

Operation & Maintenance Manual

GALEO

WD600-3

WHEEL DOZER

SERIAL NUMBERS **WD600-3 - 50001** and up

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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 hazard when performing operation and maintenance.



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

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

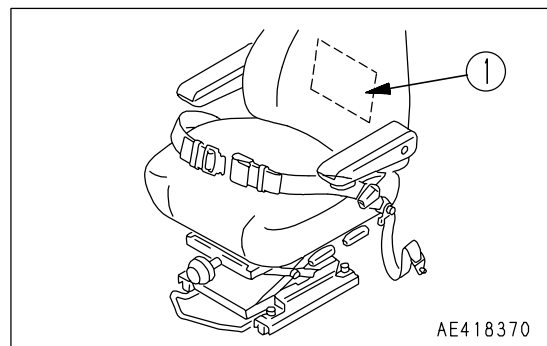
Keep this manual at the storage location for the Operation and Maintenance Manual given below, and have all personnel read it periodically.

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

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

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

Storage location for the Operation and Maintenance Manual:
Pocket (1) at rear of 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" manufacture and market products of the following models: Komatsu Dumper, Dumper, Dozer, and Grader. The emissions warranty applies to these engines bearing the Komatsu name installed in these products and used in Canada in machines designed for industrial off-highway use. This warranty is limited only to these engines produced on or after January 1, 1990. This warranty will be administered by the distributor for an area only.

2. Coverage

Komatsu warrants to the original purchaser and each subsequent purchaser that the engine is designed, manufactured and assembled at the time of sale by Komatsu, with all US 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 the years or 1,000 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 caused or resulting from use of Komatsu equipment to be abused or misused, including, but not limited to, operation without adequate coolant or lubricants, over loading, over speeding, lack of maintenance or lubricating, cooling or intake system component damage, running at excessive rpm or shutdown conditions, unauthorized modifications of the engine. Komatsu is also not responsible for failures caused by incorrect fuel or oil, fuel and metering arrangements or the fuel. Komatsu is not responsible for engine repairs, downtime, expenses and/or damage to any other machinery or equipment caused by engine failure.

KOMATSU IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

This warranty, together with the express warranties, warranties and the sole warranties of Komatsu. **THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, FOR THE 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 commercialisent des produits porteurs des modèles suivants: Komatsu, Dumper, Dozer, Grader et Grader. Cette garantie s'applique aux moteurs équipés de ces produits portant le nom Komatsu, installés dans ces produits et utilisés au Canada dans des machines conçues pour un usage industriel hors route. Cette garantie s'applique seulement aux moteurs produits à partir du 1er janvier 1990. Cette garantie sera administrée par le distributeur de Komatsu en région.

2. Couverture:

Komatsu garantit à l'acheteur ultime et à chaque acheteur subséquent que l'engin est conçu, fabriqué et assemblé au moment de la vente par Komatsu, avec toutes les Réglementations Fédérales applicables au moment de la fabrication et qu'il est exempt de défauts de travail ou de matériaux qui pourraient causer qu'il ne respecte pas les réglementations et normes de 1,000 heures d'opération, whichever occurs first, as measured from the date of delivery of the engine to the ultimate purchaser.

3. Limitations:

Les défaillances que causent des défauts de matériaux ou de construction ne sont pas couvertes par cette Garantie. Komatsu n'est pas responsable pour des défaillances causées par utilisation abusive ou mauvaise, y compris, mais non limitée à, utilisation sans refroidissement adéquat ou lubrification adéquate, utilisation avec des charges excessives, utilisation à des vitesses excessives, utilisation avec des composants du système de refroidissement ou d'intake endommagés, utilisation avec des carburants ou des huiles incorrects, utilisation avec des modifications non autorisées de l'engin. Komatsu n'est pas responsable des réparations, des arrêts ou des dépenses résultant de défaillances ou de dommages causés par des défaillances de l'engin. Komatsu n'est pas responsable des réparations, des arrêts ou des dépenses résultant de dommages causés par des défaillances de l'engin.

KOMATSU N'EST PAS RESPONSABLE DES INCIDENTS OU DOMMAGES CONSÉQUENTS

Cette garantie, ainsi que les garanties expresse, warranties and the sole warranties of Komatsu. **IL N'Y A AUCUNE AUTRE GARANTIE, EXPRESSE OU SOUS-ENTENDUE, MARC MARCHANDISE OU PROPRIÉTÉ À UNE UTILISATION PARTICULIÈRE.**

INFORMATION IMPORTANTE SUR LE MOTEUR
 SEE NOTE JE 57 COMBUSTION AIR BORNES MAJOR GARDES DE FEA JANGE EU
 MONTRETTIT DI LA CAL THINUTTCUHTI TSI MTTI TSI TAI TSI MONTRETTITTSI A GMI-
 TSI MTTI TSI MONTRETTITTSI TSI MONTRETTITTSI TSI MONTRETTITTSI TSI MONTRETTITTSI

AVERTISSEMENT
 DES BLESSES PEUVENT RESULTER DE LA SUITE
 HANNITITTSI TSI MONTRETTITTSI TSI MONTRETTITTSI TSI MONTRETTITTSI TSI MONTRETTITTSI
 ESSENTIELLES POUR LE
 A VOIE ET 570 APPLICATION

IMPORTANT ENGINE INFORMATION
 THIS ENGINE COMPAINS OVER 1000 HOURS OF OPERATION AND THE OPERATOR
 REGULATORY AGENCY FOR COMPLIANCE WITH THE EUROPEAN UNION
 THE 2010-2011 EMISSION LIMITS

WARNING
 FAILURE TO READ AND UNDERSTAND THESE WARNINGS MAY RESULT IN SERIOUS INJURY OR DEATH.
 PLEASE READ THESE WARNINGS FOR THE MODEL AND APPLICATION.

ENGINE SPEED	1500 RPM	1500 RPM
MAXIMUM FUEL INJECTION	1500 RPM	1500 RPM
MAXIMUM TORQUE	1500 RPM	1500 RPM
MAXIMUM POWER	1500 RPM	1500 RPM
MAXIMUM FUEL CONSUMPTION	1500 RPM	1500 RPM
MAXIMUM EXHAUST TEMPERATURE	1500 RPM	1500 RPM
MAXIMUM OIL TEMPERATURE	1500 RPM	1500 RPM
MAXIMUM COOLANT TEMPERATURE	1500 RPM	1500 RPM
MAXIMUM AIR INTAKE TEMPERATURE	1500 RPM	1500 RPM
MAXIMUM EXHAUST TEMPERATURE	1500 RPM	1500 RPM
MAXIMUM OIL TEMPERATURE	1500 RPM	1500 RPM
MAXIMUM COOLANT TEMPERATURE	1500 RPM	1500 RPM
MAXIMUM AIR INTAKE TEMPERATURE	1500 RPM	1500 RPM

COMPLIANCE WITH EUROPEAN EMISSION REGULATIONS

ENGINE DATASHEET - 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.



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



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



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

Example of safety message using signal word



When standing up from the operator's seat, always place the safety 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

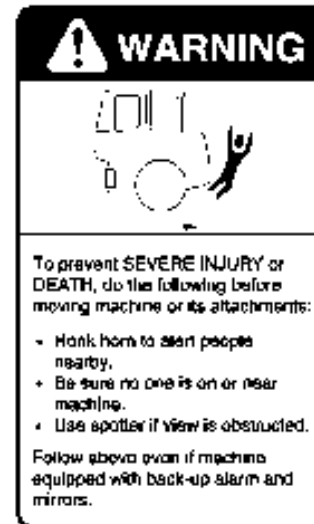
This word is used for information that is useful to know.

• Safety labels

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

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

Example of safety label using words



Safety labels using pictogram

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



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

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

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

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

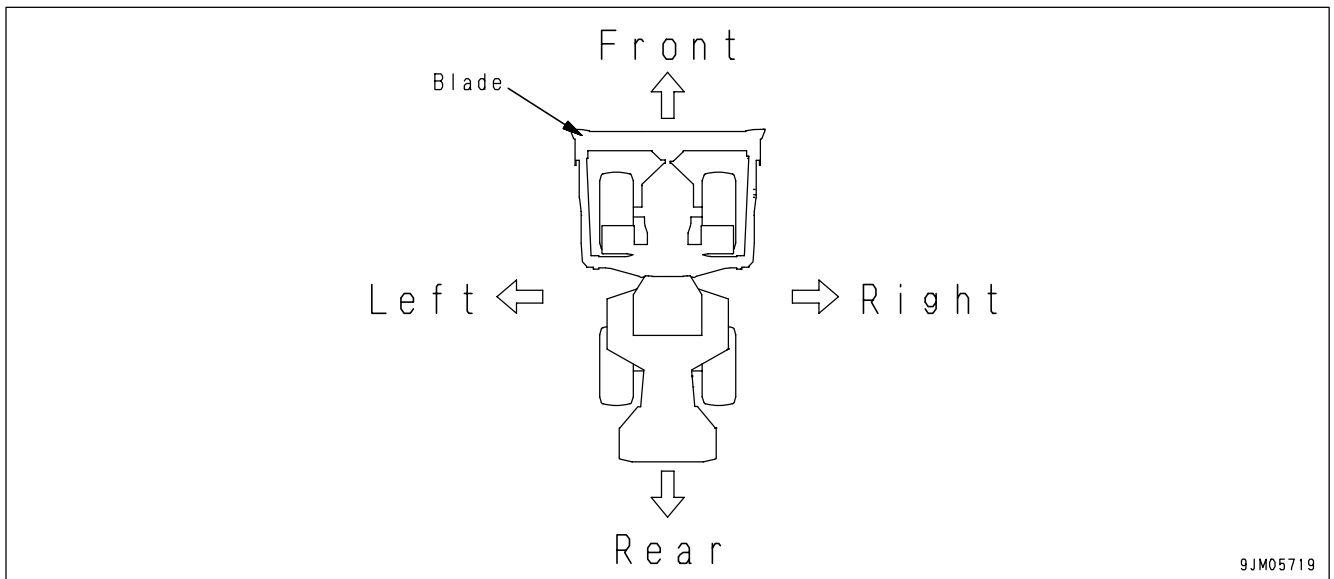
INTRODUCTION

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

- Ditching
- Smoothing
- Dozing
- Felling and uprooting

For details of the operating procedure, see "WORK POSSIBLE USING WHEEL DOZER (PAGE 3-66)".

FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE



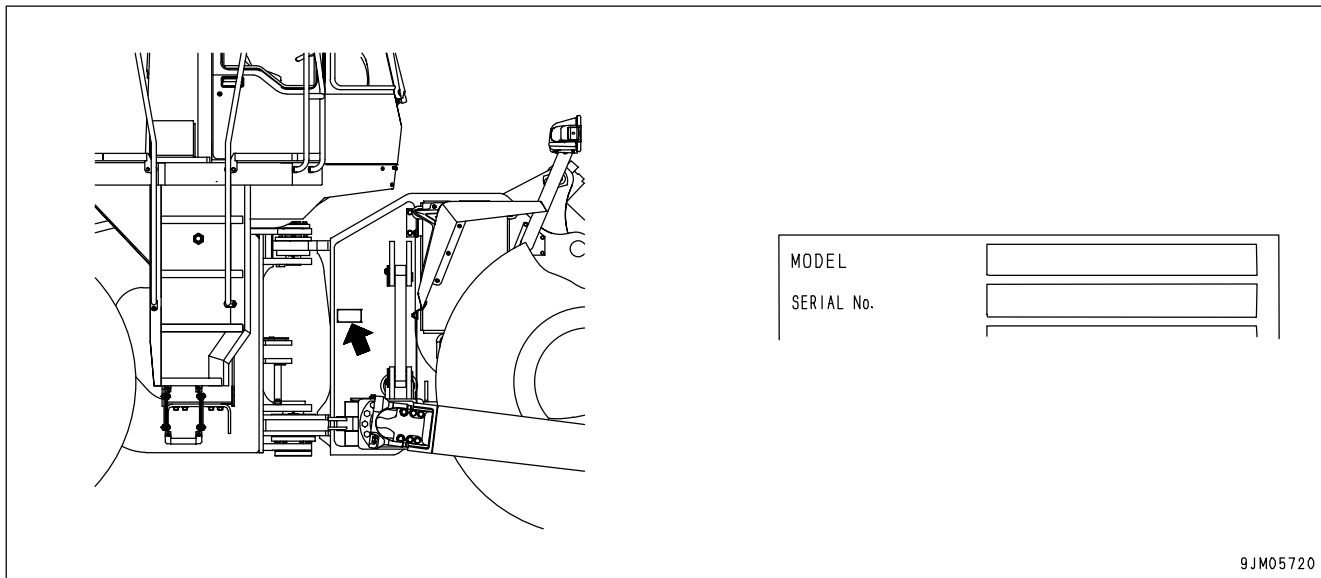
In this manual, the directions of the machine (front, rear, left, right) are determined according to the view from the operator's seat in the direction of travel (front) of the machine.

NECESSARY INFORMATION

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

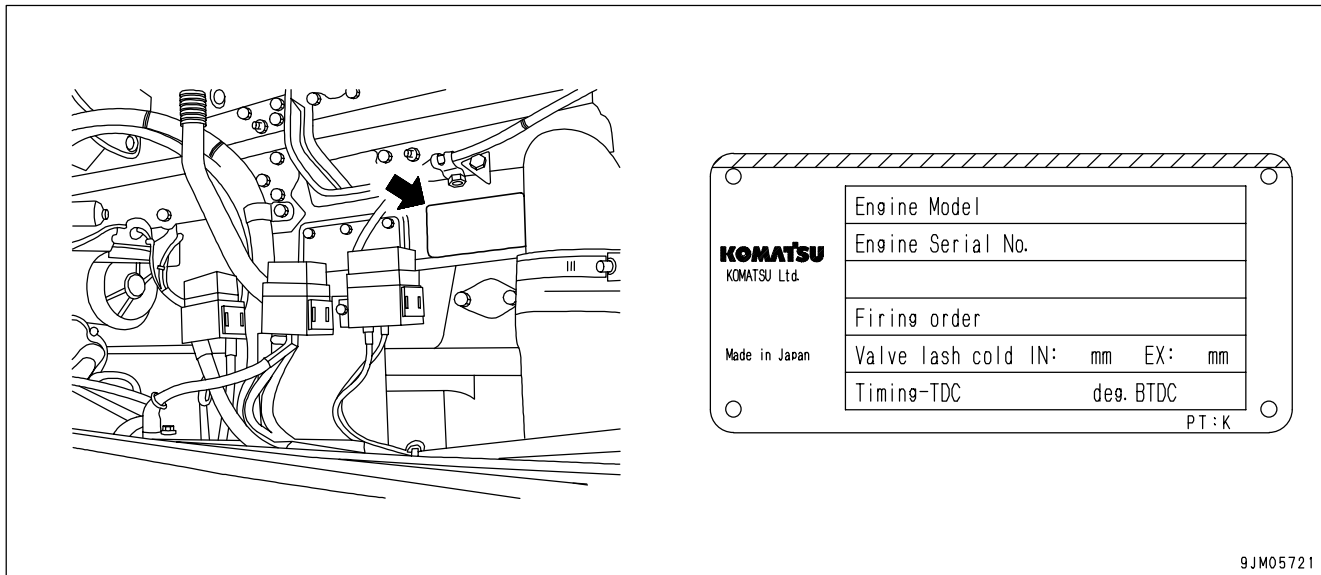
MACHINE SERIAL NO. PLATE AND POSITION

On the center right of the front frame.



ENGINE SERIAL NO. PLATE AND POSITION

On the upper left of the cylinder block, when seen from the fan side.



POSITION OF SERVICE METER

On the lower right of maintenance monitor.

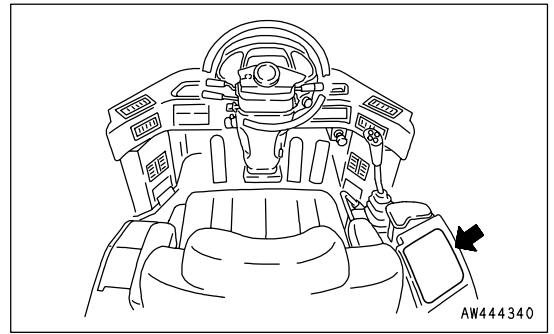


TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

Machine serial No.	
Engine serial No.	
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

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SAFETY LABELS

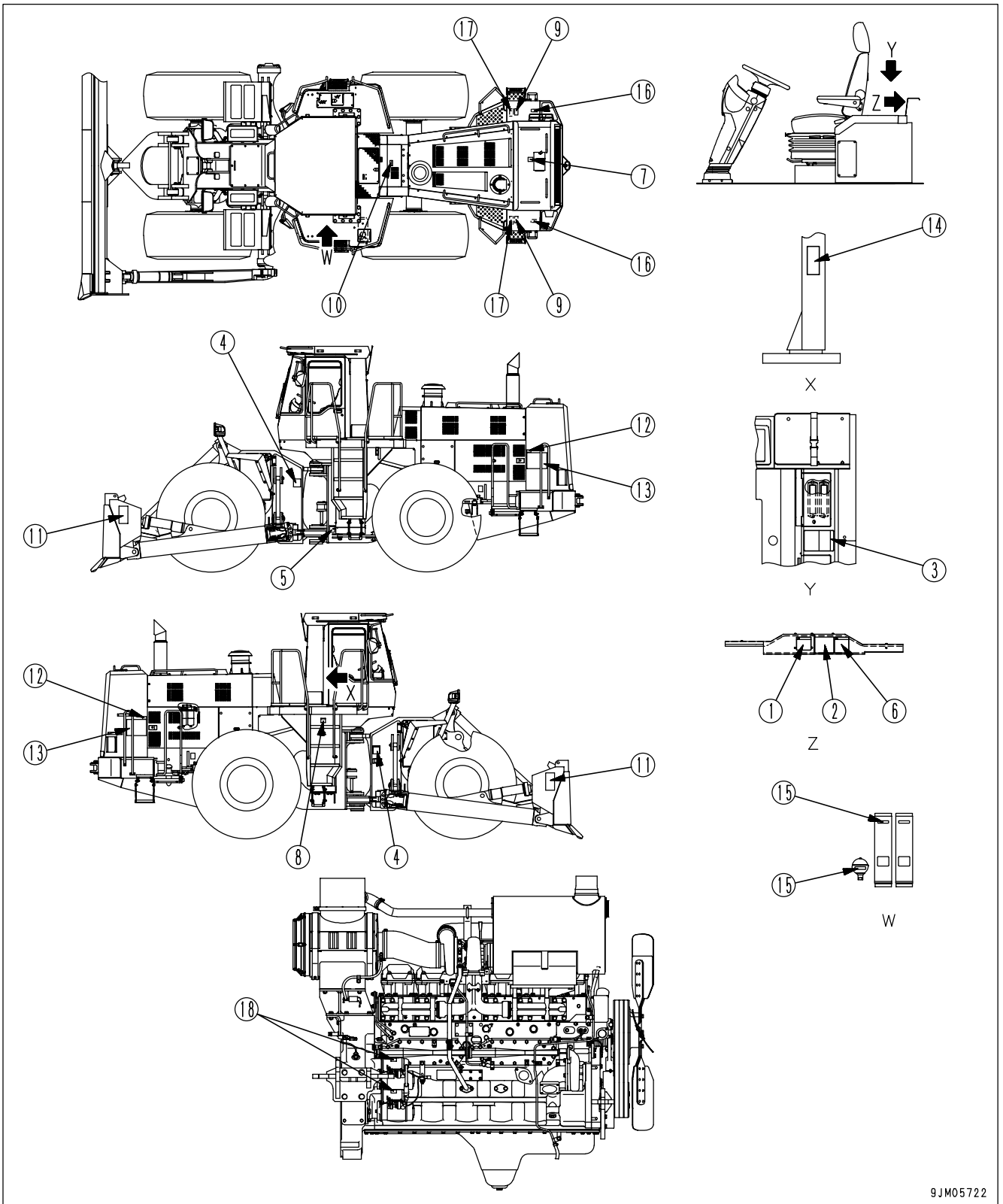
The following safety labels are used on this machine. Be sure that you fully understand the correct position and content of these safety labels.

To ensure that the content of these safety labels can be read properly, be sure that they are in the correct place and always keep them clean. When cleaning them, use soap and water. Do not use organic solvents or gasoline. These may cause the safety labels to peel off.

If the safety labels are damaged or lost, or cannot be read, replace them with new parts. For details of the part numbers, see this manual or check on the actual part, and order the new part from your Komatsu distributor.

There are also other labels in addition to the safety labels. Handle these labels in the same way.

LOCATION OF SAFETY LABELS



(1) Precautions for safety lock lever

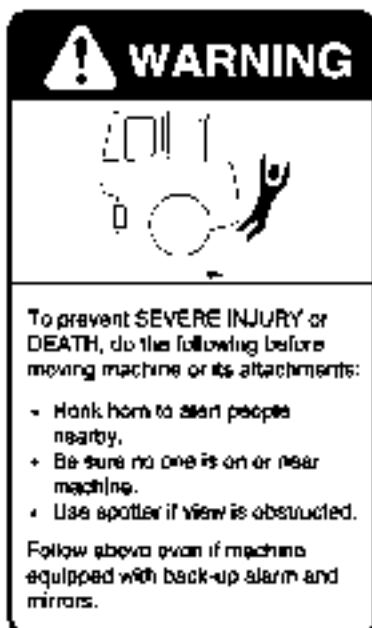


(2) Precautions for electric shock (09801-13001)

VOLTAGE		SAFE DISTANCE
LOW VOLTAGE	100V 200V	2 m
	6,600V	2 m
SPECIAL HIGH VOLTAGE	22,000V	3 m
	66,000V	4 m
	154,000V	5 m
	187,000V	8 m
	275,000V	7 m
	500,000V	11 m

09801-13001

(3) Precautions when traveling in reverse



(4) Do not enter



(5) Precautions for safety bar



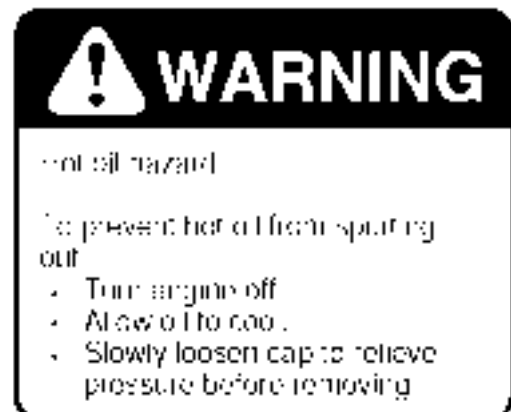
(6) Precautions before starting



(7) Precautions when coolant is at high temperature

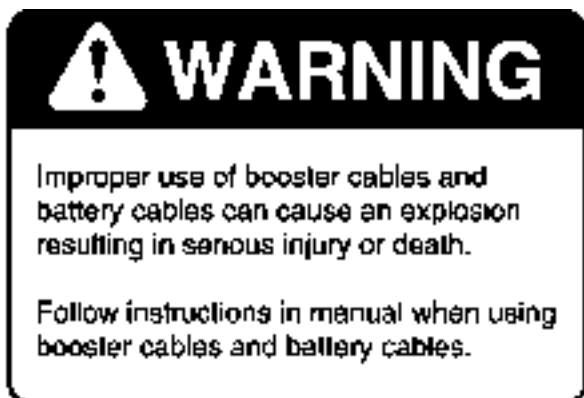


(8) Precautions when oil is at high temperature



(9) Precautions when handling battery cable

(10) Precautions to prohibit going up on the hood
(09805-13000)



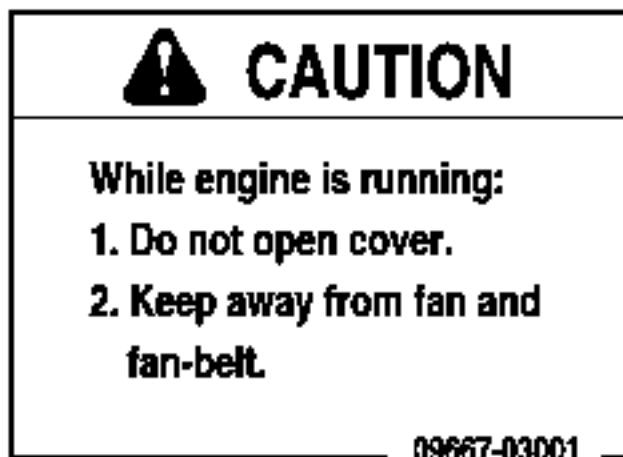
(11) Do not go under work equipment sign
(09807-C1683)

(12) Do not open when engine is running sign
(09667-03001)



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

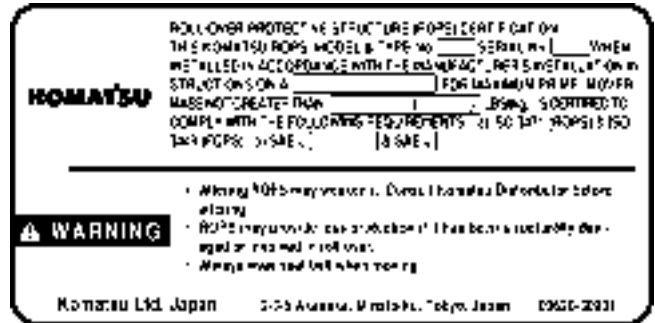
Keep away when the working device is raised.



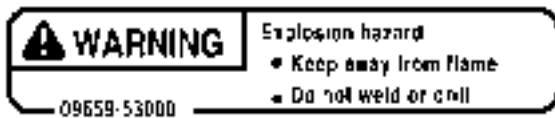
(13) Do not come near machine sign (09812-03000)



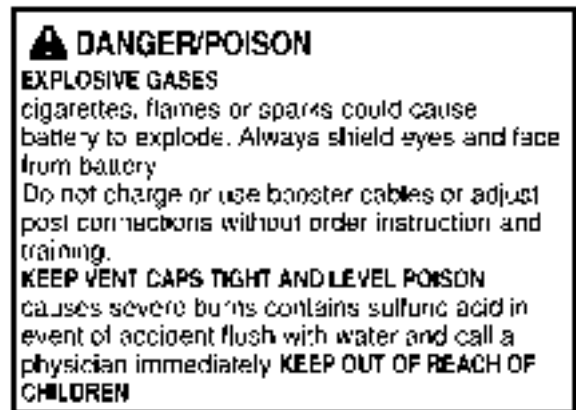
(14) Do not modify ROPS sign (09620-30201)



(15) High pressure warning
 (Precautions when handling accumulator)
 (09659-53000)



(16) Precautions when handling battery
 (09664-30000)



- (17) Precautions when handling battery
(This plate is stick on the machine by the battery maker.)



- (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.

Parts numbers for the safety labels (1), (3), (6): 41E-93-21160.

Parts numbers for the safety labels (4), (5), (7) to (9): 421-93-21311.

GENERAL PRECAUTIONS

SAFETY RULES

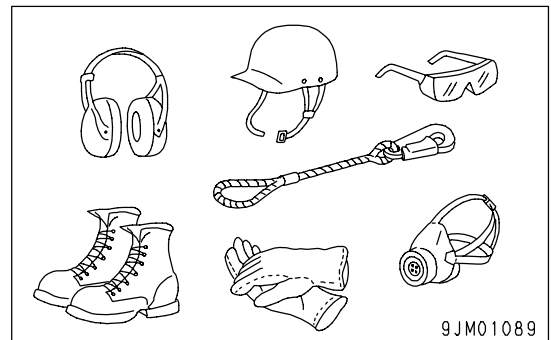
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine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

IF ABNORMALITIES ARE FOUND

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

CLOTHING AND PERSONAL PROTECTIVE ITEMS

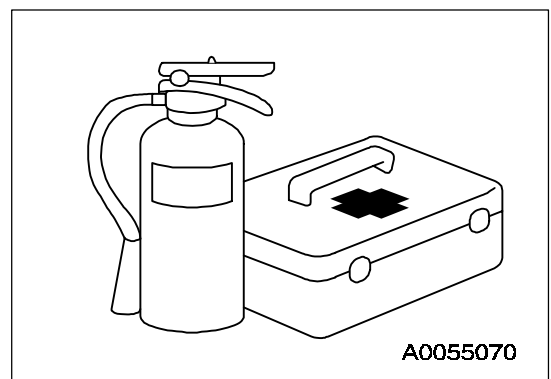
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get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



FIRE EXTINGUISHER AND FIRST AID KIT

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

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

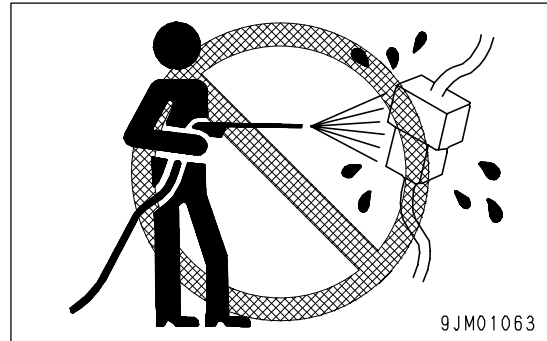


SAFETY FEATURES

- 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.

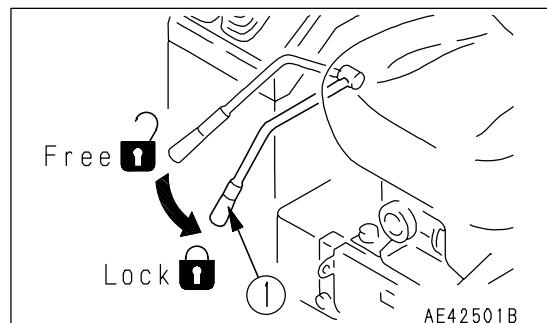
**INSIDE OPERATOR'S COMPARTMENT**

- 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 place parts and tools around the operator's seat.
- 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.

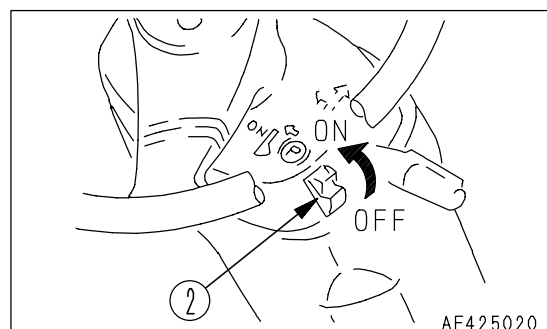
ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

- Before standing up from the operator's seat to adjust the operator's seat, always lower the work equipment, set safety lock lever (1) to the LOCK position and parking brake switch (2) to the ON position, then stop the engine.

If you accidentally touch the travel or swing lever when they are not locked. The work equipment may suddenly move and cause serious injury.



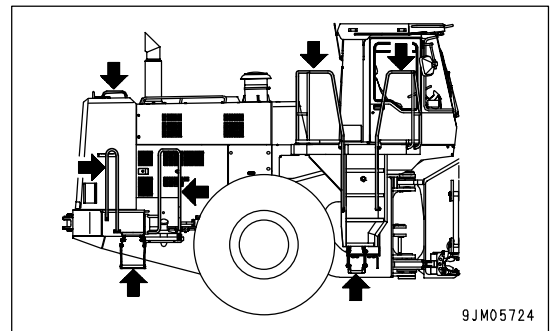
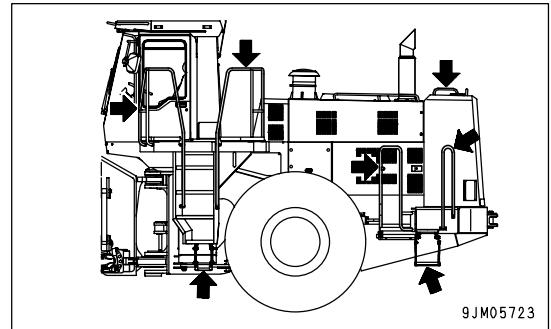
- When leaving the machine, always lower the work equipment to the ground, set safety lock lever (1) to the LOCK position and parking brake switch (2) to the ON position, then stop the engine. Lock all places and always take the key with you and leave it in the specified location.



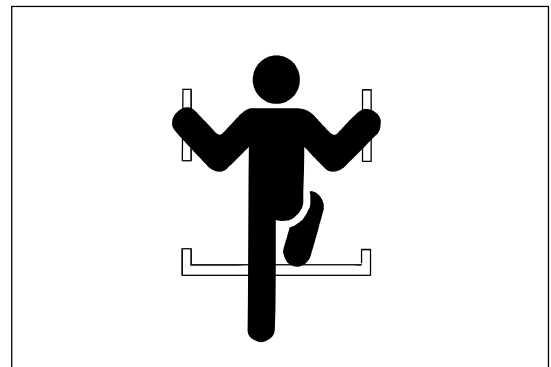
HANDRAILS AND STEPS

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 to ensure that you support yourself.
- When entering the cab, stand on the top step before opening the door.
- Do not grip the control levers when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- Never move from the step at the rear of the machine or the step at the side of the cab to stand on top of the tire.
- Before getting on or off the machine, check the handrails and steps, and if there is any oil, grease, or mud on them, wipe it off immediately. In addition, repair any damage and tighten any loose bolts.
- Do not get on or off the machine while holding tools in your hand.

**MOUNTING AND DISMOUNTING**

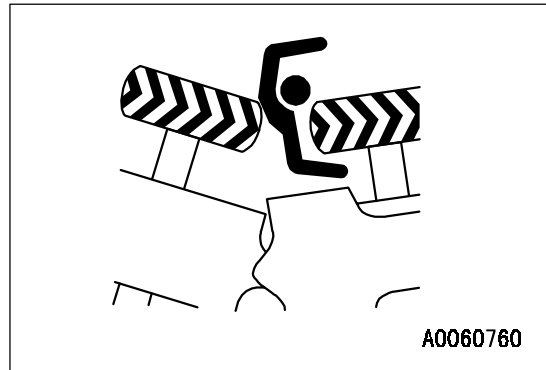
- Never jump on or off the machine. Never get on or off a moving machine.
- If the machine starts to move when there is no operator on the machine, do not jump on to the machine and try to stop it.

NO PEOPLE ON ATTACHMENTS

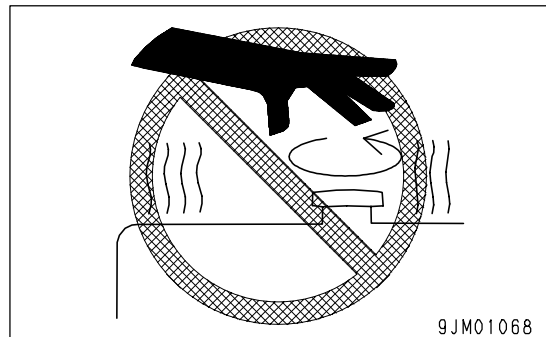
Never let anyone ride on the work equipment, or other attachments. There is a hazard of falling and suffering serious injury.

DO NOT GET CAUGHT IN ARTICULATED PORTION

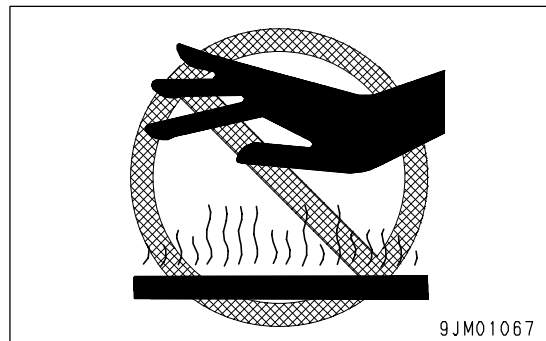
- If the clearance at the articulating portion changes, it will lead to serious personal injury.
Do not allow anyone to come inside the articulation range.
- The clearance in the area around the work equipment changes according to the movement of the link. If you get caught, it will lead to serious injury. Do not allow anyone near any of the rotating or telescoping parts.

**PREVENTION OF BURNS****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**• Fire caused by fuel or oil**

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

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

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

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

• Fire coming from electric wiring

Short circuits in the electrical system can cause fire.

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

• Fire coming from hydraulic line

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

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

• Explosion caused by lighting equipment

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

ACTION IF FIRE OCCURS

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

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

WINDOW WASHER LIQUID

Use an ethyl alcohol base washer liquid.

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

PRECAUTIONS WHEN USING ROPS (Roll Over Protective Structure)

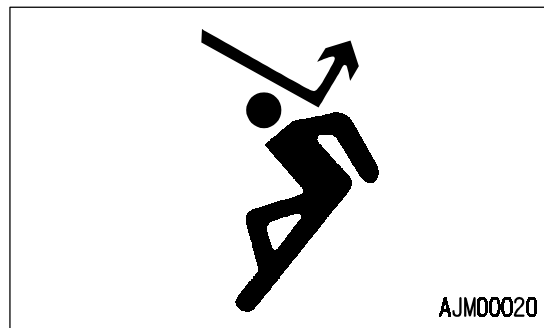
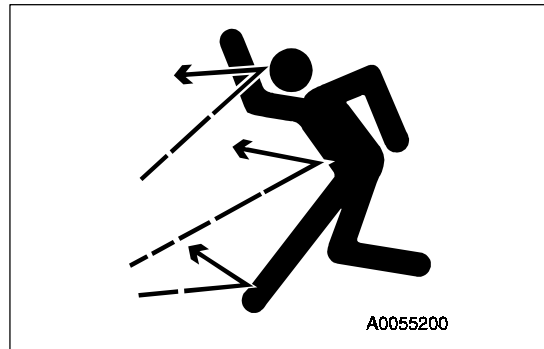
Install ROPS when working in places where there is danger of falling rocks, such as in mines and quarries, or in places where there is danger of rolling over.

- If ROPS is installed, do not remove it when operating the machine.
- ROPS is for protecting the operator when the machine is rolled over. It bears the load when the machine is rolled over and it absorbs the shock energy as well.

If the ROPS needs repair, or is altered, its strength can decrease. Consult with your Komatsu distributor when and if alteration or repair are necessary.

- If ROPS is damaged or deformed by falling objects or by rolling over, its strength will be reduced and it will not be able to fulfill its function properly. In such cases, always Komatsu contact your distributor for advice of the method of repair.

Even if ROPS is installed, always fasten your seat belt properly when operating the machine. If you do not use your fasten your seat belt properly, it cannot display its effect.

**PRECAUTIONS FOR ATTACHMENTS**

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

UNAUTHORIZED MODIFICATION

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

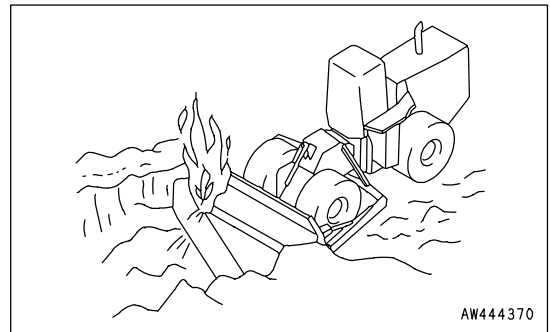
- Komatsu will not be responsible for any injuries, accidents, product failures or other property damages resulting from modifications made without authorization from Komatsu.

SAFETY AT WORKSITE

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

- When carrying out operations near combustible materials such as thatched roofs, dry leaves or dry grass, there is a hazard of fire, so be careful when operating.
- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation. Do not carry out operations at places where there is a hazard of landslides or falling rocks.

- If water lines, gas lines, or high-voltage electrical lines may be buried under the worksite, contact each utility and identify their locations. Be careful not to sever or damage any of these lines.
- Take necessary measures to prevent any unauthorized person from entering the operating area.
- In particular, if you need to operate on a road, protect pedestrian and cars by designating a person for worksite traffic duty or by installing fences around the worksite.
- 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.
- In order that travel operations can be carried out safely, always keep the roads on the jobsite properly maintained.



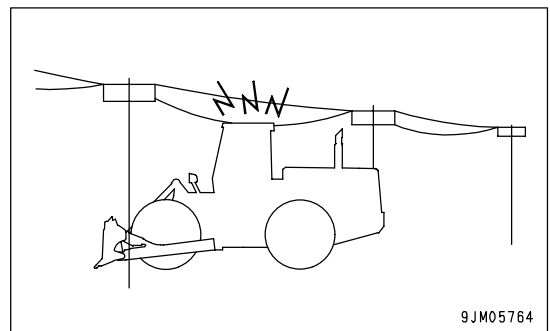
WORKING ON LOOSE GROUND

- 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.

DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES

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

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



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

Voltage of Cables	Safety Distance
100 V - 200 V	Over 2 m (7ft)
6,600 V	Over 2 m (7ft)
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)

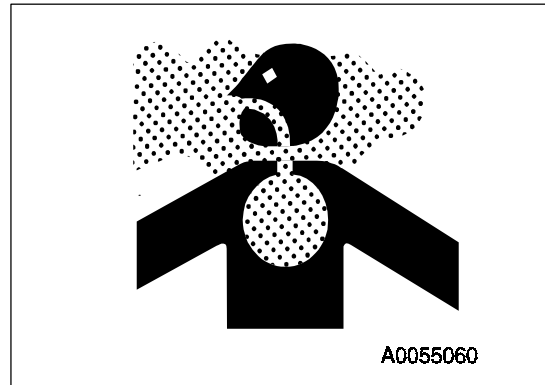
ENSURE GOOD VISIBILITY

- Check for any persons or obstacles in the area around the machine and check the conditions of the jobsite to ensure that operations and travel can be carried out safely. Always do as follows.
 - Position a signalman if there are areas at the rear of the machine where the visibility is not good.
 - When working in dark places, turn on the working lamp and front lamps installed to the machine, and set up additional lighting in the work area if necessary.
 - Stop operations if the visibility is poor, such as in mist, snow, rain, or dust.

PRECAUTIONS RELATED TO VENTILATION EXHAUST GAS

Engine exhaust gas includes substances that may harm your health or even kill. Always select a place with good ventilation when starting the engine or operating the machine.

If it is necessary to start the engine or run the machine inside a building or underground, where the ventilation is poor, take steps to remove the exhaust gas and bring in ample fresh air.

**CHECKING SIGNALMAN'S SIGNALS 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.

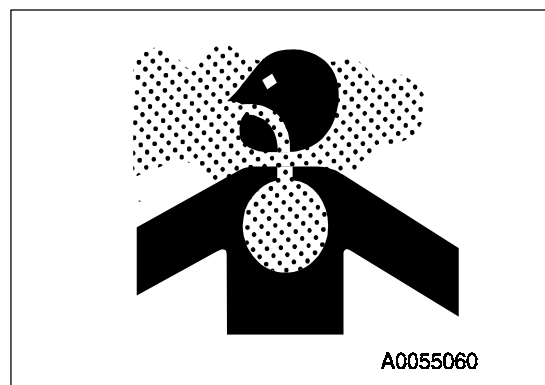
EMERGENCY EXIT FROM OPERATOR'S CAB

Machines equipped with a cab have doors on the left and right sides. If the door on the one side does not open, escape from the door on the other side.

VENTILATION FOR ENCLOSED AREAS

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.



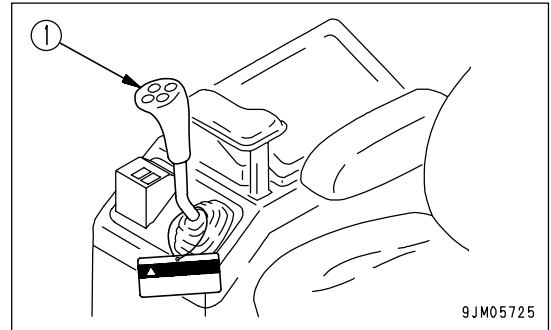
- Always observe the rules and regulations for the work site and environmental standards.

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

PRECAUTIONS FOR OPERATION

STARTING ENGINE

If there is a warning tag hanging from the blade control lever, do not start the engine or touch the levers (1).



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, working lamps, and rear combination lamp, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Check that there is no mud or dust accumulated around the movable parts of the accelerator pedal or brake pedal, and check that the pedals work properly.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the lights and working lamps, and check that the control levers are all at the neutral position.
- Before starting the engine, make sure that the safety lock lever is in the LOCK position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat. See "ADJUST REAR VIEW MIRROR (PAGE 3-50)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.

PRECAUTIONS WHEN STARTING

- When starting the engine, sound the horn as a warning.
- Start and operate the machine only while seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Do not short circuit the starting motor circuit to start the engine. Short circuit can cause fire.
- For machines equipped with a back-up alarm, check that the alarm works properly.

PRECAUTIONS IN COLD AREAS

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

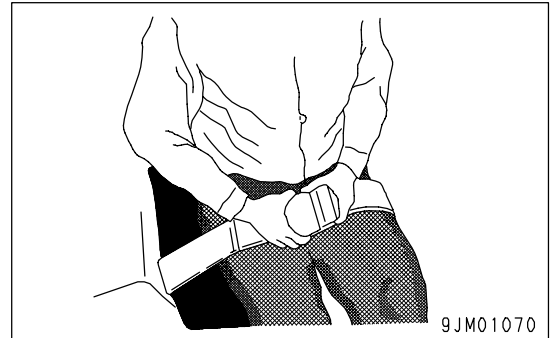
Before charging or starting the engine with a different power source, melt the battery electrolyte and check for frost and leakage of battery electrolyte before starting.

OPERATION

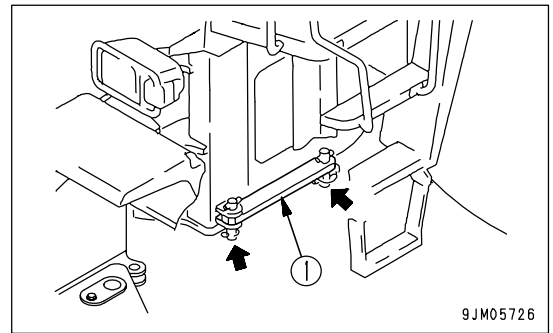
CHECKS BEFORE OPERATION

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 the operation of travel, steering and brake systems, and work equipment control system.
- Check for any abnormality in the sound of the machine, vibration, heat, smell, or gauges; check also that there is no leakage of oil or fuel.
- If any abnormality is found, carry out repairs immediately.



- Before driving the machine or starting operations, check that safety bar (1) is securely fixed at the FREE position.



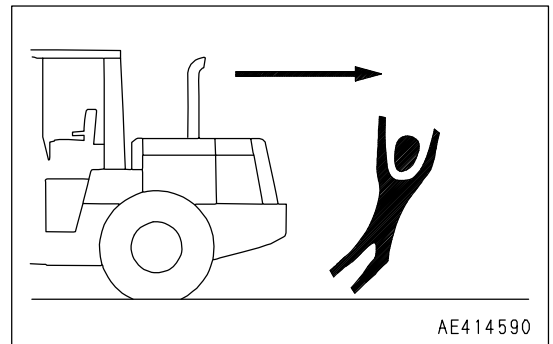
PRECAUTIONS WHEN TRAVELING IN FORWARD OR REVERSE

- Before travelling, check again that there is no one in the surrounding area, and that there are no obstacles.
- Before travelling, sound the horn to warn people in the area.
- Always operate the machine only when seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Check that the back-up alarm (alarm buzzer when machine travels in reverse) works properly.
- Always lock the door and windows of the operator's compartment in position (open or closed).

On jobsites where there is a hazard of flying objects or of objects entering the operator's compartment, check that the door and windows are securely closed.

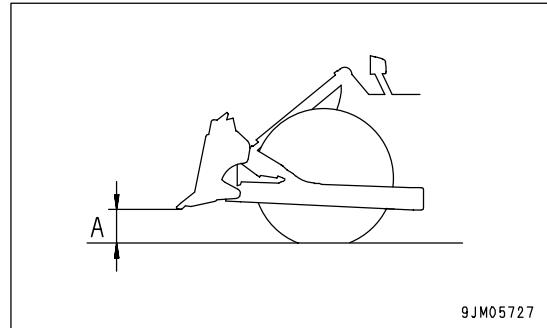
- If there is an area to the rear of the machine which cannot be seen, position a signal person. Take special care not to hit other machines or people when turning or swinging the machine.

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



PRECAUTIONS WHEN TRAVELING

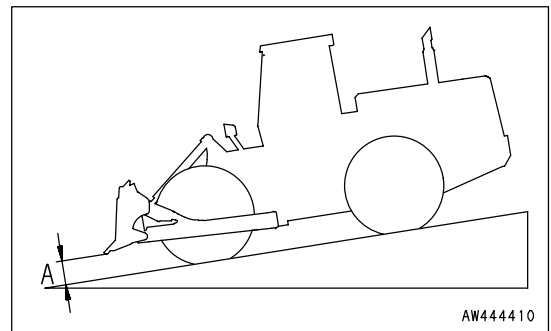
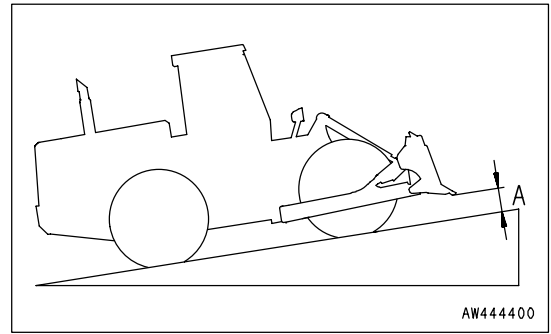
- Never turn the key in the starting switch to the OFF position. It is dangerous if the engine stops when the machine is traveling, because the steering becomes heavy. If the engine stops, depress the brake pedal immediately to stop the machine.
- When traveling on level ground, keep the work equipment at height "A" of 50 to 60 cm (20 to 24 in) from the ground. If the work equipment control levers have to be operated, stop the machine first, then operate the levers.
- 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.
- 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 mass 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.
- Always obey the traffic regulations when traveling on public roads. This machine travels at a lower speed than normal automobiles, so keep to the side of the road and be careful to leave the center of the road free for other vehicles.
- If you drive the machine at high speed continuously for a long time, the tires will overheat and the internal pressure will become abnormally high. This may cause the tires to burst. If a tire bursts, it produces an extremely large destructive force, and this may cause serious injury or accident.
If you are going to travel continuously, please consult your Komatsu distributor.



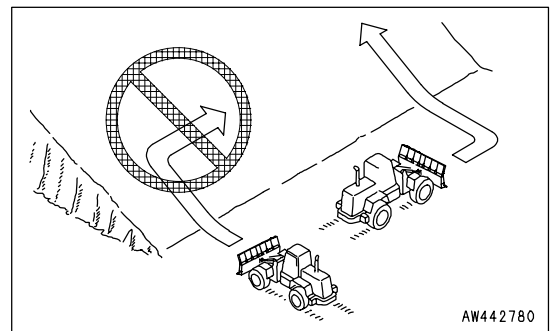
TRAVELING ON SLOPES

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

- When traveling on slopes, keep the work equipment at height "A" of approximately 50 to 60 cm (20 to 24 in) above the ground. In case of emergency, quickly lower the work equipment to the ground to help the machine to stop.



- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.



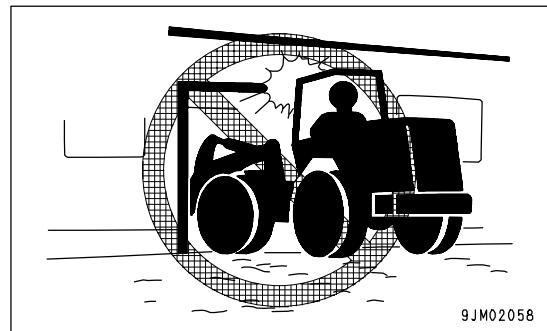
- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- If the engine stops, depress the brake pedal immediately, lower the blade to the ground, and apply the parking brake to stop the machine.
- When traveling downhill, never shift gear or place the transmission at neutral. It is dangerous not to use the braking force of the engine. Always place the transmission in a low gear before starting to travel downhill.
- When traveling downhill, travel slowly. If necessary, use the braking force of the engine together with the brake pedal to control the travel speed.

PROHIBITED OPERATIONS

- It is dangerous to use the blade for crane operations, so do not carry out such operations.

PRECAUTIONS WHEN OPERATING

- When using the machine, to prevent accidents resulting from damage to the work equipment caused by overloading, do not exceed the maximum permitted load or performance determined by the structure of the machine.
- If the engine cannot be started again after it has stopped, immediately operate the work equipment control levers to lower the work equipment to the ground. (After the engine stops, the accumulator allows the work equipment to be operated for a limited time.)
- Be careful not to approach too close to the edge of cliffs. When making embankments or landfills, or when dropping soil over a cliff, dump one pile, then use the next pile of soil to push the first pile.
- The load suddenly becomes lighter when the soil is pushed over a cliff or when the machine reaches the top of a slope. When this happens, there is danger that the travel speed will suddenly increase, so be sure to reduce the speed.
- When operating in tunnels, under bridges, under electric wires, or when entering buildings, or operating in other places where the height is limited, be extremely careful not to let the cab hit anything.
- To prevent accidents caused by hitting other objects, always operate the machine at a speed which is safe for operation, particular in confined spaces, indoors, and in places where there are other machines.



METHODS OF USING BRAKE

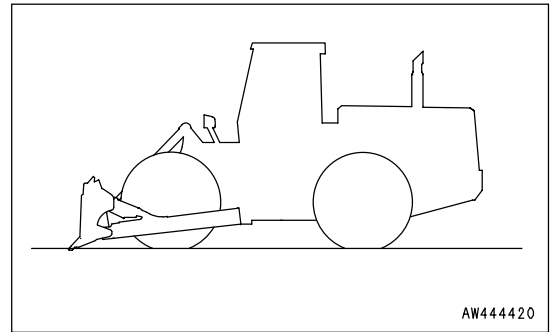
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary.
- When traveling downhill,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

OPERATE CAREFULLY ON SNOW

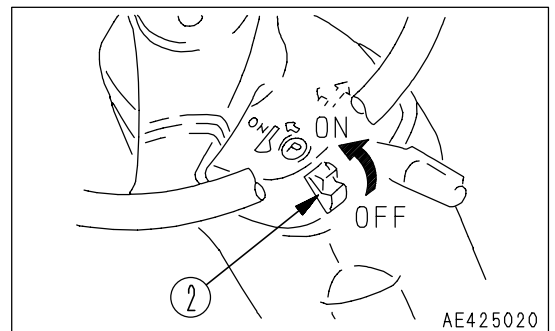
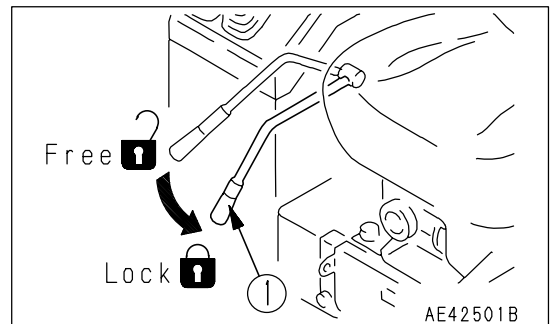
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes 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.
- When traveling on snow-covered roads, always fit tire chains.
- When traveling on snow-covered slopes, never apply the foot brake suddenly. Reduce the speed and use the engine as a brake while applying the foot brake intermittently (depress the brake intermittently several times). If necessary, lower the blade to the ground to stop the machine.

PARKING MACHINE

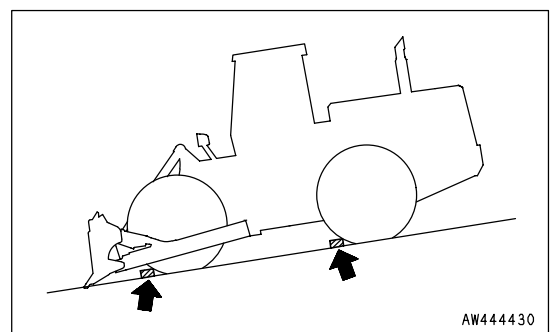
- Park the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground.



- When leaving the machine, set safety lock lever (1) to the LOCK position and parking brake switch (2) to the ON position, and stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from moving the machine. Always remove the key, take it with you, and leave it in the specified place.



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



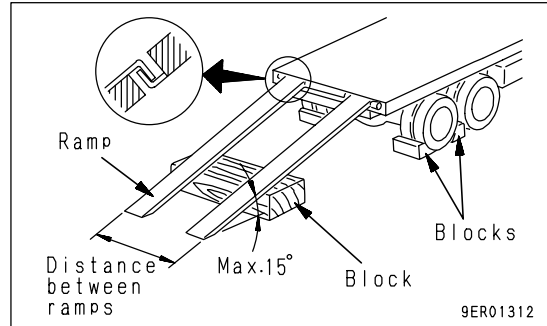
TRANSPORTATION

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

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.
- 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.
- Run the engine at low speed and travel slowly.
- Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- For machines equipped with a cab, always lock the door after boarding the machine. If this is not done, the door may suddenly open during transportation. Refer to "TRANSPORTATION (PAGE 3-72)".



SHIPPING

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

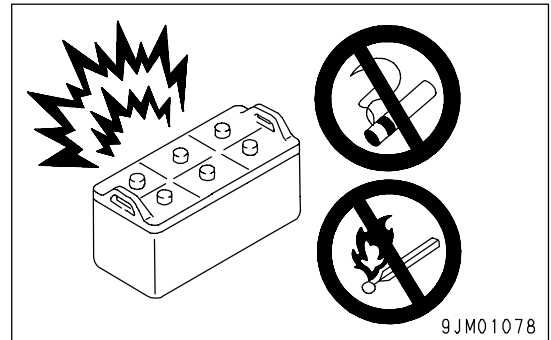
- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- Lock the frame with the safety bar to prevent the machine from articulating.
- For details of the shipping procedure, see "TRANSPORTATION (PAGE 3-72)" in the OPERATION section.

BATTERY

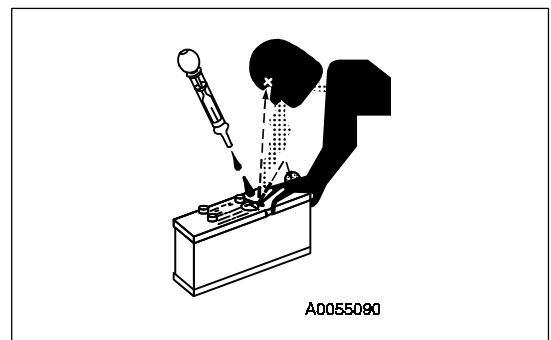
BATTERY HAZARD PREVENTION

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

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



- If you spill acid on your clothes or skin, immediately flush the area with large 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.

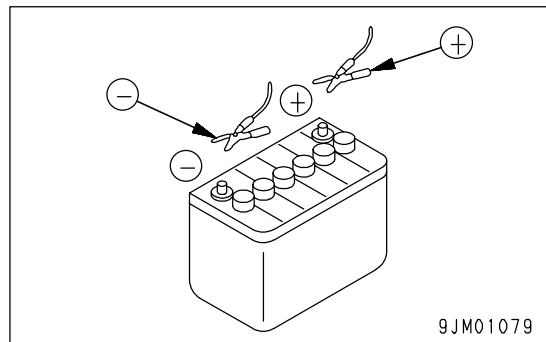
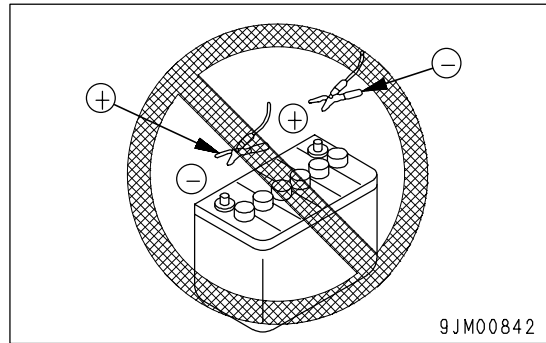
As there is a hazard that sparks will be generated, always do as follows.

- 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.
- Always disconnect the negative (-) terminal (ground side) first when removing the battery; when installing the battery, connect the positive (+) terminal first, and connect the ground last.
- Attach the battery terminal 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 WITH BOOSTER CABLES

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

- When starting with a booster cable, carry out the starting operation with two workers (one worker sitting in the operator's seat and the other working with the battery).
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the booster cables. Disconnect the negative (-) cable (ground side) first when removing them.
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.
- Always wear safety goggles and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- For details of the starting procedure when using booster cables, see "STARTING ENGINE WITH BOOSTER CABLE (PAGE 3-83)" in the OPERATION section.

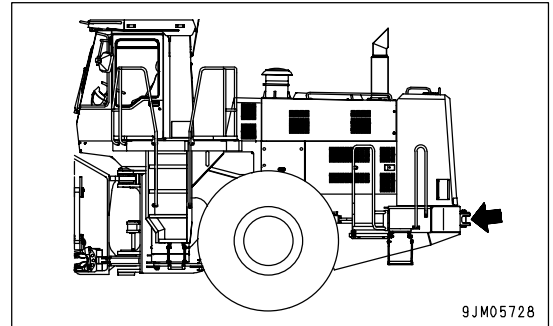


TOWING

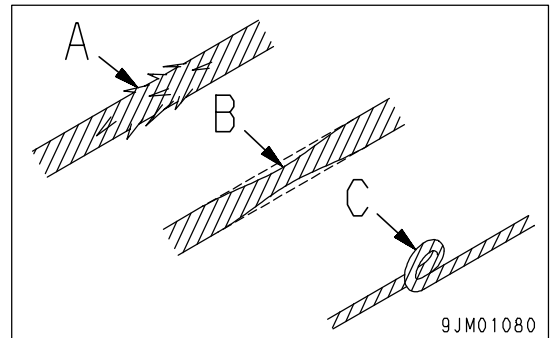
Serious injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection or inspection of the wire rope.

For towing, see "TOWING THE MACHINE (PAGE 3-79)".

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



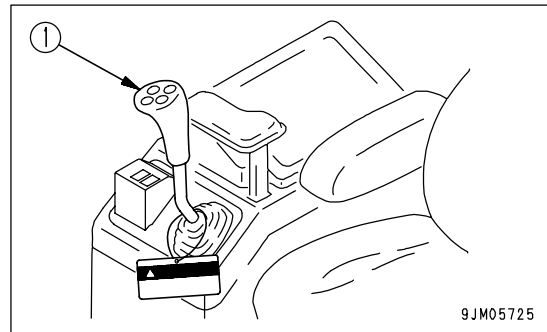
- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.



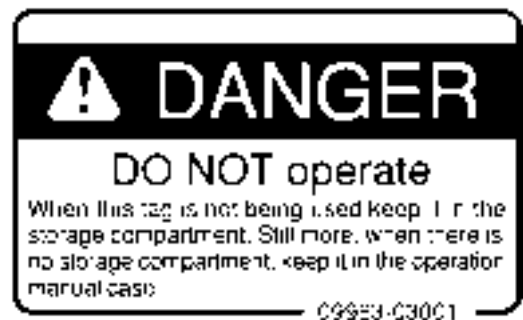
PRECAUTIONS FOR MAINTENANCE

WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to blade control lever (1) in the operator's cab to alert others that you are performing service of 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 not the tool box, keep the tag in the operation manual pocket.



- If others start the engine, or touch or operate the work equipment control lever while you are performing service or maintenance, you could suffer serious injury or property damage.

KEEP WORK PLACE CLEAN AND TIDY

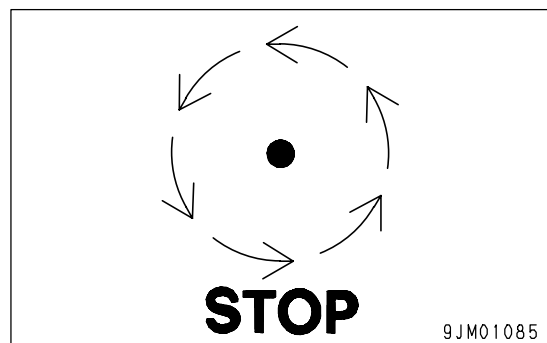
Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely. If the work place is not kept clean and tidy, there is the danger that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

APPOINT LEADER WHEN WORKING WITH OTHERS

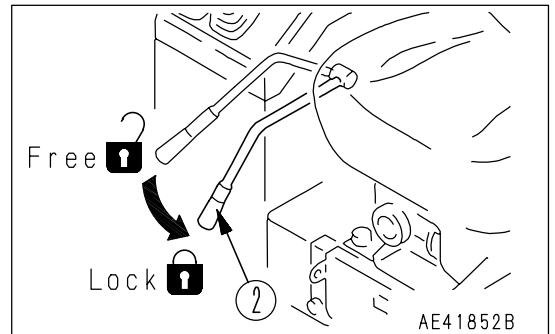
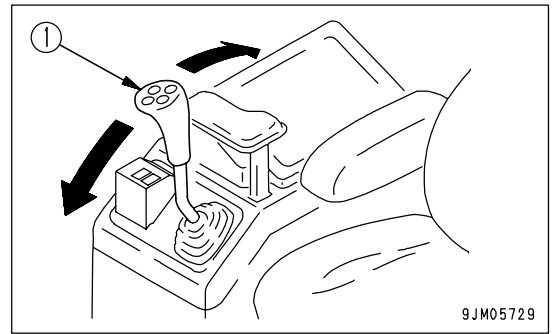
When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.
When working with others, misunderstandings between workers can lead to serious accidents.

MAINTENANCE WITH ENGINE RUNNING

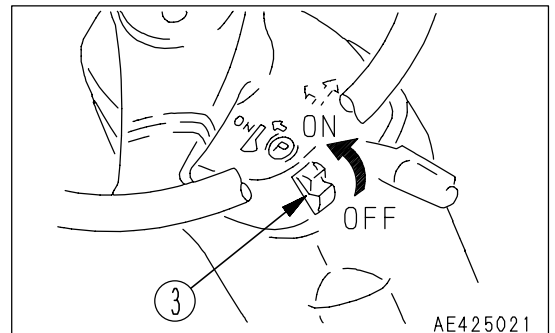
- Stop the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground and stop the engine.



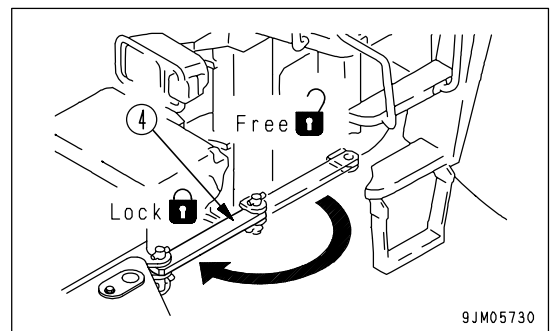
- After stopping the engine, operate blade control lever (1) 2 to 3 times fully to the RAISE and LOWER positions to release the pressure inside the hydraulic circuit, then set safety lock lever (2) to the LOCK position.



- Turn parking brake switch (3) to the ON position to apply the parking brake, then put blocks under the front and rear of the tires.



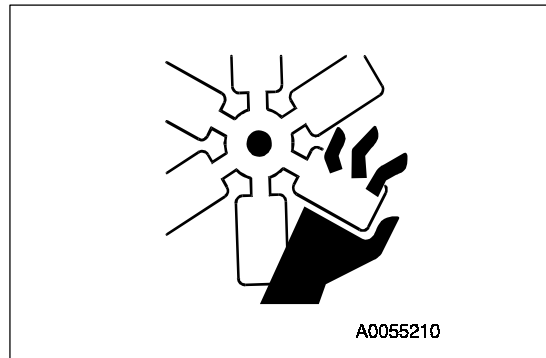
- Lock the frame with safety bar (4) to prevent the machine from articulating.



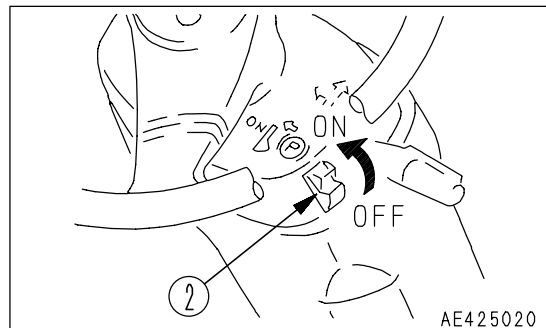
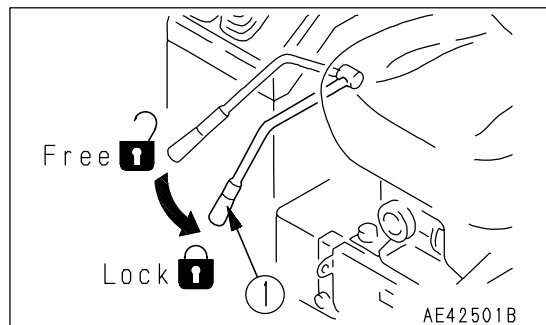
TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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.
- Never drop or insert tools or other objects into the fan or fan belt. Parts may break or be sent flying.
- 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.

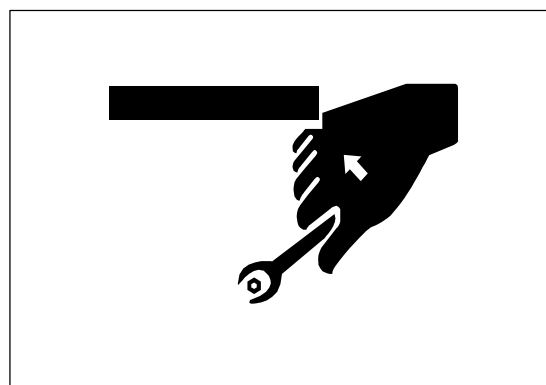


- Set safety lock lever (1) to the LOCK position to prevent the work equipment from moving.
Turn parking brake switch (2) to the ON position to apply the parking brake.
- Do not touch any control levers. If any control lever must be operated, give a signal to the other workers to warn them to move to 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.



WORK EQUIPMENT SUPPORT

- When carrying out inspection and maintenance with the work equipment raised, or if it is necessary to go under the machine, use strong supports that can fully withstand the weight of the machine or work equipment, and be sure to fix the stands in position securely.

**ACCUMULATOR**

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

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



Please contact your Komatsu distributor to have this work performed.

PERSONNEL

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

ATTACHMENTS

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

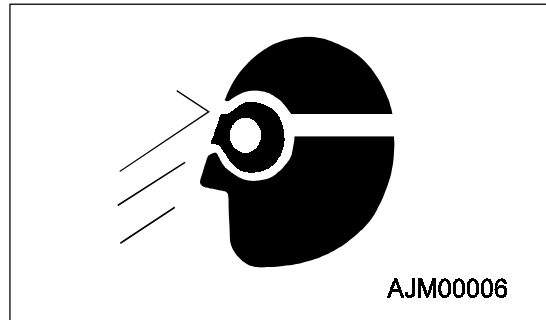
**NOISE**

If the noise from the machine is too loud, it may cause temporary or permanent hearing problems. When carrying out maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.

PRECAUTIONS 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, cutting edges, or bearings are hit with a hammer, there is a hazard that pieces might be scattered and cause injury. Always wear safety goggles and gloves.
- If pins are hit with a hammer, there is a hazard that the metal particles may fly out and injure people in the surrounding area. Always make sure that no-one is in the surrounding area before using the hammer.
- There is a hazard that the pin hit with strong force may fly out and injure people in the surrounding area.



REPAIR WELDING

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 TERMINAL

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

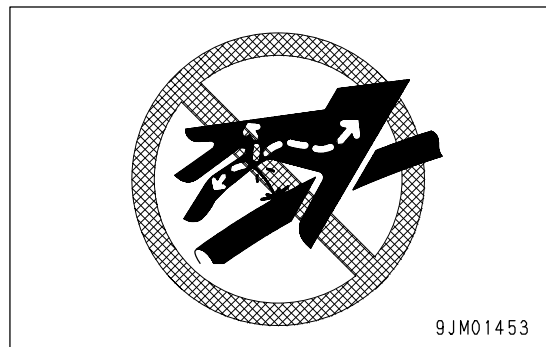
PRECAUTIONS WITH HIGH-PRESSURE OIL

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.

- When carrying out inspection and maintenance of the pressure, release the pressure before starting. For details, see "MAINTENANCE WITH ENGINE RUNNING (PAGE 2-30)". Do not carry out inspection or replacement work with the circuit under pressure.
- If there is any leakage from the piping or hoses, the surrounding area will be wet, so check for cracks in the piping and hoses and for swelling in the hoses.

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

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



HANDLING HIGH-PRESSURE HOSES

If oil or fuel leaks from high-pressure hoses, there is danger that it may cause fire or defective operation, which may lead to serious injury or fire. If there are any loose hoses or piping, or any leakage of oil or fuel from the hose or piping mount, stop operation and tighten to the specified torque.

If any hoses or pipes are damaged or deformed, please contact your Komatsu distributor.

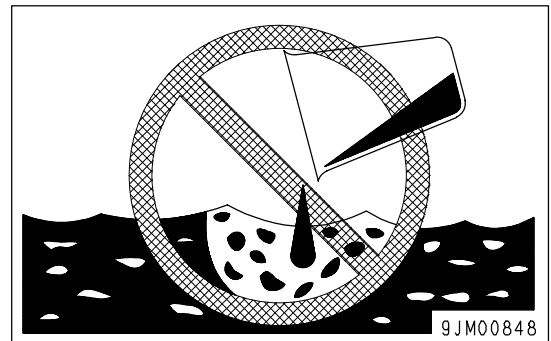
Replace the hose if any of the following problems are found.

- 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.

**MAINTENANCE OF AIR CONDITIONER**

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 goggles, dust mask, gloves, and other protective equipment.

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

- In order for the machine to be operated safely for a long time, it is necessary to add oil and to carry out service and maintenance at periodic intervals. In order to further increase safety, components with a strong relationship to safety, such as hoses and seat belts, must be replaced at periodic intervals.

Replacement of safety-critical parts: See "PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (PAGE 4-13)".

- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety-critical parts if any defect is found, even when they have not reached the time specified interval.

PRECAUTIONS WITH TIRES

HANDLING TIRES

If tires or rims are handled mistakenly, there is danger that the tire may explode or be damaged, or that the rim may fly off and cause serious injury or death.

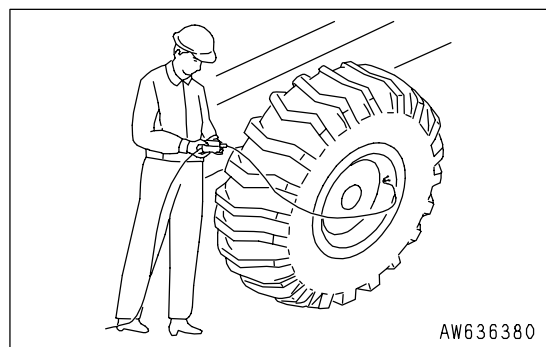
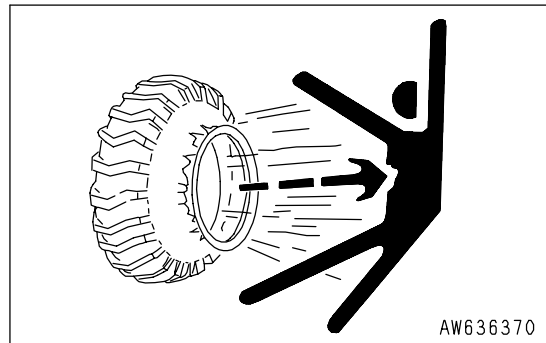
To maintain safety, always do as follows.

- Maintenance, disassembly, repair, and assembly of the tires and rims requires special equipment and special technology, so always ask your Komatsu distributor to carry out these operations.
- Always use the tires specified by Komatsu and maintain the specified inflation pressure.

Suitable tire inflation pressure: see "HANDLING THE TIRES (PAGE 3-70)"

- When pumping up the tires, check that no other person is standing near the tire, and install an air chuck with a clip that can be secured to the air valve.
To prevent the tire inflation pressure from becoming too high, measure the pressure from time to time with an air gauge while pumping up the tire.
- If the tire pressure goes down abnormally or the rim parts do not fit the tire, there is a problem with the tire or rim parts. Always contact your Komatsu distributor for repairs.

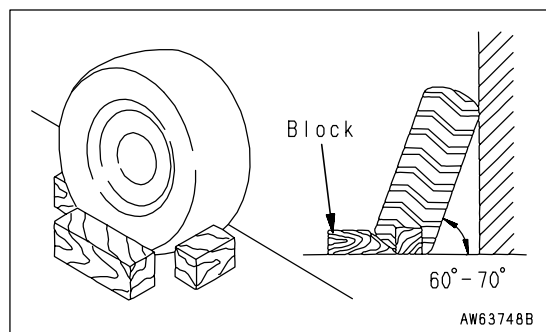
- If the rim parts are not fitted properly when the tire is being pumped up, there is danger that the rim parts may fly off, so set up a protective fence around the tire, and do not stand directly in front of the rim. Stand beside the tread when pumping up the tire.
- Do not adjust the tire inflation pressure immediately after traveling at high speed or carrying out operations under heavy load.
- Never carry out welding or light a fire near the tire.



PRECAUTIONS WHEN STORING TIRES

Tires for construction equipment are extremely heavy, so they may cause serious personal injury.

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



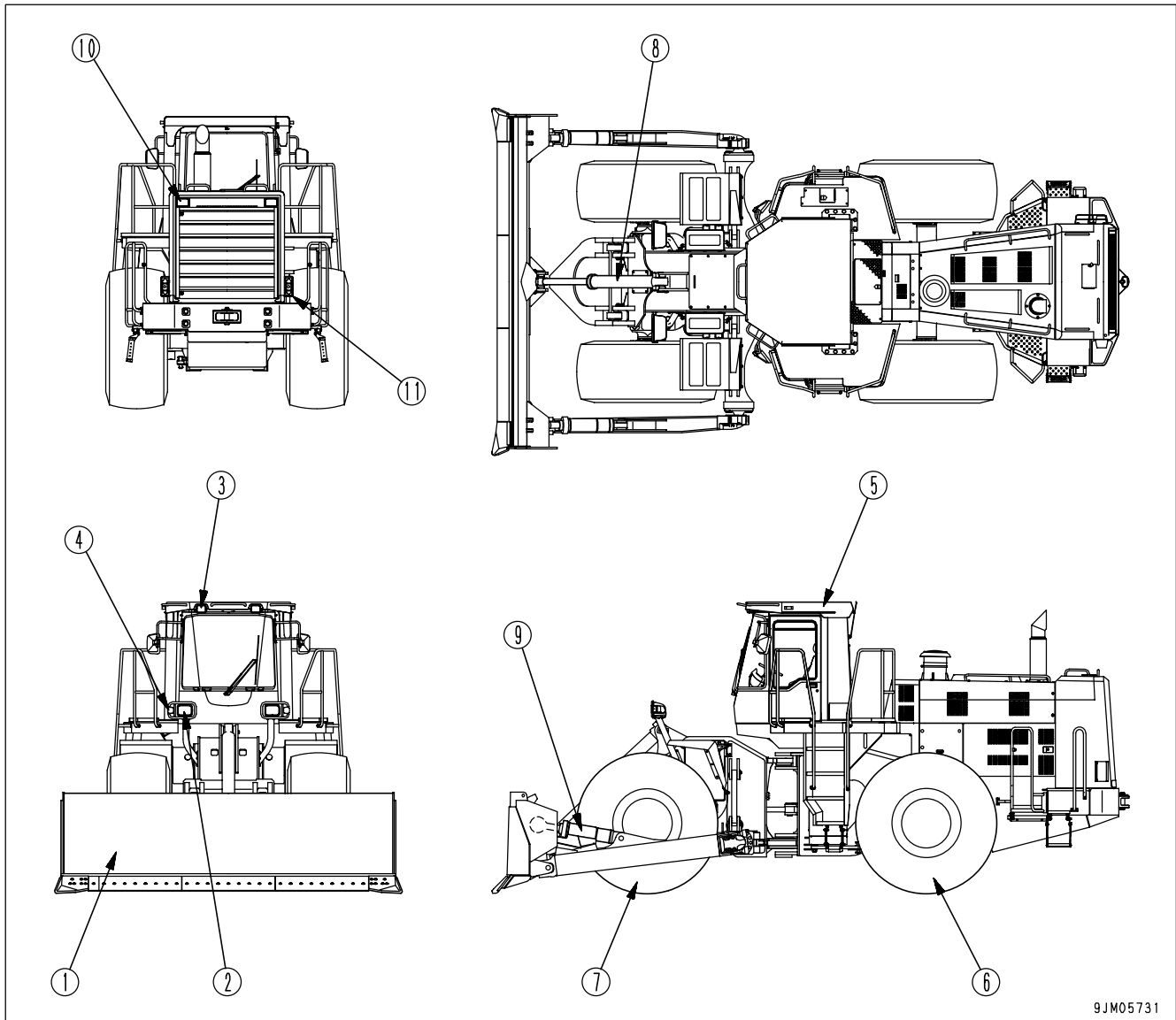
OPERATION

WARNING

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

GENERAL VIEW

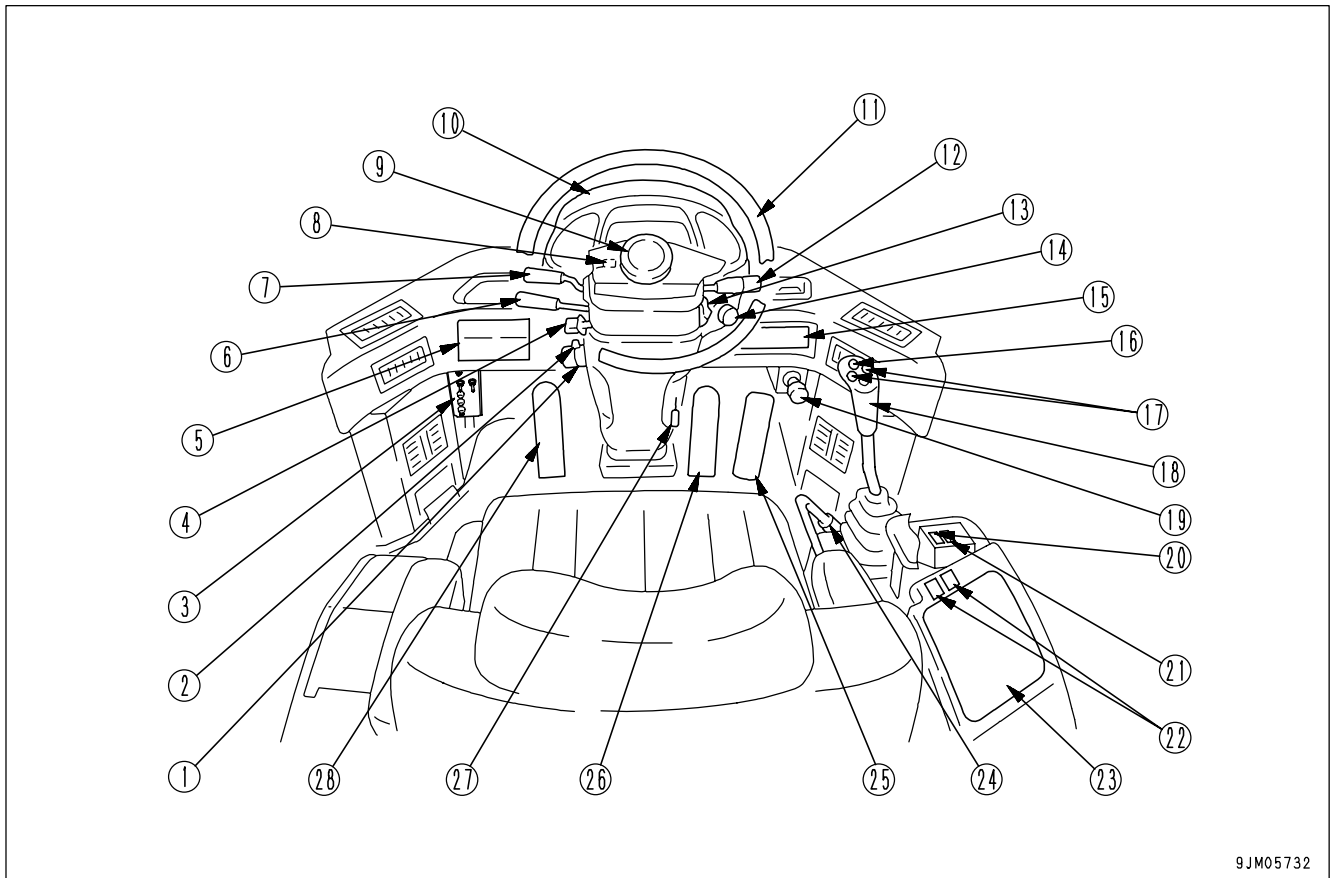
GENERAL VIEW OF MACHINE



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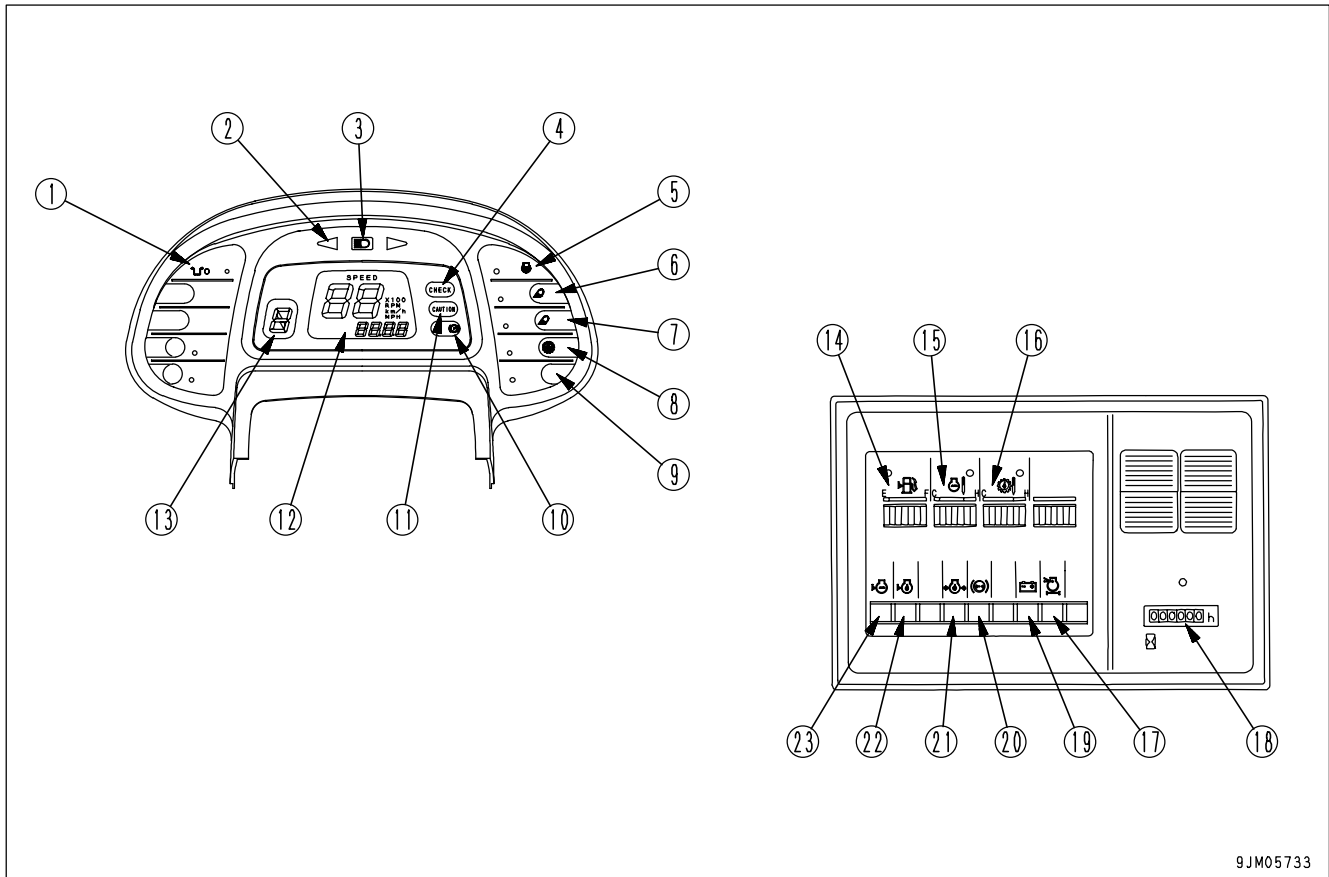
- (1) Blade
- (2) Head lamp
- (3) Front working lamp
- (4) Turn signal lamp
- (5) ROPS
- (6) Rear wheel
- (7) Front wheel
- (8) Lift cylinder
- (9) Tilt/pitch cylinder
- (10) Rear working lamp
- (11) Rear combination lamp

GENERAL VIEW OF CONTROLS AND GAUGES



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- | | |
|---|---|
| (1) Front wiper switch | (14) Starting switch |
| (2) Rear wiper switch | (15) Car radio (if equipped) |
| (3) Engine troubleshooting lamp | (16) Kickdown switch |
| (4) Gearshift lever stopper | (17) Tilt or pitch switch |
| (5) Air conditioner panel (if equipped) | (18) Blade control lever |
| (6) Gearshift lever | (19) Cigarette lighter |
| (7) Directional lever | (20) RPM set idle up-down selector switch |
| (8) Hazard lamp | (21) RPM set on-off switch |
| (9) Horn switch | (22) Power window switch |
| (10) Main monitor | (23) Maintenance monitor |
| (11) Steering wheel | (24) Safety lock lever |
| (12) Lamp switch | (25) Accelerator pedal |
| (12) Turn signal lever | (26) Brake pedal |
| (12) Dimmer switch | (27) Steering column tilt lever |
| (13) Parking brake switch | (28) Brake pedal |



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MAIN MONITOR

- (1) Emergency steering pilot lamp (if equipped)
- (2) Turn signal pilot lamp
- (3) High beam pilot lamp
- (4) Central check lamp
- (5) Preheating pilot lamp
- (6) Front working lamp (switch, pilot lamp)
- (7) Rear working lamp (switch, pilot lamp)
- (8) Transmission cut-off (switch, pilot lamp)
- (9) Transmission auto-shift/manual selector (switch, pilot lamp) (if equipped)
- (10) Parking brake pilot lamp
- (11) Central caution lamp
- (12) Speedometer
- (13) Transmission shift indicator

MAINTENACNE MONITOR

- (14) Fuel gauge
- (15) Engine water cooling temperature gauge
- (16) Torque converter oil temperature gauge
- (17) Air cleaner clogging caution pilot lamp
- (18) Service meter
- (19) Battery charge caution pilot lamp
- (20) Brake oil pressure caution pilot lamp
- (21) Engine oil pressure caution pilot lamp
- (22) Engine oil level caution pilot lamp
- (23) Engine water level caution pilot lamp

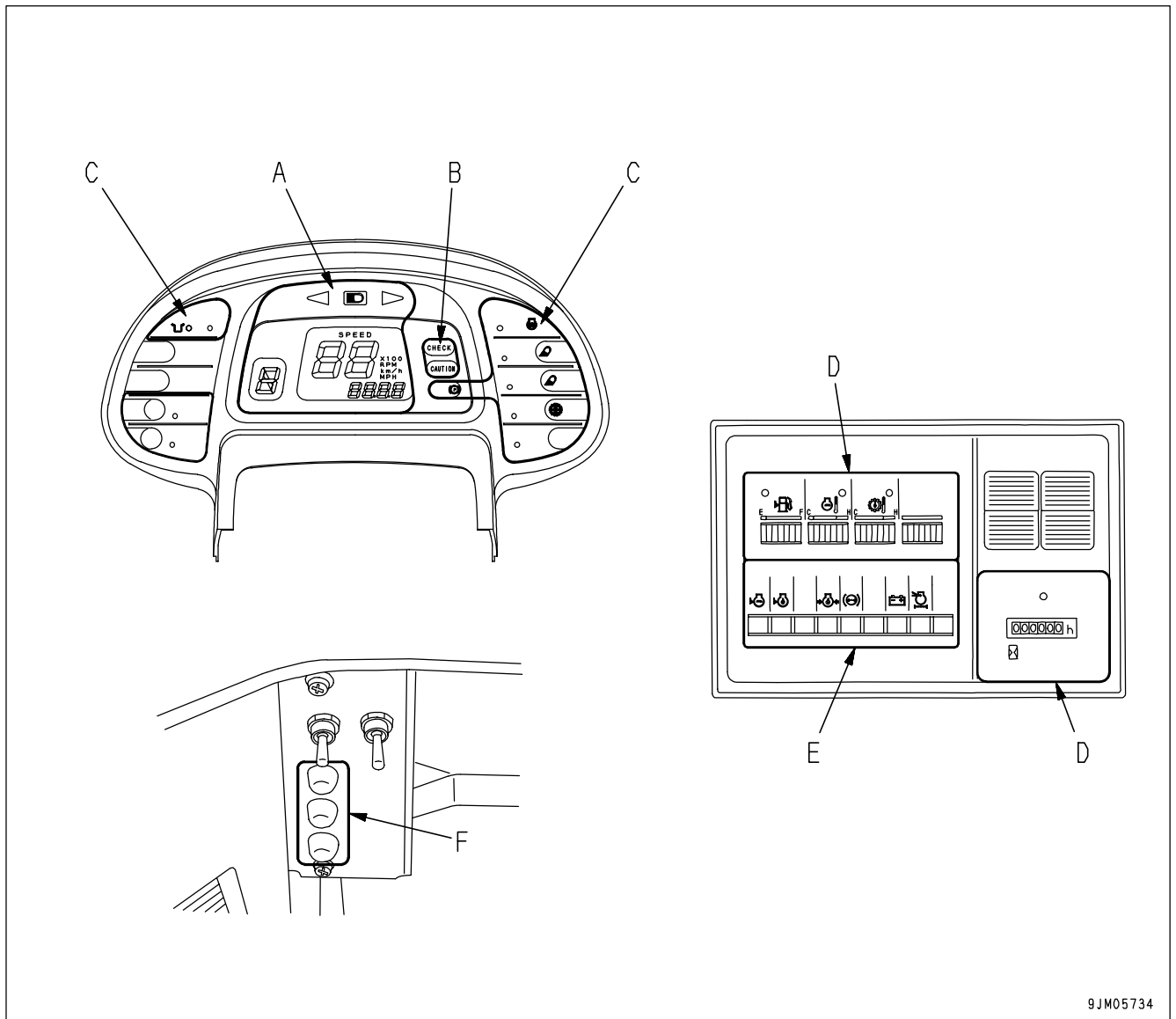
EXPLANATION OF COMPONENTS

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

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

MACHINE MONITOR

MONITOR SYSTEM



- A: Meter display portion
- B: Warning display portion
- C: Meter display portion

- D: Meter display portion
- E: Warning display portion
- F: Warning display portion

The machine monitor system is made up of the main monitor (located in front of the operator's seat), maintenance monitor (located at the right hand of the operator's seat) and engine troubleshooting lamp (located in the lower left portion in front of the operator's seat).

The monitor system can be divided functionally into the alarm display portions (B, E, and F) and the meter display portions (A, C, and D).



These monitors do not guarantee the condition of the machine.

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

WARNING DISPLAYS

(B, E, and F) See "WARNING DISPLAY (PAGE 3-7)".

This consists of the central check lamp, central warning lamp, warning pilot lamp (engine water level, engine oil level, brake oil pressure, engine oil pressure, battery charge, and clogging of air cleaner), and engine troubleshooting lamp.

METER DISPLAY PORTION

See (A, C, D) "METER DISPLAY PORTION (PAGE 3-13)".

This consists of the meters (speedometer, fuel gauge, engine water temperature gauge, torque converter oil temperature gauge, service meter, and transmission shift indicator) and the pilot lamps (turn signal indicator, head lamp Hi beam, preheating, front working lamp, rear working lamp, transmission cut-off, parking brake, emergency steering, and transmission auto-shift/manual selector).

TESTING ACTUATION OF MACHINE MONITOR SYSTEM

When the starting switch is turned to the ON position before starting the engine, all monitor lamps, gauges, and centralized warning lamps will light up for approx. 3 seconds, and the alarm buzzer will sound for approx. 1 second. When this happens, 88 is displayed on the speedometer, and 8 is displayed on the transmission shift indicator. Finally, there will be two beeps to indicate that the monitor check has been completed.

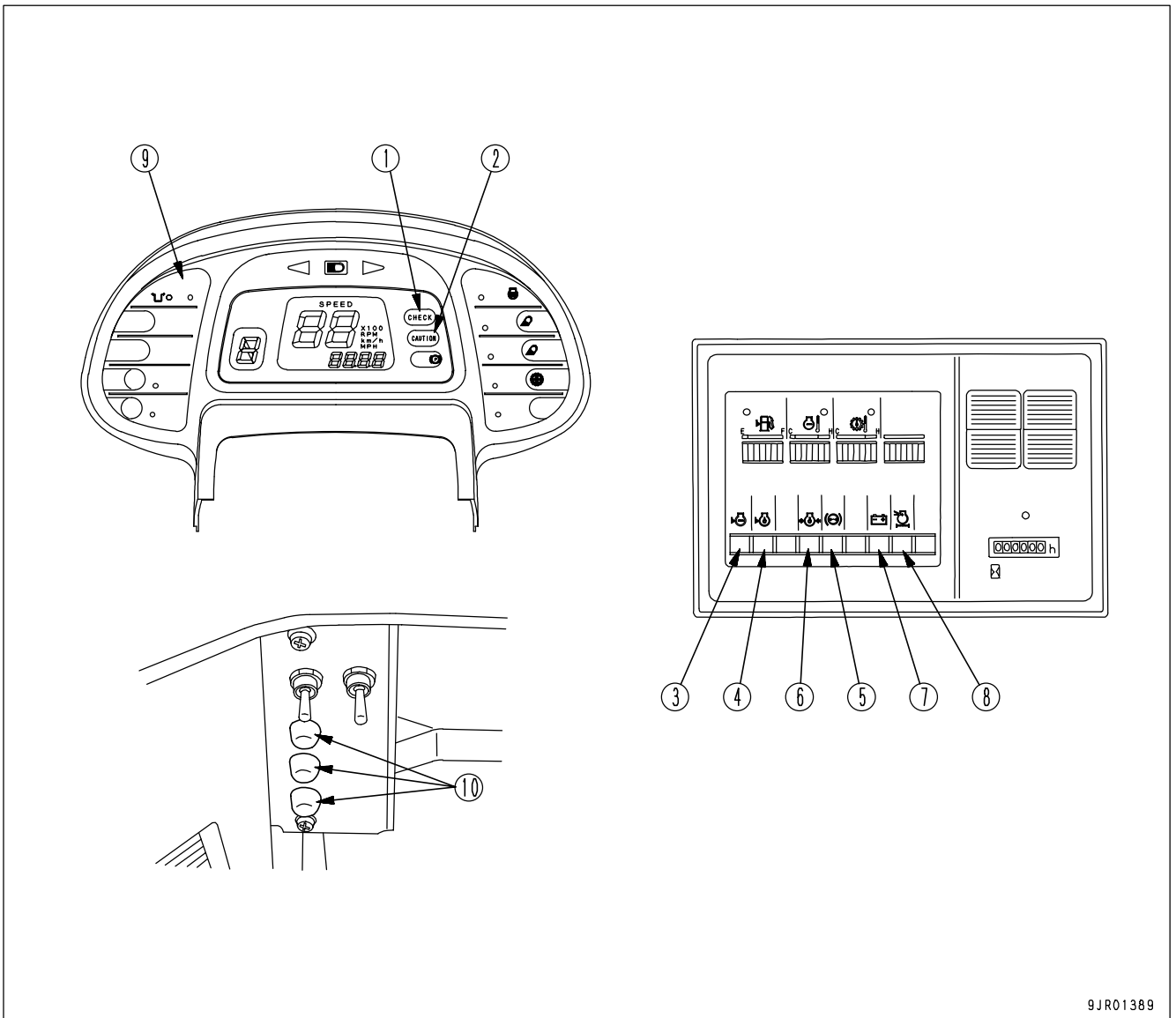
If the monitor lamps do not light up, there is probably a failure or disconnection, so please contact your Komatsu distributor for inspection.

When the starting switch is turned to the ON position, if the directional lever is not at the neutral position, the central warning lamp (CAUTION) will flash and the alarm buzzer will sound intermittently. If this happens, return the lever to the neutral position, and the lamps will go out and the buzzer will stop.

The monitor check cannot be carried out for at least 30 seconds after the engine has been stopped.

The engine troubleshooting lamps (3 lamps: red, yellow, and orange) light up for approximately 2 seconds when the starting switch is turned ON. If a lamp does not light up, ask your Komatsu distributor check it.

WARNING DISPLAY



9JR01389

- (1) Central check lamp (CHECK)
- (2) Central caution lamp (CAUTION)
- (3) Engine water level caution pilot lamp
- (4) Engine oil level caution pilot lamp
- (5) Brake oil pressure caution pilot lamp
- (6) Engine oil pressure caution pilot lamp
- (7) Battery charge caution pilot lamp
- (8) Air cleaner clogging caution pilot lamp
- (9) Emergency steering pilot lamp (red) (if equipped)
- (10) Engine troubleshooting lamp

CENTRAL CHECK LAMP (CHECK)

If this monitor flashes, carry out inspection and maintenance of the appropriate location as soon as possible.

- If any abnormality is found in the CHECK items before starting the engine (engine oil level, engine water level), the monitor lamp for the abnormal location will flash and central check lamp (CHECK) (1) will also flash.

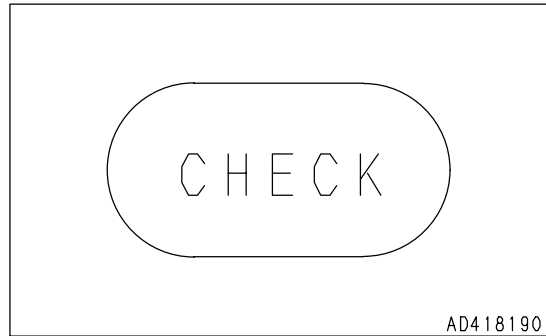
Check the location where the monitor lamp is flashing and carry out the check before starting.

When carrying out the checks before starting, do not rely simply on the monitor. Always carry out the specified check before starting items "CHECK BEFORE STARTING (PAGE 4-33)".

When carrying out checks before starting, if the engine oil level is abnormal, the engine oil level will change when the engine is started, so even if there is any abnormality, the central check lamp and monitor lamp will stop flashing.

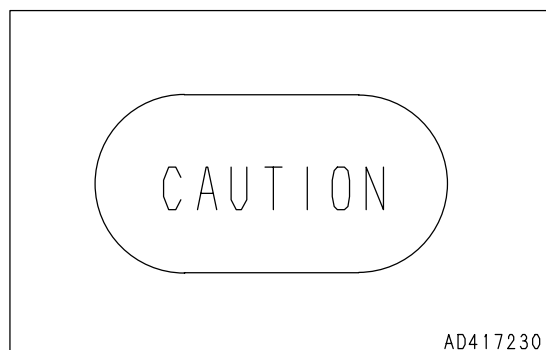
If there is any abnormality in the engine water level, the central check lamp will go out when the engine is started, but instead of this, the central caution lamp will flash and the alarm buzzer will sound intermittently.

- If there is any abnormality in the battery charging system when the engine is running, the battery charge caution pilot lamp will flash and the central CHECK lamp (1) will also flash at the same time. If the lamps flash, check the charging circuit.

**CENTRAL CAUTION LAMP (CAUTION)**

If this monitor flashes, stop the engine immediately or run it at low idling and do as follows.

- If there is an abnormality in any CAUTION item when the engine is running (engine water temperature, torque converter oil temperature, engine water level, brake oil pressure, engine oil pressure), the alarm buzzer will sound intermittently and the monitor lamp for the location of the abnormality will flash and the central CAUTION lamp (2) will also flash.
- If the fuel gauge enters the red range when the engine is running, the fuel gauge will flash and the central CAUTION lamp (2) will also flash. If they flash, check the fuel level and add fuel.



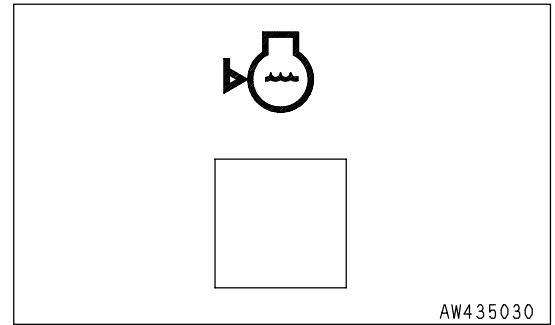
ENGINE WATER LEVEL CAUTION PILOT LAMP

This lamp (3) warns that the coolant level in the radiator has dropped.

When carrying out the checks before starting (starting switch ON, engine stopped):

If the level of the coolant in the radiator is low, the caution pilot lamp and central CHECK lamp will flash.

If the monitor lamps flash, check the coolant level in the radiator sub-tank and add water.



When operating (engine running):

If the condition is normal, the caution pilot lamp should be off. If the level of the coolant in the radiator is too low, the warning pilot lamp and central CAUTION lamp will flash, and the alarm buzzer will sound intermittently.

If the monitor lamps flash, stop the engine, check the level of the coolant in the radiator, and add water.

Stop the machine on level ground before carrying out this check.

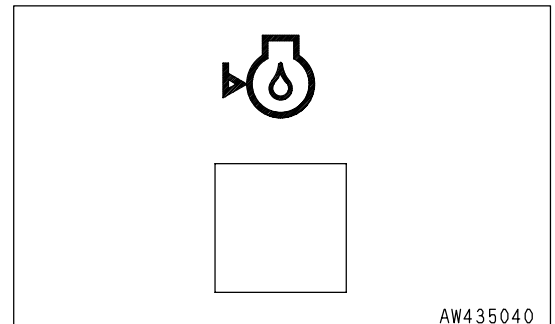
ENGINE OIL LEVEL CAUTION PILOT LAMP

This lamp (4) warns the operator that the level of the oil in the engine oil pan has dropped.

When carrying out checks before starting:

If the oil level in the engine oil pan is low, the caution pilot lamp and central CHECK lamp will flash.

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



When operating:

Even if the engine oil level caution pilot lamp is flashing during check before starting, it will go out when the engine is started.

BRAKE OIL PRESSURE CAUTION PILOT LAMP

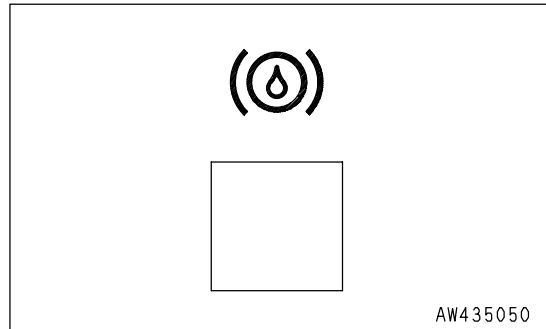
This lamp (5) warns the operator that the brake oil pressure has dropped.

When carrying out checks before starting:

When the engine is stopped, the brake oil pressure circuit is not actuated, so the caution pilot lamp and central CHECK lamp are also off.

When operating:

If the brake oil pressure goes down, the caution pilot lamp and central CAUTION lamp will flash, and the alarm buzzer will sound intermittently. If the monitor lamps flash, stop the engine immediately and check the brake oil pressure circuit.

**REMARK**

The monitor lamp may flash and go out after approx. 10 seconds immediately after the engine is started. This is because pressure is being stored in the brake accumulator. It does not indicate any abnormality.

ENGINE OIL PRESSURE CAUTION PILOT LAMP

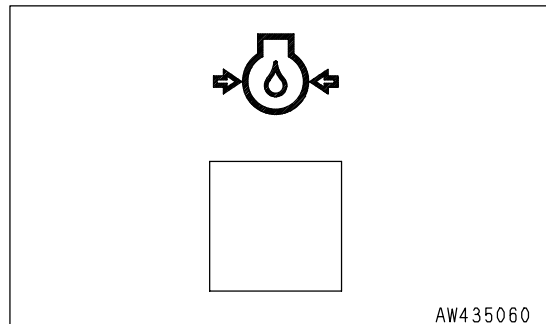
This lamp (6) warns the operator that the engine lubricating oil pressure has dropped.

If it flashes, stop the engine and check.

Check before starting: Lights up

Engine started or running:

When the engine is started, the lubrication pressure is formed and the lamps go out. If the engine lubrication pressure drops, the warning pilot lamp and central CAUTION lamp will flash, and the buzzer will sound intermittently.

**BATTERY CHARGE CAUTION PILOT LAMP**

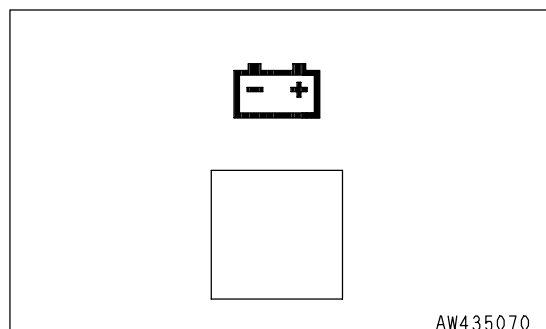
This lamp (7) warns the operator that there is an abnormality in the charging system when the engine is running.

Check before starting: Lights up

Engine started or running:

When the engine is started, the alternator generates electricity and the lamp goes out.

If any abnormality occurs in the charging system, the caution pilot lamp and central CHECK lamp will flash. If they flash, check the charging circuit.



AIR CLEANER CLOGGING CAUTION PILOT LAMP

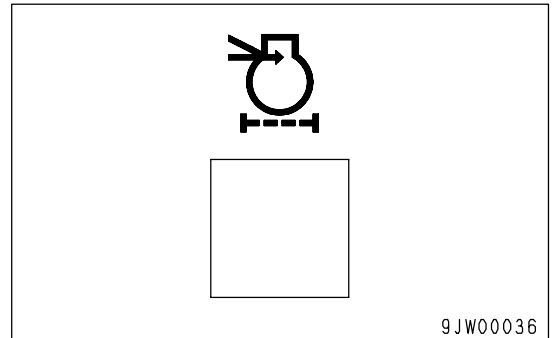
When the engine is running, this lamp (8) warns the operator that the air cleaner element is clogged.

Check before starting: OFF

When operating:

If the air cleaner becomes clogged, the caution pilot lamp and central CHECK lamp will flash.

If they flash, clean or replace the element.

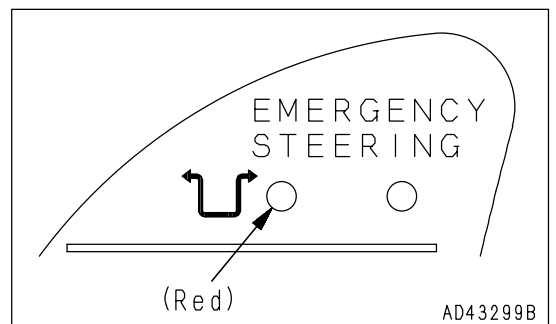


EMERGENCY STEERING PILOT LAMP

(If equipped)

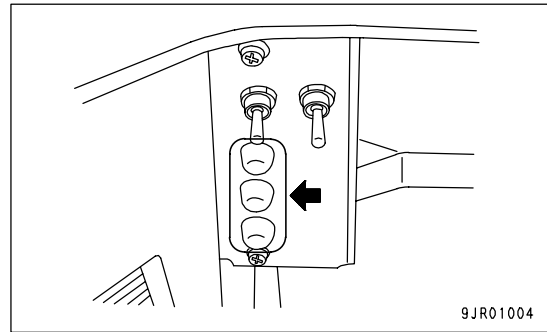
This lamp (9) indicates that the engine has stopped when the machine is traveling, or there is any abnormality in the pump circuit.

The monitor flashes (red) to indicate that the emergency steering system has been actuated. If the monitor flashes, stop the engine immediately.



ENGINE TROUBLESHOOTING LAMP

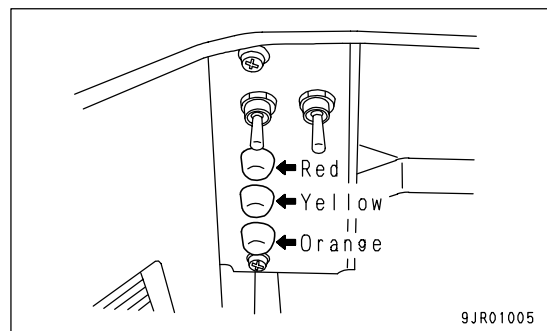
If the abnormality occurs in the engine, engine troubleshooting lamp (10) lights up.



There is an abnormality in the engine when either one of three lamps (red, yellow, and orange) in the troubleshooting indicator lights up while the machine is moving. Follow the instruction below if this occurs.

Orange lamp lights up:

It indicates that engine controller records the abnormality. Although the engine can be operated, the measured value detected by the sensor is not within the normal range. Ask your Komatsu distributor to check it immediately.



Yellow lamp lights up:

Although the engine can be operated, there is trouble. It may cause the decrease of power. Ask your Komatsu distributor to repair it immediately.

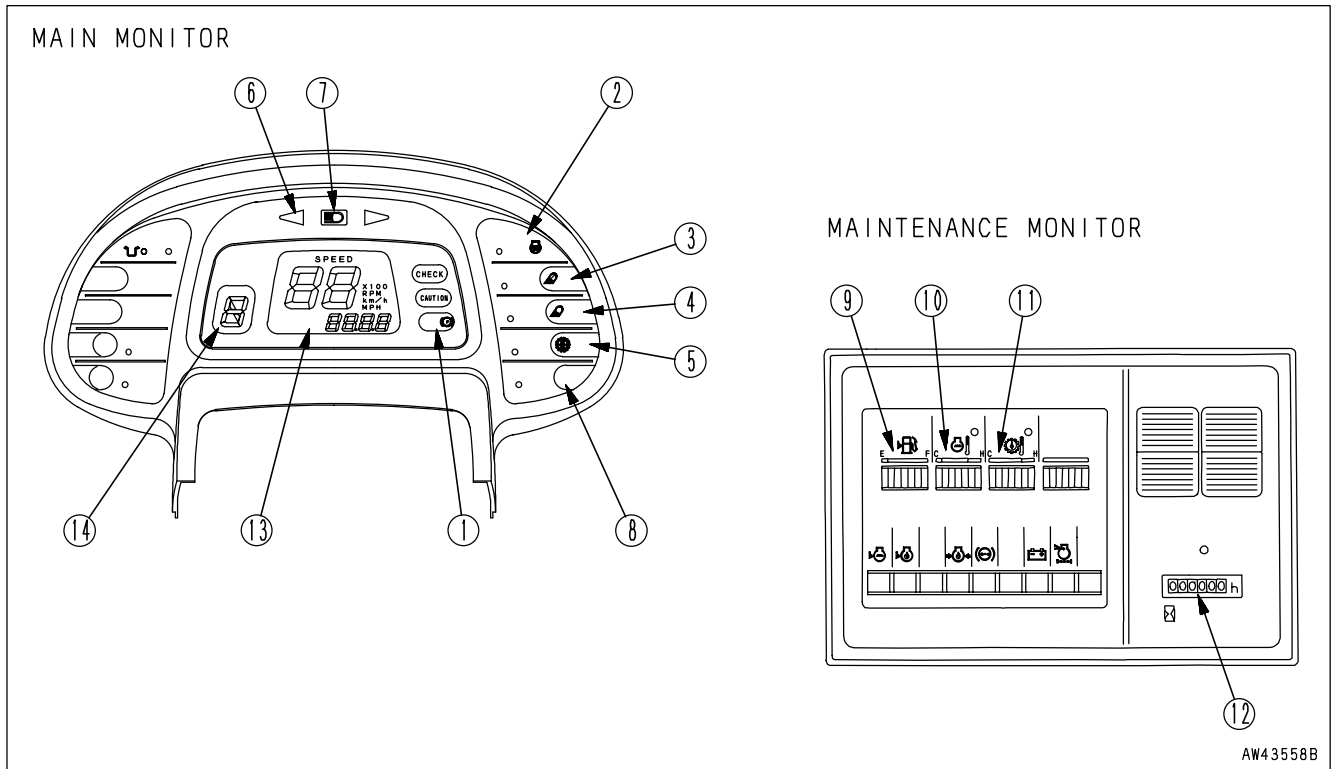
Red lamp lights up:

Immediately move the machine to the safe ground and stop the engine. Contact your Komatsu distributor.

REMARK

To confirm the engine operation, all 3 colors of engine troubleshooting lamps light up for approximately 2 seconds after the starting switch is turned ON, even if the engine is in normal condition.

METER DISPLAY PORTION



- (1) Parking brake pilot lamp
- (2) Preheating pilot lamp
- (3) Front working lamp pilot lamp
- (4) Rear working lamp pilot lamp
- (5) Transmission cut-off pilot lamp
- (6) Turn signal pilot lamp
- (7) High beam pilot lamp
- (8) Transmission auto-shift/manual selector pilot lamp (if equipped)
- (9) Fuel gauge
- (10) Engine water cooling temperature gauge
- (11) Torque converter oil temperature gauge
- (12) Service meter
- (13) Speedometer
- (14) Transmission shift indicator

PILOT DISPLAY

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

PARKING BRAKE PILOT LAMP

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



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PREHEATING PILOT LAMP

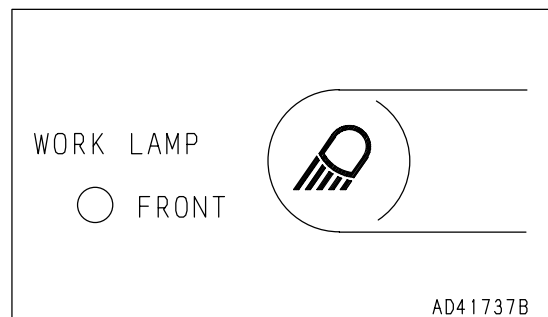
This lamp (2) informs the operator of the preheating status of the electrical intake air heater.

This lamp lights up when the starting switch is turned to the ON position, and goes out when the preheating is completed.

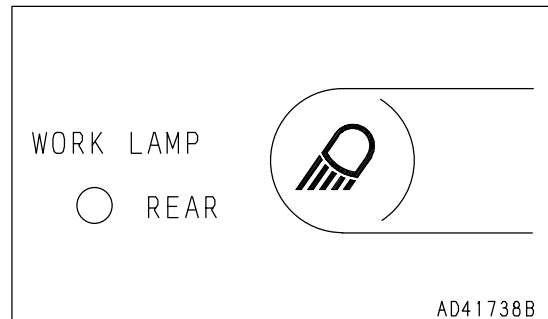
The time that it remains lighted up differs according to the water temperature when the engine is started.

**FRONT WORKING LAMP PILOT LAMP**

This lamp (3) lights up when the front working lamp is switched on.

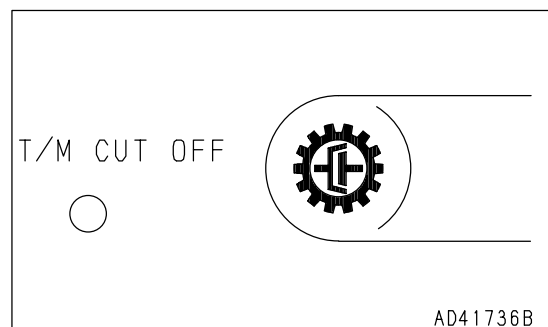
**REAR WORKING LAMP PILOT LAMP**

This lamp (4) lights up when the rear working lamp is switched on.

**TRANSMISSION CUT-OFF PILOT LAMP**

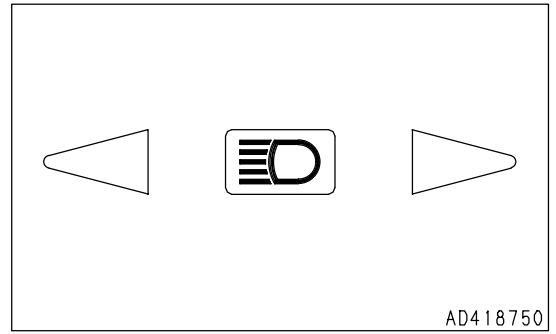
This lamp (5) lights up when the transmission cut-off switch is turned to ON.

If the monitor lamp is ON and the left brake pedal is depressed, the transmission will be returned to neutral.



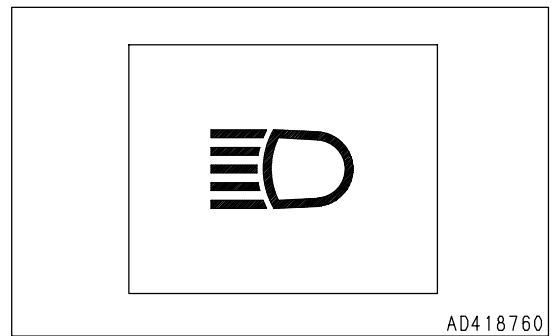
TURN SIGNAL PILOT LAMP

When the turn signal lamp flashes, this lamp (6) also flashes.



HIGH BEAM PILOT LAMP

This lamp (7) lights up when the head lamp is at high beam.

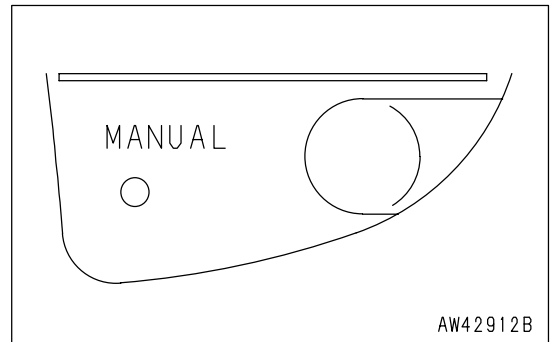


TRANSMISSION AUTO SHIFT/MANUAL SELECTOR PILOT LAMP

(If equipped)

This lamp (8) lights up when the transmission auto-shift/manual selector switch is operated and the transmission shift is changed to manual mode.

When the monitor is lighted up, the transmission speed range can be changed by operating the gearshift lever.



METERS

FUEL GAUGE

This gauge (9) indicates the amount of fuel in the fuel tank.

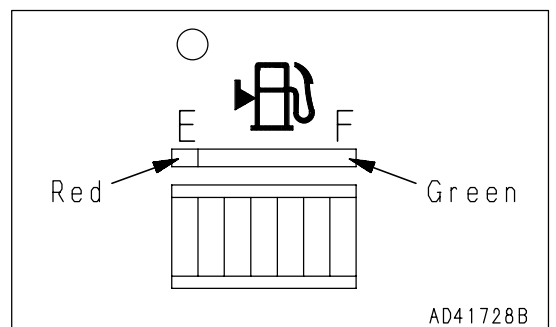
E: Tank is EMPTY

F: Tank is FULL

The lamp should light up in the green range during operation.

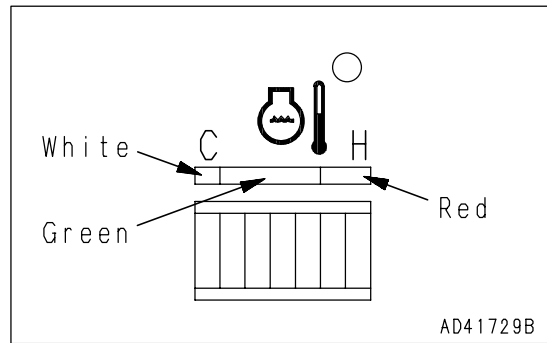
If it enters the red range during operation, the fuel gauge lamp and central CAUTION lamp will flash.

If only the red range lights up during operation, it means that there is less than 85 liters (22.44 US gal) of fuel left, so check and add fuel.



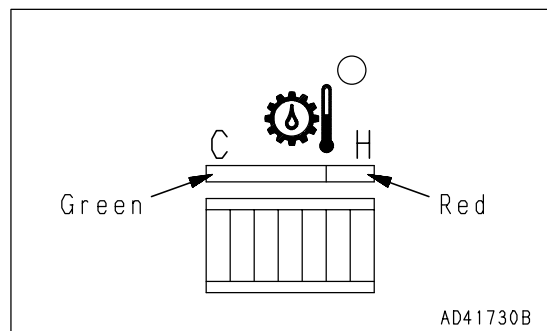
ENGINE COOLING WATER TEMPERATURE GAUGE

This gauge (10) indicates the temperature of the cooling water. If the temperature is normal during operation, the green range will light. If the red range lights during operation, stop the machine and run the engine with no load at midrange speed until the green range lights. If the lamps light up to the 1st red level, the engine water temperature gauge lamp and central CAUTION lamp will flash; when the lamps light up to the 2nd red level, the alarm buzzer will also sound intermittently.



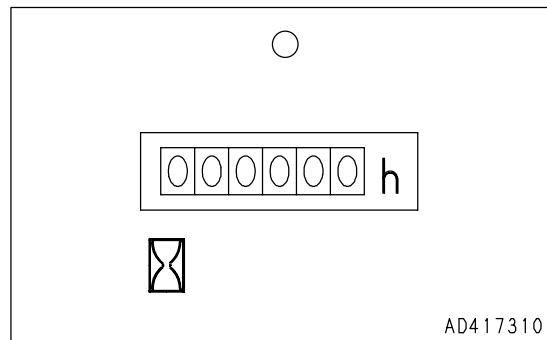
TORQUE CONVERTER OIL TEMPERATURE GAUGE

This gauge (11) indicates the temperature of the torque converter oil. If the temperature is normal during operation, the green range will light. If the red range lights during operation, stop the machine and run the engine with no load at midrange speed until the green range lights. If the lamps light up to the 1st red level, the torque converter oil temperature gauge lamp and central CAUTION lamp will flash; when the lamp lights up to the 2nd red level, the alarm buzzer will also sound intermittently.



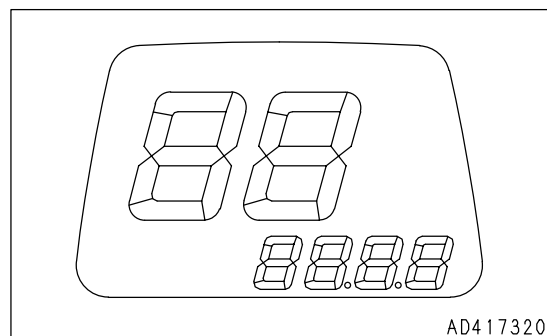
SERVICE METER

This meter (12) shows the total operation hours of the machine. The service meter advances while the engine is running - even if the machine is not traveling. While the engine is running, green pilot lamp on the service meter flashes to show the service meter advances. The service meter progresses by 1 when the engine is operated for one hour, regardless of the engine speed.



SPEEDOMETER

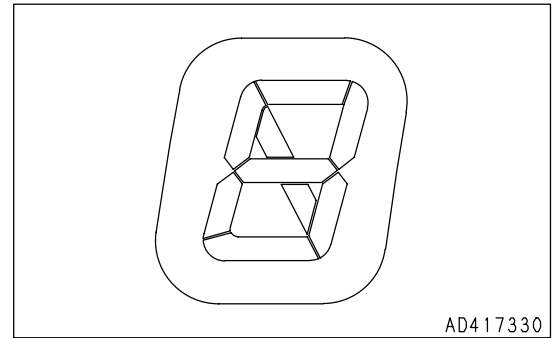
This meter (13) indicates the travel speed of the machine.



TRANSMISSION SHIFT INDICATOR

This (14) indicates the present speed range of the transmission.
 When the directional lever is at the N position, N is displayed on the indicator.

When the directional lever is at the F or R position, the shift position of the speed lever is displayed as a numeral.



WHEN USING JOYSTICK STEERING SYSTEM

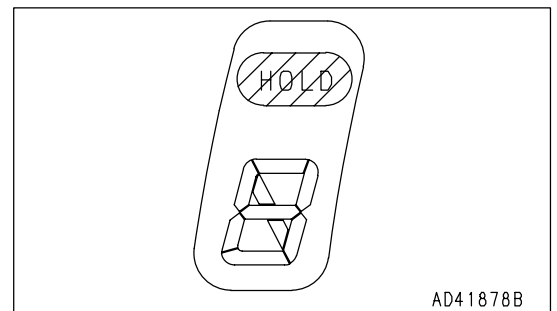
(If equipped)

This indicates the transmission speed range. When the N button of the FNR buttons on the head of the joystick lever is pressed, the indicator displays N.

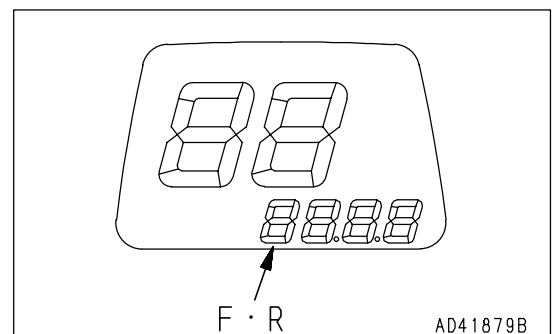
When the auto-shift (if equipped) is employed:
 The transmission speed range is indicated.

REMARK

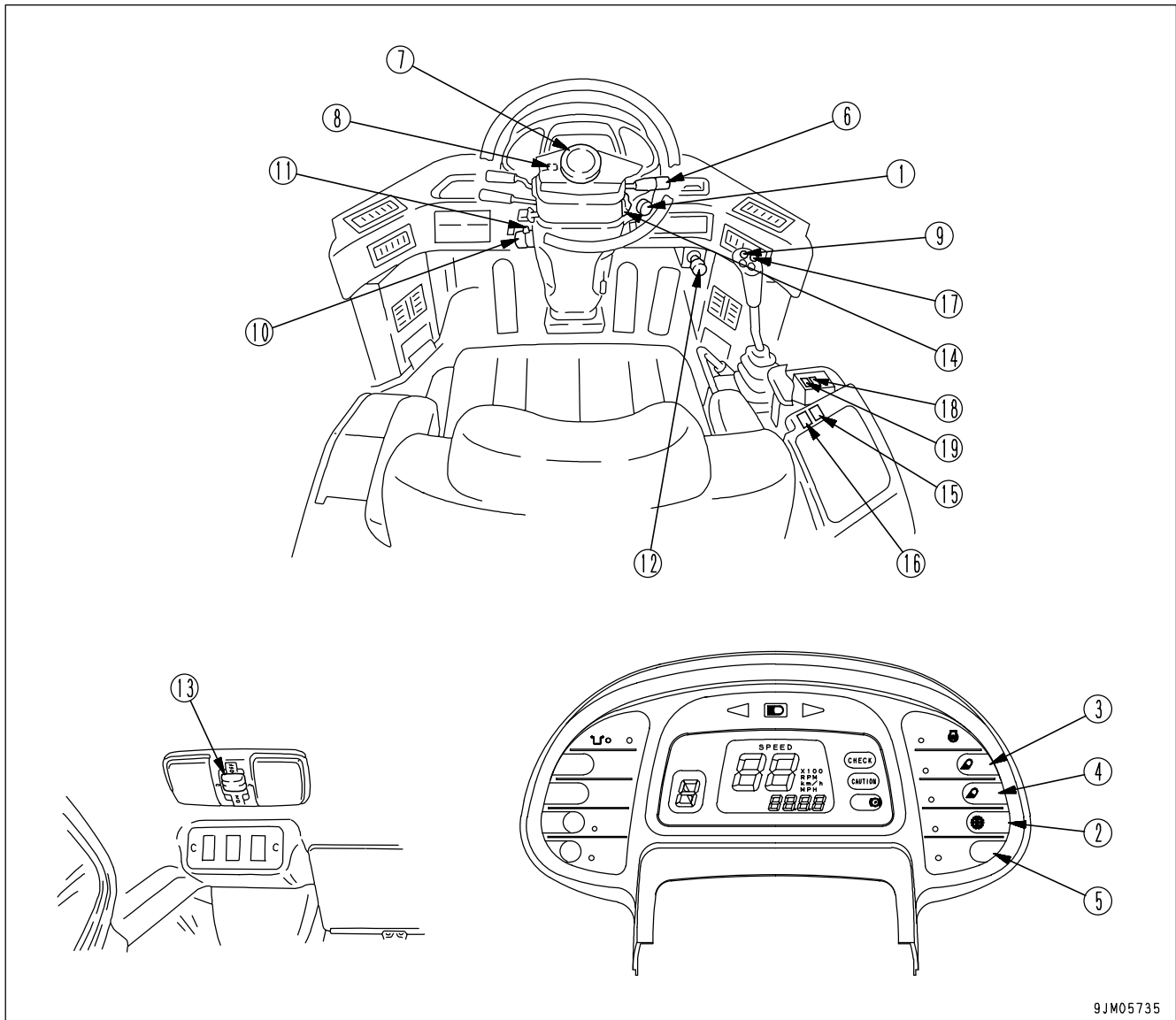
The auto-shift is installed on machines with the joystick steering system. The shift indicator shown on the right is installed as well.



When the F (FORWARD) or R (REVERSE) buttons of the FNR buttons on the head of the joystick lever are pressed, F or R is displayed at the bottom of the speedometer and the shift indicator displays the transmission speed range and N.



SWITCHES



9JM05735

- (1) Starting switch
- (2) Transmission cut-off switch
- (3) Front working lamp switch
- (4) Rear working lamp switch
- (5) Transmission auto-shift/manual selector switch (if equipped)
- (6) Lamp switch
- (6) Turn signal lever
- (6) Dimmer switch
- (7) Horn button
- (8) Hazard lamp switch
- (9) Kickdown switch
- (10) Front wiper switch
- (11) Rear wiper switch
- (12) Cigarette lighter
- (13) Room lamp switch
- (14) Parking brake switch
- (15) Power window switch (right)
- (16) Power window switch (left)
- (17) Tilt or pitch switch
- (18) RPM set on-off switch
- (19) RPM set idle up-down selector switch

STARTING SWITCH

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

OFF: The key can be inserted and removed at this position. When the key is turned to this position, all electrical circuits are turned off and the engine stops.

In addition, the parking brake is automatically applied.

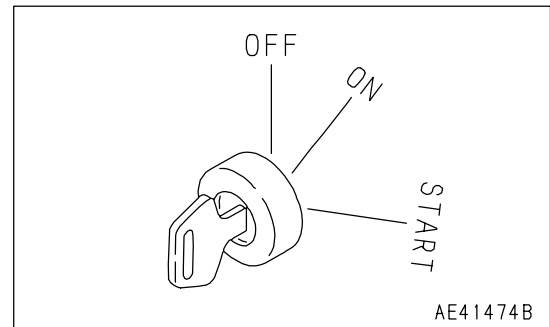
ON position

Electric current flows in the charging circuit, lamp circuit, and accessory circuit.

Keep the starting switch key at the ON position while the engine is running.

START position

This is the position to start the engine. Hold the key at this position while cranking. Release the key immediately after the engine has been started. The key will return to the ON position when released.

**TRANSMISSION CUT-OFF SWITCH****WARNING**

When moving the machine off on an uphill slope, set the transmission cut-off switch to the OFF position, depress the accelerator pedal while keeping the left brake pedal depressed, then gradually release the brake pedal and allow the machine to move. In this way the machine can be prevented from traveling backwards.

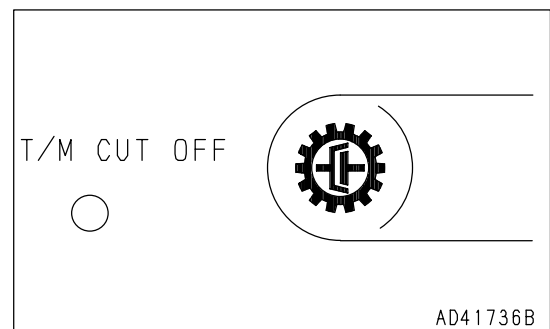
Press this push button switch (2) to turn ON or OFF.

When the pilot lamp is pressed, it will light up and come ON; if it pressed again, the pilot lamp will go out and the transmission cut-off will be turned OFF. Set at ON position normally.

OFF: Left brake pedal acts as normal brake (like right brake pedal).

ON: Left brake pedal acts as normal brake, but also switches transmission to NEUTRAL.

If the switch is turned to ON, the transmission cut-off pilot lamp will light up.



FRONT WORKING LAMP SWITCH

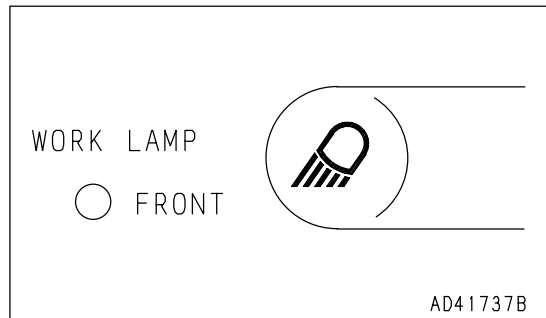


Always turn the working lamp off before traveling on public roads.

When turning on the front working lamp, turn the lamp switch to the ON position for the side clearance lamp or ON position for the head lamp, then operate the switch (3).

When the pilot lamp is pressed, it will light up and come ON; if it pressed again, the pilot lamp will go out and the working lamp will be turned OFF.

The working lamp will not light up if the lamp switch is not at the ON position for the side clearance lamp or ON position for the head lamp.



REAR WORKING LAMP SWITCH

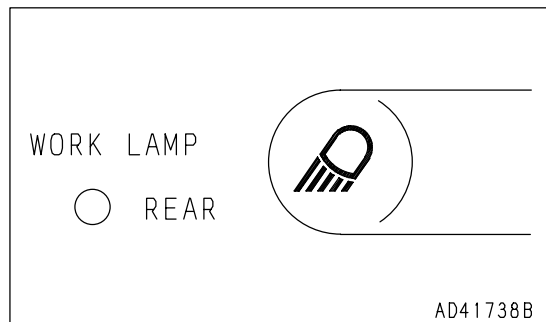


Always turn the working lamp off before traveling on public roads.

When turning on the rear working lamp, turn the lamp switch to the ON position for the side clearance lamp or ON position for the head lamp, then operate the switch (4).

When the pilot lamp is pressed, it will light up and come ON; if it pressed again, the pilot lamp will go out and the working lamp will be turned OFF.

The working lamp will not light up if the lamp switch is not at the ON position for the side clearance lamp or ON position for the head lamp.



TRANSMISSION AUTO SHIFT/MANUAL SELECTOR SWITCH

(if auto-shift equipped)

Press this push button switch (5) to turn ON or OFF.

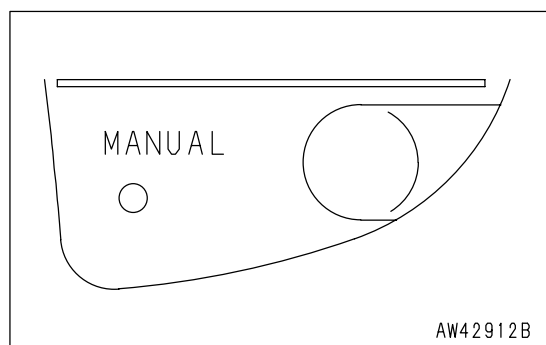
If the switch is pressed once, the pilot lamp lights up and the system is turned ON; if the switch is pressed again, the pilot lamp goes out and the system is turned OFF.

Normally, set it to the OFF position.

OFF: Transmission set to auto shift

ON: Transmission set to manual shift

When the switch is at the ON position, the transmission AUTO SHIFT/MANUAL selector pilot lamp lights up.



REMARK

For details of manual gear, see "GEARSHIFT LEVER (PAGE 3-27)". For details of automatic gear shifting (if equipped), see "HANDLING AUTOMATIC SHIFT SYSTEM (PAGE 6-2)",

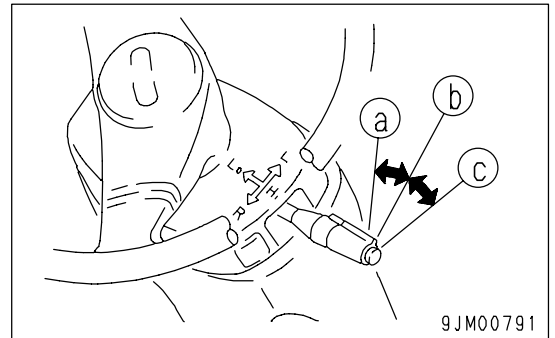
LAMP SWITCH

This switch (6) is used to light up the front lamps, side clearance lamps, tail lamps, and instrument panel.

Position (a): OFF

Position (b): Side clearance lamps, tail lamps, and instrument panel light up

Position (c): Head lamps light up in addition to lamps at (b) position



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REMARK

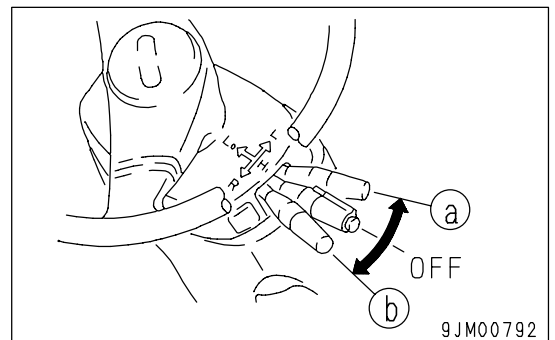
The lamp switch can be operated regardless of the position of the lever.

TURN SIGNAL LEVER

This switch (6) is used to operate the turn signal lamp.

(a) position : LEFT TURN (Push lever FORWARD.)

(b) position : RIGHT TURN (Pull lever BACK.)



9JM00792

REMARK

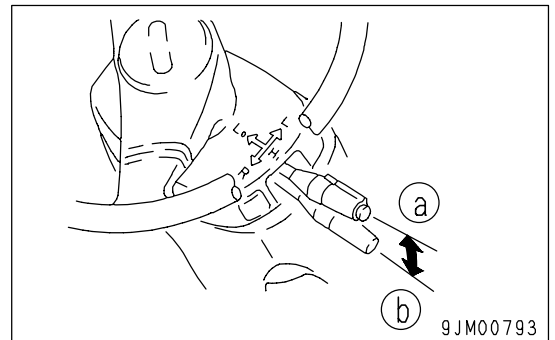
- When the lever is operated, the pilot lamp turn signal pilot lamp also flashes.
- When the steering wheel is turned back, the lever automatically returns to its original position. If it does not return, return it by hand.

DIMMER SWITCH

This switch (6) is used to switch the head lamps between high beam and low beam.

Position (a): Low beam

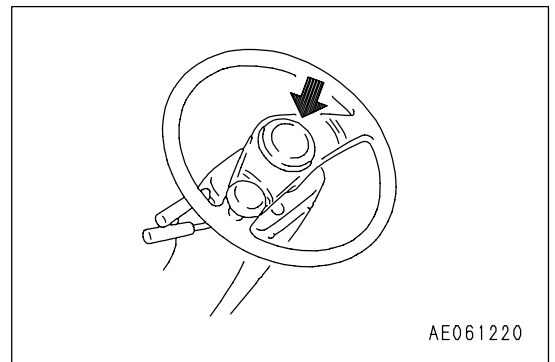
Position (b): High beam



9JM00793

HORN BUTTON

When the horn button (7) in the center of the steering wheel is pressed, the horn will sound.



AE061220

HAZARD LAMP SWITCH

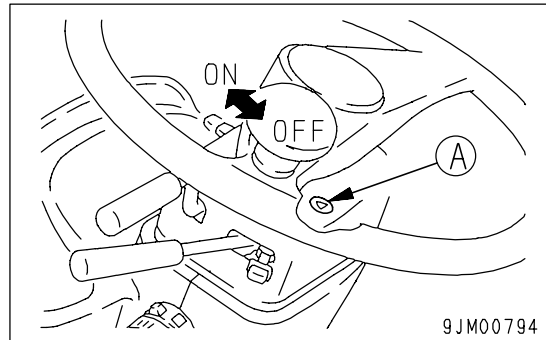


Use the hazard lamp only in emergencies. Using the hazard lamp when traveling will cause problems for other machines.

This switch (8) is used in emergencies, such as when the machine breaks down and has to be parked on the road.
 ON position: All turn signal lamps flash.

REMARK

When this switch is turned to the ON position, the turn direction indicator lamps and turn indicator pilot lamp flash, and display lamp (A) lights up at the same time.



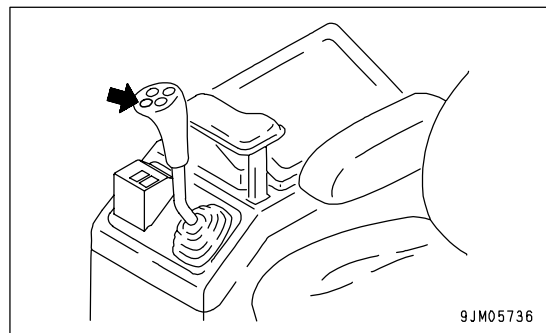
KICKDOWN SWITCH

When the gearshift lever is in 2nd, and the switch (9) at the top of the knob of the blade control lever is pressed, the gear will shift down to 1st.

Use this when you need to increase the drawbar pull in digging operations.

REMARK

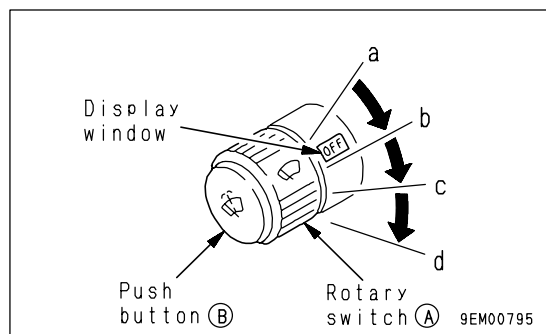
To cancel the kickdown switch, move the directional lever to REVERSE or NEUTRAL, or move the speed control lever to any position except 2nd. It is also possible to cancel the kickdown switch by operating the parking brake switch or by turning the starting switch OFF.



FRONT WIPER SWITCH

Turn rotary switch (A) of switch (10) to operate the front wiper.
 If push button (B) is pressed, washer liquid will be sprayed out onto the front glass while the button is being pressed.

- Position(a): (OFF) stop
- Position(b): (INT) Intermittent wiper
- Position(c): Low-speed wiper
- Position(d): High-speed wiper



REAR WIPER SWITCH

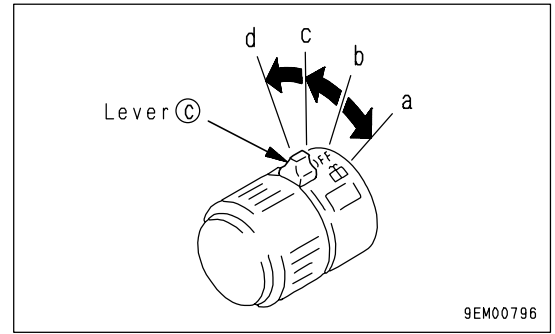
Turn lever (C) on switch (11) to operate the rear wiper.

Position (a): Washer liquid is sprayed out

Position (b): OFF

Position (c): Wiper is operated

Position (d): Washer liquid is sprayed out, wiper is operated

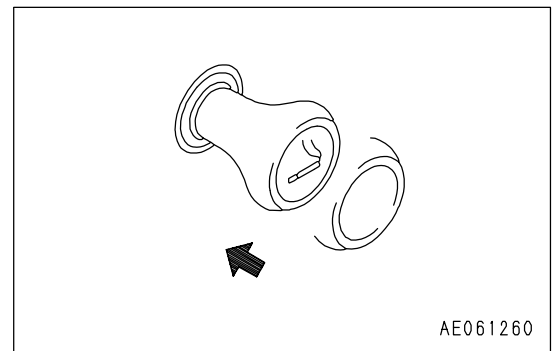


9EM00796

CIGARETTE LIGHTER

This is used to light cigarettes.

If the cigarette lighter (12) is pushed in, it will return to its original position after several seconds. When it returns, pull it out and light the cigarette.



AE061260

ROOM LAMP SWITCH

This switch (13) lights up the room lamp.

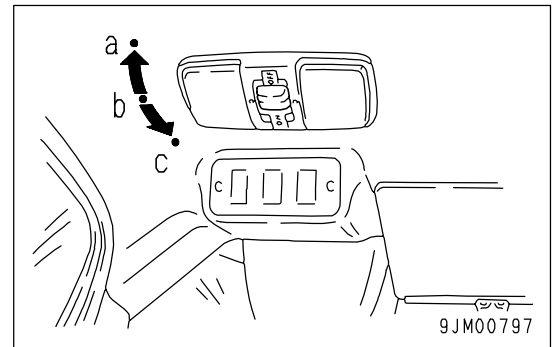
Position (a): OFF

Position (b): Lights up when cab door is opened

Position (c): Lights up

REMARK

- The room lamp lights up even when the main switch is OFF, so when leaving the operator's compartment, turn the switch to position (a) (OFF) or (b).
- When operating with the cab door fully open, set the switch to position (a) (OFF).



9JM00797

PARKING BRAKE SWITCH



Always apply the parking brake when leaving the machine or when parking it.

Even if the parking brake switch is turned ON, there is danger until the parking brake pilot lamp lights up, so keep the brake pedal depressed.

NOTICE

- **Never use the parking brake switch to apply the brakes when traveling, except in an emergency. Apply the parking brake only after the machine has stopped.**
- **If the parking brake has been used as an emergency brake when traveling at high speed (near the maximum speed), contact your Komatsu distributor to have the parking brake checked for any abnormality.**

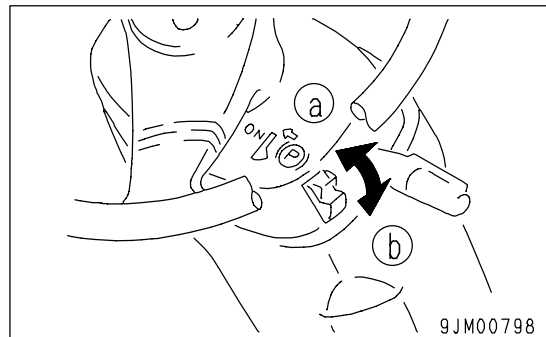
This switch (14) is used for actuating the parking brake.

Position (a): ON

The parking brake is applied, and the parking brake pilot lamp lights up.

Position (b): OFF

The parking brake is released.



REMARK

- If the directional lever is placed in F (FORWARD) or R (REVERSE) with the parking brake applied, the warning lamp will flash and the alarm buzzer will sound.
- Before starting the engine, turn the parking brake switch to ON, then turn it to OFF.
- The machine does not start when the directional lever is operated with the parking brake applied.

POWER WINDOW SWITCH**WARNING**

Be careful not to get anyone's hands or head caught when closing the window.

There is danger of serious personal injury if anyone gets their hands or head caught in the window.

**CAUTION**

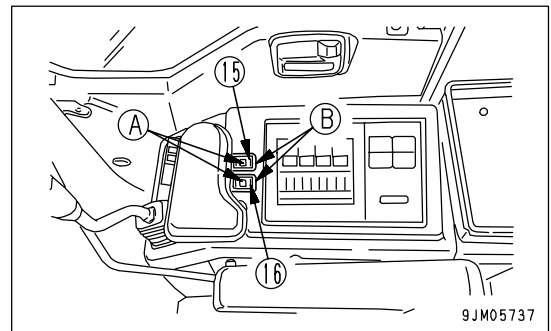
Do not continue to operate the switch when the window is fully open or fully closed. This will cause failure of the power window.

These switches (15), (16) can be used while the engine switch is at the ON position.

When portion (A) is pressed, the side window goes down.

When portion (B) is pressed, the side window goes up.

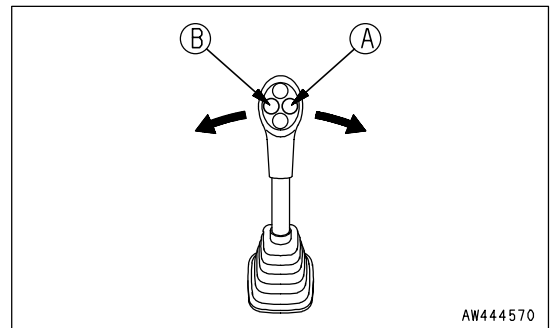
When the window reaches the top or bottom and the window stops moving, release the switch immediately.

**TILT OR PITCH SWITCH**

This switch (17) is used for pitch operation of the blade.

To operate the blade to pitch, keep to press down switch (A) or (B) and operate the blade control lever.

(When not pressing down the switch, the lever works for tilt operation.)

**RPM SET ON-OFF SWITCH**

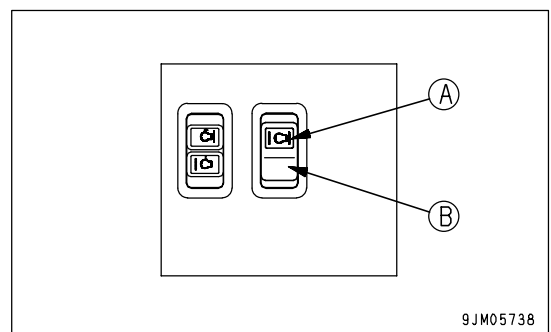
This switch (18) is used to turn the power for the RPM set system ON-OFF.

Position (A): Power for system is turned ON

The switch icon lights up.

Position (B): Power for system is turned OFF

The switch icon goes out.

**REMARK**

- The RPM SET ON-OFF switch is used only for turning the power to the RPM set system ON or OFF. To set the engine speed, use the RPM set IDLE UP-DOWN selector switch.
- This switch is a seesaw switch, so do not press it unnecessarily.

RPM SET IDLE UP-DOWN SELECTOR SWITCH



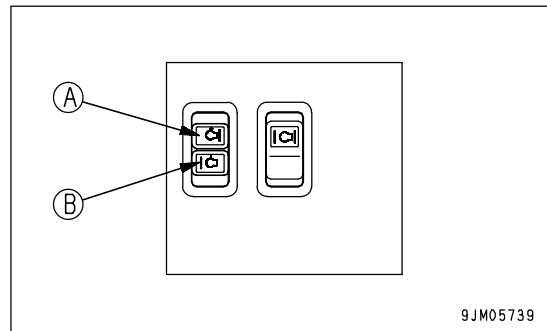
- When the RPM set ON-OFF switch or engine starting switch are turned OFF, the idling up (down) speed recorded in memory is cleared. To set the speed again, carry out the procedure again from the beginning.
- If the right brake pedal is depressed when the speed has been set by the RPM set idling up (down) selector switch, the engine speed recorded in memory is lowered to the idling speed, but when portion (B) of the switch is pressed, the engine returns to its original speed.
- To operate the switch, check that the RPM set ON-OFF switch is at the ON position. If it is ON, the RPM set switch icon lights up.

This switch (19) keeps the engine speed at the desired speed.

Position (A):

Use this position when setting the engine speed and when raising the set speed.

- When using the accelerator pedal
Depress the accelerator pedal to raise the engine speed to the desired speed, then press portion (A) of the switch. The speed is recorded in memory.



9JM05739

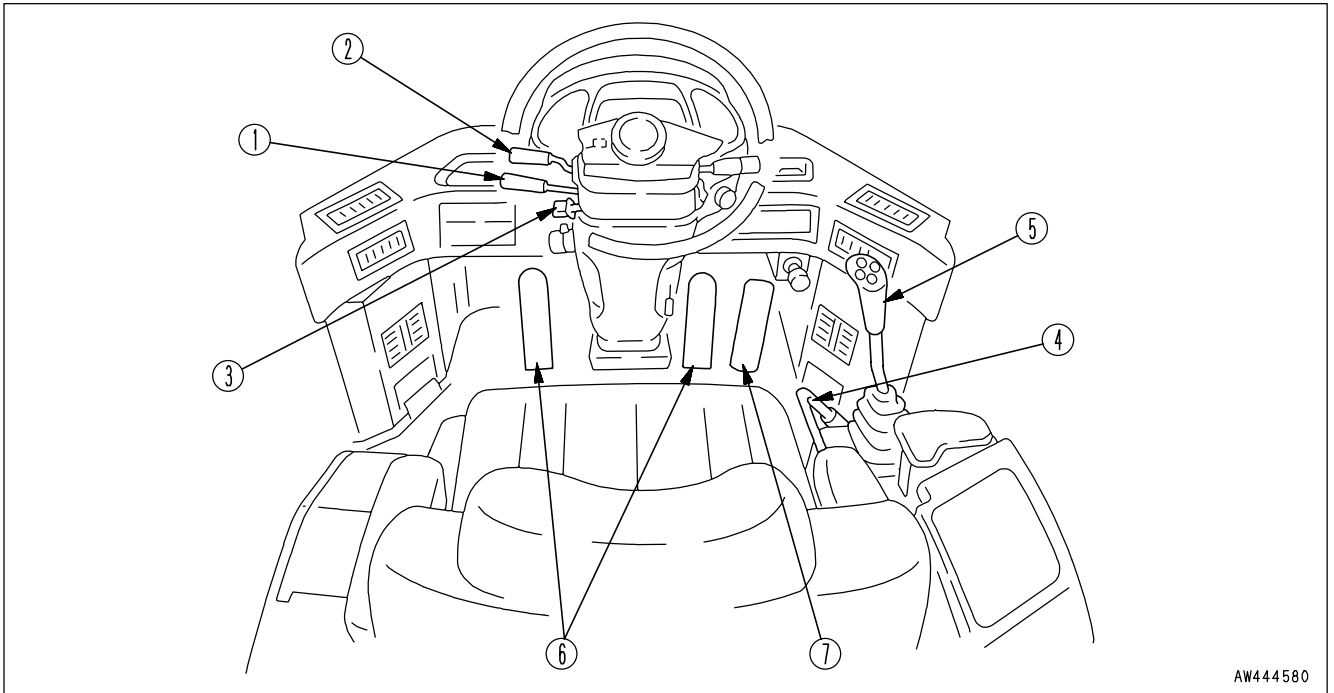
- When using the RPM set idling up/down switch
Keep portion (A) of the switch pressed to raise the engine speed by 100 rpm each second. When the engine reaches the desired speed, release the switch. The new speed is recorded to memory and the setting is made.

Position (B):

Use this position when lowering the engine speed or when resetting after canceling the RPM set switch.

- When using the RPM set up/down switch
Keep portion (B) of the switch pressed to lower the engine speed by 100 rpm each second. When the engine reaches the desired speed, release the switch. The new speed is recorded to memory and the setting is made.

CONTROL LEVERS, PEDALS



AW444580

- (1) Gearshift lever
- (2) Directional lever
- (3) Gearshift lever stopper
- (4) Safety lock lever (for blade control lever)
- (5) Blade control lever
- (6) Brake pedal
- (7) Accelerator pedal

GEARSHIFT LEVER

This lever (1) changes the speed range of the transmission.

This machine has a 4-FORWARD, 4-REVERSE speed transmission.

Place the gearshift lever in a suitable position to obtain the desired speed range.

1st and 2nd speeds are used for working.

3rd and 4th speeds are used for traveling.

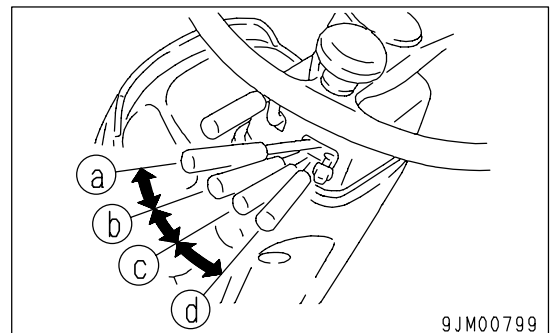
However, when the gearshift lever stopper is being used, it is impossible to shift to 3rd or 4th. Disengage the gearshift lever stopper before trying to shift gear.

Position (a): 1st

Position (b): 2nd

Position (c): 3rd

Position (d): 4th

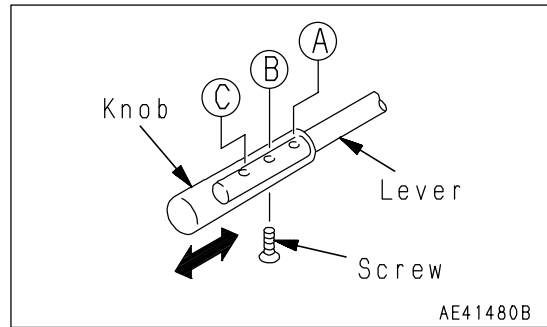


9JM00799

REMARK

The length of the lever can be adjusted to 3 stages (positions (A), (B), (C)). To adjust the length, remove the screw at the bottom of the lever knob, slide the knob to the desired position, then tighten the screw again.

(The lever is installed to position (B) when it is shipped from the factory.)



DIRECTIONAL LEVER

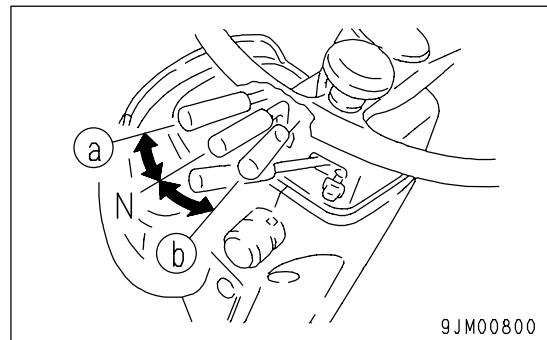
This lever (2) is used to switch the direction of travel of the machine between forward and reverse.

When starting the engine, if the directional lever is not at the N position, the engine will not start.

Position (a): FORWARD

Position N: NEUTRAL

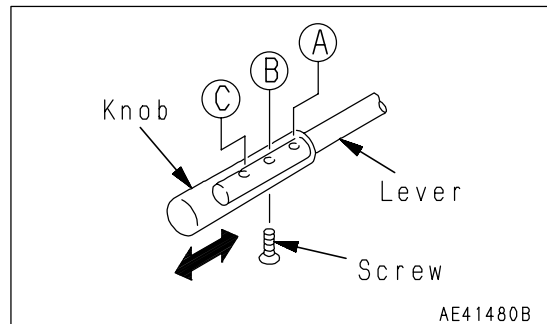
Position (b): REVERSE



REMARK

The length of the lever can be adjusted to 3 stages (positions (A), (B), (C)). To adjust the length, remove the screw at the bottom of the lever knob, slide the knob to the desired position, then tighten the screw again.

(The lever is installed to position (B) when it is shipped from the factory.)

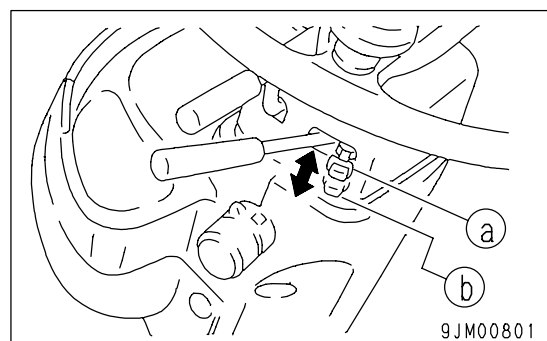


GEARSHIFT LEVER STOPPER

This stopper (3) prevents the gearshift lever from entering the 3rd or 4th positions when working.

Position (a): Stopper actuated.

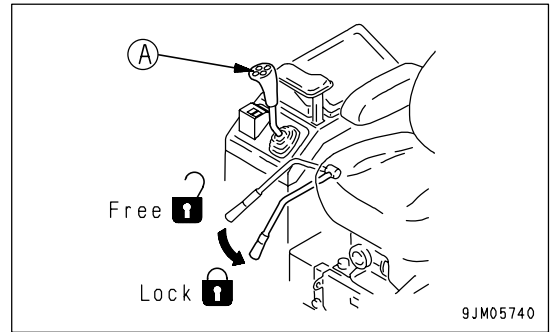
Position (b): Stopper released.



SAFETY LOCK LEVER (FOR BLADE CONTROL LEVER)



- When leaving the operator's compartment, set the safety lock lever securely to the LOCK position. If the safety lock lever is not locked, and the blade control lever (A) is touched by mistake, this may lead to a serious accident.
- If the safety lock lever is not placed securely in the LOCK position, the blade control lever may not be properly locked. Check that the situation is as shown in the diagram.
- When the safety lock lever is pulled up, do not touch the blade control lever (A).



This lever (4) is a lock device for the blade control lever.
Push the safety lock lever down to lock it.

BLADE CONTROL LEVER

This lever (5) is used to operate the blade tilt and lift.

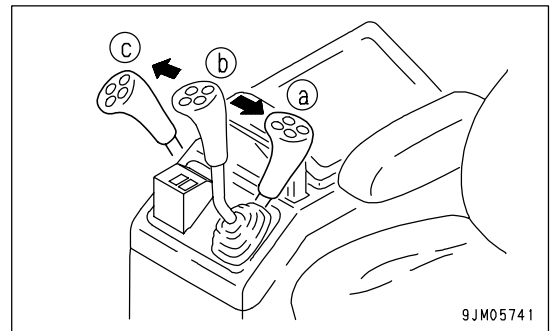
- BLADE TILT OPERATION

Position (a): LEFT TILT

Position (b): HOLD

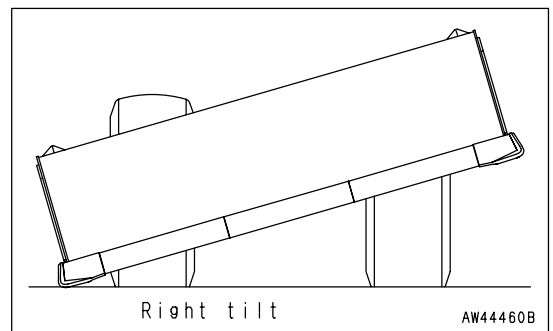
The blade is kept in the same position

Position (c): RIGHT TILT



REMARK

If the lever is released at position (a) or (c), the lever will return to the HOLD position.



• **BLADE LIFT OPERATION**

Position (a): RAISE

Position (b): HOLD

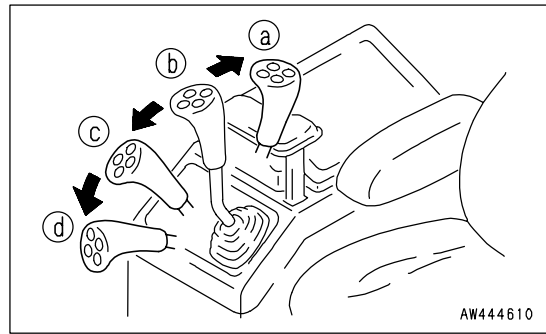
The blade is kept in the same position

Position (c): LOWER

Position (d): FLOAT

The blade moves freely under external force.

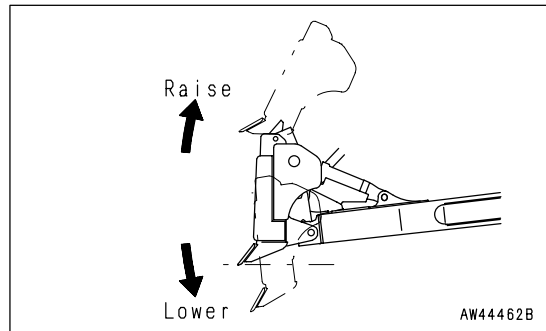
If the lever is released at this position, it will not return to the HOLD position, so return it manually.



AW444610

REMARK

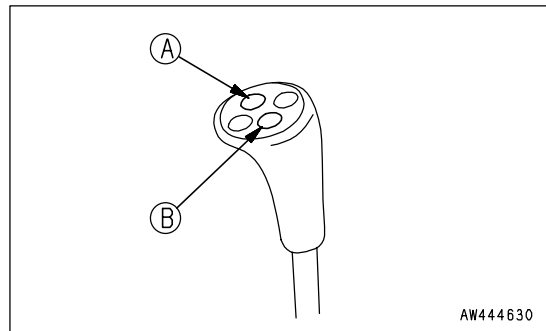
If the lever is released at position (a) or (c), the lever will return to the HOLD position.



AW44462B

• **BLADE PITCH OPERATION**

Keep the switch (A) or (B) at the tip of the lever pressed and operate the lever. If switch (A) or (B) is not kept pressed when the lever is operated, it will be impossible to carry out the blade pitch operation.

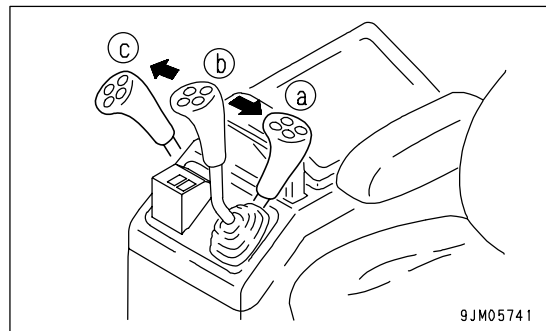


AW444630

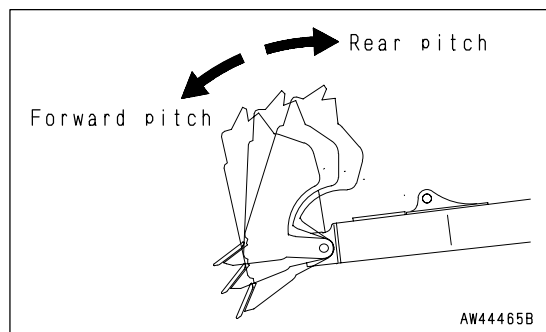
Position (a): REAR PITCH

Position (b): HOLD

Position (c): FORWARD PITCH



9JM05741

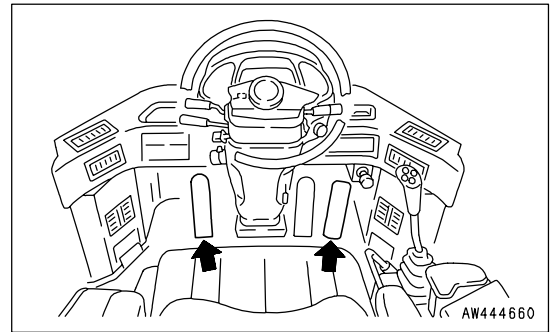


AW44465B

BRAKE PEDAL**WARNING**

- When traveling downhill, use the engine as a brake, and always use the right brake pedal.
- Do not use the brake pedals repeatedly unless necessary.
- Do not put your foot on this pedal unless necessary.

These pedals (6) operate the brakes.

**RIGHT BRAKE PEDAL**

The right brake pedal operates the wheel brakes.

Use the right brake pedal for normal braking operations.

LEFT BRAKE PEDAL

The left brake pedal operates the wheel brakes.

When the transmission cut-off switch is in the ON position, and if this brake pedal is depressed, wheel brakes are applied and the transmission is set to the neutral position at the same time. If the transmission cut-off switch is at OFF, the left brake pedal acts in the same way as the right brake pedal.

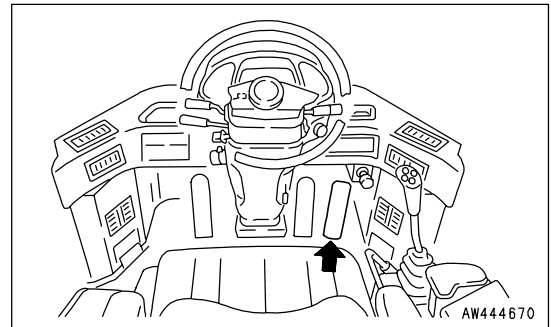
REMARK

When the accelerator is being used for operating the work equipment, always set the transmission cut-off switch to the ON position and use the left brake pedal to slow or stop the machine.

ACCELERATOR PEDAL

This pedal (7) controls the engine speed and output.

The engine speed can be freely controlled between low idling and full speed.



STEERING COLUMN TILT LEVER



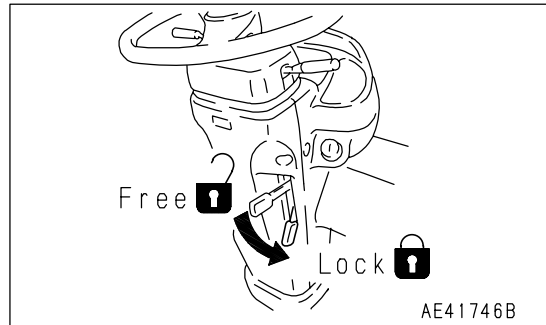
WARNING

Stop the machine before adjusting the tilt of the steering wheel. If this operation (adjustment) is carried out while the machine is moving, it may lead to a serious accident or personal injury.

This lever allows the steering column to be tilted forward or backward.

Pull the lever up and move the steering wheel to the desired position. Then push the lever down to lock the steering wheel in position.

Range of adjustment: 125 mm (4.9 in) (stepless)



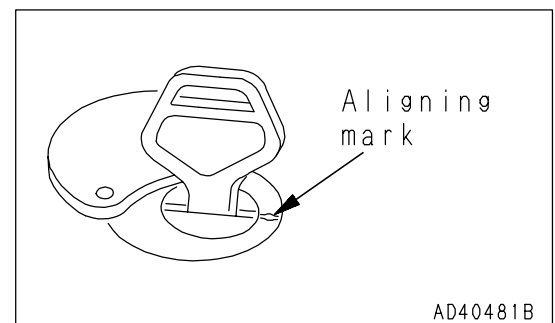
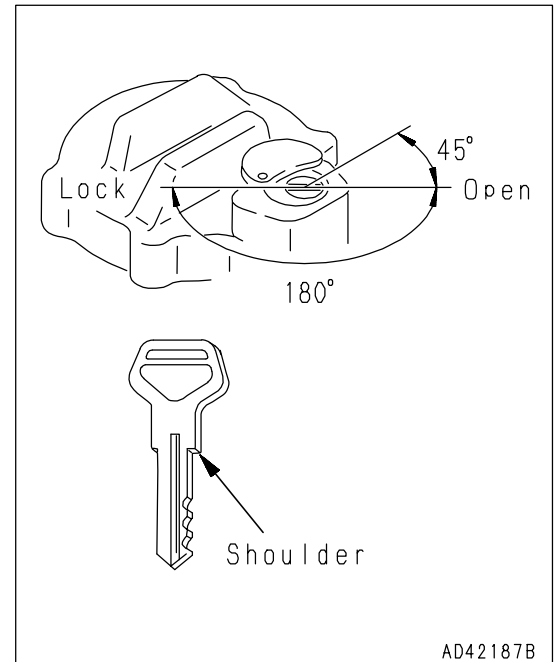
CAP WITH LOCK

A lock is provided on the caps for fuel tank oil filler port, transmission oil filler port (if equipped) and hydraulic tank oil filler port (if equipped). Use the engine starting switch for opening - closing the cap.

METHOD OF OPENING AND CLOSING CAP WITH LOCK

TO OPEN THE CAP

1. Insert the starting switch key into the cap as far as it will go (to the shoulder).
If the starting switch key is turned before it is inserted all the way, it may break.
2. Turn the starting switch key counterclockwise and bring the rotor groove in line with the aligning mark on the cap. Turn the cap slowly until a "clicking" sound is made. This releases the lock and allows the cap to be opened.



TO LOCK THE CAP

1. Screw the cap into place.
2. Turn the starting switch key counterclockwise and take the key out.

SAFETY BAR



If safety bar is unlocked, machine can jackknife unexpectedly when it is being transported or hoisted.

Jackknifing can cause serious injury or death to bystanders.

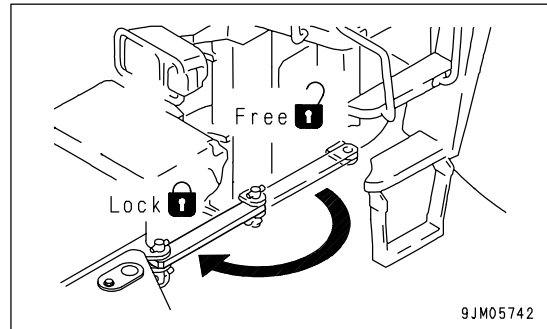
- Always lock safety bar when machine is being transported or hoisted.
- If necessary, lock safety bar during servicing or maintenance.

The safety bar is used to lock the front and rear frames, and prevents the front and rear frames from pivoting.

Lock position: Always lock safety bar when machine is being transported or hoisted.

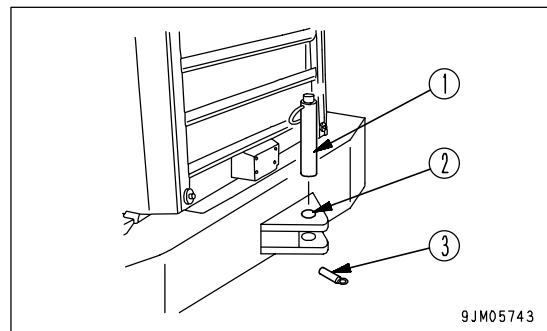
If necessary, lock safety bar during servicing or maintenance.

Free position: Always remove the safety bar for travel operations.



TOWING PIN

1. Insert towing pin (1) into hole (2) in the counterweight.
 2. Use linch pin (3) to set so that the towing pin does not come out.
- Carry out this operation in reverse to remove the pin.

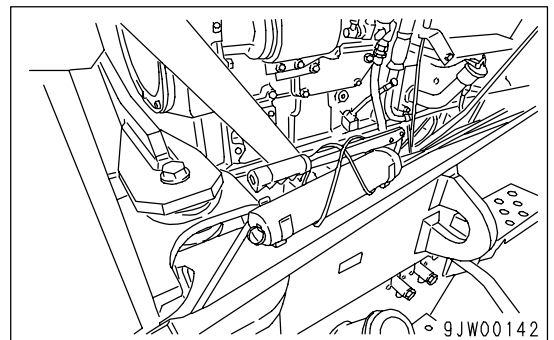
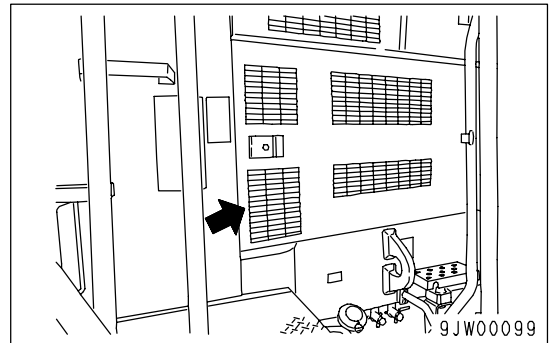


GREASE PUMP

The grease pump is stored in the engine hood at the rear of the machine. After using it, wipe off all grease stuck to its outside of the pump, then store it.

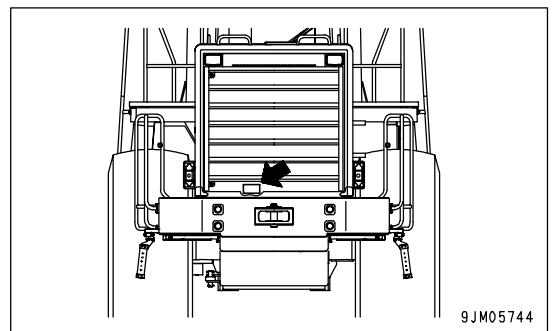
The clamp and rubber ring that secure the grease pump are seen when the engine side panel is opened. Set the grease pump in the clamp and attach the chain to the clamp to prevent any play.

In addition, attach the rubber ring in a figure eight, as shown in the diagram on the right, to hold the grease pump in position.



BACKUP ALARM

This sounds an alarm when the directional lever is set to the R position. It is used to warn people behind the machine that the machine will travel in reverse.

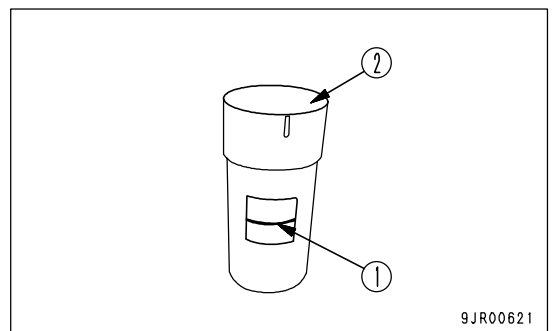


DUST INDICATOR

This device indicates clogging of the air cleaner.

Depending on the degree of clogging of the element, red line (1) appears in the transparent portion. If red line (1) indicates 0.0075 MPa (30 INCHES H₂O) (0.076 kgf/cm², 1.1 PSI), clean the element immediately.

After cleaning, press top portion (2) of the indicator to return red line (1) to its original position.



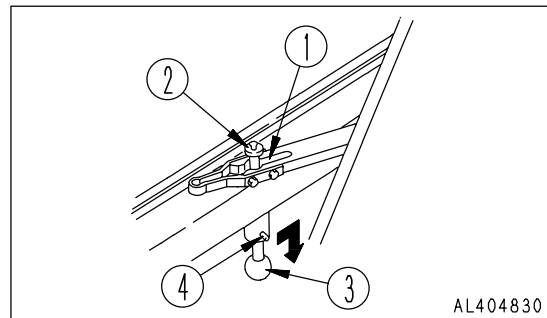
CAB DOOR OPEN LOCK

This can be used to hold the door open.

Open the door so that tip (2) of the lever is aligned with groove (1) of the lock, then pull down knob (3) as shown in the diagram.

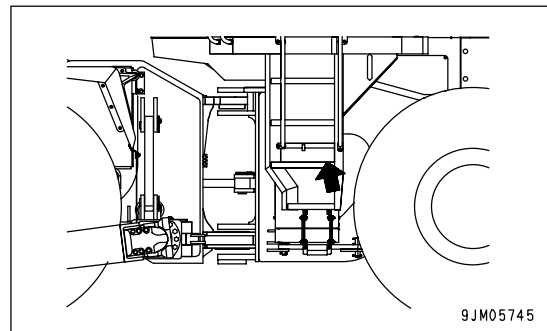
When using the door-open lock, be sure to apply the lock securely.

When releasing the lock and closing the door, push up knob (3) and insert pin (4) securely into the groove.



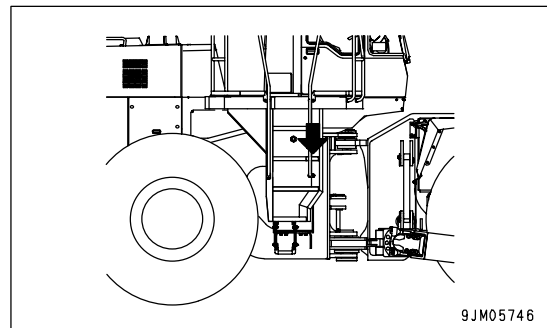
TOOL BOX

The tool box is installed under the step on the left side of the machine. Use it to store tools, etc..



OIL FILLER LOCATION

The 4th step from the bottom rung of a ladder provided at the right side of machine is big enough on which to place a large-sized oiler. Use of that step is recommended particularly when raising oil up to the top of machine.



FUSE

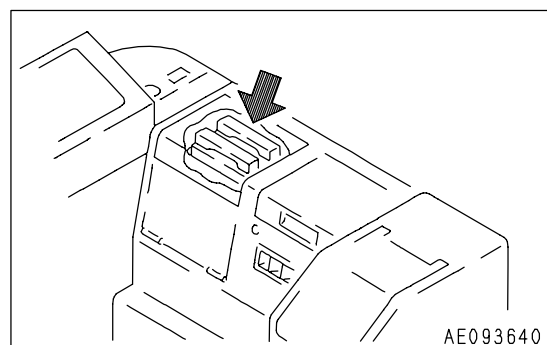
NOTICE

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.

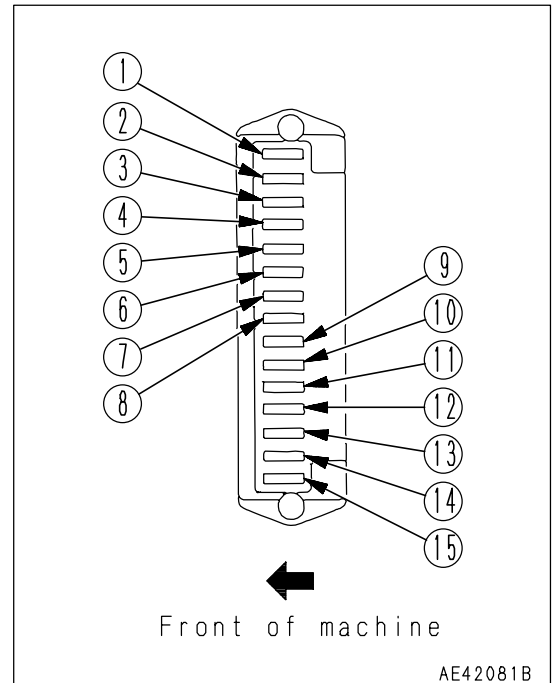
Replace the fuse with another of the same capacity.



FUSE CAPACITY AND NAME OF CIRCUIT

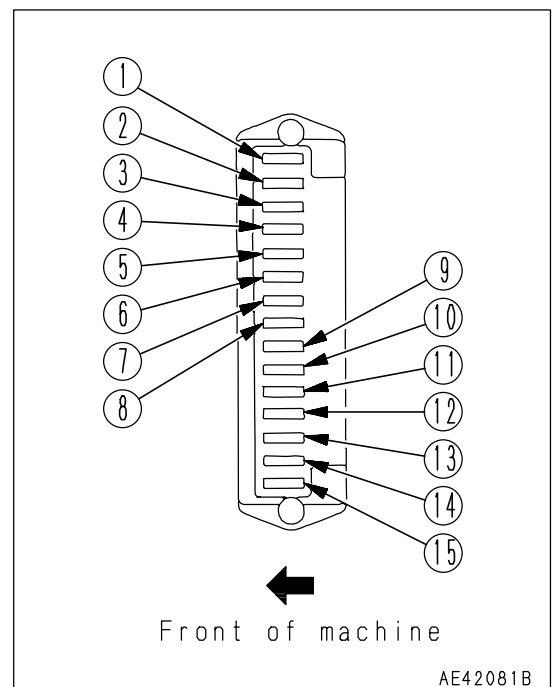
FUSE BOX 1

No.	Fuse capacity	Name of circuit
(1)	20A	Main lamp circuit
(2)	20A	Backup lamp, brake lamp
(3)	10A	Turn signal indicator lamp
(4)	10A	R.H. head lamp
(5)	10A	L.H. head lamp
(6)	10A	R.H. side clearance lamp
(7)	10A	L.H. side clearance lamp
(8)	10A	Parking brake
(9)	10A	Transmission control
(10)	10A	Instrument panel
(11)	10A	Joystick steering (if equipped)
(12)	10A	Starting switch
(13)	20A	Hazard lamp
(14)	–	–
(15)	10A	Auto-greasing (if equipped)



FUSE BOX 2

No.	Fuse capacity	Name of circuit
(1)	20 A	Front working lamp
(2)	20 A	Rear working lamp
(3)	30 A	Air conditioner 1 (if equipped)
(4)	20 A	Air conditioner 2 (if equipped)
(5)	20 A	Wiper, washer
(6)	10 A	Transmission controller (if equipped)
(7)	10 A	Cigarette lighter, radio (if equipped)
(8)	10 A	Rotating lamp (if equipped)
(9)	10 A	–
(10)	10 A	Auto-greasing (if equipped)
(11)	30 A	Spare
(12)	20 A	L.H. power window
(13)	20 A	R.H. power window
(14)	10 A	Air suspension seat (if equipped)
(15)	10 A	Blade tilt/pitch

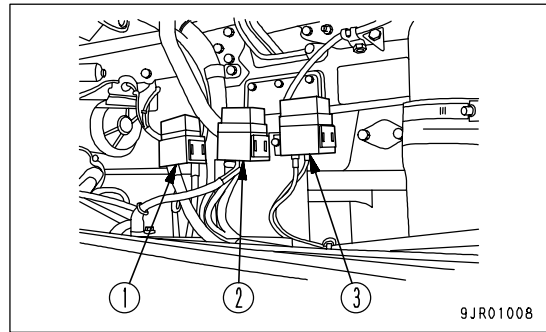


SLOW-BLOW FUSE

If the power does not come on when the starting switch is turned ON, the slow-blow fuse may be blown, so check and replace it. The slow-blow fuse is beside the engine on the left side of the machine.

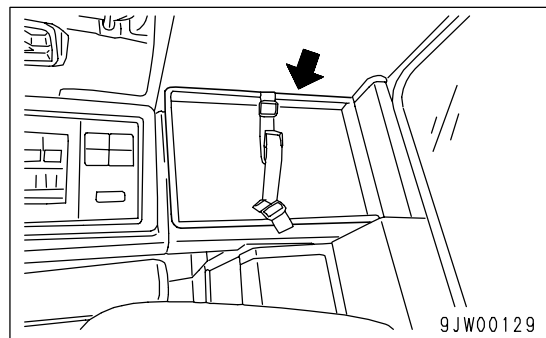
SLOW-BLOW FUSE

- (1)120A: Electrical intake air heater
- (2)80A: Main power
- (3)30A: Battery power (starting switch, hazard)



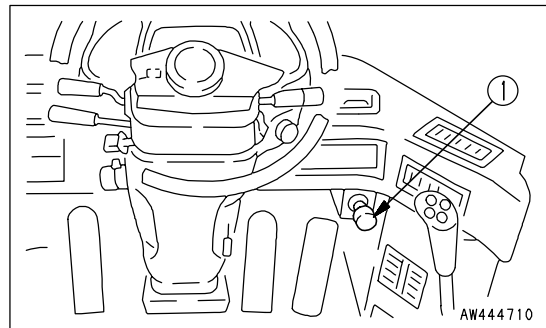
LUNCH BOX TRAY

There is a space for a lunch box at the right rear of the cab. Even a large lunch box 35 cm (13.8 in) long, 22 cm (8.7 in) wide and 18 cm (7.1 in) high can be placed easily and attached with a band.



TAKING OFF POWER

Removing the cigarette lighter (1) allows to use it power. The maximum electric current is 7 A (168 W).



OPERATION

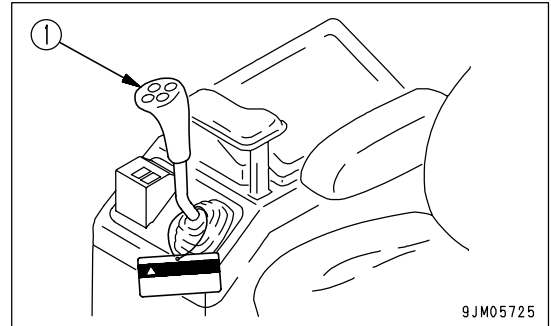
CHECK BEFORE STARTING ENGINE, ADJUST

WALK-AROUND CHECK



WARNING

- Always attach the warning tag to blade control lever (1).
- Leakage of oil or fuel, or accumulation of flammable material around high temperature parts, such as the engine muffler or turbocharger, may cause fire. Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.



Before starting the engine, walk around the machine and look to the underside of chassis for anything unusual like looseness of the bolts and nuts, leakage of fuel, oil and cooling water. Also check the condition of the work equipment and the hydraulic system.

Check also for loose wiring, play, and collection of dust at places which reach high temperature.

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

1. Check for damage, wear, play in work equipment, cylinders, linkage, hoses
Check that there are no cracks, excessive wear, or play in the work equipment, cylinders, linkage, or hoses. If any abnormality is found, repair it.
2. Remove dirt and dust from around engine, battery, radiator
Check if there is any dirt or dust accumulated around the engine or radiator. Check also if there is any flammable material (dead leaves, twigs, grass, etc.) accumulated around the battery or high temperature engine parts, such as the engine muffler or turbocharger. Remove all such dirt or flammable material.
3. Check for leakage of water or oil around the engine.
Check that there is no leakage of oil from the engine or leakage of water from the cooling system. If any abnormality is found, repair it.
4. Check for leakage of oil from the transmission case, axle, hydraulic tank, hoses, or joints
Check that there is no leakage of oil. If any abnormality is found, repair it.
5. Check for leakage of oil from the brake line
Check that there is no leakage of oil. If any abnormality is found, repair it.
6. Check for damage or wear to tires, and loose mounting bolts
Check for cracks or peeling of the tires and for cracks or wear to the wheels (side rim, rim base, lock ring). Tighten any loose wheel nuts. If any abnormality is found, repair or replace the part.
If any valve caps are missing, install new caps.
7. Check for damage to the handrail and steps, loose bolts
Repair any damage and tighten any loose bolts.

- 8. Check for damage to gauges, monitor, loose bolts
Check that there is no damage to the gauges and monitor in the operator's cab. If any abnormality is found, replace the parts. Clean off any dirt on the surface.
- 9. Check for loose air cleaner mounting bolts
Check for any loose mounting bolts, and tighten if necessary.
- 10. Check for loose battery terminals
Tighten any loose terminal.
- 11. Check seat belt and equipment

! WARNING

Even if there appears to be no abnormality with the seat belt, always replace it once every three years.

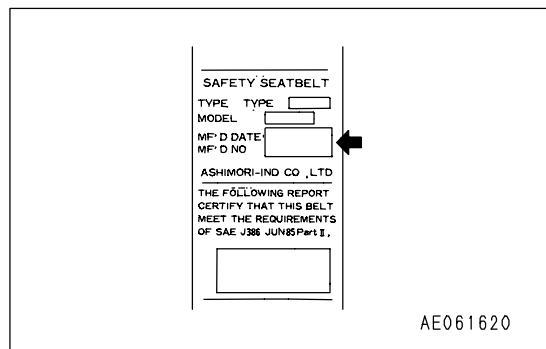
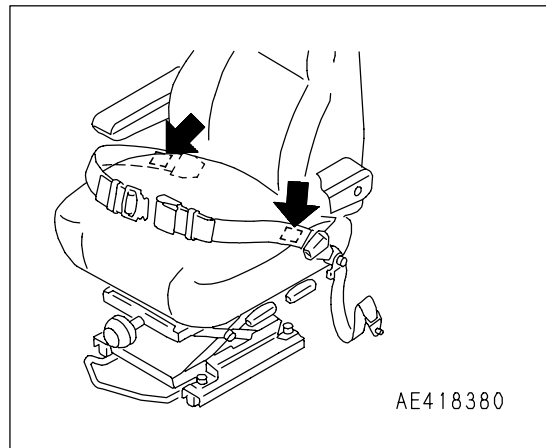
REMARK

The date of manufacture of the seat belt is marked on the belt at the place indicated by the arrow in the diagram on the right.

Check that there are no loose bolts on the equipment mounting the seat belt to the machine, and tighten if necessary.

Tightening torque: 24.5 ± 4.9 N·m
(2.5 ± 0.5 kgf·m, 18.1 ± 3.6 lbft)

If the belt is damaged or fluff is starting to form, or if there is any damage or deformation of the seat belt holders, replace the seat belt with a new one.

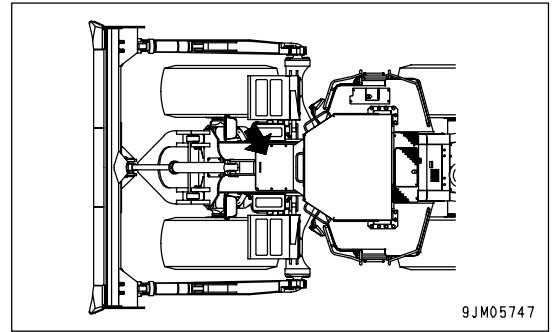


- 12. Check for loose bolts on ROPS
Check for any loose or damaged bolts. If any loose bolts are found tighten them to 1520 to 1910 N·m (155 to 195 kgf·m, 1121 to 1410 lbft).
If any bolts are damaged, replace them with genuine Komatsu bolts.

13. Clean cab window

Clean the cab window to ensure good visibility when operating the machine.

When cleaning the front glass, articulate the machine, and move onto the center of the front frame to carry out the cleaning operation.



14. Inspection of tires

**WARNING**

If worn or damaged tires are used, they may burst and cause serious injury or death.

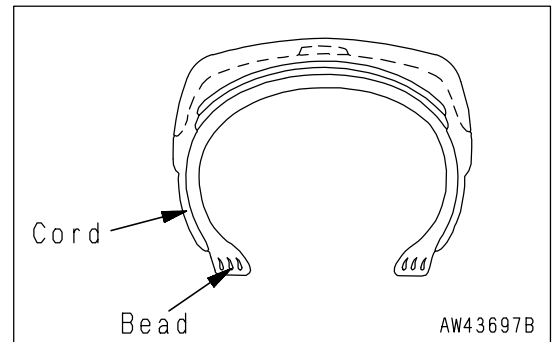
To ensure safety, do not use the following tires.

Wear:

- Tires with a tread groove of less than 15% of that of a new tire
- Tires with extreme uneven wear or with stepped-type wear

Damage:

- Tires with damage which has reached the cords, or with cracks in the rubber
- Tires with cut or pulled cords
- Tires with peeled (separated) surface
- Tires with damaged bead
- Leaking or improperly repaired tubeless tires
- Deteriorated, deformed or abnormally damaged tires which do not seem usable



15. Check rims

**WARNING**

Check the rims (wheels) and rings for deformation, corrosion and cracks.

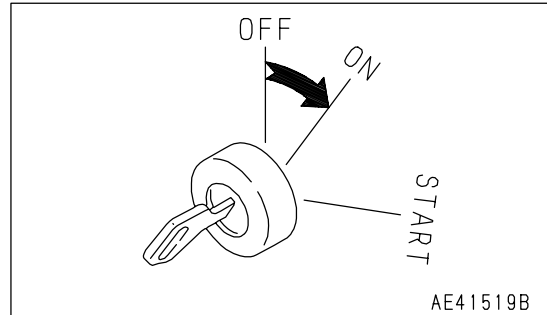
In particular, check the side rings, lock rings and rim flanges thoroughly.

CHECK BEFORE STARTING

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

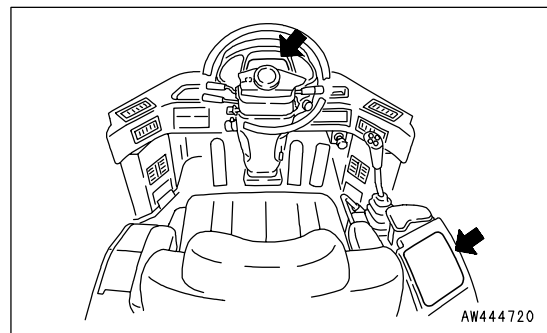
CHECK MONITOR PANEL

1. Turn the starting switch ON.



2. Check that all the monitors, gauges, and the central warning lamp light up for approx. 3 seconds and the alarm buzzer sounds for approx. 1 sec.

If the lamps do not light up, there is probably a failure or disconnection, so contact your Komatsu distributor for inspection.



CHECK COOLANT LEVEL, ADD WATER

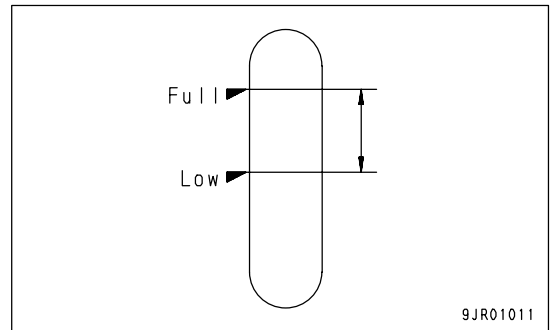
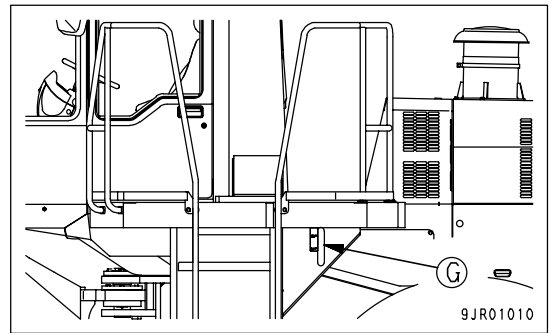
! WARNING

- Do not open the radiator cap unless necessary. When checking the coolant, always wait for the engine to cool down and check the sub tank.
- Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to 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.

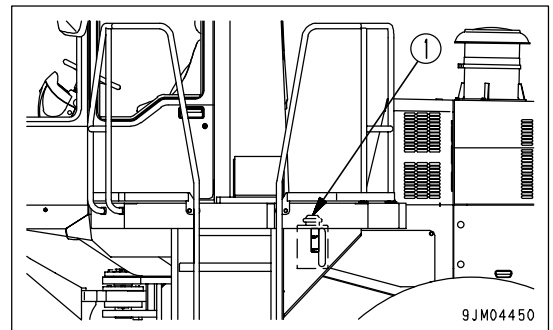
! CAUTION

When adding water, use the step and handrail provided, and support your body securely.

1. Check that the coolant is within the range of FULL-LOW marks indicated on the gauge (G). If the coolant level is low, open the cover at the top of the platform and add water through the filler port (1) up to the FULL mark.
2. After adding water, tighten the cap securely.
3. If the sub-tank is empty, check for water leakage, then add water to the radiator and sub-tank.



If the volume of coolant added is more than usual, check for possible water leakage.
Confirm that there is no oil in the coolant.



CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

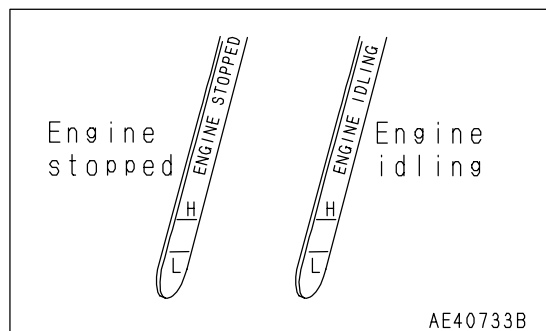
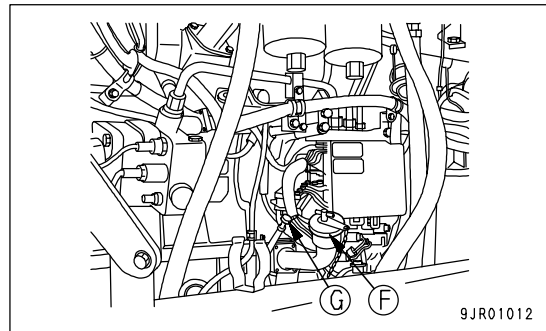
The parts and oil are at high temperature immediately after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.

1. Open the inspection cover of the right side at the rear of the machine.
2. Take out the dipstick (G) and wipe off the oil with cloth.
3. Insert dipstick (G) fully in the oil filler pipe, then take it out again.
4. The oil level should be between the H and L marks on dipstick (G).

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

The dipstick has level markings on both sides. One side gives the levels for measuring when the engine is stopped (ENGINE STOPPED) and the other side gives the levels for when the engine is idling (ENGINE IDLING).

When measuring the oil level, measure with the engine stopped and use the side of the dipstick marked "ENGINE STOPPED".



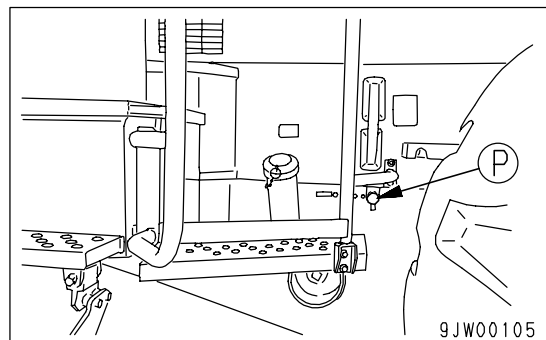
5. If the oil is above the H mark, drain the excess engine oil from drain plug (P), and check the oil level again.
6. If the oil level is correct, tighten oil filler cap (F) securely and close the inspection window.

REMARK

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

Checking the oil level with the engine idling may be allowed, if the following precautions are thoroughly satisfied:

- o Check that the engine water temperature gauge shows green range.
- o Use the side of the dipstick marked "ENGINE IDLING".
- o Remove the oil filler cap.
- If the machine is at an angle, make it horizontal before checking.

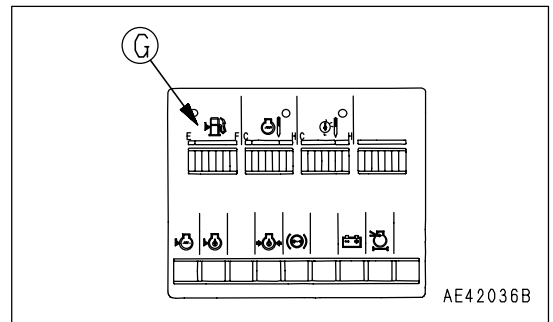
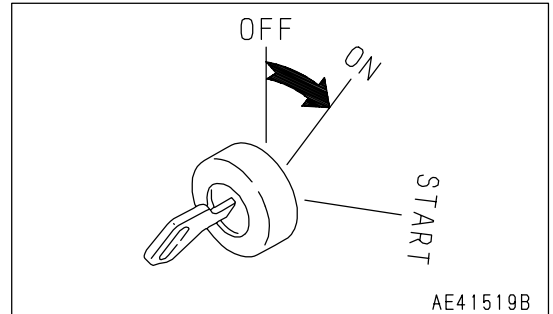


CHECK FUEL LEVEL, ADD FUEL



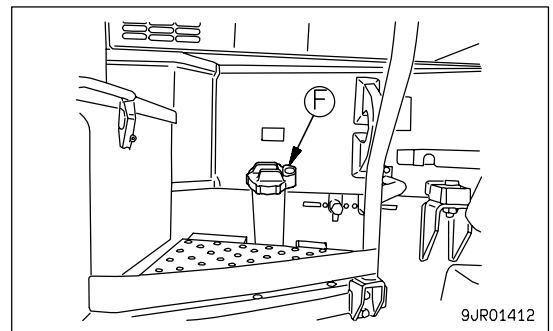
When adding fuel, never let the fuel overflow. This may cause a fire. If any fuel is spilled, wipe it up completely. Never bring flames near fuel because it is highly flammable and dangerous.

1. Turn the engine starting switch to the ON position and check the fuel level with fuel level gauge (G).
After checking, turn the switch back to the OFF position.



2. After completing operations, add fuel through fuel filler (F) to fill the tank.
For details of the method for opening and closing the cap, see "CAP WITH LOCK (PAGE 3-33)".
3. After adding fuel, tighten the cap securely.

Fuel capacity: 670 liters (177 US gal)



CHECK ELECTRIC WIRING

- If fuses are frequently blown or if there are traces of short circuit on the electrical wiring, locate the cause and carry out repair, or please contact your Komatsu distributor.
- Accumulation of flammable material (dead leaves, twigs, grass, etc.) around the battery may cause fire, so always check and remove such material.
- 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 for damage and wrong capacity of the fuse and any sign of disconnection or short circuit in the electric wiring. Check also for loose terminals and tighten any loose parts.

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

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

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

CHECK PARKING BRAKE

Check that the parking brake works properly.

If there is any abnormality in the operation of the parking brake or the brake does not provide the proper braking effect, please contact your Komatsu distributor for adjustment.

CHECK BRAKE PEDAL

Drive the machine forward and check the effect of the brakes.

If there is any abnormality in the actuation of the brakes, please contact your Komatsu distributor to have the brakes adjusted.

CHECK INFLATION PRESSURE OF TIRES

Measure the inflation pressure with a tire pressure gauge while the tires are cool before starting work.

Check for damage or wear to the tires and the rims.

Check for loose wheel hub nuts (bolts).

The proper inflation pressure is shown below.

Size	Standard inflation pressure
35/65-33-24PR (L4 Rock)	Front tire: 0.34 MPa (3.5 kgf/cm ² , 49.7 PSI) Rear tire: 0.39 MPa (4.0 kgf/cm ² , 56.8 PSI)
35/65-33-24PR (L5 Rock)	Front tire: 0.34 MPa (3.5 kgf/cm ² , 49.7 PSI) Rear tire: 0.39 MPa (4.0 kgf/cm ² , 56.8 PSI)
35/65-R33 (L4 Rock)	Front tire: 0.44 MPa (4.5 kgf/cm ² , 63.9 PSI) Rear tire: 0.49 MPa (5.0 kgf/cm ² , 71.0 PSI)

NOTICE

The optimum inflation pressure differs according to the type of work. For details, see "HANDLING THE TIRES (PAGE 3-70)".

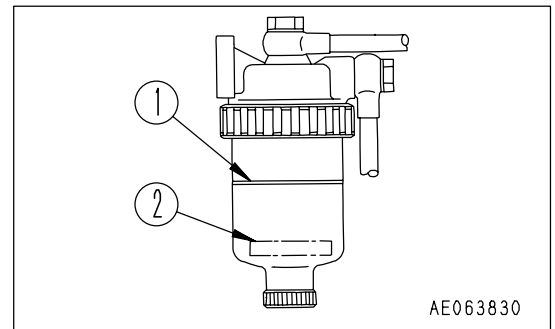
CHECK WATER SEPARATOR

(If equipped)

The water separator separates water mixed in the fuel. If float (2) is at or above red line (1), drain the water.

For the draining procedure, see section "DRAIN WATER FROM WATER SEPARATOR (PAGE 4-32)".

Even if a water separator is installed, be sure to check the fuel tank to remove water and sediment in the fuel.



ADJUSTMENT

SEAT ADJUSTMENT



- When adjusting the operator's seat, stop the machine in a safe place before starting the operation.
- Adjust the seat before starting operations for the day or when changing operators.
- When adjusting the seat, put your back against the backrest and adjust to a position where the brake pedal can be fully depressed.

(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 mm (0.6 in) x 10 stages)

(B) Adjusting seat angle

Move lever (2) up and push down on the rear of the seat to tilt it backward.

Move lever (2) down and push down on the front of the seat to tilt it forward.

Adjustment range: 13 degrees (Front tilt, rear tilt: 4 stages each)

(C) Setting seat for operator's weight

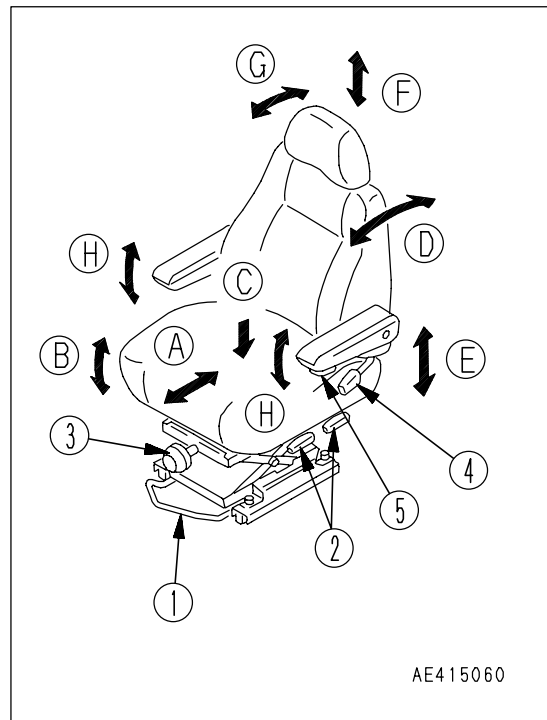
Turn grip (3) to adjust the strength of the suspension.

Adjustment range: (Target) 50 kg to 120 kg (110 to 265 lb)

(D) Adjusting backrest angle

Move lever (4) up and move the backrest to the front or rear.

Adjustment range: Front 66 degrees (3 degrees x 22 stages)
Rear 72 degrees (3 degrees x 24 stages)



NOTICE

If the backrest is reclined too far, the backrest may hit the rear glass, so use it in a position where it does not contact the glass. When reclining the seat fully to take a rest, set the seat in the following position.

- **Fore-and-aft adjustment: Max. front position**
- **Up-down adjustment: Max. height**
- **Seat angle adjustment: Horizontal or fully tilted**
- **Reclining adjustment: Fully tilted backward 36 degrees (12 stages)**

(E) Seat height adjustment

Move lever (2) up/down, then move the seat up or down as desired. Since lever (2) is also used for adjusting seat angle, set the seat to the desired height while adjusting the angle.

Adjustment range: 60 mm (2.4 in)

(F) Adjusting headrest height

Move the headrest up or down to the desired height.

Adjustment range: 50 mm (2.0 in)

(G) Adjusting headrest angle

Rotate the headrest to the front or rear.

(H) Adjusting armrest angle

Adjust angle of armrest by rotating knob (5) (left side only).

Adjustment range: 30 degrees (forward tilt: 25 degrees, backward tilt: 5 degrees)

Also, when armrest is turned, it will spring up. (Both left and right sides)

ADJUST SEAT BELT

Always wear the seat belt.

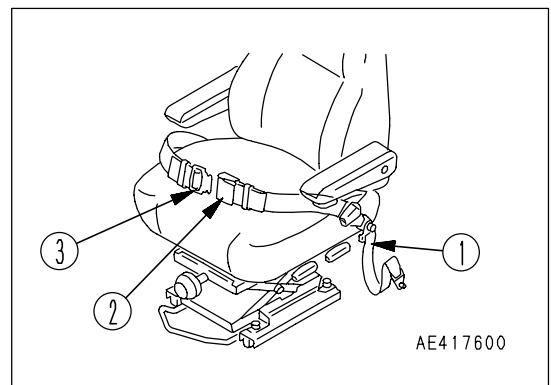
**WARNING**

- Before fastening the seat belt, check that there is no abnormality in the belt mounting bracket or mounting belt. If the belt is worn or damaged, replace it.
- Fasten the seat belt before starting operations.
- Always wear the seat belt during operations.
- Make sure that the left and right belts are not twisted when fastening the seat belt.

Fastening and removing belt

Fasten the belt so that it is tight without being too tight.

1. Sit on the seat, depress the brake pedal fully, and adjust the seat so that your back is pressed against the backrest.
2. After adjusting the seat position, adjust tether belt (1). Tense the tether belt and install it when there is no one sitting on the seat.
3. Sit on the seat, hold buckle (2) and tongue (3) with your left and right hands, insert tongue (3) into buckle (2), then pull the belt to check that it is securely locked.



AE417600

4. When removing the belt, raise the tip of buckle (2) lever to release it. Fasten belt along your body without kinking it. Adjust the lengths of the belt on both the buckle and the tongue sides so that the buckle is located at the mid-point of your body front.

WRIST REST HEIGHT ADJUSTMENT LEVER

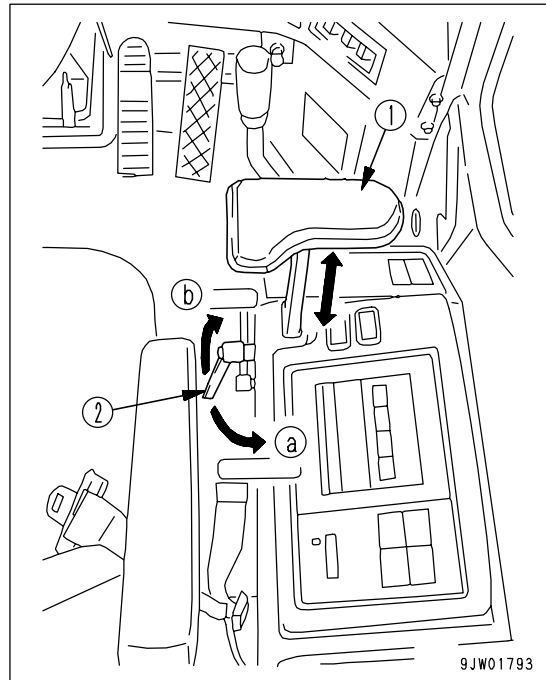
The height of lift rest (1) can be adjusted easily with adjustment lever (2). Turn adjustment lever (2) in the loosening direction and adjust the height of lift rest (1) properly, then turn adjustment lever (2) to the fixing direction.

Position (a): Loosening direction

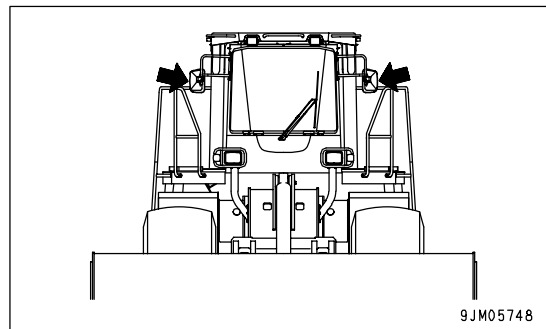
Position (b): Fixing direction

REMARK

If adjustment lever (2) is pulled towards the seat, the lever becomes free and faces directly down.

**ADJUST REAR VIEW MIRROR**

Sit in the operator's seat and adjust the rear view mirror so that you can see properly to the rear.

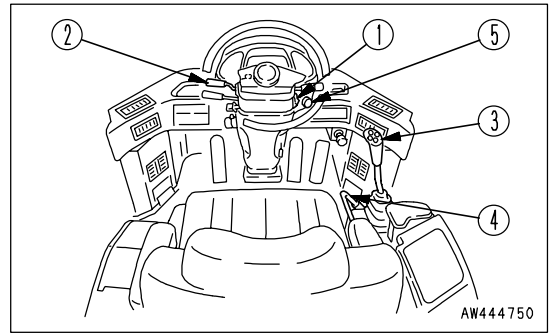


OPERATIONS AND CHECKS BEFORE STARTING ENGINE

WARNING

Before starting the engine, check that the safety lock lever is securely at the LOCK position.

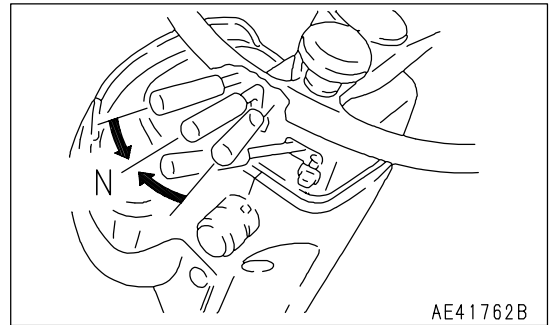
If the work equipment control lever is touched by mistake when starting the engine, the work equipment may move unexpectedly and cause serious damage or personal injury.



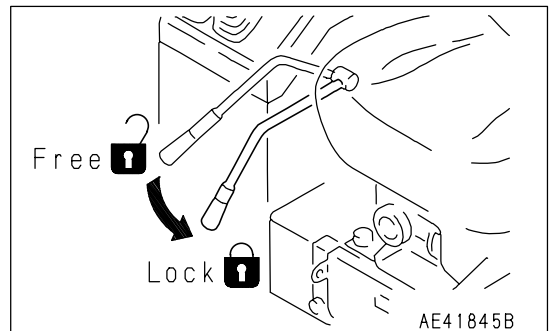
1. Check that parking brake switch (1) is at the ON position.



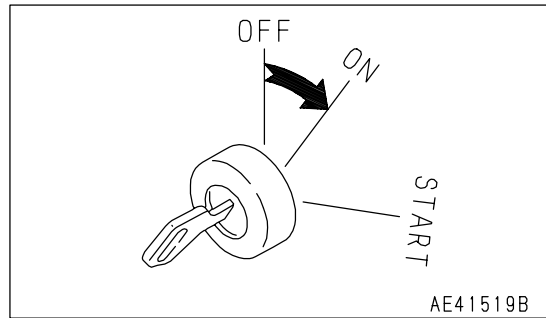
2. Check that directional lever (2) is at the N position.
When starting the engine, if directional lever (2) is not at the N position, the engine will not start.



3. Lower the blade to the ground, then check that blade control lever (3) is locked by safety lock lever (4).



4. Insert the key in starting switch (5), turn the key to the ON position, and check that the machine monitor system works. When the starting switch is turned to the ON position before starting the engine, all monitor lamps, gauges, and centralized warning lamps will light up for approx. 3 seconds, and the alarm buzzer will sound for approx. 1 second. When this happens, 88 is displayed on the speedometer, and 8 is displayed on the transmission shift indicator. If the monitor lamps do not light up, there is probably a failure or disconnection, so please contact your Komatsu distributor for inspection.



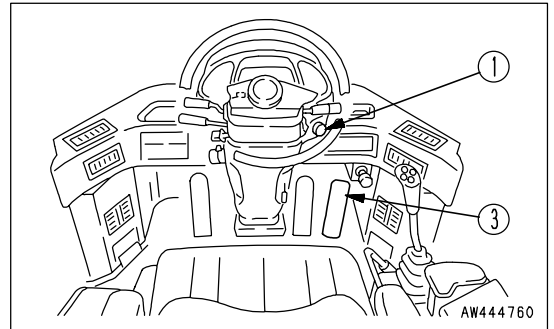
STARTING ENGINE

! WARNING

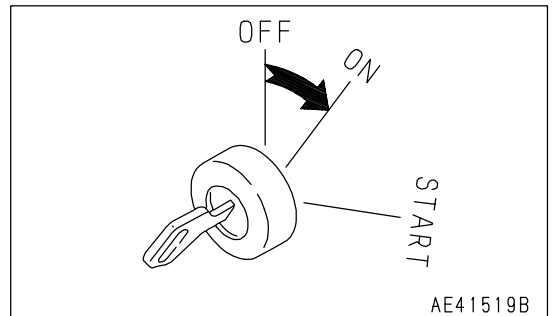
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.
- Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.

NOTICE

- Do not keep the starting motor rotating continuously for more than 20 seconds. If the engine will not start, wait for at least 2 minutes before trying to start the engine again.
- Avoid the sudden acceleration of the engine until it is warmed up.

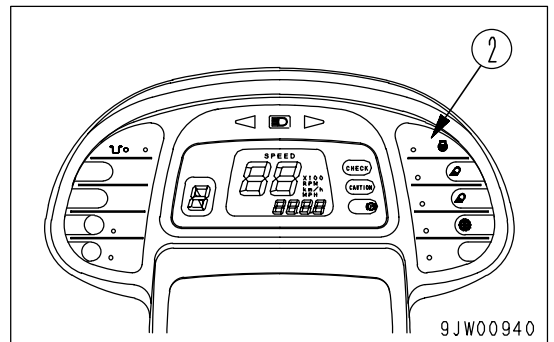


1. Turn the key of starting switch (1) to the ON position. The automatic preheating will start and the preheating pilot lamp (2) will light up.
The automatic preheating is actuated when the cooling water temperature is below 0°C (32°F).

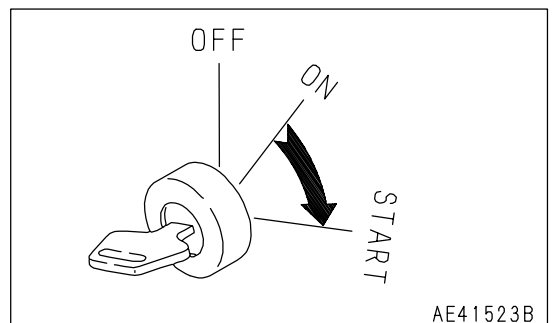


The preheating times are as shown below.

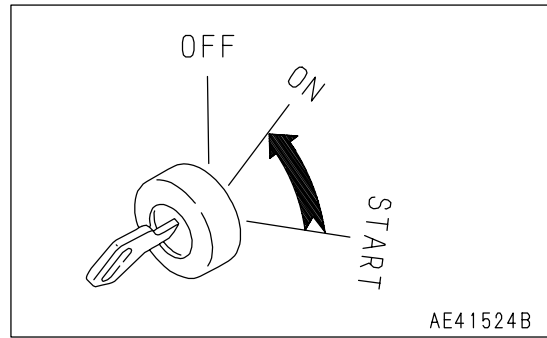
Cooling water temperature	Preheating time
below 0°C (32°F)	30 seconds



2. Keep the accelerator pedal (3) free without depressing it.
3. After the preheating pilot lamp (2) goes out, turn the key of starting switch (1) to the START position to start the engine.



- After the engine starts, release the key in starting switch (1).
The key will automatically return to the ON position.



- Immediately after starting the engine, (without depressing the accelerator pedal), run the engine at idle for at least 10 seconds during warm weather and for at least 15 seconds during cold weather.

REMARK

- Immediately after the engine is started, the turbo protect function is actuated. Even if the accelerator pedal is depressed, the engine speed will not rise above 1000 rpm.

Cooling water temperature	Turbo protect time
above 0°C (32°F)	0 second
-5°C (23°F)	3 seconds
below -10°C (14°F)	5 seconds

- If the accelerator pedal is kept depressed, the engine speed will suddenly rise after the turbo protect time. To prevent this, release the accelerator pedal.
- The turbocharger rotates at extremely high speed. Immediately after the engine is started, the pressure of the lubricating oil has not risen sufficiently, so if the engine speed is suddenly raised, it may lead to damage or seizure of the turbocharger bearing. The turbo protect function acts to prevent this problem. It uses electronic control to prevent the engine speed from rising above a certain speed for the first few seconds after the engine started.

AUTOMATIC WARMING-UP OPERATION

A function of engine warming-up run (engine rpm: 1000 rpm) is automatically actuated after the engine is started up, when the engine water temperature is low (below 30°C (86°F)). It is gradually released either when the engine cooling water temperature rises over 30°C (86°F), or when 10 minutes have passed since the engine start-up.

OPERATIONS AND CHECKS AFTER STARTING ENGINE



WARNING

- **Emergency stop**

If the operation is abnormal or any other trouble occurs, turn the key in the starting switch to the OFF position.

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

BREAKING IN THE MACHINE



CAUTION

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

Be sure to breaking-in the machine for the initial 100 hours (as indicated by the service meter).

During breaking-in operations, follow the precautions described in this manual.

- 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.

NORMAL OPERATION

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

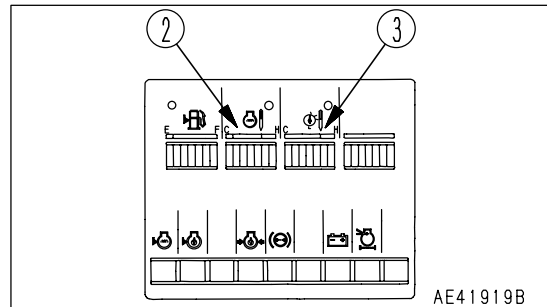
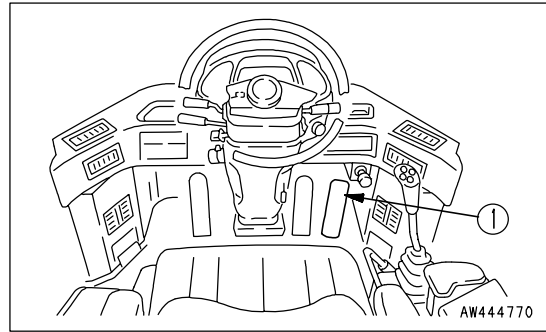
NOTICE

Do not suddenly accelerate the engine before the warming-up operation is completed.

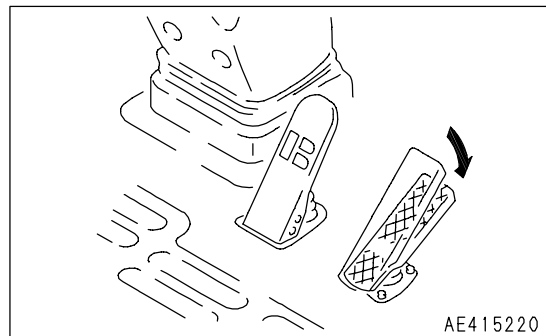
Do not run the engine at low idling or high idling continuously for more than 20 minutes.

If it is necessary to run the engine at idling, apply a load from time to time or run the engine at a mid-range speed.

1. Immediately after starting the engine, without depressing the accelerator pedal (1), run the engine at idle for at least 10 seconds during the warm weather and for at least 15 seconds during the cold weather.



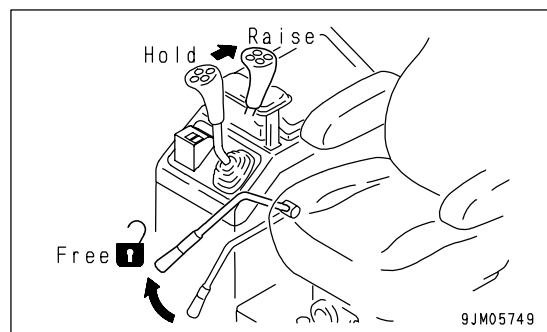
2. Depress accelerator pedal (1) lightly and run the engine with no load at midrange speed for about 5 minutes.



3. To warm up the hydraulic oil in cold areas only, do as follows. During the warming-up operation, check that the engine rotation is smooth, then set the safety lock lever of the blade control lever to the FREE position and move the blade control lever in and out of the RAISE position to warm up the hydraulic oil.

The relief time at the raise position should be maximum of 10 seconds.

With this operation, the oil will reach the relief pressure and this will warm up the hydraulic oil more quickly.



4. After carrying out the warming-up operation, check that the gauges and caution lamps are normal. If there is any abnormality, carry out maintenance or repair. Run the engine under a light load until engine cooling water temperature gauge (2) and torque converter oil temperature gauge (3) are in the green range.
5. Check that there is no abnormal exhaust gas color, noise, or vibration. If any abnormality is found, contact your Komatsu distributor.

REMARK

A peculiar noise from the engine may be heard, while reducing the travel speed with the accelerator pedal. But it has nothing to do with quality or durability of the machine.

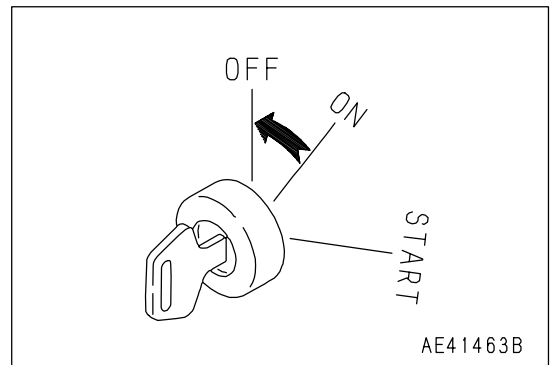
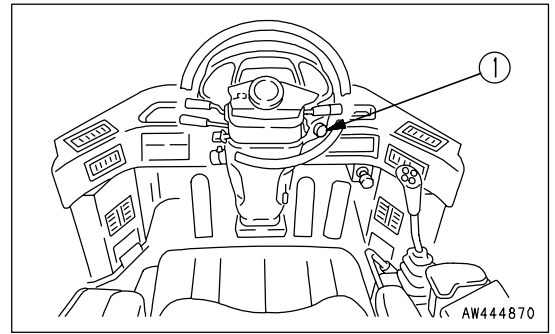
STOPPING ENGINE

NOTICE

If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.

In particular, if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.

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



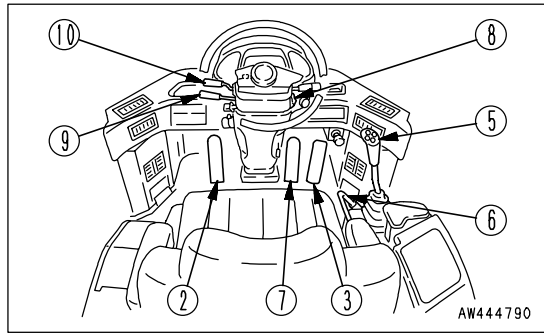
CHECK AFTER STOPPING ENGINE

1. Walk around the machine and check the work equipment, body work, and undercarriage, and check also for leakage of oil and water.
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.

MOVING MACHINE OFF (DIRECTIONAL, SPEED), STOPPING

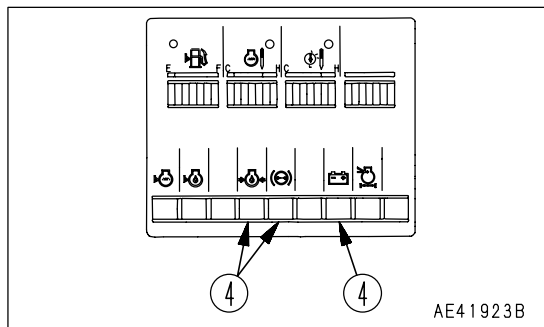
WARNING

- When moving the machine off, check that the area around the machine is safe, then sound the horn before starting.
- Do not allow people to get near the machine.
- Clear the machine's travel path of any obstacle.
- Pay a particular attention to the blind spot at the rear of the machine, when traveling the machine in reverse.

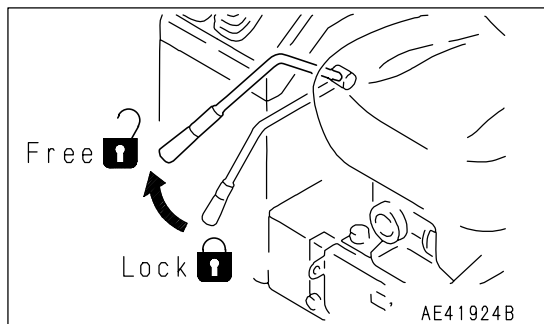


PREPARATIONS FOR MOVING MACHINE

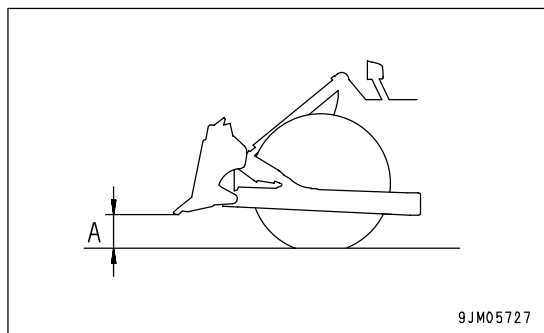
1. Check that caution pilot lamp (4) is not lighted up.



2. Set safety lock lever (6) of blade control lever (5) to the FREE position.



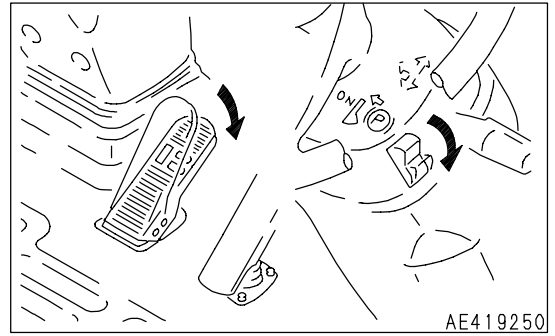
3. Operate blade control lever (5) to set the work equipment to the travel posture shown in the diagram on the right.
A: 50 to 60 cm (20 to 24 in).



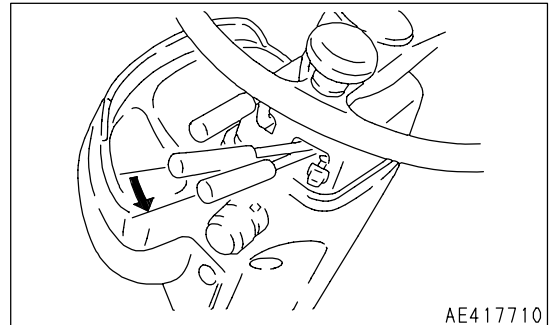
- Depress right brake pedal (7) and turn parking brake switch (8) to the OFF (RELEASE) position to release the parking brake. Keep right brake pedal (7) depressed.

REMARK

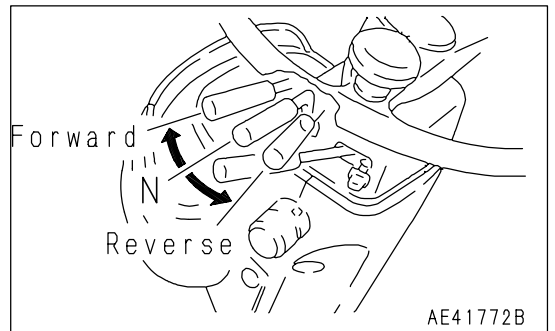
If the parking brake is still actuated when parking brake switch (8) is at the OFF (RELEASE) position, turn the parking brake switch ON, then turn it OFF again.



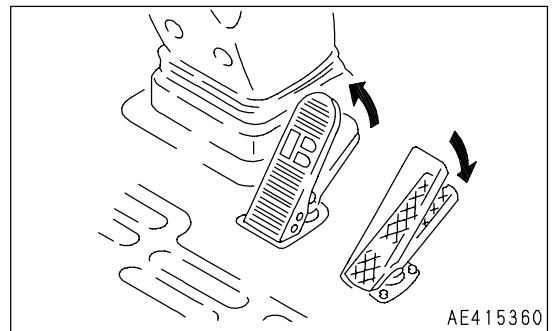
- Set gearshift lever (9) to the desired position.



- Set directional lever (10) to the desired position.

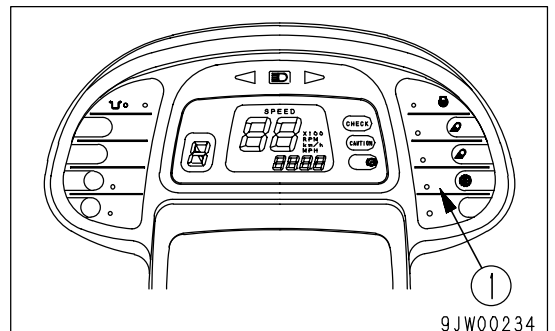


- Release right brake pedal (7), then depress accelerator pedal (3) to move the machine off.



REMARK

When moving the machine off on a hill, turn transmission cut-off switch (1) OFF, depress left brake pedal (2), operate the gearshift lever to the low speed range, then depress accelerator pedal (3) and gradually release left brake pedal (2) to let the machine move off. This makes it possible to prevent the machine from rolling back.



CHANGING GEAR SPEED



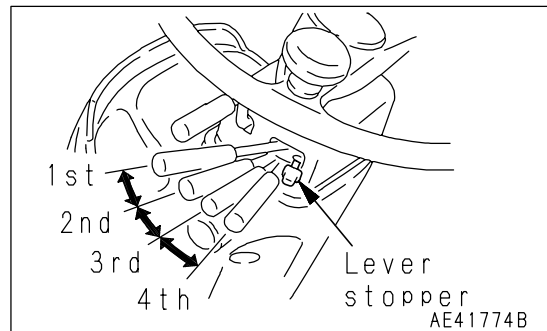
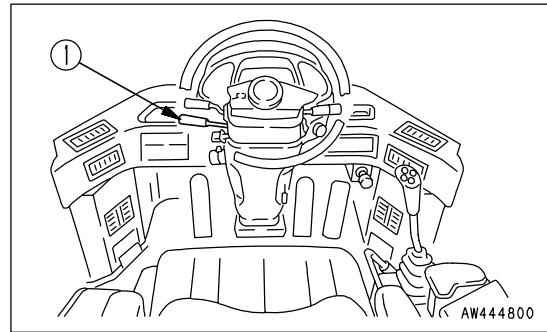
WARNING

When traveling at high speed, do not shift gear suddenly. Use the brake to reduce the travel speed before shifting gear.

Shift gear as follows.

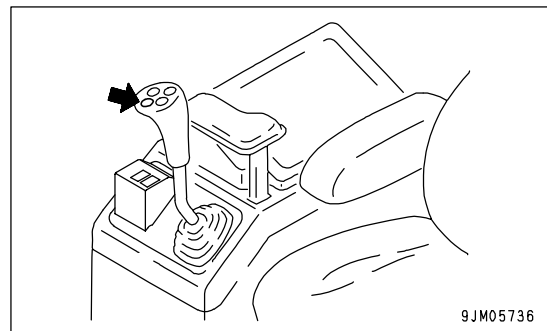
Move the gearshift lever (1) to the desired position to shift gear.

When carrying out operations in 1st or 2nd gear, use the gearshift lever stopper.



REMARK

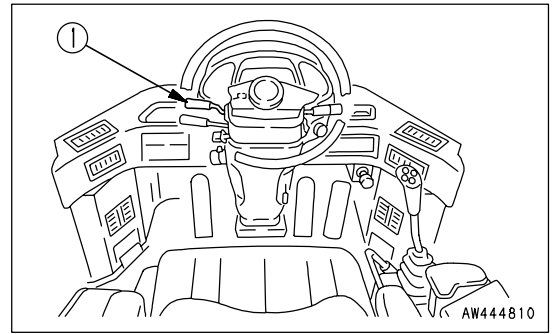
- This machine is equipped with a kickdown switch that shifts the gear down to 1st if the button at the tip of the blade control lever is pushed when the machine is traveling in 2nd gear. We recommend use of the kickdown switch when carrying out operations in 1st or 2nd gear. For details of use, see "KICKDOWN SWITCH (PAGE 3-22)".
- If the gearshift lever is operated slowly or it is stopped between speed ranges, error code "CALL" may be displayed. This is not a failure: the gearshift lever must be operated to complete the gear shifting within 2 seconds.



CHANGING DIRECTION

WARNING

- When changing direction between FORWARD and REVERSE, check that the new direction of travel is safe. There is a blind spot behind the machine, so be particularly careful when changing direction to travel in reverse.
 - Do not switch between FORWARD and REVERSE when traveling at high speed.
- When switching between FORWARD and REVERSE, depress the brake to reduce the travel speed sufficiently, then change the direction of travel. (Max. speed for changing direction: 12 km/h (7.5 MPH))

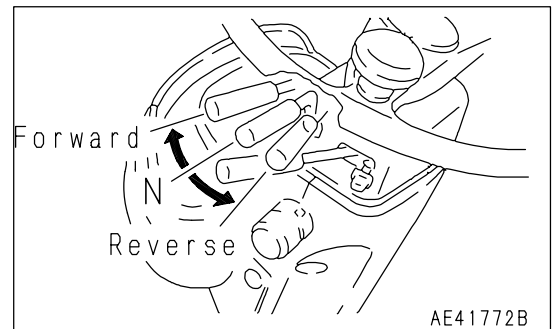


There is no need to stop the machine even when switching between FORWARD and REVERSE.

Place directional lever (1) in the desired position.

REMARK

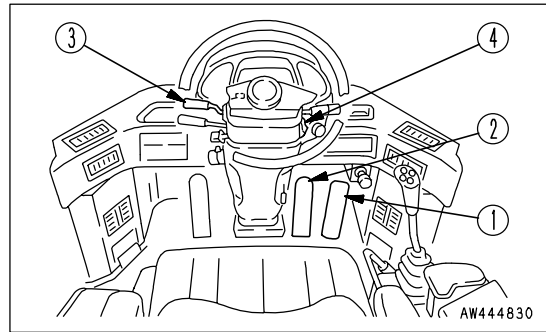
If the directional lever is operated slowly or it is stopped between directional range, error code "CALL" may be displayed. This is not a failure: the directional lever must be operated to complete the directional shifting within 2 seconds.



STOPPING MACHINE

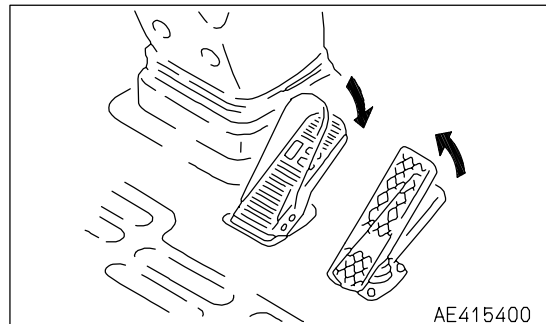
**WARNING**

- Avoid stopping suddenly. Give yourself ample room when stopping.
- Even if the parking brake switch is turned ON, there is danger until the parking brake pilot lamp lights up, so keep the brake pedal depressed.

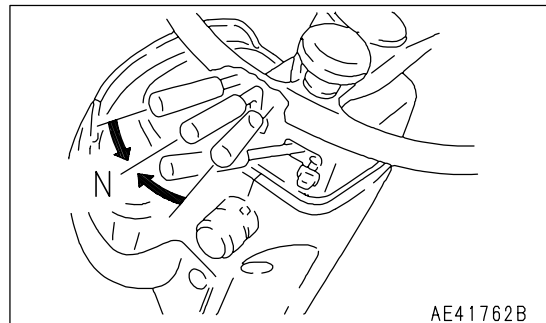
**NOTICE**

Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

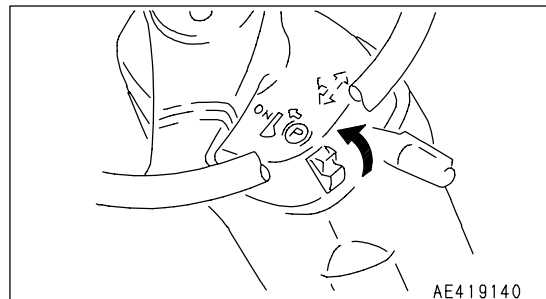
1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



2. Place directional lever (3) in N (neutral) position.



3. Turn parking brake switch (4) to ON to apply the parking brake.



TURNING



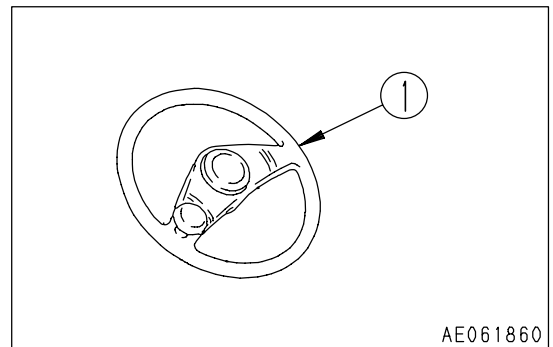
WARNING

- Operating the steering wheel suddenly at high speed or operating the steering wheel on steep slopes is dangerous. Do not operate the steering wheel in such situations.
- If the engine stops when the machine is traveling, it will become impossible to operate the steering, so never stop the engine. It is particularly dangerous if the engine stops when the machine is traveling on slopes, so never let the engine stop when traveling on slopes.
If the engine stops, stop the machine immediately at a safe place.

When traveling, use steering wheel (1) to turn the machine.

With this machine, the front frame is joined to the rear frame at the center of the machine by the center pin. The front and rear frames bend at this point, and the rear wheels follow in the same track as the front wheels when turning.

Turn the steering wheel lightly to follow the machine as it turns.

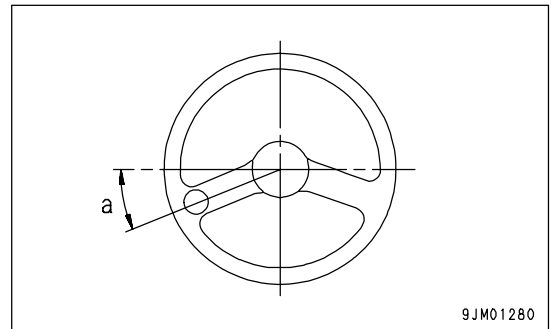


AE061860

NOTICE

Do not attempt to turn the steering wheel any further in an effort to make a sharp turn, when it reaches its stroke end.

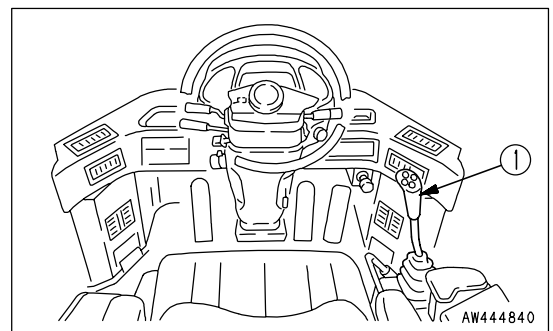
Check that steering wheel play (a) is somewhere between 50 - 100 mm (2.0 - 3.9 in) and that steering normally functions. If any abnormality is noticed, call your Komatsu distributor for inspection and repair.



9JM01280

OPERATION OF WORK EQUIPMENT

Blade control lever (1) can be used to operate the blade as follows.



AW444840

BLADE LIFT OPERATION

Position (a): RAISE

Position (b): HOLD

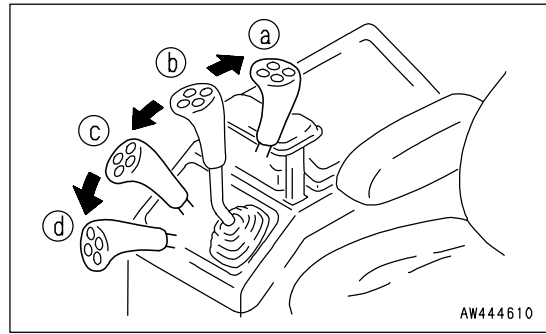
The blade is kept in the same position

Position (c): LOWER

Position (d): FLOAT

The blade moves freely under external force.

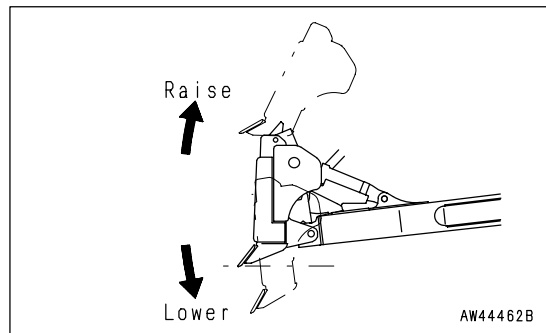
If the lever is released at this position, it will not return to the HOLD position, so return it manually.



AW444610

REMARK

If the lever is released at position (a) or (c), the lever will return to the HOLD position.



AW44462B

BLADE TILT OPERATION

Position (a): LEFT TILT

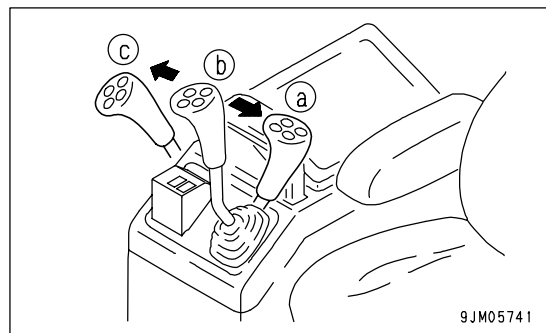
Position (b): HOLD

The blade is kept in the same position

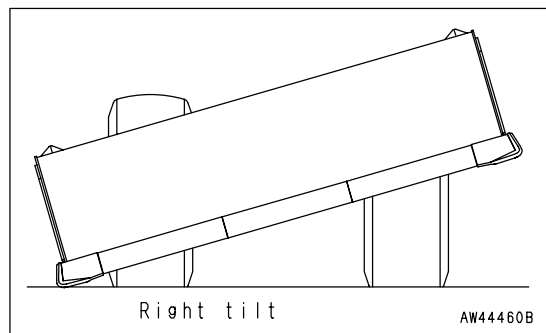
Position (c): RIGHT TILT

REMARK

If the lever is released at position (a) or (c), the lever will return to the HOLD position.



9JM05741



AW44460B

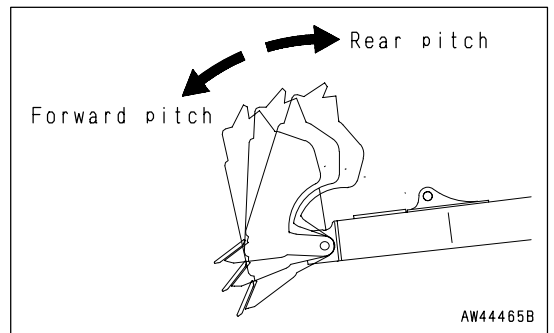
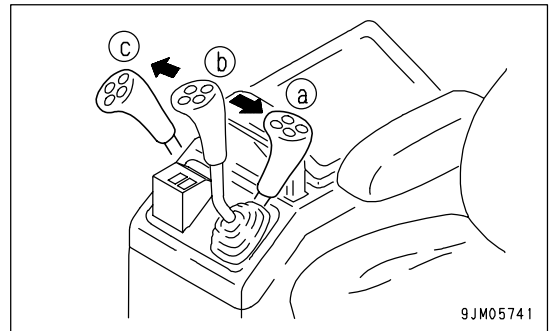
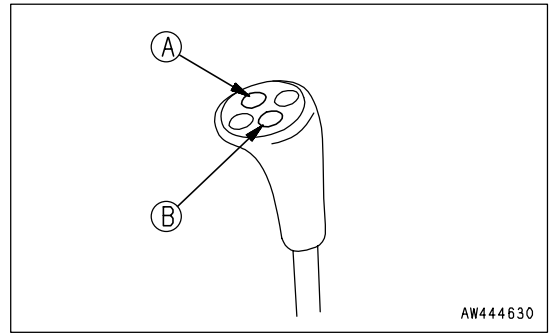
BLADE PITCH OPERATION

Keep the switch (A) or (B) at the tip of the lever pressed and operate the lever. If switch (A) or (B) is not kept pressed when the lever is operated, it will be impossible to carry out the blade pitch operation.

Position (a): REAR PITCH

Position (b): HOLD

Position (c): FORWARD PITCH



WORK POSSIBLE USING WHEEL DOZER

DITCHING

For ditch excavation, tilt the blade. Ground can be dug effectively by a tilted blade.

SMOOTHING

Uneven ground surfaces remaining after digging can be leveled off by fine operation of blade. The basic method is to operate the machine at low speeds with the blade fully loaded with soil and sand. A flat finished surface is also possible by slowly backing the machine with the blade "floating" so it is dragged across the surface. However, avoid this on rocky or stony ground, as it may damage the blade.

DOZING

A wheel dozer transports dirt in a forward direction. Slope excavation can always be most effectively carried out by proceeding from the top downward.

FELLING AND UPROOTING

A tree, 10 to 30 cm (3.9 to 11.8 in) in diameter, can be felled by giving 2 or 3 pushes with the blade held off the ground. Next, back the machine and lower the blade to cut into the earth. Break the roots and push them forward while digging.

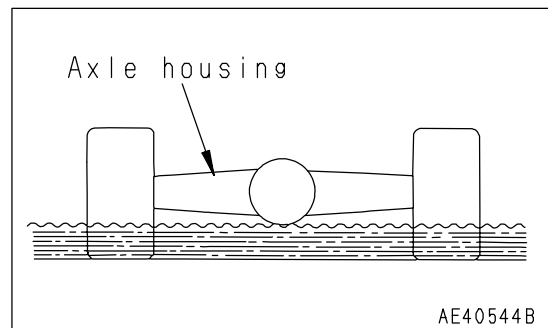
Never allow the machine to butt against, or give strong impact to a tree by operating at high speeds.

PRECAUTIONS FOR OPERATION

PERMISSIBLE WATER DEPTH

When working in water or on swampy ground, do not let the water come above the bottom of the axle housing.

After finishing the operation, wash and check the lubricating points.



IF WHEEL BRAKE DOES NOT WORK

If the machine is not stopped by depressing the brake pedal, use the parking brake to stop the machine.

NOTICE

If the parking brake has been used as an emergency brake, contact your Komatsu distributor to have the parking brake checked for any abnormality.

PRECAUTIONS WHEN DRIVING UP OR DOWN SLOPES

LOWER THE CENTER OF GRAVITY WHEN TURNING.

When turning on slopes, lower the work equipment to lower the center of gravity before turning. It is dangerous to turn the machine suddenly on slopes.

BREAKING ON DOWNHILL SLOPE

If the service brake is used too frequently when traveling downhill, the brake may overheat and be damaged. To avoid this problem, shift down to a low range and make full use of the braking force of the engine.

When braking, use the right brake pedal.

If the speed control lever is not placed in a proper speed position, the torque converter oil may overheat. If it overheats, place the speed control lever in the next lower gear speed to lower the oil temperature.

If the temperature gauge does not indicate the green range of the scale even with the lever in the 1st speed position, stop the machine, place the lever in neutral, and run the engine at medium speed until the gauge indicates the green range.

IF ENGINE STOPS

If the engine stops on a slope, apply the parking brake immediately, and lower the work equipment to the ground and stop the machine. Then put the directional lever in neutral position, and start the engine again.

PRECAUTIONS WHEN DRIVING MACHINE

When the machine travels at high speed for a long distance, the tires become extremely hot. This causes early wear of the tires, so it should be avoided as far as possible. If the machine must be driven for a long distance, take the following precautions.

- Follow the regulations related to this machine, and drive carefully.
- Before driving the machine, carry out the checks before starting.
- The most suitable tire pressure, travel speed, or tire type differ according to the condition of the travel surface. Contact your Komatsu distributor or tire dealer for information.
- The following is a guide to suitable tire pressures and speeds when traveling on a paved surface with standard tires.

Tire pressure: front 0.34 MPa (3.5 kgf/cm², 49.7 PSI)

rear 0.39 MPa (4.0 kgf/cm², 56.8 PSI)

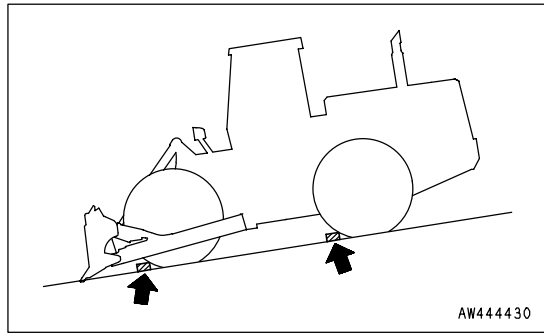
Speed: 13 km/h (8.1 MPH)

- Check the tire pressure before starting, when the tire is cool.
- After traveling for 1 hour, stop for 30 minutes. Check the tires and other parts for damage; also check the oil and coolant levels.
- Never put "calcium chloride" or "dry ballast" in the tires when traveling.

PARKING MACHINE

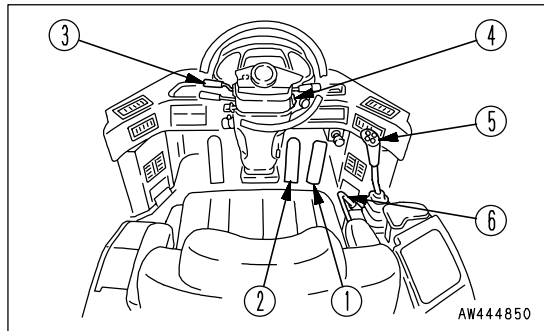
WARNING

- Avoid stopping suddenly. Give yourself ample room when stopping.
- Do not park the machine on slopes.
If the machine has to be parked on a slope, set it facing directly down the slope, then dig the blade into the ground and put blocks under the tires to prevent the machine from moving.
- 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 safety lock lever securely to the LOCK position.
- Even if the parking brake switch is turned ON, there is danger until the parking brake pilot lamp lights up, so keep the brake pedal depressed.

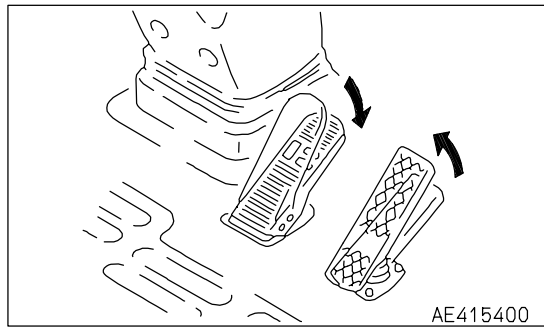


NOTICE

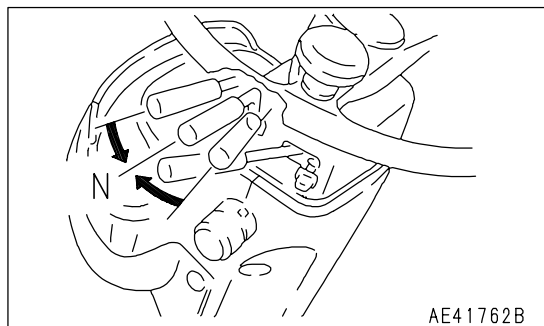
Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.



1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



2. Place directional lever (3) in N (neutral) position.



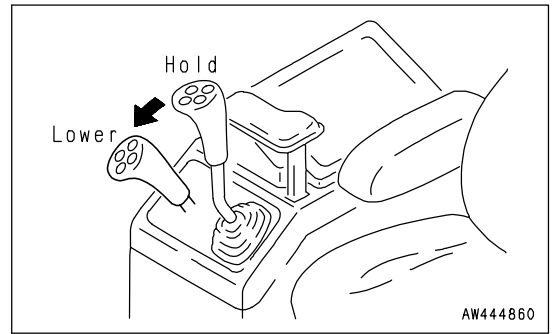
3. Turn parking brake switch (4) to ON to apply the parking brake.

NOTICE

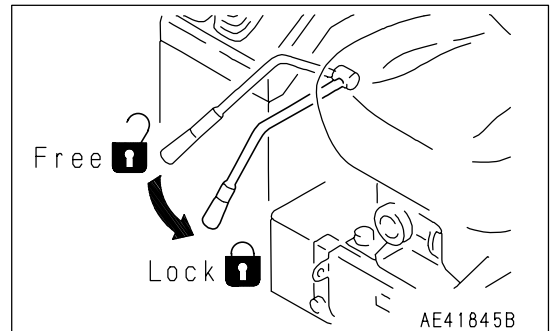
When the parking brake is applied, the transmission is automatically returned to neutral.



4. Operate blade control lever (5) to lower the blade to the ground.



5. Lock blade control lever (5) with safety lock lever (6).



CHECKS AFTER COMPLETION OF OPERATION

Check the engine water temperature, engine oil pressure, torque converter oil temperature, and fuel level with the machine monitor.

If the engine has overheated, do not stop it suddenly. Run the engine at a midrange speed to allow the engine to cool down before stopping it.

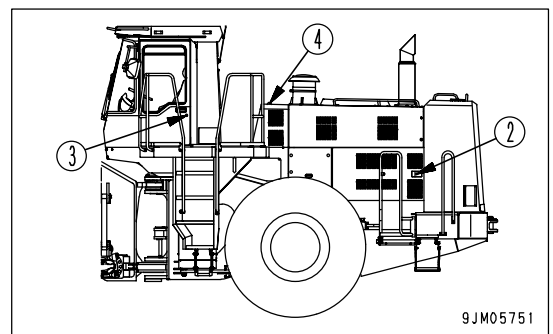
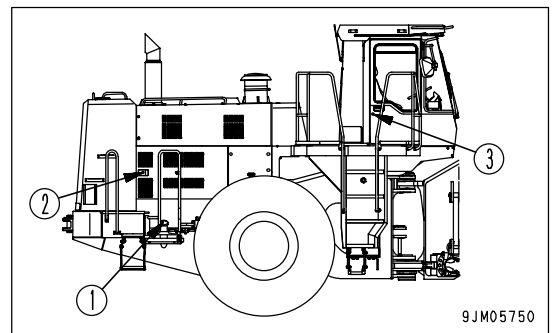
LOCKING

Always lock the following parts.

- (1) Fuel tank filler cap
- (2) Engine side panel (2 places)
- (3) Cab door (2 places)
- (4) Engine hood (1 place) (Bulkhead cover)

REMARK

The starting switch key is used also for locks (1), (2), (3) and (4).



HANDLING THE TIRES

PRECAUTIONS WHEN HANDLING TIRES



If a tire has reached any of the following service limits, there is danger that the tire may burst or cause an accident, so to ensure safety, replace it with a new tire.

- **Service limits for wear**

When the remaining depth of the groove on construction equipment tires (at a point approx. 1/4 of the tread width) is 15% of the groove depth on a new tire.

When the tire shows marked uneven wear, stepped wear or other abnormal wear, or when the cord layer is exposed.

- **Service limits for damage**

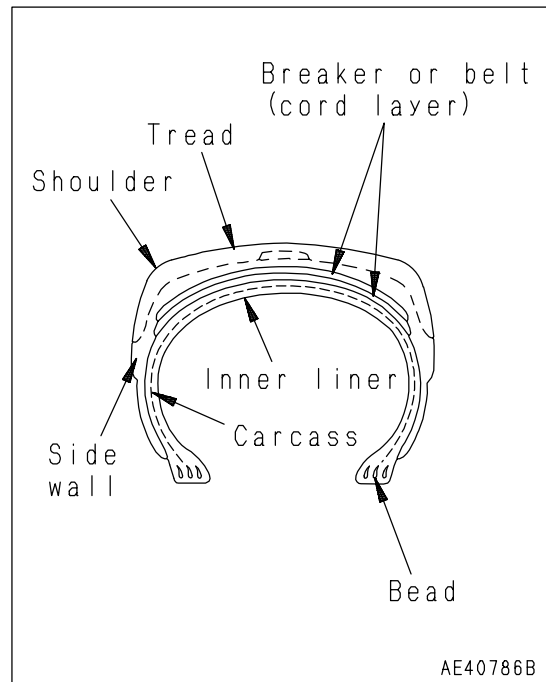
When there is external damage extending to the cord or when the cord is broken

When the cord is cut or there is dragging

When the tire is peeling (there is separation)

When the bead is damaged

For tubeless tires, when there is air leakage or improper repair



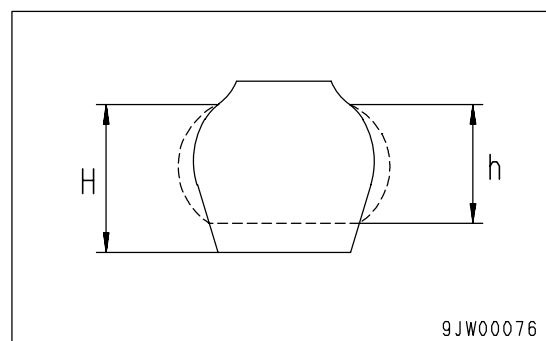
Please contact your Komatsu distributor when replacing the tires. It is dangerous to jack up the machine without taking due care.

TIRE PRESSURE

Measure the tire pressure before starting operations, when the tires are cool.

If the tire inflation pressure is too low, there will be overload; if it is too high, it will cause tire cuts and shock burst. To prevent these problems, adjust the tire inflation pressure according to the table on the next page.

Deflection ratio = $\frac{H - h}{H} \times 100$



As a visual guideline, the deflection ratio (deflection/free height) of the front tire is approx. 15 to 25%.

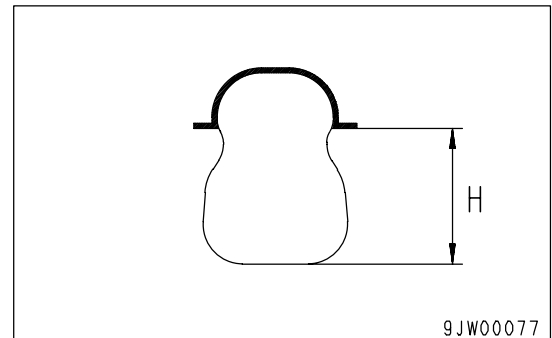
When checking the tire inflation pressure, check also for small scratches or peeling of the tire, for nails or pieces of metal which may cause punctures, and for any abnormal wear.

Clearing fallen stones and rocks from the operating area and maintaining the surface will extend the tire life and give improved economy.

- For operations on normal road surfaces, rock digging operations: High end of range in air pressure chart
- Operations on soft ground: Set to lower than air pressure in table below

If the deflection of the tire is excessive, raise the inflation pressure within the limits given in the table to give a suitable deflection (see deflection ratio).

Tire size (Pattern)	H Free Height (mm)	Inflation pressure MPa (kgf/cm ² , PSI)		
		Soft ground (sandy ground)	Normal road	When shipped from factory
35/65-33-24PR (L4 Rock)	529	0.34 - 0.39 (3.5 - 4.0, 49.7 - 56.8)	0.34 - 0.39 (3.5 - 4.0, 49.7 - 56.8)	Front tire: 0.34 (3.5, 49.7) Rear tire: 0.39 (4.0, 56.8)
35/65-33-24PR (L5 Rock)	529	0.34 - 0.39 (3.5 - 4.0, 49.7 - 56.8)	0.34 - 0.39 (3.5 - 4.0, 49.7 - 56.8)	
35/65-R33 (L4 Rock)	529	0.39 - 0.44 (4.0 - 4.5, 56.8 - 63.9)	0.44 - 0.49 (4.5 - 5.0, 63.9 - 71.0)	Front tire: 0.44 (4.5, 63.9) Rear tire: 0.49 (5.0, 71.0)



TRANSPORTATION

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

LOADING, UNLOADING WORK



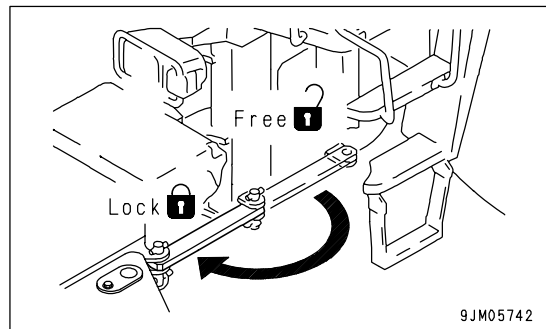
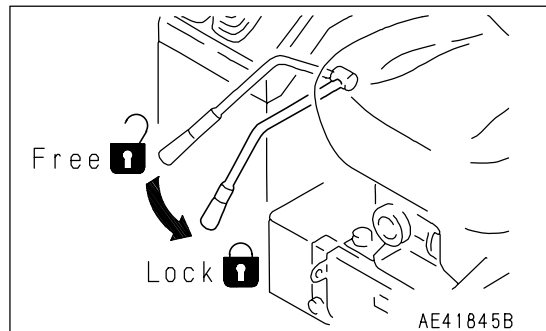
WARNING

When transporting this machine, observe all related laws and regulations. Disassembling for transportation is needed. Consult your Komatsu distributor for transporting the machine.

PRECAUTIONS FOR LOADING

After loading the machine in the specified position, secure it in place as follows.

1. Lower the work equipment slowly.
2. Apply the safety lock lever to lock blade control lever securely.
3. Turn the starting switch to the OFF position to stop the engine, and pull out the starting switch key.
4. Lock front frame and rear frame with safety bar.
5. Put blocks in front and behind the wheels, and secure the machine with chains or wire rope to prevent the machine from moving during transportation.
6. Always retract the car radio (if equipped) antenna fully.



LIFTING MACHINE



WARNING

- When lifting the machine, if the wire rope is not fitted correctly the machine may fall and cause serious injury or even death. Raise the machine 100 to 200 mm (4 to 8 in) from the ground, check that the machine is horizontal and that there is no slack in the wire rope, then continue to lift the machine.
- Before lifting the machine, always stop the engine and lock the brakes.
- Lifting operations using a crane must be carried out by a qualified operator.
- Never raise the machine with any worker on it.
- Always make sure that the wire rope used for lifting the machine is of ample strength for the weight of the machine.
- Never try to lift the machine at any position or in any posture other than the posture given in the procedure below.
- Never try to go under the lifted machine.

LIFTING PROCEDURE

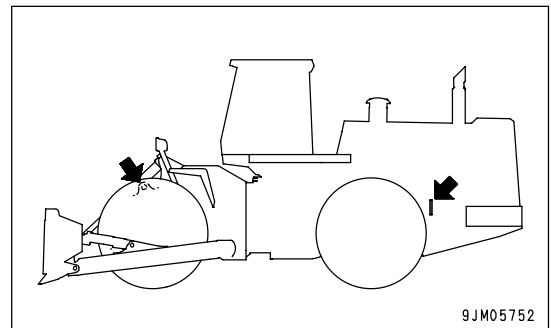


CAUTION

When the machine is raised, check that there is no leakage of oil from the hydraulic circuits of the machine.
When carrying out the lifting operation, please contact your Komatsu distributor.

Lifting work can be carried out only for machines with lifting marks. Before starting the lifting operation, stop the machine in a horizontal place and do as follows.

1. Fit the lifting equipment to the lifting hooks (marked by the lifting mark) at the front of the front frame and the rear of the rear frame.
2. When the machine leaves the ground, stop for a moment and wait for the machine to stabilize, then continue the lifting operation slowly.



COLD WEATHER OPERATION

PRECAUTIONS FOR LOW TEMPERATURE

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 the fuel and oil for each component to those of lower viscosity. For the specific viscosity, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-8)".

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 amount 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. Antifreeze is toxic, so do not let it flow into drainage ditches or spray it on to the ground surface.**
- **Antifreeze is flammable, so do not bring any flame close. Do not smoke when handling antifreeze.**

NOTICE

- **Never use methanol, ethanol or propanol based antifreeze.**
- **Absolutely avoid using any water leak preventing agent irrespective of weather it is used independently or mixed with an antifreeze.**
- **Do not mix one antifreeze with a different brand.**

For details of the antifreeze mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-19)".

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 cooling water must be changed twice a year (spring and fall), so use permanent antifreeze as far as possible.

BATTERY



- The battery generates flammable gas, so do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large 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.

When the ambient temperature drops, the capacity of the battery will also drop. If the battery charge ratio is low, the battery electrolyte may freeze. Maintain the battery charge as close as possible to 100%, and insulate it against cold temperature so that the machine can be started easily the next morning.

REMARK

Measure the specific gravity and calculate the rate of charge from the following conversion table.

Temperature (°C) \ Charging Rate(%)	20	0	-10	-20
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

- As the battery capacity drops markedly in low temperatures, cover the battery or remove it from the machine, keep it in a warm place, and install it again the next morning.
- If the electrolyte level is low, add distilled water in the morning before beginning work. Do not add the water after the day's work so as to prevent fluid in the battery from freezing in the night.

PRECAUTIONS AFTER COMPLETION OF WORK

To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, always observe the following precautions.

- Remove all the mud and water from the machine body. In particular, wipe the hydraulic cylinder rod clean to prevent damage to the seal caused by mud or dirt on the rod surface getting inside the seal together with drops of water.
- Park the machine on hard, dry ground.
If this is impossible, park the machine on wooden boards.
The boards help protect the tracks from being frozen in soil and the machine can start next morning.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.

AFTER COLD WEATHER

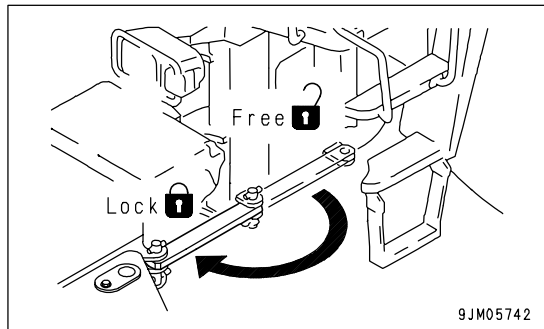
When season changes and the weather becomes warmer, do as follows.

- Replace the fuel and oil for all parts with oil of the viscosity specified.
For details, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-8)".
- If for any reason permanent antifreeze cannot be used, and an ethyl glycol base antifreeze (winter, one season type) is used instead, or if no antifreeze is used, drain the cooling system completely, then clean out the inside of the cooling system thoroughly, and fill with fresh soft water.

WARMING-UP OPERATION FOR STEERING HYDRAULIC CIRCUIT IN COLD WEATHER

! WARNING

If the steering wheel is operated and stopped while the oil temperature is low, there may be a time lag before the machine stops turning. In this case, use the safety bar to ensure safety, and perform the warm-up operation in a wide place. Do not relieve the hydraulic oil in the circuit continuously for more than 5 seconds.



When the temperature is low, do not start the operation of the machine immediately after starting the engine.

Warming up steering hydraulic circuit

Slowly operate the steering wheel to the left and right to warm up the oil in the steering valve. (Repeat this operation for about 10 minutes to warm up the oil.)

NOTICE

Operate the steering wheel a little and stop in that position. Then, confirm that the machine is being steered by an angle equivalent to the amount that the steering wheel is operated

RECOMMENDED OIL

Change oil according to the following table, depending on an ambient temperature.

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		
Hydraulic system	Engine oil	SAE 10WCD																			
		SAE 5W-20CD																			

If SAE5W-20CD is used in the cold season, replace it with SAE10WCD after the cold season is over.

LONG-TERM STORAGE

BEFORE STORAGE

When putting the machine in storage for a long time, do as follows.

- Clean and wash all parts, then store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with a sheet.
- Completely fill the fuel tank, lubricate and change the oil before storage.
- Apply a thin coat of grease to the metal surface of the hydraulic piston rods.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
- If the ambient temperature is expected to drop below 0°C (32°F), add antifreeze to the cooling water.
- Lock each control lever with the safety lock lever.

DURING STORAGE



WARNING

If it is unavoidably necessary to carry out the rust-preventive operation while the machine is indoors, open the doors and windows to improve ventilation and prevent gas poisoning.

- During storage, always operate the machine once a month so that a new film of oil will be coated over movable parts and component surfaces. At the same time, also charge the battery.
- When operating the work equipment, wipe off all the grease from the hydraulic cylinder rod.
- If the machine is equipped with an airconditioner, operate it for 3 to 5 minutes once a month to lubricate each portion of its compressor. Be sure to idle the engine at low speed for this purpose. Also, check the quantity of refrigerant twice a year.

AFTER STORAGE

NOTICE

If the machine is to be used when the monthly rust prevention operation has not been carried out, please contact your Komatsu distributor.

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

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

TROUBLESHOOTING

WHEN MACHINE RUNS OUT OF FUEL



WARNING

When starting the engine again, check carefully that the area around the engine is safe before cranking the engine.

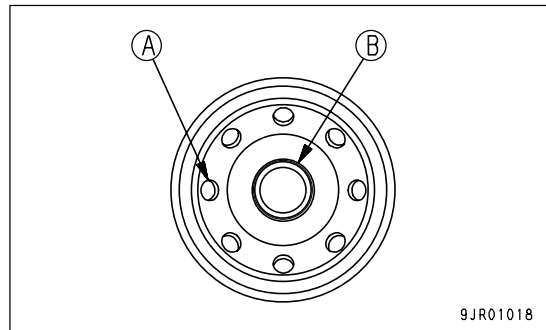
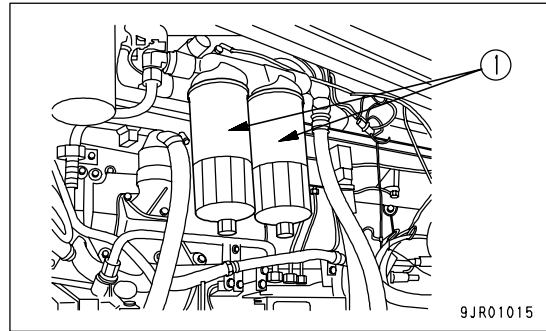


CAUTION

This engine is designed using more precision parts compared to the conventional injection pump and nozzle. So, if the foreign material is mixed into the fuel system, it may cause trouble. If the dust or dirt clings to the fuel system, perform cleaning using the fuel.

1. Remove the fuel filter cartridge (1), fill the filter with the clean fuel without letting the dust or dirt come in, then reinstall the cartridge.

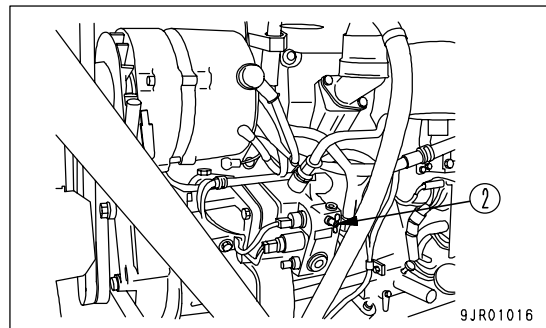
Fill the fuel through the small holes (A)(dirty side)(8 points). Do not fill the fuel through the center hole (B)(clean side).



2. Remove the quick coupler (2) at the exit port of the fuel pump, and fill the clean fuel until it overflows (approximately 30 cc, (1 oz)) through that port.

NOTICE

Do not fill the fuel while applying pressure through the quick coupler of the fuel pump. If the pressure is applied, it may damage the fuel seal.



3. Install quick coupler (2).

Tightening torque: 12.7 N·m (1.3kgf·m, 9.4 lbft)

4. Start the engine with referring to "STARTING ENGINE (PAGE 3-53)".

The cranking time may be longer than usual to bleed the air from the fuel system. Also, the engine will not be stabilized for a while until the remaining air in the fuel system is purged. This is normal.

REMARK

The hand priming pump is not equipped for this engine. However, without performing the air bleeding with the hand priming pump, the air in the fuel system can be bled while the engine is running.

TOWING THE MACHINE**WARNING**

- Check that the wire rope is of ample strength for the weight of the machine being towed.
- Do not apply a load to the wire rope suddenly.
- If there is a failure in the brake line, the brakes cannot be used, so be extremely careful when towing.

NOTICE

- Towing is for moving the machine to a place where inspection and maintenance can be carried out, and not for moving it long distances.
The machine must not be towed for long distances.
- For details of the procedure for towing a machine when it has broken down, please contact your Komatsu distributor.

This machine must not be towed except in emergencies. When towing the machine, take the following precautions.

- When releasing the brakes, put blocks under the wheels to prevent the machine from moving. If the wheels are not blocked, the machine may suddenly move.
- When towing a machine, tow it at a low speed of less than 2 km/h (1.2 MPH), and for a distance of a few meters to a place where repairs can be carried out. The machine should be towed only in emergencies. If the machine must be moved long distances, use a transporter.
- To protect the operator if the towing rope or bar should break, install a protector plate to the machine being towed.
- If it is impossible to operate the steering and brakes of the machine being towed, do not let anyone ride on the machine.
- Check that the tow rope or bar is of ample strength for the weight of the machine being towed. If the machine being towed must travel through mud or up hills, use a tow rope or bar of a strength of at least 1.5 times the weight of the machine being towed.
- Keep the angle of the tow rope as small as possible. Keep the angle between the center lines of the two machines to within 30 degrees.
- If the machine is moved suddenly, the tow rope or bar will be subjected to an excessive load, and it may break. Start the machine gradually and travel at a constant speed.
- The towing machine should normally be of the same class as the machine being towed. Check that the towing machine has ample braking power, weight, and rimpull to allow it to control both machine on slopes or on the tow road.
- When towing a machine downhill, use a larger machine for towing to provide ample rimpull and braking power, or connect another machine to the rear of the machine being towed. In this way it is possible to prevent the machine from losing control and turning over.
- Towing may be carried out under various differing conditions, so it is impossible to determine beforehand the requirements for towing. Towing on flat horizontal roads will require the minimum rimpull, while towing on slopes or on uneven road surfaces will require the maximum rimpull.

WHEN ENGINE CAN BE USED

- If the transmission and steering wheel can be operated, and the engine is running, it is possible to tow the machine out of mud or to move it for a short distance to the edge of the road.
- The operator should sit on the machine being towed and operate the steering in the direction that the machine is towed.

WHEN ENGINE CANNOT BE USED

When towing a machine with the engine stopped, use the following procedure.

1. The transmission oil does not lubricate the system, so remove the front and rear drive shafts. If necessary, block the tires to prevent the machine from moving.
2. The steering cannot be operated, so remove the steering cylinder.
Even if the brakes are in good condition, the brakes can only be used a limited number of times. There is no change in the operating force for the brake pedal, but the braking force is reduced each time the pedal is depressed.
3. Connect the towing equipment securely. When carrying out towing operations, use two machines of at least the same class as the machine being towed. Connect one machine each to the front and rear of the machine being towed, then remove the blocks from the tires and tow the machine.
4. Parking brake
The parking brake cannot be turned OFF. To release the parking brake, do as follows.

RELEASING PARKING BRAKE



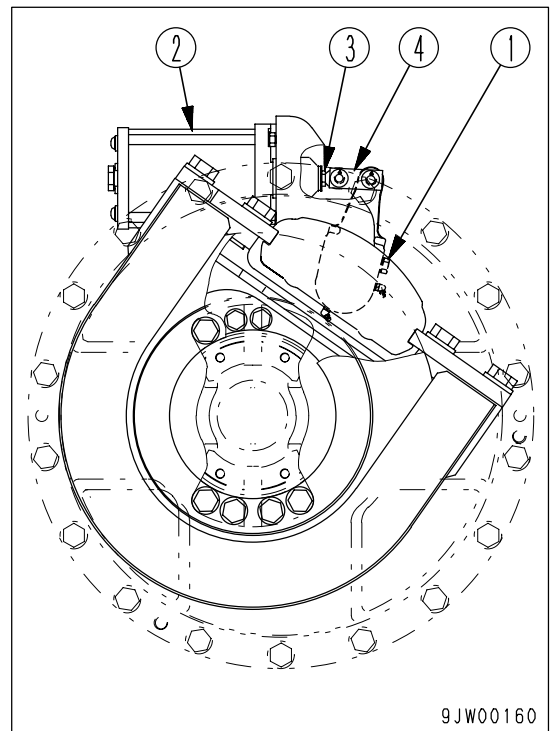
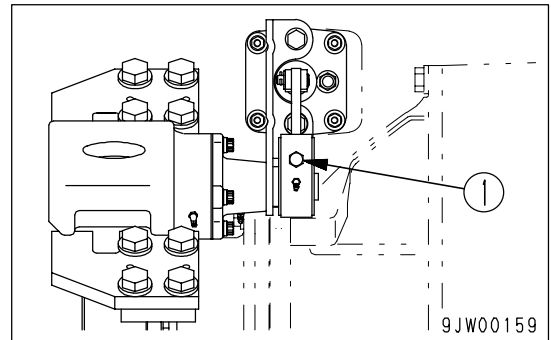
WARNING

- When releasing the parking brake, stop the machine on level ground and check that the surrounding area is safe. If it is necessary to release the brake on a slope in an emergency, block the tires before starting the operation.
- If the parking brake is released, the brake cannot be used, so check the safety carefully when moving the machine.

The parking brake is released by the accumulator oil pressure of the brake.

If the accumulator pressure is lowered for some trouble, however, release the parking brake mechanically, then tow the machine.

1. Turn adjustment screw (1) at the end of the hydraulic cylinder linkage for the parking brake clockwise to retract rod (3) of spring cylinder (2) fully into spring cylinder (2) to loosen plate (4).
2. Turn adjustment screw (1) further by 1/2 turn. This releases the parking brake.



EMERGENCY TRAVEL OPERATION

The normal gear shifting operation is carried out by electric signals. If there should be a failure in the electrical system and the machine does not move, please contact your Komatsu distributor to have the machine moved.

NOTICE

Always request your Komatsu distributor to carry out the emergency travel operation.

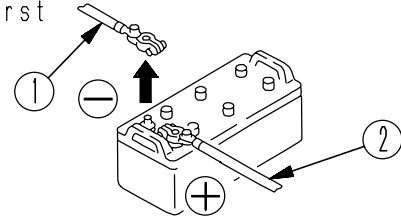
IF BATTERY IS DISCHARGED



WARNING

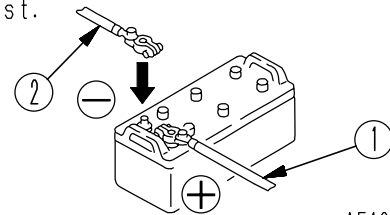
- When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.
- The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.
- Battery electrolyte is dilute sulphuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, wash it immediately off with large 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). When installing, install the positive (+) terminal first.
If a tool touches the positive terminal and the chassis, there is danger that it will cause a spark, so be extremely careful.
- If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.
- When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.

When removing, disconnect the cable from the ground terminal first



AE42128B

When installing, connect the cable to the positive ⊕ terminal first.



AE42129B

REMOVAL AND INSTALLATION OF BATTERY

- 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.

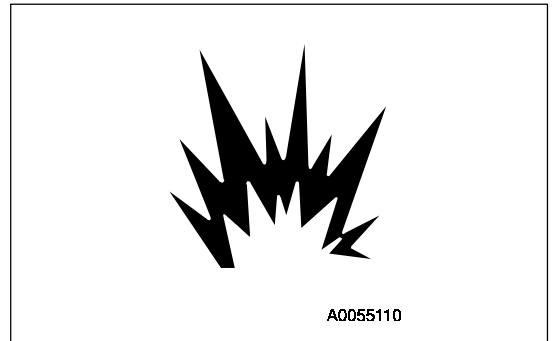
REMARK

The batteries are on both sides at the rear of the machine. The battery used for the ground is on the right side of the machine.

PRECAUTIONS FOR CHARGING BATTERY

When charging the battery, if the battery is not handled correctly, there is danger that the battery may explode. Always follow the instructions in "BATTERY (PAGE 3-75)" and the instruction manual accompanying the charger, and do as follows.

- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Always check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.
- Set the voltage of the charger to match the voltage of the battery to be charged. If the voltage is not selected correctly, the charger may overheat and cause an explosion.
- Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to fix the clips securely.
- Set the charging current to 1/10 of the value of the rated battery capacity; when carrying out rapid charging, set it to less than the rated battery capacity.
If the charger current is too high, the electrolyte will leak or dry up, and this may cause the battery to catch fire and explode.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery electrolyte and cause the battery to explode.



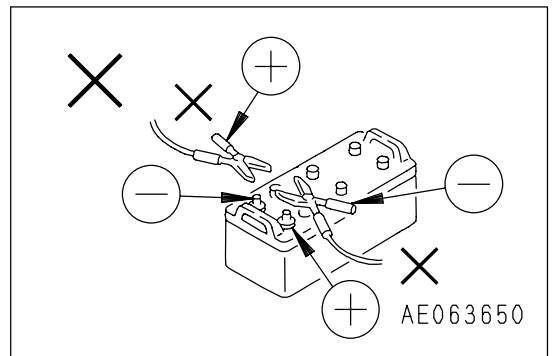
STARTING ENGINE WITH BOOSTER CABLE

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

PRECAUTIONS WHEN CONNECTING AND DISCONNECTING BOOSTER CABLE



- When connecting the cables, never contact the positive (+) and negative (-) terminals.
- When starting the engine with a booster cable, always wear safety glasses and rubber gloves.
- 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.
- Make sure that there is no mistake in the booster cable connections. The final connection is to the engine block of the problem machine, but sparks will be generated when this is done, so connect to a place as far as possible from the battery.
- When disconnecting the booster cable, take care not to bring the clips in contact with each other or with the machine body.



NOTICE

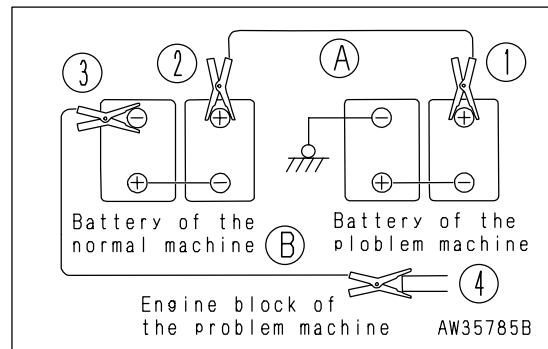
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the engine to be started.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check that the safety lock levers and parking brake levers of both machines are in the LOCK position.
- Check that each lever is in the NEUTRAL position.

CONNECTING THE BOOSTER CABLE

Keep the starting switch of the normal machine and problem machine are both at the OFF position.

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

1. 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 engine block of the problem machine.



STARTING ENGINE



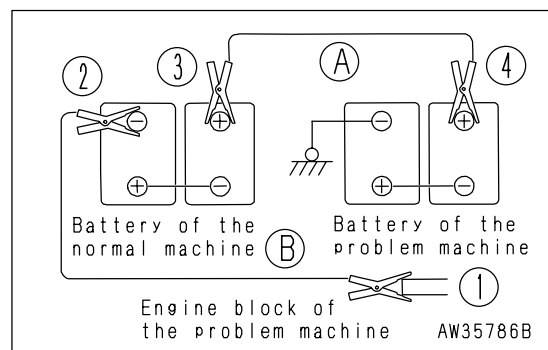
Always check that the safety lock lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Check also that all the control levers are at the HOLD or neutral position.

1. Make sure the clips are firmly connected to the battery terminals.
2. Start the engine of the normal machine and keep it to run at high idling speed.
3. Turn the starting switch of the problem machine to the START position and start the engine.
If the engine doesn't start at first, wait for at least 2 minutes before trying again.

DISCONNECTING THE BOOSTER CABLE

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

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



OTHER TROUBLE

ELECTRICAL SYSTEM

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

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed Lamp flickers while engine is running	<ul style="list-style-type: none"> • Defective wiring • Defective adjustment of alternator belt tension 	<ul style="list-style-type: none"> (• Check, repair loose terminals, disconnections) • Adjust alternator belt tension for details, see every 250 hours service
Even when the engine is rotating, the charge caution pilot lamp does not go out	<ul style="list-style-type: none"> • Defective alternator • Defective wiring • Defective adjustment of alternator belt tension 	<ul style="list-style-type: none"> (• Replace) (• Check, repair) • Adjust alternator belt tension. See every 250 hours service
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 • Insufficient battery charge • Defective starting motor 	<ul style="list-style-type: none"> (• Check, repair) • Charge (• Replace)
Pinion of starting motor keeps going in and out	<ul style="list-style-type: none"> • Insufficient battery charge 	<ul style="list-style-type: none"> • Charge
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 • Insufficient battery charge 	<ul style="list-style-type: none"> (• Check, repair) • Charge
Preheating pilot lamp does not light up	<ul style="list-style-type: none"> • Defective wiring • Defective controller • Defective monitor 	<ul style="list-style-type: none"> (• Check, repair) (• Replace) (• Replace)
Even when engine is stopped, charge caution pilot lamp does not light up (starting switch at ON position)	<ul style="list-style-type: none"> • Defective wiring • Defective monitor 	<ul style="list-style-type: none"> (• Check, repair) (• Replace)
Outside of glow plug is not warm when touched by hand	<ul style="list-style-type: none"> • Defective wiring • Disconnection in glow plug • Defective poration of heater relay switch 	<ul style="list-style-type: none"> (• Check, repair) (• Replace) (• Replace of heater switch)

CHASSIS

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

Problem	Main causes	Remedy
Transmission		
Engine is running but machine does not move	<ul style="list-style-type: none"> • Parking brake is applied • Directional lever is not shifted properly • Lack of oil in transmission case 	<ul style="list-style-type: none"> • Release parking brake • Shift lever properly • Add oil to specified level. see when required
Even when engine is run at full throttle, machine only move slowly and lacks power	<ul style="list-style-type: none"> • Lack of oil in transmission case • Screen is clogged 	<ul style="list-style-type: none"> • Add or drain oil to specified level. See when required (• Disassemble, clean)
Oil overheats	<ul style="list-style-type: none"> • Too much oil or too little oil • Machine is not traveling in correct speed range • Torque converter is stalled for long periods • Engine is overheating 	<ul style="list-style-type: none"> • Add or drain oil to specified level. See when required • Place in correct speed range • Reduce stall time (• Check engine)
Noise generated	<ul style="list-style-type: none"> • Lack of oil 	<ul style="list-style-type: none"> • Add oil to specified level. See when required
Axle		
Noise generated	<ul style="list-style-type: none"> • Lack of oil • Improper oil used (for machines with limited slip differential) 	<ul style="list-style-type: none"> • Add oil to specified level See when required • Replace with specified oil
Brake		
Brake is not applied when pedal is depressed	<ul style="list-style-type: none"> • Disc has reached wear limit • Defective hydraulic system • Lack of oil • Air in brake line 	<ul style="list-style-type: none"> (• Replace disc) (• Check, repair) • Add oli to specified level. See every 100 hours service • Bleed air See when required
Brake drags or remains applied	<ul style="list-style-type: none"> • Vent hole of brake valve is clogged • Defective slack adjuster 	<ul style="list-style-type: none"> • Clean (• Check, repair)
Brakes squeal	<ul style="list-style-type: none"> • Disc is worn • Large amounmt of water in axle oil • Deteriorated axle oil due to overuse of brake 	<ul style="list-style-type: none"> (• Replace disc) • Change axle oil • Change axle oil

Problem	Main causes	Remedy
Steering		
Steering wheel is heavy	<ul style="list-style-type: none"> • Defective hydraulic system • Lack of oil 	<ul style="list-style-type: none"> (• Check, repair) • Add oil to specified level. See every 100 hours service
Steering wheel is loose	<ul style="list-style-type: none"> • Play in steering cylinder pin • Defective hydraulic system • Lack of oil 	<ul style="list-style-type: none"> • Grease bearing or replace pin and bushing where there is play (• Check, repair) • Add oil specified level. See every 100 hours service
Parking brake		
Brake does not work well	<ul style="list-style-type: none"> • Loose linkage • Wet pad • Spring for hydraulic pressure cylinder is worn • Pad is worn 	<ul style="list-style-type: none"> • Adjust • Clean (• Replace spring) • Adjust or replace
Hydraulic system		
Lacks blade lifting power Takes time to lift the blade	<ul style="list-style-type: none"> • Lack of oil • Clogged hydraulic tank filter 	<ul style="list-style-type: none"> • Add oil to specified level. See every 100 hours service • Replace filter. See every 2000 hours service
Excessive bubbles in oil	<ul style="list-style-type: none"> • Low quality oil being used • Oil level is low • Air in oil line 	<ul style="list-style-type: none"> • Replace with good quality oil • Add oil to specified level. See every 100 hours service • Bleed air. See every 2000 hours service
Hydraulic pressure is low	<ul style="list-style-type: none"> • Oil level is low and pump is sucking in air 	<ul style="list-style-type: none"> • Add oil to specified level. See every 100 hours service Then bleed air. See every 2000 hours service
Movement of cylinder is irregular	<ul style="list-style-type: none"> • Oil level is low • Leak in the cylinder 	<ul style="list-style-type: none"> • Add oil to specified level. See every 100 hours service (• Check, repair)

ENGINE

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

Problem	Main causes	Remedy
Engine oil pressure caution pilot lamp 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 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)
Steam is emitted from top part of radiator (pressure valve) Water temperature gauge is in red range Coolant temperature monitor lights up	<ul style="list-style-type: none"> • Cooling water level low, water leakage • Loosen fan belt • Dirt or scale accumulated in cooling system • Clogged radiator fin or damaged fin • Defective thermostat • Loose radiator filler cap (high altitude operation) • Defective monitor 	<ul style="list-style-type: none"> • Add cooling water, repair, see when required • Adjust auto-tensioner, see when required • Change cooling water, clean inside of cooling system, see when required • Clean or repair, see when required (• Replace thermostat) • Tighten cap or replace packing (• Replace)
Water temperature gauge is in white range on left	<ul style="list-style-type: none"> • Defective thermostat • Defective monitor 	<ul style="list-style-type: none"> (• Replace thermostat) (• Replace)
Engine does not start when starting motor is turned	<ul style="list-style-type: none"> • Lack of fuel • Air in fuel system • Defective fuel injection pump or nozzle • Starting motor cranks engine sluggishly • Preheating pilot lamp does not light up • Defective compression • Defective valve clearance 	<ul style="list-style-type: none"> • Add fuel, see check before starting • Repair place where air is sucked in (• Replace pump or nozzle) • See electrical system • See electrical system (• Check, repair) (• Adjust valve clearance)
Exhaust gas is white or blue	<ul style="list-style-type: none"> • Too much oil in oil pan • Insufficient fuel 	<ul style="list-style-type: none"> • Add oil to specified level, see check before starting • Change to specified fuel
Exhaust gas occasionally turns black	<ul style="list-style-type: none"> • Clogged air cleaner element • Defective nozzle • Defective compression • Defective turbocharger 	<ul style="list-style-type: none"> • Clean or replace, see when required (• Replace nozzle) (• See defective compression above) (• Clean or replace turbocharger)
Combustion noise occasionally makes breathing sound	<ul style="list-style-type: none"> • Defective nozzle 	<ul style="list-style-type: none"> (• Replace nozzle)
Abnormal noise generated (combustion or mechanical)	<ul style="list-style-type: none"> • Low grade fuel being used • Overheating • Damage inside muffler • Excessive valve clearance 	<ul style="list-style-type: none"> • Change to specified fuel • Refer to "Water temperature gauge is in red range" as above • Replace muffler (• Adjust valve clearance)

MAINTENANCE

WARNING

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

GUIDES TO MAINTENANCE

Do not carry out any inspection and maintenance operation that is not found in this manual.

CHECK SERVICE METER:

Check the service meter reading every day to see if the time has come for any necessary maintenance to be carried out.

KOMATSU GENUINE REPLACEMENT PARTS:

Use Komatsu genuine parts specified in the Parts Book as replacement parts.

KOMATSU GENUINE OILS:

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

ALWAYS USE CLEAN WASHER FLUID:

Use automobile window washer fluid, and be careful not to let any dirt get into it.

ALWAYS USE CLEAN OIL AND GREASE:

Use clean oil and grease. Also, keep the containers of the oil and grease clean. Keep foreign materials away from oil and grease.

CHECKING FOR FOREIGN MATERIALS IN DRAINED OIL AND ON FILTERS:

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 200V continuously.
- Connect grounding cable within 1m (3.3 ft) from the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may have troubles.
- If a seal or bearing happen to come between the welding part 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.
- Remove the negative (-) terminal of the battery to stop the flow of electric current.

DO NOT DROP THINGS INSIDE MACHINE:

- When opening inspection windows or the oil filler port of the tank to carry out inspection, be careful not to drop nuts, bolts, or tools inside the machine.
If such things are dropped inside the machine, it will cause damage and malfunction of the machine, and will lead to failure. If you drop anything inside the machine, always remove it immediately.
- Do not put unnecessary things in your pockets. Carry only things which are necessary for inspection.

DUSTY WORKSITES:

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 air cleaner element at a shorter interval than specified.
- 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 OIL:

If a different type of oil has to be added, drain the old oil and replace all the oil with the new type of oil. Never mix different kinds of oil.

LOCKING INSPECTION COVERS:

If inspection or maintenance has to be carried out with the inspection cover open, lock it securely in position with the lock bar. If inspection or maintenance is carried out with the inspection cover not locked in position, there is a hazard that it may be suddenly blown shut by the wind and cause injury to the worker.

BLEEDING AIR FROM HYDRAULIC CIRCUIT:

After repairing or replacing the parts of hydraulic circuit, or removing the piping of hydraulic circuit, it is necessary to bleed the air from inside of the circuit. See "BLEEDING AIR FROM HYDRAULIC TANK (PAGE 4-29)" for bleeding the air.

PRECAUTIONS WHEN INSTALLING HYDRAULIC HOSES:

- When removing parts at locations where there are O-rings or gasket seals, clean the mounting surface, and replace with new parts.
When doing this, be careful not to forget to assemble the O-rings and gaskets.
- When installing the hoses, do not twist them or bend them into loops with a small radius.
This will cause damage to the hose and markedly reduce its service life.

CHECKS AFTER INSPECTION AND MAINTENANCE:

If you forget carrying out the checks after inspection and maintenance, unexpected problems may occur, and this may lead to serious injury or property damage. Always do as follows.

- Checks after operation (with engine stopped)
 - Have any inspection and maintenance points been not forgotten?
 - Have all inspection and maintenance items been carried out correctly?
 - Have any tools or parts been not dropped inside the machine? It is particularly dangerous if parts are dropped inside the machine and get caught in the lever linkage mechanism.
 - Is there any leakage of water or oil? Have all the bolts been tightened?
- Check when the engine is running
 - See "TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-32)" in the section on safety for checking when the engine is running. Pay enough attention for safety.
 - Check if the inspected and maintenance area is normally operated.
 - Increase the engine speed to check for the leak of fuel and oil.

OUTLINES OF SERVICE

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and work equipment under extremely severe conditions (high temperature, high pressure), and is deteriorates with use.
Always use oil that matches the grade and temperature for use given in the Operation and Maintenance Manual. Even if the oil is not dirty, always change the oil after the specified interval.
- Oil corresponds to blood in the human body, so always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
The majority of problems with machine are caused by the entry of such impurities.
Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
Having too much oil or too little oil are both causes of problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, please contact your Komatsu distributor.
- When changing the oil, always replace the related filters 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.
- At the time of shipment from the factory, SAE10WCD is used for hydraulic oil circuit. Do not use the hydraulic oil that is not recommended by Komatsu since it will be the cause for clogging. It will be no problem to mix with the small amount of remaining oil in piping and the cylinder.

FUEL

- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified in the Operation and Maintenance Manual.
Fuel may congeal depending on the temperature when it is used (particularly in low temperature below -15°C (5 °F)). It is necessary to change for the fuel that is suitable for the temperature.
- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- This engine has the electronic control and high-pressure injection system in order to yield good fuel efficiency and emission properties. For this, high degrees of precision of the parts and lubricating ability is required. So, if the fuel other than light oil is used (kerosene, heavy oil), it may cause such problems as decreasing durability and clogging of fuel filter cartridge in earlier period.

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 anti-freeze, 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.
- Anti-freeze 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 4-19)".
- 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 from the air in the coolant.

GREASE

- Grease is used to prevent twisting and noise at the joints.
- The nipples not included in the maintenance section are nipples for overhaul, so they do not need grease.
If any part becomes stiff after being used for long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing.
Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

CARRYING OUT KOWA (Komatsu Oil Wear Analysis)

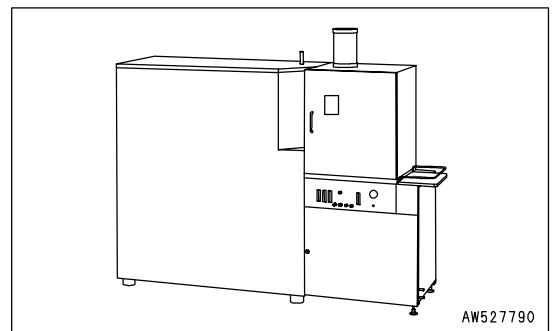
KOWA is a maintenance service that makes it possible to prevent machine failures and down-time. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other abnormalities.

Periodic use of KOWA makes the following possible:

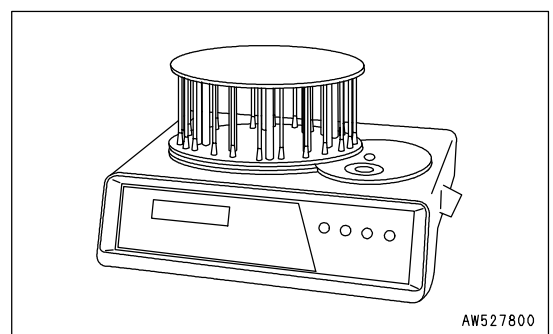
- It enables abnormalities to be detected early, leading to reduction of repair costs and machine downtime.
- It enables repair schedules to be planned, leading to improved machine availability.

KOWA analysis items

- Analysis of metal wear particles
This uses an ICP (Inductively Coupled Plasma) analyzer to measure the density of metal wear particles in the oil.



- Measurement of particle quantity
This uses a PQI (Particle Quantifier Index) measurer to measure the quantity of large iron particles in the oil.



- Others
Measurements are made of items such as the ratio of water or fuel in the oil, and the dynamic viscosity.

Oil sampling

- Sampling interval
250 hours: Engine
500 hours: Other components

- Precautions when sampling
 - Make sure that the oil is well mixed before sampling.
 - Carry out sampling regularly at fixed intervals.
 - Do not carry out sampling on rainy or windy days when water or dust can get into the oil.

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

STORING OIL AND FUEL

- Keep indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, put the drum on its side so that the filler port of the drum can is at the side. (To prevent moisture from being sucked in)
If drum cans have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

FILTERS

- Filters are extremely important safety parts. They prevent impurities in the fuel and air circuits from entering important equipment and causing problems.
Replace all filters periodically. For details, see the Operation and Maintenance Manual.
However, when working in severe conditions, replace the filters at shorter intervals according to the oil and fuel (sulfur content) being used.
- Never try to clean the filters (cartridge type) and use them again. Always replace with new filters.
- When replacing oil filters, check if any metal particles are affixed to the old filter. If any metal particles are found, please contact your Komatsu distributor.
- Do not open packs of spare filters until just before they are to be used.
- Always use Komatsu genuine filters.

OUTLINE OF ELECTRIC SYSTEM

- It is extremely dangerous if the electrical equipment becomes wet or the covering of the wiring is damaged. This will cause electrical leakage and may lead to malfunction of the machine. Do not wash the inside of the operator's cab with water. When washing the machine, be careful not to let water get into the electrical components.
- Service relating to the electric system is check of fan belt tension, check of damage or wear in the fan belt and check of battery fluid level.
- Never install any electric components other than those specified by Komatsu.
- External electro-magnetic interference may cause malfunction of the control system controller, so before installing a radio receiver or other wireless equipment, please contact your Komatsu distributor.
- When working at the seashore, carefully clean the electric system to prevent corrosion.
- The optional power source must never be connected to the fuse, starting switch, or battery relay.

WEAR PARTS

Wear parts such as the filter element, air cleaner element, blade edge, etc. are to be replaced at the time of periodic maintenance or before their abrasion limits.

The wear parts should be changed correctly in order to use the machine economically.

For part change, Komatsu genuine parts of excellent quality should be used.

When ordering parts, please check the part number in the parts book.

WEAR PARTS LIST

The parts in parentheses are to be replaced at the same time.

Item	Part No.	Part name	Q'ty	Replacement frequency
Engine oil filter	600-211-1231	Cartridge	2	Every 500 hours
Fuel filter (*)	600-311-3111	Cartridge	2	Every 500 hours
Transmission oil filter	424-16-11140	Element	3	Every 500 hours
	(07000-12014)	(O-ring)	(3)	
	(07000-12125)	(O-ring)	(3)	
Corrosion resistor	600-411-1171	Cartridge	1	Every 1000 hours
Hydraulic filter	07063-51142	Element	2	Every 2000 hours
	(07000-15175)	(O-ring)	(2)	
Air cleaner	600-185-6100	Element ass'y	1	-
	600-185-6110	Outer element ass'y	1	
Air conditioner air filter	421-07-12312	Element	2	-
Center edge	41E-70-15221	Edge	3	-
	(423-70-13180)	(Bolt)	(27)	
	(175-71-11530)	(Nut)	(27)	
	(01643-22245)	(Washer)	(27)	
Corner edge	175-70-21126	End bit (Left)	1	-
	175-70-21136	End bit (Right)	1	
	(02090-11485)	(Bolt)	(14)	
	(175-71-11530)	(Nut)	(14)	
	(01643-22245)	(Washer)	(14)	

* Since this engine yields high injection pressure, a more sophisticated filter is required. Be sure to use the special filter. Its part number is found in the table above.

If any other filter is used, it may decrease the life of the injection system and cause trouble.

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE										
		-22 -30	-4 -20	14 -10	32 0	50 10	68 20	86 30	104 40	122°F 50°C		
Engine oil pan	Engine oil						SAE30					
					SAE10W							
				SAE10W-30								
			SAE15W-40									
Transmission case	Engine oil						SAE30					
		SAE10W										
Hydraulic system			SAE10W									
Axle (Front and rear) (each)		See Note 1										
Greasing system	Grease	NLGI No. 2										
Fuel tank (*)	Diesel fuel					ASTM D975 No. 2						
		※										
Cooling system	Water	Add antifreeze										

※ ASTM D975 No. 1

* Use only diesel fuel.

If the machine is operated at temperatures below -20°C (-4°F), a separate device is needed, so please consult your Komatsu distributor.

Note 1: Use the oil in the table below.

Maker	Brand
SHELL	DONAX TD 5W-30
MOBIL	MOBILFLUID 424

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.

Reservoir		Engine oil pan	Transmission case	Hydraulic system	Axle (front and rear) (each)	Pins	Fuel tank	Cooling system
Capacity	Liters	62	120	330	124	–	670	160
	US gal	16.4	31.7	87.2	33	–	177	42.3
Refill	Liters	47	110	215	124	–	–	–
	US gal	12.4	29.0	56.8	33	–	–	–

REMARK

- When fuel sulphur content is less than 0.5%, change oil in the oil pan according to every periodic maintenance hours described in this manual.
Change oil according to the following table if fuel sulphur 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 Insitute

Fuel sulphur content	Change interval of oil in engine oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

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	*Superme duty fleet motor oil	Multi-purpose 4092 Multi-purpose 4140	Multi-purpose white grease 705 707L White-bearing grease	Anti-freeze and summer coolant
15	PETROFIN E	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 pres- tidge 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

STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

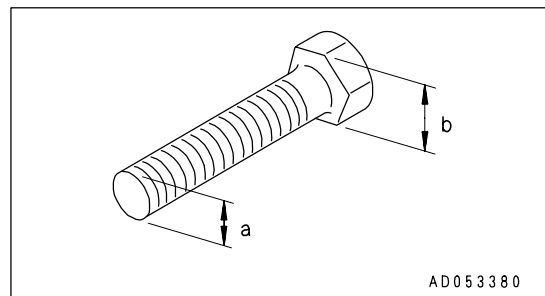
TORQUE LIST



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.

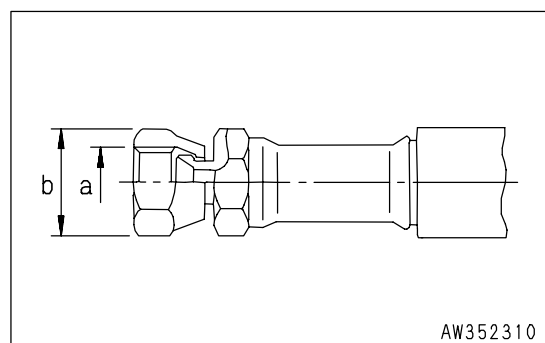
Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		N·m	kgf·m	lbft	N·m	kgf·m	lbft
6	10	13.2	1.35	9.8	11.8-14.7	1.2-1.5	8.7-10.8
8	13	31	3.2	23.1	27-34	2.8-3.5	20.3-25.3
10	17	66	6.7	48.5	59-74	6.0-7.5	43.4-54.2
12	19	113	11.5	83.2	98-123	10.0-12.5	72.3-90.4
14	22	177	18	130.2	157-196	16.0-20.0	115.7-144.7
16	24	279	28.5	206.1	245-309	25.0-31.5	180.8-227.8
18	27	382	39	282.1	343-425	35.0-43.5	253.2-314.6
20	30	549	56	405.0	490-608	50.0-62.0	361.7-448.4
22	32	745	76	549.7	662-829	67.5-84.5	488.2-611.2
24	36	927	94.5	683.5	824-1030	84.0-105.0	607.6-759.5
27	41	1320	135.0	976.5	1180-1470	120.0-150.0	868.0-1085.0
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



AD053380

Apply the following table for Hydraulic Hose.

Thread diameter a (mm)	Width across flats b (mm)	Tightening torque					
		Target value			Permissible range		
		N·m	kgf·m	lbft	N·m	kgf·m	lbft
10	14	14.7	1.5	10.8	12.7 - 16.7	1.3 - 1.7	9.4 - 12.3
14	19	29.4	3.0	21.7	27.5 - 39.2	2.8 - 4.0	20.3 - 28.9
18	24	78.5	8.0	57.9	58.8 - 98.1	6.0 - 10.0	43.4 - 72.3
22	27	117.7	12.0	86.6	88.3 - 137.3	9.0 - 14.0	65.1 - 101.3
24	32	147.1	15.0	108.5	117.7 - 176.5	12.0 - 18.0	86.8 - 130.2
30	36	215.7	22.0	159.1	176.5 - 245.2	18.0 - 25.0	130.2 - 180.8
33	41	255.0	26.0	188.1	215.7 - 284.4	22.0 - 29.0	159.1 - 209.8



AW352310

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

To ensure safety at all times when operating or driving the machine, the user of the machine must always carry out periodic maintenance. In addition, to further improve safety, the parts in the safety-critical parts list on the next page must also be replaced at the specified interval. These parts are particularly closely connected to safety and fire prevention, so please contact your Komatsu distributor to have them replaced.

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 irrespective of their conditions after a certain period of usage. This is important to ensure that these parts maintain their full performance at all the time.

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 parts has not yet arrived.

If any of the hose clamps show deterioration like deformation or crack, replace such a defective clamp with a new one together with a defective hose.

Also carry out the following checks with hydraulic hoses which need not be replaced periodically. Tighten a loosened clamp again or replace a defective hose, as such abnormality requires.

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

SAFETY CRITICAL PARTS

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (fuel tank - fuel filter)	2	Every 2 years or every 4000 hours, whichever comes first
2	Fuel return hose (fuel injection nozzle - fuel tank)	1	
3	Work equipment hose (work equipment pump - work equipment valve)	3	
4	Steering hose (steering pump - steering valve)	2	
5	Steering hose (steering valve - steering cylinder)	4	
6	Steering hose (switch pump - steering valve)	2	
7	Brake hose (pump - accumulator charge valve)	2	
8	Brake hose (accumulator charge valve - check valve)	1	
9	Brake hose (accumulator - tandem valve)	2	
10	Brake hose (accumulator - single valve)	1	
11	Brake hose (Check valve - accumulator P.P port)	1	
12	Brake hose (tandem valve - front brake)	2	
13	Brake hose (tandem valve - rear brake)	2	
14	Brake hose (single valve - tandem valve)	1	
15	Brake hose (tandem valve - drain block)	1	
16	Brake hose (single valve - drain block)	1	
17	Brake hose (drain block - hydraulic tank)	1	
18	Brake hose (brake accumulator - parking solenoid valve)	3	
19	Brake hose (parking solenoid valve - parking brake cylinder)	1	
20	Brake hose (parking solenoid valve - hydraulic tank)	3	
21	Brake hose (charge valve drain - hydraulic tank)	1	
22	Seat belt	1	Every 3 years

MAINTENANCE SCHEDULE CHART

MAINTENANCE SCHEDULE CHART

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

REPLACE TRANSMISSION OIL FILTER ELEMENT -----	4- 47
CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT -----	4- 53

INITIAL 2000 HOURS SERVICE (ONLY AFTER THE FIRST 2000 HOURS)

CHECK INJECTOR SETTING LOAD, ADJUST -----	4- 16
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WHEN REQUIRED

CHECK, CLEAN, OR REPLACE AIR CLEANER ELEMENT -----	4- 17
CLEAN INSIDE OF COOLING SYSTEM -----	4- 19
CHECK TRANSMISSION OIL LEVEL, ADD OIL -----	4- 22
CHECK AXLE OIL LEVEL, ADD OIL -----	4- 23
CLEAN AXLE CASE BREATHER -----	4- 24
CLEAN CONDENSER OF AIR CONDITIONER -----	4- 24
CHECK WINDOW WASHING FLUID LEVEL, ADD FLUID -----	4- 25
CLEAN RADIATOR FINS -----	4- 25
REVERSE, REPLACE CUTTING EDGE, END BIT -----	4- 26
CHECK AIR CONDITIONER -----	4- 27
REPLACE SLOW-BLOW FUSE -----	4- 28
BLEEDING AIR FROM HYDRAULIC TANK -----	4- 29
REPLACE FAN BELT, ADJUST AUTO-TENSIONER -----	4- 29
SELECTION AND INSPECTION OF TIRES -----	4- 31
DRAIN WATER FROM WATER SEPARATOR -----	4- 32

CHECK BEFORE STARTING

EVERY 50 HOURS SERVICE

DRAIN WATER, SEDIMENT FROM FUEL TANK -----	4- 34
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EVERY 100 HOURS SERVICE

LUBRICATE REAR AXLE PIVOT PIN -----	4- 35
CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL -----	4- 35
CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER -----	4- 36

EVERY 250 HOURS SERVICE

CHECK BATTERY ELECTROLYTE LEVEL -----	4- 37
CHECK PARKING BRAKE -----	4- 38
CHECK ALTERNATOR BELT TENSION, ADJUST -----	4- 39
CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST -----	4- 40
CHECK FOR LOOSE WHEEL HUB NUTS, TIGHTEN -----	4- 40
CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER -----	4- 41
LUBRICATING -----	4- 41

EVERY 500 HOURS SERVICE

CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE	4- 44
REPLACE FUEL FILTER CARTRIDGE	4- 46
REPLACE TRANSMISSION OIL FILTER ELEMENT	4- 47
LUBRICATE CENTER DRIVE SHAFT SPLINE	4- 48
CHECK FAN BELT FOR WEAR	4- 48

EVERY 1000 HOURS SERVICE

CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER	4- 49
CLEAN TRANSMISSION CASE BREATHER	4- 50
CLEAN RADIATOR SUB-TANK BREATHER	4- 50
LUBRICATING	4- 50
CHECK TIGHTENING PARTS OF TURBOCHARGER	4- 52
CLEAN FUEL STRAINER	4- 52
REPLACE CORROSION RESISTOR CARTRIDGE	4- 52

EVERY 2000 HOURS SERVICE

CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT	4- 53
REPLACE HYDRAULIC TANK BREATHER ELEMENT	4- 55
CHANGE AXLE OIL(*)	4- 55
REPLACE ELEMENT IN AIR CONDITIONER RECIRCULATION AIR FILTER, FRESH AIR FILTER	4- 56
CLEAN PPC CIRCUIT STRAINER	4- 57
CLEAN ENGINE BREATHER ELEMENT	4- 58
CHEK ALTERNATOR, STARTING MOTOR	4- 58
CHECK ENGINE VALVE CLEARANCE, ADJUST	4- 58
CHECK BRAKE DISC WEAR	4- 58
CLEAN AND CHECK TURBOCHARGER	4- 58
CHECK ACCUMULATOR FUNCTION	4- 59
CHECK ACCUMULATOR GAS PRESSURE	4- 59

*: The interval of 2000 hours for changing the axle oil is for standard operations. If the brake is used frequently or the brakes make a sound, change the oil after a shorter interval.

EVERY 4000 HOURS SERVICE

CHECK WATER PUMP	4- 60
CHECK VIBRATION DAMPER	4- 60
CHECK FAN PULLEY AND TENSION PULLEY	4- 60
CHECK AIR CONDITIONER COMPRESSOR, ADJUST	4- 60

SERVICE PROCEDURE

INITIAL 250 HOURS SERVICE

Carry out the following maintenance only after the first 250 hours.

- REPLACE TRANSMISSION FILTER ELEMENT
- REPLACE HYDRAULIC FILTER ELEMENT

For details of the method of replacing or maintaining, see the section on EVERY 500 HOURS and 2000 HOURS SERVICE.

INITIAL 2000 HOURS SERVICE

Perform the following maintenance after 2000 hours of traveling only for the first maintenance of the new car.

CHECK INJECTOR SETTING LOAD, ADJUST

The special tools are needed for the check and adjustment.

Ask your Komatsu distributor for checking and adjustment.

WHEN REQUIRED

CHECK, CLEAN, OR REPLACE AIR CLEANER ELEMENT



- If inspection, cleaning, or maintenance is carried out with the engine running, dirt will get into the engine and the engine will suffer damage. Always stop the engine before carrying out these operations.
- When using compressed air, there is danger that dirt may be blown around and cause serious injury. Always use safety glasses, dust mask, and other protective equipment.

CHECKING

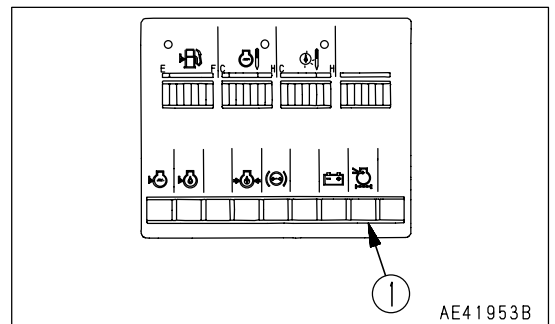
If air cleaner clogging caution lamp (1) on the maintenance monitor flashes, clean the air cleaner element.

NOTICE

Do not clean the air cleaner element before the air cleaner clogging caution lamp flashes.

If the air cleaner element is cleaned frequently before the air cleaner clogging caution lamp flashes, the proper performance of the air cleaner is not provided and the cleaning efficiency is lowered.

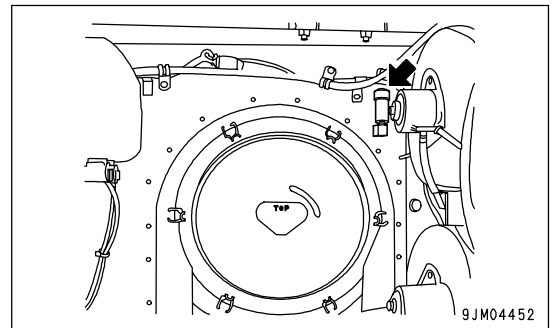
In addition, dust sticking to the cleaner element falls on the inner element side while cleaning the element.



REMARK

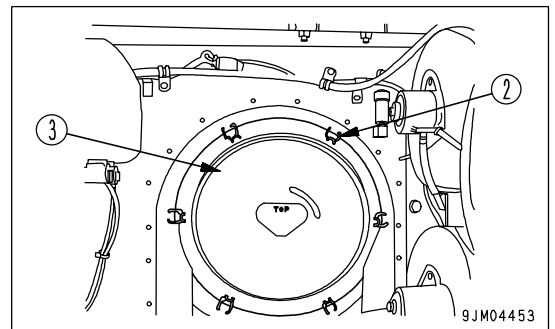
A dust indicator (with 5-stage display) is installed to the side of the air cleaner. This displays the condition of the clogging of the air cleaner.

This makes it possible to check the clean status of the element and the replacement time.



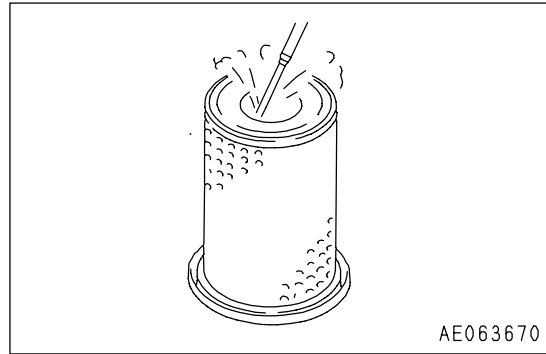
CLEANING OR REPLACING OUTER ELEMENT

1. Release lock (2) of cover (3), then remove the cover.
2. Remove outer element.
3. Clean the inside and the cover of the air cleaner body.



4. Direct dry compressed air (less than 0.69 MPa, 7 kgf/cm², 99.4 PSI) from the inside of the element along its folds. Then blow with air along the folds from the outside, and finally blow again from the inside.

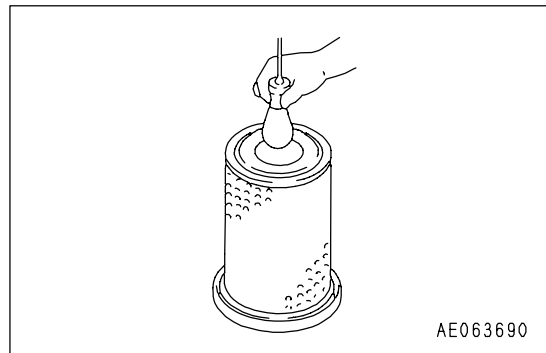
- 1) Remove one seal from the element whenever the element has been cleaned.
- 2) Replace the outer element if it has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.
- 3) If the air cleaner clogging monitor flashes immediately after the outer element has been cleaned, replace both inner and outer elements, even if the outer element has not been cleaned 6 times.



NOTICE

After cleaning and drying the element, check it by shining a light through it. If any small holes or thin cracks are found, replace the element. When cleaning the element, do not hit it or beat it against anything. Do not use an element that has damaged folds, gaskets, or seals.

5. Install the cleaned element, then install cover (3).



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 inside of the air cleaner body, then remove the cover installed in Step 2.
4. Fit a new inner element and securely push it in.

NOTICE

The inner element must not be used again even after its cleaning. When replacing the outer element, replace the outer element at the same time.

5. Install the outer element and the cover.

CLEAN INSIDE OF COOLING SYSTEM



- Immediately after the engine is stopped, the engine coolant is hot and the pressure inside the radiator is high. Removing the cap and draining the water under this condition could cause burns. Allow the engine to cool down, then turn the cap slowly to release the pressure.
- Start the engine and flush the system. When standing up or leaving the operator's seat, set the safety lock lever to the LOCK position.
- For details of starting the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (PAGE 3-39)" and "STARTING ENGINE (PAGE 3-53)" in the OPERATION section of the Operation and Maintenance Manual.
- When the undercover is removed, there is danger of touching the fan.
Never go to the rear of the machine when the engine is running.

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

Clean the inside of the cooling system, change the coolant 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 no using antifreeze	Every 6 months or every 1000 hours, whichever come first	

Use a permanent type of antifreeze.

If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol. 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	- 10	- 15	- 20	- 25	- 30
	°F	14	5	- 4	- 13	- 22
Amount of antifreeze	Liters	48	56	64	72	80
	US gal	12.68	14.80	16.91	19.02	21.15
Amount of water	Liters	112	104	96	88	80
	US gal	29.62	27.50	25.39	23.28	21.15

 **WARNING**

Antifreeze is flammable, so keep it away from flame.

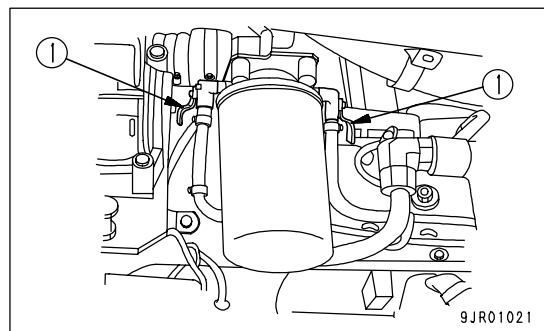
Antifreeze is toxic. When removing the drain plug, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.

Use city water for the cooling water.

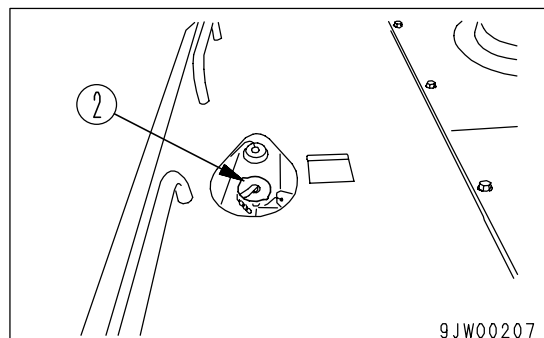
If river water, well water or other such water supply must be used, contact your Komatsu distributor.

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

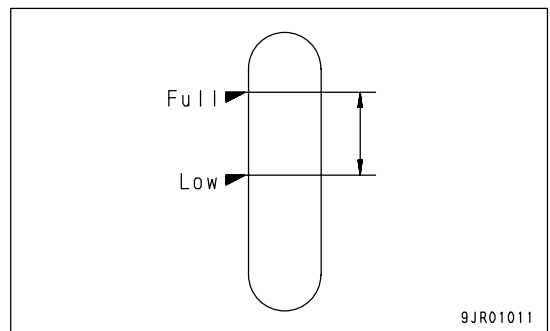
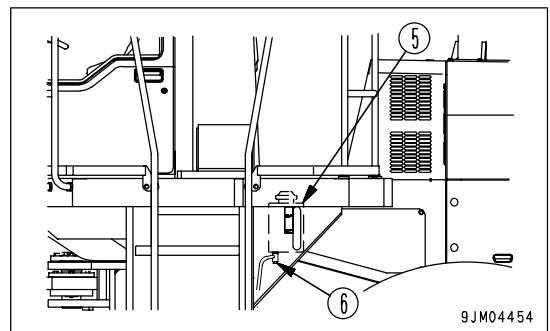
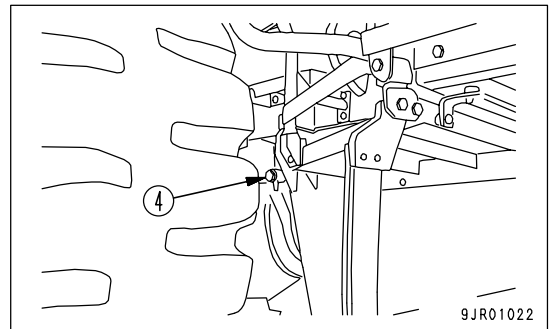
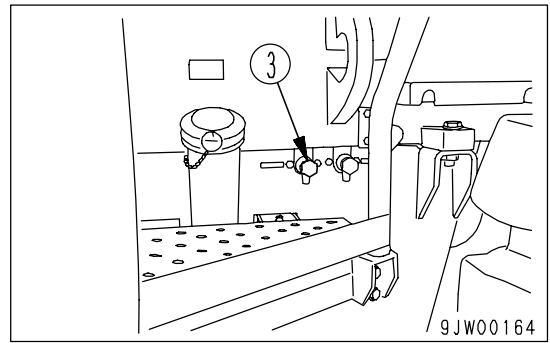
1. Stop the engine and tighten corrosion resistor valve (1).



2. Turn radiator cap (2) slowly to release the pressure, and remove it.



3. Put a container in place to catch the engine cooling water with antifreeze, then open radiator drain valve (3) and oil cooler drain valve (4) to drain the water.
4. After draining the water, close drain valves (3) and (4), and fill with city water.
5. When the radiator is full, start the engine, and run it at low idling.
Keep the engine running at low idling for 10 minutes until the water temperature reaches more than 90°C (194°F).
6. After flushing, stop the engine, open drain valves (3) and (4) to drain the water.
7. After draining the water, clean the cooling system with cleaning agent.
For the cleaning method, see the instructions for the cleaning agent.
8. Close drain valves (3) and (4).
9. Replace the corrosion resistor and open valves (1). See "REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-52)" for the replacement of corrosion resistor.
10. Add cooling water until it overflows from the water filler.
Decide the proportions of antifreeze and water according to the table for the mixing rate of water and antifreeze.
11. To remove the air in the cooling system, run the engine for 5 minutes at low idling, and for another 5 minutes at high adling. (When doing this, leave the radiator cap off.)
12. Open drain plug (6) to drain the coolant inside sub tank (5), wash the inside of the sub tank, then add water until the coolant level is between the FULL and LOW marks.
13. Stop the engine, wait for approx. 3 minutes, then add tap water until the water level is near the water filler port, and tighten the cap. Check the coolant level and add water if necessary.



CHECK TRANSMISSION OIL LEVEL, ADD OIL



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.

Carry out this procedure if there is any sign of oil on the transmission case, or if there is oil mixed with the cooling water.

The precise measurement of the amount of oil cannot be performed immediately after the engine is stopped because the oil still remains in each section. Wait at least 15 minutes for the check.

1. Stop the engine and remove the cap from oil filler (F).
2. Take out the dipstick (G) and wipe off the oil with cloth.
3. Insert dipstick (G) fully in the oil filler pipe, then take it out again.
4. The oil level should be between the H and L marks on dipstick (G).

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

5. If the oil is above the H mark, remove drain plug (1), then loosen drain plug (2), and drain the excess oil.

After draining the oil, check the oil level again.

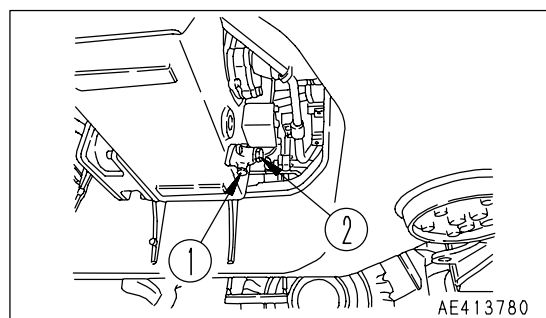
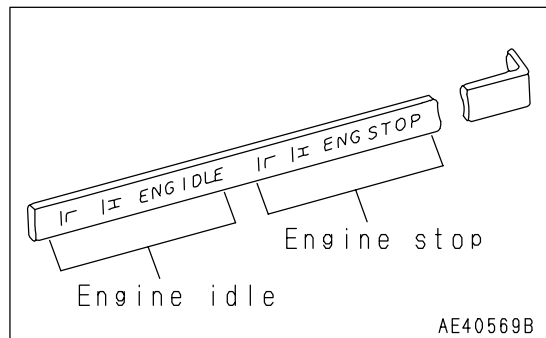
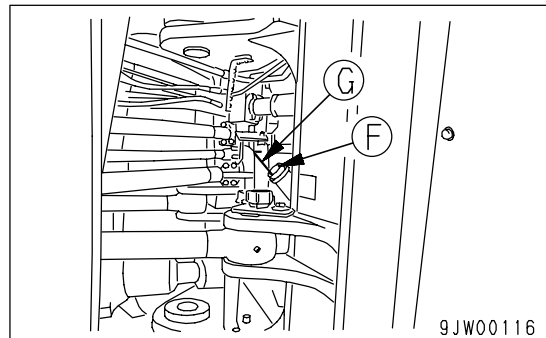
6. If the oil level is correct, insert dipstick (G) in the dipstick guide, then tighten the cap

The dipstick has 2 level marks on one side: ENG STOP (for measuring when the engine is stopped) and ENG IDLE (for measuring when the engine is idling).

When measuring the oil level, wait for at least 60 minutes after stopping the engine, and measure with the "ENG STOP" marks.

It is also possible to measure when the engine is at low idle, but in such cases, do as follows.

- Start the engine and run it until the oil level is stable, then wait for 5 minutes and measure with the "ENG IDLE" marks.



CHECK AXLE OIL LEVEL, 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.

Carry out this procedure if there is any sign of oil on the axle case.

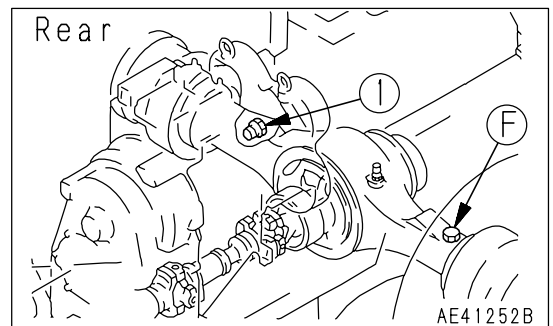
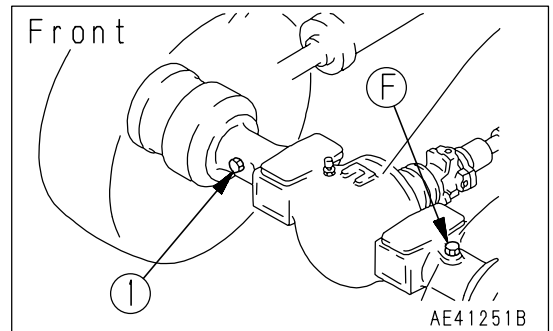
Carry out the inspection with the machine on a horizontal road surface.

(If the road surface is at an angle, the oil level cannot be checked correctly.)

1. Stop the engine and remove level plug (1).
2. Check that the oil level reaches the bottom of the plug hole.
3. If the oil is not near the bottom of the plug hole, add axle oil through the plug hole(F).
4. If the oil level is correct, install level plug (1)

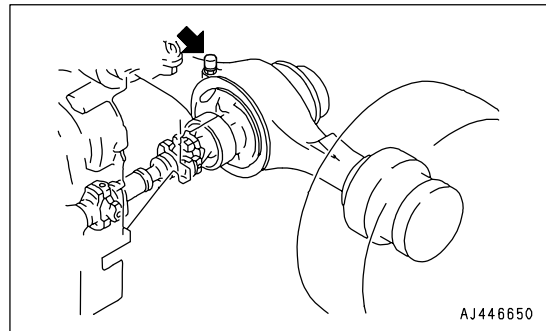
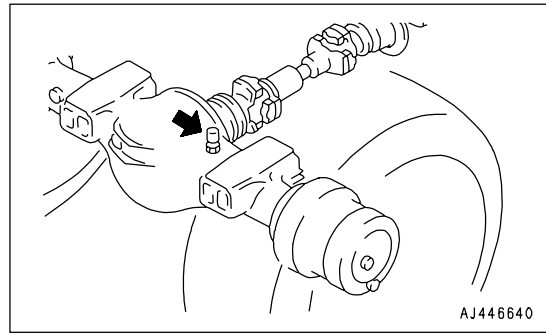
Tightening torque: $152 \pm 24.5 \text{ N}\cdot\text{m}$

($15.5 \pm 2.5 \text{ kgf}\cdot\text{m}$, $112 \pm 18 \text{ lbf}\cdot\text{ft}$)



CLEAN AXLE CASE BREATHER

Remove all mud and dirt from around the breather with a brush.
 After removing the mud or dirt from around the breather, remove the breather, immerse it in cleaning fluid and clean it.
 When cleaning the breather, clean the breathers at two places (front and rear).
 After removing the breather, take steps to prevent dirt or dust from entering the mount.

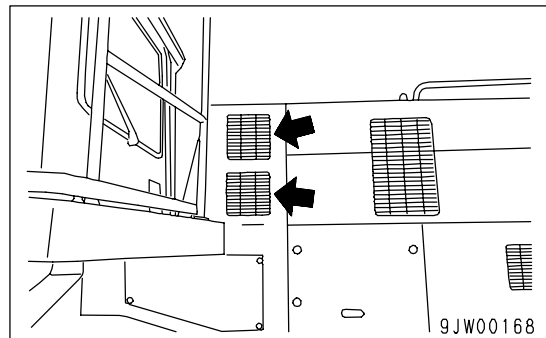


CLEAN CONDENSER OF AIR CONDITIONER



WARNING

- Do not wash the condenser with a steam cleaner. There is danger that the condenser overheat.
- If high-pressure water hits your body directly or dirt is sent flying the high-pressure water, there is danger of personal injury. Always wear protective glasses, dust mask, and other protective equipment.



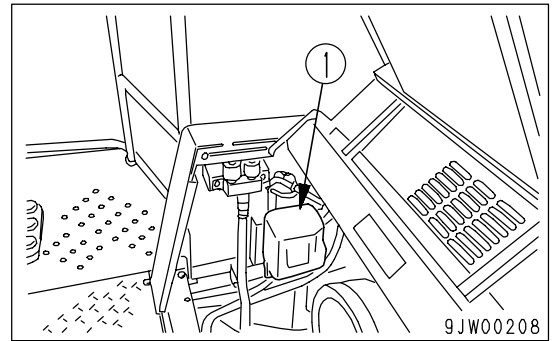
If there is mud or dust on the air conditioner condenser, clean it with water.

If the water pressure is too high, the fins may get deformed. When washing with a high pressure washing machine, apply the water from a reasonable distance.

CHECK WINDOW WASHING FLUID LEVEL, ADD FLUID

Check the washing fluid levels in washer tank (1). When the fluid has run short, add automotive window washing fluid.

Be careful not to let dust get into the fluid.



CLEAN RADIATOR FINS

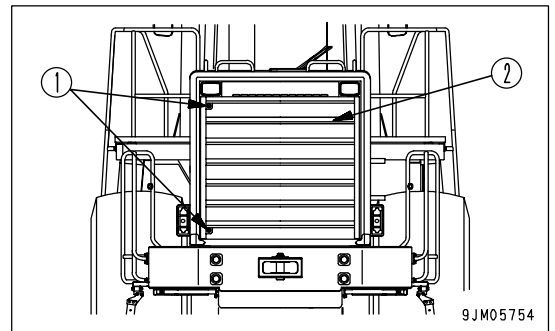


WARNING

If compressed air, high-pressure water, or steam hits your body directly or dirt is sent flying by the compressed air, high-pressure water, or steam, there is danger of personal injury. Always wear protective glasses, dust mask, and other protective equipment.

Clean the radiator or cleaner if mud or dirt is stuck to it.

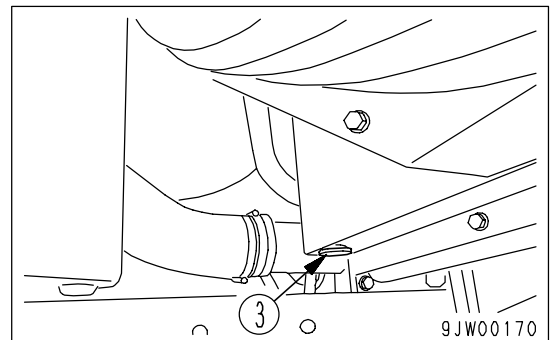
1. Remove bolt (1) and open radiator grill (2).
2. Use compressed air to clean the mud, dust, and leaves from the radiator and oil cooler fins. Steam or water may be used instead of compressed air.



NOTICE

If the steam jet nozzle is brought too close to the radiator fins, it may damage the fins, so keep the nozzle a suitable distance away from the fins when cleaning.

3. Remove rubber caps (3) on both sides of the shroud and supply compressed air in either hole to blow out mud, dust, leaves, etc. from the hole on the opposite side.
4. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by ageing. Further, check hose clamps for looseness.



REVERSE, REPLACE CUTTING EDGE, END BIT**WARNING**

It is dangerous if the blade moves by mistake when the turning or replacing operation is being carried out.

Set the blade in a stable condition, stop the engine, then lock the blade control lever securely with the safety lock lever.

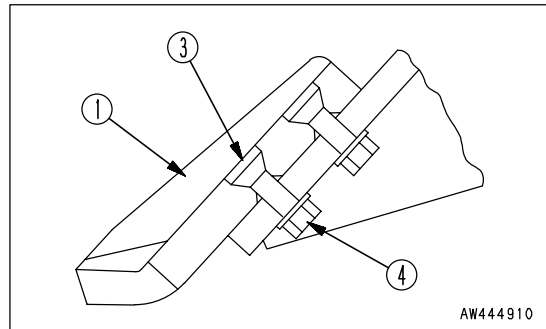
Reverse or replace end bit (1) and cutting edge (2) before they wear down to the end face of the blade.

1. Raise the blade to a convenient height, and put blocks under the blade to prevent it from coming down.
Raise the blade so that the bottom is horizontal.

2. Remove bolt (3) and nut (4), then replace end bit (1) with new one.

If the bolt and nut are worn out, replace with new one.

Tightening torque of mounting bolt: 863 to 941 N·m (88 to 96 kgf·m, 637 to 694 lbf)

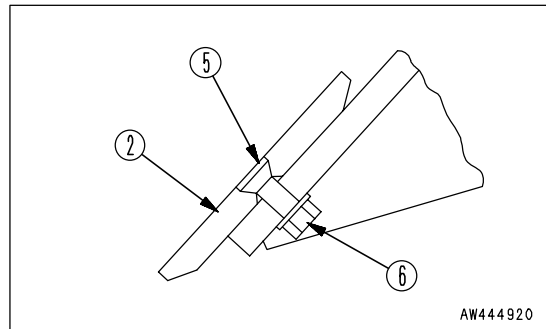


3. Remove bolt (5) and nut (6), then reverse cutting edge (2).

If both sides of the cutting edge are worn, replace with a new part.

If the wear extends to the mounting surface, repair the mounting surface before installing the cutting edge.

Tightening torque of mounting bolt: 863 to 941 N·m (88 to 96 kgf·m, 637 to 694 lbf)



4. Fit the edges to the blade, tighten temporarily, lower the blade 3 to 5 times to the ground, and remove the clearance at bolts (3) and (5). After doing this, tighten the bolts to the correct tightening torque.
5. After operation for several hours, tighten again to the correct tightening torque.

CHECK AIR CONDITIONER

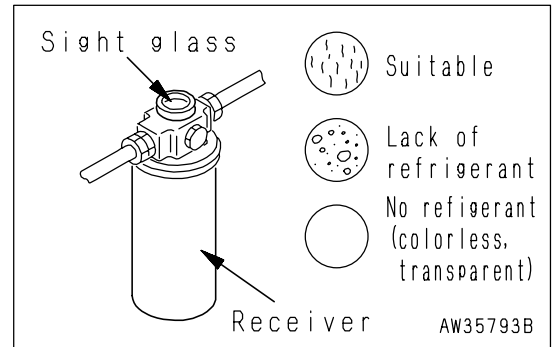
CHECK LEVEL OF REFRIGERANT(GAS)



If the refrigerant used in the cooler gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the refrigerant. Never loosen any part of the refrigerant circuit. Do not bring any flame close to any point where the refrigerant gas is leaking.

If there is a lack of refrigerant (gas), the cooling performance will be poor. When operating the cooler at high speed with the engine at full throttle, use the receiver sight glass (inspection window) to check the condition of the refrigerant gas (Freon R134a) flowing in the refrigerant circuit.

- No bubbles in refrigerant flow: Suitable
- Some bubbles in flow (bubbles pass continuously): Lack of refrigerant
- Colorless, transparent: No refrigerant



REMARK

When there are bubbles, the refrigerant gas level is low, so contact your refrigerant dealer to have refrigerant added. If the air conditioner is run with the refrigerant gas level low, it will cause damage to the compressor.

OPERATING THE AIR CONDITIONER OFF SEASON

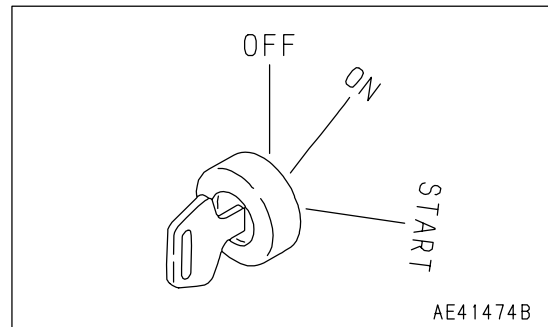
Even during the off-season, operate the air conditioner for 3 - 5 minutes once a month to maintain the oil film at all parts of the compressor.

REPLACE SLOW-BLOW FUSE

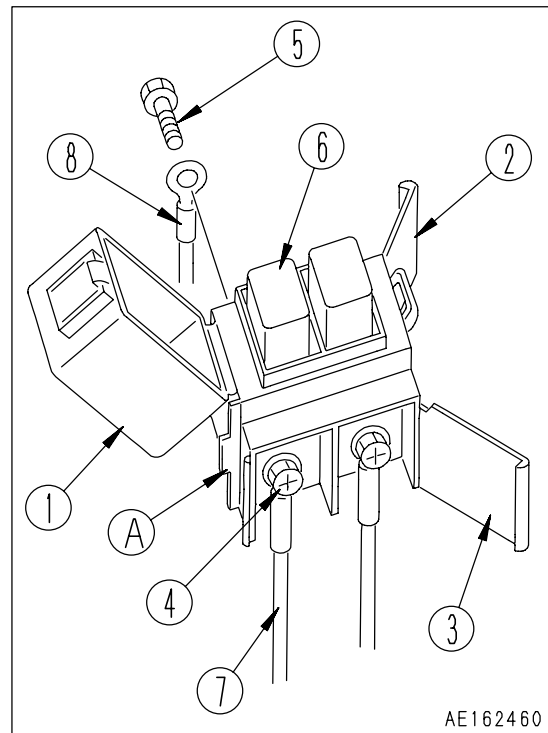
NOTICE

- Always turn the power OFF when replacing the slow blow fuse (turn the starting switch to the OFF position).
- Always replace the slow blow fuse with a fuse of the same capacity.

1. Turn the starting switch to the OFF position.
2. Remove the slow blow fuse box from the chassis.



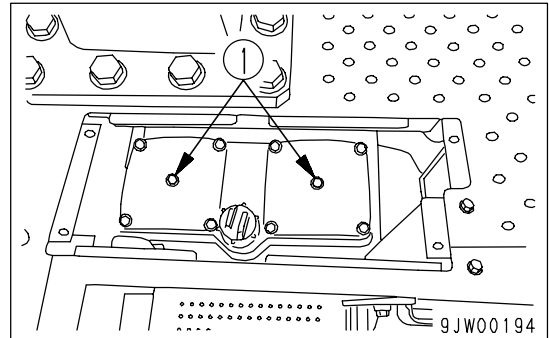
3. Open covers (1), (2), and (3) of the slow blow fuse box. Covers (2) and (3) can be removed easily by using protrusion (A) on the body as a fulcrum and levering the catch of the cover with a flat-headed screwdriver to release it.
4. Loosen screws (4) and (5), and remove. When screws (4) and (5) are removed, slow blow fuse 6 will also come off together with electric wiring (7) and (8).
5. Using screws (4) and (5), install a new slow blow fuse together with electric wiring 7 and 8 to the slow blow fuse box, then close covers (1), (2), and (3).
6. Install the slow blow fuse box to the chassis.



BLEEDING AIR FROM HYDRAULIC TANK

After removing the hydraulic cylinders and piping for the work equipment, bleed air from them in the following manner.

1. Check that the hydraulic oil in the hydraulic tank is at the specified level.
2. Run the engine at low idling, and extend and retract the steering, lift, and tilt/pitch cylinders 4 to 5 times. Be careful not to operate the cylinder to the end of its stroke (stop approx. 100 mm (3.94 in) before the end of stroke).
3. Next, operate each cylinder (steering, lift, tilt/pitch) 3 or 4 times to the end of its stroke. Stop the engine and loosen air bleed plug (1) to bleed the air from the hydraulic tank. After bleeding the air, tighten plug (1).
4. Check the oil level in the hydraulic tank, and add oil to the specified level as necessary. See "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-35)".
5. Run the engine at low idle and loosen the air bleeding plug (1) to bleed air from the inside of the filter tank.
6. Next, increase the engine speed, and repeat step 3 to bleed the air until no more bubbles come out from plug (1).



If the engine is run at high speed at first, or if the cylinder is moved to the end of its stroke, the air in the cylinder may damage the piston packing, etc.

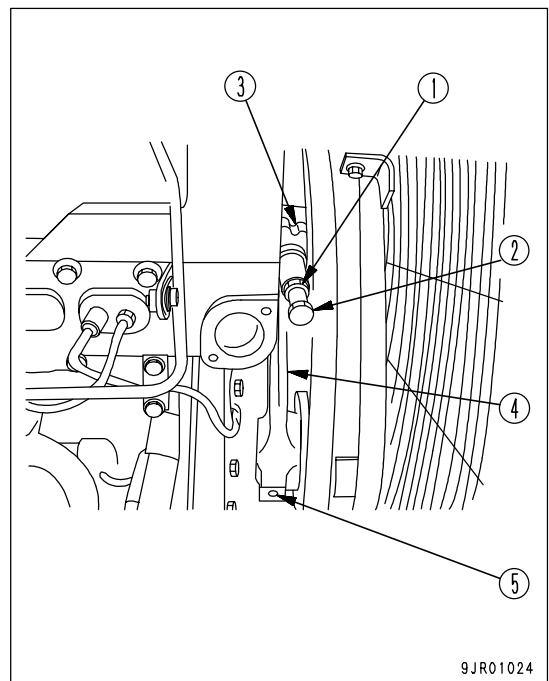
7. After bleeding the air, tighten the air bleeding plug (1).
Tightening torque of the plug: $11.3 \pm 1.47 \text{ N}\cdot\text{m}$ ($1.15 \pm 0.15 \text{ kgf}\cdot\text{m}$, $8.3 \pm 1.1 \text{ lb ft}$)
8. Check the hydraulic oil level and make sure it is correct. (Refer to "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-35)".)

REPLACE FAN BELT, ADJUST AUTO-TENSIONER

Replace the V-belts if they contact the bottom of the pulley grooves, if they are lower than the outside diameter of the pulleys, or if they are cracked or flaking.

PEPLACEMENT

1. Loosen locknut (1), then loosen adjustment screw (2) and move them to bracket (3).
2. Insert a bar about 50 cm (20 in) long into the dent (5) of the tension pulley (4), and pull firmly toward you.
3. The spring extends and the tension pulley moves inwards. Remove the old belts and install new ones. Always replace the belts as a set (3 belts).



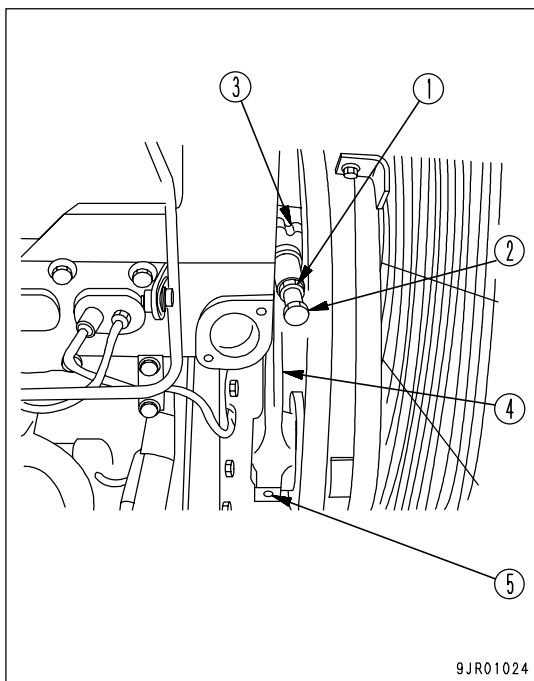
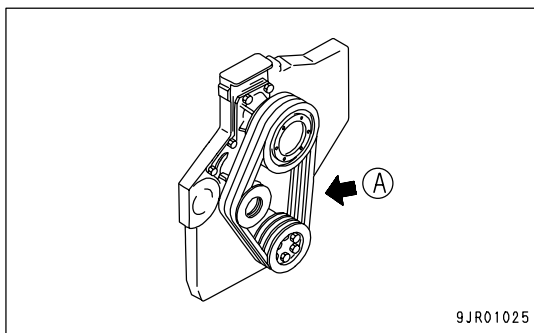
ADJUSTMENT

Press point (A) in the middle of the belt between the fan pulley and crank pulley with a force of about 98.1 N (10 kgf). The standard deflection at this time is about 9 to 11 mm (0.35 to 0.43 in).

If the deflection is larger, adjust the belt tension.

1. Tighten adjustment screw (2), and when the tip of the adjustment screw contacts tension pulley lever (4), tighten the adjustment screw further 3 turns, then lock it in position with locknut (1).
2. If a gap is made between tension pulley lever (4) and adjustment screw (2) during operation, repeat Step 1 to adjust again.

If the fan belts make any abnormal noise, adjust in the same way.

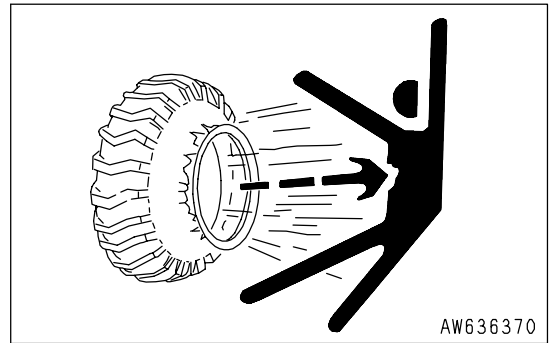


SELECTION AND INSPECTION OF TIRES

! WARNING

If a tire or a rim is handled wrongly, the tire may burst or may be damaged and the rim may be broken and scattered, and that can cause serious injury or death.

- Since maintenance, disassembly, repair and assembly of the tires and rims require special equipment and skill, be sure to ask a tire repair shop to carry out the work.
- Do not heat or weld the rim to which the tire is installed. Do not make a fire near the tire.



SELECTION OF TIRES

! WARNING

Select the tires according to the conditions of use and the weight of the attachments on the machine. Use only specified tires and inflate them to the specified pressure.

Select the tires according to the conditions of use and the weight of the attachments of the machine. Use the following table.

Since the travel speed indicated on the speedometer varies with the tire size, consult your Komatsu distributor when using optional tires.

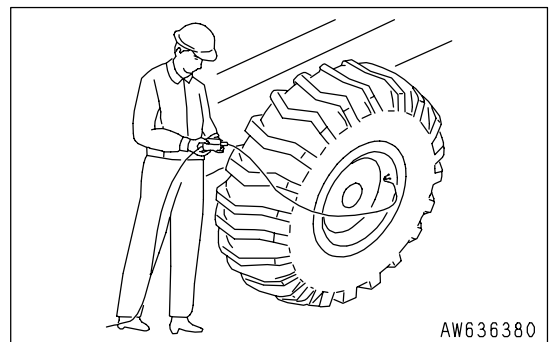
	Maximum load [kg (lb)]	Size	Remarks
Front wheel	18,610 kg (41,028 lb)	35/65-33-24PR (L4 Rock)	Type 3 for construction equipment
Rear wheel	18,610 kg (41,028 lb)	35/65-33-24PR (L4 Rock)	

CHECK INFLATION PRESSURE OF TIRES

! WARNING

When inflating a tire, check that no one will enter the working area and use an air chuck which has a clip and which can be fixed to the air valve.

- While inflating the tire, check the inflation pressure occasionally so that it will not rise too high.
- If the rim is not fitted normally, it may be broken and scattered while the tire is inflated. To ensure safety, place a guard around the tire and do not work in front of the rim but work on the tread side of the tire.
- Abnormal drop of inflation pressure and abnormal fitting of the rim indicate a trouble in the tire or rim. In this case, be sure to ask a tire repair shop to carry out repairs.
- Be sure to observe the specified inflation pressure.
- Do not adjust the inflation pressure of the tires just after high-speed travel or heavy-duty work.



Check

Measure the inflation pressure with a tire pressure gauge while the tires are cool before starting work.

Inflation of tires

Adjust the inflation pressure properly.

When inflating a tire, use an air chuck which can be fixed to the air valve of the tire as shown in the figure. Do not work in front of the rim but work on the tread side of the tire.

The proper inflation pressure is shown below.

Size	Standard inflation pressure
35/65-33-24PR (L4 Rock)	Front tire: 0.34 MPa (3.5 kgf/cm ² , 49.7 PSI) Rear tire: 0.39 MPa (4.0 kgf/cm ² , 56.8 PSI)
35/65-33-24PR (L5 Rock)	Front tire: 0.34 MPa (3.5 kgf/cm ² , 49.7 PSI) Rear tire: 0.39 MPa (4.0 kgf/cm ² , 56.8 PSI)
35/65-R33 (L4 Rock)	Front tire: 0.44 MPa (4.5 kgf/cm ² , 63.9 PSI) Rear tire: 0.49 MPa (5.0 kgf/cm ² , 71.0 PSI)

NOTICE

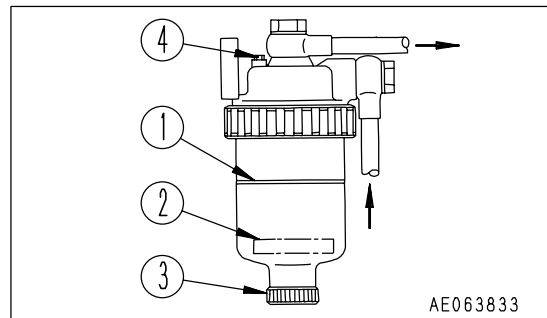
The optimum inflation pressure differs according to the type of work. For details, see "HANDLING THE TIRES (PAGE 3-70)".

DRAIN WATER FROM WATER SEPARATOR

When float (2) is at or above red line (1), drain the water according to the following procedure:

1. Loosen drain plug(3) and air bleed plug (4) (if equipped), drain the accumulated water until the float reaches the bottom.
2. Tighten air bleed plug (4) (if equipped) and drain plug(3).
3. If the air is sucked into fuel line when drain the water, be sure to bleed air in the same manner as for the fuel filter.

See Fuel Filter Cartridge in "REPLACE FUEL FILTER CARTRIDGE (PAGE 4-46)" section.



AE063833

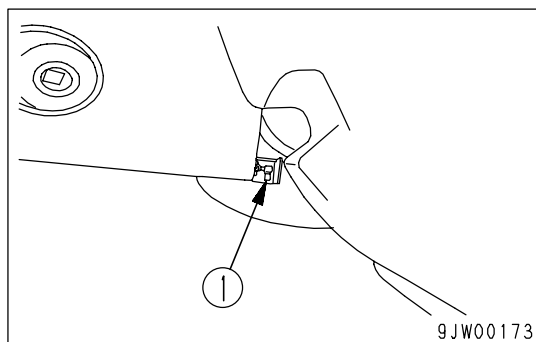
CHECK BEFORE STARTING

For the following items, see "CHECK BEFORE STARTING (PAGE 3-42)".

- Check monitor panel
- Check coolant level, add water
- Check oil level in engine oil pan, add oil
- Check fuel level, add fuel
- Check electrical wiring
- Check parking brake
- Check brake pedal
- Check inflation pressure of tires
- Check water separator

EVERY 50 HOURS SERVICE**DRAIN WATER, SEDIMENT FROM FUEL TANK**

Loosen valve (1) on the right side of the tank so that the sediment and water will be drained together with fuel.



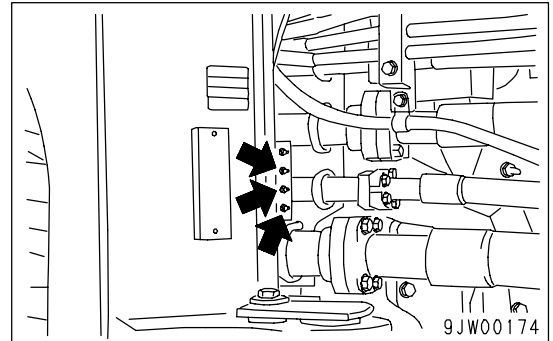
EVERY 100 HOURS SERVICE

Maintenance for every 50 hours service should be carried out at the same time.

LUBRICATE REAR AXLE PIVOT PIN

(3 places)

1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. After greasing, wipe off any old grease that was pushed out.

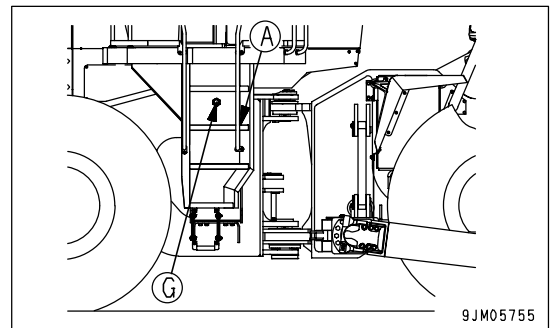


CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

! WARNING

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

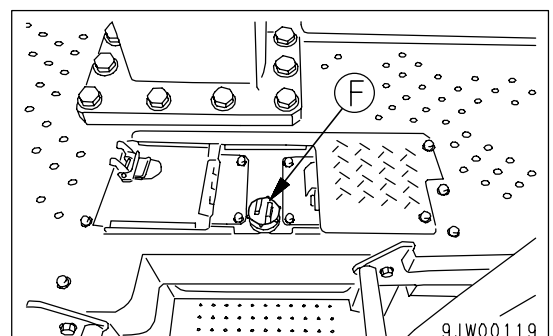
1. Lower the blade horizontally to the ground and stop the engine. Wait for 5 minutes, then check sight gauge (G). The oil level should be between the H and L marks.



NOTICE

Do not add oil if the level is above the H line. If the oil has been added to above H level, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from the drain plug. If the oil is above H level, it will damage the hydraulic circuit or cause the oil to spurt out.

2. If the oil is below the L level, open the inspection cover above the step and add oil through oil filler port (F).



REMARK

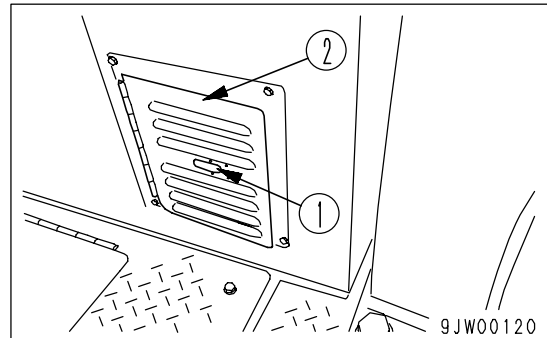
There is a space (A) for storing the oil container on the 4th step from the bottom of the ladder located on the right side of the machine. The oil can be used for adding to the hydraulic oil.

CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER

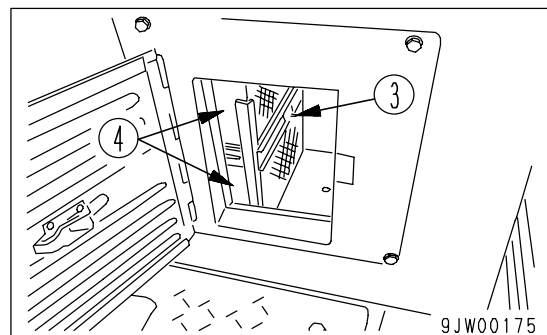
**If compressed air is used, there is danger that dirt may fly and cause personal injury.
Always wear safety glasses, dust mask, and other protective equipment.**

If the air conditioner has been used, the air filter should be cleaned.
Stop the air conditioner before cleaning the element.

1. Grip the handle (1) and open the cover (2).



2. Loosen screw (3), then take out element (4) and clean it.
3. Direct dry compressed air (less than 0.69 MPa (7 kgf/cm², 99.4 PSI)) to the element from inside along its folds, then direct it from outside along its folds and again from inside.

**REMARK**

When assembling the element again, install so that the arrow at the top of the element faces the inside of the cab.

EVERY 250 HOURS SERVICE

Maintenance for every 50 and 100 hours service should be carried out at the same time.

CHECK BATTERY ELECTROLYTE LEVEL

Carry out this check before operating the machine.



- Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may also cause an explosion.
- The battery generates flammable gas and there is danger of explosion, so do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amount of water and consult a doctor.
- When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.

NOTICE

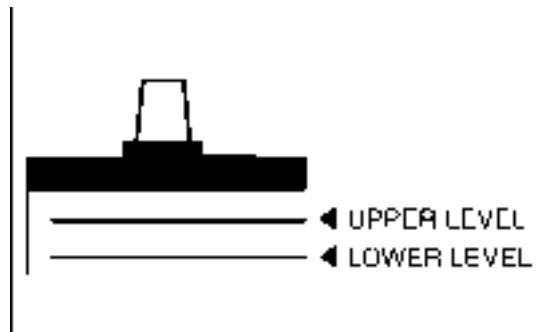
When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

Try to check the electrolyte level on the daily basis. Be sure to check it at least once a month.

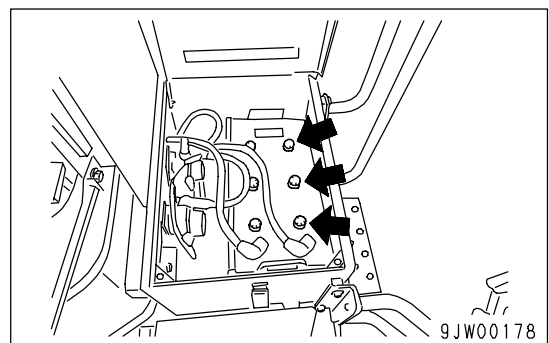
WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

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 mid point of U.L and L.L marks, remove the cap immediately and add the distilled water.
3. After adding, securely tighten the cap.



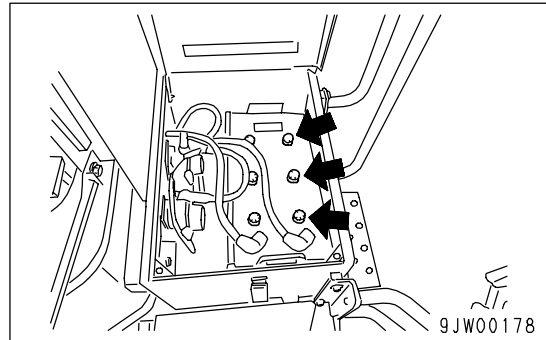
REMARK

If distilled water is added to above the U.L line, use a pipette to lower the level to the U.L line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

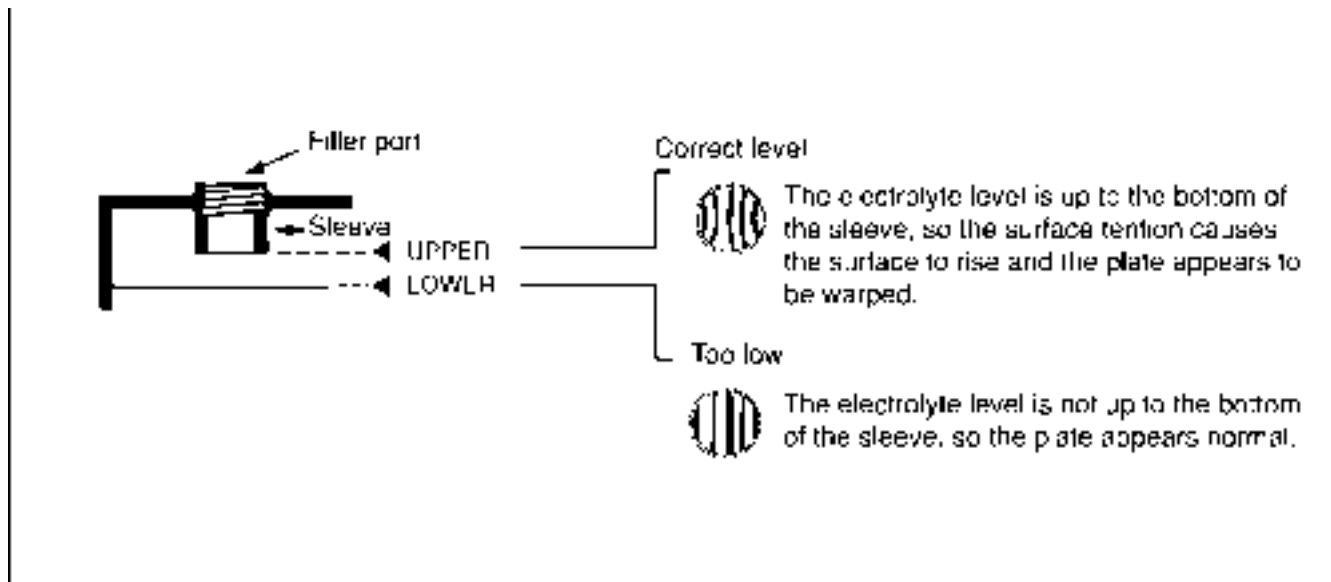
If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

1. Remove the cap on the top of the battery, look into the filler port and check the electrolyte level. If the electrolyte level is not up to the UPPER LEVEL line, add distilled water (locally available refill material can be used).
2. After adding, securely tighten the cap.



REMARK

If distilled water is added to above the bottom of the sleeve, use a pipette to lower the level to the bottom of the sleeve. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.



WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL

If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

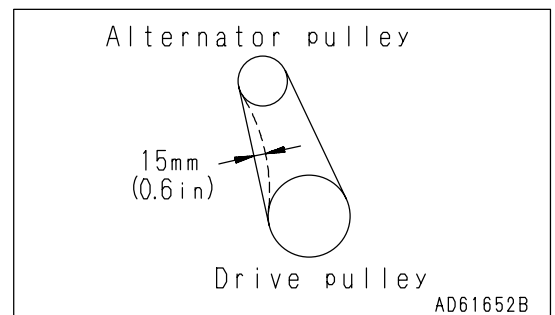
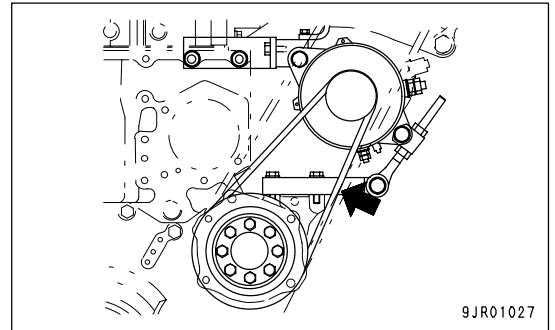
CHECK PARKING BRAKE

1. Set the machine on a dry downhill slope, press the parking brake switch to the ON position, and check if the parking brake holds the machine in position.
2. If any abnormality is found, please contact your Komatsu distributor.

CHECK ALTERNATOR BELT TENSION, ADJUST

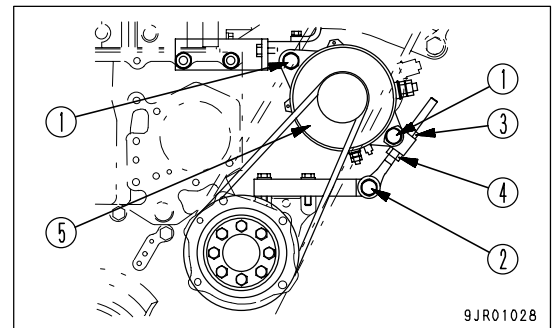
CHECKING

The standard deflection for the drive belt is about 15 mm (0.6 in) when pressed by thumb 58.8 N (about 6 kgf) at a point midway between the drive pulley and alternator pulley.



ADJUSTING

1. Loosen bolts (1), (2) and nut (3).
2. Turn nut (4) to move alternator (5) until the belt is deflected by about 15 mm (0.6 in) (when pressed with 58.8 N (about 6 kgf)).
Turn nut (4) to adjust the belt tension as follows:
TIGHTEN to INCREASE tension
LOOSEN to DECREASE tension
3. Tighten bolts (1), (2) and nut (3) to secure alternator (5).

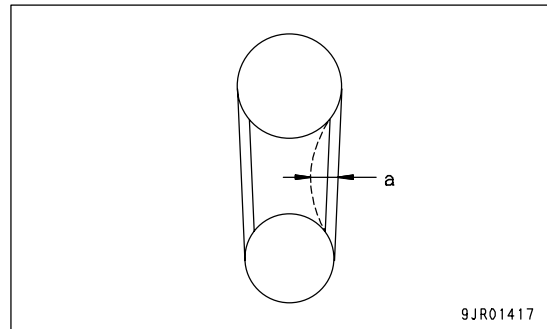


4. Check each pulley for damage, wear of the V-groove, and wear of the V-belt. Be particularly careful to check that the V-belt is not in contact with the bottom of the V-groove.
5. If the belt has elongated and there is no more allowance for adjustment, or if the belt is cut or cracked, replace the belt.
6. After replacing the belt, operate for one hour, then adjust again.

CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST

CHECKING

Belt deflection (a) should be 10 to 15 mm (0.4 to 0.6 in) when pressed with a finger force of approx. 58.8 N (6 kgf) at a point midway between the air compressor pulley and drive pulley.

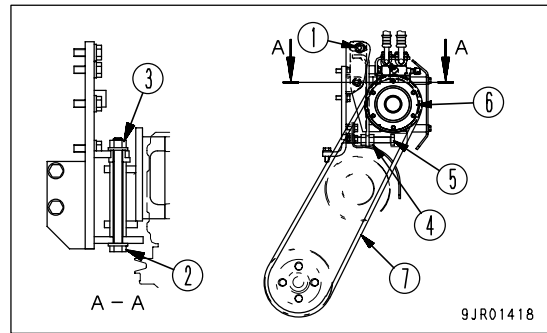


ADJUSTING

1. Loosen bolts (1) and (2) and nuts (3) and (4).
2. Use adjustment bolt (5) to adjust the tension of belt (7) so that deflection (a) is 10 to 15 mm (0.4 to 0.6 in) when pressed with a finger force of approx. 58.8 N (6 kgf) at a point midway between the air compressor pulley and drive pulley.

Turn the adjustment bolt to adjust the belt tension as follows:
TIGHTEN to INCREASE tension
LOOSEN to DECREASE tension

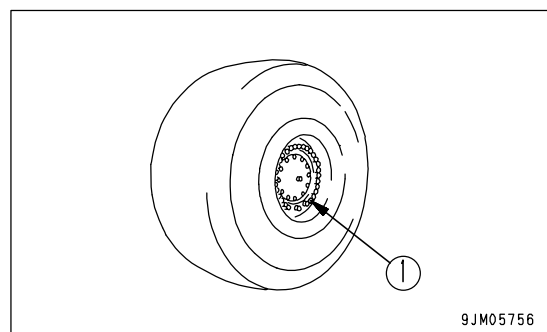
3. Tighten nut (4) to hold adjustment bolt (5) in position.
4. Tighten bolts (1) to hold air compressor (6) in position.
5. Tighten bolt (2) and nut (3).
6. Check each pulley for damage, wear of the V-groove, and wear of the V-belt. Be particularly careful to check that the V-belt is not in contact with the bottom of the V-groove.
7. Replace the V-belt if it has stretched, leaving no allowance for adjustment, or if the belt is cut or cracked.
If the V-belt has been replaced with a new part, there will be initial elongation, so inspect and adjust it again after one-hour of operation.



CHECK FOR LOOSE WHEEL HUB NUTS, TIGHTEN

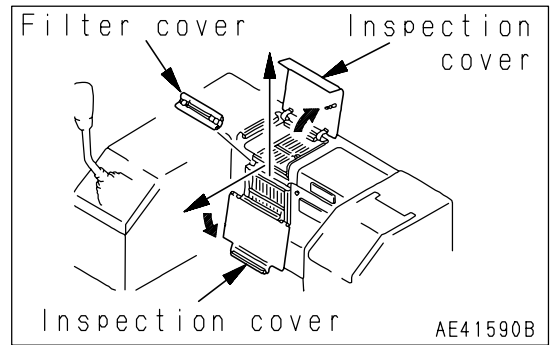
If wheel hub nuts (1) are loose, tire wear will be increased and accidents may be caused.

1. Check for loose nuts, and tighten if necessary.
When checking for loose nuts, always turn the nuts in the direction of tightening to check.
Tightening torque: $824 \pm 88.3 \text{ N}\cdot\text{m}$
($84 \pm 9 \text{ kgf}\cdot\text{m}$, $607.6 \pm 65.1 \text{ lbft}$)
2. If any stud bolt is broken, replace all the stud bolts for that wheel.



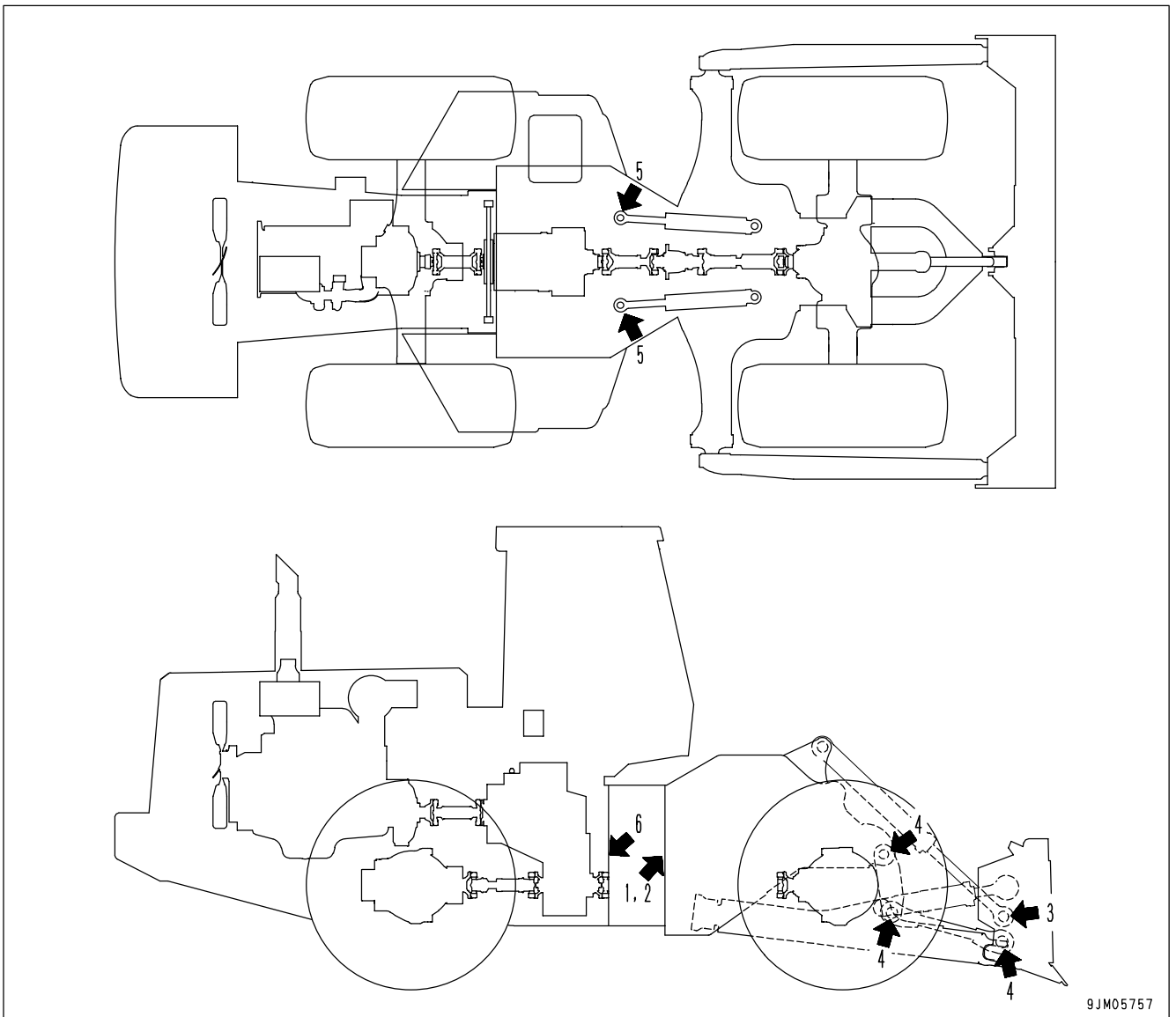
CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER

1. Open the filter inspection cover, remove the filter cover, then remove the filter in the direction of the arrow.
When removing the filter to the side, put your weight on the seat, and push down.
2. Clean with compressed air in the same way as for the fresh air filter.
If the filter is extremely dirty, rinse it in water.
After rinsing the filter, dry it completely before installing it again.

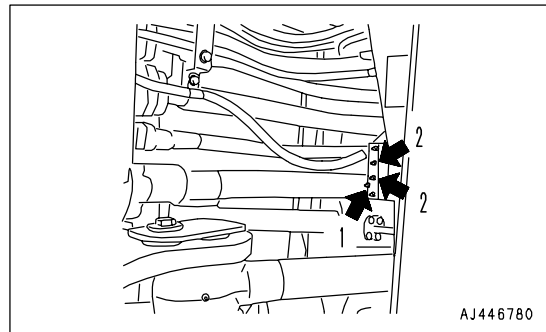


LUBRICATING

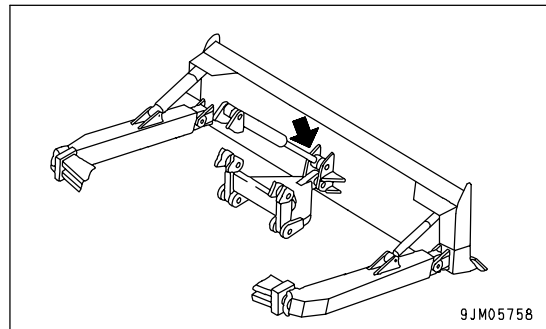
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. After greasing, wipe off any old grease that was pushed out.



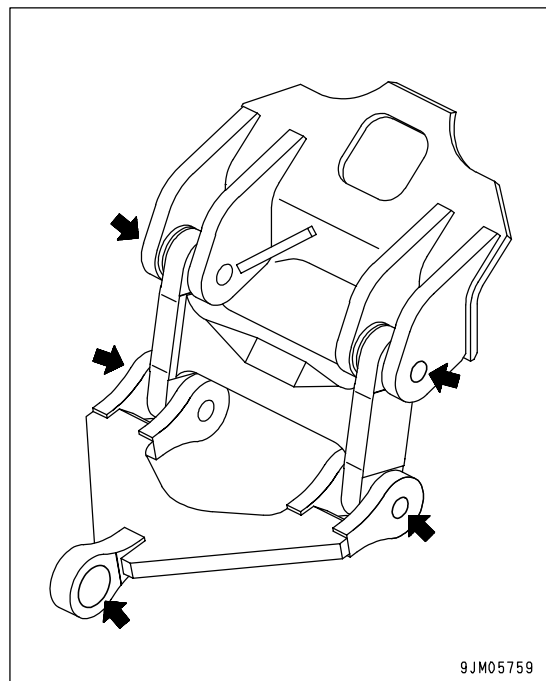
- (1) Lift cylinder bottom pin (1 place)
- (2) Steering cylinder bottom pin (2 places)



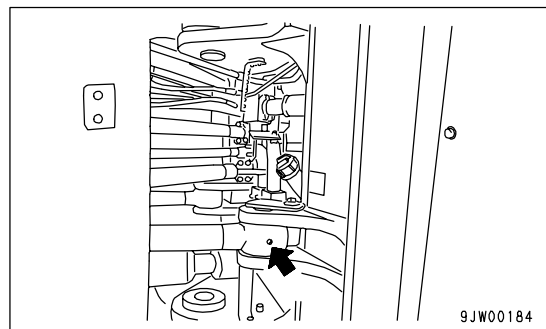
- (3) Lift cylinder rod end pin (1 place)



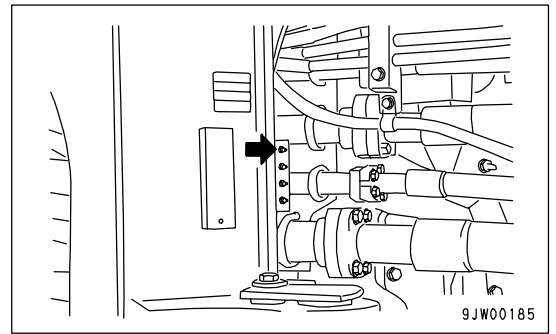
- (4) Link pin (5 places)



- (5) Steering cylinder rod end pin (2 places)



(6) Transmission mount trunnion (1 place)



EVERY 500 HOURS SERVICE

Maintenance for every 50, 100 and 250 hours service should be carried out at the same time.

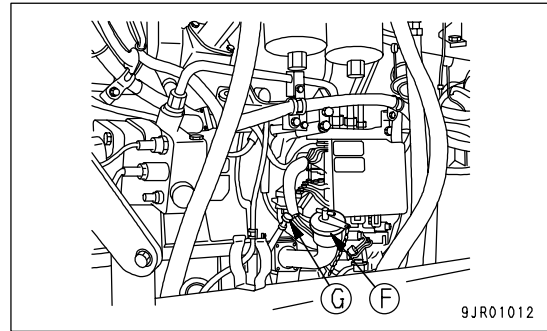
CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE



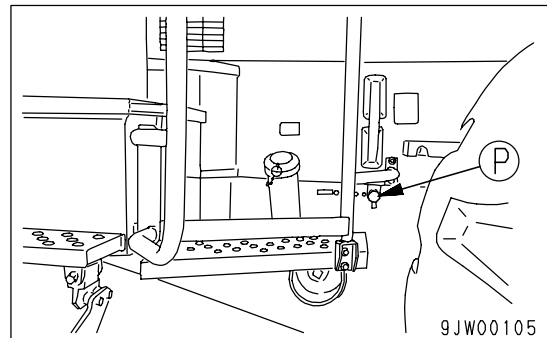
- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

- Refill capacity: 47 liters (12.4 US gal)
- Filter wrench

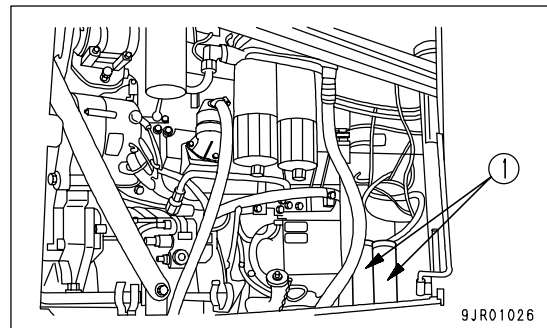
1. Open the engine side cover on the right side of the chassis.
2. Open oil filler (F).



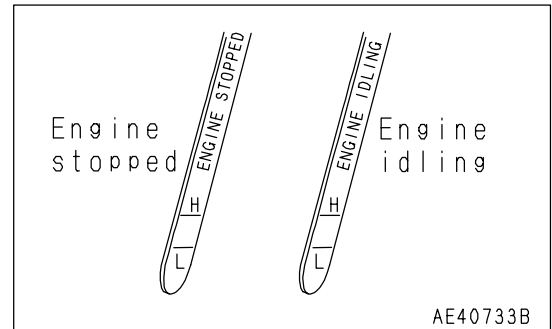
3. Place a container to catch the oil under drain plug (P).
4. Loosen drain plug (P), and drain the oil.
5. Check the drained oil, and if there are excessive metal particles or foreign material, please contact your Komatsu distributor.
6. Install drain plug (P).



7. Using the filter wrench, turn filter cartridge (1) counterclockwise to remove it.
In particular, if this operation is carried out immediately after stopping the engine, a large amount of oil will come out, so wait for 10 minutes before starting the operation.
8. Clean the filter holder, fill the new filter cartridge with engine oil, then coat the seal and thread of the filter cartridge with engine oil (or coat thinly with grease) and install.
9. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 to 1 turn.



10. After replacing the filter cartridge, add engine oil through oil filler port (F) until the oil level is between the H and L marks on the dipstick.
11. Run the engine at idling for short time, then stop the engine, and check the oil is between the H and L marks on the dipstick. For details, see "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-44)".



REPLACE FUEL FILTER CARTRIDGE

WARNING

- The oil is at high temperature after the engine has been operated, so never replace the filter immediately after finishing operations. Wait for the parts to cool down before changing the filter.
- Do not bring fire or sparks near the fuel.

CAUTION

Use a genuine Komatsu fuel filter cartridge for this engine. Since this engine yields high pressure in the injection system, the filter cartridge with a more sophisticated filtering function than the conventional filter is used.

- Prepare a filter wrench

1. Set the container to catch the fuel under the filter cartridge (1).
2. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.

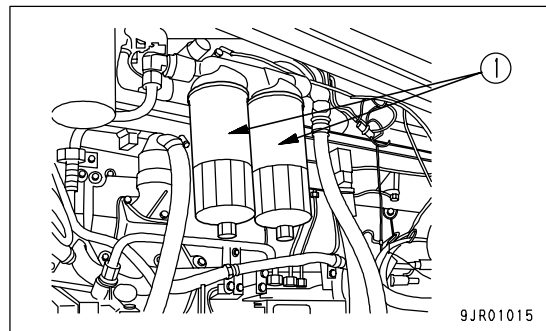
3. Clean the filter holder. Fill a new filter cartridge with clean fuel and coat the packing surface with engine oil. Then install it to the filter holder.

Be sure to use clean fuel when filling the cartridge and be careful not to let the dust get in.

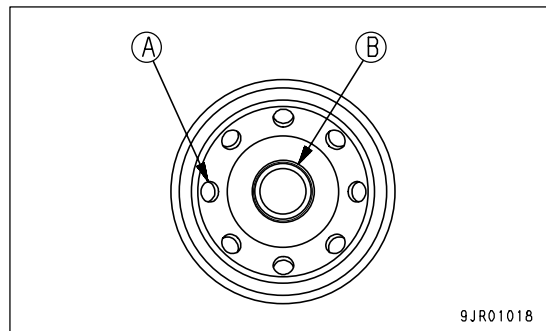
Fill the fuel through the small holes (A) (dirty side) (8 places). Do not fill through the center hole (B) (clean side).

4. When installing the filter cartridge, tighten it manually until its packing face comes to contact the seal face of the filter holder, then tighten it by further 3/4 of a turn.

If the filter cartridge is tightened excessively, the packing will be damaged, causing fuel to leak. If it is tightened loosely, on the other hand, fuel will seep out through the packing. Hence be sure to strictly follow the specified tightening angle.



9JR01015



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5. After replacing the filter cartridge, turn the key in the starting switch to the START position. When the engine starts, check for any leakage from the filter seal surface. If there is any leakage, check the tightening of the filter cartridge. If there is still leakage, follow the procedure in Steps 1 and 2 to remove the filter cartridge, and check the packing surface. If there is any damage or any dirt or dust caught in the surface, replace the packing with a new part, then repeat Steps 3 to 5 to install the filter again.

The cranking time to start the engine may be longer than usual when bleeding air from the fuel system. Also, the engine may not operate smoothly (after initial start-up) until the remaining air in the fuel system is purged. This is normal.

After replacing the filter cartridge, if the engine does not start, see "WHEN MACHINE RUNS OUT OF FUEL (PAGE 3-78)" to start the engine.

REMARK

The air remaining in the fuel system will be exhausted while the engine is running.

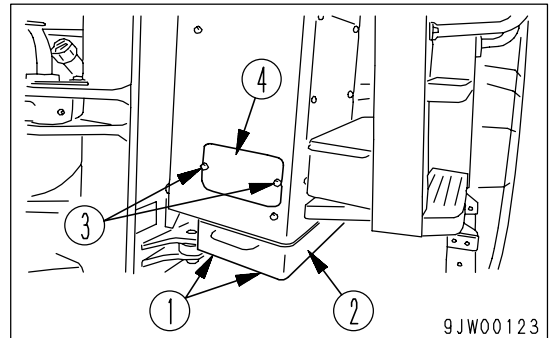
REPLACE TRANSMISSION OIL FILTER ELEMENT



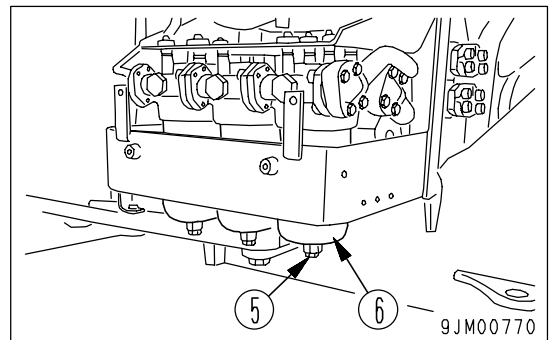
WARNING

- 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. Remove bolts (1) and open cover (2). Remove bolts (3), then remove cover (4).
Set the container to catch the oil under the filter case.



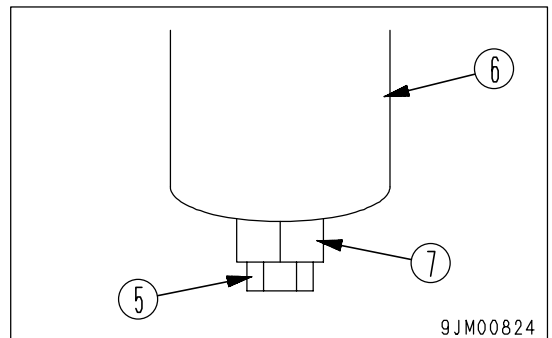
2. Remove drain plug (5) at the bottom of the filter case, and drain the oil. After draining the oil, install and tighten the plug.
3. Loosen hexagon part (7) of case (6), then remove case (6).
4. Remove the element and clean the inside of the case.
5. Replace the filter O-ring with new one. In addition, coat the new O-ring thinly with engine oil before installing it.
6. Install a new element, then install case (6) and tighten it using hexagon part (7).



Drain mount tightening torque: 49 to 58.8 N·m
(5 to 6 kgf·m, 36.2 to 43.4 lbf)

Case tightening torque: 58.8 to 78.5 N·m
(6 to 8 kgf·m, 43.4 to 57.9 lbf)

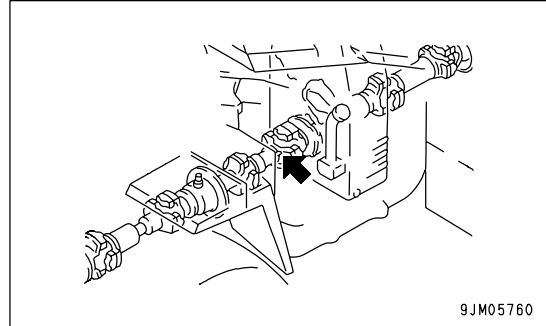
7. Run the engine at idle for a short time, then check that the oil is up to the specified level. For details, see "CHECK TRANSMISSION OIL LEVEL, ADD OIL (PAGE 4-22)".



LUBRICATE CENTER DRIVE SHAFT SPLINE

(1 place)

1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. After greasing, wipe off any old grease that was pushed out.



CHECK FAN BELT FOR WEAR

Check the V-belt and when the following conditions exist, replace or adjust the V-belt.

- When there is a clearance between the tension pulley lever and tip of the adjustment screw.
- When the V-belt makes contact with the bottom of the groove in each pulley.
- When the V-belt is worn, and its surface is lower than the outer diameter of the pulley.
- When the V-belt is cracked or flaked.
- When the V-belt makes an abnormal noise.

A device is installed to maintain the tension constant regardless of any elongation of the V-belt, so there is no need to carry out adjustment until the V-belt is replaced.

For details of the replacement and adjustment procedure for V-belt, refer to "REPLACE FAN BELT, ADJUST AUTO-TENSIONER (PAGE 4-29)".

EVERY 1000 HOURS SERVICE

Maintenance for every 50, 100, 250 and 500 hours service should be carried out at the same time.

CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER

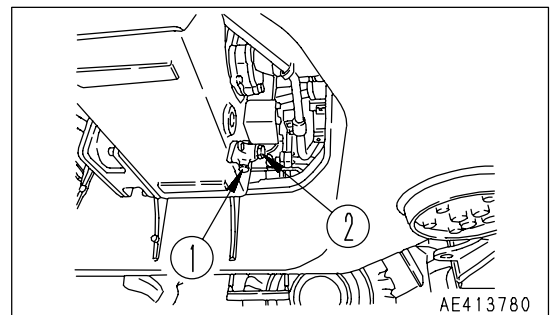


WARNING

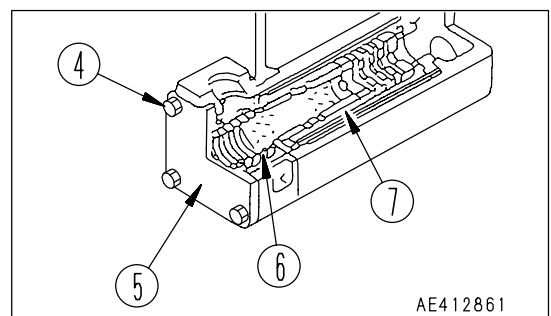
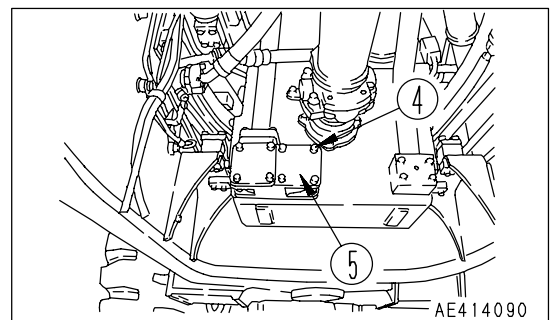
- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

- Refill capacity: 110 liters (29.0 US gal)

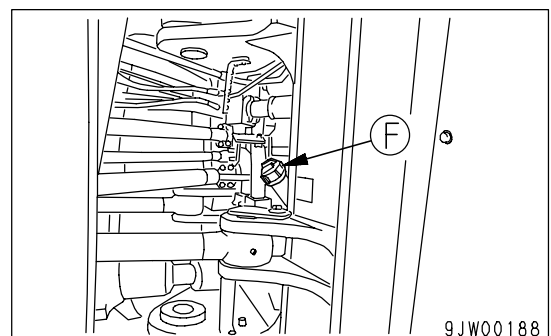
1. Set a container to catch the oil under drain plugs (1) and (2), then remove drain plug (1) and loosen plug (2) to drain the oil. To prevent the oil from pouring out suddenly, loosen drain plug (2) and remove it gradually.
2. After draining the oil, install drain plugs (1) and (2).
3. Set a container to catch the oil under the transmission filter.
4. See "REPLACE TRANSMISSION OIL FILTER ELEMENT (PAGE 4-47)" for the replacement of the element.



5. Remove bolts (4), then remove cover (5) and take out strainer (7) together with spring (6).
6. Remove any dirt stuck to strainer (7), then wash it in clean diesel oil or flushing oil. If strainer (7) is damaged, replace it with a new one.
7. Install spring (6) and strainer (7) to cover (5). Replace the O-ring on the cover with a new one, then install the cover.

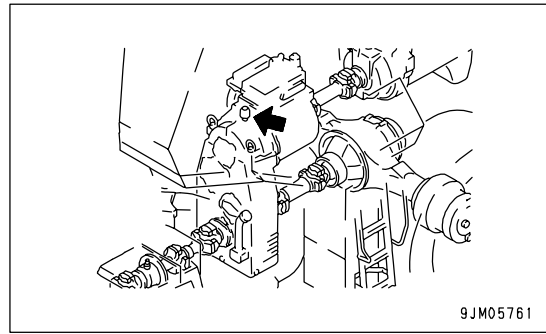


8. Pour in the specified amount of engine oil from oil filler (F).
9. After filling with oil, check that the oil is at the specified level. For details, see "CHECK TRANSMISSION OIL LEVEL, ADD OIL (PAGE 4-22)".
10. Check that there is no leakage of oil from the transmission case or oil filter.



CLEAN TRANSMISSION CASE BREATHER

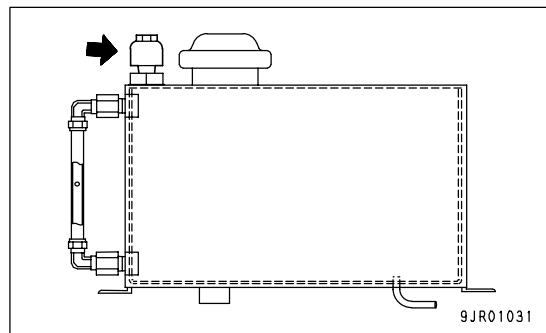
Remove all mud and dirt from around the breather, then remove the breather, immerse it in cleaning fluid and clean it. Be careful not to let dirt enter through the mount while the breather is removed.



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CLEAN RADIATOR SUB-TANK BREATHER

Remove all mud and dirt from around the breather, then remove the breather, immerse it in cleaning fluid and clean it. Be careful not to let dirt enter through the mount while the breather is removed.



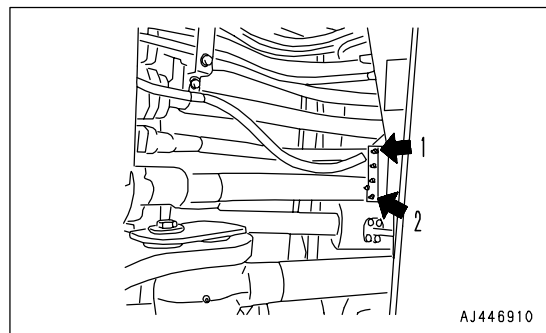
9JR01031

LUBRICATING

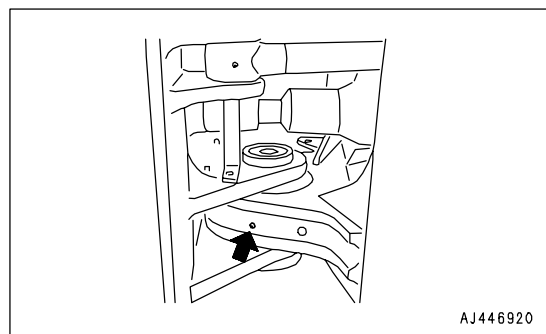
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. After greasing, wipe off any old grease that was pushed out.

(1) Center hinge pin (2 places)

(2) Drive shaft center support (1 place)

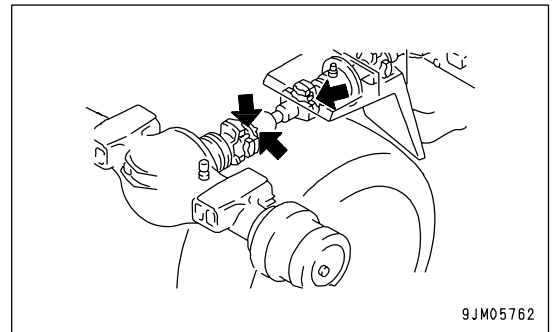


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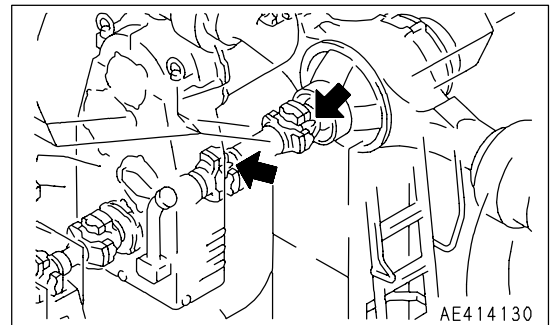


AJ446920

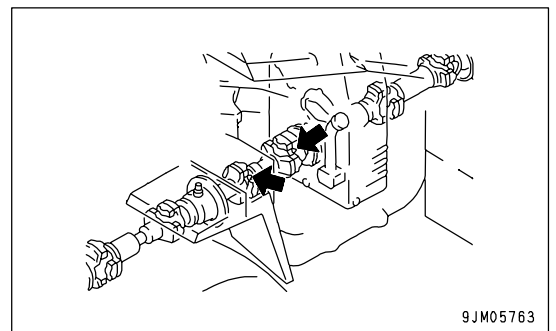
(3) Front drive shaft (3 places)



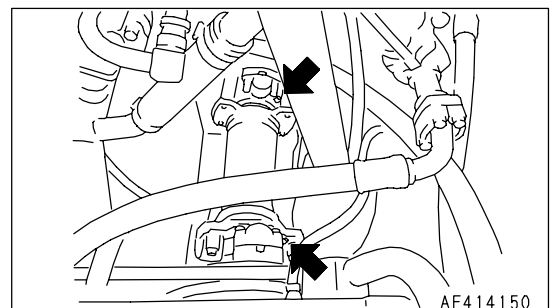
(4) Rear drive shaft (2 places)



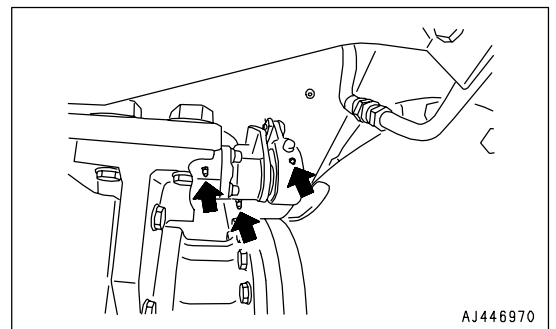
(5) Center drive shaft (2 places)



(6) Upper drive shaft (2 places)

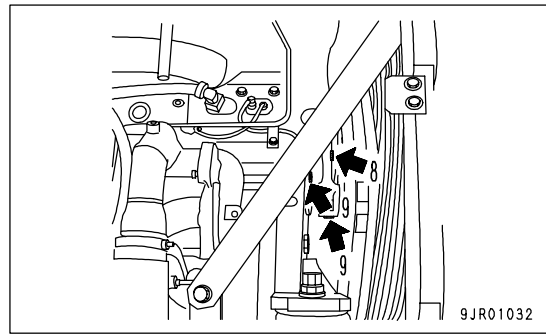


(7) Parking brake linkage (2 places)



- (8) Fan pulley (1 place)
- (9) Tension pulley (2 places)

Open the side cover at the right side of the machine and add grease.

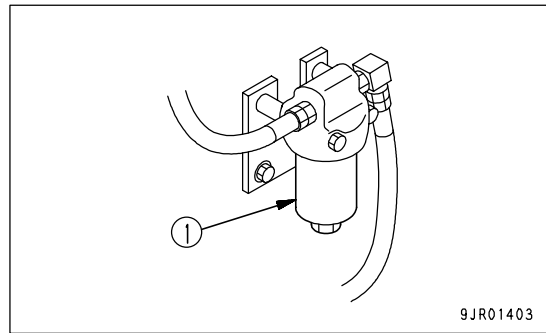


CHECK TIGHTENING PARTS OF TURBOCHARGER

Please contact your Komatsu distributor to have the tightening portions checked.

CLEAN FUEL STRAINER

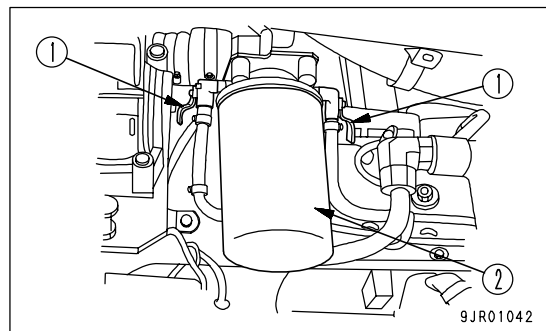
1. Remove filter case (1).
2. Take out the strainer, clean off dirt clung to it, and wash it in clean light oil or diesel oil.
If the strainer is damaged, replace it with a new one.
3. Install the strainer and filter case (1).



REPLACE CORROSION RESISTOR CARTRIDGE

1. Open the engine side cover located on the right of the engine hood.
2. Screw in valve (1) at the side of the corrosion resistor.
3. Using a filter wrench, turn cartridge (2) to the left to remove it.
4. Apply engine oil to the sealing surface of a new cartridge, then install it to the filter holder.
5. When installing, bring the gasket into contact with the seal surface of the filter holder, then tighten approx. 2/3 turns.
6. Open valve (1).

After replacing the cartridge, start the engine and check that there is no leakage of water from the filter seal surface.



EVERY 2000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500 and 1000 hours service should be carried out at the same time.

CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT

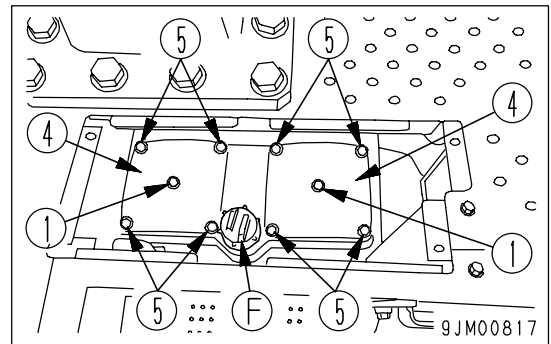


WARNING

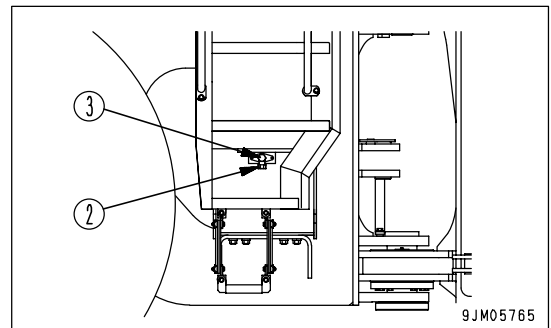
- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

- Refill capacity: 215 liters (56.8 US gal)

1. Lower the blade horizontally to the ground and apply the parking brake, then stop the engine.
2. Remove oil filler (F) and plug (1) from the filter case.

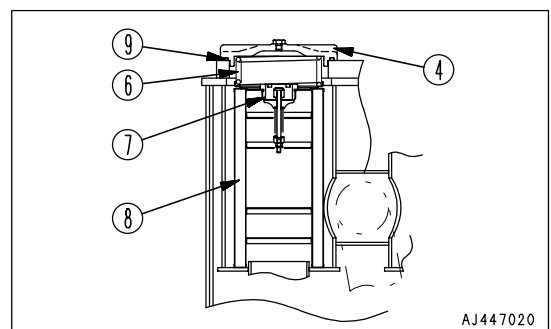


3. Set a container to catch the oil under drain plug (2).
4. Remove drain plug (2).
5. Loosen drain valve (3), then gradually pull it out to drain the oil.
6. After draining the oil, close drain valve (3), install and tighten drain plug (2).



7. Remove mounting bolts (5) of the 2 filter covers (4) at the top of the tank, then remove the covers. When doing this, the cover may fly off because of the force of spring (6), so keep the cover pushed down while removing the bolts.

8. Remove spring (6) and bypass valve (7), then take out element (8).
9. Check that there is no foreign material inside the tank, then clean it.



10. Install a new element, then place bypass valve (7), spring (6), and cover (4) into the tank.

Replace cover O-ring (9) with a new one.

11. When installing the cover bolts, push down the cover and tighten the bolts evenly.

12. Add engine oil through oil filler port (F) to the specified level, then install cap (F).

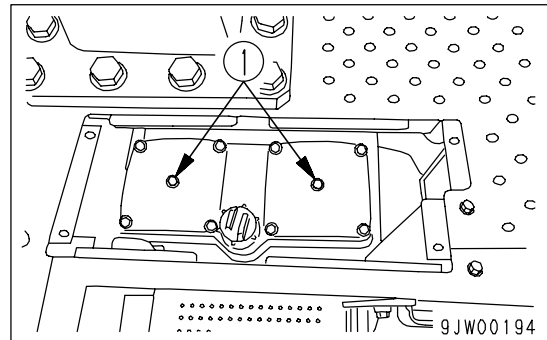
13. Check that the hydraulic oil is at the standard level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-35)".

14. Run the engine at low idling, and extend and retract the steering, lift, and tilt/pitch cylinders 4 to 5 times. Be careful not to operate the cylinder to the end of its stroke (stop approx. 100 mm (3.94 in) before the end of stroke).

NOTICE

If the engine is run immediately at high speed or the cylinder is operated to the end of its stroke, the air inside the cylinder will cause damage to the piston packing.

15. Next, operate each cylinder (steering, lift, tilt/pitch) 3 or 4 times to the end of its stroke. Stop the engine and loosen air bleed plug (1) to bleed the air from the hydraulic tank.
After bleeding the air, tighten plug (1).
16. Check the hydraulic oil level and add oil to the specified level.
For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-35)".
17. Run the engine at low idle, loosen the air bleeding plug (1) to bleed the air from inside the filter tank.



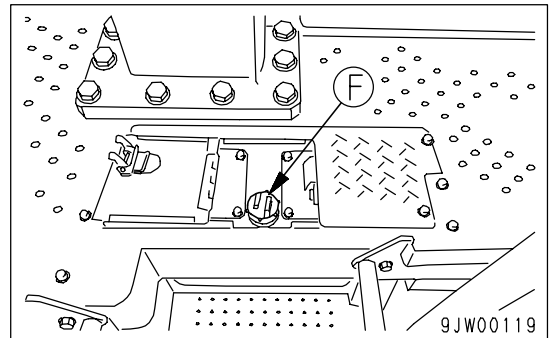
18. Next, increase the engine speed and repeat the procedure in Step 15 to bleed the air. Continue this operation until no more air comes out from plug (1).
19. After completely bleeding the air, tighten plug (1).
Tightening torque: $11.3 \pm 1.5 \text{ N}\cdot\text{m}$
($1.15 \pm 0.15 \text{ kgf}\cdot\text{m}$, $8.3 \pm 1.1 \text{ lbft}$)
20. Check that the hydraulic oil is at the standard level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-35)".
21. Check that there is no leakage of oil from the filter cover mount.

REPLACE HYDRAULIC TANK BREATHER ELEMENT

! WARNING

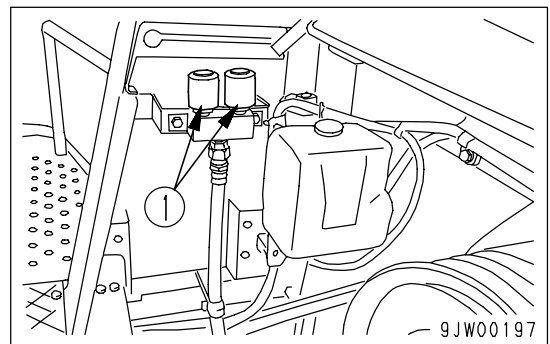
- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove the cap of oil filler (F).
2. Remove the snap ring from breather (1), then remove the breather cap.
3. Replace the filter element with a new part, then install the breather cap and snap ring.
4. Tighten the cap of oil filler (F).



REMARK

It is possible to replace the element with the breather installed in the tank. However, if the breather is removed, do not wrap the taper thread of the breather with seal tape when assembling again, and be careful not to tighten too much.



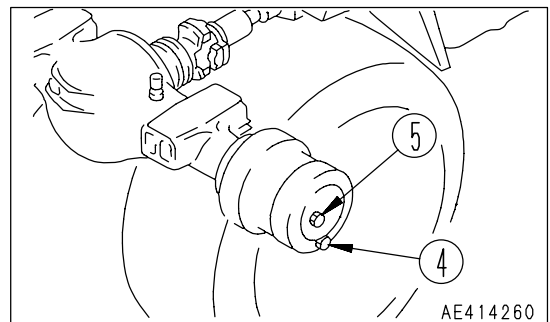
CHANGE AXLE OIL

! WARNING

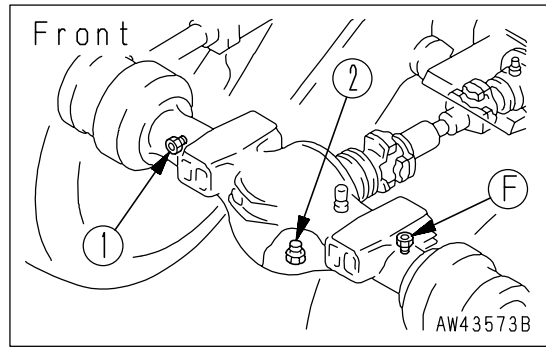
- The parts and oil are at high temperature immediately after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- When removing plug, oil may spout out. So turn the plug gradually to release the internal pressure, then carefully remove it.

- Refill capacity (front and rear, each): 124 liters (33 US gal)

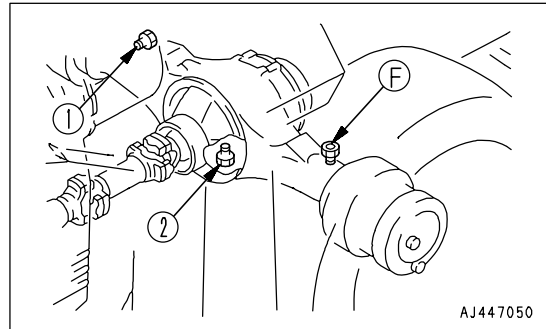
1. Move the machine so that drain plug (4) of the final drive is at the bottom, then remove drain plug (4) and oil filler plug (5), and drain the oil.
 - If the nipple and hose in the tool kit (option) is available, do as follows.
Move the machine so that drain plug (4) of the final drive is at the top, then remove drain plug (4), install the nipple from the tool kit, and do as follows.
Move the machine so that plug (4) is at the bottom, then remove oil filler plug (5) and drain the oil through the hose.



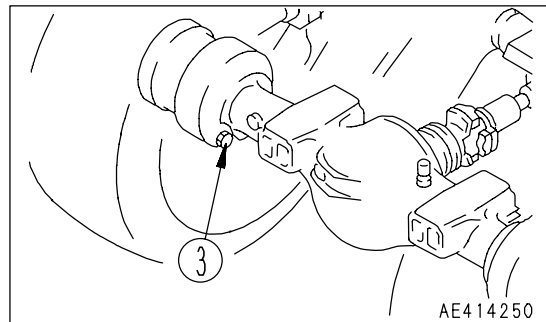
2. Remove front and rear oil filler plugs (F), then remove level plug (1) and drain plug (2) to drain the oil.



Rear



3. Remove drain plug (3) and attach the tool (nipple and hose) to drain the oil.



- 4. After draining the oil, clean drain plugs (2), (3) and (4), then install them.
- 5. Add oil to the specified level through the oil filler ports (F) and (5) of the axle housing and left and right final drives.
- 6. After adding oil, check at level plug (1) that the oil is at the specified level. For details, see "CHECK AXLE OIL LEVEL, ADD OIL (PAGE 4-23)".

REMARK

For operations where the brake is used frequently, change the axle oil at shorter intervals.

REPLACE ELEMENT IN AIR CONDITIONER RECIRCULATION AIR FILTER, FRESH AIR FILTER

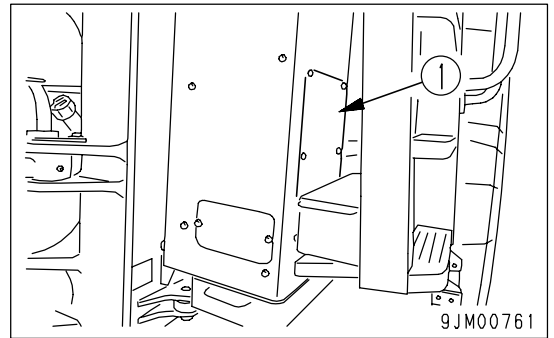
Remove both the recirculation air filter and fresh air filter in the same way as when cleaning, and replace them with new parts.

For details of cleaning the recirculation air filter, see "CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER (PAGE 4-41)".

For details of cleaning the fresh air filter, see "CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER (PAGE 4-36)".

CLEAN PPC CIRCUIT STRAINER

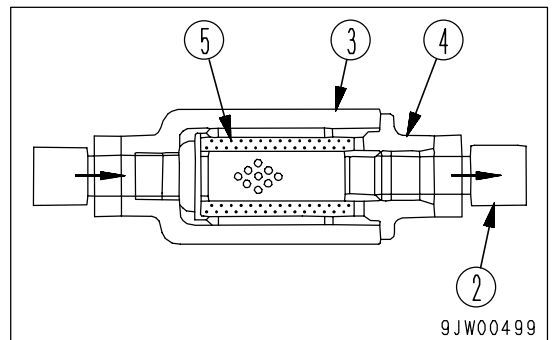
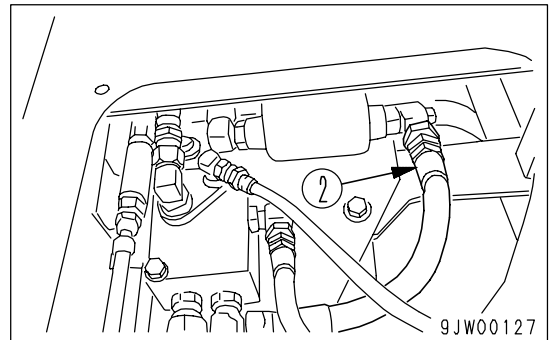
1. Remove cover (1) from the accumulator on the left side of the rear frame, then take out hose (2) on the outlet side of the PPC circuit strainer.
2. Remove cap (4) from strainer case (3), then take out strainer (5) and wash it in light oil.



NOTICE

Install the strainer with its cover side on the deeper side.

3. Assemble strainer (1) in the strainer case and install the case with bolts.
4. Set the blade control lever to the FLOAT position and lower the blade.
5. Leave the blade control lever at the FLOAT position, and press the tilt or pitch switch to the Rear Pitch position. When the cylinder reaches the end of its stroke, hold it there for 1 minute.
6. Set the blade control lever to the RAISE position and raise the blade.
7. Leave the blade control lever at the RAISE position, and press the tilt or pitch switch to the Forward Pitch position. When the cylinder reaches the end of its stroke, hold it there for 1 minute.



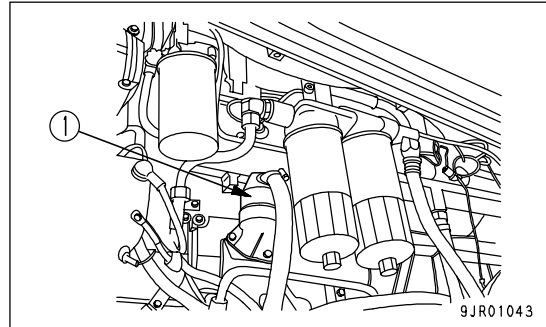
For details of the procedure for bleeding air from the hydraulic circuit, please contact your Komatsu distributor.

CLEAN ENGINE BREATHER ELEMENT



- 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 and remove the hose. Remove breather (1).
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 (1).
5. Check the breather hose and pipe. If caked oil (sludge) adhere to insides, replace the hose and pipe with new parts.



CHECK ALTERNATOR, STARTING MOTOR

There is a possibility that the bearing is short of grease. Call your Komatsu distributor for inspection and repair. If the engine is started frequently, ask for the inspection every 1000 hours of operation.

CHECK ENGINE VALVE CLEARANCE, ADJUST

As special tool is required for removing and adjusting the parts, request your Komatsu distributor for service.

CHECK BRAKE DISC WEAR

As special tool is required for checking and adjusting the parts, request Komatsu distributor for service.

CLEAN AND CHECK TURBOCHARGER

If there is carbon or oil sludge stuck to the blower impeller, it will lower the performance of the turbocharger or cause it to break, so ask your Komatsu distributor to carry out the cleaning.

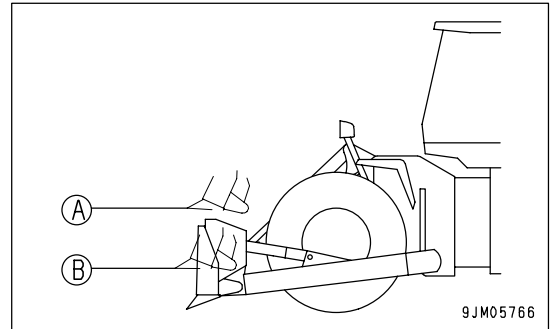
CHECK ACCUMULATOR FUNCTION

Check the gas pressure of the accumulator as follows.

CHECKING

1. Stop the machine on level ground and apply the parking brake.
2. Raise the work equipment to maximum height (A), then place the blade control lever at HOLD.
3. Leave the work equipment in this position, and stop the engine.
4. Confirm that it is safe around the machine, then set the blade control lever at FLOAT and lower the work equipment to position (B) 0.5 m (20 in) from the ground.
5. When the work equipment reaches position (B) 0.5 m (20 in) from the ground, move the blade control lever to LOWER, and lower the work equipment slowly to the ground.

If the work equipment stops moving during checking, the gas pressure may be below the service limit (0.69MPa (7kgf/cm², 99.4 PSI)), so contact your Komatsu distributor to have the gas pressure measured or gas charged.



Carry out the checks within five minutes of stopping the engine. If the machine is left with the engine stopped, the accumulator pressure will drop and it will be impossible to carry out the check.

CHECK ACCUMULATOR GAS PRESSURE

When carrying out the EVERY 2000 HOURS SERVICE or EVERY YEAR SERVICE or when making periodic replacement of the critical safety parts, please ask your Komatsu distributor to check the accumulator gas pressure.

EVERY 4000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours service should be carried out at the same time.

CHECK WATER PUMP

Check that there is no play in the pulley or any grease leakage, water leakage, or clogging of the drain hole. If any abnormality is found, contact your Komatsu distributor for disassembly and repair or replacement.

CHECK VIBRATION DAMPER

Check that there is no drum-shaped deformation of the surface of the damper, and check that there are no traces of leakage of the damper oil around the damper.

If any abnormality is found, please contact your Komatsu distributor for replacement of the parts.

CHECK FAN PULLEY AND TENSION PULLEY

Check for play of the pulley and leakage of grease. If any abnormality is found, please contact your Komatsu distributor.

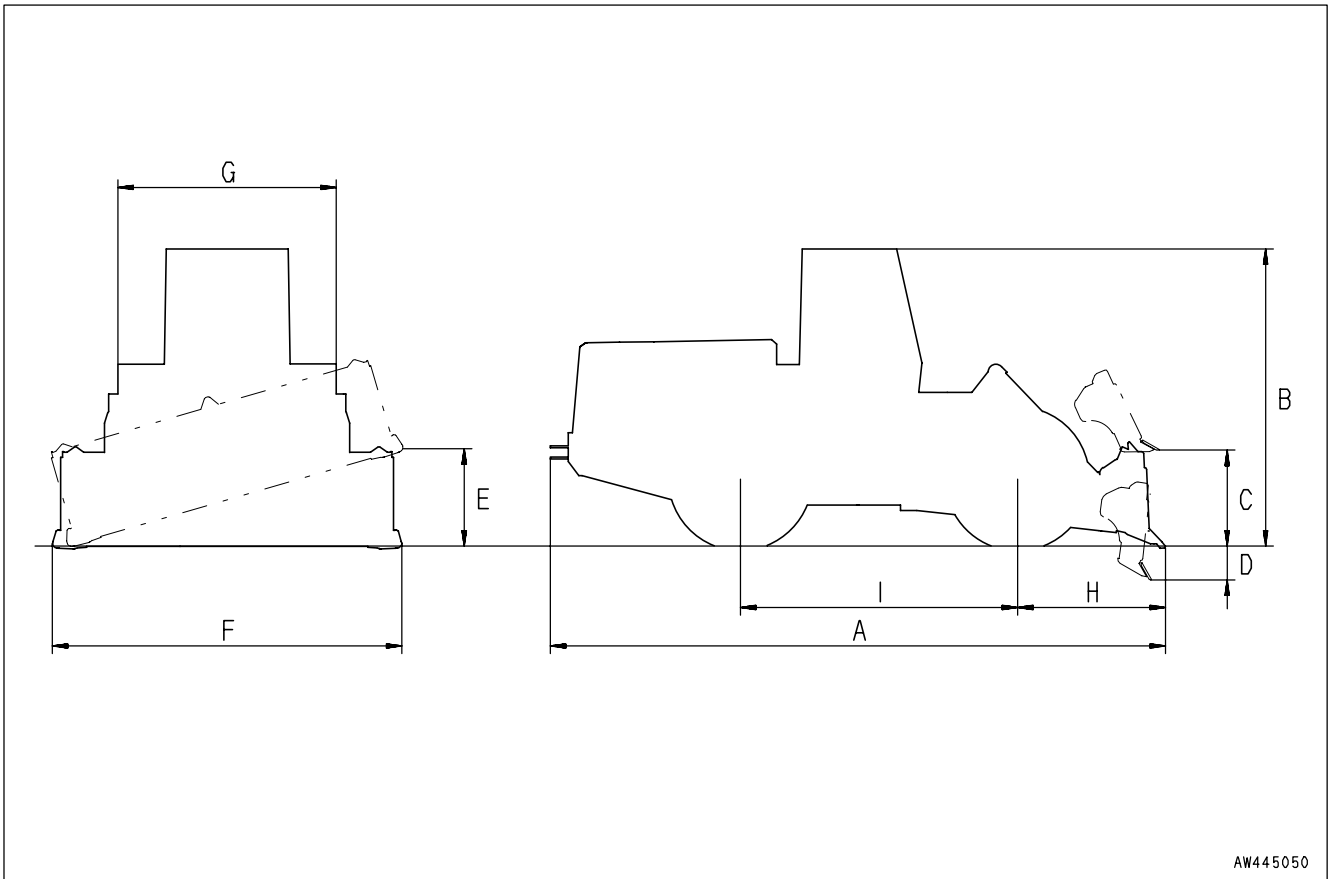
CHECK AIR CONDITIONER COMPRESSOR, ADJUST

As special tool is required for checking and adjusting the parts, request Komatsu distributor for service.

SPECIFICATIONS

SPECIFICATIONS

Item		Unit	WD600-3		
Operating weight (including 1 operator: 80 kg (176 lb))		kg (lb)	42900 (94595)		
Blade size (width x height)		mm (ft in)	5100 (16' 9") x 1470 (4' 10")		
Engine model		–	Komatsu SAA6D170E-3 Diesel engine		
Engine flywheel horsepower		kW (HP)/rpm	362 (485)/2000		
A	Overall length	mm (ft in)	9285 (30' 6")		
B	Overall height	mm (ft in)	4250 (13' 11")		
C	Blade clearance	mm (ft in)	1500 (4' 11")		
D	Max. drop below ground	mm (ft in)	450 (1' 6")		
E	Max. tilt adjustment	mm (ft in)	1430 (4' 8")		
F	Blade width	mm (ft in)	5100 (16' 9")		
G	Overall width	mm (ft in)	3570 (11' 9")		
H	Front overhung	mm (ft in)	2210 (7' 3")		
I	Wheel base	mm (ft in)	4100 (13' 5")		
Min. turning radius		Outside of chassis	mm (ft in)	8500 (27' 11")	
		Center of outside tire	mm (ft in)	6980 (22' 11")	
Travel speed	Without torque converter lock-up function	Forward	1 st	km/h (MPH)	6.5 (4.0)
			2 nd	km/h (MPH)	11.4 (7.1)
			3 rd	km/h (MPH)	20.2 (12.6)
			4 th	km/h (MPH)	34.3 (21.3)
		Reverse	1 st	km/h (MPH)	7.2 (4.5)
			2 nd	km/h (MPH)	12.6 (7.8)
			3 rd	km/h (MPH)	22.1 (13.7)
			4 th	km/h (MPH)	37.7 (23.4)
	With torque converter lock-up function	Forward	1 st	km/h (MPH)	6.5 (4.0)
			2 nd	km/h (MPH)	11.8 (7.3)
			3 rd	km/h (MPH)	20.8 (12.9)
			4 th	km/h (MPH)	36.2 (22.5)
		Reverse	1 st	km/h (MPH)	7.2 (4.5)
			2 nd	km/h (MPH)	13.0 (8.1)
			3 rd	km/h (MPH)	23.0 (14.3)
			4 th	km/h (MPH)	40.0 (24.9)



ATTACHMENTS, OPTIONS

WARNING

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

HANDLING AUTOMATIC SHIFT SYSTEM

With computer control, this system enables automatic gear shifting from 2nd to 4th, depending on travel conditions.

METHOD OF OPERATION

The range of speeds during automatic gear shifting is determined by the position of the gearshift lever as shown in the chart on the right.

Position (a): 1st

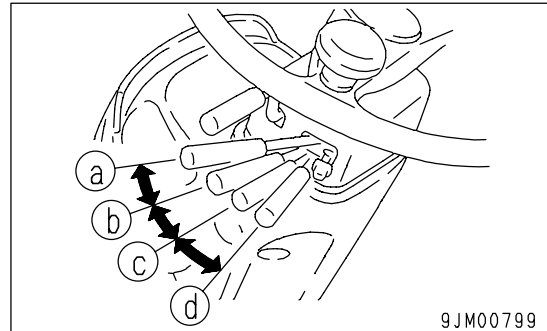
Position (b): 2nd

Position (c): 3rd

Position (d): 4th

Also, when changing direction between FORWARD and REVERSE, the transmission automatically starts from 2nd speed.

The automatic gear shifting does not function when the gear is at the 1st position; the 1st gear is fixed.



9JM00799

Gear shift lever position	4		○	→	○	→	○
	3		○	→	○		
	2		○				
	1						
		1	2	3	4	Automatic speed range	

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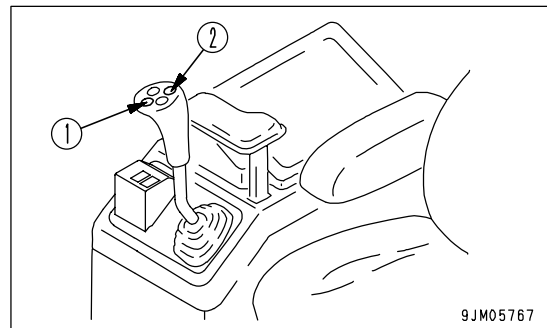
REMARK

When shifting down from 2nd to 1st, press kickdown switch (1) on the blade control lever.

At any speed with the directions of FORWARD and REVERSE, the transmission can be shifted down to 1st due to the function of kickdown switch if the travel speed is equal to or less than 12 km/h (7.5 MPH).

To set to the desired speed range when traveling uphill or downhill, do as follows.

- When fixing the speed range
Press HOLD switch (2) on the blade control lever.
The speed range is fixed at the speed range displayed on the transmission indicator on the main monitor.
- When shifting up or down from set speed range
Shift gear with the gearshift lever.



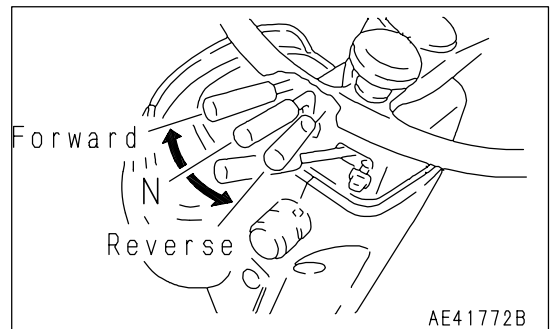
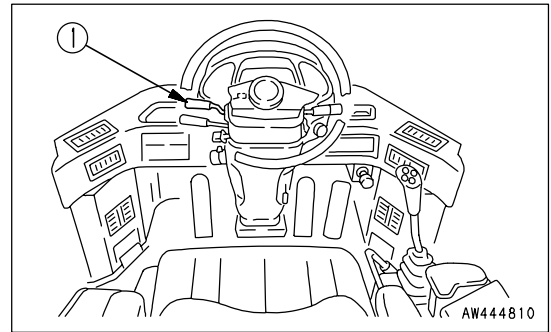
9JM05767

REMARK

When the transmission has been shifted down from 2nd to 1st with the kickdown switch, it will shift up from 1st to 2nd when the travel speed increases.

PRECAUTION WHEN CHANGING DIRECTION**⚠ WARNING**

- When changing direction between **FORWARD** and **REVERSE**, check that the new direction of travel is safe. There is a blind spot behind the machine, so be particularly careful when changing direction to travel in reverse.
 - Do not switch between **FORWARD** and **REVERSE** when traveling at high speed.
- When switching between **FORWARD** and **REVERSE**, depress the brake to reduce the travel speed sufficiently, then change the direction of travel. (Max. speed for changing direction: 12 km/h (7.5 MPH))



There is no need to stop the machine even when switching between **FORWARD** and **REVERSE**.

Place directional lever (1) in the desired position.

On machines equipped with auto shift, when switching between **FORWARD** and **REVERSE**, the machine starts automatically from 2nd speed.

AUTOMATIC SHIFT

If it is attempted to change direction between **FORWARD** and **REVERSE** when the machine is traveling in automatic gear shifting, the alarm buzzer will sound for 3 seconds (rapid intermittent sound) if the travel speed is high.

If the alarm buzzer sounds, depress the brake immediately to reduce the speed sufficiently, then change direction between **FORWARD** and **REVERSE**.

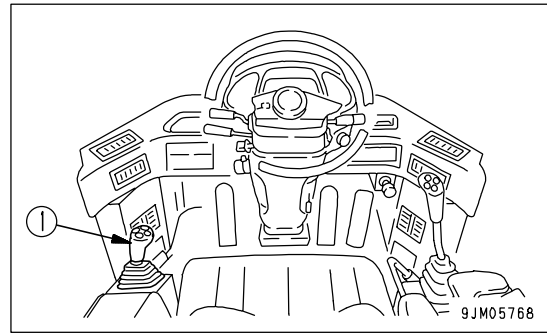
REMARK

If the directional lever is operated slowly or it is stopped between directional range, error code "CALL" may be displayed. This is not a failure: the directional lever must be operated to complete the directional shifting within 2 seconds.

HANDLING JOYSTICK STEERING SYSTEM

The joystick steering system is a system used to steer wheel dozer with a lever instead of a steering wheel.

The joystick (1) enables steering with small, light movements, and helps to reduce operator fatigue.

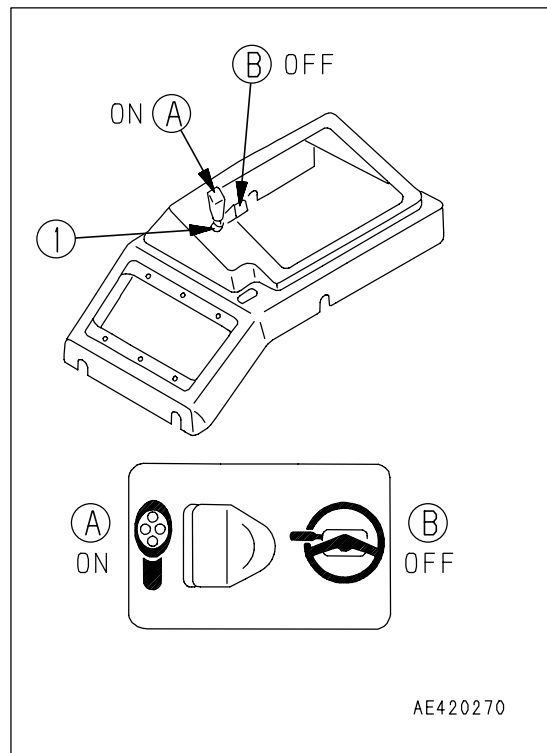


STRUCTURE AND FUNCTION OF JOYSTICK STEERING

When joystick ON/OFF switch (1) is turned ON, it becomes possible to operate the steering with the joystick.

- On machines equipped with the joystick steering system, it is possible to use joystick ON/OFF switch (1) to select the steering and transmission operation method as shown in the table below. In addition, on machines equipped with joystick steering, the transmission auto shift function is also included. The differences between operation using the joystick and operation using the steering wheel are as follows.

Selection		(A)	(B)
Joystick steering ON/OFF switch		ON (Steering with joy stick)	OFF (Steering with steering wheel)
Steering		Steering with joystick (Steering with steering wheel is also possible)	Steering with steering wheel
Transmission	F/N/R	Operated with F/N/R button on joystick head	Operated with directional lever
	Selection of gear speed	Auto-shift	Auto-shift
		*1: When manual switch is turned ON, operation is also possible with the shift-up/shift-down switch on the blade control lever. *2: Shift up switch: Speed range shifts 1→2→3→4 Shift down switch: Speed range shifts 4→3→2→1	*1: When manual switch is turned ON, operation is also possible with transmission control lever. Speed range shifts 1↔2↔3↔4



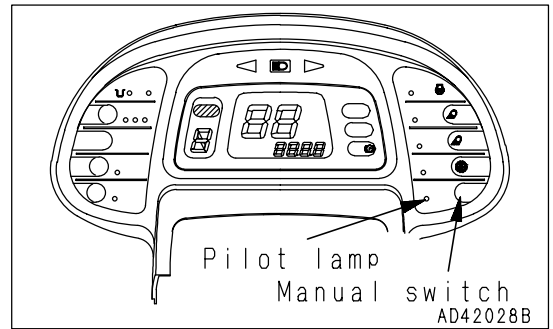
***1 Manual switch**

Press the push button switch to turn OFF/ON.

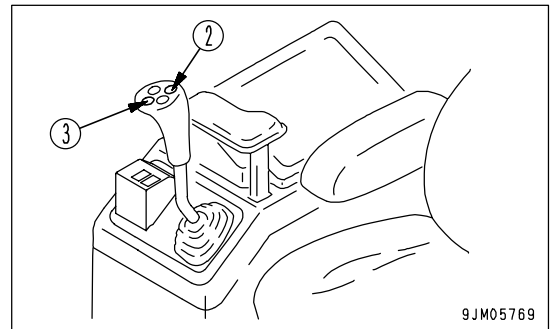
When the switch is pressed once, the pilot lamp lights up and the system is turned ON; when the switch is pressed again, the pilot lamp goes out and the system is switched OFF.

OFF: Automatic gear shifting

ON: Gear shifting using transmission control lever, or shift up or shift down switch (joystick steering machine only)



*2 When the joystick steering is ON (operated with joystick lever), if the manual switch is turned ON, it is possible to shift the speed range between 1 and 4 with shift up switch (2) or shift down switch (3) as shown in the table below.



Gearshift lever position	Shift range			
	1	2	3	4
1st				
2nd	←	→		
3rd	←	→	←	→
4th	←	→	←	→

- The combination of functions for switches (2) and (3) is as shown in the table below.

Steering		Steering wheel		Joystick	
Transmission		Automatic	Manual	Automatic	Manual
Function	Switch (2)	Hold	—	Hold	Shift up
	Switch (3)	Kick down	Kick down	Kick down	Shift down

- Work with joystick and steering wheel

! CAUTION

The forward and reverse directions of the transmission cannot be switched (from the directional lever to the FNR button on the joystick when the joystick ON/OFF switch is ON, or from the FNR button on the joystick to the directional lever when the joystick ON/OFF switch is OFF) if the directional lever and FNR button on the joystick are not both at the neutral position.

Use the joystick or steering wheel according to the type of work.

- Steering with joystick

This is suitable for dozing operations on a wide jobsite with a relatively long cycle time.

Since the stroke of the joystick is short and the resistance is low, the operator is less fatigued even if he operates the machine continuously.

- Steering with steering wheel

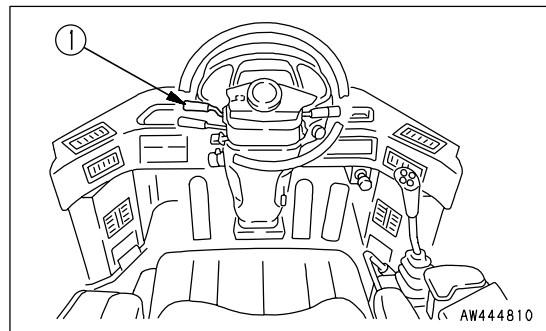
This provides excellent fine control and ability to drive in a straight line, so it is suitable for travel between jobsites.

In addition, the operator can hold the upper part of his body in position when changing direction frequently between forward and reverse, so it is also suitable for operations with short cycle times.

CHANGING DIRECTION

! WARNING

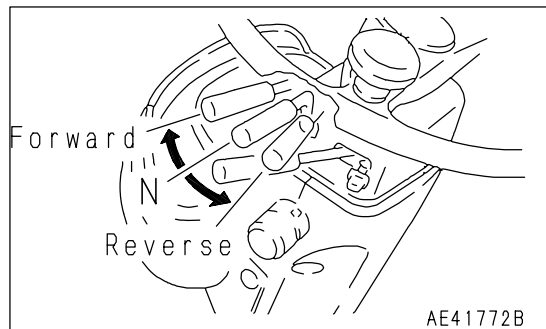
- When changing direction between FORWARD and REVERSE, check that the new direction of travel is safe. There is a blind spot behind the machine, so be particularly careful when changing direction to travel in reverse.
- Do not switch between FORWARD and REVERSE when traveling at high speed.
When switching between FORWARD and REVERSE, depress the brake to reduce the travel speed sufficiently, then change the direction of travel. (Max. speed for changing direction: 12 km/h (7.5 MPH))



There is no need to stop the machine even when switching between FORWARD and REVERSE.

Place directional lever (1) in the desired position.

On machines equipped with auto shift, when switching between FORWARD and REVERSE, the machine starts automatically from 2nd speed.



- Operation in joystick mode and manual mode
 - While traveling at 2nd to 4th speed

While the machine is traveling in the joystick steering mode and normal mode, if the travel direction is changed between FORWARD and REVERSE in travel speed and engine speed area shown at right, the alarm buzzer may sound for 3 seconds (rapid intermittent sound).

If the alarm buzzer sounds, depress the brake immediately to reduce the speed sufficiently, then change direction between FORWARD and REVERSE.

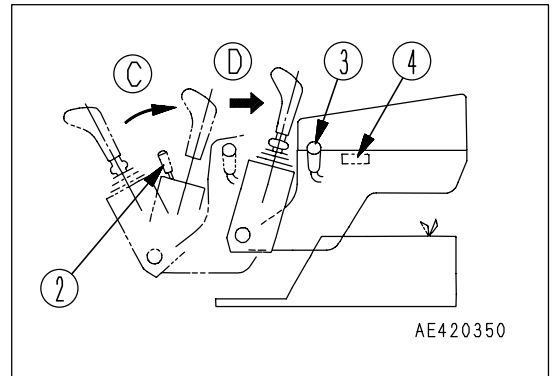
REMARK

If the directional lever is operated slowly or it is stopped between directional range, error code "CALL" may be displayed. This is not a failure: the directional lever must be operated to complete the directional shifting within 2 seconds.

- The joystick console can be slid for the ease of riding and getting off the vehicle.
It is possible to tilt the console box to position C (→) by operating lever (2) and to slide the console to position D (⇒) by operating lever (3).

**WARNING**

When riding and getting off the cab, be sure to slide the joystick console backward. If the console is positioned backward, safety switch (3) is turned off and operation of the joystick is automatically turned off.



If the height of grease cartridge (2) for an auto-lubricator is lower than reading of gauge (A) on tank cover (1), replace the grease cartridge with new one.

OPERATION METHOD OF JOYSTICK STEERING SYSTEM


CAUTION

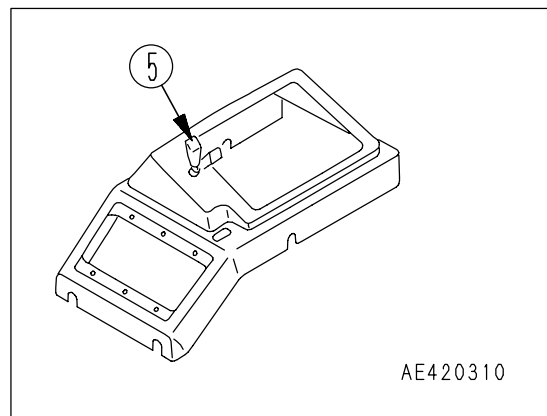
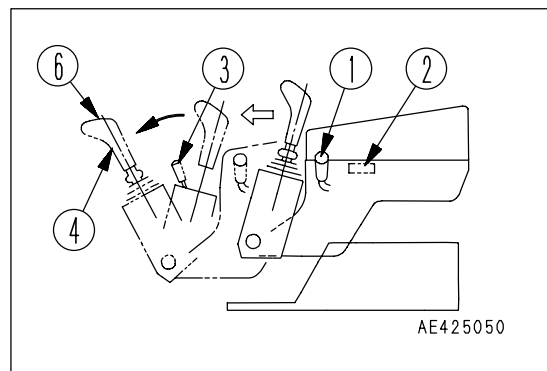
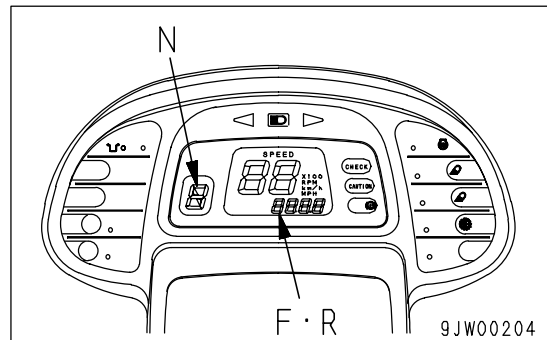
When operating with joystick lever (4), always adjust the angle of the steering wheel so that it is possible to see the FNR display on the machine monitor.

1. Sit on the operator's seat and pull up lever (1) to unlock the joystick console, then slide the latter from the rear position to the forward stroke end, then lock it securely.

Under this condition, safety switch (2) is turned on. Adjust joystick (4) to the angle for easy operation with console box adjustment lever (3). (See "ADJUSTMENT OF JOYSTICK CONSOLE (PAGE 6-11)".)

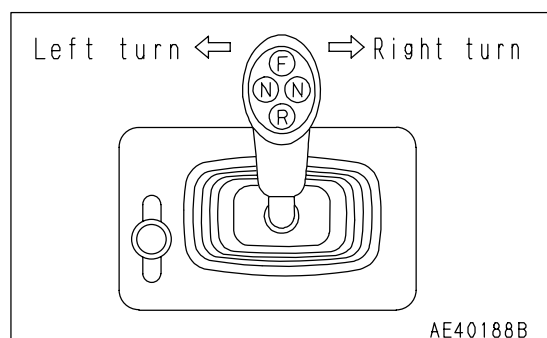
2. Fasten the seat belt.
3. Confirm that joystick (4) operates normally and the directional lever of the transmission is in the neutral position and the periphery of the vehicle is safe. Then, start the engine.
4. Turn on joystick ON/OFF switch (5).

FNR button (6) on joystick (4) head is set to the neutral position automatically.



5. If joystick (4) is turned to the right the machine turns to the right, and if the former is turned to the left, the latter turns to the left. The more the joystick is turned sharply, the more the machine turns quickly.
6. After the machine turns to the desired angle, return the joystick to the neutral position.
7. When returning the machine in the straight position, turn the joystick in the opposite direction from the neutral position (If it was turned to the right, turn it to the left).

Even when the joystick is returned to the neutral position, the machine remains at the same angle of articulation. It does not return to the straight travel position.



8. Select the forward or reverse direction of the transmission with FNR button (6) on joystick head (4).

Button N: Neutral

(Transmission is set to the neutral position at the moment when this button is pushed.)

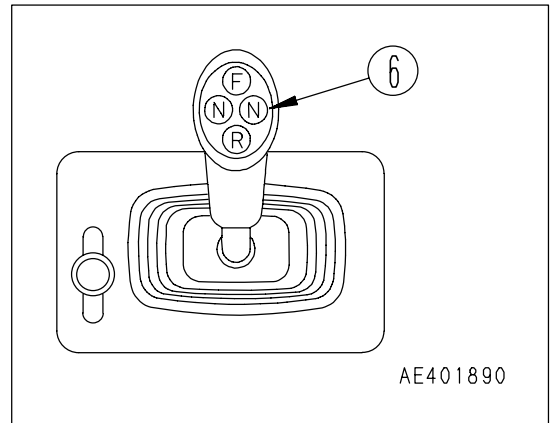
Button F: Forward

(Transmission is set to the forward position at the moment when this button is pushed and released.)

Button R: Reverse

(Transmission is set to the reverse position at the moment when this button is pushed and released.)

9. Turn off joystick ON/OFF switch (5), and the operation of the joystick is turned off.



PRECAUTIONS FOR STEERING WITH JOYSTICK

WARNING

- If the machine and transmission cannot be operated normally with the joystick, or if the warning lamp lights up, stop the machine with the brake first. Then, turn off the joystick ON/OFF switch and move to a safe place by using the steering wheel and directional lever.
- Before starting the operation of the machine again, find out and repair the troubled part and confirm that the function is normal. For the troubleshooting and repair, please contact your Komatsu distributor.
- Never operate the machine before it is repaired completely.

- In the joy stick mode, F, N and R are indicated by the LED lamps on the machine monitor, found on the left front side of the panel as shown at the right.

- Do not move the joystick to the left or right until the N display (on the machine monitor F-N-R display) lights up to indicate that the joystick is ready.

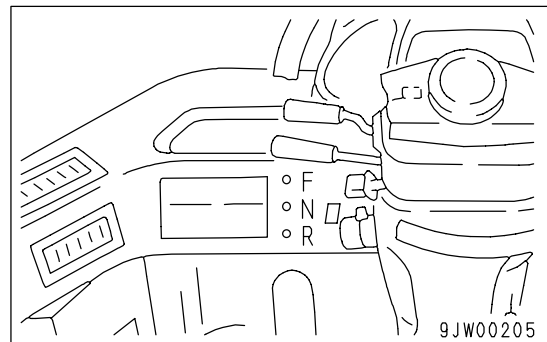
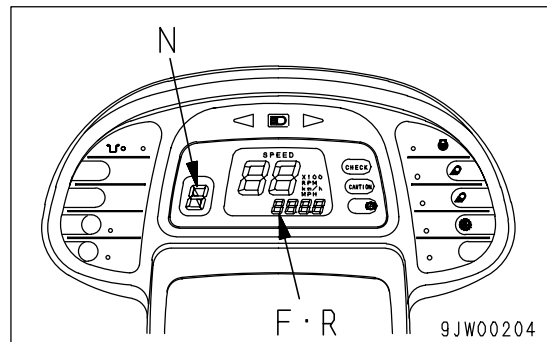
The joystick controller must sense the neutral position of the joystick first. If the joystick is moved before the neutral position is sensed, an error is detected, the caution lamp flashes and the joystick steering system does not work.

If an error is indicated, turn off the joystick ON/OFF switch, then turn it on again.

- If the vehicle is steered with the steering wheel, its turning angle is fixed when turning of the wheel is stopped. If the vehicle is steered with the joystick and the joystick is held turned, the vehicle is steered to the articulate end. Since the feel of steering of the joystick is different from the steering wheel, take sufficient care until you are get accustomed to the joystick.

- If the F or R button at the joystick head is pushed and held more than 30 seconds, a short circuit is sensed and an error is indicated. Touch these buttons only when required.

- If the forward/reverse lever is not at the neutral position, when the joy stick ON/OFF switch is turned off, the neutral interlock circuit prevents it from turning to the forward/reverse lever side. Since the transmission is kept at the neutral position, the vehicle cannot move either forward or in reverse. In this case, turn the forward/reverse lever to the N (Neutral) position.



- If the electric circuit of the joystick steering system or transmission control system has trouble, the central caution lamp (Red) on the left side of the main monitor flashes to notify the trouble to the operator. Since both steering system and transmission are set in the respective neutral positions, turn off the joystick ON/OFF switch, then drive the machine with the steering wheel and the directional lever.

ADJUSTMENT OF JOYSTICK CONSOLE

WARNING

- Stop the machine on level ground in a safe place when carrying out the adjustment.
- Carry out the adjustment before starting operations or when changing operator shifts.
- Put your back against the backrest of the operator's seat and adjust the seat so that it is possible to depress the brake fully, then adjust the console.

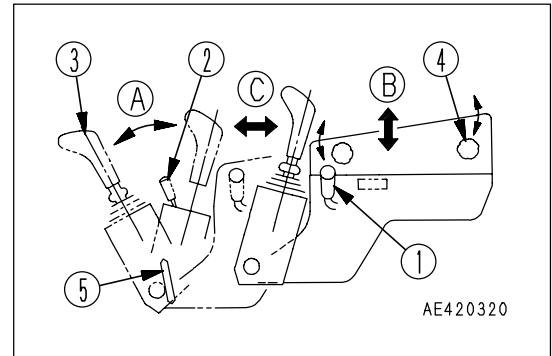
(A) Adjustment of joystick

Turn lever (2) forward and set knob (3) to a desired position.

After setting, release the lever.

Forward/Backward adjustment: 130 mm (5.12 in) (At knob top)

Loosen lever (5) and move the console to the rear until it contacts the stopper, then tighten lever (5). In this way, lever (3) can be set to the desired position, and there will be no need to adjust the position of lever (3) in the future.



(B) Adjusting the height of the armrest (Left-hand)

Turn grip (4) to unlock the armrest and set the armrest to the desired position. After setting, tighten the grip securely.

Vertical adjustment range: 35 mm (1.38 in)

(C) Sliding of console

CAUTION

When traveling or operating the work equipment, be sure to lock the console at the forward stroke end.

- When getting on or off the machine, pull up lever (1) and slide the console to the rear.
When doing this, do not stop the console half way, but slide it fully to the rear and lock it in position.
- After getting off the machine, be sure to slide the console fully to the front and lock it in position.

HANDLING AIR-SUSPENSION SEAT

SEAT ADJUSTMENT



WARNING

- When adjusting the operator's seat, stop the machine in a safe place before starting the operation.
- Adjust the seat before starting operations for the day or when changing operators.
- When adjusting the seat, put your back against the backrest and adjust to a position where the brake pedal can be fully depressed.

(A) Fore-and-aft adjustment

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

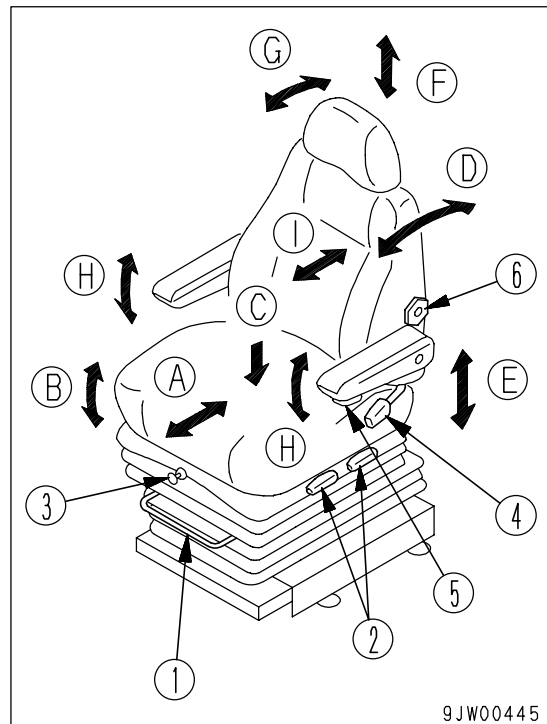
Fore-and-aft adjustment: 180 mm (7.1 in)
(18 mm (0.71 in) x 10 stages)

(B) Adjusting seat angle

Move lever (2) up and push down on the rear of the seat to tilt it backward.

Move lever (2) down and push down on the front of the seat to tilt it forward.

Adjustment range: 13 degrees (Front tilt, rear tilt: 4 stages each)



9JW00445

(C) Setting seat for operator's weight

Sit in the seat and operate valve (3) to adjust the strength of the suspension.

Amount of adjustment: 50 kg to 120 kg (110.3 to 264.6 lb) (target)

Push: Suspension becomes stronger

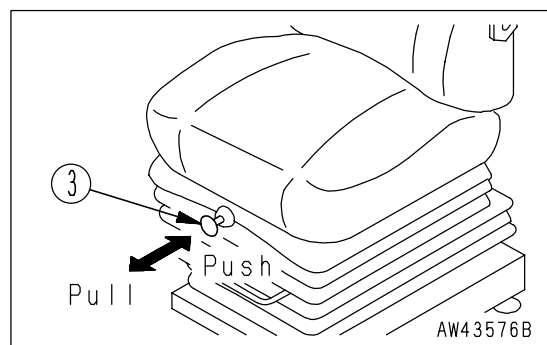
Pull: Suspension becomes weaker

(D) Adjusting backrest angle

Move lever (4) up and move the backrest to the front or rear.

Adjustment range: Front 66 degrees (3 degrees x 22 stages)

Rear 72 degrees (3 degrees x 24 stages)



AW43576B

NOTICE

If the seat back is reclined too far, the seat back may hit the rear glass, so use it in a position where it does not contact the glass.

(E) Seat height adjustment

Move lever (2) up/down, then move the seat up or down as desired. Since lever (2) is also used for adjusting seat angle, set the seat to the desired height while adjusting the angle.

Adjustment range: 60 mm (2.4 in)

(F) Adjusting headrest height

Move the headrest up and down to the desired height.

Adjustment range: 50 mm (2.0 in)

(G) Adjusting headrest angle

Rotate the headrest to the front or rear.

(H) Adjusting armrest angle

Adjust angle of armrest by rotating knob (5) (left side only).

Adjustment range: 30 degrees (forward tilt: 25 degrees, backward tilt: 5 degrees)

Also, when armrest is turned, it will spring up. (Both left and right sides)

(I) Lumbar support

Turn grip (6) to provide suitable support for the lumbar region.

FAILURE DISPLAY ON MAIN MONITOR

If the action code is displayed on the main monitor section (normally the speedometer display) of the machine monitor, follow the corresponding operator's troubleshooting table below.

FAILURE CODE ON MAIN MONITOR

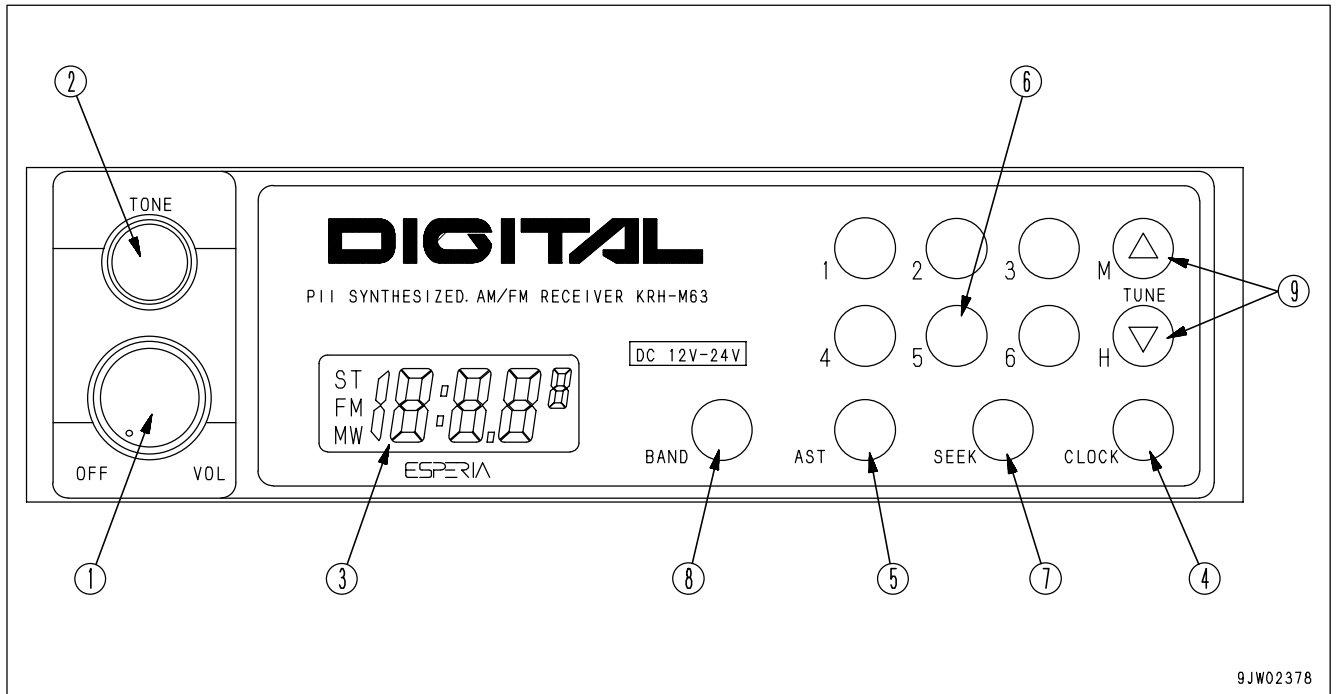
Error code	Option				Alarm buzzer	Action by operator
	Transmission control system		Joystick control system			
	Problem system	Condition of machine	Problem system	Condition of machine		
E00	Disconnection in travel speed sensor system	Does not shift gear automatically (switches to manual gear shifting)	Disconnection, short circuit, or short circuit with ground in joystick FNR signal system (or L, R signal system)	Returns to neutral (possible to manual switch)	No	Normal work possible with manual operation
	Disconnection, short circuit, or abnormality in engine speed sensor system	Engine speed taken as 2100 rpm (there is gear shifting shock)	—	—		Normal work possible, but there is gear shifting shock
CALL	Disconnection, short circuit with ground, or short circuit in shift lever system	Becomes neutral, travel impossible (judges controller input as N)	—	—	Yes	Stop machine, turn starting switch OFF, do same as above, then call service
	Disconnection, short circuit with ground, or short circuit in F, R solenoid signal system	Becomes neutral, travel impossible (ECMV output OFF)	—	—		
	Disconnection, short circuit with ground, or short circuit with speed range solenoid signal system	Becomes neutral, travel impossible (ECMV output OFF)	—	—		

FAILURE CODE ON AUTOMATIC SHIFT AND JOYSTICK STEERING SYSTEM

If the error code is displayed, park the machine in a safe place, then contact your Komatsu distributor to report the displayed code (number and/or letter).

CAR RADIO

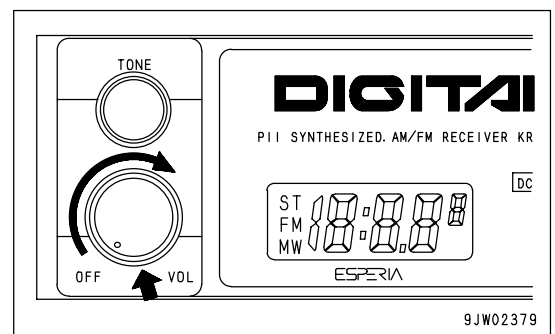
EXPLANATION OF COMPONENTS



- | | |
|---------------------------------------|--------------------------|
| (1) Power switch/Volume | (6) Preset switch |
| (2) Tone control knob | (7) Seek |
| (3) Display | (8) Band selector switch |
| (4) Clock button/Displaying frequency | (9) Tuning switch |
| (5) AST | |

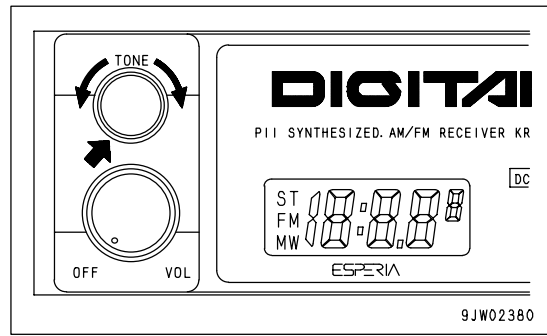
POWER SWITCH/VOLUME

When this switch (1) is turned to the right, it clicks and the power is turned on. If it is turned further, the speaker volume is adjusted.



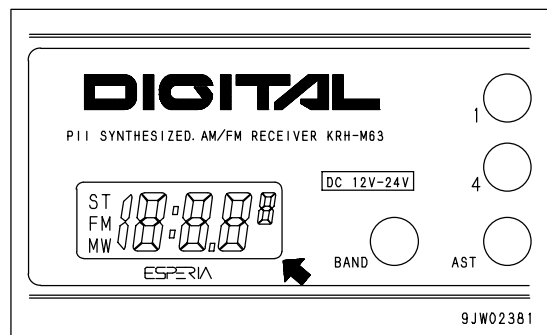
TONE CONTROL KNOB

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



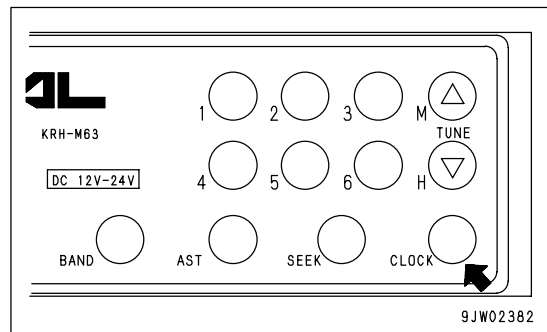
DISPLAY

This display (3) shows the radio reception frequency and the operating mode.



CLOCK BUTTON/DISPLAYING FREQUENCY

When this button (4) is pressed, the display changes to the time. If it is pressed again, it displays the frequency.

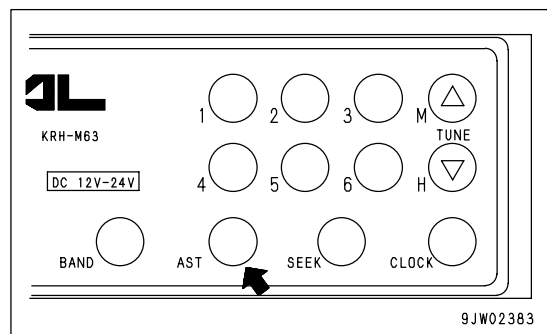


AST

When this button (5) is pressed, the preset stations are called up in turn.

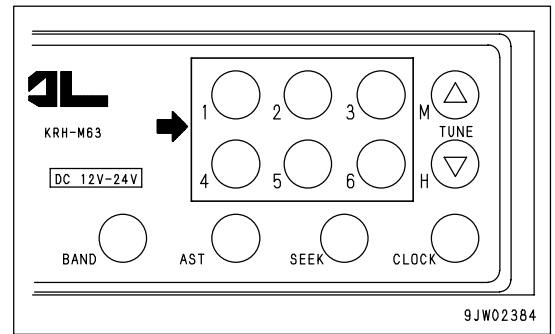
When the desired broadcasting station is reached, press the button again to stop it.

If the button is kept pressed continuously for 2 seconds, it is set to auto memory.



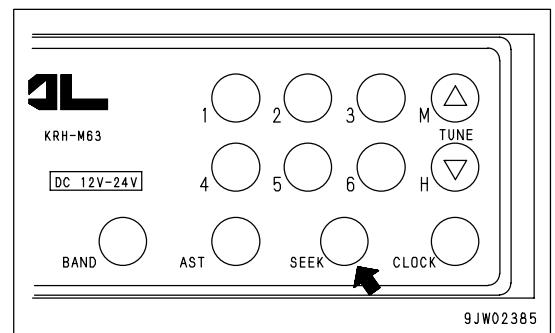
PRESET BUTTON

With this switch (6), each button can be set to one station each for FM and MW (AM). (For details of the method of resetting, see "METHOD OF SETTING PRESET BUTTONS (PAGE 6-19)".)



SEEK

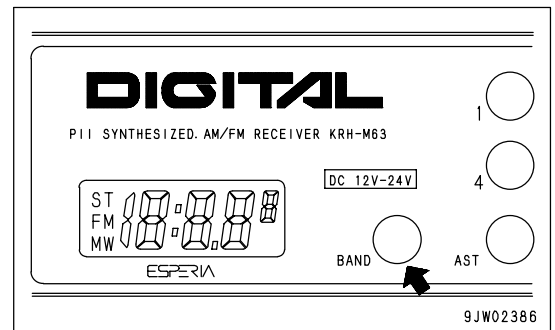
When this switch (7) ("SEEK") is pressed, it automatically searches for stations that can be received, and when it receives a station, it stops.



BAND SELECTOR SWITCH

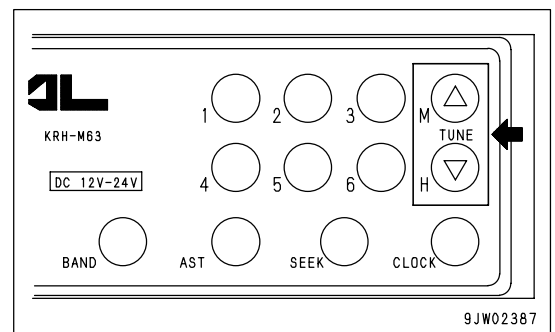
When this switch (8) ("BAND") is pressed, the band is switched between FM and MW (AM).

The reception band and frequency are displayed on the display.



TUNING SWITCH

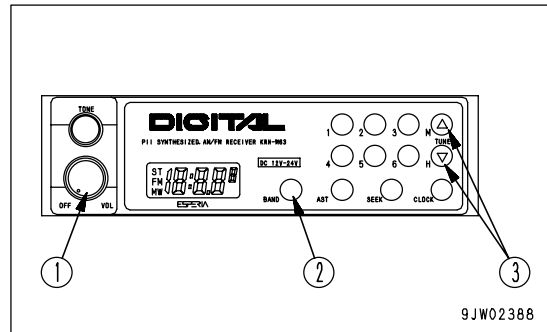
When the "TUNE" button Δ of switch (9) is pressed, the frequency goes up; when the ∇ button is pressed, the frequency goes down. If it is kept pressed, the frequency changes continuously.



METHOD OF USE

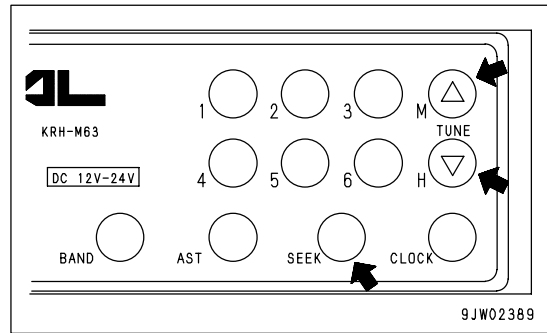
LISTENING TO RADIO

1. This switches on power (1) for the radio.
2. "BAND" switch (2) is used to select MW (AM) or FM.
3. Use the preset switch or tuning switch (3) to select the station.
4. Adjust the volume and tone as desired.
5. To turn the radio OFF, turn VOL knob (1) to the left until a click is heard.



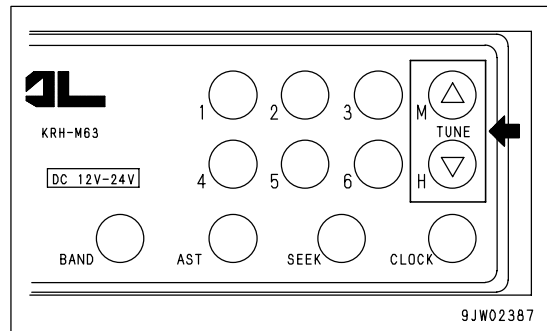
METHOD OF AUTOMATIC TUNING

When the "SEEK" switch is pressed, it moves up to higher frequencies and when it finds a station that can be received, it stops automatically.



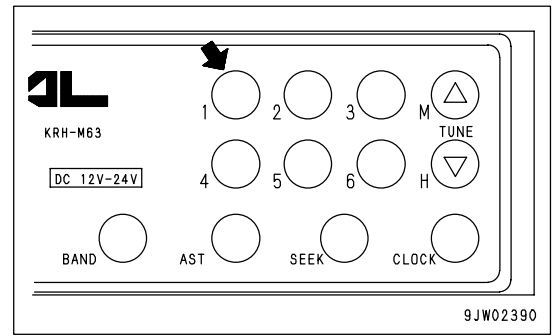
METHOD OF MANUAL TUNING

When the TUNE button Δ is pressed, the frequency goes up; when the ∇ button is pressed, the frequency goes down. If it is kept pressed, the frequency changes continuously.



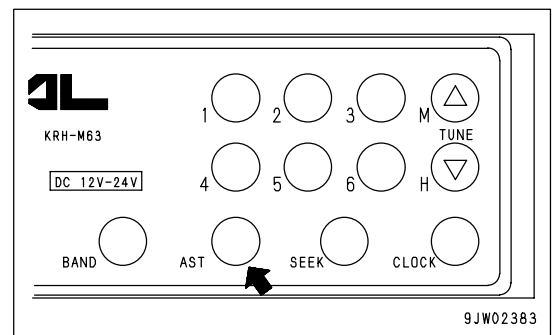
METHOD OF SETTING PRESET BUTTONS

1. Select the desired preset station.
Use the "BAND" button to select MW (AM) or FM, and use the "TUNE" button to select the frequency of the broadcasting station.
2. Decide the number of the button to be preset, and keep it pressed for 2 seconds. The number of the button will be displayed and the presetting is completed.
3. Repeat Steps 1 - 2 to preset other broadcasting stations.
 - To change the setting of a preset switch to another station, repeat Steps 1 - 2.
 - If the battery is replaced or the power is switched off, all the preset settings are deleted. Carry out the presetting operation again.
 - It is possible to preset 6 AM (MW) stations and 6 FM stations.



METHOD OF AUTOMATIC MEMORY

If the "AST" button is pressed for 2 seconds, the broadcasting stations that can be received in the area are called up in turn, and the broadcasting stations are automatically saved in the preset memory.

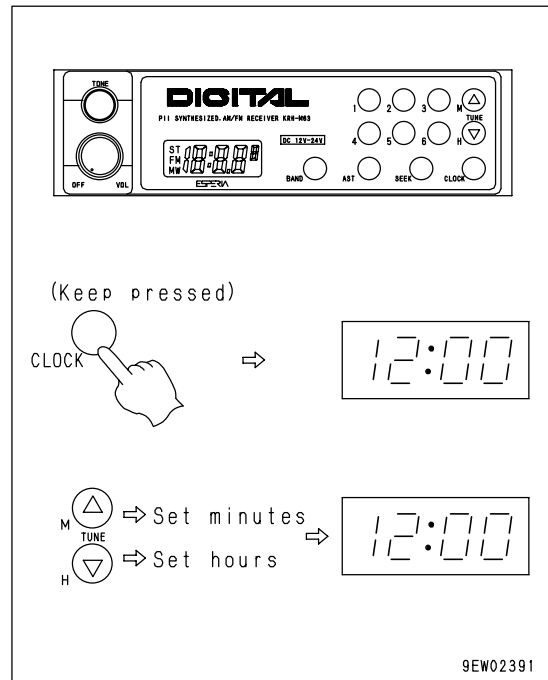


AUTOMATIC SWITCHING RECEPTION OF MONAURAL/STEREO

If the reception of the FM stereo broadcast being received is weak (when you are far from the broadcasting station or are surrounded by hills), the radio is automatically switched from stereo to monaural to reduce the interference. When the stereo broadcast becomes stronger, it automatically switches back to stereo broadcasting.

ADJUSTING TIME

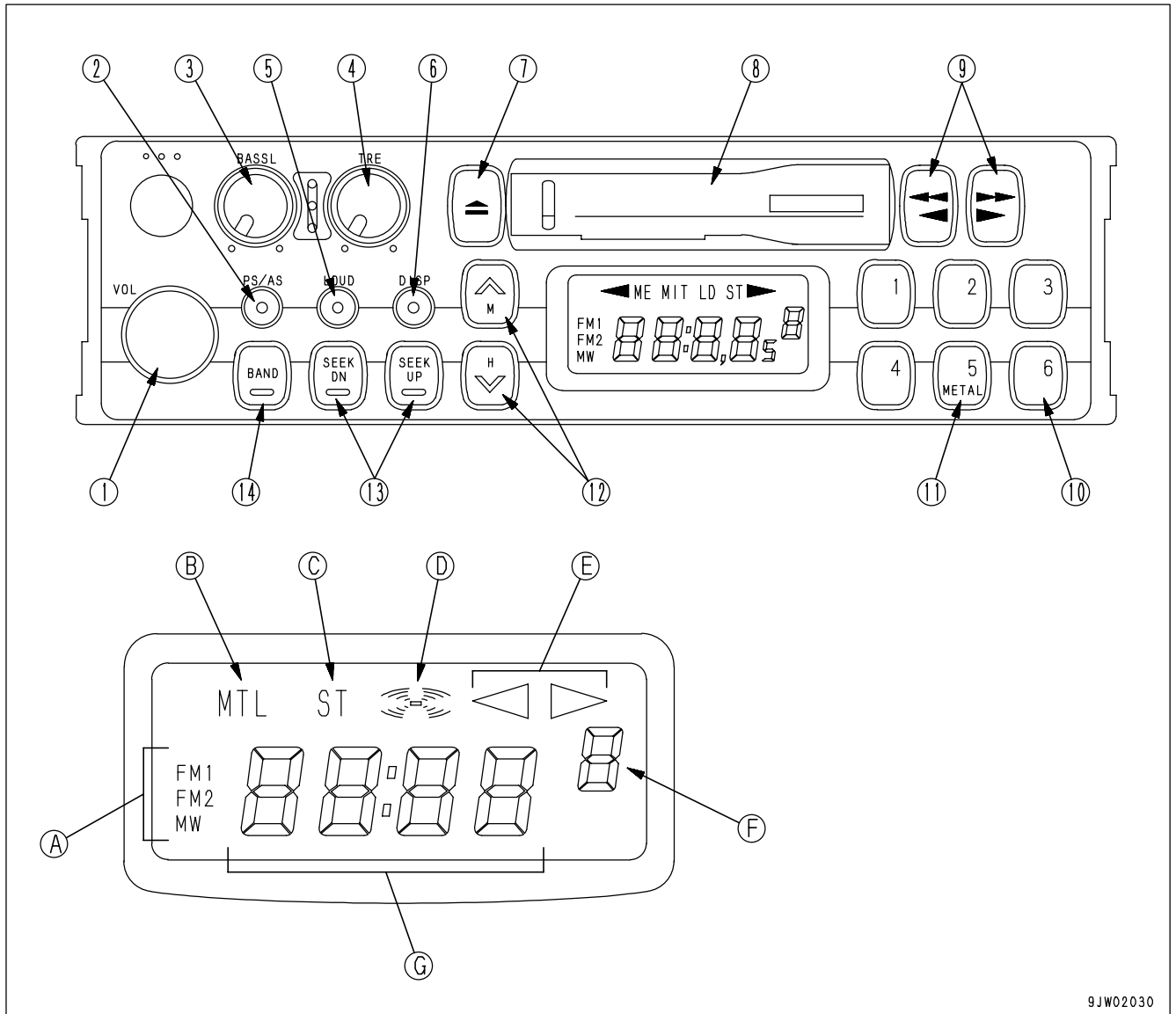
1. Turn the radio power ON. If the display shows the frequency, set the CLOCK button to the time display.
2. To set the time, keep the CLOCK button pressed and
 - Press the \triangle button to change the minutes
 - Press the ∇ button to change the hours

**PRECAUTIONS WHEN USING**

- Stow the antenna when traveling in places with low overhead clearance.
- 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.

AM/FM RADIO-CASSETTE STEREO

EXPLANATION OF COMPONENTS

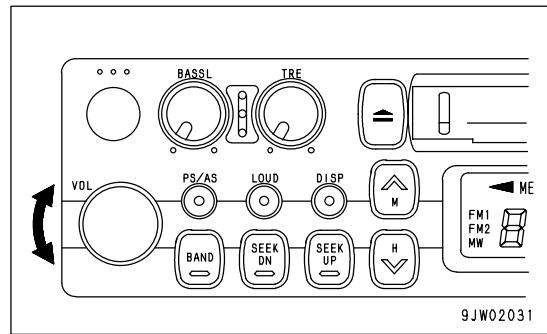


9JW02030

- | | |
|--|----------------------------------|
| (1) Power switch/volume | (8) Cassette door |
| (2) Auto-store/preset scan button | (9) Fast forward, rewind buttons |
| (3) Bass control knob | (10) Preset buttons |
| (4) Treble control knob | (11) Metal tape button |
| (5) Loudness button | (12) Manual tuning buttons |
| (6) Time/radio display selector button | (13) Seek tuning buttons |
| (7) Tape eject button | (14) Band selector button |
| (A) Band display | (E) Tape direction display |
| (B) Metal tape display | (F) Preset channel display |
| (C) FM stereo reception display | (G) Time/frequency display |
| (D) Loudness display | |

POWER SWITCH/VOLUME

Turn this knob (1) to the right until it clicks to turn the power on.
Turn it further to increase the volume.

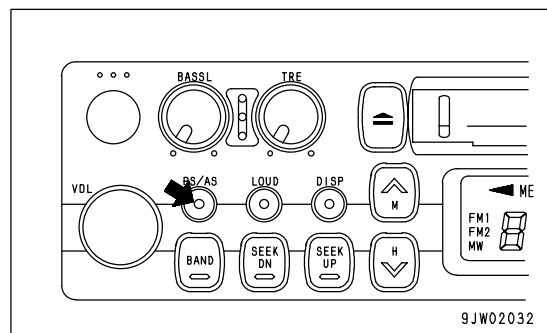


AUTO-STORE/PRESET SCAN BUTTON

Use this button (2) to actuate the preset scan and auto-store functions.

• Auto-store

Each time this button is pressed for more than 2 seconds while in radio reception, this auto-store function automatically starts to search for the desired station within a receivable band, and memorize the frequency in the preset memory. During this scanning process, the frequency shown in the right side of display continues to change. This indicates that each frequency is memorized in the auto-store.



REMARK

The auto-store function cannot be used when the channel display is flashing.

When the display is flashing, the preset scan function is being used.

• Preset scan

If this button is pressed for less than 0.5 second while in radio reception, programs from the six preset stations in the same band will be broadcast one after another for 5 seconds each, starting from No. 1 through 6 stations consecutively.

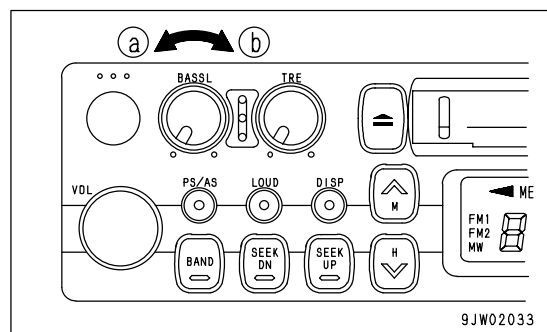
When the desired station is arrived at, press the button again, which stops this preset scan tuning process and switches to an ordinary broadcasting. The same process will be repeated endlessly until the button is pressed again.

BASS CONTROL KNOB

Turn this button (3) to the left to reduce the low tones ; turn it to the right to emphasize the low tones.

Direction (a) : Low tone reduced

Direction (b) : Low tone emphasized

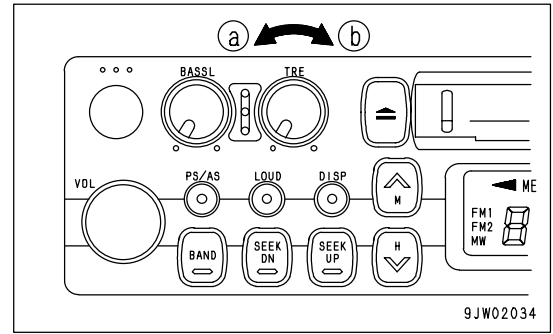


TREBLE CONTROL KNOB

Turn this button (4) to the left to reduce the low tones ; turn it to the right to emphasize the high tones.

Direction (a) : High tone reduced

Direction (b) : High tone emphasized

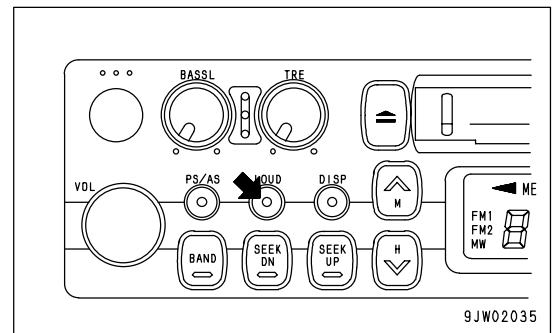


LOUDNESS BUTTON

This button (5) is used when playing at low volume. It makes it possible to hear more easily by emphasizing the low tone when it is felt that the low tones are weak.

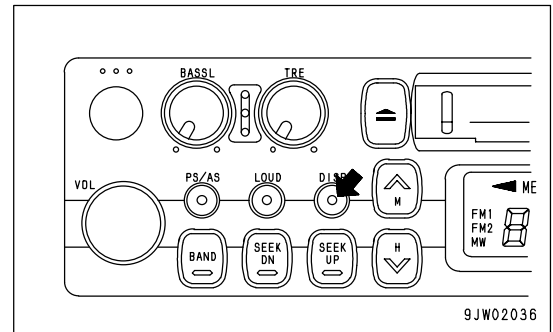
Push button : Actuated (ON)

Push button again : Canceled (OFF)



TIME/RADIO DISPLAY SELECTOR BUTTON

This button (6) is used to switch between the "Radio/tape display" and the "Time display".



- Correcting the time

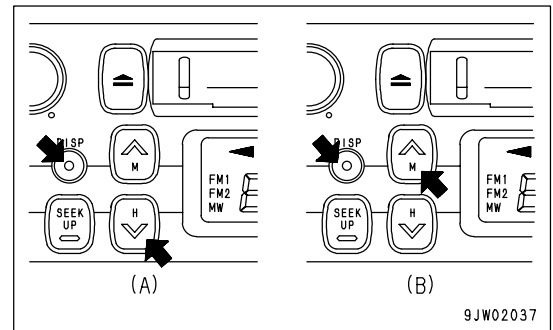
Press the button to set to the time display.

- (A) Correcting hour:

Keep the DISP button pressed and press the bottom (H) of the TUNING button to correct the hour.

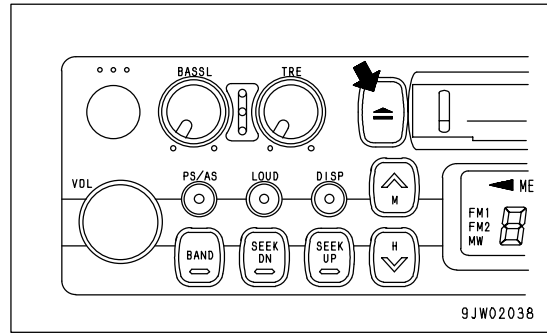
- (B) Correcting minute:

Keep the DISP button pressed and press the top (M) of the TUNING button to correct the minute.



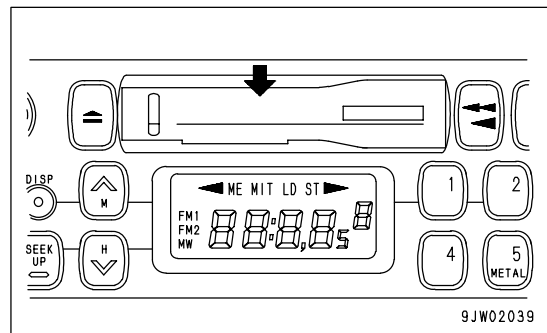
TAPE EJECT BUTTON

This button (7) is used to stop the tape and to eject the cassette. When this button is pressed, the tape is ejected and the radio plays.



CASSETTE DOOR

Set the cassette with the exposed portion of the tape on the right side and insert it in cassette door (8).



FAST FORWARD, REWIND BUTTONS

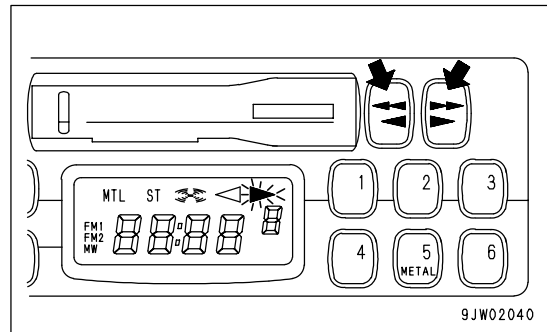
These buttons (9) are used to fast forward or rewind the tape.

- Fast forward/rewind

If you press the button pointing in the same direction as the lighted arrow indicating the direction of play, the tape will be fast forwarded; if you press the button pointing in the opposite direction, the tape will be rewound.

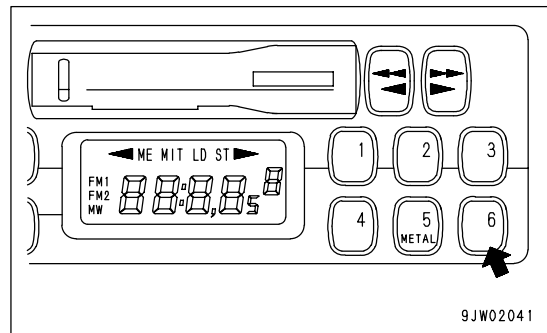
To stop the tape, lightly press the button that is not locked. The fast forward or rewind operation will be canceled.

If the fast forward and rewind button are pressed at the same time, the tape will change sides.



PRESET BUTTONS

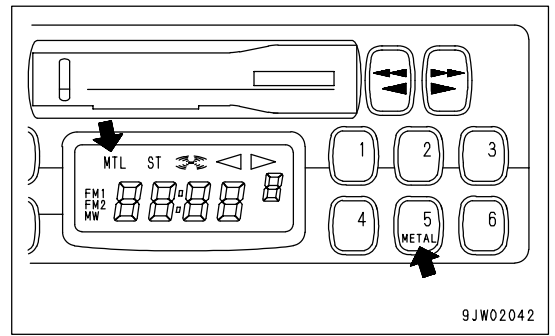
These buttons (10) are used to call up the broadcast station frequencies preset in memory for each of buttons No.1 to No.6. It is possible to preset 18 stations (FM:12; AM:6) with these buttons.



METAL TAPE BUTTON

(used also for preset button No.5)

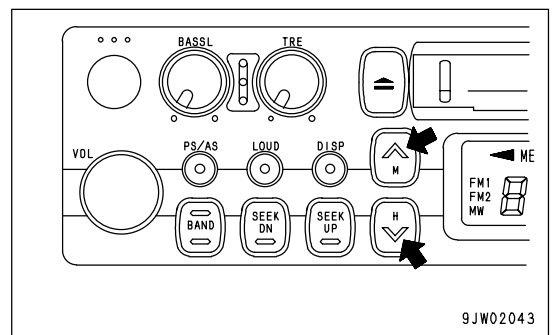
This button (11) is used when playing a metal or chrome tape. This button is used also for preset button No.5. When it is pressed, "MTL" appears on the display.



MANUAL TUNING BUTTONS

These buttons (12) are used to manual tuning.

When "TUN ^" button of button is pressed, the frequency goes up 9 kHz for AM or 0.1 MHz for FM; when "TUN v" button of button is pressed, the frequency goes down 9 kHz for AM or 0.1 MHz for FM. If the button is pressed down and held, the frequency will change continuously.

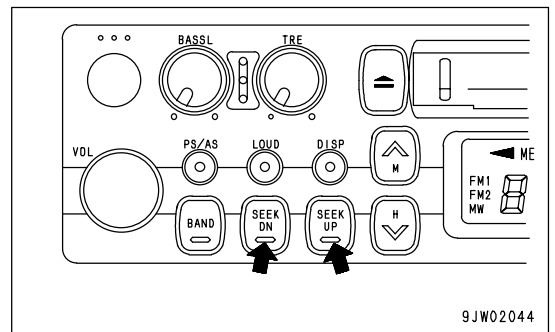


SEEK TUNING BUTTONS

These buttons (13) are used to seek tuning.

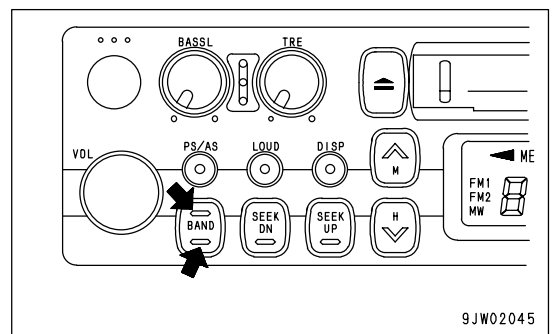
When the "SEEK UP" button of button is pressed, the frequency automatically goes up; when the "SEEK DOWN" button of button is pressed, the frequency automatically goes down.

When the next station that can be received is found, it automatically stops.



BAND SELECTOR BUTTON

When this button (14) is pressed, the band is switched between FM1, FM2, and MW (AM). The band is shown on the display.



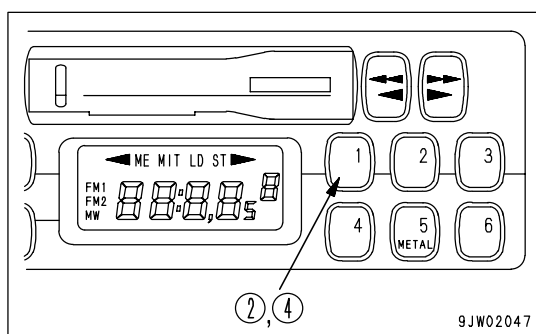
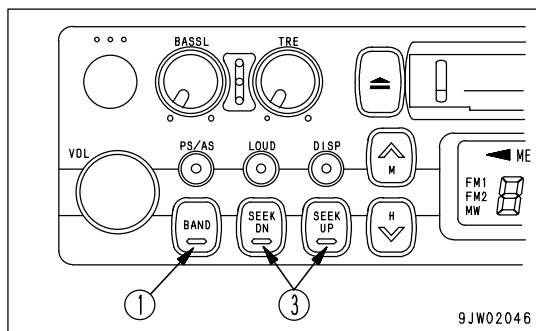
METHOD OF OPERATION

METHOD OF SETTING PRESET BUTTONS

To listen to a preset station, use band selector button (1) to select AM, FM1, or FM2, then press the preset switch number to listen to the desired station.

It is possible to preset six AM stations and 12 FM stations (FM1: 6, FM2: 6).

1. If you are playing a cassette, press the tape eject button to stop the tape.
2. Select the station to be preset.
Use band selector button (1) to select MW (AM), FM1, or FM2, then use the manual tuning button to select the frequency of the broadcasting station.
3. Press manual memory button (2) or seek tuning button (3).
4. Press preset button (4) of the number to be preset for 2 seconds while the frequency display is being shown on the display. (The preset channel and frequency are displayed and the presetting is completed).
5. Repeat Steps 2 to 4 to preset other stations.

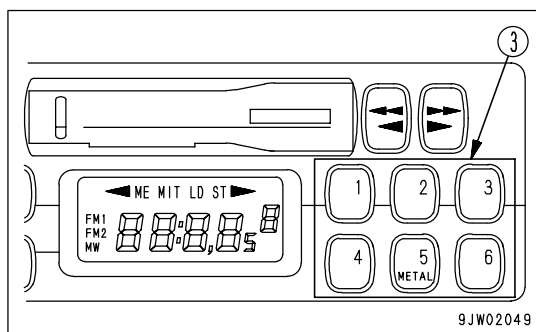
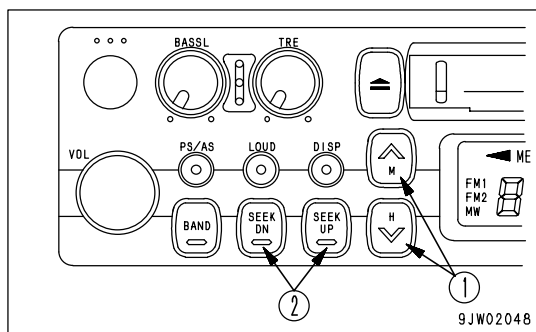


REMARK

- Use Steps 2 to 4 also when changing the setting of a preset switch to another station.
- When the power is disconnected, such as when the battery is replaced, all the settings are deleted, so preset the stations again.

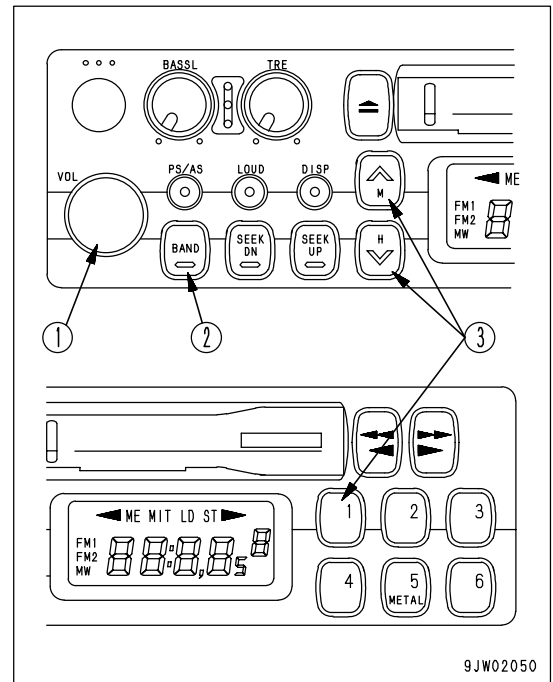
MANUAL MEMORY BUTTON

Select the station to be preset with manual tuning button (1) or seek tuning button (2), then keep button No.1 to button No.6 of button (3) pressed for 2 seconds while the frequency is being displayed to preset the station.



LISTENING TO RADIO

1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set band selector button (2) to AM or FM.
3. Select the station with the preset buttons or manual tuning button (3).
4. Adjust the volume, balance, and tone as desired.
5. When turning the radio OFF, turn power switch (1) to the left until there is a click.



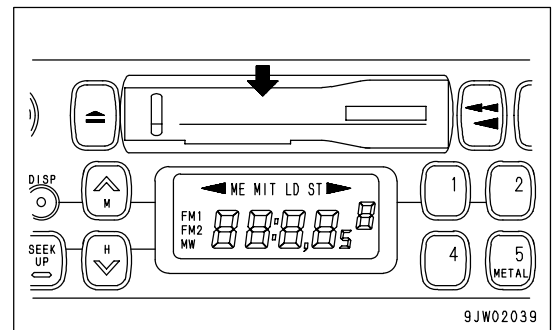
9JW02050

REMARK

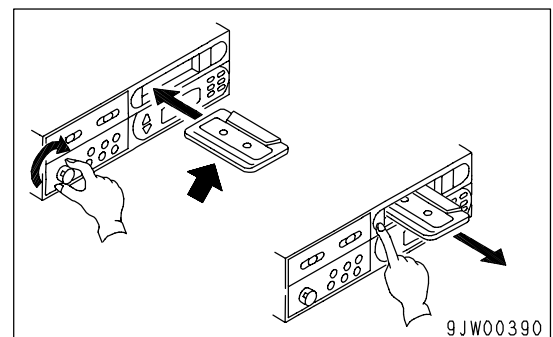
- To switch to the radio when listening to a cassette, press the cassette eject button to stop the tape.
- If you insert a cassette when listening to the radio, the tape will start to play.

LISTENING TO CASSETTE TAPE

1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set the cassette with the exposed portion of the tape on the right side and push it into the cassette door. The tape will automatically start playing.
If the arrow indicating the direction of play is pointing to the right, the top side is being played; if the arrow is pointing to the left, the bottom side is being played.
When the tape reaches the end, it is automatically reversed and the other side starts to play.
3. When finishing with the tape, press the cassette eject button to eject the tape and automatically switch to the radio.



9JW02039

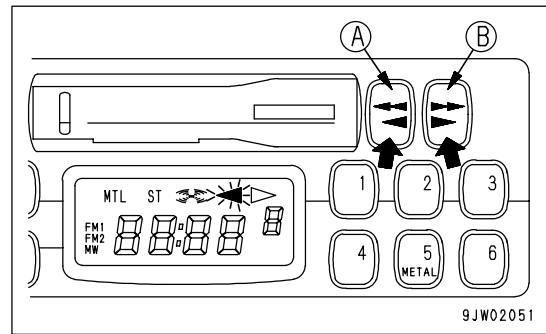


9JW00390

REVERSING TAPE

When listening to the tape, press both FAST FORWARD, REWIND buttons (A) and (B) at the same time lightly.

When this is done, the tape direction display will be reversed.

**PRECAUTIONS FOR USE**

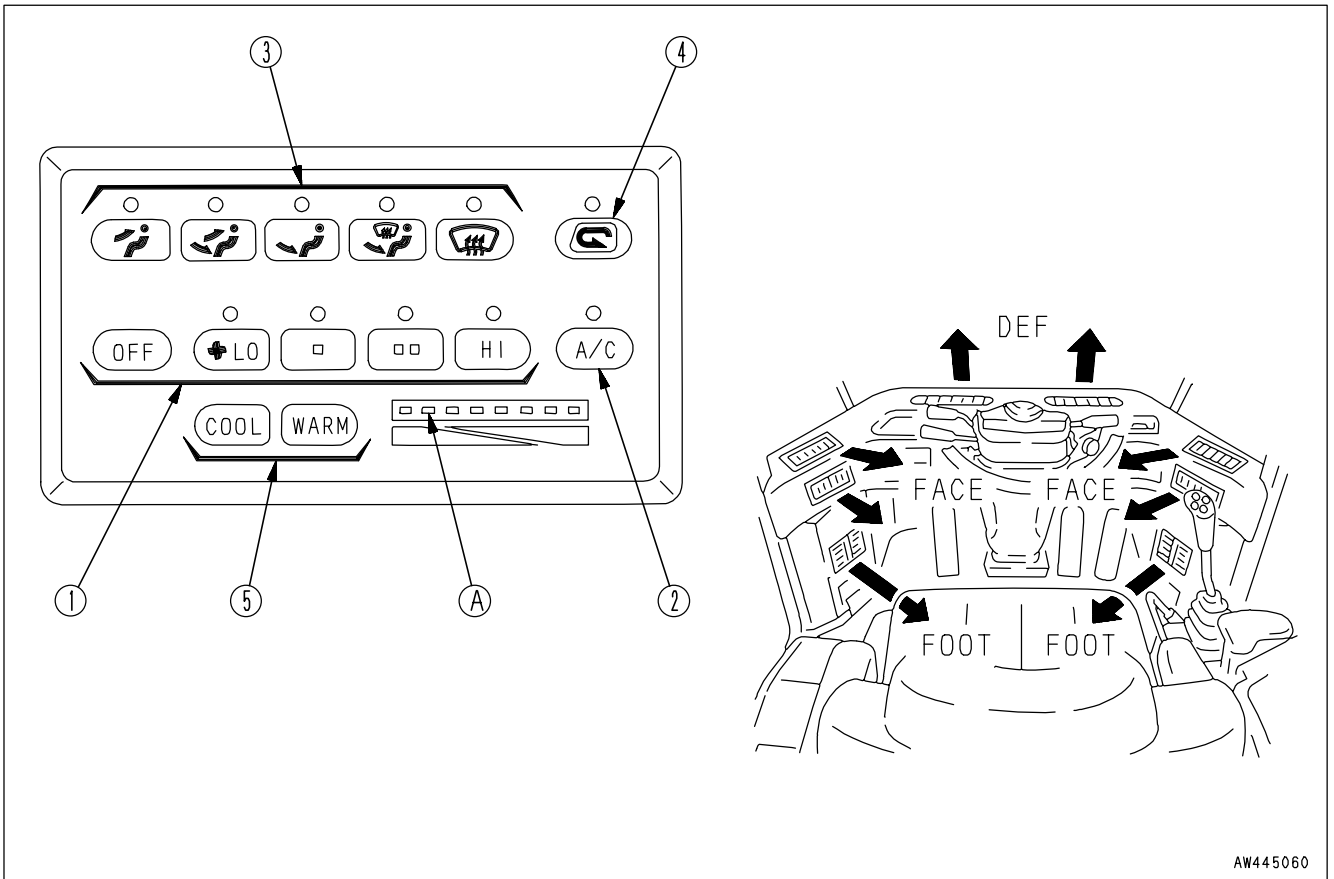
- Stow the antenna when traveling in places with low overhead clearance.
- To ensure safety during operations, keep the volume at a level where it is possible to hear other machines.
- If water gets inside the speaker case or car radio (auto tuning), it may cause a serious problem, take care not to let water get in these items.
- 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.

NOTICE**Handling cassette tape**

- **Clean the tape head approx. once a month with a commercially available head. cleaning tape.**
- **Do not leave the tape in any place where it is exposed to direct sunlight, any place that is excessively dusty, or any place where there is a magnetic field.**
- **Do not use 120-minute tapes. The tape is thin and it is easily gets caught up inside the machine.**
- **If the tape is slack, it easily gets caught up inside the machine. Use a pencil to wind in the tape to remove any slack.**
- **Do not use any cassette tape if the label has started to come off. It may cause defective rotation, or it may be impossible to get the tape out of the machine.**

AIR CONDITIONER

GENERAL LOCATIONS AND FUNCTION OF CONTROL PANEL

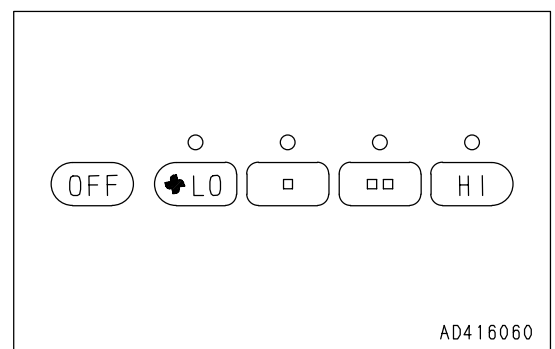


AW445060

- (1) Fan switch
- (2) Air conditioner switch
- (3) Mode selector switch
- (4) FRESH/RECIRC selector switch
- (5) Temperature control switch
- (A) Temperature level indicator lamp

FAN SWITCH

This switch (1) can be used to adjust the air flow to four stages. It also acts as the main switch for the air conditioner. When the OFF switch is pressed, the fan stops. When the switch is pressed, the indicator lamp above the switch lights up to display the air flow.

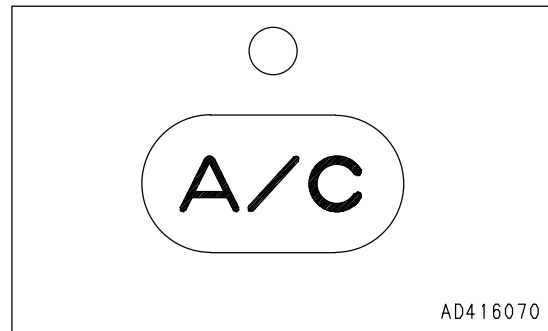


AD416060

AIR CONDITIONER SWITCH

This switch (2) is used to start or stop the cooling or dehumidifying function.

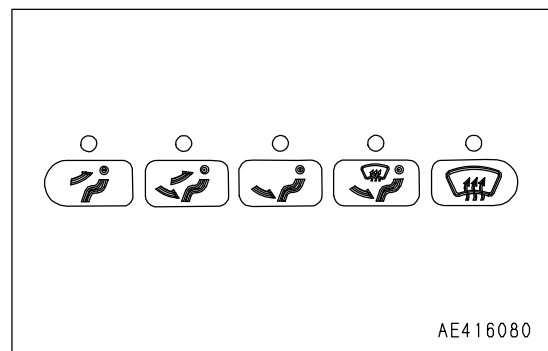
When the fan switch is turned ON and the air conditioner switch is pressed, the indicator lamp above the switch lights up. When the switch is pressed again, the switch is turned OFF and the indicator lamp goes out.

**MODE SELECTOR SWITCH**

This switch (3) is used to select the vents.

The following five vent modes are available: FACE, FACE/FOOT, FOOT, FOOT/DEF, DEF.

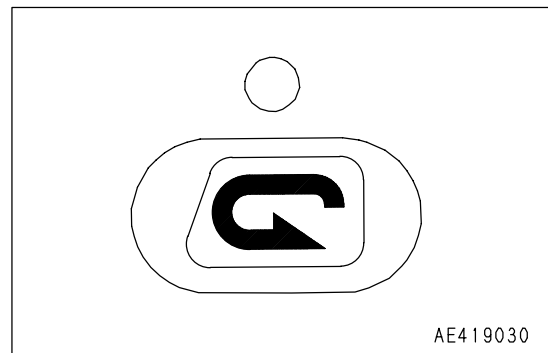
When the switch is pressed, the indicator lamp above the switch lights up to display the vent mode.

**FRESH/RECIRC SELECTOR SWITCH**

This switch (4) is used to select between recirculating the air inside the cab or taking in fresh air from outside.

When the RECIRC position is selected, the indicator lamp above the switch lights up.

When the switch is pressed again, the indicator lamp goes out, and fresh air is taken in.

**TEMPERATURE CONTROL SWITCH**

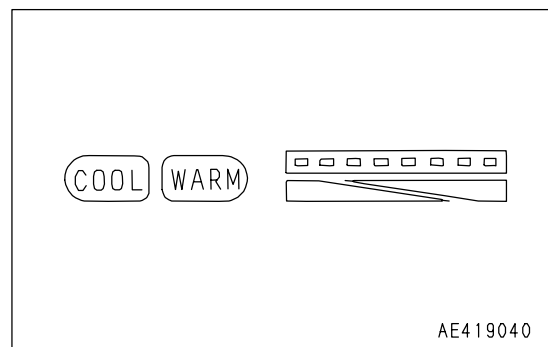
The temperature can be adjusted with this switch (5) steplessly from low temperature to high temperature.

The temperature level indicator lamps light up to display the temperature of the air coming from the vents.

The more the blue lamps light up, the lower the temperature is.

The color of the indicator lamp changes while the switch is being pressed.

When the temperature reaches the desired level, release the switch to set the temperature.



The settings for each mode are retained in memory even when the starting switch is turned OFF. However, in the following cases, the settings must be made again.

- When the machine has been out of use for more than 7 days
- When the battery voltage is extremely low
- When there has been abnormal interference from outside
- When the fan switch is turned OFF (the setting is not kept in memory with only the air conditioner switch)

If the air conditioner is used at the FRESH position, the inside of the cab will be pressurized and this will prevent the entry of dust.

The higher the position of the fan switch, the more effective the pressurizing becomes.

METHOD OF OPERATION

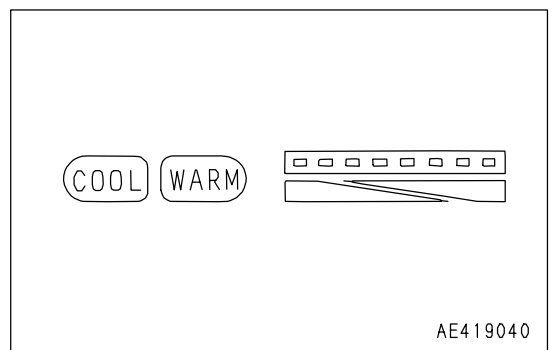
Switch		Fan switch	Air conditioner switch	Temperature control switch	FRESH/RECIRC selector switch	Mode selector switch
Condition of use	Rapid	HI	ON	All blue	RECIRC	FACE
	Normal	HI – LO	ON	More than half are blue	FRESH	FACE
Dehumidifying, heating		HI – LO	ON	More than half are red	FRESH	FOOT
Heating	Rapid	HI	OFF	All red	RECIRC	FOOT
	Normal	HI – LO	OFF	More than half are red	FRESH	FOOT
Defroster		HI	ON	More than half are red	FRESH	DEF
Ventilation or pressurizing		HI – LO	OFF	All blue	FRESH	FACE

When carrying out the defrosting, if the temperature control switch is set so that all lamps are red, this will improve the performance for defrosting and demisting.

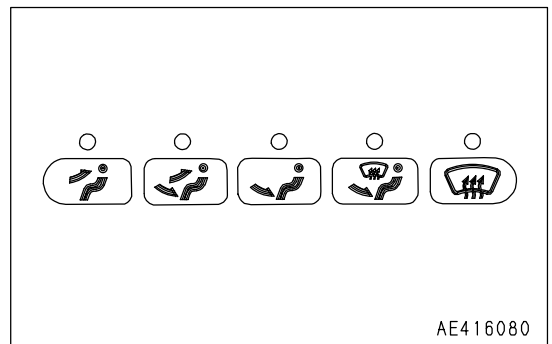
Set the vent mode selector switch to the intermediate position to give the desired condition.

With the FACE vents, it is possible to adjust the direction of the air flow and to turn it on or off.

However, do not set to the FACE mode with the vents closed.



AE419040



AE416080

WHEN NOT USING THE AIR CONDITIONER REGULARLY

Run the air conditioner at cooling or dehumidification + heating for several minutes from time to time to prevent the loss of the oil film at various parts of the compressor.

REMARK

If the temperature inside the cab is low, the air conditioner may not work. In such cases, use the recirculated air to heat up the inside of the cab, then turn the air conditioner switch on to run the air conditioner.

COOL BOX

When the cooling is being used, this can be used for keeping drinks and other things cool.

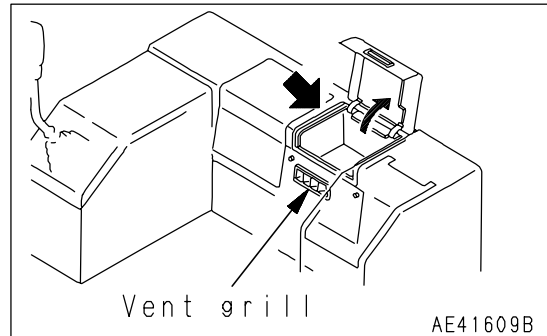
When the heating is being used, it can be used to keep things warm.

When using the box, open the vent grill.

When not using the box, close the grill.

Do not use the cool box for things which smell or leak water or break easily.

Do not use it as a holder for tools or other small objects.



HANDLING TORQUE CONVERTER LOCK-UP



WARNING

When traveling downhill, do not depress the accelerator pedal fully, regardless of whether the torque converter lock-up switch is ON or OFF. This will cause the machine to travel too fast, and is extremely dangerous.

NOTICE

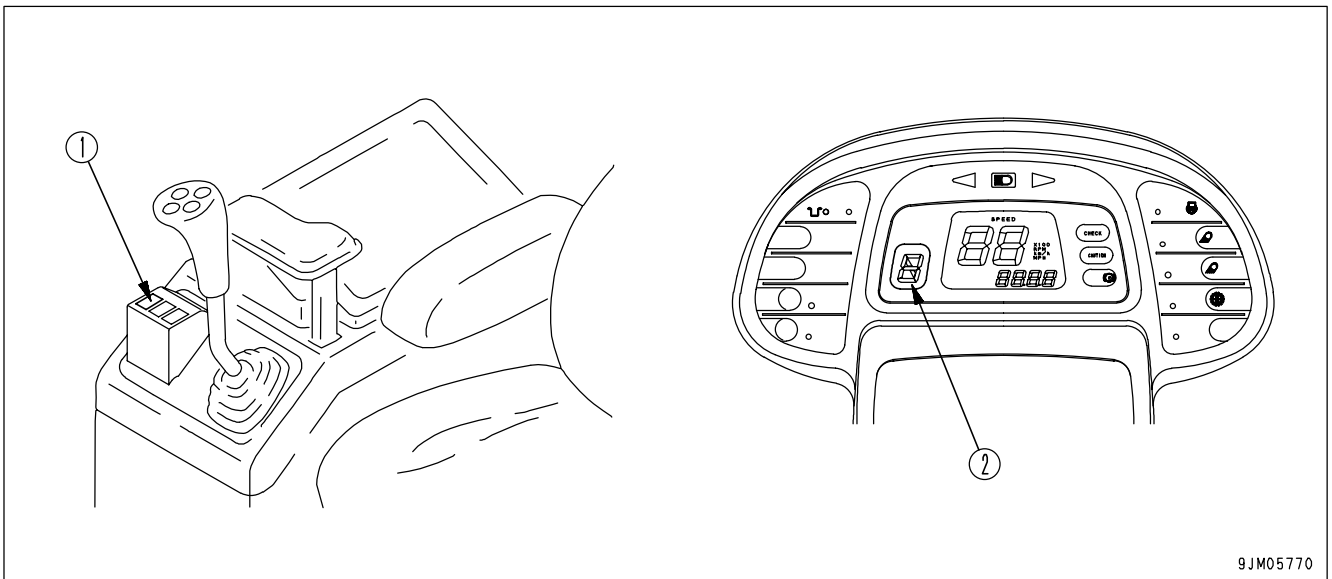
To prevent overrunning, do not shift down when traveling at high speed.

- When traveling in F2 at a speed of more than 16 km/h (9.9 MPH), do not shift down to F1.
- When traveling in F3 at a speed of more than 24 km/h (14.9 MPH), do not shift down to F2.
- When traveling in F4 at a speed of more than 34 km/h (21.1 MPH), do not shift down to F3.

When the actual speed range is between the 2nd and 4th in either FORWARD or REVERSE, the torque converter lock-up function is actuated according to the travel speed and sets to direct drive.

To prevent overrun, the lock-up is automatically canceled to prevent the travel speed from going above 37 km/h (23.0 MPH).

GENERAL LOCATIONS



(1) Torque converter lock-up switch

(2) Shift indicator (displays actual speed range)

TORQUE CONVERTER LOCK-UP SWITCH

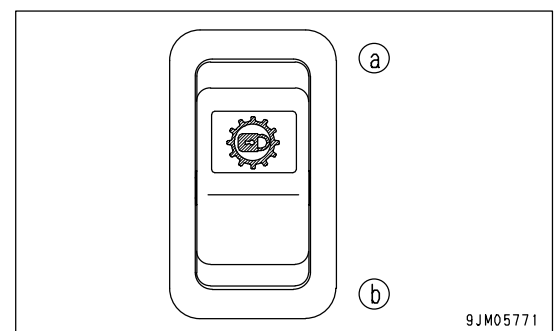
This switch (1) is the control switch for the torque converter lock-up function.

Position (a): ON

The pilot lamp inside the switch lights up and the lock-up is actuated according to the travel speed.

Position (b): OFF

The lock-up does not function.



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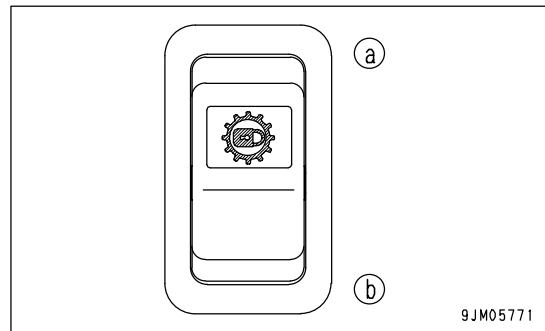
For details of (2), see "TRANSMISSION SHIFT INDICATOR (PAGE 3-17)" in the section on the machine monitor in the OPERATION section.

METHOD OF OPERATION

1. Press the top (a) of the torque converter lock-up switch to turn it ON.

The pilot lamp inside the switch lights up.

2. When the actual speed range is between the 2nd and 4th in either FORWARD or REVERSE, the torque converter lock-up function is actuated according to the travel speed and sets to direct drive.



REMARK

However, when the gearshift lever is at 4th in the auto-shift mode, the lock-up is not actuated if the actual speed range is 2nd or 3rd. The lock-up is actuated only when the actual speed range is 4th.

3. To cancel the lock-up, press the bottom (b) of the torque converter lock-up switch to turn it OFF.
The lock-up is canceled.

The travel speed for actuation and cancellation of the lock-up is as shown below.

Lock-up / Speed range	REVERSE travel speed (km/h (MPH))		REVERSE travel speed (km/h (MPH))	
	Actuated	Canceled	Actuated	Canceled
2 nd	8.0 (5.0)	7.1 (4.4)	8.9 (5.5)	7.9 (4.9)
3 rd	14.2 (8.8)	12.6 (7.8)	15.7 (9.8)	14.0 (8.7)
4 th	24.9 (15.5)	22.2 (13.8)	27.6 (17.2)	24.5 (15.2)

TRAVEL SPEED LIMIT FUNCTION

(This functions only when the torque converter lock-up switch is ON.)

To prevent the travel speed from going above 37.0 km/h (23.0 MPH), the lock-up is automatically canceled. The lock-up cancel continues until the travel speed goes below 37.0 km/h (23.0 MPH).

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WD600-3 WHEEL DOZER

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