

Operation & Maintenance Manual

TEN00039-03

GALEO **PC400,400LC-7** **PC450,450LC-7** **HYDRAULIC EXCAVATOR**

SERIAL NUMBERS PC400,400LC-50288 and up
PC450,450LC-20235

⚠ WARNING

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

NOTICE

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

KOMATSU

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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.

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.

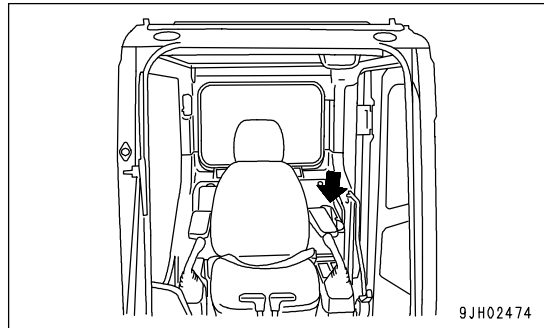
Keep this manual at the storage location for the Operation and Maintenance Manual given below so that all personnel involved in working on the machine can consult it periodically.

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 on the left side of the operator's seat.



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 PARTICULAR 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-roulière. 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-relées 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.**

INFORMATION IMPORTANTE SUR LE MOTEUR
CE MOTEUR EST CONFORME AUX NORMES AMÉRICAINES DE L'EPA (ANNÉE DU MODÈLE) ET DE LA CALIFORNIE POUR LES MOTEURS LARGES NON-ROUTIERS À IGNITION PAR COMPRESSION. CE MOTEUR EST CERTIFIÉ POUR OPÉRER À ESSENCE DIESEL.

AVERTISSEMENT
DES BLESSURES PEUVENT RÉSULTER ET LA GARANTIE S'ANNULER SI LES RPM DU TAUX D'ESSENCE OU L'ALTITUDE EXCÈDENT LES VALEURS MAXIMALES PUBLIÉES POUR CE MODÈLE ET SON APPLICATION.

IMPORTANT ENGINE INFORMATION
THIS ENGINE CONFORMS TO YYYY MODEL YEAR U.S. EPA REGULATION AND THE CALIFORNIA REGULATIONS LARGE NON ROAD COMPRESSION IGNITION ENGINES. THIS ENGINE IS CERTIFIED TO OPERATE ON DIESEL FUEL.

WARNING
INJURY MAY RESULT AND WARRANTY IS VOIDED IF FUEL RATE RPM OR ALTITUDES EXCEED PUBLISHED MAXIMUM VALUES FOR THIS MODEL AND APPLICATION.

ENGINE MODEL	SERIAL NO.	DISPLACEMENT	LITERS
ENGINE FAMILY			
EXHAUST EMISSION CONTROL SYSTEM		FIRING ORDER	1 - 5 - 3 - 6 - 2 - 4
ADV. LOAD OUTPUT	Kw (HP)		RPM
VALVE LASH COLD (mm)	IN. EX.	FUEL RATE AT ADV.	mm ³ /STROKE
IDLE SPEED	RPM	FAMILY EMISSION LIMIT	
INITIAL INJECTION TIMING	DEG. BTDC	DATE OF MANUFACTURE	
KOMATSU LTD. MADE IN JAPAN			

MODÈLE DU MOTEUR

FAMILLE DU MOTEUR

SYSTÈME DE CONTRÔLE DES ÉMISSIONS D'ÉCHAPPEMENT

CHARGE DE SORTIE ADV.

PORTÉE DE VALVE À FROID (mm)

VITESSE STATIQUE

RÉGLAGE DE L'ALLUMAGE - INJECTION INITIALE

DEG. BTDC

NO. SÉRIE

DÉPLACEMENT

LITRES

SÉQUENCE DE MISE À FEU

mm³/BATTEMENT

TAUX D'ESSENCE À ADV.

LIMITE D'ÉMISSION DE LA FAMILLE

DATE DE FABRICATION

KOMATSU LTD. FABRIQUÉ AU JAPON

ENGINE DATAPLATE - ENGLISH / FRENCH




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



Part No

Safety labels using pictogram

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



Part No

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

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

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

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

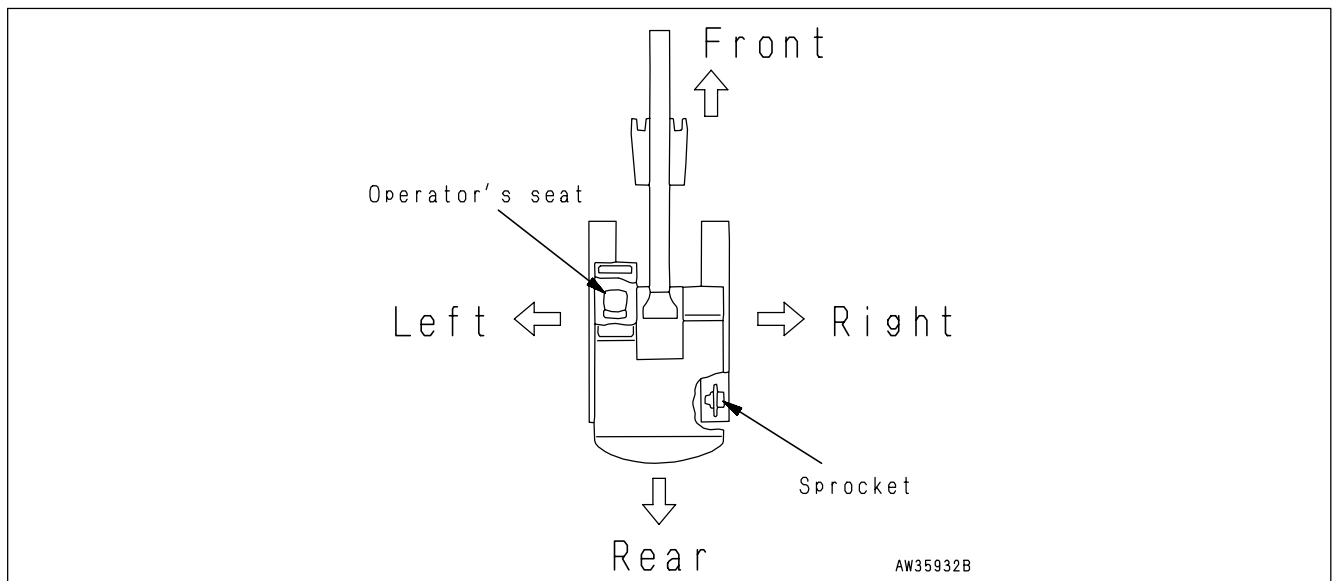
INTRODUCTION

This Komatsu 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 3-101)" for further details.

DIRECTIONS OF MACHINE



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

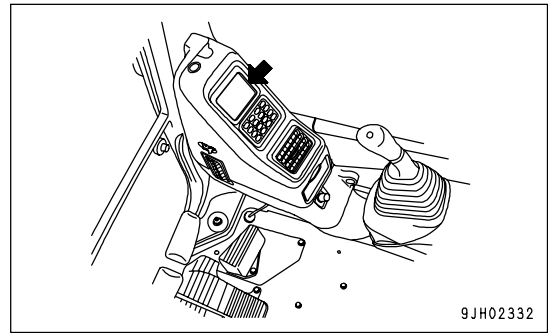
Be sure to break in the machine for the initial 100 hours (as indicated on the service meter).

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.

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.

SAFETY INFORMATION

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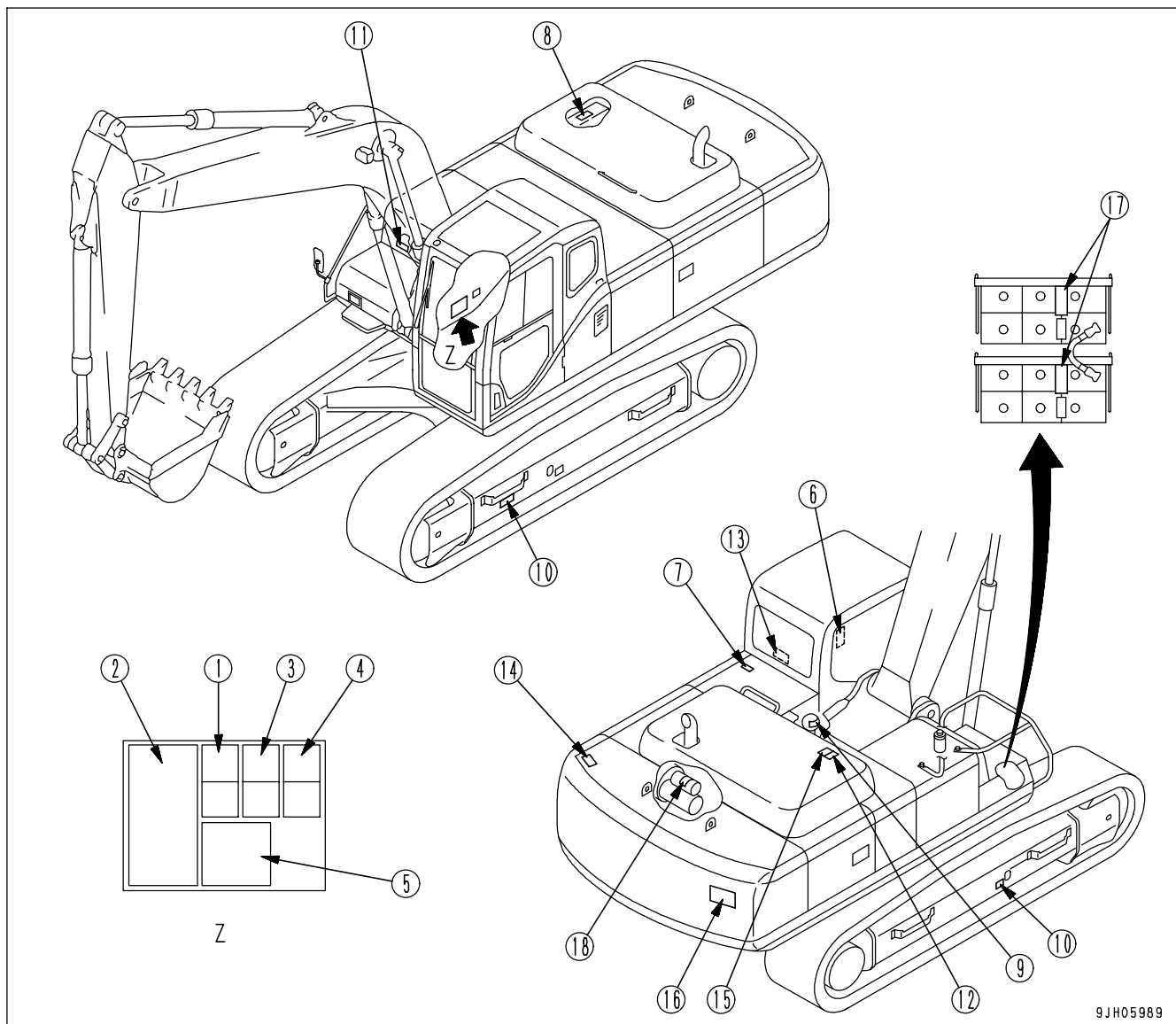
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SAFETY LABELS

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

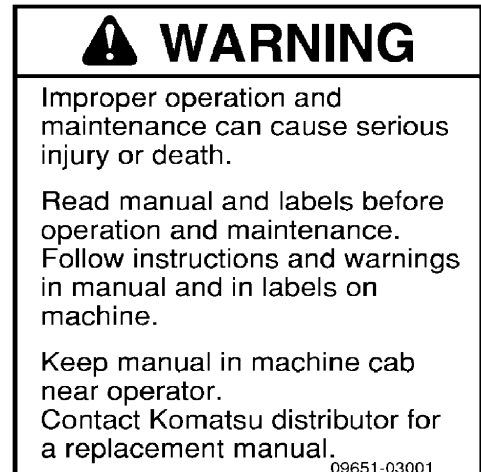
- Be sure that you fully understand the correct position and content of labels.
- To ensure that the content of labels can be read properly, be sure that they are in the correct place and always keep them clean. When cleaning them, do not use organic solvents or gasoline. These may cause the labels to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

LOCATION OF SAFETY LABELS

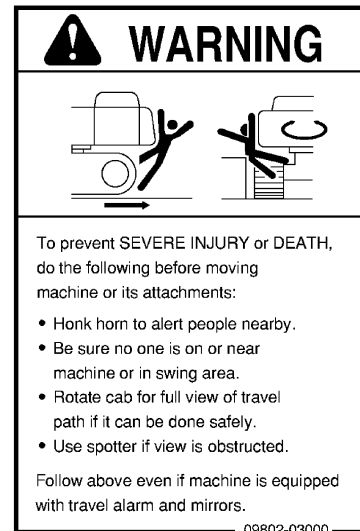


SAFETY LABELS

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



- (2) Caution before operating (09802-03000)




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



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

⚠ DANGER



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

	VOLTAGE	SAFE DISTANCE
LOW VOLTAGE	100V 200V	2m
	6.600V	2m
	22.000V	3m
SPECIAL HIGH VOLTAGE	66.000V	4m
	154.000V	5m
	187.000V	6m
	275.000V	7m
	500.000V	11m

09801-03001

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

⚠ WARNING

To open or close the front or ceiling window, never stand up from the operator's seat before throwing the lock lever to the LOCK position.
Inadvertently touching any of the working equipment control levers might cause the machine to start moving all of a sudden, probably resulting in a serious injury.

09839-03000

(6) Warning when stowing front window (09803-03000)

⚠ WARNING

When raising window, lock it in place with lock pins on both sides.
Falling window can cause injury.

09803-03000

(7) Warning for hot oil (09653-03001)



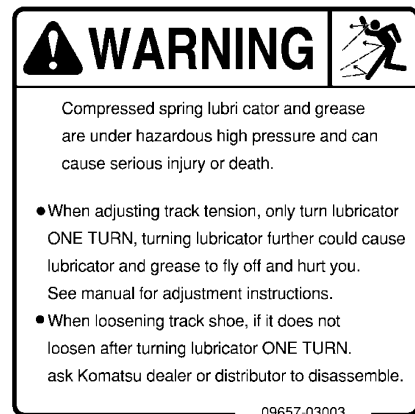
(8) Warning for hot cooling water (09668-03001)



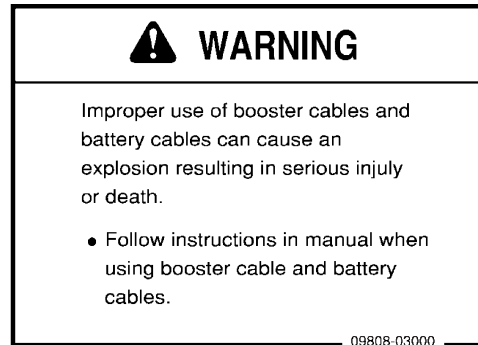
(9) Caution for handling accumulator (09659-53000)



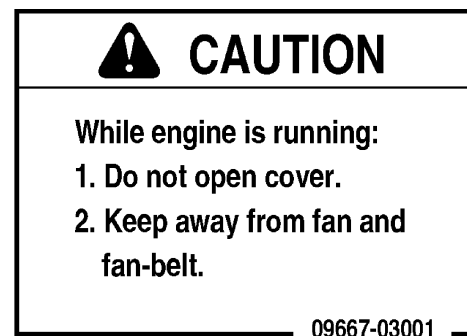
(10) Warning when adjusting track tension (09657-03003)



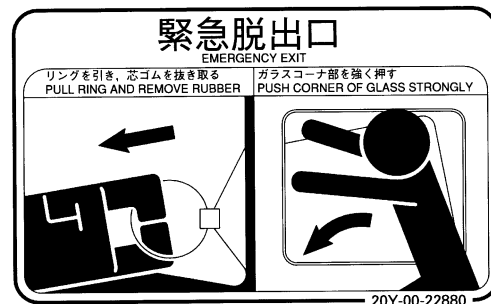
(11) Warning for improper use of cables (09808-03000)



(12) Stop engine when performing inspection or maintenance (09667-03001)



(13) Explanation of method for emergency escape (20Y-00-22880)



(14) Warning against falling off the edge (09805-23000)



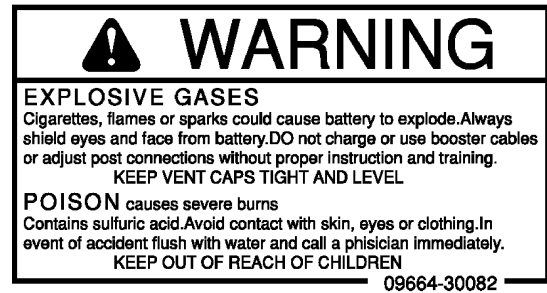
(15) Warning against falling (09805-13000)



(16) Keep off swing area (09133-23000)



(17) Warning when handling battery (09664-30082)



(18) Prohibition of jump start (09842-A0481)



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

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

SAFETY INFORMATION

SAFETY RULES

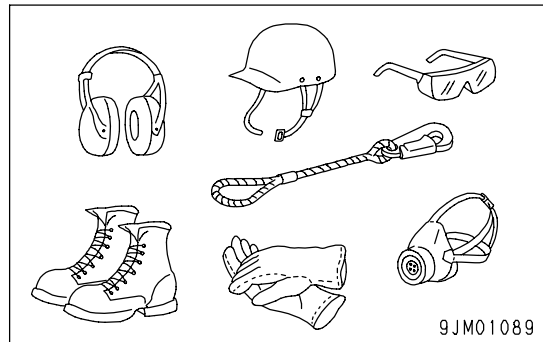
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine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

IF 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.

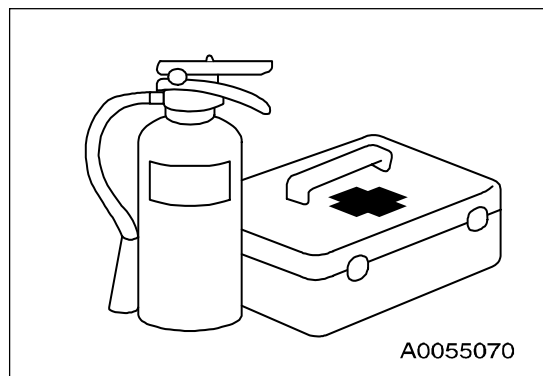


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FIRE EXTINGUISHER AND FIRST AID KIT

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.



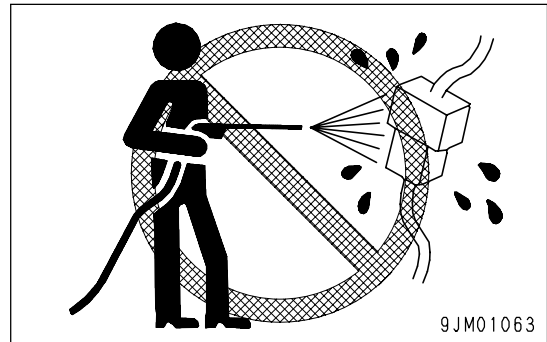
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SAFETY EQUIPMENT

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

KEEP MACHINE CLEAN

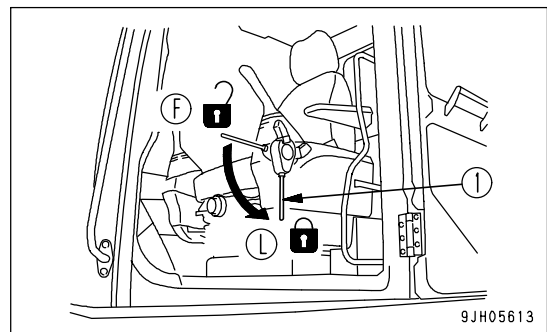
- If water gets into the electrical system, there is a hazard that it will cause malfunctions or misoperation. Do not use water or steam to wash the electrical system (sensors, connectors).
- If inspection and maintenance is carried out when the machine is still dirty with mud or oil, there is a hazard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

**KEEP OPERATOR'S COMPARTMENT CLEAN**

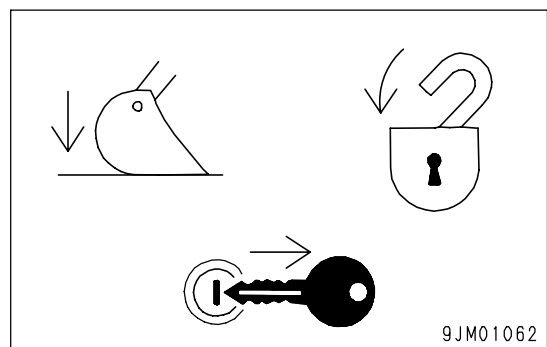
- When entering the operator's compartment, always remove all mud and oil from the soles of your shoes. If you operate the pedal with mud or oil affixed to your shoes, your foot may slip and this may cause a serious accident.
- Do not leave parts or tools lying around the operator's compartment.
- Do 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.



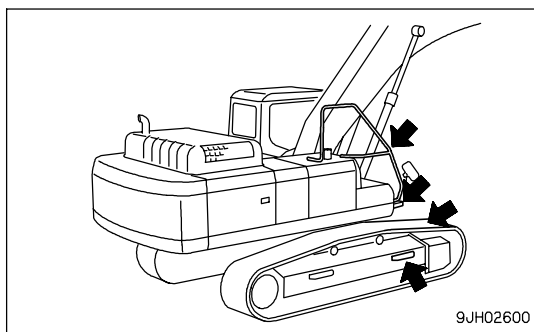
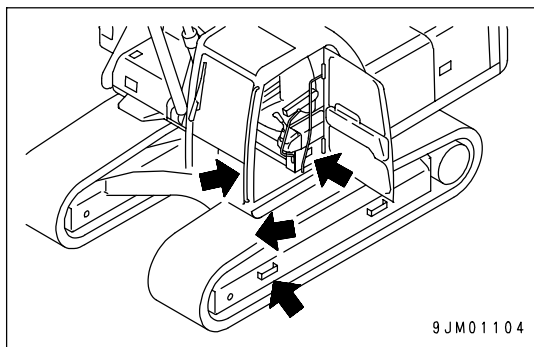
- When leaving the machine, always lower the work equipment completely to the ground, set lock lever (1) securely to the LOCK position (L), then stop the engine. Use the key to lock all the equipment. Always remove the key, take it with you, and keep it in the specified place.



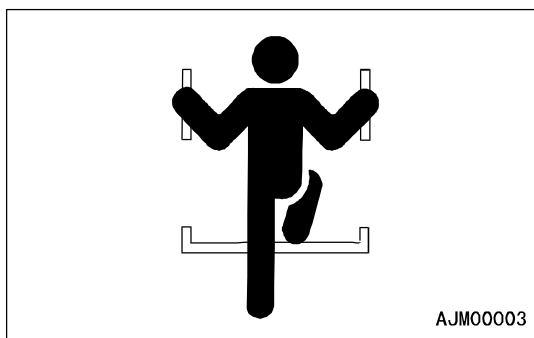
HANDRAILS AND STEPS

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

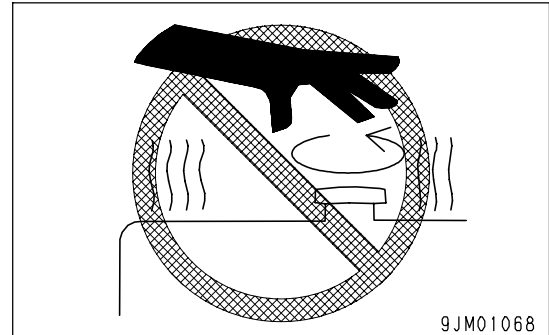
Never let anyone ride on the work equipment, or other attachments. There is a hazard of falling and suffering serious injury.

DO NOT GET CAUGHT IN ARTICULATED PORTION

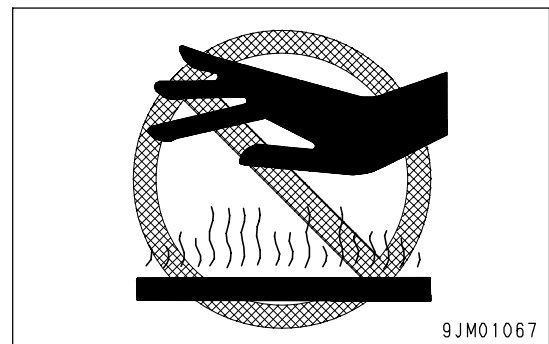
The clearance around the work equipment will change according to the movement of the link. If you get caught, this may lead to serious personal injury. Do not allow anyone to approach any rotating or telescoping part.

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.



FIRE PREVENTION AND EXPLOSION PREVENTION**• Fire caused by fuel or oil**

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

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

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

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

• Fire coming from electric wiring

Short circuits in the electrical system can cause fire.

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

• Fire coming from hydraulic line

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

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

• Explosion caused by lighting equipment

When checking fuel, oil, battery electrolyte, window washer fluid, or coolant, always use lighting with antiexplosion 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 of "AUXILIARY ELECTRIC POWER (PAGE 3-53)".

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.

WINDSHIELD WASHER FLUID

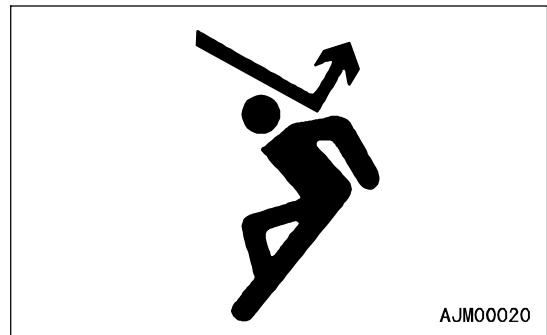
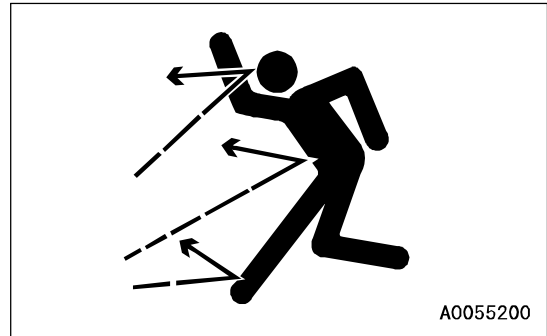
Use an ethyl alcohol base washer liquid.

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

FALLING OBJECTS, FLYING OBJECTS AND INTRUDING OBJECTS PREVENTION

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

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

**ATTACHMENT INSTALLATION**

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

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.

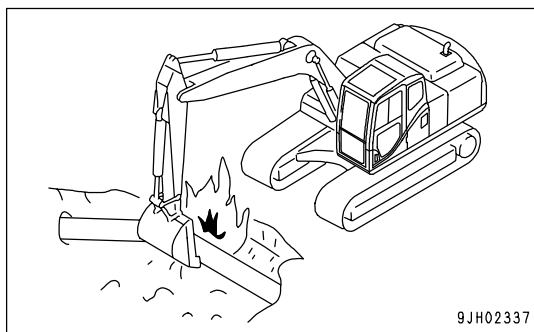
SAFETY AT JOBSITE

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.



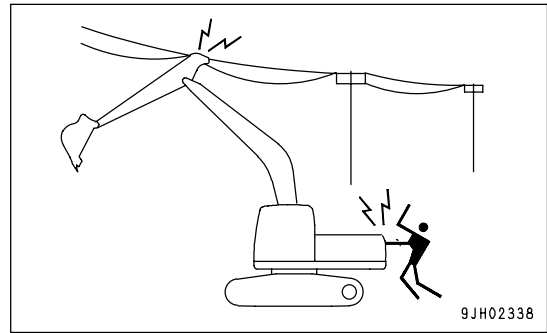
WORKING ON LOOSE GROUND

- 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.



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

Voltage of Cables	Safety Distance
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)

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.

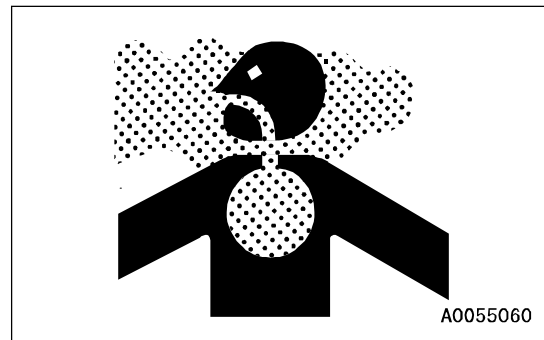
When operating or traveling in places with poor visibility, if it is impossible to confirm the condition of the job side or obstacle is in the area around the machine, there is danger that the machine may suffer damage or the operator may suffer serious personal injury. When operating or traveling in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

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.

**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.

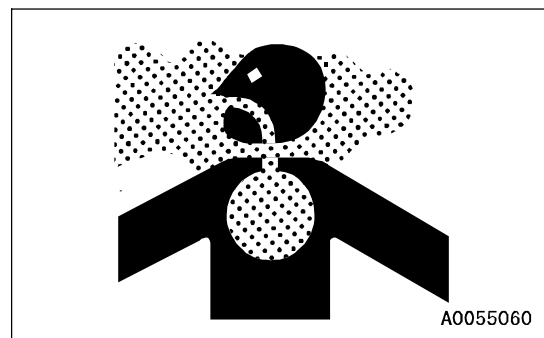
EMERGENCY EXIT FROM OPERATOR'S CAB

If for some reason, the cab door does not open, use the rear window as an emergency escape. For details, see "EMERGENCY EXIT FROM OPERATOR'S CAB (PAGE 3-30)" in this manual.

ASBESTOS DUST HAZARD PREVENTION

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

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

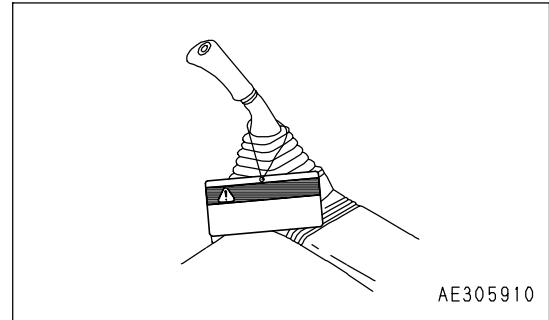


This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.

SAFETY MACHINE OPERATION

STARTING ENGINE

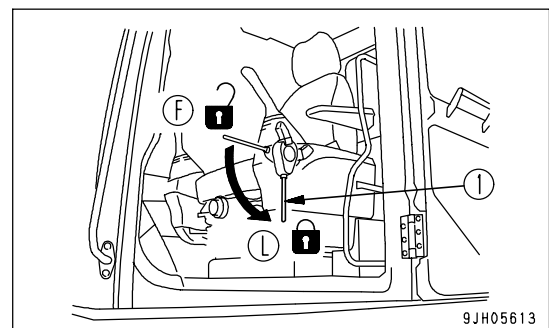
If there is a warning tag hanging from the work equipment control lever, do not start the engine or touch the levers .



CHECKS BEFORE STARTING ENGINE

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

- Remove all dirt from the surface of the window glass to ensure a good view.
- Remove all dirt from the surface of the lens of the front lamps and working lamps, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check 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.
When adjusting, see "Rearview Mirrors (PAGE 3-68)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.



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 or control pedals are operated, the reaction of the machine will be slow or the machine may move in a way not expected by the operator. Particularly in cold weather, be sure to carry out the warming-up operation thoroughly.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery and cause the battery to explode. Before charging or starting the engine with a different power source, melt the battery electrolyte and check that there is no leakage of electrolyte before starting.

OPERATION

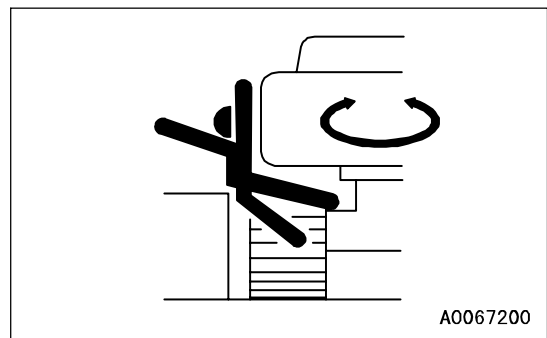
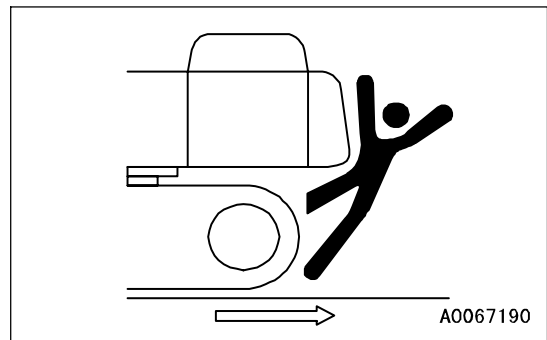
CHECKS BEFORE OPERATION

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.

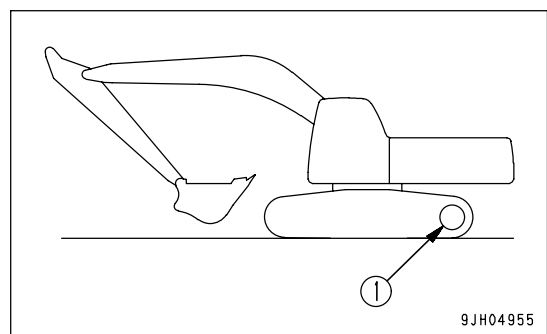
- Always fasten your seat belt.
- Check that the movement of the machine matches the display on the control pattern card. If it does not match, replace it immediately with the correct control pattern card.
- Check the operation of the work equipment, travel system and swing system.
- Check for any problem 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.

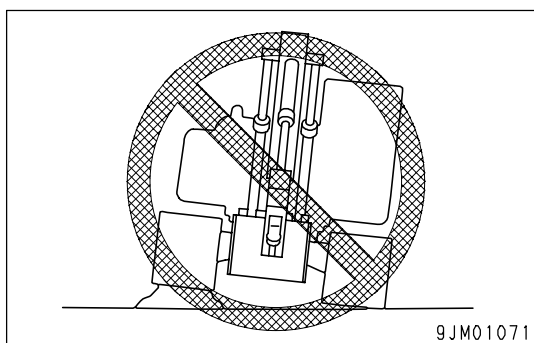
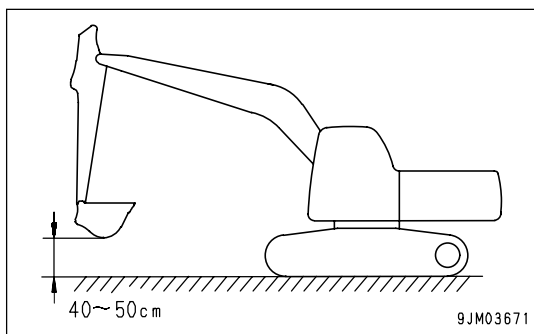


- Before traveling, position the upper structure so that the sprocket (1) is at the rear of the operator's cab. If the sprocket (1) is at the front of the operator's cab, the machine makes a movement reverse to the control lever movement (for example, forward becomes reverse, and left becomes right). Be careful to avoid such a reverse movement of the machine.



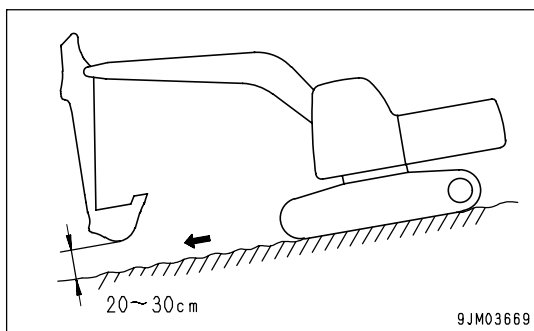
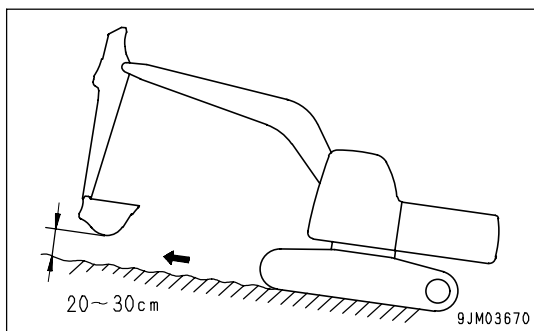
SAFETY RULES FOR TRAVELING

- 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 operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the work equipment hit anything.

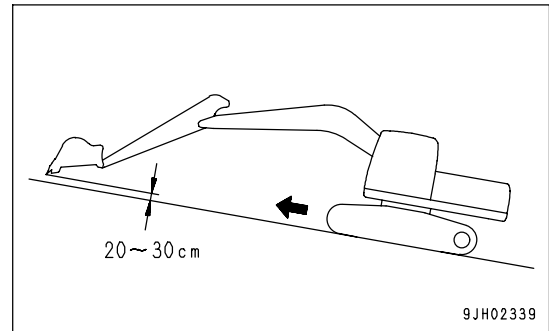
**TRAVELING ON SLOPES**

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

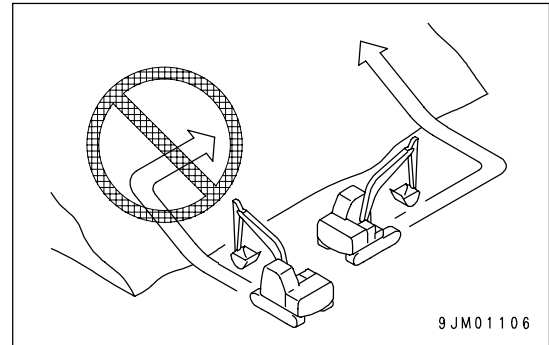
- Keep the work equipment approx. 20 to 30 cm (8 to 12 in) above the ground. In case of emergency, lower the work equipment to the ground immediately to help stop the machine.
- When traveling uphill, set the machine with the operator's seat on the uphill side; when traveling downhill, set the operator's seat on the downhill side. Check that the ground under the machine is safe when traveling.



- When traveling downhill, lower the engine speed, keep the travel lever close to the neutral position, 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.

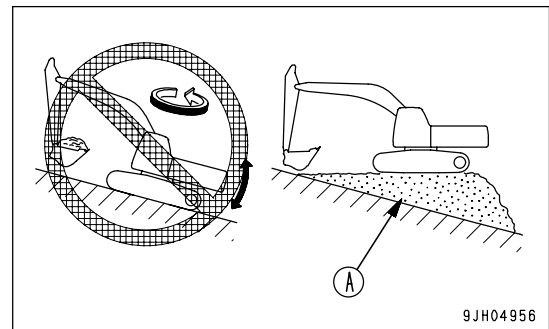


- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.
- Travel on grass, fallen leaves, or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



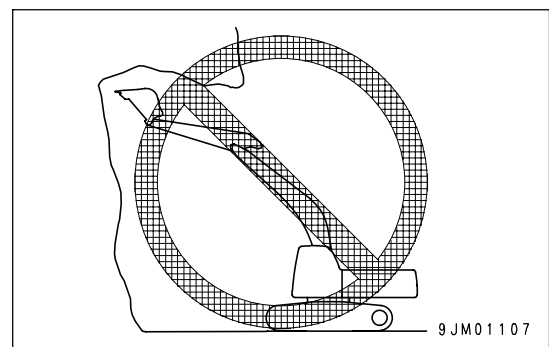
OPERATIONS ON SLOPES

- 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.

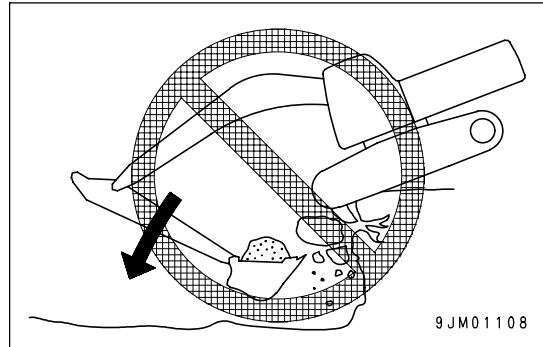


PROHIBITED OPERATIONS

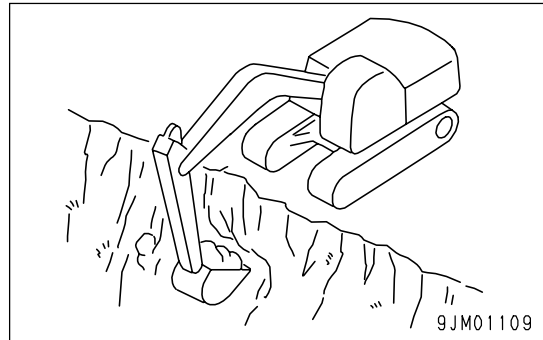
- Never dig the work face under an overhang. There is a hazard that rocks may fall or that the overhang may collapse and fall on top of the machine.



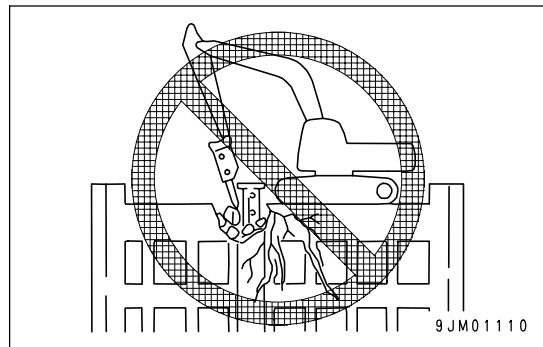
- Do not excavate too deeply under the front of the machine. The ground under the machine may collapse and cause the machine to fall.



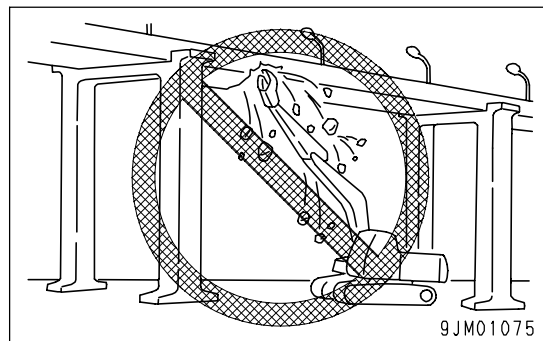
- To make it easier to escape if there is any problem, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when carrying out operations.



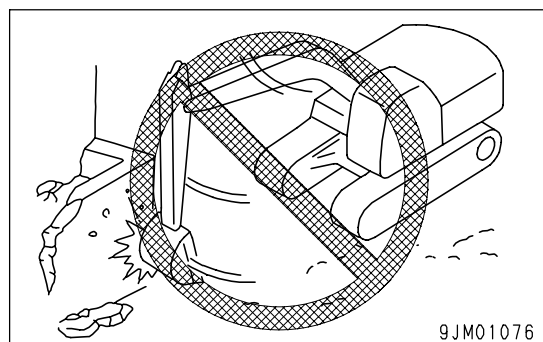
- Do not carry out demolition work under the machine. There is a hazard that the machine may become unstable and tip over.
- When working on or from the top of buildings or other structures, check the strength and the structure before starting operations. There is a hazard of the building collapsing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



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



- Do not use the impact force of the work equipment for breaking work. There is a hazard of 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.



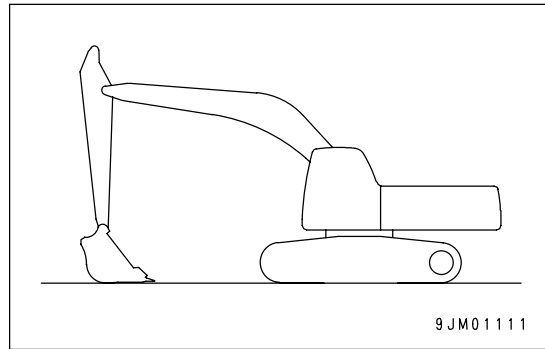
- When using a breaker or other heavy work equipment, there is a hazard of the machine losing its balance and tipping over. When operating on flat ground as well as on slopes.
 - Do not suddenly lower, swing, or stop the work equipment.
 - Do not suddenly extend or retract the boom cylinder. There is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

OPERATIONS ON SNOW

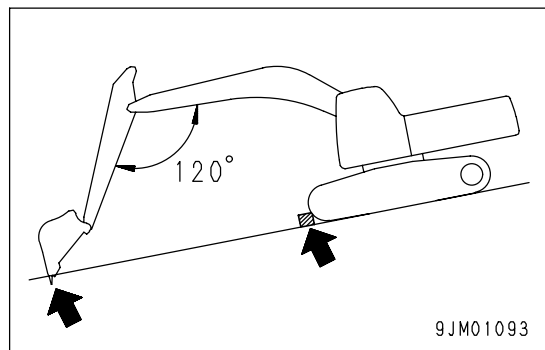
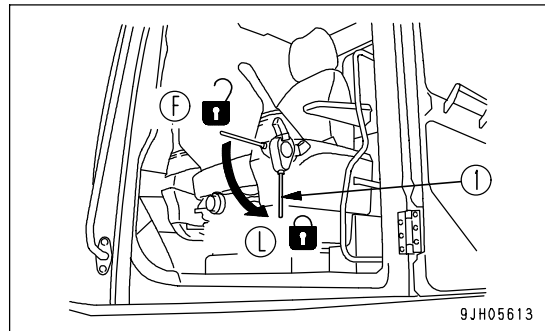
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes 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.

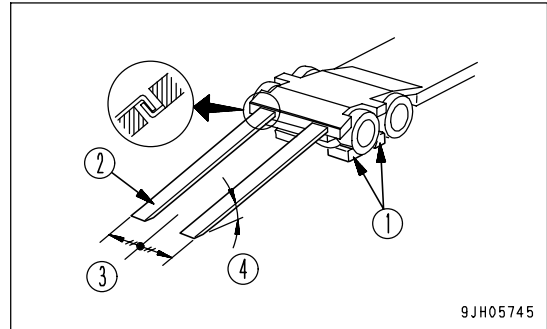


TRANSPORTATION

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.
- 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 3-109)".



REMARK

(1) Blocks (2) Ramp (3) Center line of trailer (4) Angle for setting ramps

SHIPPING THE MACHINE

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

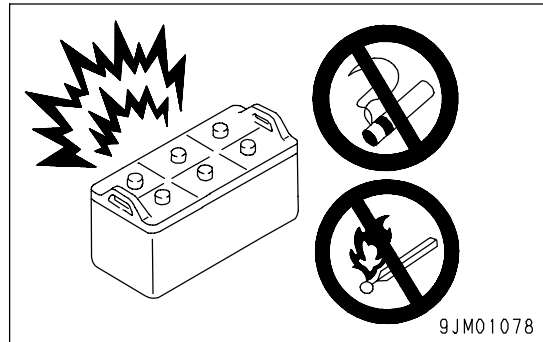
- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- For details of the shipping procedure, see "TRANSPORTATION (PAGE 3-109)" in the OPERATION section.

BATTERY

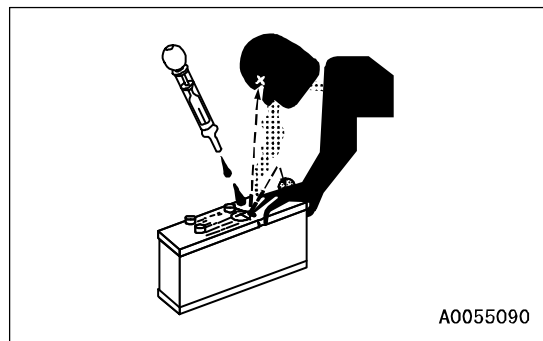
BATTERY HAZARD PREVENTION

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

- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. 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.

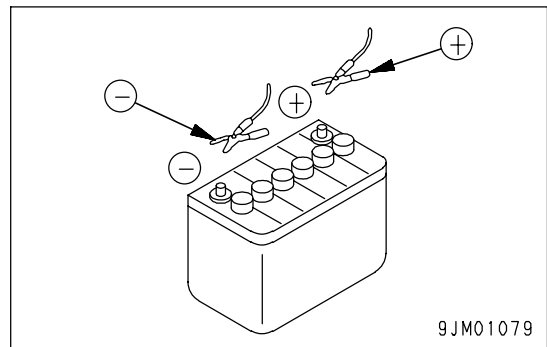
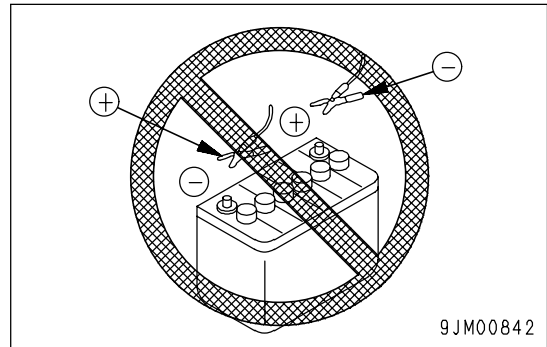
As there is a hazard that sparks will be generated, always do as follows.

- 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.

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 3-135)" in the OPERATION section.



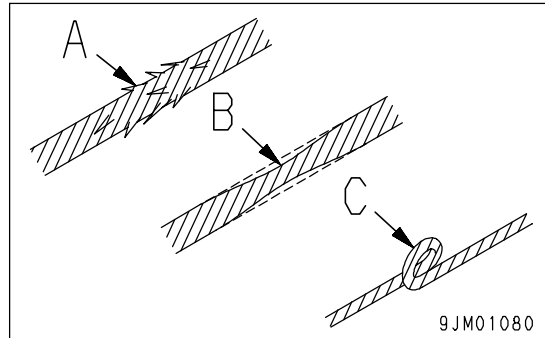
TOWING

SAFETY RULES FOR TOWING

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

For towing, see "TOWING THE MACHINE (PAGE 3-131)".

- 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.

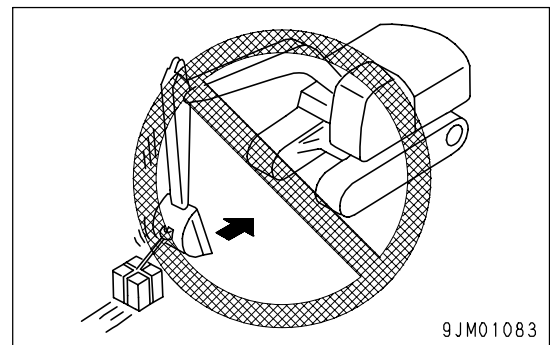
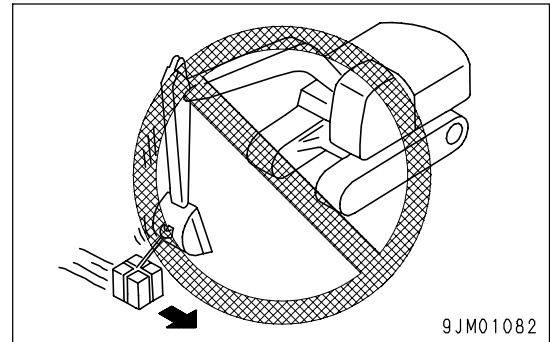


- Always wear leather gloves when handling wire rope.
- Never tow a machine on a slope.
- During the towing operation, never stand between the towing machine and the machine being towed.
- Operate the machine slowly and be careful not to apply any sudden load to the wire rope.

LIFTING OBJECTS WITH BUCKET

SAFETY RULES FOR LIFTING OBJECTS

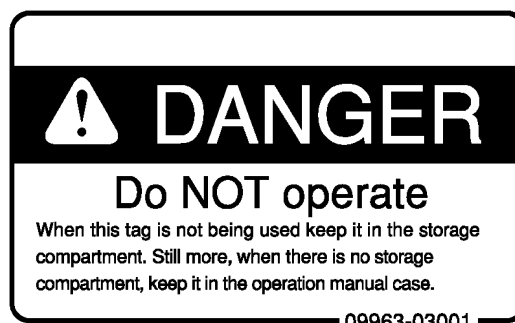
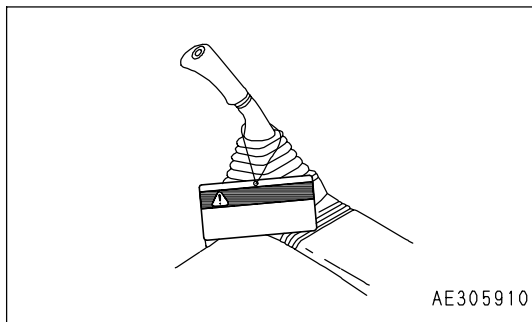
- Do not carry out lifting work on slopes, soft ground, or other places where the machine is not stable.
- Use wire rope that conforms to the specified standard.
- Always observe the specified lifting load strictly.
- It is dangerous if the load hits any worker or structure. Always check carefully that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



SAFETY MAINTENANCE INFORMATION

WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to the work equipment control lever in the operator's cab to alert others that you are performing service or maintenance on the machine. Attach additional warning tags around the machine if necessary. Warning tag Part No. 09963-03001
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 any other person starts the engine, or touches or operates the control levers or control pedals while you are performing service or maintenance, you may suffer serious injury.



KEEP WORK PLACE CLEAN AND TIDY

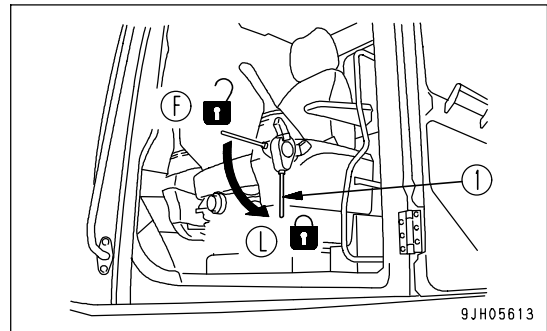
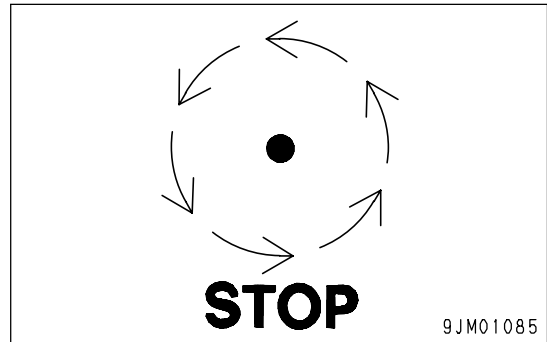
- Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely. If the work place is not kept clean and tidy, there is the danger that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

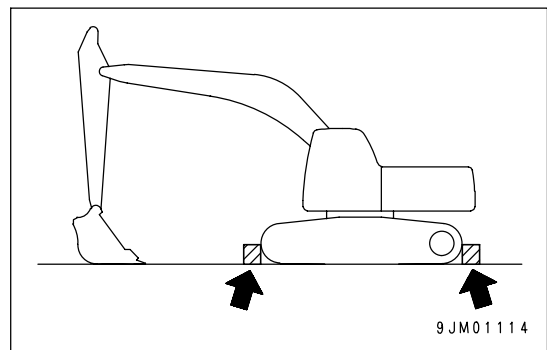
When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.

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.)



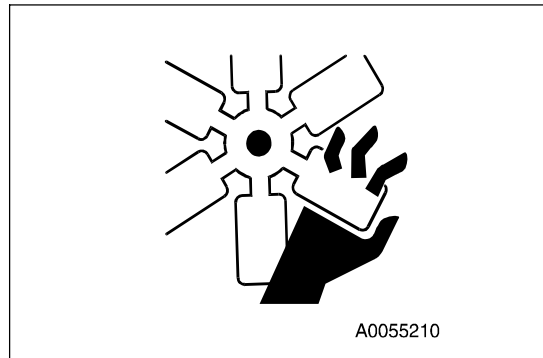
- Put blocks under the track to prevent the machine from moving.



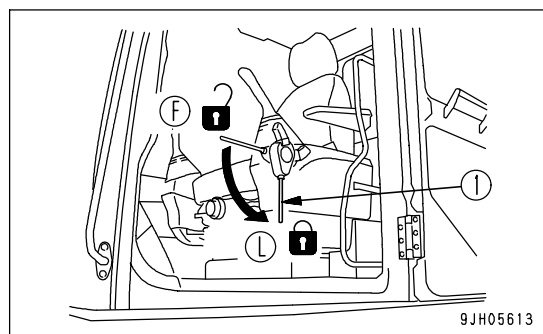
TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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.

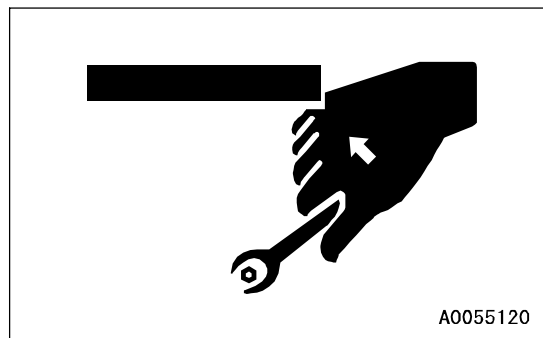
- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- When carrying out operations near the fan, fan belt, or other rotating parts, there is a hazard of being caught in the parts, so be careful not 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.



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.



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PERSONNEL

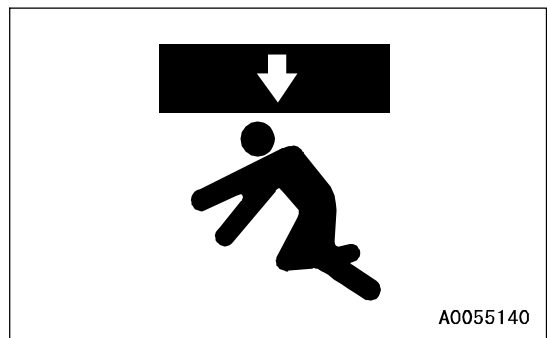
Only authorized personnel can service and repair the machine. Do not allow unauthorized personnel into the area. If necessary, employ an observer.

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.



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NOISE

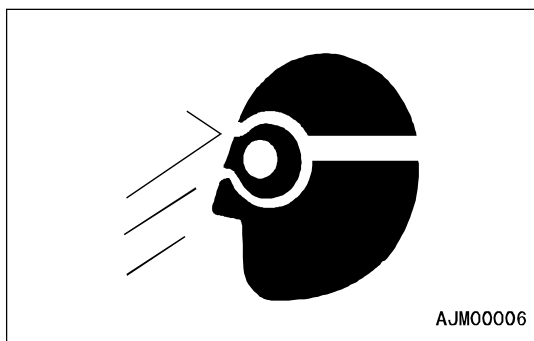
When carrying out maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.

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

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

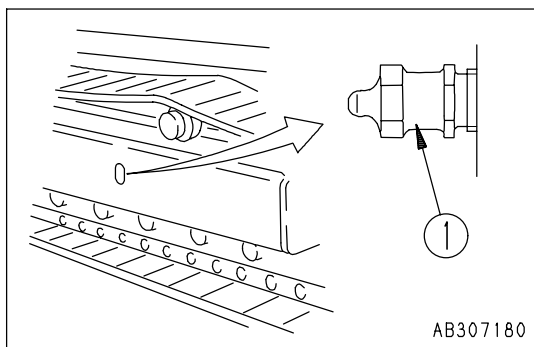
When repairing or welding the electrical system, wait for approx. one minute after turning off the engine starting switch key, and then disconnect the negative (-) terminal of the battery to stop the flow of electricity.

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.

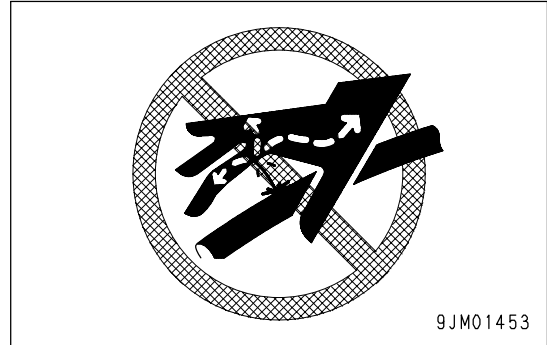
SAFETY RULES FOR HIGH-PRESSURE OIL

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.

- For details of the method of releasing the pressure, see "METHOD FOR RELEASING INTERNAL PRESSURE IN HYDRAULIC CIRCUIT (PAGE 4-42)". If the circuit is still under pressure, do not carry out any inspection or replacement operation.
- If there is any leakage from the piping or hoses, the surrounding area will be wet, so check for cracks in the piping and hoses and for swelling in the hoses.

When carry out inspection, wear safety glasses and leather gloves.

- There is a hazard that high-pressure oil leaking from small holes may penetrate your skin or cause blindness if it contacts your eyes directly. If you are hit by a jet of high-pressure oil and suffer injury to your skin or eyes, wash the place with clean water, and consult a doctor immediately for medical attention.



SAFETY HANDLING HIGH-PRESSURE HOSES

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

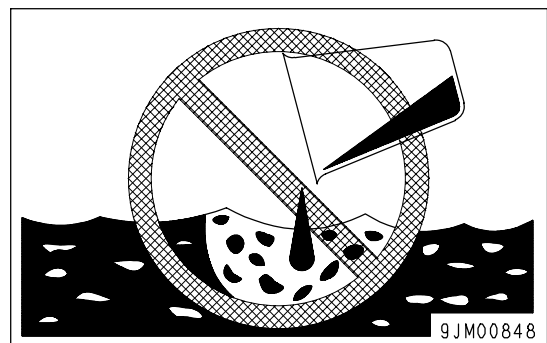
Replace the hose if any of the following problems are found.

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

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 4-14)".

- 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.

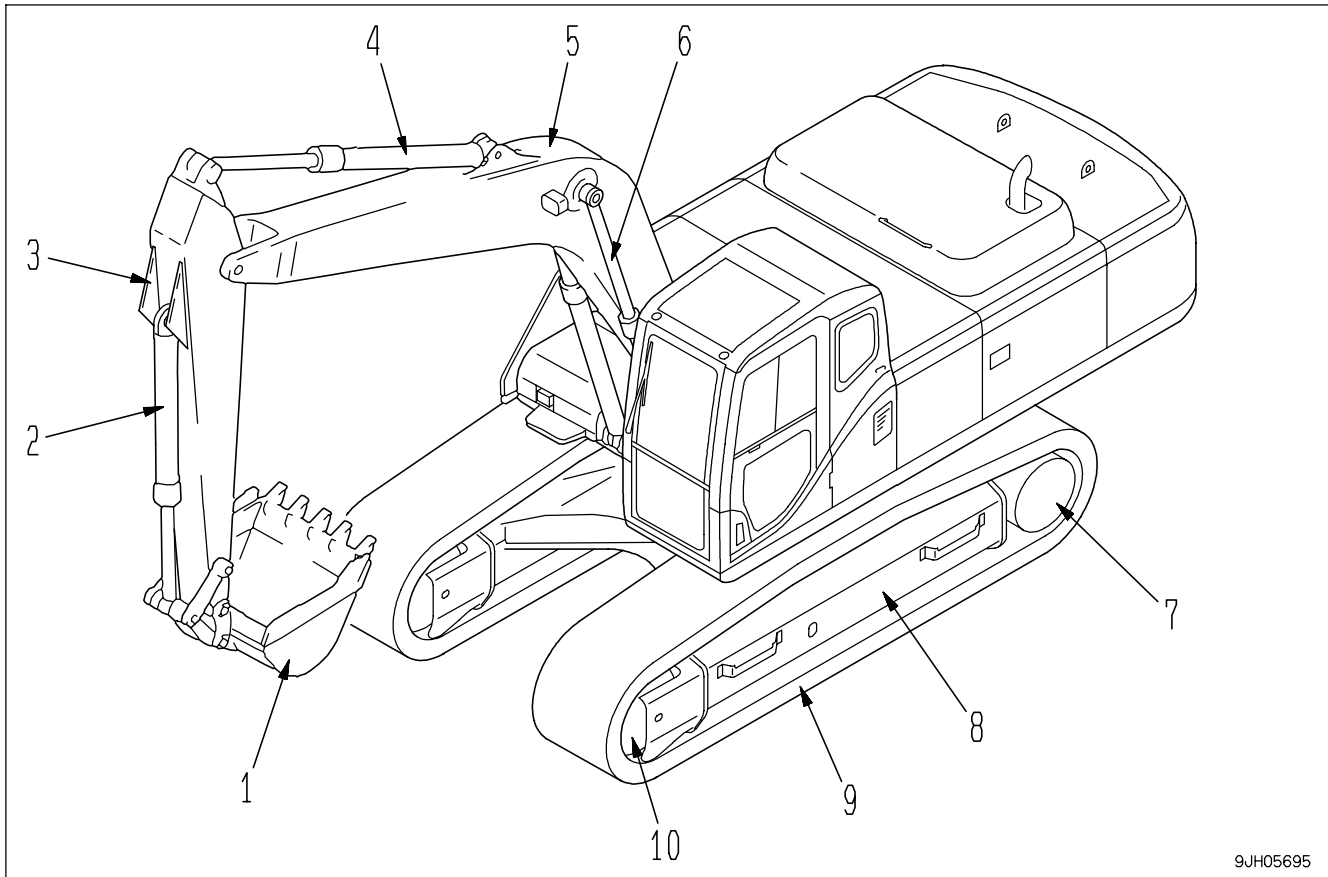
OPERATION

WARNING

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

MACHINE VIEW ILLUSTRATIONS

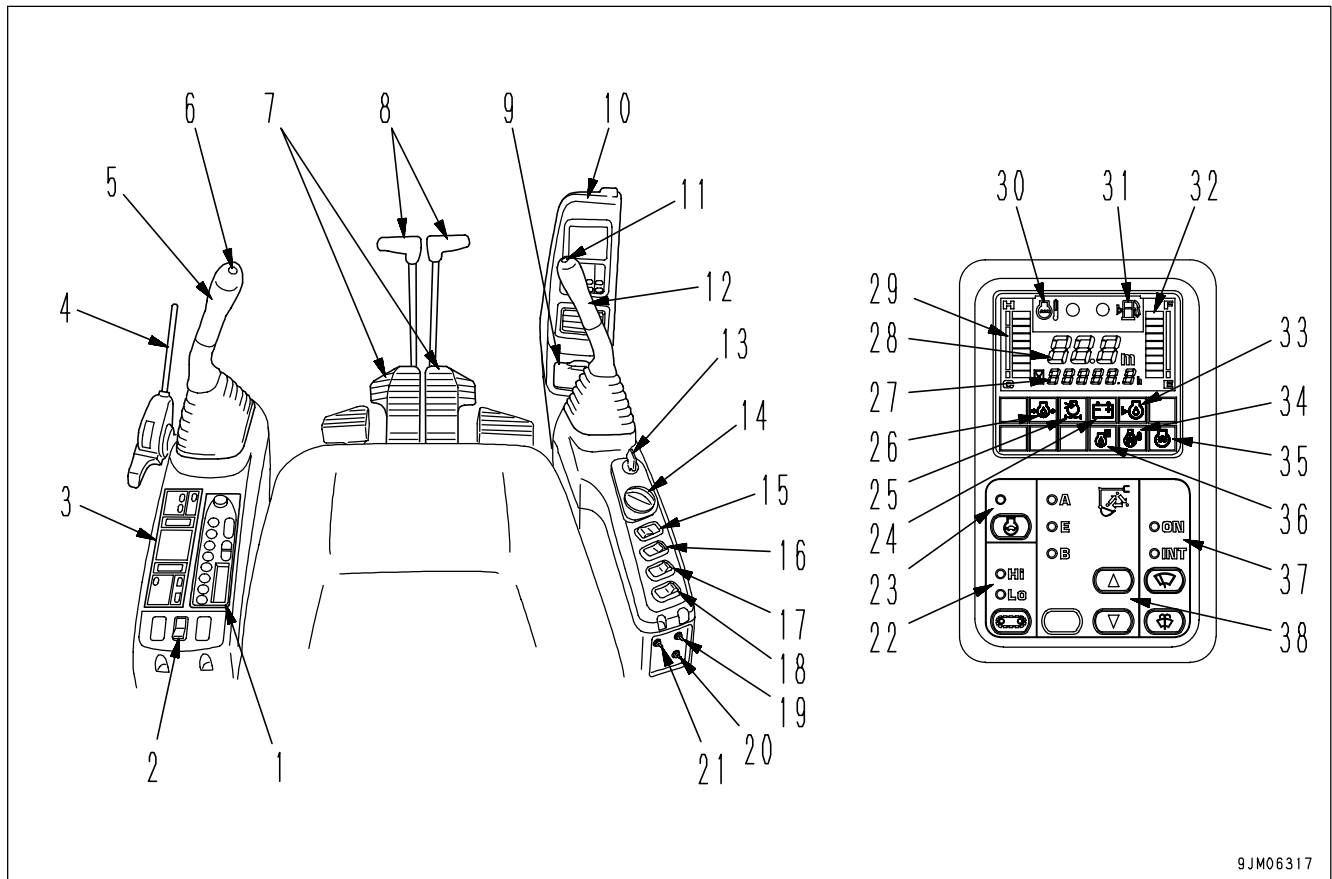
OVERALL MACHINE VIEW



9JH05695

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

CONTROLS AND GAUGES



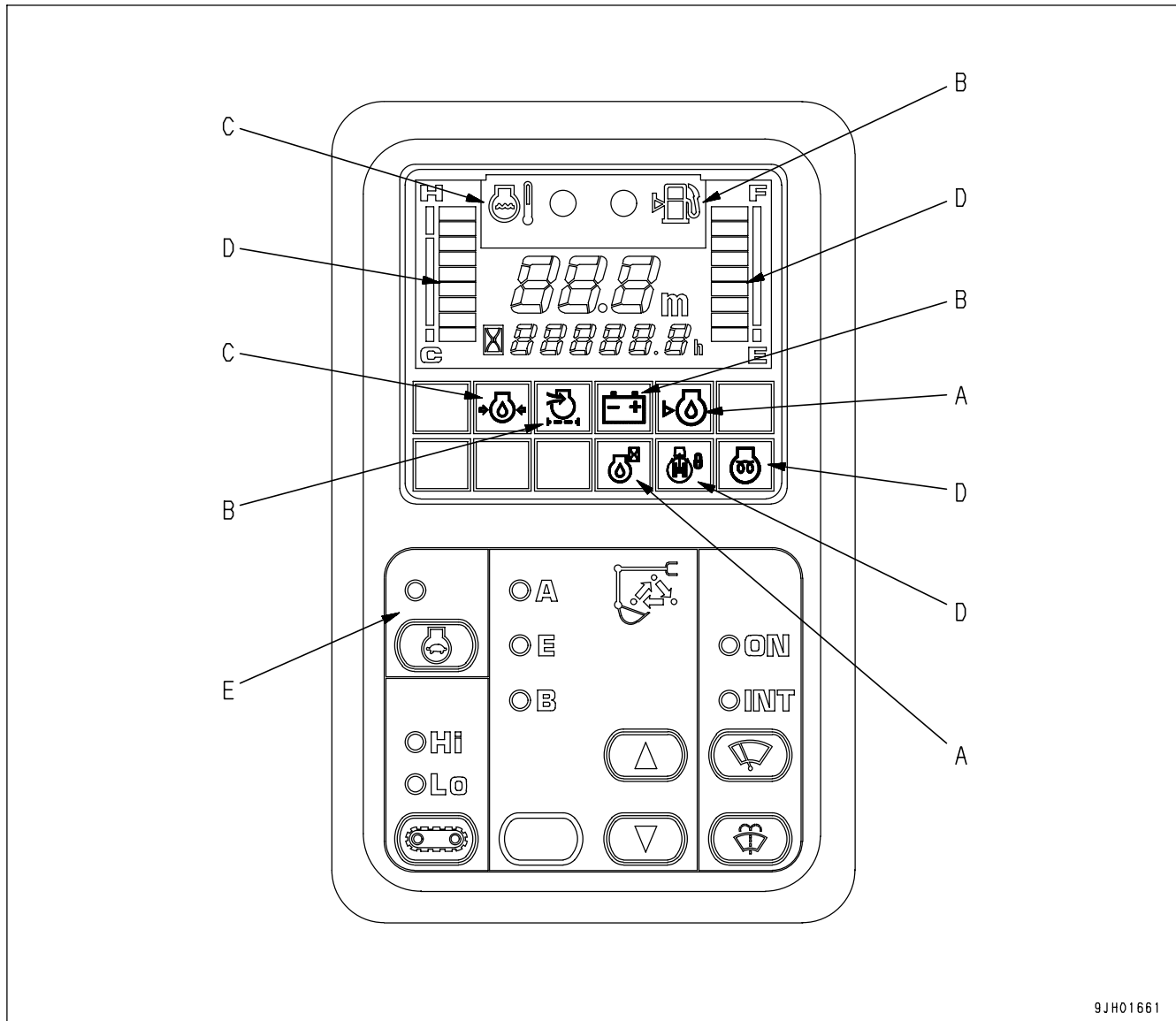
- | | |
|---|---|
| (1) Car radio | (21) Pump drive emergency switch |
| (2) Rotating lamp switch (if equipped) | (22) Travel speed selector switch |
| (3) Air conditioner control panel | (23) Auto-deceleration switch |
| (4) Lock lever | (24) Charge level monitor |
| (5) Left work equipment control lever | (25) Air cleaner clogging monitor |
| (6) One-touch power max. switch | (26) Engine oil pressure monitor |
| (7) Travel pedals | (27) Service meter |
| (8) Travel levers | (28) Display |
| (9) Cigarette lighter | (29) Engine coolant temperature gauge |
| (10) Monitoring system | (30) Engine coolant temperature monitor |
| (11) Horn switch | (31) Fuel level monitor |
| (12) Right work equipment control lever | (32) Fuel gauge |
| (13) Starting switch | (33) Engine oil level monitor |
| (14) Fuel control dial | (34) Swing lock monitor |
| (15) Lamp switch | (35) Engine pre-heating monitor |
| (16) Alarm buzzer stop switch | (36) Oil maintenance monitor |
| (17) Swing lock switch | (37) Wiper switch |
| (18) Machine push-up switch | (38) Working mode selector switch |
| (19) Swing holding brake release switch | |
| (20) Not used | |

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



9JH01661

- A: Basic check monitors
- B: Caution monitors
- C: Emergency monitors

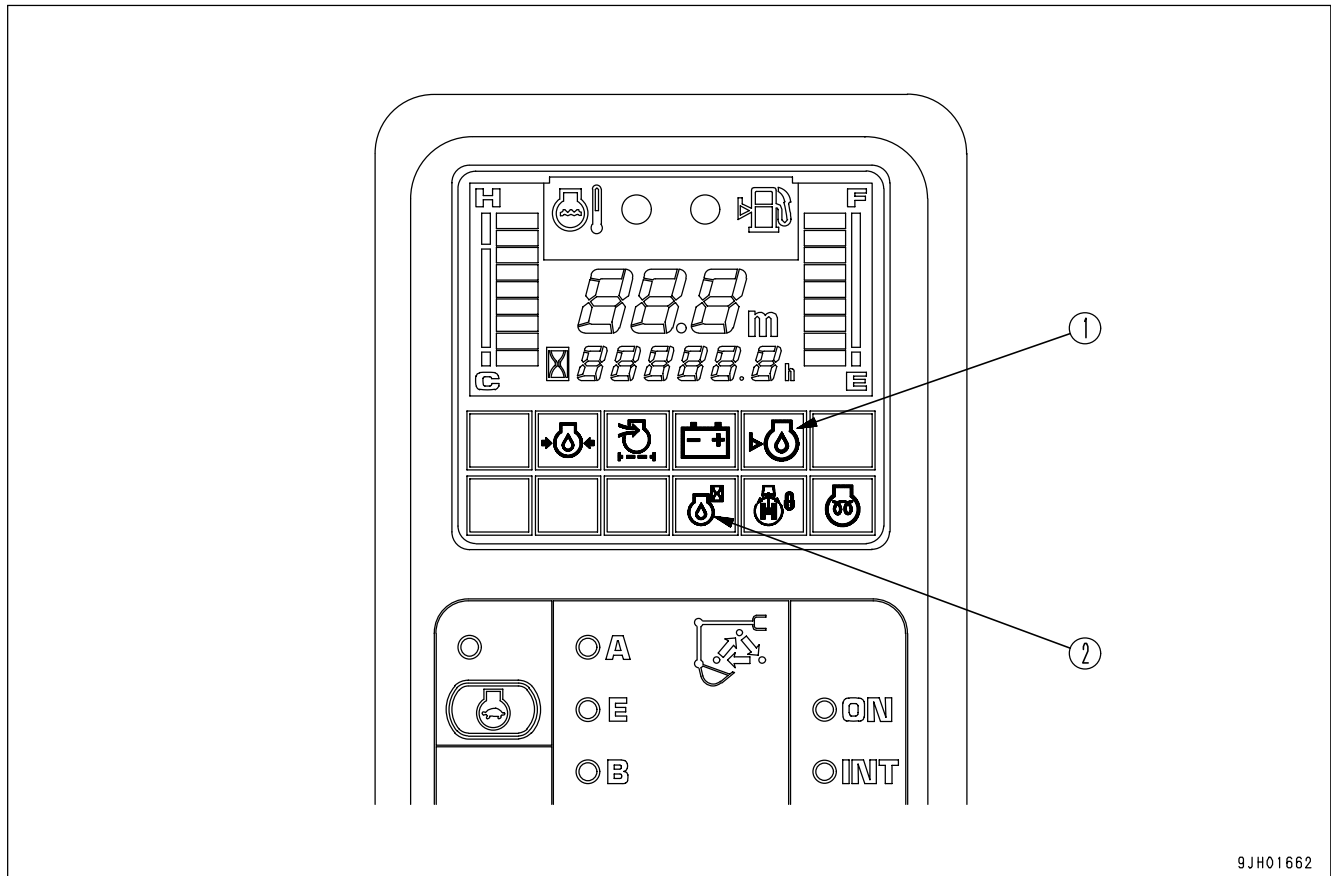
- D: Meter display portion
- E: Monitor switches portion

Basic Check Monitors

CAUTION

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

This displays the basic items that should be checked before starting the engine. If there is any problem, the appropriate monitor lamp will flash.



9JH01662

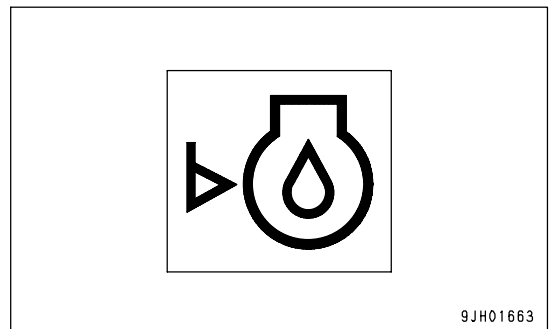
(1) Engine oil level monitor

(2) Engine oil deterioration monitor (if equipped)

Engine Oil Level Monitor

This monitor (1) lights up to warn the operator that the oil level in the engine oil pan is low.

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



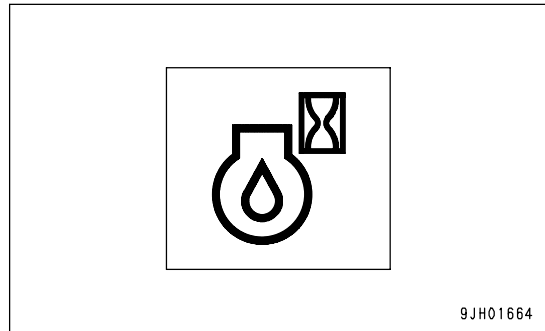
9JH01663

Engine Oil Deterioration Monitor (If Equipped)

This monitor (2) warns the operator that the set time for the engine oil change has passed.

If the set time (125, 250, 500 H) passes after the engine oil is replaced, this lamp lights up. If the lamp lights up, change the engine oil.

When you want to change the oil replacement interval, consult Komatsu Ltd. or its distributor.



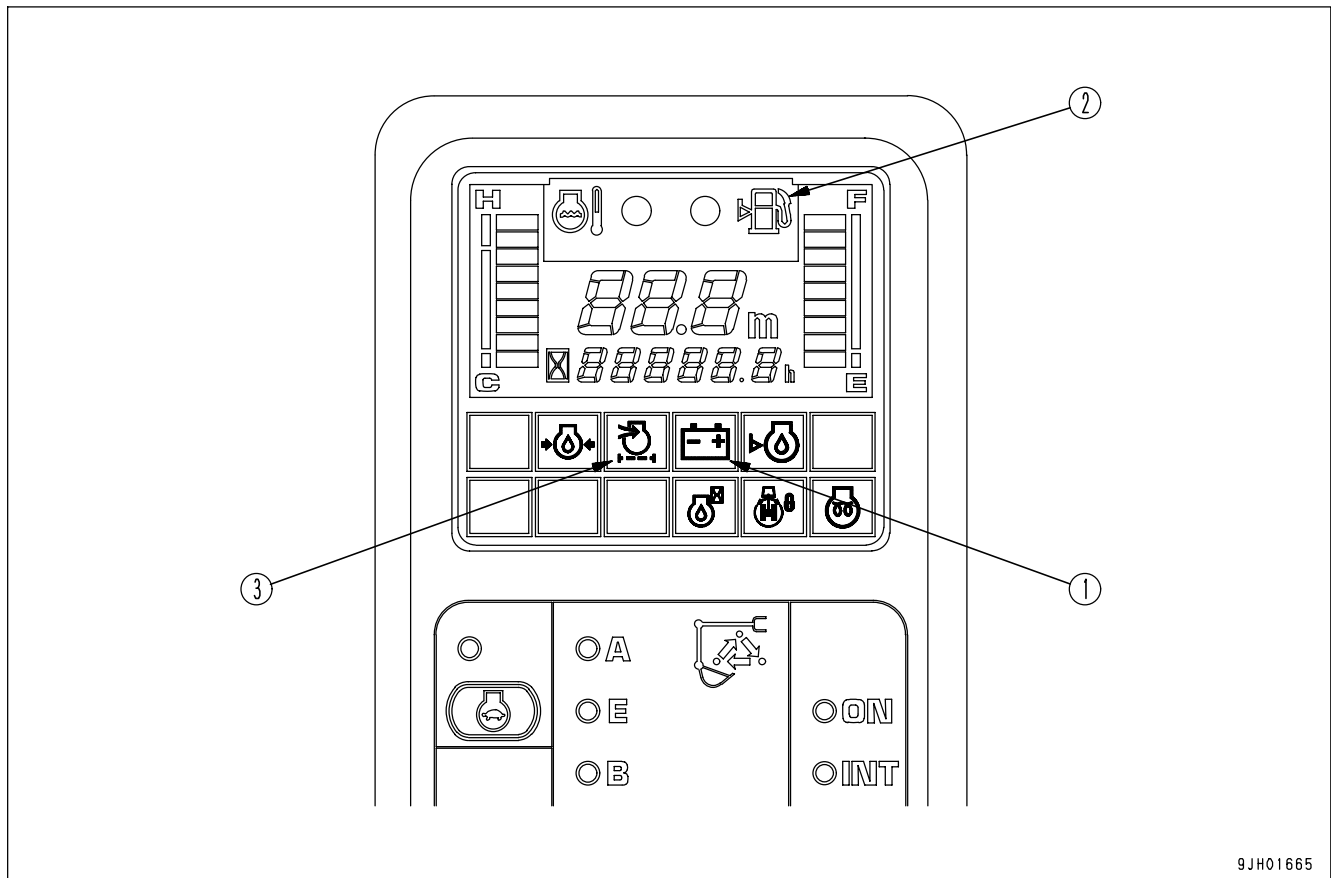
Caution Monitors

! CAUTION

If the warning monitor flashes, check the problem point as soon as possible and carry out maintenance. Failure to repair the problem may cause to failure of the machine.

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

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



9JH01665

- (1) Charge level monitor
- (2) Fuel level monitor

- (3) Air cleaner clogging monitor

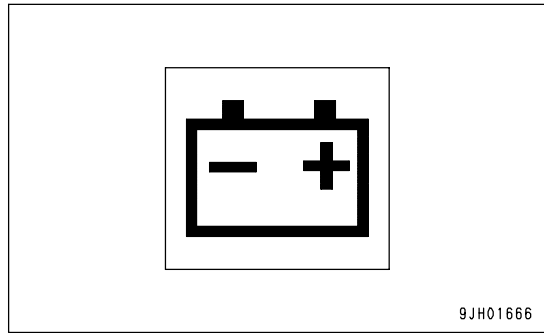
Charge Level Monitor

This monitor (1) flashes if the battery is not being properly charged when the engine is running.

If it flashes, check the V-belt for looseness. If any problem is found, take the action given in "OTHER TROUBLE (PAGE 3-137)".

REMARK

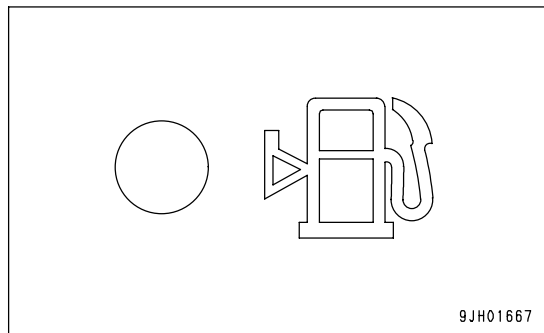
- When the starting switch is ON, the lamp stays lighted up. After the engine starts, it goes out.
- When the starting switch is ON, and the engine is started or stopped, the lamp may light up momentarily and the buzzer may sound, but this does not indicate any problem.



Fuel Level Monitor

This monitor (2) warns the operator the reduced fuel level in the fuel tank is low.

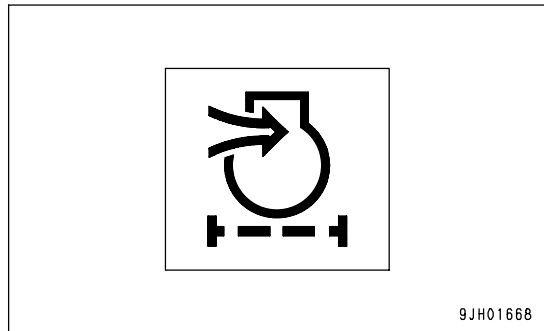
When the remaining oil level goes down to approx. 60 liters (15.85 US gal), the lamp flashes, so add fuel as soon as possible.



Air Cleaner Clogging Monitor

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

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

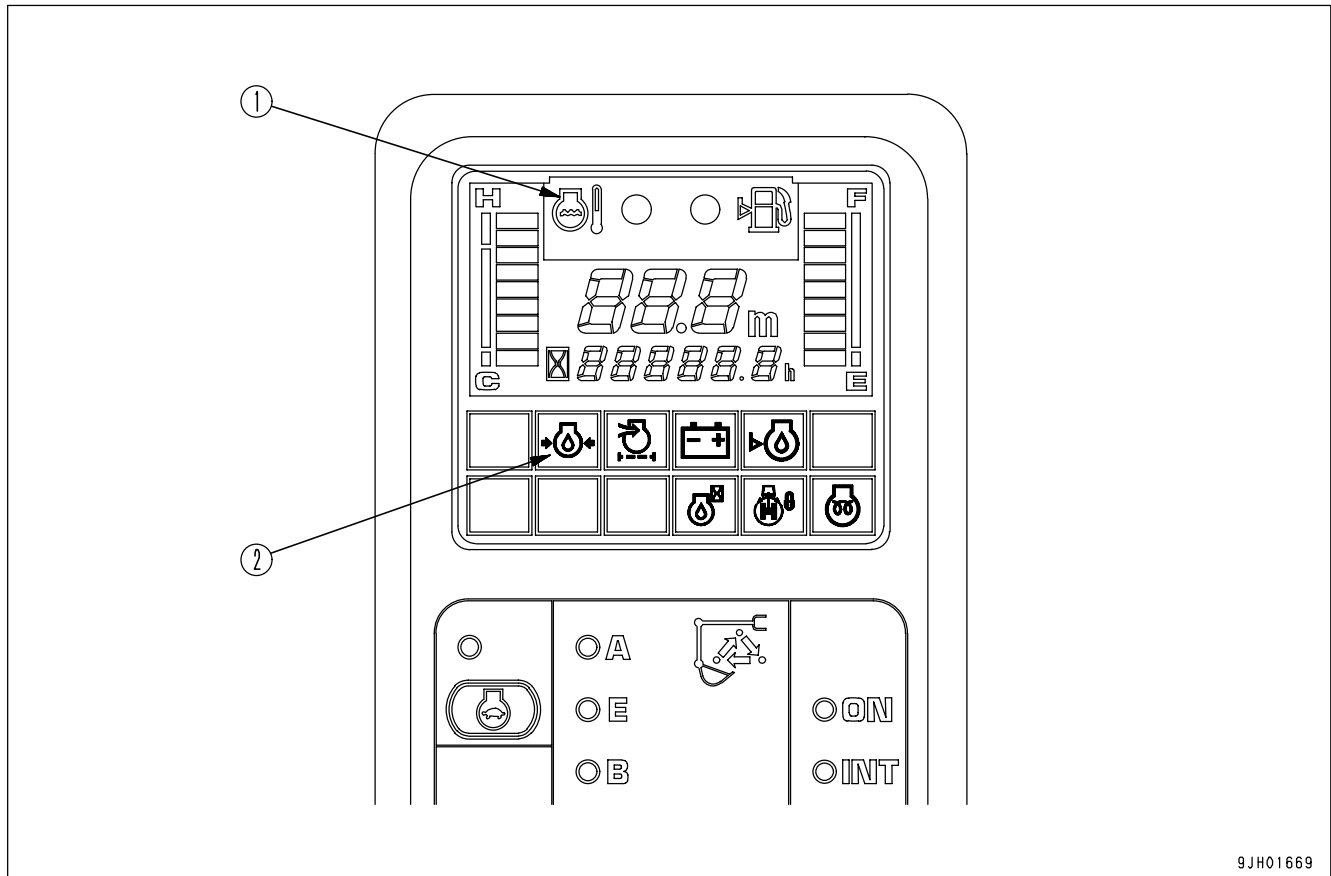


Emergency Monitors

! CAUTION

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

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



9JH01669

(1) Engine coolant temperature monitor

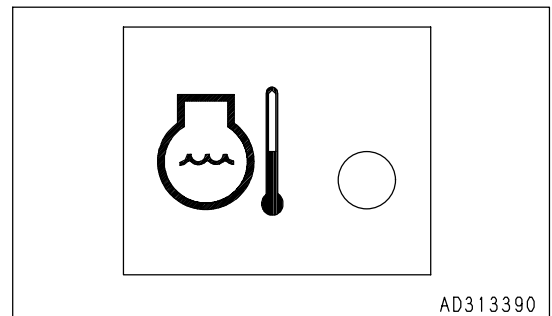
(2) Engine oil pressure monitor

Engine Coolant Temperature Monitor

This monitor (1) serves to warn against abnormal rise of the engine coolant temperature.

If the temperature of the engine coolant is too high, the monitor lamp flashes, and the overheat prevention system is automatically actuated to reduce the engine speed.

Stop operations and run the engine at low idle until the engine coolant temperature gauge enters the green range.



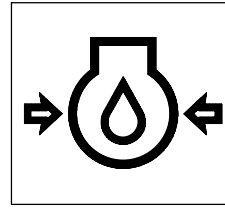
AD313390

Engine Oil Pressure Monitor

If the engine lubricating pressure is below the normal value, this monitor (2) flashes. If it flashes, stop the engine, and check the oil level in the oil pan and lubricating system.

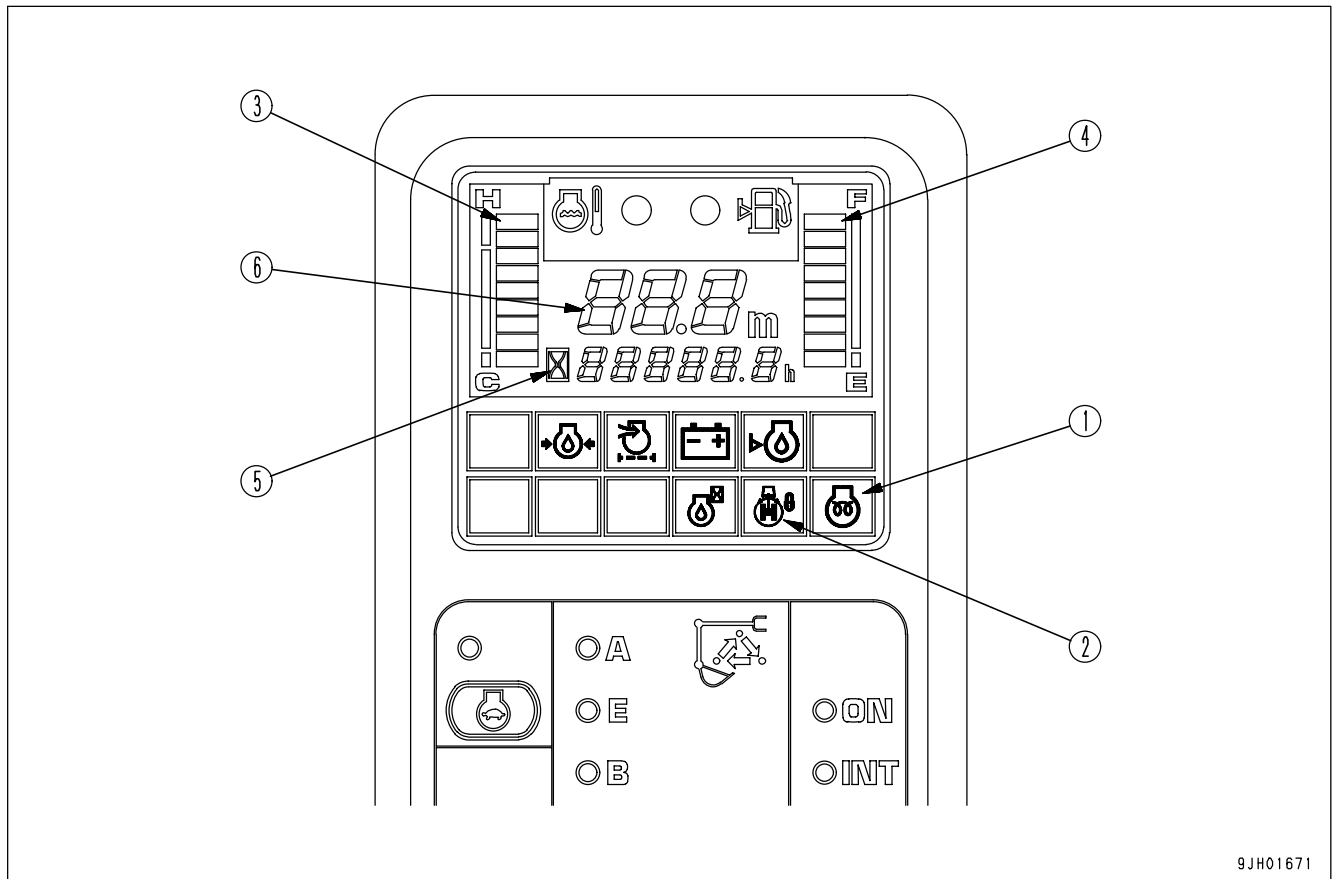
REMARK

When the starting switch is ON, the lamp is always lighted up. After the engine starts, it should go out. When the engine is started, the buzzer may sound momentarily, but this does not indicate any problem.



9JH01670

Meter Display Portion



9JH01671

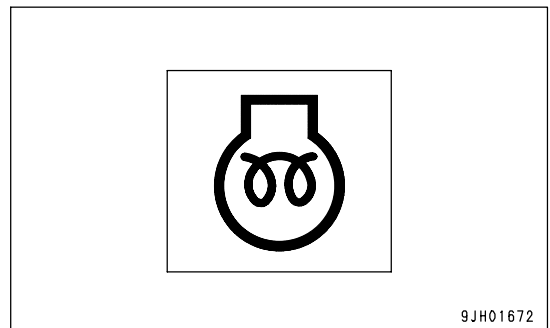
- | | |
|---|--------------------------------------|
| (1) Engine pre-heating monitor (Pilot Display) | (4) Fuel gauge (Gauges and Meter) |
| (2) Swing lock monitor (Pilot Display) | (5) Service meter (Gauges and Meter) |
| (3) Engine coolant temperature gauge (Gauges and Meter) | (6) Display (Gauges and Meter) |

Pilot Display

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

Engine Pre-heating Monitor

This monitor (1) indicates the pre-heating time required when starting the engine at an ambient temperature below 0°C (32°F). The monitor lamp lights up when the engine starting switch is turned to the HEAT position and begins to flash after about 30 seconds to show that the pre-heating is completed. (The monitor lamp will go off after about 10 seconds)



9JH01672

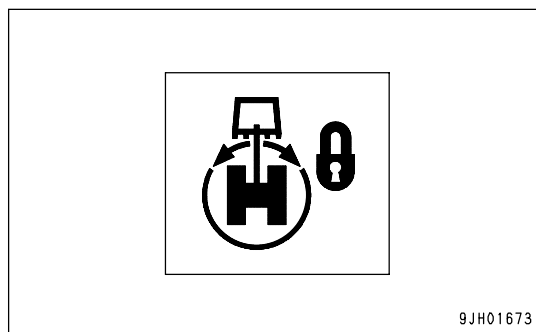
Swing Lock Monitor

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

Actuated: Lights up

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

When the swing holding brake release switch is turned on, this monitor lamp flashes.



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.

Gauges and Meter

Engine Coolant Temperature Gauge

This gauge (3) indicates the engine coolant temperature.

If the temperature is normal during operation, the green range will light up.

If the red range lights up during operation, the overheat prevention system will be actuated.

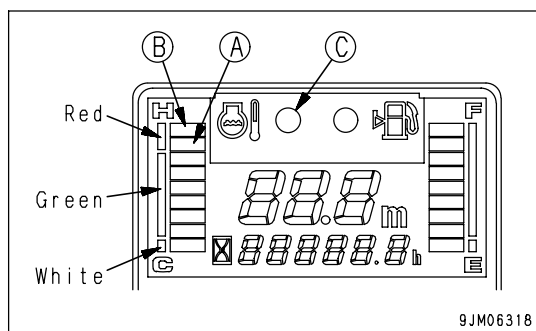
The overheat prevention system is actuated as follows.

Red range (A) lights up: Engine coolant temperature monitor lamp (C) flashes.

Red range (B) lights up: Engine speed is reduced to low idling, engine coolant temperature monitor lamp (C) flashes, and alarm buzzer sounds at the same time.

The overheat prevention system works until the temperature enters the green range.

When red range (A) has lighted up, if the fuel control dial is set to low idle after the engine coolant temperature drops, the display is canceled.



Fuel Gauge

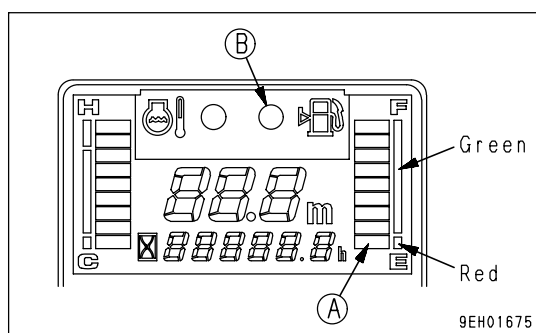
This meter (4) shows the fuel level in the fuel tank. During normal operation, the lamp should light up in the green range.

If the lamp in the red range flashes during operation, there is less than 100 liters (24.42 US gal) of fuel remaining, so check and add fuel.

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

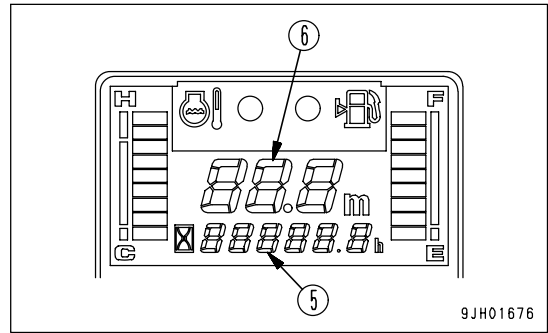
The correct level may not be displayed for a short time after the starting switch is turned to the ON position, but this is not an abnormality.

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



Display

This display (5) shows the service meter. If any problem occurs, (6) indicates the content of the failure.



REMARK

If the machine has a problem, error information appears while the starting switch is ON. The monitor flashes and displays all error information sequentially.

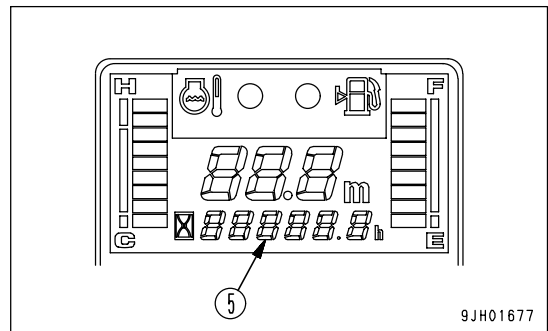
Monitor display	Failure mode
E02	Pump control system error
E03	Swing brake system error
E05	Governor system error
E06	Electric system error

If any of the above displays flashes, see "Electronic Control System (PAGE 3-141)".

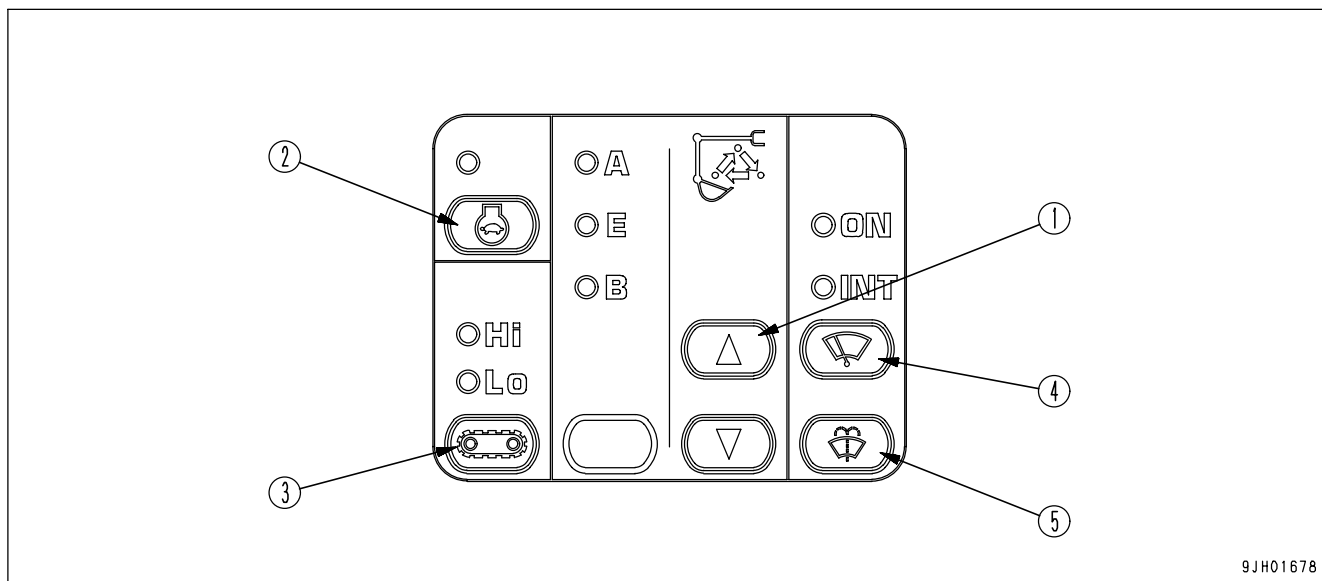
Service Meter

This monitor (5) displays the total amount of time that the machine has been operating.

Use the time display to set the maintenance intervals. If the engine is running, even if the machine is not moving, the service meter advances. The service meter advances by 1 for every hour that the engine is running, regardless of the engine speed.



Monitor Switches Portion



9JH01678

- (1) Working mode selector switch (basic switch)
- (2) Auto-deceleration switch (selection switch)
- (3) Travel speed switch
- (4) Wiper switch
- (5) Window washer switch

Working Mode Selector Switch (Basic Switch)

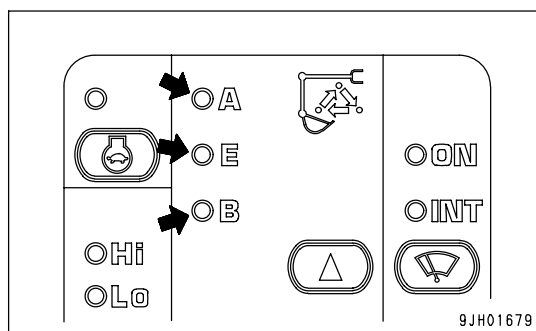
This switch (1) is used to set the power and movement of the work equipment.

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

A lights up: For heavy-load operations

E lights up: For operations with emphasis on fuel economy

B lights up: For breaker operations



9JH01679

- When the engine is started, the mode is set by default to A mode. Each time the switch is pressed, the next mode is selected.
- When starting the engine, if it is desired to set the E or B mode automatically (default option setting), please contact your Komatsu distributor for adjustment.

NOTICE

Do not use A mode when using a breaker. Otherwise the breaker will be damaged.

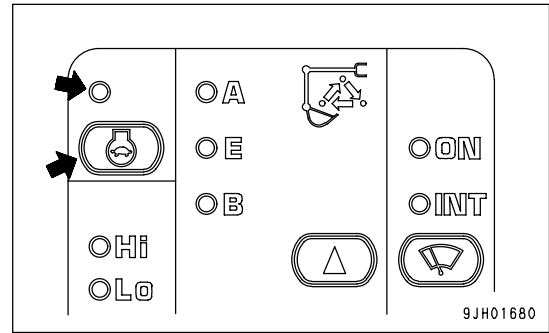
Auto-deceleration Switch (Selection Switch)

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

Auto-deceleration lights up: Auto-deceleration is actuated

Auto-deceleration goes out: Auto-deceleration is canceled

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



Travel Speed Switch



WARNING

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

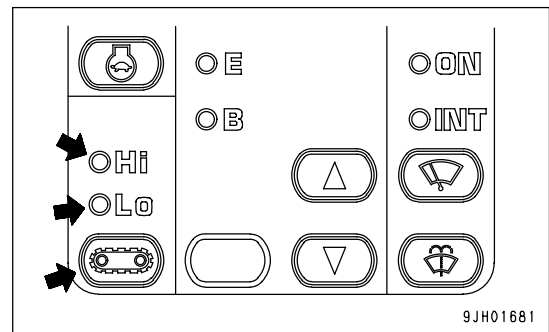
This switch (3) is used to switch the travel speed between two levels (high and low).

Lo lights up: Low speed

Hi lights up: High speed

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

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



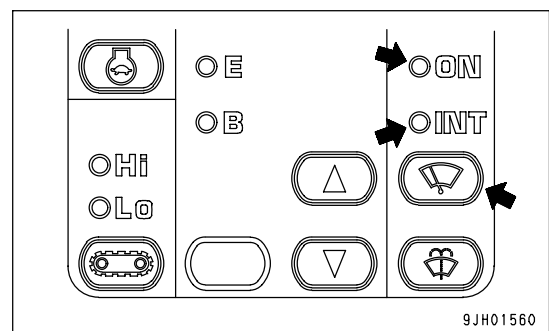
Wiper Switch

This switch (4) actuates the front window wiper.

ON lights up: The wiper works continuously.

INT lights up: The wiper works intermittently.

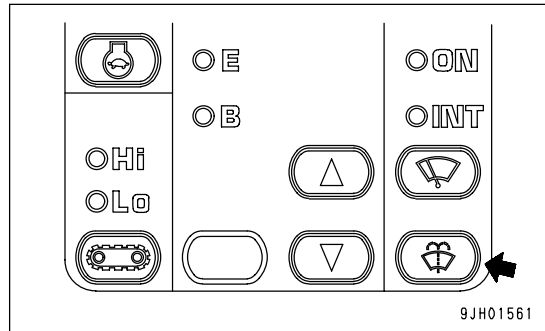
OFF: The wiper stops.



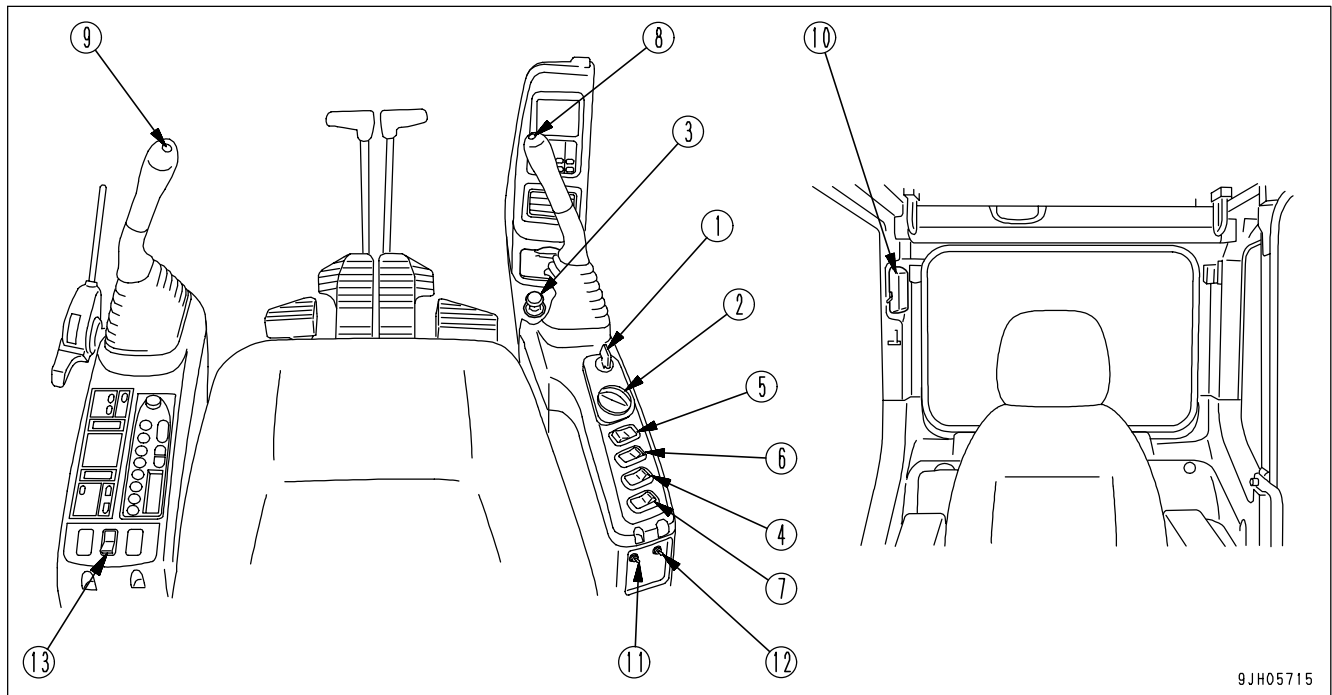
Window Washer Switch

This switch (5) is kept continuously pressed, window washer fluid is sprayed 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 intermittently 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.



SWITCHES



9JH05715

- | | |
|----------------------------|---|
| (1) Starting switch | (8) Horn switch |
| (2) Fuel control dial | (9) One-touch power max. switch |
| (3) Cigarette lighter | (10) Room lamp switch |
| (4) Swing lock switch | (11) Emergency pump drive switch |
| (5) Lamp switch | (12) Swing brake cancel switch |
| (6) Alarm buzzer switch | (13) Revolving warning lamp switch
(if equipped) |
| (7) Machine push-up switch | |

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

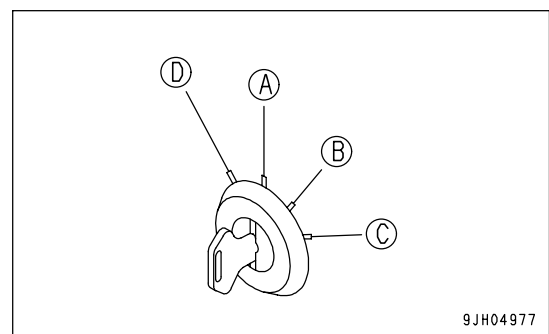
Electric current flows through the charging and lamp circuits. Keep starting switch key in the ON position while the engine is running.

(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).

(D): HEAT (pre-heat) position

When starting the engine in cold weather, turn the key to HEAT position (D), the pre-heating monitor lights up. Keep the key at this position until the monitor lamp flashes. Immediately after the pre-heating lamp flashes, release the key. The key automatically returns to OFF position (A). Then, start the engine by turning the key to START position (C).



9JH04977

Fuel Control Dial

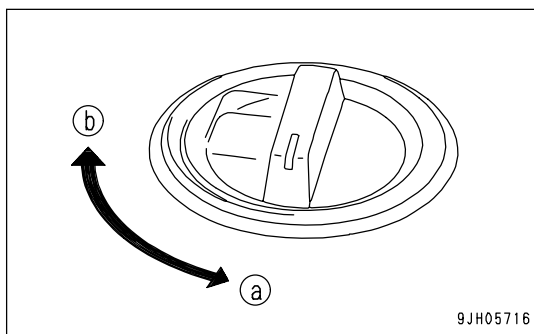
This dial (2) adjusts the engine speed and output.

(a) Low idle (MIN): Turned fully to the left

(b) Full speed (MAX): Turned fully to the right

REMARK

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



9JH05716

Cigarette Lighter

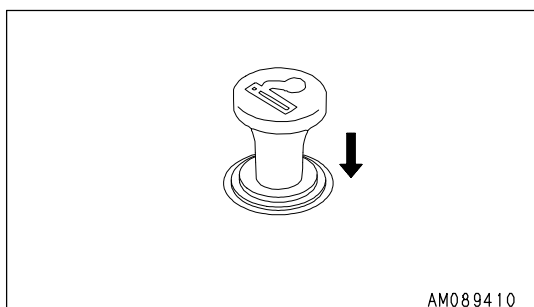
This switch (3) is used to light cigarettes.

To use, push the lighter in. After a few seconds it will spring back.

Pull out the lighter and light your cigarette.

By removing the cigarette lighter, the socket is available as a power source for the yellow flashing lamp.

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



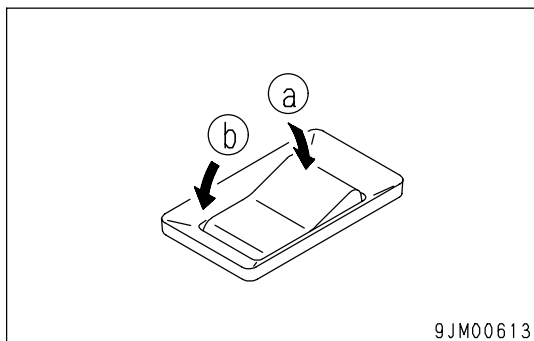
AM089410

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.



9JM00613

Switch (4) is used to lock the upper structure so it will not swing.

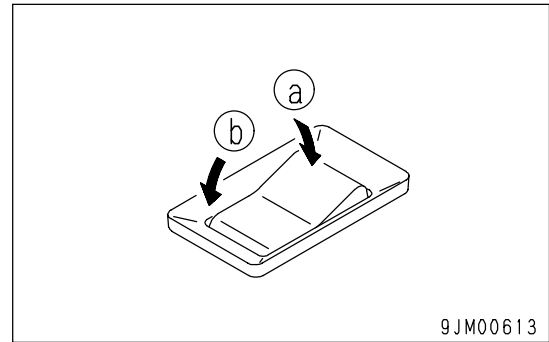
(a) ON position: The swing lock is always applied, and the upper structure will not swing even if the swing is operated. In this condition, the swing lock lamp lights up.

(b) OFF position: The swing lock is applied only when the swing control lever is in the neutral position, and released when operating the swing control lever. The swing lock is actuated in 7 seconds after putting the swing control lever in the neutral position.

Lamp Switch

Switch (5) is used to turn on the front lamps, working lamps, additional lamps at top front of the cab, and monitor lighting.

- (a) ON: Lamps light up
- (b) OFF: Lamps go off



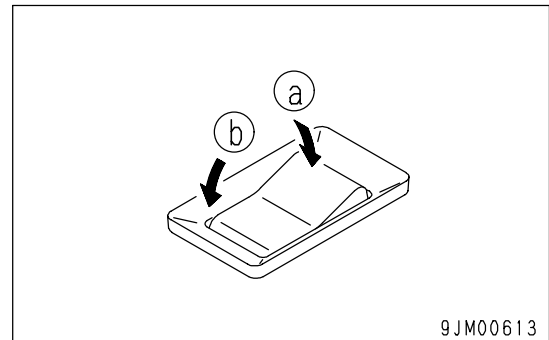
9JM00613

Alarm Buzzer Stop Switch

This switch (6) is used (when the engine is running) to stop the alarm buzzer when it has sounded to warn of a problem in a warning item.

REMARK

The switch (6) is an automatic return switch. For this reason, if the switch is pressed to position (a) and released, it will return to STOP position (b), but this is not a problem.

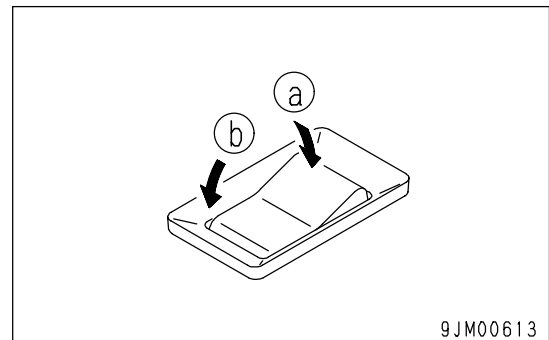


9JM00613

Machine Push-up Switch

This switch (7) is used to switch the safety valve set pressure at the head end of the boom cylinder to two levels.

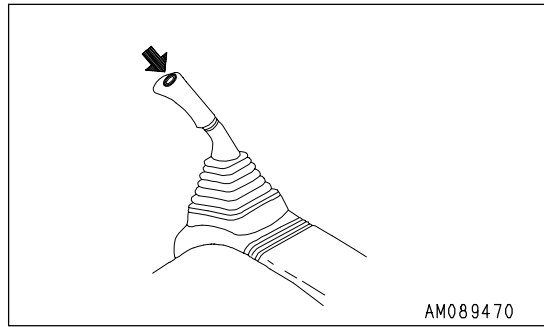
- (a) Low-pressure setting: The boom thrust force is weak, so the swaying of the chassis is small during digging operations, and digging operations can be carried out smoothly. This is used for general digging operations on normal ground, soft rock, or blasted rock.
- (b) High-pressure setting: The thrusting force of the boom becomes more powerful, so it is easy to escape from soft ground.



9JM00613

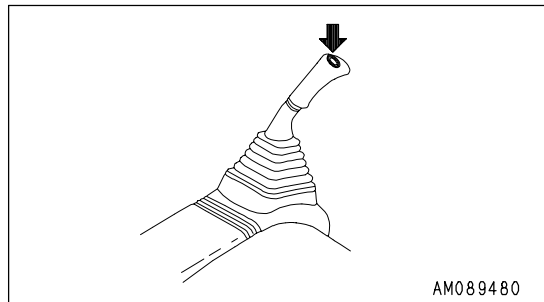
Horn Switch

When the switch (8) at the tip of the right work equipment control lever is pressed, the horn will sound.



One-Touch Power Max. Switch

This switch (9) on the left work equipment control lever is used to actuate the power max and slow down functions. Press once (single click) and keep the switch pressed. The one-touch power max. function is actuated for a maximum of 8.5 seconds at A and E mode.



Room Lamp Switch

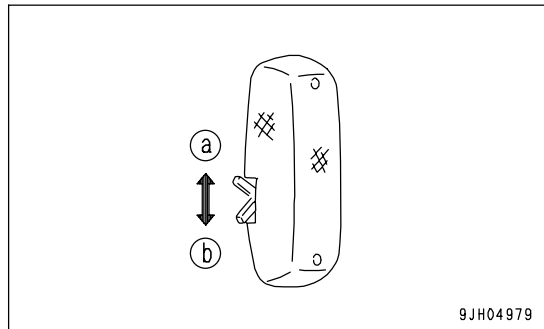
NOTICE

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.

This switch (10) is used to light up the room lamp.

- (a) ON position: Lights up
- (b) OFF position: Goes out

It will also light up even when the starting switch is off.



Emergency Pump Drive Switch

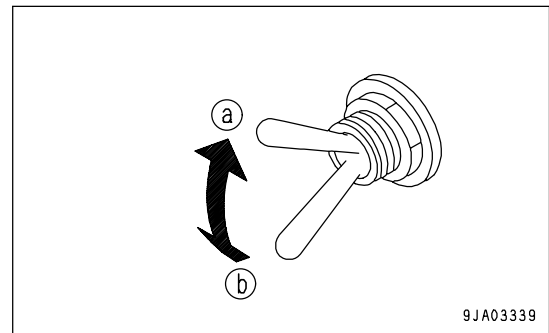
NOTICE

Emergency pump drive switch is provided to make it possible to perform work for a short time when there is a failure in the pump control system. It is necessary to repair the abnormal location as soon as possible.

This switch (11) is used to make it possible to carry out operations temporarily if any abnormality should occur in the pump control system (when the display shows E02).

- (a) When abnormal : Move switch up
- (b) When normal : Move switch down

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



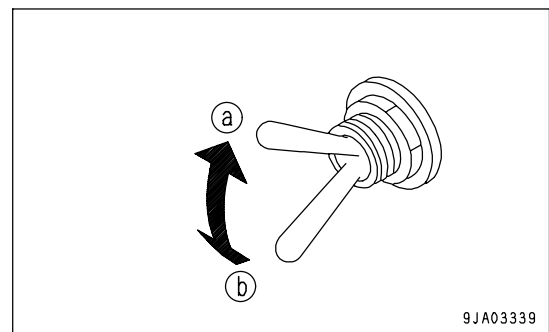
Swing Parking Brake Release Switch

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 (12) is used to make it possible to carry out operations temporarily if any abnormality should occur in the swing brake system (when the display shows E03).

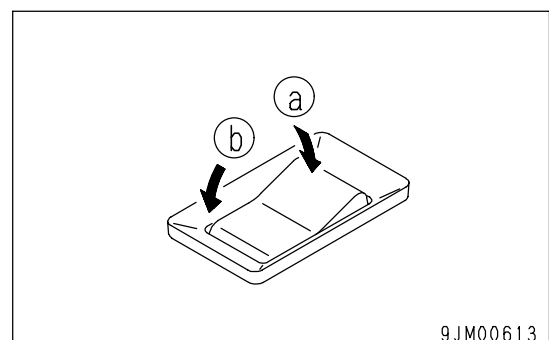
- (a) When condition is abnormal: Move switch up
- (b) When condition is normal: Move switch down
- When the display is "E03", move this switch up to make it possible to carry out operations.



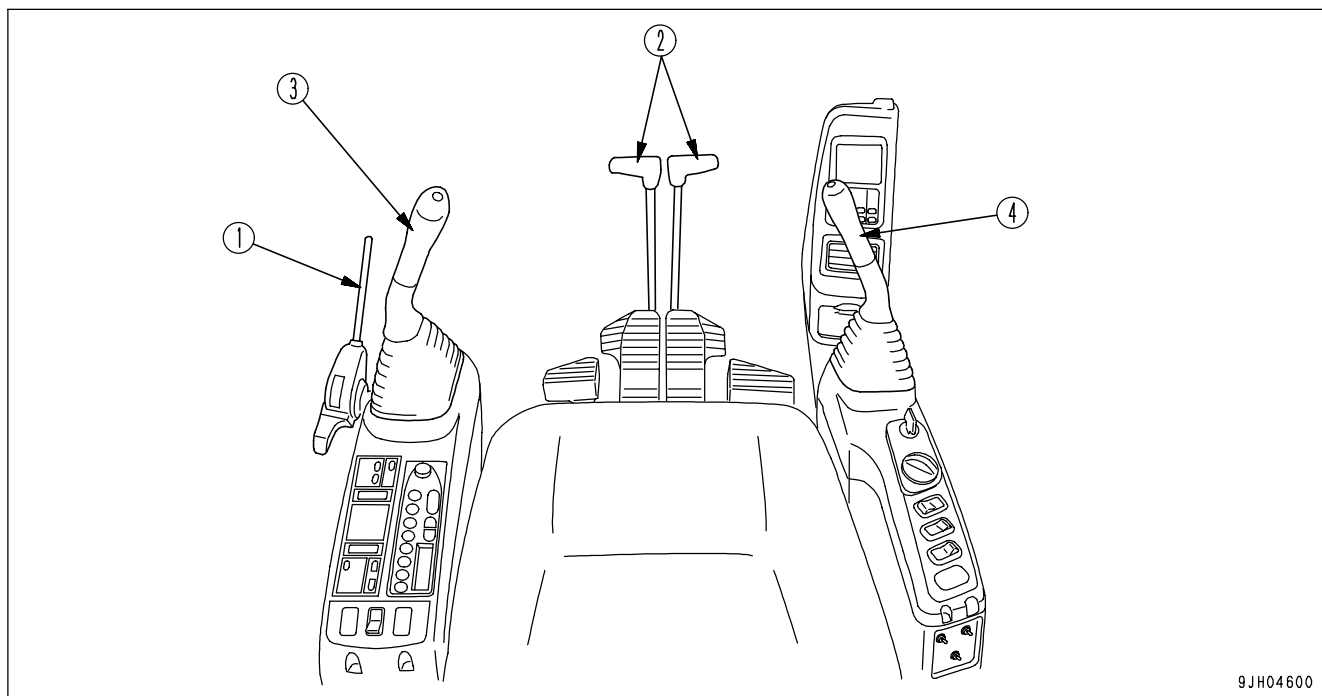
Rotating Lamp Switch (If Equipped)

This switch (13) is used to light up the yellow rotating lamp on top of the cab.

- (a) ON: Lamps light up
- (b) OFF: Lamps go off



CONTROL LEVERS AND PEDALS



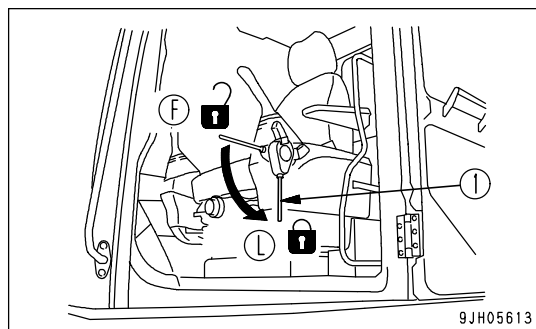
9JH04600

- (1) Lock lever
- (2) Travel levers
(with a 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)

Lock Lever

! WARNING

- When leaving the operator's compartment, set the lock lever (1) securely to the LOCK position (L). If the lock lever is not at the LOCK position (L) and the control levers are touched by mistake, it may lead to serious personal injury.
- Check that the condition of the lock lever (1) is as shown in the diagram.
- When pulling or pushing the lock lever (1) up, be careful not to touch the work equipment control lever.



9JH05613

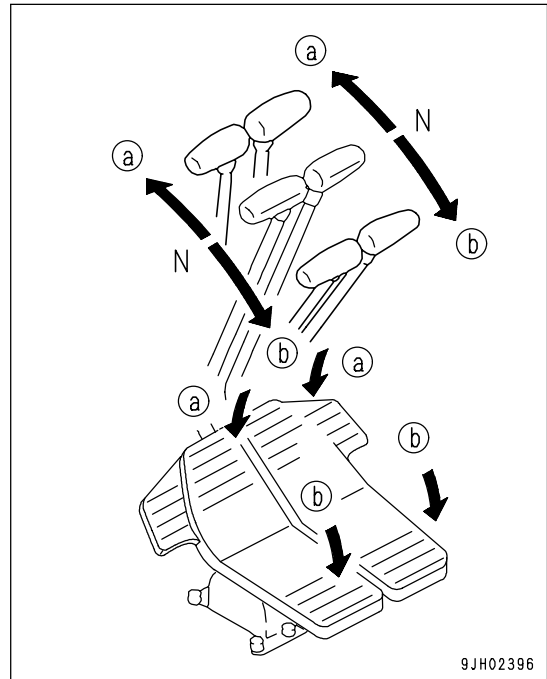
This lever (1) is a device to lock the work equipment, swing, travel, and attachment (if equipped) control levers. Push the lever (1) down to apply the lock.

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

Travel Levers

! WARNING

- Do not rest your foot on the pedal during operations. If the pedal is depressed by mistake, the machine may suddenly move and cause a serious accident. Be extremely careful when operating the pedal for travel or steering operations. When you are not using the pedal, do not rest your foot on it.
- If the track frame is facing the rear, the direction of travel operations will be reversed when the travel lever is operated. (The machine will travel forward when operated in reverse, and in reverse when operated forward; the left and right directions will also be reversed.)
- When operating the travel levers, check if the track frame is facing the front or the rear. (If the sprocket 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

Machines equipped with travel alarm (If equipped)

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.

Work Equipment Control Lever

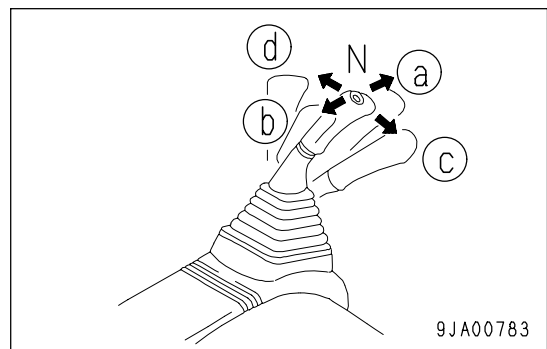
Left work equipment control lever (3) is used to operate the arm and upper structure.

Arm operation

- (a) Arm OUT
- (b) Arm IN

Swing operation

- (c) Swing to right
- (d) Swing to left



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

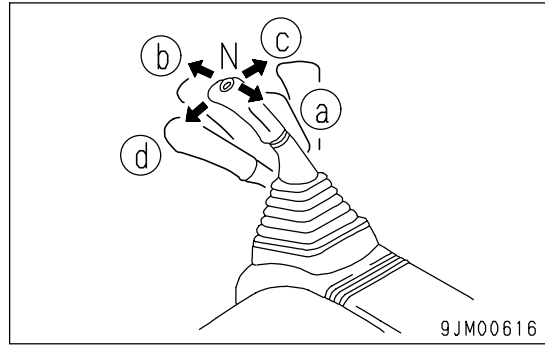
Right work equipment control lever (4) is used to operate the boom and bucket.

Boom operation

- (a) RAISE
- (b) LOWER

Bucket operation

- (c) DUMP
- (d) CURL



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

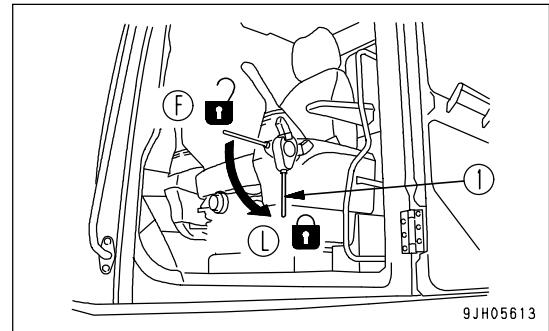
SUN ROOF



WARNING

When leaving the operator's seat, set the lock lever securely to the LOCK position (L).

If the lock lever (1) is in the FREE position (F) and the control lever is touched by mistake, this may lead to a serious accident.

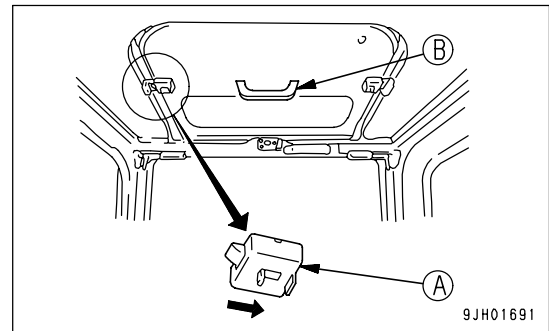


Opening

1. Set the lock lever (1) securely to the LOCK position (L).
2. Check for any ceiling window movement by pulling lock knob (A) located on front side, then push up and open the ceiling window grasping grip (B).

REMARK

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



Closing

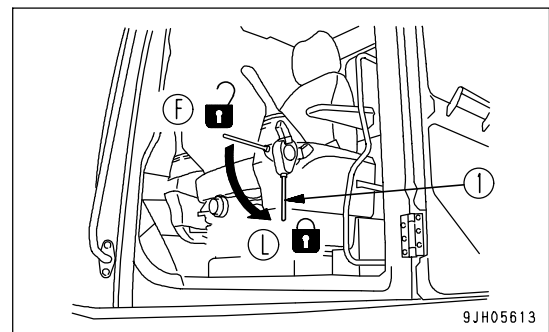
Hold grip (B), lower the ceiling window, and apply lock (A). If the lock cannot be applied, open the ceiling window, then pull it in again and apply the lock.

WINDSHIELD



WARNING

- When opening or closing the front window, bottom window, or door, always set the lock lever (1) in the LOCK position (L).
If the control levers are not locked and they are touched by accident, this may lead to a serious accident.
- When opening or closing the window at the front of the cab, stop the machine on horizontal ground, lower the work equipment completely to the ground, stop the engine, then carry out the operation.
- When opening the front window, hold the grip securely with both hands, pull up, and do not let go until the automatic lock catch is locked.
- When closing the front window, the window will move quicker under its own weight. Hold the grips securely with both hands when closing it.



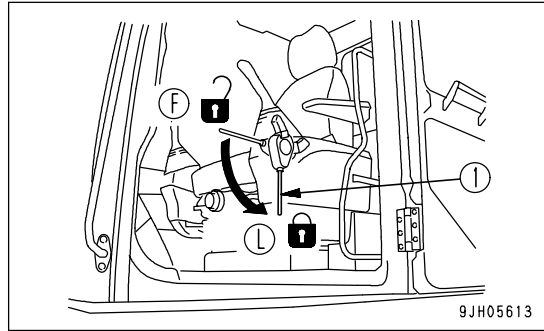
It is possible to stow (pull up) the front window in the roof of the operator's compartment.

REMARK

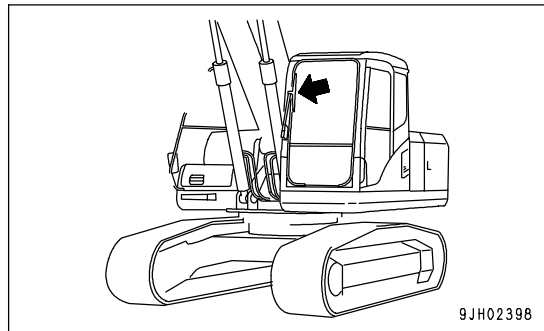
With the single-pane front glass, the cab front window cannot be opened.

Opening

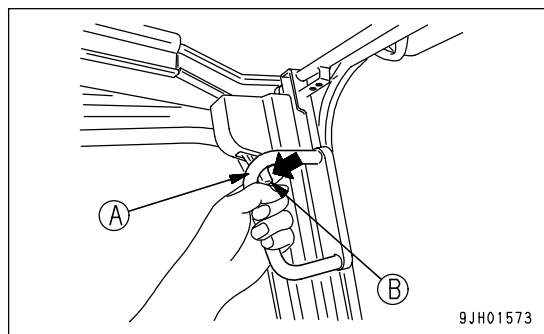
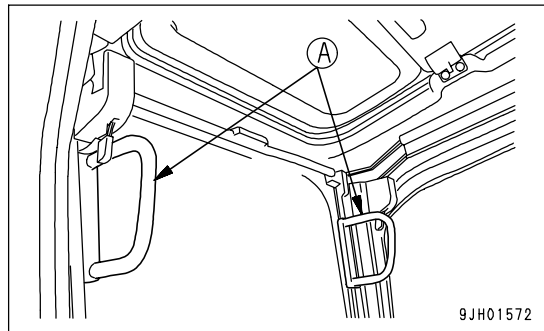
1. Stop the machine on level ground, lower the work equipment completely to the ground, then stop the engine.
2. Set the lock lever securely in the LOCK position (L).



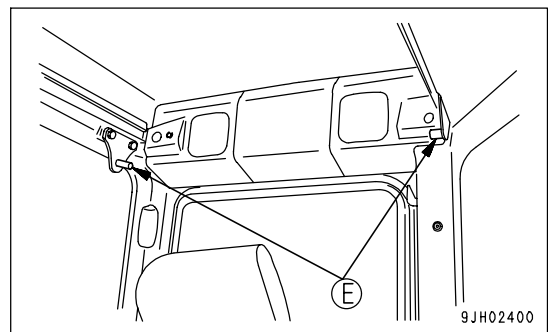
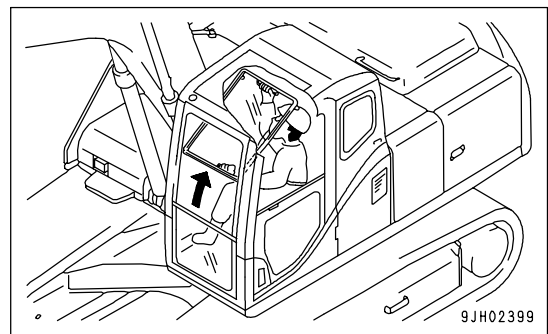
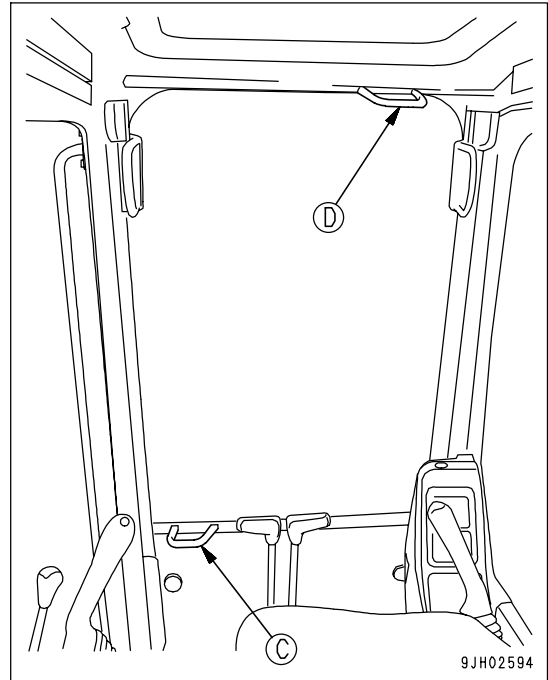
3. Check that the wiper blade is stowed in the right stay.



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

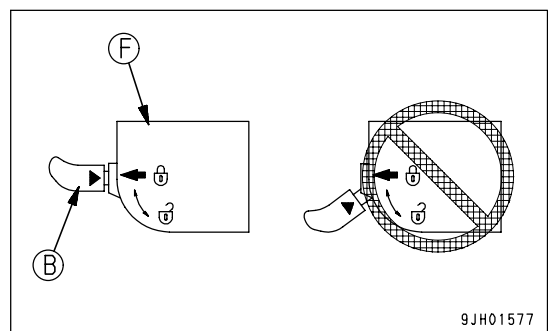


5. Hold lower knob (C) with your left hand from inside the operator's cab, and with your right hand, grip top knob (D), pull it up, and push it against lock catch (E) at the rear of the cab securely to lock the window.



6. Check that lock lever (B) is securely in the LOCK position.

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

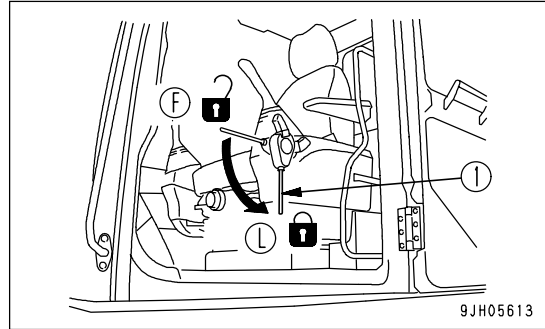


Closing

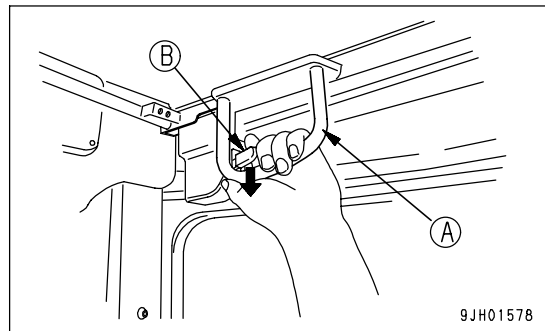
 **WARNING**

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

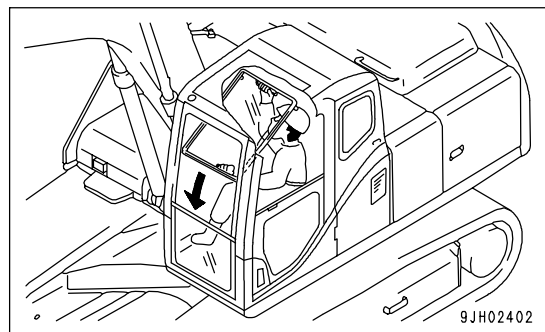
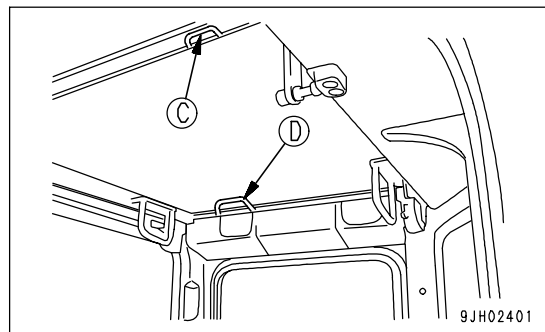
1. Stop the machine on level ground, lower the work equipment completely to the ground, then stop the engine.
2. Set the lock lever securely in the LOCK position (L).



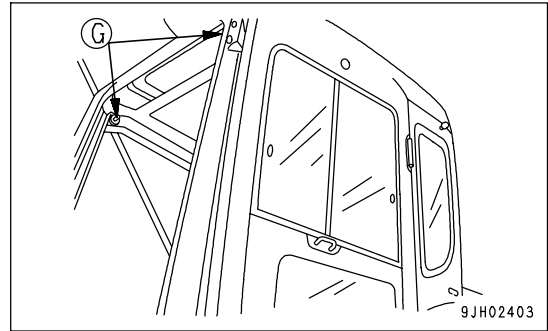
3. Grip left and right handles (A), and pull down lock lever (B) to release the lock.



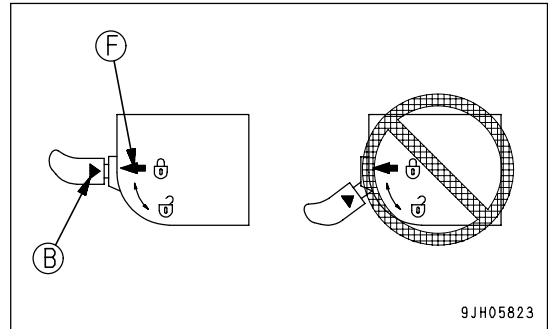
4. Grip handle (C) at the bottom of the front window with your left hand and handle (D) at the top with your right hand, push to the front, then lower slowly.



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.

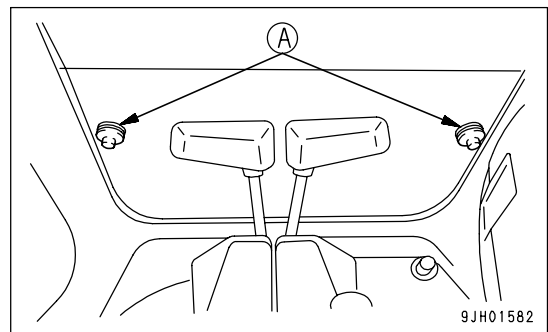


6. Check that lock lever (B) is securely in the LOCK position.
- The lock is engaged if the arrow on lock case (F) matches the position of the arrow on lock lever (B). Check visually.
 - If the arrow on lock case (F) does not match the position of the arrow on lock lever (B), the lock is not engaged.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

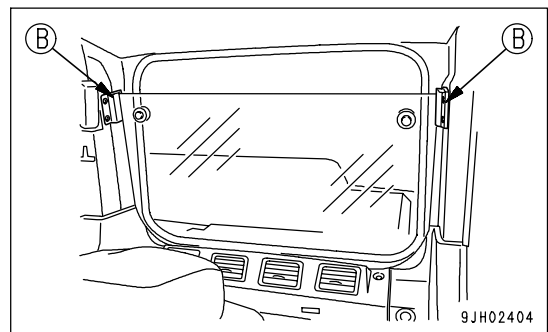


Removing Lower Windshield

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

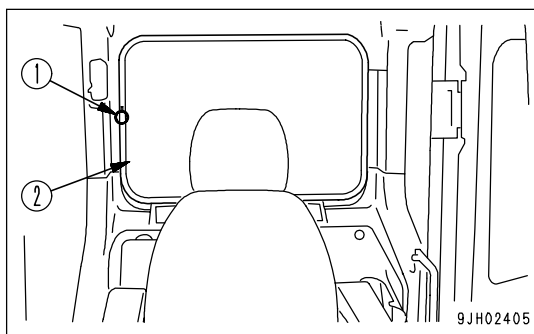


2. After removing the bottom window, store it at the rear of the operator's cab and lock it securely with left and right locks (B).
- When removing, always hold the glass with one hand and release the lock with the other hand.



EMERGENCY EXIT FROM OPERATOR'S CAB

- If for some reason, the cab door does not open, remove the rear window and use it as an emergency escape.
- Remove the rear window as follows.
 1. Pull ring (1) and completely remove seal (2) from the rubber core.



2. With pressure push on corner of the window, the glass will fall outside.
 - Do not remove the rear window except when using it as an emergency exit.

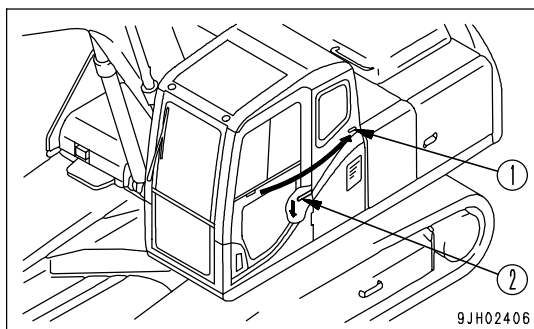
DOOR LOCK



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

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

1. Push the door against catch (1) to lock it in position.
2. When closing the door, push down the lever (2) on the left of the operator's seat to release the catch.
3. When attaching the door in position, lock it firmly to the catch.

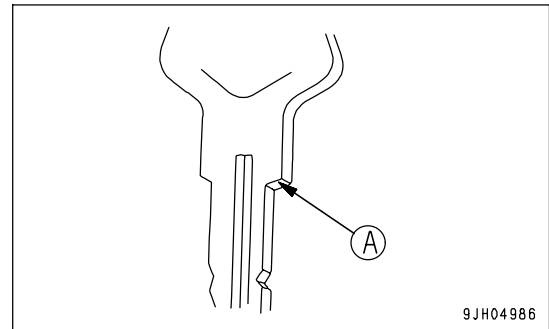


CAP WITH LOCK

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 3-108)".

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.



9JH04986

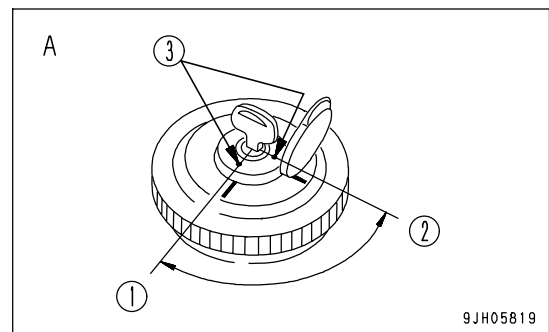
Opening and Closing Caps with Lock

Type A is used for the fuel tank cap; type B is used for the hydraulic tank cap.

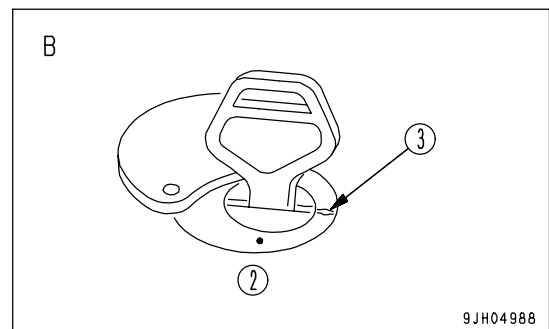
Opening the Cap

1. Insert the key into the key slot.
2. Turn the key clockwise (counterclockwise for type B), align the key groove with counter mark (3) on the cap, then open the cap.

- (1): Open
(2): Lock



9JH05819



9JH04988

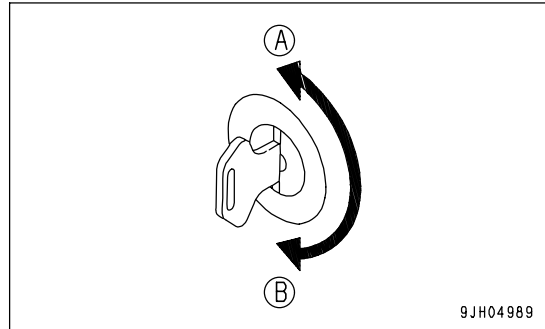
Locking the Cap

1. Turn the cap until tight, then insert the key into the key slot.
2. Turn the starting switch key counterclockwise (clockwise for the B type) and remove the key.

Opening and Closing Cover with Lock

Opening the Cover (Locked Cover)

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

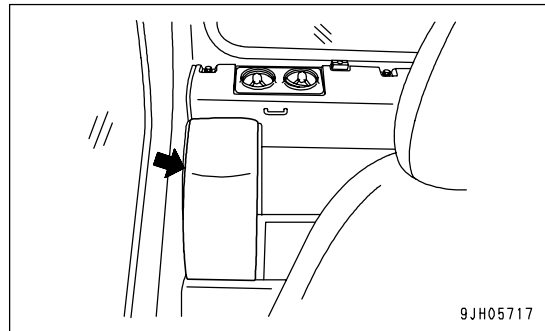


Locking the Cover

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

HOT AND COOL BOX

This is on the right side at the rear of the operator’s seat. It is interconnected with the air conditioner: it stays warm when the heating is used, and stays cool when the cooling is used.

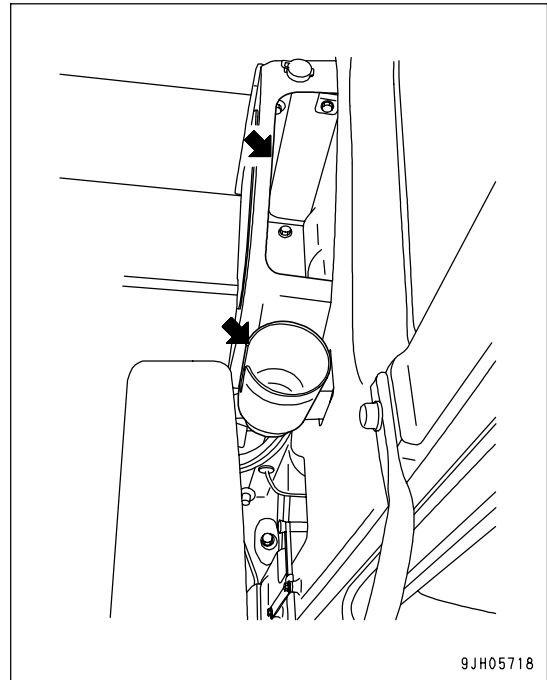


MAGAZINE BOX

(The cup holder is provided separately at the front of the magazine box.)

Located on left side of the operator's seat.

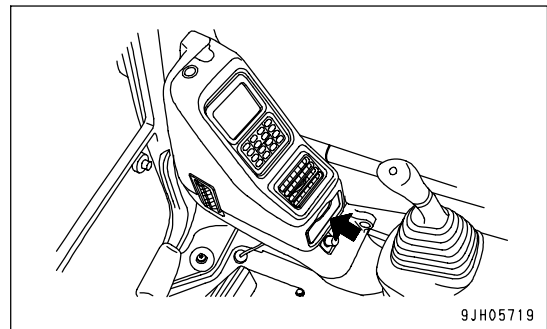
Keep the Operation and Maintenance Manual in this box so that it can be taken out and read whenever necessary.



ASHTRAY

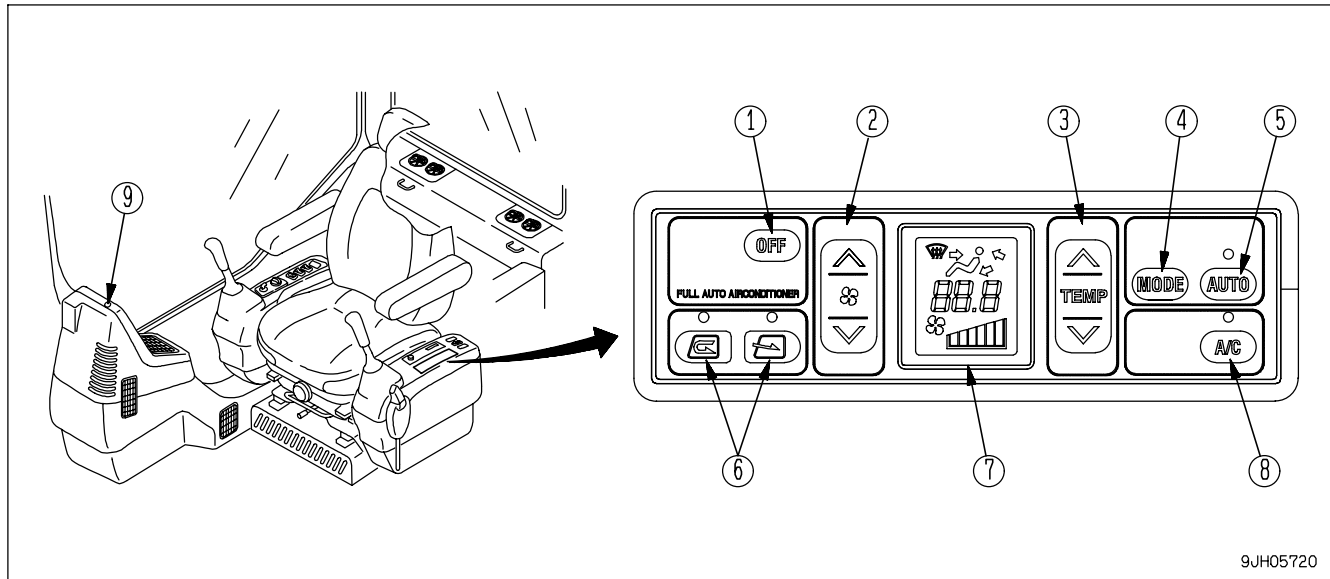
This is under the machine monitor at the front right of the operator's compartment.

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



AIR CONDITIONER CONTROLS

Air Conditioner Control Panel



9JH05720

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

OFF Switch

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

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

REMARK

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



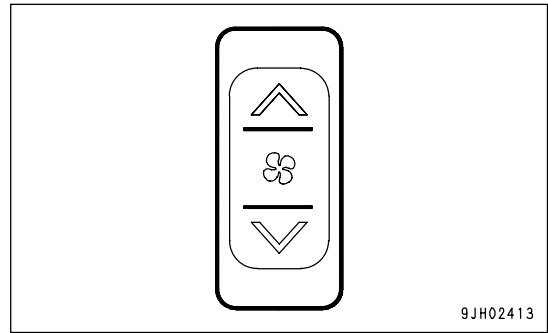
9JH02411

Fan Switch

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

The air flow can be adjusted to six levels.

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



9JH02413

A: Liquid crystal display

B: Air flow

a: Air flow "low"

b: Air flow "medium 1"

c: Air flow "medium 2"

d: Air flow "medium 3"

e: Air flow "medium 4"

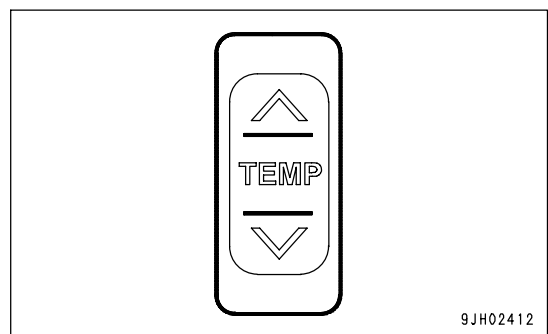
f: Air flow "high"

A	B
	a
	b
	c
	d
	e
	f

Temperature Control Switch

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

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



9JH02412

<Monitor display and the function>

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

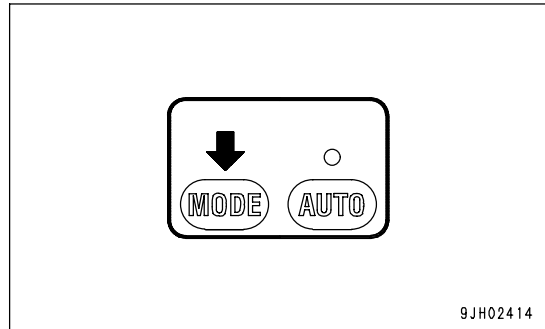
REMARK

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

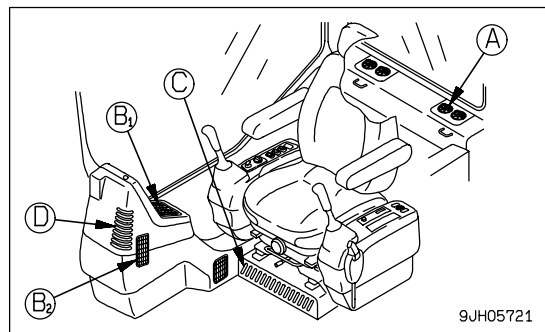
Vent Selector Switch

Switch (4) is used to select the vents.

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



- (A): Rear vent (4 places)
- (B1): Face vent (1 place)
- (C): Foot vent (1 place)
- (D): Front window glass vent (2 place)
- (B2): Front window glass vent (1 place)



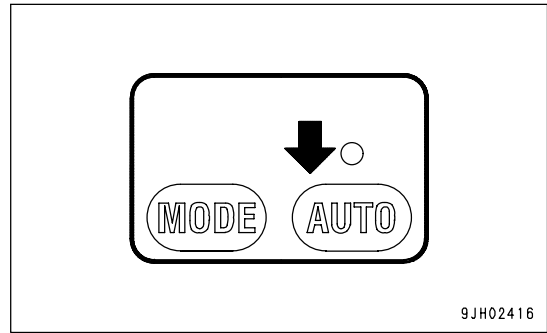
Liquid crystal display	Vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Front vents		○			Cannot be selected for automatic operation
	Front and rear vents	○	○			-
	Front, rear and foot vents	○	○	○		-
	Foot vent			○		-
	Foot vent Defroster vent			○	○	Cannot be selected for automatic operation
	Defroster vent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

Note 1: Air blows out from vents marked ○

Auto Switch

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

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



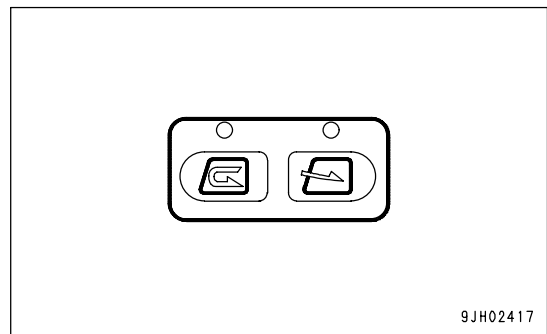
REMARK

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.

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

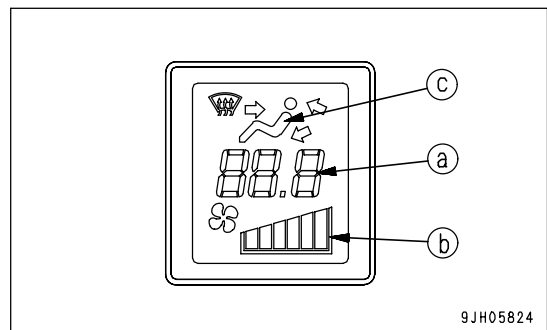


RECIRC	Outside air is shut off and only air inside the cab is circulated. Use this setting to perform rapid cooling of the cab or when outside air is dirty.
FRESH	Outside air is taken into the cab. Use this setting to take in fresh air when performing demisting.

Display Monitor

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

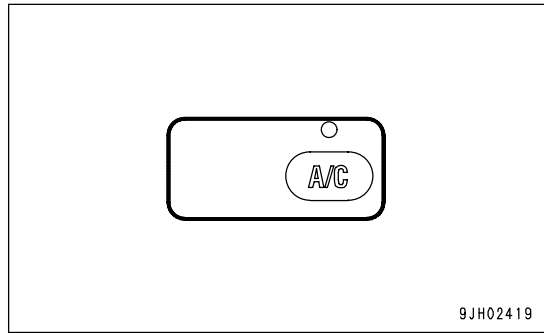
- When OFF switch (1) is pressed, the display of temperature setting (a) and air flow (b) goes out, and operation stops.



Air Conditioner Switch

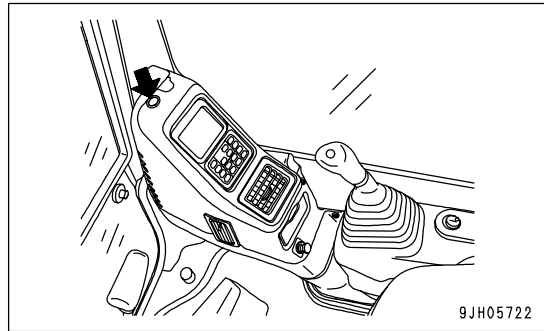
Switch (8) is used to turn the air conditioner (cooling, dehumidifying, heating) ON or OFF.

- When the fan is actuated (display (b) is shown) and air conditioner switch (8) is pressed, the air conditioner is switched ON, lamp above the air conditioner switch lights up, and the air conditioner starts.
When switch (8) is pressed again, the air conditioner is switched OFF, lamp above the air conditioner switch goes out, and the air conditioner stops.
- Air conditioner cannot be operated while the fan is off.



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.

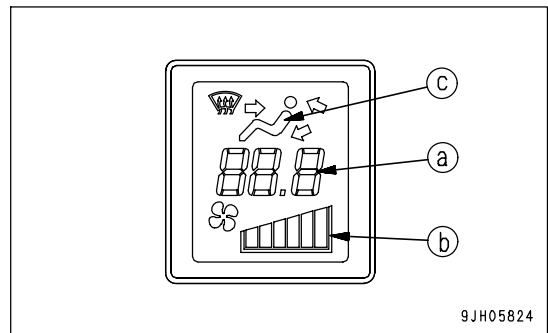
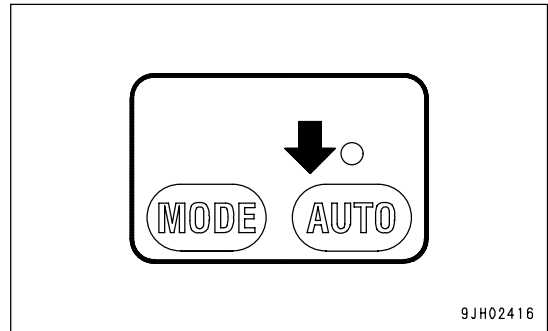


Method of Operation

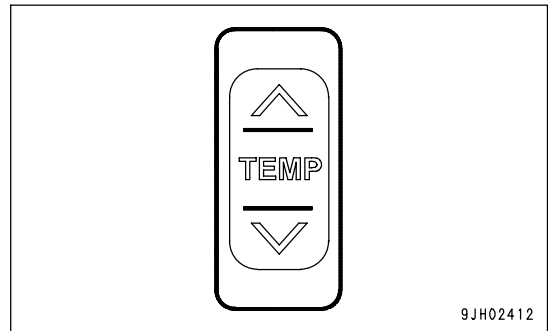
The air conditioner can be operated automatically or manually. Select the method of operation as desired.

Automatic Operation

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

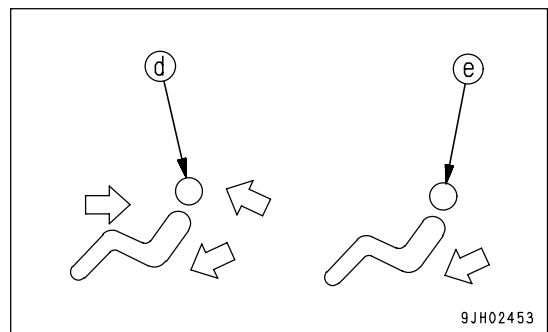


2. Use temperature set switch (3) to set to the desired temperature. The air flow, combination of vents, and selection of fresh or recirculated air is automatically selected according to the set temperature, and the air conditioner is operated automatically to provide the set temperature.



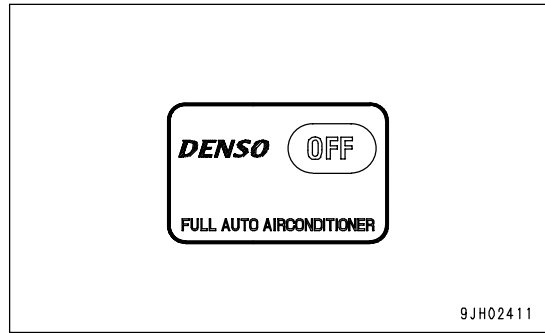
REMARK

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



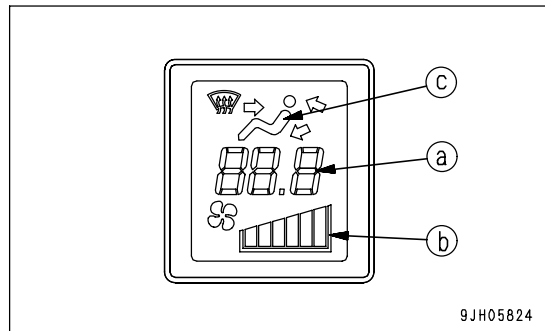
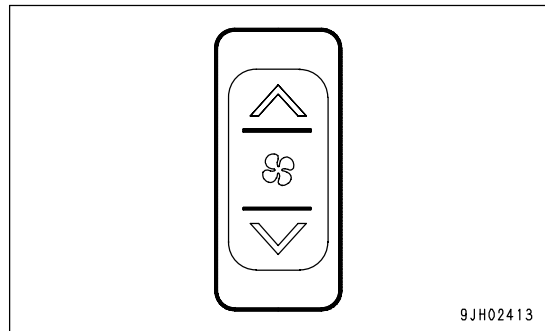
Stopping Automatic Operation

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

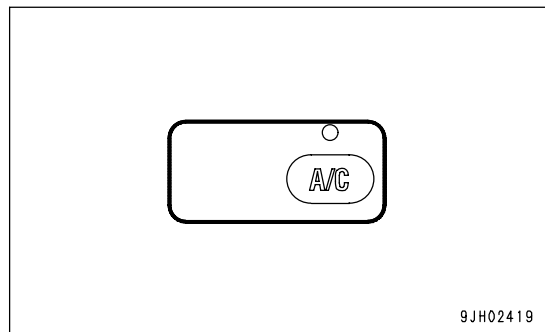


Manual Operation

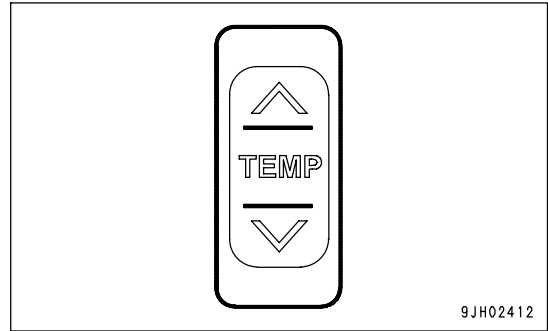
1. Press fan switch (2) and adjust the air flow. When doing this, check that temperature setting (a) and air flow (b) are displayed on monitor (7).



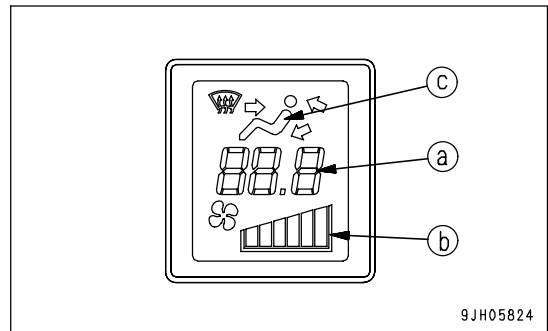
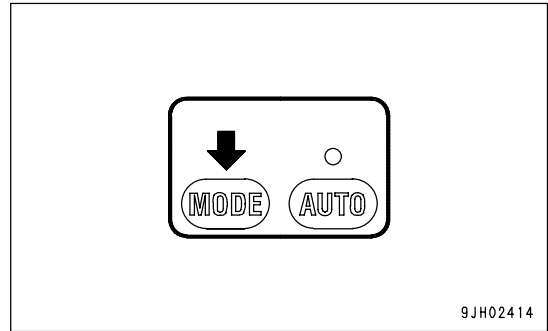
2. Turn air conditioner switch (8) ON. Check that the lamp above air conditioner switch lights up.



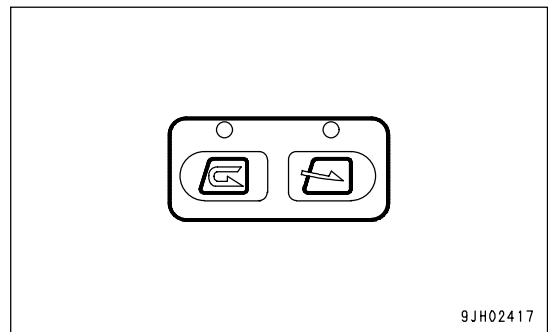
3. Press temperature setting switch (3) and adjust temperature inside the cab.



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

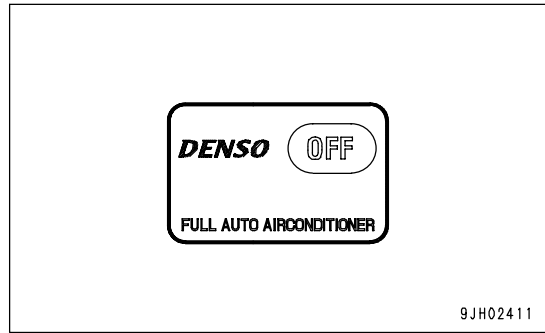


5. Press RECIRC/FRESH selector switch (6) and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).



Stopping Manual Operation

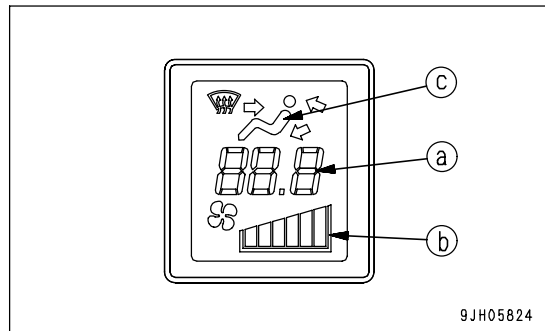
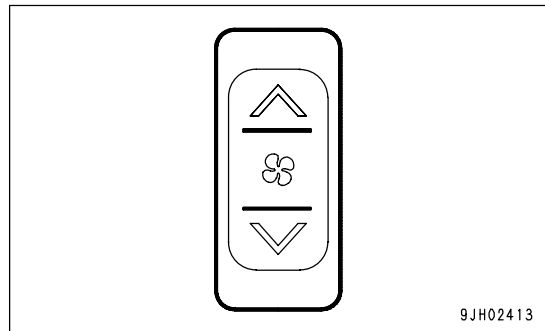
Press OFF switch (1). The displays for temperature setting (a) and air flow (b) on monitor (7), and lamps above auto switch (5) and air conditioner switch (8) go out, the operation stops.



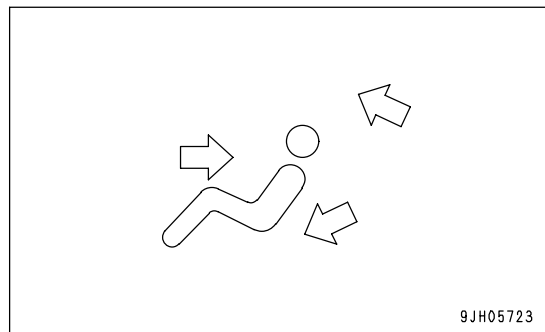
Operation with Cold Air to Face and Warm Air to Feet

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

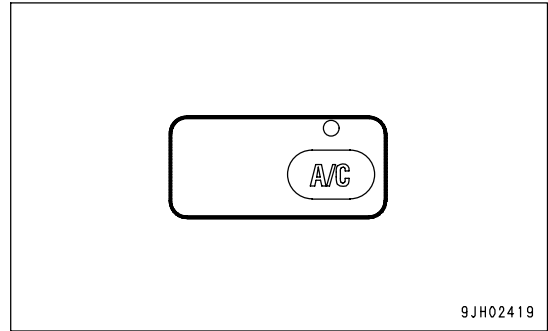
1. Press fan switch (2) and adjust the air flow. When doing this, check that temperature setting (a) and air flow (b) are displayed on monitor (7).



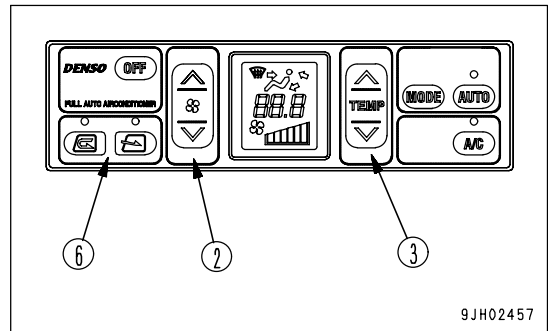
2. Press vent selector switch (4) and set the vent display on the display monitor (C) to the display shown in the diagram on the right.



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

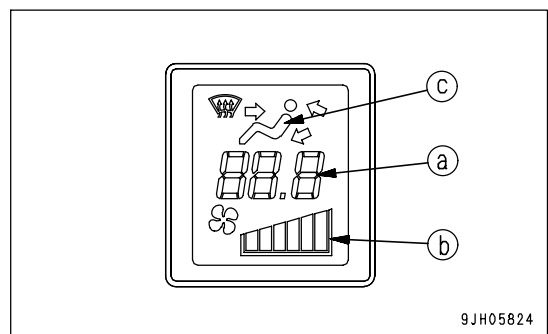
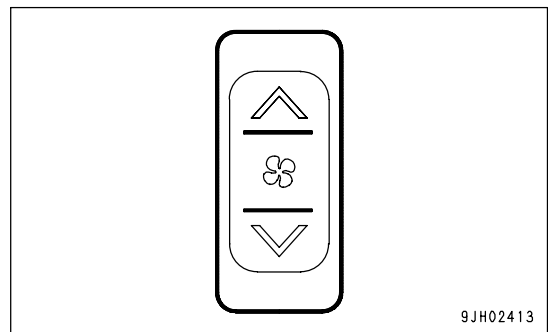


4. Adjust fan switch (2), temperature setting switch (3) and RECIRC/FRESH selector switch (6) to the desired positions.

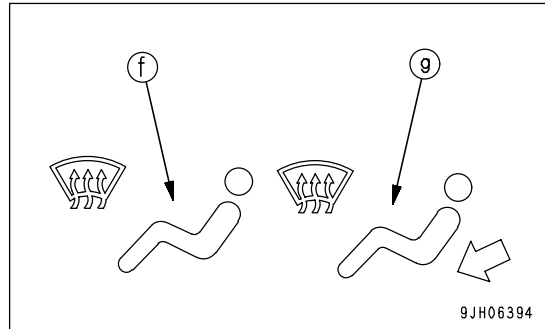
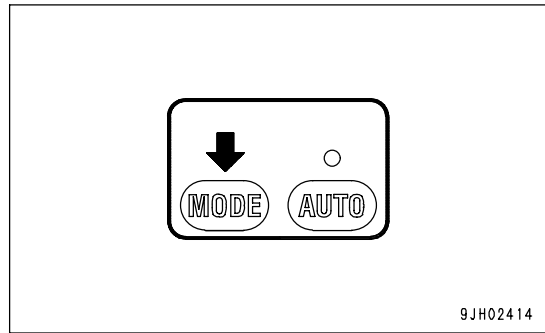


Defroster Operation

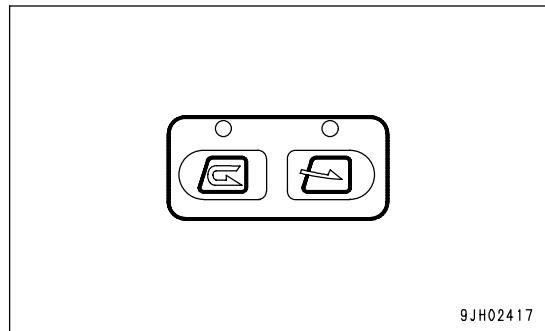
1. Press fan switch (2) and adjust the air flow. When doing this, check that temperature setting (a) and air flow (b) are displayed on monitor (7).



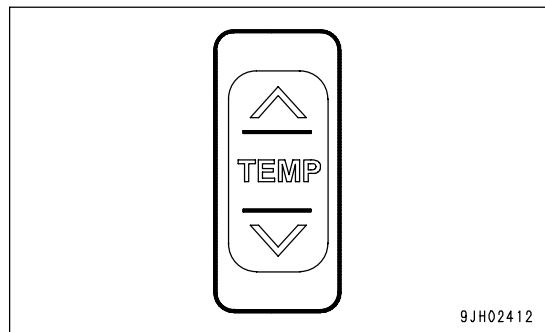
2. Press vent selector switch (4) and set vent display on the display monitor to (f) or (g) as shown in diagram on the right.



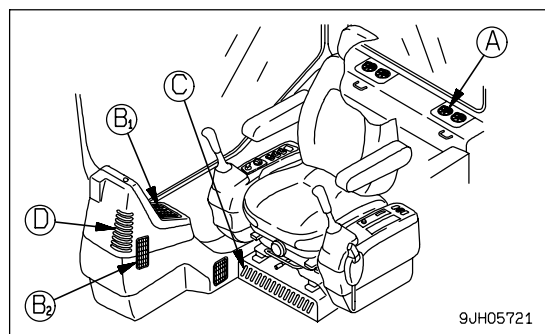
3. Press RECIRC/FRESH selector switch (6) and set it to take in fresh air.



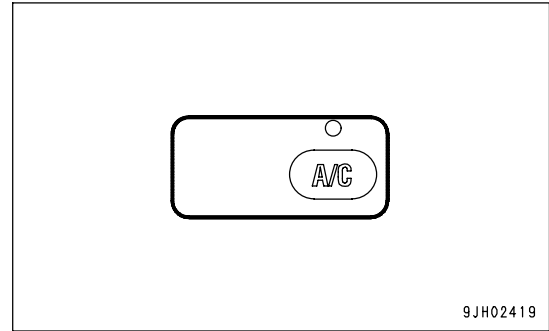
4. Press temperature setting switch (3) and set temperature on the display (7) monitor to maximum heating.



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.



Use Air Conditioner with Care

NOTICE

- 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 display its full effect, always keep the sunlight sensor clean and do not leave anything around the sunlight sensor that may interfere with its sensor function.

Ventilation

- 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.
- When running the air conditioner for a long time, turn the lever to the FRESH position once an hour to carry out ventilation and cooling.

Temperature Control

When the cooler is on, set the temperature so that it feels slightly cool when entering the cab (5 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

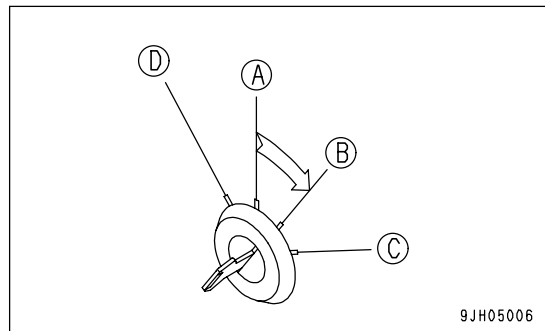
When carrying out an inspection and maintenance of a machine equipped with air conditioner, see "CHECK AND MAINTENANCE AIR CONDITIONER (PAGE 4-36), CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST (PAGE 4-54), CLEAN AIR CONDITIONER FRESH/RECIRC FILTERS (PAGE 4-62)" and follow the instruction on the table.

Other Functions

Self-diagnostic Function

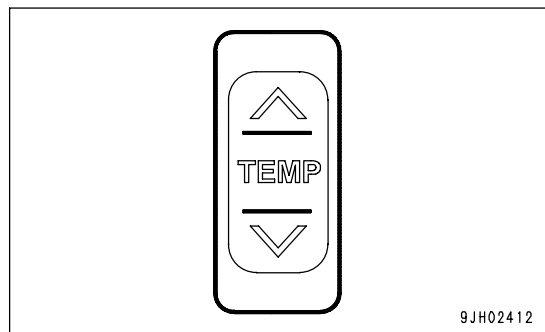
It is possible to perform troubleshooting of various sensors and equipment used on the air conditioner.

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



<Monitor display and failure mode>

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



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

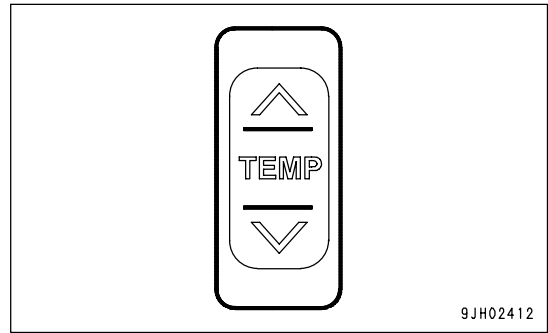
If any problem is detected by the self-diagnostic function, contact your Komatsu distributor to perform inspection and repair.

Function to Switch Set Temperature Display Between Fahrenheit and Celsius

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

If the "∨" and "∧" portions of temperature setting switch (3) are pressed at the same time for more than 5 seconds while the fan is running, the temperature display will switch between °F and °C.

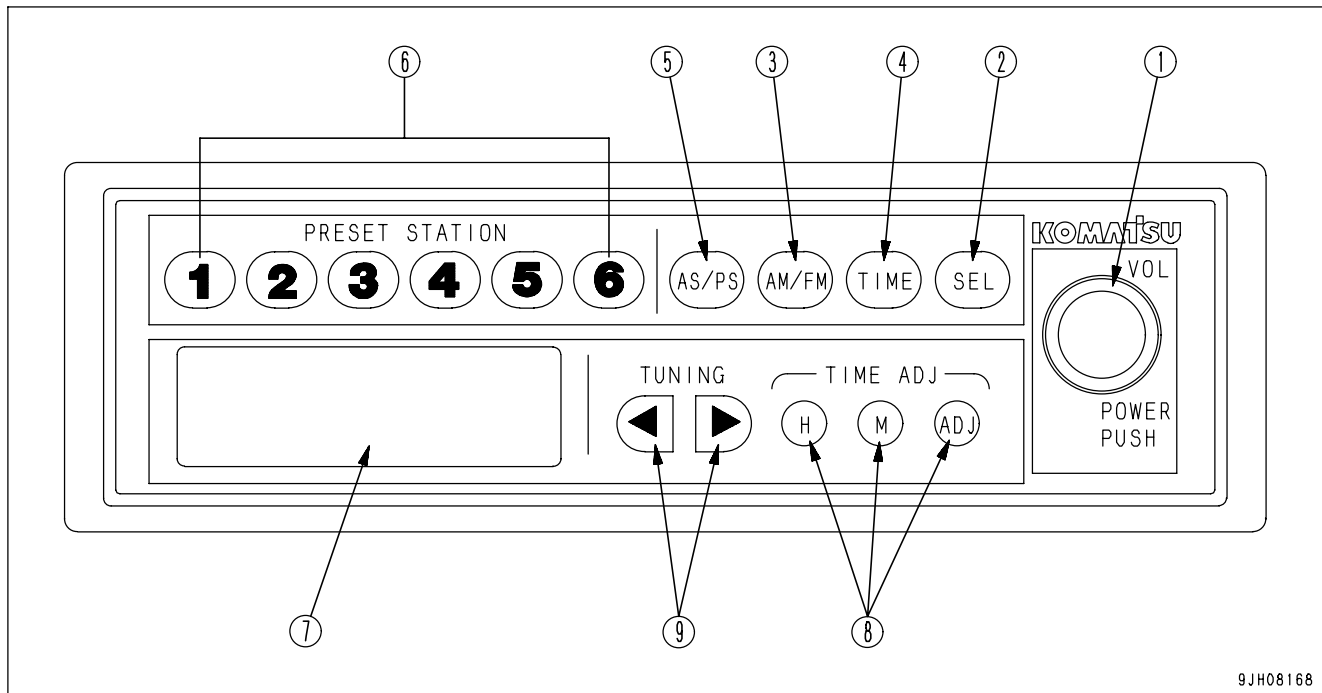
(Note that the unit is not displayed.)



	Liquid crystal display range
°C	18.0 to 32.0
°F	63 to 91

RADIO

Control Panel



9JH08168

- | | |
|---|--|
| (1) Power switch, Volume control knob, Balance control knob | (5) AS/PS button |
| (2) SEL button | (6) Preset station buttons (1,2,3,4,5,6) |
| (3) FM/AM selection button | (7) Display |
| (4) Display selection button | (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 3-51)".

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 . . .

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 3-51)".

AS/PS button

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

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

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

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

For details of the method of presetting the stations, see "Method of Setting with Preset Button (PAGE 3-50)".

Display

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

Time Reset Button

Use this button (8) when adjusting the time. For details of the method of adjusting the time, see "Setting Correct Time (PAGE 3-51)".

H: Hour

M: Minute

ADJ: Sets to 00 minutes

Tuning Button (TUNING)

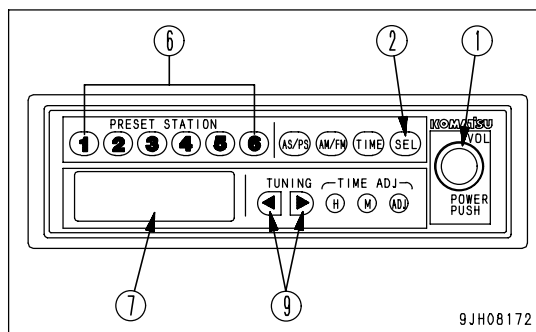
Use this button (9) to change the frequency.

For further details, see "Method of Tuning (PAGE 3-50)"

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.

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) is 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)

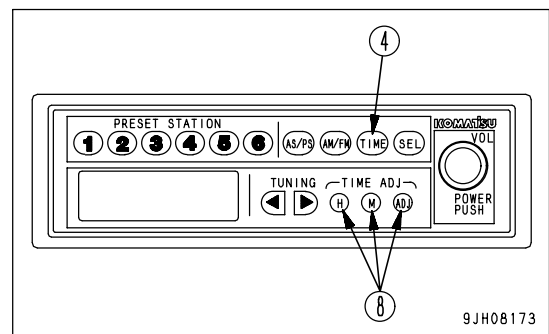
Example

10:05 → 10:00

10:59 → 11:00

10:26 → 10:26

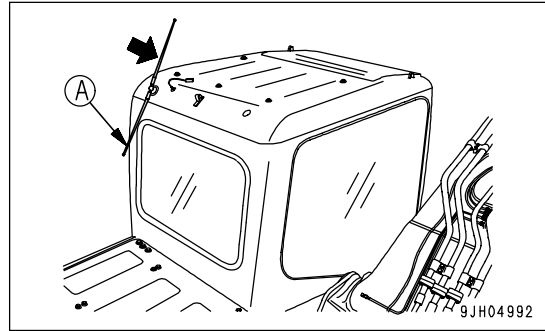
Use the H, M, and ADJ buttons to set to the correct time.



Antenna

NOTICE

Before transporting the machine or putting it inside a building, stow the antenna at position (A) to prevent any interference.



Use Radio with Care

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

AUXILIARY ELECTRIC POWER

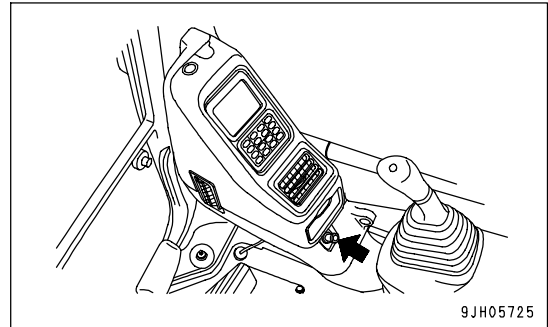
24V power source

NOTICE

Do not use this as the power source for 12 V equipment.

Pull out the connector plug for taking out electric power from the rear side of the panel.

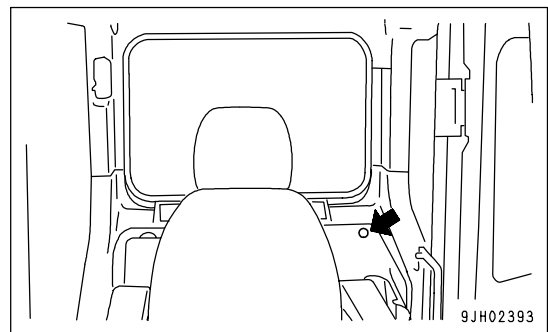
Maximum usable electric power is 85 W (24 V x 3.5 A).



12V power source

(if equipped)

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



FUSE

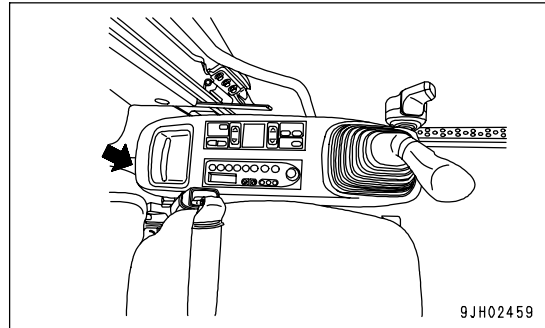
NOTICE

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

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

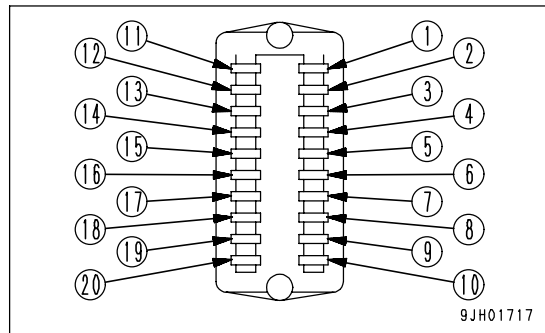
If the fuse becomes corroded, or white powder can be seen, or the fuse is loose in the fuse holder, replace the fuse.

Replace the fuse with another of the same capacity.



Fuse Capacities and Circuit Names

No.	Fuse	Circuit name
(1)	10A	Controller
(2)	20A	Solenoid valve
(3)	10A	PPC oil pressure lock solenoid
(4)	10A	Window washer, Cigarette lighter
(5)	10A	Horn
(6)	10A	Spare fuse
(7)	10A	Revolving warning lamp
(8)	10A	Light relay
(9)	10A	Radio, Speaker, Left knob switch
(10)	10A	Spare fuse
(11)	20A	Air conditioner unit
(12)	20A	Monitors, Wiper monitor
(13)	20A	Light, Light relay drive
(14)	10A	OPT power supply (1)
(15)	10A	OPT power supply (2), Travel alarm, 12V power supply (if equipped)
(16)	10A	Radio backup
(17)	10A	Monitor (normal power source)
(18)	10A	Starting switch
(19)	10A	Room lamp
(20)	10A	Spare fuse



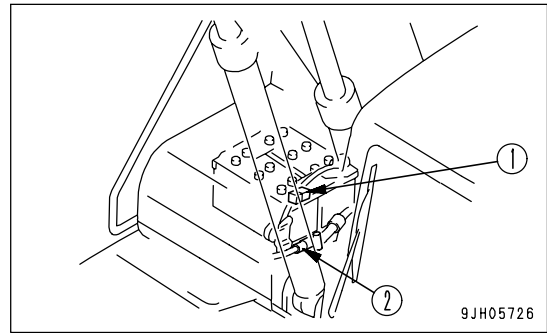
FUSIBLE LINK

If the starting motor does not turn when the starting switch is turned to the START position, there is probably a disconnection in fusible link (1) or (2). Open the battery box cover on the right side of the chassis, then check and replace the fusible link.

(1): Fusible link for 24V power supply

(2): Fusible link for 24V permanent power supply

Fusible links (1) and (2) are wound with tape to the nearby wiring harness. Check the wiring harness number before carrying out inspection and replacement.



REMARK

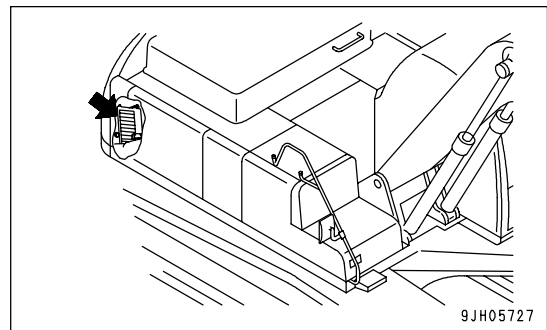
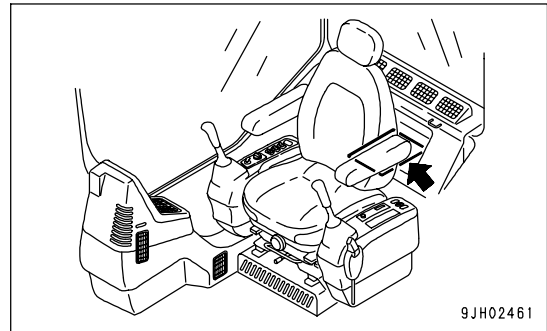
A fusible link refers to the large-sized fuse wiring installed in the high current flow portion of the circuit to protect electrical components and wiring from burning, in the same way as an ordinary fuse.

CONTROLLER

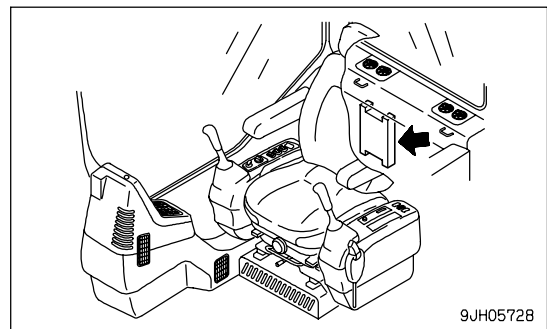
Controller installed.

NOTICE

- Be careful not to get water, mud, or juice on the controller. This will cause failure.
 - The engine controller has been given moisture prevention treatment, so there is no problem if rain gets on it, but do not spray it with water when washing the machine.
 - If any abnormality occurs in the controller, do not disassemble it yourself. Contact your Komatsu distributor for repairs.
- Engine controller
This is inside of the cover at the rear right side of the chassis.



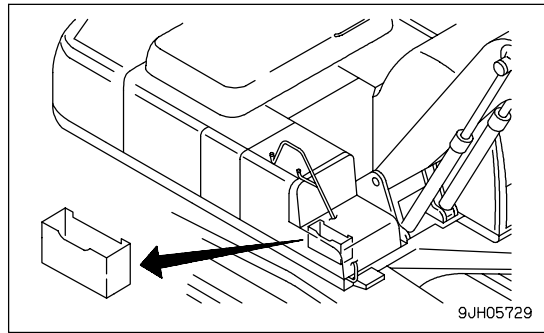
- Pump controller
This is on the right side at the rear of the operator's seat.



TOOL BOX

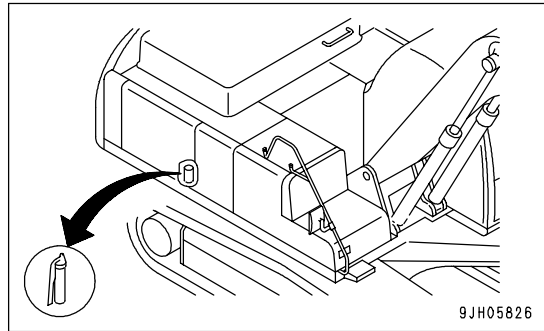
This is used for keeping the tools.

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



GREASE GUN HOLDER

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



ACCUMULATOR

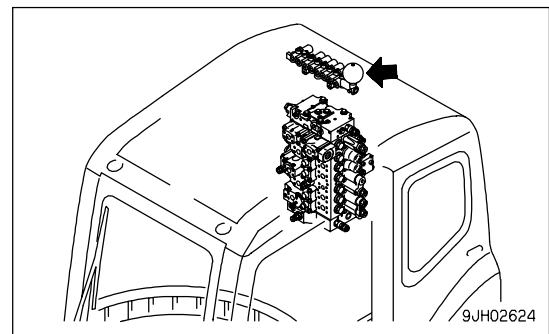
WARNING

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

- Pressure in the control circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that oil spurts out when performing the operation.
- Loosen the bolts slowly.
- Do not disassemble the accumulator.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it or weld it.
- Do not hit it, roll it, or subject it to any impact.
- When disposing of the accumulator, the gas must be released. Contact your Komatsu distributor for proper disposal.

This machine is equipped with an accumulator in the control circuit. The accumulator is a device to store oil pressure for the control circuit. Because an accumulator is installed, the control circuit can be actuated for a short time even after the engine is stopped. As a result, if the control lever is moved in the LOWER direction, the work equipment will go down under its own weight.

The accumulator is installed to the position shown in the diagram on the right.



Releasing Hydraulic Pressure with Accumulator

1. Place the work equipment on the ground. Close the crusher attachment jaws, etc.
2. Stop the engine.
3. Turn the key in starting switch to the ON position.
4. Move lock lever to the free position. Move the work equipment control lever and attachment control pedal to full strokes back and forth, right and left to release pressure in the control circuit.
5. Move the lock lever to the LOCK position. Lock the control lever and attachment control pedal.
6. Turn the key in starting switch to the OFF position.

MACHINE OPERATIONS AND CONTROLS

BEFORE STARTING ENGINE

Walk-around Checks

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



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.

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

1. Check for damage, wear, play in work equipment, cylinders, linkage, hoses
Check for cracks, excessive wear, play in work equipment, cylinders, linkage, and hoses. If any 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 method of removing dirt from the radiator, see "CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS (only machines equipped with air conditioner) (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 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.
5. 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.
6. Check for problems in handrails, steps, loose bolts.
If any problem is found, repair it. Tighten any loose bolts.
7. Check for problem in gauges, 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.
8. Clean, check rear view mirror
Check that there is no damage to the rear view mirror. If it is damaged repair. Clean the surface of the mirror and adjust the angle so that the area at the rear can be seen from the operator's seat.

9. 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.

Checks Before Starting

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

Check Coolant Level, Add Coolant



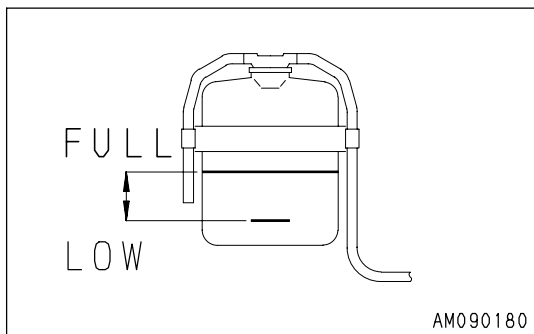
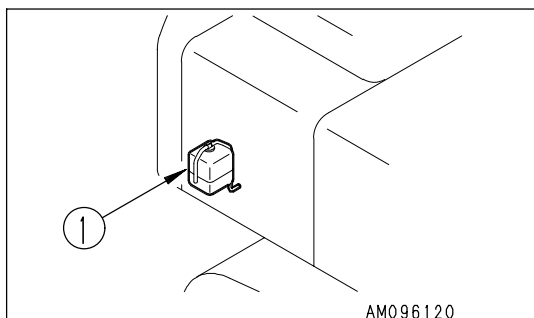
WARNING

- Do not open the radiator cap unless necessary. Wait for the engine to cool down before checking the coolant in 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 before removing it.

1. Open the right rear cover on the machine and check that the cooling water 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.
3. If the sub-tank (1) is empty, there is probably leakage of coolant. After inspecting, repair any problem immediately. If there is no problem, check the coolant level in the radiator. If the coolant level is low, add coolant to the radiator, then fill the sub-tank (1).

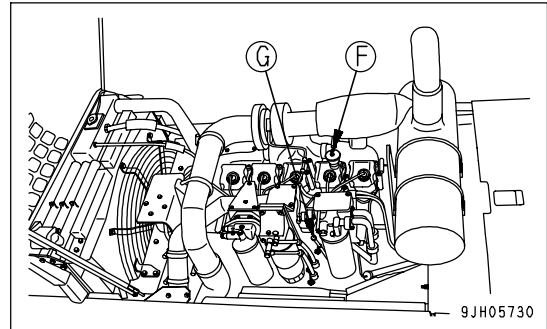


Check Oil Level in Engine Oil Pan, Add Oil

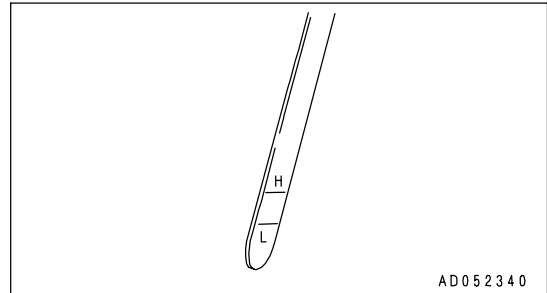
**WARNING**

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

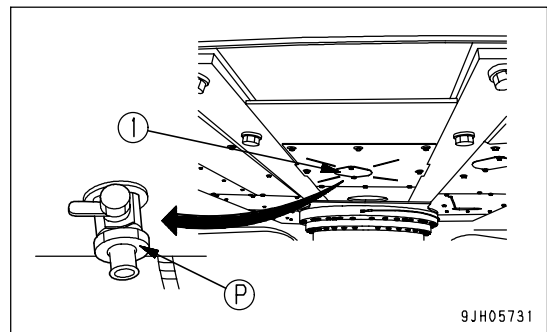
1. Open the engine hood.
2. Remove dipstick (G), and wipe the oil off with a cloth.
3. Fully insert dipstick (G) into filler pipe (F), then remove it.



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 is above the H mark, drain the excessive engine oil from drain plug (P) at the bottom of the engine oil pan, then check the oil level again.
Remove inspection cover (1), then operate drain valve (P) from the inspection window.



6. If oil level is correct, securely tighten the oil filler cap and close the engine hood.

REMARK

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

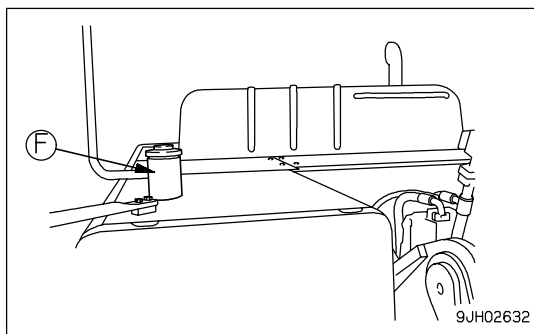
If the machine is at an angle, make it horizontal before checking.

Check Fuel Level, Add Fuel

! WARNING

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

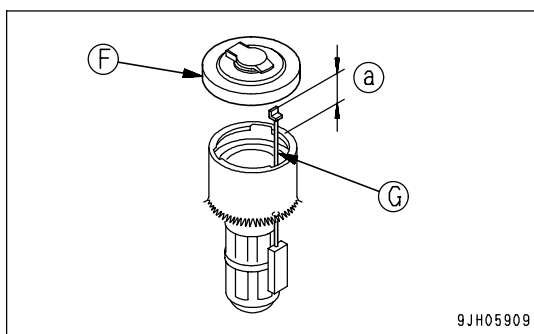
1. Unscrew fuel filler cap (F) on the fuel tank.
2. When fuel filler cap (F) is opened, float gauge (G) comes up in proportion to the remaining fuel level in the tank. Check that the fuel tank is full. Inspect the fuel level both visually and with float gauge (G).



3. If the fuel tank is not full, supply fuel through the fuel filler until float gauge (G) rises to the maximum position. (a: Approx. 50 mm (2 in))

Fuel tank capacity: 650 liters (171.73 US gal)

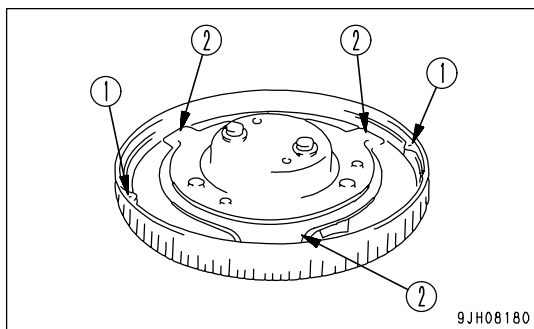
4. When refueling is finished, push float gauge (G) straight down along the fuel filler cap (F), then tighten fuel filler cap (F) securely, taking care so that float gauge (G) will not get caught on claw (2) of the cap.



REMARK

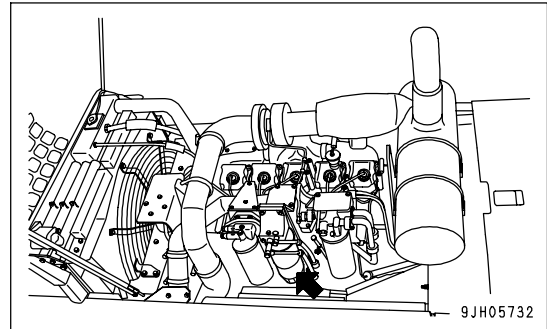
If breather hole (1) in the cap is clogged, the pressure inside the tank will go down and no fuel will be supplied, so clean the breather hole periodically.

- The diagram on the right shows the rear surface of the cap.

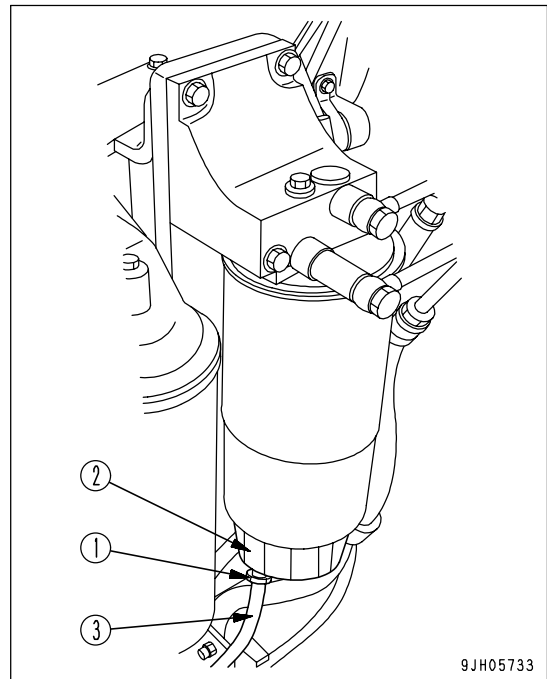


Check for Water and Sediment in Water Separator, Drain Water (Machines equipped with additional fuel filter cartridge)

1. Open the engine hood.
The water separator is at the bottom and forms one unit with the additional fuel filter.



2. It is possible to judge the water level and amount of sediment by looking through transparent cap (2). If there is any water or sediment collected at the bottom, set a container to catch the drain water under drain hose (3).
3. Loosen plug (1) and drain the water.
4. When fuel comes out from drain hose (3), tighten plug (1) immediately.
Tightening torque: 0.2 to 0.45 N·m (0.02 to 0.046 kgf·m, 0.1 to 0.3 lbf·ft)

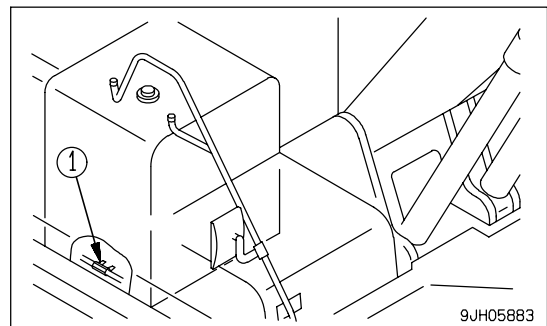


Drain Water And Sediment from Fuel Tank

1. Prepare a container to catch the fuel that is drained.
2. Open valve (1) at the bottom of the tank and drain the sediment and water that has accumulated at the bottom together with fuel. When doing this, be careful not to get fuel on yourself.
3. When only clean fuel comes out, close drain valve (1).

NOTICE

- Never use trichlene for washing the inside of the tank. Use diesel fuel only.



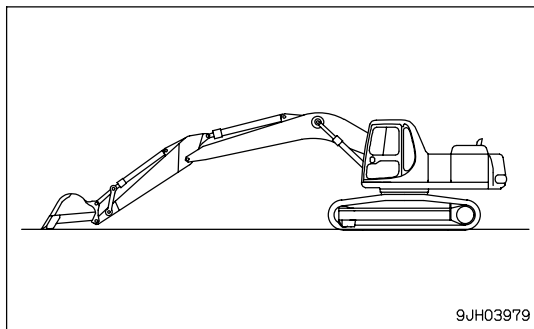
Check Oil Level in Hydraulic Tank, Add Oil



WARNING

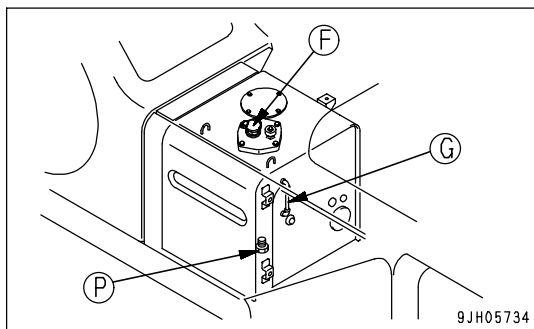
- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Set the work equipment in the posture shown in the diagram on the right, then check the oil level and add oil if necessary.
2. If the work equipment is not in the condition shown in the diagram on the right, start the engine, run the engine at low speed, retract the arm and bucket cylinder rods fully, then lower the boom, set the bucket teeth in contact with the ground, and stop the engine.
3. Within 15 seconds after stopping the engine, move each control lever (for work equipment and travel) to the full stroke in all directions to release the internal pressure.
4. Check sight gauge (G). The oil level should be between the H and L marks.



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 to above the H level, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from drain plug (P).



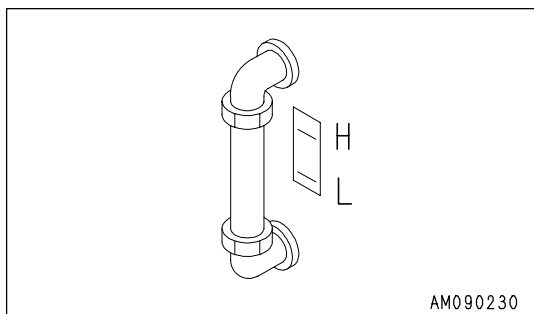
5. If the level is below the L mark, add oil through oil filler (F) at the top of the hydraulic tank.

REMARK

The oil level will vary depending upon the oil temperature.

Accordingly, use the following as a guide:

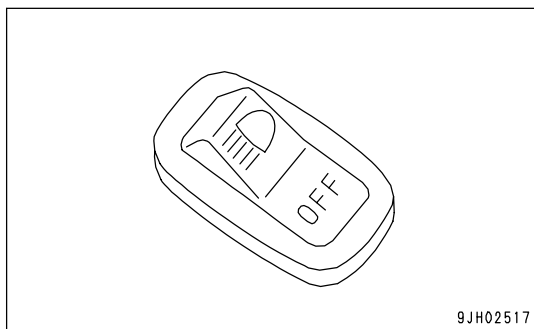
- Before starting operation: Between H and L levels
(Oil temperature 10 to 30°C (50 to 86°F))
- Normal operation: Around H level
(Oil temperature 50 to 80°C (122 to 176°F))



Check Working Lamp Switch

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

If the lamps do not light up, there is probably a broken bulb or disconnection in the wiring, contact your Komatsu distributor for repairs.



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 Function of Horn

1. Turn 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.

Adjustment

Seat Adjustment



WARNING

When adjusting the position of the operator's seat, always set the lock lever to the LOCK position to prevent any accidental contact with the control levers.

- Always adjust the operator's seat before starting each operation or when the operators change shift.
- Adjust the operator's seat so control levers and switches can be operated freely and easily with the operator's back against the backrest.

(A) Fore-and-aft adjustment

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

Fore-and-aft adjustment: 160 mm (6.3 in) (16 stages)

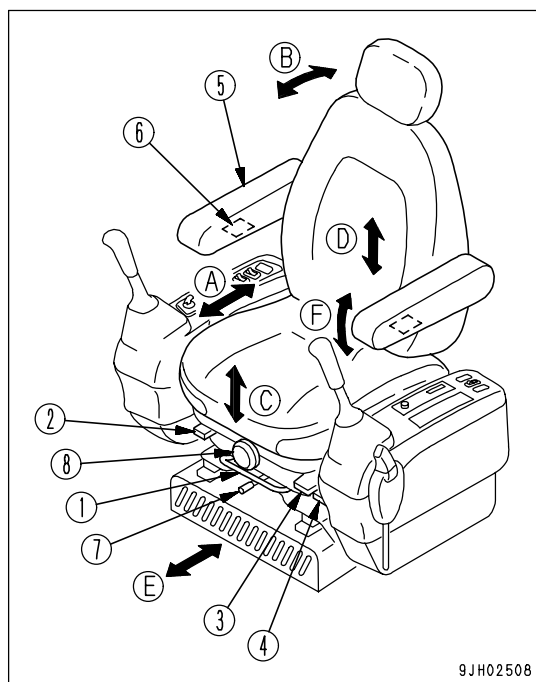
(B) Adjusting reclining

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.



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(C) Adjusting seat tilt

- Forward tilt

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

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

- Rear tilt

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

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

Amount of tilt: Up 13°, down 13°

- Adjusting seat height

It is possible to move the seat up or down by combining adjustments forward tilt and rear tilt.

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

Height adjustment: 60 mm (2.4 in)

(D) Adjusting armrest angle

Armrest (5) can be made to spring up by hand approx. 90°.

In addition, by turning the bottom (6) of the armrest by hand it is possible to make fine vertical adjustments of the armrest angle.

Armrest adjustment angle: 25°.

REMARK

- If the seat back is tipped to the front without raising the armrest(5), armrest will rise automatically.
- If the cable at the rear of armrest (5) is tense (when the seat back is tipped to the front), armrest (5) cannot be adjusted by turning dial (6). When adjusting the angle of armrest (5), set the seat back to a position where it is easy to carry out operations, then adjust the armrest.

(E) Overall fore-and-aft adjustment of seat

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

Fore-and-aft adjustment:180 mm (7.1 in) (9 stages)

(F) Adjusting suspension

Turn knob (8) to the right to make the suspension harder, or to the left to make the suspension softer. Adjust the reading of the dial to match the operator's weight and select the optimum suspension.

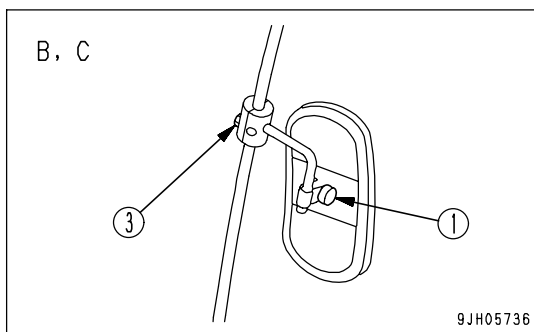
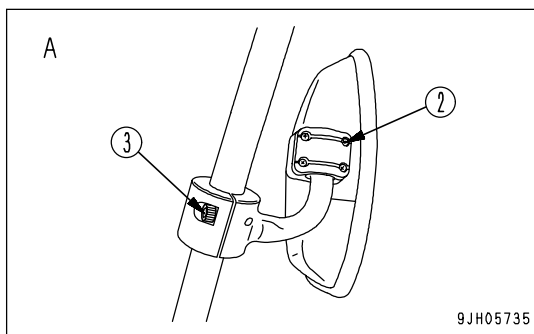
REMARK

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

Rearview Mirrors

Loosen nuts (1), screw (2) and bolt (3) of the mirror and adjust the mirror to give the best view of the blind spots behind the operator's cab on the left and right rear sides.

- A: Mirror on right side of machine
- B: Mirror on left side of machine
- Adjust the mirror mount so that it is possible to see people (or objects with a height of 1 m (3.3 ft) or a diameter of 30 cm (12 in)) at the rear left and right of the machine
- Install the mirror to the dimensions listed in the table below. Recognition areas are also shown in the table for reference.



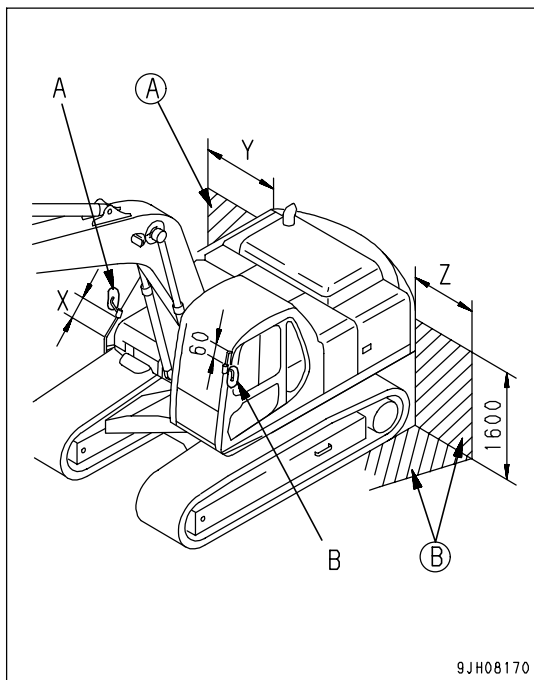
Mounting position X : 40 mm (1.6 in)

Range of view Y (right side) : 2800 mm (9 ft 2 in)

Range of view Z (left side) : 2400 mm (7 ft 10 in)

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

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



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 operations.
- Fit the seat belt so that it is not twisted.

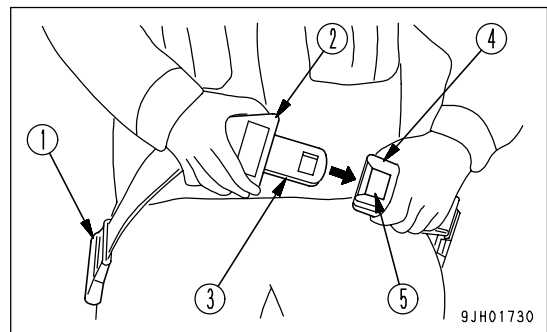
Fastening and Removing

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, hold grip (2) and return the belt slowly to wind-in device (1).

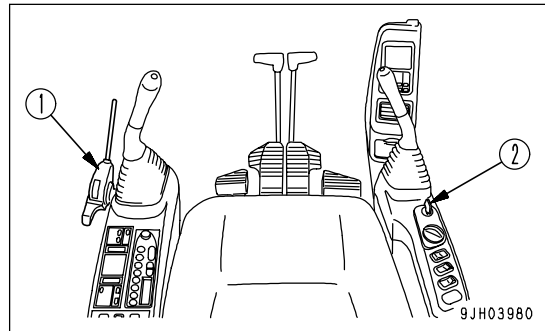
Operations Before Starting Engine



WARNING

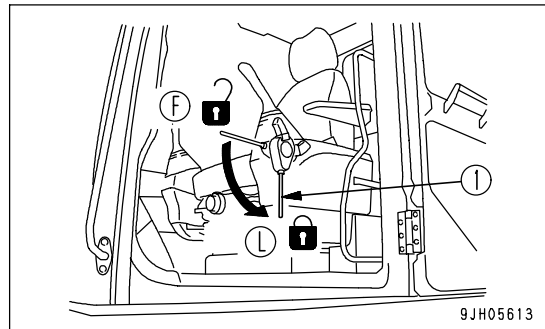
When starting the engine, check that the lock lever is securely at the LOCK position (L).

If the control levers are not locked and they are touched by accident when starting the engine, the work equipment may move unexpectedly, and this may lead to a serious accident.

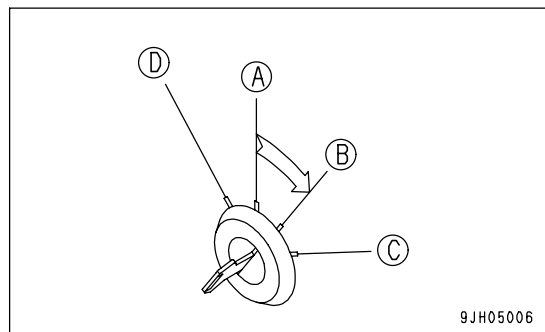


1. Check that lock lever (1) is at the LOCK position (L).

2. Check the position of each lever.
Set control lever to 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.



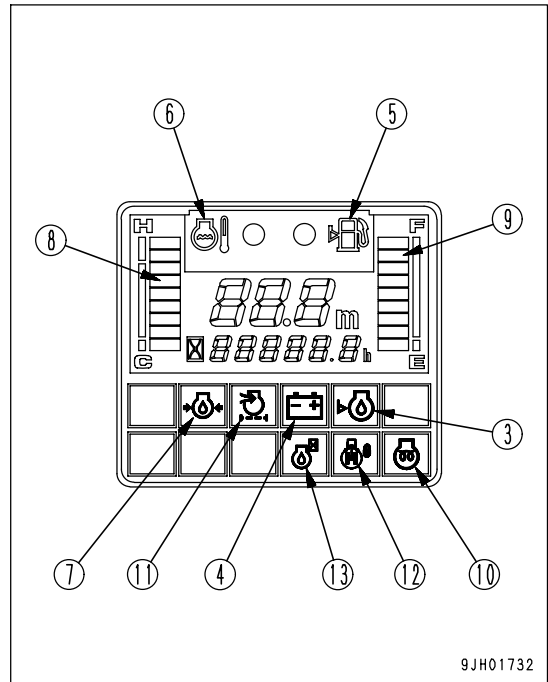
1) The buzzer will sound for approx. 1 sec, and the following monitors and gauges will light up for approx. 3 sec.

- Engine oil level monitor (3)
- Charge level monitor (4)
- Fuel level monitor (5)
- Engine coolant temperature monitor (6)
- Engine oil pressure monitor (7)
- Engine coolant temperature gauge (8)
- Fuel gauge (9)
- Engine pre-heating monitor (10)
- Air cleaner clogging monitor (11)
- Swing lock monitor (12)
- Engine oil change monitor (13)

If the monitors or gauges do not light up or the buzzer does not sound, there is probably a blown bulb or disconnection, please contact your Komatsu distributor for repair.

After approx. 3 seconds, the following monitors and gauges will stay lighted up; the other monitors and gauges will go out.

- Charge level monitor (4)
- Engine oil pressure monitor (7)
- Engine coolant temperature gauge (8)
- Fuel gauge (9)



9JH01732

STARTING ENGINE

Normal Starting

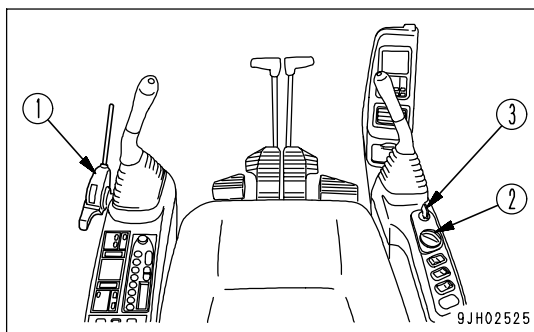


WARNING

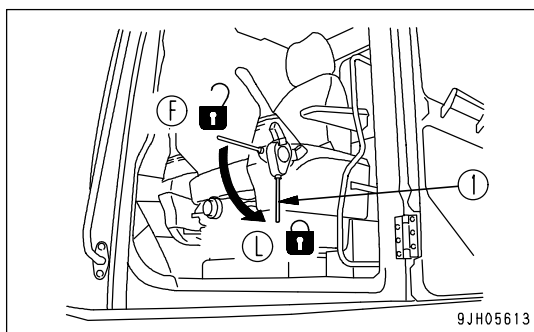
- Sit down in the operator's seat before starting the engine.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause serious bodily injury or fire.
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start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

NOTICE

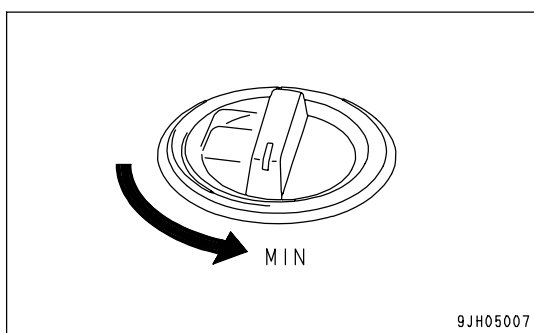
- Before starting the engine, check that the fuel control dial is at the low idle (MIN) position.
If the fuel control dial is at the FULL position, the engine will accelerate suddenly and cause damage to the engine parts.
- Do not crank the starting motor continuously for more than 20 seconds.
If the engine does not start, wait for at least 2 minutes before trying again.



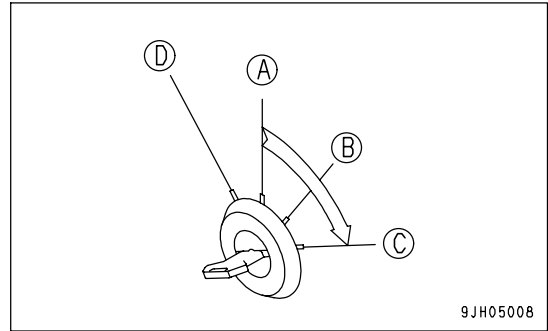
1. Check the lock lever (1) is in the LOCK position (L). If the lock lever is in the FREE position (F), the engine does not start.



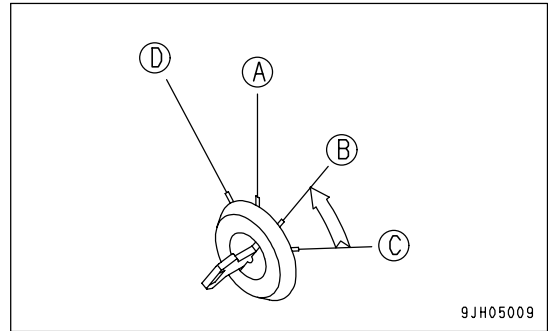
2. Set fuel control dial (2) at the low idle (MIN) position.
If it is at the high idle (MAX) position, always change it to the low idle (MIN) position.



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



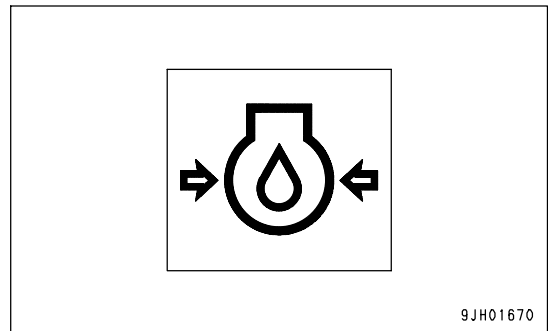
- After the engine starts, release the key in starting switch (3).
The key will automatically return to the ON position (B).



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

NOTICE

If the engine oil pressure monitor does not go out even after 4 to 5 seconds have passed, stop the engine immediately. Check the oil level, check for leakage of oil, and take the necessary action.



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.

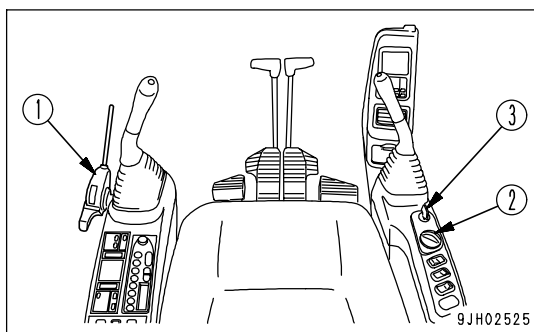
NOTICE

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

If the fuel control dial is at the FULL position, the engine will accelerate suddenly and cause damage to the engine parts, set it to an intermediate or low speed position.

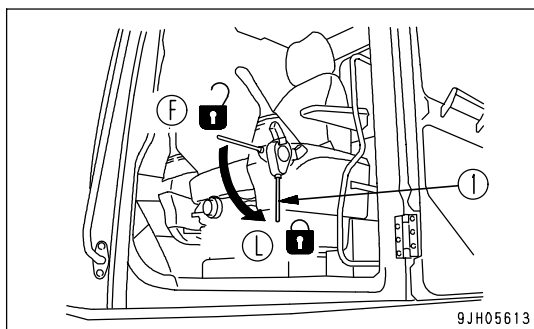
- Do not keep the starting motor rotating continuously for more than 20 seconds.

If the engine fails to start, wait for about 2 minutes and repeat from Step 2.

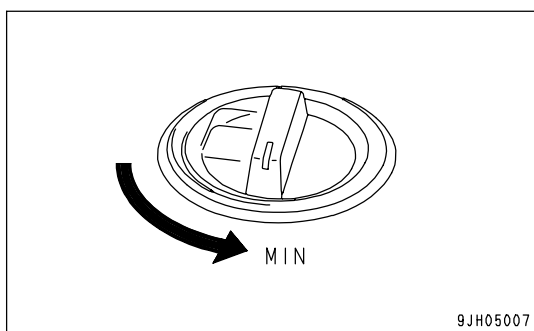


When starting in low temperatures, do as follows.

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



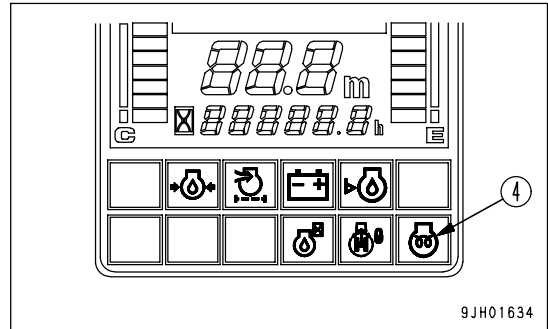
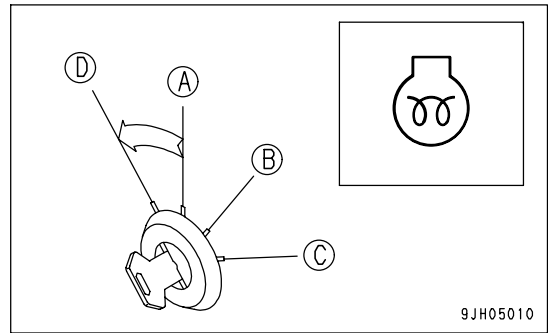
2. Set fuel control dial (2) at a low idle (MIN) position.
Do not set fuel control dial (2) at the high idle (MAX) position.



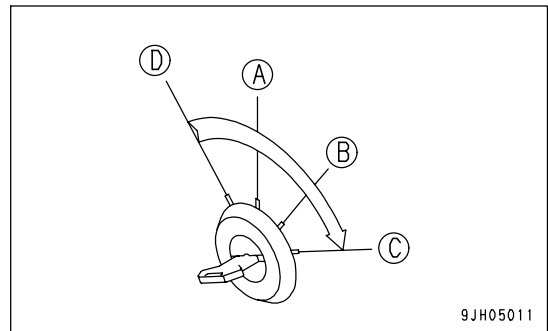
3. Hold the key in starting switch (3) in the HEAT position (D), and check that engine pre-heating monitor (4) lights up. After about 30 seconds, engine pre-heating monitor lamp (4) will flash to indicate that pre-heating is finished.

REMARK

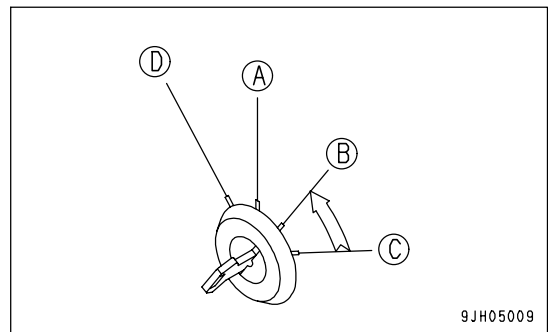
- The monitors and gauges will light up also when the key is turned to the HEAT position, but this is not a problem.
- If the temperature is low, the monitor screen may become dark or it may take time for the display to appear, but this is not a problem.



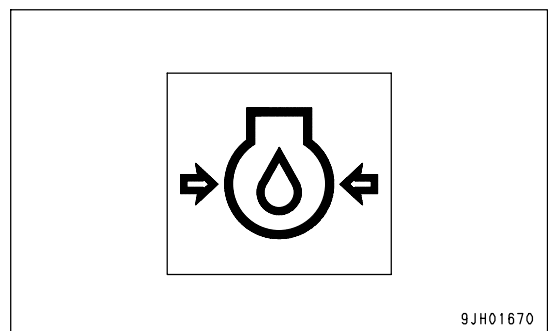
4. When engine pre-heating monitor (4) flashes, turn the key in starting switch (3) to the START position (C) to start the engine.



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



6. After starting the engine, do not touch the work equipment control lever or travel pedal while the engine oil pressure monitor lamp is lighted up.



AFTER STARTING ENGINE



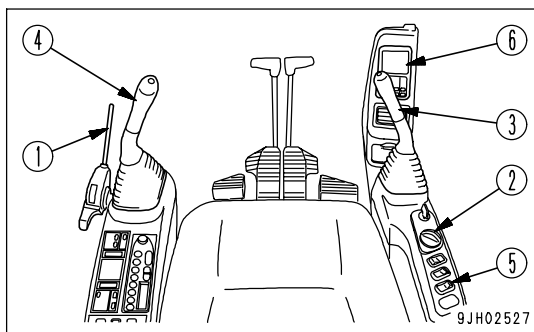
WARNING

- If any trouble occurs, such as sudden stopping or abnormal operation, turn the starting switch to the OFF position.
- If the work equipment is operated without carrying out the warming-up operation properly, the reaction of the work equipment to the operation of the control lever will be slow and the work equipment may not move as the operator intends. To prevent such problems, always be sure to carry out the warming-up operation fully. In cold weather particularly, be extremely careful to carry out the warming-up operation fully.

Warming-up Operation

NOTICE

- When the hydraulic oil is at a low temperature, do not perform operations or move the levers suddenly. Always perform the warming-up operation. This will help extend the machine life. Do not suddenly accelerate the engine before the warming-up operation is completed.
- Do not run the engine at low or high idle continuously for more than 20 minutes. This will cause oil leaks from the turbocharger oil supply piping. If it is necessary to run the engine at idle, apply a load from time to time or run the engine at a mid-range speed.

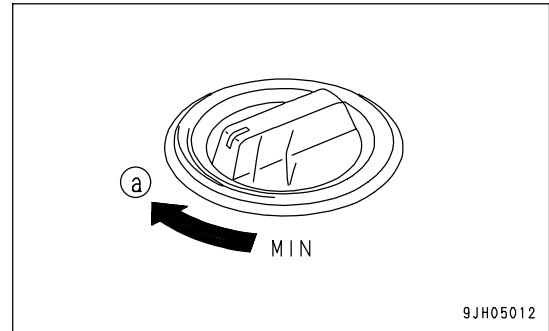


REMARK

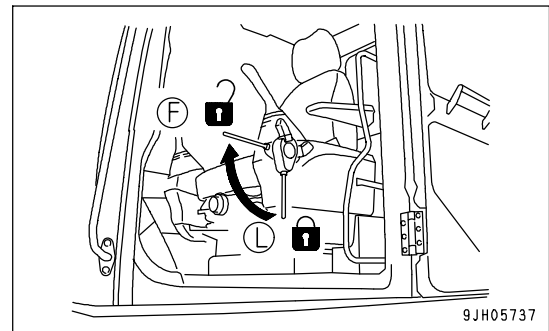
- If the engine coolant temperature is above 30°C (86°F), to protect the turbocharger, the engine speed does not rise for 2 seconds after starting, even if the fuel control dial is turned.
- If the hydraulic oil temperature is low, the hydraulic oil temperature monitor display will be white.

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

1. Turn fuel control dial (2) to center position (a) between the low idle (MIN) and high idle (MAX) positions and run the engine at a mid-range speed under no load until the engine coolant temperature monitor gives a green display.



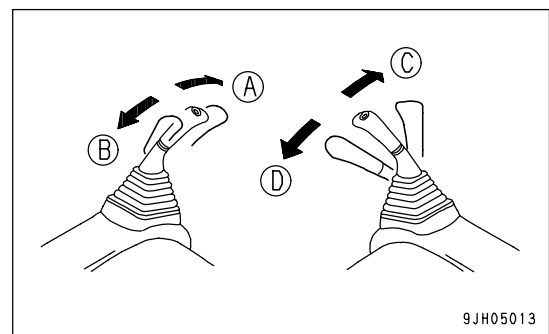
2. Set lock lever (1) slowly and securely to the FREE position (F), then raise the bucket from the ground.



3. Operate bucket control lever (3) and arm control lever (4) slowly to move the bucket cylinder and arm cylinder to the end of the stroke.

4. Operate the bucket for 30 seconds and the arm for 30 seconds in turn fully for 5 minutes.

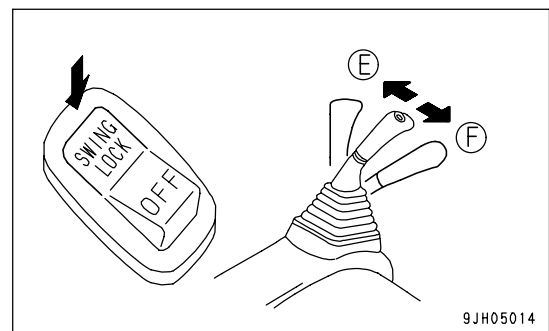
- (A): Arm is pushed out
- (B): Arm is pulled in
- (C): Bucket is pushed out
- (D): Bucket is pulled in



REMARK

If the swing lock switch (5) is set to the ON (actuated) position and swing control lever (4) is operated at full stroke, oil temperature rise can be increased earlier.

- (E): Left swing
- (F): Right swing

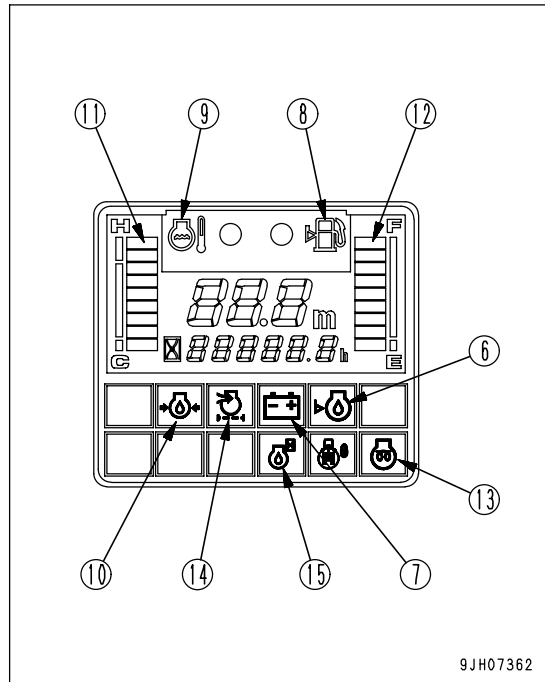


NOTICE

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

5. After the warming-up operation is completed, check that each gauge and monitor lamp is in the following condition:

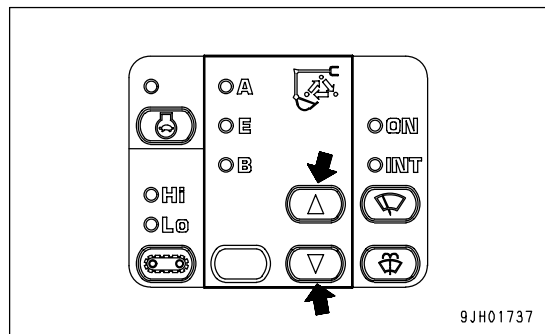
- Engine oil level monitor (6): Is it lighted up?
- Charge level monitor (7): Is it lighted up?
- Fuel level monitor (8): Is it lighted up?
- Engine coolant temperature monitor (9): OFF
- Engine oil pressure monitor (10): ON
- Engine coolant temperature gauge (11): Is it in green range?
- Fuel gauge (12): Is it in green range?
- Engine pre-heating lamp(13): OFF
- Air cleaner clogging monitor (14): OFF
- Engine oil change monitor (15): OFF



9JH07362

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

7. Use the working mode switch on monitor panel (16) to select the working mode to be used.



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In Cold Weather Areas

(AUTOMATIC WARMING-UP OPERATION)

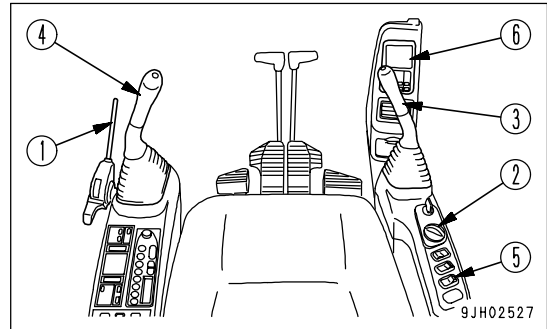
This machine is equipped with an automatic warming-up device.

When the engine is started, if the engine coolant temperature is low (below 30 °C (86 °F)), the warming-up operation is carried out automatically.

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

NOTICE

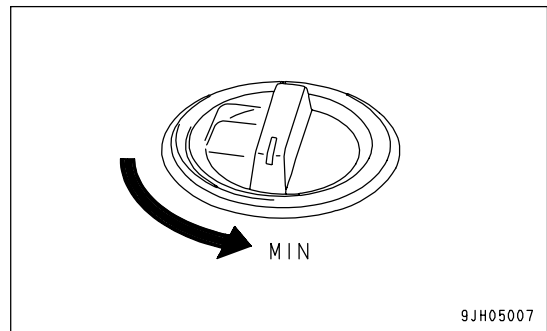
- Do not suddenly accelerate the engine before the warming-up operation is completed.
Do not run the engine at low or high idle continuously for more than 20 minutes. This will cause oil leaks from the turbocharger oil supply piping. If it is necessary to run the engine at idle, apply a load from time to time or run the engine at a mid-range speed.
- Never perform operations or operate the control levers when the hydraulic oil is still a low temperature. Always continue the warming-up operation until the hydraulic oil temperature monitor display is green. This will extend the service life of the machine.



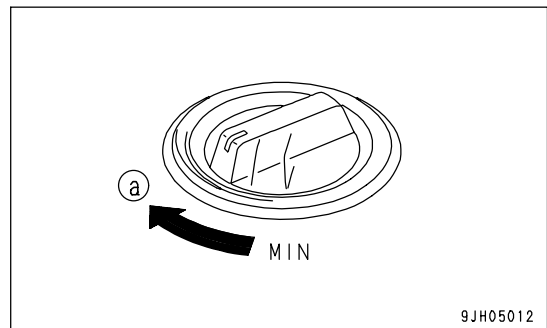
REMARK

If the hydraulic oil temperature is low, the hydraulic oil temperature monitor display will be white.

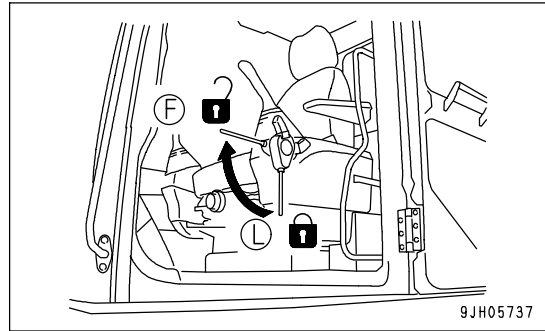
1. Turn fuel control dial (2) to the low idle (MIN) position and run the engine under no load until the engine coolant temperature monitor gives a green display.
2. To raise the hydraulic oil temperature quickly, use the operating mode switch on the machine monitor to set to A mode (heavy-duty operation mode).



3. Turn fuel control dial (2) to the medium speed position (a).

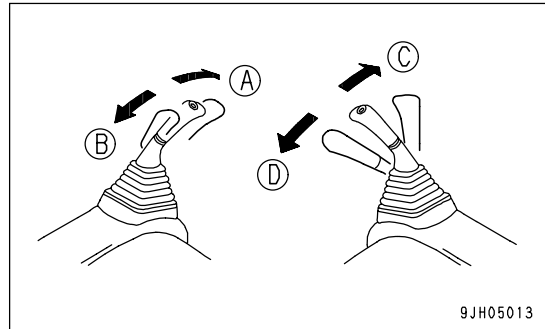


4. Set lock lever (1) slowly and securely to the FREE position (F), then raise the bucket from the ground.



5. Operate bucket control lever (3) and arm control lever (4) slowly to move the bucket cylinder and arm cylinder to the end of the stroke.
6. Operate the bucket for 30 seconds and the arm for 30 seconds in turn fully for 5 minutes.

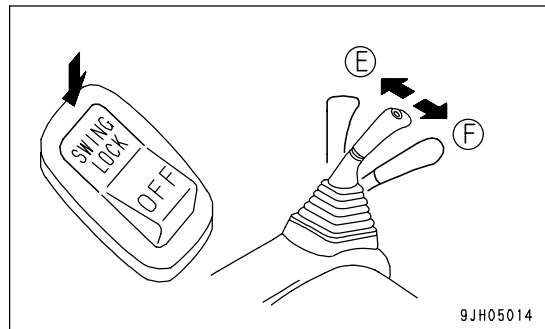
- (A): Arm is pushed out
- (B): Arm is pulled in
- (C): Bucket is pushed out
- (D): Bucket is pulled in



REMARK

If the swing lock switch (5) is set to the ON (actuated) position and swing control lever (4) is operated at full stroke, oil temperature rise can be increased earlier.

- (E): Left swing
- (F): Right swing



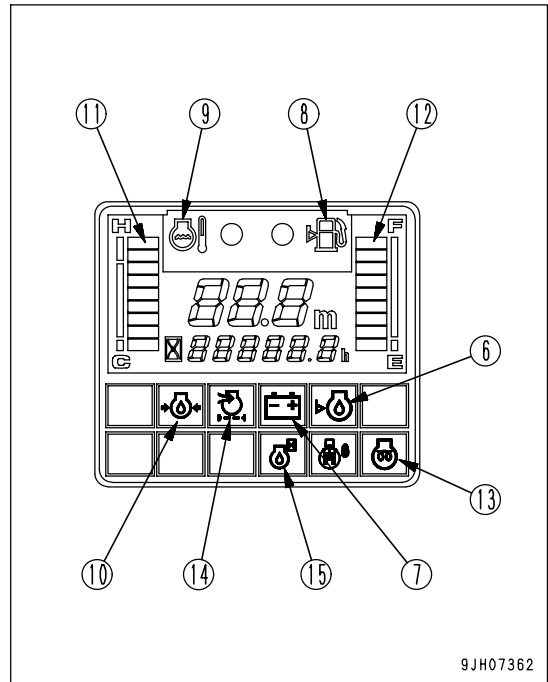
NOTICE

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

7. After the warming-up operation is completed, check that each gauge and monitor lamp is in the following condition:

- Engine oil level monitor (6): Is it lighted up?
- Charge level monitor (7): Is it lighted up?
- Fuel level monitor (8): Is it lighted up?
- Engine coolant temperature monitor (9): OFF
- Engine oil pressure monitor (10): ON
- Engine coolant temperature gauge (11): Is it in green range?
- Fuel gauge (12): Is it in green range?
- Engine pre-heating lamp(13): OFF
- Air cleaner clogging monitor (14): OFF
- Engine oil change monitor (15): OFF

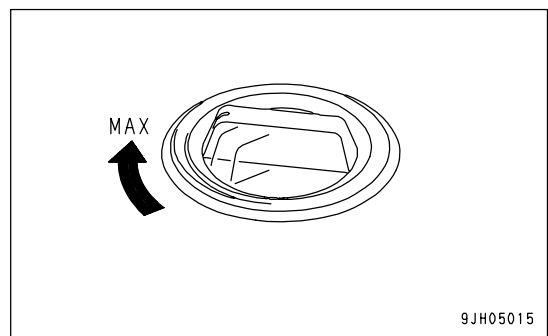
8. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.



9. Turn fuel control dial (2) to the full speed (MAX) position and carry out the operation is Step 5. for 3 to 5 minutes.

10. Repeat the following operation 3 - 5 times and operate slowly.

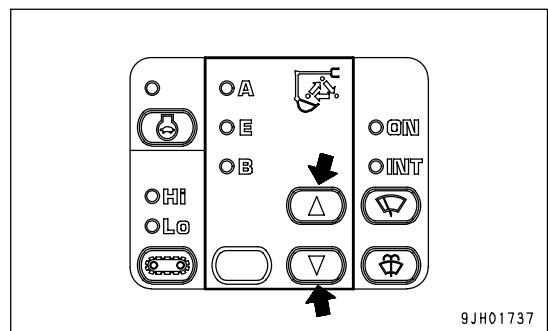
- | | |
|-----------------------|-------------------|
| Boom operation | RAISE ↔ LOWER |
| Arm operation | IN ↔ OUT |
| Bucket operation | CURL ↔ DUMP |
| Swing operation | LEFT ↔ RIGHT |
| Travel (Lo) operation | FORWARD ↔ REVERSE |



REMARK

If the above operation is not carried out, then may be a delay in response when starting or stopping the actuation of the travel, swing, or work equipment.

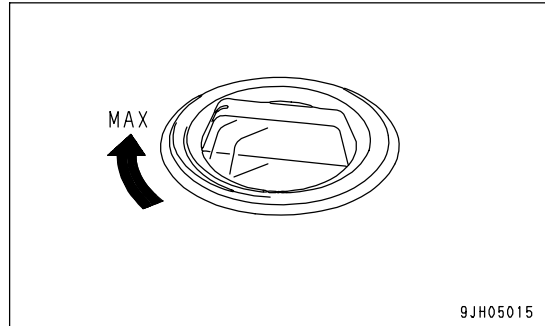
11. Use working mode switch on the monitor panel to select the working mode to be used.



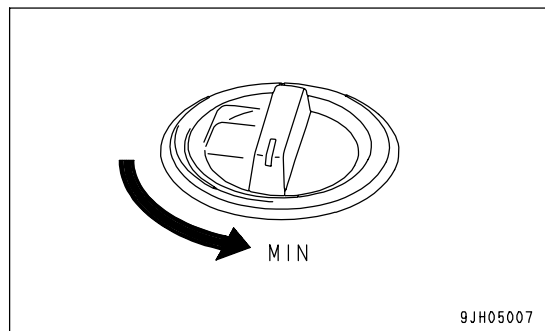
NOTICE**Canceling automatic warm-up operation**

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.

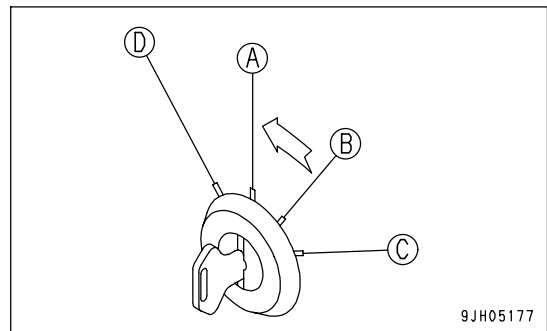
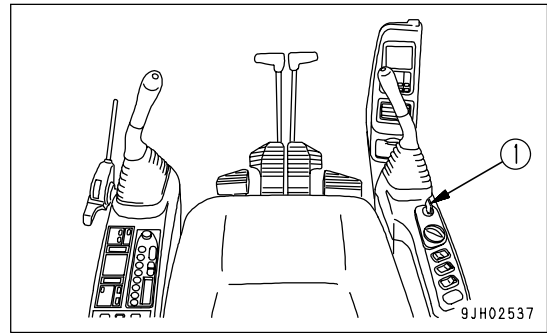


STOPPING THE ENGINE

NOTICE

If the engine is stopped abruptly, service life of component parts of the engine may be considerably reduced. Hence do not stop the engine abruptly except in an emergency. If the engine has overheated, do not try to stop it abruptly. Run it at low idling 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).



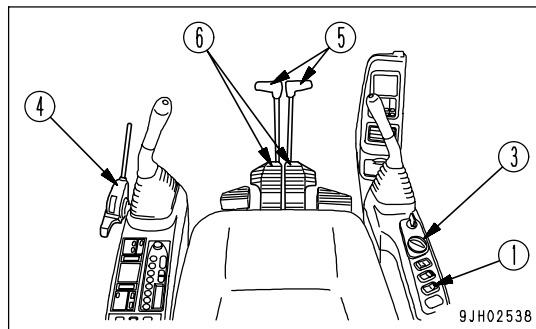
MACHINE OPERATION

Preparations for Moving the Machine

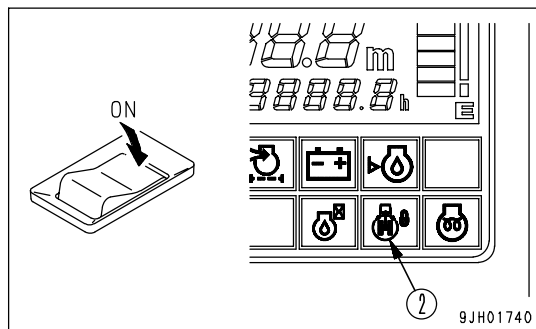


WARNING

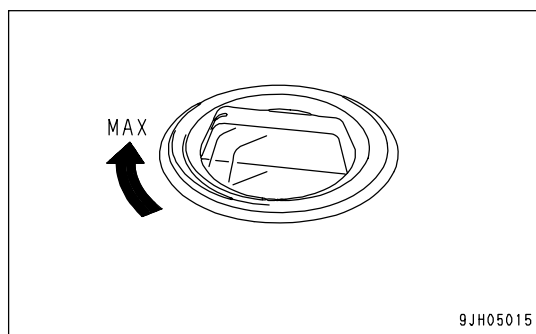
- Before operating the steering levers, check the direction of the track frame.
If the sprocket is at the front, the operation of the travel levers is reversed.
- When moving the machine, check that the area around the machine is safe, and always sound the horn before moving.
- Do not allow anyone in the area around the machine.
- Remove all obstacles from the travel path of the machine.
- The rear of the machine is a blind spot, be extremely careful when traveling in reverse.
- If the lever is moved inside the deceleration range, engine speed will rise suddenly. Operate the levers carefully.
- For machines equipped with a travel alarm, check that the warning equipment works properly.



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

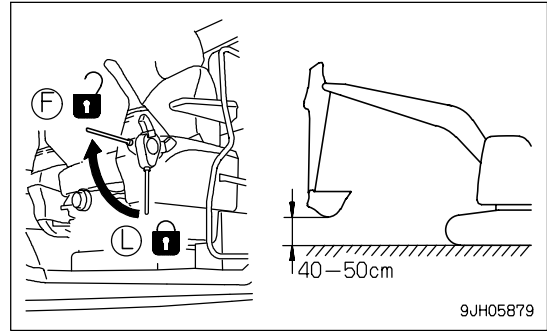


2. Turn fuel control dial (3) towards the full speed position to increase the engine speed.



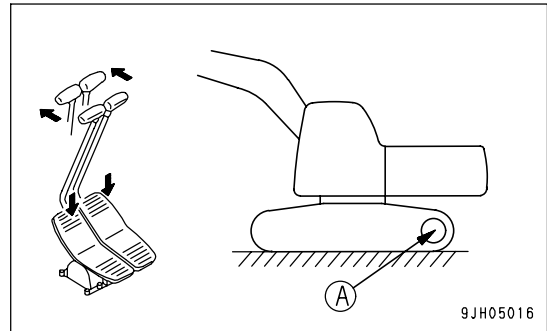
Moving Machine Forward

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.

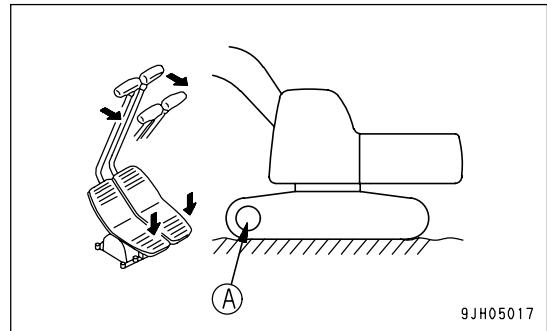


2. Operate the right and left travel levers (5), or the right or left travel pedals (6) as follows:

- When sprocket (A) is at the rear of the machine:
Slowly push the levers (5) forward, or slowly depress the front part of the pedals (6) to move the machine forward.



- When sprocket (A) is at the front of the machine:
Slowly pull the levers (5) backward, or slowly depress the rear part of the pedals (6) to move the machine forward.



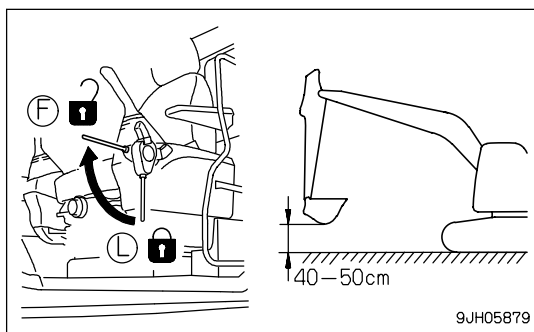
3. For machines equipped with a travel alarm (if equipped), check that the alarm sounds. If the alarm does not sound, please contact your Komatsu distributor for repair.

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.

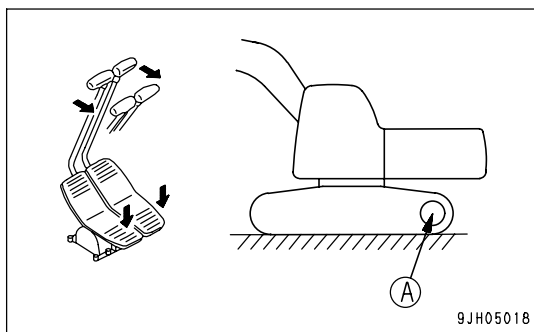
Moving Machine Backward

1. Set lock lever (4) in the FREE position (F), fold the work equipment, and raise it 40 to 50 cm (16 to 20 in) from the ground.

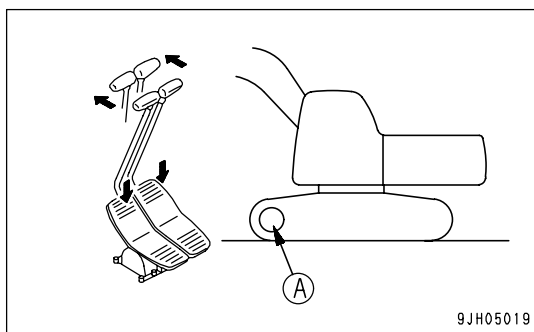


2. Operate the right and left travel levers (5), or the right or left travel pedals (6) as follows:

- When sprocket (A) is at the rear of the machine:
Slowly pull the levers (5) backward, or slowly depress the rear part of the pedals (6) to move the machine backward.



- When sprocket (A) is at the front of the machine:
Slowly push the levers (5) forward, or slowly depress the front part of the pedals (6) to move the machine backward.

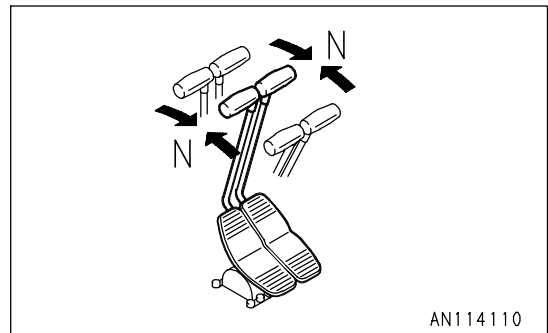
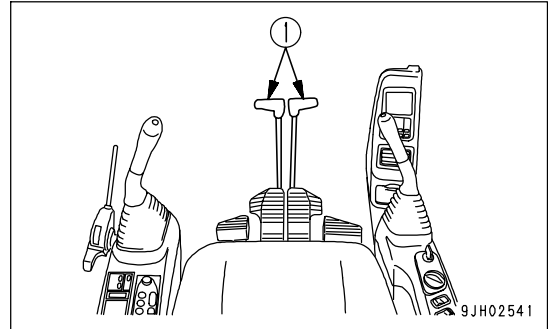


3. For machines equipped with a travel alarm (if equipped), check that the alarm sounds. If the alarm does not sound, please contact your Komatsu distributor for repair.

Stopping Machine

Avoid stopping suddenly. Give yourself ample room and return the lever slowly when stopping.

1. Put the left and right travel levers (1) in the neutral position, then stop the machine.



STEERING THE MACHINE

Steering



WARNING

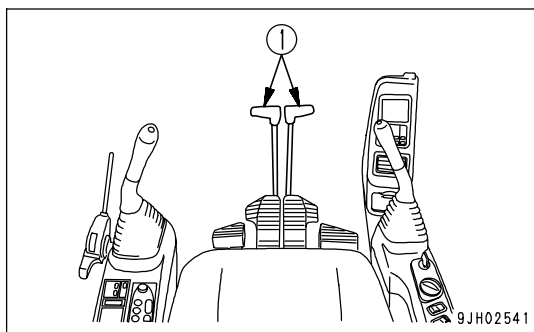
Before operating the travel levers, check the direction of the track frame (the position of the sprocket). If the sprocket is at the rear, the machine moves in the reverse direction to the operation of the travel levers.

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:

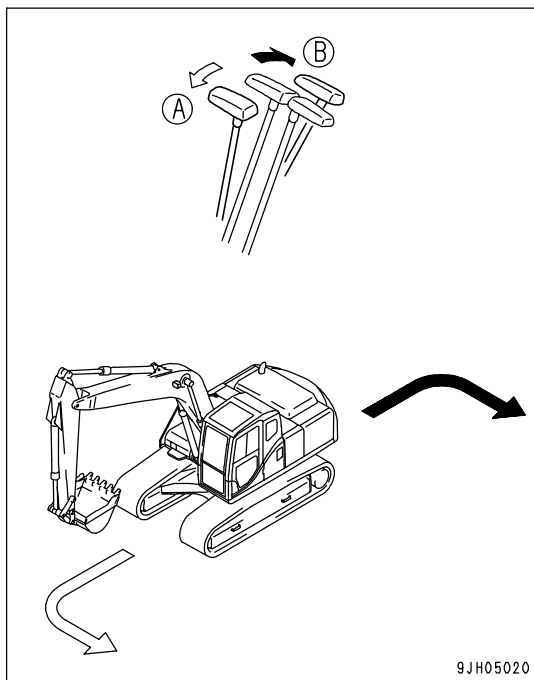
Push the right travel lever forward to turn to the left when traveling forward; and pull it back to turn left when traveling in reverse.

(A): Forward left turn

(B): Reverse left turn

REMARK

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



Changing Direction of the Machine

When turning to the left:

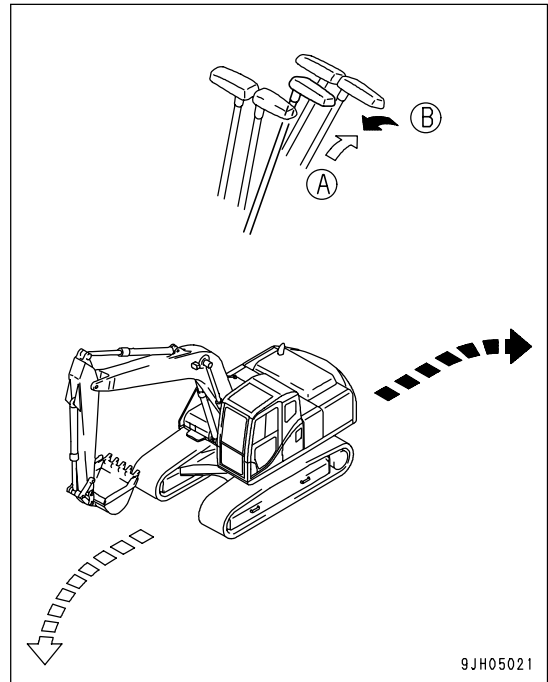
If the left travel lever is returned to the neutral position, the machine will turn to the left.

(A): Forward left turn

(B): Reverse left turn

REMARK

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



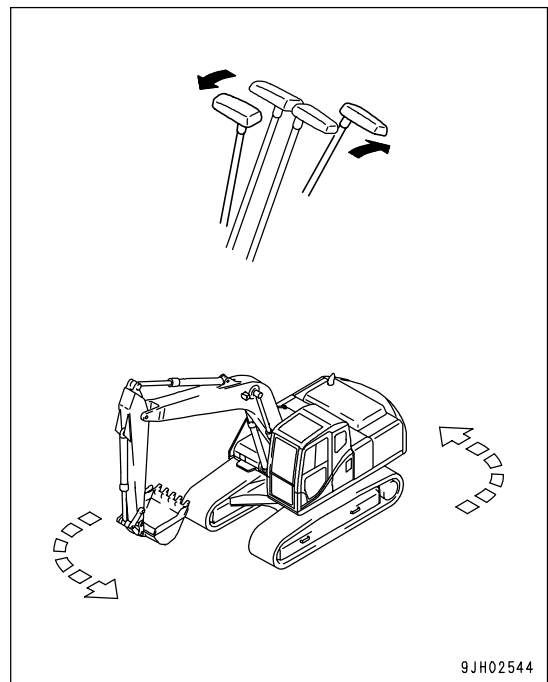
9JH05021

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.

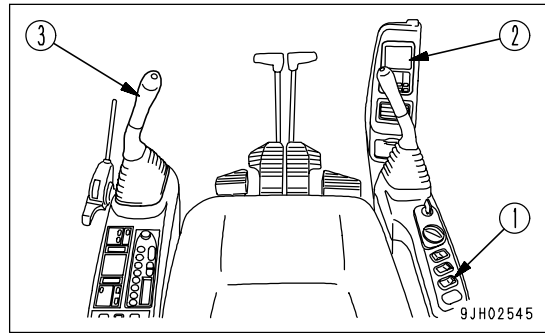


9JH02544

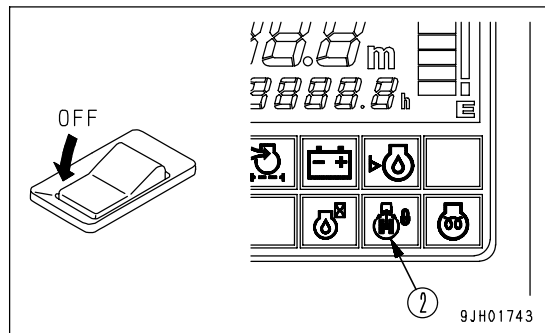
SWINGING

! WARNING

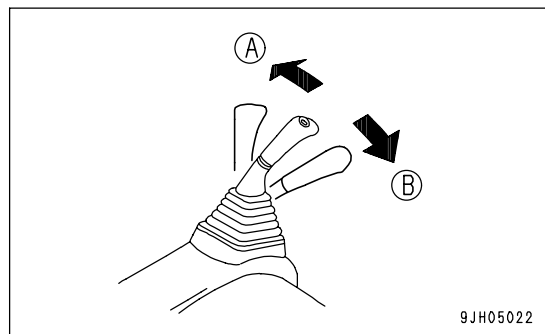
The tail of the machine extends outside the tracks. Before operating the swing, check that the area around the machine is safe.



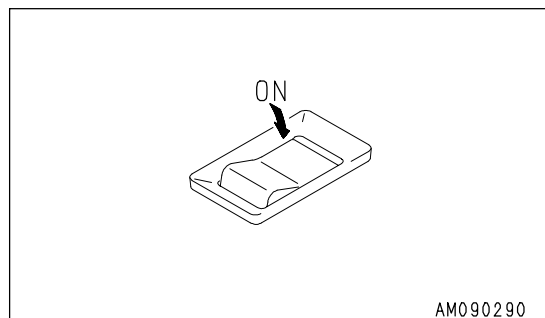
1. Before starting the swing operation, turn swing lock switch (1) OFF and check that swing lock monitor (2) has gone out.



2. Operate left work equipment control lever (3) to 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.



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.

The work equipment is operated by the left and right work equipment control levers. The left work equipment control lever operates the arm and swing, and the right work equipment control lever operates the boom and bucket.

The movements of the lever and work equipment are as shown in the diagrams on the right. When the levers are released, they automatically return to the neutral position and the work equipment is held in place.

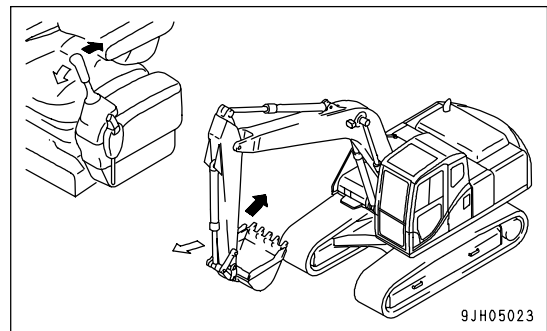
- If the work equipment control levers are returned to the neutral position when the machine is stopped, even if the fuel control dial is set to FULL, the auto-deceleration mechanism will act to reduce the engine speed to a mid-range speed.

REMARK

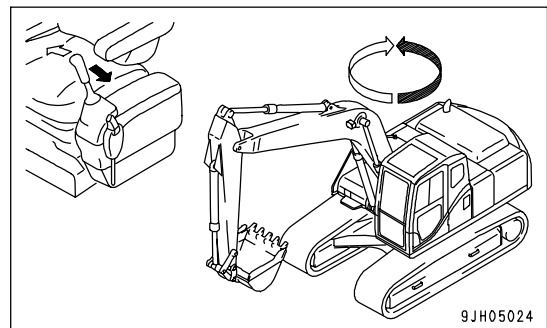
With this machine, an accumulator is installed in the operating circuit, if less than 15 seconds has passed since the engine was stopped, when the starting switch is turned to the ON position even with the engine stopped, it is possible to operate the levers to lower work equipment to the ground.

In addition, this operation can also be used to release the remaining pressure in the hydraulic cylinder circuit or to lower the boom after the machine has been loaded onto a trailer.

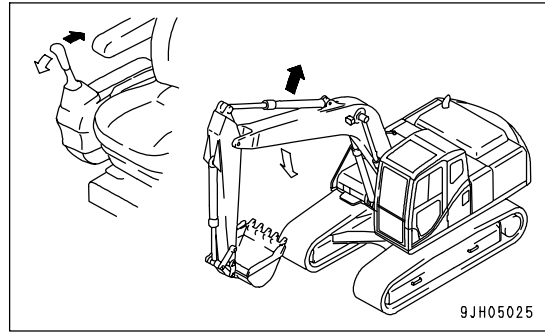
Arm operation



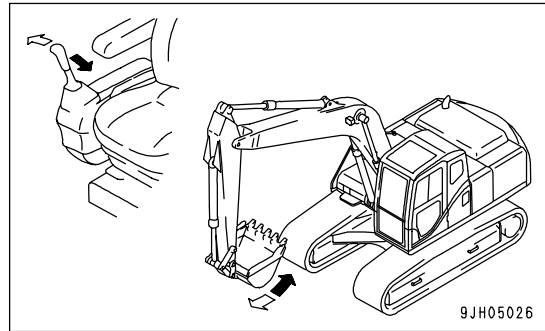
Swing operation



Boom operation



Bucket operation



WORKING MODE

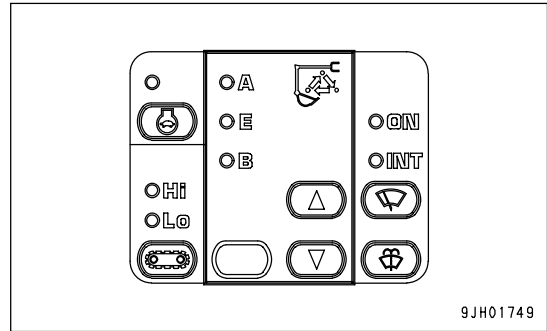
Working Mode

The mode selector switch can be used to switch the mode to match operating conditions and purpose, thereby enabling work to be performed efficiently.

Make effective use of each mode as follows.

When the starting switch is turned to the ON position, the working mode is set to A mode (digging).

Use the working mode switch to set the mode to the most efficient mode to match the type of work.



Working mode	Applicable operations
A mode	Normal digging, loading operations (Operations with emphasis on productivity)
E mode	Normal digging, loading operations
B mode	Breaker operations

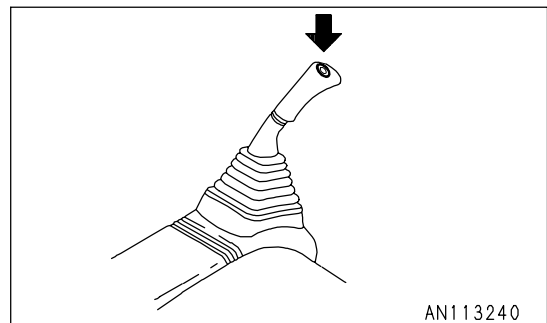
NOTICE

Do not use the heavy-duty operation mode for breaker operations. If breaker operations are carried out in the heavy-duty operation mode, there is a hazard that the hydraulic equipment may be damaged or broken.

One-Touch Power Max. Switch

The one-touch power max. Switch can be used during operations to increase the power. Make effective use of this function whenever necessary in combination with the working mode.

- Press the left knob switch and keep it pressed. The power is increased as long as the switch is being pressed. However, the increased power is automatically canceled after 8.5 seconds.
- This function does not work if the working mode is B mode.



PROHIBITED OPERATIONS

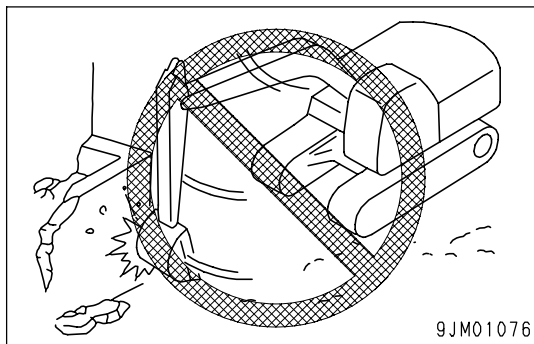


WARNING

- 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.

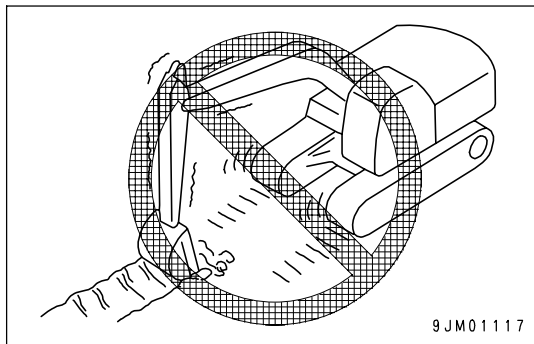
Operations Using Swing Force

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.



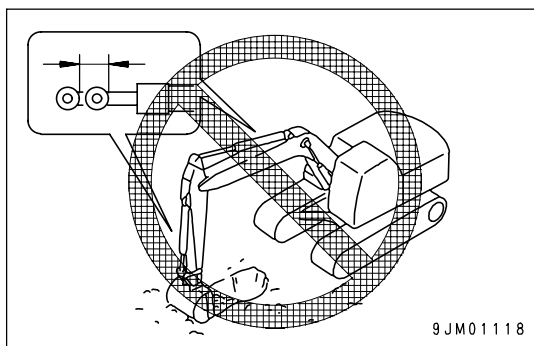
Operations Using Travel Force

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.



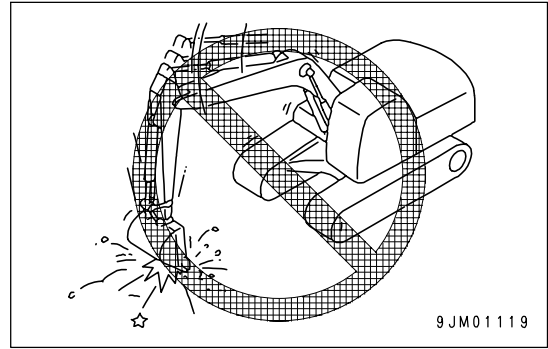
Prohibition of Operations Using Hydraulic Cylinders to Stroke Ends

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.



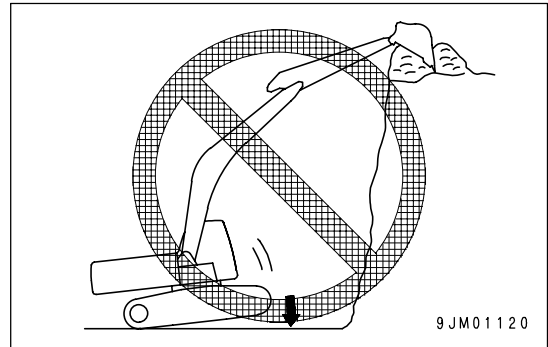
Operations Using Bucket Dropping Force

Do not use the dropping force of the machine for digging, or use the dropping force of the bucket as a pickaxe, breaker, or pile driver. This will drastically reduce the life of the machine.



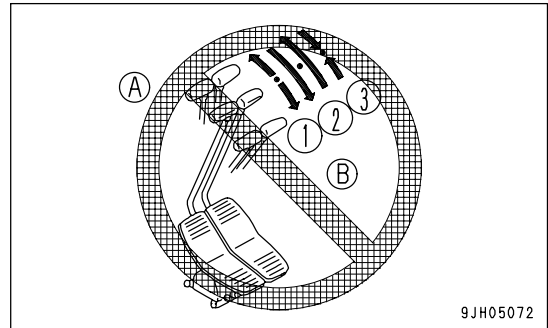
Operations Using Machine Dropping Force

Do not use the dropping force of the machine for digging.



Sudden Lever Shifting High Speed Travel

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

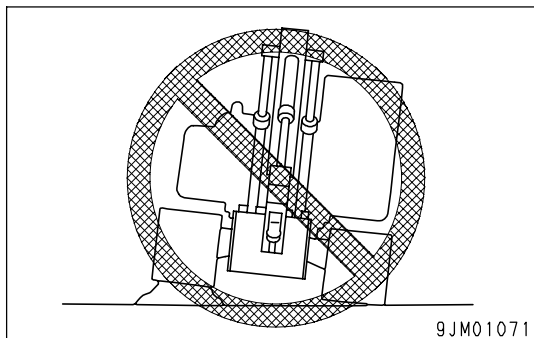


GENERAL OPERATION INFORMATION

Traveling

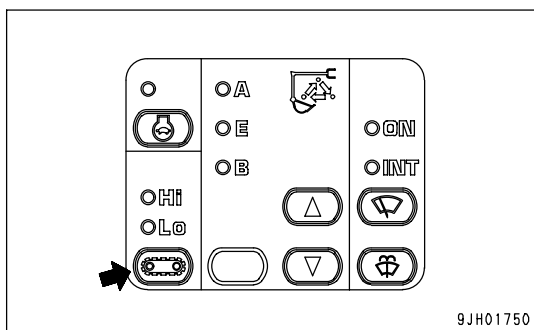
Traveling over boulders, tree stumps, or other obstacles will cause a big shock to the chassis (and in particular to the tracks), and this will cause damage to the machine. For this reason, always remove any obstacles or travel around them, or take other steps to avoid traveling over such obstacles as 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.



High Speed Travel

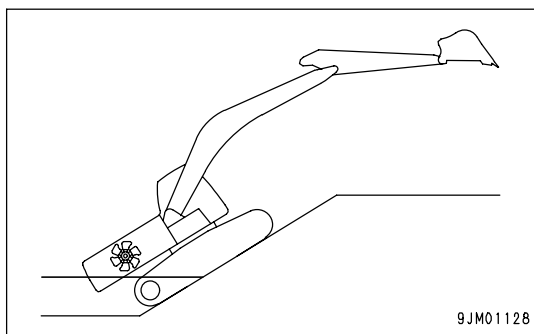
On uneven roadbeds such as rock beds or uneven roads with large rocks, travel at Lo speed. When traveling at high speed, set the idler in the forward direction.



Permissible Water Depth

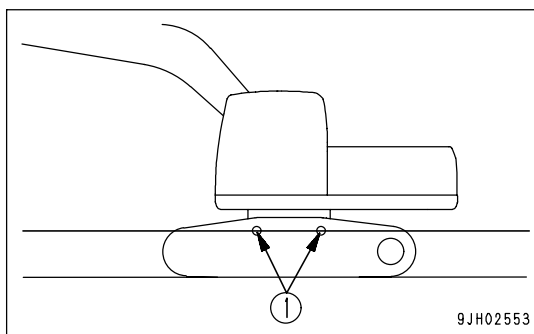
NOTICE

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 cooling 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).



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.

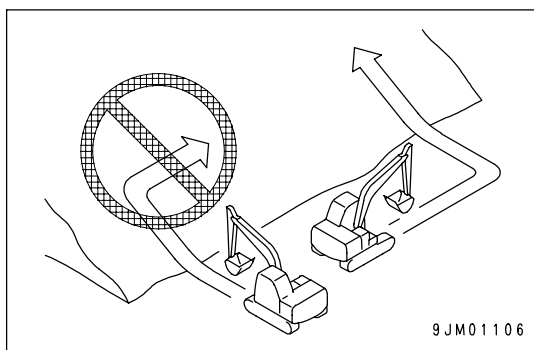
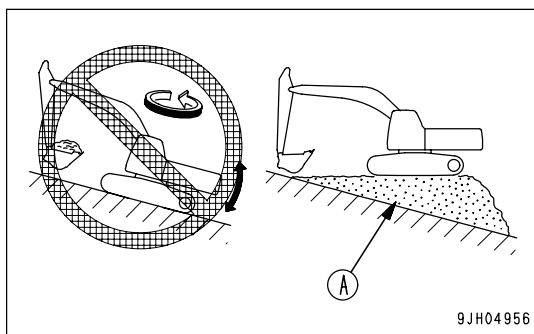
TRAVELING ON SLOPES

 **WARNING**

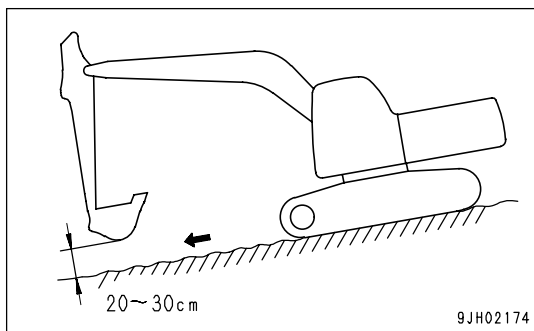
- Turning or operating the work equipment when working on slopes may cause the machine to lose its balance and turn over, so avoid such operations.

It is particularly dangerous to swing downhill when the bucket is loaded. If such operations have to be performed, pile soil to make a platform (A) on the slope so the machine is kept horizontal during operation.

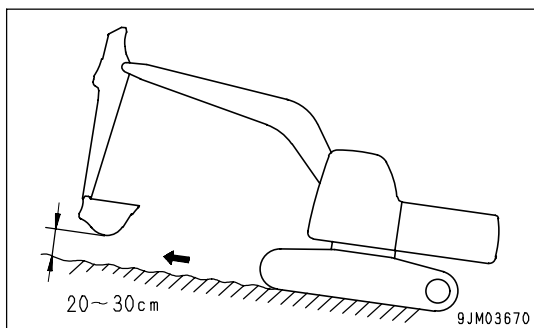
- Do not travel up or down steep slopes. There is a danger that the machine may turn over.
- When traveling, raise the bucket approx. 20 to 30 cm (8 to 12 in) from the ground. Do not travel downhill in reverse.
- Never turn on slopes or travel across slopes. Always go down to a flat place to perform 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.



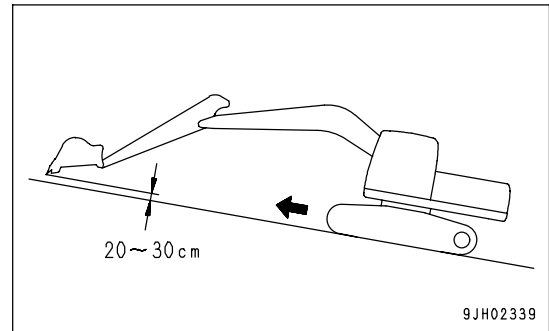
1. When traveling down steep hills, use the travel lever and fuel control dial to keep the travel speed low. When traveling down a steep hill of more than 15°, set the work equipment to the posture shown in the diagram on the right, and lower the engine speed.



2. When traveling up a steep hill of more than 15°, set the work equipment to the posture shown in the diagram on the right.



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



Traveling Downhill

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.

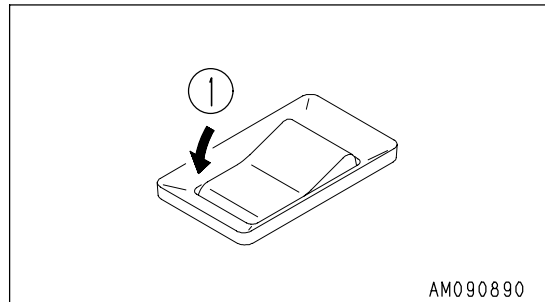
Cab Doors on Slope

- 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 door when the machine is on a slope. The operating effort may suddenly change. Always keep the door locked in position when it is open and when it is closed.

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.

- Place the machine push-up switch at position (1). This will increase the pushing power of the boom and make it easier to escape.



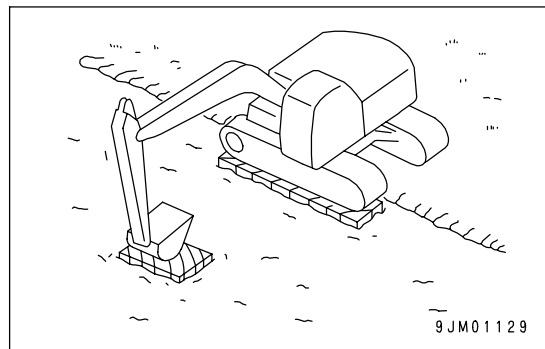
Track on One Side Stuck

NOTICE

When using the boom or arm to raise the machine, always have the bottom of the bucket in contact with the ground. The angle between the boom and arm should be 90° to 110°.

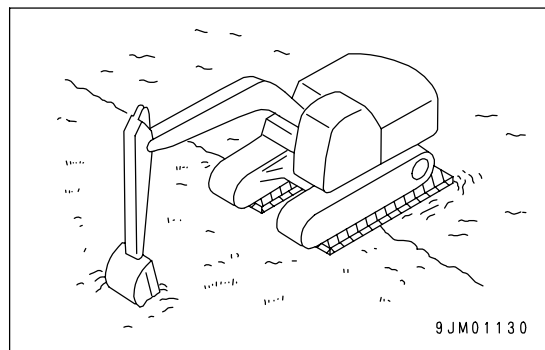
The same applies when using the bucket installed in the reverse direction.

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

When the tracks on both sides are stuck in mud and they slip, making it impossible for the machine to move, lay boards or logs as explained above, and dig the bucket into the ground in front. Then pull in the arm as in normal digging operations and put the travel levers in the FORWARD position to pull the machine out.



RECOMMENDED APPLICATIONS

In addition to the following, it is possible to further increase the range of applications by using various attachments.

Backhoe Work

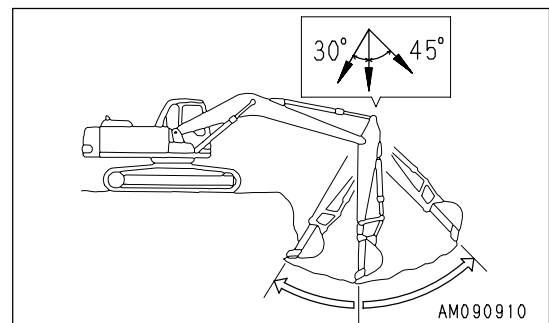
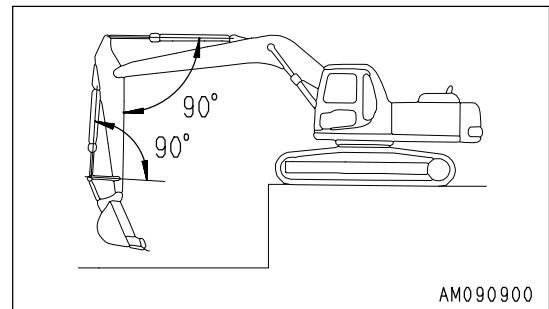
A backhoe is suitable for excavating areas that are lower than the machine.

When the condition of the machine is as shown in the diagram on the right (angle between [bucket cylinder and link] and [arm cylinder and arm] is 90°), the maximum excavation force is obtained from the pushing force of each cylinder.

When excavating, use this angle effectively to optimize your working efficiency.

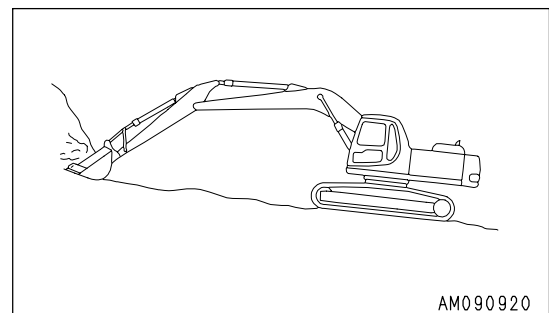
The range for excavating with the arm is from a 45° angle away from the machine to a 30° angle towards the machine.

There may be some differences depending on the excavation depth, but try to stay within the above range rather than operating the cylinder to the end of its stroke.



Shovel Work

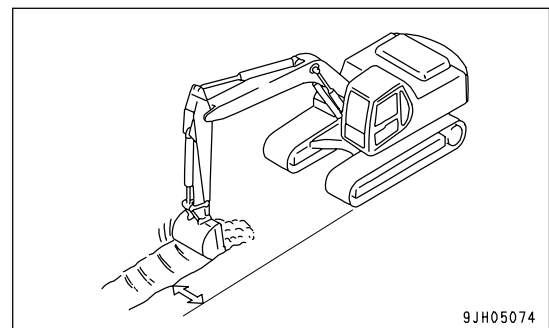
A shovel is suitable for excavating at a position higher than the machine. Shovel work is performed by attaching the bucket in the reverse direction.



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.

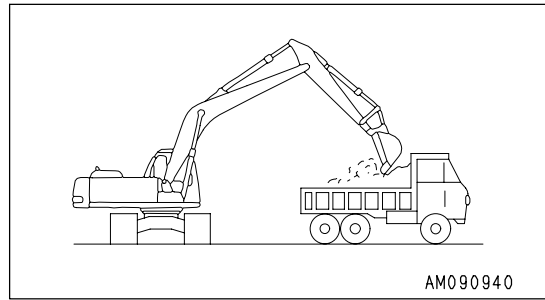
To excavate a wide ditch, first dig both sides and then finally remove the center portion.



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 is easier and capacity greater if you begin from the front of the dump truck body than if loading is done from the side.



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

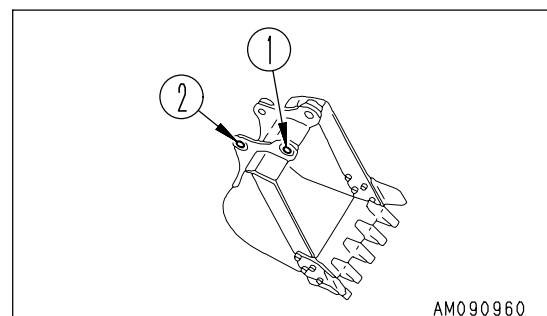
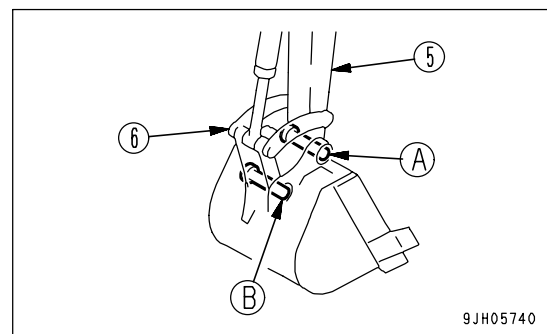
When removing the pins, place the bucket so that it is in light contact with the ground.

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.

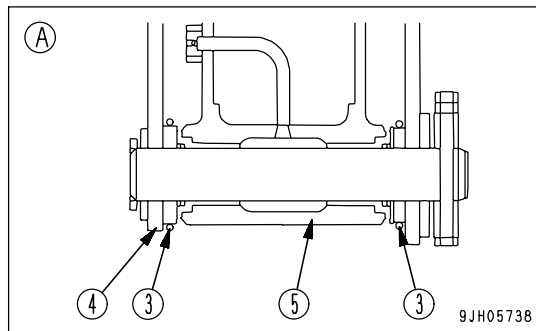


REMARK

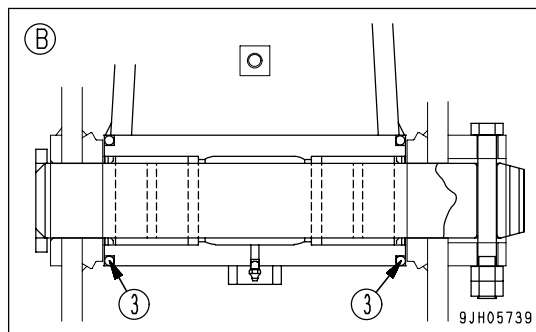
When installing the bucket, for arm pin portion (A), fit O-ring (3) to bucket (4) in the position shown in the diagram on the right. After inserting the pin, fit it in the standard groove.

For link pin portion (B), install the bucket with O-ring (3) fitted in the standard groove.

4. Install the stopper bolts and nuts for each pin, then grease the pin.

**REMARK**

- Lubricate with grease thoroughly until the grease comes out from the end face.
- When replacing the bucket, replace the dust seal if it has been damaged. If a damaged seal is used without being replaced, sand and dirt may enter the pin portion and cause abnormal wear of the pin.



Inversion

NOTICE

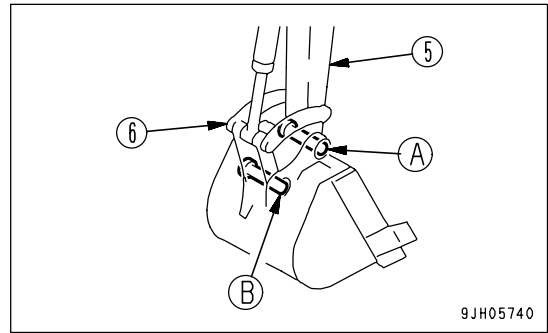
The rock bucket (PC 400: if equipped, PC 450: standard) interferes with the arm, so it cannot be reversed to carry out excavation to the front.

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.

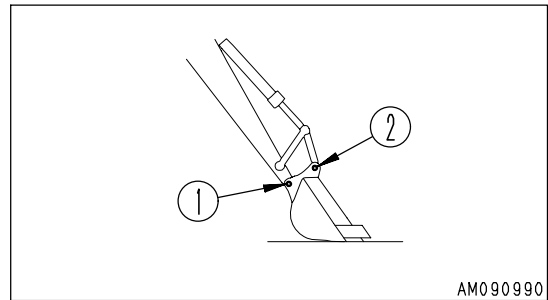
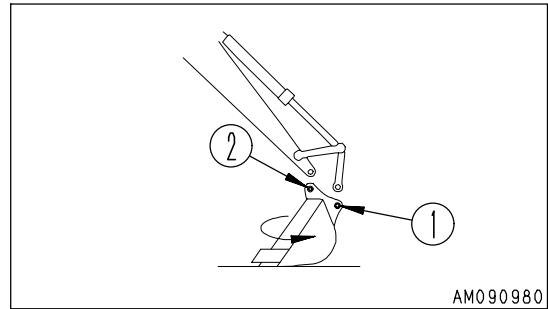
If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.



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. After removing the bucket, reverse it.
4. Align arm (5) with replacement bucket hole (1), then align link (6) with hole (2), coat pins (A) and (B) with grease, and install.



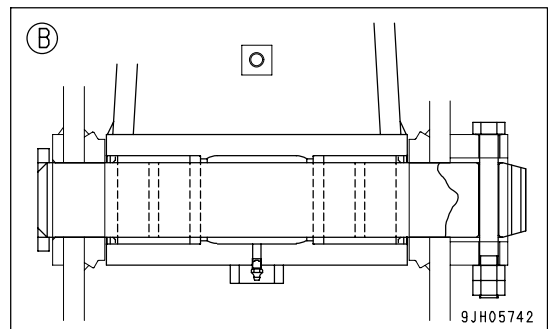
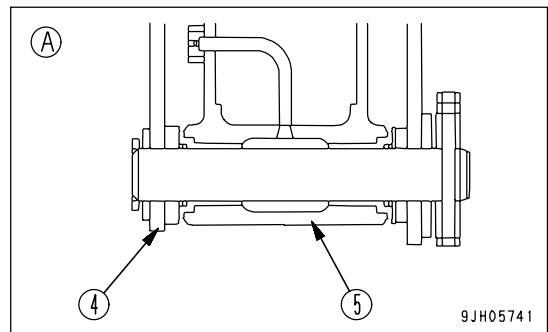
REMARK

When reversing, do not install an O-ring. Keep the O-ring in a safe place until using it next.

5. Install the stopper bolts and nuts for each pin, then grease the pin.

REMARK

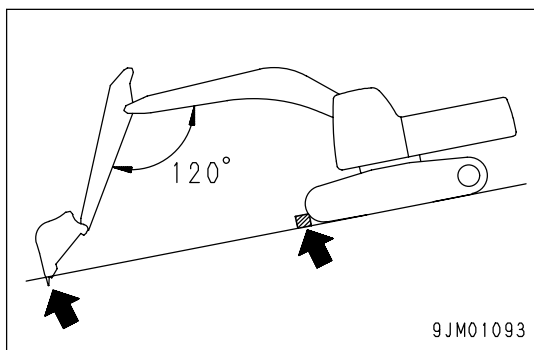
- Lubricate with grease thoroughly until the grease comes out from the end face.
- When replacing the bucket, replace the dust seal if it has been damaged. If a damaged seal is used without being replaced, sand and dirt may enter the pin portion and cause abnormal wear of the pin.



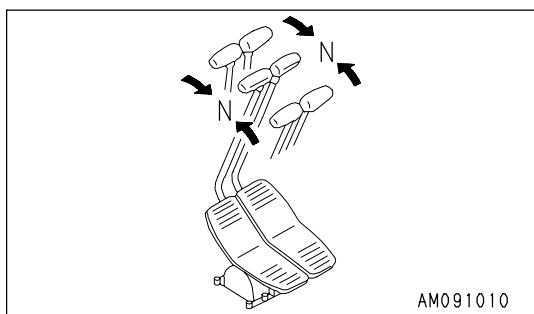
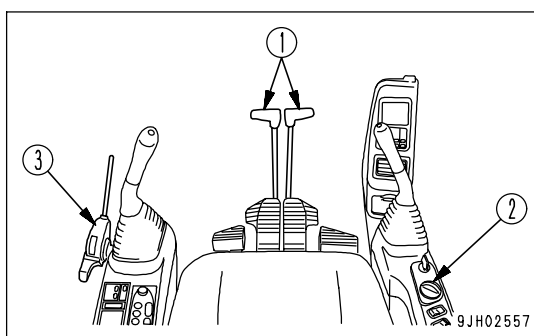
PARKING MACHINE

WARNING

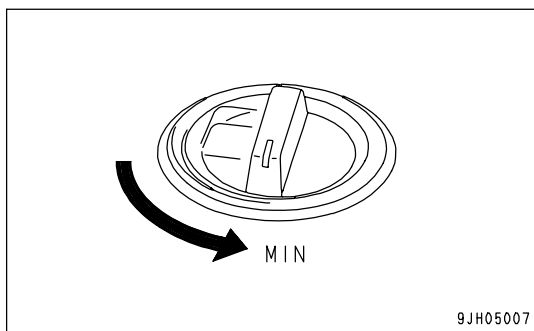
- Avoid stopping suddenly. Give yourself ample room when stopping.
- When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, insert blocks underneath the track shoes. As an additional safety measure, thrust the bucket into the ground.
- If the control lever is touched by accident, the work equipment or the machine may move suddenly, and this may lead to a serious accident. Before leaving the operator's compartment, always set the lock lever securely to LOCK position.



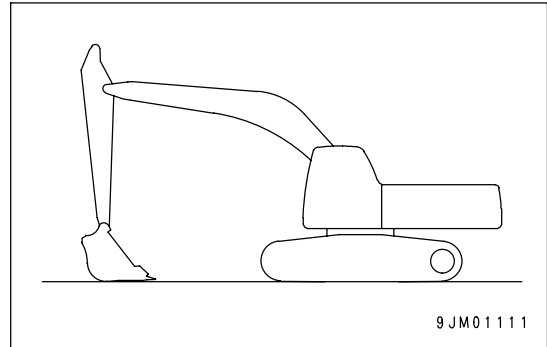
1. Put left and right travel levers (1) in the neutral position.
The machine stops.



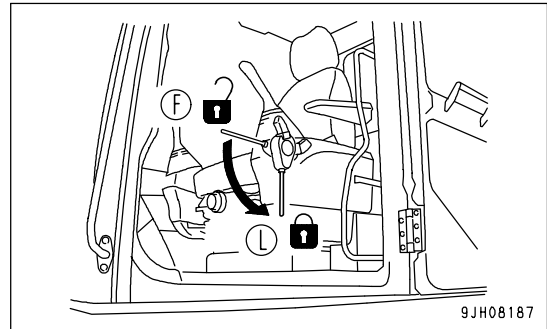
2. Turn fuel control dial (2) to lower the engine speed to low idle.



- Lower the bucket horizontally until the bottom touches the ground.



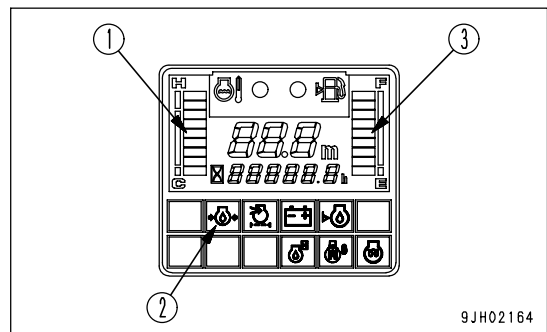
- Set lock lever (3) in the LOCK position.



- Stop the engine. For details on the procedure for stopping the engine, see "STOPPING THE ENGINE (PAGE 3-83)".

CHECK AFTER SHUT OFF ENGINE

Use the machine monitor to check engine coolant temperature (1), engine oil pressure (2), and fuel level (3).



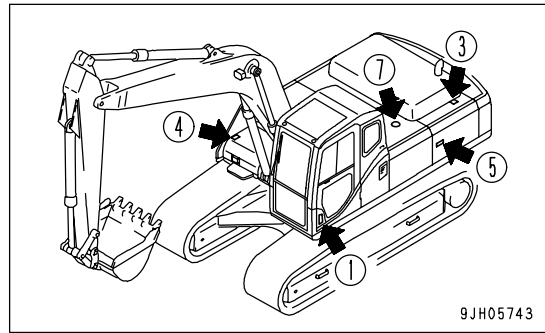
MACHINE INSPECTION AFTER DAILY WORK

- Walk around the machine and check the work equipment, machine exterior, and undercarriage, also check for any leakage of oil or coolant. If any problems are found, repair them.
- Fill the fuel tank.
- Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.
- Remove any mud affixed to the undercarriage.

LOCKING

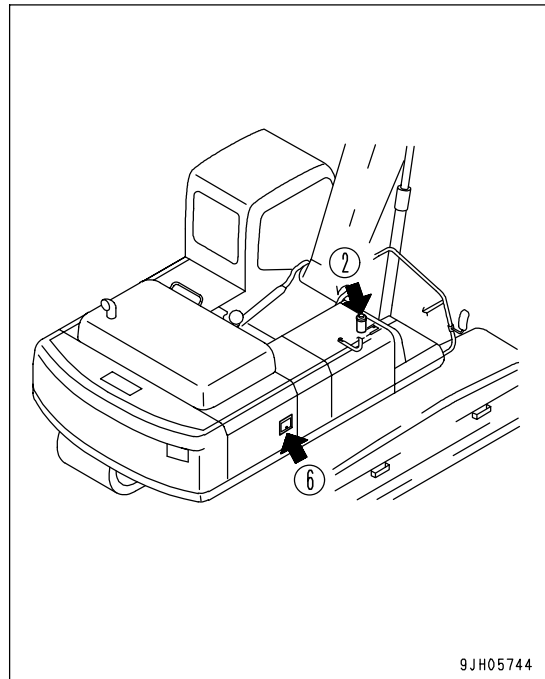
Always lock the following places.

1. Door of operator's cab
Always remember to close the window.
2. Fuel tank filler port
3. Engine hood
4. Battery box cover
5. Left side door of the machine
6. Right side door of the machine
7. Hydraulic tank filler port



REMARK

Use the starting switch key to lock and unlock all these places.



TRANSPORTATION

When transporting the machine, observe all related laws and regulations, and be careful to assure safety.

PRECAUTIONS FOR TRANSPORTATION



WARNING

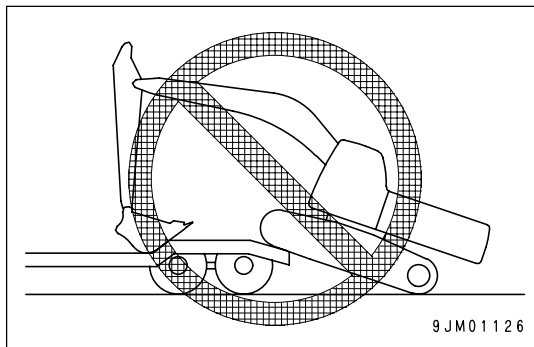
This machine must be divided into several units for transportation.

When transporting the machine, please consult your Komatsu distributor.

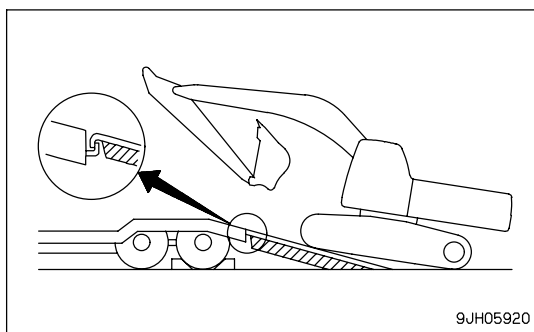
LOADING AND UNLOADING WITH TRAILER

**WARNING**

- Always turn the auto-deceleration switch OFF (cancel) during loading and unloading operations.
If the auto-deceleration switch is left ON, the machine may suddenly start moving.
- When loading or unloading the machine on a trailer, always travel at low speed. Do not operate the travel speed selector switch.
- Run the engine at low idle, set to Lo speed, and operate the machine slowly when loading or unloading.
- Do not carry out loading or unloading operations during the automatic warming-up operation.
If the automatic warming-up operation is canceled before completion, the travel speed may suddenly change.
- Select firm, level ground when loading or unloading the machine. Maintain a safe distance from the edge of the road.
- Use ramps with ample width, length, thickness, and strength and install them at a maximum slope of 15°.
When using piled soil, compact the piled soil fully and prevent the slope face from collapsing.
- Remove all mud and dirt from the machine tracks 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.
- Never correct your steering on the ramps. There is a hazard that the machine may turn over.
If necessary, drive off the ramps, correct the direction, then enter the ramps again.
- It is dangerous to use the work equipment for loading and unloading operations.
- 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 track or trailer, and there is a hazard of the machine losing its balance. Travel slowly over this point.
- When swinging the upper structure on the trailer, the trailer is unstable, pull in the work equipment and swing slowly.



9JM01126

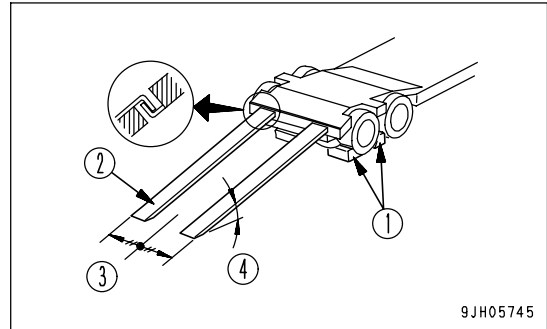


9JH05920

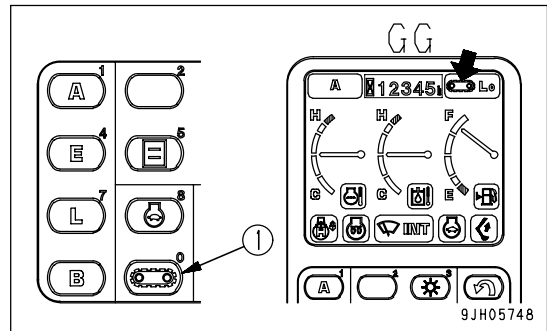
When loading or unloading, always use ramps or a platform. Proceed as follows.

Loading

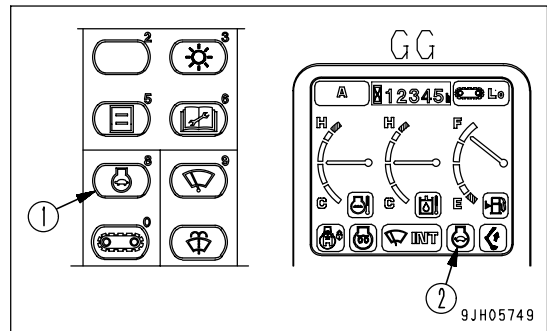
1. Load and unload on firm level ground only.
 Maintain a safe distance from the edge of a road.
2. Apply the trailer brakes securely, then put blocks (1) under the tires to prevent the trailer from moving.
 - Set left and right ramps (2) parallel to each other and equally spaced to the left and right 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.



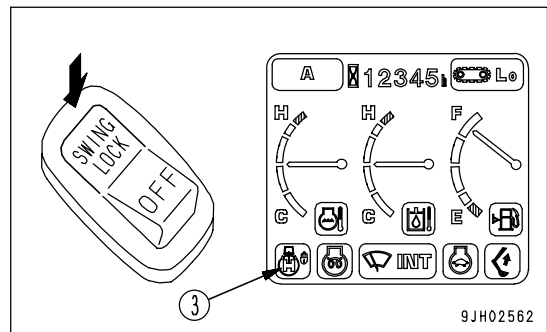
3. Set the travel speed selector switch to Lo (low speed travel).
 - To switch the travel speed, press travel speed selector switch (1). The travel speed is displayed as Lo, Mi, or Hi on the monitor display.



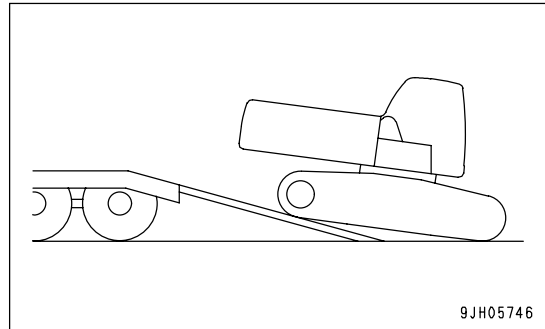
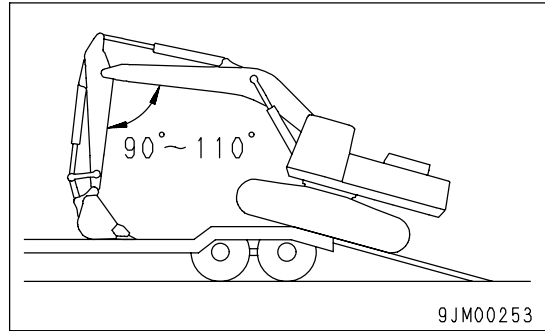
4. Turn auto-deceleration switch (1) OFF and operate the fuel control dial to set the engine speed to low idle.
 - Each time auto-deceleration switch (1) is pressed, it switches OFF → ON → OFF in turn.
 - When auto-deceleration switch (1) is turned OFF, display monitor (2) goes out.



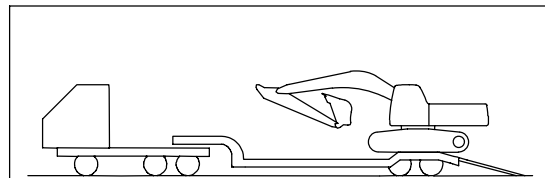
5. Turn the swing lock switch ON to apply the swing lock.
 - When the swing lock switch is turned ON, display monitor (3) lights up.



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.

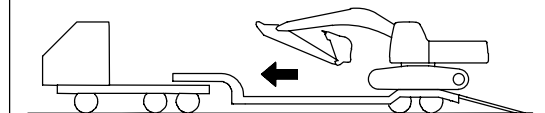


7. Before moving onto the ramps, make sure that the machine is positioned in a straight line with the ramps and that the centerline of the machine matches that of the trailer.
Align the direction of travel with the ramps and travel slowly.
Lower the work equipment as far as possible without causing interference.

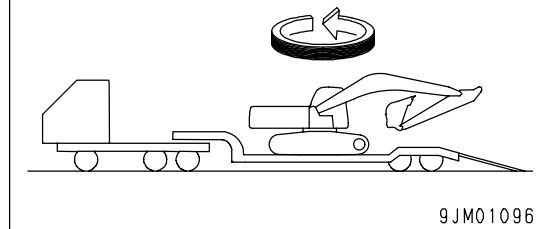


When on the ramps, operate only the travel lever. Do not operate any other lever.

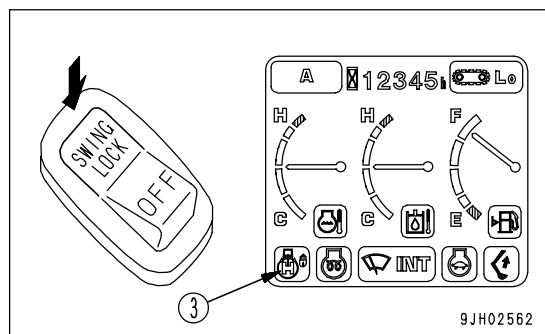
8. When the machine travels over the rear wheels of the trailer, it becomes unstable, drive slowly and carefully. (Never operate the steering.)
9. At the moment the machine passes the rear wheels, it tilts forward, be careful not to let the work equipment hit the trailer body. Drive the machine forward to the specified position, then stop the machine.



10. Turn the swing lock switch OFF to release the swing lock, then swing the upper structure slowly 180°.
11. Stop the machine at the specified position on the trailer.



12. Turn the swing lock switch ON to lock the swing lock.
• When the swing lock switch is turned ON, display monitor (3) lights up.



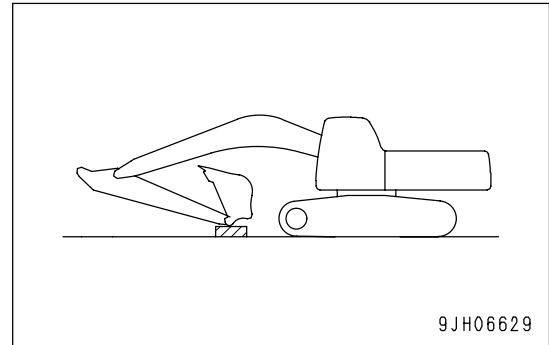
Securing Machine

NOTICE

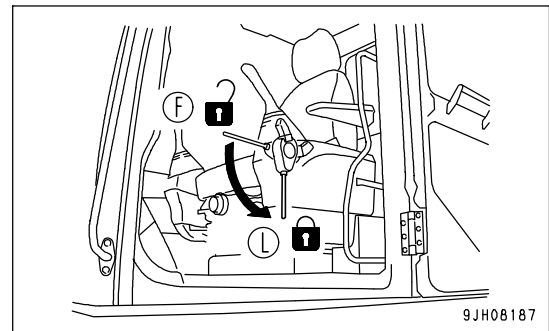
- Stow the antenna and reassemble the mirrors so that they are within the width of the machine.
- To prevent damage to the bucket cylinder during transportation, fit a wooden block at one end of the bucket cylinder to prevent it from touching the floor.

Load the machine onto a trailer as follows:

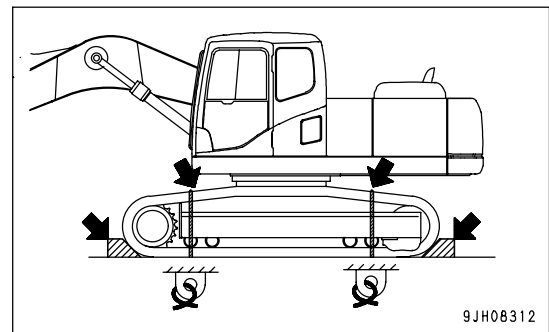
1. Extend the bucket and arm cylinders fully, then lower the boom slowly.



2. Set the lock lever securely to the LOCK position (L).
3. Stop the engine, then remove the key from the starting switch.
4. Lock the window glass, roof window, front window, operator's seat door, side cover, engine hood, and battery box cover securely.

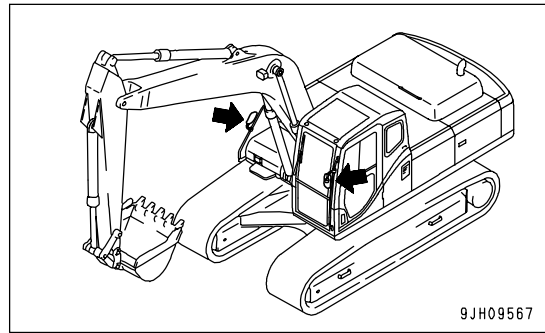


5. Place blocks under both ends of the tracks to prevent the machine from moving during transportation, and secure the machine with chains or wire rope of suitable strength. Be particularly careful to secure the machine in position so it does not slip to the side.



Rearview Mirrors

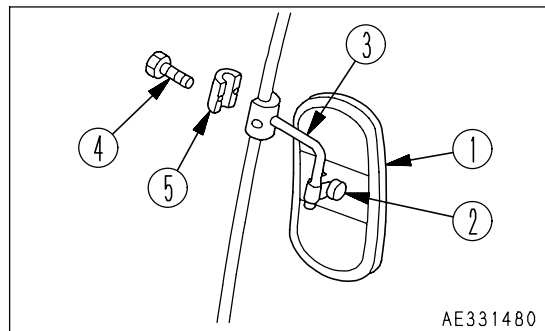
The mirrors are at the positions shown in the diagram on the right. If they are damaged, or are to be removed for shipment, or are to be installed again, use the following procedure.



Removal

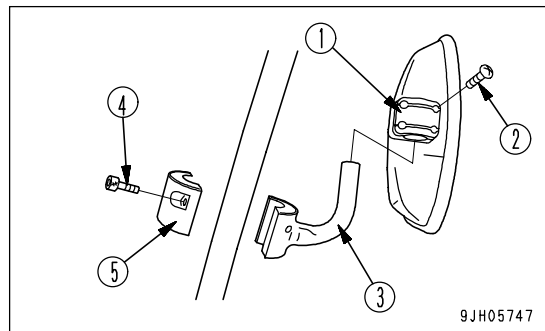
• Left mirror

1. Loosen locknut (2) of mirror (1), then remove mirror (1) from support (3).
2. Loosen bolt (4) and remove support (3) and clamp (5) from the handrail.



• Right mirror

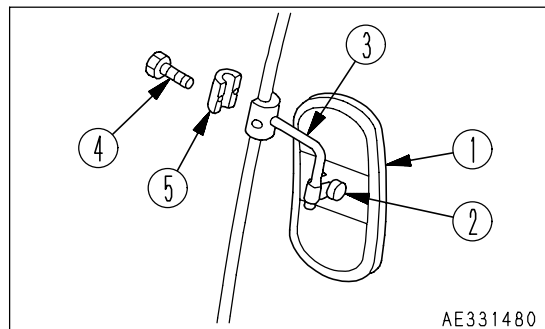
3. Loosen locknut (2) of mirror (1), then remove mirror (1) from support (3).
4. Loosen bolt (4) and remove support (3) and clamp (5) from the handrail.



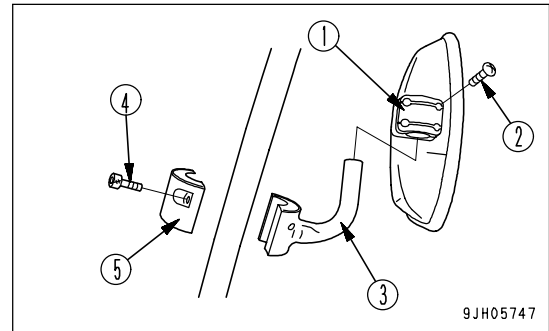
Installation

• Left mirror

1. Install support (3) and clamp (5) to the handrail, then tighten with bolt (4).
2. Install mirror (1) to bracket (3), then tighten locknut (2).



- Right mirror
3. Install support (3) and clamp (5) to the handrail, then tighten with bolt (4).
 4. Install mirror (1) to bracket (3), then tighten lock bolt (2).



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.

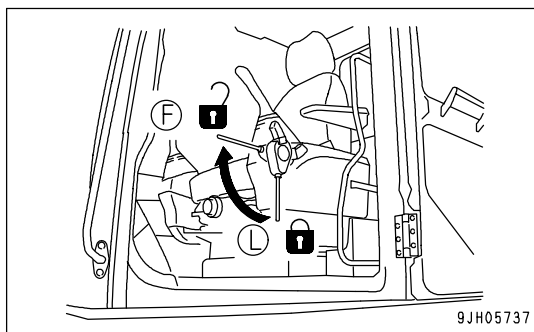
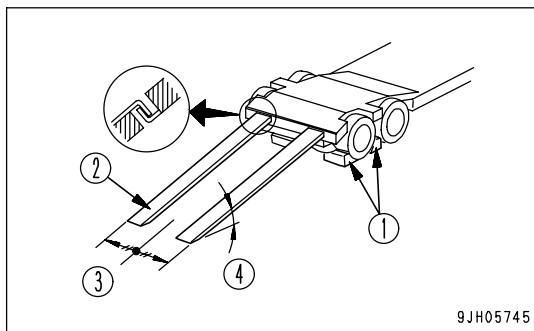
- Set left and right ramps (2) parallel to each other and equally spaced to the left and right of center (3) of the trailer. Make angle of installation (4) a maximum of 15°. If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.

3. Remove the chains and wire ropes fastening the machine.

4. Start the engine.

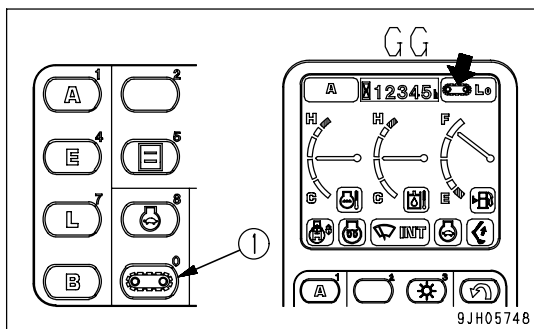
Warm the engine up fully.

5. Set the lock lever to FREE position (F).



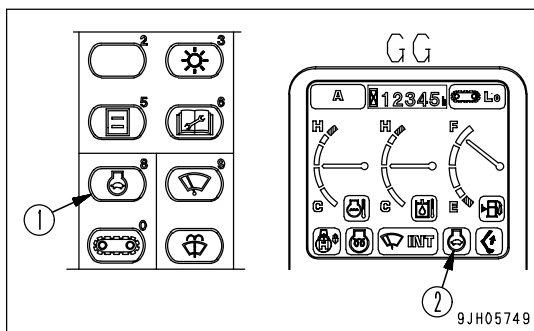
6. Set the travel speed selector switch to Lo (low speed travel).

- Press travel speed selector switch (1) to set the travel speed. The travel speed (Lo, Mi, Hi) is displayed on monitor display GG.

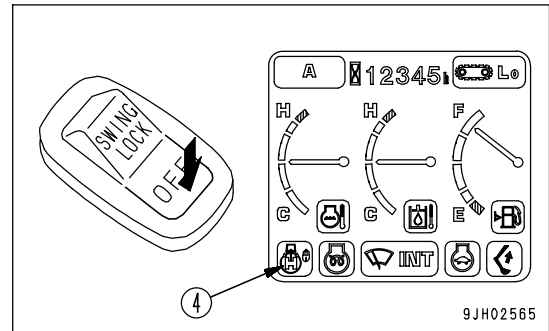


7. Turn auto-deceleration switch (1) OFF and operate the fuel control dial to set the engine speed to low idle.

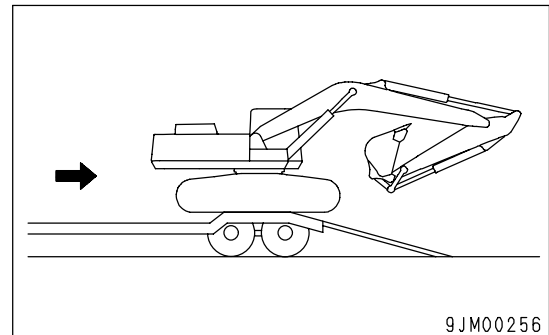
- Each time auto-deceleration switch (1) is pressed, it switches OFF → ON → OFF in turn.
- When auto-deceleration switch (1) is turned OFF, monitor display GG (2) goes out.



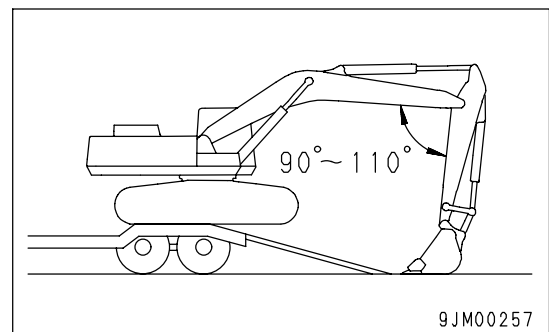
8. Turn the swing lock switch OFF to release the swing lock.
- When the swing lock switch is turned OFF, display monitor (4) goes off.



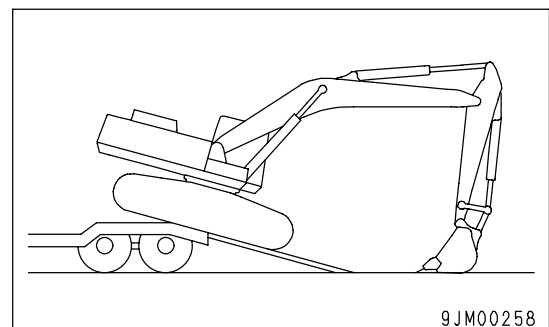
9. Raise the work equipment, pull in the arm under the boom, then move the machine slowly.
10. When the machine is horizontal on top of the rear wheels of the trailer, stop the machine.



11. 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.



12. When moving down the ramps, operate the boom and arm slowly to lower the machine carefully until it is completely off the ramps.



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 enter the area under or around a raised machine.

Never try to lift the machine in any posture other than the posture given in the procedure below or using lifting equipment other than in the procedure below.

There is a hazard that the machine may lose its balance.

NOTICE

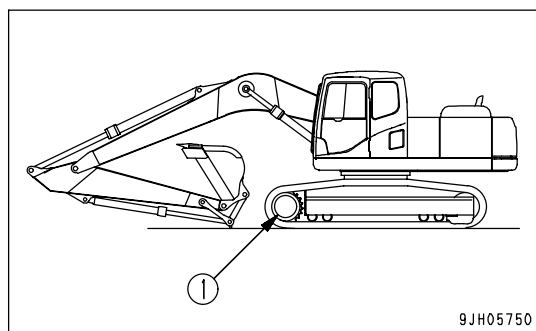
The lifting procedure applies to machines with standard specifications.

The method of lifting differs according to attachments and options actually installed on the machine. For the proper lifting procedures, contact your Komatsu distributor.

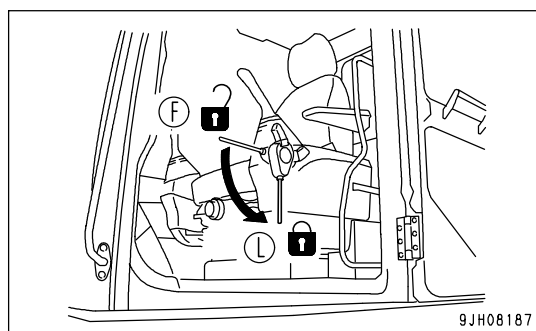
For details of the weight, see "SPECIFICATIONS (PAGE 5-2)".

When lifting the machine, carry out the operation on flat ground as follows.

1. Start the engine, then swing 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.

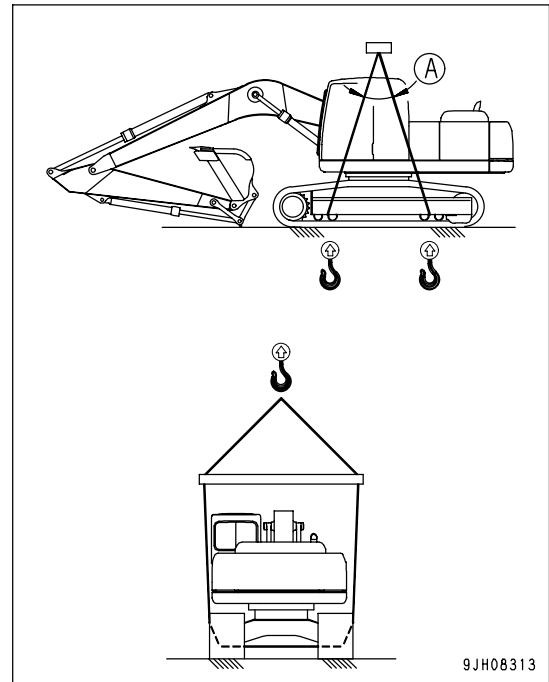


3. Set the lock lever securely to the LOCK position (L).



4. 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.

5. Pass wire ropes between the 1st and 2nd track rollers from the front and between the 1st and 2nd track rollers from the rear. However, for machines equipped with a full roller guard for the track roller, pass the wire rope under the track.
6. Set the lifting angle (A) of the wire rope to 30° to 40° , then lift the machine slowly.
7. After the machine comes off the ground, check the hook condition and the lifting posture, and then lift slowly.

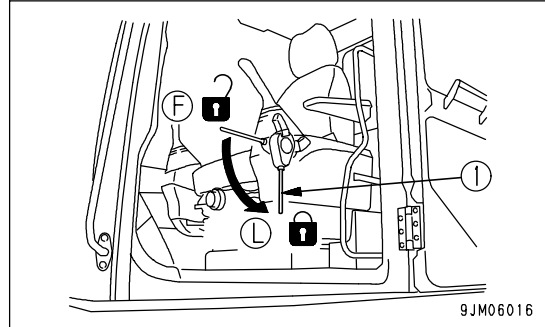


PRECAUTIONS WHEN LOADING**WARNING**

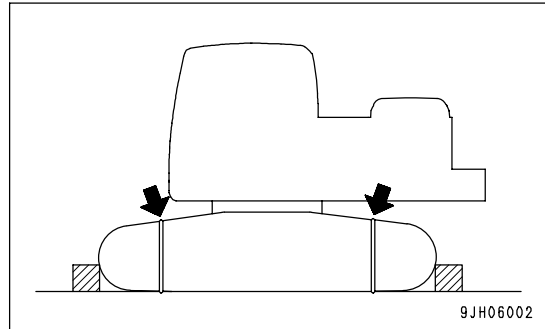
- When loading the machine, choose firm level ground. Keep well away from the road shoulder.
- Run the engine at low speed and operate slowly.

After placing the machine on the specified position of the trailer, secure it according to the following procedure.

1. Set all the control levers securely at LOCK position (L) with lock lever (1).

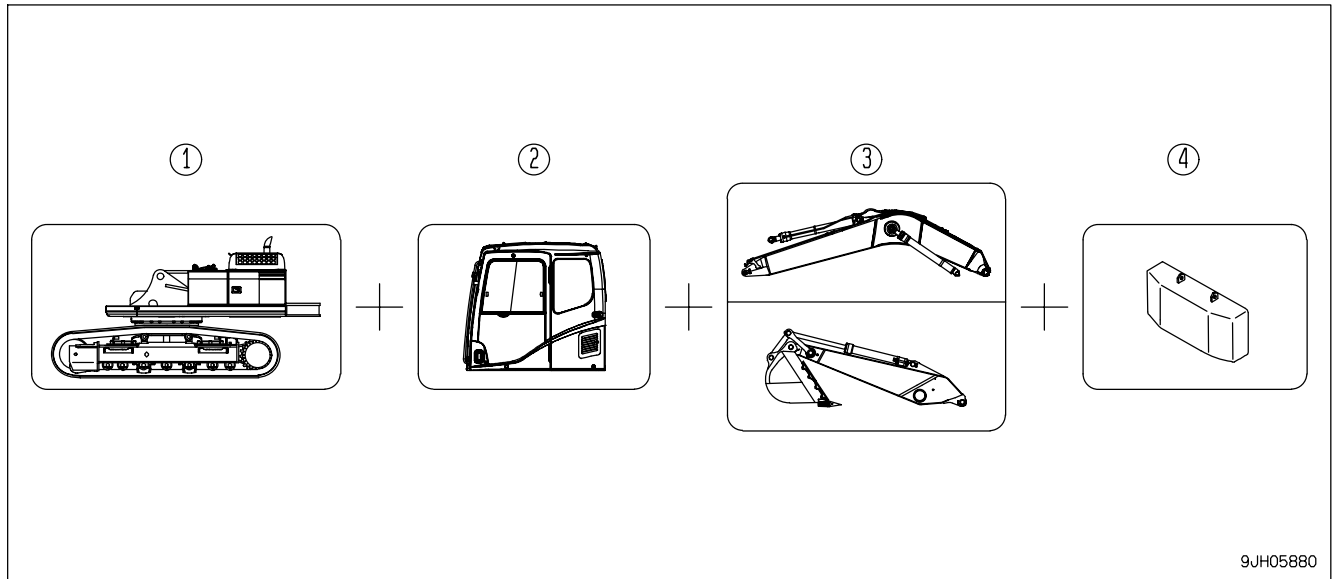


2. When transporting the machine, place wooden blocks under the front and rear track shoes to prevent the machine from moving. Also, hold it down with chains or wire rope of a suitable strength. Be particularly careful to ensure that the machine does not slip sideways.



TRANSPORTATION POSTURE

This machine is separated into four kits for transportation: (1) upper structure, (2) cab, (3) work equipment, (4) others. When transporting the machine, please ask your Komatsu distributor to divide the machine up into kits.



9JH05880

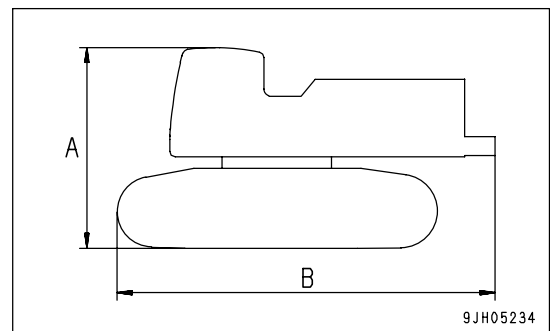
Posture for Each Unit

Upper Structure + Undercarriage

- Variable gauge specification machine

The value given in [] for the overall width is the value when the track frame gauge has been retracted.

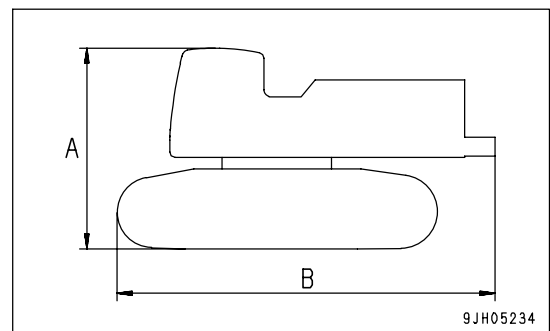
Item	Unit	PC400	PC400LC	PC450	PC450LC
A	mm	3,275	3,275	3,275	3,275
	(ft in)	(10' 9")	(10' 9")	(10' 9")	(10' 9")
B	mm	5,850	6,035	5,850	6,035
	(ft in)	(19' 2")	(19' 10")	(19' 2")	(19' 10")
Overall width	mm	3,490	3,590	3,490	3,490
		(11' 5")	(11' 9")	(11' 5")	(11' 5")
	(ft in)	[2,990] (9' 10")	[2,990] (9' 10")	[2,990] (9' 10")	[2,990] (9' 10")
Weight	kg	25,170	26,270	25,670	26,370
	(lb)	(55,500)	(57,925)	(56,602)	(58,146)



9JH05234

- Fixed gauge specification machine

Item	Unit	PC400	PC400LC	PC450	PC450LC
A	mm	3,275	3,275	3,275	3,275
	(ft in)	(10' 9")	(10' 9")	(10' 9")	(10' 9")
B	mm	5,850	6,035	5,850	6,035
	(ft in)	(19' 2")	(19' 10")	(19' 2")	(19' 10")
Overall width	mm	3,340	3,440	3,340	3,340
	(ft in)	(10' 11")	(11' 3")	(10' 11")	(10' 11")
Weight	kg	24,000	25,000	24,460	25,460
	(lb)	(52,920)	(55,125)	(53,934)	(56,139)



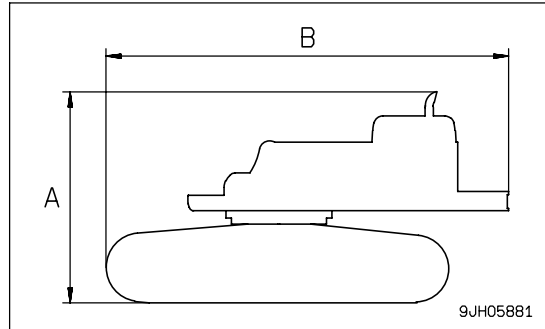
9JH05234

Upper Structure + Undercarriage (without cab)

- Variable gauge specification machine

The value given in [] in the table below is the value when the track frame gauge has been retracted.

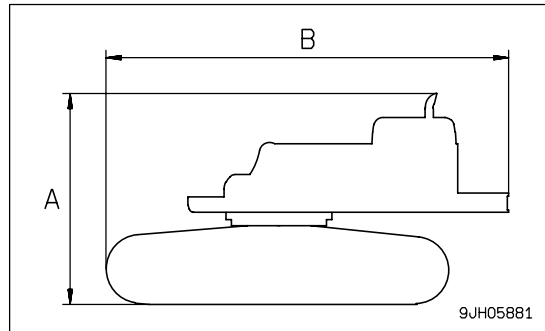
Item	Unit	PC400	PC400LC	PC450	PC450LC
A	mm (ft in)	3,115 (10' 3")	3,115 (10' 3")	3,115 (10' 3")	3,115 (10' 3")
B	mm (ft in)	5,850 (19' 2")	6,035 (19' 10")	5,850 (19' 2")	6,035 (19' 10")
Overall width	mm	3,490 (11' 5")	3,590 (11' 9")	3,490 (11' 5")	3,490 (11' 5")
	(ft in)	[2,990] (9' 10")	[2,990] (9' 10")	[2,990] (9' 10")	[2,990] (9' 10")
Weight	kg (lb)	24,890 (54,882)	25,990 (57,308)	25,380 (56,963)	26,090 (57,528)



9JH05881

- Fixed gauge specification machine

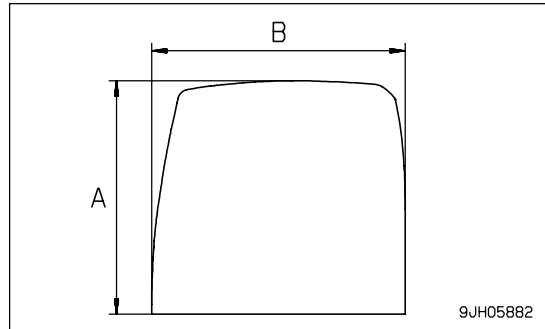
Item	Unit	PC400	PC400LC	PC450	PC450LC
A	mm (ft in)	3,115 (10' 3")	3,115 (10' 3")	3,115 (10' 3")	3,115 (10' 3")
B	mm (ft in)	5,850 (19' 2")	6,035 (19' 10")	5,850 (19' 2")	6,035 (19' 10")
Overall width	mm (ft in)	3,340 (10' 11")	3,440 (11' 3")	3,340 (10' 11")	3,340 (10' 11")
Weight	kg (lb)	23,720 (52,303)	24,720 (54,508)	24,170 (53,295)	25,180 (55,522)



9JH05881

Cab

Item	Unit	PC400, PC400LC	PC450, PC450LC
A	mm (ft in)	1,670 (5' 6")	1,670 (5' 6")
B	mm (ft in)	1,840 (6')	1,840 (6')
Overall width	mm (ft in)	1,000 (3' 3")	1,000 (3' 3")
Weight	kg (lb)	280 (617)	280 (617)

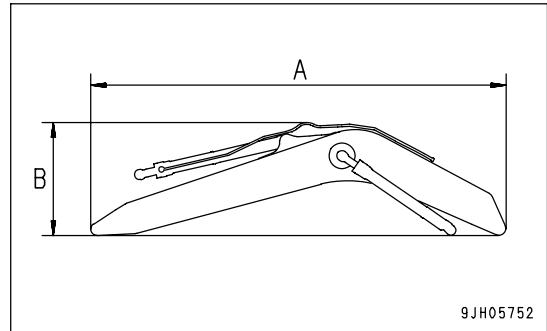


9JH05882

Work Equipment

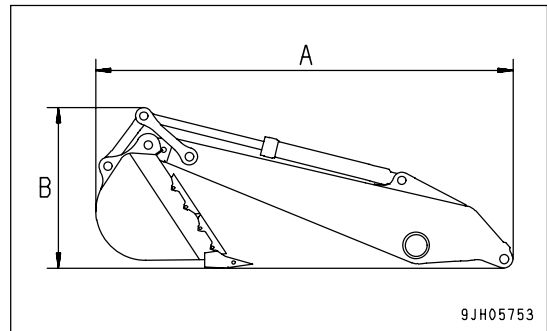
- Boom

Item	Unit	PC400, PC400LC	PC450, PC450LC
A	mm (ft in)	7,280 (23' 11")	7,280 (23' 11")
B	mm (ft in)	1,730 (5' 8")	1,760 (5' 8")
Overall width	mm (ft in)	985 (3' 3")	985 (3' 3")
Weight	kg (lb)	4,600 (10,143)	4,770 (10,518)



- Arm, Bucket

Item	Unit	PC400, PC400LC	PC450, PC450LC
A	mm (ft in)	4,890 (16' 1")	5,050 (16' 7")
B	mm (ft in)	1,950 (6' 5")	1,950 (6' 5")
Overall width	mm (ft in)	1,620 (5' 4")	1,620 (5' 4")
Weight	kg (lb)	3,430 (7,563)	4,230 (9,327)

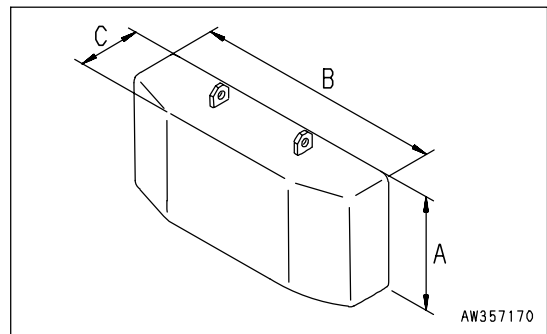


Others

The value given in [] for the overall width is the value for the America specification machine.

- Counterweight

Item	Unit	PC400, PC400LC	PC450, PC450LC
A	mm (ft in)	1,145 (3' 9")	1,145 (3' 9")
B	mm (ft in)	2,995 (9' 10")	2,995 (9' 10")
C	mm (ft in)	970 (3' 2")	970 (3' 2")
Weight	kg (lb)	9,230 (20,352) [9,510 (20,970)]	9,230 (20,352) [9,510 (20,970)]



COLD WEATHER OPERATION

COLD WEATHER OPERATION INFORMATION

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

Fuel and Lubricants

Change to fuel and oil with low viscosity for all components. For details of the specified viscosity, see "LUBRICANTS, FUEL AND COOLANT SPECIFICATIONS (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

- Never use methanol, ethanol, or propanol-based antifreeze.
- Never use any water-leakage prevention agent or any antifreeze containing such an agent.
- Do not mix different types of antifreeze.

For details of the antifreeze mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-24)".

Use a Permanent Antifreeze (ethylene glycol mixed with corrosion inhibitor, antifoam agent, etc.) meeting the standard requirements as shown below. With permanent antifreeze, no change of coolant is required for a year. If it is doubtful that an available antifreeze meets the standard requirements, ask the supplier of that antifreeze for information.

Standard requirements for permanent antifreeze

- SAE J1034
- FEDERAL STANDARD O-A-548D

REMARK

In areas where permanent antifreeze is not available, it is possible to use antifreeze whose main component is ethylene glycol and does not contain any corrosion inhibitor. (Such antifreeze can be used for the winter season only.) However, in such a case, the coolant must be changed twice a year (spring and autumn), so use permanent antifreeze when possible.

Battery



WARNING

- The battery generates flammable gas, so do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.
- Battery electrolyte dissolves paint. If it gets on to the bodywork, wash it off immediately with water.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is danger that the battery may explode.
- Battery electrolyte is toxic, so do not let it flow into drainage ditches or spray it on to the ground surface.
- If the breather hole in the battery cap becomes clogged, there is danger of damage to the battery. If the breather hole is clogged, clean it.

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
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.

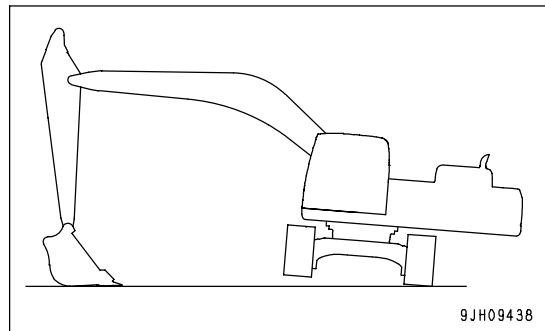
- Remove all the mud and water from the machine body. In particular, wipe the hydraulic cylinder rods clean to prevent damage to the seal caused by mud, dirt, or drops of water on the rod from getting inside the seal.
- Park the machine on hard, dry ground.

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.

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 all fuel and oil with the specified fuel and oil.

For details, see "LUBRICANTS, FUEL AND COOLANT SPECIFICATIONS (PAGE 4-9)".

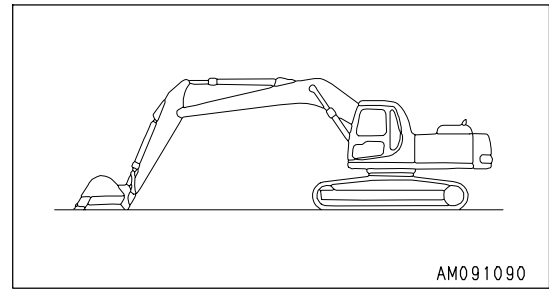
LONG TERM STORAGE

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 putting the machine in storage for a long time (more than one month), do as follows.

- Clean and wash all parts, then store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with canvas.
- Completely fill the fuel tank. This prevents moisture from collecting.
- Lubricate and change the oil before storage.
- Coat the exposed portion of the hydraulic cylinder piston rod with grease.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
- Lock each control lever and pedal with the lock lever and pedal lock.
- 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 "Where no attachment is mounted" position.

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.
- For machines equipped with an air conditioner, run the air conditioner.

AFTER STORAGE

NOTICE

If the machine has been stored without carrying out the monthly rust-prevention operation, consult your Komatsu distributor before using it.

When using the machine after long-term storage, do as follows before using it.

- Wipe off the grease from the hydraulic cylinder rods.
- Add oil and grease at all lubrication points.
- When the machine is stored for a long period, moisture in the air will mix with the oil. Check the oil before and after starting the engine. If there is water in the oil, change all the oil.

STARTING MACHINE AFTER LONG-TERM STORAGE

When starting the engine after the machine has been in storage for a long time, perform the automatic warming-up operation.

If the engine is started according to the starting procedure for cold weather, the warming-up operation is performed automatically.

(For details, see "Starting Engine in Cold Weather (PAGE 3-74)" and "In Cold Weather Areas (PAGE 3-79)".)

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.

Always watch the fuel level and be careful not to run out of fuel.

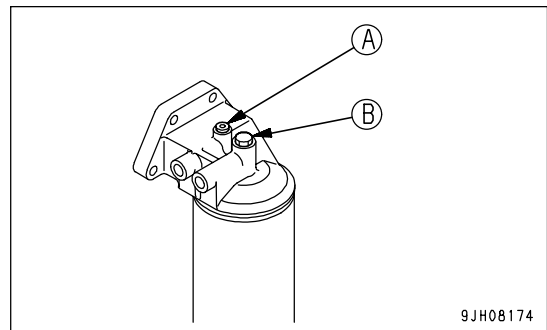
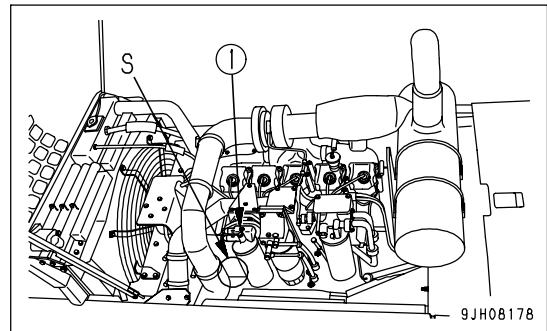
If the engine has stopped because of lack of fuel, it is necessary to use the priming pump to bleed the air completely from the fuel circuit.

Procedure for Bleeding Air

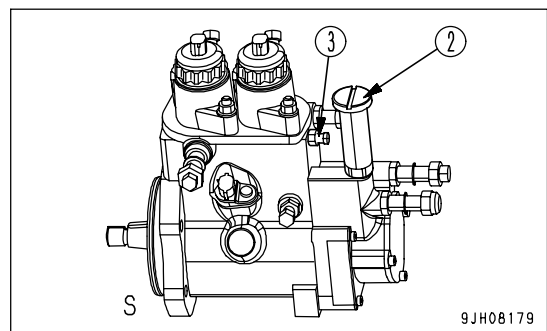
CAUTION

- This engine consists of higher precision parts than on the conventional fuel injection pump and nozzle, so if dirt gets in, it will cause problems. If there is any dirt stuck to the fuel line, use fuel to wash it off completely.
- Be careful when opening the air bleed plug at the fuel filter head and the air bleeder of the supply pump. The system is still under pressure and fuel may spurt out.

1. Loosen air bleed plug (A), (B) at the fuel filter head (1).
2. Loosen the knob of priming pump (2), then pump the knob until no more bubbles come out of air bleed plug (A).
3. Wrap sealing tape around air bleed plug (A) before tightening it.
4. Operate the priming pump again and check that no more bubbles come out with the fuel from air bleed plug (B).
5. Tighten air bleed plug (B).
Tightening torque: 4.9 to 6.9 N·m (0.5 to 0.7 kgf·m, 3.6 to 5.1 lbft)



6. Loosen air bleeder (3) of the supply pump.
7. Pump priming pump (2) approx. 90 - 100 times until no more bubbles come out with the fuel from air bleeder (3), then tighten air bleeder (3).
Tightening torque: 4.9 to 6.9 N·m (0.5 to 0.7 kgf·m, 3.6 to 5.1 lbft)



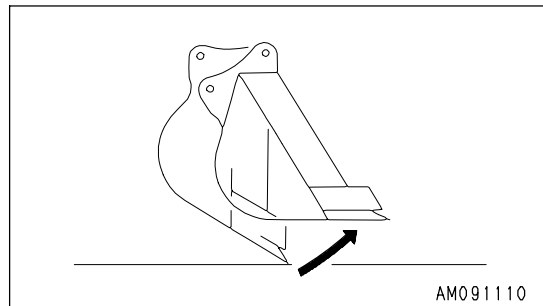
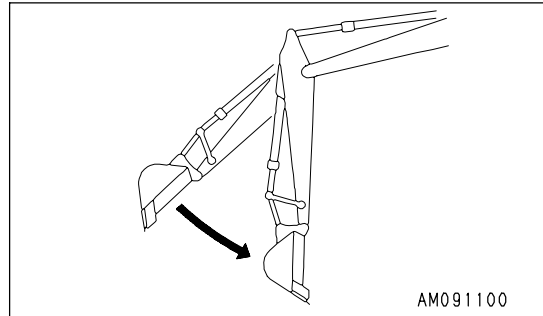
8. Continue pumping (approx. 50 times) until the priming pump (2) becomes stiff and the overflow valve release sound becomes continuous.

9. Push in the knob of priming pump (2) and tighten it.
10. 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.
11. If the engine does not start, repeat the operation from Step 1.

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.

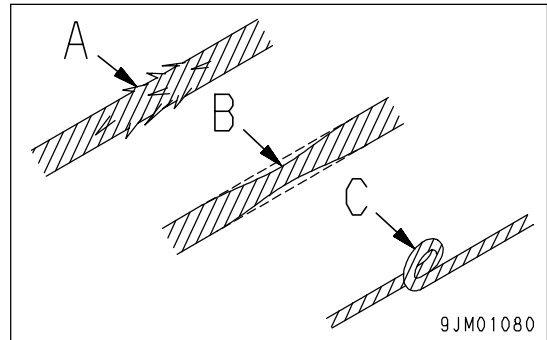


TOWING THE MACHINE

**WARNING**

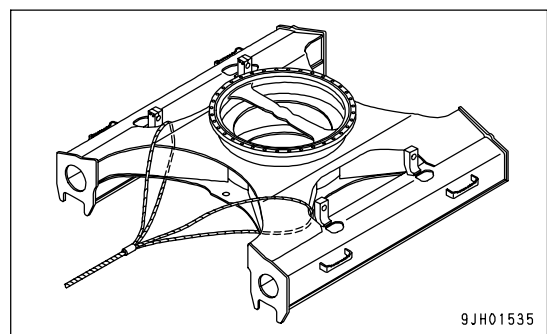
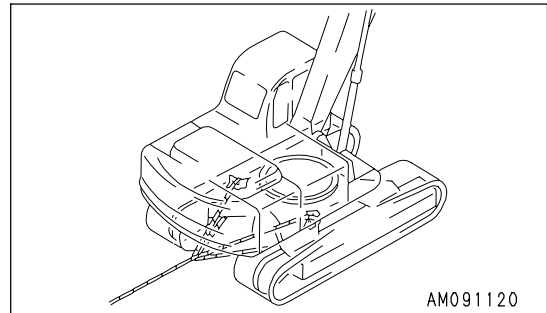
Serious injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection or inspection of the wire rope.

- 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 303,030N (30,900 kgf). 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.



LIGHTWEIGHT TOWING HOLE

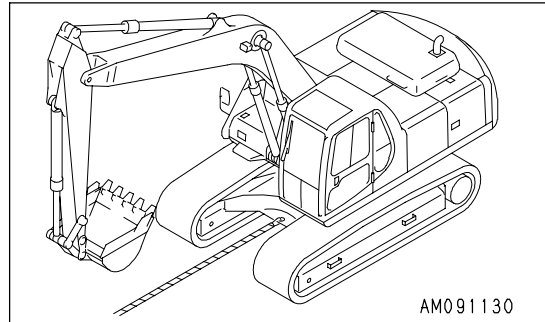


WARNING

- The shackle must always be used.
- Hold the rope level and direct it straight to the track frame.
- Move the machine slowly in the Lo mode.

There is a hole in the track frame to fit the shackle when towing light objects.

Permissible towing load: Max. 154,000N(16,000 kgf)



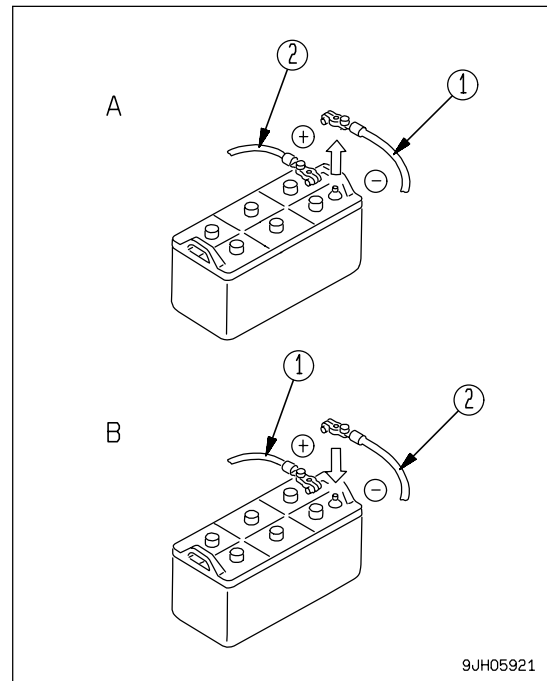
SEVERE JOB CONDITION

- 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.

DISCHARGED BATTERY

**WARNING**

- It is dangerous to charge a battery when mounted on a machine. Make sure that it is dismantled before charging.
- When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.
- The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.
- Battery electrolyte is dilute sulphuric 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 protective goggles and rubber gloves.
- When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal) (diagram A). When installing, install the positive (+) terminal first (diagram B).
If a tool touches between at 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. Terminals should be connected firmly.
- When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.



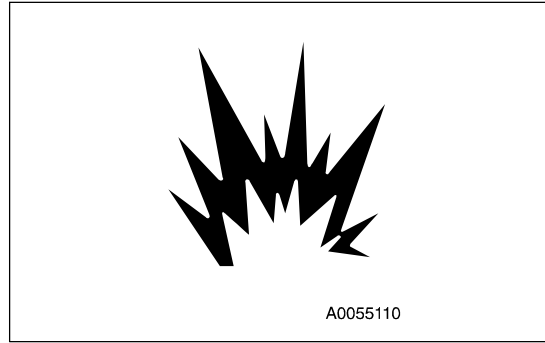
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Battery Removal and Installation

- Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal).
If any tool touches between the positive terminal and the chassis, there is a hazard of sparks being generated.
- When installing the battery, connect the ground cable last.
- When replacing the battery, secure it with battery hold-down.
Tightening torque: Tightening battery terminal: 9.8 to 14.7 N·m (1 to 1.5 kgf·m, 7.2 to 10.8 lbft)

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 3-133)" 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.

Starting Engine with Booster Cables

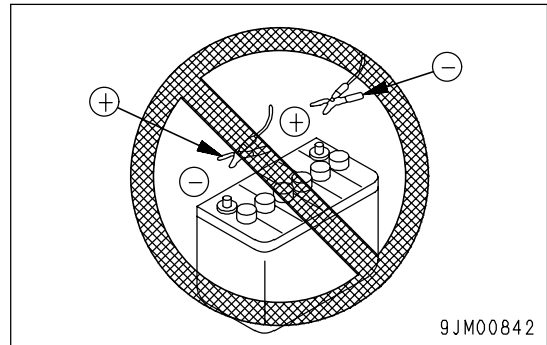
When starting the engine with a booster cable, do as follows:

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

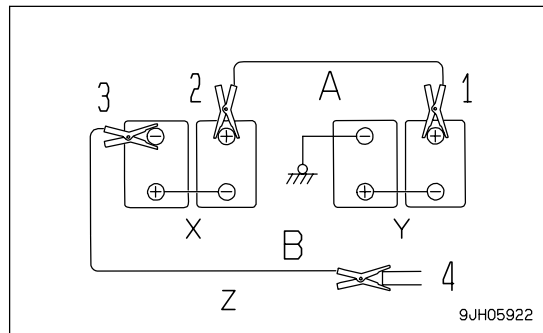
- The starting system for this machine uses 24V. For the normal machine, also use a 24V battery.
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the engine to be started.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check that the lock levers and parking brake levers of both machine are in the LOCK position.
- Check that each lever is in the NEUTRAL position.

Booster Cable Connection

Keep the starting switch of the normal machine and problem machine in the OFF position.

Connect the booster cable as follows, in the order of the numbers marked in the diagram.

1. Connect one clip of booster cable (A) to the positive (+) terminal of the problem machine.
2. Connect the other clip of booster cable (A) to the positive (+) terminal of the normal machine.
3. Connect one clip of booster cable (B) to the negative (-) terminal of the normal machine.
4. Connect the other clip of booster cable (B) to the upper structure frame of the problem machine.



X: Battery on normal machine

Y: Battery on problem machine

Z: Upper structure frame on problem machine

Starting the Engine



WARNING

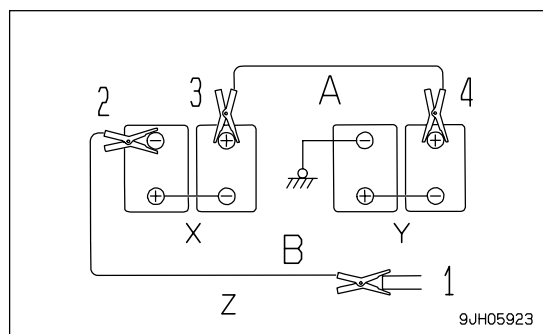
Always check that the lock lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Check also that all the control levers are in the HOLD or neutral position.

1. Make sure the clips are firmly connected to the battery terminals.
 2. Start engine of the normal machine and run it at high idle speed.
 3. Turn the starting switch of the problem machine to the START position and start the engine.
- If the engine doesn't start at first, try again after 2 minutes or so.

Booster Cable Disconnection

After the engine has started, disconnect booster cables in the reverse order in which they were connected.

1. Remove one clip of booster cable (B) from the revolving frame of the problem machine.
2. Remove the other clip of booster cable (B) from the negative (-) terminal of the normal machine.
3. Remove one clip of booster cable (A) from the positive (+) terminal of the normal machine.
4. Remove the other clip of booster cable (A) from the positive (+) terminal of the problem machine.



X: Battery on normal machine

Y: Battery on problem machine

Z: Upper structure frame on problem machine

OTHER TROUBLE

Electrical System

- (): Always contact your Komatsu distributor when dealing with these items.
- In cases of problems or causes which are not listed below, contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed	<ul style="list-style-type: none"> • Defective wiring, deterioration of battery • Loose fan belt 	<ul style="list-style-type: none"> (• Check, repair loose terminals, disconnections, replace battery) • Check fan belt tension, replace
Lamp flickers while engine is running		
Charge level monitor does not go out even when engine is running	<ul style="list-style-type: none"> • Defective alternator • Defective wiring 	<ul style="list-style-type: none"> (• Replace) (• Check, repair)
Abnormal noise is generated from alternator	<ul style="list-style-type: none"> • Defective alternator 	<ul style="list-style-type: none"> (• Replace)
Starting motor does not turn when starting switch is turned to ON	<ul style="list-style-type: none"> • Defective wiring • Defective starting motor • Insufficient battery charge 	<ul style="list-style-type: none"> (• Check, repair) (• Replace) • Charge
Pinion of starting motor keeps going and out	<ul style="list-style-type: none"> • Insufficient battery charge • Defective safety relay 	<ul style="list-style-type: none"> • Charge (• Replace)
Starting motor turns engine sluggishly	<ul style="list-style-type: none"> • Insufficient battery charge • Defective starting motor 	<ul style="list-style-type: none"> • Charge (• Replace)
Starting motor disengages before engine starts	<ul style="list-style-type: none"> • Defective wiring, defective ring gear pinion • Insufficient battery charge 	<ul style="list-style-type: none"> (• Check, repair) • Charge
Engine pre-heating monitor does not light	<ul style="list-style-type: none"> • Defective wiring • Defective heater relay • Defective monitor 	<ul style="list-style-type: none"> (• Check, repair) (• Replace) (• Replace)
Oil pressure monitor does not light up when engine is stopped (starting switch at ON position)	<ul style="list-style-type: none"> • Defective monitor • Defective caution lamp switch 	<ul style="list-style-type: none"> (• Replace) (• Replace)
Outside of electrical heater is not warm when touched by hand	<ul style="list-style-type: none"> • Defective wiring • Disconnection in electric heater • Defective operation of heater relay switch 	<ul style="list-style-type: none"> (• Check, repair) (• Replace) (• Replace)

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

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	<ul style="list-style-type: none"> • Engine oil pan oil level is low (sucking in air) • Clogged oil filter cartridge • Defective tightening of oil pipe joint, oil leakage from damaged part • Defective engine oil pressure sensor • Defective monitor 	<ul style="list-style-type: none"> • Add oil to specified level, see CHECK BEFORE STARTING • Replace cartridge, see EVERY 500 HOURS SERVICE (• Check, repair) (• Replace sensor) (• Replace monitor)
Steam is emitted from top part of radiator (pressure valve)	<ul style="list-style-type: none"> • Cooling water level low, water leakage • Loosen fan belt • Dirt or scale accumulated in cooling system 	<ul style="list-style-type: none"> • Add cooling water, repair, see CHECK BEFORE STARTING • Replace fan belt Check tension • Change cooling water, clean inside of cooling system, see WHEN REQUIRED
Radiator water level monitor lights up	<ul style="list-style-type: none"> • Clogged radiator fin or damaged fin • Defective thermostat • Loose radiator filler cap (high altitude operation) • Defective water level sensor • Defective monitor 	<ul style="list-style-type: none"> • Clean or repair, see EVERY 500 HOURS SERVICE (• Replace thermostat) • Tighten cap or replace packing (• Replace sensor) (• Replace monitor)
Engine does not start even when starting motor is turned	<ul style="list-style-type: none"> • Lack of fuel • Air in fuel system • Defective fuel injection pump or nozzle • Starting motor cranks engine too slowly • Preheating monitor does not light up • defective compression <ul style="list-style-type: none"> • Defective valve clearance • Password setting is wrong 	<ul style="list-style-type: none"> • Add fuel, see CHECK BEFORE STARTING • Repair place where air is sucked in. See EVERY 500 HOURS SERVICE. (• Replace pump or nozzle) • See ELECTRICAL SYSTEM • See ELECTRICAL SYSTEM (• Adjust valve clearance) (• Input correct password)
Exhaust gas is white or blue	<ul style="list-style-type: none"> • Excessive oil in il pan • Improper fuel 	<ul style="list-style-type: none"> • Add oil to specified level. See CHECK BEFORE STARTING. • Replace with specified fuel
Exhaust gas is black	<ul style="list-style-type: none"> • Clogged air cleaner element • Defective nozzle • Defective compression • Defective turbocharger 	<ul style="list-style-type: none"> • Clean or replace. See WHEN REQUIRED. (• Replace nozzle) (• See "Defective pressure" above) • Wash or replace turbocharger
There is sometimes breathing in combustion sound	<ul style="list-style-type: none"> • Defective nozzle 	<ul style="list-style-type: none"> (• Defective nozzle)

Problem	Main causes	Remedy
Abnormal noise is generated (combustion or mechanical)	<ul style="list-style-type: none">• Poor quality fuel being used• Overheating • Breakage inside muffler• Excessive valve clearance	<ul style="list-style-type: none">• Replace with specified fuel• See "Radiator water level monitor lights up" above• Replace muffler(• Adjust valve clearance)

Electronic Control System

If an error code appears on the machine monitor display (normally displays TIME), follow the countermeasure table as shown below in the self-diagnosis.

Machine Monitoring System

Monitor display	Error mode	Countermeasure
E02	PC-EPC valve system error	If the pump override switch is set to the ON position, operation can be carried out. However, immediately have the TVC valve system inspected by your Komatsu distributor.(*)
E03	Swing brake system error	Turn the swing prolix switch ON to cancel the brake. When applying the swing brake, operate the swing lock switch manually. Depending on the cause of the failure, it may be impossible to release the brake. In any case, have the system inspected immediately by your Komatsu distributor.(*)
E05	Governor system error	Governor will not execute the control function. Manually operate the governor-lever. To fix the governor lever at the full stroke position, use the retaining bolt holes on bracket. In this case, immediately have the governor system inspected by your Komatsu distributor.
When no error code is displayed and starting motor rotates, but engine does not start		Turn emergency fuel solenoid drive switch ON and turn starting switch to START. If engine starts, release emergency fuel solenoid drive switch and return it to OFF position. The switch will return automatically to the OFF position when it is released.
In the case where the monitor will not display error codes and work equipment operation and swing operation cannot be carried out.		Have the machine inspected immediately by your Komatsu distributor.

(*): For details of handling the emergency pump drive switch and swing holding brake cancel switch, see "SWITCHES (PAGE 3-17)".

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MAINTENANCE

 **WARNING**

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

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

Use Komatsu genuine oils and grease. Choose oils and grease with proper viscosities specified for 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

If your machine is equipped with a fuel strainer, do not remove it while fueling.

Welding Instructions

- Turn off the engine starting switch.
- Do not apply more than 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.

Dusty Jobsite

When working at dusty worksites, do as follows:

- Inspect the air cleaner clogging monitor frequently to see if the air cleaner is 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 4-40)".

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 2-34)" 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?

OUTLINE OF SERVICE

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 shorten the oil change interval.
For this reason, we recommend making full use of the Komatsu oil clinic.

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.

Cooling System Coolant

- River water contains large amount of calcium and other impurities, so if it is used, scale will stick to the engine and radiator, and this will cause defective heat exchange and overheating.
Do not use water that is not suitable for drinking.
- When using antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- Komatsu machines are supplied with Komatsu original anti-freeze in the coolant when the machine is shipped. This anti-freeze is effective in preventing corrosion of the cooling system.
The anti-freeze can be used continuously for two years or 4000 hours. Therefore, it can be used as it is even in hot areas.
- Antifreeze is flammable, so be extremely careful not to expose it to flame or fire.
- The proportion of anti-freeze to water differs according to the ambient temperature.
For details of the mixing proportions, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-24)".
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating, and will also cause problems with corrosion due to air entering the coolant.

Grease

- Grease is used to prevent seizure and noises at the joints.
- This construction equipment is used under heavy-duty conditions. Always use the recommended grease and follow the change intervals and recommended ambient temperatures given in this Operation and Maintenance Manual.
- 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)

The oil clinic samples the oil periodically and analyzes it. This is a preventive maintenance service, which provides early discovery of abnormal parts and wear of the drive parts of the machine. This then makes it possible to ensure prevention of failures and reduction in downtime.

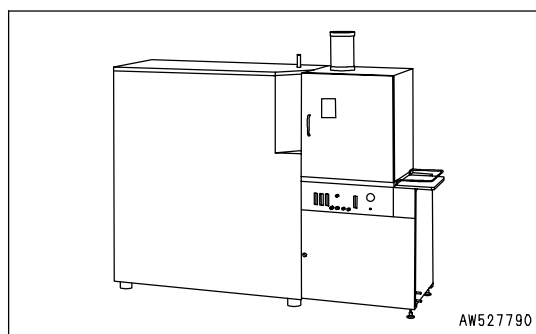
Komatsu's long years of experience and rich supply of accumulated data make it possible to accurately determine the condition of your machine. This enables us to locate the problems and to recommend suitable and timely repair methods.

The oil clinic charges the customer only the actual costs, and provides an immediate report of the results of the analysis and recommendations for action to take. This low-cost service can save you high costs and inconvenience in the future, so we strongly recommend you to avail yourself of this service.

KOWA Analysis Items

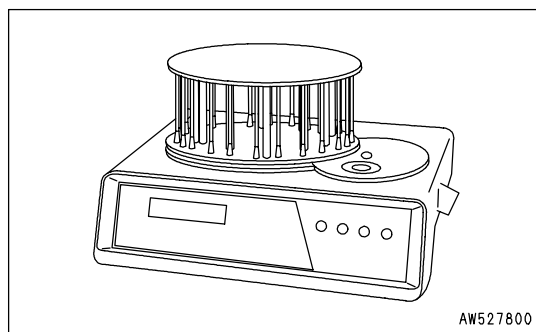
- Measurement of density of metal wear particles

This uses an ICP (Inductively Coupled Plasma) analyzer to measure the density of iron, copper, and other metal wear particles in the oil.



- Measurement of quantity of particles

This uses a particle quantifier index measurement machine to measure the quantity of iron particles of 5 μ or more, enabling early detection of failures.



- Others

Measurements are made of items such as the ratio of water in the oil, density of the antifreeze coolant, ratio of fuel in the oil, and dynamic viscosity, enabling a highly precise diagnosis of the machine's health.

Oil Sampling

- Sampling interval

250 hours: Engine

500 hours: Other components

- Precautions when sampling

- Make sure that the oil is well mixed before sampling.
- Perform sampling at regular fixed intervals.
- Do not perform sampling on rainy or windy days when water or dust can get into the oil.

For further details of KOWA, please contact your Komatsu distributor.

Oil and Fuel Storage

- Keep indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, put the drum on its side so that the filler port of the 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.

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	Change interval
Engine oil filter	600-211-1340	Cartridge	1	Every 500 hours
Fuel filter	600-319-3520	Cartridge	1	Every 500 hours (Without additional fuel filter) Every 1000 hours (With additional fuel filter)
Additional fuel filter	600-319-3440	Cartridge	1	Every 500 hours
Hydraulic tank breather	20Y-60-21470	Element	1	Every 500 hours
Additional breather for hydraulic tank	421-60-35170	Element	1	Every 1000 hours
Corrosion resistor	600-411-1571	Cartridge	1	Every 1000 hours
Hydraulic oil filter	208-60-71122 (07000-15210)	Element (O-ring)	1 (1)	Every 1000 hours
Air conditioner RECIRC filter	20Y-979-6261	Filter		Every one year
Air conditioner FRESH filter	17M-911-3530	Element		Every one year
Air cleaner	600-185-6100	Element assembly (Outer, Inner, O-ring)	1	-
Additional filter for breaker (if equipped)	207-970-5121 (07000-12011) (07000-02125)	Element (O-ring) (O-ring)	1 (1) (1)	-
Electric heater	6150-11-4821	Gasket	2	-
Line filter (if equipped)	207-60-61250 (07002-13634)	Element (O-ring)	2 (2)	-
Bucket	208-70-34211 (208-70-34200)	Vertical pin type Tooth (Pin)	5 (5)	-
	208-70-14152	Horizontal pin type Tooth	5	
	208-70-34160 208-70-34170	Side cutter type cutter (left) cutter (right)	1 1	
	208-934-7130 113-78-21170 209-939-7110 209-939-7120	Shroud type Shroud Pin Shim Shim	4 8 16 8	

LUBRICANTS, FUEL AND COOLANT SPECIFICATIONS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE									
		-22	-4	14	32	50	68	86	104	122°F	
		-30	-20	-10	0	10	20	30	40	50°C	
Engine oil pan	Engine oil					SAE 30					
			SAE 10W								
		SAE 10W-30									
		SAE 15W-40									
Swing machinery case	Engine oil										
Final drive case (each)		SAE 30									
Damper case											
Hydraulic system	Engine oil	SAE 10W									
		SAE 10W-30									
		SAE 15W-40									
Fuel tank	Diesel fuel	ASTM D975 No.2									
		*									
Grease fitting	Grease	NLGI No.2									
Cooling system	Water	Add antifreeze									

*1: ASTM D975 No.1

NOTICE

Use only diesel fuel.

The engine mounted on this machine employs electronic control and a high-pressure fuel injection device to obtain good fuel consumption and good exhaust gas characteristics. For this reason, it requires high precision for the parts and good lubrication. If kerosene or other fuel with low lubricating ability is used, there will be a big drop in durability.

		Engine oil pan	Swing machinery case	Final drive case (Each)	Damper case	Hydraulic oil system	Cooling system	Fuel tank
Specified capacity	Liter	42	20	12	1.07	472	36	650
	US gal	11.10	5.28	3.17	0.28	124.70	9.51	171.73
Refill capacity	Liter	38	20	12	1.07	248	36	-
	US gal	10.04	5.28	3.17	0.28	65.2	9.51	-

REMARK

- When fuel sulphur content is less than 0.5%, change oil in the oil pan according to the periodic maintenance hours described in this manual.
Change oil according to the following table if fuel sulfur content is above 0.5%.
- When starting the engine with an atmospheric temperature of lower than 0°C (32°F), be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though the atmospheric temperature goes up to 10°C (50°F) more or less during the day.
- Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.
- There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30, 15W-40), but be sure to add single grade oil that matches the temperature range in the table.
- We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

Specified capacity: Total amount of oil including oil for components and oil in piping.

Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

ASTM: American Society of Testing and Material

SAE: Society of Automotive Engineers

API: American Petroleum Institute

Fuel sulfur content	Engine oil change interval
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

No.	Supplier	Engine Oil [CD or CE] SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.)	Gear Oil [GL-4 or GL-5] SAE80, 90, 140	Grease [Lithium-Base] NLGI No.2	Anti-freeze Coolant [Ethylene Glycol Base] Permanent Type
1	KOMATSU	EO10-CD EO30-CD EO10-30CD EO15-40CD	GO90 GO140	G2-LI G2-LI-S	AF-ACL AF-PTL AF-PT(Winter, one season type)
2	AGIP	Diesel sigma S super dieselmulti- grade *Sigma turbo	Rotra MP	GR MU/EP	-
3	AMOCO	*Amoco 300	Multi-purpose gear oil	PYKON premium grease	-
4	ARCO	*Arcofleet S3 plus	Arco HD gear oil	Litholine HEP 2 Arco EP moly D	-
5	BP	Vanellus C3	Gear oil EP Hypogear EP	Energrease LS-EP2	Antifreeze
6	CALTEX	*RPM delo 400 RPM delo 450	Universal thuban Universal thuban EP	Marfak all purpose 2 Ultra-duty grease 2	AF engine coolant
7	CASTROL	*Turbomax *RX super CRD	EP EPX Hypoy Hypoy B Hypoy C	MS3 Spheerol EPL2	Anti-freeze
8	CHEVRON	*Delo 400	Universal gear	Ultra-duty grease 2	-
9	CONOCO	*Fleet motor oil	Universal gear lubricant	Super-sta grease	-
10	ELF	Multiperformance 3C Performance 3C	-	Tranself EP Tranself EP type 2	Glacelf
11	EXXON (ESSO)	Essolube D3 *Essolube XD-3 *Essolube XD-3 Extra *Esso heavy duty Exxon heavy duty	Gear oil GP Gear oil GX	Beacon EP2	All season coolant
12	GULF	Super duty motor oil *Super duty plus	Multi-purpose gear lubricant	Gulfcrown EP2 Gulfcrown EP special	Antifeeze and coolant
13	MOBIL	Delvac 1300 *Delvac super 10W-30, 15W-40	Mobilube GX Mobilube HD	Mobilux EP2 Mobilgease 77 Mobilgrease special	-

No.	Supplier	Engine Oil [CD or CE] SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.)	Gear Oil [GL-4 or GL-5] SAE80, 90, 140	Grease [Lithium-Base] NLGI No.2	Anti-freeze Coolant [Ethylene Glycol Base] Permanent Type
14	PENNZOIL	*Supreme duty fleet motor oil	Multi-purpose 4092 Multi-purpose 4140	Multi-purpose white grease 705 707L White-bearing grease	Anti-freeze and summer coolant
15	PETROFIN A	FINA kappa TD	FINA potonic N FINA potonic NE	FINA marson EPL2	FINA tamidor
16	SHELL	Rimura X	Spirax EP Spirax heavy duty	Albania EP grease	-
17	SUN	-	Sunoco GL5 gear oil	Sunoco ultra prestige 2EP Sun prestige 742	Sunoco antifreeze and summer coolant
18	TEXACO	*Ursa super plus Ursa premium	Multigear	Multifak EP2 Starplex 2	Coda 2055 startex antifreeze coolant
19	TOTAL	Rubia S *Rubia X	Total EP Total Transmission TM	Multis EP2	Antigal/antifreeze
20	UNION	*Guardol	MP gear lube LS	Unoba EP	-
21	VEEDOL	*Turbostar *Diesel star MDC	Multigear Multigear B Multigear C	-	Antifreeze

TIGHTENING TORQUE SPECIFICATIONS

TIGHTENING TORQUE LIST

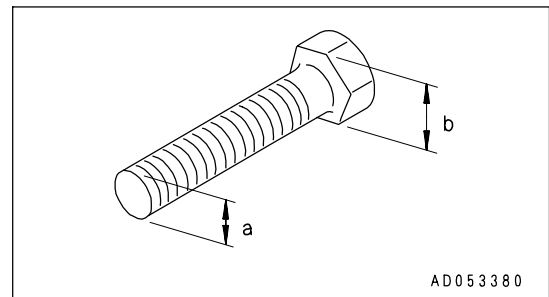


If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation.

Always pay careful attention when tightening parts.

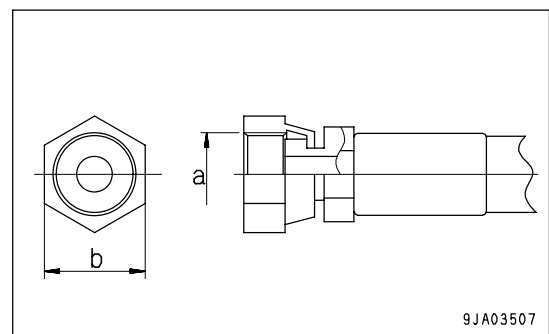
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below. If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		N·m	kgf·m	lbft	N·m	kgf·m	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.

Thread diameter a (mm)	Width across flat b(mm)	Tightening torque [N·m (kgf·m)]	
		Target value	Permissible range
9/16 -18UNF	19	44 (4.5)	35 - 54 (3.5 - 5.5)
11/16 -16UN	22	74 (7.5)	54 - 93 (5.5 - 9.5)
13/16 -16UN	27	103 (10.5)	84 - 132 (8.5 - 13.5)
1 -14UNS	32	157 (16.0)	128 - 186 (13.0 - 19.0)
1-3/16 -12UN	36	216 (22.0)	177 - 245 (18.0 - 25.0)
*1-7/16-12UN -2B	41	215 (22)	176 - 234 (18 - 24)



- The torques marked * indicate the tightening torques for the hoses at the top of the swivel joint.

SAFETY CRITICAL PARTS

For using the machine safely for an extended period of time, you are required to periodically replace the safety (critical and fire prevention) related parts listed in the table of important parts on the following page.

Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.

Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.

If any of the hose clamps show deterioration like deformation or cracking, replace the clamps at the same time as the hoses.

Also perform the following checks with hydraulic hoses which need to be replaced periodically. Tighten all loose clamps and replace defective hoses, as required.

When replacing hoses, always replace O-rings, gaskets, and other such parts at the same time.

Have your Komatsu distributor replace the critical parts.

SAFETY CRITICAL PARTS LIST

No	Safety critical part	Q'ty	Replacement interval
1	Fuel return hose (engine to fuel cooler)	1	Every two years or 4000 hours, whichever comes sooner
2	Fuel cooler to fuel tank	1	
3	Fuel hose (fuel tank to fuel strainer)	1	
4	Fuel strainer to engine or additional fuel filter	1	
5	Spill hose (nozzle to fuel tank)	1	
6	Spill hose (between nozzles)	5	
7	Fuel hose (fuel filter to injection pump)	1	
8	Fuel hose	1	
9	Pump outlet hose (pump to control valve)	2	
10	Work equipment hose (boom cylinder inlet port)	4	
11	Work equipment hose (bucket cylinder line, boom foot portion)	2	
12	Work equipment hose (bucket cylinder inlet port)	2	
13	Work equipment hose (bucket cylinder inlet port 4.0 m (13 ft 1 in) arm)	2	
14	Work equipment hose (arm cylinder line, boom foot portion)	2	
15	Work equipment hose (arm cylinder inlet port)	2	
16	Attachment additional line hose (boom foot portion)	2	
17	Attachment additional line hose (boom intermediate portion)	2	
18	Attachment additional line hose (boom top portion)	2	
19	Swing line hose (swing motor inlet port)	2	
20	Main suction hose	1	
21	Gear pump suction hose	1	
22	Heater hose	2	
23	Travel line hose (control valve to swivel joint)	4	
24	Travel line hose (swivel joint to travel motor)	4	
25	Seat belt	1	

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 4-17)" to confirm the correct maintenance schedule when carrying out maintenance.

MAINTENANCE SCHEDULE CHART

INITIAL 250 HOURS MAINTENANCE (ONLY AFTER THE FIRST 250 HOURS)

REPLACE FUEL FILTER CARTRIDGE ----- 4- 55

INITIAL 1000 HOURS MAINTENANCE (ONLY AFTER THE FIRST 1000 HOURS)

CHECK ENGINE VALVE CLEARANCE, ADJUST ----- 4- 75

WHEN REQUIRED

CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT ----- 4- 19

CLEAN INSIDE OF COOLING SYSTEM ----- 4- 24

CHECK AND TIGHTEN TRACK SHOE BOLTS ----- 4- 26

CHECK AND ADJUST TRACK TENSION ----- 4- 27

CHECK ELECTRICAL INTAKE AIR HEATER ----- 4- 28

REPLACE BUCKET TEETH (VERTICAL PIN TYPE) ----- 4- 29

REPLACE BUCKET TEETH (HORIZONTAL PIN TYPE) ----- 4- 32

REPLACE BUCKET SIDE CUTTER, SHROUD ----- 4- 33

ADJUST BUCKET CLEARANCE ----- 4- 34

CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID ----- 4- 35

CHECK AND ADJUST AIR CONDITIONER ----- 4- 36

WASH WASHABLE FLOOR ----- 4- 37

BLEEDING AIR FROM HYDRAULIC SYSTEM ----- 4- 40

METHOD FOR RELEASING INTERNAL PRESSURE IN HYDRAULIC CIRCUIT ----- 4- 42

CHECK NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (CONTROL CIRCUIT) ----- 4- 43

CHECKS BEFORE STARTING

EVERY 50 HOURS MAINTENANCE

LUBRICATING ----- 4- 45

EVERY 100 HOURS MAINTENANCE

LUBRICATING ----- 4- 46

EVERY 250 HOURS MAINTENANCE

CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL ----- 4- 48

CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL ----- 4- 49

CHECK LEVEL OF BATTERY ELECTROLYTE ----- 4- 50

LUBRICATE SWING CIRCLE (2 POINTS) ----- 4- 53

CHECK FAN BELT, ALTERNATOR BELT TENSION, ADJUST ----- 4- 53

CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST ----- 4- 54

EVERY 500 HOURS MAINTENANCE

REPLACE FUEL FILTER CARTRIDGE (MACHINES EQUIPPED WITHOUT ADDITIONAL FUEL
FILTER CARTRIDGE) ----- 4- 55

CHECK, WASH FUEL STRAINER ----- 4- 57

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EVERY 1000 HOURS MAINTENANCE

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EVERY 2000 HOURS MAINTENANCE

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EVERY 4000 HOURS MAINTENANCE

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EVERY 5000 HOURS MAINTENANCE

CHANGE OIL IN HYDRAULIC TANK -----	4- 78
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EVERY 8000 HOURS MAINTENANCE

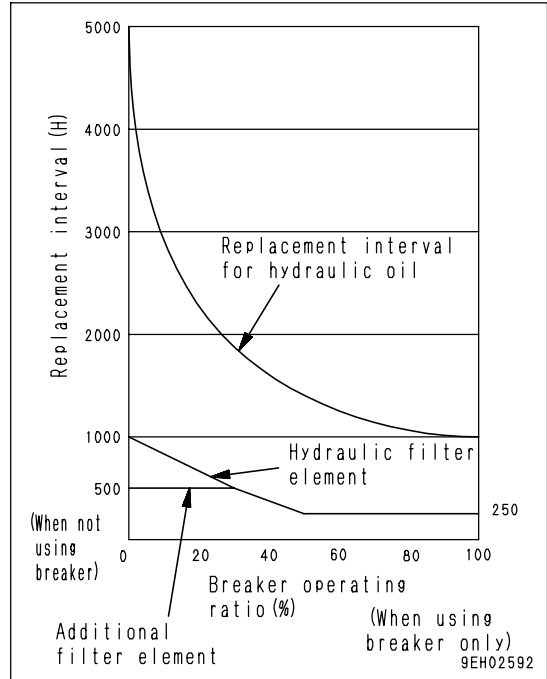
REPLACE HIGH-PRESSURE PIPING CLAMP -----	4- 80
REPLACE FUEL SPRAY PREVENTION CAP -----	4- 80

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 OIL FILTER ELEMENT

- On new machines, 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.

REPLACE ADDITIONAL FILTER ELEMENT FOR BREAKER

- 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.

MAINTENANCE PROCEDURE

INITIAL 250 HOURS MAINTENANCE (ONLY AFTER THE FIRST 250 HOURS)

Carry out the following maintenance only after the first 250 hours of operation on new machines.

- Replace fuel filter cartridge

Special tools are needed for the inspection and maintenance, so please contact your Komatsu distributor to have this work carried out.

For details of the method of replacing or maintaining, see the section on EVERY 500 HOURS SERVICE.

INITIAL 1000 HOURS MAINTENANCE (ONLY AFTER THE FIRST 1000 HOURS)

Carry out the following maintenance only after the first 1000 hours of operation on new machines.

- Check engine valve clearance, adjust

Special tools are needed for inspection and maintenance, so contact your Komatsu distributor.

For details of the method of replacing or maintaining, see the section on EVERY 2000 HOURS SERVICE.

WHEN REQUIRED

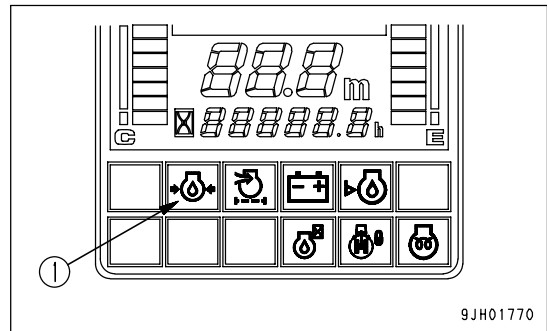
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

WARNING

- When using compressed air, there is danger of dirt flying and causing personal injury. Always wear protective glasses, dust mask, or other protective equipment.
- When removing the outer element from the air cleaner body, it is dangerous to pull it out by force. When working in high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

Checking

If air cleaner clogging monitor (1) of the monitor panel flashes, clean the air cleaner element.



Replacing

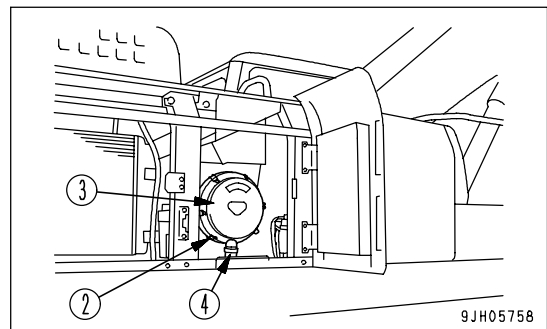
- Replacing element, O-ring
 - If one year has passed since installing the element or if air cleaner clogging monitor (1) on the monitor panel flashes immediately after the element is cleaned, replace the outer element, inner element, and O-ring.
- Replacing evacuator valve
 - Replace it if it is damaged or the rubber is markedly deformed.

NOTICE

- Do not clean the air cleaner element until the air cleaner clogging monitor on the monitor panel light up. If the element is cleaned frequently before the air cleaner clogging monitor light up, the air cleaner will not be able to display its performance fully, and the cleaning efficiency will also go down. In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.
- If inspection, cleaning, or maintenance is carried out with the engine running, dirt will enter the engine and cause damage to the engine. Always stop the engine before carrying out these operations.

Cleaning Outer Element

1. Open the engine hood at the front side of the machine, remove 6 hooks (2), then remove cover (3).



NOTICE

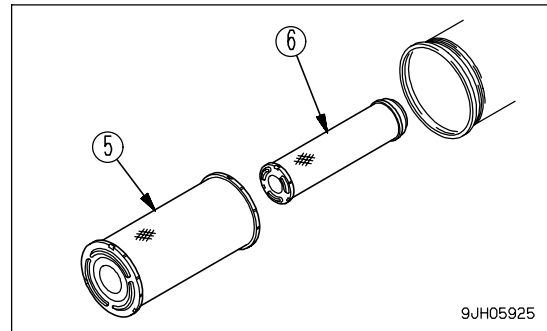
Before and after cleaning the element, do not leave or keep it in direct sunlight.

2. Hold the outer element, rock it lightly up and down and to the left and right, and rotate the element to the left and right to pull it out.

NOTICE

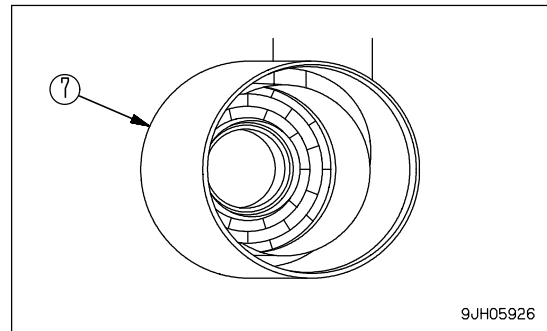
- Never remove the inner element (6). It will allow dirt to enter and cause failure of the engine.
- Do not use a screwdriver or other tool.

3. After removing the outer element (5), cover the inner element (6) with a clean cloth or tape to prevent dirt or dust from entering.

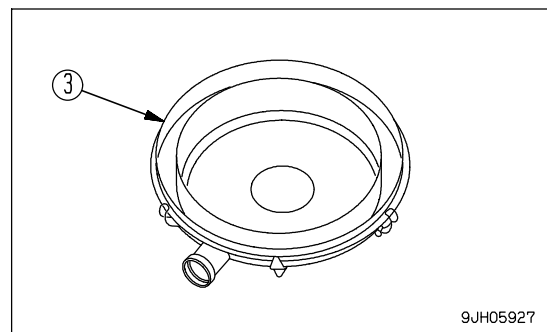


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4. Wipe off or brush off the dirt stuck to cover (3) and the inside of the air cleaner body (7).

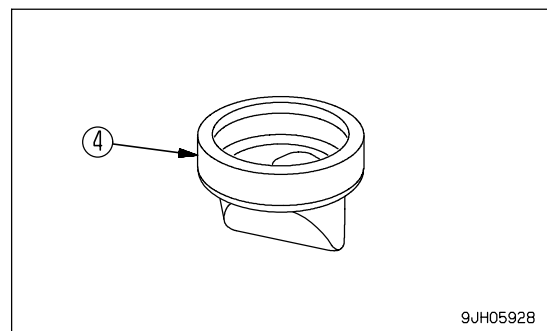


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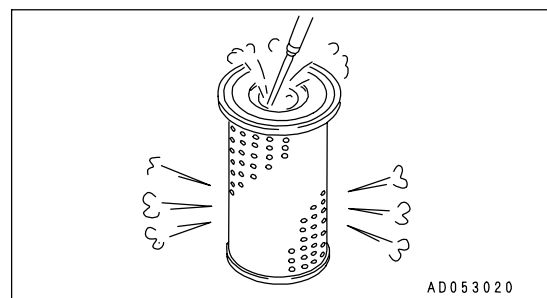
5. Remove any dirt or dust that is accumulated to evacuator valve (4) installed to cover (3).



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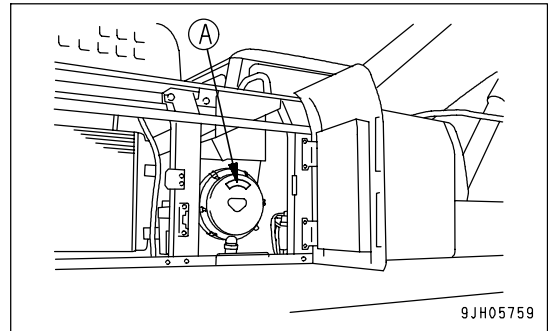
6. Direct dry compressed air (less than 0.69 MPa (7 kgf/cm², 99.4 PSI)) to the outer element from inside along its folds, then direct it from outside along its folds and again from inside.

- 1) Remove one seal from the element whenever the element has been cleaned.
- 2) Replace the outer element which has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.



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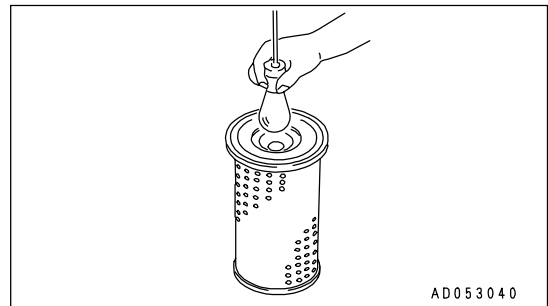
- 3) Replace both inner and outer elements when the air cleaner clogging monitor (1) lights up soon after installing the cleaned outer element even though it has not been cleaned 6 times.
- 4) When replacing the element, stick on seal (A) packed in the same box as the element. Stick the seal in the position shown in the diagram on the right.



- 7. Remove the cloth or tape cover installed in Step 3.
- 8. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.

NOTICE

- When cleaning the element, do not hit or beat it against anything.
- Do not use an element whose folds or gasket or seal are damaged.



Install Air Cleaner Element

NOTICE

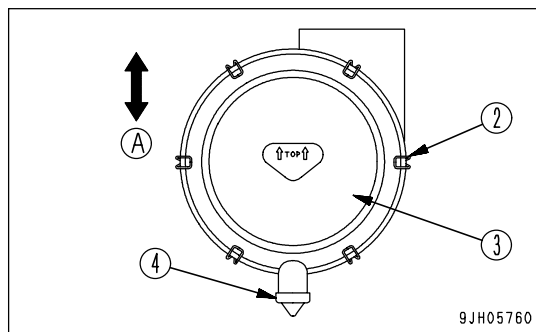
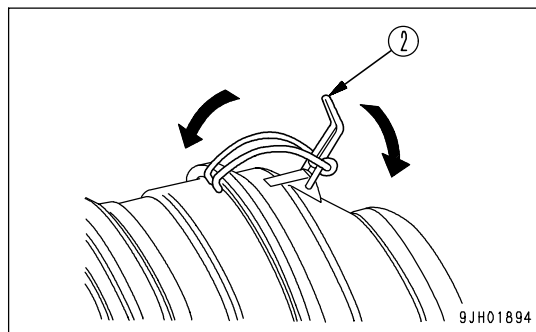
- Do not use any damaged gasket or seal or element with damaged pleats.
- Cleaning the element or O-ring after one year has passed and using them again will cause problems. Always replace them with new parts.
- The seal portion on imitation parts lacks precision, and allows the entry of dust, which leads to damage of the engine. Do not use such imitation parts.
- Do not run the engine with the inner element removed. It will cause damage to the engine.

1. Check that there is no dirt or oil stuck to the seal portion of the new element or cleaned element. Wipe off any dirt or oil.
2. When the outer element has been removed, check that the inner element has not come out of position and is not at an angle. If inner element is at an angle, insert your hand and push it in straight.
3. Push the outer element in straight with your hand when installing it to the air cleaner body.
If the outer element is held and rocked lightly up and down and to the left and right while pushing it in, the outer element can be inserted easily.

NOTICE

When inserting the element, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is assembled by force to hook (2), there is danger that the hook and air cleaner body may be damaged, so be careful when assembling.

4. Install cover (3) as follows.
 - 1) Align cover (3) with the element.
 - 2) Hook the tip of hook (2) to the protruding part of the air cleaner body and lock it in position.
 - 3) When locking hooks (2) in position, apply the hooks in turn on opposite sides (top, bottom, left, right) in the same way as when tightening bolts.
 - 4) Always install cover (3) so that the evacuator (4) is facing the ground (A).
 - 5) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large. If it is too large, install again.



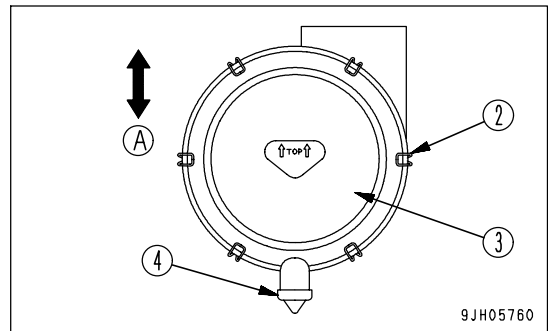
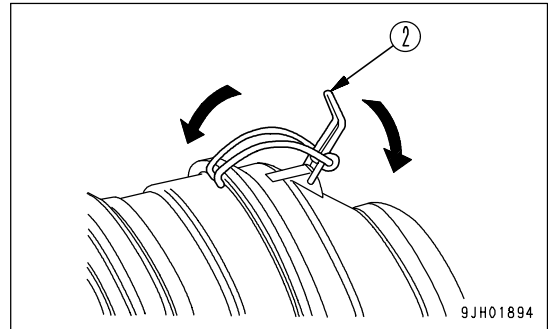
Replacing Inner Element

1. First remove the outer element, and then remove the inner element.
2. Cover the air connector side (outlet side) with a clean cloth or tape.
3. Clean the air cleaner body interior, then remove the cover from the air intake port in Step 2.
4. Install the new inner element to the connector, then install the outer element.

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.

5. Set the outer element in position, then lock cover (3) with hooks (2).



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 3-58)" and "STARTING ENGINE (PAGE 3-72)" in the OPERATION section.
- There is danger of touching the fan if the undercover is left removed.
Never enter behind the machine when the engine is running.

Clean the inside of the cooling system, change the coolant and replace the corrosion resistor according to the table below.

Kind of coolant	Cleaning inside of cooling system and changing coolant	Replacing corrosion resistor
Permanent type antifreeze (All season type)	Every year (autumn) or every 2000 hours, whichever comes first	Every 1000 hours and when cleaning the inside of the cooling system and when changing coolant
Non permanent type antifreeze containing ethylene glycol (winter, one season type)	Every 6 months (spring, autumn) (Drain antifreeze in spring, add antifreeze in autumn)	
When not using antifreeze	Every 6 months or every 1000 hours, whichever come first	

Stop the machine on level ground when cleaning or changing the coolant.

Use a permanent type of antifreeze.

If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol. Super Coolant (AF-ACL) has an anti-corrosion effect as well as an antifreeze effect.

The ratio of antifreeze to water depends on the ambient temperature, but to obtain the corrosion resistance effect, a minimum ratio of 30% by volume is necessary.

When deciding the ratio of antifreeze to water, check the lowest temperature in the past, and decide from the mixing rate table given below.

It is actually better to estimate a temperature about 10°C (18°F) lower when deciding the mixing rate.

Mixing rate of water and antifreeze

Min. atmospheric temperature	°C	Above-10	-15	-20	-25	-30	-35	-40
	°F	Above14	5	-4	-13	-22	-31	-40
Amount of antifreeze	liter	10.8	13.0	14.8	16.6	18.0	19.4	20.1
	US gal	2.85	3.43	3.91	4.39	4.76	5.13	5.31
Amount of water	liter	25.2	23.0	21.2	19.4	18.0	16.6	15.9
	US gal	6.66	6.08	5.60	5.12	4.76	4.39	4.20
Volume ratio (%)		30	36	41	46	50	54	58


WARNING

Antifreeze is flammable, so keep it away from flame.

Antifreeze is toxic. When removing the drain plug, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.

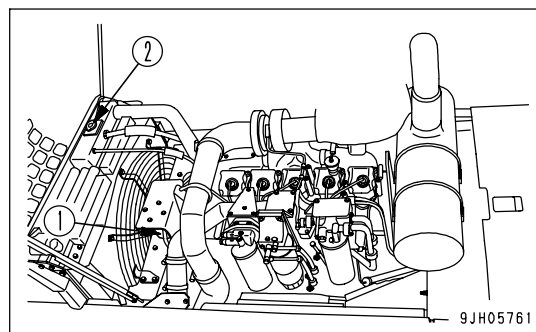
Use city water for the coolant.

If river water, well water or other such water supply must be used, contact your Komatsu distributor.

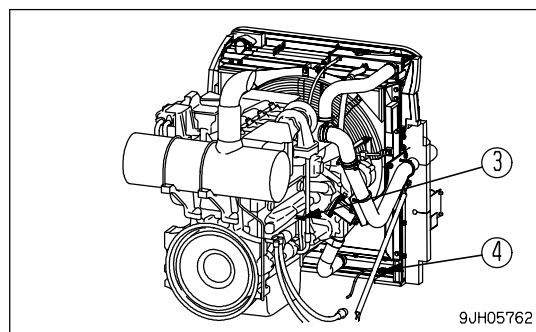
We recommend use of an antifreeze density gauge to control the mixing proportions.

Prepare two containers of a capacity of at least 20 liters (5.28 US gal) to catch the coolant.

1. Stop the engine and tighten corrosion resistor valve (1). (Only machines equipped with corrosion resistor)
2. Turn radiator cap (2) slowly to release the internal pressure.
3. Push radiator cap (2) in and turn it slowly.

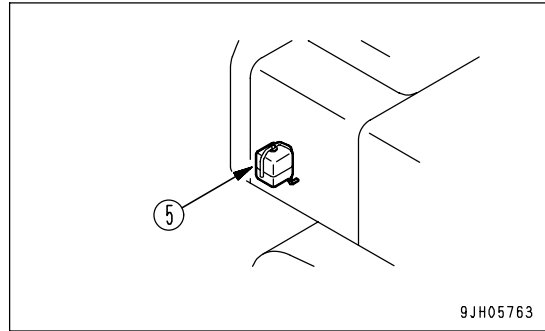


4. Remove the undercover, then set containers to catch the coolant under drain valves (3) and (4).
 - Open drain valve (3) at the rear of the machine (right side of engine block) and drain the water.
 - Open drain valve (4) under the radiator and drain the water.
5. After draining the antifreeze solution, close drain valves (3) and (4), then fill with clean water. After the radiator is filled with water, start and run the engine at low idling speed. After the water temperature rises above 90 °C (194 °F), run the engine for about 10 minutes.
6. Stop the engine and open drain valves (3) and (4) to drain the water.
7. After draining the water, clean the radiator with detergent. For the cleaning method, follow the instruction of detergent.
8. Close drain valves (3) and (4).



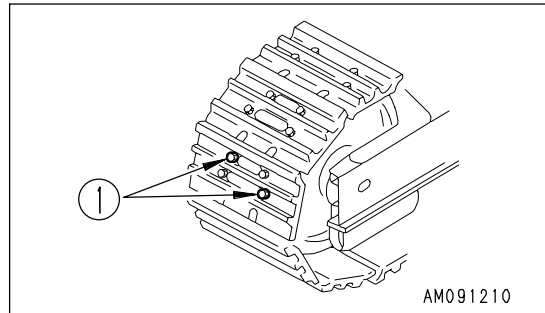
9. Replace the corrosion resistor, and open valve (1). (Only machines equipped with corrosion resistor)
For details of replacement of the corrosion resistor cartridge, see "REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-71)".
10. Install the undercover.
11. Add water through the water filler up to the filler port.
12. Run the engine at low idling for 5 minutes to remove the air from the water, then run at high idling for 5 minutes. (Leave radiator cap (2) removed when doing this.)

13. Drain the coolant from sub tank (5), wash the inside of the sub tank, then add water to between the FULL and LOW marks.
14. Stop the engine, wait for approx. 3 minutes, add city water up to near the mouth of the filler port, then tighten radiator cap (2).



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.

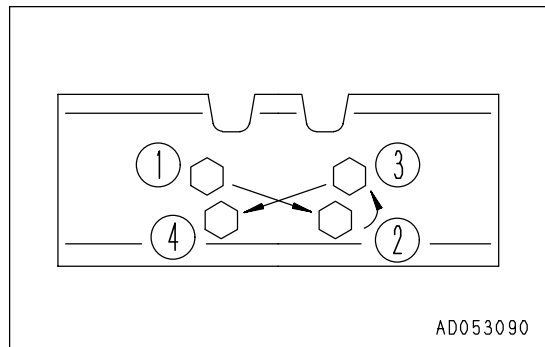


Tightening

1. First, tighten to a tightening torque of $392 \pm 39.2 \text{ N}\cdot\text{m}$ ($40 \pm 4 \text{ kgf}\cdot\text{m}$, $289.3 \pm 28.9 \text{ lbft}$), then check that the nut and shoe are in tight contact with the link mating surface.
2. After checking, tighten a further $120^\circ \pm 10^\circ$.

Order for Tightening

Tighten the bolts in the order shown in the diagram on the right. After tightening, check that the nut and shoe are in close contact with the link mating surface.



CHECK AND ADJUST TRACK TENSION

WARNING

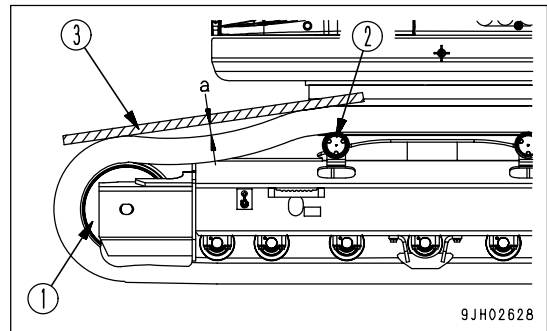
For details on starting the engine and operating the work equipment, see "BEFORE STARTING ENGINE (PAGE 3-58)", "STARTING ENGINE (PAGE 3-72)", "AFTER STARTING ENGINE (PAGE 3-76)", and "WORK EQUIPMENT CONTROLS AND OPERATIONS (PAGE 3-91)" in the OPERATION section.

Wear on pins and bushings of the undercarriage will vary with working conditions and type of soil, so inspect the track tension every now and then in order to maintain the standard tension.

For carrying out inspection and adjustment of track shoes, park the machine on the flat and solid ground.

Checking

1. Run the engine at low idle, then move the machine forward for a distance equal to the track length on ground, and slowly stop the machine.
2. Put on the track shoe straight wooden bar (3) which stretches from idler (1) to upper carrier roller (2).
3. Measure the maximum deflection between bottom surface of the wooden bar and top surface of the track shoe. Deflection "a" should be 10 - 30 mm (0.4 - 1.2 in).



If the track tension is not at the standard value, adjust it in the following manner.

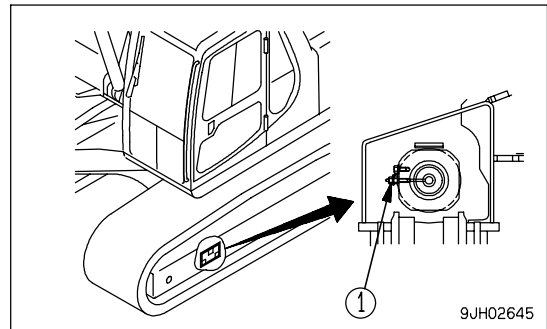
Adjustment

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).

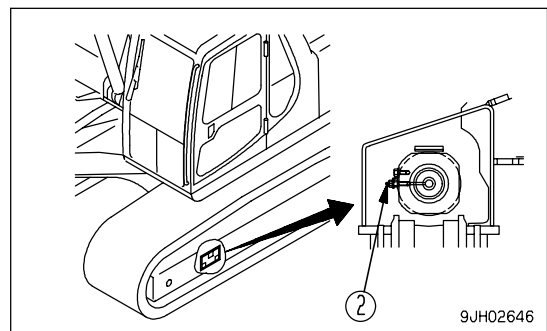
If the track tension cannot be loosened with the procedure given here, please contact your Komatsu distributor.



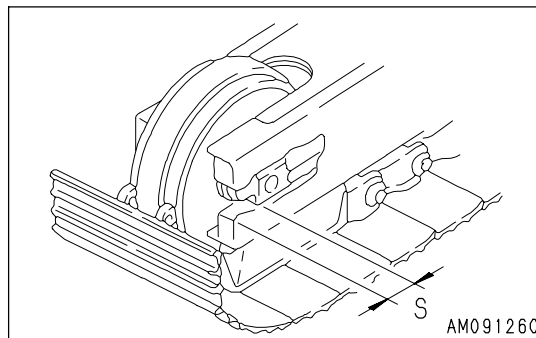
Increasing Track Tension

Prepare a grease pump.

1. Pump in grease through grease fitting (2) with a grease pump. (Grease fitting (2) forms one part with plug (1).)
2. To check if the tension is correct, run the engine at low idle, move the machine slowly forward (by an amount equal to the length of track on ground), then stop the machine.
3. Check the track tension again, and if the tension is not correct, adjust it again.



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.

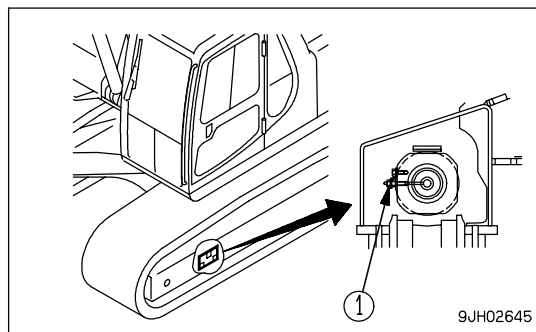


Loosening Track Tension



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 if the tension is correct, run the engine at low idle, move the machine slowly forward (by an amount equal to the length of track on ground), then stop the machine.
6. Check the track tension again, and if the tension is not correct, adjust it again.



CHECK ELECTRICAL INTAKE AIR HEATER

Before the start of the cold season (once a year), contact your Komatsu distributor to have the electrical intake air heater checked for dirt or disconnections.

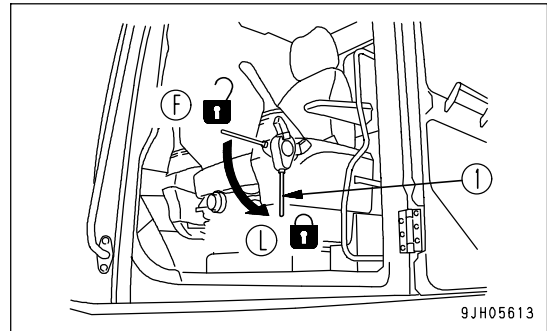
REPLACE BUCKET TEETH (VERTICAL PIN TYPE)

Replace the bucket teeth before the adapter starts to wear.



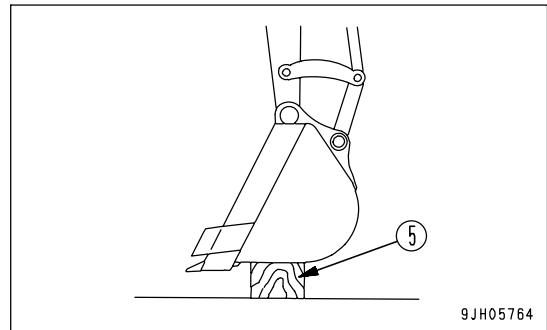
WARNING

- It is dangerous if the work equipment is mistakenly moved when replacing the teeth.
Set the work equipment in a stable condition, stop the engine, then set lock lever (1) securely to the LOCK position (L).
- As the locking pin is knocked out with force, there is danger that the pin may fly out. Check that there is no one near the machine.
- Broken pieces may fly during the replacement operation, so always wear safety glasses, gloves, or other protective equipment.



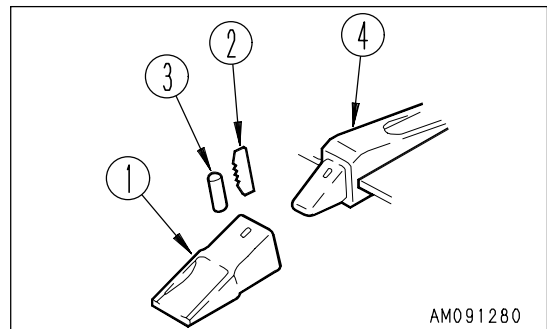
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1. To make it possible to knock out pin of tooth (1), put block (5) under the bottom of the bucket, and set so that the bottom surface of the bucket is horizontal.



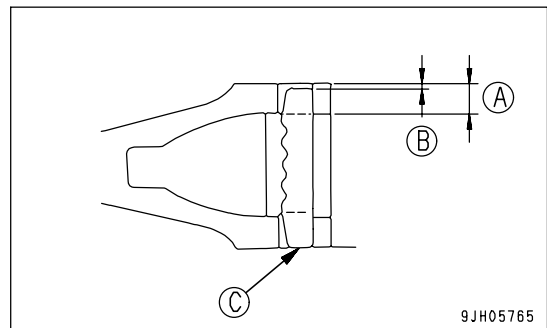
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2. Use a hammer and drift to knock out lock pin (2). (If the drift is set against rubber pin lock (3) when it is hit, the rubber pin lock may break. Set it against the back of the pin.)
3. After removing lock pin (2) and rubber pin lock (3), check them. 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.



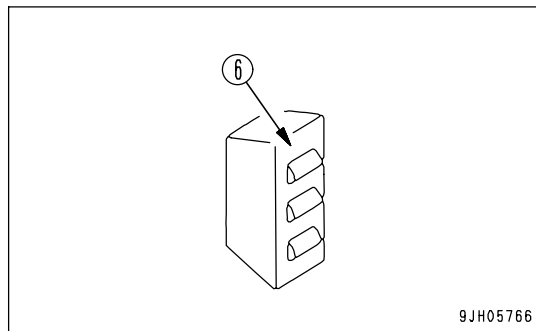
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- Lock pin (2) is too short.
Dimension (B) is less than $\frac{1}{3} A$ when lock pin (2) is aligned at bottom surface (C).

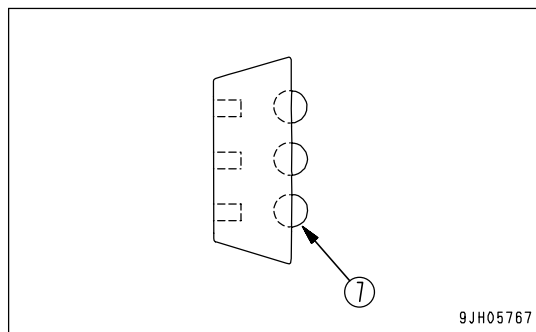


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- Rubber (6) of the rubber pin lock is cut and the steel ball is about to come out.



- Steel ball (7) sinks in when it is pushed by hand.

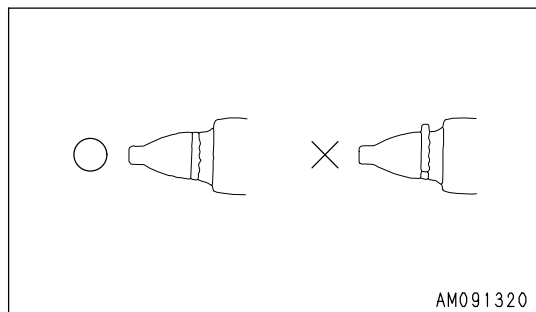


4. Clean the surface of adapter (4) and remove the soil with a knife.

5. Hit rubber pin lock (3) by hand or with a metal hammer and push it into the hole in adapter (4).

When doing this, be careful not to let rubber pin lock (3) fly out from the surface of adapter (4).

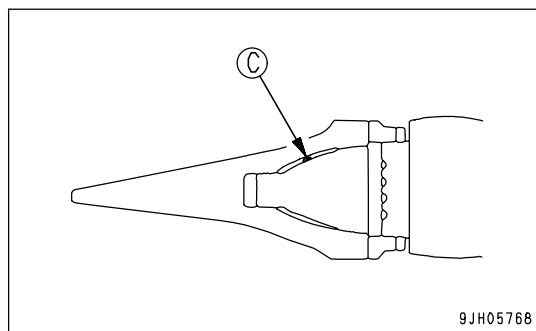
6. Clean the inside surface of tooth (1), then install to adapter (4). If there is any mud stuck to it or any protrusion, tooth (1) will not fit properly in adapter (4) and the fitting contact will be poor.



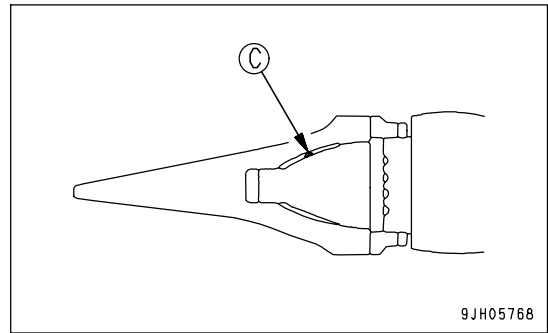
7. Fit tooth (1) to adapter (4), and confirm that when the pointer is pressed strongly, the rear face of the hole for the pin of the teeth (1) is at the same level as the rear face of the hole for the pin of the adapter (4).

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).



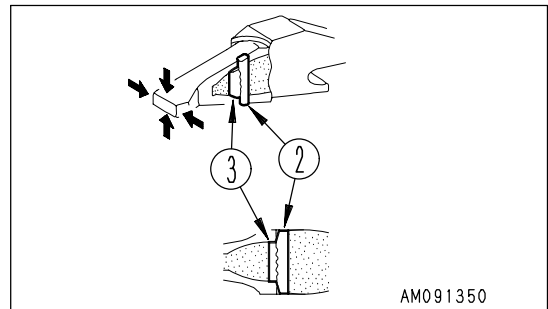
8. Insert lock pin (2) in the pin hole in the tooth (1), and knock it in so that the top surface of lock pin (2) is the same height as the surface of tooth (1).
9. After replacing the bucket tooth, always check as follows.
 - 1) After lock pin (2) is completely knocked in, check that it is secured in position at tooth (1) and the surface.
 - 2) After knocking in the lock pin (2) from one direction, tap it back lightly in the opposite direction.
 - 3) Tap the tip of tooth (1) from the top and bottom, and the side face from the left and right.
 - 4) Rubber pin lock (3) and lock pin (2) must be as shown in the diagram on the right.



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.



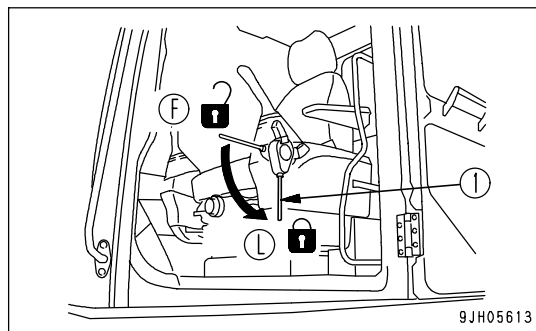
REPLACE BUCKET TEETH (HORIZONTAL PIN TYPE)

Replace the teeth before the wear reaches the adapter.

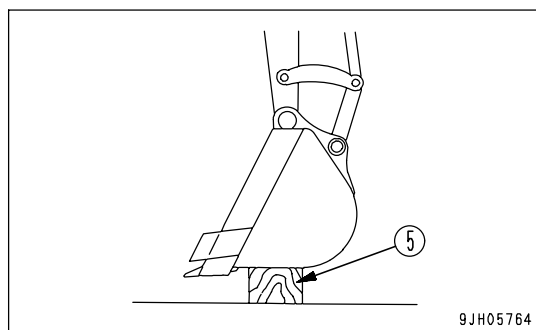


WARNING

- It is dangerous if the work equipment is mistakenly moved when replacing the teeth.
Set the work equipment in a stable condition, stop the engine, then set lock lever (1) securely to the LOCK position (L).
- As the locking pin is knocked out with force, there is danger that the pin may fly out. Check that there is no one near the machine.
- Broken pieces may fly during the replacement operation, so always wear safety glasses, gloves, or other protective equipment.



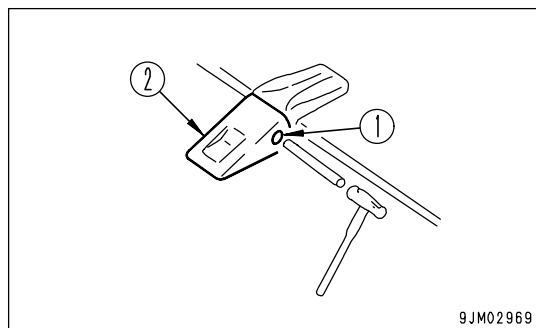
1. To make it possible to knock out pin (1) of tooth (2), put block (5) under the bottom of the bucket, and set so that the bottom surface of the bucket is horizontal.



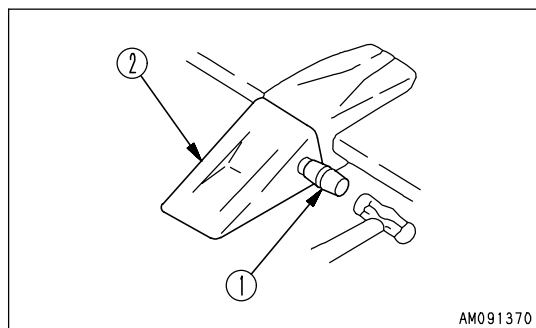
2. Place a bar on the head of pin (1), hit the bar with a hammer to knock out the pin, then remove tooth (2).

REMARK

- If the bucket teeth cannot be safely removed by this method, have your Komatsu distributor replace the bucket teeth.



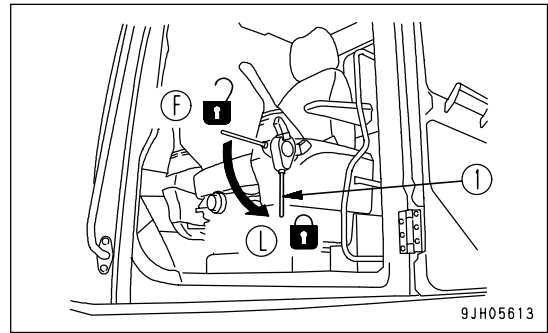
3. Clean the mounting face. Fit a new tooth (2) in the adapter, push in pin (1) partially by hand, then lock it with a hammer to install the tooth to the bucket.



REPLACE BUCKET SIDE CUTTER, SHROUD

WARNING

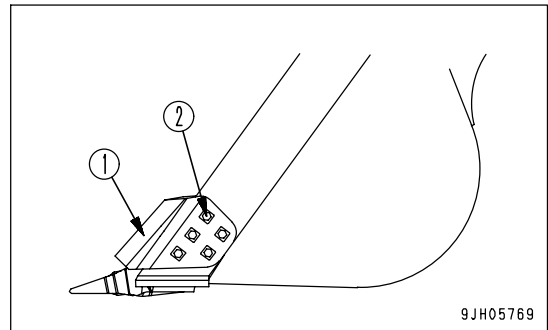
- It is dangerous if the work equipment is mistakenly moved when replacing the bucket side cutters and shroud.
Set the work equipment in a stable condition, stop the engine, then set lock lever (1) securely to the LOCK position (L).
- As the locking pin is knocked out with force, there is danger that the pin may fly out. Check that there is no one near the machine.
- Broken pieces may fly during the replacement operation, so always wear safety glasses, gloves, or other protective equipment.



Side Cutters

Loosen mounting bolts (2), then remove side cutter (1). Replace the side cutter, bolts, and nuts with new parts.

Tightening torque for bolts: 3040 to 3630 N·m (310 to 370 kgf·m, 2,242.2 to 2,676.2 lbf·ft)



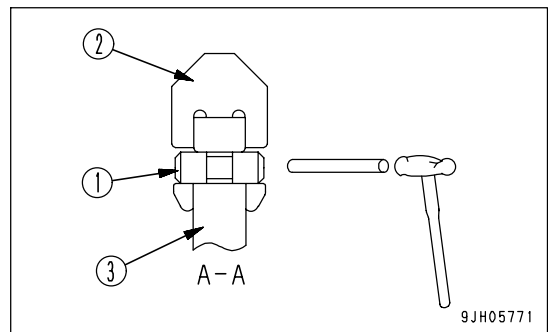
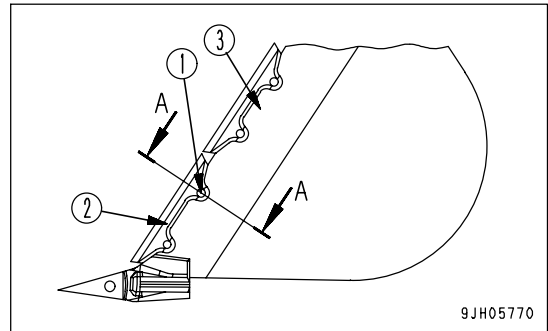
Shroud

1. 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 it cannot be removed by this method, for safety reasons, always contact your Komatsu distributor to have the replacement carried out.

2. Clean the mounting face. Fit a new shroud (2) in the adapter, push in pin (1) partially by hand, then lock it with a hammer to install the tooth to the bucket.

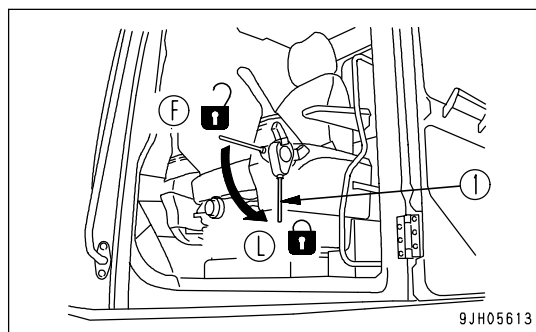


ADJUST BUCKET CLEARANCE

WARNING

It is dangerous if the work equipment is mistakenly moved when adjusting the bucket clearance.

Set the work equipment in a stable condition, stop the engine, then set lock lever (1) 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) and measure the amount of play "a".
Measurement is easier if you move the bucket to one side so that all the play can be measured at one place (the right side in the diagram).
Use a clearance gauge for easy and accurate measurement.
3. Loosen 4 plate mounting bolts (2), and loosen plate (3).
The shim is a split type, so the operation can be carried out without removing the bolts.
4. Remove shim (4) corresponding to the amount of play "a" measured above.

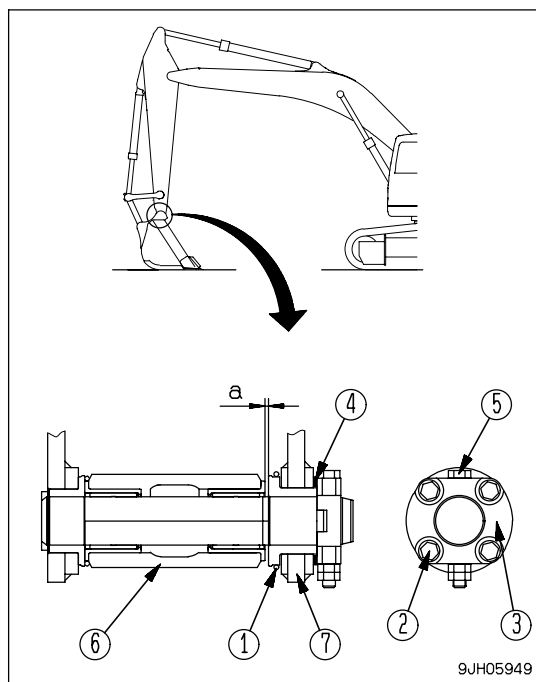
[Example]

In the case of play of 3 mm (0.118 in), remove two 1.0 mm (0.039 in) shims and one 0.5 mm (0.020 in) shim. Play becomes 0.5 mm (0.020 in). For shim (4), two types of 1.0 mm (0.039 in) and 0.5 mm (0.020 in) are used.

When play "a" is smaller than one shim, do not carry out any maintenance.

5. Tighten the four bolts (2).
If the bolts (2) are too stiff to tighten, pull out pin stopper bolt (5) for easier tightening.

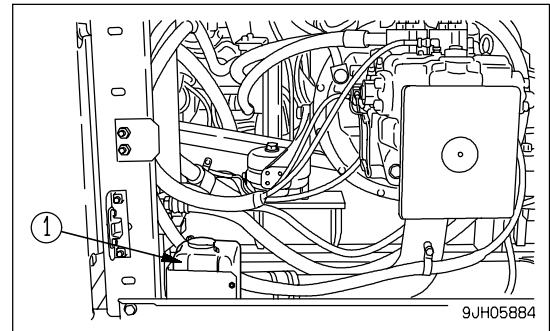
- (6): Arm
- (7): Bucket



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), and if it is low, add automobile window washer fluid.

The window washer tank (1) is at the rear left of the machine inside the door.



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.

CHECK AND MAINTENANCE AIR CONDITIONER

Check Level of Refrigerant (gas)

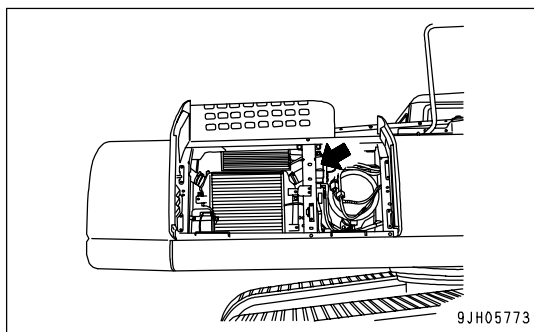


WARNING

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.

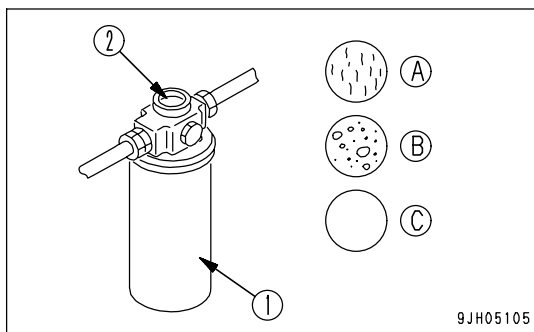
If the level of the refrigerant (gas) is low, the cooling effect will be reduced. Run the engine at high idle, and check the flow of the refrigerant gas (R134a) in the refrigerant circuit through the sight glass (2) (inspection window) of the receiver (1) when the cooler is running at high speed.

- (A) 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

WASH WASHABLE FLOOR**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 work equipment or 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

- When carrying out this operation, be careful not to get water on the monitor and connectors inside the operator's cab.
- Never spray water above the pedestal of the operator's seat (2).
- If any water splashes on the surrounding equipment, be sure to wipe it off.

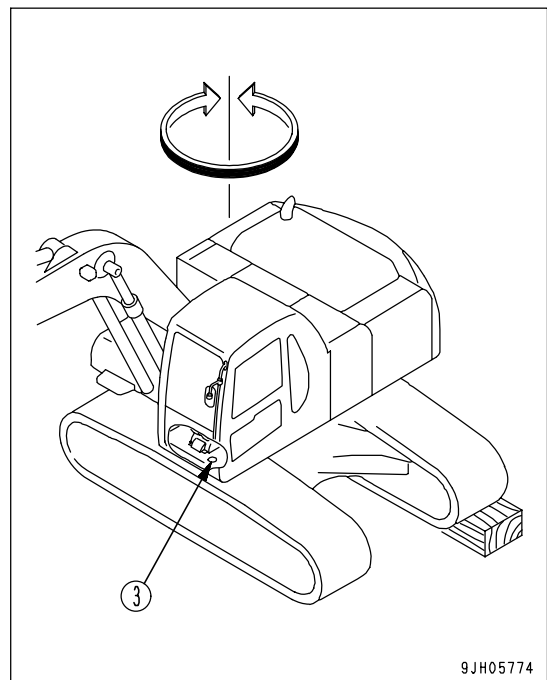
With the washable floor, it is possible to flush out the dirt on the cab floor directly with water.

Washing Washable Floor Mat

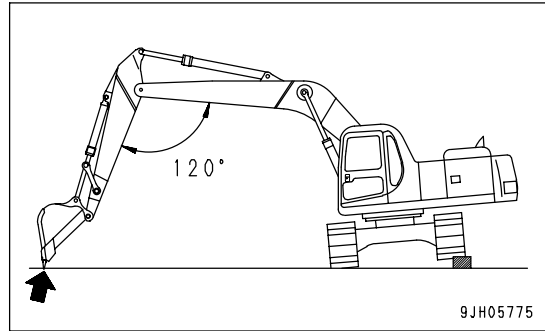
1. Stop the machine on horizontal ground, lower the bucket to the ground, and then stop the engine.
2. When washing the floor mat, use a brush to remove the dust, or direct the water onto the mat and wash it with a brush.

Method of Washing

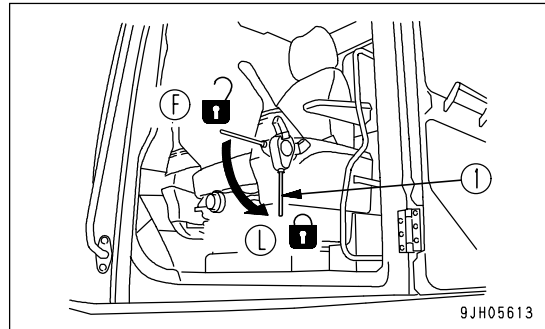
1. Set the machine at an angle.
For details, see "Method of Setting Machine at Angle (PAGE 4-39)"
2. Swing the upper structure slowly so that water drain holes (3) in the cab floor are at a low position.



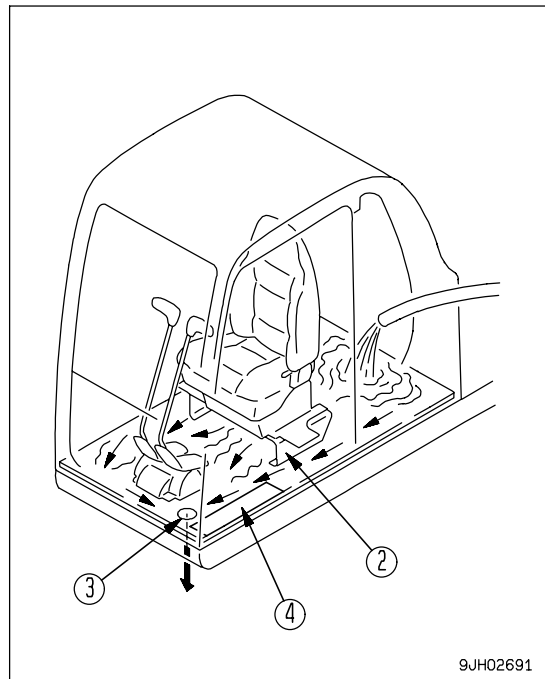
3. Lower the work equipment to the ground and set the machine in a stable condition.



4. Set lock lever (1) to LOCK position (L) and stop the engine.



5. Remove the floor mat holder plate (4).
6. Remove the floor mat.
7. Remove the cap from water drain hole (3).
8. Flush out the dirt on the floor directly with water through water drain hole (3).



9. After completing the washing operation, install the cap in water drain hole (3).
10. Fit the floor mat, then secure it with floor mat holder plate (4).

Method of Setting Machine at Angle

Method Using Slope

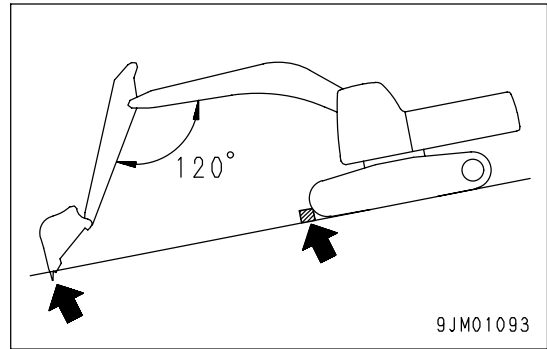


WARNING

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.



Method Using Block

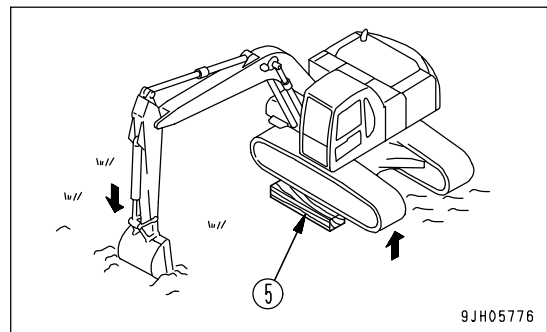


WARNING

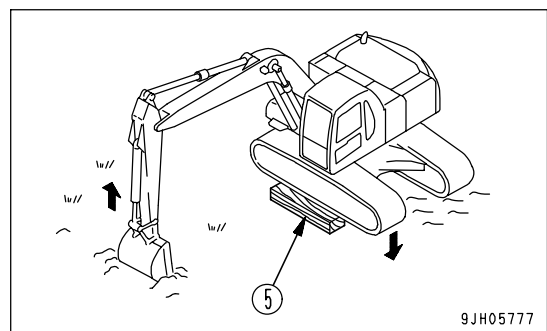
Select a firm flat place.

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 block (5) under the raised track to make the machine stable.



3. Raise the boom slowly and lower the machine.
When doing this, check that the machine is always stable.



BLEEDING AIR FROM HYDRAULIC SYSTEM

For details, see "STARTING ENGINE (PAGE 3-72)". If it is necessary to refer to the items for starting the engine, moving the machine off, steering, or stopping, see the OPERATION section.

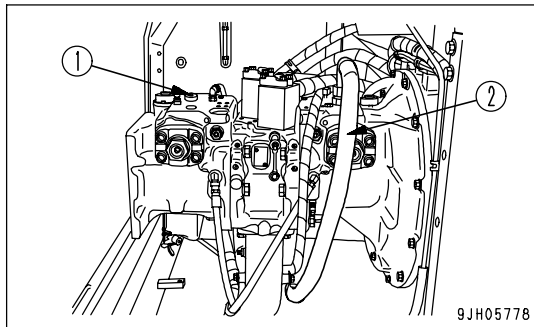
1. Bleeding air from pump

1) Loosen air bleeder (1) and check that oil oozes out from the air bleeder.

2) If the oil does not ooze out, remove the drain hose from the hydraulic pump case and fill the pump case completely with hydraulic oil through drain port (2).

Hold the removed hose firmly, keeping the mouthpiece higher than the oil level in the hydraulic tank so that oil will not spill out of the hose.

3) After completing the air bleed operation, tighten air bleeder (1) and install the drain hose.



NOTICE

If the drain hose is installed first, oil will spurt out from bleeder hole (1).

If the pump is operated without filling the pump case with hydraulic oil, abnormal heat will be generated and this may cause an unexpected damage to the pump.

2. Starting engine

Start the engine, referring to "STARTING ENGINE (PAGE 3-72)".

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.

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.

4. Bleeding air from swing motor

1) Run the engine at low idling, loosen the S port hose, and check that oil oozes out from the S port hose.

NOTICE

Do not operate the swing under any circumstances.

2) If no oil oozes out, stop the engine, remove the S port hose, and fill the inside of the motor case with hydraulic oil.

3) After completely bleeding the air, tighten the S port hose.

4) Run the engine at low idle and slowly swing at least two times uniformly to the left and right. This will automatically bleed the air from the swing circuit.

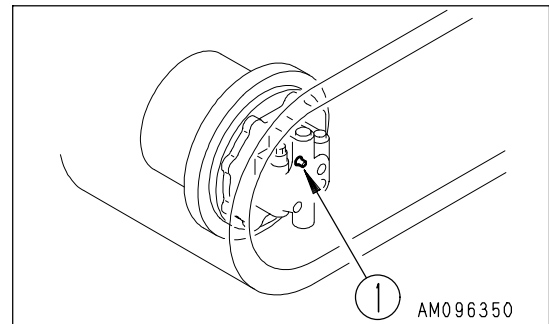
NOTICE

- If the air is not bled from the swing motor, the motor bearings may be damaged.
- When replacing the travel motor safety valve, please contact your Komatsu distributor to have it replaced and to have the air bled.

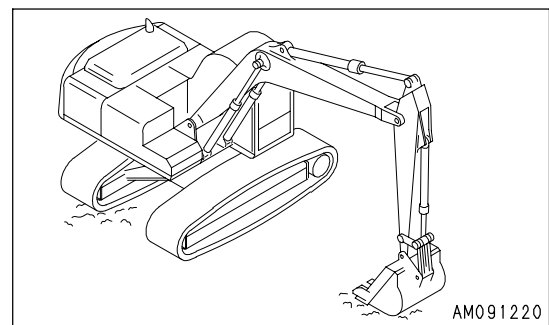
5. Bleeding air from travel motor

(Bleed the air only when the oil inside the travel motor case has been drained.)

- 1) Run the engine at low idling, loosen air bleeder (1), and check that oil flows out.



- 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.



6. Bleeding air from attachment (when installed)

If a breaker or other attachment has been installed, run the engine at low idle and operate the attachment pedal repeatedly (approx. 10 times) until the air has been bled from the attachment circuit.

NOTICE

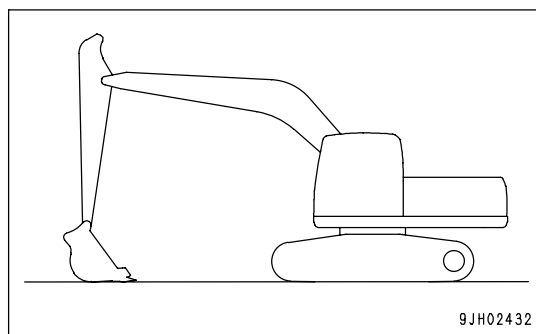
- If the method of bleeding the air from the attachment itself is specified by the manufacturer, bleed the air according to the specified procedure.
- After completing the air bleeding operation, stop the engine, and leave the machine for 5 minutes before starting operations. This will remove the air 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.
- After completing the air bleeding operation, inspect the oil level, and if the oil level is low, add oil.

METHOD FOR RELEASING INTERNAL PRESSURE IN HYDRAULIC CIRCUIT

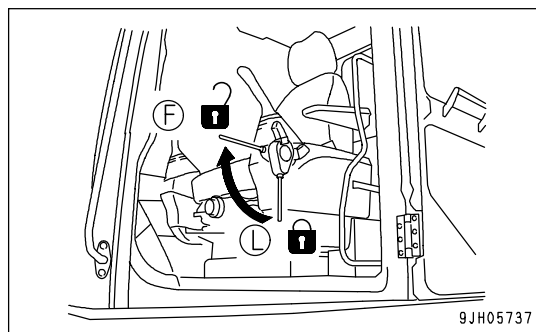
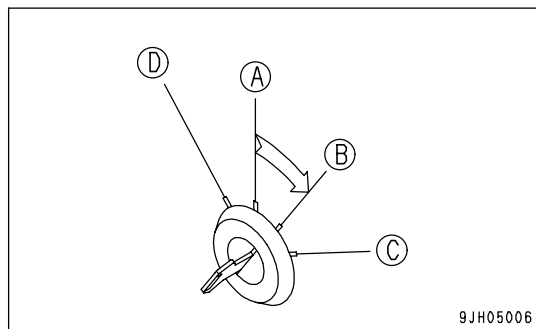
! WARNING

- The hydraulic system is always under internal pressure, so when inspecting or replacing the piping or hoses, always release the pressure in the circuit before starting. If the pressure is not released, high pressure oil may spurt out and cause serious personal injury.
- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the pressure before removing the cap.

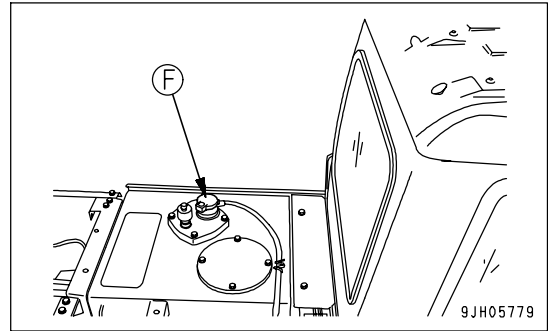
1. Stop the machine on firm level ground.



2. Turn the starting switch to ON position (B) within 15 seconds after stopping the machine. Then set the lock lever to the FREE position (F) and operate each control lever (work equipment, travel) fully in each direction to release the internal pressure.



- Loosen oil filler cap (F) at the top of the hydraulic tank slowly to release the internal pressure.



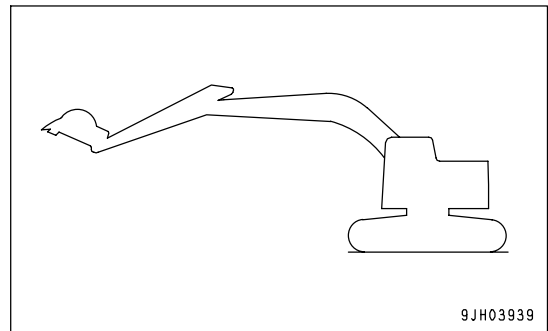
CHECK NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (control circuit)

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.

Check the nitrogen gas charge pressure as follows.

- Set the work equipment to maximum reach as shown in the diagram on the right.



- Stop the engine and carry out the LOWER operation for the boom.
- Check that the tip of the bucket drops at least 1 m (3 ft).

If the tip of the bucket drops less than 1 m (3 ft), the charge pressure inside the accumulator is low, so contact your Komatsu distributor.

CHECK BEFORE STARTING

For details of the following items, see "Checks Before Starting (PAGE 3-60)" in the OPERATION section.

- Check coolant level, add coolant
- Check oil level in engine oil pan, add oil
- Check fuel level, add fuel
- Check water separator, drain water and sediment
- Drain water and sediment from fuel tank
- Check oil level in hydraulic tank, add oil
- Check working lamp switch
- Check electric wiring
- Check function of horn

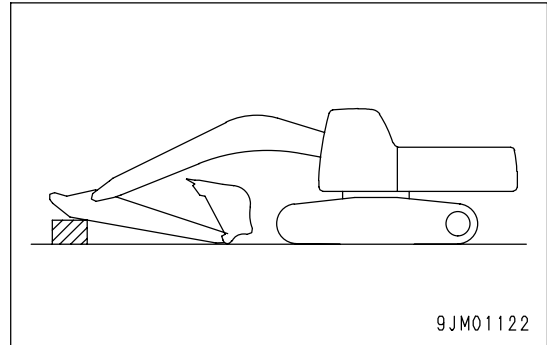
EVERY 50 HOURS MAINTENANCE

LUBRICATING

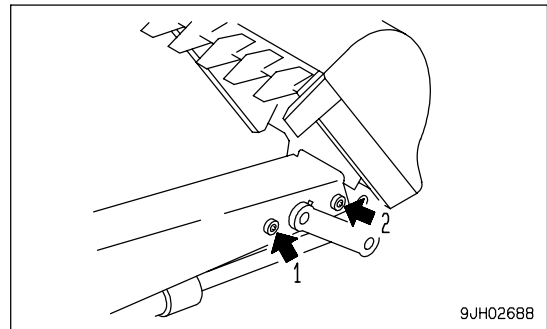
NOTICE

- 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.

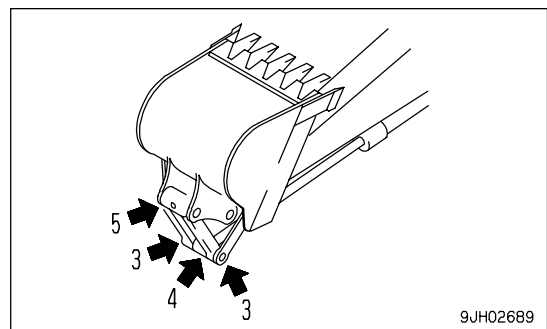
1. Set the machine to the greasing posture shown on the right, lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.



- (1) Arm-Link coupling pin (1 place)
- (2) Arm-Bucket coupling pin (1 place)



- (3) Link coupling pin (2 places)
- (4) Bucket cylinder rod pin (1 place)
- (5) Bucket-Link coupling pin (1 place)



EVERY 100 HOURS MAINTENANCE

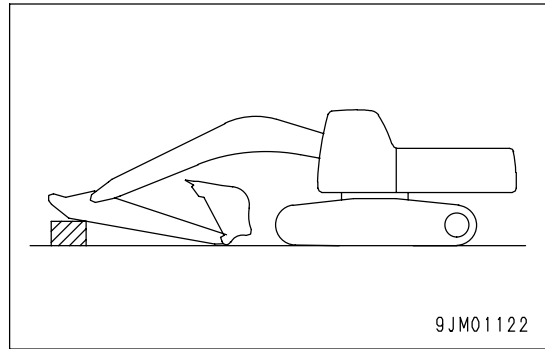
Maintenance for every 50 hours service should be carried out at the same time.

LUBRICATING

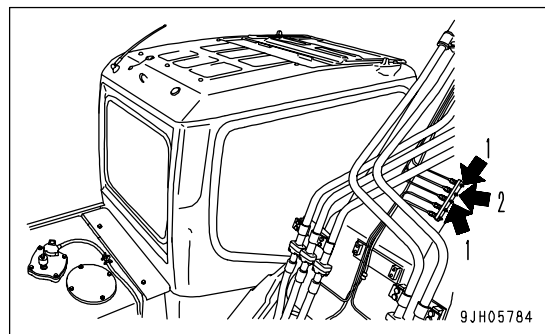
NOTICE

- 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.

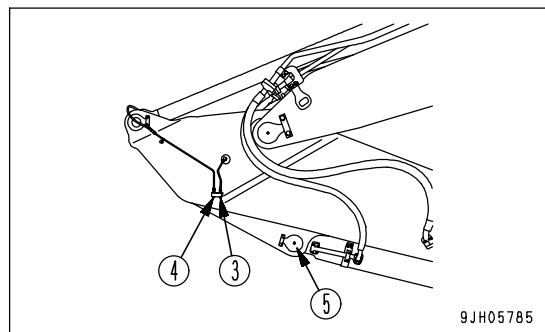
1. Set the machine to the greasing posture shown on the right, lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.



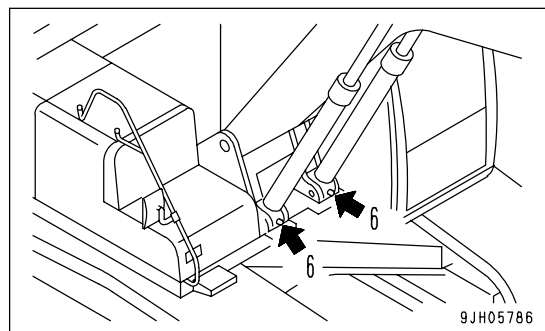
- (1) Boom cylinder rod pin (2 places)
- (2) Arm cylinder foot pin (1 place)



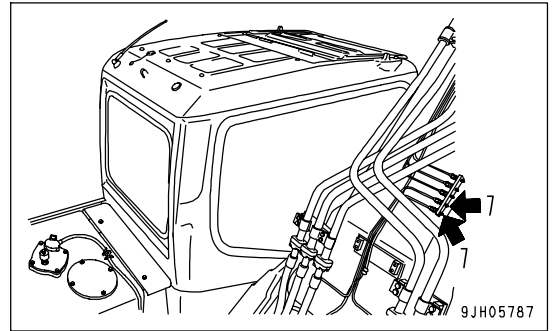
- (3) Boom-Arm coupling pin (1 place)
- (4) Arm cylinder rod end (1 place)
- (5) Bucket cylinder foot pin (1 place)



- (6) Boom cylinder foot pin (2 places)



(7) Boom foot pin (2 places)



EVERY 250 HOURS MAINTENANCE

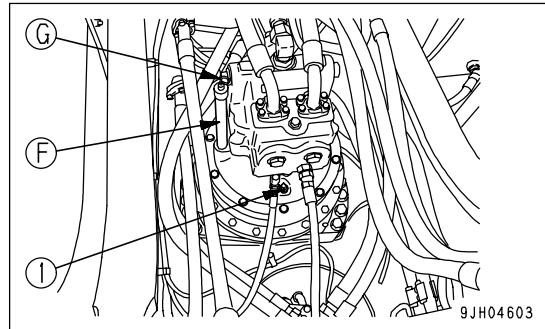
Maintenance for every 50 hours service should be carried out at the same time.

CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL

WARNING

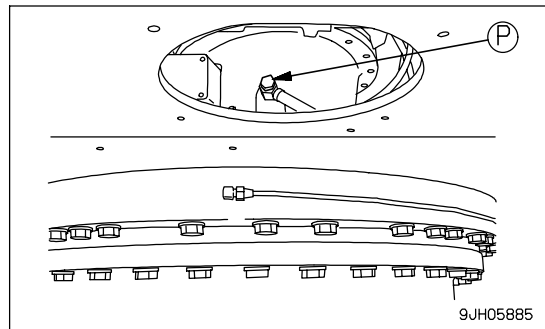
Parts and oil are at high temperature immediately after the engine is stopped and may cause serious burns. Wait for the oil temperature to go down before performing this operation.

1. 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 does not reach the L mark on dipstick (G), add engine oil through dipstick insertion hole (F).
- When refilling, remove bleeding plug (1).
5. If the oil is above the L mark on the dipstick, loosen drain valve (P) and drain the excess oil.



For details of the method of draining the oil, see "CHANGE OIL IN SWING MACHINERY CASE (PAGE 4-69)".

6. After checking oil level or adding oil, insert the dipstick into the hole and install air bleeding plug (1).



CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

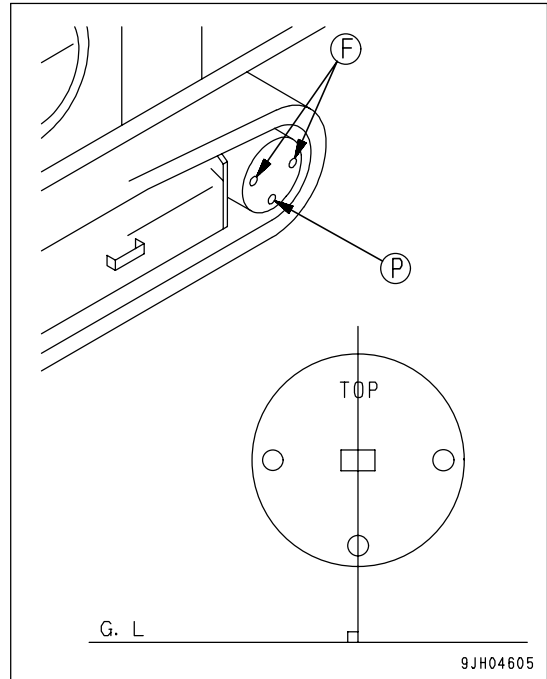
**WARNING**

- The parts and oil are at high temperature immediately after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- 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 handle.
1. Set the TOP mark at the top, with the UP mark and plug (P) perpendicular to the ground surface.
 2. Remove plug (F) using the handle. When the oil level reaches a point 10 mm (0.4 in) below the bottom of the plug hole, the correct amount of oil has been added.
 3. If the oil level is too low, install plug (F), operate the travel levers, and drive forward or in reverse to rotate the sprocket one turn. Then repeat Step 2 to check again.
 4. If the oil level is low, add engine oil through plug hole (F) until the oil overflows from plug hole (F).
 5. After checking, install plug (F).
Tightening torque for plugs (F): 68.6 ± 9.8 N·m (7 ± 1 kgf·m, 50.6 ± 7.2 lbf·ft)

REMARK

There are two plugs (F). Add oil through the one easier to fill oil and through which no internal gears are to be seen.



9JH04605

CHECK LEVEL OF BATTERY ELECTROLYTE

Perform this check before operating the machine.



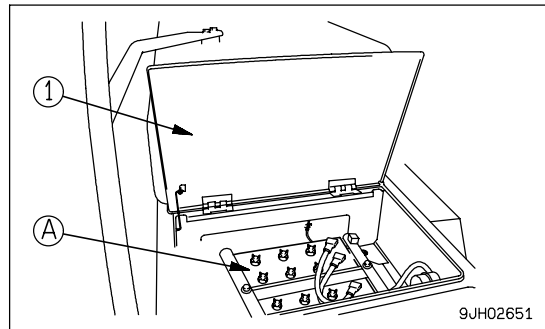
WARNING

- Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may 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

When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below. Open cover (1) at the rear left side of the machine. The batteries are installed at (A) part.

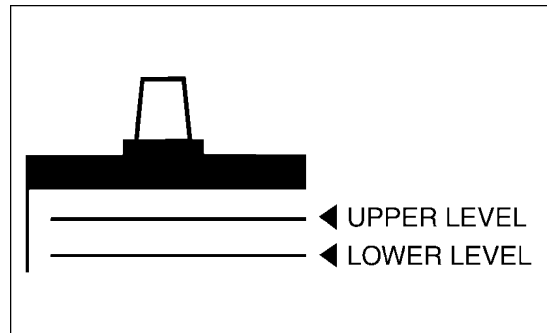


When Checking Electrolyte Level from Side of Battery

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines.

If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.

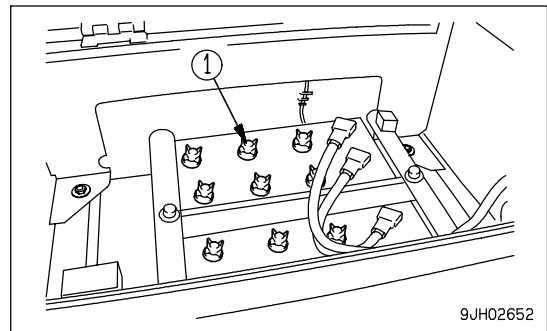


2. If the electrolyte level is below the midway point between the U.L. and L.L. lines, remove cap (1) and add distilled water to the U.L. line.

3. After adding distilled water, tighten cap (1) securely.

REMARK

If distilled water is added to above the U.L. line, use a syringe to lower the level to the U.L. line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

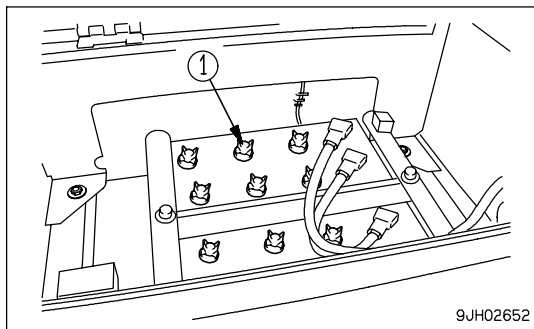


9JH02652

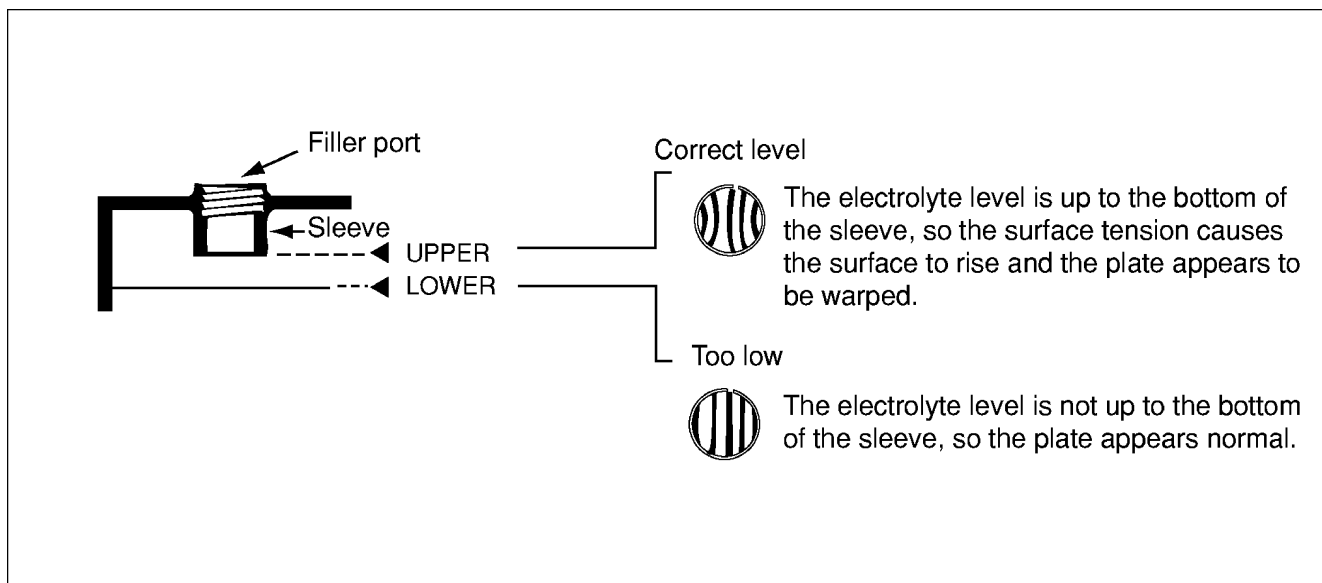
When it is Impossible to Check Electrolyte Level from Side of Battery

If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

1. Remove cap (1) at the top of the battery, look through the water filler port, and check the electrolyte surface. If the electrolyte does not reach the sleeve, add distilled water so that the level reaches the bottom of the sleeve (UPPER LEVEL line) without fail.



Use the diagram below for reference, and check if the electrolyte reaches the bottom of the sleeve.



2. After adding distilled water, tighten cap (1) securely.

REMARK

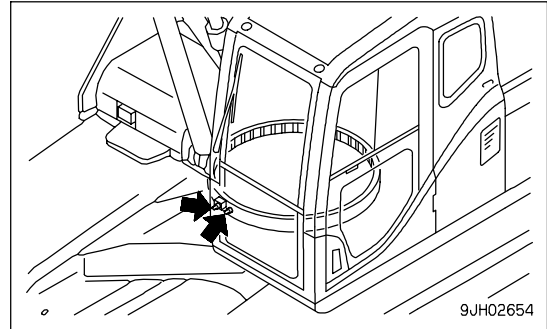
If distilled water is added to above the bottom of the sleeve, use a syringe to lower the level to the bottom of the sleeve. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

When it is Possible to Use Indicator to Check Electrolyte Level

If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

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.

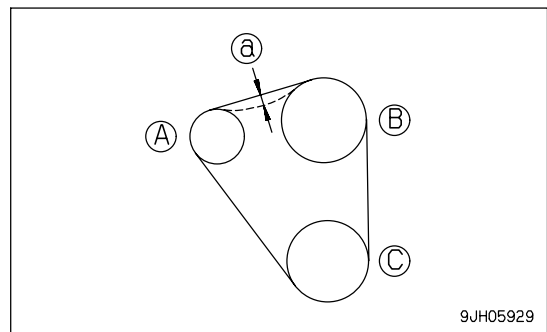
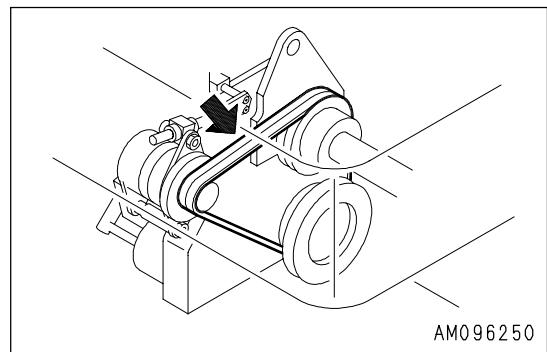


CHECK FAN BELT, ALTERNATOR BELT TENSION, ADJUST

Inspection

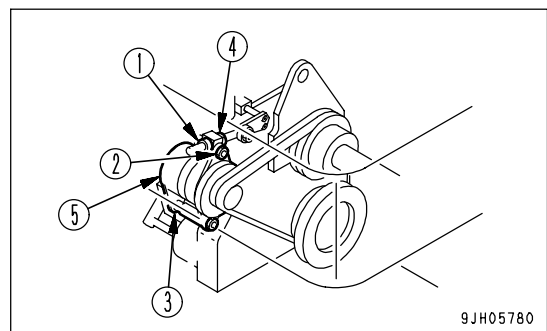
The deflection of the belt should be approx. 13 mm (0.5 in) when pressed with a finger force of approx. 58.8N (6 kgf) at mid-point (a) between the alternator pulley and the fan pulley.

- (A): Alternator pulley
- (B): Fan pulley
- (C): Crankshaft pulley



Adjustment

1. Loosen bolts and nuts (1), (2), (3).
Turn nut (4) clockwise to move alternator (5) so that the belt deflects by approx. 13 mm (0.5 in) with applied force of approx. 6 kg (58.8 N).
2. Tighten bolts and nuts (1), (2) and (3) to secure alternator (5).
Tightening torque
Lock nut(1) and (4): $137.2 \pm 53.9 \text{ N}\cdot\text{m}$ ($14 \pm 5.5 \text{ kgf}\cdot\text{m}$, $101.3 \pm 39.8 \text{ lbft}$)
Bolt(2): $33.3 \pm 4.9 \text{ N}\cdot\text{m}$ ($3.4 \pm 0.5 \text{ kgf}\cdot\text{m}$, $24.6 \pm 3.6 \text{ lbft}$)
Bolt(3): $127.4 \pm 19.6 \text{ N}\cdot\text{m}$ ($13 \pm 2 \text{ kgf}\cdot\text{m}$, $94.0 \pm 14.5 \text{ lbft}$)



3. Check for damage to the pulleys, and wear of the groove and belt. Be particularly careful to check that the belt is not in contact with the bottom of the groove.
4. If the belt has elongated and there is no more allowance for adjustment, or if the belt is cut or cracked, replace the belt.
5. After replacing the belt, operate for one hour, then adjust again.

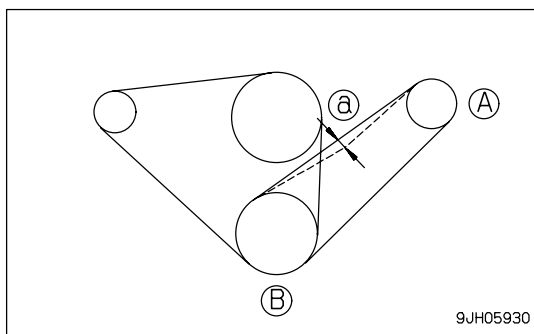
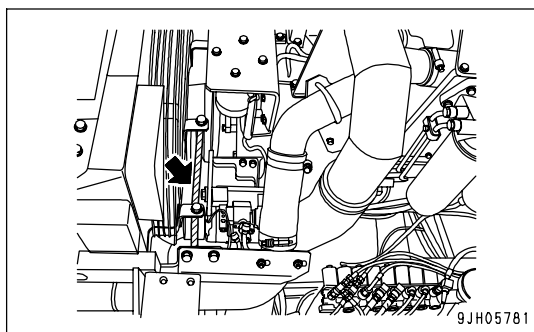
CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST

Checking

The deflection of the belt should be 14 to 16 mm (0.6 in) when pressed with a finger force of approx. 58.8N (6 kgf) at mid-point (a) between the crankshaft pulley and the compressor pulley.

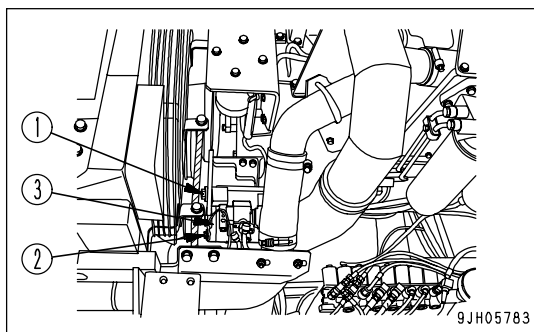
(A): Compressor pulley

(B): Crankshaft pulley



Adjustment

1. Loosen bolts (1) and (2), then move compressor (3) to adjust the belt tension.
2. When the deflection is correct, tighten bolts (1) and (2) to hold the compressor in position.
3. Check for damage to the pulleys, and wear of the V-groove and V-belt. Be particularly careful to check that the V-belt is not in contact with the bottom of the V-groove.
4. If the belt has elongated and there is no more allowance for adjustment, or if the belt is cut or cracked, replace the belt.
5. After replacing the V-belt, operate for one hour, then adjust again.



EVERY 500 HOURS MAINTENANCE

Maintenance for every 250 hours service should be carried out at the same time.

REPLACE FUEL FILTER CARTRIDGE

(Machines equipped without additional fuel filter cartridge)



WARNING

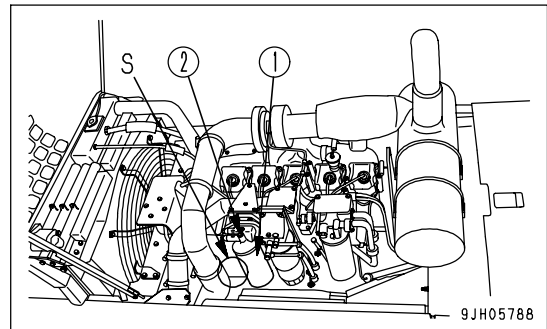
- After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any fire or flame close.
- Be careful when opening the air bleed plug in the fuel filter head. It is still under pressure, so fuel may spurt out.

NOTICE

- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
- The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle. If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.

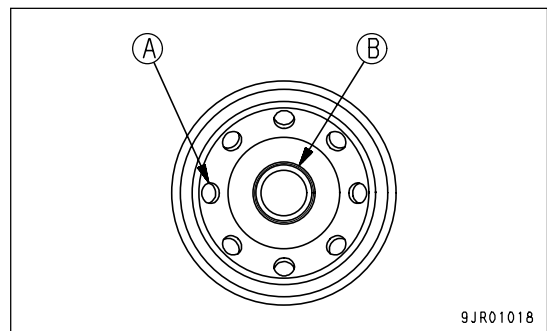
- Container to catch the oil
- Prepare a filter wrench

1. Set the container to catch the fuel under the filter cartridge.
2. Using a filter wrench, turn filter cartridge (1) counterclockwise on remove it.
3. 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.



NOTICE

- Do not fill the fuel filter cartridge with fuel.
- Remove cap (B) and install the fuel filter.



4. 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.

5. After completion of the replacement of fuel filter cartridge (1), bleed the air.

Bleed the air as follows:

6. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).

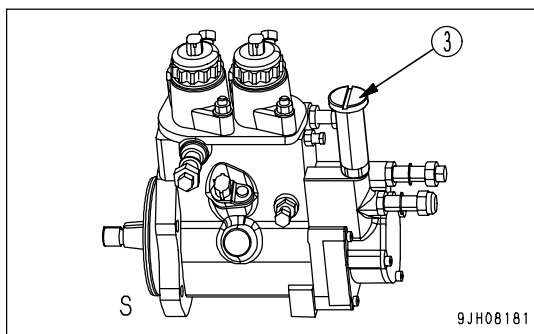
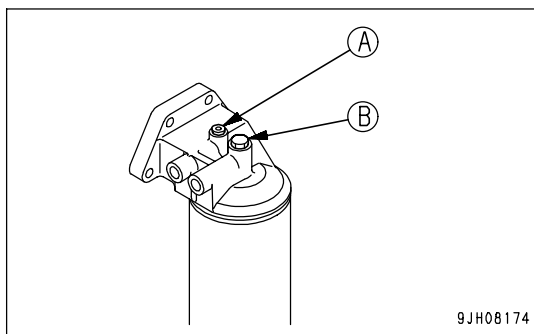
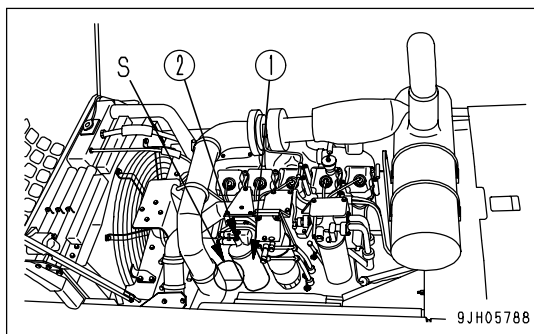
7. After replacing filter cartridge (1), loosen air bleed plug (B) in the filter head (2).

8. Loosen the knob of priming pump (3), then pump the knob until no more bubbles come out of air bleed plug (B).

9. Tighten air bleed plug (B).

Tightening torque: 4.9 to 6.9 N·m (0.5 to 0.7 kgf·m, 3.6 to 5.1 lbf·ft)

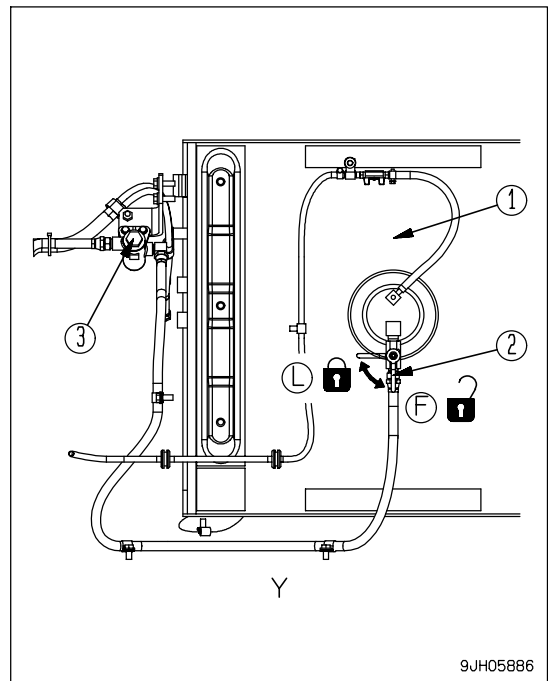
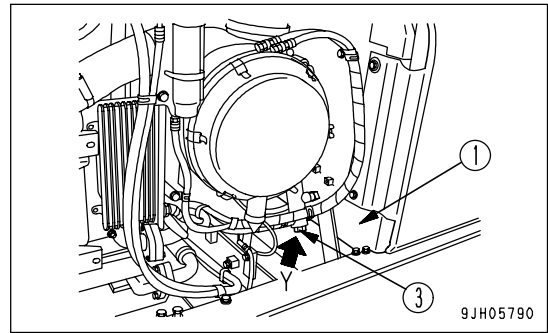
10. Push the knob of priming pump (3) in and tighten it.



11. After replacing the filter cartridge, start the engine and check that there is no leakage of fuel from the filter seal surface. If there is any leakage of fuel, check the tightening of the filter cartridge. If there is still leakage of fuel, follow Step 1 and 2 to remove the filter cartridge, then check the packing surface for damage or foreign material. If any damage or foreign material is found in the packing, replace the cartridge with a new part, then repeat Steps 3 - 10 to install the filter cartridge.

CHECK, WASH FUEL STRAINER

1. Turn fuel supply valve lever (2) at the bottom face of fuel tank (1) to the (L) position to close it.
2. Open the door at the right side of the machine, remove cap (3) of the strainer case, then remove the strainer and wash the strainer and strainer case.
 - The strainer forms one unit with cap (3).
3. After checking and cleaning, insert the strainer in the strainer case, then tighten cap (3).
4. Turn fuel supply valve lever (2) to the (F) position to open it.

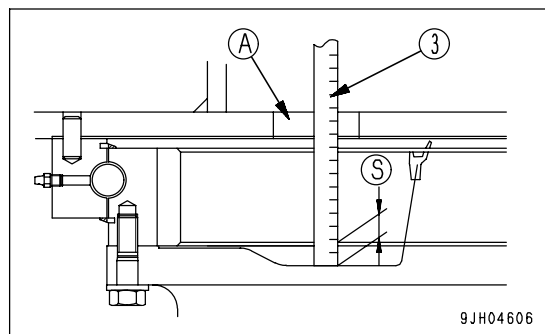
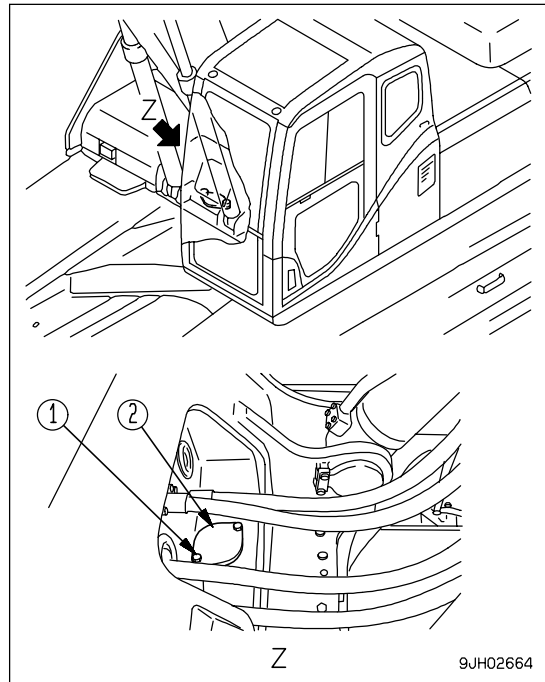


CHECK SWING PINION GREASE LEVEL, ADD GREASE

- Prepare a scale.
- 1. Swing 3 times each to the left and right, then stop the machine.
- 2. Remove bolts (1) (2 bolts) on the top of the revolving frame and remove cover (2).
- 3. Insert scale (3) through inspection and maintenance hole (A) into the grease, and check that height (S) of the grease is at least 54 mm (2.1 in). If the grease level is low, add grease.
- 4. Check if the grease is milky white. If it is milky white, it is necessary to change the grease. Please contact your Komatsu distributor.

The total amount of grease is 33 liters (29.7 kg) [8.7 US gal (65 lb)].

- 5. Install cover (2) with bolts (1).

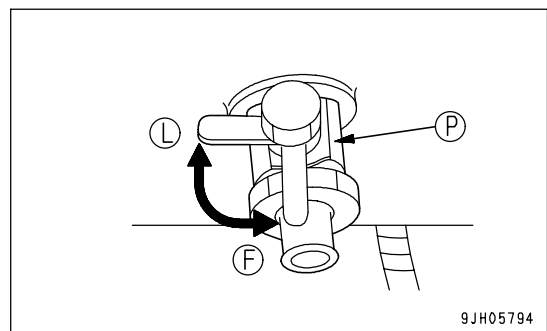
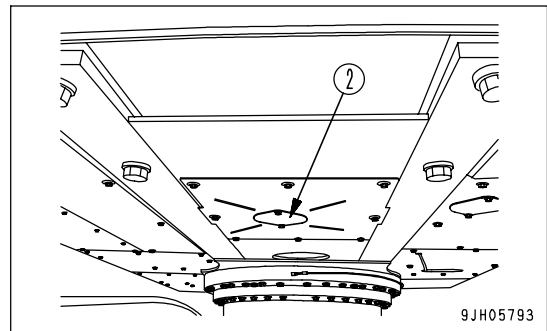
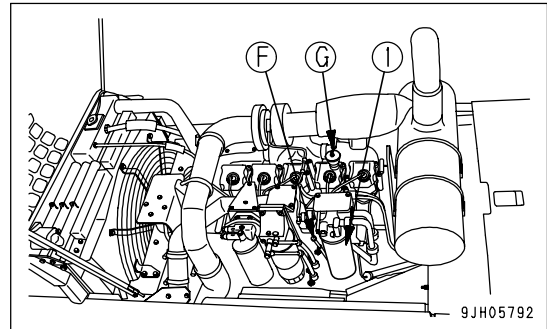


CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

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.

- Refill capacity: 38 liters (10.04 US gal)
- Prepare a filter wrench
 1. Remove inspection cover (2) of the undercover directly under drain valve (P) under the machine, then set a container to catch the oil.
 2. Be careful not to get oil on yourself. Move lever (F) of the drain valve (P) down slowly to drain the oil, and after draining the oil, raise the lever (L) to close it.
 3. Open the cover of the engine hood, use a filter wrench from the top of the engine, turn filter cartridge (1) to the left, and remove it.

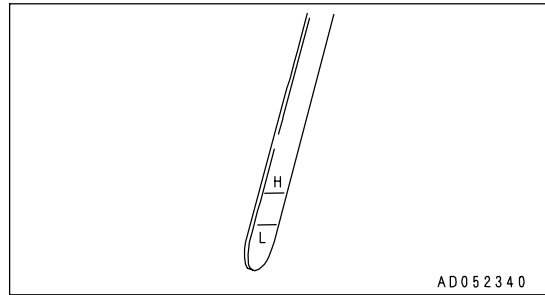


4. Clean the filter holder, fill the new filter cartridge with clean oil, coat the thread and packing surface of the new filter cartridge with clean oil (or coat it thinly with grease), then install it to the filter holder.

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.

5. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it a further 3/4 to 1 turn.
6. After replacing the filter cartridge, open the engine hood and add engine oil through oil filler (F) to between the H and L marks on dipstick (G).
7. 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 3-61)".
8. Install the undercover and inspection cover (2).



CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS (only machines equipped with air conditioner)

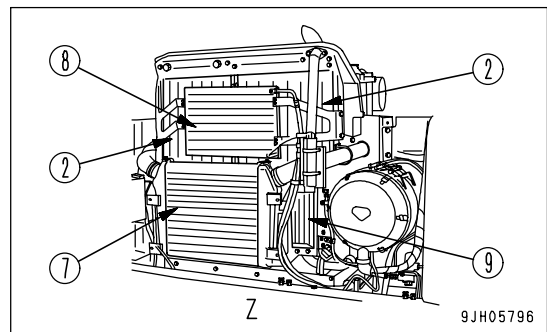
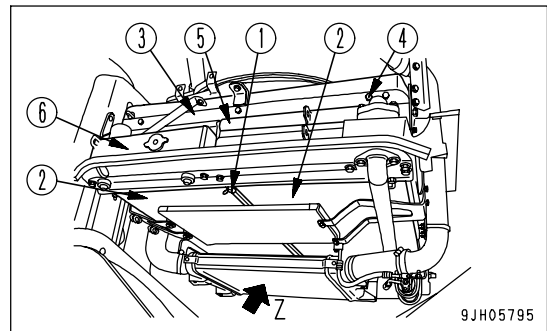
! WARNING

If compressed air, high-pressure water, or steam hit your body directly, or they cause dirt or dust to be blown up, there is a hazard of serious injury. Always use safety glasses, dust mask, or other protective equipment.

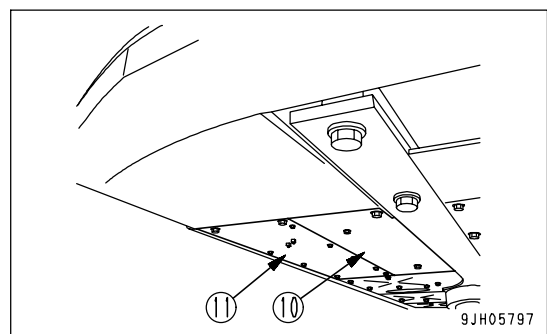
NOTICE

When using compressed air for cleaning, blow it keeping some distance to avoid damaging the fins. Damage on the fins can cause water leakage and overheating. In a dusty job site, check the fins every day, regardless of the maintenance interval.

1. Open the engine hood.
2. Loosen screw (1), then pull up net (2).
3. Clean net (2). (it is to be installed again, as instructed in the step 8.)
4. Loosen bolts (4) of top cover (3) on the engine side, then slide cover (3) to the rear.
5. Check the front face and rear face of oil cooler fins (5), radiator fins (6), aftercooler fins (7), condenser fins (8), and fuel cooler fins (9). If there are any leaves, mud, or dirt, blow off with compressed air.
Steam or water may be used instead of compressed air.
6. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by aging. In addition, check the hose clamps for looseness.



7. Remove undercovers (10) and (11), and clean out all the leaves, mud, and dirt blown off during the cleaning operation.
8. Insert cleaned net (2) into its original position, then install with screw (1).
9. Install cover (3) with mounting bolts (4).
10. Install undercovers (10) and (11).



CLEAN AIR CONDITIONER FRESH/RECIRC FILTERS



WARNING

If compressed air is used, there is danger that dirt may fly and cause personal injury. Always wear protective glasses, dust mask, and other protective equipment.

NOTICE

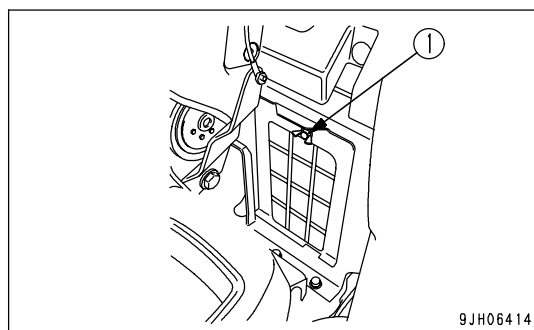
As a guideline, the filters should be cleaned every 500 hours, but on dusty jobsites, clean the filters more frequently.

REMARK

If the filter becomes clogged, the air flow will be reduced, and there will be an abnormal noise from the air conditioner unit.

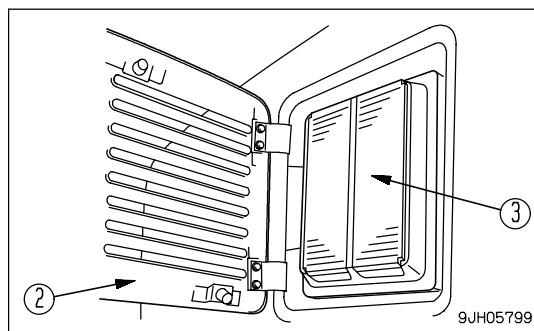
Cleaning Reticulated Air Filter

1. Remove wing bolts (1) from the inspection window at the bottom rear left on the inside of the operator's cab, then take out the recirculated air filter.
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.



Cleaning Fresh Air Filter

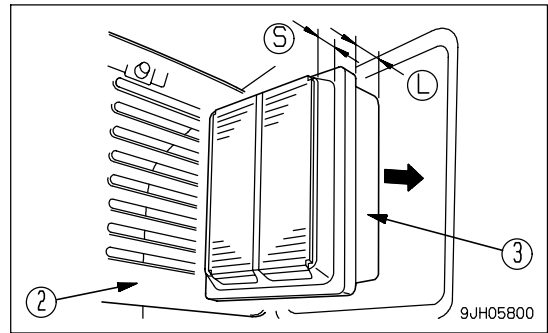
1. Use the starting switch key to open cover (2) at the rear left of the operator's cab, then open cover (2) by hand and remove filter (3) inside the cover.



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 (3) to its original position and close the cover. Use the starting switch key to lock the cover. Do not forget to remove the starting switch key.

REMARK

The FRESH filter must be installed facing in the correct direction. When installing, insert the long (L) end of filter (3) into the filter case first. If the short (S) end is installed first, cover (2) will not close.



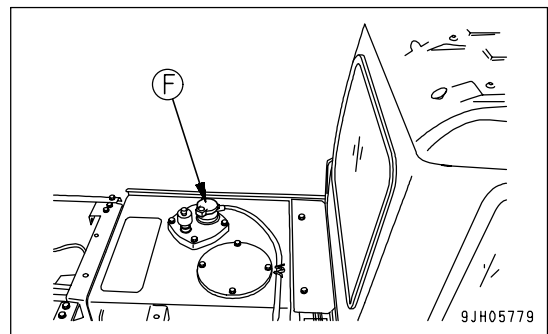
REPLACE BREATHER ELEMENT IN HYDRAULIC TANK



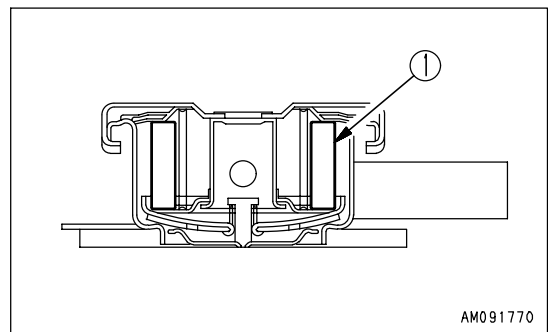
WARNING

- 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 the cap of oil filler (F) at the top of the hydraulic tank.



2. Replace element (1) inside the cap.



REPLACE ADDITIONAL FUEL FILTER CARTRIDGE

(If equipped with machines)

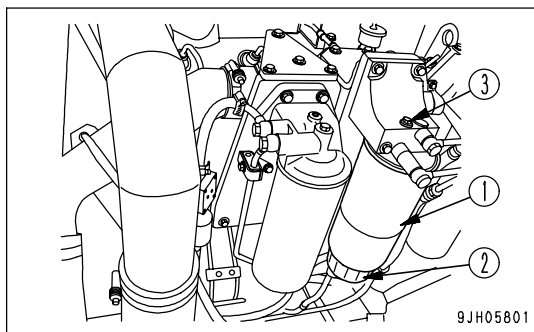
WARNING

- After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any fire or flame close.
- Be careful when opening the air bleed plug in the fuel filter head. It is still under pressure, so fuel may spurt out.

NOTICE

- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
 - The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle. If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
 - When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.
- Container to catch the oil
 - Prepare a filter wrench

1. Set the container to catch the fuel under the additional fuel filter cartridge.
2. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.
3. After removing the cartridge, turn cup (2) of the water separator installed to the bottom of the cartridge counterclockwise. (This cup is used again.)
4. Install cup (2) to the bottom of the new additional fuel filter cartridge. (When doing this, always replace the O-ring with a new part.)



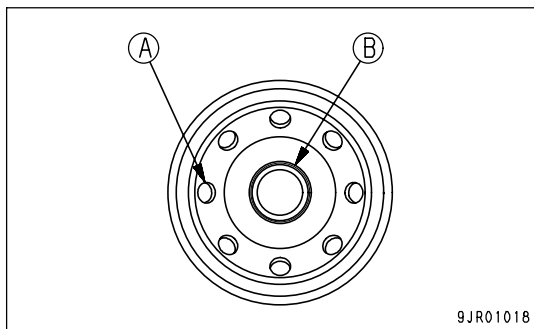
9JH05801

- Cup tightening torque: 10 N·m (1.0 kgf·m, 7.2 lbft)

5. 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.



9JR01018

6. 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.
7. Check that the drain plug at the bottom of the water separator cup is tightened securely.
Tightening torque: 0.2 to 0.45 N·m (0.02 to 0.046 kgf·m, 0.1 to 0.3 lbft)
8. When carrying out standard replacement of the fuel filter cartridge (every 1000 hours), replace the cartridge and bleed the air. For details, see "REPLACE FUEL FILTER CARTRIDGE (PAGE 4-66)".
9. Start the engine, check that there is no leakage of fuel from the filter seal surface or water separator mounting surface, then run for approx. 10 minutes at low idling.

EVERY 1000 HOURS MAINTENANCE

Maintenance for every 250 and 500 hours service should be carried out at the same time.

REPLACE FUEL FILTER CARTRIDGE

(Machines equipped with additional fuel filter cartridge)



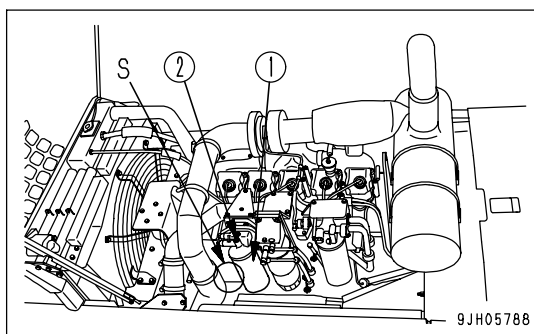
WARNING

- After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any fire or flame close.
- Be careful when opening the air bleed plug in the fuel filter head. It is still under pressure, so fuel may spurt out.

NOTICE

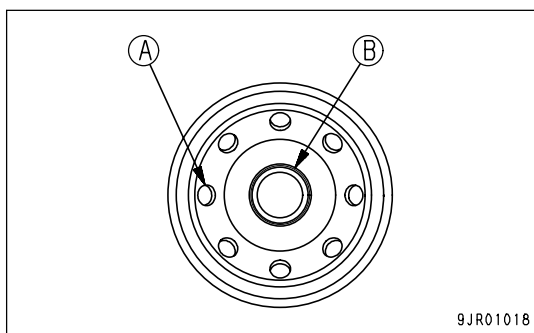
- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
- The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle. If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.
- Container to catch the oil
- Prepare a filter wrench

1. Set the container to catch the fuel under the filter cartridge.
2. Using a filter wrench, turn filter cartridge (1) counterclockwise on remove it.
3. 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.



NOTICE

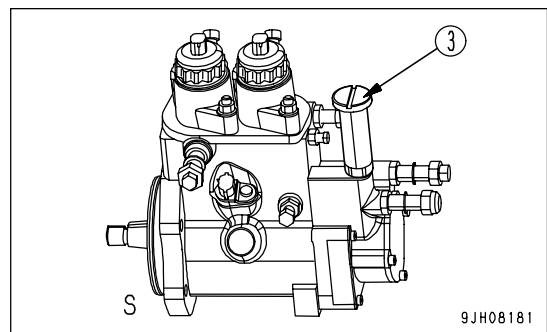
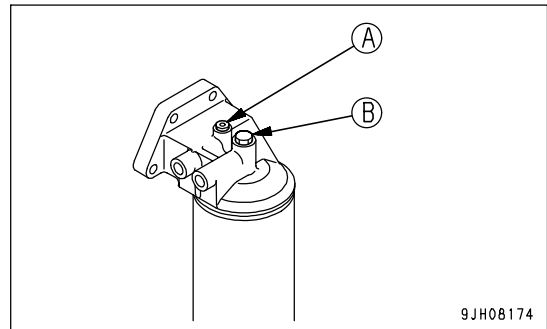
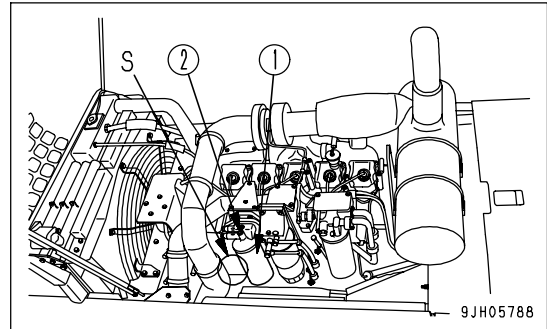
- Do not fill the fuel filter cartridge with fuel.
- Remove cap (B) and install the fuel filter.



4. 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.
5. After completion of the replacement of fuel filter cartridge (1), bleed the air.

Bleed the air as follows:

6. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
7. After replacing filter cartridge (1), loosen air bleed plug (B) in the filter head (2).
8. Loosen the knob of priming pump (3), then pump the knob until no more bubbles come out of air bleed plug (B).
9. Tighten air bleed plug (B).
Tightening torque: 4.9 to 6.9 N·m (0.5 to 0.7 kgf·m, 3.6 to 5.1 lbf·ft)
10. Push the knob of priming pump (3) in and tighten it.



11. After replacing the filter cartridge, start the engine and check that there is no leakage of fuel from the filter seal surface. If there is any leakage of fuel, check the tightening of the filter cartridge. If there is still leakage of fuel, follow Step 1 and 2 to remove the filter cartridge, then check the packing surface for damage or foreign material. If any damage or foreign material is found in the packing, replace the cartridge with a new part, then repeat Steps 3 - 10 to install the filter cartridge.

REPLACE HYDRAULIC OIL FILTER ELEMENT

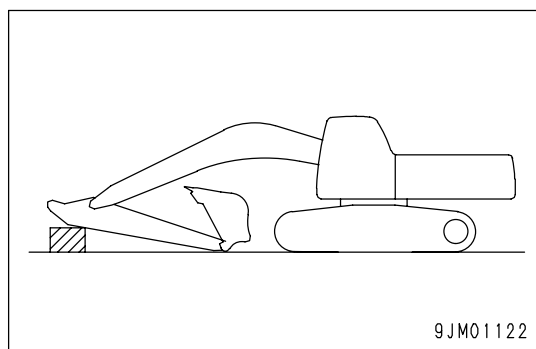
WARNING

- 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.

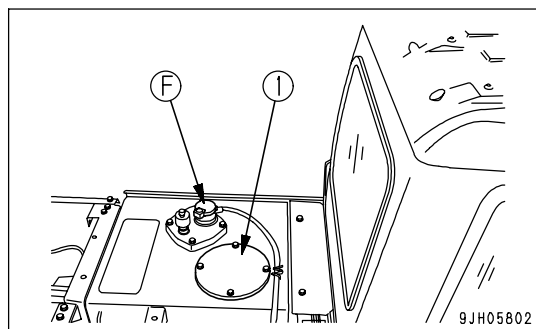
NOTICE

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 4-17)" when carrying out maintenance.

1. Set the work equipment on the hard and flat ground in the maintenance posture as shown in the figure, then lower it to the ground and stop the engine.



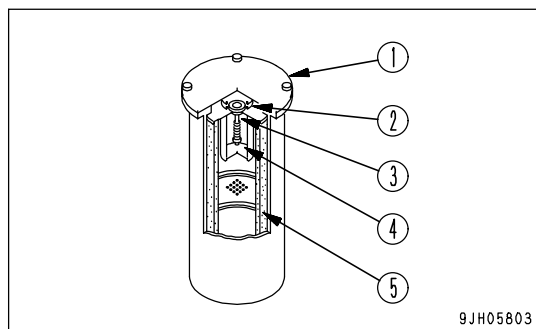
2. Remove the cap from oil filler (F) on top of the hydraulic tank, and release the internal pressure.
3. Loosen 4 bolts, then remove cover (1).
When doing this, the cover may fly out under the force of spring (2), hold the cover down when removing the bolts.



REMARK

If the mounting bolts of cover (1) are loosened and the cover is left as it is for approx. 5 minutes, the pressure inside the case is released, so the oil in the element is drained and less oil drips when the element is removed.

4. After removing spring (2), valve (3) and strainer (4), take out element (5).
5. Clean the removed parts in diesel oil.
6. Install the new element in the place where old element (5) was installed.
7. Set valve (3) and spring (2) on top of the element.
8. Set cover (1) in position, push it down by hand, and install the cover with the mounting bolts.
9. Screw in the oil filler cap and install the cover.



10. To bleed the air, start the engine according to "STARTING ENGINE (PAGE 3-72)" and run the engine at low idle for 10 minutes.
11. Stop the engine.

REMARK

Wait for at least 5 minutes after stopping the engine to eliminate bubbles in the oil inside the tank.

12. Check for oil leakage and wipe off any spilled oil.

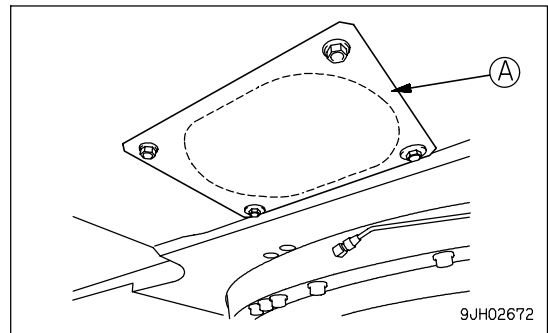
CHANGE OIL IN SWING MACHINERY CASE



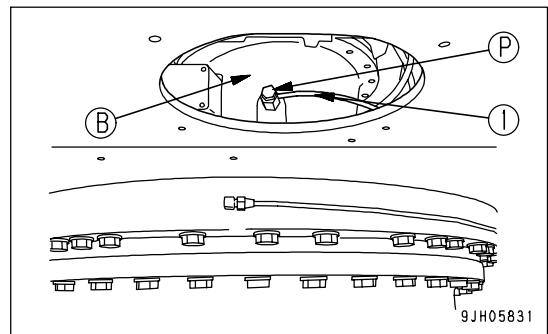
WARNING

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

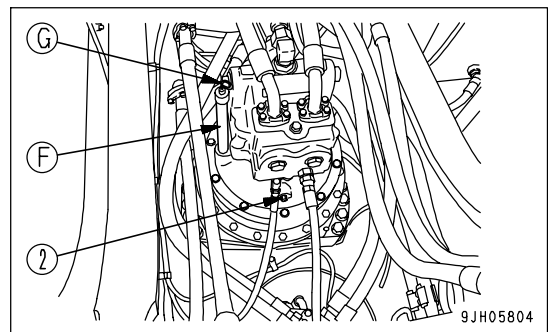
- Refill capacity: 20 liters (5.28 US gal)
1. Remove cover (A) of the inspection hole.
(Only machines equipped with optional cover)



2. Set a container under drain valve (P) under the machine body to catch the oil.
3. Loosen drain valve (P) under the body, drain the oil, then tighten the drain valve again.
4. Remove dipstick (G) and air bleeding plug (2), then add the specified amount of oil through filler port (F) of the dipstick guide.
5. After adding oil, install air bleed plug (2).



6. Pull out dipstick (G) and wipe off oil on the dipstick with cloth.
7. Fully insert dipstick (G) into filler pipe (F), then remove it.
8. The oil level should be between H and L marks on the dipstick (G). If the oil does not reach the L mark, add oil through oil filler port (F).
9. If the oil is above the H mark, drain the excess engine oil from drain valve (P), and check the oil level again.
 - When draining the oil, first pull hose (1) out from inspection hole (B), then turn the drain valve to the OPEN position.



CHECK OIL LEVEL IN DAMPER CASE, ADD OIL**WARNING**

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

NOTICE

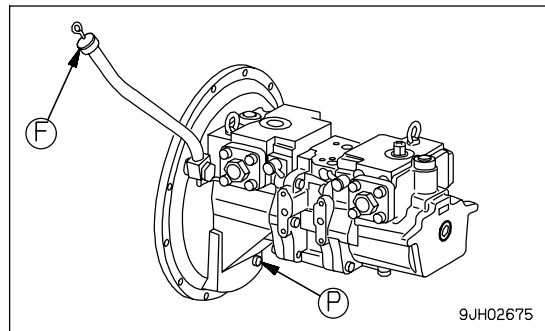
Park the machine on flat ground and stop the engine. After waiting for more than 30 minutes after stopping the engine, check the oil level.

1. Open the door on the left side of the machine.
2. Remove plug (P) and check that the oil is up to near the bottom of the plug hole. If the oil level is low, remove cap (F) and add oil through the oil filler port to the bottom of the hole of plug (P).

NOTICE

If excess oil is supplied, drain it to the specified amount to avoid overheating.

3. Install plug (P) and cap (F).
4. Close the door.

**CHECK ALL TIGHTENING PARTS OF TURBOCHARGER**

Contact your Komatsu distributor to have the tightening portions checked.

CHECK PLAY TURBOCHARGER ROTOR

Contact your Komatsu distributor to have the rotor play checked.

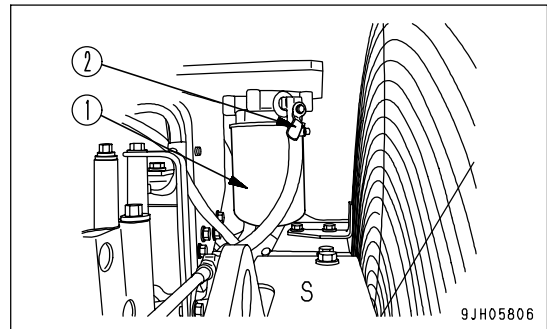
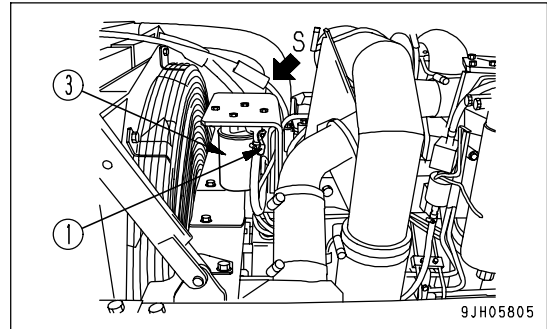
REPLACE CORROSION RESISTOR CARTRIDGE


WARNING

The oil is at high temperature after the engine has been operated, so never replace the cartridge immediately after finishing operations.

Wait for the oil to cool down before replacing cartridge.

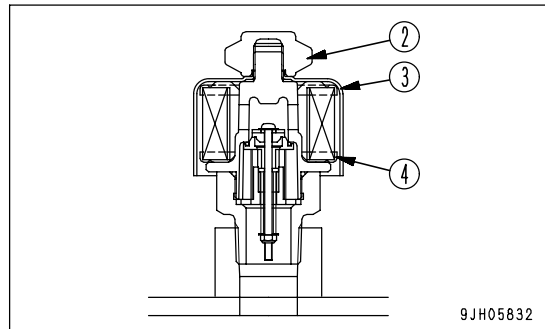
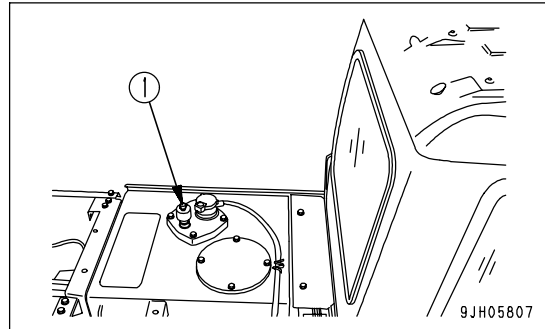
1. Close valves (1) and (2) at the top of the corrosion resistor.
2. Using a filter wrench, turn cartridge (3) to the left to remove it.
3. Install a new filter cartridge after coating oil on its sealing face.
In the installation, turn the cartridge by two-thirds of one turn after the packing surface comes to contact with the sealing face of the cartridge stand.
A genuine Komatsu filter cartridge is recommended for use.
4. Open valve (1).
5. Run the engine and check that there is no leakage of water from the seal surface.



REPLACE HYDRAULIC TANK ADDITIONAL BREATHER ELEMENT**WARNING**

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

1. Remove nut (2) of breather assembly (1) at the top of the hydraulic tank, then remove cover (3).
2. Replace filter element (4) with a new element.
3. Install cover (3) and nut (2).

**CHECK NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (for breaker)**

(If equipped)

A special tool is needed for inspecting and charging with nitrogen gas.
Have your Komatsu distributor inspect and charge the accumulator.

EVERY 2000 HOURS MAINTENANCE

Maintenance for every 250, 500 and 1000 hours service should be carried out at the same time.

CHANGE OIL IN FINAL DRIVE CASE

WARNING

- The parts and oil are at high temperature immediately after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- 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 12 liters (3.17 US gal)
- Prepare a handle.
 1. Set the TOP mark at the top, with the TOP mark and plug (P) perpendicular to the ground surface.
 2. Set a container under plug (P) to catch the oil.
 3. Remove plugs (P) and (F) with the handle and drain the oil.

REMARK

Check the O-rings in the plugs for damage. If necessary, replace with new ones.

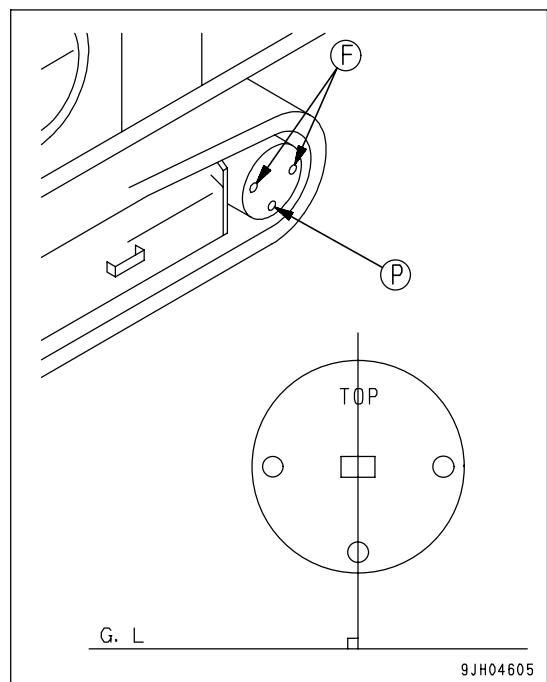
4. Tighten plug (P).
5. Add oil through the hole of plug (F).
6. When oil begins to overflow from the plug (F) hole, install plug (F).

Tightening torque of plugs (P) and (F):

$68.6 \pm 9.8 \text{ N}\cdot\text{m}$ ($7 \pm 1 \text{ kgf}\cdot\text{m}$, $50.6 \pm 7.2 \text{ lbft}$)

REMARK

There are two plugs (F). Add oil through the one easier to fill oil and through which no internal gears are to be seen.



CHECK INJECTOR

Check the color of the exhaust gas visually. If there is any abnormality in the exhaust gas color, contact your Komatsu distributor for inspection.

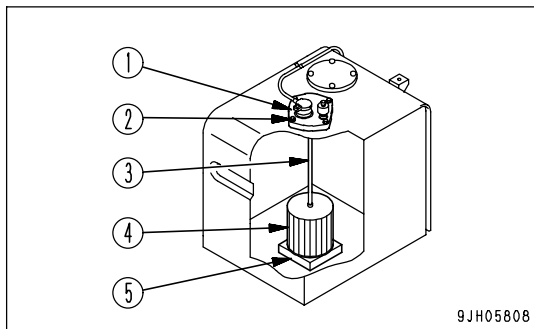
For details, see "TROUBLES AND ACTIONS (PAGE 3-129)" "Exhaust color is black".

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 4 bolts, then remove cover (1). When doing this, cover (1) may fly out under the force of spring (2), so keep the cover pressed down while removing the bolts.
2. Hold the top of rod (3) and pull up to remove spring (2) and strainer (4).
3. Remove any dirt stuck to strainer (4), then wash it in flushing oil. If strainer (4) is damaged, replace it with a new part.
4. When installing, insert strainer (4) into protruding part (5) of the tank, and assemble.
5. Assemble so that the protruding part at the bottom of cover (1) holds spring (2), then tighten with the bolt.

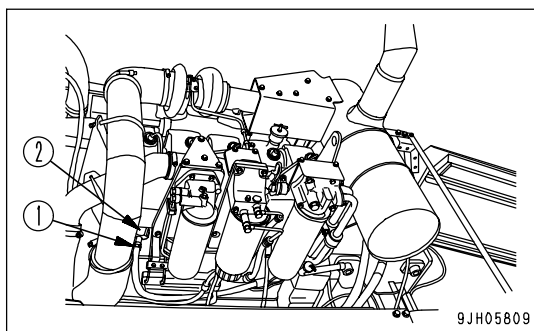


CLEAN ENGINE BREATHER

! WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the engine breather.
- When using compressed air, there is a hazard that dirt may be blown up and cause serious injury. Always use safety glasses, dust mask, or other protective equipment.

1. Wipe away dust around the breather.
2. Loosen the clamp (1), remove the breather hose, then remove breather (2) from the cylinder head cover.
3. Clean the breather body with light oil or cleaning oil.
4. Replace O-ring with new one. Coat a new O-ring with engine oil, set it, then install breather (2).
5. Check the breather hose and pipe. If caked oil (sludge) adhere to insides, replace the hose and pipe with new parts.



CLEAN, CHECK TURBOCHARGER

Contact your Komatsu distributor for cleaning and inspection.

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.

CHECK VIBRATION DAMPER

Check that there are no cracks or peeling in the outside surface of the rubber.

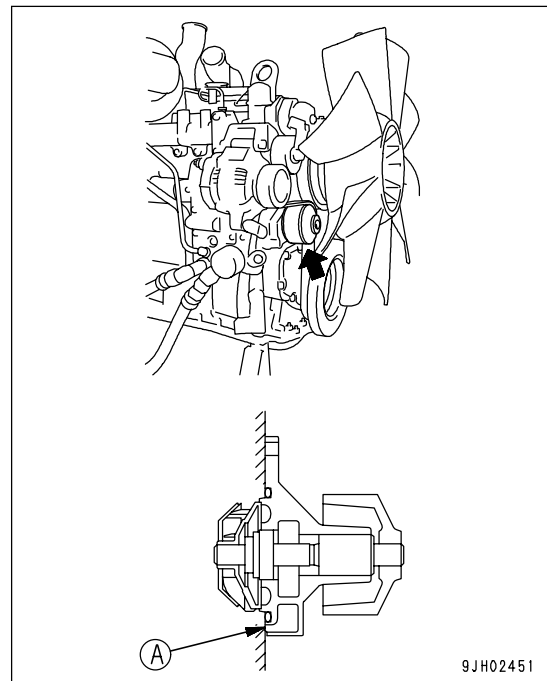
If any cracks or peeling are found, contact your Komatsu distributor to have the parts replaced.

EVERY 4000 HOURS MAINTENANCE

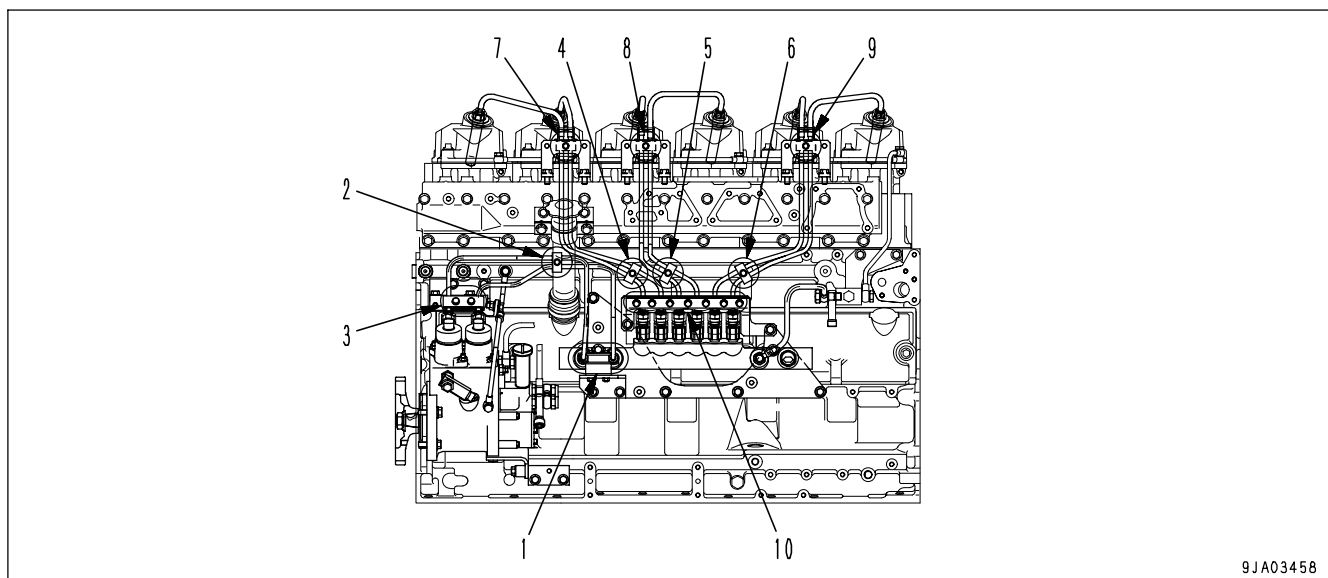
Maintenance for every 250, 500, 1000 and 2000 hours service should be carried out at the same time.

CHECK WATER PUMP

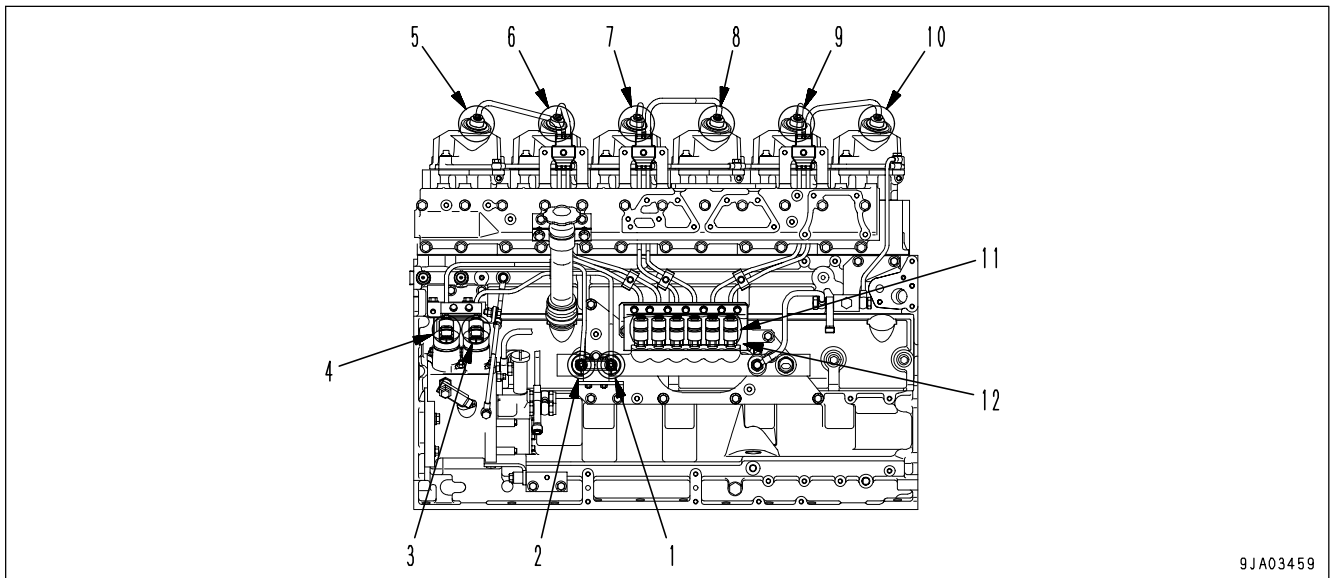
Since the pulley may have play, oil may leak, water may leak and the drain hole (A) may be clogged, contact your Komatsu distributor for inspection, overhaul or replacement.



CHECK FOR LOOSENESS OF HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER



Check visually and touch with your fingers to check that there are no loose bolts or hardening of rubber parts at clamps (1) to (10). If there is any looseness or hardened rubber, contact your Komatsu distributor for replacement.

CHECK FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

Check for any missing fuel spray prevention caps (1) to (11) or fuel spray prevention cover (12), and check also for any hardened rubber portions. If there are any missing caps or cover or the rubber is hardened, please contact your Komatsu distributor for repairs.

REPLACE INJECTOR NOZZLE ASSEMBLY

Please contact your Komatsu distributor to have the injector nozzle assembly replaced.

EVERY 5000 HOURS MAINTENANCE

Maintenance for every 250, 500 and 1000 hours service should be carried out at the same time.

CHANGE OIL IN HYDRAULIC TANK



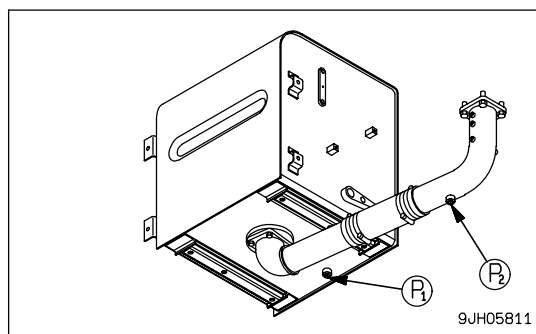
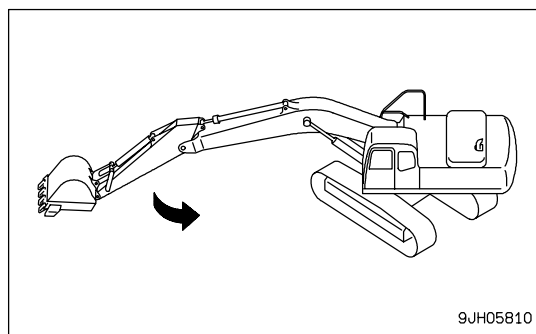
WARNING

- 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 4-17)" when carrying out maintenance.

- Refill capacity: 248 liters (65.52 US gal)
 - Prepare a handle (for the socket wrench).
1. Swing the upper structure 45° to the left so that drain plugs (P1), (P2) under the tank and the bottom of the pump suction tube are in the middle between the left and right tracks.
 2. Retract the arm and bucket cylinders, then lower the boom and put the teeth in contact with the ground.
 3. Set the lock lever to the LOCK position and stop the engine.
 4. Remove the 2 undercovers under drain plugs (P1) and (P2).



5. Remove the cap of oil filler port (F) at the top of the hydraulic tank.

6. Set a container to catch the oil under the drain plug at the bottom of the machine, then remove drain plugs (P1) and (P2), and drain the oil.

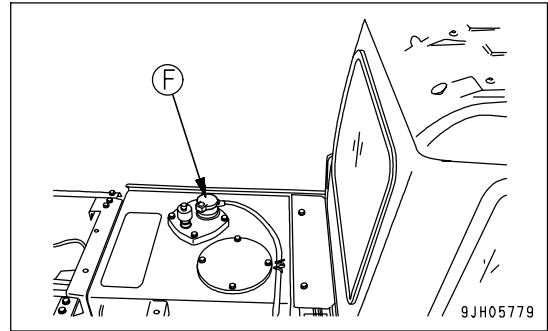
Check the O-rings installed to drain plugs (P1) and (P2). If there is any damage, replace the O-ring. After draining the oil, tighten drain plugs (P1) and (P2).

- Tightening torque: 68.6 ± 9.81 N·m (7 ± 1 kgf·m, 50.6 ± 7.2 lbft)
- When removing drain plugs (P1) and (P2), be careful not to get the oil over yourself.
- Remove drain plug (P1) at the bottom of the tank first, then remove plug (P2) at the suction tube. This makes it possible to drain approximately the same amount of oil from the two places.

7. Add the specified amount of new and clean oil through oil filler port (F). Check that the oil level is between H and L on the sight gauge.

For details of oil level check, see "Check Oil Level in Hydraulic Tank, Add Oil (PAGE 3-64)".

8. Install the 2 undercovers under drain plugs (P1) and (P2).



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

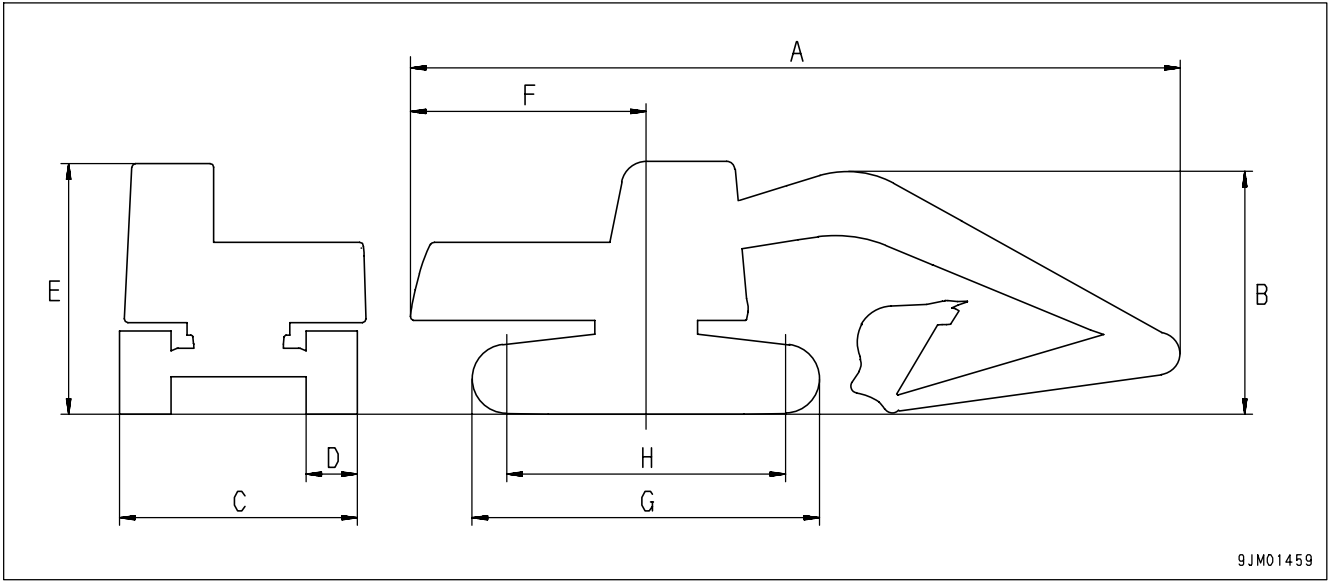
Contact your Komatsu distributor to have the fuel spray prevention cap replaced.

SPECIFICATIONS

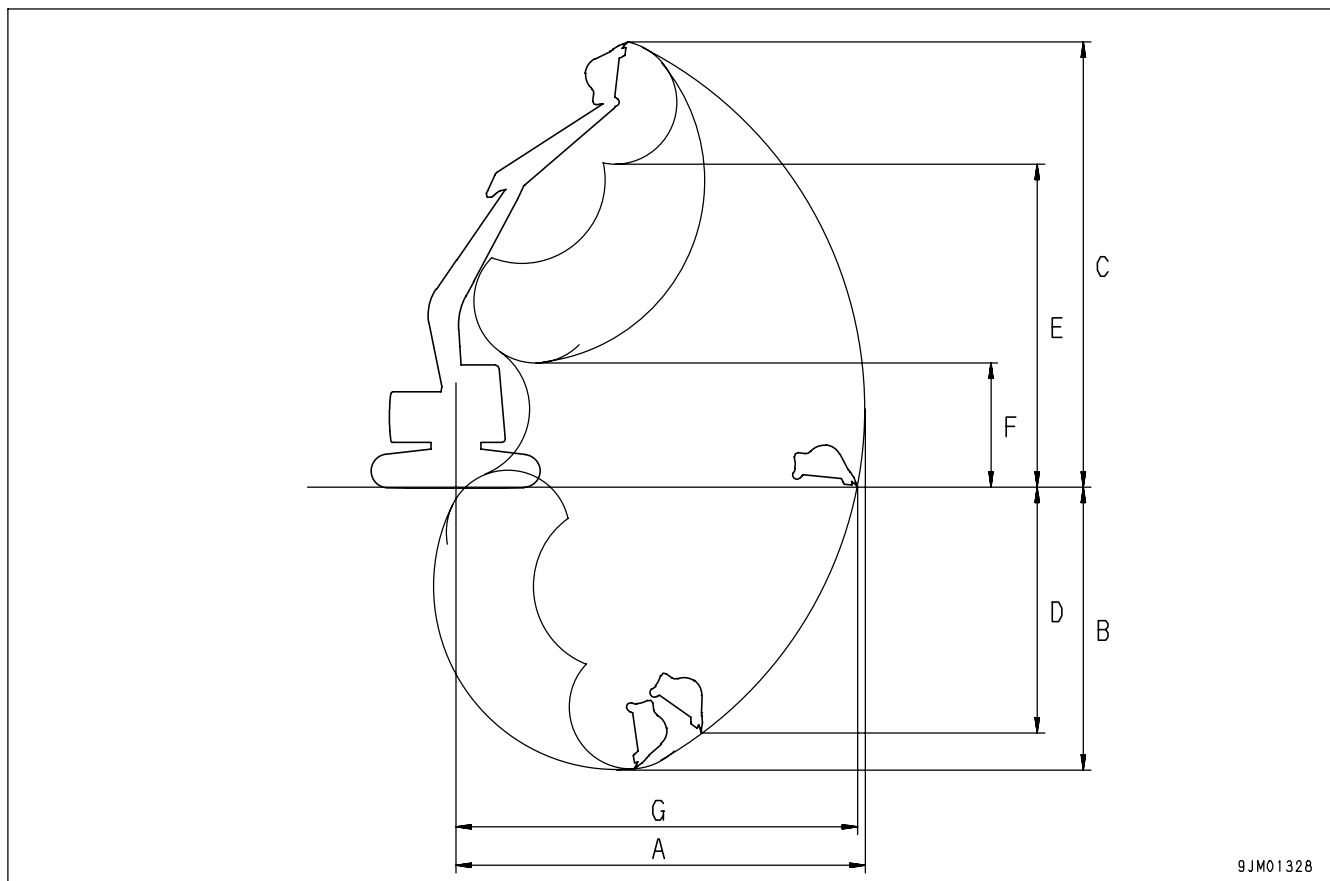
SPECIFICATIONS

Item	Unit	PC400-7	PC400LC-7	PC450-7	PC450LC-7
Operating weight (Variable gauge specification)	kg (lb)	42,400 (93,492)	43,500 (95,918)	44,000 (97,020)	44,600 (98,343)
Operating weight (Fixed gauge specification)		41,200 (90,846)	42,200 (93,051)	42,700 (94,154)	43,700 (96,359)
Operating weight (Fixed gauge specification for America)		41,200 (90,846)	42,500 (93,713)	42,700 (94,154)	43,700 (96,359)
Bucket capacity	m ³ (cu.yd)	1.9 (2.5)	1.9 (2.5)	1.9 (2.5)	1.9 (2.5)
Name of engine	-	KOMATSU SAA6D125E-3 deisel engine			
Rated horsepower of engine	kW (HP)/rpm	246(330) /1,850	246(330) /1,850	246(330) /1,850	246(330) /1,850
A Overall length	mm (ft in)	11,945 (39' 2")	11,945 (39' 2")	12,040 (39' 6")	12,040 (39' 6")
B Overall height	mm (ft in)	3,635 (11' 11")	3,635 (11' 11")	3,670 (12')	3,670 (12')
C Overall width (Variable gauge specification)	mm (ft in)	3,490 (11' 5")	3,590 (11' 9")	3,490 (11' 5")	3,490 (11' 5")
C Overall width (Fixed gauge specification)		3,340 (10' 11")	3,440 (11' 3")	3,340 (10' 11")	3,340 (10' 11")
D Track shoe width	mm (ft in)	600 (1' 12")	700 (2' 4")	600 (1' 12")	600 (1' 12")
E Height of cab	mm (ft in)	3,250 (10' 8")	3,250 (10' 8")	3,250 (10' 8")	3,250 (10' 8")
F Radius of upper structure	mm (ft in)	3,645 (11' 12")	3,645 (11' 12")	3,645 (11' 12")	3,645 (11' 12")
G Overall length of track	mm (ft in)	-	-	-	-
H Tumbler center distance	mm (ft in)	4,020 (13' 2")	4,350 (14' 3")	4,020 (13' 2")	4,350 (14' 3")
Min. ground clearance	mm (ft in)	685 (2' 3")	685 (2' 3")	685 (2' 3")	685 (2' 3")
Traveling speed (low/middle/high)	km/h (MPH)	3.0/4.4/5.5 (1.9/2.7/3.4)	3.0/4.4/5.5 (1.9/2.7/3.4)	3.0/4.4/5.5 (1.9/2.7/3.4)	3.0/4.4/5.5 (1.9/2.7/3.4)
Swing speed	rpm	9.1	9.1	9.1	9.1

- "Variable gauge specification" means the machine can extend and retract overall width (C) of the track frame.
- "Fixed gauge specification" means the machine cannot extend or retract overall width (C) of the track frame.



	Working ranges	Unit	PC400-7	PC400LC-7	PC450-7	PC450LC-7
A	Max. digging reach	mm (ft in)	12,025 (39' 5")	12,030 (39' 6")	12,020 (39' 5")	12,020 (39' 5")
B	Max. digging depth	mm (ft in)	7,820 (25' 8")	7,830 (25' 8")	7,810 (25' 7")	7,810 (25' 7")
C	Max. digging height	mm (ft in)	10,915 (35' 10")	10,915 (35' 10")	10,930 (35' 10")	10,930 (35' 10")
D	Max. vertical wall digging depth	mm (ft in)	6,870 (22' 6")	6,870 (22' 6")	6,660 (21' 10")	6,660 (21' 10")
E	Max. dumping height	mm (ft in)	7,565 (24' 10")	7,565 (24' 10")	7,625 (25')	7,625 (25')
F	Min. dump height	mm (ft in)	-	-	-	-
G	Max. digging reached at ground level	mm (ft in)	11,820 (38' 9")	11,820 (38' 9")	11,800 (38' 9")	11,800 (38' 9")



9JM01328

ATTACHMENTS, OPTIONS

 **WARNING**

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

GENERAL PRECAUTIONS FOR SAFETY

When installing attachments or options to the machine, it is necessary to pay attention to safety. Please obey the following precautions strictly when selecting, installing, or using attachments or options.

PRECAUTIONS WHEN SELECTING

- Please consult your Komatsu distributor before installing attachments or options to the machine. Depending on the type of attachment or option, it may be necessary to install a front guard, overhead guard, or other safety structure to the machine. There may also be problems of the attachment or option hitting the operator's cab.
- Install only attachments or options authorized by Komatsu. Komatsu cannot accept any responsibility for any accident, damage, or failure caused by the use of attachments or options not authorized by Komatsu.

READ THE INSTRUCTION MANUAL THOROUGHLY

- Before installing or using any attachment or option, make sure that you thoroughly read and understand the instruction manuals for the machine and the attachment or option.
- If you lose the instruction manual or it is damaged, always obtain a new copy from the attachment manufacturer or your Komatsu distributor.

PRECAUTIONS WHEN REMOVING OR INSTALLING

When removing or installing the attachment or option, 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, choose the leader and follow his instructions.
- Use a crane when handling heavy objects (more than 25 kg (55 lb)). (The crane must be operated by a qualified operator.)
- Never go under a load raised by the crane.
- Do not carry out operations with the load kept raised by the crane. Always use a stand to prevent the load from falling.
- When removing a heavy part, consider the balance after it is removed. To prevent the machine from tipping over, set a support in position if necessary before removing the part.
- Before installing or after removing the attachment or option, set it in a stable condition to prevent it from falling over.
- For details of the removal or installation operation, please consult your Komatsu distributor.

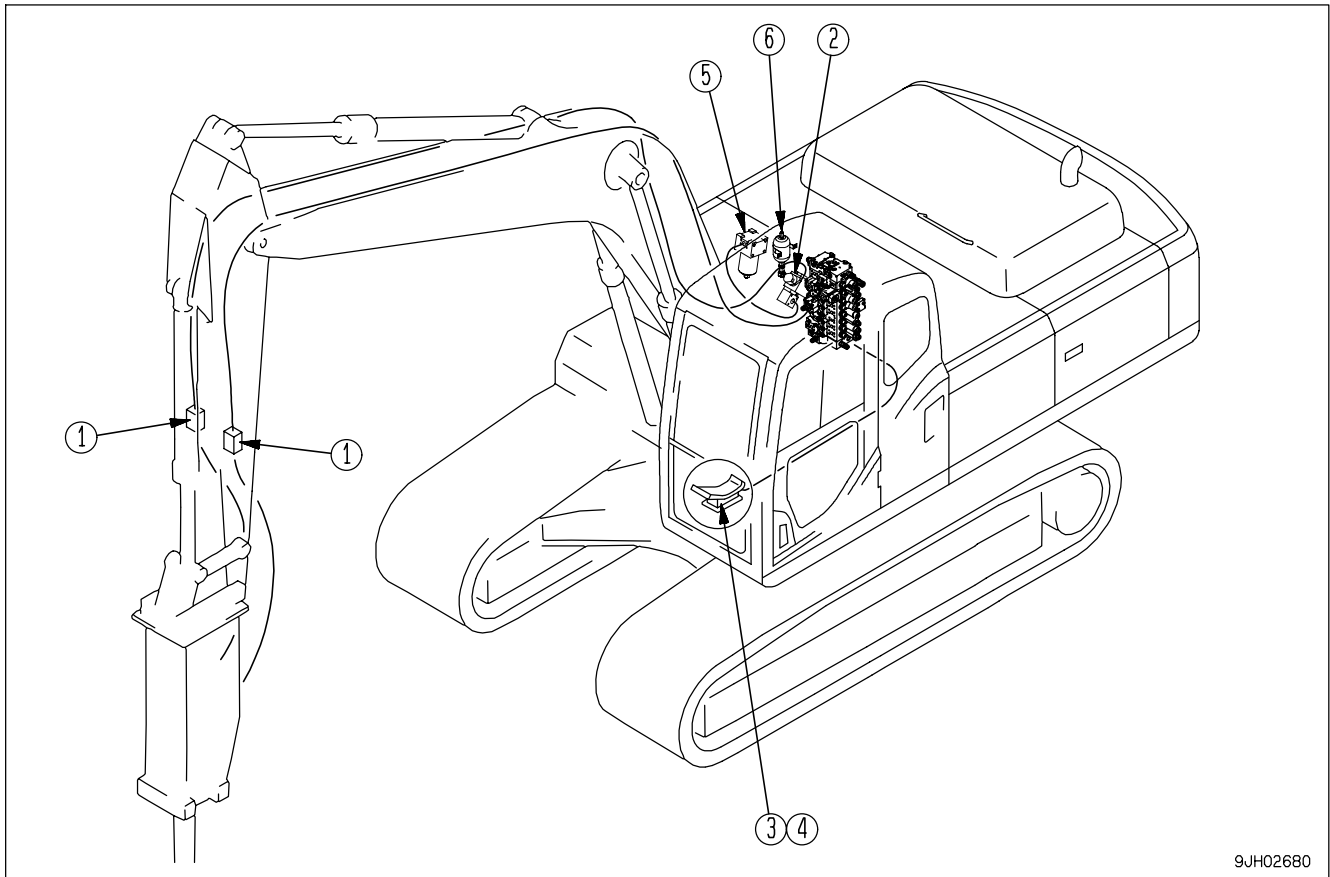
PRECAUTIONS WHEN USING

When long or heavy work equipment is installed, remember the following precautions. Before starting operations, move the machine to a safe place and carry out a test operation to make sure that you fully understand the movement, center of gravity, and working range of the machine.

- Do not swing the work equipment if the machine is at an angle. If the work equipment is swung with the machine at an angle, there is danger that the machine will tip over.
- Always maintain a safe distance from obstacles in the surrounding area when operating. If long work equipment is installed, the working range becomes larger.
- If heavy work equipment is installed, pay careful attention to the following precautions.
 - The swing overrun (the distance the work equipment moves before completely stopping after the swing brake is applied) will be greater. There is danger of hitting objects if the swing overrun is miscalculated, so allow extra space to the swing position when swinging.
 - The hydraulic drift of the work equipment (the amount of the work equipment moves down under its own weight when it is stopped in a raised position) also becomes greater. Do not stop the work equipment in a raised position; always lower it to the ground.
 - Do not swing, lower, or stop the work equipment suddenly. There is danger that the machine may tip over.
 - Do not suddenly extend or retract the boom cylinder. The shock may cause the machine to tip over.

MACHINE READY FOR ATTACHMENT

LOCATIONS



9JH02680

- | | |
|------------------------------|---|
| (1) Stop valve | (4) Lock pin |
| (2) Selector valve | (5) Breaker circuit additional oil filter |
| (3) Attachment control pedal | (6) Accumulator |

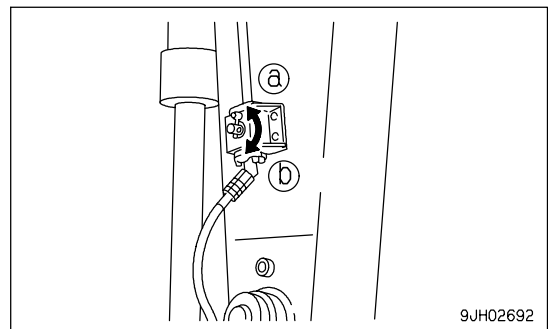
Stop Valve

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.

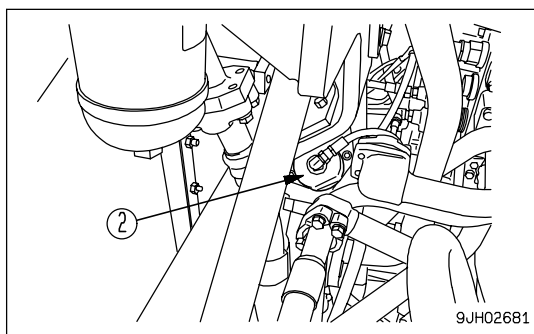


9JH02692

Selector Valve

This valve (2) switches the flow of hydraulic oil.

It is automatically switched according to the selected working mode. It is necessary to switch the working mode to match the attachment that is installed. For details of switching the working mode, see "HYDRAULIC CIRCUIT (PAGE 6-7)".

**NOTICE**

If a service circuit from the attachment maker has been added, the return circuit may not switch automatically.

Attachment Control Pedal**WARNING**

Do not carry out operations with your foot on the pedal. If the pedal is depressed by mistake, the attachment may suddenly move and cause a serious accident. Lock the pedal with the lock pin when you are not operating the attachment.

This pedal (3) is used to control the attachment.

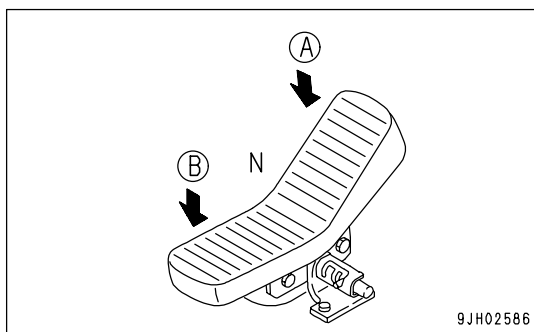
When the front, center (neutral), and rear of the pedal are depressed, the movement of the attachment is as follows.

Hydraulic breaker

Front of pedal (A): Actuated

Center of pedal N: Stopped

Rear of pedal (B): Stopped



Regarding other attachments, hold a meeting with the attachment maker at the time of installation to confirm the operation of the pedal and attachment before using it.

REMARK

This pedal cover (3) differs in thickness at both ends. It can be stalled facing in either direction, so install it according to your own preference.

Lock Pin

This pin (4) locks the control pedal.

Position (a): Locked

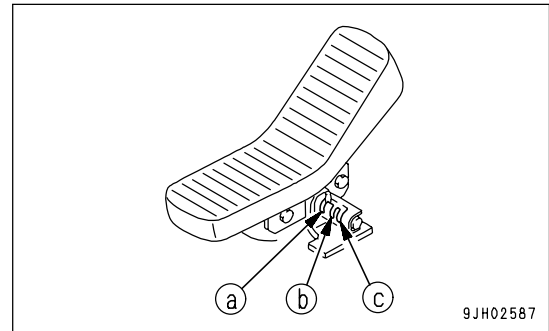
Position (b): Only front of pedal can be operated to full position
(rear is locked)

Position (c): Both front and rear of pedal can be operated to
full position

- When using a breaker, select B mode on the monitor and set the lock pin to position (b).

When not using the attachment, set the lock pin to position (a).

- When using a Crasher, select A or E mode on the monitor and set the lock pin to position (c).

**NOTICE**

When using a breaker, if the lock pin is set to position (c) and the rear portion (B) of the pedal is depressed, it will cause defective operation or breakage of the breaker, so always set the lock pin to position (b) when using the breaker.

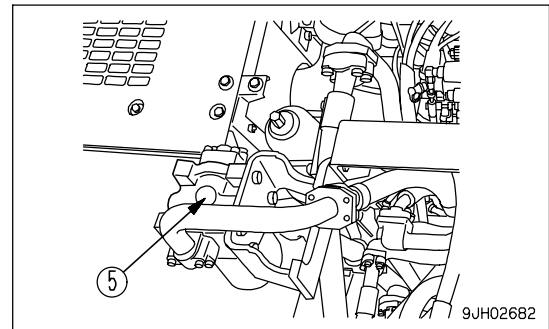
Breaker Circuit Additional Oil Filter

This filter (5) prevents deterioration of the hydraulic oil when using a breaker.

Oil only flows when B mode is selected on the monitor.

NOTICE

Always install an additional filter in the return circuit on machines equipped with a hydraulic breaker.



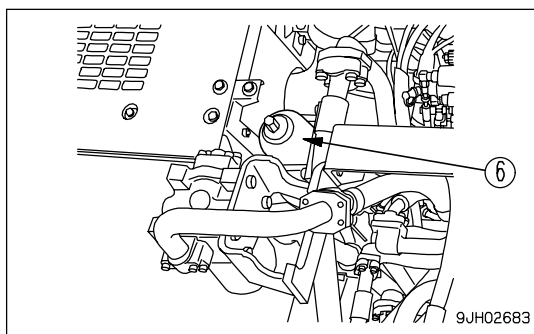
Accumulator



WARNING

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

- Pressure in the control circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that oil spurts out when performing the operation.
- Loosen the bolts slowly.
- Do not disassemble the accumulator.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it or weld it.
- Do not hit it, roll it, or subject it to any impact.
- When disposing of the accumulator, the gas must be released. Contact your Komatsu distributor for proper disposal.



This accumulator (6) is installed to reduce the peak pressure in the hydraulic circuit when a breaker is used. Normally, do not touch it.

NOTICE

- For machines equipped with a breaker, when connecting to the breaker piping, it is necessary to install the accumulator specified by the breaker manufacturer for that breaker model. If the breaker is operated without an accumulator being installed, the life of the machine will be reduced. Please contact your Komatsu distributor if you have questions about the applicable breaker.
- If the nitrogen gas charge pressure inside the accumulator goes down, it will become impossible to release the remaining pressure inside the hydraulic circuit after the engine is stopped. In addition, if operations are continued when the nitrogen gas charge pressure is low, it will lead to failure of the hydraulic circuit or the machine. Check the nitrogen charge pressure periodically.

For details, see "CHECK NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (control circuit) (PAGE 4-43)" and "CHECK NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (for breaker) (PAGE 4-72)".

HYDRAULIC CIRCUIT

NOTICE

- It is necessary to return the return circuit directly to the return filter when a breaker is used, so use only the B mode. Do not use any other mode.
- When the machine is shipped from the factory, the standard set pressure of the safety valve in the service valve is set as follows:
 When B mode is selected: 17.2 MPa (175 kgf/cm², 2,485 PSI)
 When A or E mode is selected: 20.1 MPa (205 kgf/cm², 2,911 PSI).
 The set pressure may have to be adjusted depending on the attachment. In such cases, please ask your Komatsu distributor to carry out the adjustment.

Switching Hydraulic Circuit

- Depending on the type of attachment, set the working mode on the monitor as follows.
- The set pressure of the safety valve in the service valve and the hydraulic circuit switch is according to the working mode selected.

Attachment	Working mode	Hydraulic circuit	Set pressure of service safety valve
1-way circuit attachment (such as breaker)	B mode	Return circuit automatically becomes circuit which does not pass through control valve	When shipped from factory: 17.2 MPa (175 kgf/cm ² , 2,485 PSI)
2-way circuit attachment (such as crusher)	A mode or E mode	Return circuit automatically becomes circuit which passes through control valve	When shipped from factory: 20.1 MPa (205 kgf/cm ² , 2,911 PSI)

Adjusting Oil Flow

Depending on the attachment, it is necessary to change the oil flow in the service circuit. For details of setting the oil flow, see "ATTACHMENT OPERATIONS (PAGE 6-13)".

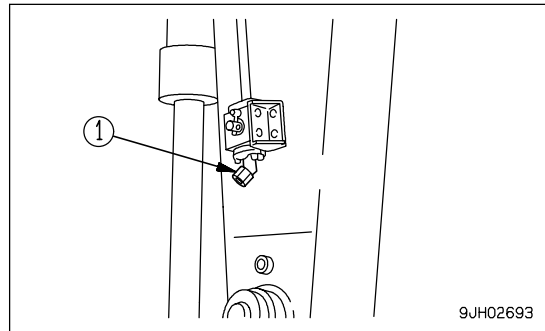
Switching Between Breaker and General Attachment

- If an attachment is installed as an option, and the mode is set to B mode:
 - (1) The system is set to the breaker operation circuit (1-way circuit).
 - (2) The hydraulic oil flowing to the breaker circuit flows to the additional filter for the breaker.
 - (3) The relief pressure valve is set to low pressure.
 Set pressure when machine is shipped from factory: 17.2 MPa (175 kgf/cm², 2,490 PSI)
 - (4) It is possible to use the selector mode to adjust the maximum oil flow.
- If an attachment is installed as an option, and the mode is set to A or E mode:
 - (1) The system is set to the crusher operation circuit (2-way circuit).
 - (2) The hydraulic oil flowing to the crusher circuit does not flow to the additional filter for the breaker.
 - (3) The relief pressure valve is set to high pressure.
 Set pressure when machine is shipped from factory: 20.1 MPa (205 kgf/cm², 2,911 PSI)
 - (4) It is possible to use the selector mode to adjust the maximum oil flow.

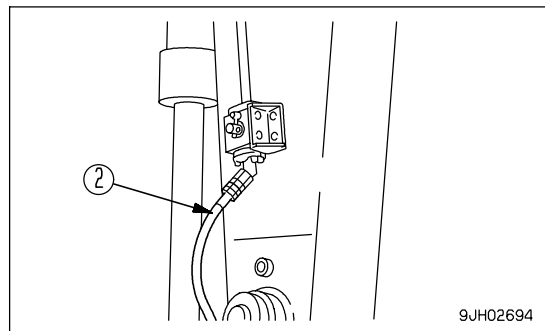
Hydraulic Circuit Connection

When connecting the attachment, connect the hydraulic circuit as follows.

1. Remove blind plug (1) at the end of the stop valve piping.
(Two spots on the left and right)
Be careful not to lose or damage any part that has been removed.

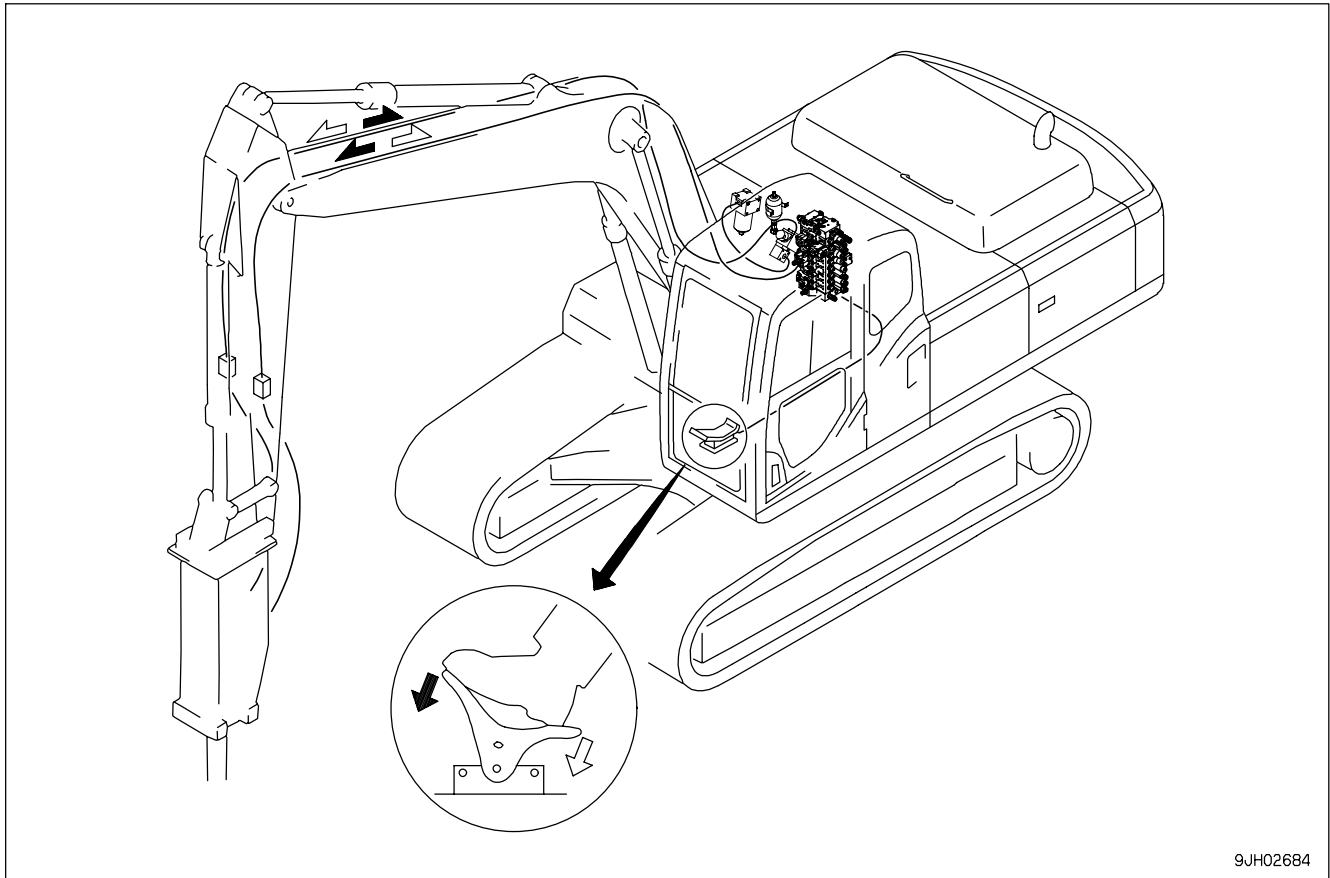


2. Connect attachment piping (2) provided by the attachment maker to the part from which the plug was removed Step 1.
For the mouthpiece size and accumulator add-on, the action to take differs according to the attachment manufacturer, so please consult your Komatsu distributor.



Oil Flow Path

The direction of operation of the pedal and the path of the oil flow is as shown in the diagram below.



9JH02684

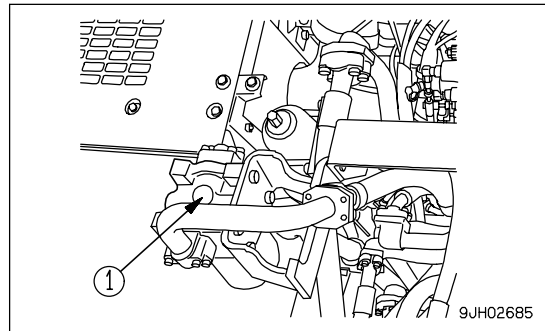
When the front of the pedal is depressed, oil flows to the piping on the left side of the work equipment; when the rear of the pedal is depressed, oil flows to the piping on the right side of the work equipment. (When a breaker is installed, only the front of the pedal can be used.)

Replace Additional Breaker Filter Element



WARNING

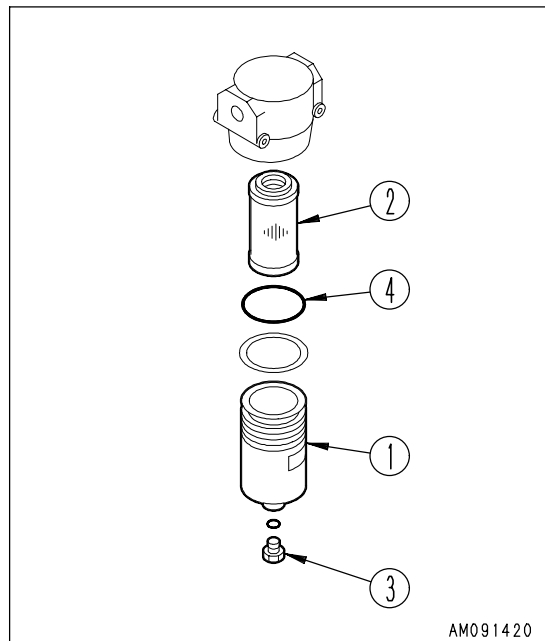
- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.



- Prepare a container to catch the oil.
 1. Place a container under the filter element to catch the oil.
 2. Remove plug (3) from filter case (1) and drain the oil.
 3. Turn filter case (1) to the left to remove it, then take out element (2).
 4. Clean the removed parts, then install new element (2) and O-ring (4).
 5. When installing, bring the case into contact with the filter holder, then tighten a further 1/2 turns.

NOTICE

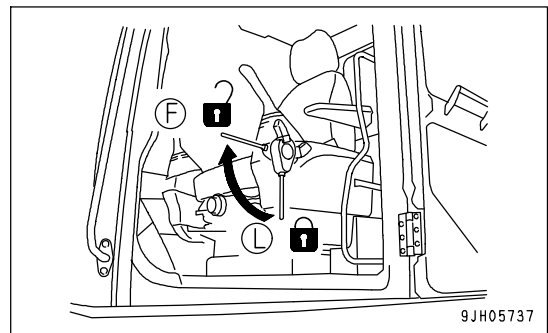
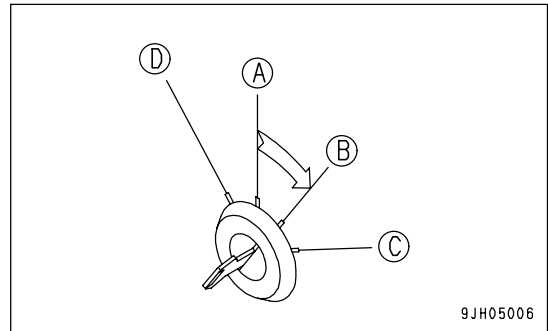
For details of the replacement interval for the element, "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (PAGE 4-17)".



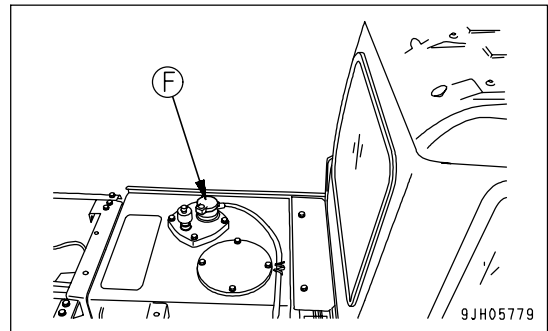
ATTACHMENT REMOVAL AND INSTALLATION

Attachment Removal

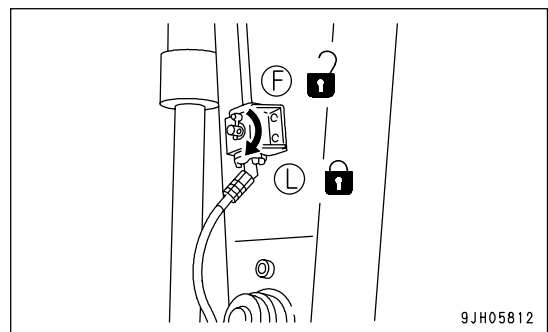
1. Lower the attachment to the ground and stop the engine.
2. Turn the starting switch to the ON position (B), then set the lock lever to the FREE position (F).
3. Operate each work equipment control lever and the attachment control pedal back and forth, left and right at full stroke 2 to 3 times to eliminate the internal pressure in the hydraulic circuit.



4. Loosen slowly oil filler cap (F) on top of the hydraulic tank to eliminate the internal pressure in the hydraulic circuit.



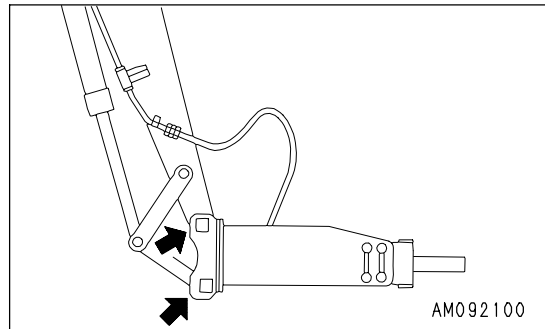
5. After checking that the oil has cooled down, turn the rotor on the stop valve installed to the piping for the inlet port and outlet port on the side face of the arm to the LOCK position (L).
6. Remove the hoses on the attachment side. Install the plugs to the two outlets.
The plugs are used to prevent the attachment from incorrect operation caused by mixing in of foreign matter. After the plugs are correctly installed, store the attachment.



7. 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 3-103)".

8. After installing the bucket, check the oil level in the hydraulic tank.

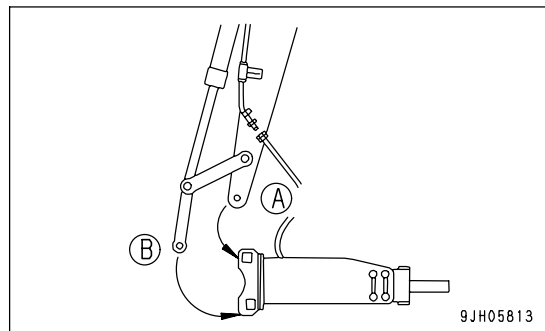


Attachment Installation

1. Remove the bucket.

For bucket dismounting procedure, see "BUCKET REPLACEMENT AND INVERSION (PAGE 3-103)".

2. Place the attachment in a horizontal position, then install to the arm with pin (A) and then pin (B).



3. After confirming low oil temperature, remove the plug from the outlet and inlet port respectively.

Take care that no dust, mud etc. adheres to the hose mousepiece portions.

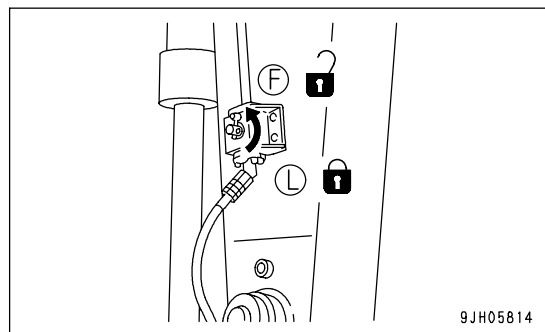
If O-ring is damaged, replace it with a new one.

4. 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.

5. Turn the rotor on the stop valve installed to the piping for the inlet port and outlet port on the side face of the arm to the FREE position (F).

6. After installing the attachment, check the oil level in the hydraulic tank.



ATTACHMENT OPERATIONS

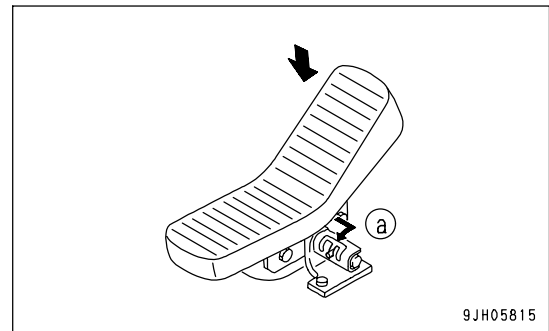

WARNING

- Do not rest the foot on the pedal and depress it, when the auto deceleration switch is in ON position. The engine speed rises all of sudden and the attachment will move suddenly and cause serious damage or injury.
- Do not put your foot on the pedal except when operating the pedal. If rest your foot is the pedal during operations, and it is depressed by accident, the attachment may move suddenly and cause serious damage or injury.

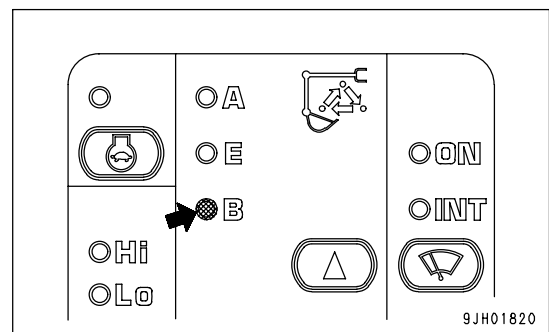
Operate the attachment as follows.

When Using Breaker

Set the lock pin to FREE position (a) and depress the front of the pedal to operate the breaker.



Set the working mode to B mode.



Precautions when using

- Check that the stopper valve is in the FREE position.
- Check of the selector valve is installed to the breaker position.
For details of the path of the oil, see "HYDRAULIC CIRCUIT (PAGE 6-7)".
- Consult each manufacturer of breaker to decide if an accumulator for the breaker circuit may well be installed in your machine.
- For details of pther precautions when handling the breaker, read and use correctly the instruction manual provided by the breaker manufacturer.
- When the 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 4-17)".

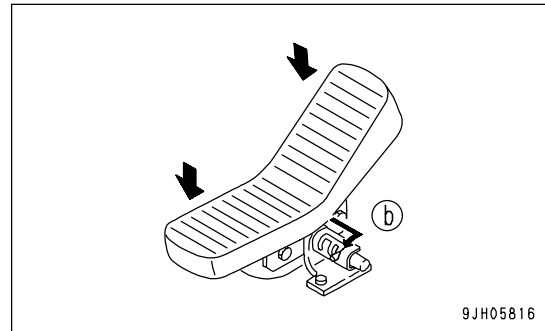
When Using General Attachment Such as Crusher

Set the working mode to A mode or E mode.

Set the lock pin to FREE position (b) and depress the front or rear of the pedal to operate the attachment.

Precautions when using

- Check that the stop valve is at the FREE position.
- Check that the working mode is set to A mode or E mode.
For details of the path of the oil flow, see "HYDRAULIC CIRCUIT (PAGE 6-7)".
- For other precautions regarding the handling of attachments, follow the instruction manual provided by the attachment maker, and be sure to use the attachment properly.



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 the plug and O-rings to the valves.
- 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

- Max. flow at merge: 270 x 2 liters / min.
- Safety valve relief set pressure for service valve
 - A port: 21.6 MPa (220 kgf/cm², 3,120 PSI) (except B mode)
 - B port: 24.5 MPa (250 kgf/cm², 3,550 PSI) (except B mode)
- Safety valve cracking pressure for service valve
 - A port: 17.2 MPa (175 kgf/cm², 2,490 PSI) (except B mode)
 - B port: 20.1 MPa (205 kgf/cm², 2,910 PSI) (except B mode)
- Safety valve relief set pressure for service valve: 21.6 MPa (220 kgf/cm², 3,120 PSI) (B mode)
- Safety valve cracking pressure for service valve: 17.2 MPa (175 kgf/cm², 2,490 PSI) (B mode)

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.

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.

PC400, PC400LC

This table lists the combination of attachments which can be installed to the long arm (standard), short arm and extension 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.

The items marked * are for when the side cover is installed.

Bucket name	Bucket Capacity m ³ (cu.yd)	Opening width mm (ft in)	Use	Standard boom 7,000 mm (22' 12")					HD boom 7,000 mm (22' 12")
				Standard arm 3.4 m (11' 2")	Short arm 2.9 m (9' 6")	Ultra short arm 2.4 m (7' 10")	Semi-long arm 4.0 m (13' 1")	Long arm 7.8 m (25' 7")	HD arm 3.4 m (11' 2")
*Narrow	1.3 (1.7)	1,120 (3' 8")	Narrow width excavation	○	○	○	○	○	×
*Narrow	1.6 (2.1)	1,270 (4' 2")	Narrow width excavation	○	○	○	△	△	×
*Standard	1.9 (2.5)	1,475 (4' 10")	General excavation	○	○	○	×	×	×
*Light-duty work	2.1 (2.7)	1,565 (5' 2")	Loading	△	△	△	×	×	×
Light-duty work	2.2 (2.9)	1,715 (5' 8")	Loading	△	△	△	×	×	×
*Rock	1.9 (2.5)	1,440 (4' 9")	Excavating soft rock	○	○	○	×	×	○
*Rock	2.1 (2.7)	1,560 (5' 1")	Excavating soft rock	△	△	△	×	×	△
Ripper	1.1 (1.4)	1,250 (4' 1")	Excavating rock	○	○	○	×	×	○
Single-shank ripper	-	-	Ripping rock	○	○	○	×	×	○

PC450, 450LC

This is the combination table for attachments installed to the standard HD arm.

The items marked * are for when the side cover is installed.

Name	Capacity m ³ (cu.yd)	Opening width mm (ft in)	Use	Standard arm 3.4m (11 ft 2 in)
*Rock (standard) bucket	1.9 (2.5)	1,420 (4' 8")	General excavation	○
*Rock (large) bucket	2.1 (2.7)	1,560 (5' 1")	For large-scale excavation	○
Ripper bucket	1.1 (1.4)	1,250 (4' 1")	Excavating rock	○
Single-shank ripper	-	-	Ripping rock	○

NOTICE

When the boom is fully lowered during oblique digging, the boom interferes with the undercarriage. Operate the boom carefully.

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.

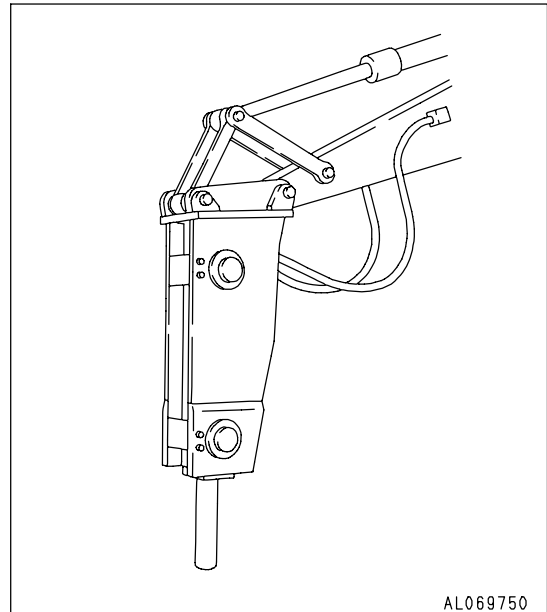
- Depending on machine models of hydraulic excavator, the kind of attachments or the model of specific attachments that can be mounted will vary. Hence, consult your Komatsu distributor for the selection of optimum attachments.

HYDRAULIC BREAKER

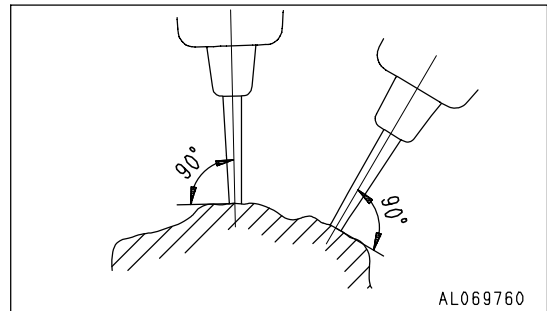
Main Applications

- Crushed rock
- Demolition work
- Road construction

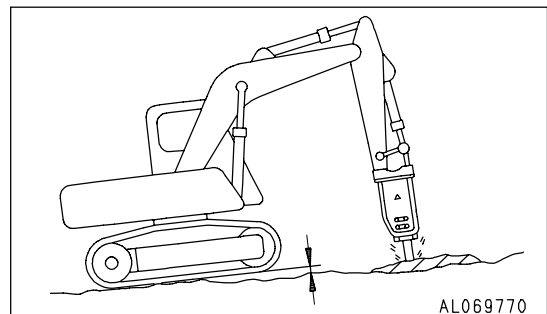
This attachment can be used for a wide range of applications including demolition of buildings, breaking up road surfaces or slag, tunnel work, rock crushing and breaking operations in quarries.



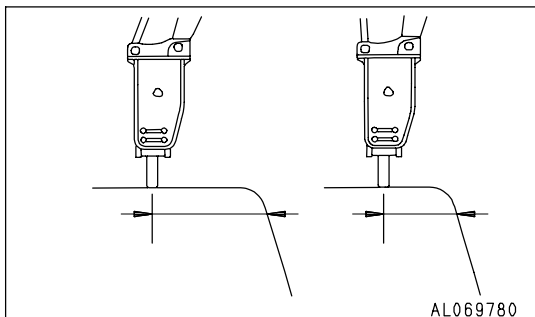
Keep the chisel pushed perpendicularly against the impact surface when carrying out breaking operations.



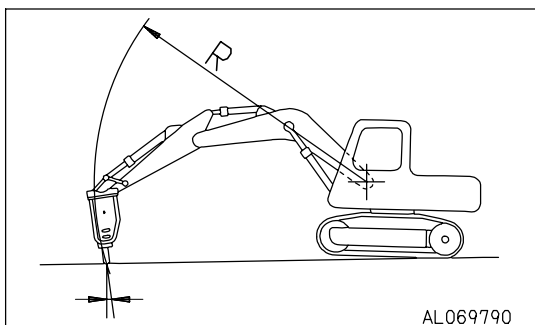
When applying impact, push the chisel against the impact surface and operate so that the chassis rises approx. 5 cm (2 in) off the ground. Do not let the machine come further off the ground than this amount.



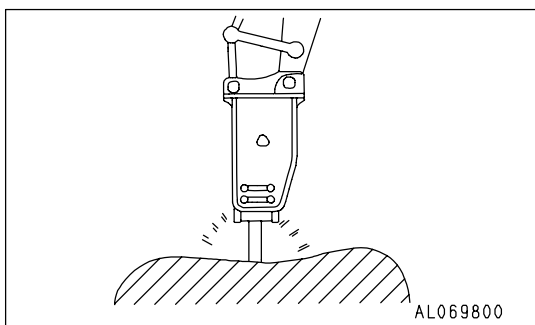
When applying continuous impact to the same impact surface, if the chisel does not penetrate or break the surface within 1 minute, change the point of impact and carry out breaking operations closer to the edge.



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.

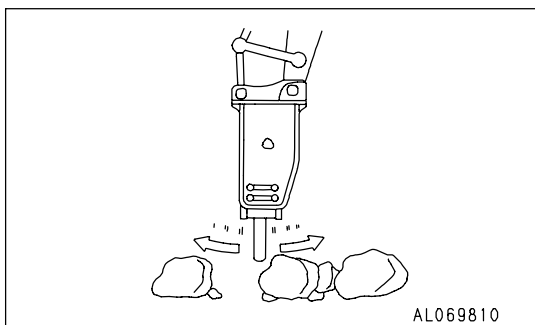


Prohibited Works

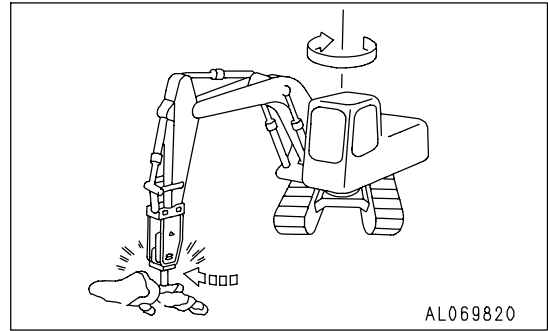
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate all cylinders to the end of their strokes. Always leave approx. 5 cm (2 in) to spare.

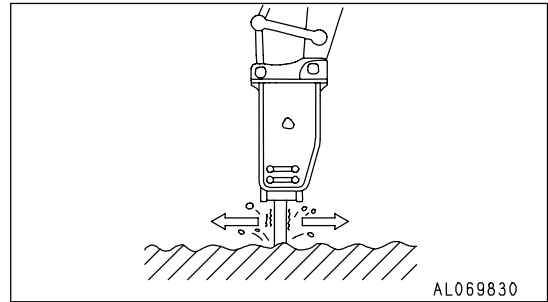
Using the mount to gather in pieces of rock



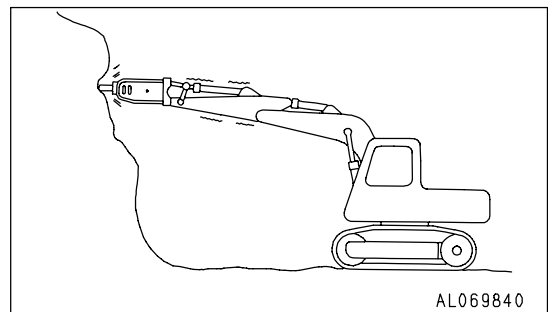
Operations using the swing force



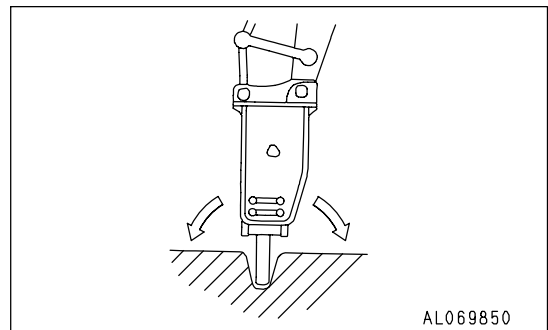
Moving the chisel while carrying out impacting operations



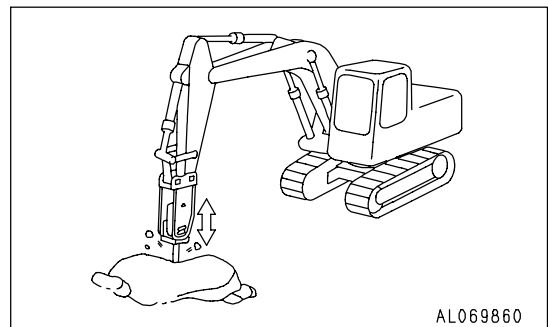
Holding the chisel horizontal or pointed up when carrying out impacting operations



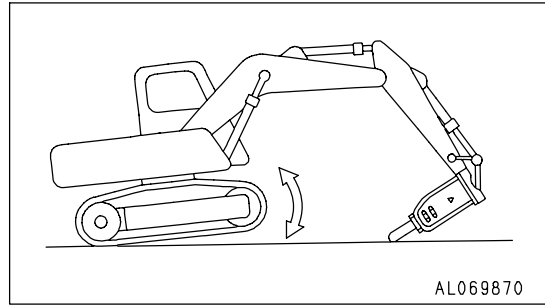
Twisting the chisel when it has penetrated the rock



Pecking operations

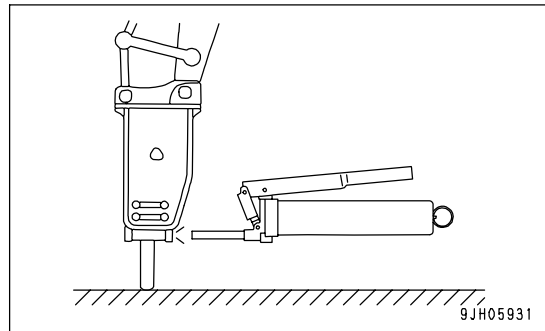


Extending the bucket cylinder fully and thrusting to raise the machine off the ground



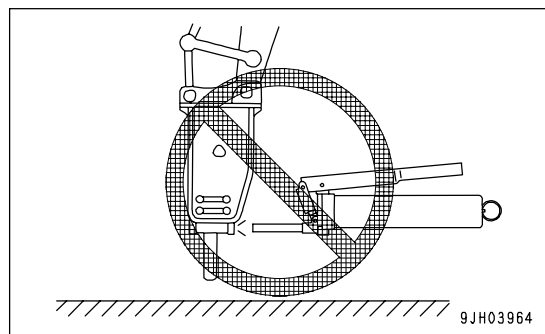
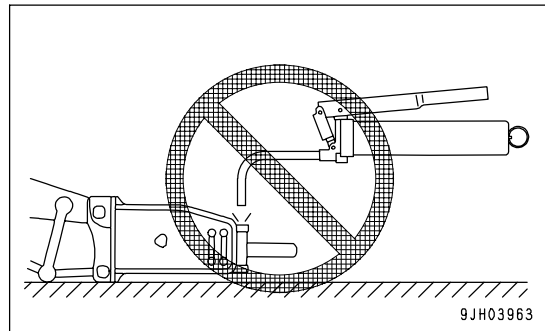
Greasing

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.



MULTI-MONITOR SPECIFICATION

WARNING

When using a multi-monitor specification machine, the method for operation is different in some ways from the standard machine. This section gives the explanation for only the parts that are different.

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MAINTENANCE

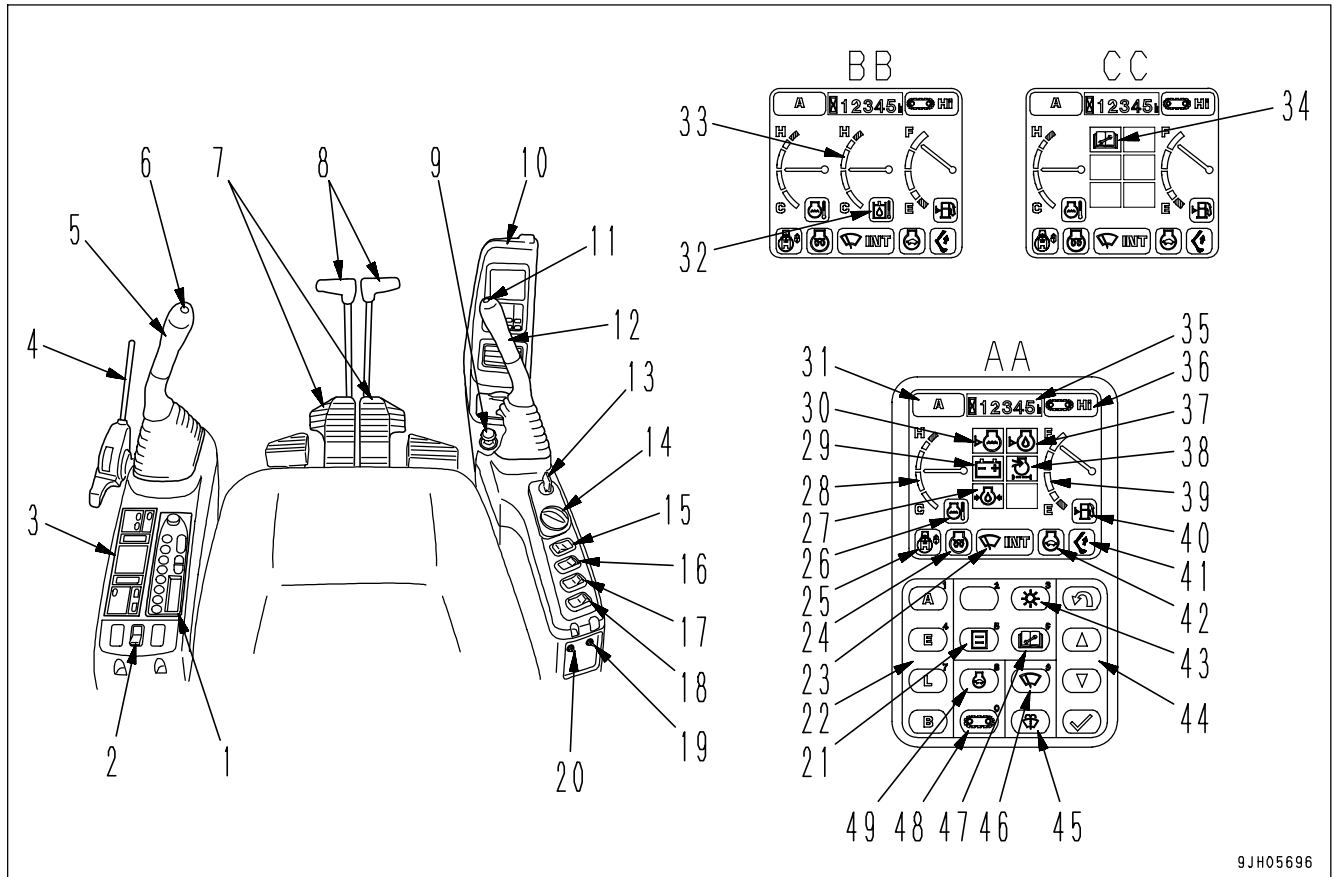
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MACHINE VIEW ILLUSTRATIONS

CONTROLS AND GAUGES



9JH05696

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

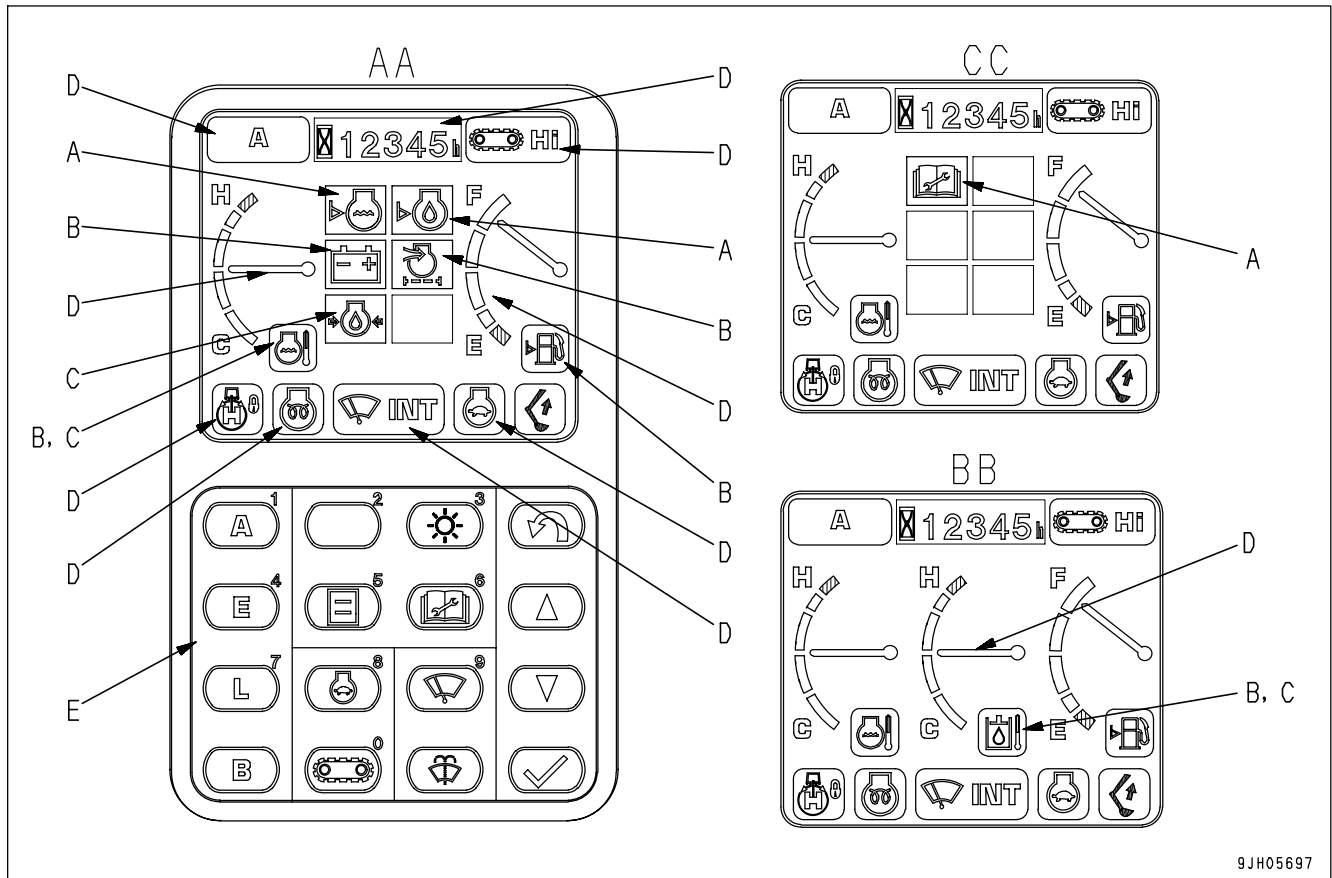
- (1) Car radio
- (2) Revolving warning lamp switch (option)
- (3) Air conditioner control switch
- (4) Lock lever
- (5) L.H. work equipment control lever
- (6) One-touch power max. switch
- (7) Travel pedals
- (8) Travel levers
- (9) Cigarette lighter
- (10) Machine monitor
- (11) Horn switch
- (12) R.H. work equipment control lever
- (13) Ignition switch
- (14) Fuel control dial
- (15) Lamp switch
- (16) Alarm buzzer stop switch
- (17) Swing lock switch
- (18) Machine push-up switch
- (19) Swing holding brake release switch
- (20) Emergency pump drive switch
- (21) Select switch
- (22) Working mode selector switch
- (23) Wiper monitor
- (24) Engine pre-heating monitor
- (25) Swing lock monitor
- (26) Engine coolant temperature monitor
- (27) Engine oil pressure monitor
- (28) Engine coolant temperature gauge
- (29) Charge level monitor
- (30) Radiator coolant level monitor
- (31) Working mode monitor
- (32) Hydraulic oil temperature monitor
- (33) Hydraulic oil temperature gauge
- (34) Maintenance interval monitor
- (35) Service monitor
- (36) Travel speed monitor
- (37) Engine oil temperature monitor
- (38) Air cleaner clogging monitor
- (39) Fuel gauge
- (40) Fuel level monitor
- (41) One-touch power max. monitor
- (42) Auto-deceleration monitor
- (43) Display control monitor
- (44) Input control switch
- (45) Window washer switch
- (46) Wiper switch
- (47) Maintenance switch
- (48) Travel speed selector switch
- (49) Auto-deceleration switch

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



9JH05697

AA: Screen with all lamps lighted up

BB: Screen for standard

CC: Maintenance time warning screen

A: Basic check monitors

B: Caution monitors

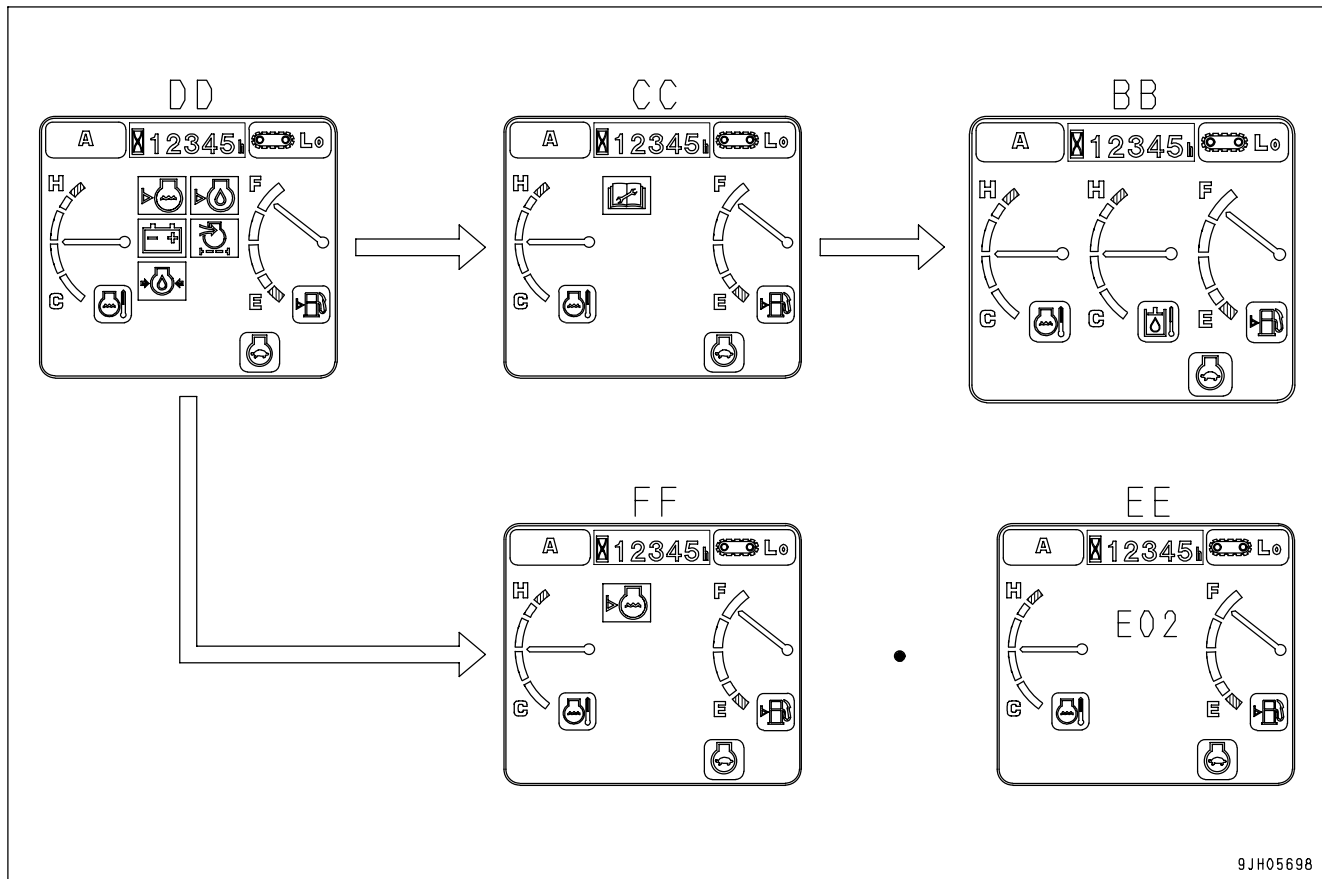
C: Emergency monitors

D: Meter display portion, pilot display

E: Monitor switches portion

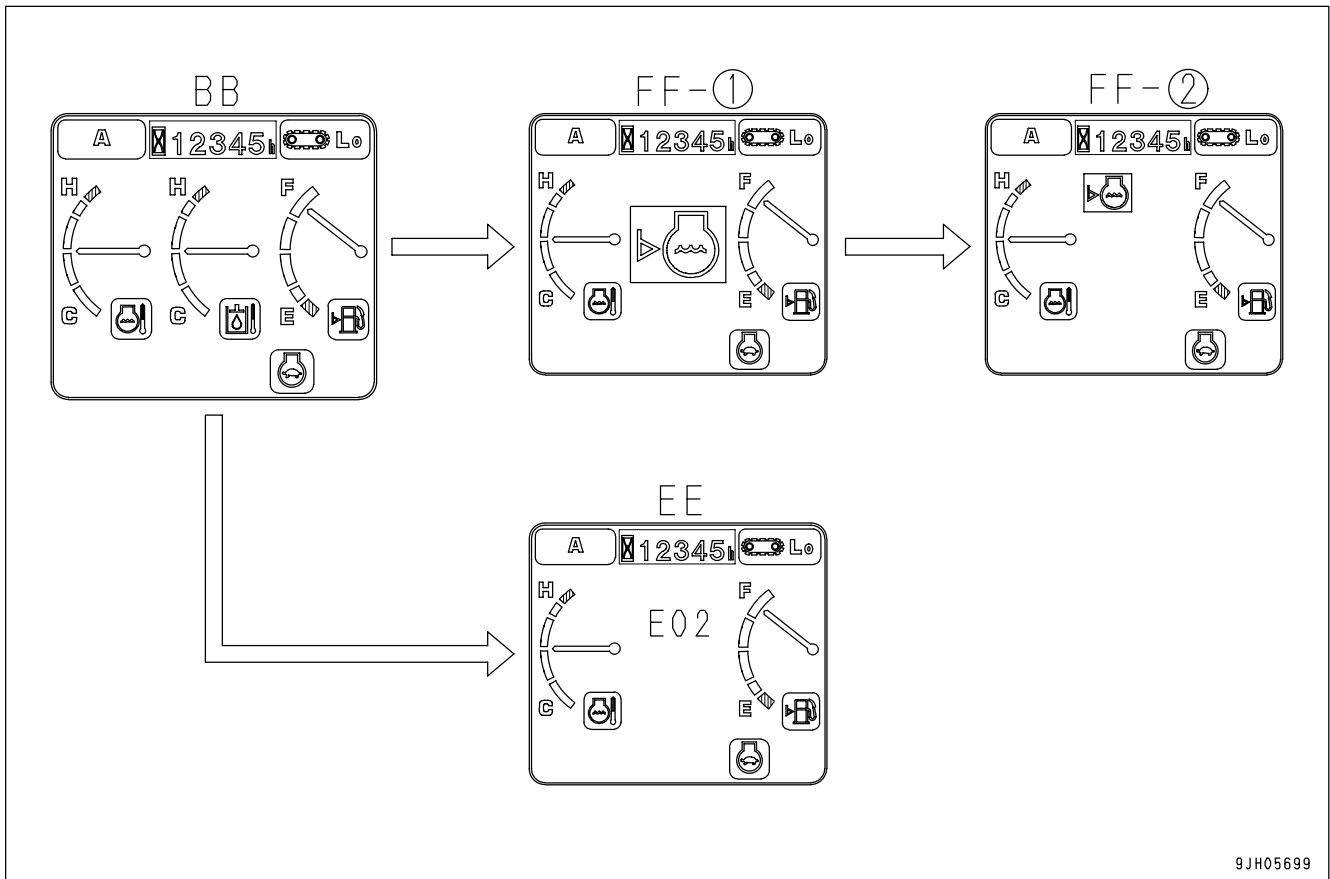
Basic Operation of MACHINE MONITOR

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.

If any abnormality occurs during operation



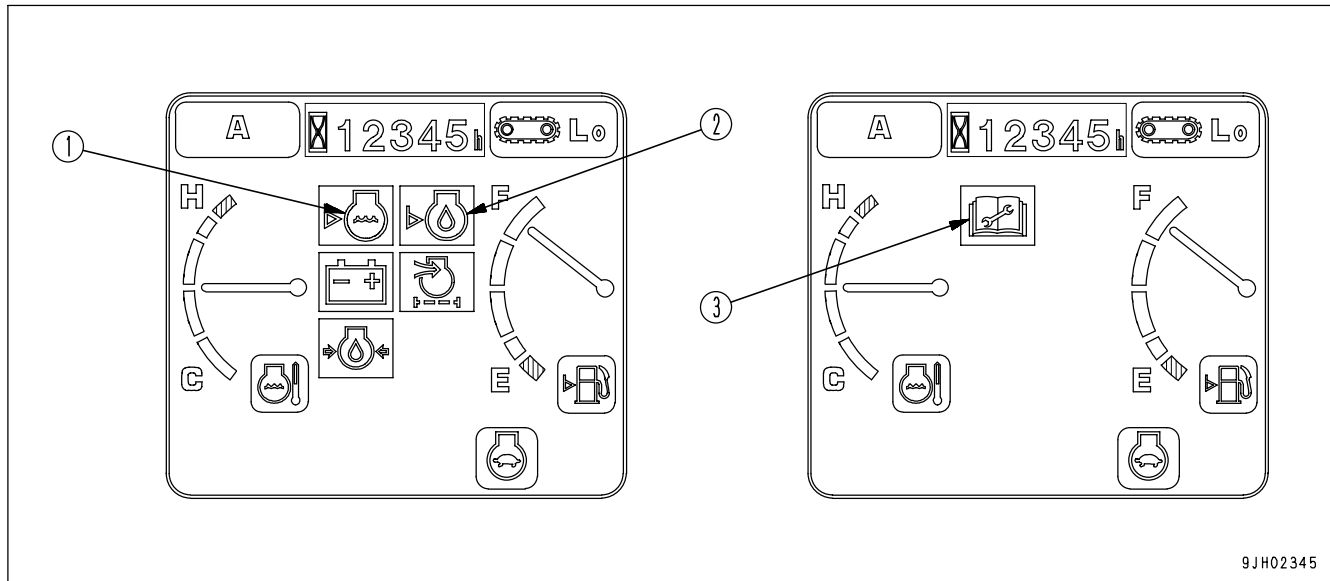
- If any abnormality occurs during operation, the standard screen BB changes to warning screen FF-(1) or the error screen EE.
- After displaying warning screen FF-(1) for 2 seconds, the screen automatically changes to warning screen FF-(2).

Basic Check Monitors



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



9JH02345

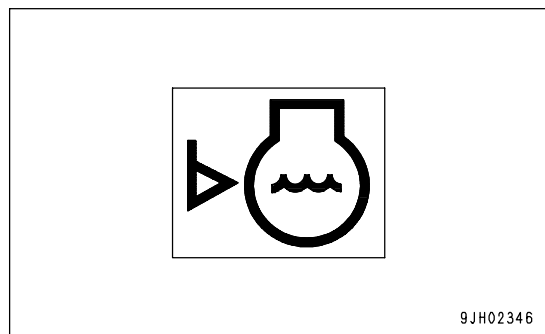
- A(1) Radiator coolant level monitor
- A(2) Engine oil level monitor

- A(3) Maintenance interval monitor

Radiator Coolant Level Monitor

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

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

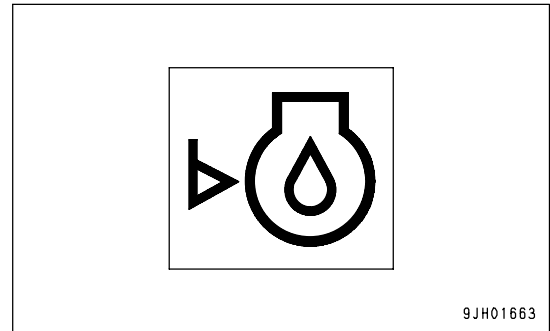


9JH02346

Engine Oil Level Monitor

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

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

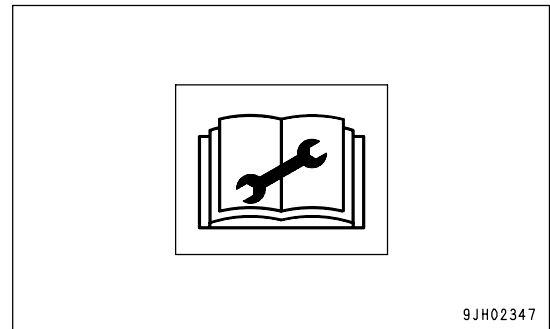
**Maintenance Interval Monitor**

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

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

- For details of the method of checking the maintenance interval, see "Maintenance Switch (PAGE 7-24)" in the Detailed controls and gauges.

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



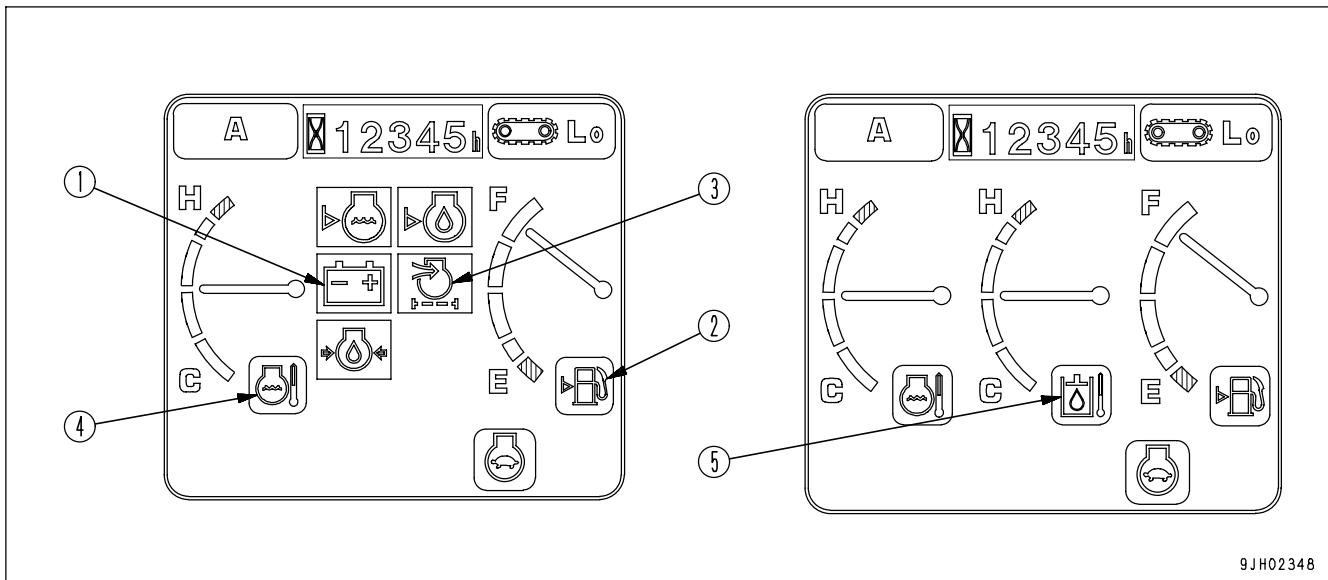
Caution Monitors



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.



9JH02348

B(1) Charge level monitor

B(2) Fuel level monitor

B(3) Air cleaner clogging monitor

B(4) Engine coolant temperature monitor

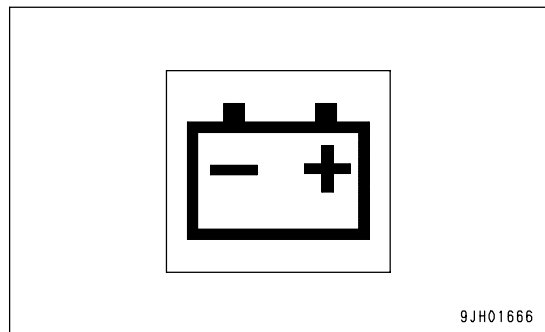
B(5) Hydraulic oil temperature monitor

Charge Level Monitor

Monitor (1) warns the operator of an abnormality in the charging system while 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 3-137)".



9JH01666

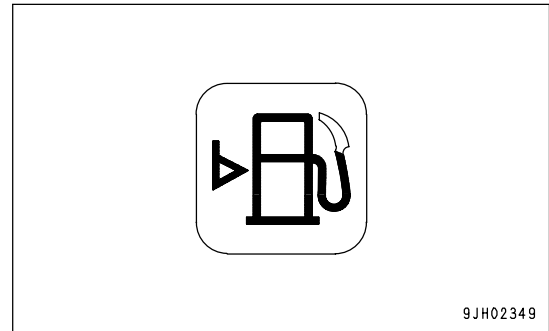
REMARK

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

Fuel Level Monitor

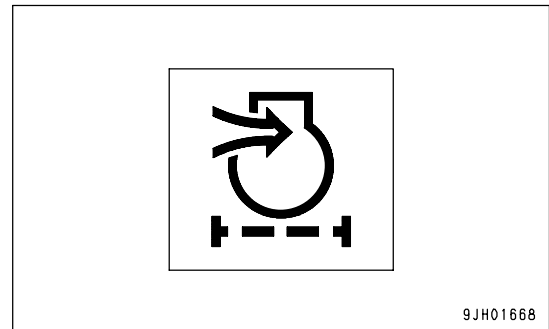
Monitor (2) lights up to warn the operator the fuel level in the tank is low.

If the remaining amount of fuel goes down to 80 liters (21.14 US gal), the light changes from green to red, so add fuel as soon as possible.

**Air Cleaner Clogging Monitor**

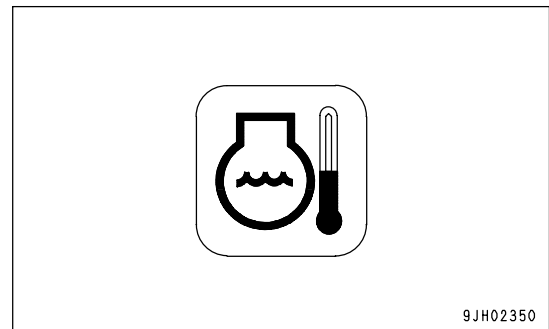
Monitor (3) warns the operator of a clogged air cleaner.

If the monitor lights up red, stop the engine, inspect and clean the air cleaner. For details, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-19)".

**Engine Coolant Temperature Monitor**

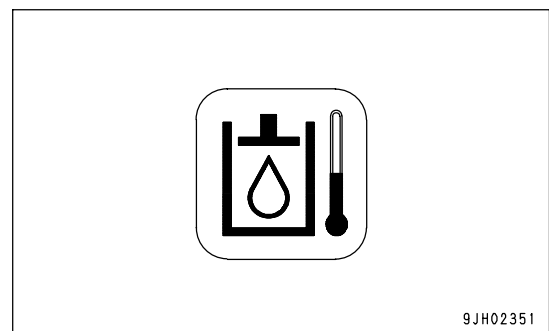
If monitor (4) lights up white in low temperatures, perform warming-up operation. For details, see "Warming-up Operation (PAGE 3-76)".

Continue warming-up operation until monitor (4) changes to green.

**Hydraulic Oil Temperature Monitor**

If monitor (5) lights up white in low temperatures, perform warming-up operation. For details, see "Warming-up Operation (PAGE 3-76)".

Continue warming-up operation until monitor (5) changes to green.

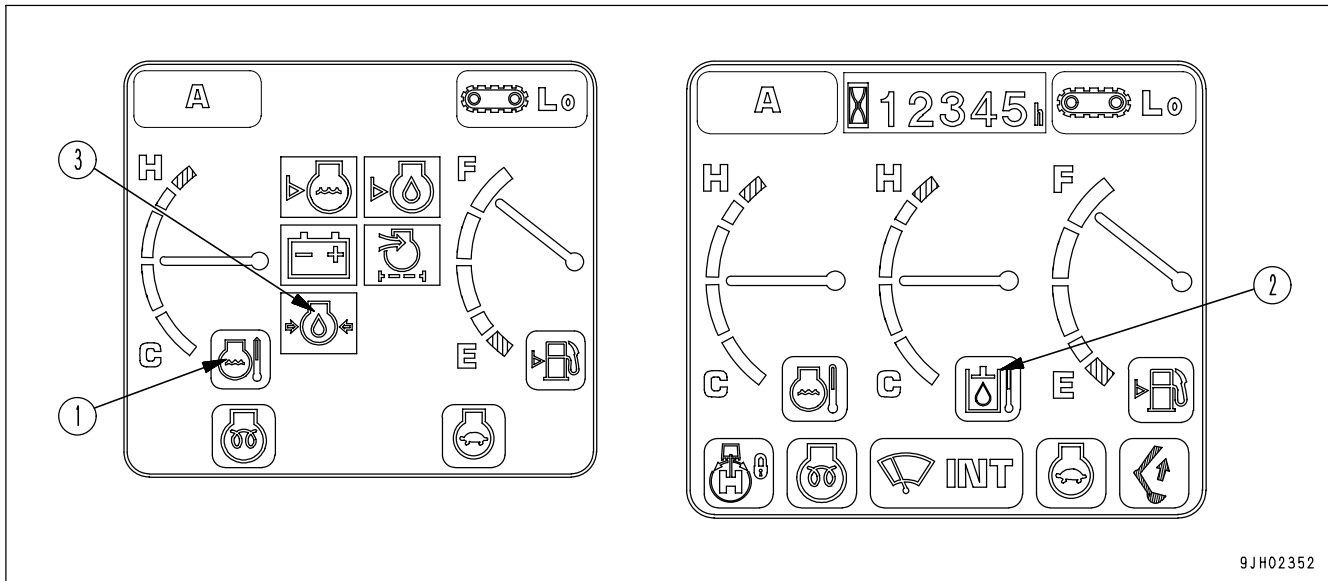


Emergency Monitors



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.



C(1) Engine coolant temperature monitor
C(2) Hydraulic oil temperature monitor

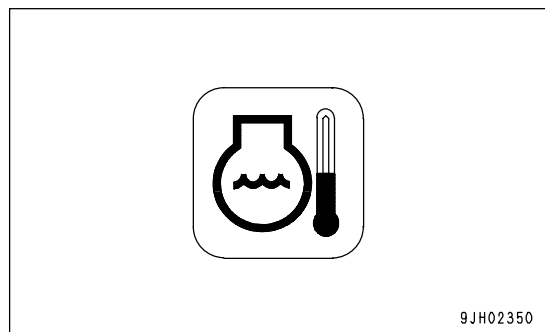
C(3) Engine oil pressure monitor

Engine Coolant Temperature Monitor

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

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

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

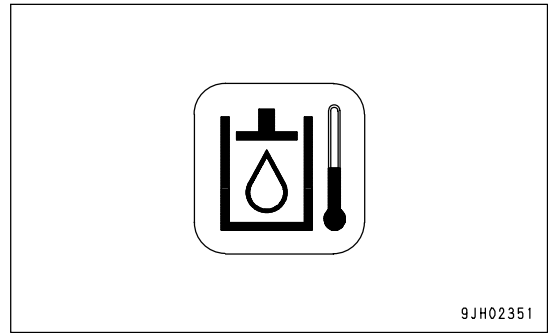


9JH02350

Hydraulic Oil Temperature Monitor

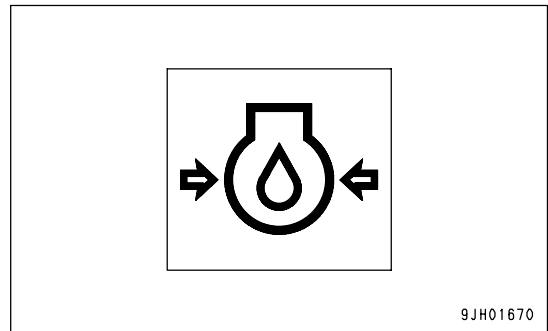
Monitor (2) warns operator that the hydraulic oil temperature has risen.

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



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.

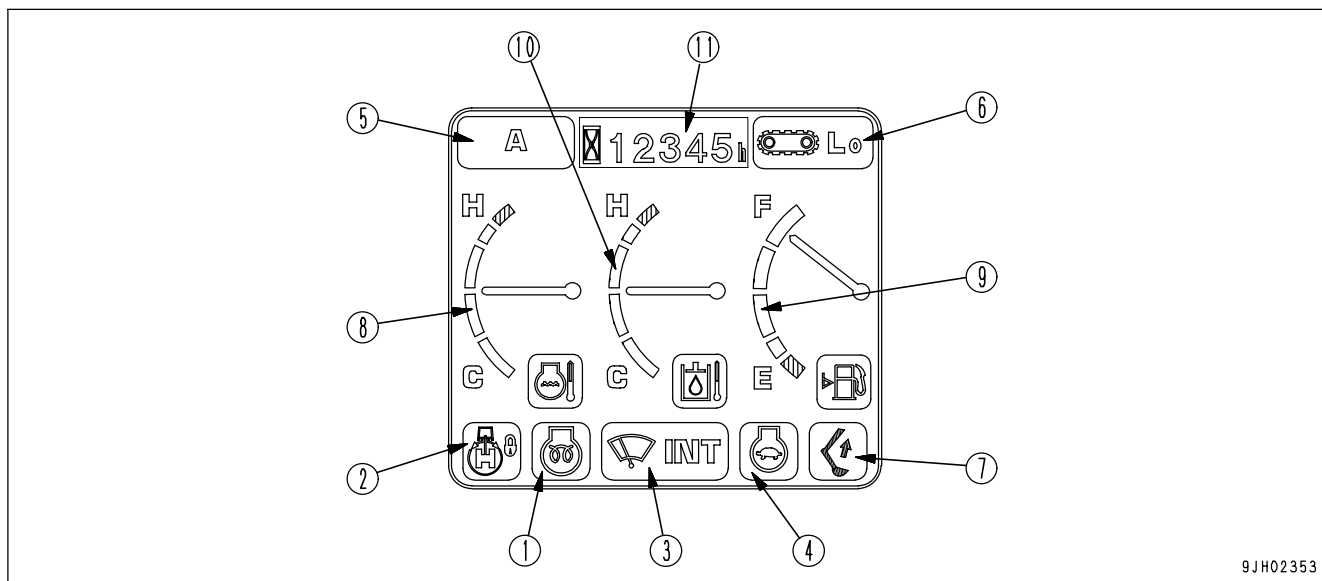


REMARK

Color when the monitor lights up for basic check items, caution items, and emergency stop items are as follows.

Type of monitor	Color when monitor lights up		
	When normal	When abnormal	At low temperature
Radiator coolant level monitor	OFF	Red	-
Engine oil level monitor	OFF	Red	-
Maintenance interval monitor	OFF	Red	-
Charge monitor	OFF	Red	-
Fuel level monitor	Green	Red	-
Air cleaner clogging monitor	OFF	Red	-
Engine coolant temperature monitor	Green	Red	White
Hydraulic oil temperature monitor	Green	Red	White
Engine oil pressure monitor	OFF	Red	-

Meter Display Portion



9JH02353

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

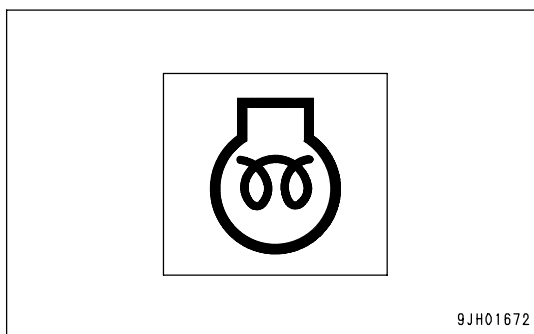
Pilot Display

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

Engine Pre-heating Monitor

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

The monitor lamp lights when the starting switch is turned to the HEAT position and flashes after 30 seconds to show pre-heating is completed. (Monitor lamp will go off after 10 seconds.)



9JH01672

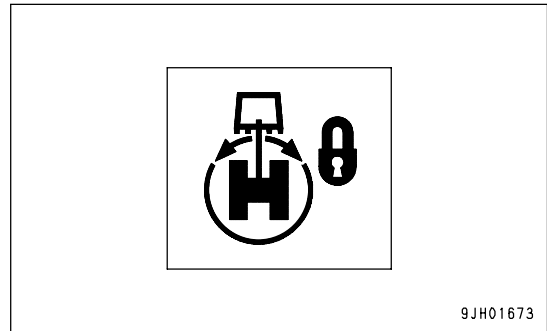
Swing Lock Monitor

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

Actuated: Lights up

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

This monitor flashes when the swing holding brake release switch is turned on.



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 status 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



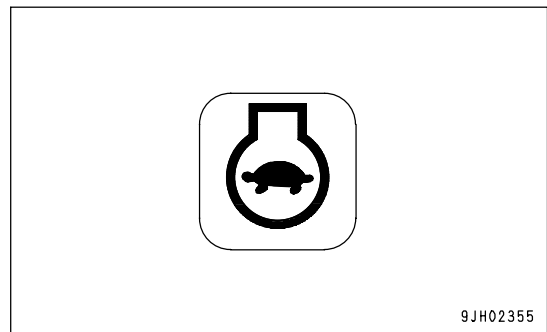
Auto-deceleration Monitor

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



Working Mode Monitor

Monitor (5) displays the set working mode.

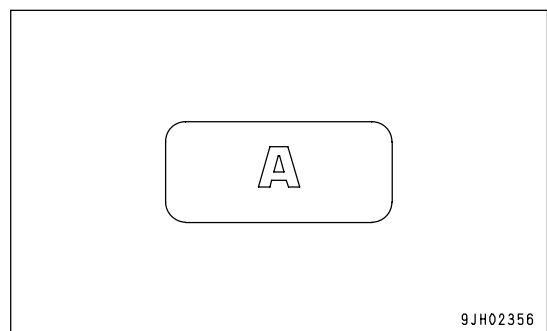
The monitor display when the working mode switch is operated is as follows.

A: A mode (for heavy-load operations)

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

L: L mode (for fine-control operations)

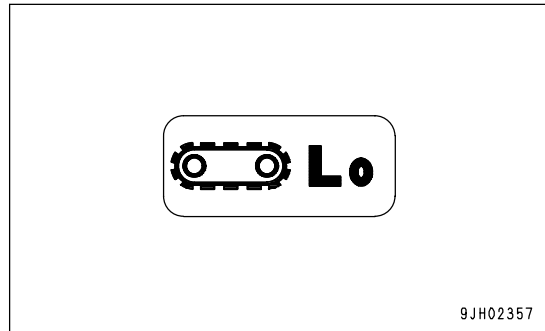
B: B mode (for breaker operations)



Travel Speed Monitor

Monitor (6) displays set mode for the travel speed.
 The monitor display when the travel speed selector switch is operated is as follows.

- Lo: Low speed
- Mi: Medium speed
- Hi: High speed

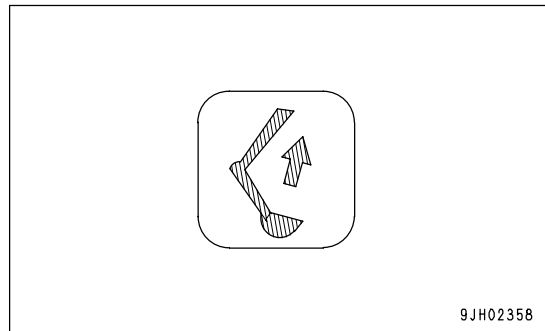


9JH02357

One touch power up monitor

Meter (7) shows if the power max function is being actuated.
 The monitor display when the knob switch on the left control lever is operated is as follows.

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

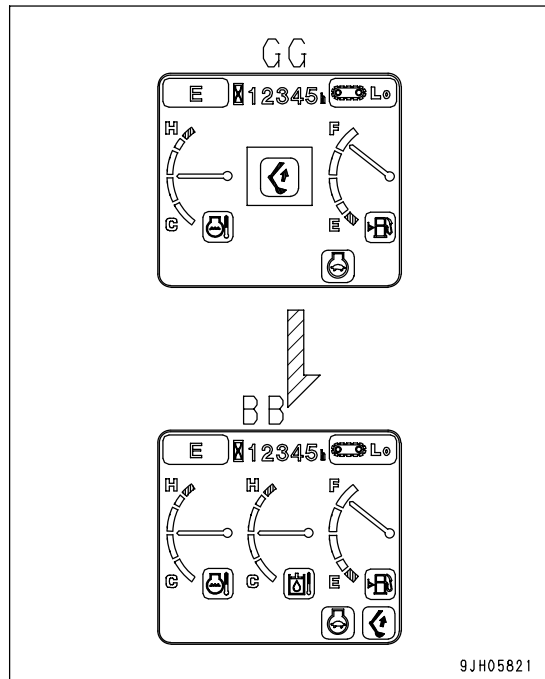


9JH02358

REMARK

- The digging power is increased while the knob switch is being pressed only for working modes A and E. Note that even if the knob switch is kept pressed, the increase in power ends after 8.5 seconds.
- When the knob switch is pressed, the mode is displayed in the central portion of display GG, and after 2 seconds the monitor in the center goes out and the screen switches to monitor display BB.

Monitor goes out: Power max function stopped



9JH05821

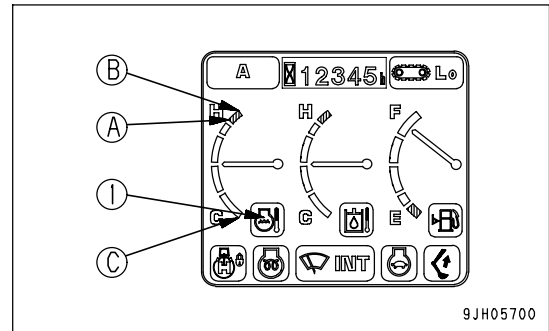
Gauges and Meter

Engine Coolant Temperature Gauge

Gauge (8) indicates the engine coolant temperature. During normal operations, indicator should be in the black range (A) - (C). If indicator enters the red range (A) - (B) during operations, the overheat prevention system is actuated.

REMARK

- (A) - (B): Displays red range
- (A) - (C): Displays black range



The overheat prevention system acts as follows.

Red range position (A): Engine coolant temperature monitor lamp (1) lights up red.

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

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

When the engine is started, if the indicator is at position (C), engine coolant temperature monitor (1) lights up white. In this case, carry out the warming-up operation. For details, see "Warming-up Operation (PAGE 3-76)".

Fuel Gauge

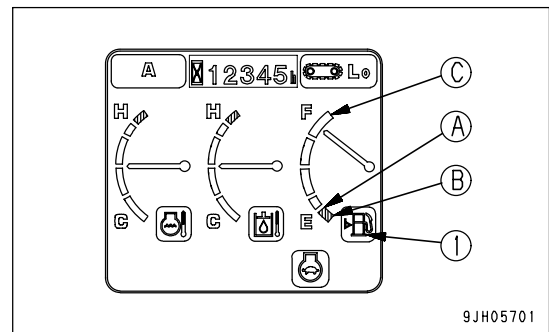
Gauge (9) indicates the amount of fuel in the fuel tank.

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

If indicator enters red range (A) during operations, there is less than 110 liters (29.06 US gal) of fuel remaining in the tank, check and add fuel.

REMARK

- (A) - (B): Displays red range
- (A) - (C): Displays black range



REMARK

When the remaining fuel goes below 80 liters (21.14 US gal), fuel level monitor (1) 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.

Hydraulic Oil Temperature Gauge

Meter (10) displays the hydraulic oil temperature.

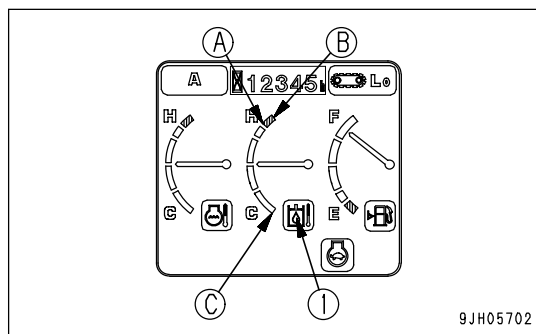
During operations, the indicator should be in the black range.

If the indicator enters red range (A) during operations, the hydraulic oil temperature has gone above 102°C (215.6°F).

Stop the engine or run it at low idle and wait for the hydraulic oil temperature to go down.

REMARK

- (A) - (B): Displays red range
- (A) - (C): Displays black range



REMARK

Hydraulic oil temperature is as follows when the indicator enters the red range (A):

(A) position in the red range: 102°C (215.6°F) or over

(B) position in the red range: 105°C (221°F) or over

When the indicator is in the red range (A) - (B), hydraulic oil temperature monitor (1) lights up red.

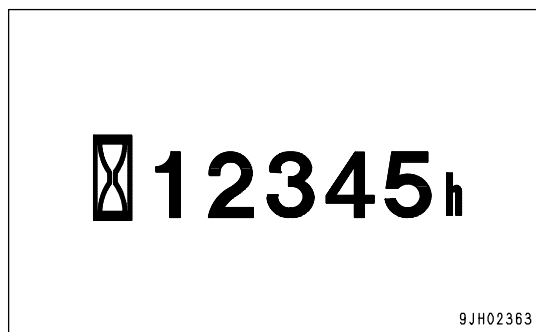
If the indicator is on (C) position when starting the engine, it means that hydraulic oil temperature is 25°C (77°F) or lower and the hydraulic oil temperature monitor (1) will be illuminated white. When this happens, refer to the section "Warming-up Operation (PAGE 3-76)" and perform warm-up operation.

Service Meter

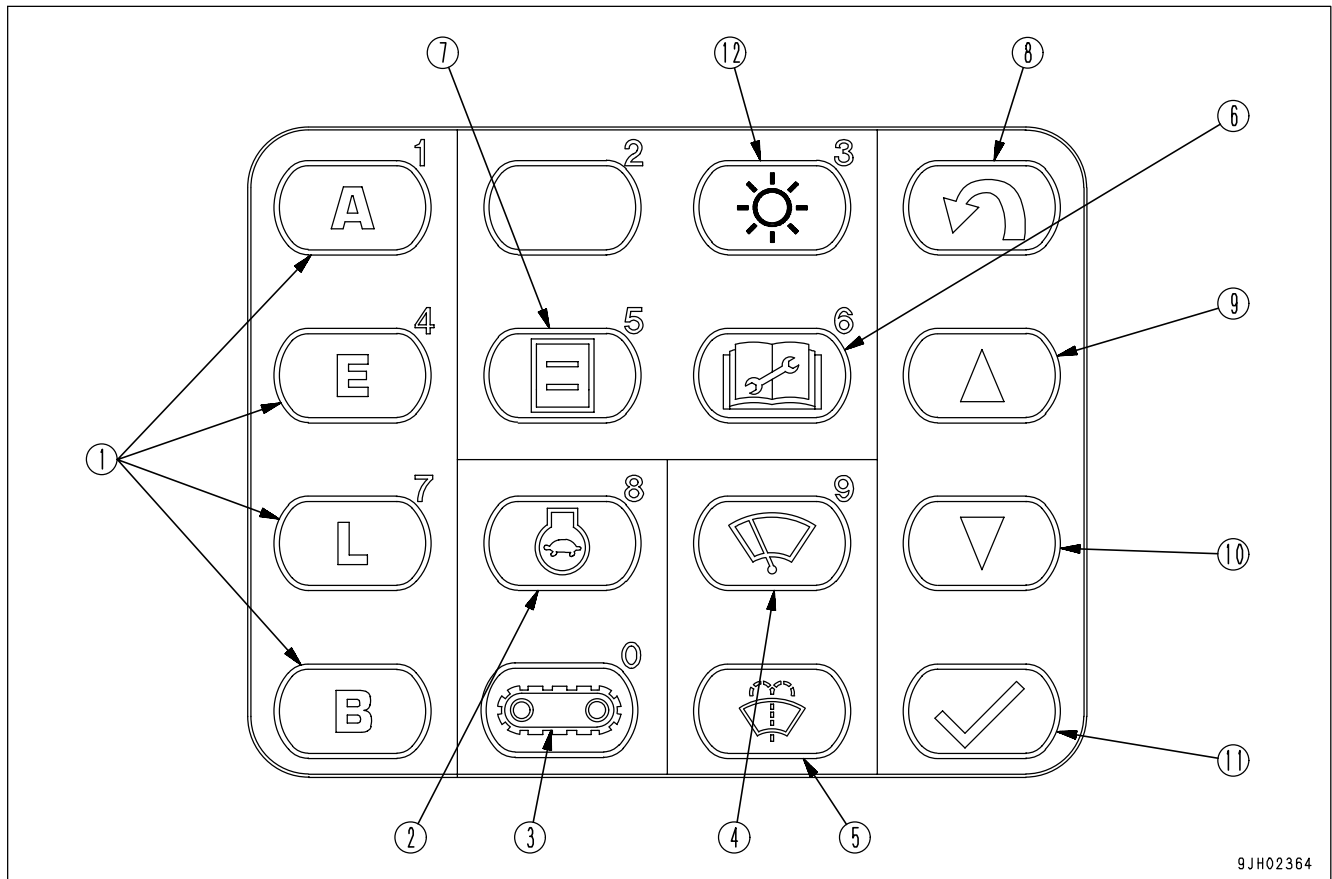
This monitor (11) displays the total time that the machine has been operated.

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

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



Monitor Switches Portion



9JH02364

E(1) Working mode selector switches
(basic switches)

E(2) Auto-deceleration switch (selection switch)

E(3) Travel speed selector switch

E(4) Wiper switch

E(5) Window washer switch

E(6) Maintenance switch

E(7) Select switch

E(8) Return switch

E(9) Up switch

E(10) Down switch

E(11) Input confirmation switch

E(12) LCD monitor adjustment switch

Working Mode Selector Switch (Basic Switch)

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

Operations can easily be performed by selecting the mode to match the type of operation.

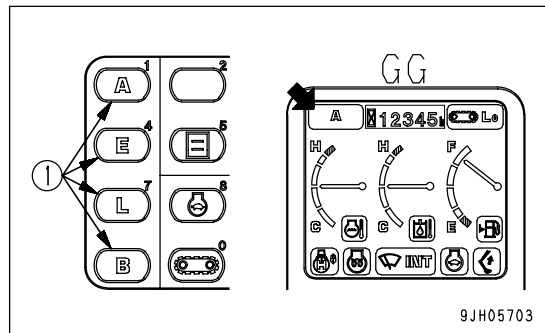
A mode: For heavy-duty operations

E mode: For operations prioritizing fuel consumption

L mode: For fine-control operations

B mode: For breaker operations

GG mode: Monitor display

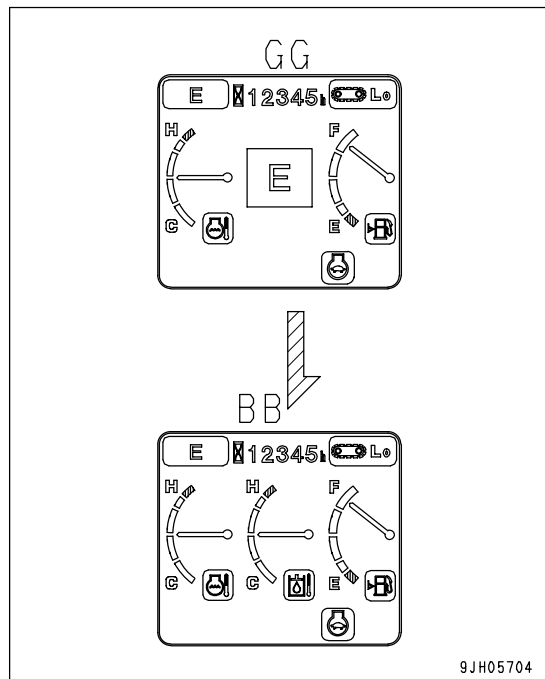


9JH05703

- When the engine is started, the working mode is set automatically to A mode. When switch (1) is pressed, it is possible to select other modes. The monitor display on display portion (GG) changes for each mode.
- If it is desired to have the working mode set to start automatically in E, L, or B mode (default option setting), have your Komatsu distributor change the setting.

REMARK

When the mode selector switch is pressed, the mode is displayed in the center of monitor display portion (GG), and the screen returns to standard screen (BB) after 2 seconds. (Diagram on the right is an example of display for the E mode.)



9JH05704

NOTICE

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

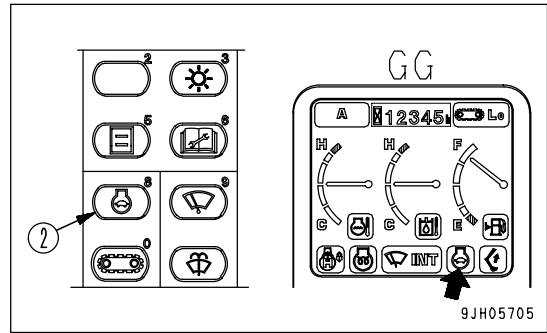
Auto-deceleration Switch (Selection Switch)

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

Monitor display portion GG ON : Auto-deceleration actuated

Monitor display portion GG OFF : Auto-deceleration canceled

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



- Auto-deceleration function

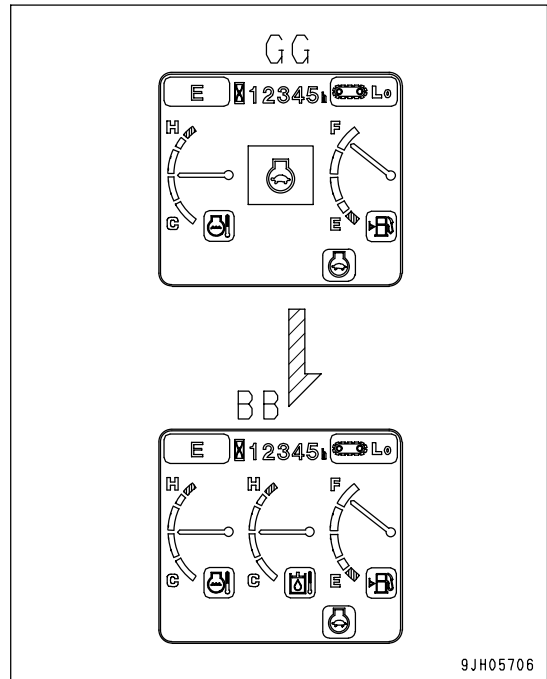
When the auto-deceleration function is ON, if the work equipment and travel levers are returned to the N position, the engine speed will drop after 4 seconds from the operating speed to idling speed.

This makes it possible to reduce fuel consumption.

If any lever is operated when the machine is in this condition, engine speed will return to the previous operating speed to make it possible to perform operations.

REMARK

When the auto-deceleration switch is pressed and the auto-deceleration is actuated, the mode is displayed in the center of display portion (GG), and the screen returns to standard screen (BB) after 2 seconds.



Travel Speed Selector Switch

! WARNING

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

Switch (3) is used to set the travel speed to 3 stages.

Lo lights up : Low-speed travel

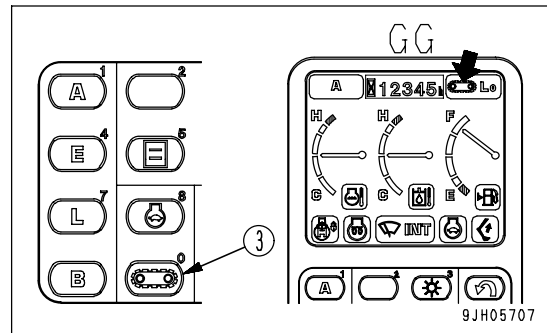
Mi lights up : Medium-speed travel

Hi lights up : Hi-speed travel

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

Each time that the switch is pressed, the display changes Lo →

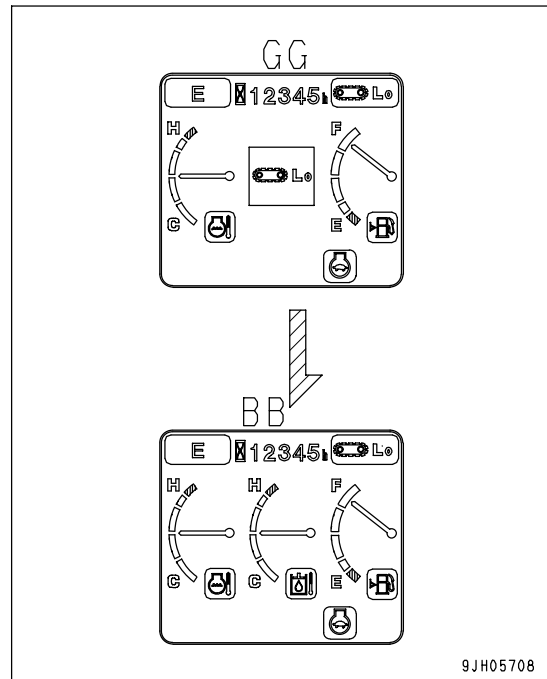
Mi → Hi → Lo in turn.



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

REMARK

Each time that the travel speed selector switch is operated, the mode is displayed in the center of display portion (GG), and the screen returns to standard screen (BB) after 2 seconds.



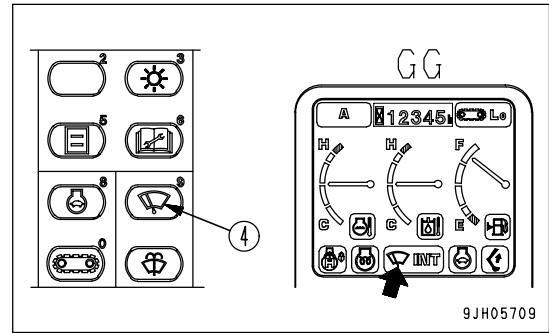
Wiper Switch

Switch (4) operates the wiper for the front glass.
 Each time the switch is pressed, it changes ON → INT → stop (OFF).

Monitor display portion GG INT lighted up: Wiper moves intermittently

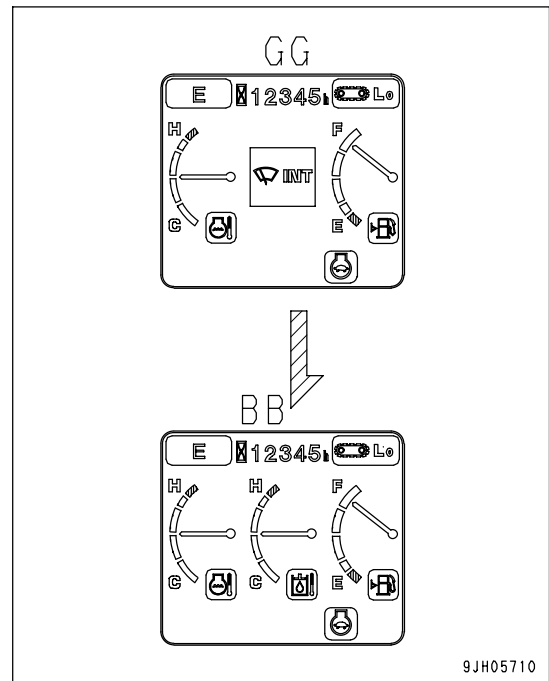
Monitor display portion GG ON lighted up: Wiper moves continuously

Monitor display portion GG OFF: Wiper stops



REMARK

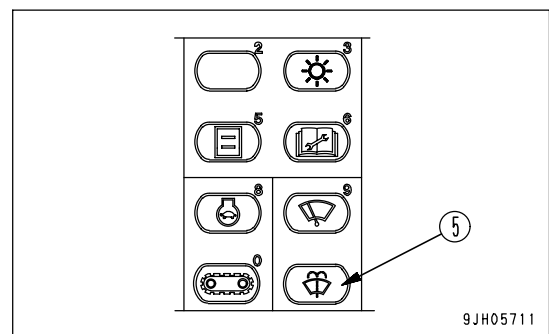
Each time that the wiper switch is operated, the mode is displayed in the center of display portion (GG). The screen returns to standard screen (BB) after 2 seconds.



Window Washer Switch

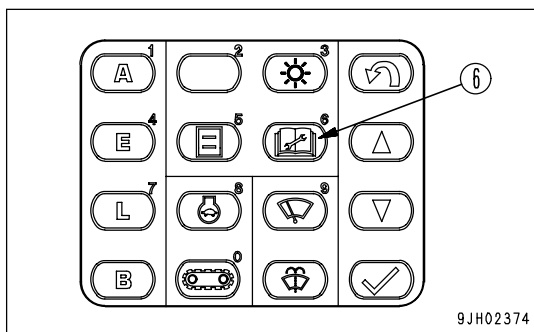
Switch (5) is kept continuously pressed, window washer fluid is sprayed onto the front glass. When the switch is released, spray stops.

- 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 intermittently 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.



Maintenance Switch

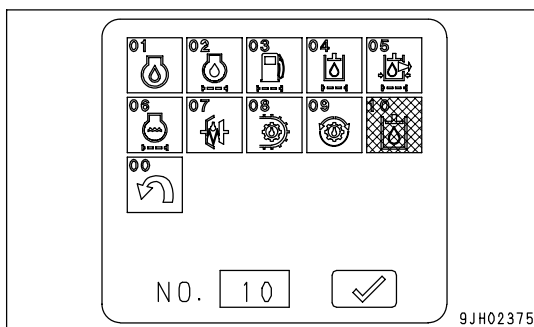
- Switch (6) is used to check the time remaining until maintenance.



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

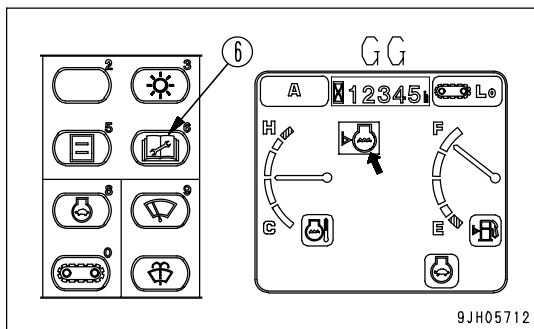
The time remaining until maintenance is indicated by the color of each monitor display. After confirming the maintenance time, perform the maintenance.

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



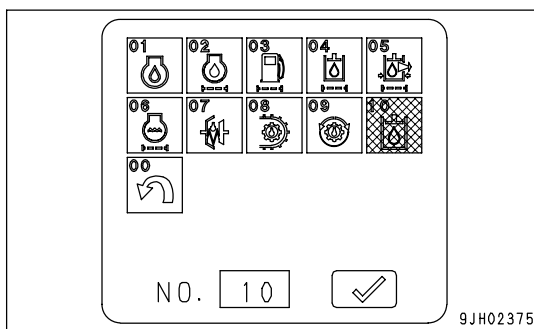
NOTICE

1. If monitor display portion GG changes to the maintenance timing warning screen when the engine is started or when the machine is being operated, stop operations immediately.
2. Press switch (6) to display the maintenance screen.
Perform maintenance for any location indicated by the monitor that has lighted red.



- Maintenance display items are as follows:

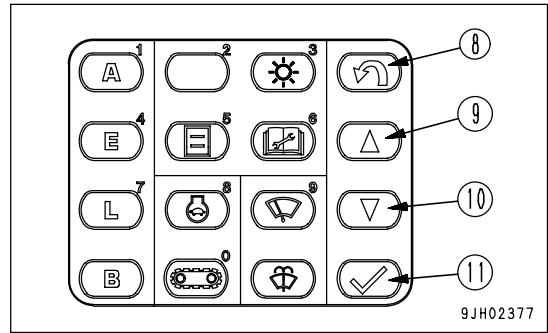
Monitor No.	Maintenance item	Default set screen (H)
01	Change engine oil	500
02	Change engine oil filter	500
03	Change fuel filter	500
04	Change hydraulic oil filter	1000
05	Change hydraulic tank breather	500
06	Change corrosion resistor (option for overseas)	1000
07	Check damper case oil level, add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



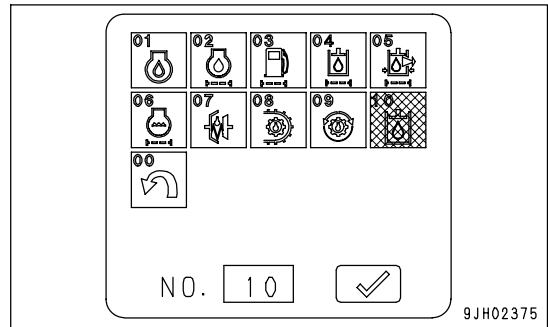
If it is desired to change settings for the maintenance interval, have your Komatsu distributor change the settings.

• The method of checking time remaining until maintenance is as follows:

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

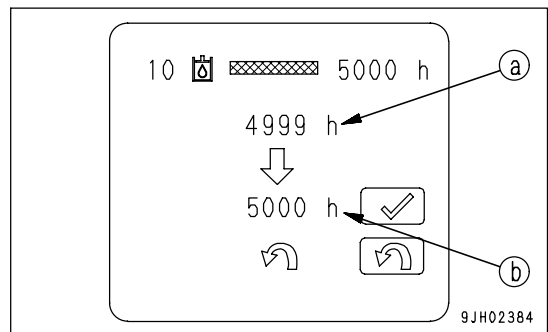


2. After selecting the monitor item, press input confirmation switch (11). Display screen will switch to the time remaining until maintenance. (Press back switch (8) to return to the previous screen.)

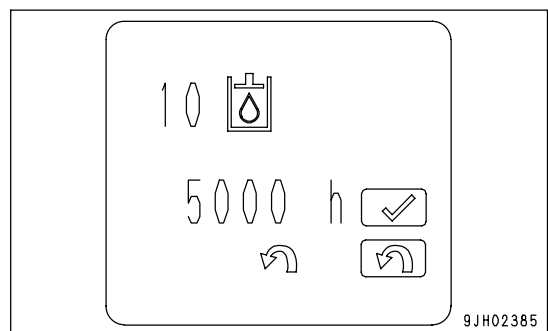


3. Check the time remaining until maintenance.
 - (a): Time remaining until maintenance
 - (b): Default setting for maintenance interval

When only checking the time remaining until maintenance, press back switch (8) twice. The screen will return to the normal operation monitor screen. When canceling time remaining until maintenance and returning to the default time setting, press input confirmation switch (11). The screen will switch to the default setting screen.

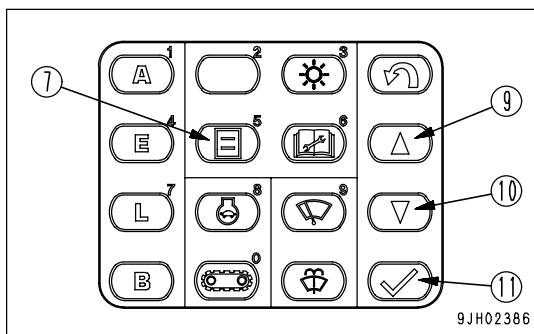


4. After checking the time on the default setting screen, press input confirmation switch (11). The screen will return to the maintenance screen. (Press back switch (8) to return to the previous screen.)



Select Switch

This switch (7) is used as a selector switch when setting the oil flow for each working mode (A, E, B mode).



- When working mode is A or E

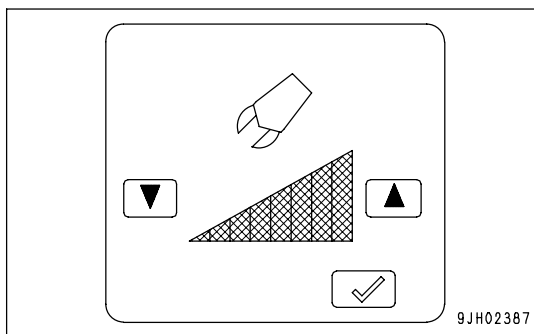
(1) Press select switch (7) and the normal screen on the monitor display changes to the flow setting screen shown in the diagram on the right.

(2) Press up switch (9) or down switch (10) to adjust to the desired flow.

Each segment on the scale is approx. 30 liters/min.

(3) After completing the flow setting, press input confirmation switch (11).

The monitor display will return to the normal screen.



REMARK

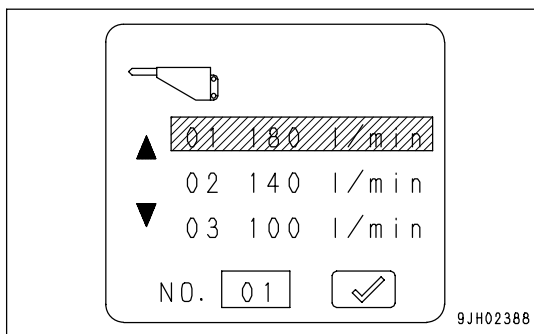
The flow can be adjusted only when it is possible to install an attachment. (if equipped)

- When working mode is B mode

(1) Press select switch (7) and the normal screen on the monitor display changes to the flow setting screen shown in the diagram on the right.

(2) Press up switch (9) or down switch (10) to adjust to the desired flow.

(3) After completing the flow setting, press input confirmation switch (11).



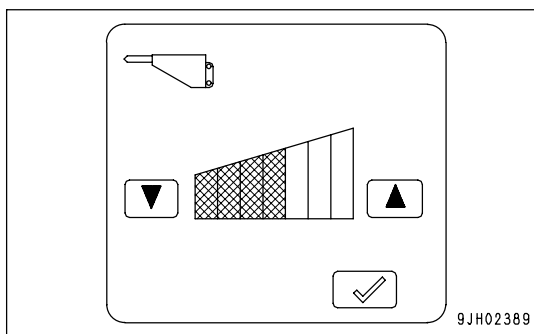
(4) With the operation in Step (3), the flow setting screen changes to the fine flow adjustment screen shown in the diagram on the right.

(5) Press up switch (9) or down switch (10) to adjust to the desired flow.

Each segment on the scale is approx. 10 liters/min.

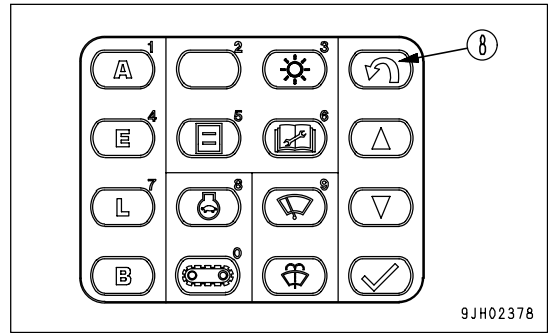
(6) After completing the flow setting, press input confirmation switch (11).

The monitor display will return to the normal screen.



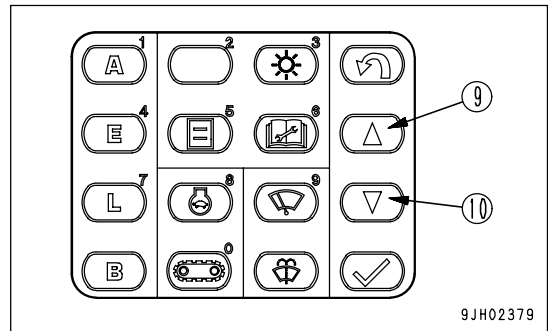
Back Switch

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



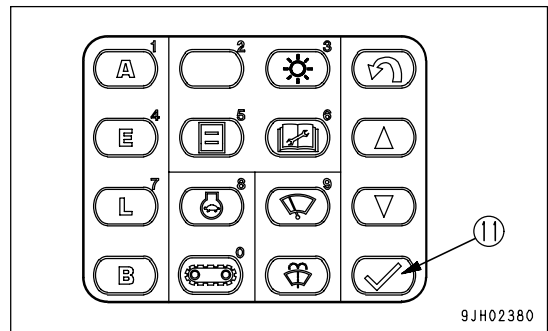
Up Switch, Down Switch

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



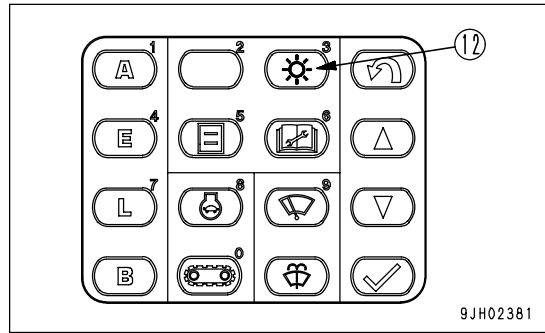
Input Confirmation Switch

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



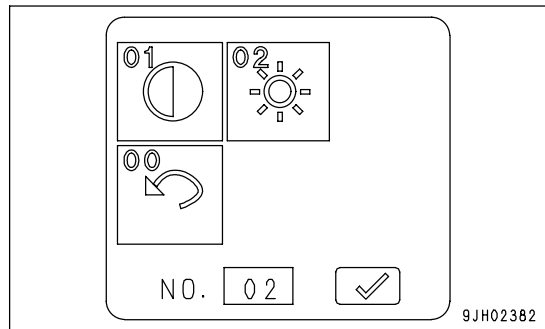
Liquid Crystal Monitor Adjustment Switch

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



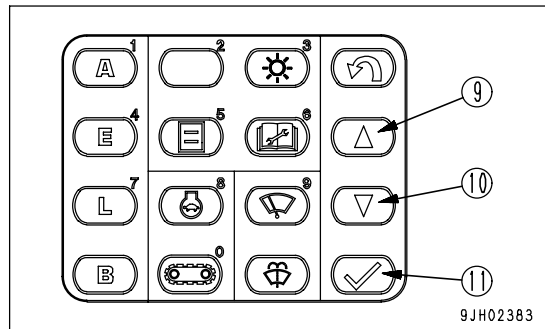
Adjusting brightness and contrast

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

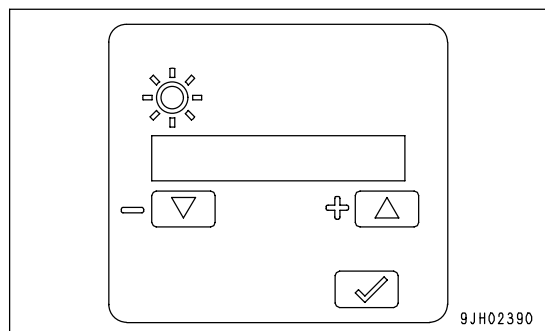


- Adjusting brightness

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

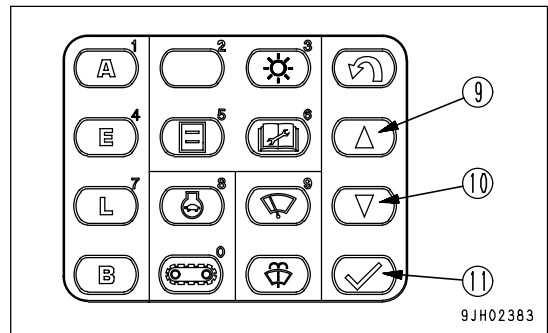


3. When the screen changes to the brightness adjustment screen, press up switch (9) or down switch (10) to adjust the brightness.
 4. After completing adjustment of the brightness, press input confirmation switch (11).



- Adjusting contrast

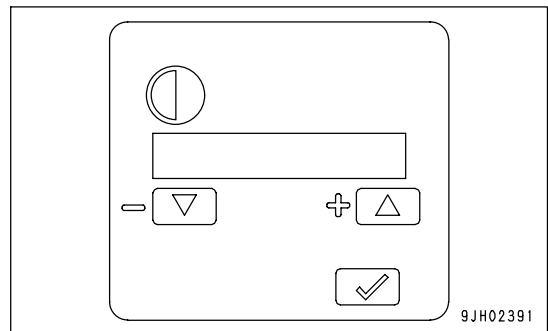
2. Use the brightness/contrast screen and press up switch (9) or down switch (10) to select the contrast monitor.
 (The selected monitor is inverted to black.)



3. When the screen changes to the contrast adjustment screen, press up switch (9) or down switch (10) to adjust the contrast.
 4. After completing adjustment of the contrast, press input confirmation switch (11).

REMARK

When the machine is shipped from the factory, the brightness is set to the maximum (+) setting. The contrast is set to the midpoint value.



MACHINE OPERATIONS AND CONTROLS

BEFORE STARTING ENGINE

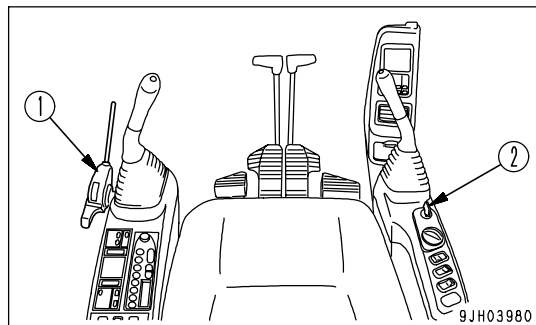
Operations Before Starting Engine



WARNING

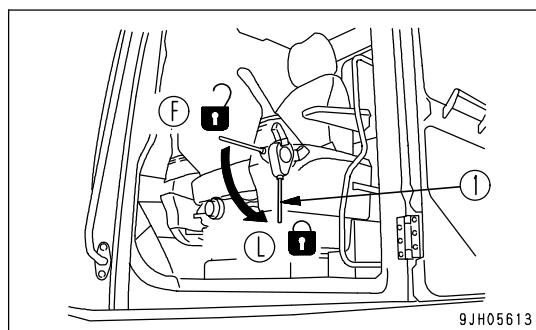
When starting the engine, check that the lock lever is securely at the LOCK position (L).

If the control levers are not locked and they are touched by accident when starting the engine, the work equipment may move unexpectedly, and this may lead to a serious accident.

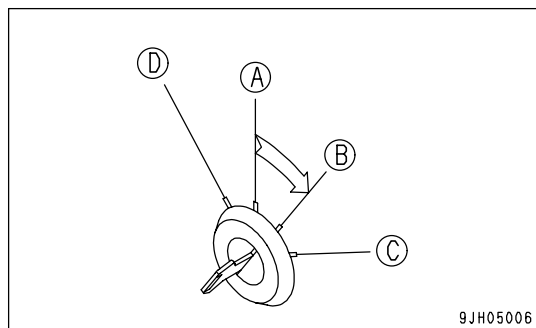


1. Check that lock lever (1) is at the LOCK position (L).

2. Check the position of each lever.
Set control lever to the neutral position.



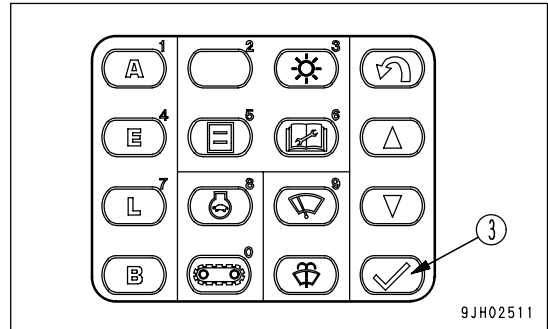
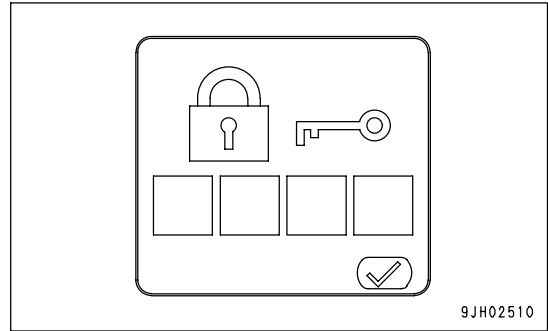
3. Insert the key in starting switch (2), turn the key to the ON position (B), then carry out the following checks.



- If a password has been set, the input display screen is shown on the monitor screen.
After inputting the password, press input confirmation switch (3).

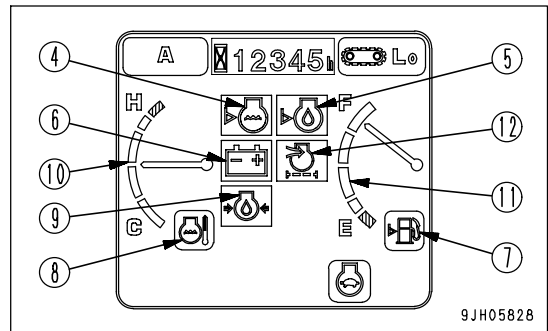
REMARK

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



1) The buzzer sounds for approx. 1 second, and the following monitors and meters light up for approx. 3 seconds.

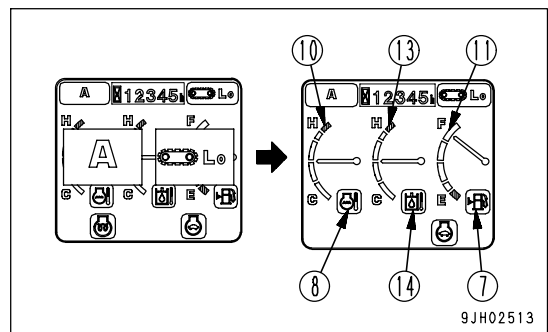
- Radiator coolant level monitor (4)
- Engine oil level monitor (5)
- Charge level monitor (6)
- Fuel level monitor (7)
- Engine coolant temperature monitor (8)
- Engine oil pressure monitor (9)
- Engine coolant temperature gauge (10)
- Fuel gauge (11)
- Air cleaner clogging monitor (12)



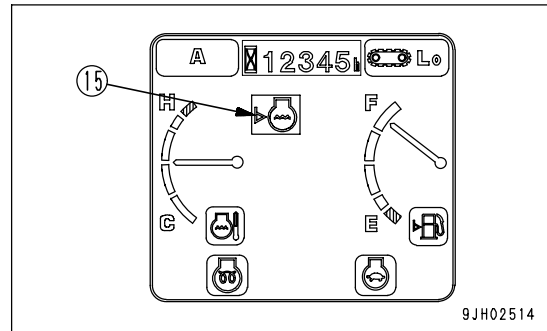
If the monitors do not light up or the buzzer does not sound, there is probably a failure in the monitor, so contact your Komatsu distributor for repairs.

2) After approx. 3 seconds, the screen switches to the working mode/travel speed display monitor. Then it switches to the normal screen.

- Fuel level monitor (7)
- Engine coolant temperature monitor (8)
- Engine coolant temperature gauge (10)
- Fuel gauge (11)
- Hydraulic oil temperature gauge (13)
- Hydraulic oil temperature monitor (14)

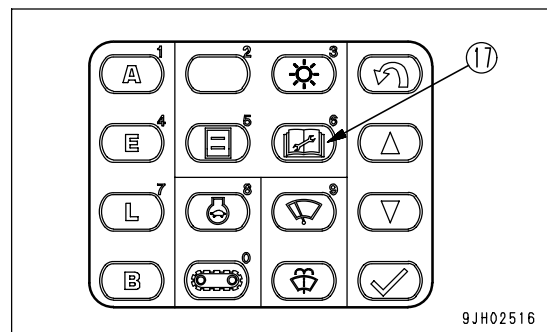
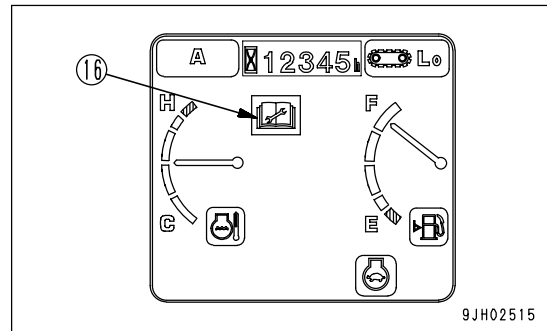


3) If the hydraulic oil temperature gauge goes out and caution lamp (15) stays lighted up red, perform inspection immediately for the item which is lighted up red.



4) If there are any items where the maintenance time has passed, maintenance interval monitor (16) lights up for 30 seconds. Press maintenance switch (17), check the item, then perform maintenance immediately.

For details of the method of checking the maintenance interval, see "Maintenance Switch (PAGE 7-24)" in the Detailed controls and gauges.



STARTING ENGINE

Normal Starting

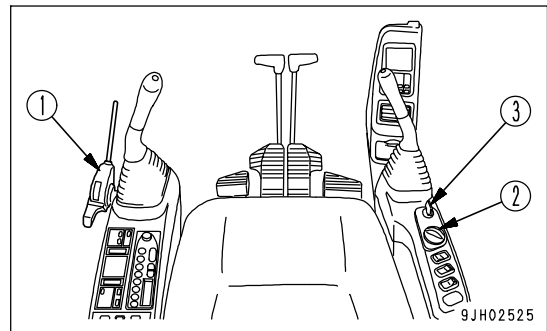


WARNING

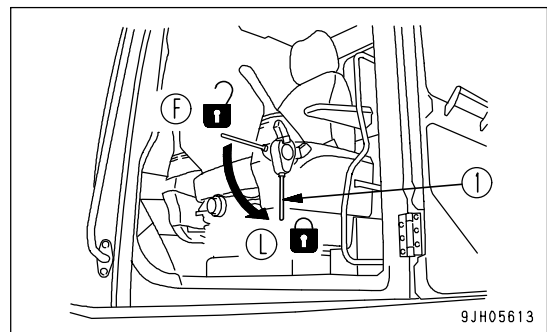
- Sit down in the operator's seat before starting the engine.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause serious bodily injury or fire.
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start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

NOTICE

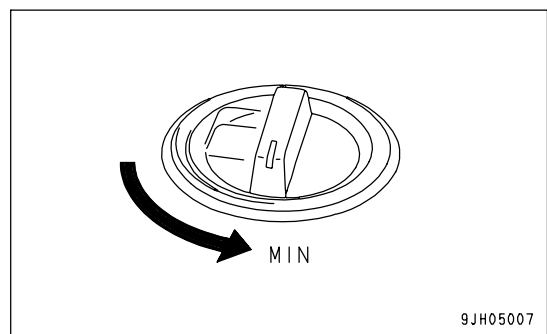
- Before starting the engine, check that the fuel control dial is at the low idle (MIN) position.
If the fuel control dial is at the FULL position, the engine will accelerate suddenly and cause damage to the engine parts.
- Do not crank the starting motor continuously for more than 20 seconds.
If the engine does not start, wait for at least 2 minutes before trying again.



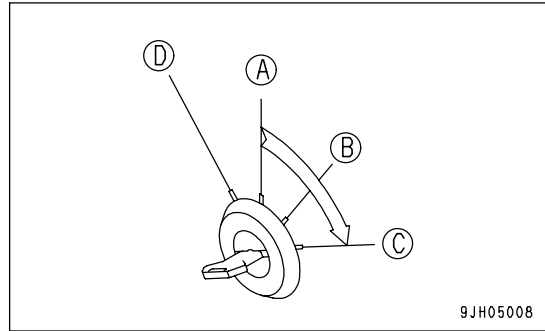
1. Check the lock lever (1) is in the LOCK position (L). If the lock lever is in the FREE position (F), the engine does not start.



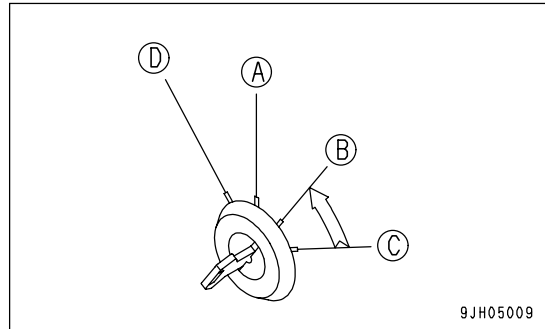
2. Set fuel control dial (2) at the low idle (MIN) position.
If it is at the high idle (MAX) position, always change it to the low idle (MIN) position.



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



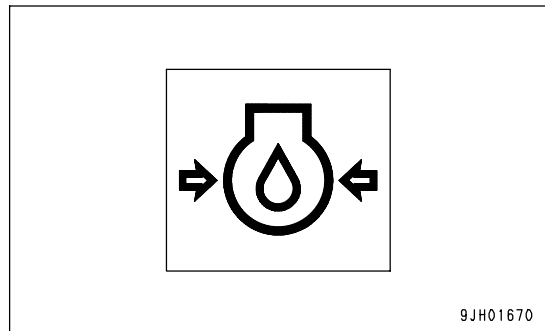
- After the engine starts, release the key in starting switch (3).
The key will automatically return to the ON position (B).



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

NOTICE

If the engine oil pressure monitor does not go out even after 4 to 5 seconds have passed, stop the engine immediately. Check the oil level, check for leakage of oil, and take the necessary action.



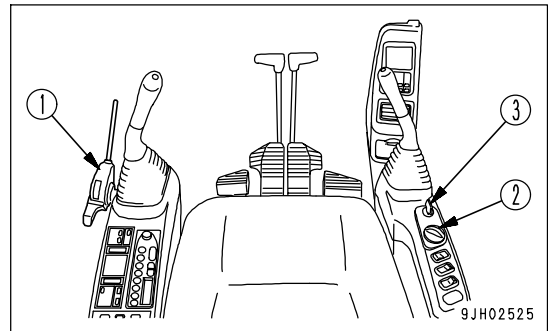
Starting Engine in Cold Weather

! 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.

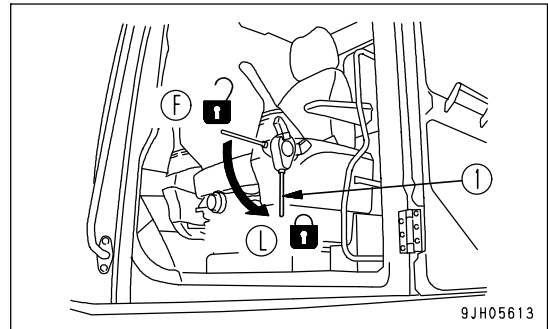
NOTICE

- Before starting the engine, check that fuel control dial (2) is at the low idle (MIN) position.
If the fuel control dial is at the FULL position, the engine will accelerate suddenly and cause damage to the engine parts, set it to an intermediate or low speed position.
- Do not keep the strating motor rotating continuously for more than 20 seconds.
If the engine fails to start, wait for about 2 minutes and repeat from Step 2.

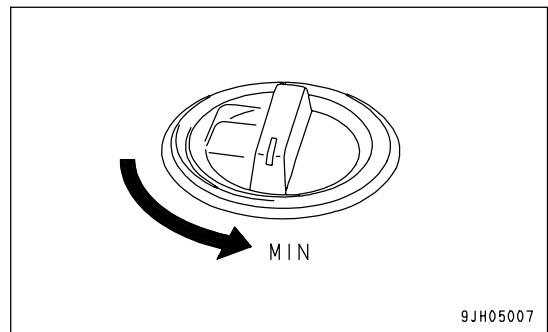


When starting in low temperatures, do as follows.

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



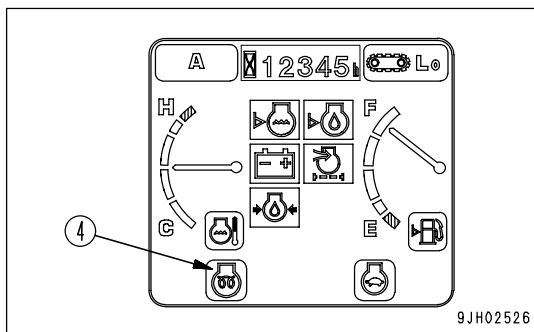
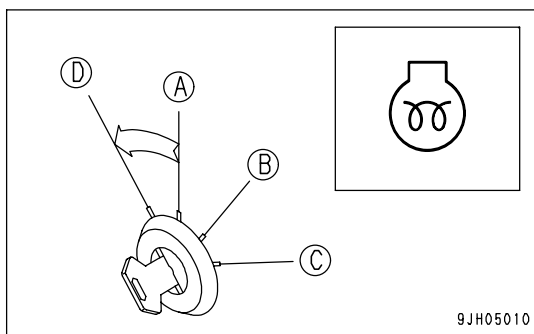
2. Set fuel control dial (2) at a low idle (MIN) position.
Do not set fuel control dial (2) at the high idle (MAX) position.



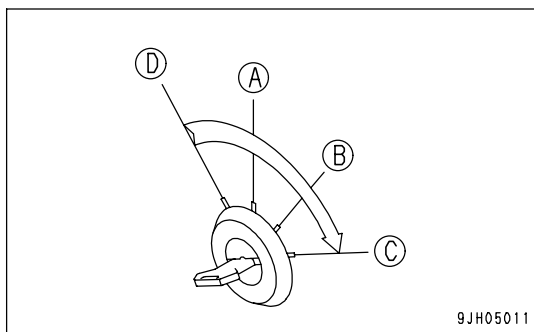
3. Hold the key in starting switch (3) in the HEAT position (D), and check that engine pre-heating monitor (4) lights up. After about 30 seconds, engine pre-heating monitor lamp (4) will flash to indicate that pre-heating is finished.

REMARK

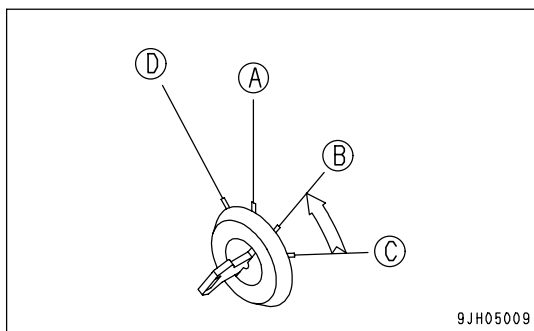
- The monitors and gauges will light up also when the key is turned to the HEAT position, but this is not a problem.
- If the temperature is low, the monitor screen may become dark or it may take time for the display to appear, but this is not a problem.



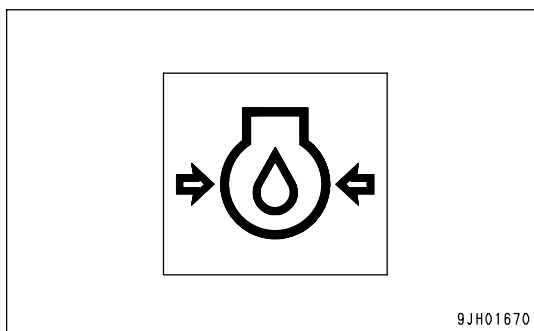
4. When engine pre-heating monitor (4) flashes, turn the key in starting switch (3) to the START position (C) to start the engine.



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



6. After starting the engine, do not touch the work equipment control lever or travel pedal while the engine oil pressure monitor lamp is lighted up.



AFTER STARTING ENGINE

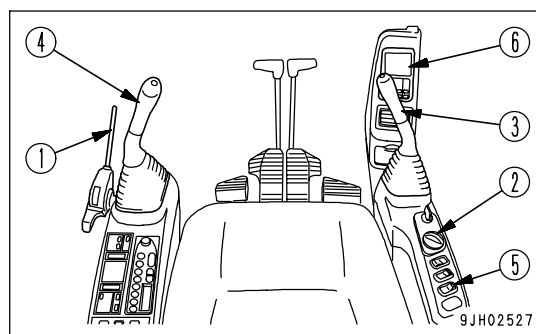
WARNING

- If any trouble occurs, such as sudden stopping or abnormal operation, turn the starting switch to the OFF position.
- If the work equipment is operated without carrying out the warming-up operation properly, the reaction of the work equipment to the operation of the control lever will be slow and the work equipment may not move as the operator intends. To prevent such problems, always be sure to carry out the warming-up operation fully. In cold weather particularly, be extremely careful to carry out the warming-up operation fully.

Warming-up Operation

NOTICE

- When the hydraulic oil is at a low temperature, do not perform operations or move the levers suddenly. Always perform the warming-up operation. This will help extend the machine life.
Do not suddenly accelerate the engine before the warming-up operation is completed.
- Do not run the engine at low or high idle continuously for more than 20 minutes. This will cause oil leaks from the turbocharger oil supply piping. If it is necessary to run the engine at idle, apply a load from time to time or run the engine at a mid-range speed.

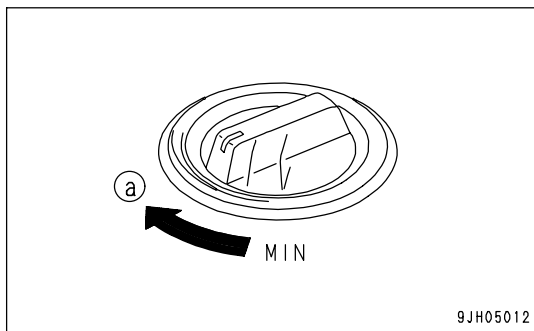


REMARK

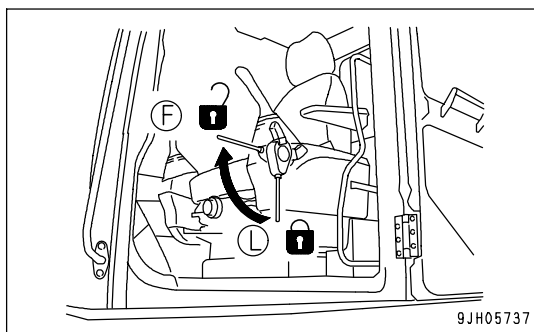
- If the engine coolant temperature is above 30°C (86°F), to protect the turbocharger, the engine speed does not rise for 2 seconds after starting, even if the fuel control dial is turned.
- If the hydraulic oil temperature is low, the hydraulic oil temperature monitor display will be white.

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

1. Turn fuel control dial (2) to center position (a) between the low idle (MIN) and high idle (MAX) positions and run the engine at a mid-range speed under no load until the engine coolant temperature monitor gives a green display.



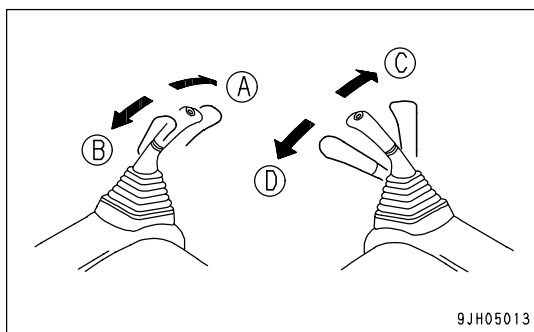
2. Set lock lever (1) slowly and securely to the FREE position (F), then raise the bucket from the ground.



3. Operate bucket control lever (3) and arm control lever (4) slowly to move the bucket cylinder and arm cylinder to the end of the stroke.

4. Operate the bucket for 30 seconds and the arm for 30 seconds in turn fully for 5 minutes.

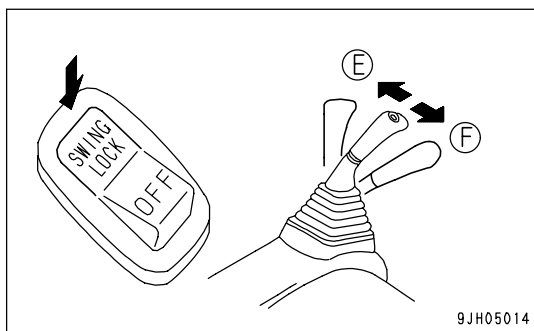
- (A): Arm is pushed out
- (B): Arm is pulled in
- (C): Bucket is pushed out
- (D): Bucket is pulled in



REMARK

If the swing lock switch (5) is set to the ON (actuated) position and swing control lever (4) is operated at full stroke, oil temperature rise can be increased earlier.

- (E): Left swing
- (F): Right swing

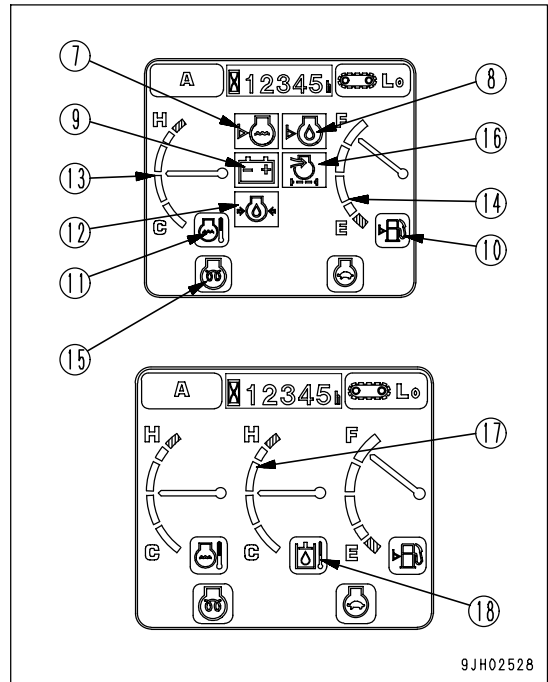


NOTICE

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

5. After performing the warming-up operation, check and be sure all the gauges on machine monitor (6) and the caution lamps are in the following conditions:

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

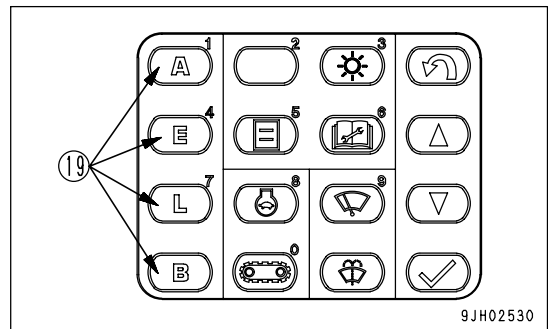


6. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.

7. If air cleaner clogging monitor (16) lights up, clean or replace the element immediately.

For details of the method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-19)".

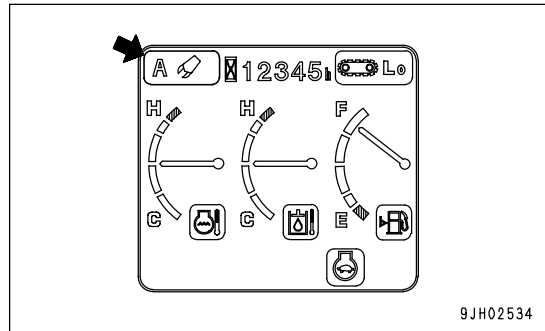
8. Use working mode selector switch (19) on machine monitor (6) to select the working mode to be used.



Working mode monitor display

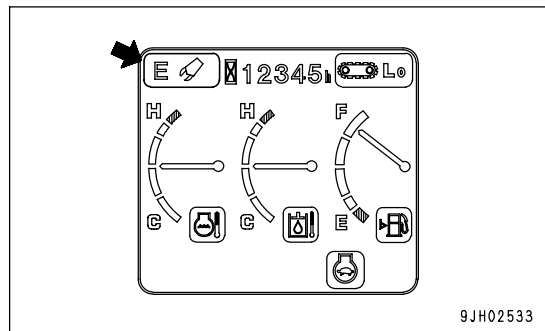
1) A mode

For heavy-load operations



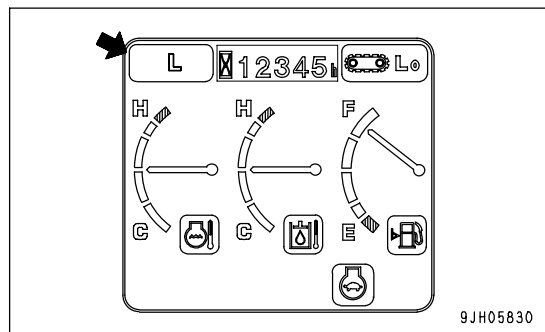
2) E mode

For operations with emphasis on fuel economy



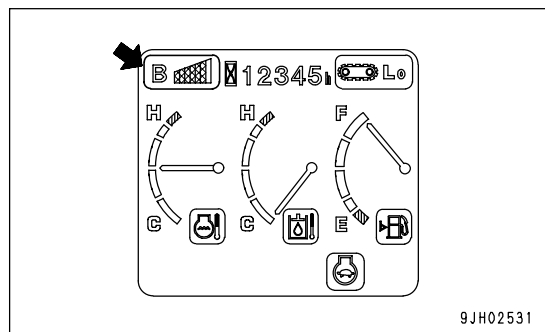
3) L mode

For operations requiring fine control



4) B mode

For breaker operations



In Cold Weather Areas

(AUTOMATIC WARMING-UP OPERATION)

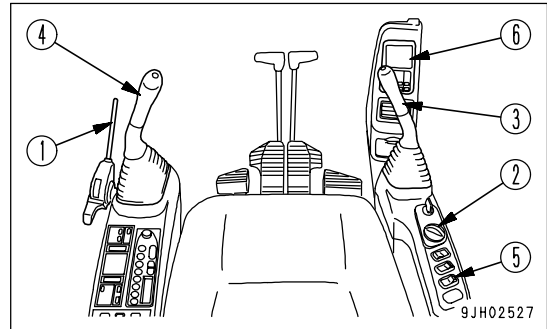
This machine is equipped with an automatic warming-up device.

When the engine is started, if the engine coolant temperature is low (below 30 °C (86 °F)), the warming-up operation is carried out automatically.

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

NOTICE

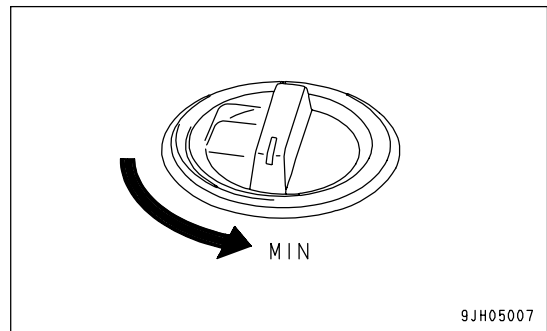
- Do not suddenly accelerate the engine before the warming-up operation is completed.
Do not run the engine at low or high idle continuously for more than 20 minutes. This will cause oil leaks from the turbocharger oil supply piping. If it is necessary to run the engine at idle, apply a load from time to time or run the engine at a mid-range speed.
- Never perform operations or operate the control levers when the hydraulic oil is still a low temperature. Always continue the warming-up operation until the hydraulic oil temperature monitor display is green. This will extend the service life of the machine.



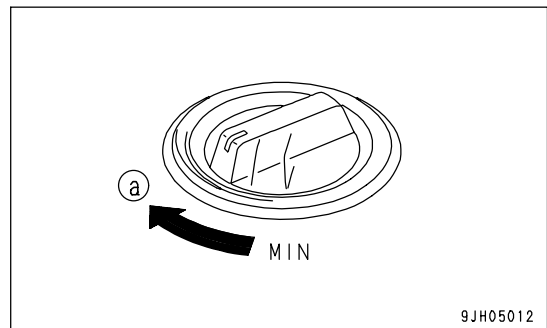
REMARK

If the hydraulic oil temperature is low, the hydraulic oil temperature monitor display will be white.

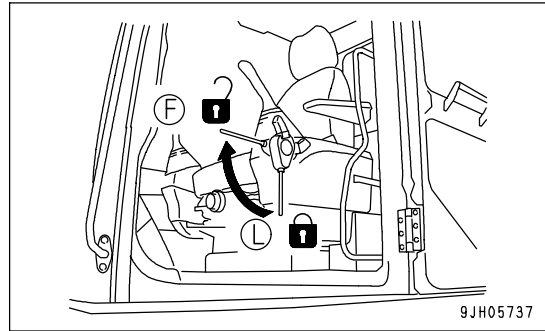
1. Turn fuel control dial (2) to the low idle (MIN) position and run the engine under no load until the engine coolant temperature monitor gives a green display.
2. To raise the hydraulic oil temperature quickly, use the operating mode switch on the machine monitor to set to A mode (heavy-duty operation mode).



3. Turn fuel control dial (2) to the medium speed position (a).

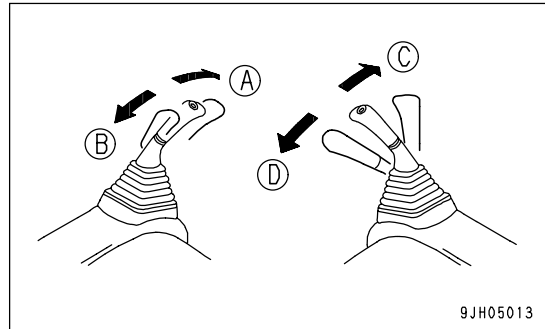


4. Set lock lever (1) slowly and securely to FREE position (F), then raise the bucket from the ground.



5. Operate bucket control lever (3) and arm control lever (4) slowly to move the bucket cylinder and arm cylinder to the end of the stroke.
6. Operate the bucket for 30 seconds and the arm for 30 seconds in turn fully for 5 minutes.

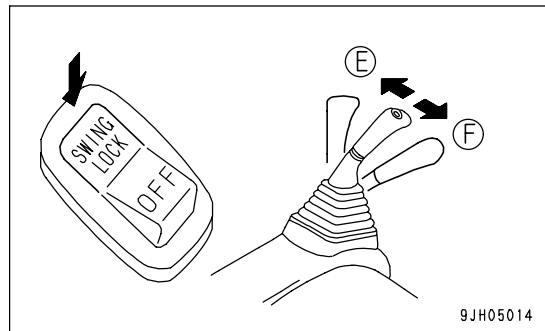
- (A): Arm is pushed out
- (B): Arm is pulled in
- (C): Bucket is pushed out
- (D): Bucket is pulled in



REMARK

If the swing lock switch (5) is set to the ON (actuated) position and swing control lever (4) is operated at full stroke, oil temperature rise can be increased earlier.

- (E): Left swing
- (F): Right swing

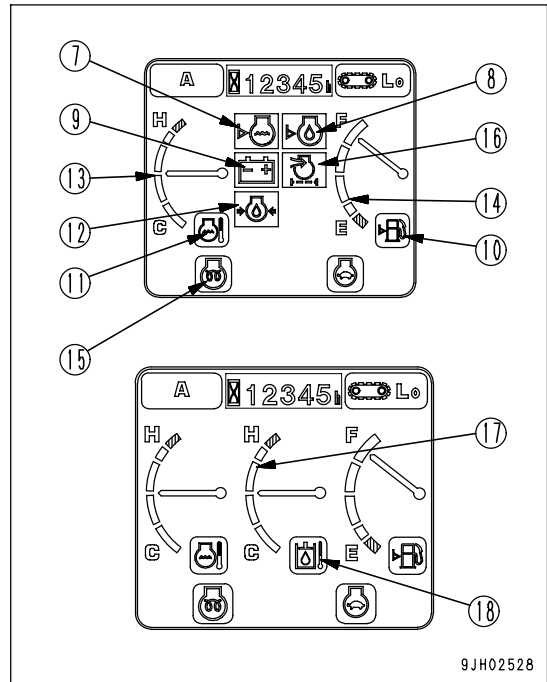


NOTICE

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

7. After the warming-up operation is completed, check that each gauge and monitor lamp is in the following condition:

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



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

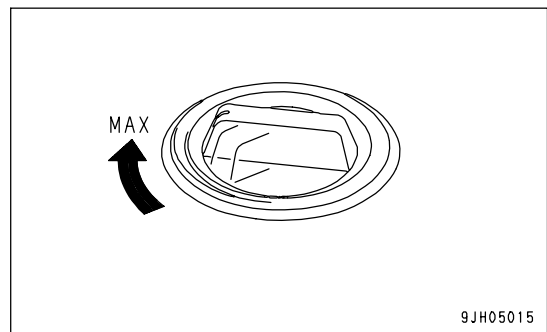
9. If air cleaner clogging monitor (16) lights up, clean or replace the element immediately.

For details of the method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-19)".

10. Turn fuel control dial (2) to the full speed (MAX) position and carry out the operation in Step 5. for 3 to 5 minutes.

11. Repeat the following operation 3 - 5 times and operate slowly.

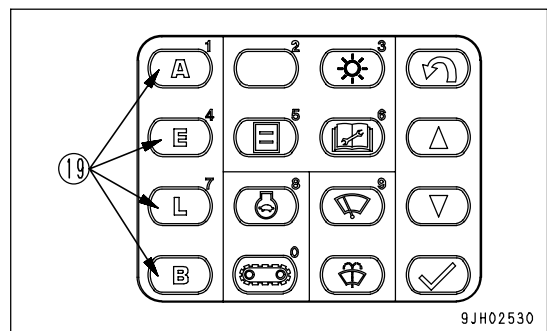
- Boom operation RAISE ↔ LOWER
- Arm operation IN ↔ OUT
- Bucket operation CURL ↔ DUMP
- Swing operation LEFT ↔ RIGHT
- Travel (Lo) operation FORWARD ↔ REVERSE



REMARK

If the above operation is not carried out, then there may be a delay in response when starting or stopping the actuation of the travel, swing, or work equipment.

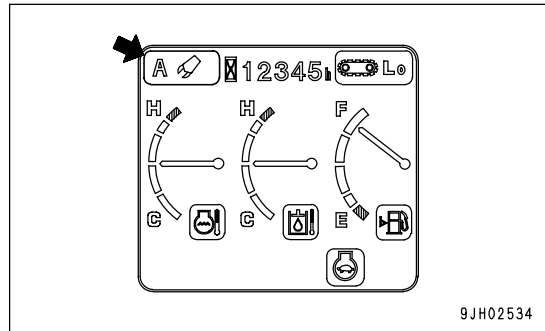
12. Use working mode selector switch (19) on machine monitor (6) to select the working mode to be used.



Working mode monitor display

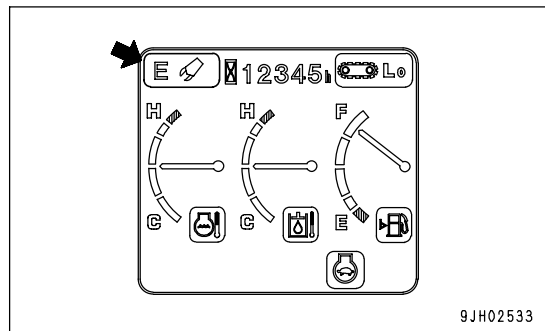
1) A mode

For heavy-load operations



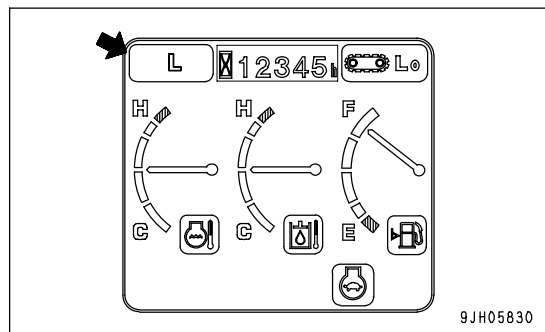
2) E mode

For operations with emphasis on fuel economy



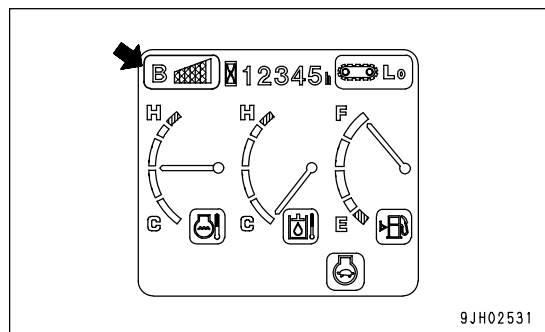
3) L mode

For operations requiring fine control



4) B mode

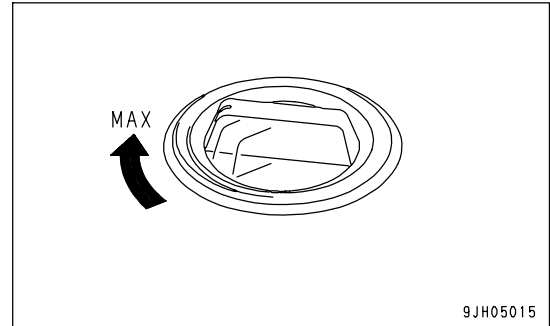
For breaker operations



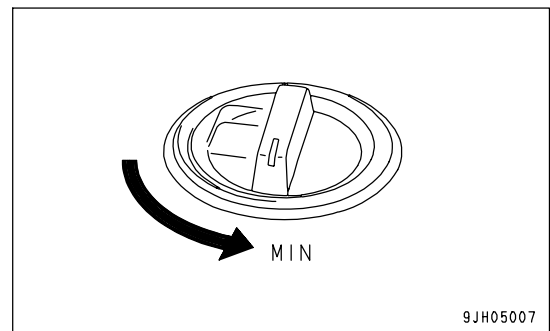
NOTICE**Canceling automatic warm-up operation**

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.

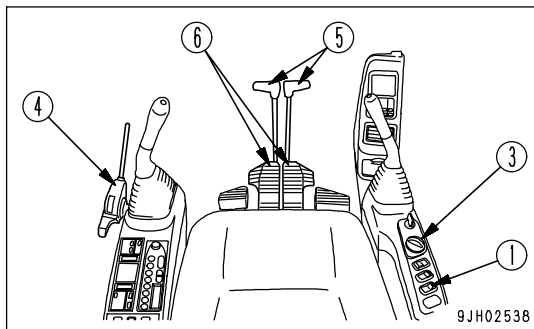


MACHINE OPERATION

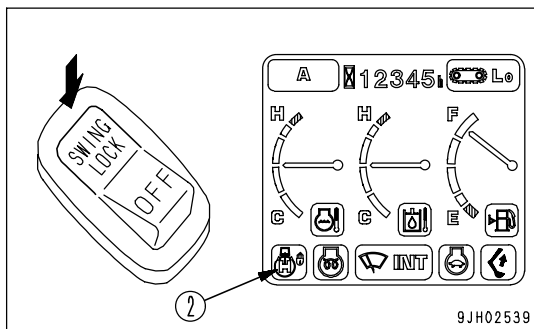
Preparations for Moving the Machine

WARNING

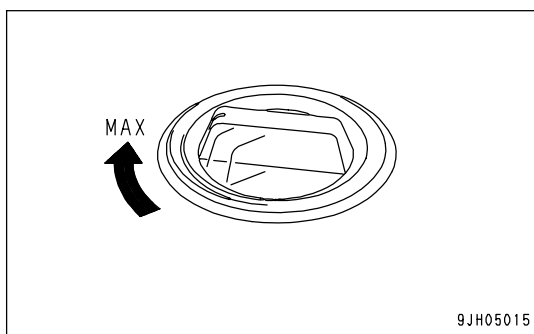
- Before operating the steering levers, check the direction of the track frame.
If the sprocket is at the front, the operation of the travel levers is reversed.
- When moving the machine, check that the area around the machine is safe, and always sound the horn before moving.
- Do not allow anyone in the area around the machine.
- Remove all obstacles from the travel path of the machine.
- The rear of the machine is a blind spot, be extremely careful when traveling in reverse.
- If the lever is moved inside the deceleration range, engine speed will rise suddenly. Operate the levers carefully.
- For machines equipped with a travel alarm, check that the warning equipment works properly.



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

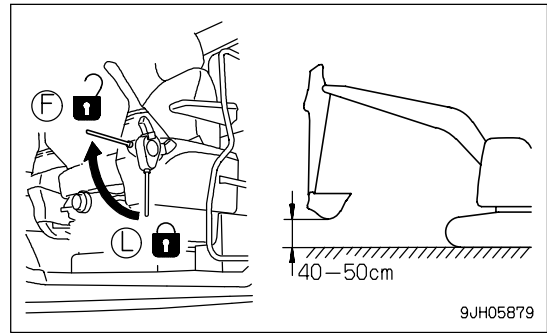


2. Turn fuel control dial (3) towards the full speed position to increase the engine speed.



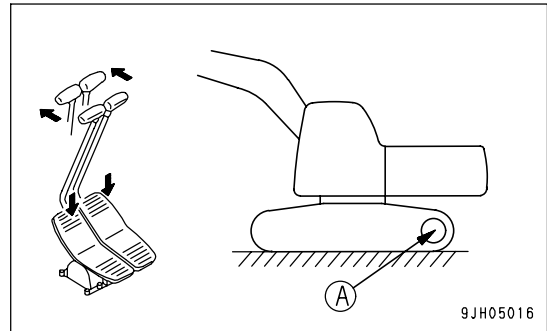
Moving Machine Forward

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.

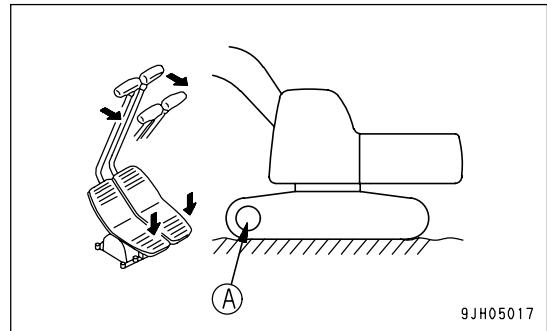


2. Operate the right and left travel levers (5), or the right or left travel pedals (6) as follows:

- When sprocket (A) is at the rear of the machine:
Slowly push the levers (5) forward, or slowly depress the front part of the pedals (6) to move the machine forward.



- When sprocket (A) is at the front of the machine:
Slowly pull the levers (5) backward, or slowly depress the rear part of the pedals (6) to move the machine forward.



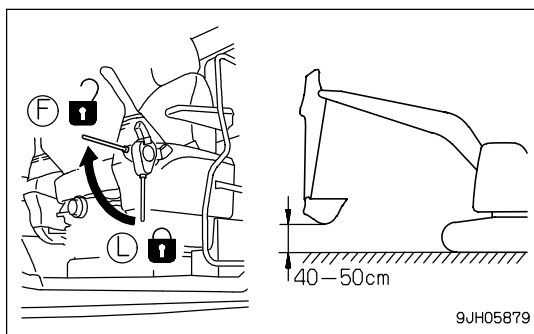
3. For machines equipped with a travel alarm (if equipped), check that the alarm sounds. If the alarm does not sound, please contact your Komatsu distributor for repair.

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.

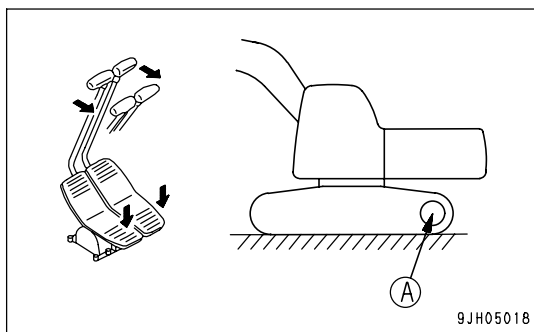
Moving Machine Backward

1. Set lock lever (4) in the FREE position (F), fold the work equipment, and raise it 40 to 50 cm (16 to 20 in) from the ground.

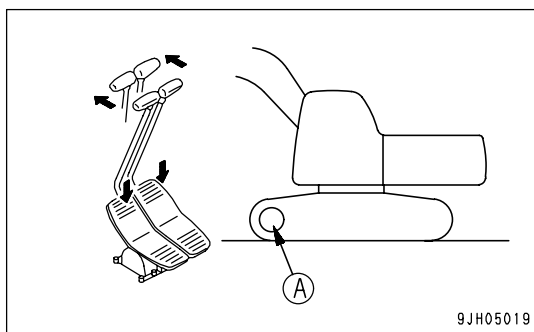


2. Operate the right and left travel levers (5), or the right or left travel pedals (6) as follows:

- When sprocket (A) is at the rear of the machine:
Slowly pull the levers (5) backward, or slowly depress the rear part of the pedals (6) to move the machine backward.



- When sprocket (A) is at the front of the machine:
Slowly push the levers (5) forward, or slowly depress the front part of the pedals (6) to move the machine backward.

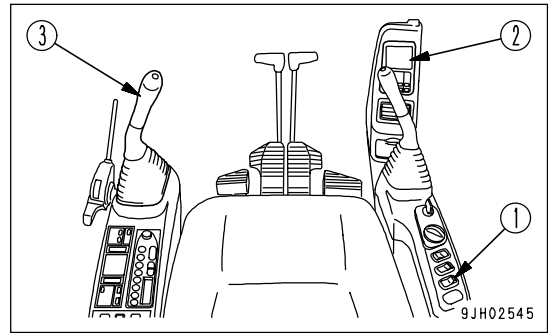


3. For machines equipped with a travel alarm (if equipped), check that the alarm sounds. If the alarm does not sound, please contact your Komatsu distributor for repair.

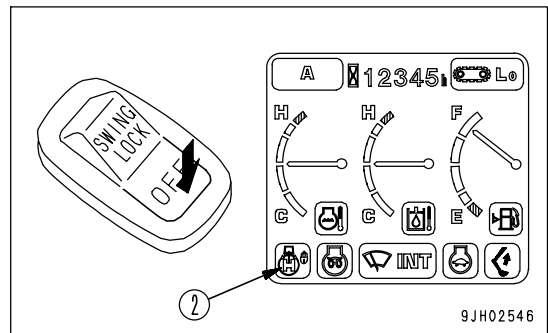
SWINGING

WARNING

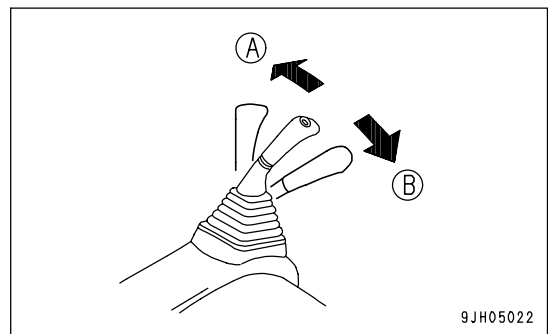
The tail of the machine extends outside the tracks. Before operating the swing, check that the area around the machine is safe.



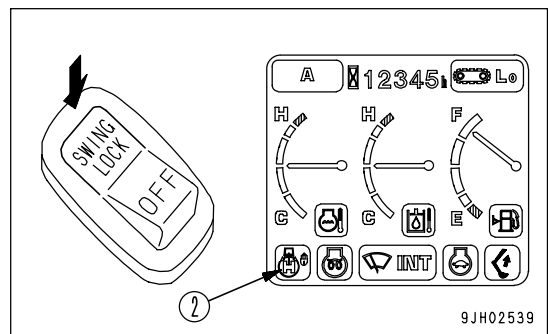
1. Before starting the swing operation, turn swing lock switch (1) OFF and check that swing lock monitor (2) has gone out.



2. Operate left work equipment control lever (3) to 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.



WORKING MODE

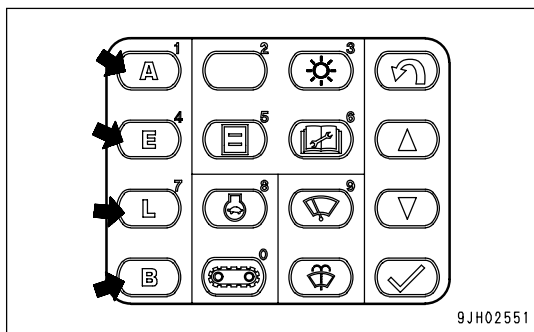
Working Mode

The mode selector switch can be used to switch the mode to match operating conditions and purpose, thereby enabling work to be performed efficiently.

Make effective use of each mode as follows.

When the starting switch is turned to the ON position, the working mode is set to A mode (digging).

Use the working mode switch to set the mode to the most efficient mode to match the type of work.



Working mode	Applicable operations
A mode	Normal digging, loading operations (Operations with emphasis on productivity)
E mode	Normal digging, loading operations (Operations with emphasis on fuel consumption)
L mode	When positioning work equipment exactly (fine-control operations)
B mode	Breaker operations

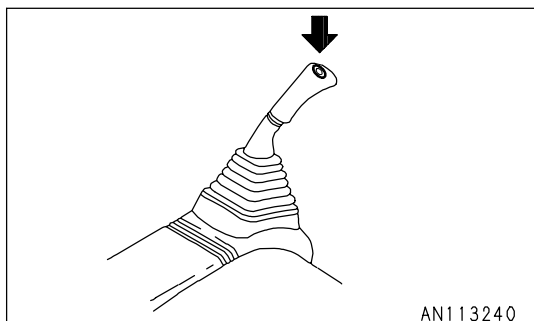
NOTICE

Do not use the heavy-duty operation mode for breaker operations. If breaker operations are carried out in the heavy-duty operation mode, there is a hazard that the hydraulic equipment may be damaged or broken.

Power Max and Shift Slowdown

The one-touch power max. Switch can be used during operations to increase the power. Make effective use of this function whenever necessary in combination with the working mode.

- Press the left knob switch and keep it pressed. The power is increased as long as the switch is being pressed. However, the increased power is automatically canceled after 8.5 seconds.
- This function is not actuated when the working mode is set to L mode or B mode.

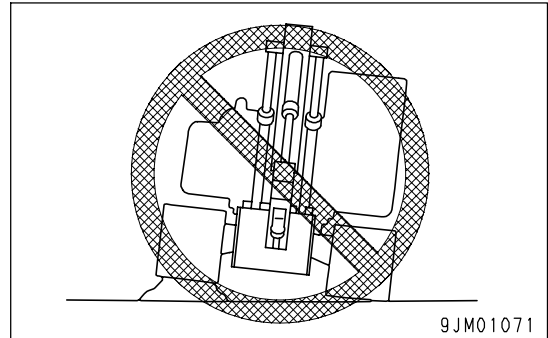


GENERAL OPERATION INFORMATION

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.

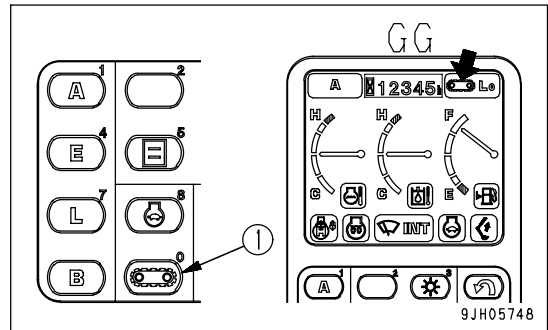
If there is no way to avoid traveling over an obstacle, reduce the travel speed, keep the work equipment close to the ground, and try to travel so that the center of the track passes over the obstacle.



High Speed Travel

On uneven roadbeds such as rock beds or uneven roads with large rocks, travel at Lo speed. When traveling at high speed, set the idler in the forward direction.

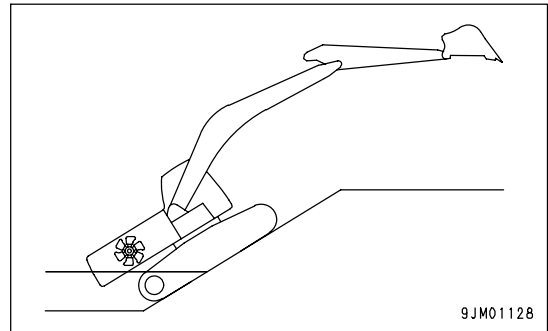
- To switch the travel speed, press travel speed selector switch (1). The travel speed is displayed as Lo, Mi, or Hi on the monitor display.



Permissible Water Depth

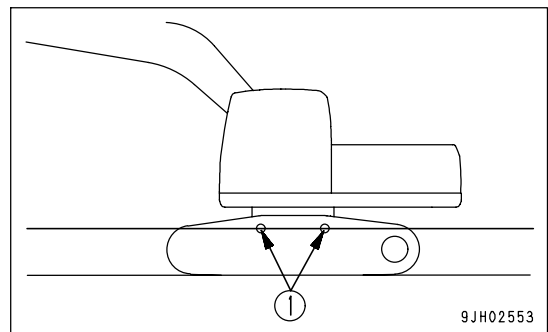
NOTICE

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 cooling 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).

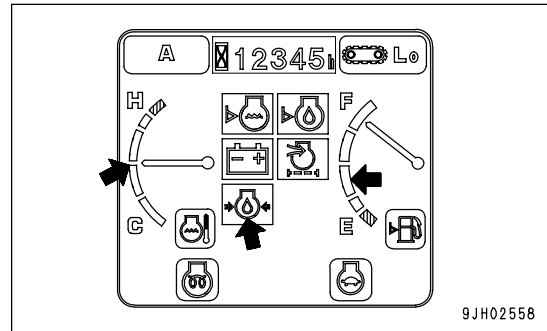


CHECK AFTER SHUT OFF ENGINE

Check the engine coolant temperature, engine oil pressure, and fuel level on the machine monitor.

REMARK

After stopping the engine, if the starting switch is turned within approx. 10 seconds to the ON or START position to start the engine again, the monitor display is not reset, and the screen before the starting switch was turned OFF is displayed.



MACHINE INSPECTION AFTER DAILY WORK

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.

COLD WEATHER OPERATION

MONITOR

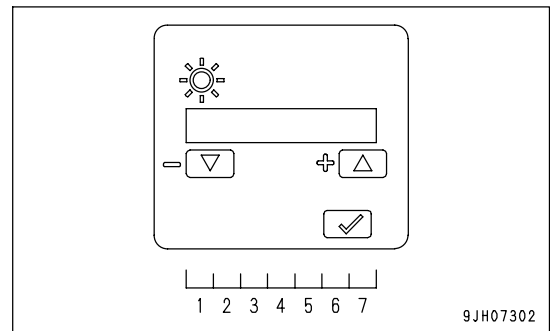
A feature of the liquid-crystal monitor is that the screen becomes dark and is difficult to read in cold weather (particularly with the starting switch ON).

In this case, adjust the brightness and contrast of the screen.

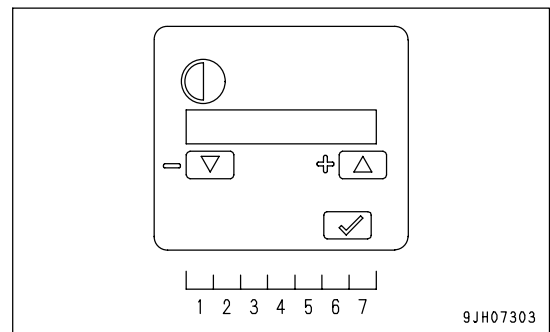
For details, see "Liquid Crystal Monitor Adjustment Switch (PAGE 7-28)".

If the screen is dark, increase the brightness and contrast (extend the scale in the + Δ direction) to make the screen brighter and easier to read.

Brightness



Contrast



Guideline for bar display for brightness and contrast in cold weather

Ambient temperature	Brightness	Contrast
-10°C (14°F)	7 (max)	5 - 4
-20°C (-4°F)	7	7 - 6

MAINTENANCE PROCEDURE

WHEN REQUIRED

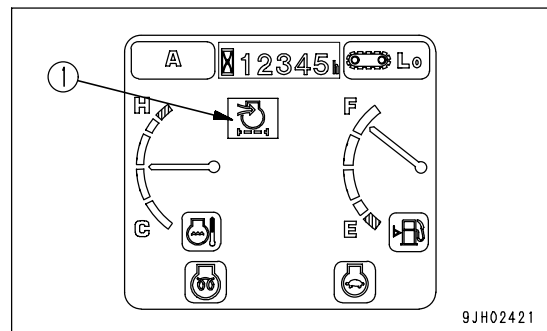
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

WARNING

- When using compressed air, there is danger of dirt flying and causing personal injury.
Always wear protective glasses, dust mask, or other protective equipment.
- When removing the outer element from the air cleaner body, it is dangerous to pull it out by force. When working in high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

Checking

If air cleaner clogging monitor (1) of the monitor panel flashes, clean the air cleaner element.



Replacing

- Replacing element, O-ring
If one year has passed since installing the element or if air cleaner clogging monitor (1) on the monitor panel flashes immediately after the element is cleaned, replace the outer element, inner element, and O-ring.
- Replacing evacuator valve
Replace it if it is damaged or the rubber is markedly deformed.

NOTICE

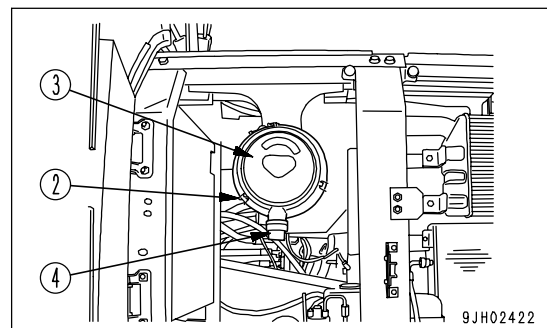
- Do not clean the air cleaner element until the air cleaner clogging monitor on the monitor panel light up. If the element is cleaned frequently before the air cleaner clogging monitor light up, the air cleaner will not be able to display its performance fully, and the cleaning efficiency will also go down.
In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.
- If inspection, cleaning, or maintenance is carried out with the engine running, dirt will enter the engine and cause damage to the engine. Always stop the engine before carrying out these operations.

Cleaning or Replacing Outer Element

1. Open a door located at the rear left side of the machine, release hooks (2) at 3 locations and then detach cover (3).

NOTICE

Before and after cleaning the element, do not leave or keep it in direct sunlight.

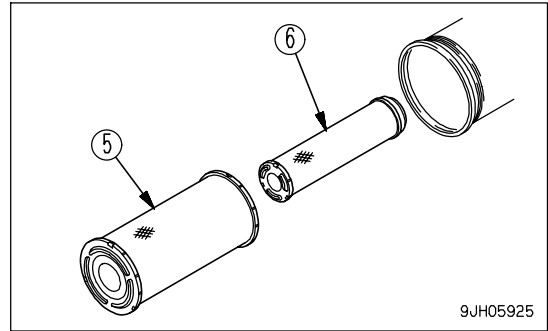


2. Hold the outer element, rock it lightly up and down and to the left and right, and rotate the element to the left and right to pull it out.

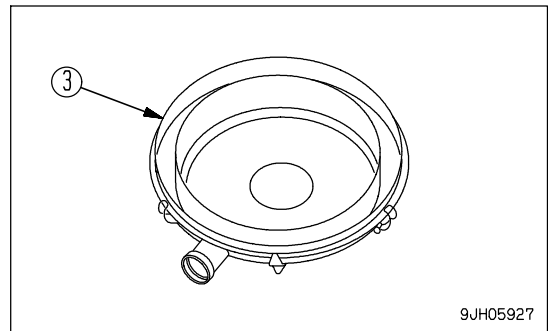
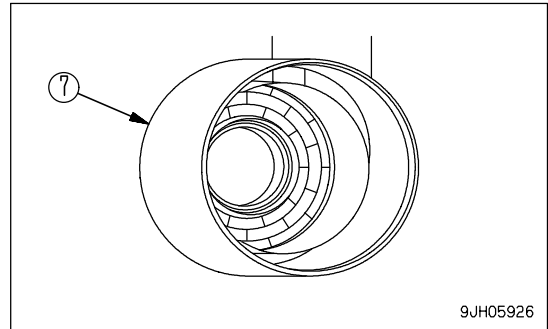
NOTICE

- Never remove the inner element (6). It will allow dirt to enter and cause failure of the engine.
- Do not use a screwdriver or other tool.

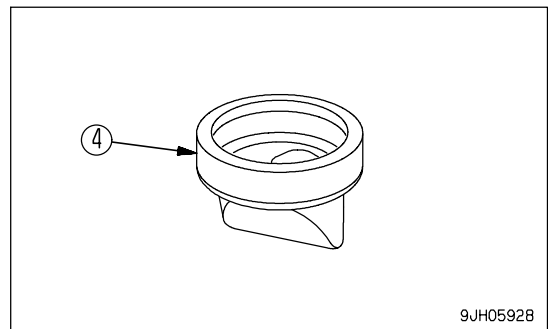
3. After removing the outer element (5), cover the inner element (6) with a clean cloth or tape to prevent dirt or dust from entering.



4. Wipe off or brush off the dirt stuck to cover (3) and the inside of the air cleaner body (7).

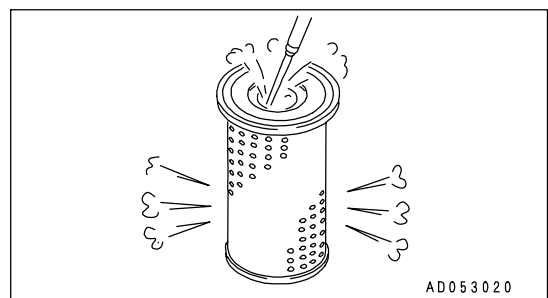


5. Remove any dirt or dust that is accumulated to evacuator valve (4) installed to cover (3).

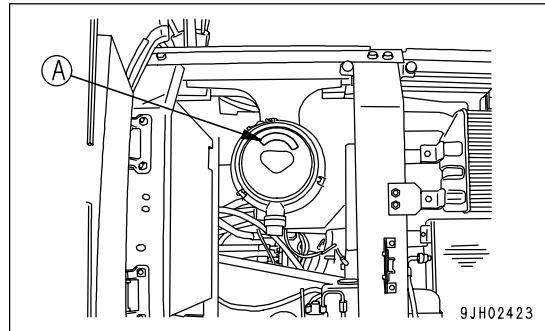


6. Direct dry compressed air (less than 0.69 MPa (7 kgf/cm², 99.4 PSI)) to the outer element from inside along its folds, then direct it from outside along its folds and again from inside.

- 1) Remove one seal from the element whenever the element has been cleaned.
- 2) Replace the outer element which has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.



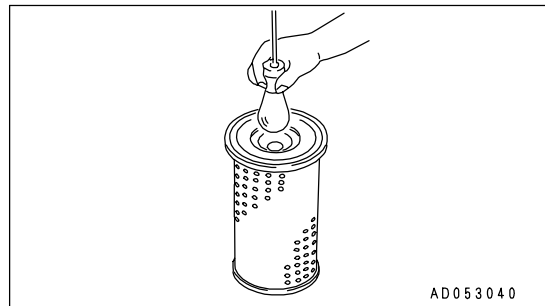
- 3) Replace both inner and outer elements when the air cleaner clogging monitor (1) lights up soon after installing the cleaned outer element even though it has not been cleaned 6 times.
- 4) When replacing the element, stick on seal (A) packed in the same box as the element. Stick the seal in the position shown in the diagram on the right.



7. Remove the cloth or tape cover installed in Step 3.
8. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.

NOTICE

- When cleaning the element, do not hit or beat it against anything.
- Do not use an element whose folds or gasket or seal are damaged.



Install Air Cleaner Element

NOTICE

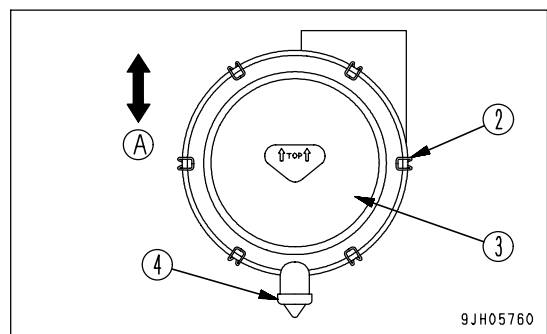
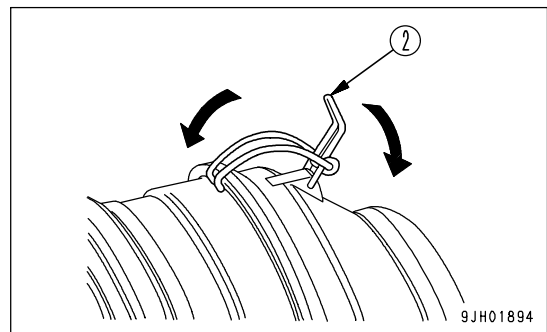
- Do not use any damaged gasket or seal or element with damaged pleats.
- Cleaning the element or O-ring after one year has passed and using them again will cause problems. Always replace them with new parts.
- The seal portion on imitation parts lacks precision, and allows the entry of dust, which leads to damage of the engine. Do not use such imitation parts.
- Do not run the engine with the inner element removed. It will cause damage to the engine.

1. Check that there is no dirt or oil stuck to the seal portion of the new element or cleaned element. Wipe off any dirt or oil.
2. When the outer element has been removed, check that the inner element has not come out of position and is not at an angle. If inner element is at an angle, insert your hand and push it in straight.
3. Push the outer element in straight with your hand when installing it to the air cleaner body.
If the outer element is held and rocked lightly up and down and to the left and right while pushing it in, the outer element can be inserted easily.

NOTICE

When inserting the element, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is assembled by force to hook (2), there is danger that the hook and air cleaner body may be damaged, so be careful when assembling.

4. Install cover (3) as follows.
 - 1) Align cover (3) with the element.
 - 2) Hook the tip of hook (2) to the protruding part of the air cleaner body and lock it in position.
 - 3) When locking hooks (2) in position, apply the hooks in turn on opposite sides (top, bottom, left, right) in the same way as when tightening bolts.
 - 4) Always install cover (3) so that the evacuator (4) is facing the ground (A).
 - 5) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large. If it is too large, install again.



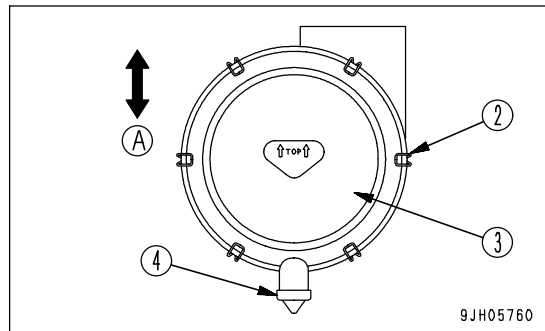
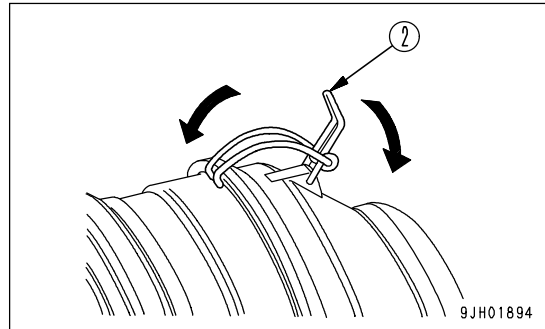
Replacing Inner Element

1. First remove the outer element, and then remove the inner element.
2. Cover the air connector side (outlet side) with a clean cloth or tape.
3. Clean the air cleaner body interior, then remove the cover from the air intake port in Step 2.
4. Install a new inner element to the connector, then tighten the nut.

NOTICE

The inner element must not be used again even after cleaning. When replacing the outer element, replace the inner element at the same time.

5. Set the outer element in position, then lock cover (3) with hooks (2).



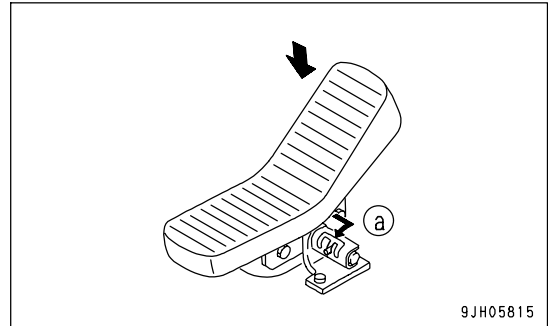
MACHINE READY FOR ATTACHMENT

ATTACHMENT OPERATIONS

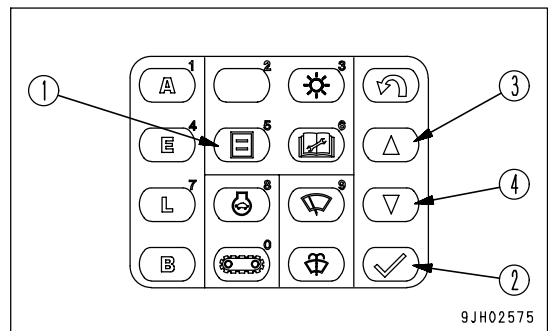
When Using Breaker

With the working mode set to B mode, set the lock pin to FREE position (a) for the front only, and depress the front of the pedal to actuate the breaker.

1. Set the working mode to B mode.
2. When monitor select switch (1) is pressed, the screen changes to screen (A), so select the appropriate oil flow for the breaker that is installed (300 liter (79.26 US gal)/min., 220 liter (58.12 US gal)/min., 140 liter (36.99 US gal)/min.), then press input confirmation switch (2).
3. The screen changes to screen (B), so if any fine adjustment is needed, press UP switch (3) or DOWN switch (4) to move the bar graph showing the oil flow up or down, select the appropriate oil flow, then press input confirmation switch (2).
 - One segment on the scale can change the oil flow by approx. 20 liter (5.28 US gal)/min.
 - If no fine adjustment is needed, simply press input confirmation switch (2).
 - Even when the starting switch is turned OFF, the oil flow set by the above operation remains as the set value when the engine is started next.



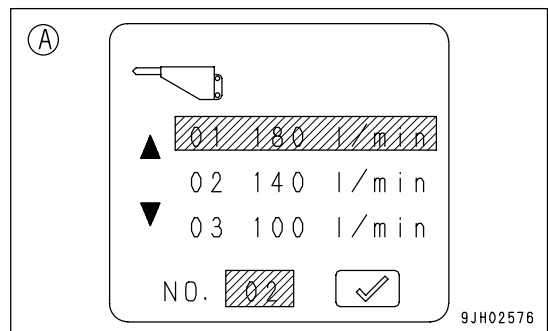
9JH05815



9JH02575

Precautions when using

- Check that the stop valve is at the FREE position.
- Check that the working mode is B mode.
For details of the path of the oil, see "HYDRAULIC CIRCUIT (PAGE 6-7)".
- When considering whether it is necessary to install an accumulator for the attachment circuit, contact the attachment manufacturer and then decide.
- For other precautions when handling the breaker, follow the instruction manual from the breaker manufacturer and use the breaker correctly.

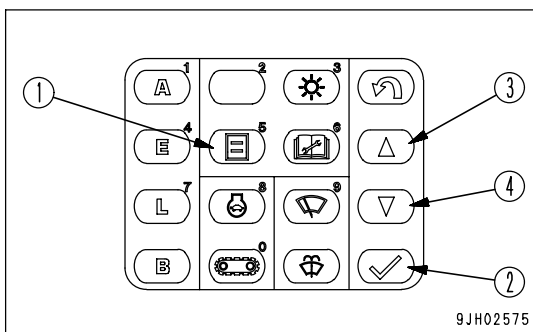
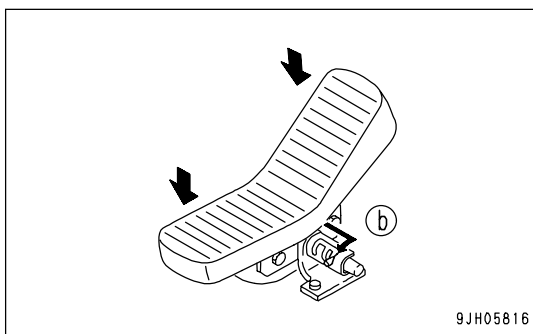


9JH02576

When Using General Attachment Such as Crusher

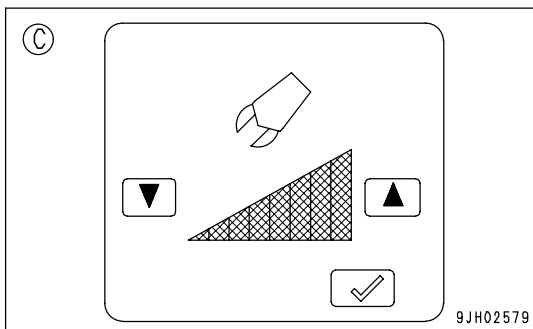
With the working mode set to A mode or E mode, set the lock pin to FREE position (b) for both the front and rear, and depress the front or rear of the pedal to actuate the attachment.

1. Set the working mode to A mode or E mode.
2. When monitor select switch (1) is pressed, the screen changes to screen (C), so press UP switch (3) or DOWN switch (4) to move the bar graph showing the oil flow up or down, select the appropriate oil flow, then press input confirmation switch (2).
 - The default setting is the full oil flow (approx. 550 liter (145.31 US gal)/min.).
 - Even when the starting switch is turned OFF, the oil flow set by the above operation remains as the set value when the engine is started next.



Precautions when using

- Check that the stop valve is at the FREE position.
- Check that the working mode is E mode.
For details of the path of the oil, see "HYDRAULIC CIRCUIT (PAGE 6-7)".
- For other precautions when handling the attachment, follow the instruction manual from the attachment manufacturer and use the attachment correctly.



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PC400,400LC,450,450LC-7 GALEO HYDRAULIC EXCAVATOR

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