosen mounting bolt (3) of alternator (2).
3. Loosen alternator lock bolt (4).
4. Turn tension bolt (5) of alternator (2) in the direction to loosen it
   and adjust so that the belt tension is 7-10 mm (0.3-0.4 in) (approx. 58.8 N (6 kg)).
   When doing this, do not touch double nut (6).
5. Tighten mounting bolt (3) and lock bolt (4).

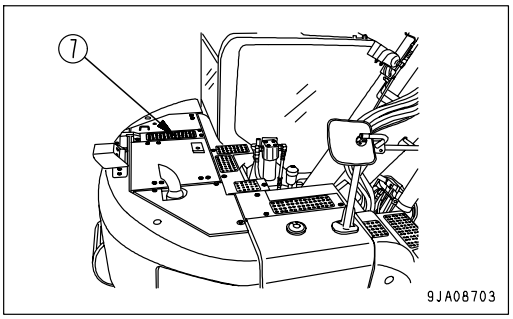




6. Install cover (1) and step (7).

NOTICE

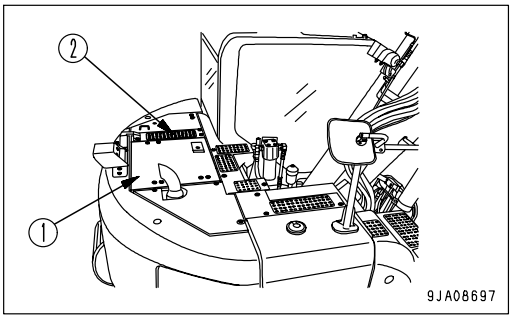
- **Check each pulley for damage, wear of the V-groove, and wear of the V-belt. In particular, be sure to check that the V-belt is not touching the bottom of the V-groove.**
- **If the belt is stretched and there is no allowance for adjustment, or if it is cut or cracked, please contact your Komatsu distributor for replacement.**



CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST

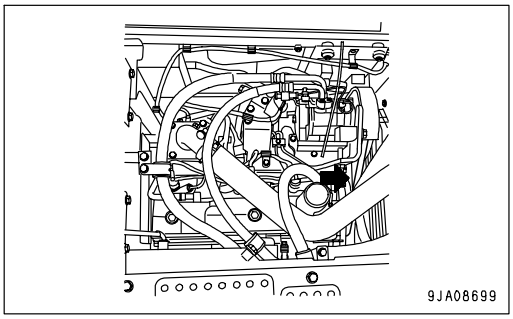
Checking

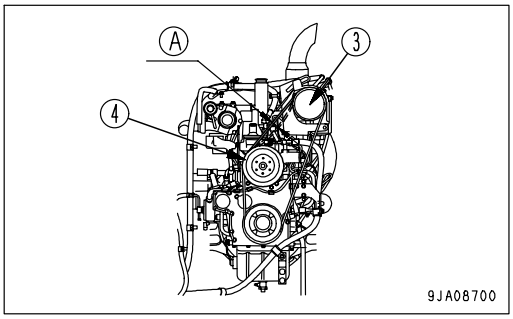
1. Open the engine hood (1) and remove or Step (2).



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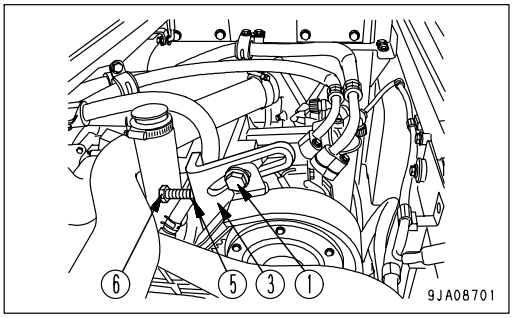
2. Deflection (A) should be 5-8 mm (0.2-0.3 in) when the belt is pressed with the thumb with a force of approx. 58.8 N (6 kg) at a point midway between compressor pulley (3) and fan pulley (4).





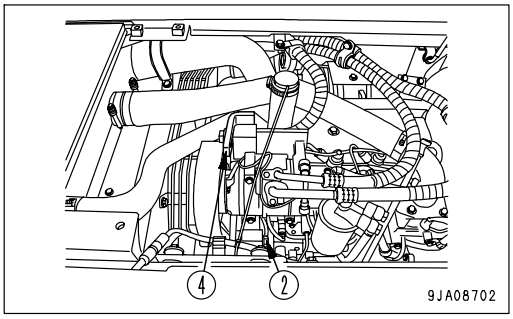
Adjustment

1. Loosen bolts (1) and (2).
   - Bracket (4) holds the compressor in place. When bolts (1) and (2) are loosened, bracket (4) moves with the bolt (2) securing position as a fulcrum.
2. Loosen nut (5) attached to the fixed bracket (3) and then tighten bolt (6).
   - Tighten bolt (6) so that the deflection of the belt will be 5 to 8 mm (0.2 to 0.3 in) (approx. 58.8N (6 kg)).
3. Tighten bolts (1) and (2) to secure bracket (4).
4. Loosen bolt (6) to remove from bracket (4).
5. Tighten nut (5).



NOTICE

- **Check each pulley for damage, wear of the V-groove, and wear of the V-belt. In particular, be sure to check that 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.**



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EVERY 500 HOURS MAINTENANCE

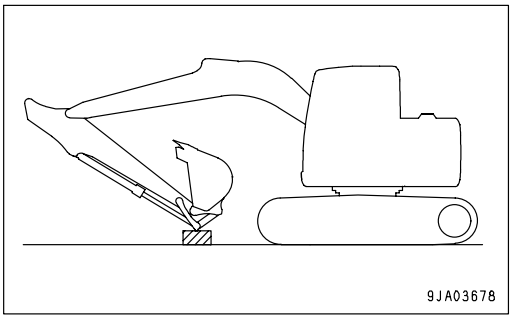
Maintenance for every 100 and 250 hours should be carried out at the same time.

LUBRICATING

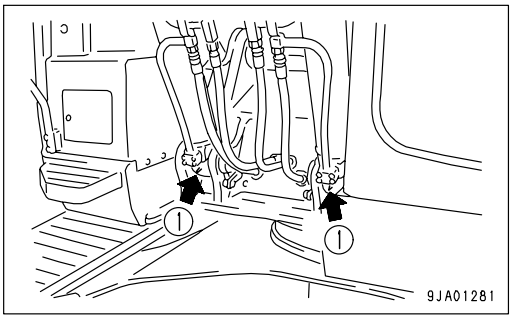
NOTICE

- **If any abnormal noise is generated from any greasing point, carry out greasing regardless of the greasing interval.**
- **Carry out greasing every 10 hours for the first 50 hours on a new machine.**
- **After the machine was subjected to jobs in the water, be sure to grease the wet pins.**

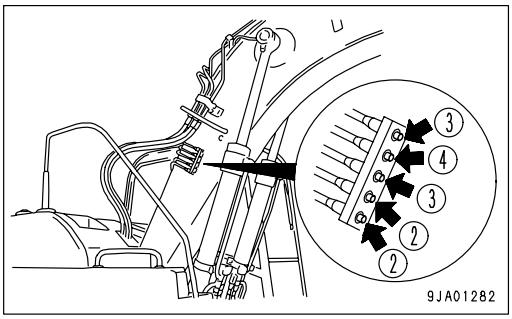
1. Set the machine to the greasing posture shown on the right, lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.



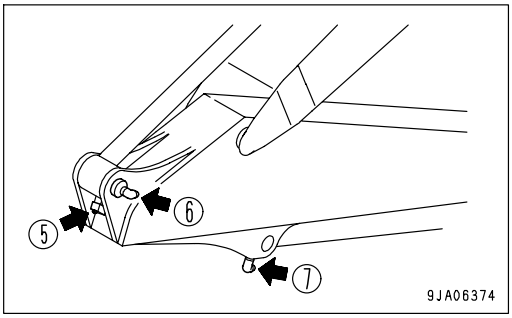
(1) Boom cylinder foot pin (2 places)



(2) Boom foot pin (2 places)
(3) Boom cylinder rod end pin (2 places)
(4) Arm cylinder foot pin (1 place)

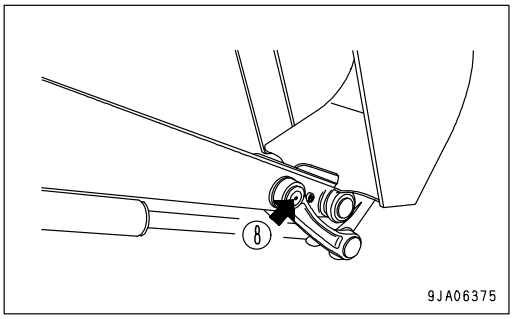


(5) Boom - Arm coupling pin (1 place)
(6) Arm cylinder rod end pin (1 place)
(7) Bucket cylinder foot pin (1 place)



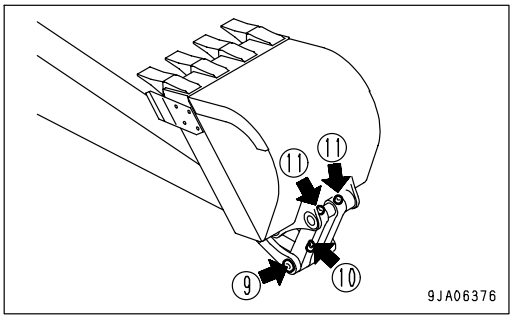
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(8) Arm - Link coupling pin (1 place)

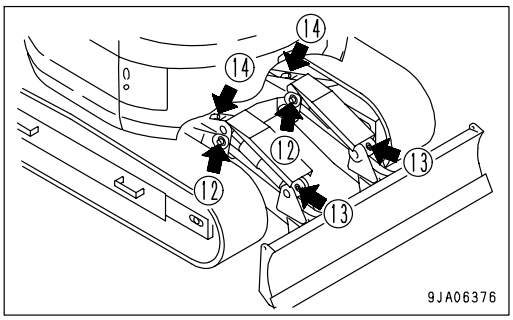


(9) Link connecting pin (1 place)
(10) Bucket cylinder rod end (1 place)
(11) Bucket-link connecting pin (2 places)

If greasing cannot be carried out with a tube type of nozzle, use a flexible type nozzle to carry out greasing.



(12) Blade connecting pin (2 places)
(13) Blade cylinder foot pin (2 places)
(14) Blade cylinder rod end pin (2 places)



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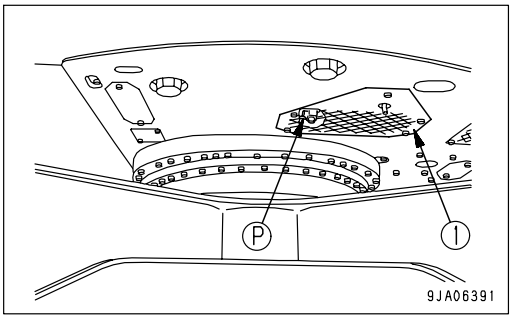
CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

WARNING

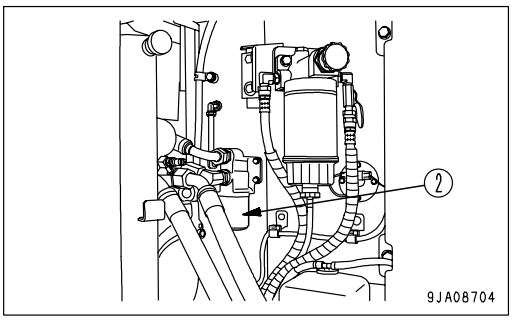
Parts and oil are at high temperature immediately after the engine is stopped and may cause serious burns. Wait for the oil temperature to go down before performing this operation.

- Oil pan refill amount: 11 liters (2.91 US gal)
- Prepare a filter wrench

1. Remove undercover (1) at the bottom of the machine, then set the container under drain valve (P) on the left side of the machine to catch the oil.
2. Loosen drain plug (P) and drain the oil. Be careful not to get oil on yourself.
3. Tighten drain plug (P).



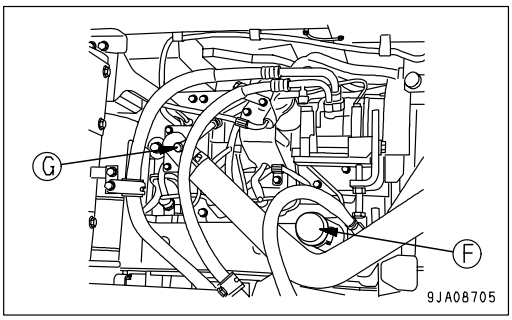
4. Open the pump room on the right side of the machine, then using the filter wrench, turn filter cartridge (2) to the left to remove it.
5. Clean the filter holder, fill the new filter cartridge with clean oil, coat the thread and packing portion of the new filter cartridge with oil (or coat thinly with grease), then install.



REMARK

Check that 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.

6. When installing, tighten until the packing surface contacts the filter holder, then tighten a further 3/4 turn.
7. After replacing the filter cartridge, add oil through oil filler (F) until the oil level is between the H and L marks on the dipstick (G).
8. Run the engine at idle for a short time, then stop the engine, and check that the oil level is between the H and L marks on the dipstick. For details, see "Check Oil Level in Engine Oil Pan, Add Oil (PAGE 3-117)".



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REPLACE FUEL PRE-FILTER CARTRIDGE

⚠ WARNING

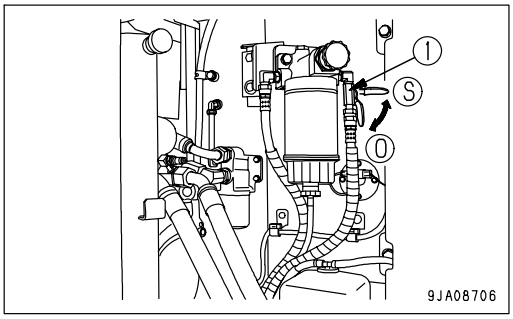
- **After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.**
- **High pressure is generated inside the engine fuel piping system when the engine is running.**
  When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- **Do not bring any fire or flame close.**

NOTICE

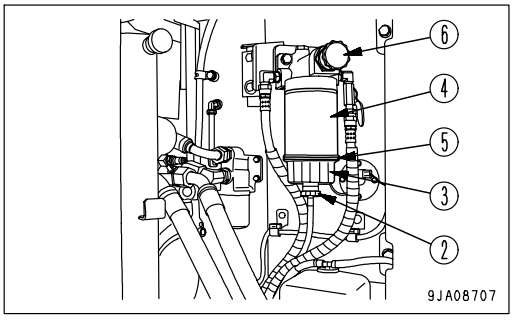
- **Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.**
  If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- **When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.**

- Prepare a container to catch drain fuel.
- Prepare a filter wrench

1. Open the pump room door on the right side of the machine.
2. Set valve (1) at the side of the fuel pre-filter cartridge to the shut position (S).



3. Set the container to catch the fuel under the pre-filter cartridge.
4. Loosen drain valve (2), then drain all the water and sediment in the transparent cap (3) and also the fuel accumulated in filter cartridge (4).
5. Using a filter wrench, turn transparent cap (3) to the left to remove it. (This cap is used again.)



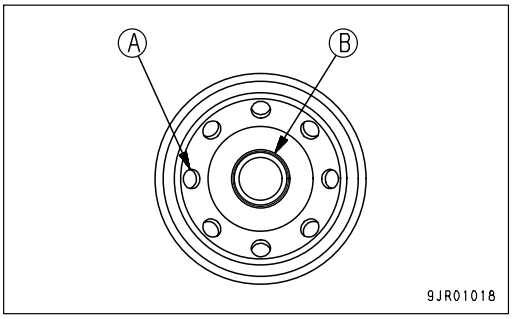
6. Using a filter wrench, turn cartridge (4) to the left to remove it.
7. Install transparent cap (3) to the bottom of the new filter cartridge. (When doing this, always replace O-ring (5).)

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8. When installing, apply oil to the packing surface and bring the packing surface into contact with the seal surface of filter cartridge (4) and then tighten it further by 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.

NOTICE

- **When adding fuel, do not remove cap (B). Always add fuel from the 8 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 that the drain valve (2) is tightened securely.

12. Set valve (1) at the side of the fuel pre-filter cartridge to the open position (O).
13. After completing the replacement of filter cartridge (4), bleed the air.

Bleed the air as follows:

14. Fill the fuel tank with fuel (to the position where the float is at the highest position).
15. Loosen the knob of feed pump (6), pull it out, then pump it in and out until the movement becomes heavy.

REMARK

- It is not necessary to remove the plug at the top of the fuel pre-filter and fuel main filter.
- After the engine runs out of fuel, use the same procedure to operate feed pump (6) and bleed the air.

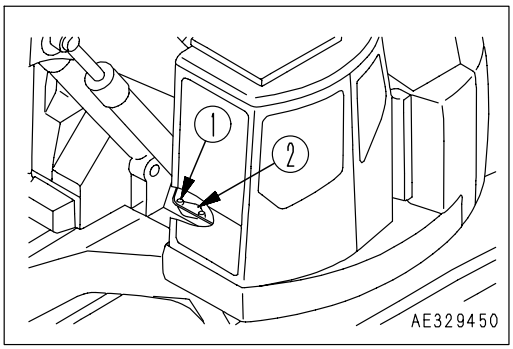
16. After finishing to bleed air, push in the knob of feed pump (6) and tighten it.
17. After replacing the filter cartridge, start the engine and run it at low idling for 10 minutes.
    Check for leakage of oil from the filter seal surface and tranparent cap mounting. If any oil is leaking, check the tightening of the filter cartridge.
    If there is still oil leakage, repeat Steps 2 - 6 to remove the filter cartridge, and if any damage or embedded foreign material in the packing surface is found, replace it with a new cartridge and repeat Steps 7 - 17 to install it.

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CHECK SWING PINION GREASE LEVEL, ADD GREASE

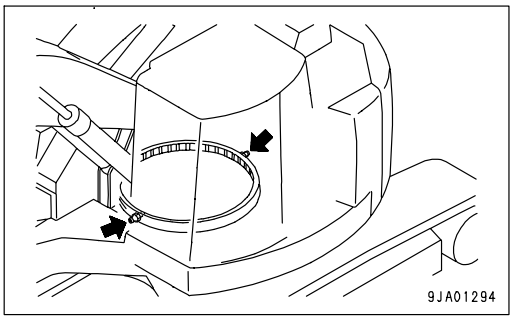
- Prepare a scale.

1. Remove bolts (1) (2 bolts) on the top of the revolving frame and remove cover (2).
2. Insert a scale into the grease and check that the height of the grease in the portion where the pinion passes is at least 4 mm (0.158 in). Add more grease if necessary.
3. Check if the grease is milky white. If it is milky white, it is necessary to change the grease. Please contact your Komatsu distributor.
   The total amount of grease is 10 liters (9.1 kg) (2.64 US gal, [20 lb]).
4. Install cover (2) with bolts (1).



LUBRICATE SWING CIRCLE

1. Lower the work equipment to the ground.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows. (2 places)
3. After greasing, wipe off any old grease that was pushed out.



CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS,FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS

WARNING

If compressed air, high-pressure water, or steam hits your body directly or dirt is sent flying by the compressed air, high-pressure water, or steam, there is danger of personal injury. Always wear protective glasses, dust mask, and other protective equipment.

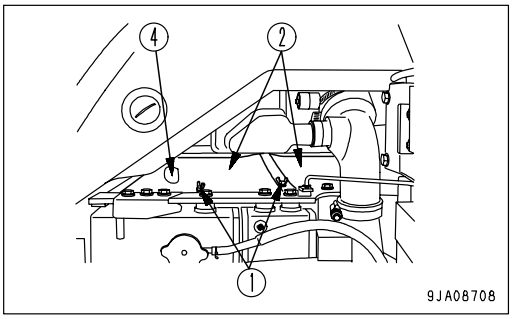
NOTICE

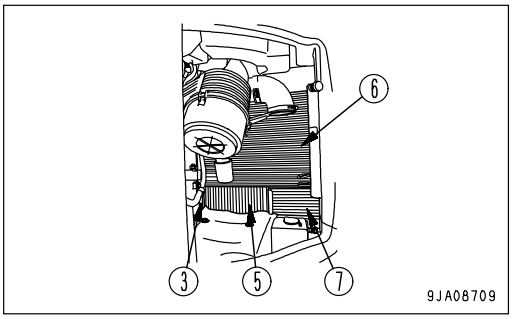
When use the compressed air, keep a distance from air nozzle, to prevents damage to the fins.

To prevent damage to the fins, apply compressed air from and appropriate distance. Damaged fins may cause water leakage or overheating. In a dusty site, check the fins daily, irrespective of the maintenance interval.

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1. Open the cover at the rear of the cab and the battery room door at the left side of the machine.
2. Remove 4 wing screws (1) and remove net (2).
3. Check the front and rear surfaces of oil cooler fins (3), radiator fins (4), aftercooler fins (5), Air conditioner condenser fins (6), and fuel cooler fins (7). If there is any mud, dirt, or leaves stuck to the fins, blow the dirt off with compressed air.
   Steam or water may be used instead of compressed air. However, when carrying out powerful steam cleaning (high-pressure machine wash) of the heat exchange equipment (radiator, oil cooler, aftercooler, fuel cooler, air conditioner condenser), maintain sufficient distance from the machine when carrying out the operation. If steam cleaning (high-pressure machine wash) is carried out at close range, there is danger that the internal fins of the heat exchange equipment may be deformed, and this will cause early clogging and breakage.
4. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by aging.
   Also, check hose clamps for looseness.
5. After completing inspection and cleaning, install net (2) to its original condition.





CLEAN AIR CONDITIONER FRESH/RECIRC FILTERS

WARNING

- **When using compressed air, there is danger of dirt flying and causing personal injury. Always wear protective glasses, dust mask, and other protective equipment.**
- **Always check that the slide door is locked at the open or closed position before cleaning the FRESH or RECIRC filter. If the slide door is free, there is danger that it may suddenly move and catch your fingers or break the cover.**

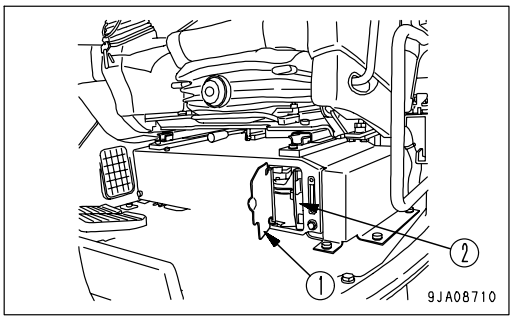
NOTICE

- **The guide for cleaning the filter is 500 hours, but if the machine is used on an extremely dusty jobsite, reduce the maintenance interval and clean the filter more frequently.**
- **When washing the floor, be careful not to get water on the air conditioner system.**

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Cleaning Recirculated Air Filter

1. Open cover (1) at the front bottom left of the operator's seat.
2. Take out internal filter (2).
3. Clean internal filter (2) with compressed air. If there is oil stuck to the filter (2) or it is extremely dirty, wash it in a neutral agent. After washing, dry it thoroughly before using it again.



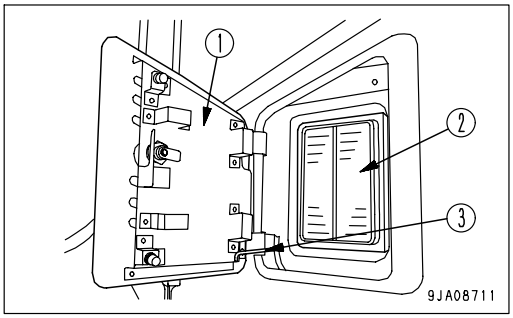
REMARK

If the clogging of the filter cannot be removed by blowing it with compressed air or washing in water, replace the filter with a new one.

4. After cleaning filter (2), return it to its original position and close cover (1).

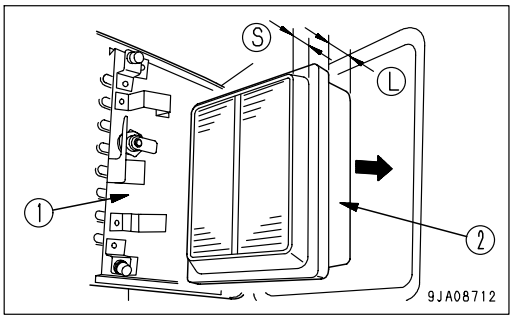
Cleaning Fresh Air Filter

1. Use the starting key to unlock cover (1) at the rear left of the operator's cab, open cover (1) by hand, secure it in position with cover support lever (3), then remove filter (2) from the inside.
2. 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.
3. After cleaning, return filter (2) to its original place, remove cover support lever (3), and close the cover. When doing this, lock it with the starting key. After locking it, do not forget to remove the starting key.



REMARK

The FRESH filter must be installed facing in the correct direction. When installing, insert the long (L) end of filter (2) into the filter case first. If the short (S) end is installed first, cover (1) will not close.



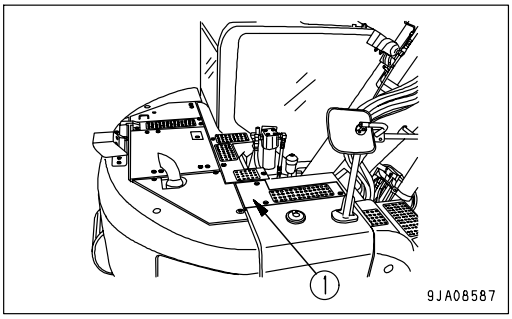
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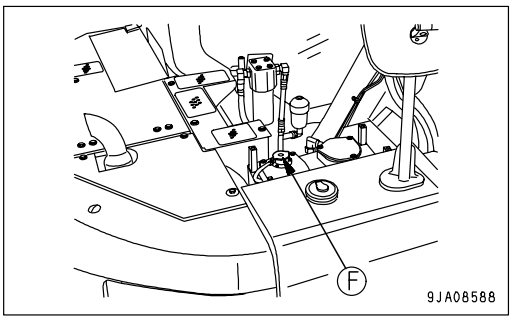
REPLACE BREATHER ELEMENT IN HYDRAULIC TANK

WARNING

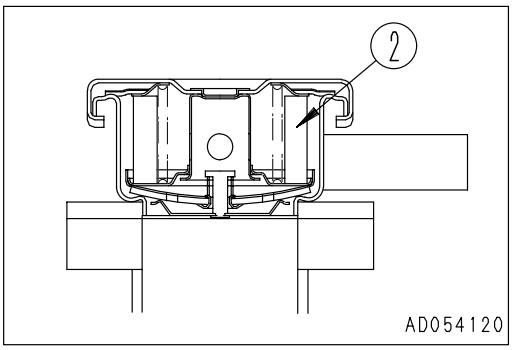
- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.**

1. Remove cover (1) at the top of the hydraulic tank.
   Remove the cap of oil filler (F) over the hydraulic tank.





2. Replace element (2) inside the cap.



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EVERY 1000 HOURS MAINTENANCE

Carry out the EVERY 100 HOURS MAINTENANCE, EVERY 250 HOURS MAINTENANCE, and EVERY 500 HOURS MAINTENANCE at the same time.

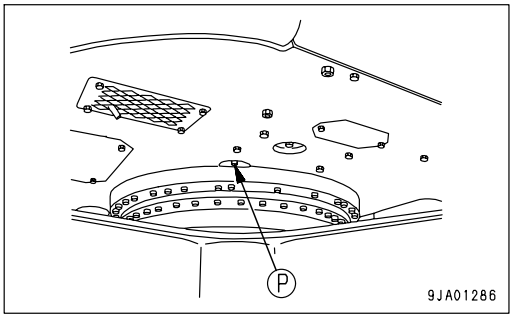
CHANGE OIL IN SWING MACHINERY CASE

⚠ WARNING

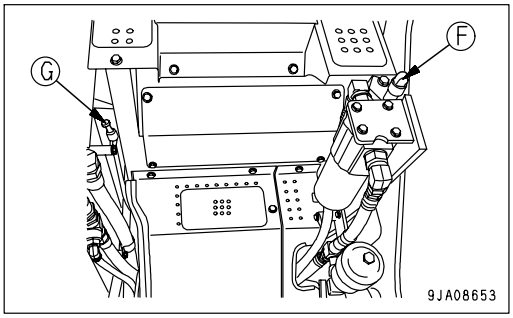
The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.

- Refill capacity: 2.5 liters (0.66 US gal)

1. Swing the upper structure so that drain plug (P) is between the left and right tracks.
2. Set an oil container under drain valve (P) at the bottom of the machine.
3. Remove drain plug (P) at the bottom of the machine, drain the oil, then tighten the drain plug again.
   Tightening torque for drain plug: 44.1 to 93.1 Nm (4.5 to 9.5 kgm, 32.5 to 68.7 lbft)



4. Remove dipstick (G) and the cap of oil filler (F), then add the specified amount of oil from oil filler (F).
5. Wipe off the oil on the dipstick with a cloth.
6. Fully insert dipstick (G) into filler pipe (F), then remove it.
7. The oil level should be between the H and L marks on oil level gauge (G). If the oil level is below the L mark, add oil through oil filler port (F).
8. If the oil is above the H mark, drain the excess oil from drain plug (P), then check the oil level again.



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CHANGE OIL IN FINAL DRIVE CASE

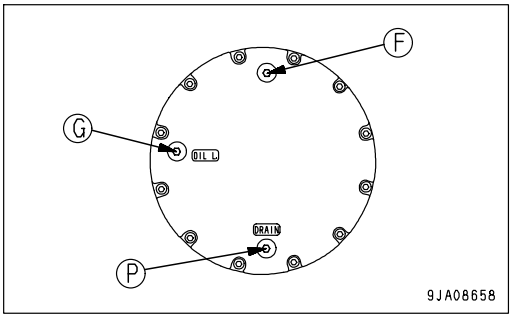
WARNING

- **The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.**
- **If there is still pressure remaining inside the case, the oil or plug may fly out. Loosen the plug slowly to release the pressure.**

- Refill capacity (each): 2.1 liters (0.55 US gal)
- Prepare a hexagon wrench.

The diagram on the right shows the left final drive case.

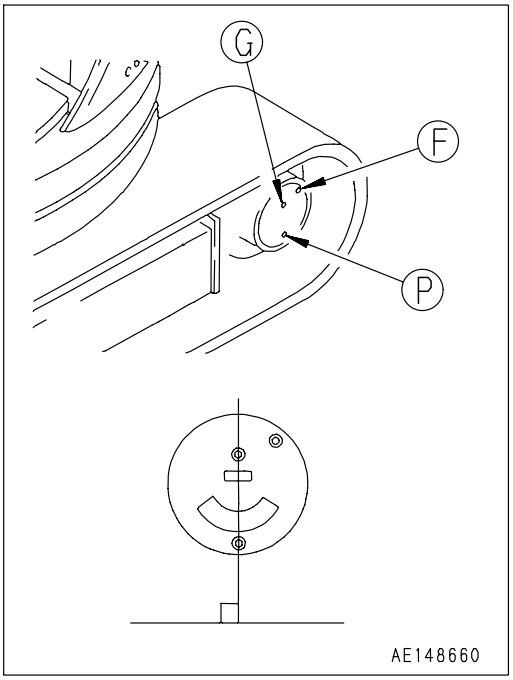
1. Set plug (F) at the top, with plug (F) and plug (P) perpendicular to the ground surface.
2. Set a container under plug (P) to catch the oil.
3. Remove plugs (P), (G) and (F) with hexagonal wench to drain the oil.
4. Tighten plug (P).
5. Add the replacement amount of oil through the hole of plug (F).
6. After the oil flows out of the hole plug (G), install plugs (G) and (F).



Large-capacity Final Drive

(If equipped for PC138US)

1. Set so that plug (G) is at the top, with plug (G) and plug (P) perpendicular to the ground.
2. Set the container to catch oil under plug (P).
3. Remove plugs (P), (G) and (F) with hexagonal wench to drain the oil.
4. Tighten plug (P).
5. Add the replacement amount of oil through the hole of plug (F).
6. After the oil flows out of the hole plug (G), install plugs (G) and (F).



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REPLACE HYDRAULIC OIL FILTER ELEMENT

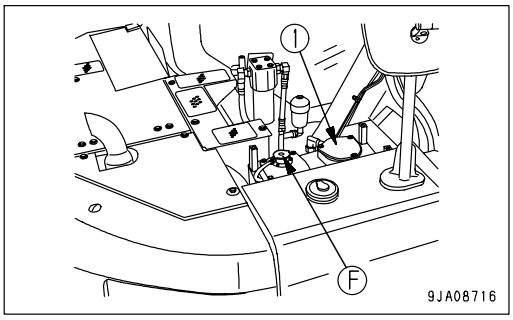
WARNING

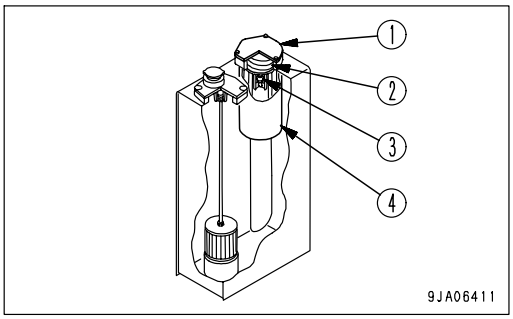
- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.**

NOTICE

If the machine is equipped with a hydraulic breaker, the hydraulic oil will deteriorate much faster than during normal bucket operations. For details, see "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (PAGE 4-16)" when carrying out maintenance.

1. Remove the cover at the top of the hydraulic tank.
2. Remove the cap from oil filler (F), and release the internal pressure.
3. Loosen 3 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) and valve (3), take out element (4).
5. Clean the removed parts in flushing oil.
6. Install the new element in the place where old element (4) was installed.
7. Set valve (3) 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. Install the oil filler cap, then install the cover at the top of the hydraulic tank.
10. To bleed the air, start the engine according to "STARTING ENGINE (PAGE 3-133)" and run the engine at low idle for 10 minutes.
11. Stop the engine.





REMARK

Operate the machine after halting for more than 5 minutes to eliminate bubbles in the oil inside the tank.

12. Check for oil leakage and wipe off any spilled oil.

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REPLACE FUEL MAIN FILTER CARTRIDGE

WARNING

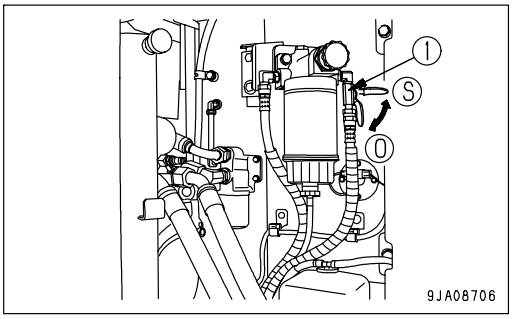
- **After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.**
- **High pressure is generated inside the engine fuel piping system when the engine is running.**
  When replacing the 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.**

NOTICE

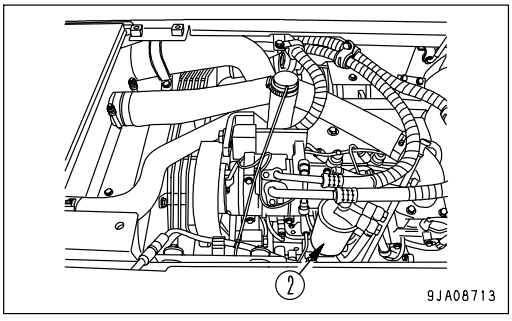
- **Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.**
  If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- **When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.**

- Prepare a container to catch drain fuel.
- Prepare a filter wrench

1. Open the pump room door on the right side of the machine.
2. Set valve (1) at the side of the fuel pre-filter cartridge to the shut position (S).

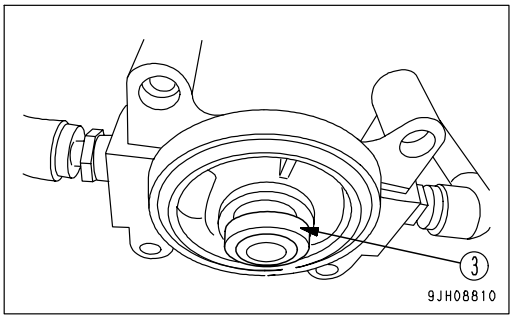


3. Open the engine hood.
4. Set the container to catch the fuel under the filter cartridge.
5. Using a filter wrench, turn filter cartridge (2) counterclockwise to remove it.
6. Clean the filter holder, coat the packing surface of the new filter cartridge thinly with oil, then install the filter cartridge to the filter holder.



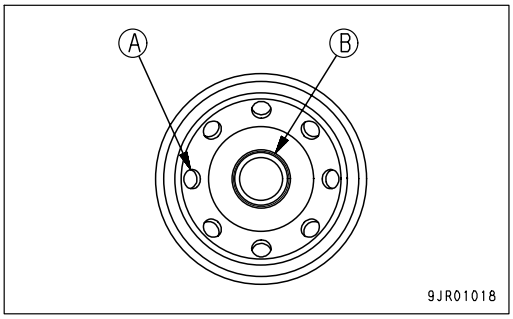
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- Replace inner seal (3) with a new part.



NOTICE

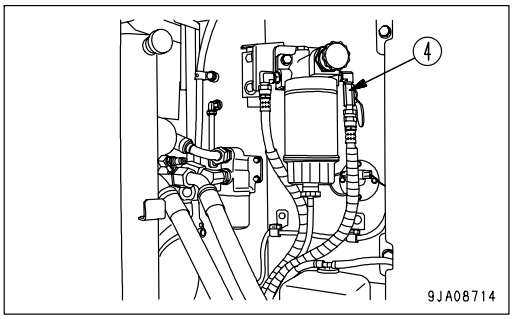
- **Do not fill the new filter cartridge with fuel.**
- **Remove cap (B) and install the filter cartridge.**



7. 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.
8. Set valve (1) at the side of the fuel pre-filter cartridge to the open position (O).
9. After completing the replacement of filter cartridge (2), bleed the air.

Bleed the air as follows:

10. Fill the fuel tank with fuel (to the position where the float is at the highest position).
11. Loosen the knob of feed pump (4), pull it out, then pump it in and out until the movement becomes heavy.



REMARK

- It is not necessary to remove the plug at the top of the fuel pre-filter and fuel main filter.
- After the engine runs out of fuel, use the same procedure to operate feed pump (4) and bleed the air.

12. Push in the knob of feed pump (4) and tighten it.
13. After replacing the filter cartridge, start the engine and run it at low idling for 10 minutes.
    Check for leakage of oil from the filter seal surface. If any oil is leaking, check the tightening of the filter cartridge. If there is still oil leakage, repeat Steps 2 - 5 to remove the filter cartridge, and if any damage or embedded foreign material in the packing surface is found, replace it with a new cartridge and repeat Steps 6 - 13 to install it.

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CHECK ALL TIGHTENING POINTS OF ENGINE EXHAUST PIPE CLAMPS

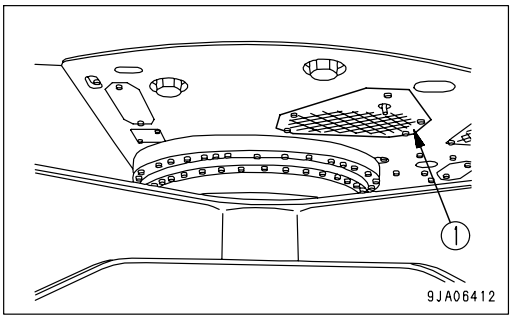
Please ask your Komatsu distributor to check the tightening of the clamps between the air cleaner - turbocharger - aftercooler - engine.

CHECK OIL LEVEL IN PTO GEAR CASE, ADD OIL

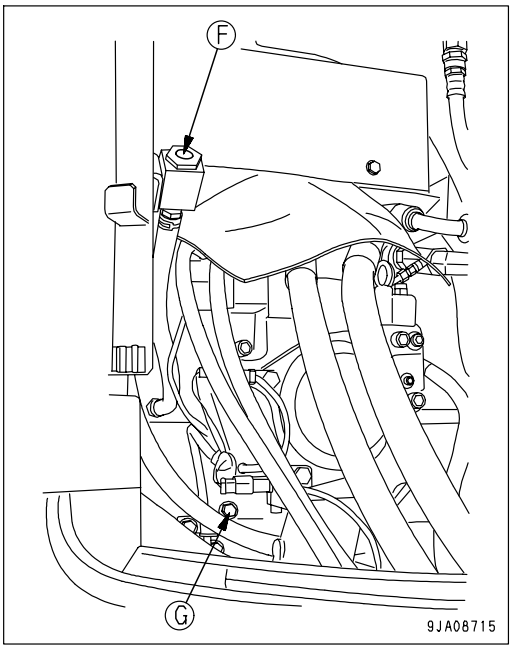
⚠ WARNING

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.

1. Swing the upper structure so that the PTO gear case is in the middle between the left and right tracks. Stop the engine and set the lock lever to the LOCK position.
2. Remove undercover (1) at the bottom of the machine.



3. Remove oil inspection plug (G) and check that the oil is near the bottom of the plug hole.
4. If the oil level is low, open the pump room door on the right side of the machine, remove the plug from oil filler (F), and add oil. Add oil until the oil level is close to the bottom of the hole of oil inspection plug (G).
5. Install oil inspection plug (G) and the plug of oil filler (F).



6. Install cover (1).

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EVERY 2000 HOURS MAINTENANCE

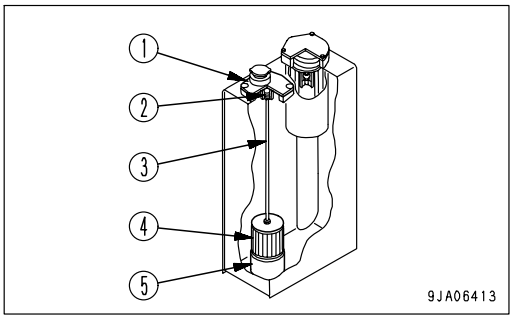
Carry out the periodic maintenance work of every 100, 250, 500 and 1000 hours of operation at the same time.

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 cover at the top of the hydraulic tank.
2. Remove 4 bolts, then remove cover (1). When doing this, cover (1) may fly off because of the force of spring (2), keep the cover pushed 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 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. Install cover (1) with bolts.
7. Install the cover at the top of the hydraulic tank.



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 inspection and maintenance, please contact your Komatsu distributor.

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CHECKING CHARGE PRESSURE OF NITROGEN GAS IN ACCUMULATOR (FOR CONTROL CIRCUIT)

⚠ WARNING

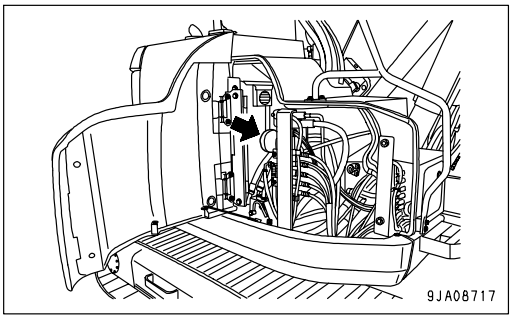
The accumulator is charged with high-pressure nitrogen gas, so mistaken operation may cause an explosion, which will lead to serious injury or damage. When handling the accumulator, always do as follows.

- **The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when carrying out the operation. In addition, loosen the bolts slowly when carrying out the operation.**
- **Do not disassemble the accumulator.**
- **Do not bring it near flame or dispose of it in fire.**
- **Do not make holes in it or weld it.**
- **Do not hit it, roll it, or subject it to any impact.**
- **When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor to have this work carried out.**

FUNCTION OF ACCUMULATOR

The accumulator stores the pressure in the control circuit. Even after the engine is stopped, the control circuit can be operated, so the following actions are possible.

- If the control lever is operated in the direction to lower the work equipment, it is possible for the work equipment to go down under its own weight.
- The pressure in the hydraulic circuit can be released.



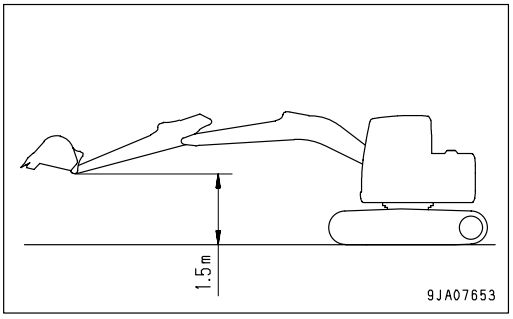
The accumulator is installed to the position shown in the diagram on the right.

CHECKING FUNCTION OF ACCUMULATOR

Replace the accumulator every 2 years or every 4000 hours, whichever comes sooner.

Check the nitrogen gas charge pressure as follows.

1. Stop the machine on firm, level ground.
2. Set the work equipment to the maximum reach (arm fully extended and bucket fully dumped) and hold the work equipment at a position 1.5 m (4 ft 11 in) above the ground.

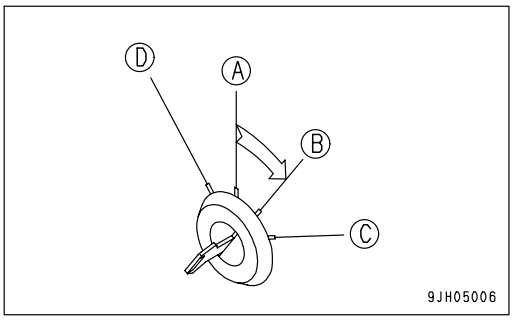


NOTICE

Carry out the following procedure to lower the work equipment to the ground within 15 seconds of stopping the engine. When the engine stops, the pressure in the accumulator gradually goes down, so inspection can only be carried out immediately after the engine is stopped.

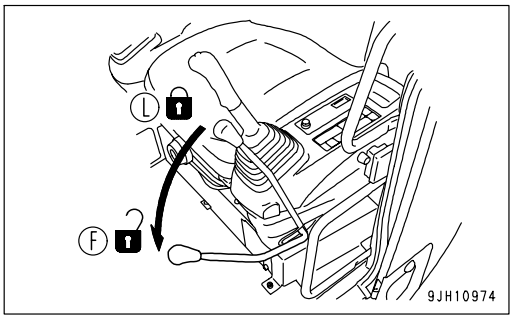
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3. Keep the work equipment at the maximum reach, turn the starting switch to the OFF position (A), and stop the engine.
4. Turn the starting switch to the ON position (B).

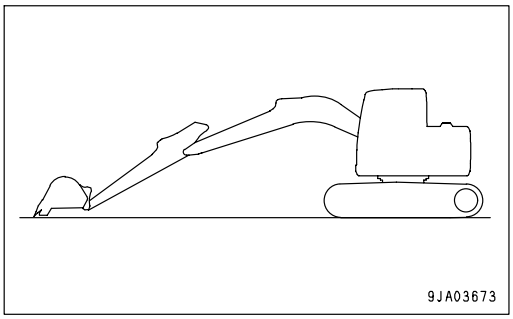


5. Set the lock lever to the FREE position (F).
6. Operate the work equipment control lever fully to the boom LOWER position.

REMARK
Check that the area around the machine is safe, then operate the work equipment control lever to the LOWER position.



7. Check that the work equipment goes down to the ground under its own weight.
8. This completes the inspection.



NOTICE
If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it will become impossible to release the remaining pressure inside the hydraulic circuit if a failure occurs on the machine.

In the following cases, the charge pressure of the accumulator has gone down. Please contact your Komatsu distributor.

- Work equipment does not go down
- Stops while going down

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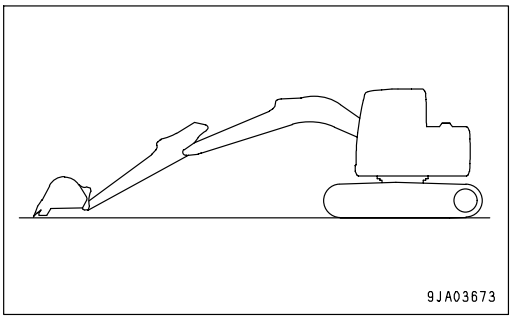
METHOD OF RELEASING PRESSURE IN HYDRAULIC CIRCUIT

NOTICE

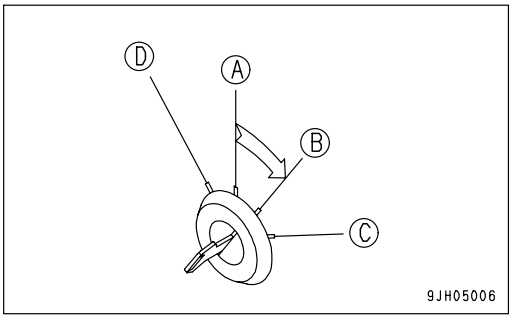
Carry out the following procedure to operate the work equipment control lever fully to the front, rear, left, and right within 15 seconds of stopping the engine.

When the engine stops, the pressure in the accumulator gradually goes down, so the pressure can only be released immediately after the engine is stopped.

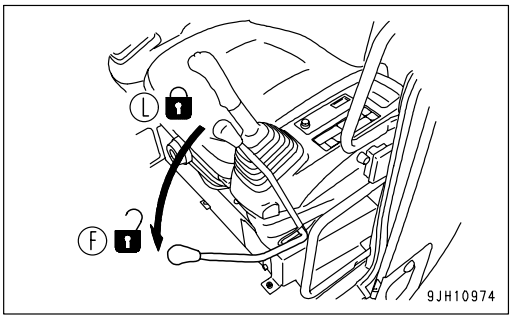
1. Place the work equipment on the ground. Close the crusher attachment jaws, etc.
2. Stop the engine.



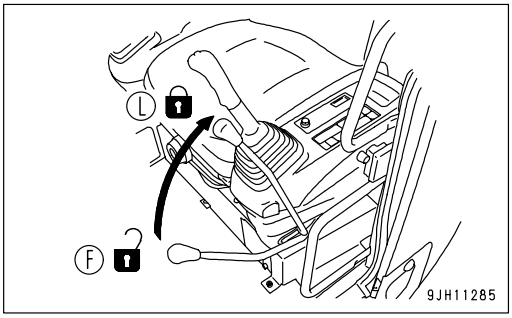
3. Turn the starting switch to the ON position (B).



4. Set the lock lever to the FREE position (F), then operate each work equipment control lever and attachment control pedal (if equipped) fully to the front, rear, left, and right to release the pressure in the hydraulic circuit.



5. Set the lock lever to the LOCK position (L) to lock the work equipment control levers and attachment control pedal (if equipped).



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EVERY 4000 HOURS MAINTENANCE

Carry out the EVERY 100 HOURS MAINTENANCE, EVERY 250 HOURS MAINTENANCE, EVERY 500 HOURS MAINTENANCE, EVERY 1000 HOURS MAINTENANCE, and EVERY 2000 HOURS MAINTENANCE at the same time.

CHECK WATER PUMP

Check that there is no play in the pulley, leakage of oil or water, or clogging of the drain hole. If any problem is found, please contact your Komatsu distributor for repairs or replacement.

REPLACE ACCUMULATOR (FOR CONTROL CIRCUIT)

Replace the accumulator every 2 years or every 4000 hours, whichever comes sooner.

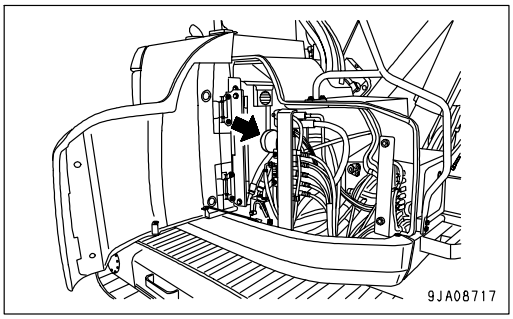
⚠ WARNING

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

- **The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when carrying out the operation. In addition, loosen the bolts slowly when carrying out the operation.**
- **Do not disassemble the accumulator.**
- **Do not bring it near flame or dispose of it in fire.**
- **Do not make holes in it or weld it.**
- **Do not hit it, roll it, or subject it to any impact.**
- **When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor to have this work carried out.**

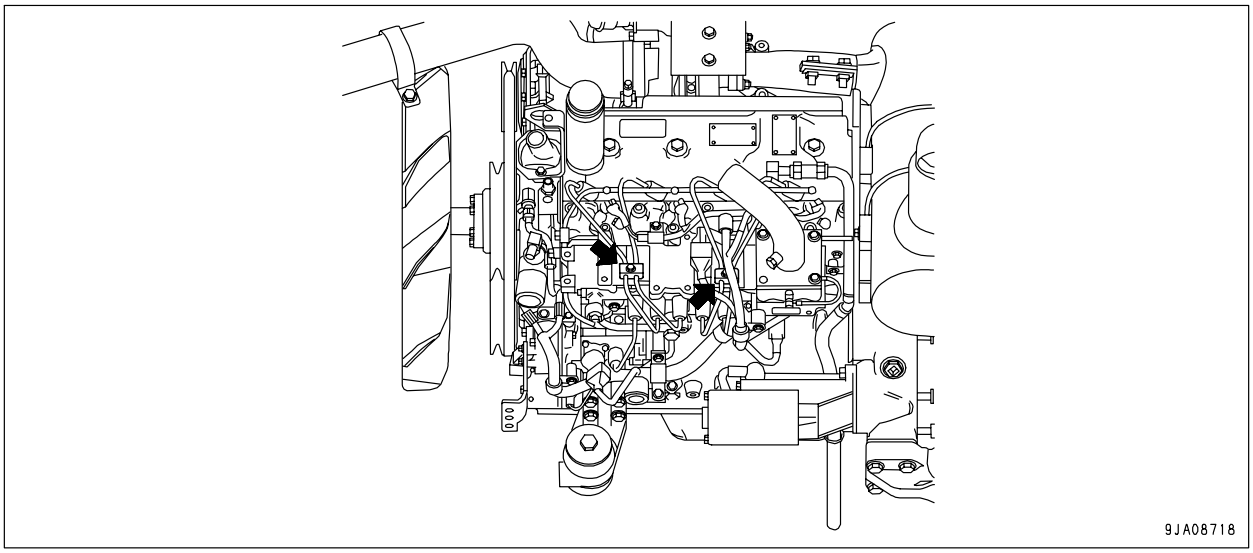
If operations are continued after the performance of the accumulator has dropped, it will be impossible to release the remaining pressure in the hydraulic circuit if there should be a failure on the machine. Please ask your Komatsu distributor to replace the accumulator.

The accumulator is installed to the position shown in the diagram on the right.



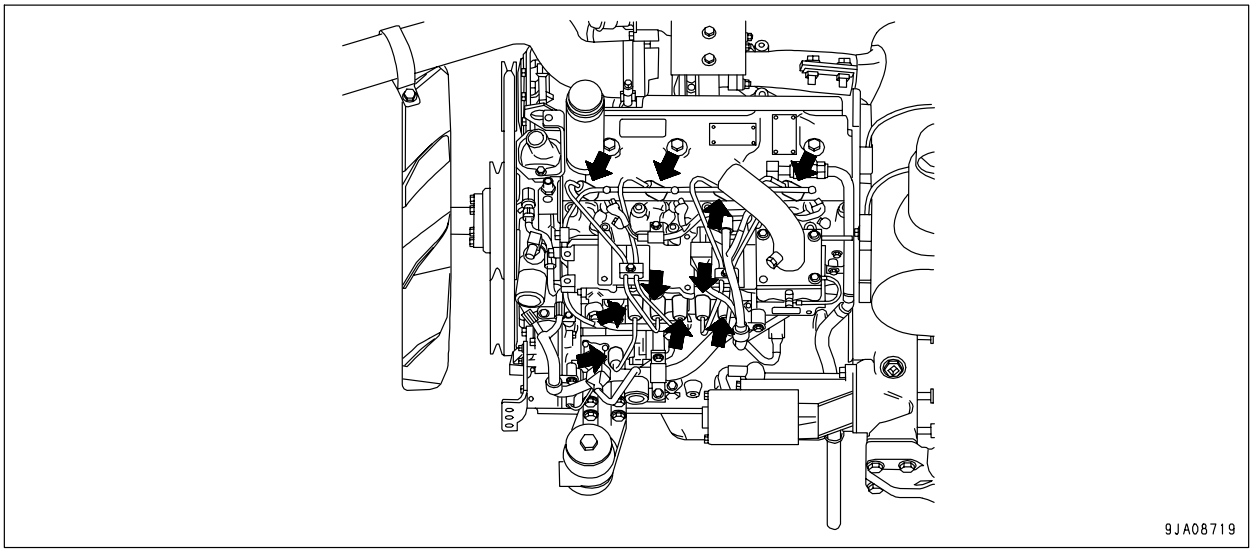
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CHECK FOR LOOSENESS OF HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER



Check visually and touch by hand to check that there is no hardening of the rubber and no loose bolts of the mounting clamps (2 places) for the high-pressure piping between the supply pump and the common rail. If there are any problems, the parts must be replaced. In this case, please ask your Komatsu distributor to carry out replacement.

CHECK FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER



The fuel spray prevention caps (10 places) on the fuel injection piping and both ends of the high-pressure piping act to prevent the fuel from coming into contact with high-temperature parts of the engine and causing a fire if the fuel should leak or spray out. Check visually and touch by hand to check that there are no missing caps, loose bolts or hardening of the rubber. If there are any problems, the parts must be replaced. In this case, please ask your Komatsu distributor to carry out replacement.

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EVERY 5000 HOURS MAINTENANCE

Carry out the periodic maintenance work of every 100, 250, 500 and 1000 hours of operation at the same time.

CHANGE OIL IN HYDRAULIC TANK

⚠ WARNING

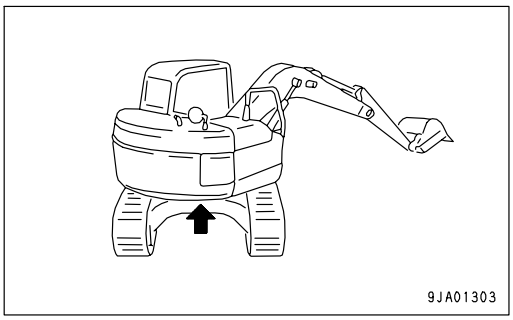
- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.**

NOTICE

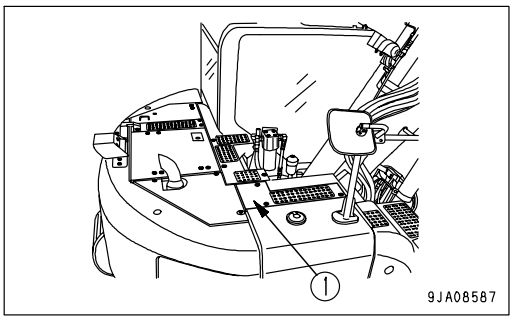
If the machine is equipped with a hydraulic breaker, the hydraulic oil will deteriorate much faster than during normal bucket operations. For details, see "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (PAGE 4-16)" when carrying out maintenance.

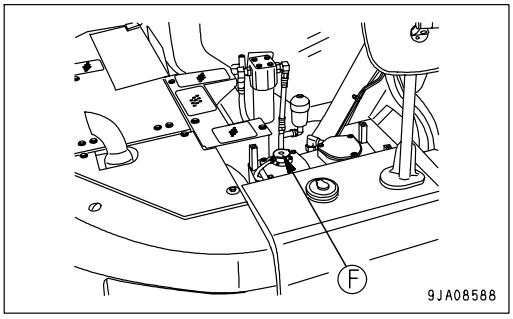
- Refill, capacity: 69 liters (18.22 US gal)
- Prepare a handle (for the socket wrench).

1. Swing so that the drain plug at the bottom of the hydraulic tank is 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 cover (1) at the top of the hydraulic tank.
   Remove the cap of oil filler (F) over the hydraulic tank.

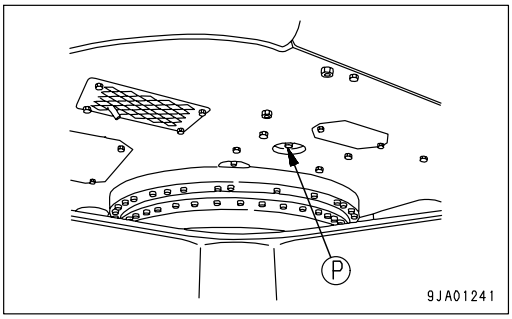




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5. Set the oil container under the drain plug under the machine. Using the handle, remove drain plug (P) and drain the oil. Check the O-ring installed to plug (P), and if it is dam-aged, replace the O-ring. After draining the oil, tighten drain plug (P). Tightening torque: 58.8-78.4 Nm (6-8 kgm, 43.4-57.9 lbft).

   - Take care not to get oil on yourself when you remove drain plug (P).



6. Add the replacement amount of oil through oil filler (F). Check that the oil level is between the H and L lines on the sight gauge.
   For details of oil level check, see "Check Oil Level in Hydraulic Tank, Add Oil (PAGE 3-119)".

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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.

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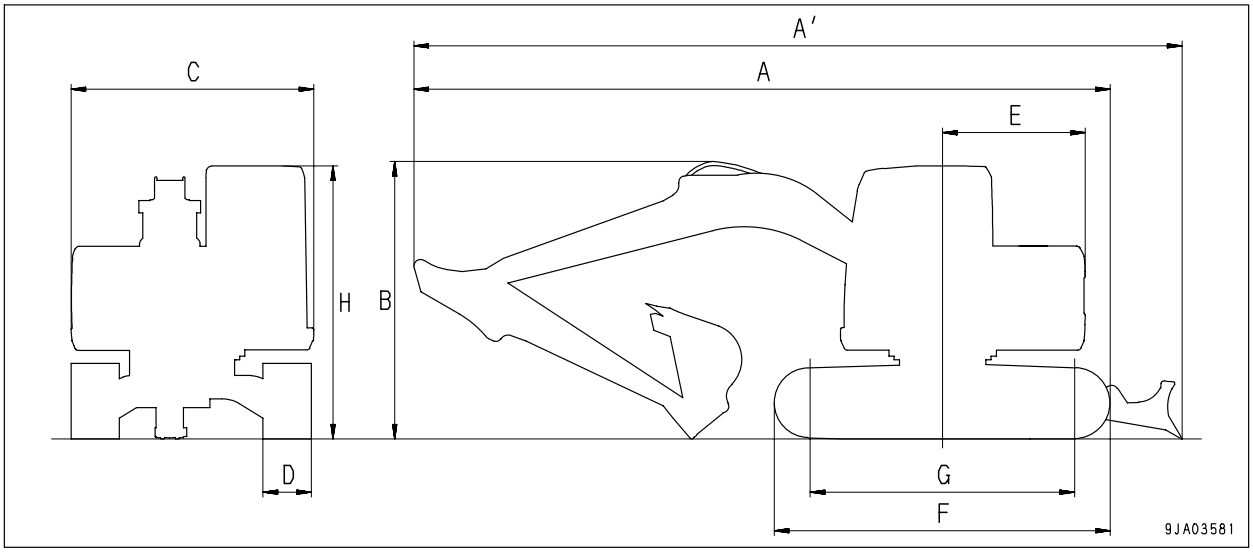
SPECIFICATIONS

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SPECIFICATIONS

PC138US-8

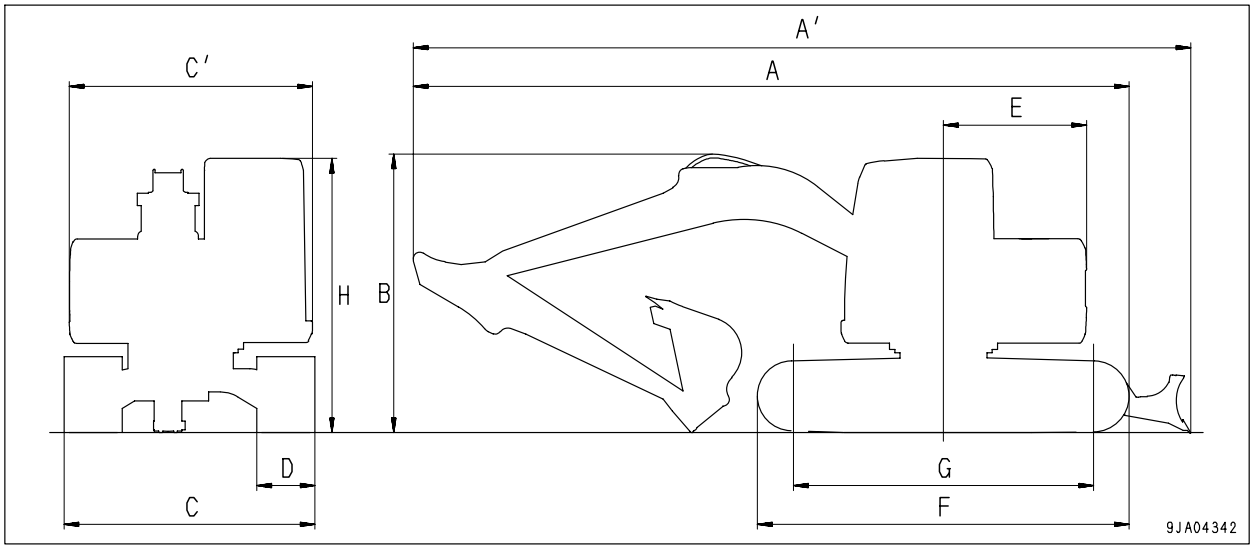
	Item	Unit	Standard specification	Blade specification
	Machine weight	kg (lb)	13,400 (29,547)	14,050 (30,980)
	Bucket capacity	m^3 (cu.yd)	0.50 (0.65)	
	Name of engine	-	Komatsu SAA4D95LE-5 diesel engine	
	Engine horsepower	kW (HP)/rpm	68.4 (91.7)/2,200	
A	Overall length (Standard specification)	mm (ft in)	7,260 (23' 10")	-
A'	Overall length (Blade specification)	mm (ft in)	-	7,970 (26' 2")
B	Overall height	mm (ft in)	2,850 (9' 4")	
C	Overall width	mm (ft in)	2,490 (8' 2")	
D	Track width	mm (ft in)	500 (1' 8")	
E	Tail swing radius	mm (ft in)	1,480 (4' 10")	
F	Length of track	mm (ft in)	3,610 (11' 10")	
G	Tumbler canter distance	mm (ft in)	2,880 (9' 5")	
H	Cab height	mm (ft in)	2,815 (9' 3")	
	Min. ground clearance	mm (ft in)	395 (1' 4")	
	Travel speed (Low/High)	km/h (MPH)	2.9/5.1 (1.8/3.2)	
	Continuous swing speed	rpm	11.0	



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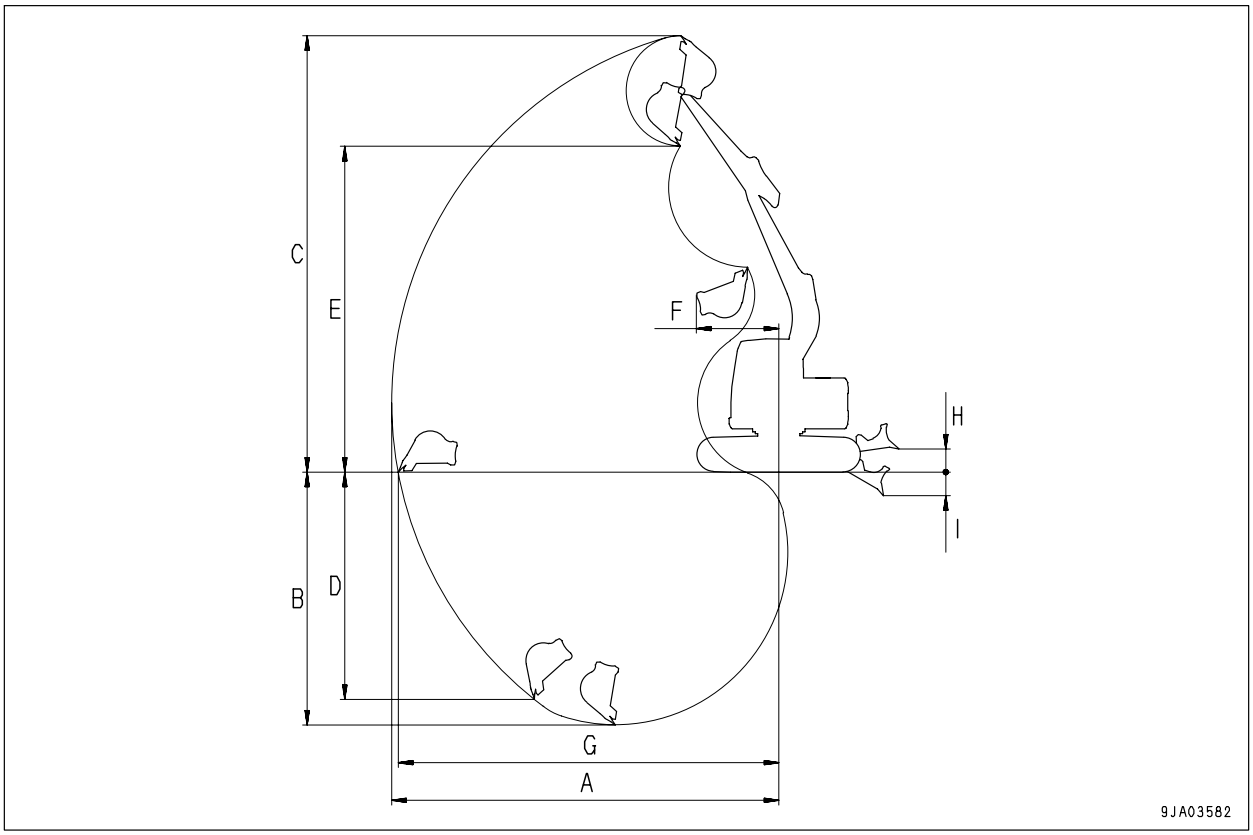
PC138USLC-8

	Item	Unit	Standard specification	Blade specification
	Machine weight	kg (lb)	14,500 (31,973)	15,150 (33,406)
	Bucket capacity	m^3 (cu.yd)	0.50 (0.65)	
	Name of engine	-	Komatsu SAA4D95LE-5 diesel engine	
	Engine horsepower	kW (HP)/rpm	68.4 (91.7)/2,200	
A	Overall length (Standard specification)	mm (ft in)	7,390 (24' 3")	-
A'	Overall length (Blade specification)	mm (ft in)	-	8,040 (26' 5")
B	Overall height	mm (ft in)	2,850 (9' 4")	
C	Overall width	mm (ft in)	2,590 (8' 6")	
C'	Overall width (Blade specification)	mm (ft in)	2,490 (8' 2")	
D	Track width	mm (ft in)	600 (2' 0")	
E	Tail swing radius	mm (ft in)	1,545 (5' 1")	
F	Length of track	mm (ft in)	3,870 (12' 8")	
G	Tumbler canter distance	mm (ft in)	3,140 (10' 4")	
H	Cab height	mm (ft in)	2,815 (9' 3")	
	Min. ground clearance	mm (ft in)	395 (1' 4")	
	Travel speed (Low/High)	km/h (MPH)	2.9/5.1 (1.8/3.2)	
	Continuous swing speed	rpm	11.0	



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	Working ranges	Unit	PC138US-8	PC138USLC-8
A	Max. digging reach	mm (ft in)	8,300 (27’ 3")	
B	Max. digging depth	mm (ft in)	5,480 (17’ 2")	
C	Max. digging height	mm (ft in)	9,340 (30’ 8")	
D	Max. vertical wall digging depth	mm (ft in)	4,900 (16’ 1")	
E	Max. dumping height	mm (ft in)	6,840 (22’ 5")	
F	Min. swing radius of work equipment	mm (ft in)	1,980 (6’ 6")	
G	Max. reach ground level	mm (ft in)	8,180 (26’ 10")	
H	Max. blade lifting height	mm (ft in)	470 (1’ 7")	
I	Max. blade lowering depth	mm (ft in)	525 (1’ 9")	490 (1’ 7")



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ATTACHMENTS, OPTIONS

⚠ WARNING

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

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ATTACHMENTS AND OPTIONS - GENERAL INFORMATION

SAFETY FIRST

If attachments or options other than those authorized by Komatsu are installed, this will not only affect the life of the machine, but will also cause problems with safety.
When installing attachments not listed in this Operation and Maintenance Manual, contact your Komatsu distributor first.
If you do not contact Komatsu, we cannot accept any responsibility for any accidents or failures.

⚠ WARNING

General precautions

- **Read the instruction manual for the attachment thoroughly, and do not use this attachment unless you are sure that you have understood the guides completely.**
  If you lose the instruction manual, always ask the manufacturer or your Komatsu distributor for a new copy.
- **Depending on the attachment, install the necessary front guard on the machine.**
- **Depending on the attachment, the impact noise may make it difficult for fellow workers to transmit instructions for the operation. Before starting operation, decide a leader and determine the signals to be used.**
- **Do not carry out swinging operations to the side with a heavy load on the attachment. This is particularly dangerous on slopes.**
- **Comparing with a machine equipped with a bucket, a machine equipped with a breaker has a heavy load at the front of the work equipment and is unstable. To avoid a hazard of tipping over, do not carry out operations with the attachment swung to the side.**
- **When an attachment is installed, the swing range and center of gravity of the machine are different, and the machine may move in an unexpected way. Be sure that you understand the condition of the machine properly.**
- **Before starting operations, set up a fence around the machine to prevent people from entering.**
  Never operate the machine when there are people near the machine.
- **To prevent serious accidents caused by misoperation, do not put your foot on the pedal except when operating the pedal.**

Precautions for removal and installation operations

When removing or installing the attachments, obey the following precautions and take care to ensure safety during the operation.

- **Carry out the removal and installation operation on a flat, firm ground surface.**
- **When the operation is carried out by two or more workers, determine the signals and follow these during the operation.**
- **When carrying heavy objects (more than 25 kg or 55 lb), use a crane.**
- **When removing heavy parts, always support the part before removing it.**
  When lifting such as heavy parts with a crane, always pay careful attention to the position of the center of gravity.
- **It is dangerous to carry out operations with the load kept suspended. Always set the load on a stand, and check that it is safe.**
- **When removing or installing attachments, make sure that it is in a stable condition and will not fall over.**
- **Never go under a load suspended from a crane.**
  Always stand in a position that is safe even if the load should fall.

NOTICE

Qualifications are required to operate a crane. Never allow the crane to be operated by an unqualified person.
For details of removal and installation operations, contact your Komatsu distributor.

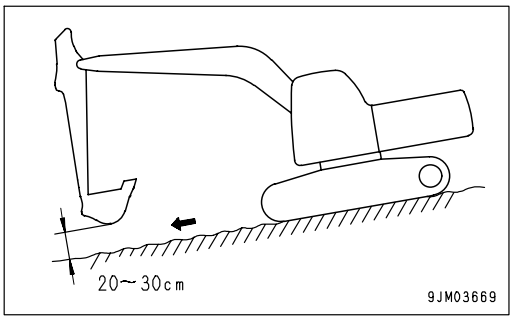
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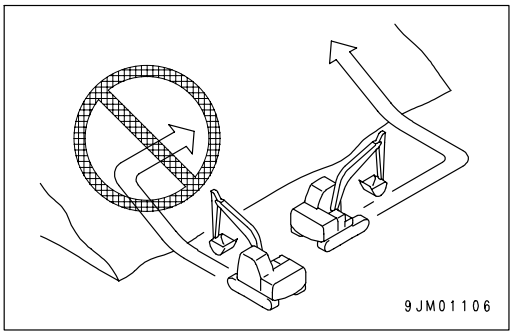
ATTACHMENT INSTALLATION

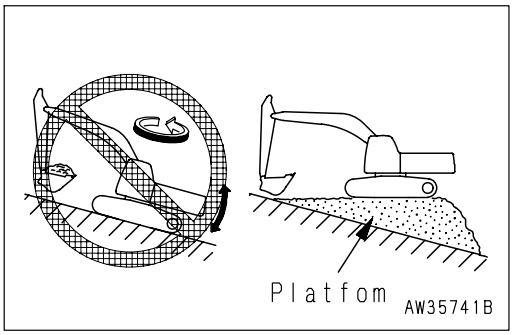
WARNING

Long work equipment or heavy work equipment cause the machine to have poor stability, so there is danger of the machine losing its balance and tipping over when traveling down steep hills or when swinging on slopes. Never do any of the following. They are extremely dangerous.

- **Traveling downhill with the work equipment raised**
- **Traveling across slopes**
- **Swinging upper structure on slopes**
- **If heavy-load work equipment is installed, there will be excessive overrun when swinging (the distance from operating to stop the swing to the point where the swing stops completely), so there is danger of mistaking the distance and hitting other objects.**
  Allow a margin to the stopping point when operating.
  In addition, the hydraulic drift (the gradual downward movement caused by the weight of the work equipment when the work equipment is stopped in a raised condition) will also increase.
- **If the correct procedure is not used when installing the boom and arm, it may lead to serious damage. Please consult your Komatsu distributor.**
- **When long work equipment is installed, the working range will suddenly become larger, so there is danger of mistaking the distance and hitting other objects. Allow an ample margin between the work equipment and surrounding obstacles when operating.**







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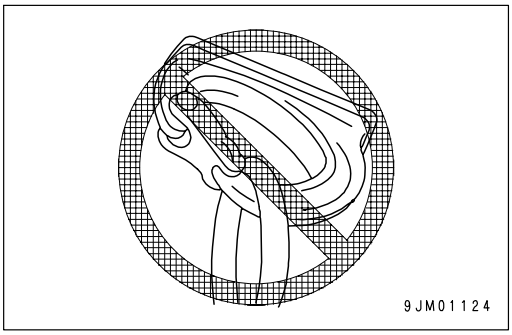
BUCKET WITH HOOK

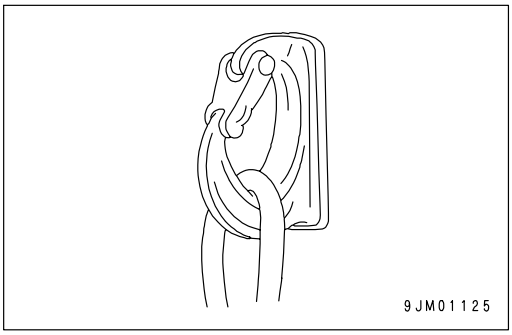
HOOK CONDITION

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



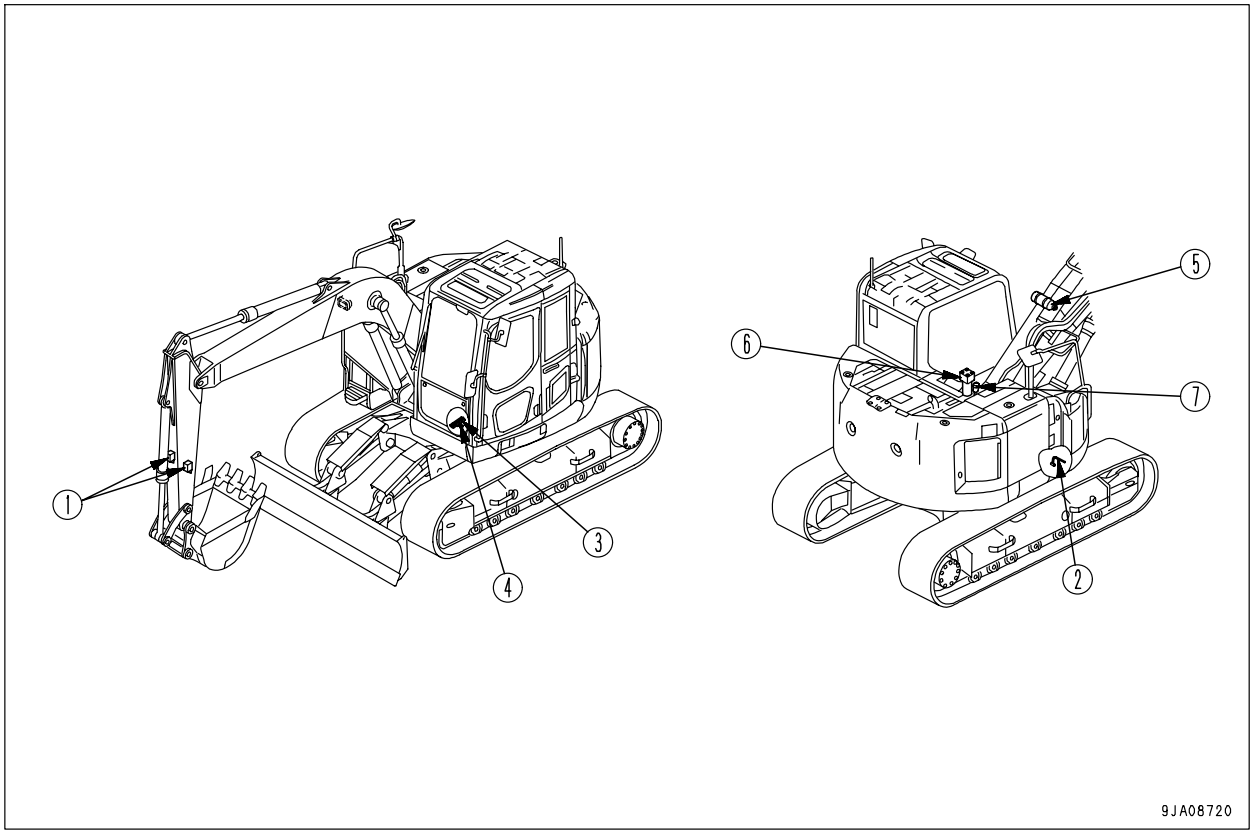


- Do not exceed the following loads when carrying out lifting operations.
  When standard arm is installed: 700 kg (1544 lb)
  When long arm is installed: 500 kg (1103 lb)
- It is dangerous if the load sways excessively. Lower the engine speed and operate the control levers slowly.
- The swing speed of this machine is 3 to 4 times the speed of a mobile crane. Be particularly careful to check that the surrounding area is safe when operating the swing.
- Check that there is no damage to the hook, stopper, and hook mount. If any problem is found, please contact your Komatsu distributor.
- Never travel the machine while lifting a load.
- Depending on the operating posture, there is danger that the wire or pulley may come off from the hook. To avoid these parts from coming off, pay careful attention to the angle of the hook. In addition, do not allow any person to come under or in the area around a raised 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 a hook is to be installed, please consult your Komatsu distributor.
- If you are planning to newly install a hook, contact your Komatsu distributor.

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MACHINE READY FOR ATTACHMENT

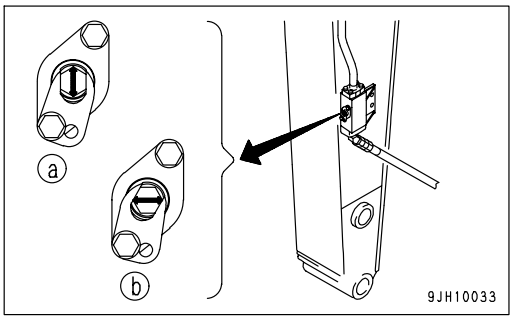
LOCATIONS



(1) Stop valve
(2) Selector valve
(3) Attachment Control pedal
(4) Lock pin
(5) Accumulator (for high pressure)
(6) Breaker circuit additional oil filter
(7) Accumulator (for low pressure)

Stop Valve

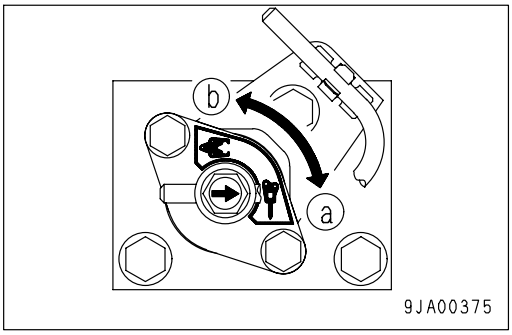
This valve (1) stops the flow of the hydraulic oil.
(a) FREE: Hydraulic oil flows.
(b) LOCK: Hydraulic oil stops.
When removing or installing attachments, set this valve to the LOCK position.



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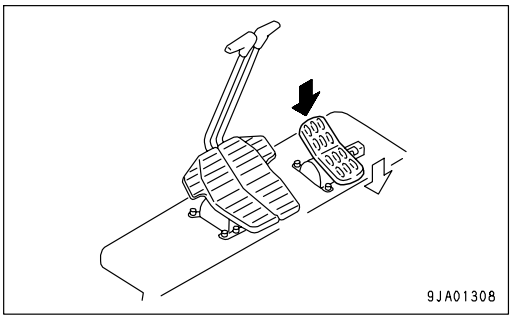
Selector Valve

This valve (2) selector the flow of the hydraulic oil.
Position (a) : When breaker is used
Position (b) : When general attachment is used (crusher, etc.)



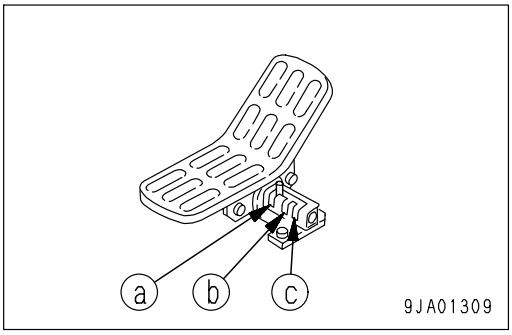
Attachment Control Pedal

This pedal (3) is used to operate the attachment.



Lock Pin

This pin (4) locks the control pedal.
Position (a): Lock
Position (b): Pedal half stroke position (When using an attachment like the slide arm requiring a small flow rate or a breaker)
Position (c): Pedal full stroke position (When using an attachment like the crusher and power ripper requiring a large flow rate)
Keep the lock pin in the LOCK position when attachment is not used.



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Accumulator (for High Pressure)

(If equipped)

When a breaker is in use, this accumulator (5) serves to assure the number of breaker hammering by lowering pulsation in the hydraulic pump discharging pressure. Its another function is to protect the pump.

Consult each manufacturer of breaker to decide if an accumulator may well be installed on your machine.

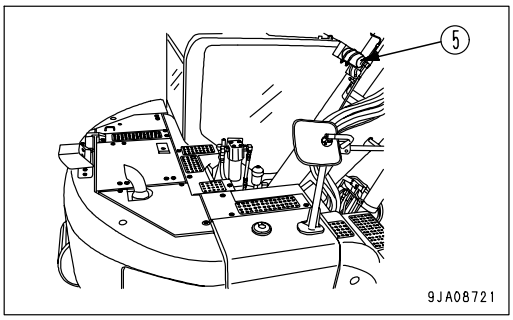


Table for Additional Circuit and Parts Required for Mounting Breaker
(○ white circlet indicates an item necessary to install)

	Additional filter	Accumulator		Low-pressure safety valve	
		Attachment circuit	Control circuit	Main valve	Selector valve
Hydraulic breaker	○	○ (go/return)	○	○	○

- Cracking pressure of low-pressure safety valve

Main valve 24.53 MPa (250 kg/cm^2, 3550.0 PSI)
Selector valve 17.17 MPa (175 kg/cm^2, 2490.0 PSI)

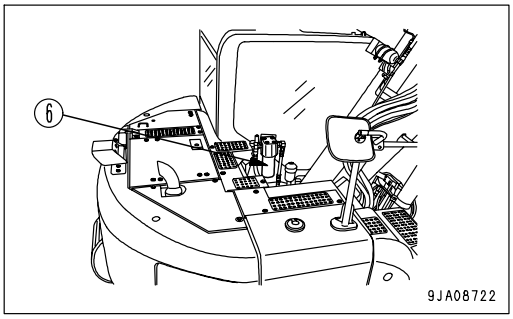
Breaker Circuit Additional Oil Filter

This filter (6) is used to prevent deterioration of the hydraulic oil when using the breaker.

The oil flows through this only when the selector valve is at the breaker position.

NOTICE

Always install an additional filter in the return circuit on machines equipped with a hydraulic breaker.

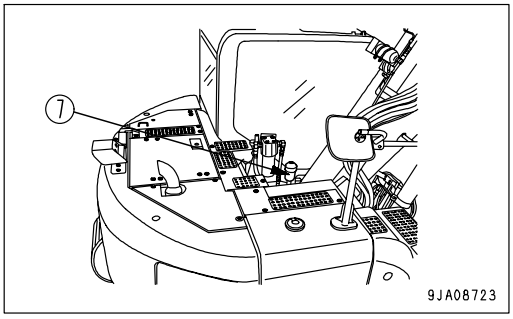


Accumulator (for Low Pressure)

(If equipped)

This accumulator (7) is installed to protect an oil cooler, when a breaker is used.

Consult each manufacturer of breaker to decide if an accumulator may well be installed in your machine.



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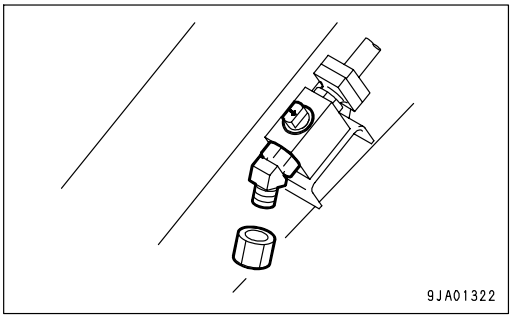
HYDRAULIC CIRCUIT

Hydraulic Circuit Connection

When connecting the attachment, connect the hydraulic circuit as follows.

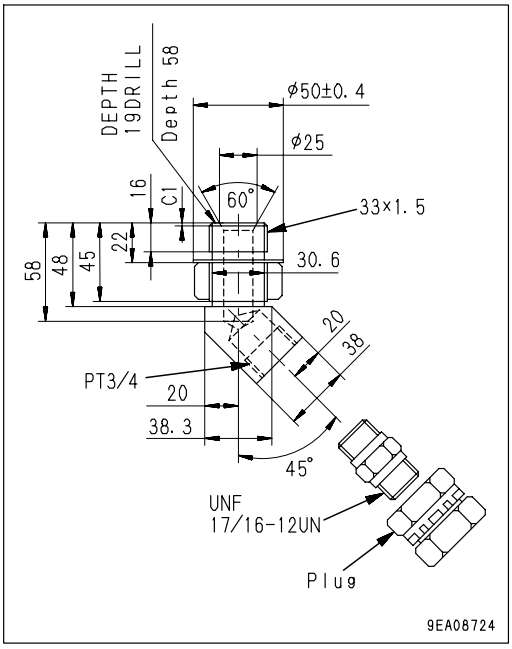
One Line Attachment

1. Check that the stop valve is at the LOCK position, then remove the plug.
   Be careful not to lose or damage any part that is removed.



2. Connect the piping for the attachment provided by the attachment maker.
   The dimensions on the stopper valve side are as indicated at right. For those on the attachment side, confer with each manufacturer of attachment and determine.

3. After connecting the piping, bleed the air from the circuit.
   1) Start the engine, referring to "STARTING ENGINE (PAGE 3-133)", and run it at low idle for the subsequent 10 minutes. Then proceed to the next work.
   2) Run the engine at low idle until the air in the attachment circuit is completely removed, then operate the attachment pedal repeatedly (approx. 10 times) to bleed the air.



NOTICE

If the attachment maker specifies an air bleeding procedure for the attachment itself, follow the specified procedure to bleed the air.

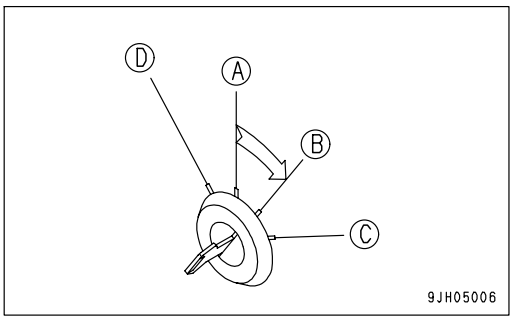
   3) After completing the bleeding of the air, stop the engine, and wait for at least 5 minutes before starting operations. This will release the bubbles in the oil inside the tank.
   4) Check that there is no oil leakage, and wipe off any oil that has been spilled.

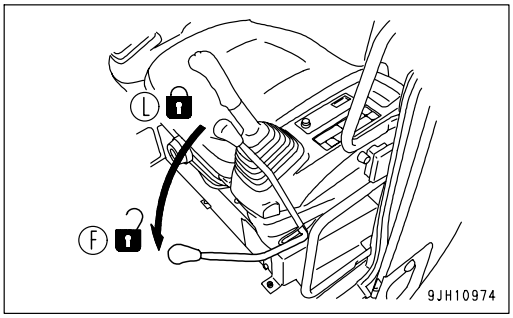
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ATTACHMENT REMOVAL AND INSTALLATION

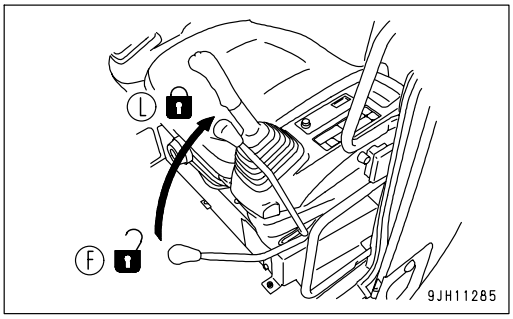
Attachment Removal

1. Lower the attachment to the ground and stop the engine.
2. Turn the starting switch to the ON position (B), then set the lock lever to the FREE position (F).
3. Within 15 seconds after stopping the engine, move each control lever (for work equipment and travel) and attachment control pedal (if equipped) to the full stroke in all directions to release the internal pressure.



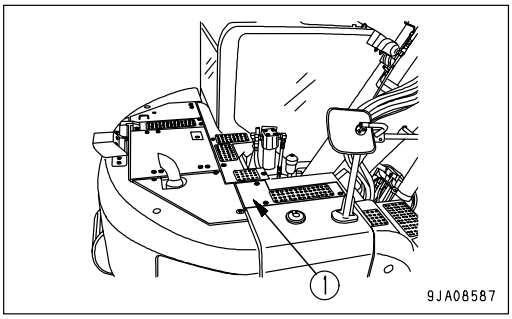


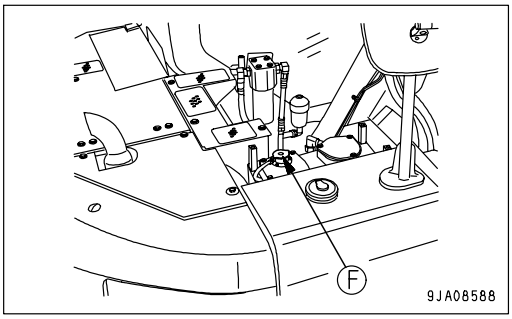
4. Set the lock lever to the LOCK position (L), then turn the starting switch to the OFF position (A).



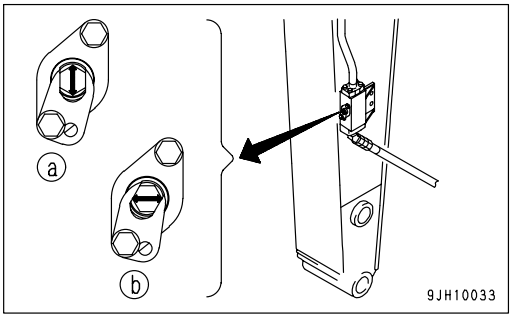
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5. Remove cover (1) at the top surface of the hydraulic tank, then slowly loosen oil filler cap (F) to release the internal pressure.



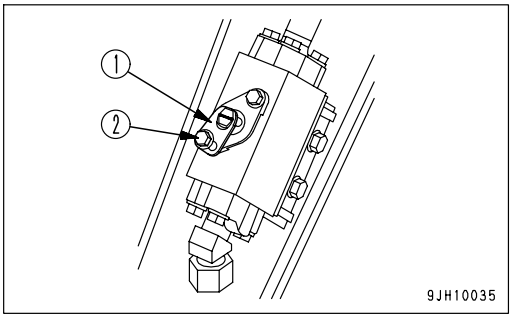


6. After checking that the hydraulic oil temperature has gone down, set the rotor of the stop valve (installed to the piping for the outlet port and inlet port on the side face of the arm) to LOCK position (b).
   (a) FREE: Hydraulic oil flows (direction of arrow is parallel to long direction of arm)
   (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angles to long direction of arm)

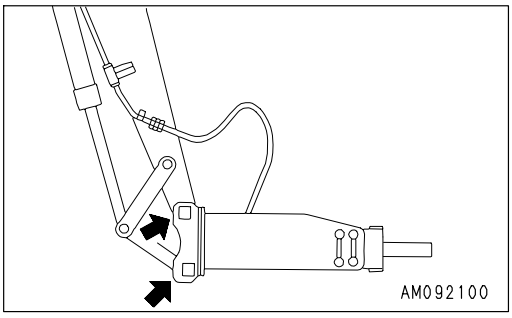


   - When setting the FREE or LOCK position of the stop valve rotor, remove bolt (2), turn over plate (1), then turn the rotor. After setting, install plate (1) again with bolt (2).

7. Remove the hoses on the attachment side. Install the plugs to the two outlets.
   The plugs are used to prevent the attachment from incorrect operation caused by mixing in of foreign matter. After the plugs are correctly installed, store the attachment.



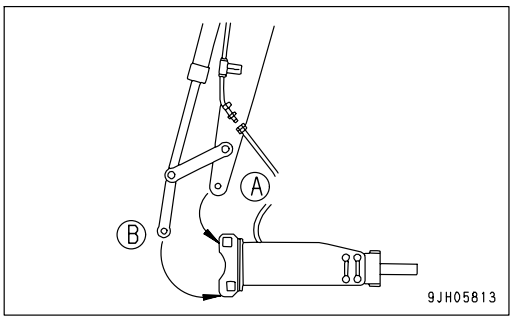
8. Pull out the mounting pins (2 places), remove the attachment, then install the bucket.
   For details of the procedure for installing the bucket, see "BUCKET REPLACEMENT AND INVERSION (PAGE 3-170)".
9. After installing the bucket, check the oil level in the hydraulic tank.



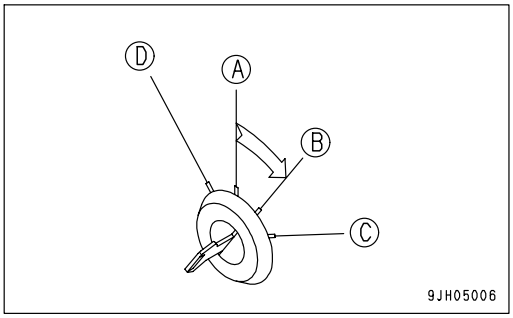
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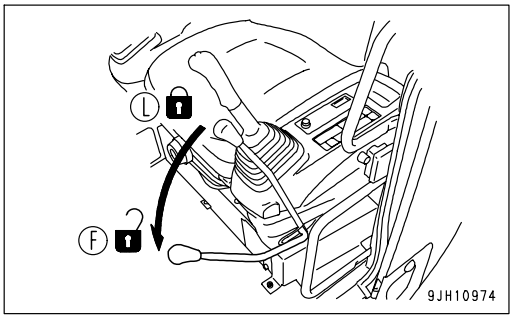
Attachment Installation

1. Remove the bucket.
   For details of the procedure for removing the bucket, see "BUCKET REPLACEMENT AND INVERSION (PAGE 3-170)".
2. Place the attachment in a horizontal position, then install to the arm with pin (A) and then pin (B).

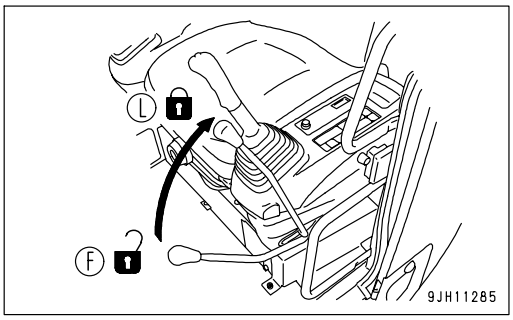


3. Turn the starting switch to the ON position (B), then set the lock lever to the FREE position (F).
4. Within 15 seconds after stopping the engine, move each control lever (for work equipment and travel) and attachment control pedal (if equipped) to the full stroke in all directions to release the internal pressure.



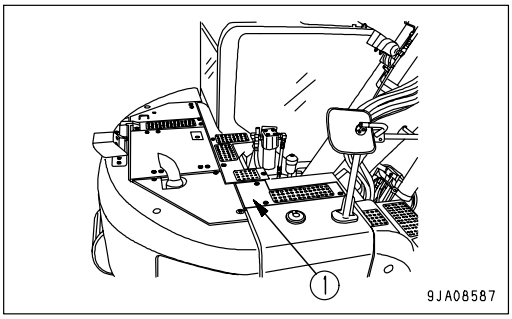


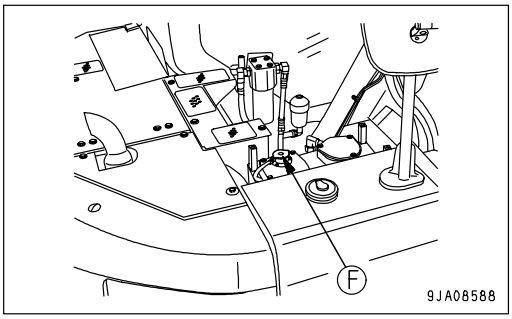
5. Set the lock lever to the LOCK position (L), then turn the starting switch to the OFF position (A).



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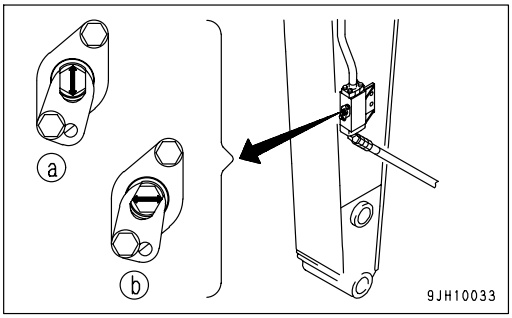
6. Remove cover (1) at the top surface of the hydraulic tank, then slowly loosen oil filler cap (F) to release the internal pressure.



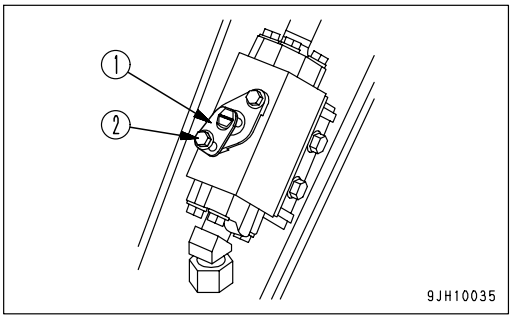


7. After checking that the oil temperature is low, remove the covers from the inlet port and outlet port (2 places). Be careful that no dirt or mud is stuck to the hose mouthpiece.
   If the O-ring is damaged, replace it with a new part.
8. Connect the hose at the attachment side.
   When doing this, check the direction of flow of the oil and be careful not to make any mistake.
9. Set the rotor of the stop valve installed to the inlet port on the side face of the arm and the outlet port piping to FREE position (a).

   (a) FREE: Hydraulic oil flows (direction of arrow is parallel to long direction of arm)
   (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angles to long direction of arm)



   - When setting the FREE or LOCK position of the stop valve rotor, remove bolt (2), turn over plate (1), then turn the rotor. After setting, install plate (1) again with bolt (2).



10. After installing the attachment, check the oil level in the hydraulic tank.

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ATTACHMENT OPERATIONS

⚠ WARNING

- **If the pedal is operated when the auto-deceleration is being actuated and the engine speed has dropped, the engine speed will suddenly rise, so be careful when operating.**
- **If you leave your foot resting on the pedal and depress the pedal by mistake, there is danger that the attachment may suddenly move and cause serious personal injury. If you do not need to operate the pedal, do not rest your foot on the pedal.**
- **When the attachment is not being used, set the lock pin of the pedal to the LOCK position to prevent the pedal from being operated.**

- When changing the oil flow setting for the breaker mode, see "Breaker/Attachment Setting (PAGE 3-43)", "Changing Breaker Mode Setting (PAGE 3-43)" for details.
- When changing the oil flow setting for the attachment mode for the crusher or other attachment, see "Breaker/Attachment Setting (PAGE 3-43)", "Changing Breaker Mode Setting (PAGE 3-43)" for details.

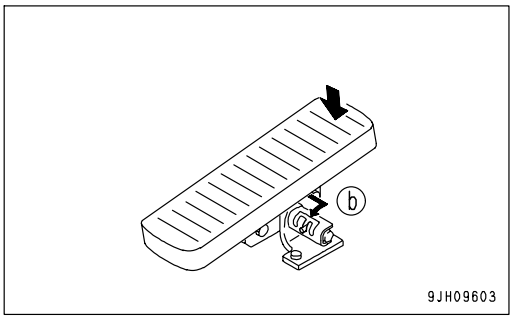
The method of operating the attachment is as follows.

When Using Breaker

NOTICE

Use the breaker mode for breaker operations. If the ATT mode is used, there is danger that the breaker may break. Note also that breaker operations are not allowed in the P, E, or L modes.

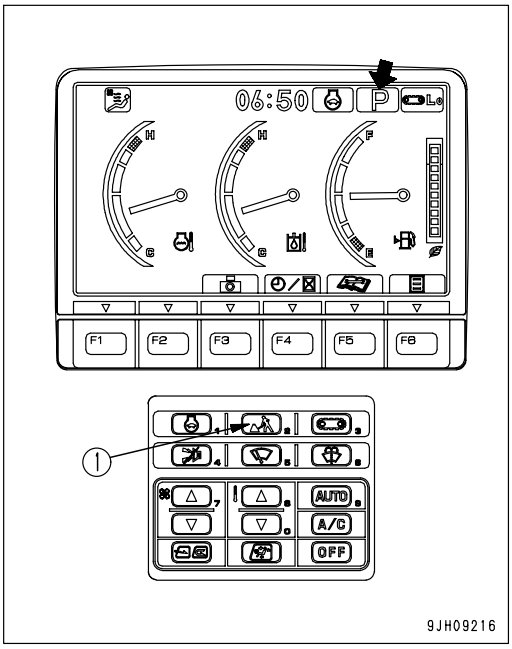
With the working mode set to B mode, insert the lock pin in front-only FREE position (b). Press the front of the pedal to operate the breaker.



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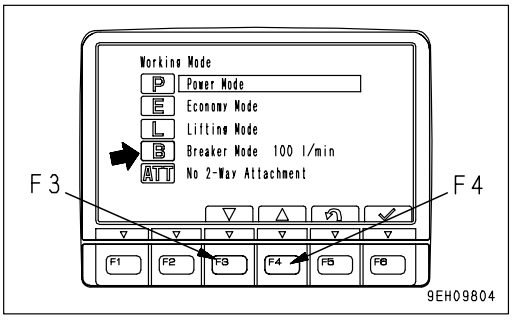
If the working mode pilot monitor does not display B for the breaker mode, press working mode selector switch (1) and set to the breaker mode as follows.

- When working mode selector switch (1) is pressed, the screen switches to the working mode selection screen.



1. Press working mode selector switch (1) or press switches F3 or F4 to select breaker mode B.
2. With breaker mode B highlighted in yellow, do one of the following to accept the selection.
   - Keep working mode selector switch (1) pressed.
   - Press switch F6.
   - Leave as it is for 5 seconds.

   If switch F5 is pressed, the screen will return to the working mode selection screen without changing the mode to the breaker mode.

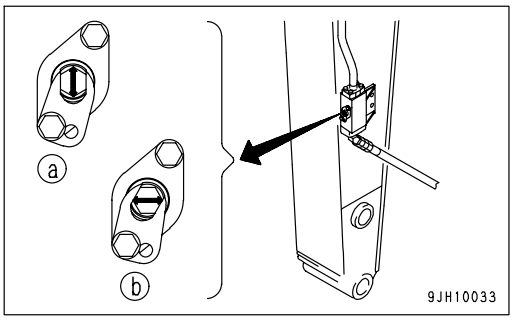


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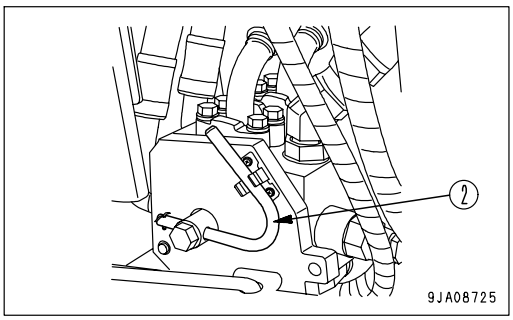
Precautions when Using

- Check that the stopper valve is in the FREE position.

(a) FREE: Hydraulic oil flows (direction of arrow is parallel to long direction of arm)
(b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angles to long direction of arm)



- Check that the working mode is B mode.
- Open the front right cover and check that the selector valve is in the Breaker position.
- Open the front right cover and check that the selector valve stopper bar (2) is installed at the Breaker position.

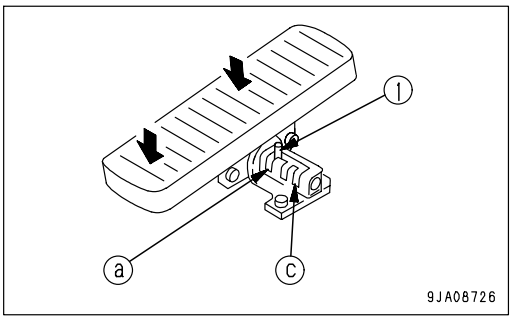


- Consult the manufacturer of the breaker to decide if an accumulator for the breaker circuit should be installed on your machine.
- For details of pther precautions when handling the breaker, read and use correctly the instruction manual provided by the breaker manufacturer.
- When breaker is used, the hydraulic oil degrades faster than in normal operation. Shorten the maintenance interval of the hydraulic oil and filter element.
  See "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (PAGE 4-16)".

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When Using General Attachment Such as Crusher

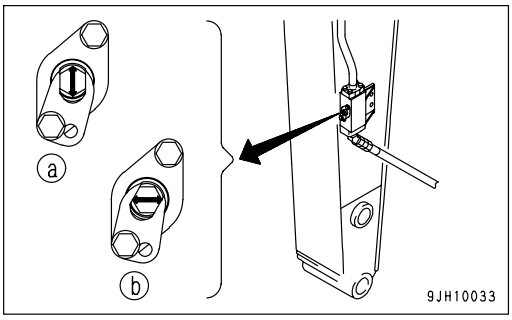
1. If the pedal is depressed with lock pin (1) set at the full stroke position (c), the attachment begins to work.
2. After the work is finished, return the lock pin to the LOCK position (a) to lock the pedal.



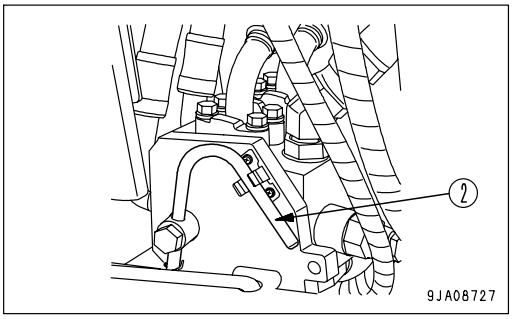
Precautions when Using

- Check that the stopper valve is in the FREE position.

(a) FREE: Hydraulic oil flows (direction of arrow is parallel to long direction of arm)
(b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angles to long direction of arm)



- Check that the working mode is ATT mode.
- Open the front right cover and check that the selector valve is in the General Attachment position (for crusher, etc).
- Open the front right cover and check that the selector valve stopper bar (2) is installed at the General Attachment position (for crusher, etc).



- For other precautions when using the attachment, see the instruction manual provided by the attachment manufacture.

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LONG TERM STORAGE

If the equipment is not to be used for a long time, do as follows.

- Set the stop valve in the LOCK condition.
- Install a plug to the valve.
  Install a plug to the stopvalve.
- Set the selector valve to the position for general attachments such as the crusher.
- Set the lock pin at the LOCK position.

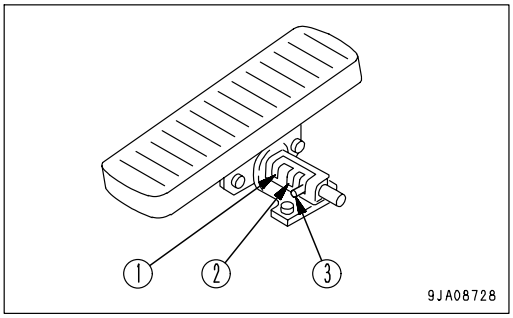
If there is no breaker or general attachment installed, operating the pedal may cause overheating and other problems.

SPECIFICATIONS

Hydraulic specifications

- Oil flow

Lock Pin position		Oil flow (liter/min)
(1)	Pedal lock	--
(2)	Half stroke	130
(3)	Full stroke	225



- Low pressure safety valve Cranking pressure
  When using breaker: 17.17 MPa (175 kg/cm^2, 2490.0 PSI)
  When using other attachment: 24.53 MPa (250 kg/cm^2, 3550.0 PSI)

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ATTACHMENT GUIDE

WARNING

- **Please read the instruction manual for the attachment and the sections of this manual related to attachments and options.**
- **When installing any attachment or option, there may be problems with safety, so please contact your Komatsu distributor before installing.**
- **Installing attachments or options without consulting your Komatsu distributor may not only cause problems with safety, but may also have an adverse effect on the operation of the machine and the life of the equipment.**
- **Any injuries, accidents, or damage resulting from the use of unauthorized attachments or options will not be the responsibility of Komatsu.**

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ATTACHMENT COMBINATIONS

⚠ WARNING

Depending on the type or combination of work equipment, there is danger that the work equipment may hit the cab or machine body.
When using unfamiliar work equipment for the first time, check before starting if there is any danger of interference, and operate with caution.

This is the combination table for attachments to install to the standard arm, short arm, or long arm.
○: Can be used
△: Can be used only for light duty work
×: Cannot be used

NOTICE

- **When the long arm is equipped, if the bucket is pulled in to the machine body, the arm interferes with the body. Operate the long arm carefully.**
- **When the boom is fully lowered during oblique digging, the boom interferes with the undercarriage. Operate the boom carefully.**

Categories of use
For general digging: Digging or loading sand, gravel, clay etc.
For light duty digging: Digging or loading dry, uncaked earth and sand, mud etc.
For loading work: Loading dry, loose earth and sand

- For digging or loading hard soil or soft rock, it is recommended that the strengthened bucket with high durability and high wear resistance be employed.

Name	Tooth mounting pin	Capacity m^3 (cu.yd) SAE/CECE	Outside width (bucket body) mm (in)	Outside width (side cutter) mm (in)	Use	Standard arm	Long arm	Short arm
Narrow bucket	Vertical	0.18/0.16 (0.24/0.21)	450 (17.7)	570 (22.5)	Narrow digging	○	○	○
Narrow bucket	Vertical Horizontal	0.29/0.26 (0.38/0.34)	600 (23.6)	720 (28.4)	Narrow digging	○	○	○
Narrow bucket	Vertical Horizontal	0.38/0.33 (0.50/0.43)	700 (27.6)	820 (32.3)	Narrow digging	○	○	○
Standard bucket	Vertical Horizontal	0.45/0.40 (0.59/0.52)	833 (32.8)	953 (37.5)	General digging	○	×	○
Reinforced bucket	Vertical Horizontal	0.50/0.45 (0.65/0.52)	859 (33.8)	979 (38.6)	Heavy-duty digging	○	×	○
Light duty bucket	Vertical Horizontal	0.50/0.45 (0.65/0.59)	859 (33.8)	979 (38.6)	General digging	○	×	△

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TRACK SHOES SELECTION

Select the most suitable track shoe to match the operating conditions.

Selection

Check the category from the uses in the table below, then select the shoes from the table below that.

- Category of use B and C are the wide shoe, so there are limits on the use. Check the precautions for use, examine the conditions of use thoroughly, and use the optimum shoes for the situation.
- When selecting the shoe width, choose the narrowest shoes possible to bring the machine within the range where there is no problem regarding the machine flotation and ground contact pressure. If wider shoes than necessary are used, the load on the shoe will increase, this may cause problems such as bending of the shoe, cracking of the link, damage of the pin, and looseness of the shoe bolts.

Category	Use	Precautions when using
A	Rocky ground, riverbeds, 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 high speed (Hi) only on flat ground. If it is impossible to avoid going over obstacles, travel slowly in low speed (Lo).
C	Extremely soft ground (swamp)	• In the case of A and B, use only in places where the machine sinks and it is impossible to travel. • These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. • Travel at high speed (Hi) only on flat ground. If it is impossible to avoid going over obstacles, travel slowly in low speed (Lo).
D	Paved road surfaces	• Be careful when using flat shoes on slopes. They have low gradeability.
E	Paved road surfaces	• To protect the road liner, always follow the precautions in Section ROAD LINERS(3-176 PAGE).

	PC138US		PC138USLC	
	Specification	Category	Specification	Category
Standard	500 mm (1 ft 8 in) Triple	A	600 mm (1 ft 12 in) Triple	B
Option	600 mm (1 ft 12 in) Triple	B	500 mm (1 ft 8 in) Triple	A
Option	700 mm (2 ft 4 in) Triple	C	500 mm (1 ft 8 in) Road liner	E
Option	500 mm (1 ft 8 in) Road liner	E		

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RECOMMENDED ATTACHMENT OPERATIONS

Below described are instructions which must be followed without fail when doing the work using a hydraulic excavator equipped with an attachment.

NOTICE

Select the optimum model of attachment for a hydraulic excavator on which it is to be mounted.

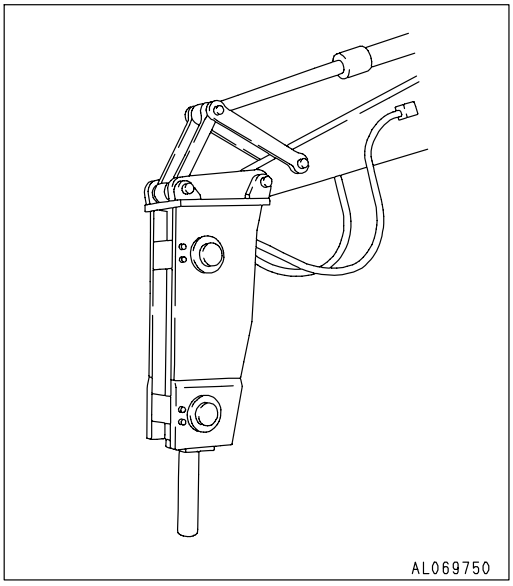
- **Depending on machine models of hydraulic excavator, the kind of attachments or the model of specific attachments that can be mounted will vary. Hence, consult your Komatsu distributor for the selection of optimum attachments.**

HYDRAULIC BREAKER

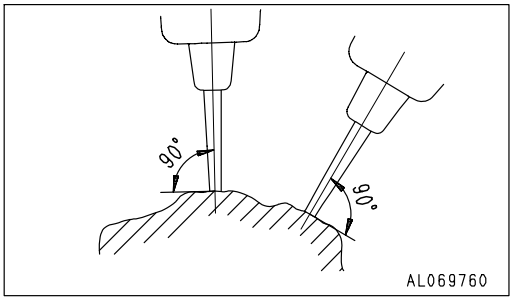
Main Applications

- Crushed rock
- Demolition work
- Road construction

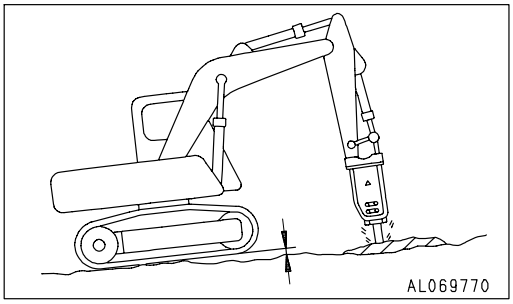
This attachment can be used for a wide range of applications including demolition of buildings, breaking up road surfaces or slag, tunnel work, rock crushing and breaking operations in quarries.



Keep the chisel pushed perpendicularly against the impact surface when carrying out breaking operations.

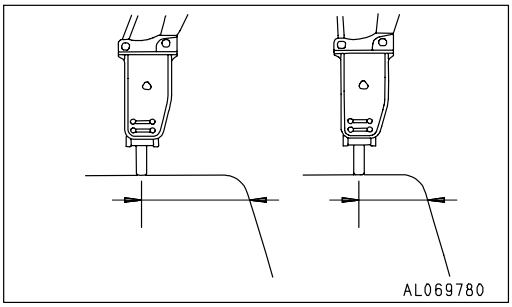


When applying impact, push the chisel against the impact surface and operate so that the chassis rises approx. 5 cm (2 in) off the ground. Do not let the machine come further off the ground than this amount.

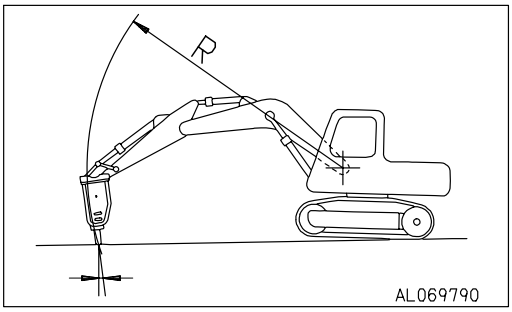


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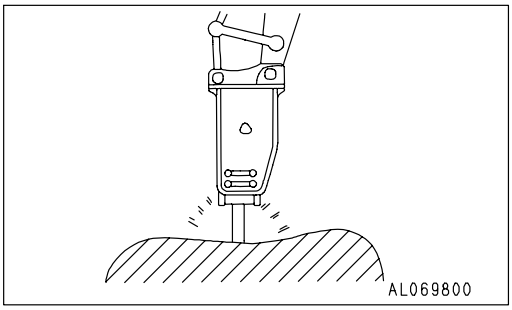
When applying continuous impact to the same impact surface, if the chisel does not penetrate or break the surface within 1 minute, change the point of impact and carry out breaking operations closer to the edge.



The direction of penetration of the chisel and the direction of the breaker body will gradually move out of line with each other, always adjust the bucket cylinder to keep them aligned.



Always keep the chisel pressed against the impact surface properly to prevent using the impact force when there is no resistance.



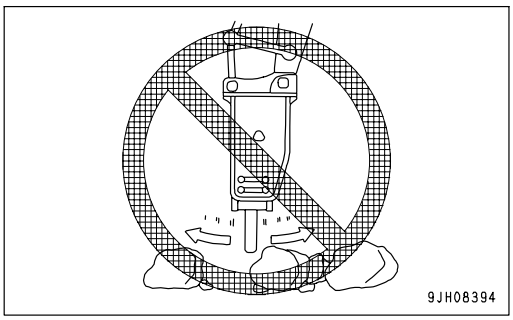
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Prohibited Works

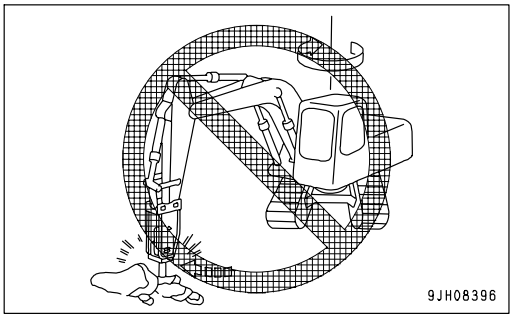
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate all cylinders to the end of their strokes. Always leave approx. 5 cm (2 in) to spare.

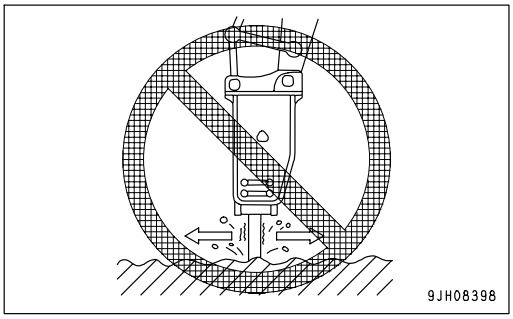
Using the mount togather in pieces of rock



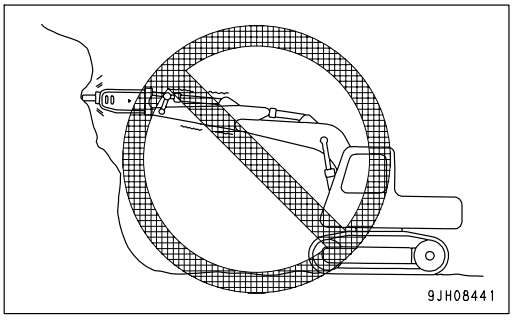
Operations using the swing force



Moving the chisel while carrying out impacting operations

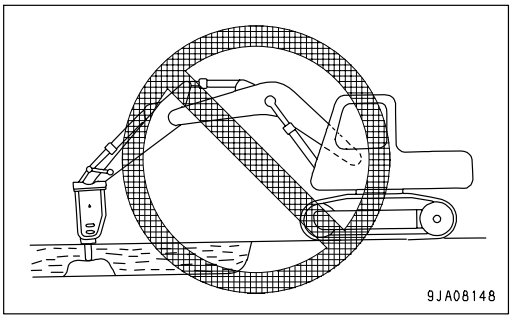


Holding the chisel horizontal or pointed up when carrying out impacting operations

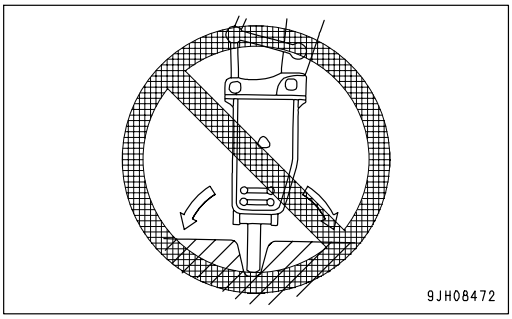


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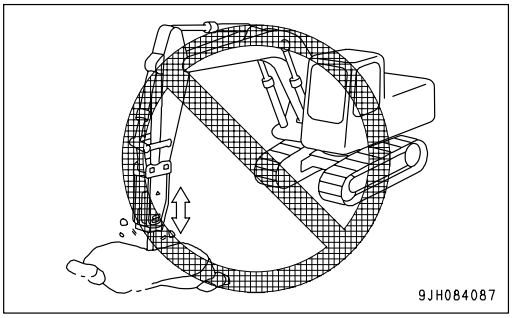
Operations in water



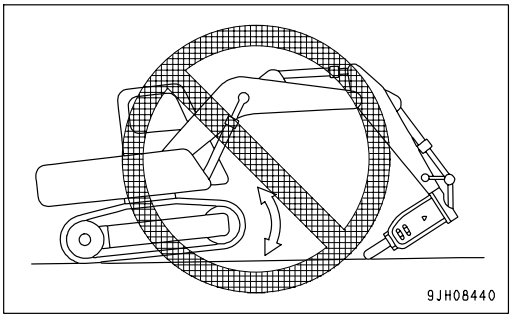
Twisting the chisel when it has penetrated the rock



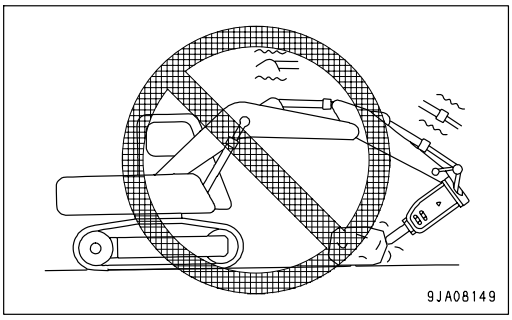
Pecking operations



Extending the bucket cylinder fully and thrusting to raise the machine off the ground



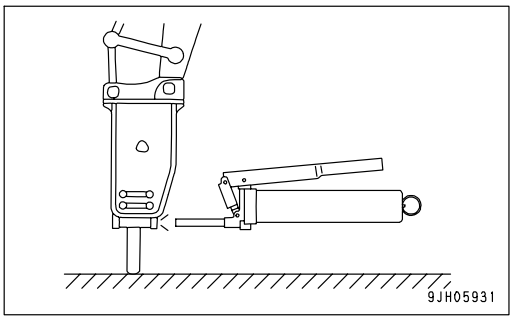
Operations using impact at end of hydraulic cylinder stroke



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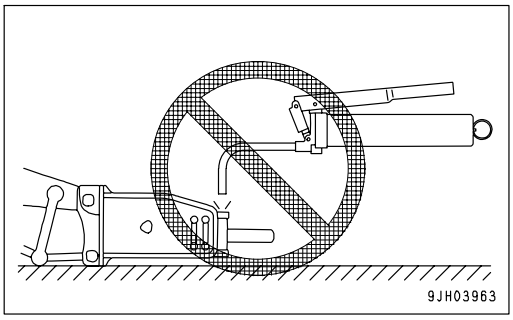
Greasing

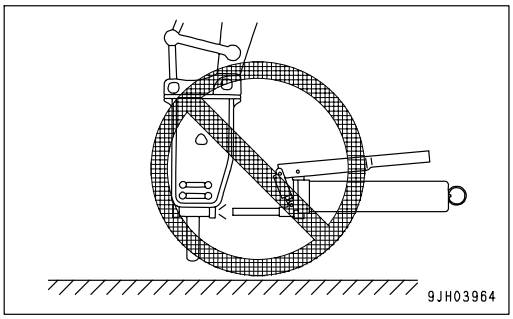
Supply grease in the correct position.



NOTICE

If the breaker is greased in an improper posture, it is filled with more grease than necessary. As a result, soil and sand will enter the hydraulic circuit and can damage the hydraulic components, while the breaker is in use. Therefore, be sure to grease the breaker, holding it in the right posture.





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HANDLING MACHINES EQUIPPED WITH KOMTRAX

- KOMTRAX is a machine management system that uses wireless communications.
- A contract with your Komatsu distributor is necessary before the KOMTRAX system can be used. Any customers desiring to use the KOMTRAX system should consult their Komatsu distributor.
- The KOMTRAX equipment is a wireless device using radio waves, so it is necessary to obtain authorization and conform to the laws of the country or territory where the machine equipped with KOMTRAX is being used. Always contact your Komatsu distributor before selling or exporting any machine equipped with KOMTRAX.
- When selling or exporting the machine or at other times when your Komatsu distributor considers it necessary, it may be necessary for your Komatsu distributor to remove the KOMTRAX equipment or to carry out action to stop communications.
- If you do not obey the above precautions, neither Komatsu nor your Komatsu distributor can take any responsibility for any problem that is caused or for any loss that results.

BASIC PRECAUTIONS

WARNING

- **Never disassemble, repair, modify, or move the communications terminal, antenna, or cables. This may cause failure or fire on the KOMTRAX equipment or the machine itself. (Your Komatsu distributor will carry out removal and installation of KOMTRAX.)**
- **Do not allow cables or cords to become caught; do not damage or pull cables or cords by force. Short circuits or disconnected wires may cause failure or fire on the KOMTRAX equipment or the machine itself.**
- **For anyone wearing a pacemaker, make sure that the communications antenna is at least 22 cm (8.7 in) from the pacemaker. The radio waves may have an adverse effect on the operation of the pacemaker.**

NOTICE

- **Even when the key in the starting switch of the KOMTRAX system is at the OFF position, a small amount of electric power is consumed. When putting the machine into long-term storage, take the action given in "LONG TERM STORAGE (PAGE 3-191)".**
- **Please contact your Komatsu distributor before installing a top guard or other attachment that covers the cab roof.**
- **Be careful not to get water on the communications terminal or wiring.**

REMARK

- The KOMTRAX system uses wireless communications, so it cannot be used inside tunnels, underground, inside buildings, or in mountain areas where radio waves cannot be received. Even when the machine is outside, it cannot be used in areas where the radio signal is weak or in areas outside the wireless communication service area.
- There is absolutely no need to inspect or operate the KOMTRAX communications terminal, but if any abnormality is found, please consult your Komatsu distributor.

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PC138US-8, PC138USLC-8 GALEO HYDRAULIC EXCAVATOR

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