SEAM046800T

Operation & Maintenance Manual

D475A-3

BULLDOZER

With Palm Command Control System

SERIAL NUMBERS D475A -10695 and up

It is out policy to improve our products whenever it is possible and practical to do so. We reserve the right to make changes or improvements at any time without incurring any obligation to install such changes on products sold previously.

Due to this continuous program of research and development, revisions may be made to this publication. It is recommended that customers contact their distributor for information on the latest revision.

DataKom Publishing Division

March 2002

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.

⚠ WARNING

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

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

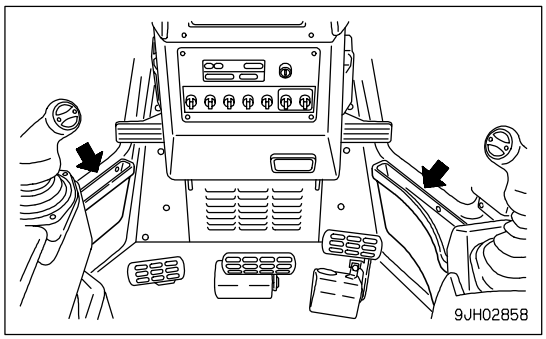
Keep this manual at the storage location for the Operation and Maintenance Manual given below, and have all personnel read it periodically.

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

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

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

Location to Keep Operation & Maintenance Manual
In Door Pocket Inside of Cab Door



EMISSION CONTROL WARRANTY

EMISSION CONTROL WARRANTY STATEMENT (APPLIES TO CANADA ONLY)

1. **Products Warranted**

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

2. **Coverage**

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

3. **Limitations**

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

KOMATSU IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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

GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS

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

1. **Produits garantis**:

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

2. **Couverture:**

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

3. **Limitations:**

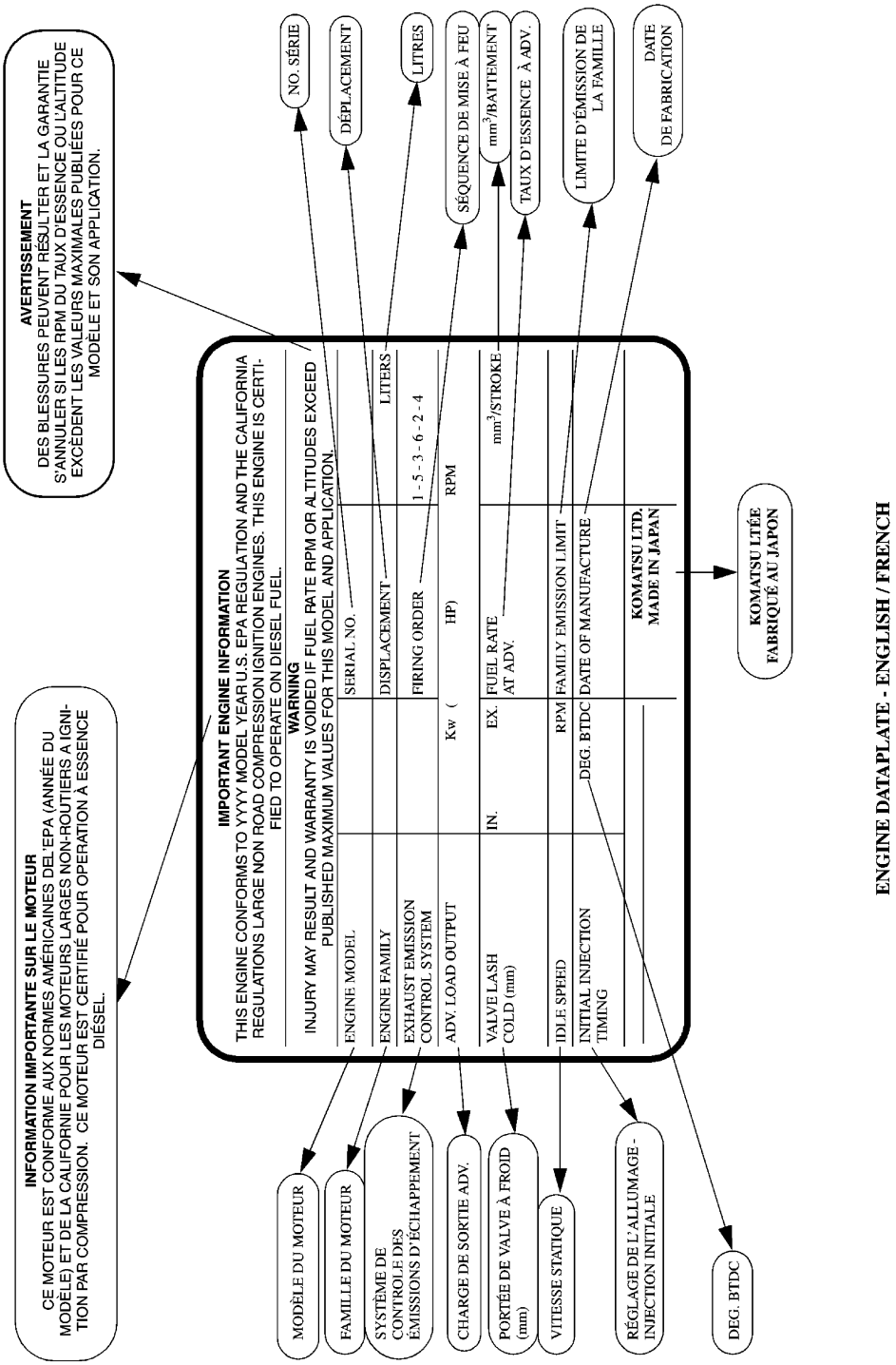
Les bris, autres que ceux résultant de défauts de matériaux ou de construction, ne sont pas couverts par cette Garantie. Komatsu n'est pas responsable pour bris ou dommages résultant de ce que Komatsu détermine comme étant de l'abus ou négligence, incluant mais ne se limitant pas à: l'opération sans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

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

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

CEKQ000600 - Komatsu America International Company 12/99

FOREWORD



ENGINE DATAPLATE - ENGLISH / FRENCH

SAFETY INFORMATION

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

Signal words

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

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

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

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

Example of safety message using signal word

⚠ WARNING

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

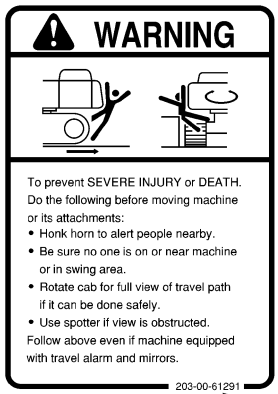
NOTICE This word is used for precautions that must be taken to avoid actions which could shorten the life of the machine.

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



Part No.

Safety labels using pictogram

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

Part No.

Komatsu cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions. If any procedures or actions not specifically recommended or allowed in this manual are used, it is your responsibility to take the necessary steps to ensure safety.
In no event should you engage in prohibited uses or actions described in this manual.

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

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

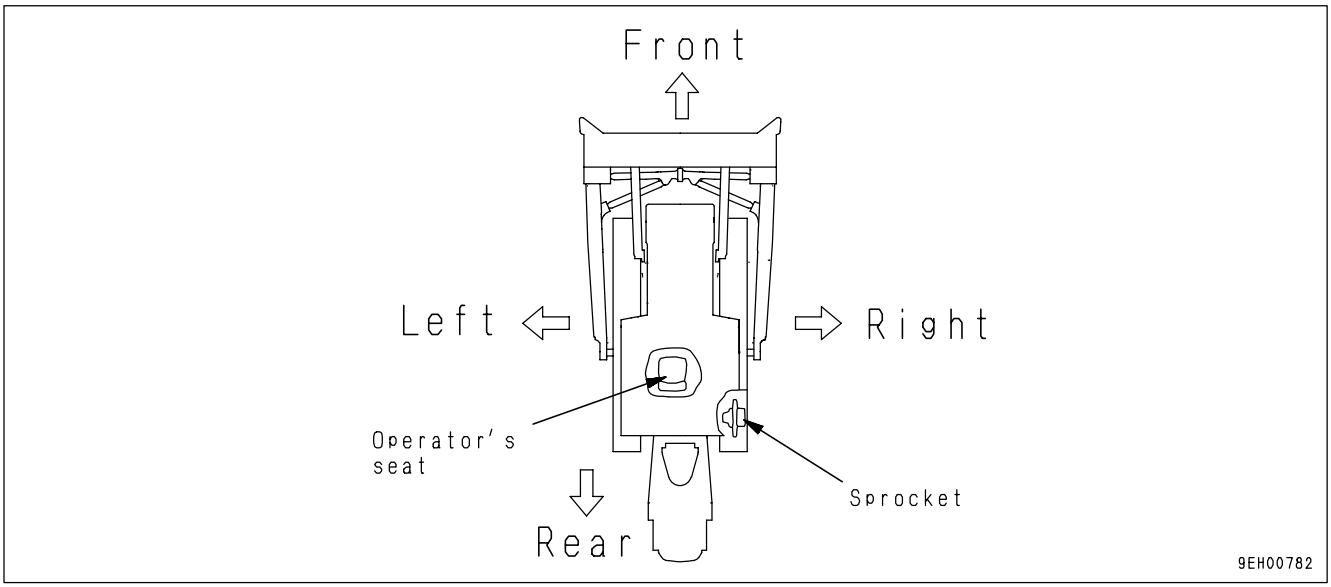
INTRODUCTION

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

- Dozing
- Cutting into hard or frozen ground or ditching
- Felling trees, removing stumps
- Pushing
- Ripping

For further details, see "WORK POSSIBLE USING BULLDOZER (PAGE 3-111)" and "RIPPER OPERATION (PAGE 3-118)".

FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE



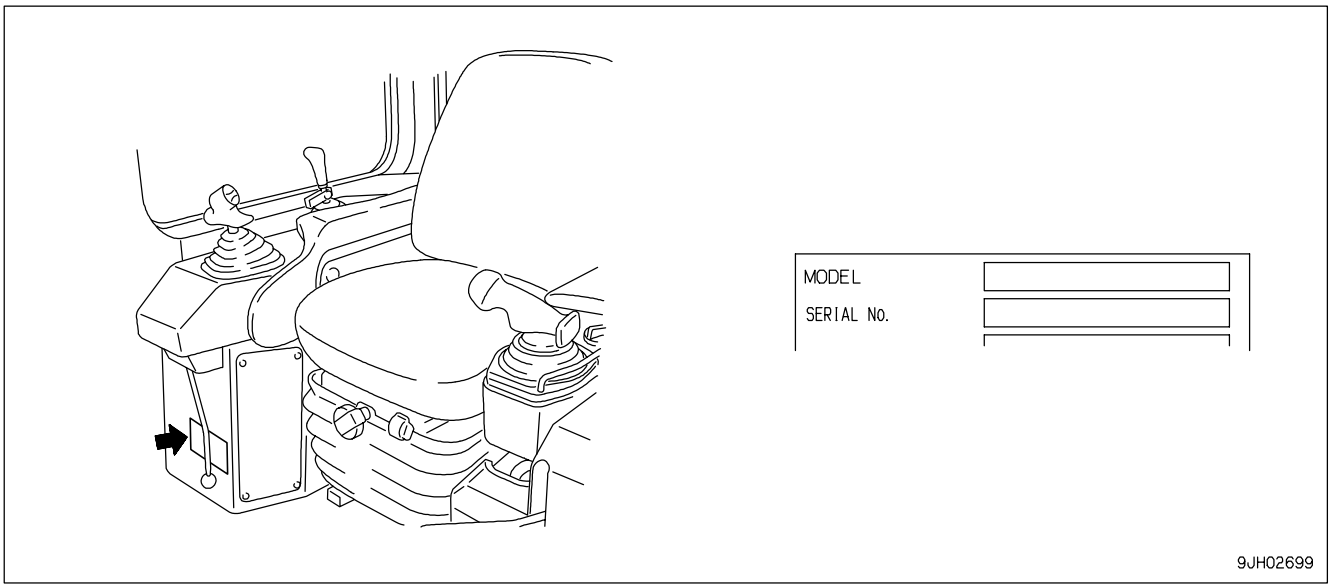
In this manual, the terms front, rear, left, and right refer to the travel direction as seen from the operator's cab when the operator's cab is facing the front and the sprocket is at the rear of the machine.

NECESSARY INFORMATION

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

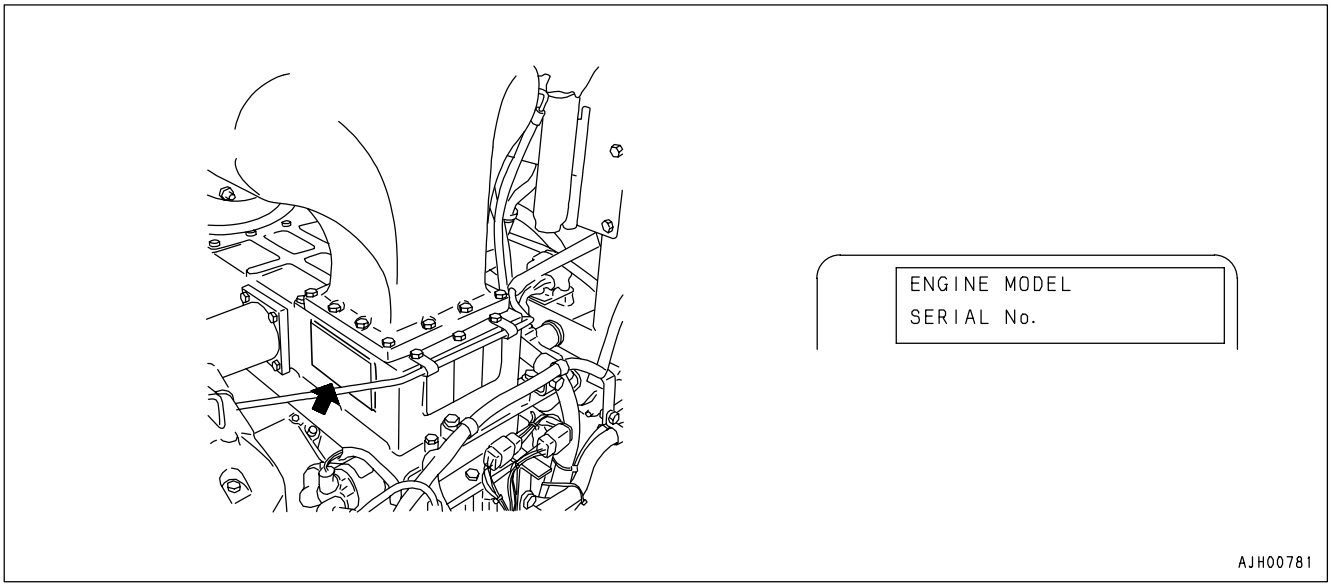
MACHINE SERIAL NO. PLATE AND POSITION

Under the front of the console box on the right side of the operator's seat.



ENGINE SERIAL NO. PLATE AND POSITION

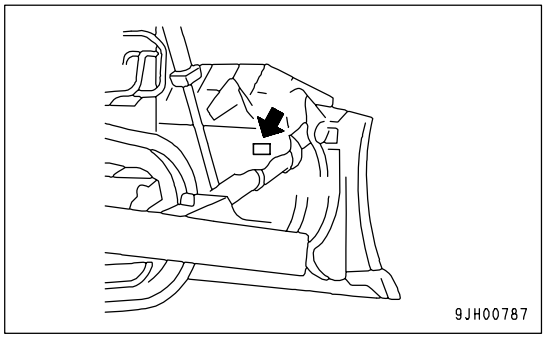
On the upper left side of the engine cylinder block, when seen from the fan.
The EPA nameplate and engine number plate are combined into one plate.



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

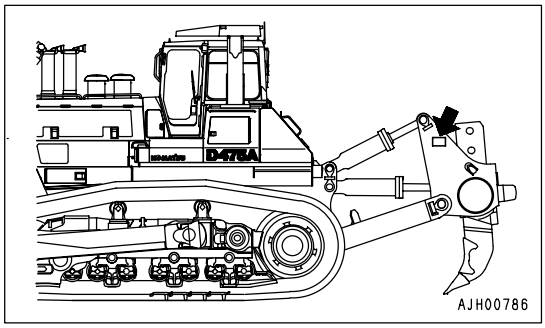
BLADE SERIAL NO. PLATE POSITION

This is located at the upper right of blade back surface.



RIPPER SERIAL NO. PLATE POSITION

This is located at the left side surface of ripper beam.



POSITION OF SERVICE METER

On top of the machine monitor

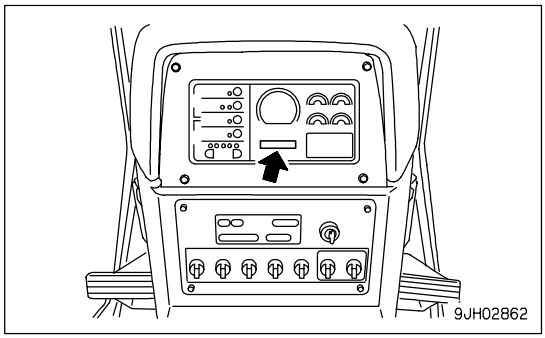


TABLE OF ENTER SERIAL NO. AND DISTRIBUTORN

Machine serial No.	
Engine serial No.	
Distributor name Address Service Personnel Phone/Fax	

CONTENTS

FOREWORD ---- 1- 1
FOREWORD ---- 1- 2
SAFETY INFORMATION ---- 1- 5
INTRODUCTION ---- 1- 7
FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE ---- 1- 7
NECESSARY INFORMATION ---- 1- 8
MACHINE SERIAL NO. PLATE AND POSITION ---- 1- 8
ENGINE SERIAL NO. PLATE AND POSITION ---- 1- 8
BLADE SERIAL NO. PLATE POSITION ---- 1- 9
RIPPER SERIAL NO. PLATE POSITION ---- 1- 9
POSITION OF SERVICE METER ---- 1- 9
TABLE OF ENTER SERIAL NO. AND DISTRIBUTORN ---- 1- 10
SAFETY ---- 2- 1
SAFETY ---- 2- 2
SAFETY LABELS ---- 2- 4
POSITIONS OF SAFETY PICTOGRAMS ---- 2- 4
SAFETY LABELS ---- 2- 5
GENERAL PRECAUTIONS ---- 2- 9
PRECAUTIONS FOR OPERATION ---- 2- 17
BEFORE STARTING ENGINE ---- 2- 17
OPERATION ---- 2- 19
TRANSPORTATION ---- 2- 23
BATTERY ---- 2- 24
TOWING ---- 2- 26
PRECAUTIONS FOR MAINTENENCE ---- 2- 27
OPERATION ---- 3- 1
GENERAL VIEW ---- 3- 2
GENERAL VIEW OF MACHINE ---- 3- 2
GENERAL VIEW OF CONTROLS AND GAUGES ---- 3- 3
EXPLANATION OF COMPONENTS ---- 3- 5
FRONT PANEL ---- 3- 5
SWITCH ---- 3- 35
CONTROL LEVERS, PEDALS ---- 3- 39
DUST INDICATOR ---- 3- 48
POWER SOURSE ---- 3- 48
FUSE BOX ---- 3- 49
FUSIBLE LINK ---- 3- 52
DOOR OPEN LOCK ---- 3- 53
SASH GLASS INTERMEDIATE LOCK ---- 3- 53
DOOR POCKET ---- 3- 54
ASHTRAY ---- 3- 54
TOOL BOX ---- 3- 54
CAR STEREO, HANDLING ---- 3- 55
AIR CONDITIONER, HANDLING ---- 3- 63
ACCUMULATOR, HANDLING ---- 3- 68
OPERATION ---- 3- 69
CHECK BEFORE STARTING ENGINE, ADJUST ---- 3- 69
STARTING ENGINE ---- 3- 87
OPERATIONS AND CHECKS AFTER STARTING ENGINE ---- 3- 91

STOPPING ENGINE ---- 3- 94
CHECK AFTER STOPPING ENGINE ---- 3- 94
MOVING MACHINE OFF ---- 3- 95
STOPPING MACHINE ---- 3- 97
SHIFTING GEAR ---- 3- 98
SHIFTING BETWEEN FOEWARD AND REVERSE ---- 3-101
STEERING MACHINE ---- 3-103
PRECAUTIONS FOR OPERATION ---- 3-106
PARKING MACHINE ---- 3-108
CHECK AFTER FINISHING WORK ---- 3-110
LOCKING ---- 3-110
WORK POSSIBLE USING BULLDOZER ---- 3-111
EFECTIVE USE OF MODE SELECTION SYSTEM ---- 3-113
RIPPER OPERATION ---- 3-118
OPERATING METHOD FOR RIPPING OPERATIONS ---- 3-121
ADJUSTING POSTURE OF WORK EQUIPMENT ---- 3-125
TIPS FOR LONGER UNDERCARRIAGE LIFE ---- 3-129
TRANSPORTATION ---- 3-131
TRANSPORTATION PROCEDURE ---- 3-131
LOADING, UNLOADING WORK ---- 3-131
PRECAUTIONS FOR LOADING ---- 3-131
METHOD OF LIFTING MACHINE ---- 3-132
PRECAUTIONS FOR TRANSPORTATION ---- 3-133
TRAVELING ON ROADS ---- 3-133
REMOVAL OF CAB ---- 3-133
INSTALLATION OF CAB ---- 3-134
COLD WEATHER OPERATION ---- 3-135
PRECAUTIONS FOR LOW TEMPERATURE ---- 3-135
AFTER COMPLETION OF WORK ---- 3-136
AFTER COLD WEATHER ---- 3-137
LONG-TERM STORAGE ---- 3-138
BEFORE STORAGE ---- 3-138
DURING STORAGE ---- 3-138
AFTER STORAGE ---- 3-138
TROUBLESHOOTING ---- 3-139
AFTER RUNNING OUT OF FUEL ---- 3-139
METHOD OF TOWING MACHINE ---- 3-139
IF BATTERY IS DISCHARGED ---- 3-140
OTHER TROUBLE ---- 3-143
WHEN MODE SELECTION SYSTEM FLASHES ---- 3-148
MAINTENANCE ---- 4- 1
GUIDES TO MAINTENANCE ---- 4- 2
OUTLINES OF SERVICE ---- 4- 5
HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC ---- 4- 5
OUTLINE OF ELECTRIC SYSTEM ---- 4- 8
WEAR PARTS LIST ---- 4- 9
WEAR PARTS LIST ---- 4- 9
USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE ---- 4- 10
PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS ---- 4- 10
STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS ---- 4- 14

TORQUE LIST ---- 4- 14
PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS ---- 4- 15
SAFETY CRITICAL PARTS ---- 4- 16
MAINTENANCE SCHEDULE CHART ---- 4- 17
MAINTENANCE SCHEDULE CHART ---- 4- 17
SERVICE PROCEDURE ---- 4- 19
INITIAL 250 HOURS SERVICE(ONLY AFTER THE FIRST 250 HOURS) ---- 4- 19
WHEN REQUIRED ---- 4- 20
CHECK BEFORE STARTING ---- 4- 44
EVERY 250 HOURS SERVICE ---- 4- 45
EVERY 500 HOURS SERVICE ---- 4- 52
EVERY 1000 HOURS SERVICE ---- 4- 57
EVERY 2000 HOURS SERVICE ---- 4- 62
EVERY 4000 HOURS SERVICE ---- 4- 67
SPECIFICATIONS ---- 5- 1
SPECIFICATIONS ---- 5- 2
ATTACHMENTS, OPTIONS ---- 6- 1
GENERAL PRECAURIONS ---- 6- 2
PRECAUTIONS RELATED TO SAFETY ---- 6- 2
SELECTION OF TRACK SHOE ---- 6- 3
SELECTION OF TRACK SHOES ---- 6- 3
PROCEDURE FOR SELECTING RIPPER POINT ---- 6- 4
PROCEDURE FOR SELECTING RIPPER POINT ---- 6- 4
CAP WITH LOCK, HANDLING ---- 6- 5
METHOD OF OPENING AND CLOSING CAP WITH LOCK ---- 6- 5
EFECTIVE METHOD OF OPERATION FOR DUAL TILT DOZER ---- 6- 6
BLADE CONDITION ---- 6- 6
DOZING WORK ---- 6- 8
LEVELING (SPREADING) OPERATION ---- 6- 11
DITCHING OPERATION ---- 6- 11
BOULDER RAISING OPERATION ---- 6- 11
SIDE-CUTTING OPERATIONS ---- 6- 12
HORIZONTAL DOZING OPERATIONS FROM SIDE SLOPE (ROUGH GROUND) ---- 6- 12
SHOE SLIP CONTROL ---- 6- 13
MODE SELECTION SWITCH PANEL (SHOE SLIP CONTROL) ---- 6- 13
EFECTIVE USE OF MODE SELECTION SYSTEM ---- 6- 15
IF MODE SELECTION SYSTEM FLASHES ---- 6- 21
INDEX ---- 7- 1

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

Safety Labels ---- 2- 4
Positions of Safety Pictograms ---- 2- 4
Safety Labels ---- 2- 5

General Precautions
Safety Rules ---- 2- 9
If Abnormalities Are Found ---- 2- 9
Clothing and Personal Protective Items ---- 2- 9
Fire Extinguisher and First Aid Kit ---- 2- 9
Fafety Features ---- 2- 9
Keep Machine Clean ---- 2- 10
Inside Operator's Compartment ---- 2- 10
Always Apply Lock When Leaving Operator's Seat ---- 2- 10
Handrails and Steps ---- 2- 11
Mounting and Dismounting ---- 2- 11
No People on Attachments ---- 2- 11
Prevention of Burns ---- 2- 12
Fire Prevention ---- 2- 12
Action If Fire Occurs ---- 2- 13
Window Washer Liquid ---- 2- 13
Pecautions for ROPS ---- 2- 13
Precautions for Attachments ---- 2- 14
Cab Window Glasses ---- 2- 14
Unauthorized Modification ---- 2- 14
Safety at Worksite ---- 2- 14
Working on Loose Ground ---- 2- 14
Do Not Go Close to High-Voltage Cables ---- 2- 15
Ensure Good Visivility ---- 2- 15
Ventilation for Enclosed Areas ---- 2- 15
Checking Signalman's Signals and Signs ---- 2- 16
Be Careful About Asbestos Dust ---- 2- 16

Precautions for Operation ---- 2- 17
Before Starting Engine ---- 2- 17
Checks Before Starting Engine ---- 2- 17
Precautions When Starting ---- 2- 17
Precautions in Cold Areas ---- 2- 18
Operation ---- 2- 19
Checks Before Operation ---- 2- 19
Precautions When Moving Machine Forward or in Reverse ---- 2- 19
Precautions When Traveling ---- 2- 20
Traveling on Slopes ---- 2- 21
Prohibited Operations ---- 2- 21
Useing Brakes ---- 2- 21
Operate Carefully on Snow ---- 2- 21
Parking Machine ---- 2- 22
Transportation ---- 2- 23
Shipping ---- 2- 23
Battery ---- 2- 24
Battery Hazard Prevention ---- 2- 24
Starting with Booster Cable ---- 2- 25
Towing ---- 2- 26
When Towing ---- 2- 26

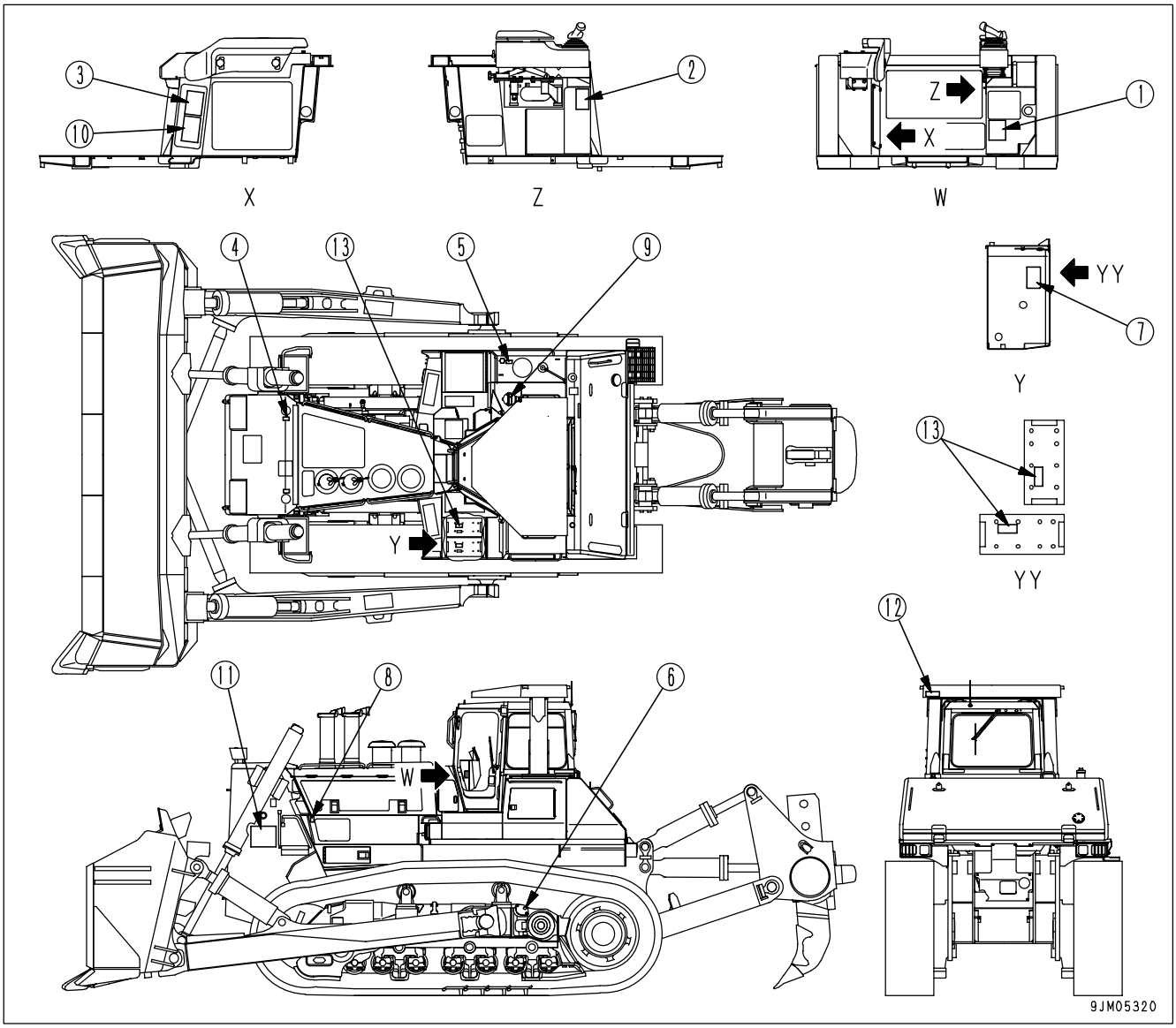
Precautions for Maintenance ---- 2- 27
Warning Tag ---- 2- 27
Keep Work Place Clean and Tidy ---- 2- 27
Appoint Leader When Working with Others ---- 2- 27
Stop Engine Before Carrrying Out Inspection and Maintenance ---- 2- 28
Two Workers for Maintenance when Engine is Running ---- 2- 29
Proper Tools ---- 2- 29
Handling Accumulator ---- 2- 30
Personnel ---- 2- 30
Attachments ---- 2- 30
Work Under the Machine ---- 2- 31
Noise ---- 2- 31
Precautions When Using Hammer ---- 2- 31
Repair Welding ---- 2- 31
Removing Battery Terminal ---- 2- 31
Precautions When Using High-Pressure Grease to Adjust Track Tension ---- 2- 32
Do Not Disassemble Recoil Spring ---- 2- 32
Precaution with High-Pressure Oil ---- 2- 32
Handing High-Pressure Hoses ---- 2- 33
Waste Material ---- 2- 33
Maintenance for Air Conditioner ---- 2- 33
Compressed Air ---- 2- 33
Periodic Replacement of Safety Critical Parts ---- 2- 34

SAFETY LABELS

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

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

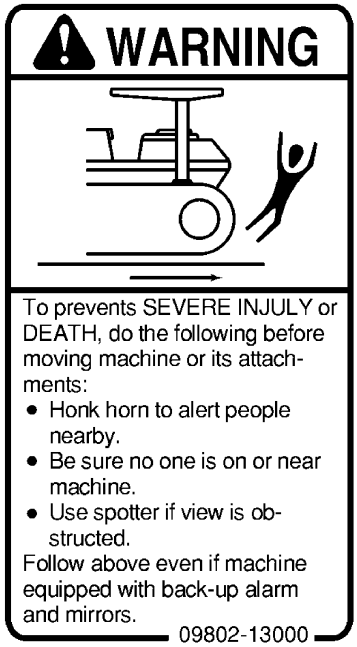
POSITIONS OF SAFETY PICTOGRAMS



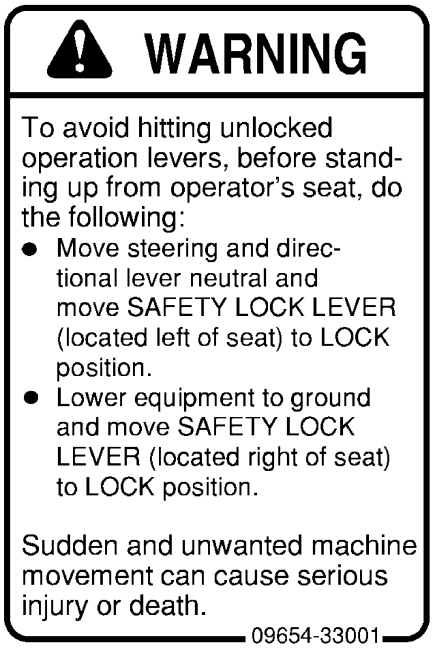
SAFETY LABELS

(1) Precautions for operation, inspection and maintenance (09651-03001)

(2) Precautions when traveling in reverse (09802-13000)



(3) Precautions for leaving operator's seat (09654-33001)



(4) Precautions for high-temperature cooling water (09668-03001)

(5) Precautions for high-temperature hydraulic oil (09653-03001)

WARNING

Hot oil hazard.

To prevent hot oil from spurting out:

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

09653-03001

(6) Precautions for check and adjust track tension (195-98-22931)

(7) Precautions for handling electric wires (09808-03000)

WARNING

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

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

09808-03000

(8) Caution for engine running (09667-03001)

CAUTION

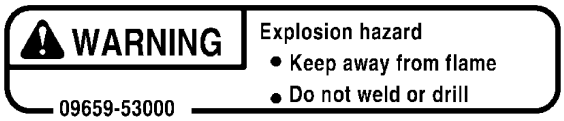
While engine is running:

1. Do not open cover.

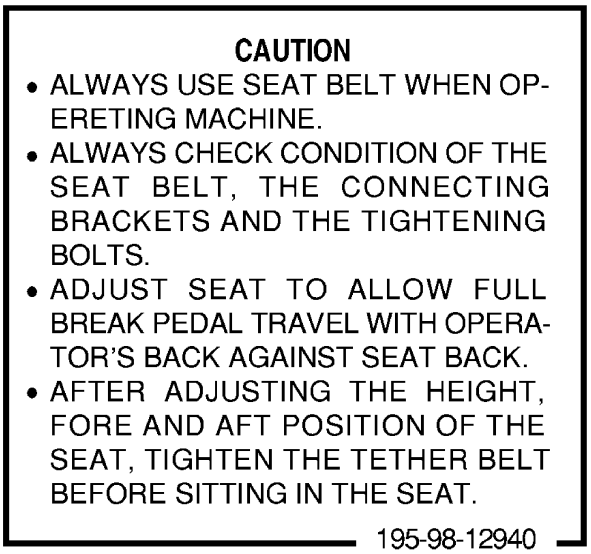
2. Keep away from fan and fan-belt.

09667-03001

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



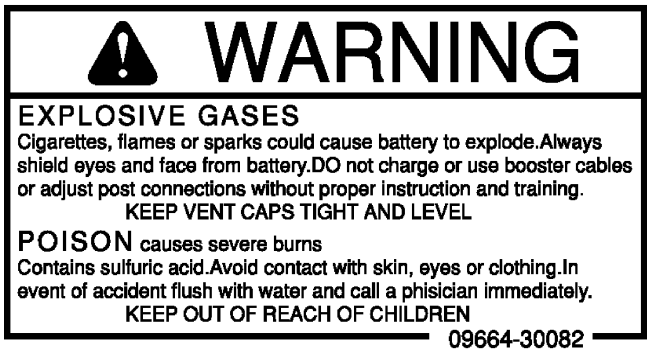
(10) Precautions for use of seat belt (195-98-12940)



(11) Caution for approach when machine moving (09812-03000)

(12) Warning for ROPS (09620-30201)

(13) Warning for battery (09664-30082)



GENERAL PRECAUTIONS

SAFETY RULES

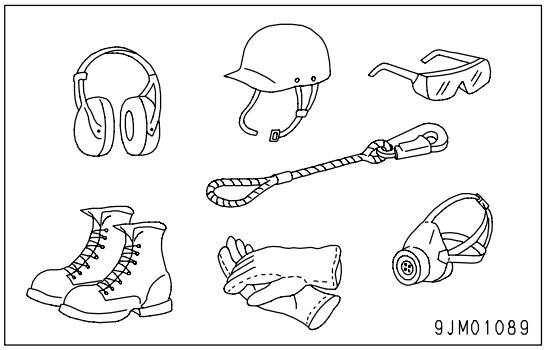
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine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

IF 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

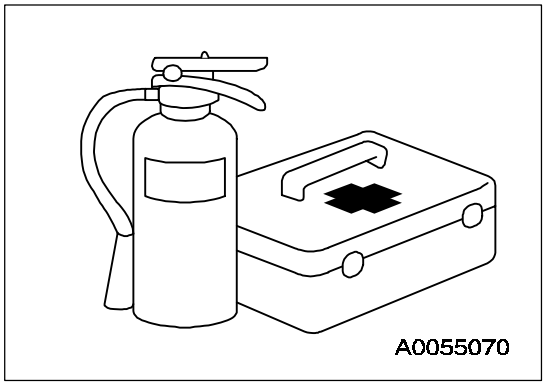
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get 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.

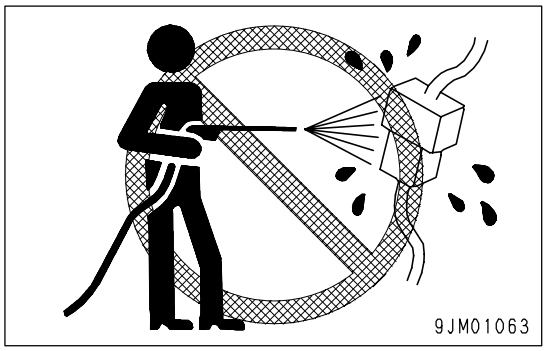


SAFETY FEATURES

- 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.

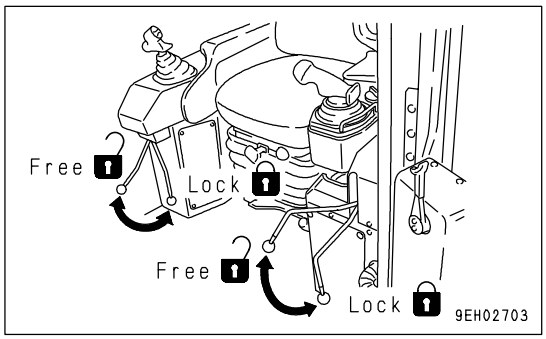


INSIDE OPERATOR'S COMPARTMENT

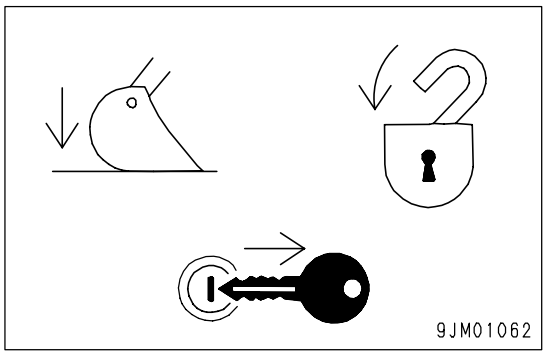
- When entering the operator's compartment, always remove all mud and oil from the soles of your shoes. If you operate the pedal with mud or oil affixed to your shoes, your foot may slip and this may cause a serious accident.
- Do not leave parts or tools lying around the operator's compartment.
- Do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

ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

- Before standing up from the operator's seat, lower the work equipment completely to the ground, set safety lock lever and parking lever securely to the LOCK position, then stop the engine.
  If you accidentally touch the levers when they are not locked, there is a hazard that the machine may suddenly move and cause serious injury or property damage.



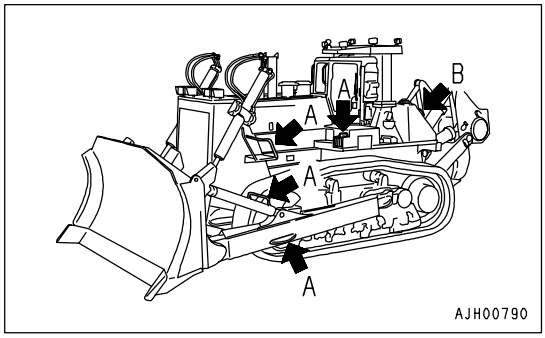
- When leaving the machine, always lower the work equipment completely to the ground, set safety lock lever and Parking lever securely to the LOCK position, then stop the engine. Use the key to lock all the equipment. Always remove the key, take it with you, and keep it in the specified place.

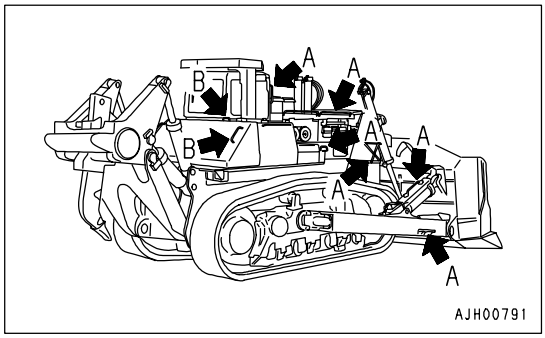


HANDRAILS AND STEPS

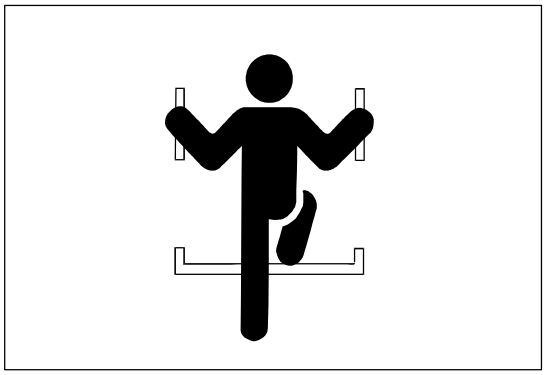
To prevent personal injury caused by slipping or falling off the machine, always do as follows.

- Use the parts marked by arrow A in the diagrams when getting on or off the machine.
  Never use the parts marked by arrow B when getting on or off the machine. Use them only when moving along the top of the track or when checking or carrying out maintenance inside the side cover, or when filling the tank with oil.
- Never jump on or off the machine. In particular, never get on or off a moving machine. This may cause serious injury.





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



MOUNTING AND DISMOUNTING

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

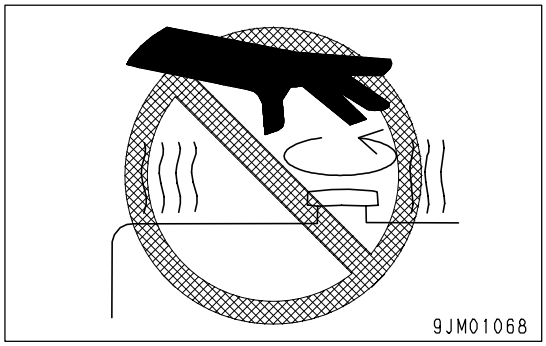
NO PEOPLE ON ATTACHMENTS

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

PREVENTION OF BURNS

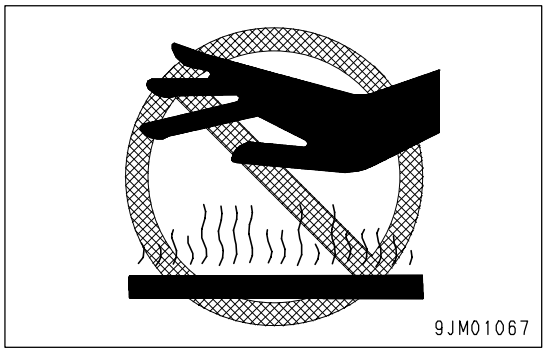
Hot coolant

- 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

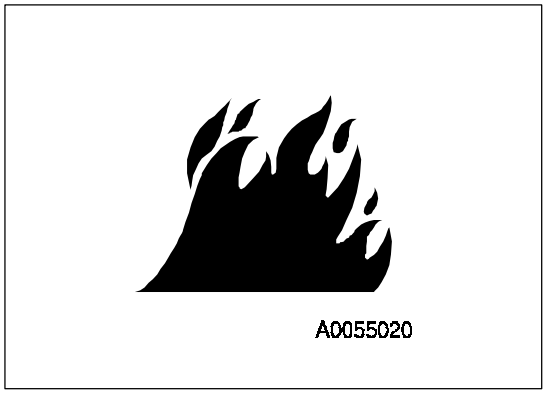
- To prevent burns from hot oil spurting out when checking or draining the oil, wait for the oil to cool to at temperature where it is possible to touch the cap or plug by hand before starting the operation. Even when the oil has cooled down, loosen the cap or plug slowly to relieve the internal pressure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

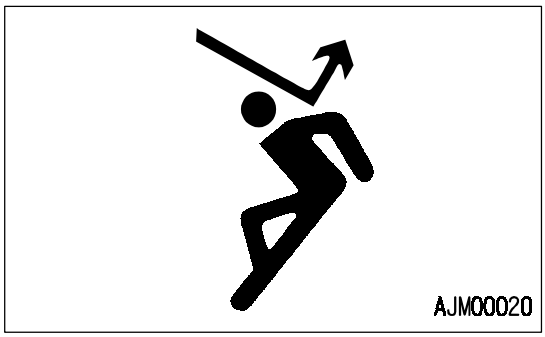
If a fire occurs, escape from the machine as follows.
- Turn the start switch OFF to stop the engine.
- Use the handrails and steps to get off the machine.

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 installed to protect the operator when machine rolls over. When machine rolls over, ROPS supports its weight and absorbs its impact energy.
- If ROPS is modified, its strength may lower. When modifying it, consult your Komatsu distributor.
- If ROPS is deformed by falling objects or by rolling over, its strength lowers and its design functions cannot be maintained. In this case, be sure to ask your Komatsu distributor about repair method.

Even when the ROPS is installed, if you do not fasten your seat belt securely, it cannot protect you properly. Always fasten your seat belt when operating the machine.

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.

CAB WINDOW GLASSES

If the cab glass on the work equipment side is broken, there is a hazard that the work equipment may contact the operator's body directly. Stop operation immediately and replace the glass.

UNAUTHORIZED MODIFICATION

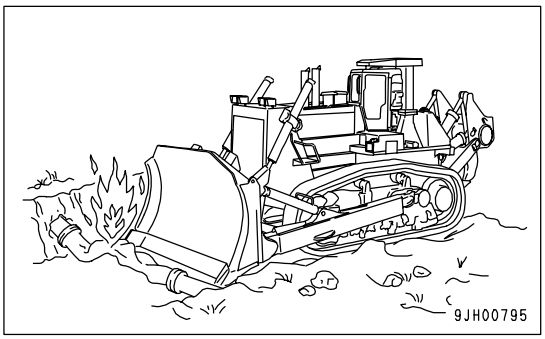
Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor.

- 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.



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
Low Voltage	100 V - 200 V	Over 2 m (7ft)
	6,600 V	Over 2 m (7ft)
Extra-high Voltage	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)

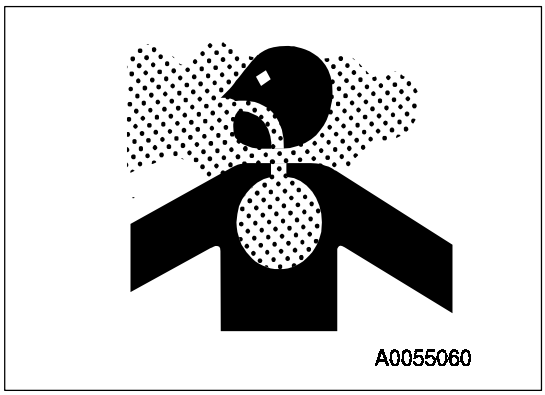
ENSURE GOOD VISIBILITY

- 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.

VENTILATION FOR ENCLOSED AREAS

Exhaust fumes from the engine can kill.

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



CHECKING SIGNALMAN'S SIGNALS AND SIGNS

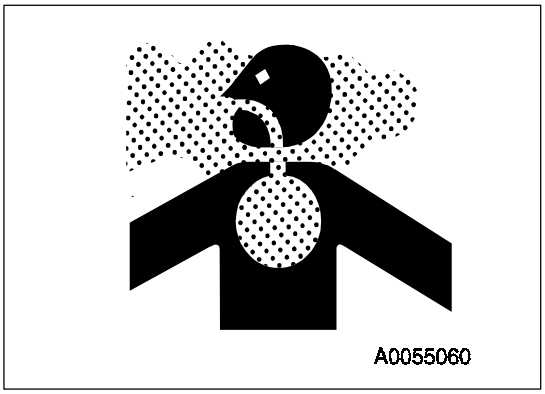
- Set up signs to inform of road shoulders and soft ground. If the visibility is not good, position a signalman if necessary. Operators should pay careful attention to the signs and follow the instructions from the signalman.
- Only one signalman should give signals.
- Make sure that all workers understand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

BE CAREFUL ABOUT ASBESTOS DUST

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.

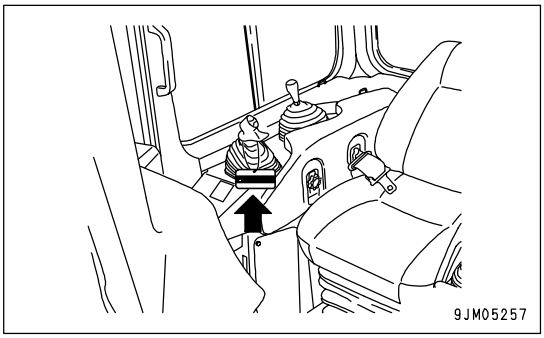
This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.



PRECAUTIONS FOR OPERATION

BEFORE STARTING ENGINE

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



CHECKS BEFORE STARTING ENGINE

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

- Completely remove all flammable materials accumulated around the engine and battery, and remove any dirt from the windows, mirrors, handrails and steps.
- Remove all dirt from the surface of the lens of the front lamps and working lamps, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the lights and working lamps, and check that the control levers are all at the neutral position.
- When starting the engine, check that the parking lever and safety lock lever are at the LOCK position.
- Adjust the mirrors so that you can get a good rear-view from the operator's seat.
  For the details of adjustment, see "ADJUST MIRROR (PAGE 3-82)".
- 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.

PRECAUTIONS IN COLD AREAS

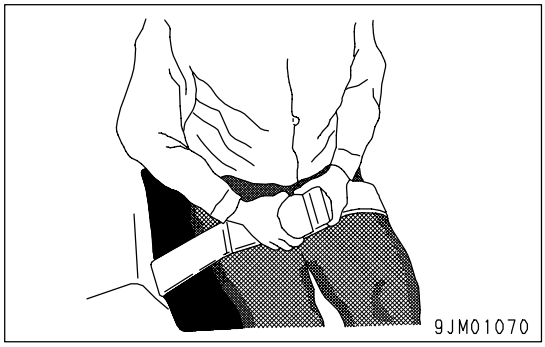
- Carry out the warming-up operation thoroughly. If the machine is not thoroughly warmed up before the control levers are operated, the reaction of the machine will be slow, and this may lead to unexpected accidents.
- If the battery electrolyte is frozen, do not charge the battery or start the engine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

OPERATION

CHECKS BEFORE OPERATION

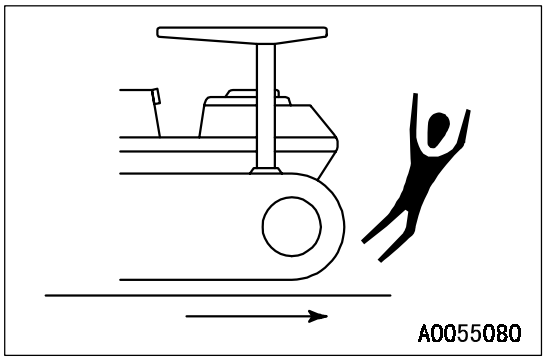
When carrying out the checks, move the machine to a wide area where there are no obstructions, and operate slowly. Do not allow anyone near the machine.

- Always fasten your seat belt.
- Check 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.



PRECAUTIONS FOR MOVING MACHINE FORWARD OR IN REVERSE

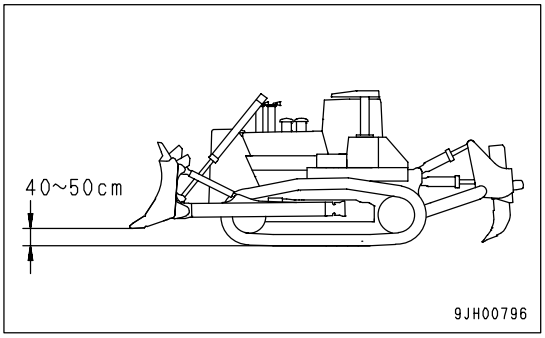
- Before travelling, check again that there is no one in the surrounding area, and that there are no obstacles.
- Before travelling, sound the horn to warn people in the area.
- Always operate the machine only when seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Check 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 where the visibility is obstructed, use a flagman. Be extremely careful not to hit anything and drive the machine slowly.



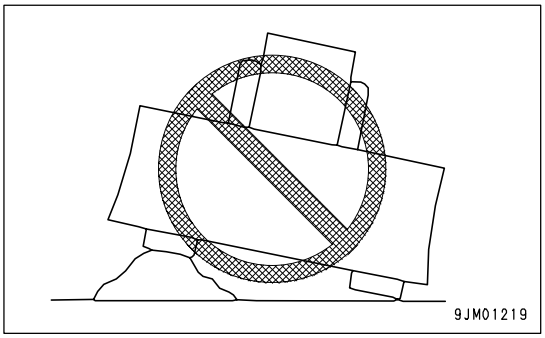
Always be sure to carry out the above precautions even when the machine is equipped with mirrors.

PRECAUTIONS WHEN TRAVELING

- Never turn the starting switch to the OFF position when traveling. It is dangerous if the engine stops when the machine is traveling. When the engine is off, it is impossible to operate the steering. Apply the brakes and stop the machine immediately, if the engine stops.
- When traveling on flat ground, keep the work equipment 40 to 50 cm (16 to 20 in) high above the ground.
- When traveling on rough ground, travel at low speed and do not operate the steering suddenly. There is danger that the machine may turn over. The work equipment may hit the ground surface and cause the machine to lose its balance, or may damage the machine or structures in the area.



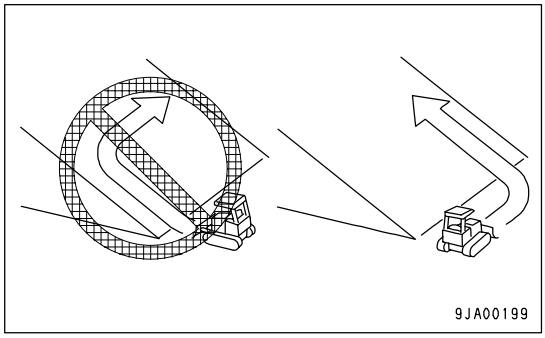
- Avoid traveling over obstacles when possible. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. Never travel over obstacles which make the machine tilt strongly to one side.
- When traveling or carrying out operations, always keep a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



- Do not approach the edge of a cliff carelessly. When dropping soil over a cliff for banking or reclamation, leave soil of one scoop at the edge of the cliff and push it with the next scoop.
- When the machine passes over the top of a hill or when a load is dumped over a cliff, the load is suddenly reduced, and there is danger that the travel speed rises suddenly. To prevent this, lower the travel speed.
- If the machine moves with only either side of the blade loaded, its tail may swing. Take care.

TRAVELING ON SLOPES

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



- When traveling on slops, keep the blade approxmately 20 to 30cm (8 to 12in) above the ground. In case of emergency, quickly lower the blade to the ground to help the machine to stop. Apply the brake and use the engine as a brake, if necessary.
- 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.
- When driving down a slope, never shift gear or place the transmission in neutral. The engine brake cannot be used and this creates a dangerous condition. Always travel downhill in the same speed range as when traveling uphill.
- When turning on a downhill ground, lower the travel speed.

PROHIBITED OPERATIONS

- To make it easier to escape if there is any problem, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when carrying out operations.
- When operating the machine, take care that it will not exceed its performance values such as stability, maximum using load, etc. to prevent rolling of the machine caused by an overload and disasters caused by breakage of the work equipment.

USING BRAKES

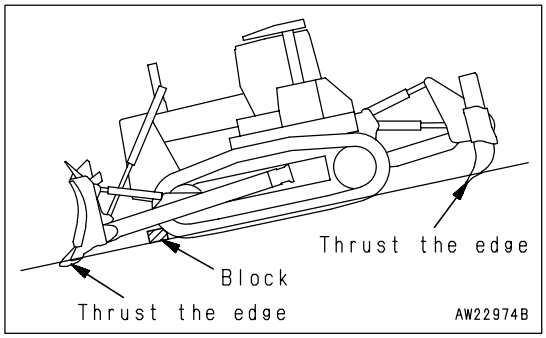
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary. If this is neglected, the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

OPERATE CAREFULLY ON SNOW

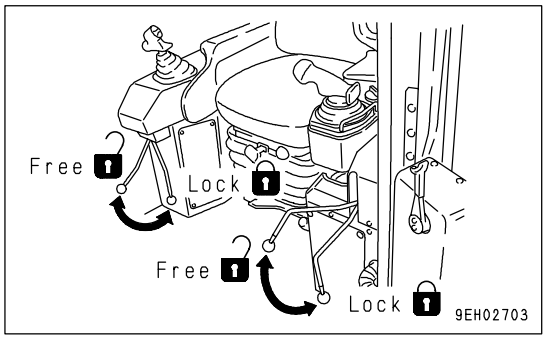
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes 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 slopes, never apply the brakes suddenly. Reduce the speed and use the engine as a brake while appling 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 level ground where there is no danger of falling rocks or landslides, or of flooding if the land is low, and lower the work equipment to the ground.
- If it is necessary to park the machine on a slope, set the blocks under the tracks to prevent the machine from moving, then dig the work equipment into the ground.
- After stopping the engine, operate the right work equipment control lever several times to the RAISE and LOWER positions to release the remaining pressure in the hydraulic circuit.



- When leaving the machine, set the safety lock lever and parking lever to the LOCK position, stop the engine, and use the key to lock all the equipment. Always remove the key and take it with you.
  Work equipment posture: See "PARKING MACHINE (PAGE 3-108)".
  Locks: See "LOCKING (PAGE 3-110)"
- Always close the door of the operator's compartment.



TRANSPORTATION

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

SHIPPING

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

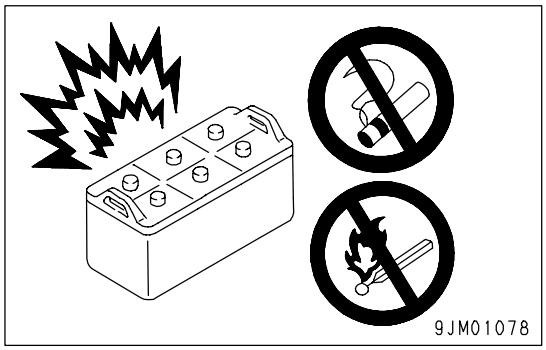
- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- For details of the shipping procedure, see "TRANSPORTATION (PAGE 3-131)" in the OPERATION section.

BATTERY

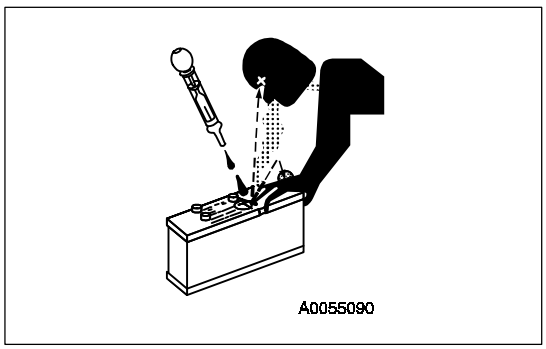
BATTERY HAZARD PREVENTION

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.

- When the battery electrolyte is below LOWER LEVEL, don't either use or charge the battery. Otherwise, that may cause explosion. Always carry out periodic checks of the battery electrolyte, and add distilled water up to UPPER LEVEL.
  For the method of checking the battery electrolyte, see CHECK LEVEL OF BATTERY ELECTROLYTE (PAGE 4-48).
- 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.

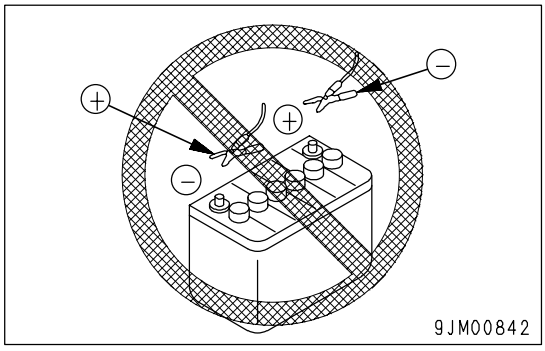
As there is a hazard that sparks will be generated, always do as follows.

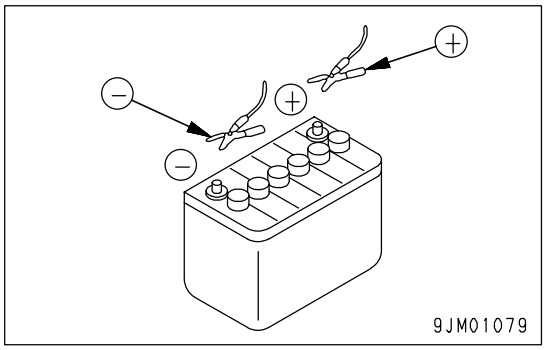
- Do not let tools or other metal objects make any contact between the battery terminals. Do not leave tools or other metal objects lying around near the battery.
- Always disconnect the negative (-) terminal (ground side) first when removing the battery; when installing the battery, connect the positive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

STARTING WITH BOOSTER CABLE

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 the procedure of starting the engine with booster cables, see STARTING ENGINE WITH BOOSTER CABLE (PAGE 3-140).



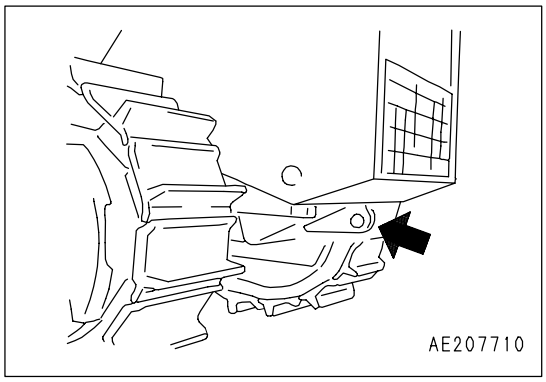


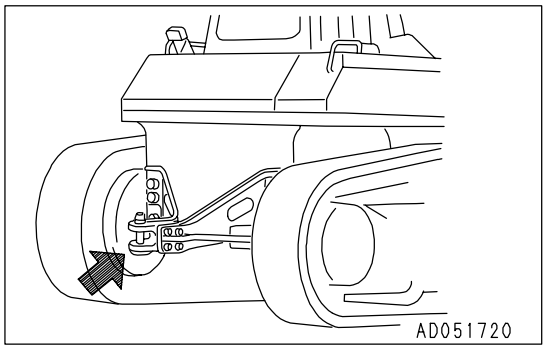
TOWING

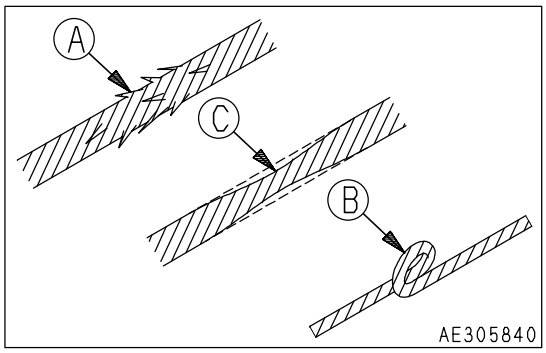
WHEN TOWING

Injury or death could result if a disabled machine is towed incorrectly. Always observe the following rules.

- Never use a towing method different from the one described in this manual.
  For the method of towing, see METHOD OF TOWING MACHINE (PAGE 3-139).
- When handling a wire rope, always wear leather gloves.
- When working with others to prepare for towing, signals should be agreed upon beforehand.
- If your machine is towed by another machine, stop the engine and release the brake. Please contact your Komatsu distributor to have the brake released.
- If this machine cannot travel under its own power, release the brakes, then tow the machine with another machine. Please contact your Komatsu distributor to have the brakes released.
- Towing on slopes is dangerous. When doing so, choose a gentle slope. If no gentle slope is available, make such a slope by earth-removal work.
- When connecting up a towing machine, do not let anyone enter the area between the towing machine and the equipment being towed.
- Do not straddle the towing cable or wire rope.
- When your machine is towed by another machine, ALWAYS use a wire rope with a sufficient towing capacity.
- Set the towing machine and the towing connection of the equipment being towed in a straight line when connecting it.
- Take up the slack in the wire rope and tow the machine.
- When lifting the machine up, use the towing hook.
- If the machine is stuck in sandy soil, dig out the soil around the towing hook, then use the towing hook to pull the machine out.
  Permissible load for towing hook: 71500 kg (701180 N)
- Do not use a broken (A), kinked (B) or frayed (C) wire rope.



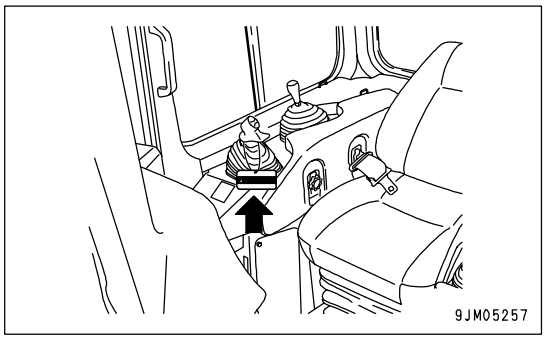




PRECAUTIONS FOR MAINTENENCE

WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to the work equipment control lever in the operator's cab to alert others that you are performing service or maintenance on the machine. Attach additional warning tags around the machine if necessary.
  Warning tag Part No. 09963-00101
  Keep the tag in the operation manual pocket.
- If others start the engine, or touch or operate the work equipment control lever while you are performing service or maintenance, you could suffer serious injury or property damage.



KEEP WORK PLACE CLEAN AND TIDY

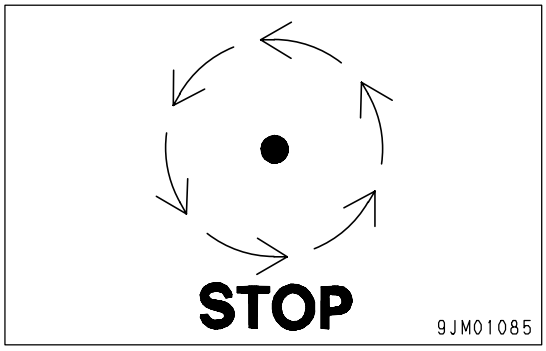
- Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely. If the work place is not kept claen and tidy, there is the danger that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

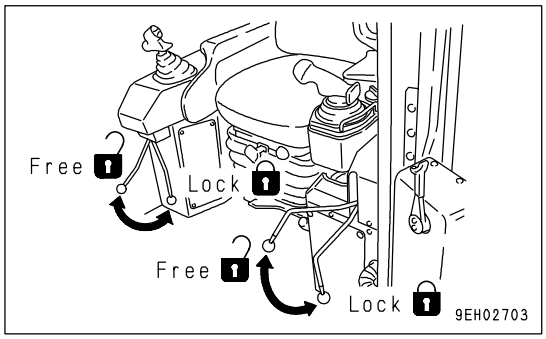
APPOINT LEADER WHEN WORKING WITH OTHERS

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

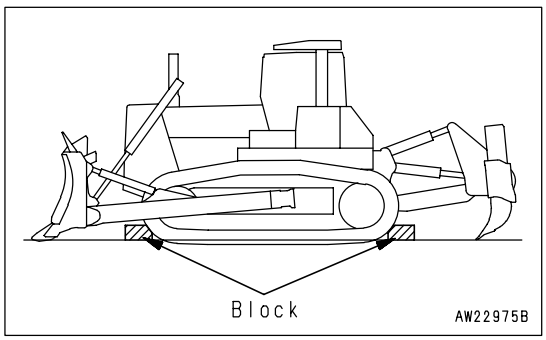
STOP ENGINE BEFORE CARRYING OUT INSPENTION AND MAINTENANCE

- Stop the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground and stop the engine.
- After stopping the engine, operate the work equipment control lever to the RAISE and LOWER positions 2 or 3 times to release the pressure remaining in the hydraulic circuit, then set the safety lock lever and Parking lever to LOCK position.





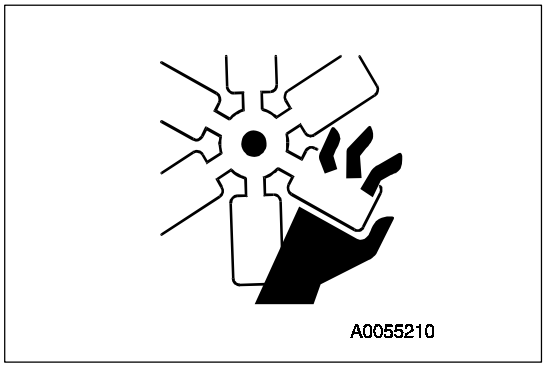
- Put blocks under the track to prevent the machine from moving.

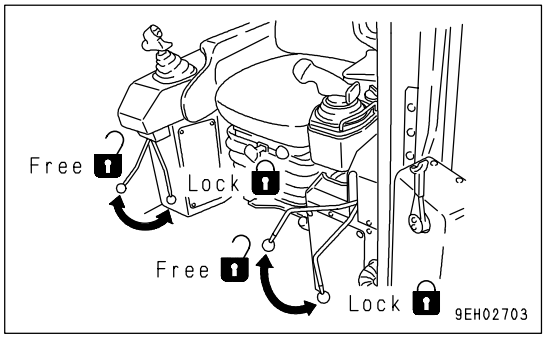


TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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

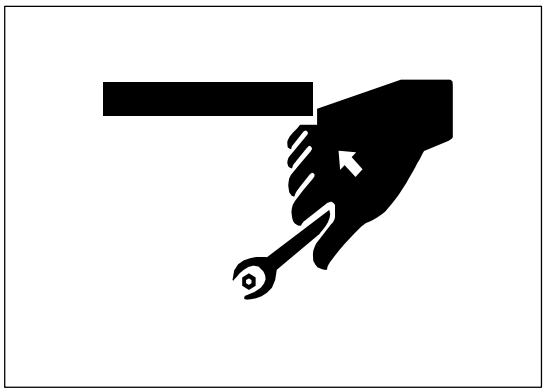
- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- Place the parking lever and safety lock lever at the LOCK position to prevent the work equipment from moving.
- When carrying out operations near 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.
- 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.
- Never drop or insert tools or other objects into the fan or fan belt. Parts may break or be sent flying.





PROPER TOOLS

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



HANDLING ACCUMULATOR

- On machines equipped with an accumulator, for a short time after the engine is stopped, if the blade control lever is moved to the LOWER position, the work equipment will move down under its own weight.
  After stopping the engine, always place the safety lock lever and Parking lever in the LOCK position.
- When releasing the pressure inside the work equipment circuit on machines equipped with an accumulator, follow the procedure given in the following section.
  Method of releasing pressure : See "ACCUMULATOR, HANDLING (PAGE 3-68)".

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.

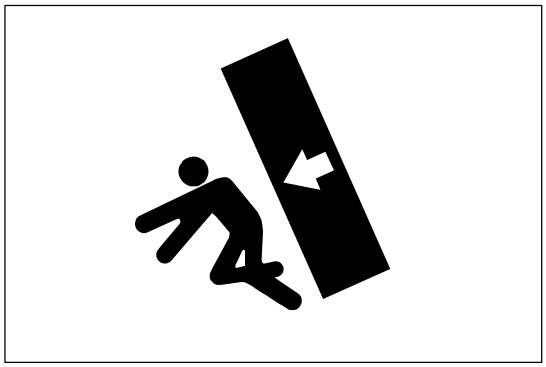
- Do not disassemble the accumulator.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it, weld it, or use a cutting torch.
- Do not hit or roll the accumulator, or subject it to any impact.
- When disposing of the accumulator, the gas must be released. Please contact your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

PERSONNAL

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

ATTACHMENTS

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



WORK UNDER THE MACHINE

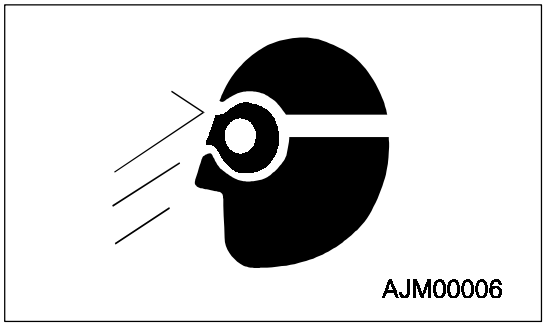
- If it is necessary to go under the work equipment or the machine to carry out service and maintenance, support the work equipment and machine securely with blocks and stands strong enough to support the weight of the work equipment and machine.
- It is extremely dangerous to work under the machine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

NOISE

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

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

REPAIR WELDING

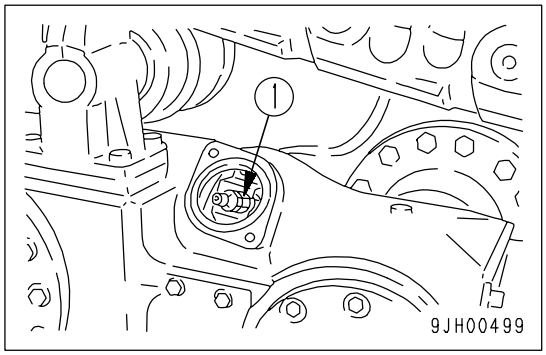
Welding operations must always be carried out by a qualified welder and in a place equipped with proper equipment. There is a hazard of gas, fire, or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

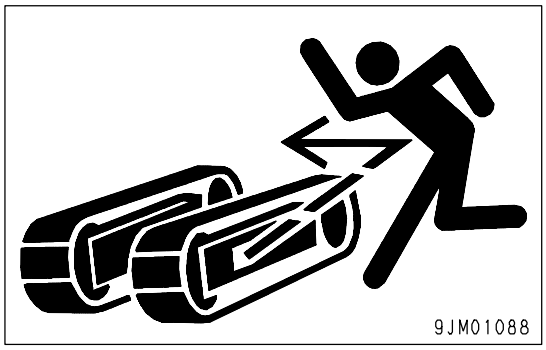
REMOVING BATTERY TERMINAL

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 WHEN USING HIGH-PRESSURE GREASE TO ADJUST TRACK TENSION

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





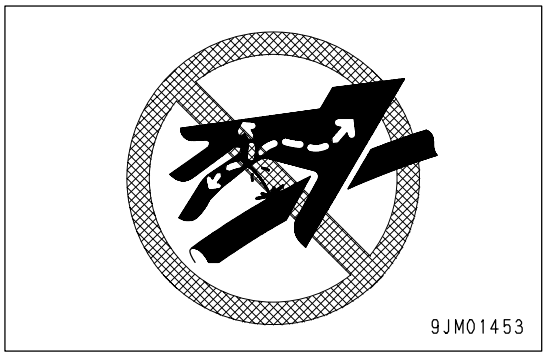
DO NOT DISASSEMBLE RECOIL SPRING

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

PRECAUTION 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.

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



HANDLING HIGH-PRESSURE HOSES

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

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

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

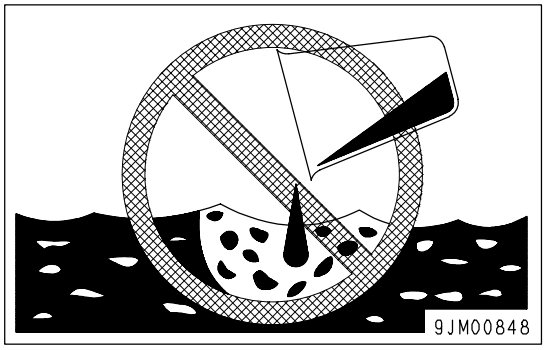
PRECAUTION FOR HIGH VOLTAGE

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

WASTE MATERIAL

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 FOR 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

- For using the machine safely for an extended period of time, replace safety-critical parts like hoses and seat belts periodically.
  Replacement of safety-critical parts: See "PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (PAGE 4-15)".
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety-critical parts if any defect is found, even when they have not reached the time specified interval.

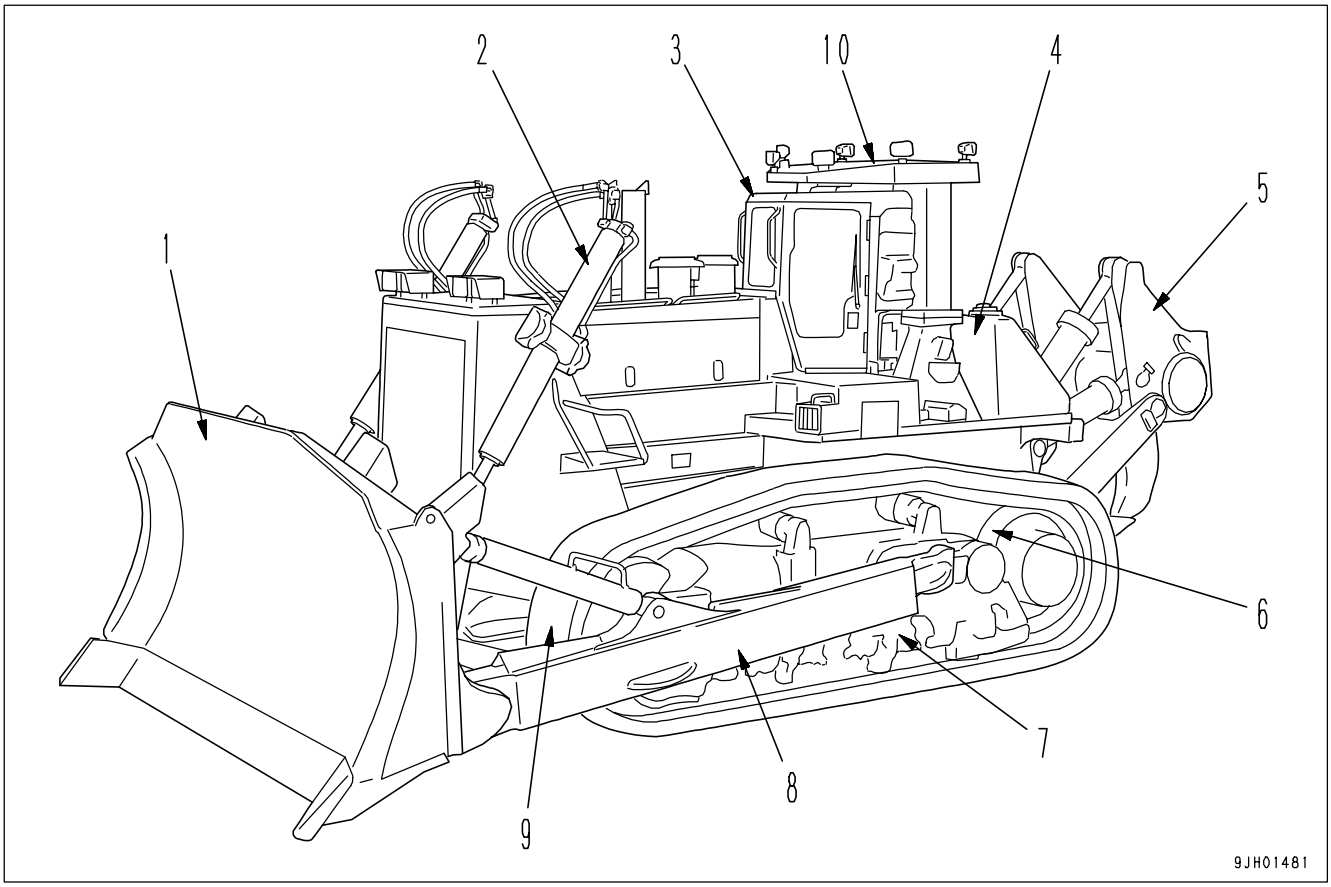
OPERATION

⚠ WARNING

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

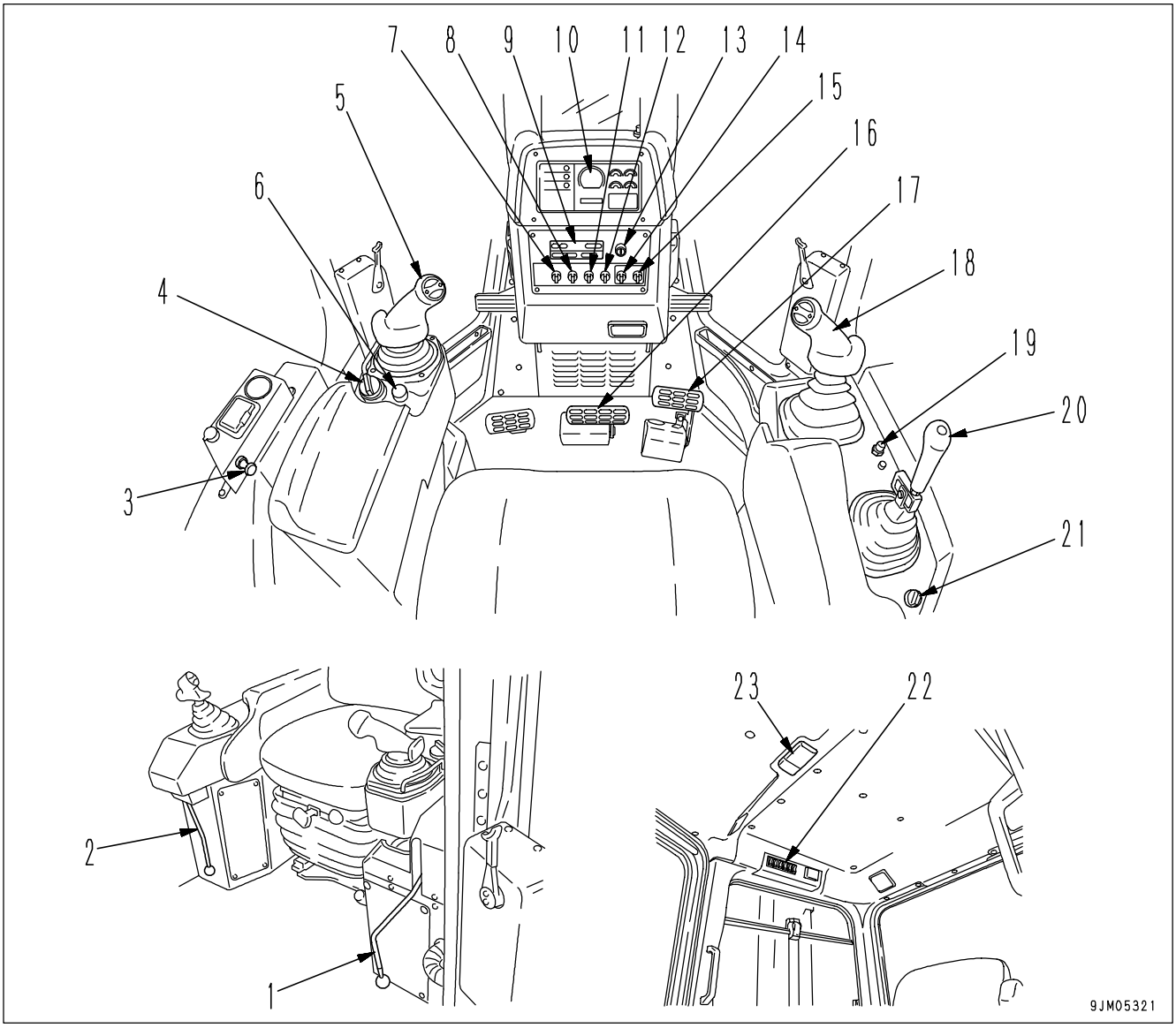
GENERAL VIEW

GENERAL VIEW OF MACHINE



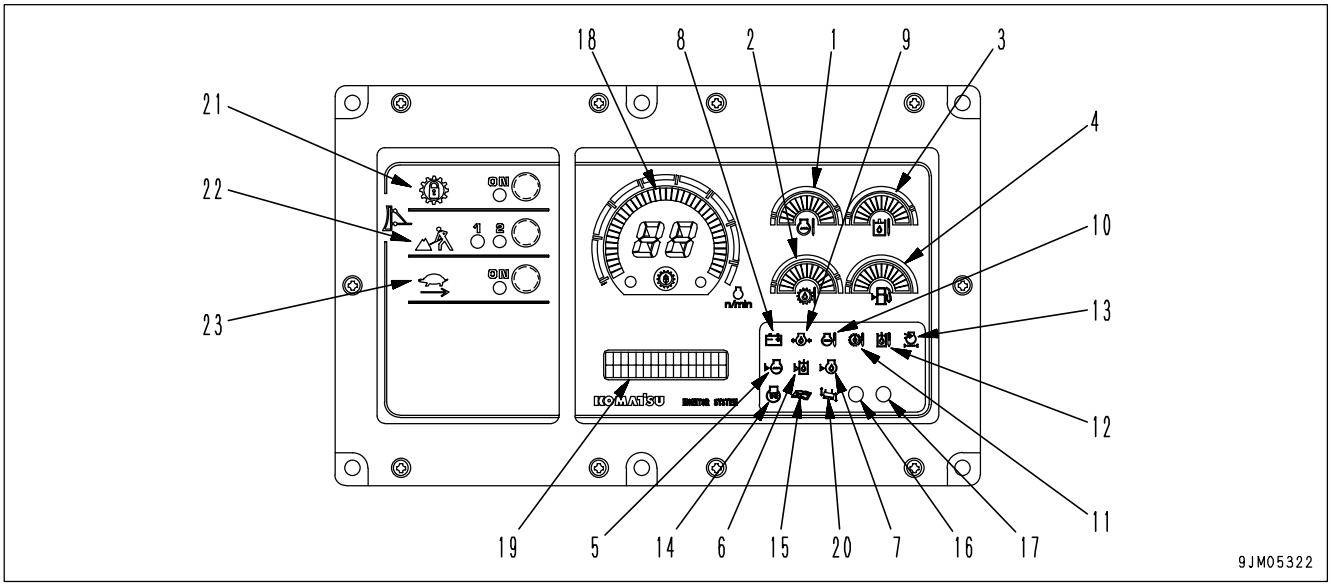
(1)Blade
(2)Blade lift cylinder
(3)Cab
(4)ROPS
(5)Ripper
(6)Sprocket
(7)Track frame
(8)Frame
(9)Track shoe

GENERAL VIEW OF CONTROLS AND GAUGES



(1) Parking lever
(2) Safety lock lever
(3) Cigarette lighter
(4) Fuel control dial
(5) Joystick (Steering, directional and gear shift lever)
(6) Neutral switch
(7) Head lamp, working lamp switch
(8) Rear lamp switch
(9) Air conditioner panel or heater panel
(10) Torque converter lock up pilot lamp
(11) Auto shift down switch
(12) Preheating switch
(13) Starting switch
(14) Information switch
(15) Buzzer cancel switch
(16) Brake pedal
(17) Deceleration pedal
(18) Blade control lever
(19) Horn switch
(20) Ripper control lever
(21) Pin puller control switch (if equipped)
(22) Wiper switch
(23) Room lamp switch

FRONT PANEL

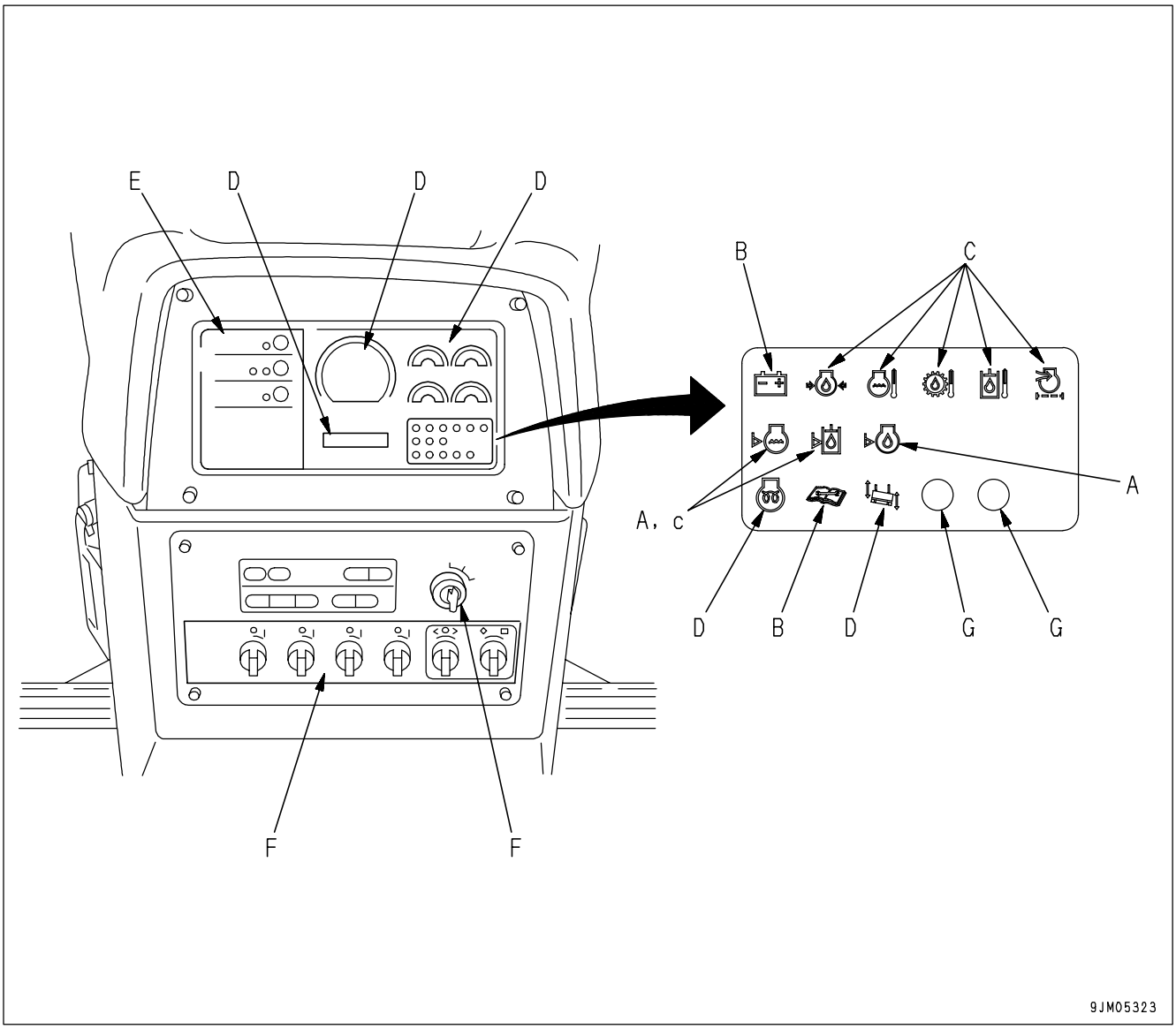


(1) Engine cooling water temperature gauge
(2) Power train oil temperature gauge
(3) Hydraulic oil temperature gauge
(4) Fuel gauge
(5) Radiator coolant level check lamp
(6) Hydraulic oil level check lamp
(7) Engine oil level check lamp
(8) Charge level monitor
(9) Engine oil pressure caution lamp
(10) Engine cooling water temperature caution lamp
(11) Power train oil temperature caution lamp
(12) Hydraulic oil temperature caution lamp
(13) Air cleaner clogging caution lamp
(14) Engine preheating pilot lamp
(15) Maintenance caution lamp
(16) Warning lamp
(17) Filter, oil change interval lamp
(18) Display panel A(Speed range, Engine speed)
(19) Display panel B (Multi-information)
(20) Dual/single tilt selector display lamp
(21) Lock up mode switch
(22) Economy mode selector switch
(23) Reverse slow mode selector switch

EXPLANATION OF COMPONENTS

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

FRONT PANEL



A: Check monitor group
B: Caution monitor group
C: Emergency caution group
D: Meter group
E: Mode selection switch group
F: Switch
G: Lamp

A Basic check items (see CHECK MONITOR GROUP (PAGE 3-7))
Before the engine is started, the basic items among the check before starting items that must be checked are displayed.
If there is any abnormality, the caution lamp for the location of the abnormality flashes.

NOTICE
When carrying out the check before starting, do not rely only on these monitors. Always carry out the inspection items according to the Maintenance section or Section OPERATION (PAGE 3-69).

B CAUTION MONITOR GROUP (See "CAUTION MONITOR GROUP (PAGE 3-9)")

⚠ CAUTION

If these caution lamp flash, check and repair the appropriate location as soon as possible.

These are items, which need to be observed while the engine is running. If any abnormality occurs, items, which need to be repaired as soon as possible, are displayed.
If there is any abnormality, the appropriate monitor lamp will flash to indicate the location of the abnormality.

C EMERGENCY CAUTION ITEMS (See "EMERGENCY CAUTION ITEMS (PAGE 3-11)")

⚠ CAUTION

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

This displays those of the abnormality items for which action must be taken immediately when the engine is running. If there is any abnormality, the monitor showing the location of the abnormality will flash and the alarm buzzer will sound.

D Meter display portion (see METER GROUP (PAGE 3-14))
This consists of the preheating pilot lamp, power train oil temperature gauge, engine water temperature gauge, hydraulic oil temperature gauge. fuel gauge, dual/single selector display lamp, torque converter lock-up display lamp, display panel A (speed range display, engine speed) and display panel B (multi-information).

E Mode selection switch panel (see MODE SELECTION SWITCH GROUP (PAGE 3-19))
This consists of the lock-up mode switch, economy mode selector switch and slow reverse mode selector switch.

F Switches (for details, see SWITCH (PAGE 3-35).)
These consist of the starting switch, buzzer cancel switch, front lamp switch, working lamp switch, rear lamp switch, auto shift down switch, pivot turn switch, information switch, and additional heater switch (option).
F Switches (for details, see SWITCH (PAGE 3-35).)
These consist of the starting switch, buzzer cancel switch, front lamp switch, working lamp switch, rear lamp switch, auto shift down switch, Preheating switch and information switch.

G Lamps (for details, see LAMP (PAGE 3-24).)
These consist of the warning lamp and filter, oil change interval lamp.

CHECK MONITOR GROUP

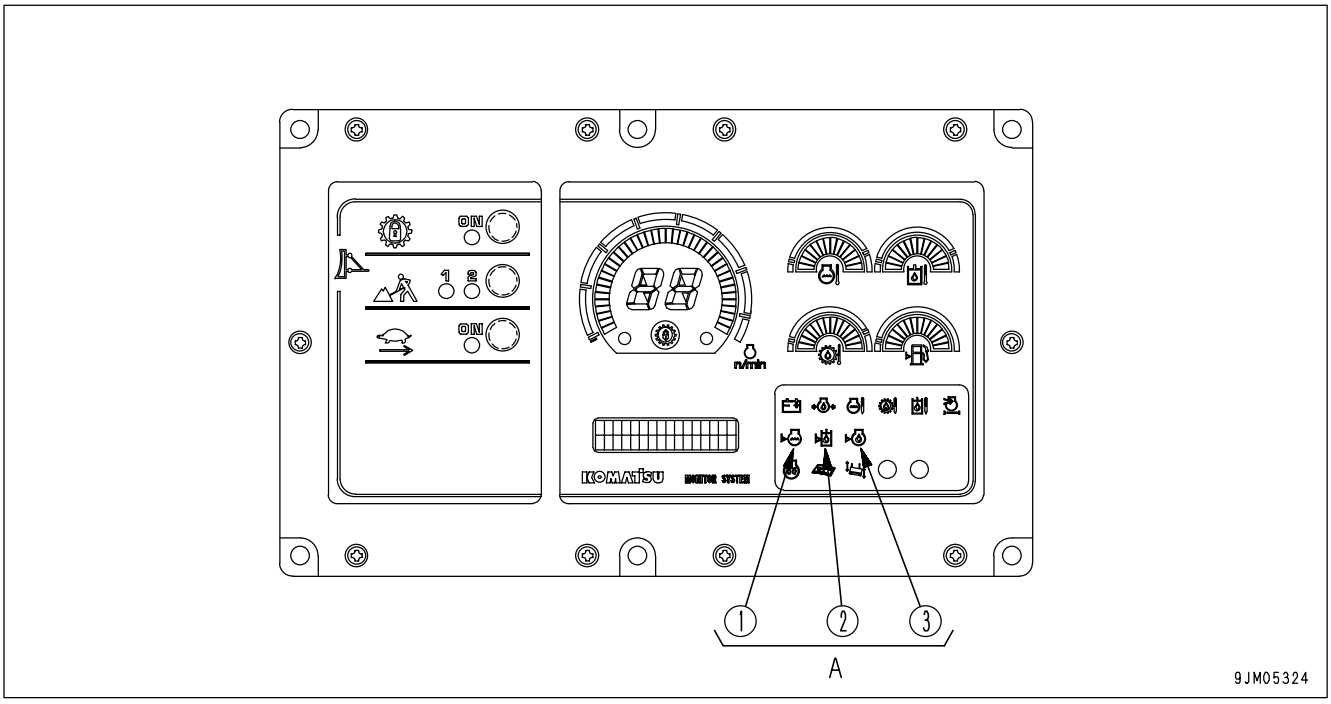
NOTICE

- **When carrying out checks before starting, do not simply rely on the monitor. Always refer to OPERATION (PAGE 3-69) to carry out the checks.**
- **Park the machine on level ground and then check the monitor lamps.**
- **Confirm that the monitor lamp lights up for about 2 seconds after the starting switch is turned to ON. If any lamp does not light up, please contact your Komatsu distributor to inspect it.**

REMARK

- When the starting switch is turned ON before starting the engine, the caution lamp flash for 2 seconds, the warning lamp lights up for 2 seconds, and the alarm buzzer sounds for 2 second.
- The caution lamps cannot be checked for breakage until at least 5 seconds after the engine has been stopped.

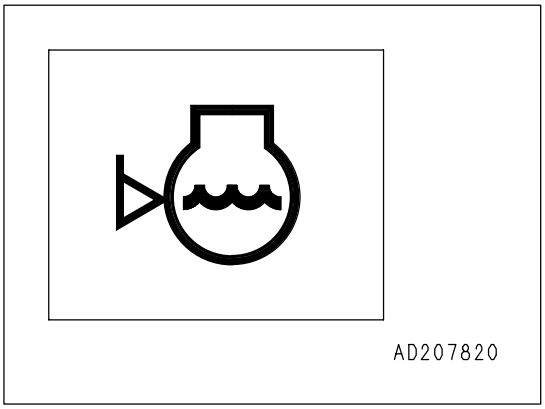
This displays the basic items among the check before starting items that must be checked before starting the engine. If there is any abnormality, the caution lamp for the location of the abnormality will flash.
When the engine is started, engine oil level monitor will go off even if there is abnormality.



A (1) Radiator coolant level monitor
A (2) Hydraulic oil level monitor
A (3) Engine oil level monitor

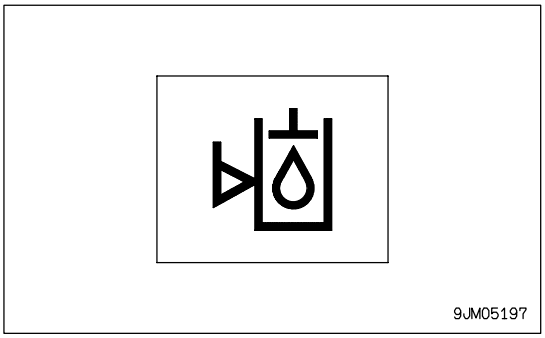
RADIATOR COOLANT LEVEL MONITOR

This lamp (1) warns the operator that the level of the cooling water in the main radiator and sub radiator has gone down.
If the lamp flashes, check the level of the cooling water in the main radiator and sub radiator, and add water.



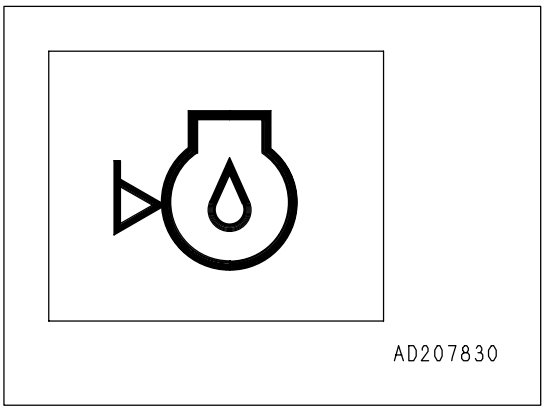
HYDRAULIC OIL LEVEL MONITOR

This lamp (2) warns the operator that the level of the hydraulic oil in the hydraulic tank has gone down.
If the lamp flashes, check the level of the hydraulic oil in the hydraulic tank, and add oil.



ENGINE OIL LEVEL MONITOR

This lamp (3) warns the operator that the level of the engine oil in the engine oil pan has gone down.
If the lamp flashes, check the level of the engine oil in the engine oil pan, and add oil.



CAUTION MONITOR GROUP

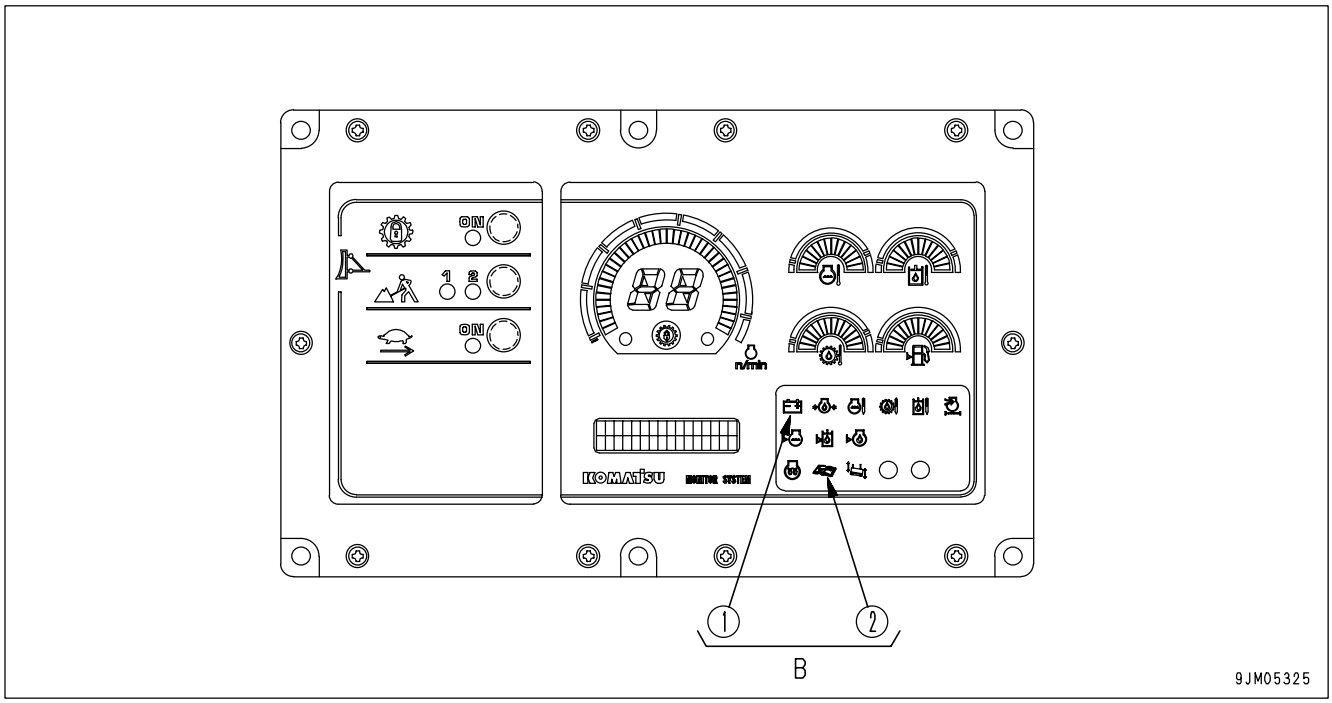
CAUTION

If these caution lamps item flash, check and repair the appropriate location as soon as possible.

NOTICE

- **Park the machine on level ground and check the monitor lamps.**
- **Confirm that these monitor lamps light for about 2 seconds after the starting switch is turned to ON. If any monitor lamp does not light, ask your Komatsu distributor to inspect it.**

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



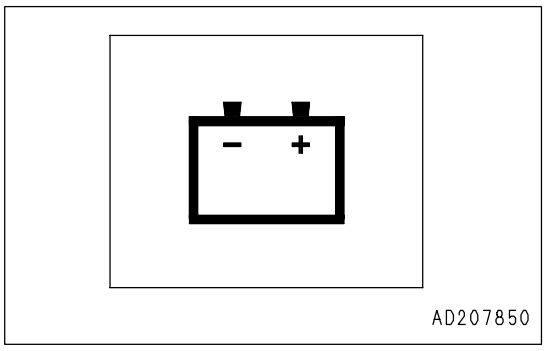
B (1) Charge level monitor

B (2) Maintenance caution lamp

CHARGE MONITOR

This lamp (1) indicates an abnormality in the charging system while the engine is running.

If the monitor lamp flashes, check the V-belt tension. If any abnormality is found, see "OTHER TROUBLE (PAGE 3-143)".

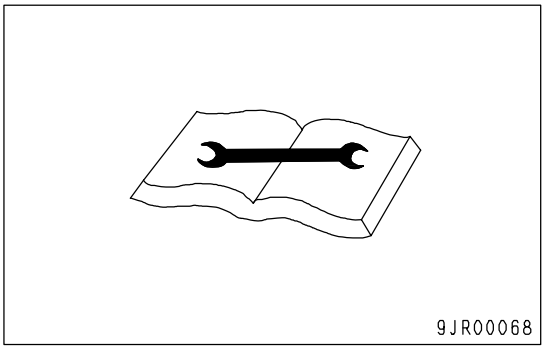


REMARK

This monitor lamp lights, when the starting switch is turned to ON immediately after the engine is started or immediately before the engine is stopped. It does not indicate an abnormality.

MAINTENANCE CAUTION LAMP

This monitor (2) flashes when the filter or oil change interval has been reached. SWITCH DISPLAY PANEL B (Multi-information) (PAGE 3-18) to the maintenance mode and check or replace the applicable filter or oil.



EMERGENCY CAUTION ITEMS

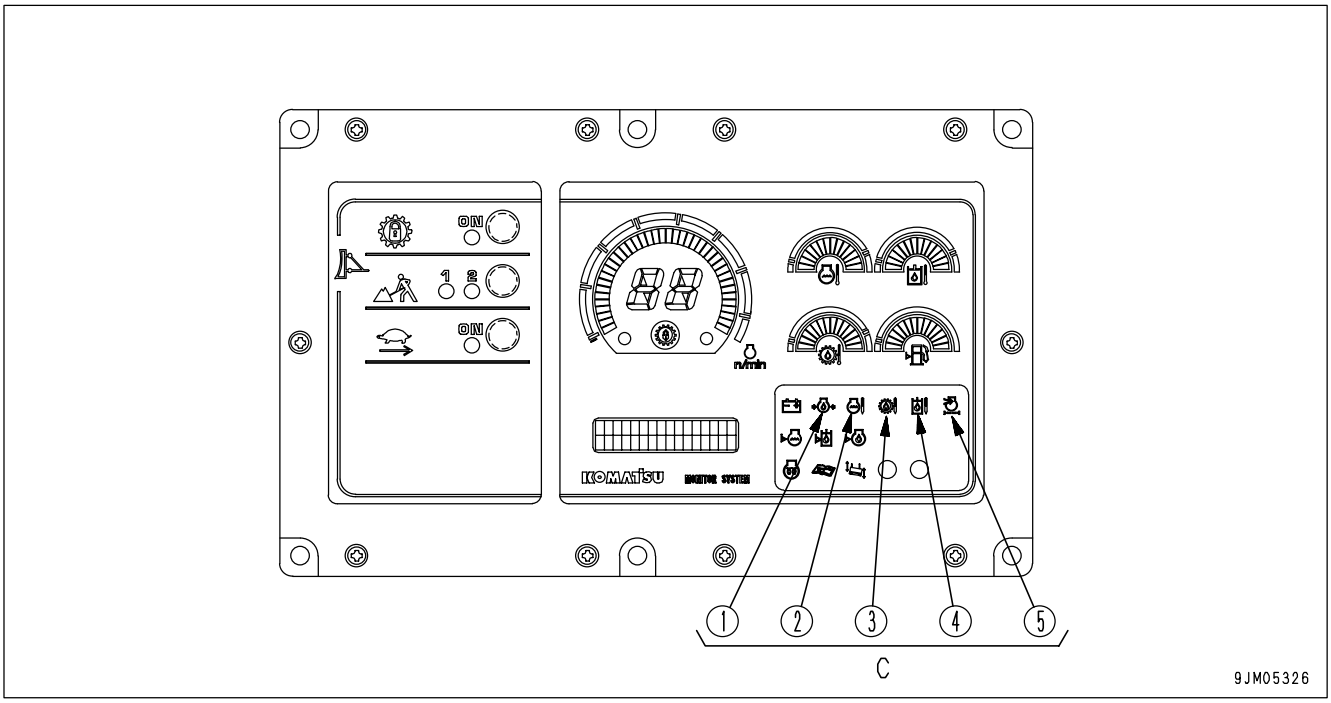
CAUTION

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

NOTICE

- **Park the machine on level ground and check the monitor lamps.**
- **Confirm that these caution lamps light for about 2 seconds after the starting switch is turned to ON. If any monitor lamp does not light, ask your Komatsu distributor to inspect it.**

These items need to be observed while the engine is running. If any abnormality occurs, items that need to be repaired immediately are displayed.
If there is any abnormality, alarm buzzer sounds intermittently and the abnormal location on the caution lamp will flash.

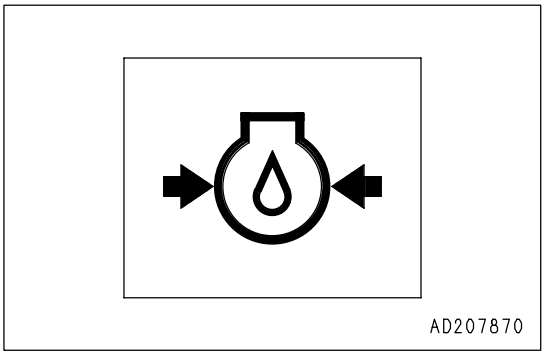


C (1) Engine oil pressure caution lamp
C (2) Engine cooling water temperature caution lamp
C (3) Power train oil temperature caution lamp
C (4) Hydraulic oil temperature caution lamp
C (5) Air cleaner clogging caution lamp

ENGINE OIL PRESSURE CAUTION LAMP

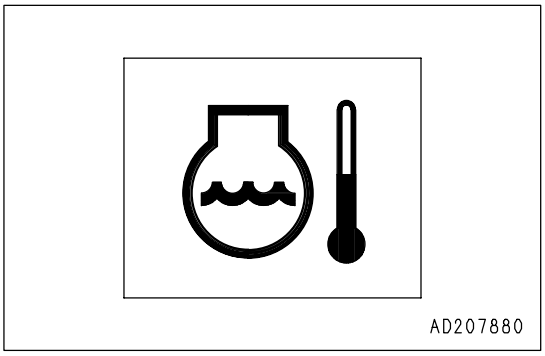
This lamp (1) indicates a low engine oil pressure.
If the monitor lamp flashes, stop the engine and check it immediately.

REMARK
The alarm buzzer sounds, when the starting switch is turned to ON immediately after the engine oil changed. It does not indicate an abnormality.


AD207870

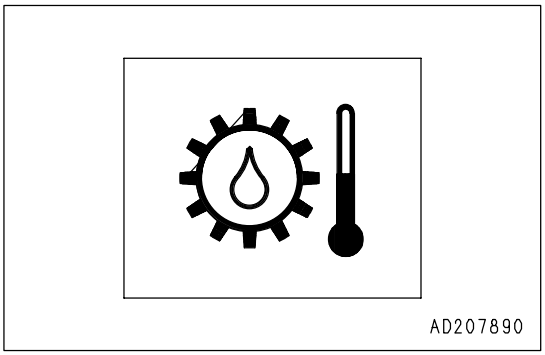
ENGINE COOLING WATER TEMPERATORE MONITOR

This lamp (2) indicates a rise in the cooling water temperature.
When the monitor lamp flashes, run the engine at the low idling speed until the green range of the engine water temperature gauge lights.


AD207880

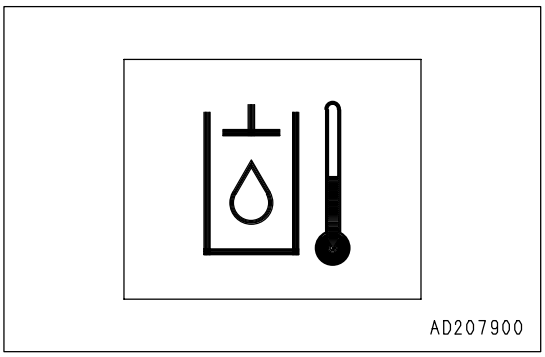
POWER TRAIN OIL TEMPERATORE MONITOR

This lamp (3) indicates a rise in the oil temperature of the torque converter outlet.
When the monitor lamp flashes, run the engine at the low idling speed until the green range of the power train oil temperature gauge lights.


AD207890

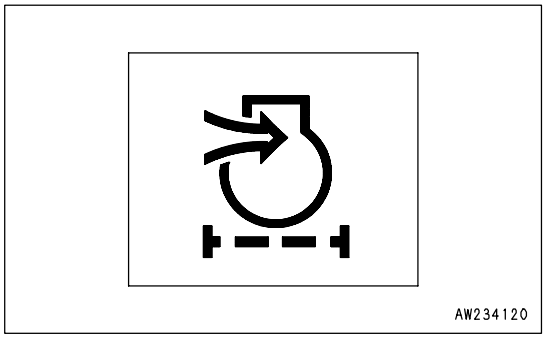
HYDRAULIC OIL TEMPERATORE MONITOR

This lamp (4) indicates a rise in the hydraulic oil temperature.
When the monitor lamp flashes, stop the machine and run the engine at the low idling speed until oil temperature falls.


AD207900

AIR CLEANER CLOGGING MONITOR

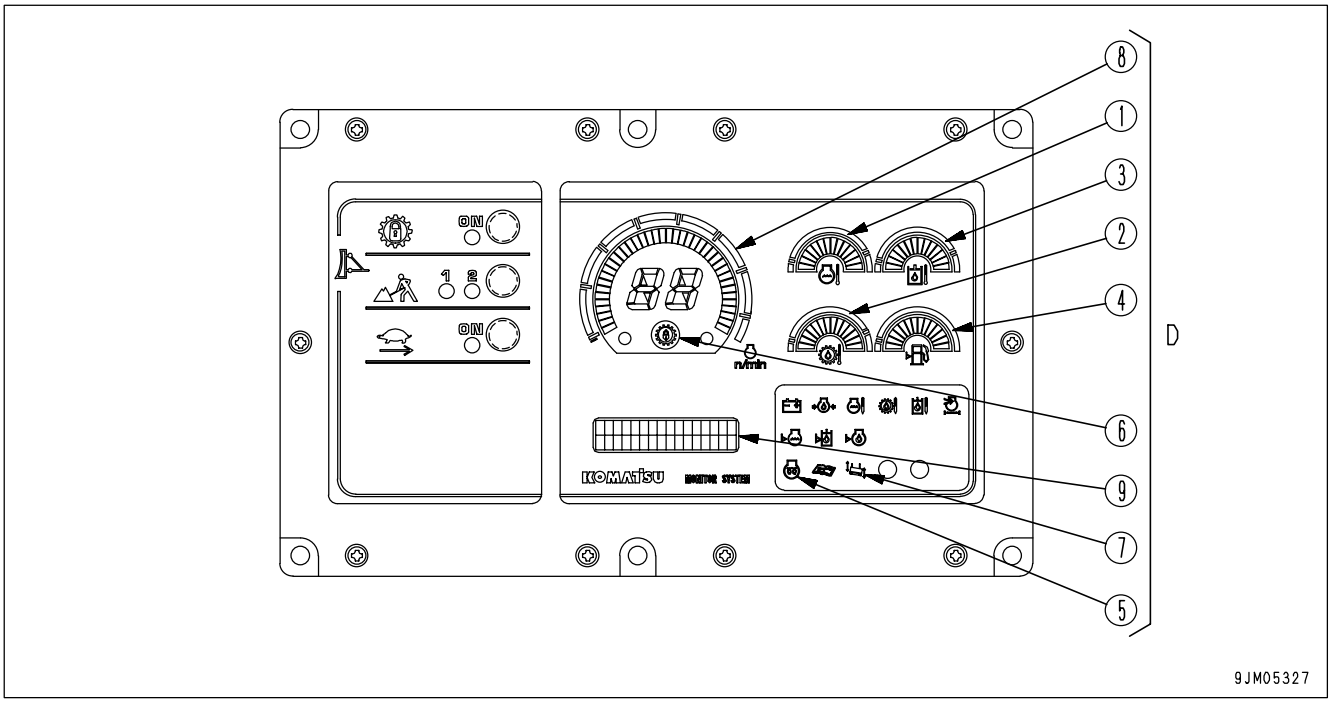
This lamp (5) warns that the air cleaner is clogged.
If the air cleaner element clogged, the monitor lamp flashes. Stop the engine, check the air cleaner element and clean it.



METER GROUP

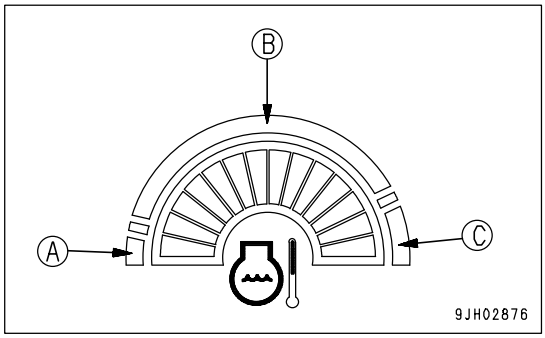
NOTICE

While the engine is at rest, turn the starting switch ON to see if engine cooling water temperature gauge, power train oil temperature gauge, fuel gauge and monitor lamps all light up.
If they do not, ask your Komatsu distributor to inspect it.



D (1) Engine cooling water temperature gauge
D (2) Power train oil temperature gauge
D (3) Hydraulic oil temperature gauge
D (4) Fuel gauge
D (5) Engine preheating pilot lamp
D (6) Torque converter lock up pilot lamp
D (7) Dual/single tilt selector display lamp (Dual tilt dozer specification)
D (8) Display panel A (Speed range display, Engine speed)
D (9) Display panel B (multi-information)

ENGINE COOLING WATER TEMPERATORE GAUGE

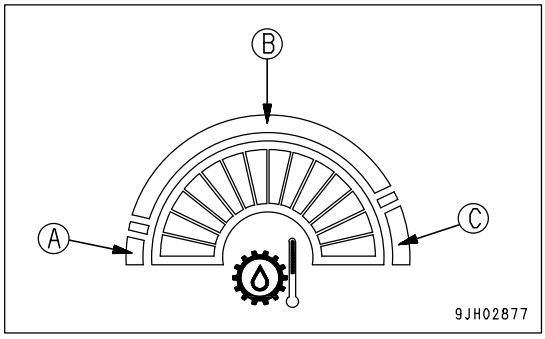


This gauge (1) indicates the temperature of the cooling water.
If the temperature is normal during operation, the green range (B) will light.
If the red range (C) lights up during operation, move the Fuel control dial to lower the engine speed to approx. 3/4 of the full speed, and run until the water temperature enters the green range (B).
If the engine cooling water temperature enters the red range, and the engine water temperature monitor flashes and the alarm buzzer sounds, stop the machine and run at low idling until the water temperature enters the green range.
(A): White range
(B): Green range
(C): Red range

NOTICE

If the water temperature gauge often enters the red range (C), check the radiator for clogging.

POWER TRAIN OIL TEMPERATORE GAUGE



This gauge(2) indicates the oil temperature of the torque converter outlet. If the temperature is normal during operation, the green range will light.
If the red range (C) lights up during operation, move the fuel control lever to lower the engine speed to approx. 3/4 of the full speed, reduce the load and run until the oil temperature enters the green range (B).
If the power train oil temperature enters the red range, and the power train oil temperature caution lamp flashes and the alarm buzzer sounds, stop the machine and run at low idling until the oil temperature enters the green range.
(A): White range
(B): Green range
(C): Red range

NOTICE

If the power train oil temperature gauge often enters the red range (C), we recommend you to lower the travel speed one range (for example, F2 → F1) to reduce the load on the power train when operating.

HYDRAULIC OIL TEMPERATURE GAUGE

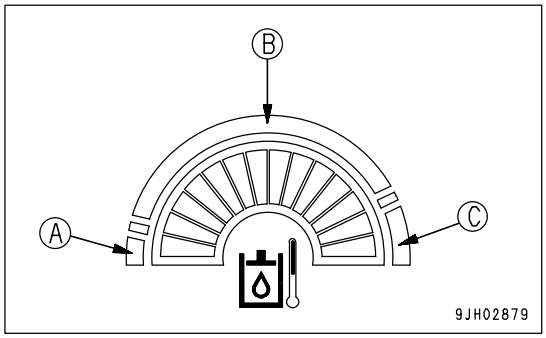
This gauge (3) indicates the oil temperature of the hydraulic oil. If the temperature is normal during operation, the green range (B) will light.

If the red range (C) lights up during operation, move the fuel control lever to lower the engine speed to approx. 3/4 of the full speed, reduce the load and run until the oil temperature enters the green range (B).

(A): White range

(B): Green range

(C): Red range



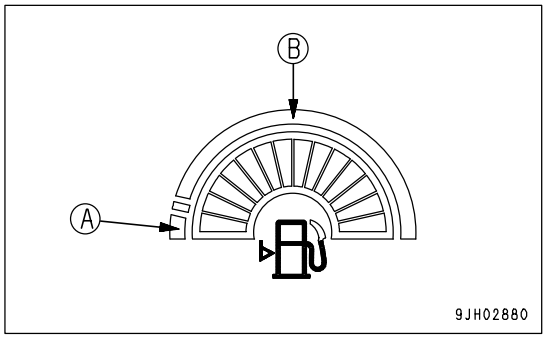
FUEL LEVEL GAUGE

This meter (4) shows the level of fuel in the fuel tank.

During normal operation, the green range (B) should be lighted up. If the red range (A) lights up during operation, add fuel immediately. If this is not done, the engine speed will become irregular or an error display will be shown on the monitor.

(A): Red range

(B): Green range



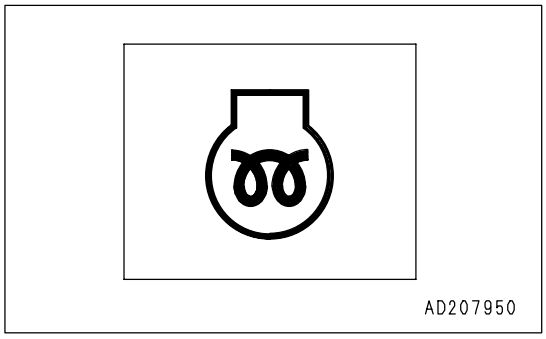
REMARK

- The display is not proportional to the amount of fuel remaining.
- If only the red range (A) lights up, there is less than 270 liters (71.33 US gal) of fuel remaining.

ENGINE PREHEATING PILOT LAMP

This lamp (5) indicates that the engine is being preheated by the electrical heater during cold weather.

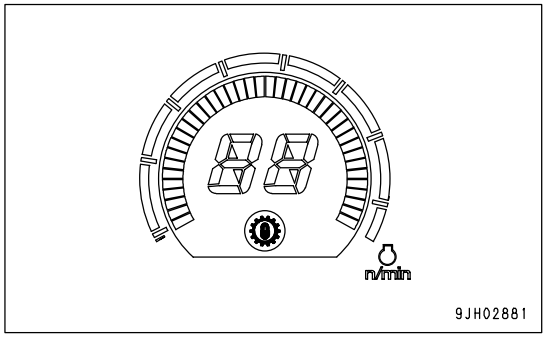
When the preheating switch is ON, the preheating monitor on the monitor panel lights up. (When the ambient temperature is below approx. -°5C)



TORQUE CONVERTER LOCK UP PILOT LAMP

This lamp (6) lights up when the torque converter has been automatically locked up (when the transmission is set to direct drive) after the lock-up switch for the monitor lamp has been turned ON.

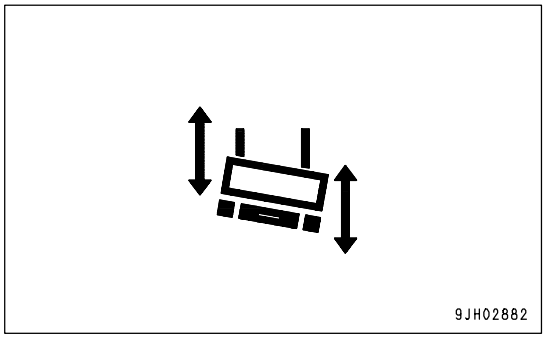
The lamp goes out when torque converter drive is being used.



DUAL/SINGLE TILT SELECTOR DISPLAY LAMP

(Dual tilt dozer specification)

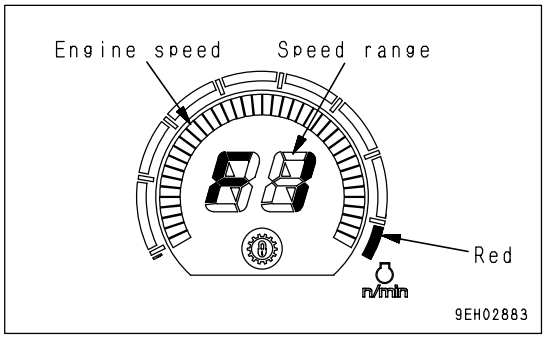
This lamp (7) lights up green when the dual/single selector switch on the work equipment control lever is set to DUAL.



DISPLAY PANEL A (speed range display, engine speed)

Meter (8) displays the transmission speed range being used on the machine and engine speed.

- When the transmission is in 1st FORWARD, the display shows F1, and when it is in 1st REVERSE, the display shows R1.
- The peripheral bar graph indicates the engine speed. When the red range lights up during running, shift the gear to a lower speed to run the engine at a speed within the green range.

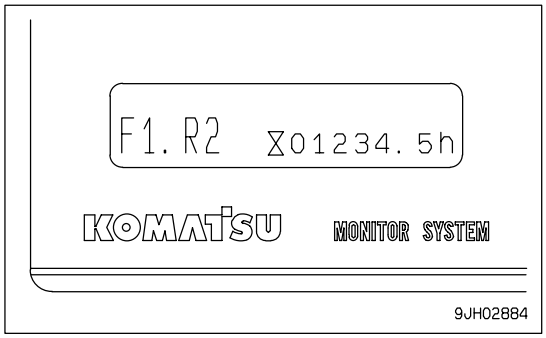


SWITCH DISPLAY PANEL B (Multi-information)

This monitor (9) displays information related to the condition of the machine on the top and bottom lines of the display portion. The content of the display can be switched by operating the service mode selector switch.

(1) Operating mode (normal operation screen)

Use this mode when operating the machine.



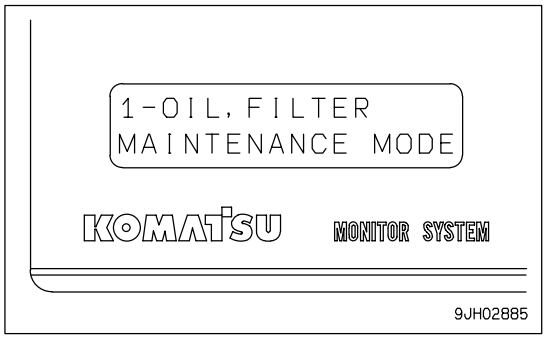
REMARK

When the starting switch is turned from the OFF position to the ON position, the multi-information is set to the operating mode.

The shift mode selected by operation of the GEARSHIFTING USING SHIFT MODE SELECTION (PAGE 3-99) through the shift mode selection is displayed on the left side of the monitor.
The total operating hours of the machine is displayed at the bottom right of the monitor. (Use the service meter function display to set the interval for periodic maintenance.)
When the engine is running, the service meter advances, even if the machine is not being used.
When the engine is running, the hourglass mark pilot display at the side of the meter lights up to show that the meter is advancing.
The meter advances by 1 for every hour of operation, regardless of the engine speed.
If there is a failure in the machine, the failure code is also displayed on the top line. If a failure code is displayed, carry out the remedy given in "OTHER TROUBLE (PAGE 3-143)".

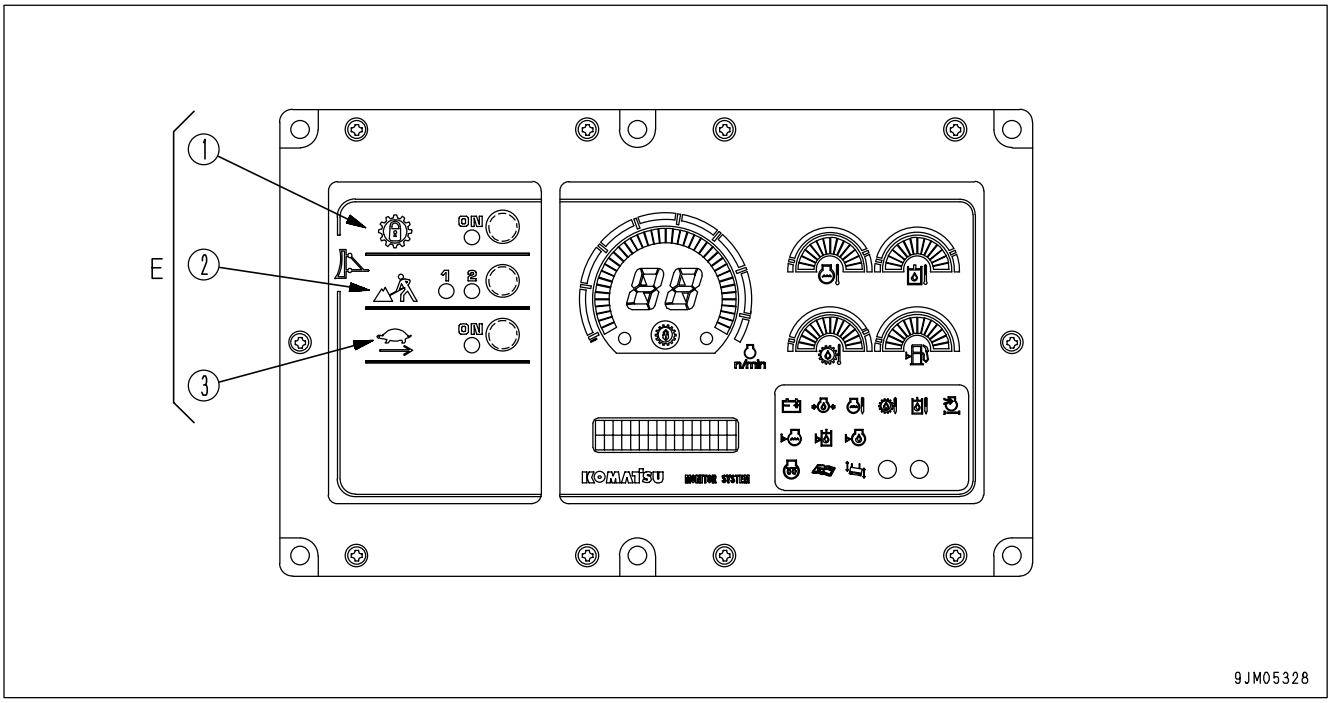
(2) Maintenance mode

The maintenance mode is displayed by continuing to turn the information switch in the ◇ direction for 2.5 seconds.
For details, see "METHOD OF USING DISPLAY PANEL B (Multi-information) (PAGE 3-26)".



MODE SELECTION SWITCH GROUP

- Press each mode switch to turn it ON or OFF and to select the mode.
- For details of of the setting of the mode to use, see "EFECTIVE USE OF MODE SELECTION SYSTEM (PAGE 3-113)".
- It is impossible to use any combination of the lock-up mode and any other mode.
- The economy mode and reverse slow mode can be used independently or in combination.



E (1) Lock up mode switch
E (2) Economy mode selector switch
E (3) Reverse slow mode selector switch

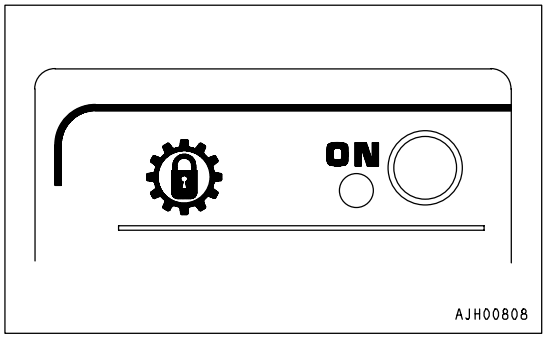
Selecting the mode to match the type of work and quality of rock or soil makes it possible to carry out operations effectively.

Dozing		Ripping
Lock up mode	Economy mode	Reverse slow mode
○	×	×
×	○	○

○: Possible to use ×: Compound use not possible

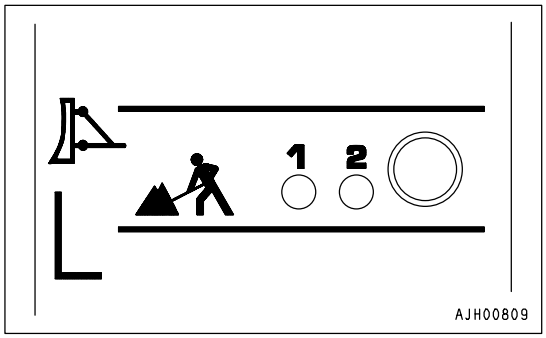
LOCK UP MODE SWITCH

This (1) is used when large power is needed rather than high production (such as when dozing loose soil).
The drive is switched between torque converter drive and direct drive according to the load. When it is ON, the lamp lights up.



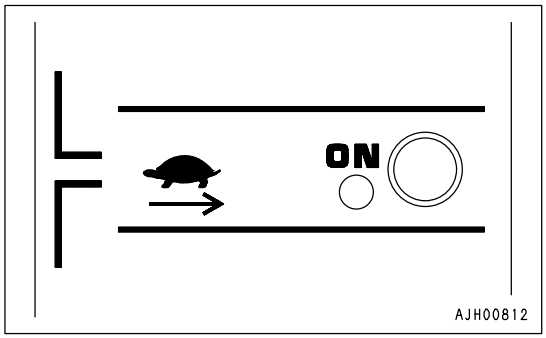
ECONOMY MODE SWITCH

This (2) is used for hauling work after ripping or for dozing blasted rock.
When the system is OFF, if the switch is pressed once, mode [1] lights up, and if it is pressed again, mode [2] lights up.
select the mode according to the type of rock.

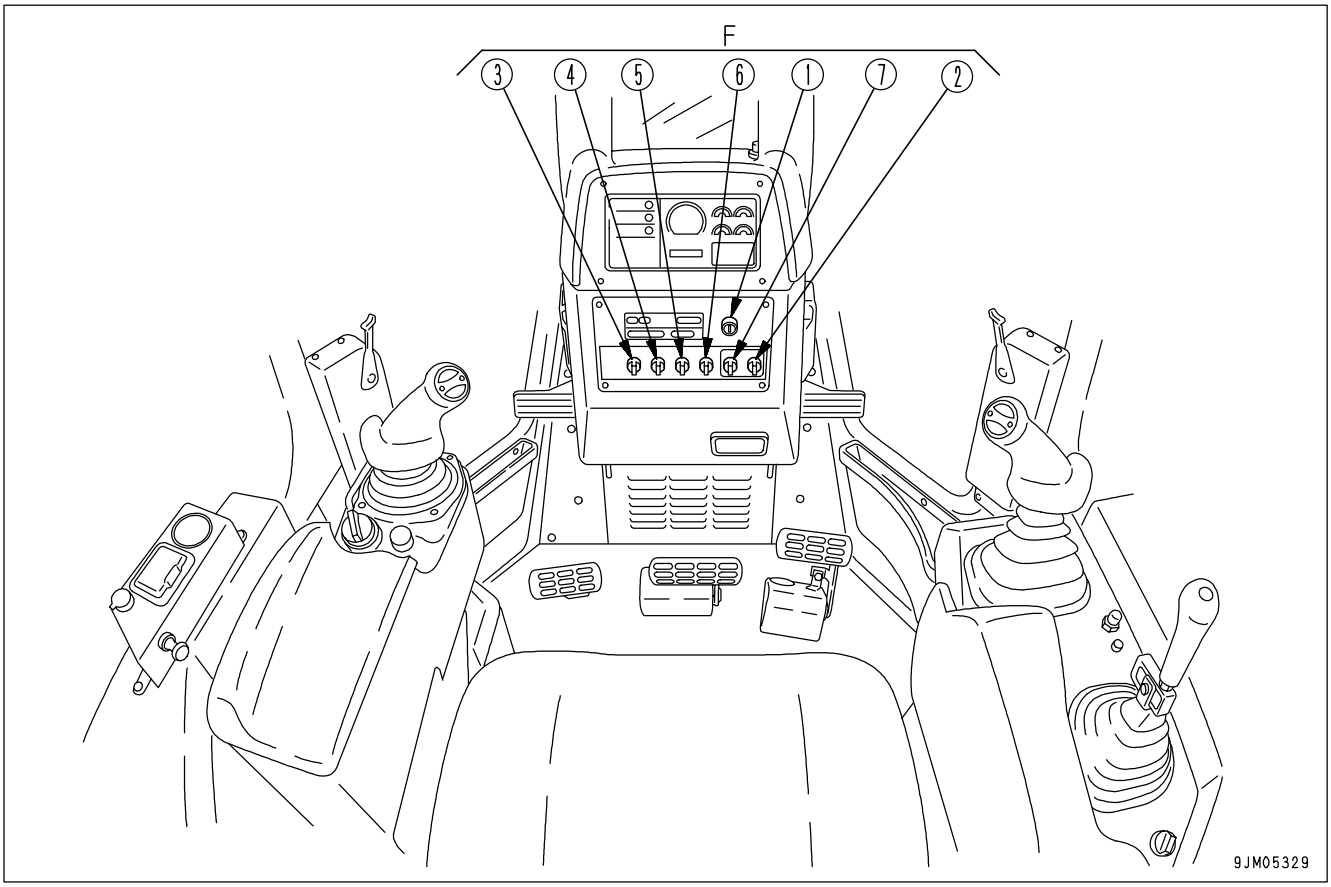


REVERSE SLOW MODE SELECTOR SWITCH

Use this switch (3) to make small reductions in the travel speed when traveling in R1, R2, or R3.
When it is turned ON, the lamp lights up.



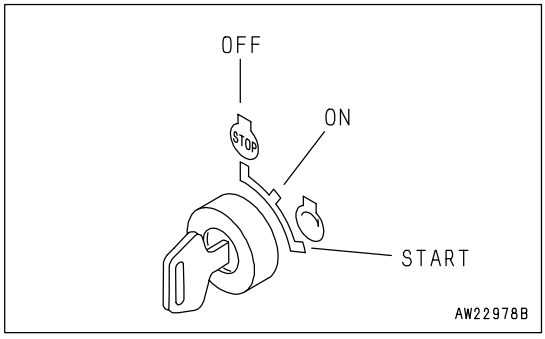
SWITCH



F (1) Starting switch
F (2) Buzzer cancel switch
F (3) Front lamp, working lamp switch
F (4) Rear lamp switch
F (5) Auto shift down switch
F (6) Preheating switch
F (7) Information switch

STARTING SWITCH

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



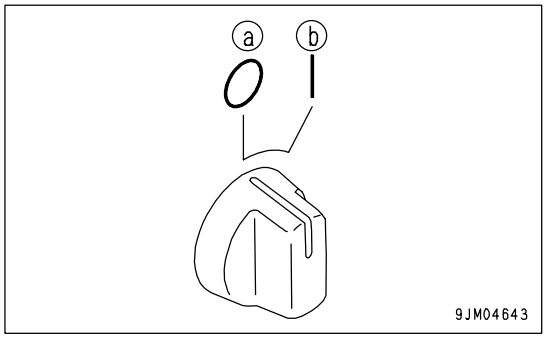
OFF
Key insertion-withdrawal position. None of electrical circuits activate.

ON
Charging and electric device circuits activate. Keep key at ON after starting.

START
At this key position, the starting motor will crank the engine. Immediately after starting the engine, release the key which will automatically return to the ON position.

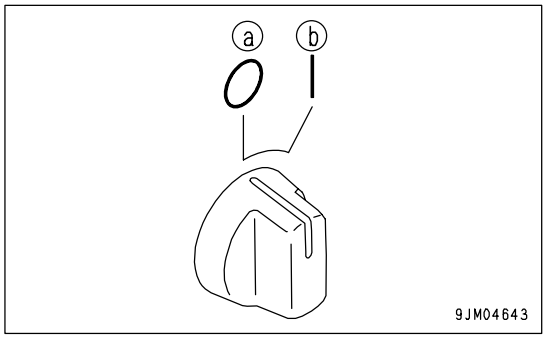
FRONT LAMP, WORKING LAMP SWITCH

This switch (3) lights up when the front lamp, left and right working lamps on the front fender, and panel lamp light up.
(a) OFF position: Goes out
(b) ON position: Lights up



REAR LAMP SWITCH

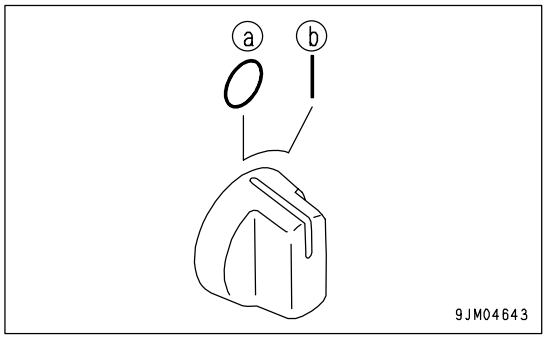
This switch (4) lights up the rear lamps.
(a) OFF position: Lamps are out
(b) ON position: Lamps light up



AUTO SHIFT DOWN SWITCH

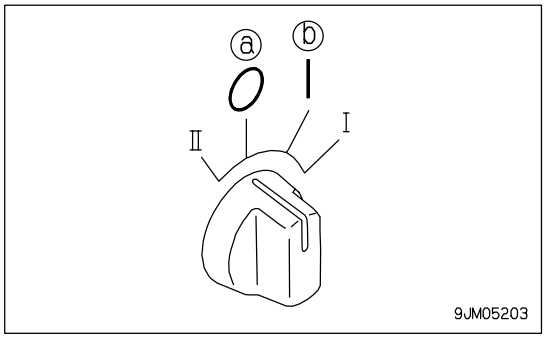
When this switch (5) is operated to the right, if the travel speed drops because of the load conditions when traveling, the transmission automatically shifts to low speed.
(a) OFF position: Automatic operation canceled
(b) ON position: Automatically shifts down to low speed

For details, see "AUTO SHIFT DOWN OPERATION (PAGE 3-100)".



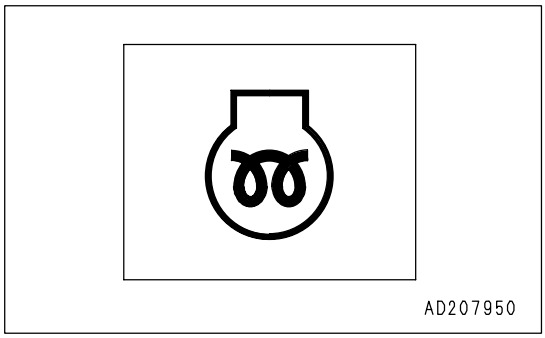
PREHEATING SWITCH

This switch (6) is used to actuate the electrical intake air heater when starting engine.
OFF position: Preheating is not actuated
ON position: Automatic preheating is actuated
I,II position: Preheating is not actuated. Normally do not turn the key to these positions.



⚠ CAUTION

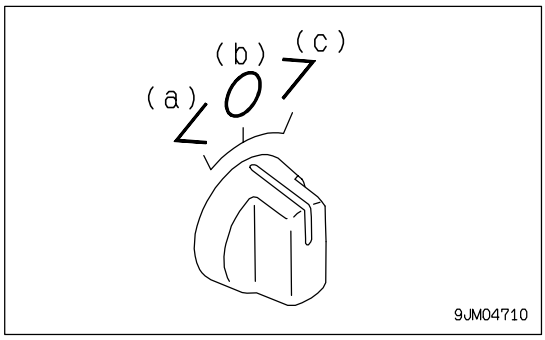
When not using the electrical intake air heater, do not turn the switch to the ON position. For details, see PRECAUTIONS IN COLD AREAS (PAGE 2-18) STARTING IN COLD WEATHER.



This is used when using the electrical intake air heater to start the engine in cold areas. When the switch is turned to the ON position, electricity flows to the glow plug and the intake air is heated. The preheating monitor on the monitor panel lights up when the switch is turned ON.
Do not turn the switch to the ON position when not using the electrical intake air heater.

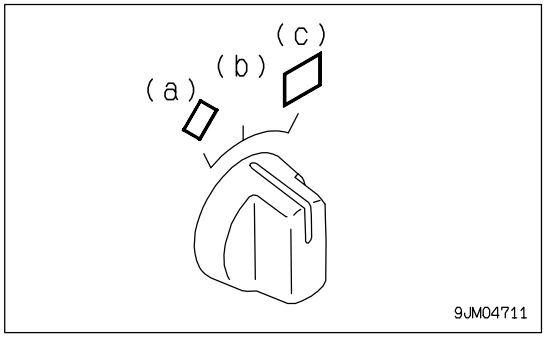
INFORMATION SWITCH

This switch (7) is used to carry out the switching of the information monitor display mode and the switching of the cursor with the maintenance mode.
(a) position: Cursor moves to left
(c) position: Cursor moves to right

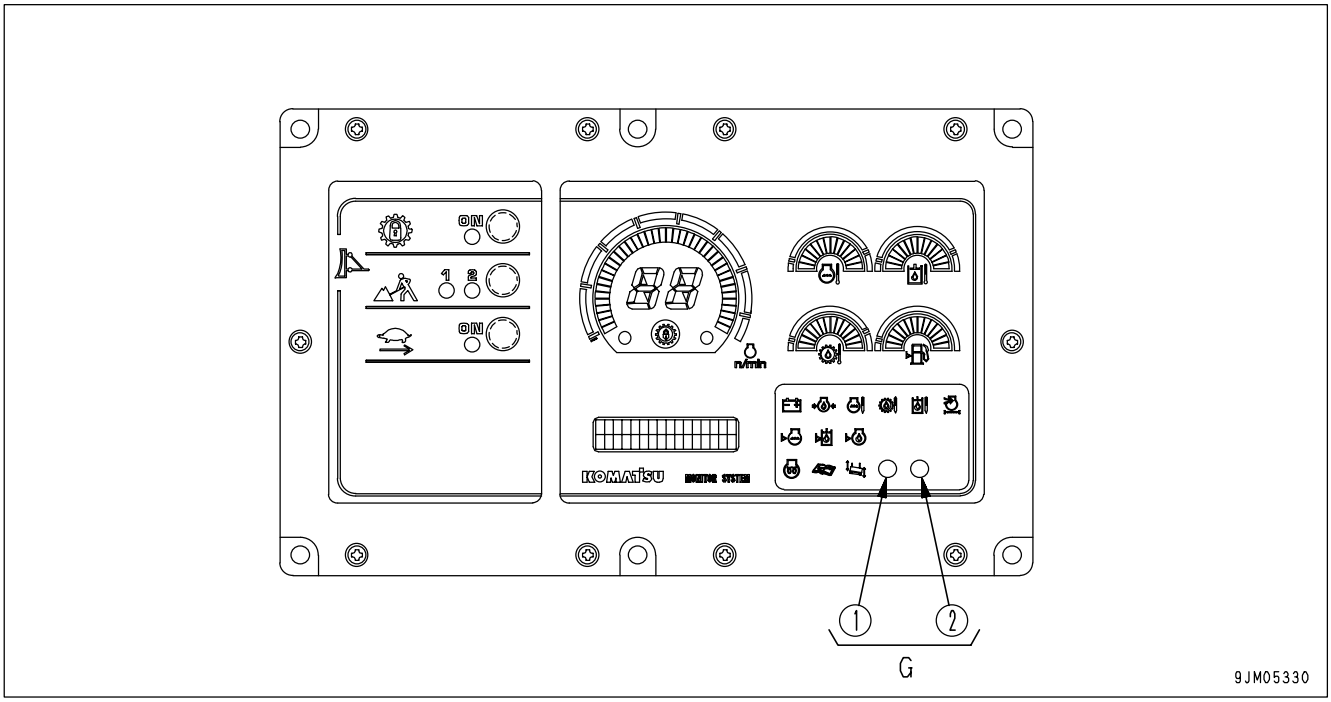


BUZZER CANCEL SWITCH

When this switch (2) is operated to the left or right, the alarm buzzer stops.
When the information monitor is in the maintenance mode, this switch can be operated to move the cursor to the left or right.
(a) position: Cancel
(c) position: Select



LAMP



G (1) Warning lamp

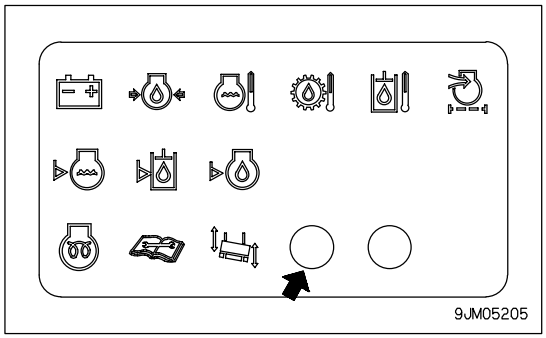
G (2) Filter, oil change interval lamp

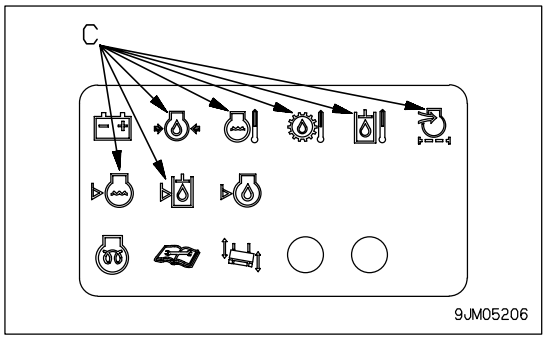
WARNING LAMP

NOTICE

If the alarm buzzer sounds, stop work immediately and carry out inspection and maintenance of the appropriate point.

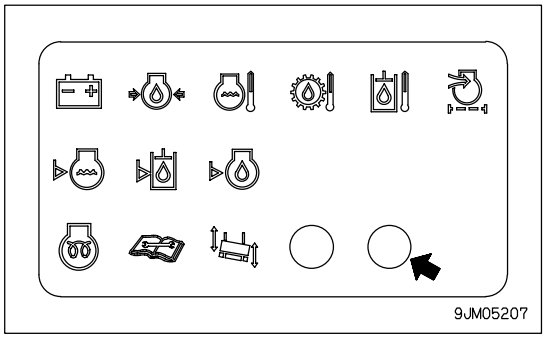
When the caution lamp for the B CAUTION and C CAUTION groups on the machine monitor system flashes, and an abnormality has occurred in the electronic control system, this lamp (1) also flashes at the same time.
If the lamp flashes, check the monitor panel to locate the abnormality.
When the monitor inside the C CAUTION group flashes, the alarm buzzer also sounds continuously.





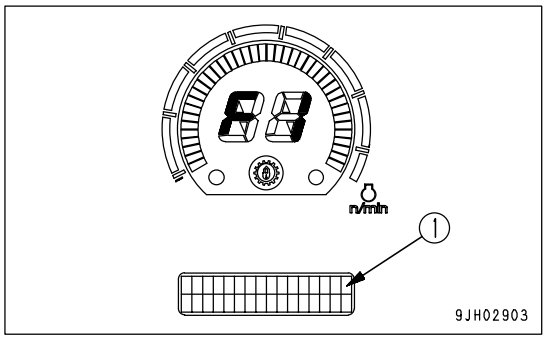
FILTER, OIL CHANGE INTERVAL LAMP

This lamp lights up when it comes near the time for replacing the filter or oil.

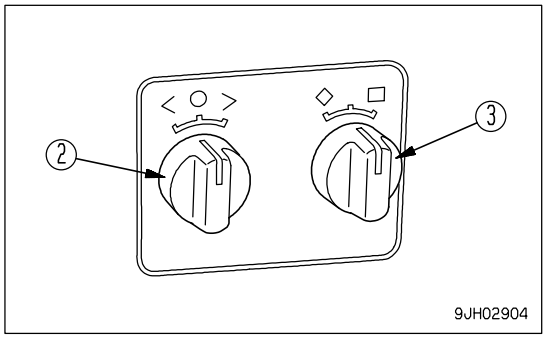


METHOD OF USING DISPLAY PANEL B (Multi-information)

EXPLANATION OF MODES AND CONTROLS



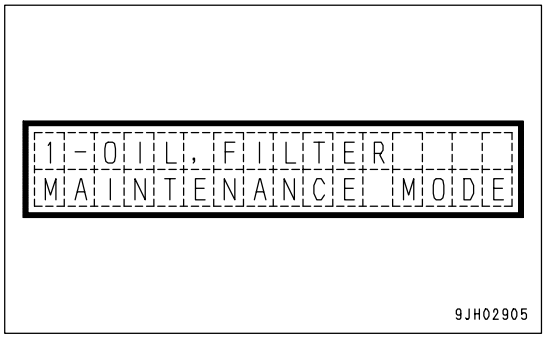
- Display panel B (1) has the function of displaying the following four types of mode. (The diagram on the right shows the normal screen before the mode display.)
  Maintenance mode
  This displays the time for replacing the filters or oil.
  PM clinic auxiliary mode
  This displays the engine speed and the oil pressure in the hydraulic circuits.
  Fault display mode
  This displays the fault code is related to the electronic control.
  Adjustment mode
  This adjusts the brightness and contrast of the display.
- There are variations (sub-items) in the four types of mode. For an explanation of the variations, see the following items.
  METHOD OF USING MAINTENANCE MODE (PAGE 3-28)
  METHOD OF USING PM CLINIC AUXILIARY MODE (PAGE 3-30)
  METHOD OF USING FAULT CODE DISPLAY MODE (PAGE 3-31)
  METHOD OF USING USER ADJUST MODE (PAGE 3-32)



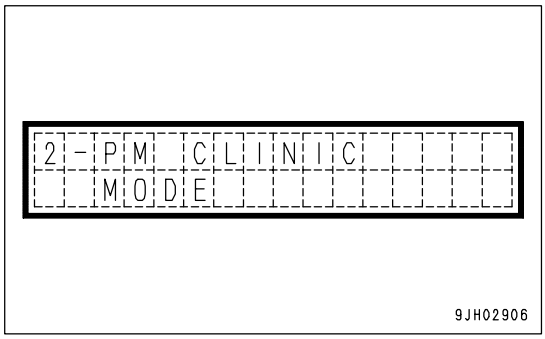
- Each mode is operated by using information switch (2) and buzzer cancel switch (3) on the dashboard in front of the operator's seat.
  After operating the switch, release the switch, and the switch will return automatically to the center position as shown in the diagram on the right.
  The functions of each position of the switches are as follows.
  <: Moves mode to left
  >: Moves mode to right
  ◇: Selects mode
  □: Cancels mode
- The four types of mode can be selected in a cycle by operating information switch (2) to > and < to give the following sequence: Maintenance mode ←→ PM clinic auxiliary mode ←→ Fault code display mode ←→ Adju stment mode ←→ Maintenance mode.
- From the normal mode before giving the mode display, if buzzer cancel switch (3) is operated to ◇ and held for 2.5 seconds, the maintenance mode is displayed. After that, if information switch (2) is operated to >, the mode changes to the PM clinic auxiliary mode. If information switch (2) is operated to <, the mode changes to the user adjust mode.
- When any mode is being displayed, if the buzzer cancel switch is operated to □, the screen returns the normal screen shown before the mode display.

METHOD OF SELECTING MODES

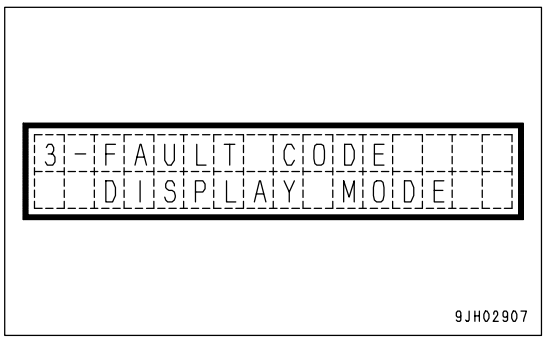
1. When moving from the normal operation display to a user mode, the maintenance mode is displayed. Use the controls to change the mode as follows.
   > position: Go to PM clinic auxiliary mode
   < position: Go to user adjust mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to maintenance mode selection screen
   20.



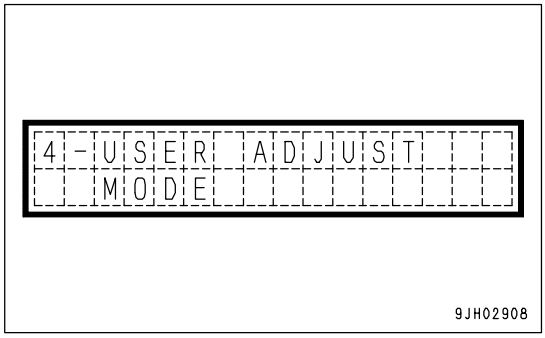
2. The diagram on the right shows the screen display for the PM clinic auxiliary mode. Use the controls to change the mode as follows.
   > position: Go to fault code display mode
   < position: Go to maintenance mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to PM clinic auxiliary mode selection item screen



3. The diagram on the right shows the screen display for the fault code display mode. Use the controls to change the mode as follows.
   > position: Go to adjustment mode
   < position: Go to PM clinic auxiliary mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to fault code selection item screen



4. The diagram on the right shows the screen display for the user adjust mode. Use the controls to change the mode as follows.
   > position: Go to maintenance mode
   < position: Go to fault code display mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to user adjust mode selection item screen

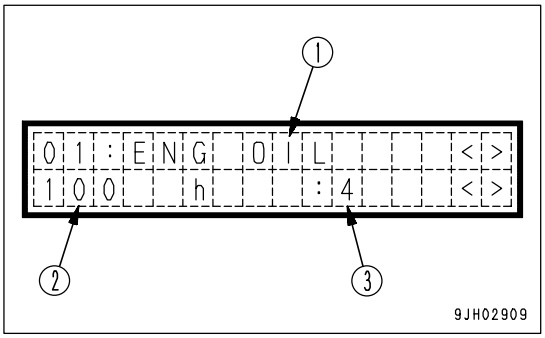


METHOD OF USING MAINTENANCE MODE

NOTICE

This function is only a guideline. If dirty or oil or filters are found during daily maintenance, replace them immediately.
If the controllers or monitor panel are replaced, the timer for this function will not work properly. Please contact your Komatsu distributor for replacement.

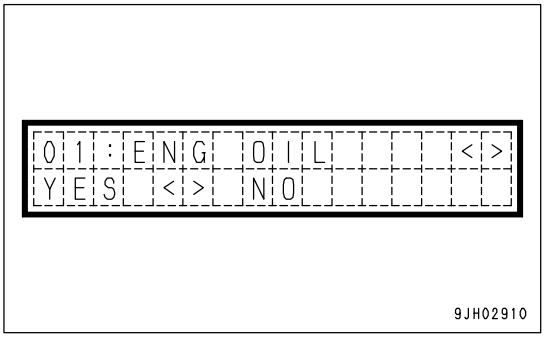
The maintenance mode shows the replacement interval for the oil filters and oil on the monitor.
The content of the display is as follows.
(1) The item is displayed.
(2) The time remaining until replacement is displayed.
(3) The number of times that replacement has been made until now is displayed.



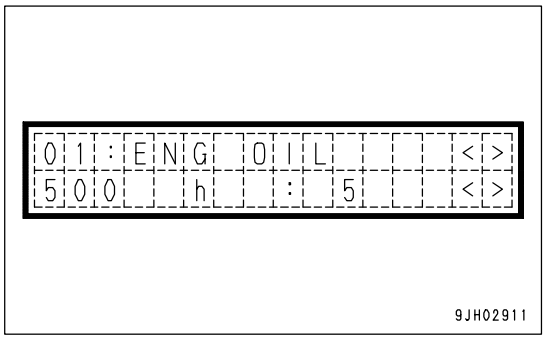
The display items can be displayed in order by operating the information switch to the left or right (<, >).

	Display	Item	Time to 1st replacement	Time to 2nd and following replacements
1.	ENG.OIL	Engine oil	250h	500h
2.	ENG.FLT	Engine oil filter	250h	500h
3.	BYPS.FLT	Bypass filter	250h	500h
4.	FUEL.FLT	Fuel filter	250h	500h
5.	CORR.FLT	Corrosion resistor	1000h	1000h
6.	P/L.OIL	Power train oil	250h	1000h
7.	P/L.FLT	Power train oil filter	250h	500h
8.	HYD.OIL	Hydraulic oil	250h	2000h
9.	HYD.FLT	Hydraulic filter	250h	2000h
10.	CHG.FLT	HSS charge filter	0h	0h
11.	DAMP.OIL	Damper oil	2000h	2000h
12.	F/D.OIL	Final drive oil	250h	2000h

When the oil or filter has been replaced, select the applicable item, then operate the buzzer cancel switch to ◇.
The screen will ask if you want to display the replacement history. Operate the information switch to select YES, then operate the buzzer cancel switch to ◇. The replacement account will increase by 1, the replacement interval will be reset, and the oil, filter change interval lamp will go out.
When this is done, if the maintenance caution lamp does not go out, there is another item close to the replacement time, so check the situation.



REMARK
To return to the function selection mode, operate the buzzer cancel switch to □.

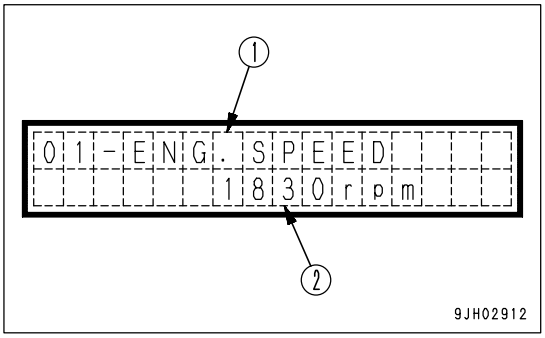


METHOD OF USING PM CLINIC AUXILIARY MODE

⚠ CAUTION

When moving the work equipment or setting the transmission to the travel position when carrying out measurements, check carefully that the situation is safe.

The PM clinic auxiliary mode displays the engine speed, hydraulic oil pressure, and other items on display panel B. Display panel B displays the item on the top line (1), and the measured value on the bottom line (2).



The display items consist of the six items in the table below.
The items can be selected by operating the information switch (<, >).

Display	Item	Measured value
01-ENG.SPEED	Engine speed	Speed (rpm)
02-HYD.PUMP PRES L	Hydraulic oil pressure (main)	Pressure (MPa)
03-HYD.PUMP PRES S	Hydraulic oil pressure (assist)	Pressure (MPa)
04-BATTERY VOLT	Battery voltage	Voltage (mV)

REMARK

- Items such as the engine speed fluctuate and are difficult to see during the measurement. In such cases, operate the buzzer cancel switch to ◇. This makes it possible to hold the display of the value.
- To cancel this mode, operate the buzzer cancel switch again to ◇.
- To return to the function selection mode, operate the buzzer cancel switch to □.

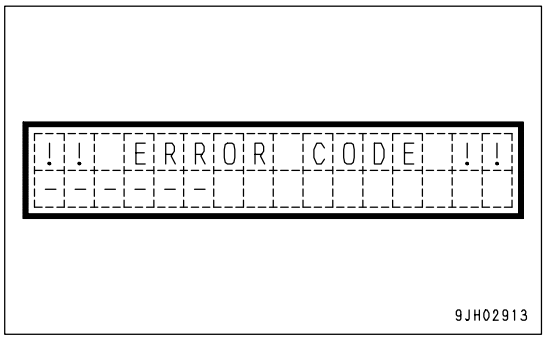
METHOD OF USING FAULT CODE DISPLAY MODE

NOTICE

The fault items observed by this function are connected with the electronic control, so even if a fault code is not displayed, there is probably some problem with the machine. If the operator feels any abnormality with the machine, the machine should be stopped immediately and checked.

When any disconnection or short circuit in any sensor is detected, the location and fault code are displayed by a 6-digit code on display panel B. When contacting your Komatsu distributor, inform your distributor of the code at the same time.

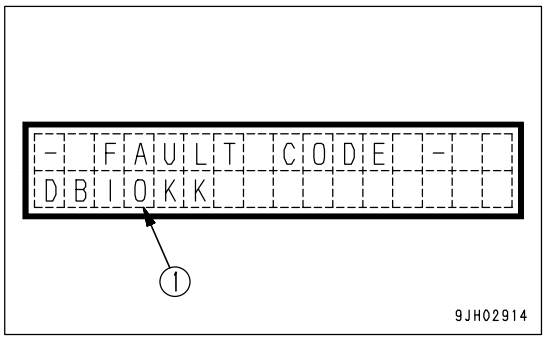
If the failure observation function has not grasped the condition of the machine, the display is as shown in the diagram on the right.



With this function, existing failures can be displayed up to a maximum of 20 items.

If multiple failures are occurring, the display automatically changes every 2 seconds, so check the code.

The display is shown repeatedly.



REMARK

To return to the function selection mode, operate the buzzer cancel switch to ☐.

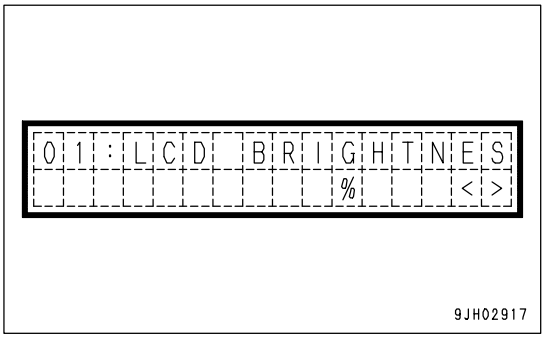
METHOD OF USING USER ADJUST MODE

With the user adjust mode, the brightness of the panel screen backlighting and the contrast of the liquid crystal panel can be changed, or the cooling fan can be set to maximum speed to clean the radiator when it is clogged.
These are displayed on display panel B.

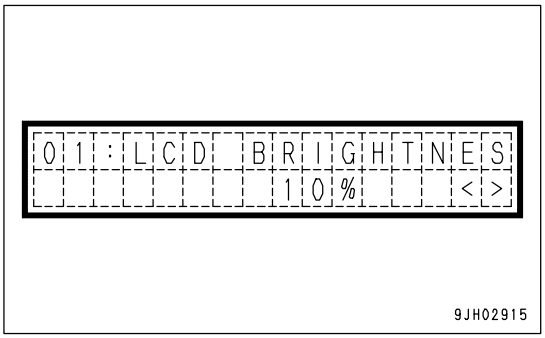
REMARK

- To return to the function selection mode, operate the buzzer cancel switch to □.
- The brightness of the backlighting of the monitor panel differs according to whether the front lamp is lighted up or not. Entering this mode when the front lamps are lighted up makes it possible to adjust the brightness when the front lamps are lighted up. In the same way, entering this mode when the front lamps are not lighted up makes it possible to adjust the brightness when the front lamps are not lighted up.

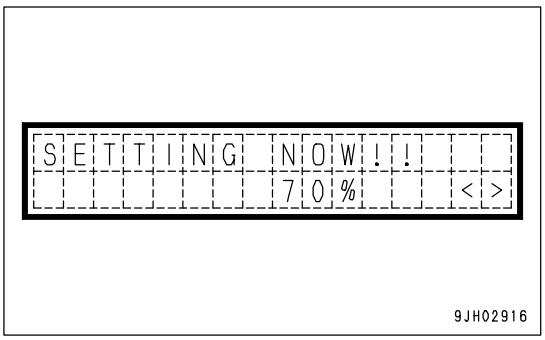
1. Adjusting backlighting of liquid crystal display
   The diagram on the right is the mode for adjusting the brightness of the backlighting of the liquid crystal panel. On this screen, operate the buzzer cancel switch to ◇ to switch to the screen to adjust the brightness.



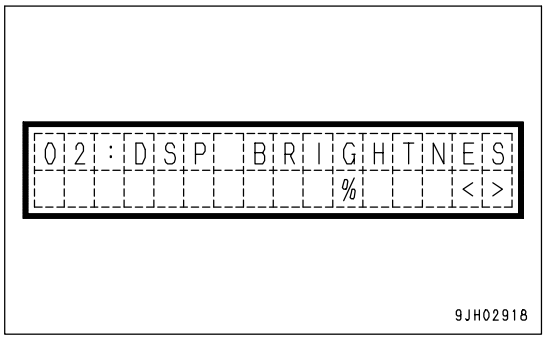
The brightness can be adjusted by operating the information switch.
The higher the number, the brighter the screen becomes; the lower the number, the darker the screen becomes.
> position: Number increases
< position: Number decreases



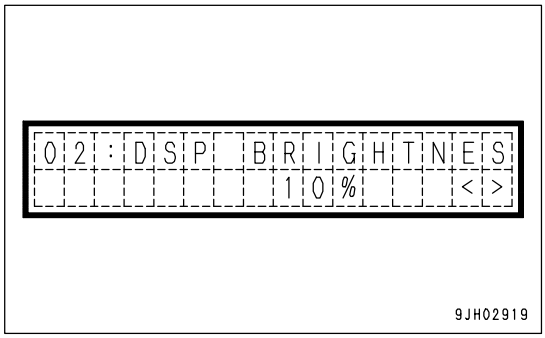
When the buzzer cancel switch is operated to ◇, the brightness of the liquid crystal display backlighting is set.



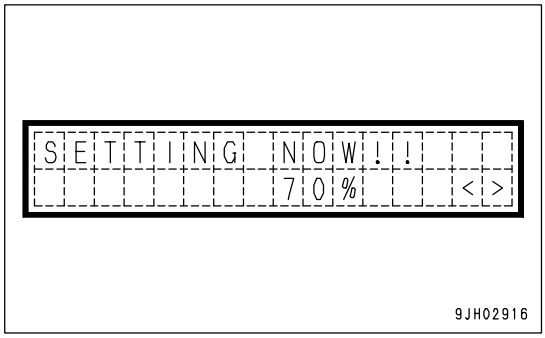
2. Adjusting backlighting of message display
   The diagram on the right is the mode for adjusting the brightness of the backlighting of the message display. On the screen, operate the buzzer cancel switch to ◇ to switch to the screen for adjusting the brightness.



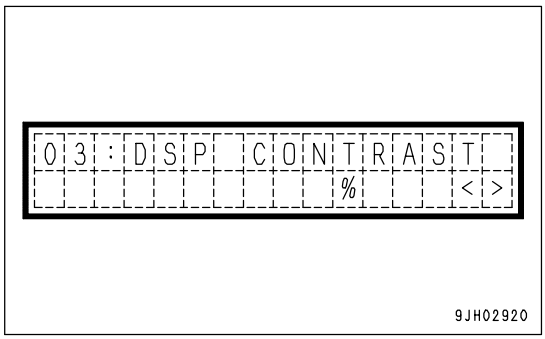
The brightness can be adjusted by operating the information switch.
The higher the number, the brighter the screen becomes; the lower the number, the darker the screen becomes.
> position: Number increases
< position: Number decreases



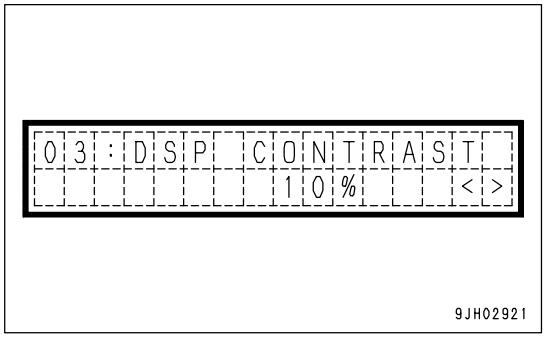
When the buzzer cancel switch is operated to ◇, the brightness of the message display backlighting is set.



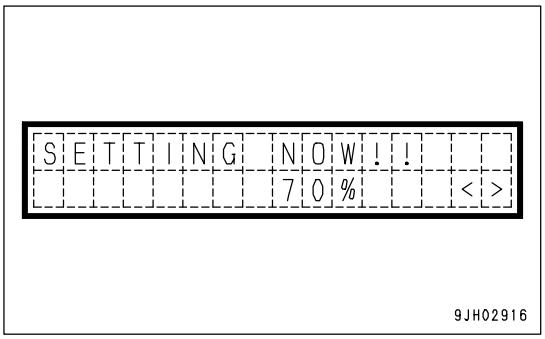
3. Adjusting contrast of liquid crystal message display
   The diagram on the right is the mode for adjusting the contrast of the liquid crystal message display.
   On this screen, operate the buzzer cancel switch to ◇ to switch to the screen to adjust the contrast.



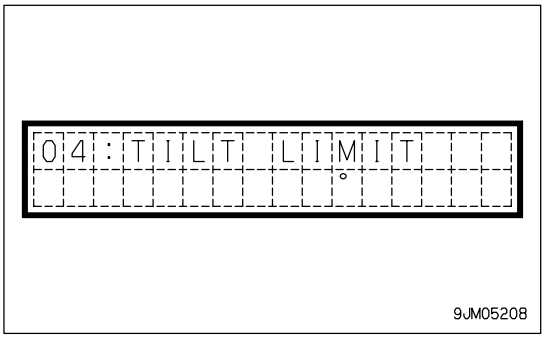
The contrast can be adjusted by operating the information switch.
The higher the number, the deeper the screen becomes; the lower the number, the lighter the screen becomes.
> position: Number increases
< position: Number decreases



When the buzzer cancel switch is operated to ◇, the contrast of the liquid crystal display is set.



4. Mode to set tilt limit (dual tilt machine)
   The diagram on the right is the mode used to set the tilt limit.
   The method for setting the tilt limit is as follows.



METHOD OF ENTERING USER ADJUSTMENT MODE AND METHOD OF ENTERING TILT LIMIT ADJUSTMENT MODE

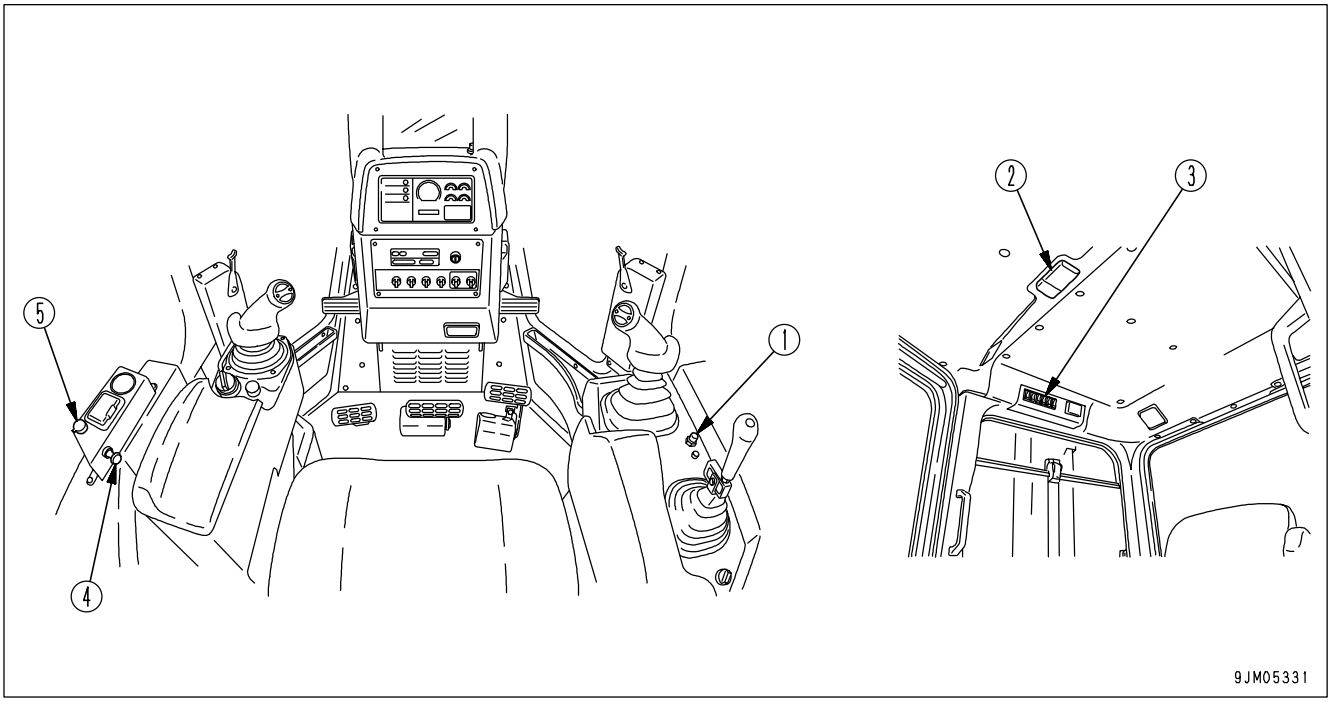
1. Turn the starting switch ON.
2. Hold the buzzer cancel switch at the SELECT position (◇) for 3 seconds.
   (This enters the user adjustment mode)
3. When the information switch is turned to the right or left, the service mode on the multi-information display changes, and 04:TILT LIMIT is displayed.
   Following this, if the buzzer cancel switch is operated to the SELECT position (◇), the system enters the control adjustment mode, but before starting, there are operations necessary for adjusting the tilt limit, so follow the procedure below.

METHOD OF ADJUSTING TILT LIMIT

1. Start the engine, use the toggle switch on the work equipment control lever to select DUAL TILT, tilt the work equipment back fully, then lower it to the ground.
2. Operate the buzzer cancel switch to the SELECT position (◇) to enter the tilt limit adjustment mode.
   When the pitch switch on the work equipment control lever is pressed, the buzzer sounds and the basic position of the work equipment is saved to memory.
3. Raise the work equipment 1000 mm (39.4 in), then tilt it 12° to the left.
   In this condition, use the toggle switch on the work equipment control lever to switch to SINGLE TILT, then switch back to DUAL TILT. The buzzer sounds and the left limit position is saved to memory.
4. Set the buzzer cancel switch to the CANCEL position (■) to exit the tilt limit adjustment mode.
5. Operate the work equipment to pitch dump to set to the full pitch dump position. (Keep the work equipment horizontal.)
6. Operate the buzzer cancel switch to the SELECT position (◇) to enter the tilt limit adjustment mode again.
7. Raise the work equipment 1000 mm (39.4 in), then tilt it 12° to the right.
8. In this condition, use the toggle switch on the work equipment control lever to switch to SINGLE TILT, then switch back to DUAL TILT. The buzzer sounds and the right limit position is saved to memory.

   This completes the adjustment operation, so set the buzzer cancel switch to the CANCEL position (■) to exit the tilt limit adjustment mode, then lower the work equipment to the ground and stop the engine.

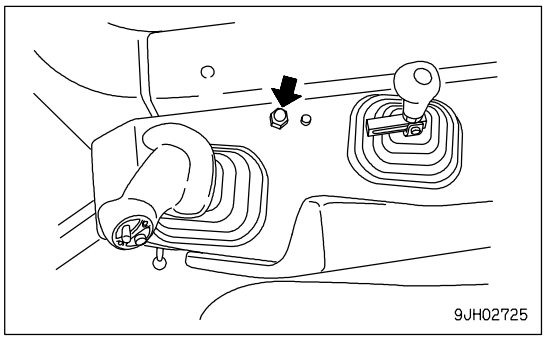
SWITCH



(1) Horn switch
(2) Room lamp switch
(3) Wiper switch
(4) Cigarette lighter (machines equipped with cab)
(5) Accessory socket

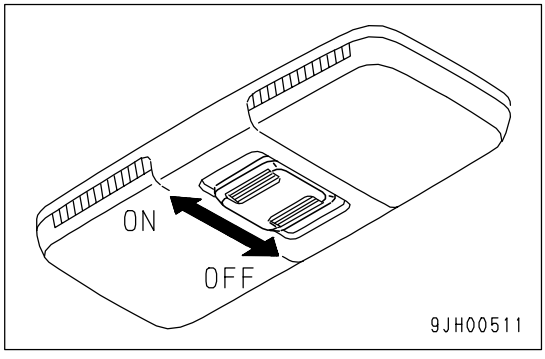
HORN SWITCH

The horn sounds when the button (1) at the rear of the blade control lever at the right side of the operator's seat is pressed.



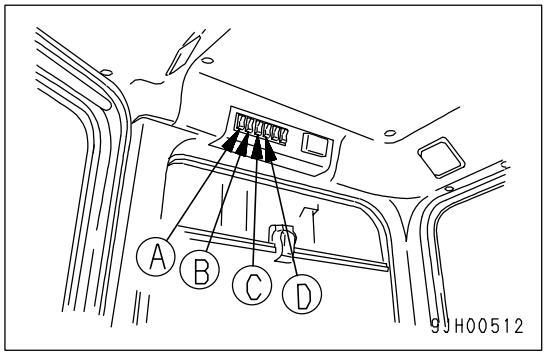
ROOM LAMP SWITCH

This (2) lights up the room lamp.
ON position: Lamp lights up
OFF position: Lamp is out

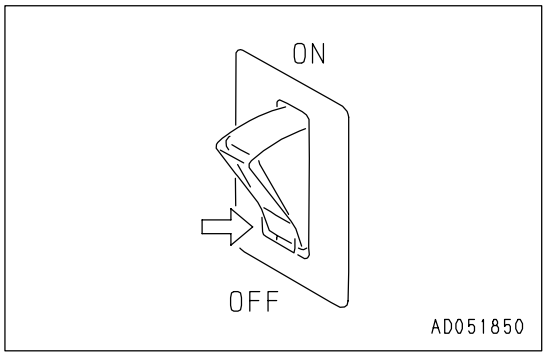


WIPER SWITCH

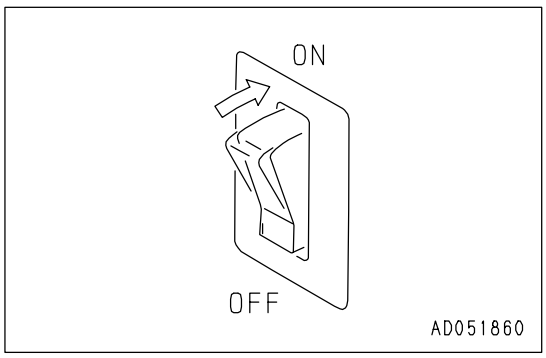
This (3) activates the wipers.
The wiper switches are as follows.
(A) Rear window
(B) Right door
(C) Left door
(D) Front window
This is also used as the window washer switch.
The switch is operated as follows.



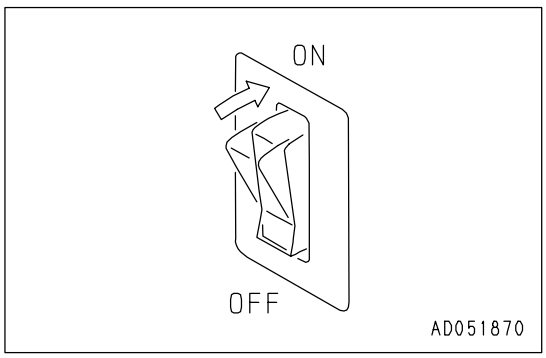
- Window washer only
  Keep the switch pressed to the OFF position to spray out water.



- Wiper only
  If this is switched on, the wiper will start.

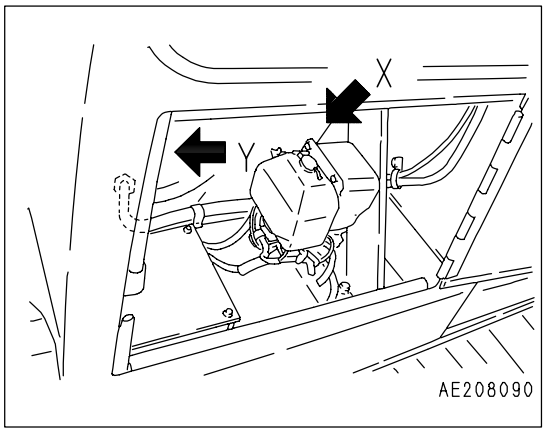


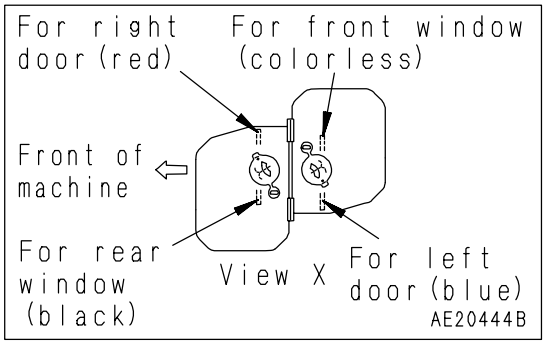
- Wiper and window washer
  If this is kept pressed to the ON position while the wiper is working, water will be sprayed out.

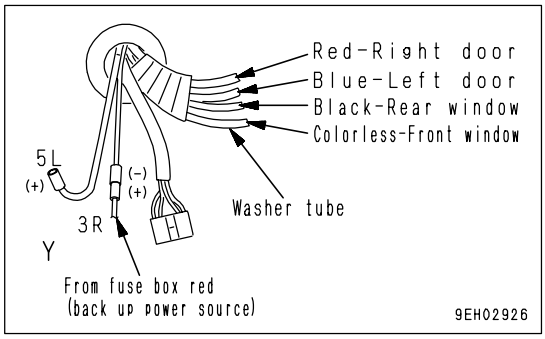


REMARK

When installing the cab, check the colors of the washer tank and window washer hoses, and be sure to connect correctly.







CIGARETTE LIGHTER

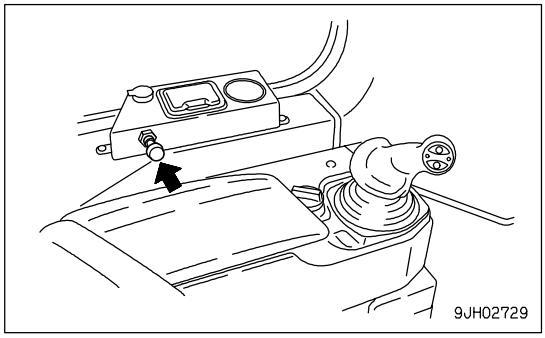
This (4) is used to light cigarettes.

When the cigarette lighter is pushed in, it will return to its original position after a few seconds, so take it out to light your cigarette.

Cigarette lighter capacity: 120W

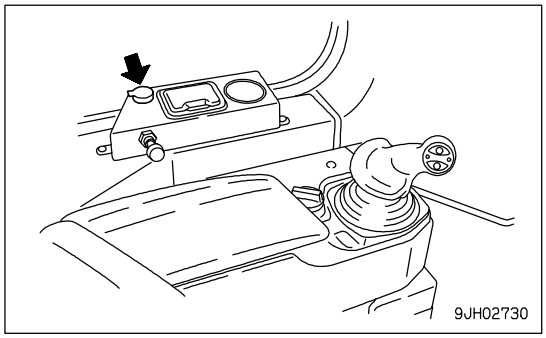
NOTICE

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

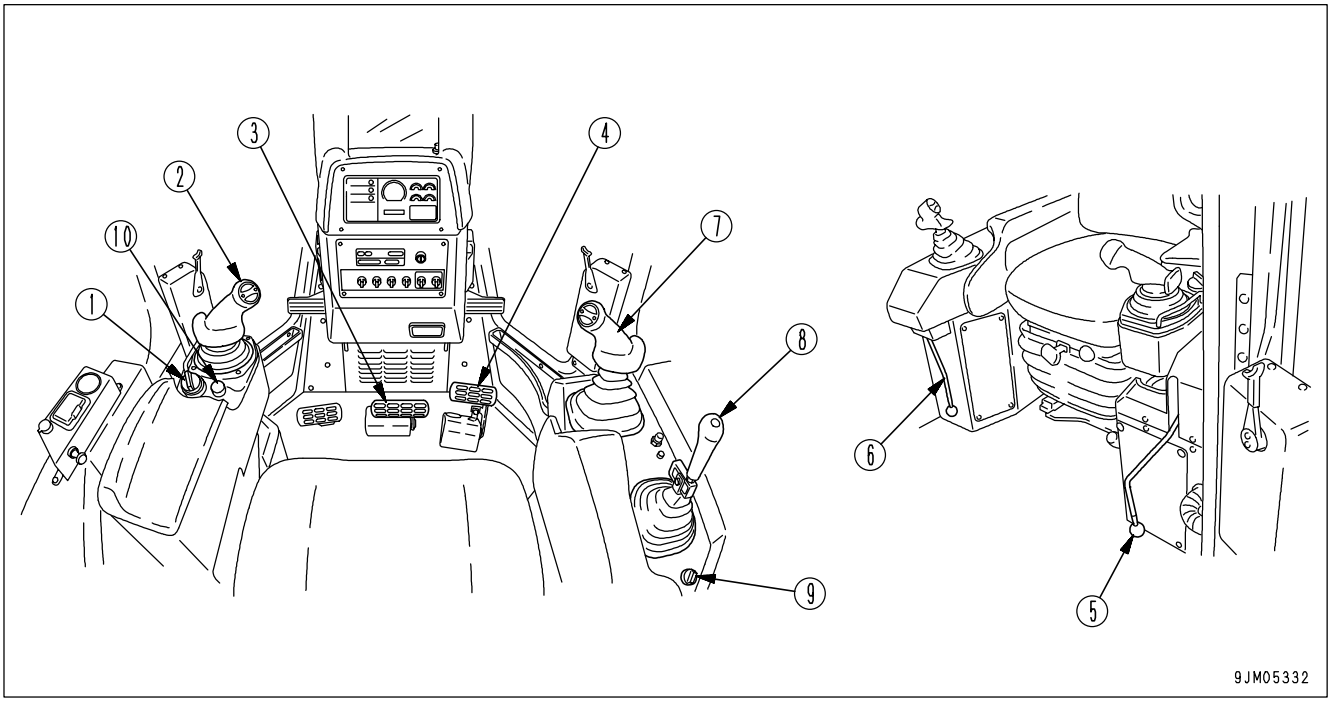


ACCESSORY SOCKET

This (5) is used as the power source for a wireless or other 12V equipment.



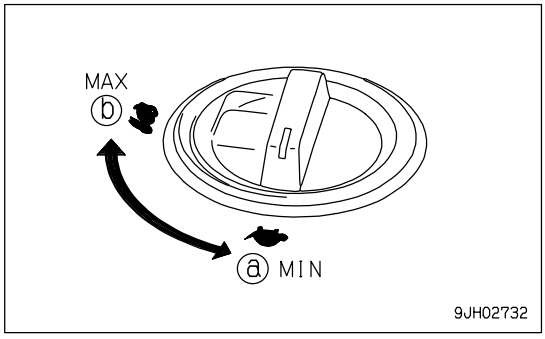
CONTROL LEVERS, PEDALS



(1) Fuel control dial
(2) Joystick (steering, directional and gear shift lever)
(3) Brake pedal
(4) Deceleration pedal
(5) Parking lever
(6) Safety lever
(for blade control lever, ripper control lever)
(7) Blade control lever
(8) Ripper control lever
(9) Pin puller control switch (for giant ripper)
(10) Neutral switch

FUEL CONTROL DIAL

This dial (1) is used to control the engine speed and output.
(a) Low idling position: Turn fully to the left
(b) High idling position: Turn fully to the right

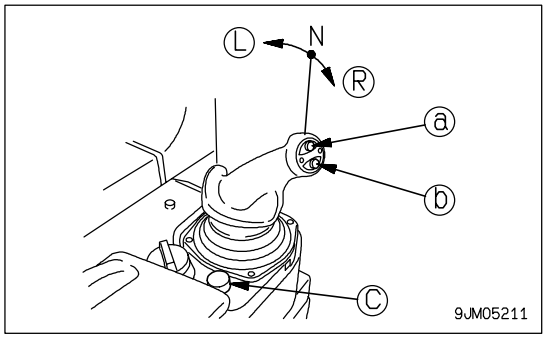


REMARK
When stopping the engine, set the starting switch to the OFF position.

JOYSTICK (STEERINTG, DIRECTIONAL AND GEAR SHIFT LEVER)

(PCCS lever Type R)

This lever (2) is used to switch between forward and reverse to steer and gear shift the machine or carry out counter rotation turns.



REMARK

PCCS: Palm command control system

- **Forward-reverse shifting**

The direction of travel (FORWARD, REVERSE) is selected by pressing switch (a) or switch (b).

Press switch (c) to return to neutral.

FORWARD switch (a): Press once to set to FORWARD

REVERSE switch (b): Press once to set to REVERSE

NEUTRAL switch (c): Press once to set to NEUTRAL

- **Steering**

(L)Left turn

(R)Right turn

With the switch operated to the front or rear, operate the lever partially to the left or right to turn the machine. The machine will turn gradually in the same direction as the lever is operated.

If the lever is operated fully to the left or right, the machine will turn in a small radius.

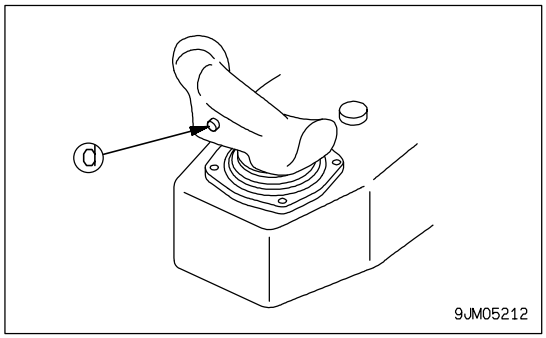
REMARK

- If the lever is released when steering the machine, the lever will return to the (N) position and the machine will be returned to straight movement.

- **Gear shifting**

Press switch (d) to shift gear when traveling in forward or reverse. For details of the maximum speed for each speed range, see SPECIFICATIONS (5-2).

Shift switch (d): Each time switch is pressed, speed range changes 1st → 2nd → 1st



REMARK

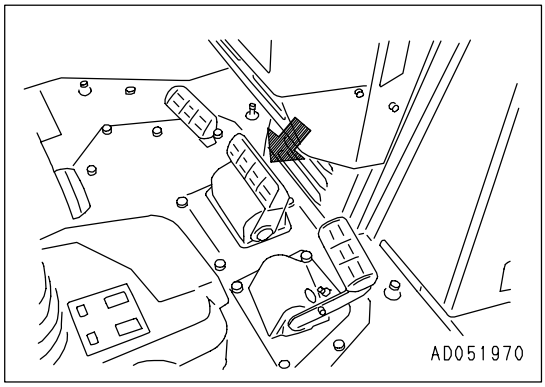
- The speed range being used is displayed on the monitor panel according to the gearshift operation.
  <Example>
  Neutral: N is displayed on the display panel.
  FORWARD 1st: F1 is displayed on the display panel.
  REVERSE 2nd: R2 is displayed on the display panel.
  When the parking lever is locked, P is displayed.
- For details of the method of shifting gear according to the shift mode, see the "SHIFTING GEAR (PAGE 3-98)". Shift mode selection means that the selected speed range is displayed at the N position before starting.

BRAKE PEDAL

WARNING

Do not place your foot on this pedal unnecessarily.

Depress the pedal (3) to apply the right and left brakes.

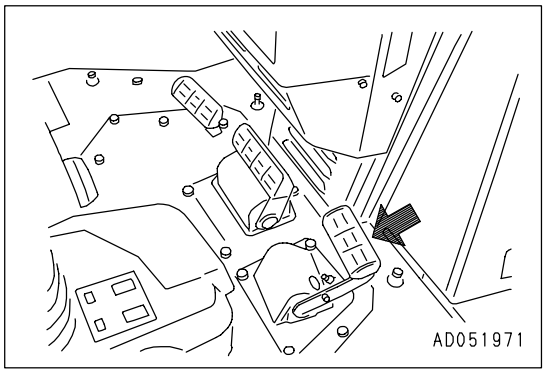


DECELERATION PEDAL

WARNING

- **Do not place your foot on this pedal unnecessarily.**
- **When passing over the top of a hill or when a load is dumped over a cliff, the load is suddenly reduced, so there is danger that the travel speed will also increase suddenly. To prevent this, depress the decelerator pedal to reduce the travel speed.**

This pedal (4) is used when reducing the engine speed or stopping the machine.
When switching between forward and reverse, or when stopping the machine, use this pedal to reduce speed.



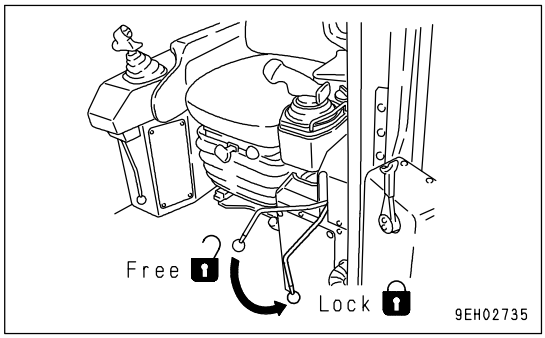
REMARK
When operating the deceleration panel, there may be a particular noise, but there is no problem with quality or durability.

PARKING LEVER

WARNING

When the machine is parked, always set the parking lever to the LOCK position.

This lever (5) is used to apply the parking brake.

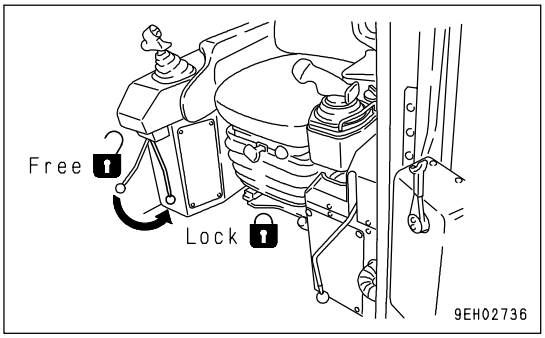


REMARK
- When operating the parking lever to the LOCK position, return the steering, directional, and gearshift lever to the N position first.
- When starting the engine, if the parking lever is not at the LOCK position, the limit switch is actuated and it is impossible to start the engine.

SAFETY LOCK LEVER

⚠ WARNING

- **When standing up from the operator's seat, always set the safety lever securely to the LOCK position.**
  If the blade control and ripper control levers are not locked and are touched by accident, it may lead to serious injury or damage.
- **If the safety lever is not set securely to the LOCK position, the lock may not be applied.**
  Check that it is in the position shown in the diagram.
- **When parking the machine or when carrying out maintenance, always lower the blade and ripper to the ground, then set the safety lever to the LOCK position.**



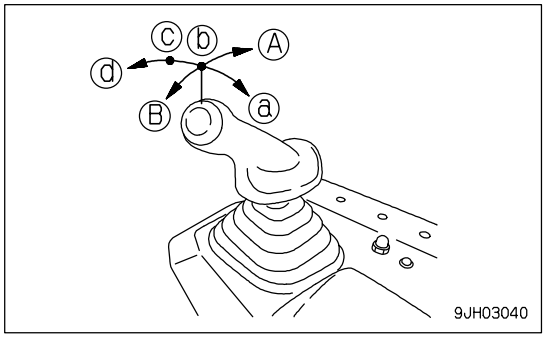
This safety lever (6) is a device to lock the blade control and ripper control levers.
When it is set to the LOCK position, the TILT, RAISE, LOWER, and FLOAT operations are locked.

REMARK
When starting the engine, to ensure safety, always set the safety lever to the LOCK position.

BLADE CONTROL LEVER

This lever (7) is used to raise the blade.

Single tiltdozer



This lever is used to raise or tilt the blade.

- Lifting control

(a) RAISE:

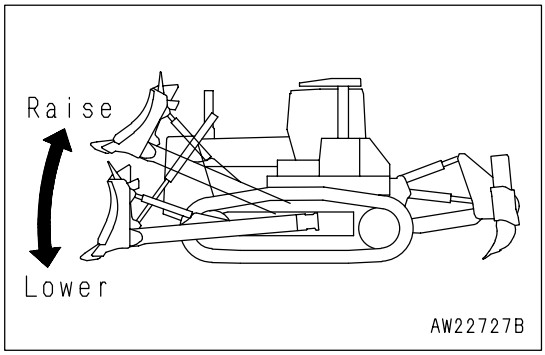
(b) HOLD:

Blade is stopped and held in this position.

(c) LOWER:

(d) FLOAT:

Blade will move freely according to external force.



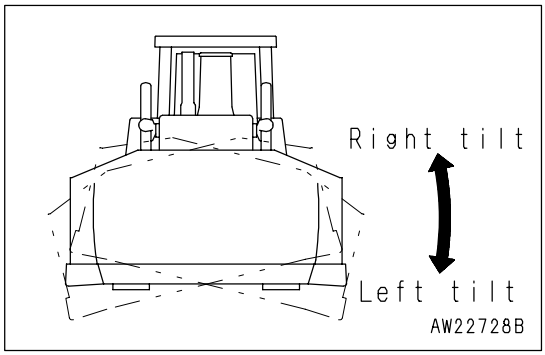
REMARK

When released form FLOAT position, this lever will not return to HOLD position, so it must be moved back by hand.

- Tilting control

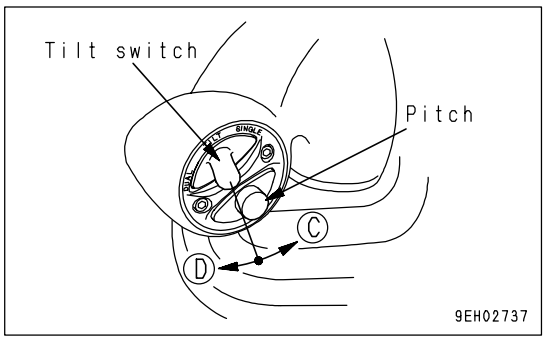
(A) RIGHT TILT

(B) LEFT TILT



DUAL TILTDOZER

Operate the tilt switch to the (D) position.



This lever is used to raise or tilt the blade.

• Lifting control

(a) RAISE:

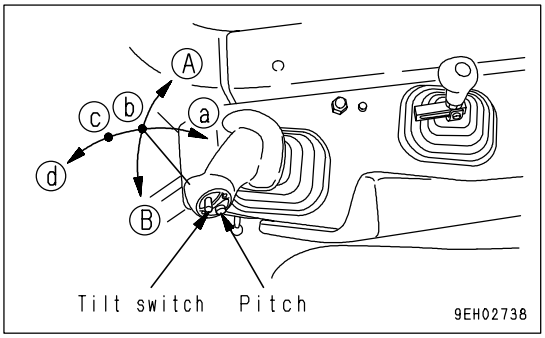
(b) HOLD:

Blade is stopped and held in this position.

(c) LOWER:

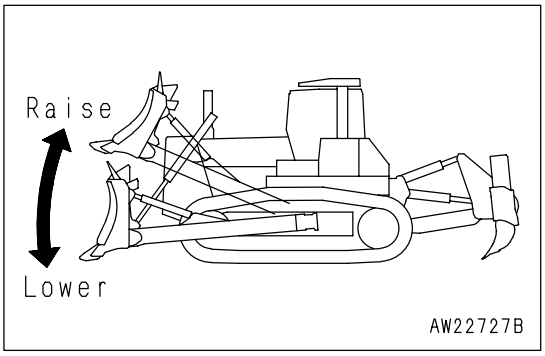
(d) FLOAT:

Blade will move freely according to external force.



REMARK

When released form FLOAT position, this lever will not return to HOLD position, so it must be moved back by hand.



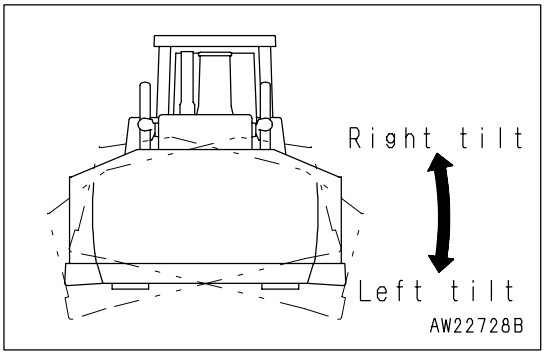
• DUAL TILT OPERATION

(A) RIGHT TILT

(B) LEFT TILT

REMARK

- With the dual tilt operation, a larger amount of tilt can be obtained than with the single tilt operation.
- With the dual tilt operation, the blade can be operated to any of RAISE, HOLD, or LOWER.

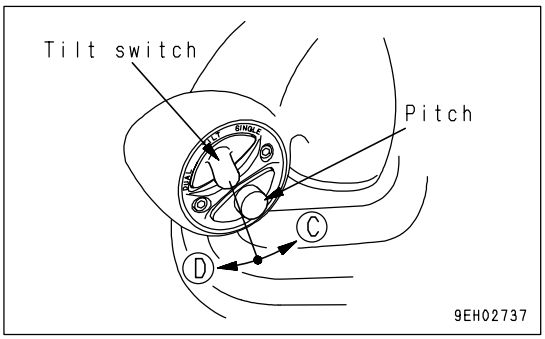


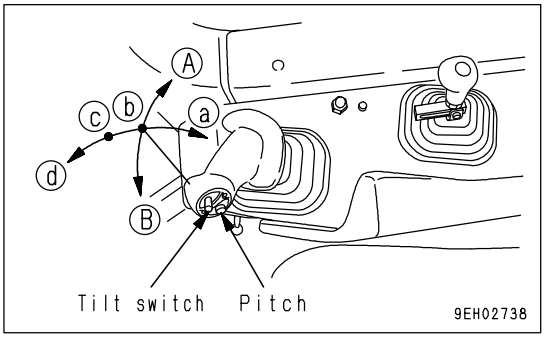
• Single tilt operation

Operate the tilt switch to the (C) position.

(A) RIGHT TILT

(B) LEFT TILT

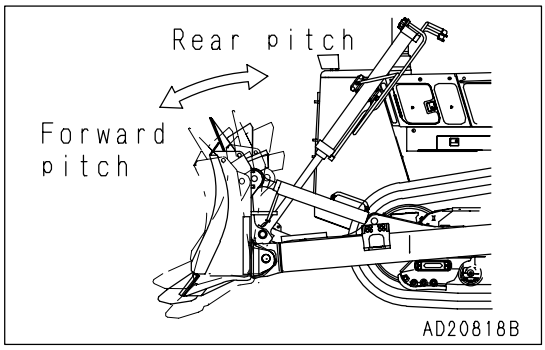




• Pitch control

Rear pitch (cutting angle reduced)
Carry out operation (B) with the pitch button pressed.

Forward pitch (cutting angle increased)
Carry out operation (A) with the pitch button pressed.



REMARK

- With the pitch operation, the blade can be operated to any of RAISE, HOLD, or LOWER.
- For details of the effective use of the dual tilt dozer, see "EFECTIVE METHOD OF OPERATION FOR DUAL TILT DOZER (PAGE 6-6)".
- To operate the pitch, keep the pitch button pressed and operate the blade control lever to the left or right to start the operation.
- The pitch is the priority circuit, so if the pitch button is pressed during single tilt operation, the pitch will be actuated.

RIPPER CONTROL LEVER

(For variable ripper)

This is used to operate the ripper.

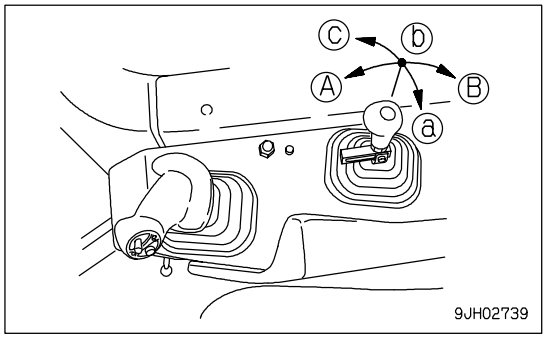
(a)RAISE

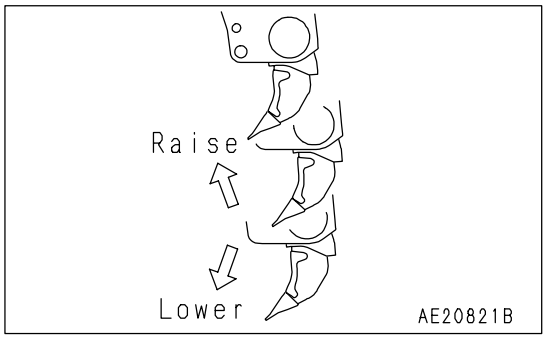
(b)HOLD: Ripper is stopped and held in the same position.

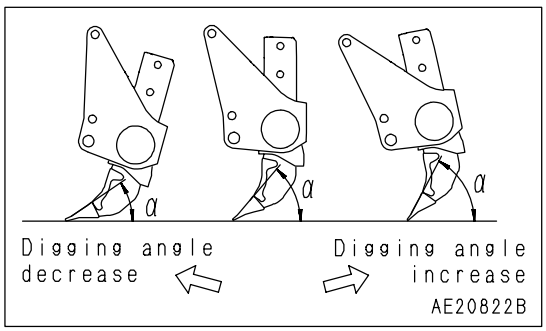
(c)LOWER

(A)Digging angle reduced: Cutting angle (α) becomes smaller.

(B)Digging angle increased: Cutting angle (α) becomes larger.

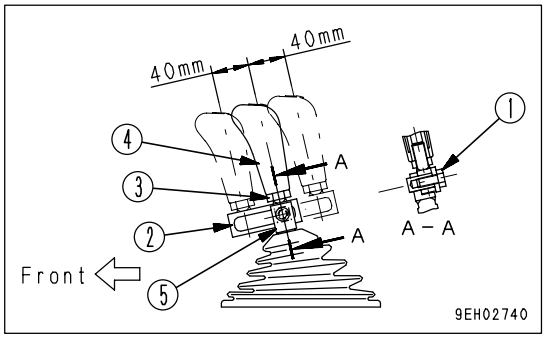






ADJUSTING FRONT-REAR POSITION OF RIPPER CONTROL LEVER

(Range of adjustment: ± 40 mm (1.6 in))



The position can be adjusted to suit the operator. The procedure is as follows.

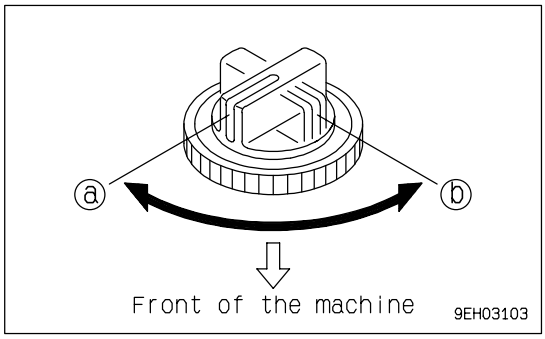
- Adjusting within range of 40 mm (1.6 in) from neutral to rear
  1. Using a wrench, loosen lock bolt (1).
  2. Set lever (2) to the most suitable position.
  3. Tighten lock bolt (1) with the wrench to hold the lever (2) in position.
- Adjusting within range of 40 mm (1.6 in) from neutral to front
  1. Remove lock bolt (1).
  2. Remove lever (2) and turn it 180°.
  3. Install lever (2) to lever (5), then set it to the most suitable position.
  4. Tighten lock bolt (1) with the wrench to hold lever (2) in position.
  5. Loosen nut (3).
  6. Turn knob (4) 180°.
  7. Tighten nut (3)

PIN PULLER CONTROL SWITCH (IF EQUIPPED)

This is used to operate the pin puller.

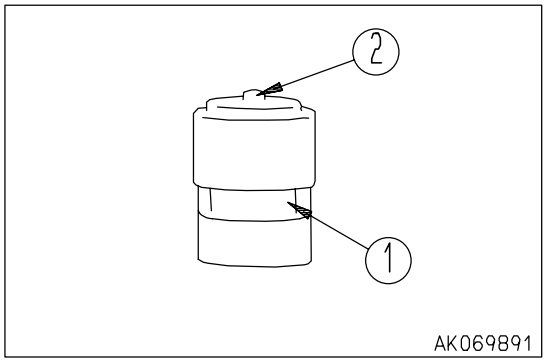
(a)PULL OUT: Pin is pulled out.

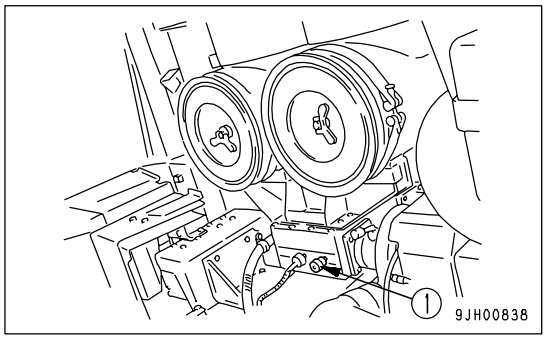
(b)PUSH IN: Pin is pushed in.



DUST INDICATOR

This device indicates clogging of the air cleaner element.
When the red piston appears in transparent part (1) of this indicator, the element is clogged. Clean the element immediately. After cleaning, push indicator button (2) to return the red piston to its original position.
The dust indicator is on the air cleaner bracket inside the engine room.





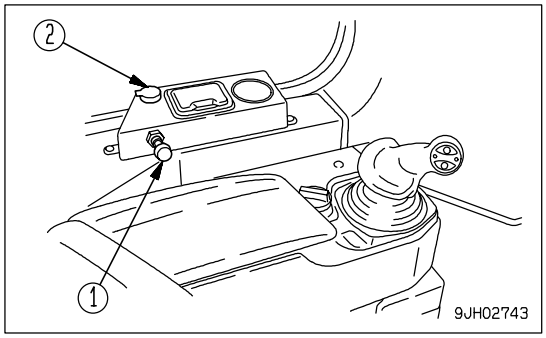
POWER SOURSE

The cigarette lighter socket (1) can be used as a power source for 24V equipment and the accessory socket (2) can be used for 12V equipment.

NOTICE

The power from the cigarette lighter socket is 24V. Do not use this as the power source for any 12V equipment.

The capacity of the cigarette lighter power source is 120W (24V x 5A).



FUSE BOX

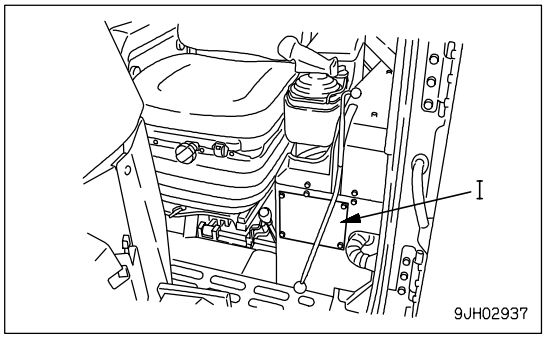
NOTICE

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

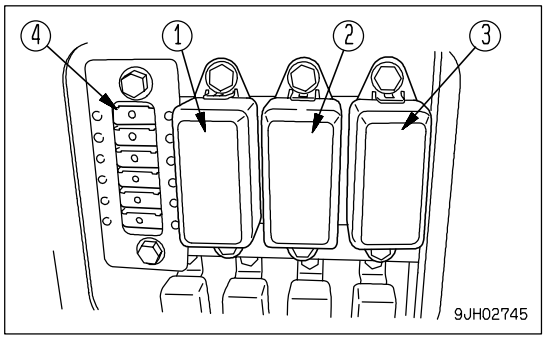
The fuses protect the electrical equipment and wiring from burning out.
If the fuse becomes corroded, or white powder can be seen, or the fuse is loose in the fuse holder, replace the fuse.
Replace a fuse with another of the same capacity.

• Chassis

Open the fuse inspection cover at the bottom front left of the operator's compartment. Fuse box I is installed inside.

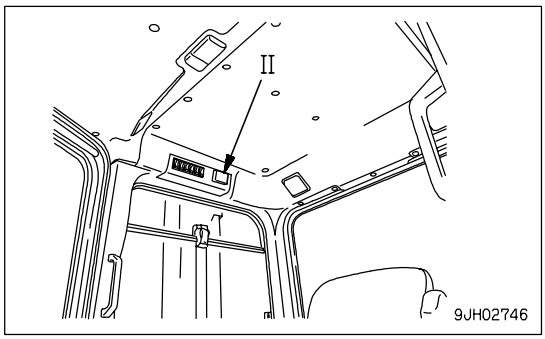


(1) Fuse box fs1
(2) Fuse box fs2
(3) Fuse box fs4
(4) Circuit breaker



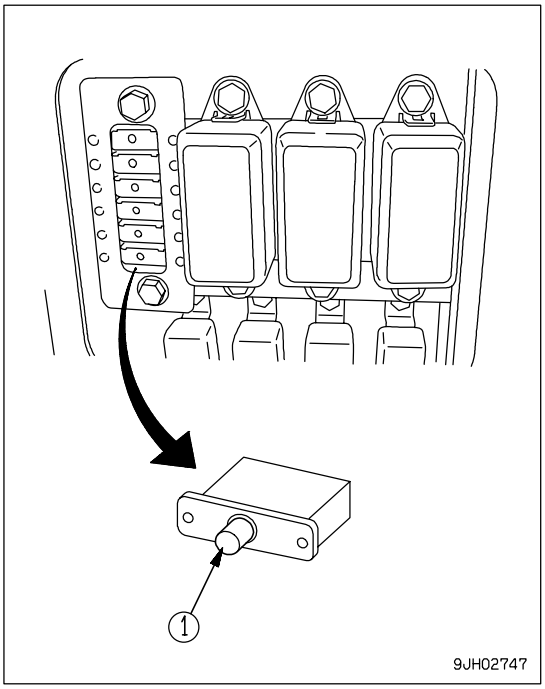
• Cab (machines equipped with cab)

Fuse box II is installed at the bottom of the overhead panel.

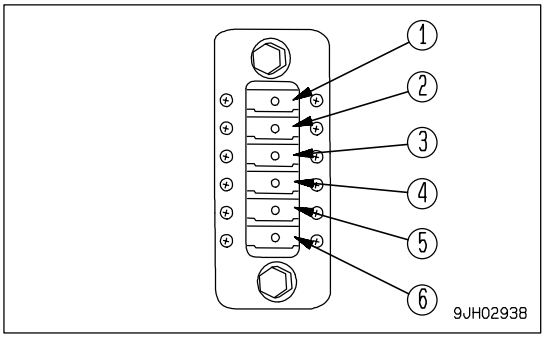


CIRCUIT BREAKER

- If the starting switch does not work even when the starting switch is turned to the ON position, open the circuit breaker box and check.
- If excessive current flows through the circuit breaker, it cuts off the electric circuit to prevent damage to the electrical components and wiring.
- To restore the electric circuit after it has been cut off, push in reset button (1). (This springs out when the circuit is cut off.)
  If the electric circuit is normal, reset button (1) will stay pushed in. If it comes out immediately when it is pushed in, the electric circuit must be checked.



No.	Capacity	Circuit
(1)	20A	Steering controller
(2)	20A	Monitor panel
(3)	20A	Transmission controller
(4)	20A	Air con main power
(5)	20A	Head lamp
(6)	20A	Starter switch



REMARK

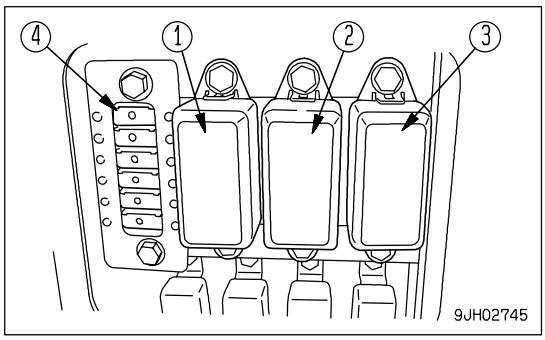
The circuit breaker is a device installed in electric circuits where a large current flows. It is installed to protect the electric circuit. It protects the electric components and wiring from damage caused by an abnormal current in the same way as a
normal fuse. After repairing and restoring the location of the abnormality, there is no need to replace the breaker. It can be used again.

FUSE CAPACITY AND NAME OF CIRCUIT

FUSE BOX I

(1) Fuse box fs1

No.	Fuse capacity	Circuit
1	20A	
2	20A	CAB continuous power
3	10A	-
4	10A	-
5	20A	VHMS continuous power



(2) Fuse box fs2

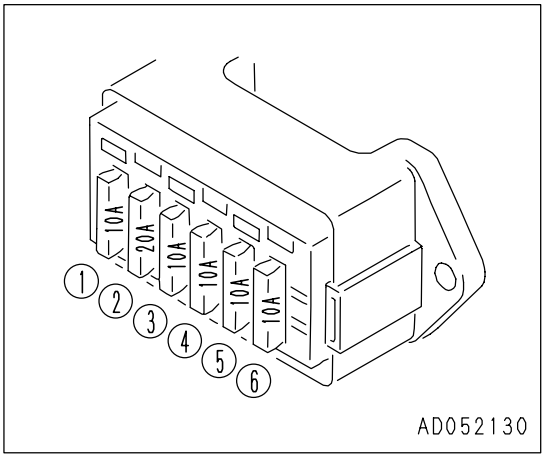
No.	Fuse capacity	Circuit
1	20A	Auxiliary power 1
2	20A	Fuel pump power
3	20A	Add heater power
4	20A	Work lamp
5	20A	Rear lamp

(3) Fuse box fs4

No.	Fuse capacity	Circuit
1	20A	Back up alarm
2	20A	Auxiliary power 2
3	20A	VHMS controller
4	20A	Ribbon heater, Horn
5	20A	Auxiliary acc signal

FUSE BOX II

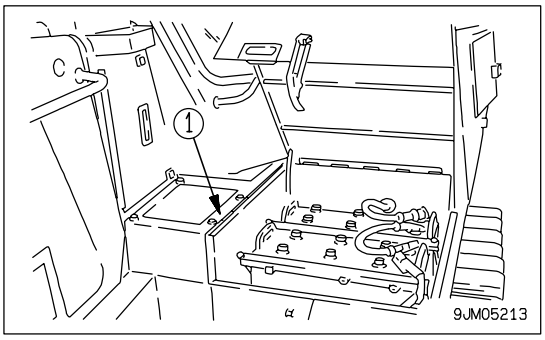
NO.	Fuse capacity	Circuit
(1)	10A	Radio memory
(2)	20A	Radio, lamp, cigarette lighter
(3)	10A	Rear wiper
(4)	10A	Right door wiper
(5)	10A	Front wiper
(6)	10A	Left door wiper

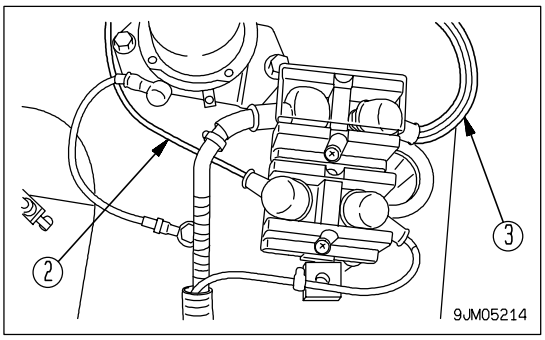


FUSIBLE LINK

If the starting motor does not work even when the starting switch is turned to the ON position, there may be a disconnection in fusible links (2) and (3) on top of the wiring, so remove the cover (1) at the side of the battery box cover on the left side of the machine and check or replace.

Capacity of (2): 32 A
Capacity of (3): 96 A





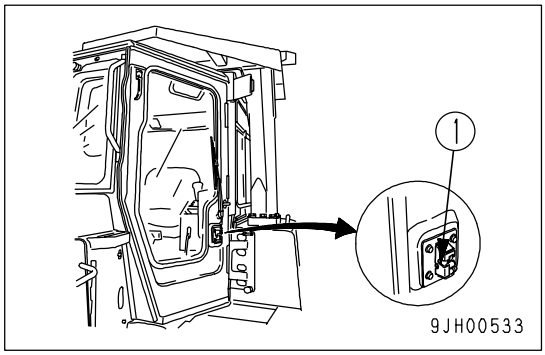
REMARK

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

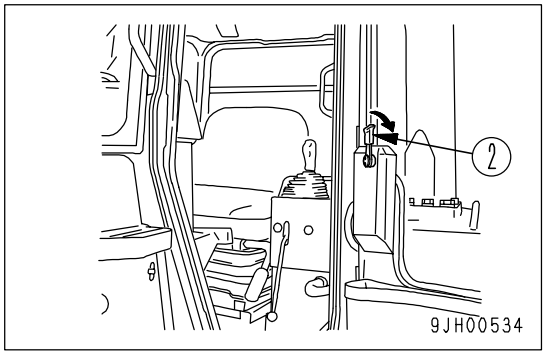
DOOR OPEN LOCK

Use this when your want to keep the door held open.

1. Push the door against door catch (1). The door will be held by the door catch.



2. To release the door, move lever (2) inside the cab to the front of the cab. This will release the catch.



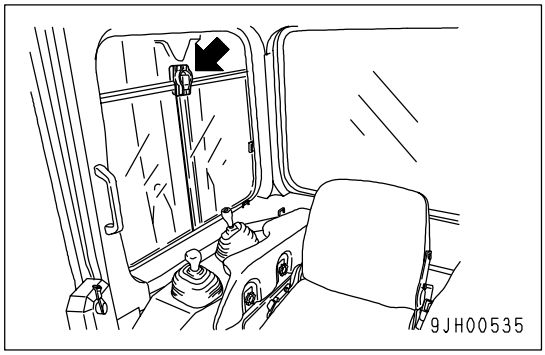
NOTICE

- **When keeping the door open, fix it securely to the catch.**
- **Always close the door when traveling or carrying out operations. Leaving the door open will cause the door to break.**
- **Keep the door locked open securely. The door may swing closed because of the vibration.**

SASH GLASS INTERMEDIATE LOCK

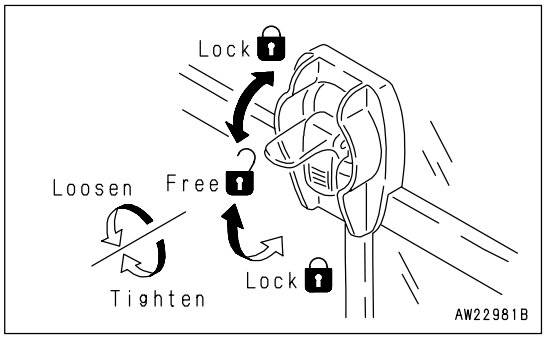
When working with the cab sash glass open, use this lock to prevent the glass from chattering.

- When the lever is at the FREE position, the glass can be opened or closed.
- When the lever is moved to the LOCK (up or down) position, the glass is fixed in position.
- If the glass is not held securely, set the lever in the FREE position and rotate clockwise to strengthen the holding power.
- To reduce the holding power, turn counterclockwise.



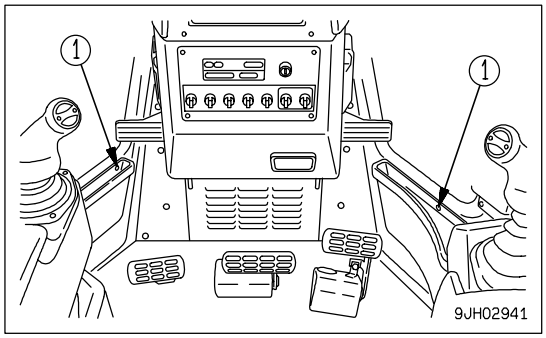
NOTICE

Always close the window when traveling or carrying out operations. Leaving the window open will cause the window to break.



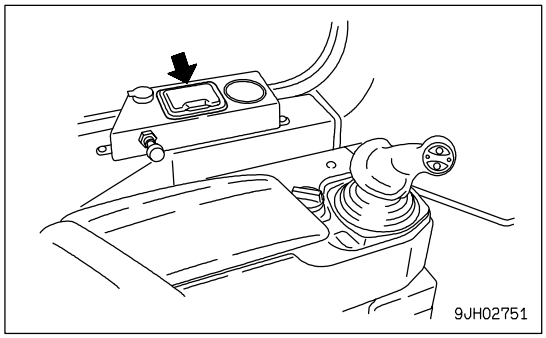
DOOR POCKET

This is inside the left and right doors. Use it for keeping things.
Do not put the heavy tools or other heavy objects in it.
If the pocket is dirty, loosen three bolts (1), then remove the pocket and rinse it.



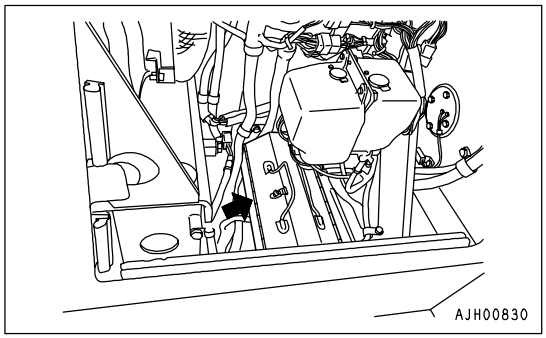
ASHTRAY

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



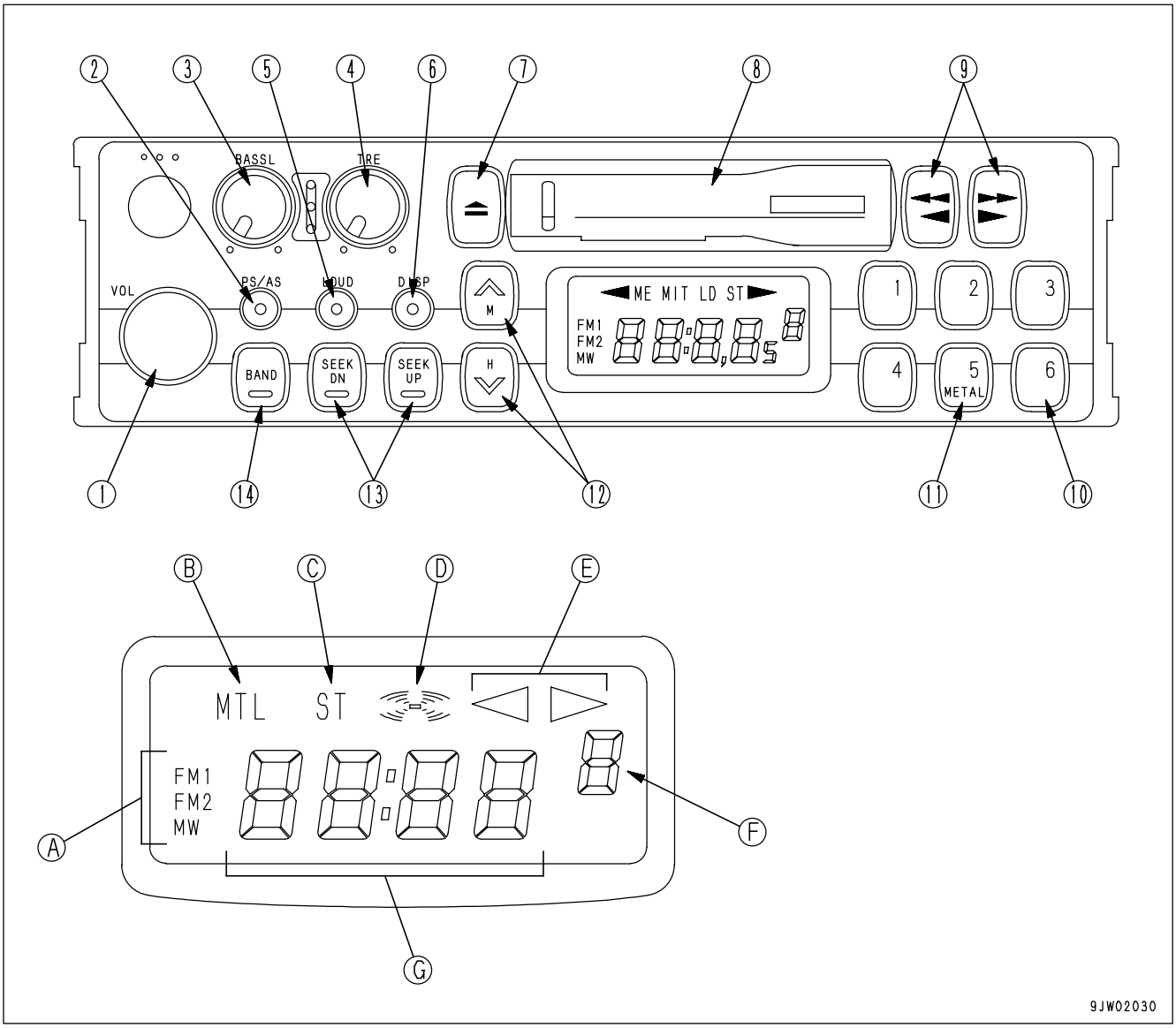
TOOL BOX

This is inside the front of the right fender.
It is used for storing tools.



CAR STEREO, HANDLING

EXPRANATION OF COMPONENTS

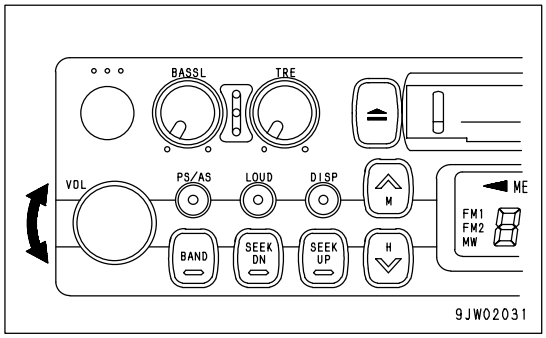


(1) Power switch/volume
(2) Auto-store/preset scan button
(3) Bass control knob
(4) Treble control knob
(5) Loudness button
(6) Time/radio display selector button
(7) Tape eject button
(8) Cassette door
(9) Fast forward, rewind buttons
(10) Preset buttons
(11) Metal tape button
(12) Manual tuning buttons
(13) Seek tuning buttons
(14) Band selector button

(A) Band display
(B) Metal tape display
(C) FM stereo reception display
(D) Loudness display
(E) Tape direction display
(F) Preset channel display
(G) Time/frequency display

POWER SWITCH/VOLUME

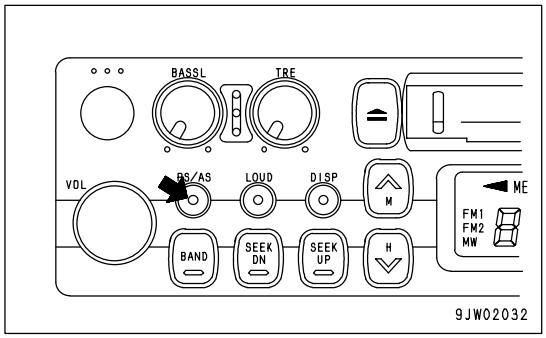
Turn this knob (1) to the right until it clicks to turn the power on. Turn it further to increase the volume.



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.

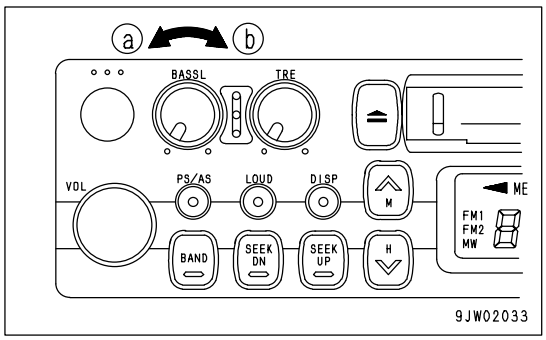


REMARK

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.

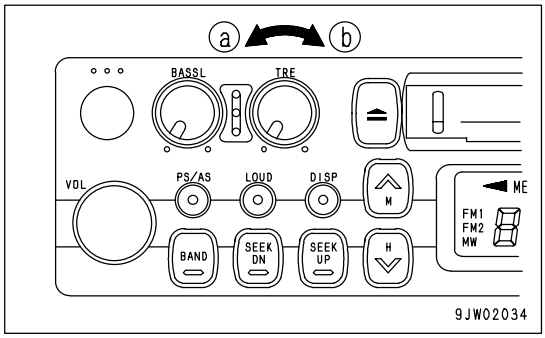
BASS CONTROL KNOB

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



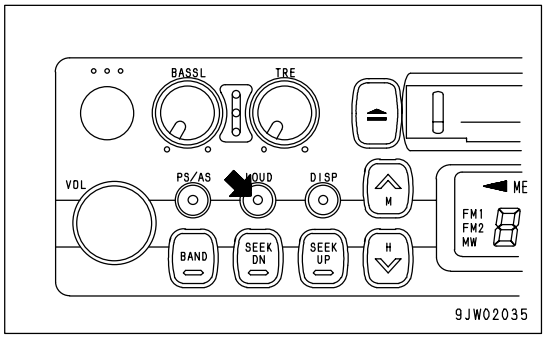
TREBLE CONTROL KNOB

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



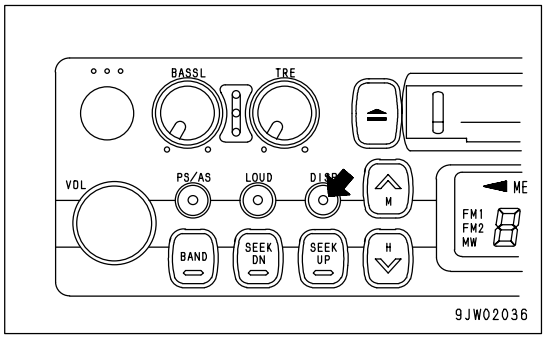
LOUDNESS BUTTON

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)

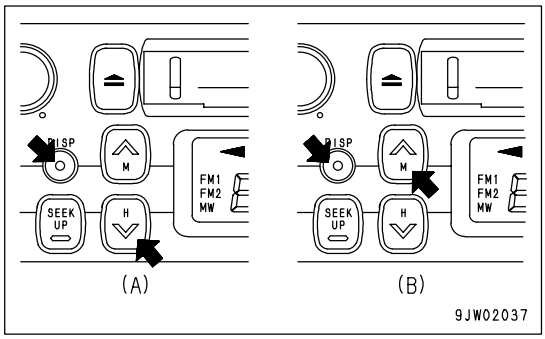


TIME/RADIO DISPLAY SELECTOR BUTTON

This button (6) is used to switch between the "Radio/tape display" and the "Time display".

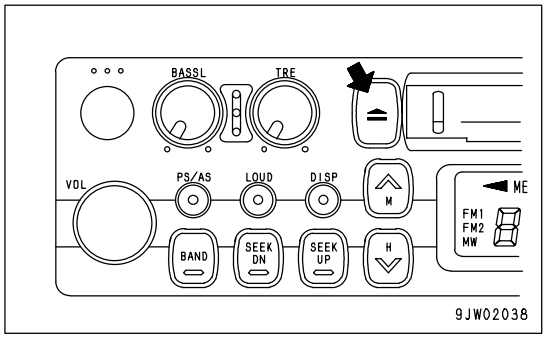


- Correcting time
  Press the button to set to the time display.
  (A) Correcting hour :
  Keep the DISP button pressed and press the bottom tuning button (H) to correct the hour.
  (B) Correcting minute :
  Keep the DISP button pressed and press the top tuning button (M) to correct the minute.



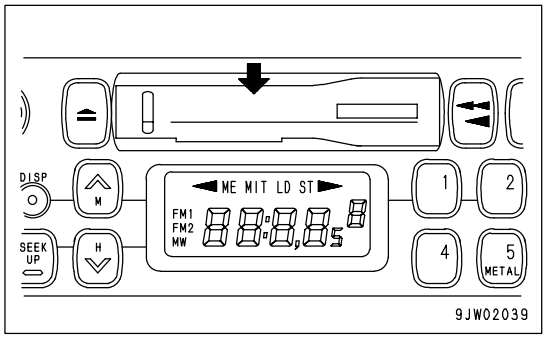
TAPE EJECT BUTTON

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 the radio plays.



CASSETTE DOOR

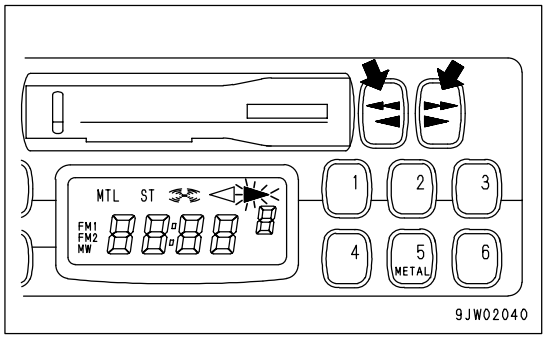
Set the cassette with the exposed portion of the tape on the right side and insert it in cassette door (8).



FAST FORWARD, REWIND BUTTONS

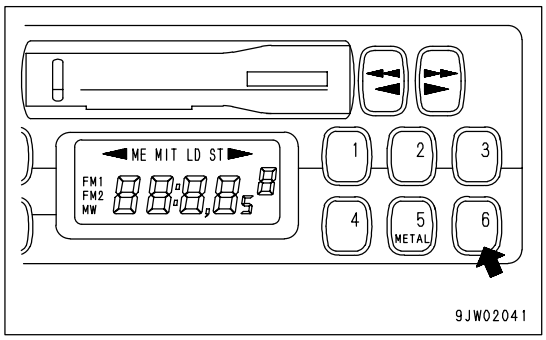
These buttons (9) are used to fast forward or rewind the tape.

- Fast forward/rewind
  If you press the button pointing in the same direction as the 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.



PRESET BUTTONS

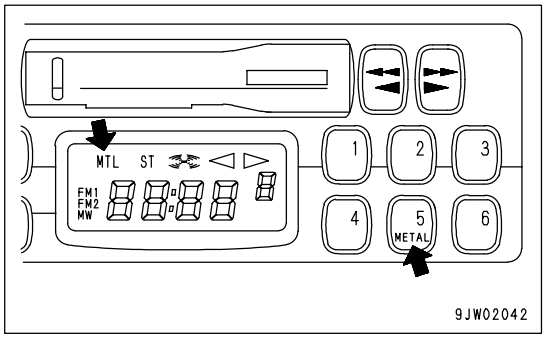
These buttons (10) are used to call up the broadcast station frequencies preset in memory for each of buttons No.1 to No.6.
It is possible to preset 18 stations (FM:12; AM:6) with these buttons.



METAL TAPE BUTTON

(used also for preset button No.5)

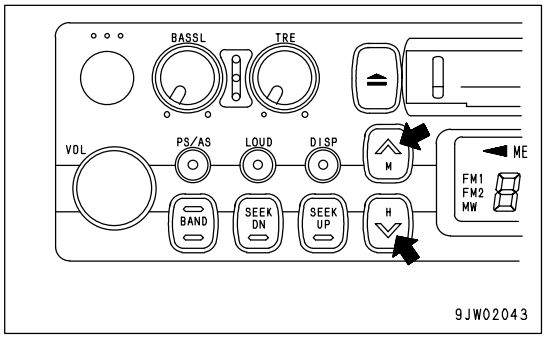
This button (11) is used when playing a metal or chrome tape. This button is used also for preset button No.5. When it is pressed, "MTL" appears on the display.



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 ∨" 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.

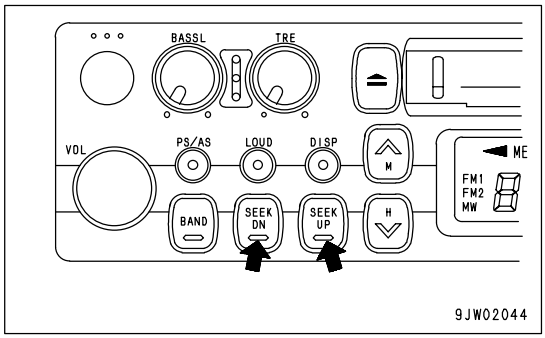


SEEK TUNING BUTTONS

These buttons (13) are used to seek tuning.

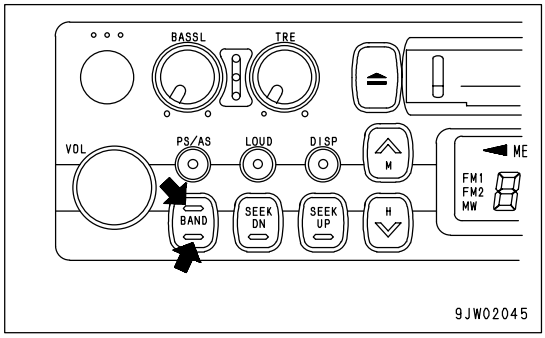
When the "SEEK UP" button of button is pressed, the frequency automatically goes up; when the "SEEK DOWN" button of button is pressed, the frequency automatically goes down.

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.

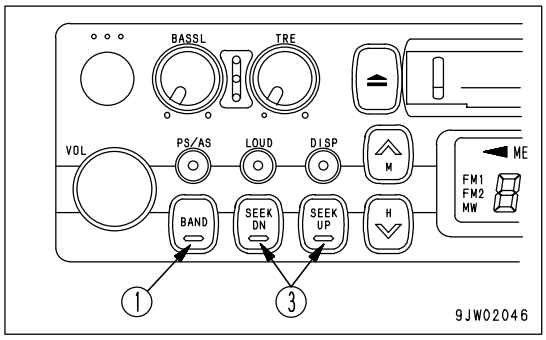


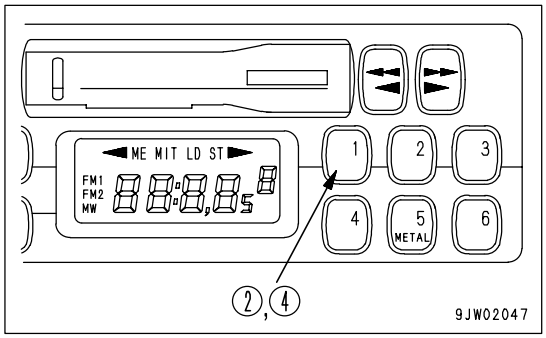
METOD OF OPERATION

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.



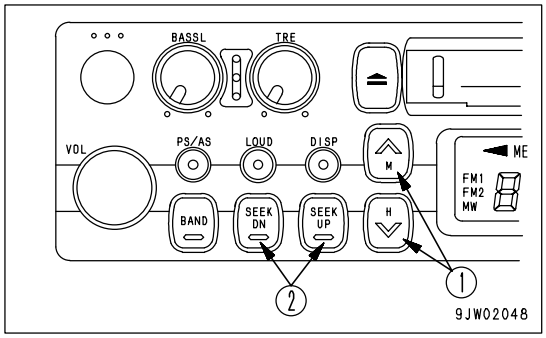


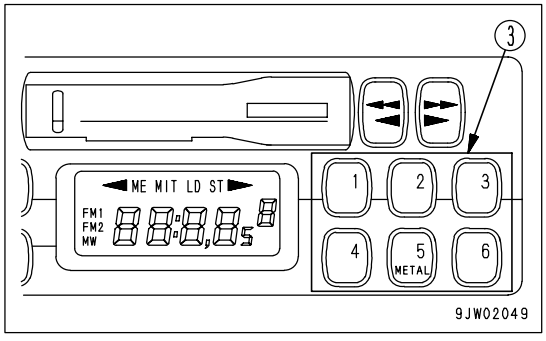
REMARK

- 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

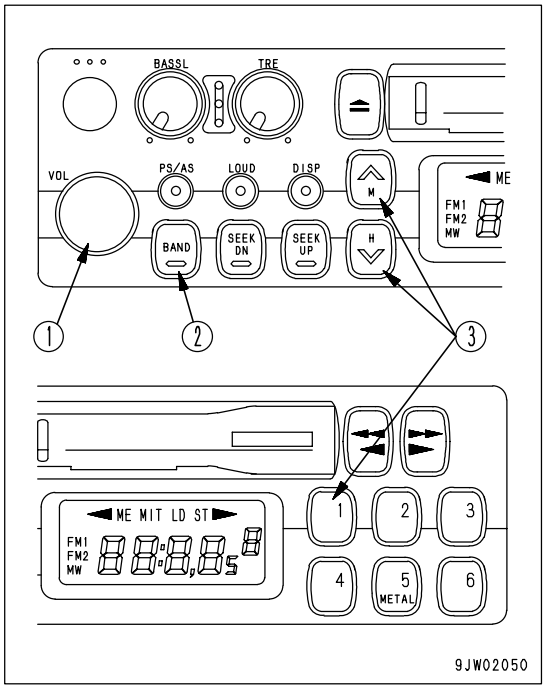
Select the station to be preset with manual tuning button (1) or seek tuning button (2), then keep button No.1 to button No.6 of button (3) pressed for 2 seconds while the frequency is being displayed to preset the station.





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.

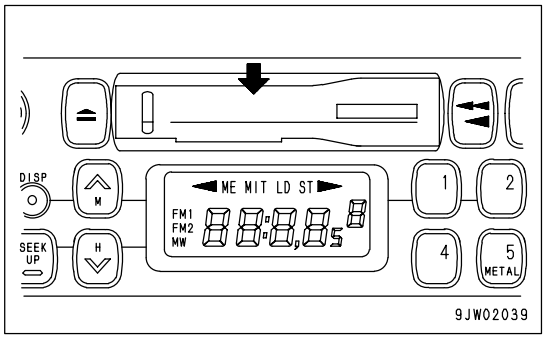


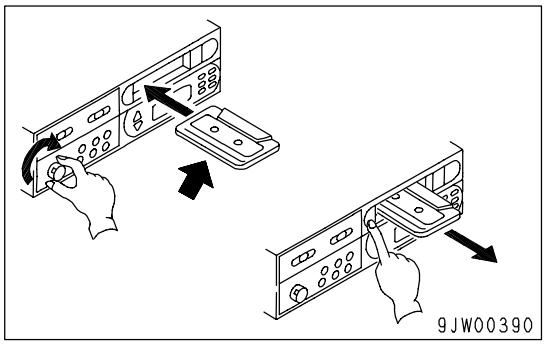
REMARK

- 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 CASSETE TAPE

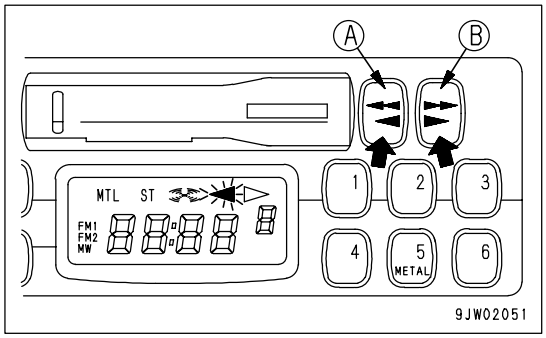
1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set the cassette with the exposed portion of the tape on the right side and push it into the cassette door. The tape will automatically start playing.
   If the arrow indicating the direction of play is pointing to the right, the top side 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.





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.



PRECAUTION WHEN USING

⚠ WARNING

- **If a voltage greater than the specified voltage is input, it may cause fire, electrocution, or other failure. Never input any voltage other than the specified voltage.**
- **Places inside the radio are under high voltage. Do not remove the cover.**
- **Do not carry out any modification. This may cause fire, electrocution, or other failure.**
- **If the sound cannot be heard, no display is given, or any other abnormality occurs, turn off the power switch and ask your Komatsu distributor as soon as possible to carry repairs.**

- 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.

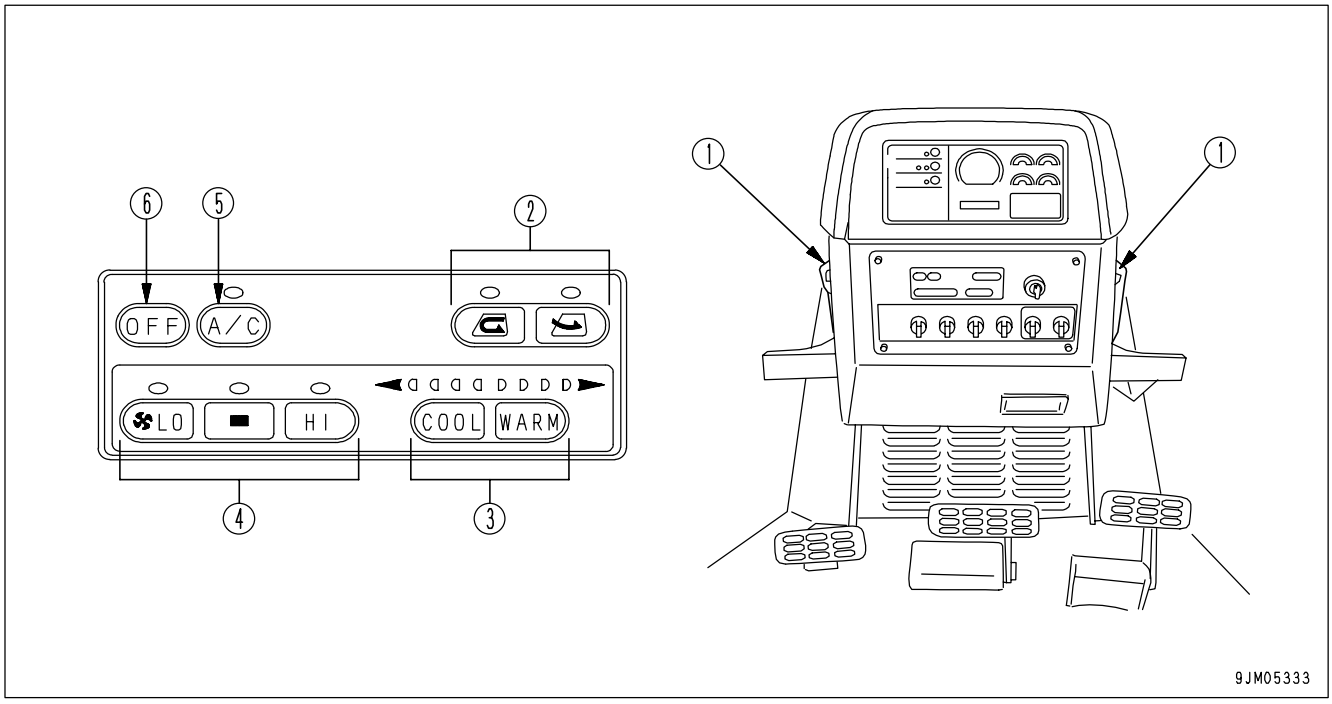
NOTICE

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, HANDLING

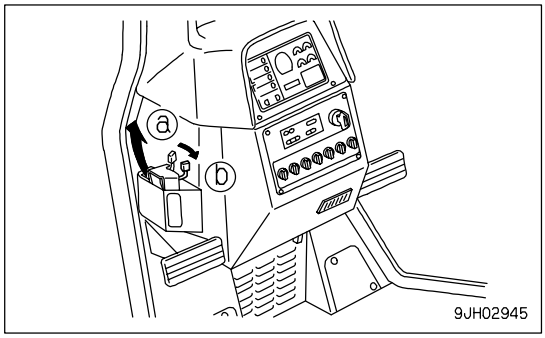
GENERAL LOCATIONS OF CONTROL PANEL



(1) Vent selector lever
(2) FRESH/RECIRC selector switch
(3) Temperature control switch
(4) Air flow selector switch
(5) Air conditioner switch
(6) OFF switch

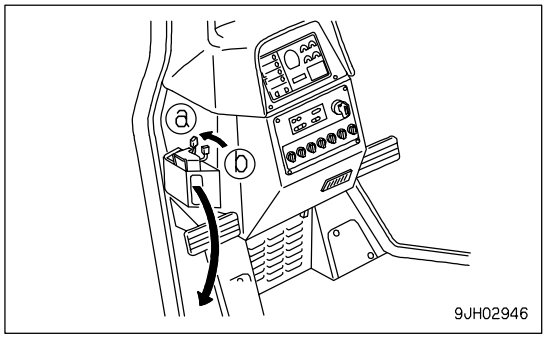
VENT SELECTOR SWITCH (sending air to upper half of cab)

If lever (1) is pulled to position (b), the air from the air conditioner is all directed to the upper half of the cab.
This can be used when sending a cool breeze during hot weather.



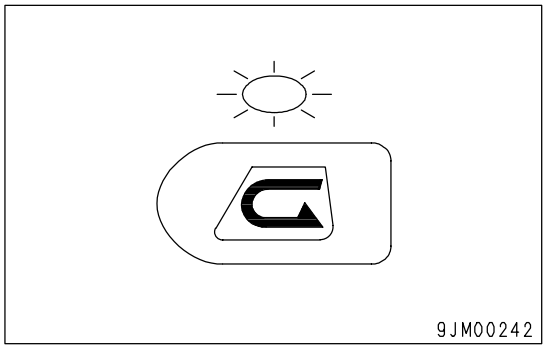
VENT SELECTOR SWITCH (sending air to feet)

If lever (1) is pushed to position (a), the air from the air conditioner is all directed to the feet.
This can be used to send warm air to the feet during cold weather.



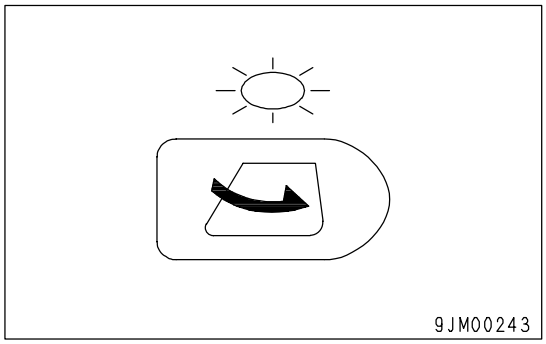
FRESH/RECIRC SELECTOR SWITCH (RECIRCULATE)

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



FRESH/RECIRC SELECTOR SWITCH (FRESH)

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

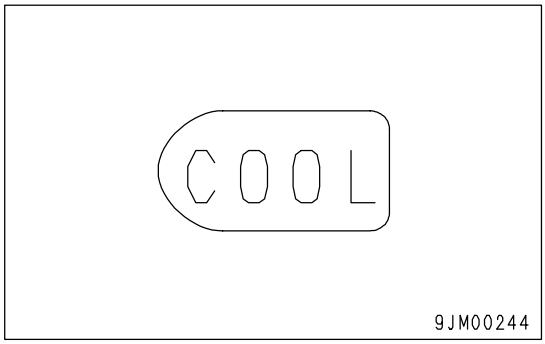


TEMPERATURE INDICATOR

The further the indicator is in the blue range, the lower the temperature is; the further the indicator is in the red range, the higher the temperature is.
The indicator range is divided into 7 levels, but within each range the temperature changes sleeplessly.

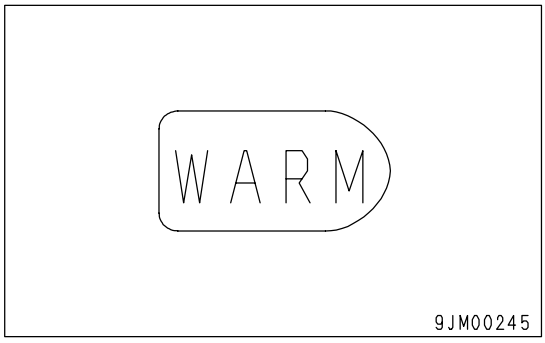
TEMPERATURE CONTROL SWITCH (COOL)

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



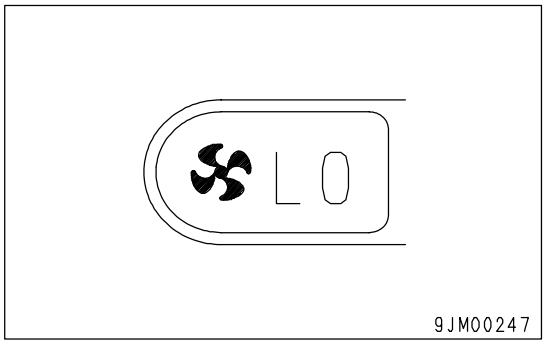
TEMPERATURE CONTROL SWITCH (WARM)

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



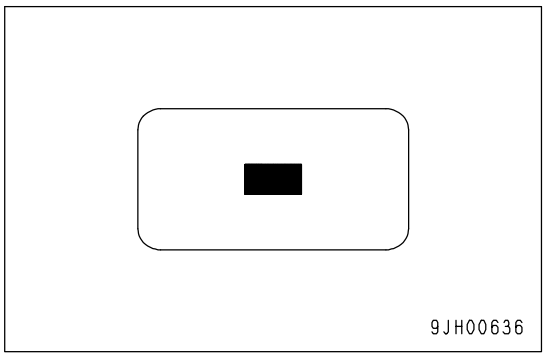
AIR FLOW SELECTOR SWITCH (LO)

Switch (4) is used to set the flow of air from the air conditioner to LOW.
When this switch is pressed, the air flow is set to the minimum amount of the three available levels.



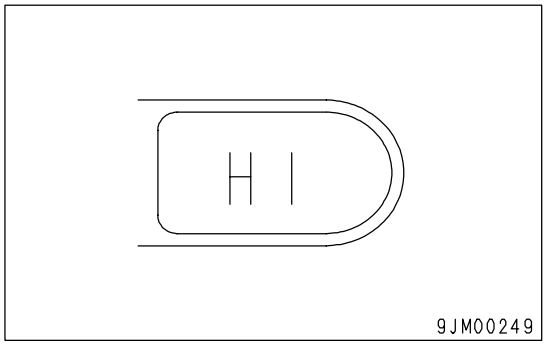
AIR FLOW SELECTOR SWITCH (MID)

Switch (4) is used to set the flow of air from the air conditioner to MID. When this switch is pressed, the air flow is set to the medium amount of the three available levels.



AIR FLOW SELECTOR SWITCH (HI)

Switch (4) is used to set the flow of air from the air conditioner to HI. When this switch is pressed, the air flow is set to the maximum amount of the three available levels.



AIR CONDITIONER SWITCH

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

REMARK

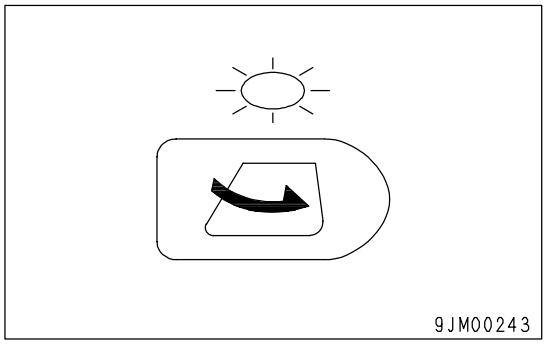
For machines equipped with a heater only, switch (5) is not available. (Option)

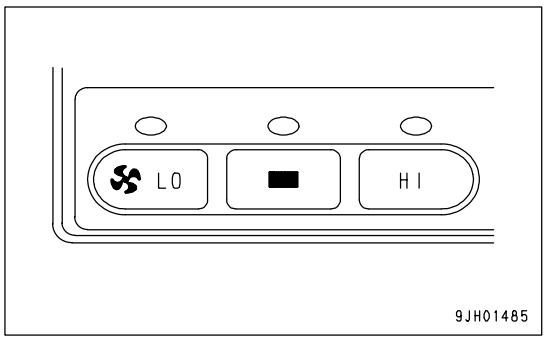
OFF SWITCH

Switch (6) is used to stop operation of the fan.

REMARK

When fresh air is taken into the cab, air pressure in the cab increases, which prevents the dust from entering. When neither heating nor cooling is needed, bring in clean fresh air to prevent the dust from coming in with your preferred air flow.





PRECAUTIONS WHEN USING AIR CONDITIONER

WHEN CARRYING OUT COOLING, VENTLATE THE CAB FROM TIME TO TIME

- If you smoke when using the air conditioner, your eyes may start to itch or burn, therefore ventilate the cab every so often to remove the smoke.
- When the air conditioner is used for long periods, carry out ventilation once every hour.

BE CAREFUL NOT TO COOL TOO MUTCH

- For reasons of health, it is recommended that the cab should feel pleasantly cool when you enter it from the outside (5 - 6°C lower than the outside temperature). Pay attention to the temperature when carrying out cooling.

SET SO THAT COLD AIR DOES NOT DIRECTLY BLOW ONTO THE GLASS SURFACE

- If the vents (left and right) in the middle of the dashboard are turned so that cold air plays directly on the cab door glass, moisture may condense on the outside of the cab door glass and reduce the visibility. (This occurs particularly in high temperatures.)
  If this happens, turn the vent fully to the rear and raise the air conditioner temperature setting slightly.

CHECKS DURING OFF-SEASON

Even during the off-season, run the compressor at low speed for several minutes once a week to prevent the loss of the oil film at the lubricated parts of the compressor. (Run the engine at low speed and set the temperature control lever at the central position.)

REMARK

When the ambient temperature is low, if the compressor is suddenly run at high speed, it may cause failure of the compressor. Note that the system is set so that the compressor will not run when the cooler switch is turned on ,if the ambient temperature is less than 2 - 6.5°C.

PROCEDURE FOR REPLACING RECEIVER

Replace the receiver once every two years.
After replacing the receiver, add compressor oil. Turn the receiver at an angle and measure the oil remaining inside the receiver, then add the same amount of oil (Denso Oil 6) to fill the receiver.

REMARK

- The replacement interval may become shorter depending on the condition of use.
- If the receiver is used when the moisture absorption limit of the desiccant has been exceeded, the refrigerant circuit may become blocked and cause the compressor to break down.

PRECAUTIONS WHEN REPLACING RECEIVER

- If the receiver is left for more than 15 minutes with the blind cover removed, the moisture in the air will be absorbed, and this will reduce the life of the desiccant. If you remove the blind cover, connect the piping quickly, evacuate the system and fill with refrigerant.
- When removing the refrigerant from the refrigerant circuit, release it gradually from the low pressure side to prevent oil from flowing out.

CHECK COMPRESSOR BELT TENSION AND REFRIGERANT (GAS) LEVEL

If the compressor belt is loose, or the refrigerant level is low, cooling is not carried out efficiently.
For details, see "WHEN REQUIRED (PAGE 4-20)".

CLEANING AIR FILTER

If the air filter for the FRESH or RECIRC air intake becomes clogged, the cooling or heating capacity will drop.
To prevent this, clean the air filter with compressed air once a week.
For details of the cleaning method, see "WHEN REQUIRED (PAGE 4-20)".

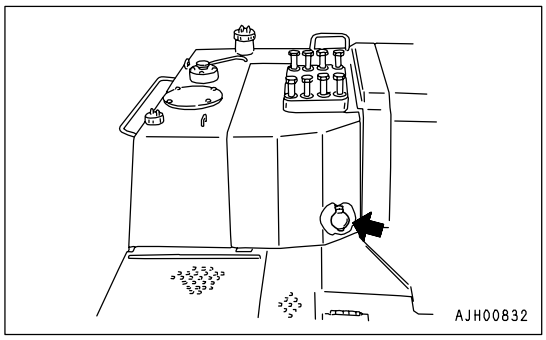
ACCUMULATOR, HANDLING

WARNING

On machines equipped with an accumulator, for a short time after the engine is stopped, if the work equipment control lever is moved to the LOWER position, the work equipment will move down under its own weight.
After stopping the engine, always place the safety lever and parking lever in the LOCK position.
The accumulator is charged with high-pressure nitrogen gas, so mistaken operation may cause an explosion, which will lead to serious injury or damage. When handling the accumulator, always do as follows.

- **The pressure in the control circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when carrying out the operation.**
- **Loosen the bolts slowly.**
- **Do not disassemble the accumulator.**
- **Do not bring it near flame or dispose of it in fire.**
- **Do not make holes in it or weld it.**
- **Do not hit it, roll it, or subject it to any impact.**
- **When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor to have this work carried out.**

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



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

1. Lower the work equipment and stop the engine.
2. After stopping the engine, operate the control lever fully to the front, rear, left and right to release the pressure inside the work equipment circuit.
   However, the pressure cannot be completely removed, so when removing the work equipment circuit, loosen the screw slowly , and never stand where the oil may spray out.

OPERATION

CHECK BEFORE STARTING ENGINE, ADJUST

WALK-AROUND CHECK

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

⚠ WARNING

- **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.
- **Do not get on or off the machine from the rear. Using this position is dangerous because it is easy to slip and you cannot be seen from the operator's compartment. Always use the handrail and step at the side when getting on or off the machine.**

If the machine is at an angle, make it horizontal before checking.
Before starting the engine, look around the machine and under the machine to check for loose nut or bolts, or leakage of oil, fuel, or coolant, and check the condition of the work equipment and hydraulic system. Check also for loose wiring, play, and collection of dust at places which reach high temperatures.
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 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 power train case, final drive case, hydraulic tank, hose, joints
   Check that there is no oil leakage. If any abnormality is found, repair the place where the oil is leaking.
   Check for leakage of oil from the undercover. Check the ground for traces of oil leakage.

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

6. Check for damage to handrail, loose bolts
   Repair any damage and tighten any loose.

7. Check for damage to gauges, lamps on instrument panel, loose bolts
   Check that there is no damage to the panel, gauges and lamps.
   If any abnormality is found, replace the parts. Clean off any dirt on the surface.

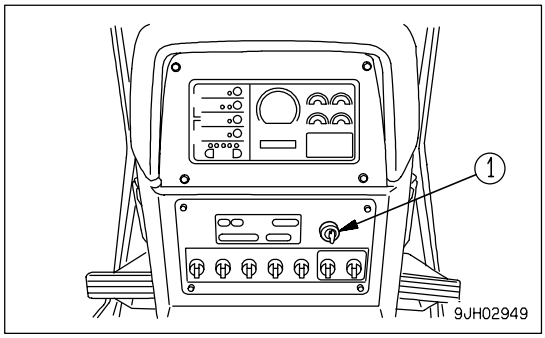
8. Check for damage to seat belt and mounting clamps
   Check that there is no abnormality in the seat belt or mounting clamps. If there is any damage, replace with new parts.

CHECK BEFORE STARTING

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

CHECK MONITOR PANEL

1. Turn starting switch (1) to the ON position.
2. Check that all monitor and gauge light up for 2 seconds, the warning lamp lights up for 1 seconds, and the alarm buzzer sounds for 2 second.

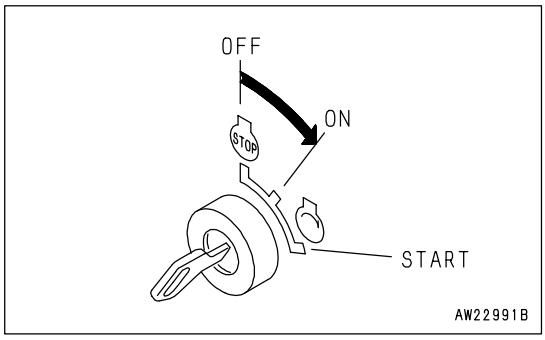


REMARK

If the lamps do not light up, there may be a failure or disconnection in the monitor, so please contact your Komatsu distributor.

NOTICE

When carrying out the checks before starting, do not relay only on the monitor. Always carry out all the items listed for the following check and maintenance.

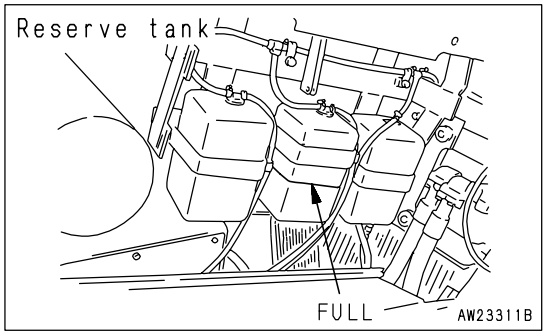


CHECK COOLANT LEVEL, ADD WATER

⚠ WARNING

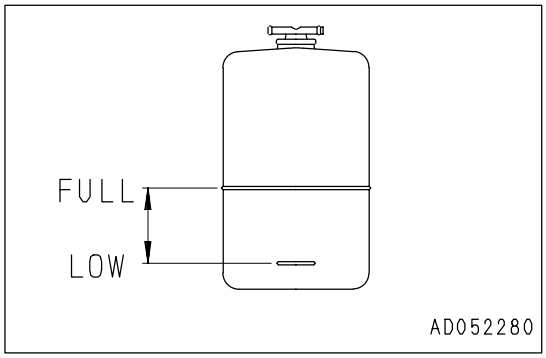
- **Normally, do not open the radiator cap. When checking the cooling water level, check the sub-tank when the engine is cold.**
- **Do not remove the cap when the radiator water is hot. Boiling water may spurt out. After the water temperature goes down, turn the cap slowly to release the pressure, then remove it.**

1. Open the engine side cover on the left side of the chassis, and check that the coolant is between the FULL and LOW marks on sub-tank(1). If the water level is low, add water to the FULL level through the water filler port in sub-tank(1).

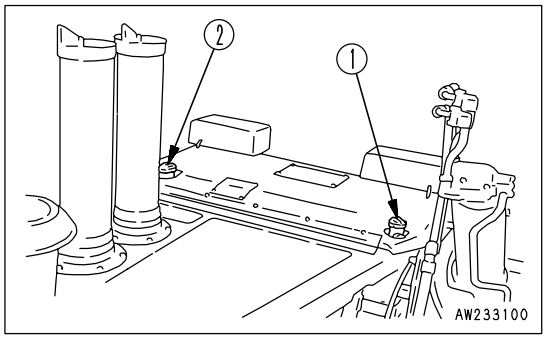


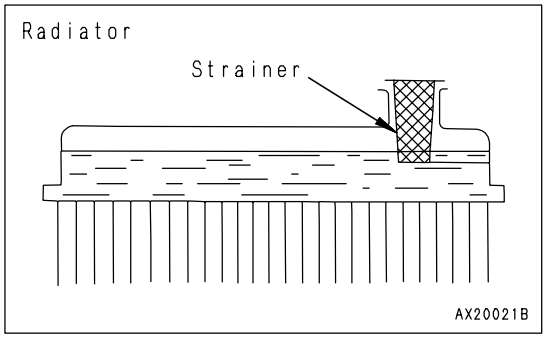
REMARK
The coolant may overflow from the sub-tank drain hose. This is no problem. It occurs because too much coolant has been added.

2. After adding water, tighten the cap securely.



3. If the sub tank is empty, first check for leakage of water, then remove main radiator cap (2) and sub radiator cap (3), and check that the coolant water is above the bottom surface of the strainer as shown in the diagram on the right. Add water if the level is low.
4. After adding water, close the engine side cover.



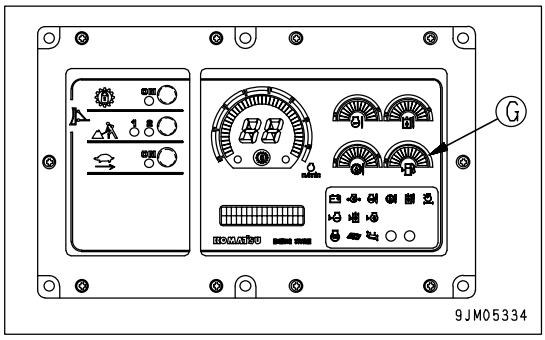


CHECK FUEL LEVEL, ADD FUEL

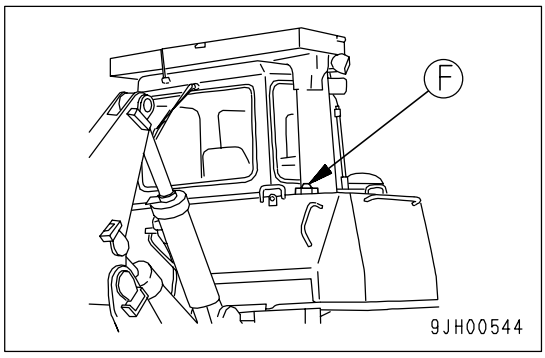
WARNING

When adding fuel, never let the fuel overflow. This may cause a fire. If the fuel is spilt, wipe it off completely.

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

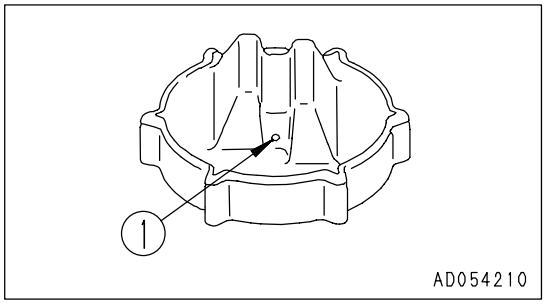


2. After completing work, fill the fuel tank through fuel filler port (F).
   Check the fuel level with the fuel gauge at the fuel filler port.
3. After adding fuel, tighten the cap securely.
   Fuel capacity: 1670 liters (441 US gal)



REMARK

- When dozing on a grade, make sure there is plenty of fuel in the tank so that the engine fuel line does not becomes aerated.
- If breather hole (1) on the cap is clogged, the pressure in the tank will drop and fuel will not flow.
  Clean the hole from time to time.

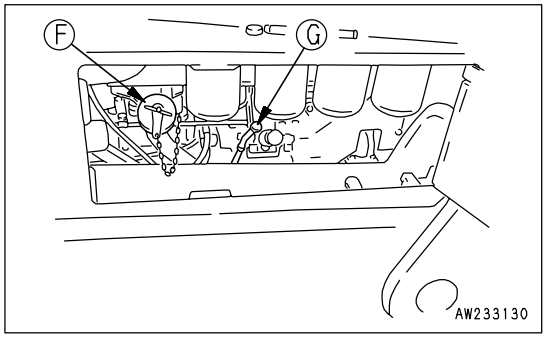


CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

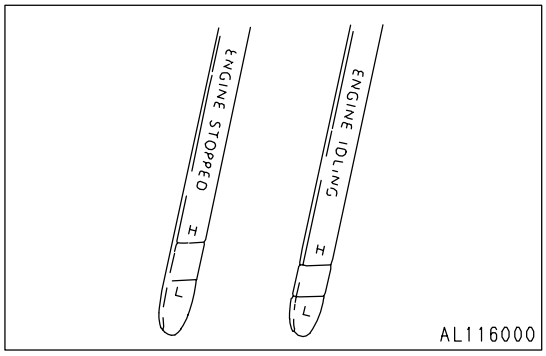
WARNING

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

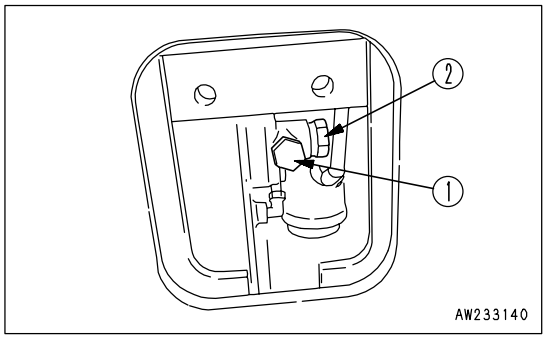
1. Open the engine side cover on the left side of the chassis.
2. Remove dipstick (G), and wipe the oil off with a cloth.
3. Insert dipstick (G) fully in the oil filler pipe, then take it out again.



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), loosen drain valve (2) to drain the excess oil, then check the oil level again.
6. If the oil level is correct, tighten the oil filler cap securely and close the engine side cover.



REMARK

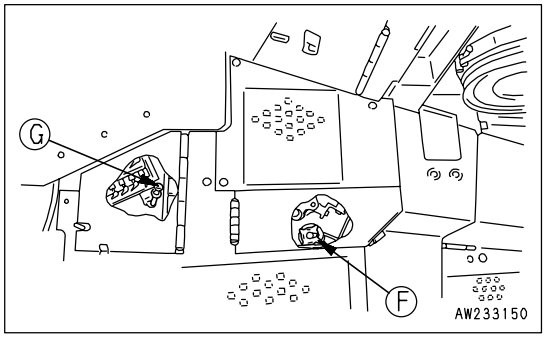
- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.
- If the machine is at an angle make it horizontal before checking.
- When adding oil, remove the dipstick form the holder to release the air inside the crankcase.
- The dipstick is marked with the levels for ENGINE STOPPED on one side and ENGINE IDLING on the other side.

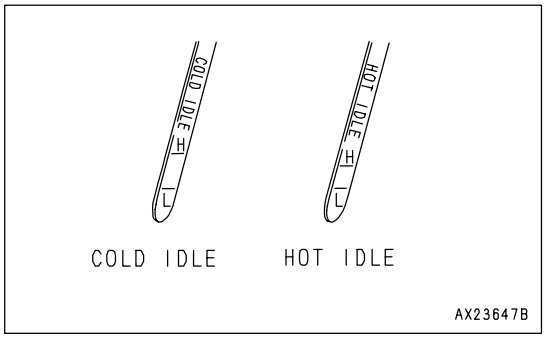
It is also possible to check the oil level with the engine idling, but be sure to remember the following points.

- Check that the engine water temperature gauge shows green range.
- Read the dipstick on its reverse side marked with "ENGINE IDLING".

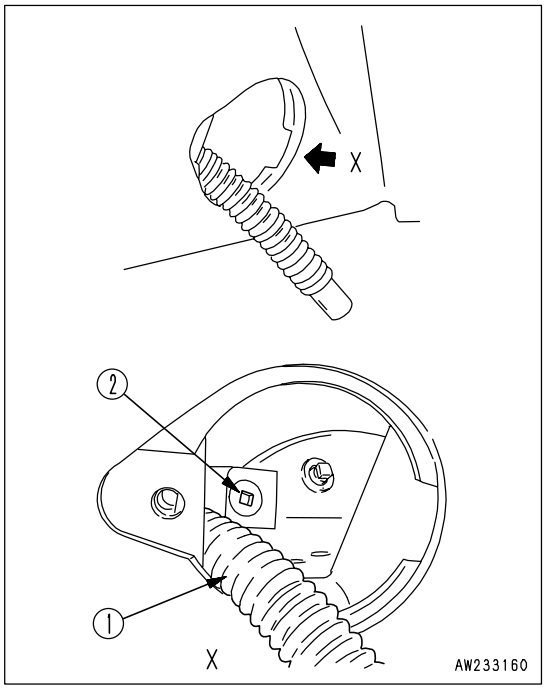
CHECK OIL LEVEL IN POWER TRAIN CASE (INCL. TRANSMISSION, TORQUE CONVERTER AND BEVEL GEAR CASES), ADD OIL

1. Start the engine and run at idling for 5 minutes, then check the oil level with the COLD side of dipstick (G).
   Remove dipstick (G), and wipe the oil off with a cloth.
2. Insert dipstick (G) fully in the oil filler pipe, then take it out again.
3. 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).





4. If the oil is above the H mark, pull out hose (1), and loosen drain plug (2) to drain the excess oil, then check the oil level again.
5. If the oil level is correct, tighten the oil filter cap securely.



REMARK

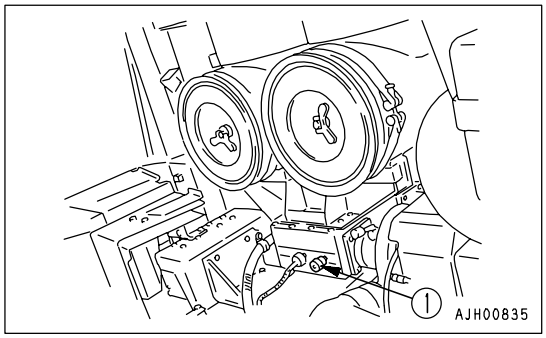
- If the machine is at an angle, make it horizontal before checking.
- When the engine is stopped, the oil level will rise, so it is impossible to check the oil level correctly.
- When cheking while the engine is running, run the engine at idling and check with the HOT side of dipstick (G). Reading on the HOT side should be treated as a rough estimate because of big fluctuations of the power train oil temperature.
- Checking should be carried out at idling within 60 minutes after starting the engine.
- When working on a slope of more than 20°, check that the oil is up to the H level.

CHECK BRAKE PEDAL TRAVEL

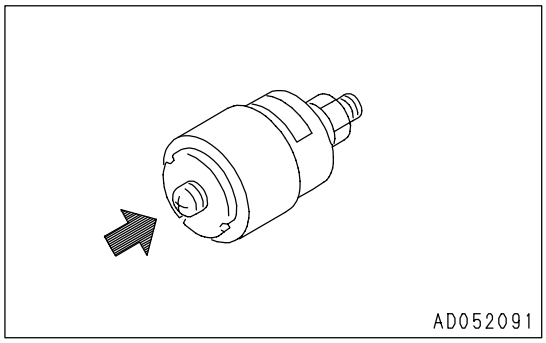
Drive the machine, depress the brake pedal, and check that the machine stops.

CHECK DUST INDICATOR

1. Check that the red piston has not appeared in the transparent portion of dust indicator (1).
2. If the red piston has appeared, clean or replace the element immediately.
   For details of the method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-24)".

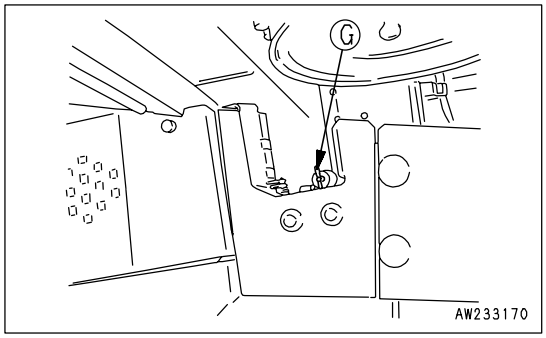


3. After checking, cleaning, and replacing, press the knob of dust indicator(1) to return the red piston to its original position.



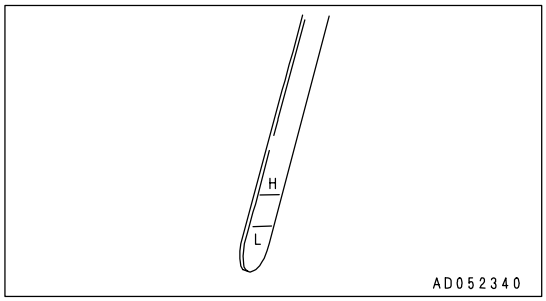
CHECK DAMPER CASE OIL LEVEL, ADD OIL

1. Remove dipstick (G), and wipe the oil off with a cloth.
2. Insert dipstick (G) fully in the oil filler pipe, then take it out again.
3. The oil level should be between the H and L marks on dipstick (G).
   If the oil is below the L mark, add engine oil through the dipstick holder.
4. If the oil is above the H mark, drain the excess oil from drain plug. After draining the oil, check the oil level again.



REMARK

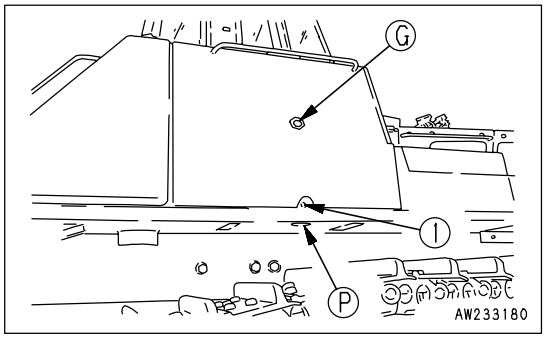
- Check the oil level with the engine stopped.
- When checking the oil level, if the machine is at an angle, move it to a horizontal position before carrying out the check.



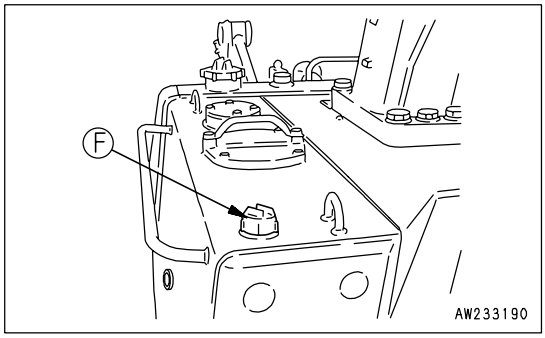
CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

⚠ WARNING

- **When removing the oil filler cap, oil may spurt out, so stop the engine and wait for the oil temperature to go down, then turn the cap slowly to release the internal pressure before removing the cap.**
- **If oil has been added to above the H mark, stop the engine and wait for the hydraulic oil to cool down. Then remove drain plug (P), loosen drain valve (1), and drain the excess oil.**



1. Lower the blade to the ground and stop the engine. Wait for about 5 minutes before checking oil level. If the oil level should be between H and L in sight gauge (G).



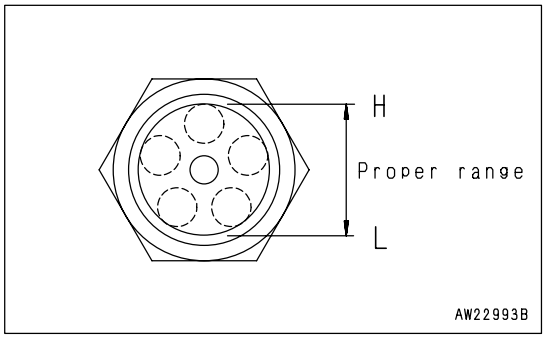
NOTICE

If the oil level is above the H line, do not add oil. Doing so may lead to damage to the oil pressure circuit and spouting out of oil.

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

REMARK

When inspecting, if the machine is at an angle, move it to a horizontal place to carry out the check.



CHECK ELECTRIC WIRINGS

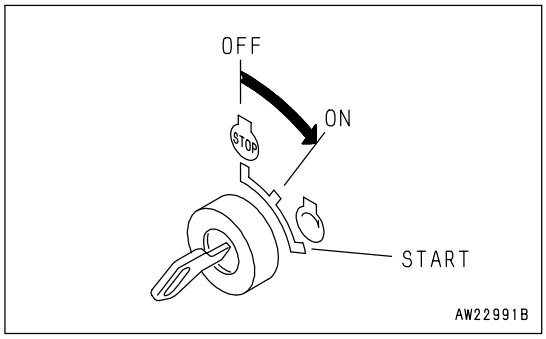
WARNING

- **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.**

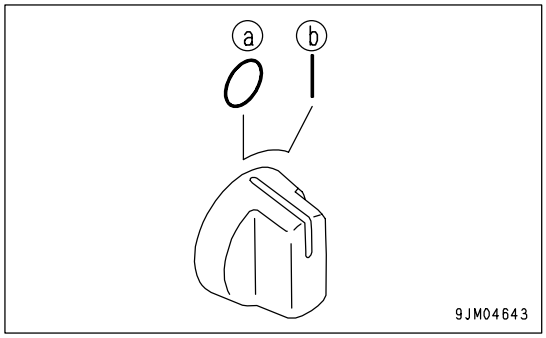
Check that there is no damage to the fuse, that a fuse of the specified capacity is being used, that there are no signs of any disconnection, breakage, or short circuit in the electric wiring, check for any loose terminals, and tighten any loose terminals that are found.
Be particularly careful to check the wiring for the battery, starting motor, and alternator.
In addition, if any flammable material is accumulated around the battery, remove it.
For repairs or investigation of the cause, please contact your Komatsu distributor.

CHECK THAT LAMPS LIGHT UP

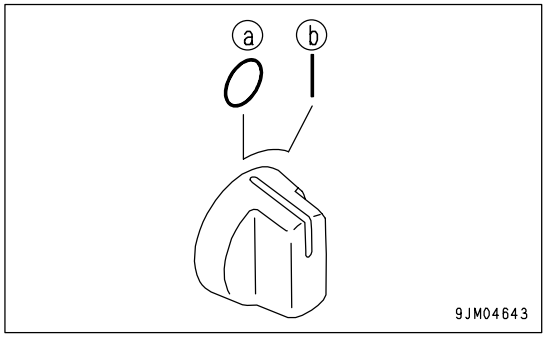
1. Turn the starting switch key to the ON position.



2. Turn the front lamp and working lamp switch to the ON (b) position and check that the front lamps and working lamp light up.

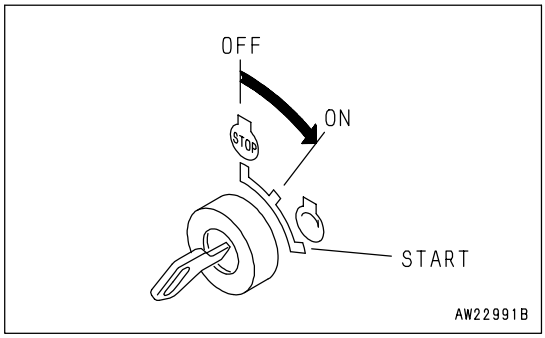


3. Turn the rear lamp switch to the ON (b) position and check that the rear lamps on the left and right fenders light up.
   If the lamps do not light up, there is probably a broken bulb or disconnection in the wiring, so contact your Komatsu distributor for repairs.

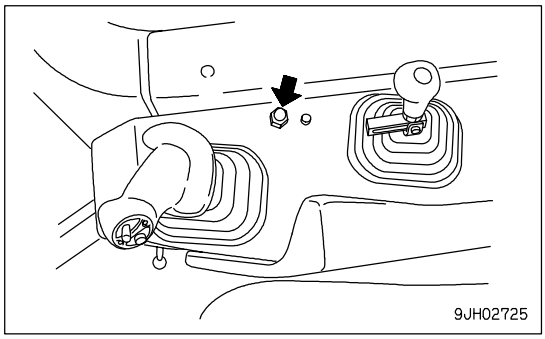


CHECK HORN SOUND

1. Turn the starting switch key to the ON position.

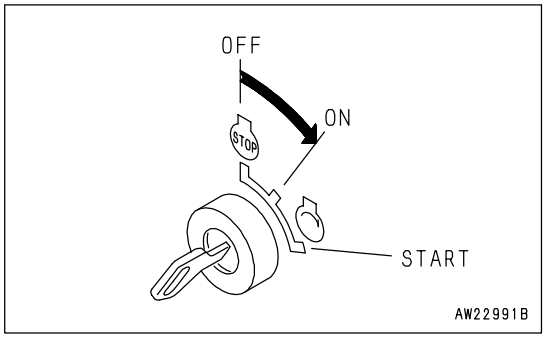


2. Push the horn switch and check that the horn sounds.

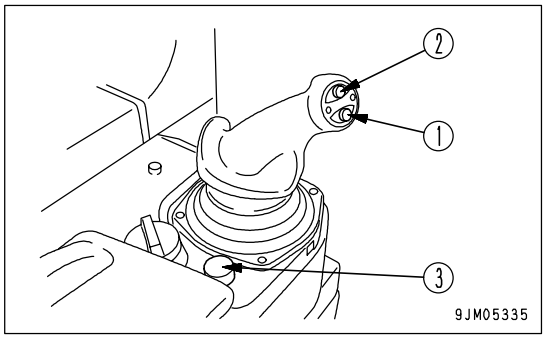


CHECK BACKUP ALARM SOUND

1. Turn the starting switch key to the ON position.



2. Push the REVERSE switch (1).
   The buzzer must sound immediately.
   The buzzer will continue to sound until the FORWARD switch (2) or NEUTRAL switch (3) is pressed.



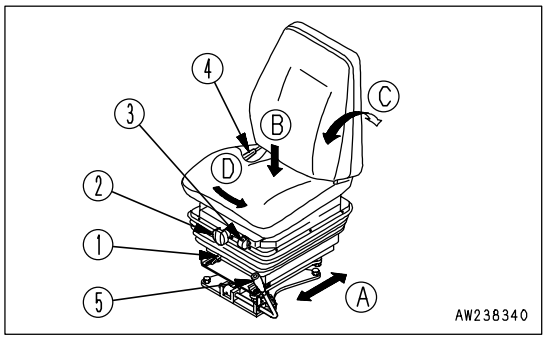
ADJUSTMENT

ADJUSTING OPERATOR'S SEAT

⚠ WARNING

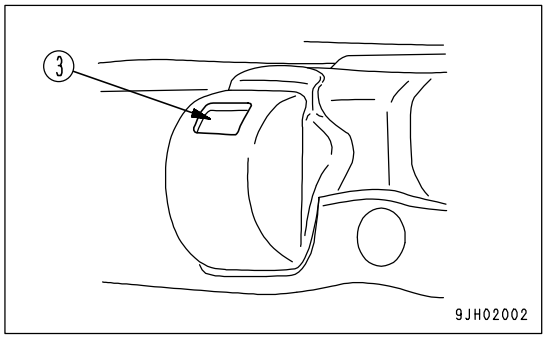
- **Adjust the seat position at the beginning of each shift or when operators change.**
- **Adjust the seat so that the brake pedal can be depressed all the way with the operator's back against the backrest.**

(A) Fore-and-aft adjustment
Pull lever (1), set the seat to a position where it is easy to operate, then release the lever.
Fore-aft adjustment: 200 mm (7.9 in) (10 stages)



(B) Weight and height adjustment of seat
- Turn knob (2) under the seat so that weight adjustment indicator (3) displays the green range. The height can be adjusted by turning the knob (2) while the green range is displayed.
- Turn the knob clockwise to raise the seat and turn the knob counterclockwise to lower the seat.

Height adjustment range: stepless, 75 mm (3 in)
Weight adjustment range: 50 to 130kg (110 to 237 lb)

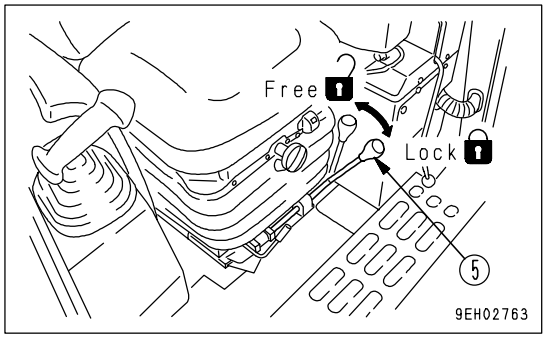


(C) Adjust reclining angle

REMARK
When the seat is pushed forward, the available reclining angle becomes greater; when the seat is pushed back, the available reclining angle becomes smaller. When moving the seat back, return the seat back to its original position before moving the seat.

Pull up lever (4), set the seatback to a position where it is easy to operate, then release the lever.

(D) Adjusting direction of seat
Pull up lever (5) to unlock the seat, and the seat can be turned by hand to the position of 15° on the right.
After changing the direction of the seat, return the lever securely to lock the seat.
- Change the direction of the seat to the right for the ease of operation of the ripper.



REMARK
If the direction of the seat is changed, the steering, directional, and gearshift lever is also interconnected and changes direction.

USING SEAT BELT

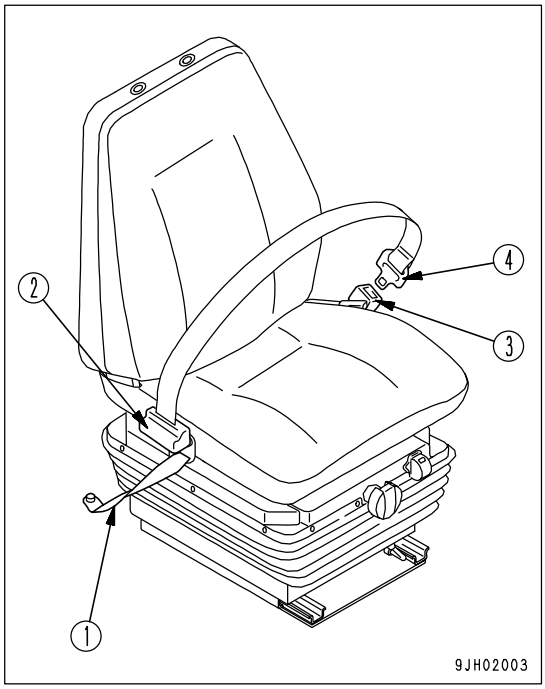
When operating a machine equipped with ROPS, be sure to use the seat belt.

⚠ WARNING

- **Before fastening the seat belt, inspect the securing brackets and belt for abnormal conditions. Replace any worn or damaged seat belt or the securing brackets.**
- **Even if no abnormality can be seen in the belt, replace the seat belt every 3 years. The date of manufacture of the belt is shown on the back of the belt.**
- **Adjust and fasten the seat belt before operating the machine.**
- **Always sure seat belt when operating the machine.**
- **Fit the seat belt across your lap without twisting.**

FASTEN THE BELT AND REMOVE IT

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 and hold tongue (4) connected to wind-in mechanism (2) and pull out the belt slowly so that the belt will cover your abdomen sufficiently.
4. Insert tongue (4) in buckle (3) until it clicks. The belt is pulled back into wind-in mechanism (2) until it is fitted to your abdomen. The belt is locked under this condition and cannot be extended anymore. Fit the belt to your abdomen without twisting it.



REMARK

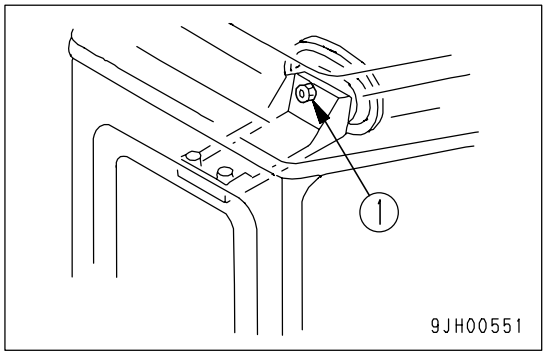
If the belt is locked before the tongue is inserted in the buckle, let it return to the wind-in mechanism, then repeat the above procedure from the first.

5. Pull the belt to check that it is securely locked in position.
6. When removing the belt, press the red button on buckle (3). The belt will automatically be wound in.

Check the mounting bolts of the belt fitting on the machine body for looseness, and re-tighten them if necessary.
Tightening torque: 24.5 ± 4.9 N·m (2.5 ± 0.5 kgf·m, 18.1 ± 3.6 lbft)
If the seat is scratched or frayed or if any of the fittings is broken or deformed from long service, replace the seat belt immediately.

ADJUST MIRROR

Loosen nut (1) of the mirror and adjust the mirror to a position where it gives the best view from the operator's seat.
In particular, be sure to adjust the mirror so that people at the rear left or right of the machine can be seen clearly.



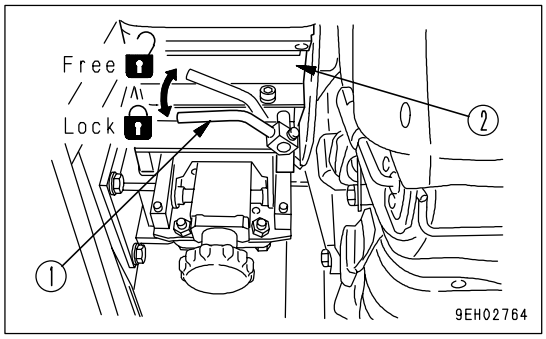
ADJUST JOYSTICK (PCCS LEVER)

⚠ WARNING

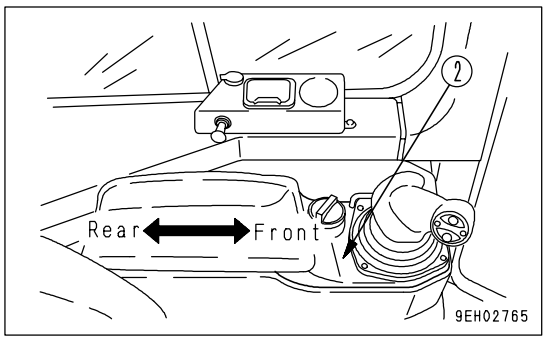
After moving case (2) in order to adjust the position of the steering, directional, and gearshift lever, check that lock lever (1) is fitted securely in the notch hole when securing it. Check that it is in the LOCK position. If the lock condition is not complete, the steering, directional, and gearshift lever may move at an unexpected time and cause serious injury or damage.

The steering, directional, and speed lever (wrist control type single lever: joystick) can be adjusted by 100 mm (3.9 in) in 5 stages to the front or rear. Adjust to the most suitable position to match the adjustment of the operator's seat.

1. Pull up lock lever (1) at the rear of case (2) on the left side of the operator's compartment and make it free.



2. Keep lock lever (1) pulled up and use your other hand to grip the front of case (2), then move it to the front with your left and right hands. The joystick moves together with the case.
3. When moving, set to the desired position of the positions where a click can be heard. Then pull up lock lever (1) and release it. Lock lever (1) returns automatically to the LOCK position.



REMARK
PCCS: Palm command control system

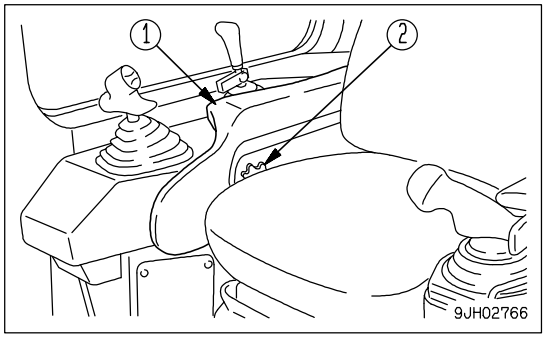
ADJUST ARMREST

The height of the armrest on the left and right sides of the operator's seat can be adjusted to 3 positions. After adjusting the operator's seat, adjust the armrest to a suitable height.

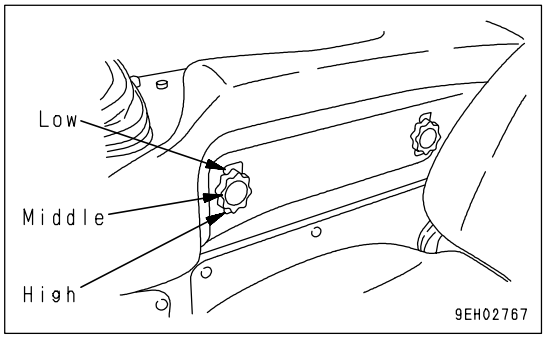
ADJUST ARMREST (RIGHT)

Armrest (1) on the right side of the operator's cab part can be adjusted up 30 mm (1.2 in) or down 30 mm (1.2 in) based on the standard height (center) in three stages.

1. Loosen knob (2) (two places).



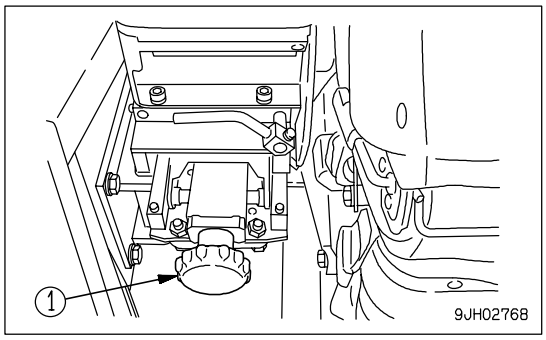
2. Move the armrest on the operator's seat to the front, then align the position of the 3 holes (high, middle, low).
3. Tighten knob (2) securely.



ADJUST ARMREST (LEFT)

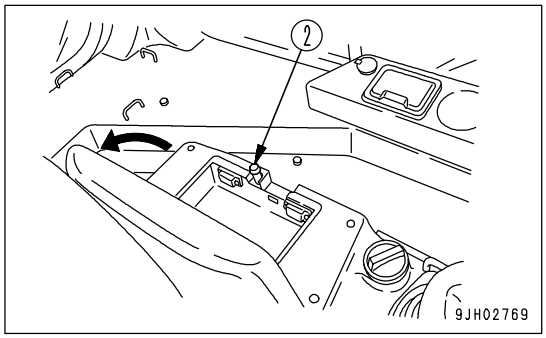
The armrest on the left side of the operator's compartment can be adjusted to 2 heights.

1. When adjusting height of both armrest and case
   It is possible to adjust the standard height up 50 mm (2.0 in) or down 50 mm (2.0 in) steplessly.
   The steering, directional, and gearshift lever moves as a unit.
   Turn up/down left adjustment knob (1) to adjust the height. Turn the knob to adjust as follows.
   Turn CLOCKWISE to move UP
   Turn COUNTERCLOCKWISE to move DOWN



2. When adjusting height of armrest only
   It is possible to adjust steplessly up to 36 mm (1.4 in) up from the armrest and case contact surface.
   The steering, directional, and gearshift lever does not move.

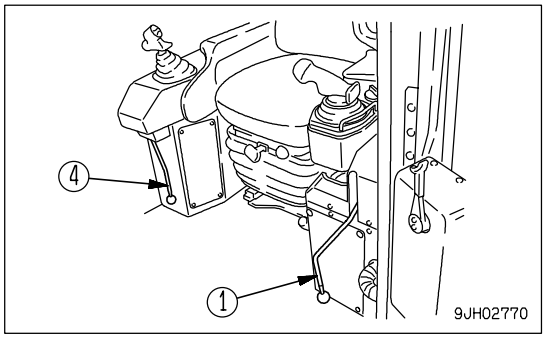
   Open the armrest, and turn counterclockwise knob (2) to adjust the height.
   Only the armrest will move up. After adjusting it to the desired height, close the armrest.

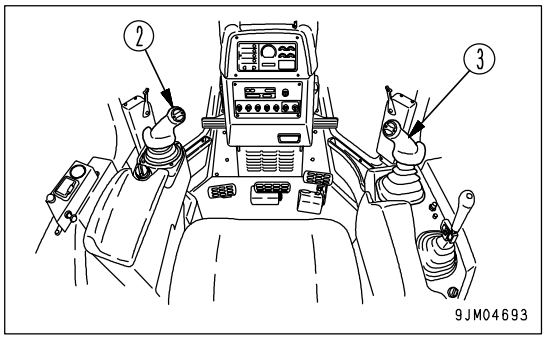


OPERATIONS AND CHECKS BEFORE STARTING ENGINE

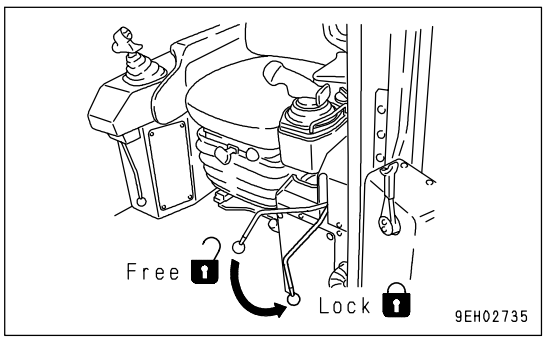
⚠ WARNING

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



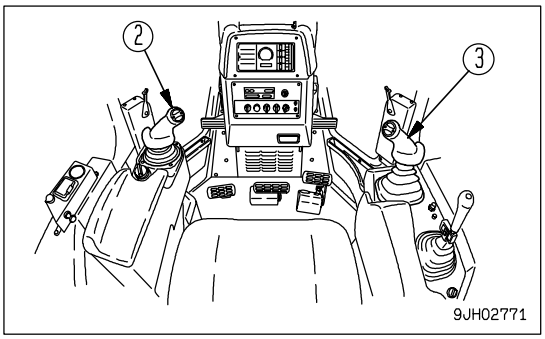


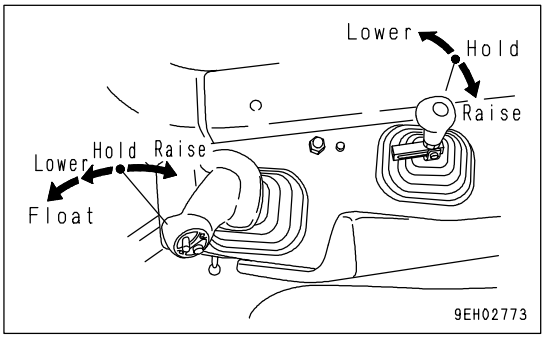
1. Check that parking lever (1) is locked. If this lever is not at the LOCK position, the engine will not start.



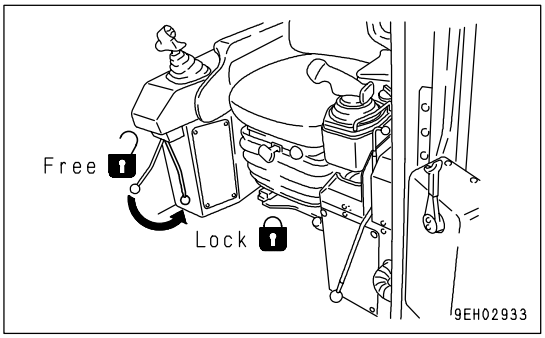
REMARK
If the steering, direction, and gearshift lever is at F or R, the letter P on display panel A will flash.

2. Check that the blade is lowered to the ground and that blade control lever (3) is at the HOLD position. If it is at the FLOAT position, the engine will not start.





3. Check that the ripper is lowered to the ground.
4. Check that safety lever (4) is locked.
   If safety lever (4) is locked, the blade control lever is returned to the HOLD position even if it is at the FLOAT position.

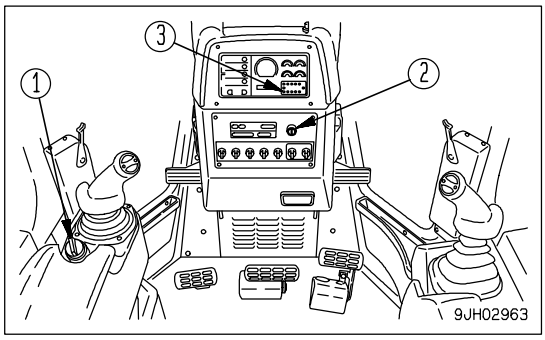


STARTING ENGINE

NORMAL STARTING

⚠ WARNING

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

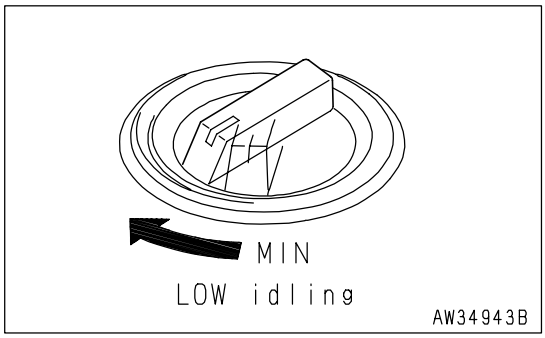


NOTICE

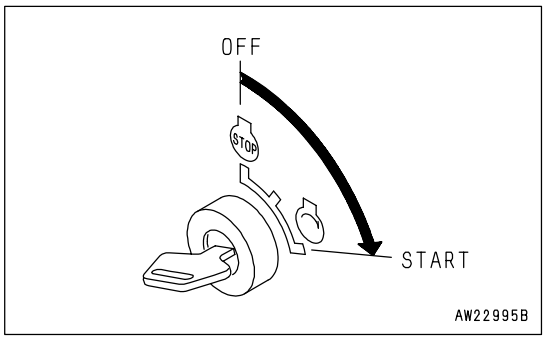
Do not keep the starting motor rotating continuously for more than 20 seconds.

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

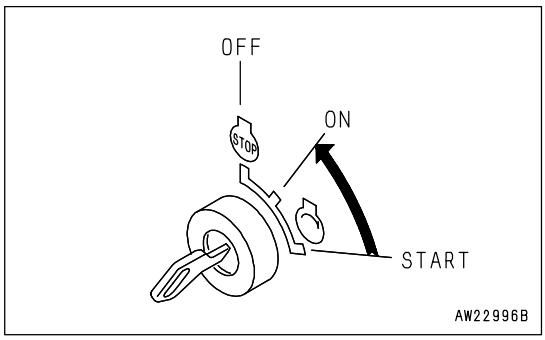
1. Turn fuel control dial (1) a little toward you from the MIN position.



2. Turn the key of starting switch (2) to the START position.



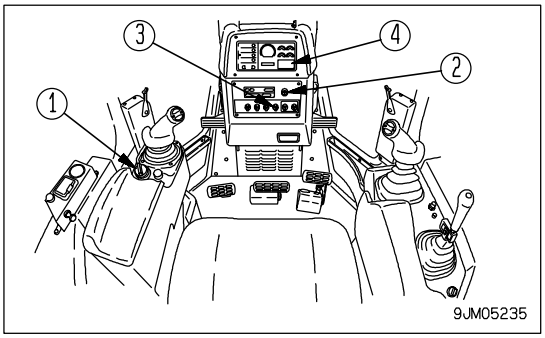
3. When engine is started, release the key of starting switch (2) and the key will return automatically to ON.



STARTING IN COLD WEATHER

⚠ WARNING

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

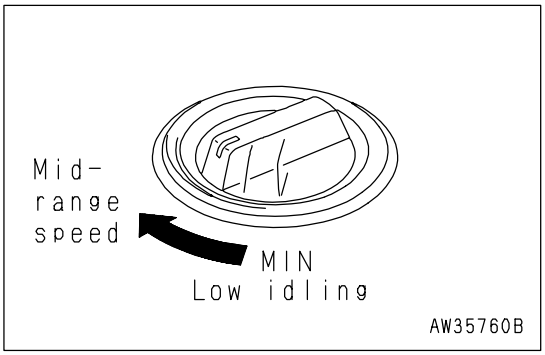


NOTICE

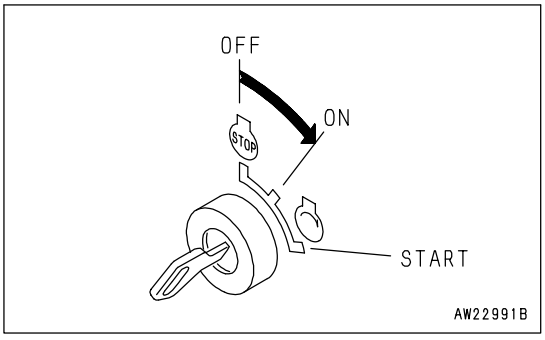
Do not keep the starting motor rotating continuously for more than 20 seconds.

If the engine fails to start, repeat steps 3 and 4 after waiting for about 2 minutes.

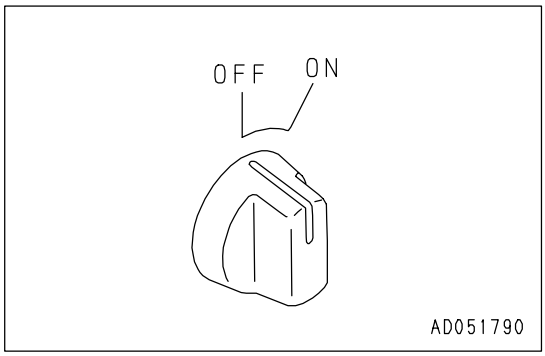
1. Turn fuel control dial (1) to the center position between low idling (MIN) and high idling (MAX).

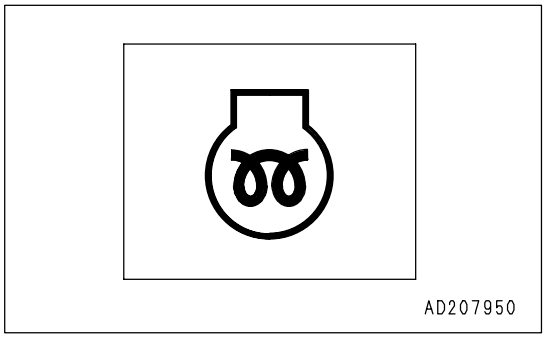


2. Turn the key of starting switch (2) to the ON position.

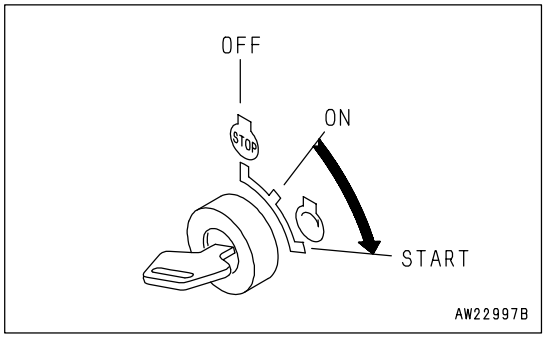


3. When preheating switch (3) is turned ON, preheating pilot lamp (4) will also light up, and preheating will automatically start.
   When the temperature is about -5°C, the automatic preheating is not actuated.



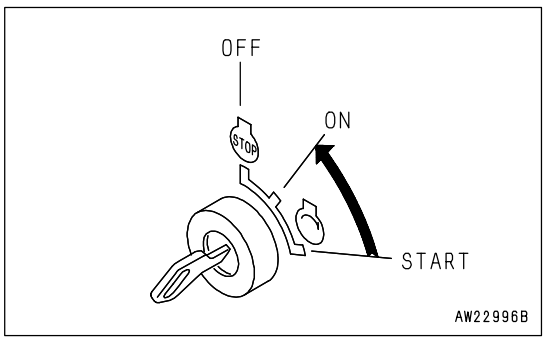


4. When preheating pilot lamp (4) goes off, turn the key of starting switch (2) to the START position to crank the engine.
   The time that preheating pilot lamp (4) stays on changes according to the ambient temperature as shown in the table below.

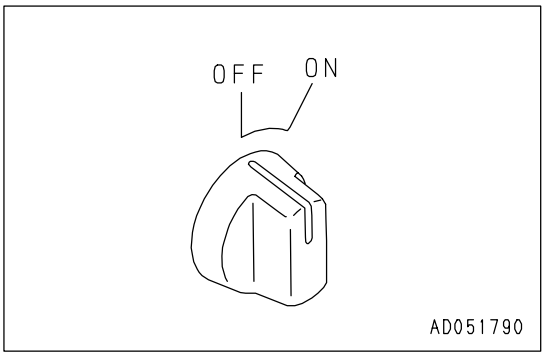


Ambient temperature	Preheat time
0˚C to -10˚C	0 to 15 seconds
-10˚C to -20˚C	15 to 30 seconds
-20˚C to -30˚C	30 to 50 seconds

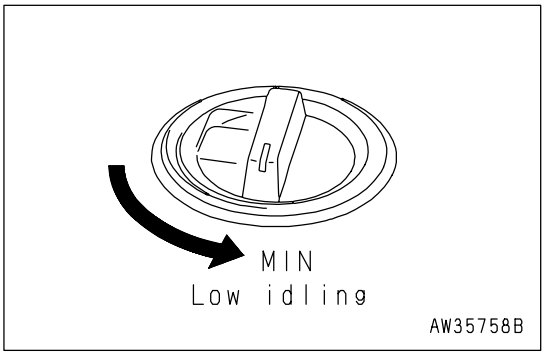
5. When the engine is started, release the key of starting switch (2) and the key will return automatically to ON.



6. When the engine rotation stabilizes and the color of exhaust gas becomes normal, put preheating switch (3) in the OFF position.



7. When the engine rotation stabilizes, return to the low idling (MIN) position of fuel control dial (1) and then carry out the warming-up operation.



REMARK

- Regardless of the ambient temperature, if the key in starting switch (2) is turned from OFF position to left, preheating pilot lamp (4) will light up and preheating will start. (Preheating continues while the starting switch is held at the left.)
  For details of the preheating time, see the table.
- While preheating is being carried out, the preheating pilot lamp (4) lights up to show that preheating is being carried out. After it lights up for 36 seconds, it flashes for 16 seconds, then goes out.
  When it goes out, complete the preheating immediately.
- If the engine does not start with the above operation, wait for approx. 2 minutes and repeat Steps 3 - 4.

OPERATIONS AND CHECKS AFTER STARTING ENGINE

⚠ WARNING

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

BREAKING IN THE MACHINE

⚠ CAUTION

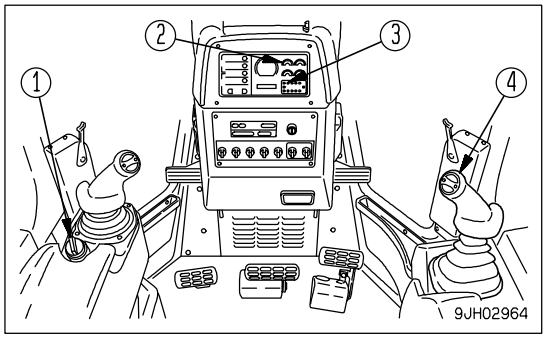
Your Komatsu machine has been thoroughly adjusted and tested before shipment. However, operating the machine under severe conditions at the beginning can adversely affect the performance and shorten the machine life.
Be sure to breaking-in the machine for the initial 100 hours (as indicated by the service meter).
During breaking-in operations, follow the precautions described in this manual.

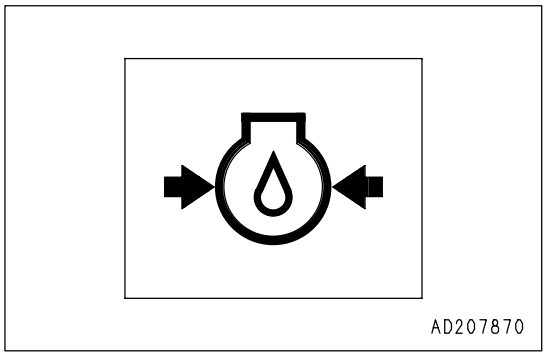
- Run the engine at idling for 15 seconds after starting it. During this time, do not operate the control levers or fuel control dial.
- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Immediately after starting the engine, avoid sudden starts,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

NORMAL OPERATION

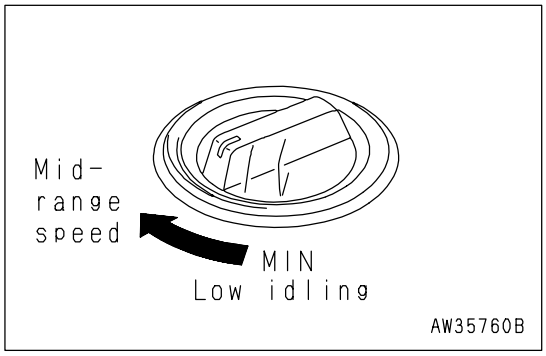
NOTICE

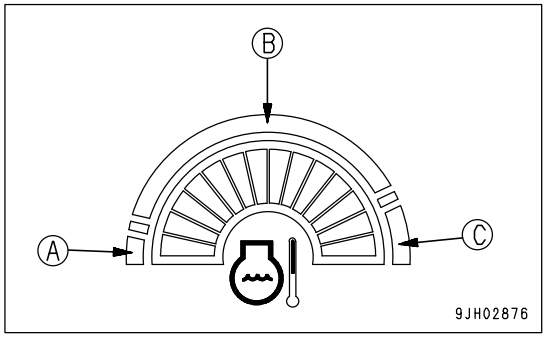
- **Do not carry out operations or operate the levers suddenly when the hydraulic oil is still at low temperature. Always carry out the warming-up operation until the hydraulic oil temperature monitor displays the green range. This will help to extend the machine life.**
  Do not accelerate the engine suddenly before the warming-up operation is completed.
- **Do not run the engine at low idling or high idling continuously for more than 20 minutes. This will cause leakage of oil from the turbocharger oil supply piping.**
  If it is necessary to run the engine at idling, apply a load from time to time or run the engine at a mid-range speed.
- **If engine oil pressure caution lamp (3) flashes or the buzzer sounds intermittently, stop the engine and check for the cause.**





1. Turn fuel control dial (1) to the center position between LOW IDLING (MIN) and HIGH IDLING (MAX) and run the engine at medium speed for about 5 minutes with no load.
2. After warm-up run is completed, check gauges and caution lamps for proper operation. If any abnormality is found, repair it.
   Continue to run the engine at light load until engine water temperature gauge indicator (2) falls within the green range (B).
   (A): White range
   (B): Green range
   (C): Red range

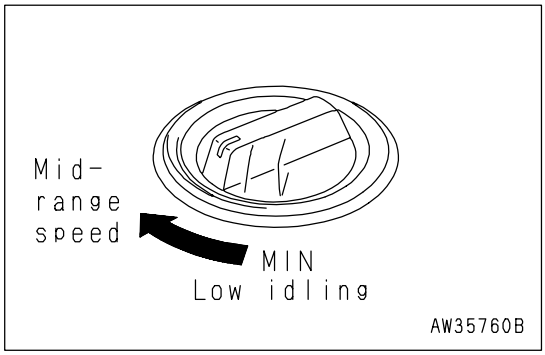




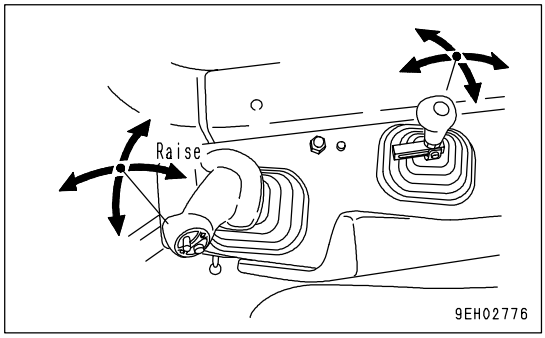
3. Check that there is no abnormal exhaust gas color, noise, or vibration. If any abnormality is found, contact your Komatsu distributor.

IN COLD AREAS

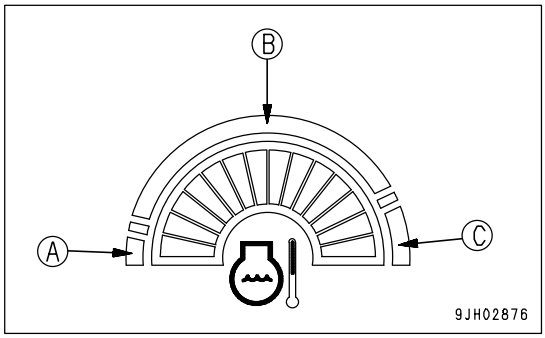
1. Turn fuel control dial (1) to the center position between LOW IDLING (MIN) and HIGH IDLING (MAX) and run the engine at medium speed for about 10 minutes with no load.



2. Operate blade control lever (4) to the RAISE position, then keep the blade raised to the maximum height and continue to relieve the circuit for 10 minutes.
3. Finally, operate blade control lever (3) and ripper control lever to operate all the blade and ripper cylinders several times.
   If the oil temperature in the work equipment is not properly raised, there will be a time lag in the response of the work equipment and steering.



4. After warm-up run is completed, check gauges and caution lamps for proper operation. If any abnormality is found, repair it.
   Continue to run the engine at light load until engine water temperature gauge indicator (2) falls within the green range (B).
   (A): White range
   (B): Green range
   (C): Red range



REMARK
If the oil temperature in the power train is not raised properly, it will take longer to accelerate to the maximum speed.

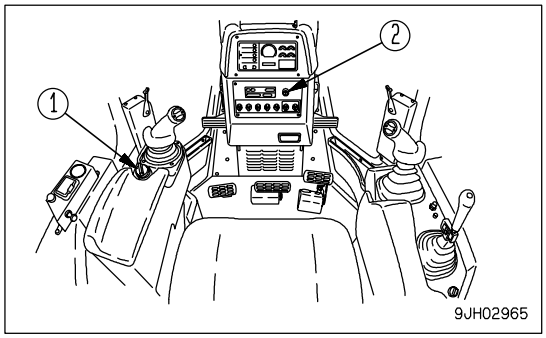
5. Check that there is no abnormal exhaust gas color, noise, or vibration. If any abnormality is found, contact your Komatsu distributor.

STOPPING ENGINE

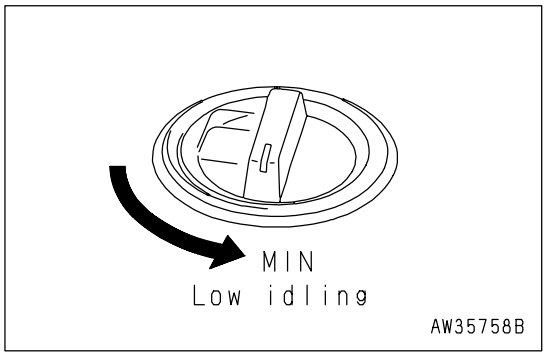
NOTICE

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.

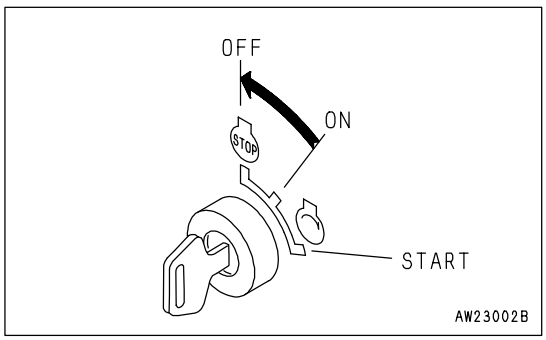
In particular, if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.



1. Place fuel control dial (1) in the low idling (MIN) position and run the engine at low idling speed for about 5 minutes to allow it to gradually cool down.



2. Place fuel control lever (1) in the engine stop position and stop the engine.



3. Remove the key of starting switch (2).

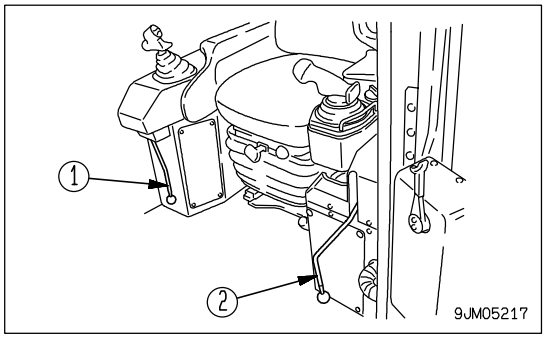
CHECK AFTER STOPPING ENGINE

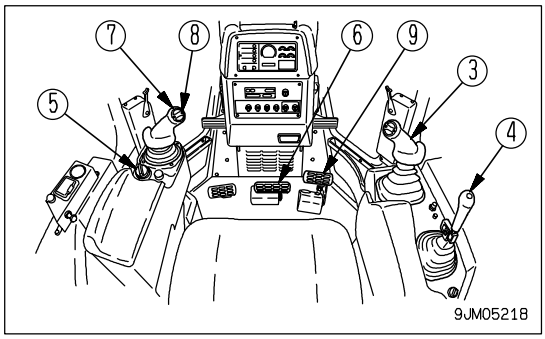
1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, and check also for leakage of oil or water. If any abnormalities are found, repair them.
2. Fill the fuel tank.
3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a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

MOVING MACHINE OFF

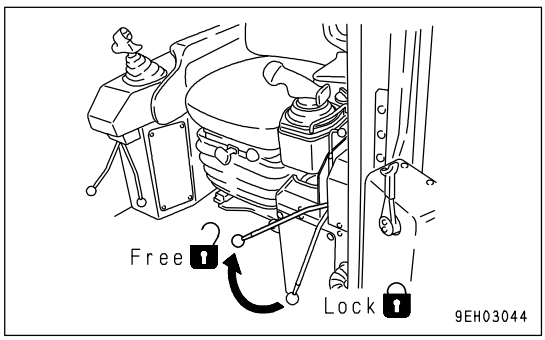
⚠ WARNING

- **When moving the machine off, check that the area around the machine is safe, and sound the horn before moving.**
  Do not allow anyone to enter the area around the machine.
  There is a blind spot at the rear of the machine, so be particularly careful when traveling in reverse.
- **When moving the machine off on a slope, always keep brake pedal (6) depressed even after releasing parking lever (1).**
- **When starting the machine up a steep slope, turn fuel control dial (5) fully to run the engine at full throttle, keep brake pedal (6) and decelerator pedal (9) depressed, press FORWARD switch (7) or REVERSE switch (8), then gradually release brake pedal (6). When the travel speed increases, gradually release decelerator pedal (9).**

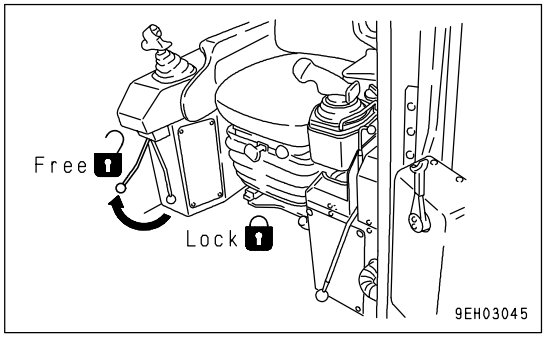




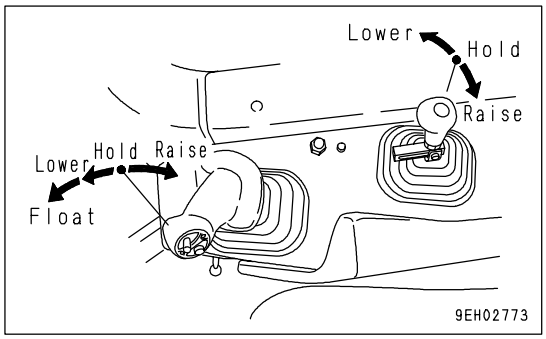
1. Set parking lever (1) to the FREE position



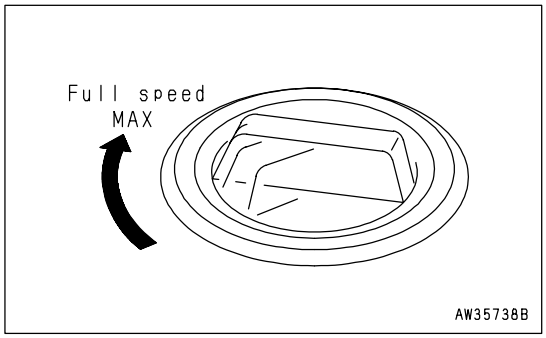
2. Set safety lever (2) for blade control lever (3) and ripper control lever (4) to the FREE position.



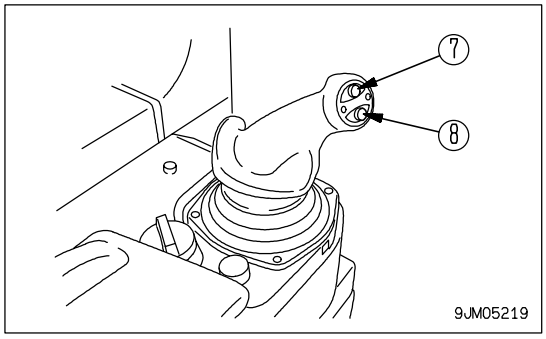
3. Operate blade control lever (3) and ripper control lever (4) to the RAISE position, raise the blade 40 - 50 cm (15.8 - 19.7 in) from the ground, and raise the ripper to the maximum height.



4. Turn fuel control dial (5) to the full speed (MAX) position, raise the engine speed, and fully depress decelerator pedal (9).



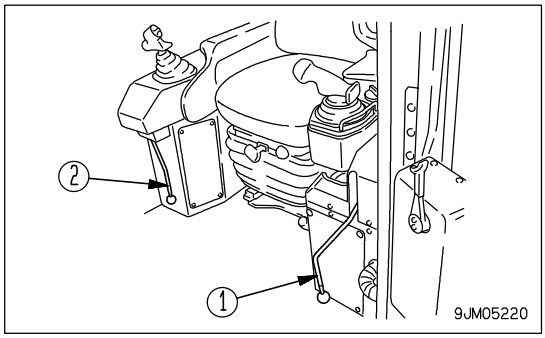
5. Press FORWARD switch (7) or REVERSE switch (8), then gradually release decelerator pedal (9) to allow the machine to move off.

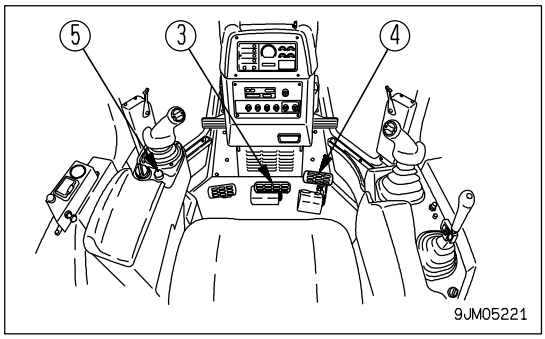


STOPPING MACHINE

WARNING

- **Avoid stopping suddenly. Give yourself ample room when stopping.**
- **When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, place the parking lever (1) in the LOCK position and insert blocks underneath the track shoes. As an additional safety measure, thrust the blade into the ground.**
- **If the work equipment control lever is touched by accident, the work equipment may move suddenly, and this may lead to a serious accident. before leaving the operator's seat, always operate the safety lever (2) to place it securely at the LOCK position.**

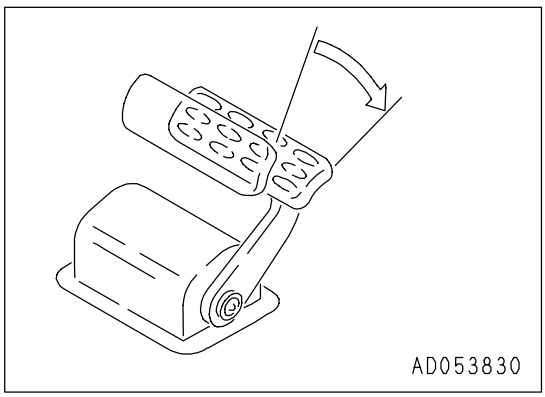




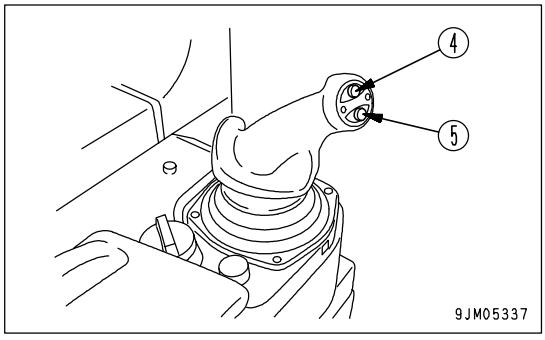
1. Depress brake pedal(3) to apply the brake.

NOTICE

If the brake is depressed when the engine speed or travel speed is high, the brake disc may make a slipping sound. Normally, depress decelerator pedal (4) to reduce the engine speed and travel speed before depressing the brake.



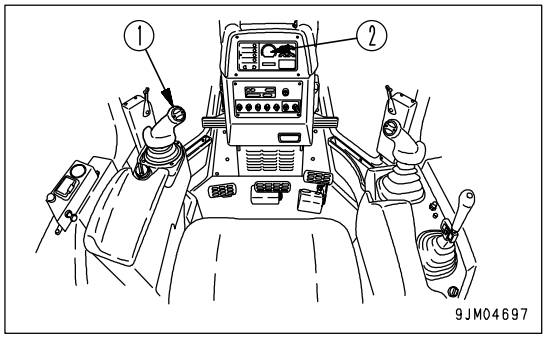
2. Press NEUTRAL switch (5).



SHIFTING GEAR

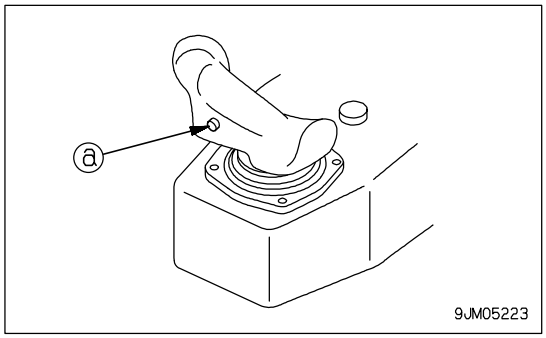
The machine does not have to be stopped to shift gears.

1. Move joystick (1) to the desired gear position to shift gears.



GEAR SHIFTING

- When the joystick is at the FORWARD or REVERSE position and switch (a) is pushed, the transmission speed will change.
  Shift switch (a): Each time switch is pressed, speed range changes 1st → 2nd → 1st When the joystick is at the FORWARD or REVERSE position and switch (a) is pushed, the transmission speed will change.

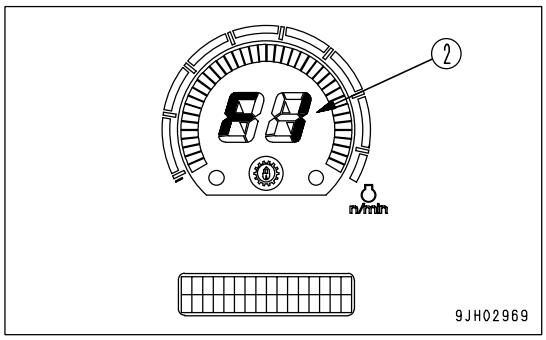


- If the switch is at the N position and the FORWARD switch is pressed, the speed range shifts to F1 (FORWARD operation).
  If the speed range is F1 and the shift switch is pressed once, the speed range shifts to F2.
  If the speed range is F2 and the shift switch is pressed once, the speed range shifts to F1.
- If the switch is at the N position and the REVERSE switch is pressed, the speed range shifts to R1 (REVERSE operation).
  If the speed range is R1 and the shift switch is pressed once, the speed range shifts to R2.
  If the speed range is R2 and the shift switch is pressed once, the speed range shifts to R1.

For details of the maximum speed at each speed range, see SPECIFICATIONS (PAGE 5-2).

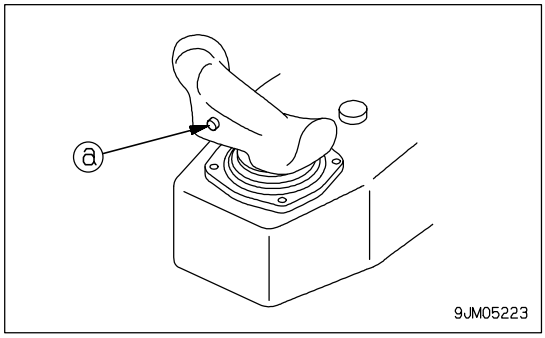
REMARK

The speed range in use is displayed on the panel display according to the gearshift operation.
For example:
Neutral: N is displayed on the display panel A (2)
FORWARD 1st: F1 is displayed on the display panel A (2)
REVERSE 2nd: R2 is displayed on the display panel A (2)
When the parking lever is locked, P is displayed.

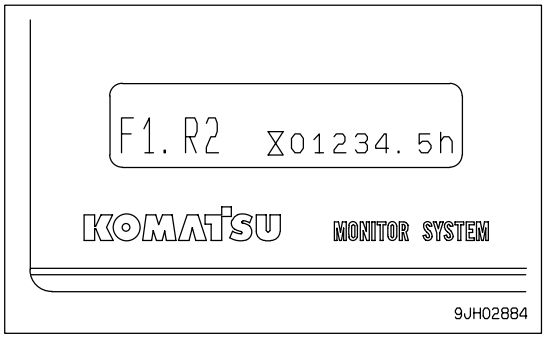


GEARSHIFTING USING SHIFT MODE SELECTION

- Shift mode selection means that the selected speed range is displayed at the N position before starting.
- If the machine is at N and shift switch (a) is pressed, the shift mode can be selected.



- The selected shift mode is displayed on display portion B (multi-information) of the monitor panel.
  When shift mode is [F1-R1] (already set as default)
  F1.R1 is displayed
  When shift mode is set to [F1-R2]
  F1.R2 is displayed
  When shift mode is set to [F2-R2]
  F2.R2 is displayed



- Shift operations when shift mode is set to [F1-R2]
  If the machine is at N and the shift switch is pressed once, the shift mode is set to [F1-R2].
  After that, if the FORWARD switch is pressed, the speed range is switched to F1 (FORWARD operation).
  If the REVERSE switch is pressed, the speed range is automatically switched R1 → R2 (REVERSE operation).

- If the machine is at N and the shift switch is pressed twice, the shift mode is set to [F2-R2].
  After that, if the FORWARD switch is pressed, the speed range is automatically switched F1 → F2 (FORWARD operation).
  If the REVERSE switch is pressed, the speed range is automatically switched R1 → R2 (REVERSE operation).

REMARK

Even if the mode is set to [F1-R1] mode, [F1-R2] mode, or [F2-R2] mode, if the shift switch is operated, priority is given to the manual operation.

For example:

After setting to [F1-R2] mode, if the FORWARD switch is pressed, the speed range is shifted to F1 (FORWARD operation), but if the direction remains at FORWARD, and shift switch (a) is pressed once, the speed range will shift to F2, and if the switch is Pressed twice, the speed range will shift to F1. If the REVERSE switch is pressed, the speed range is automatically switched R1 → R2 (REVERSE operation), but if the direction remains at REVERSE, and shift switch (a) is pressed once, the speed range will shift to R1.

However, the mode remains set to [F1-R2] mode. After the NEUTRAL switch is pressed to return to N, if the FORWARD switch is pressed, the speed range is set to F1 (FORWARD operation); and if the REVERSE switch is pressed, the speed range is automatically
switched R1 → R2 (REVERSE operation).

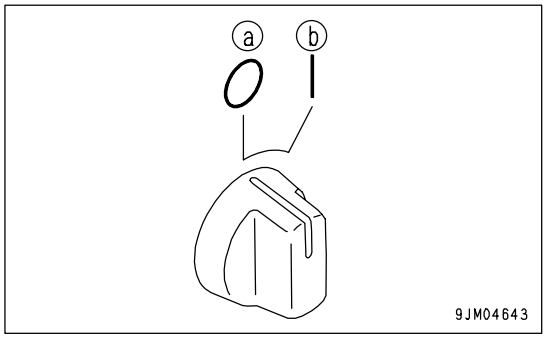
REMARK

The default setting is [F1 - R1].

After the starting switch is turned OFF, the shift mode returns to the default setting [F1 - R1].

AUTO SHIFT DOWN OPERATION

If the travel speed drops due to the load conditions when traveling, the transmission is automatically shifted to a lower speed range. This is actuated by turning auto shift down switch (2) on the instrument panel at the front of the operator's compartment to the ON (b) position.

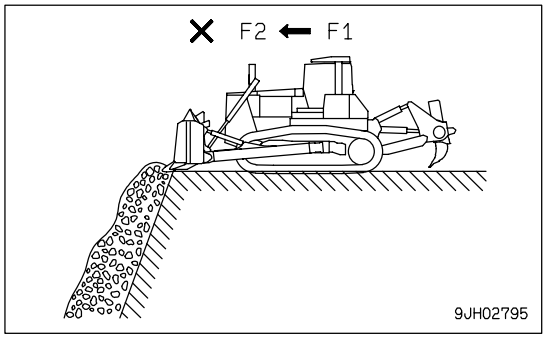


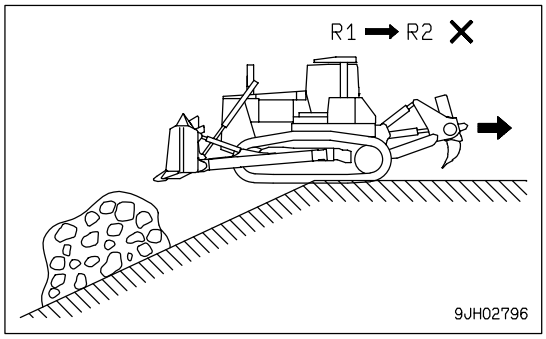
OFF position (a): Automatically canceled
ON position (b): Automatically shifted down to lower speed range

The transmission is automatically shifted down F2→ F1, R2 → R1.

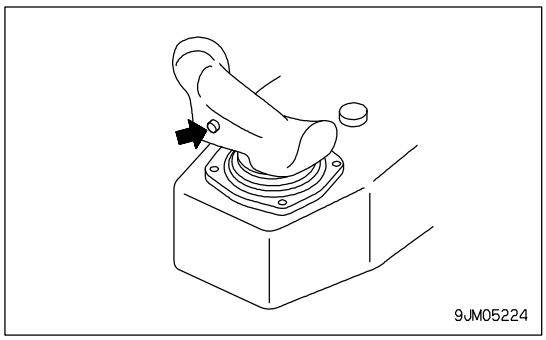
REMARK

- For safety reasons, during auto shift down, the transmission is prevented from shifting up.





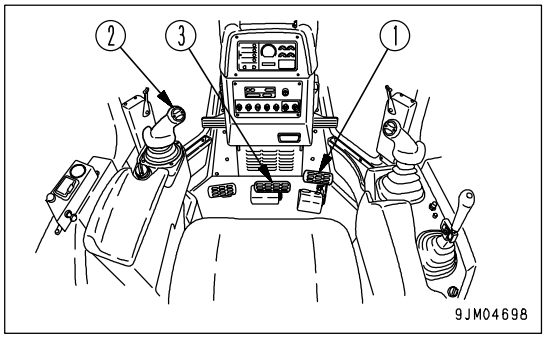
- If it is desired to shift up, use manual control and press the shift switch.



SHIFTING BETWEEN FOEWARD AND REVERSE

WARNING

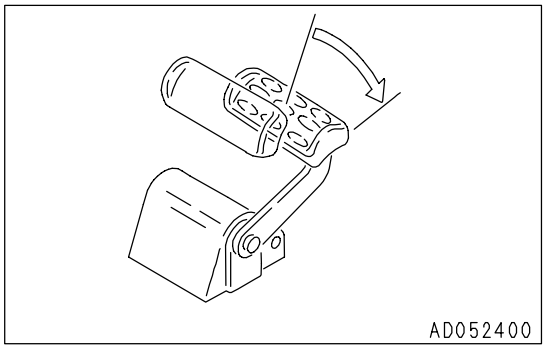
When switching between FORWARD and REVERSE, check first that the direction of travel is safe.



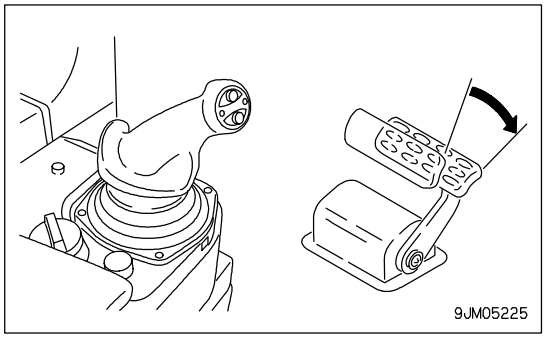
CAUTION

There is no need to stop the machine even when switching between FORWARD and REVERSE.
To increase safety, operator comfort, and the life of the transmission, leave the engine running at full speed, and always depress the decelerator pedal to lower the engine speed.

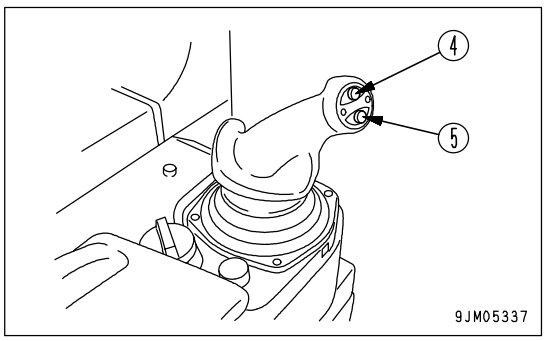
1. Depress decelerator pedal (1) and reduce the engine speed.



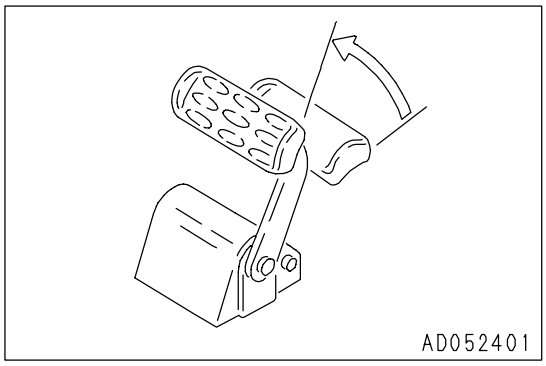
2. Reduce the speed, then depress brake pedal (3) and stop the machine.



3. After the pressing decelerator pedal (3), press the FORWARD switch (4) or REVERSE switch (5).



4. Release decelerator pedal (1) and raise the engine speed.



REMARK
When the REVERSE switch is pressed, the backup alarm buzzer will sound.

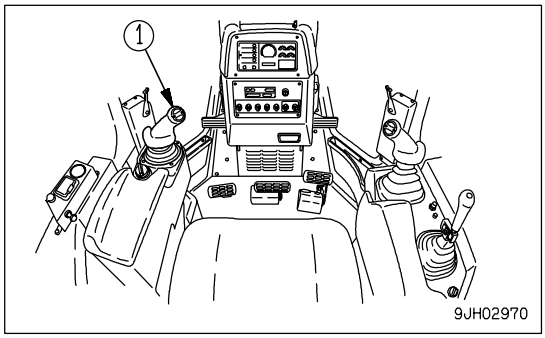
STEERING MACHINE

⚠ WARNING

- **Avoid as much as possible turning the machine on a slope.**
  The machine will tend to slip sideways. Particular care should be taken on soft or clay land.
- **Never make a pivot turn at high speed.**

NORMAL TURNING

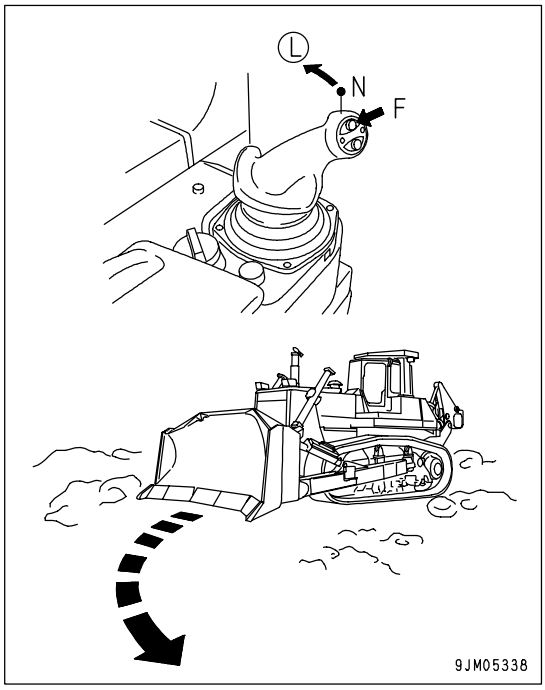
To turn the machine while traveling, incline joystick (1) in the direction to turn.



TURNING GRADUALLY TO LEFT WHILE TRAVELING FORWARD

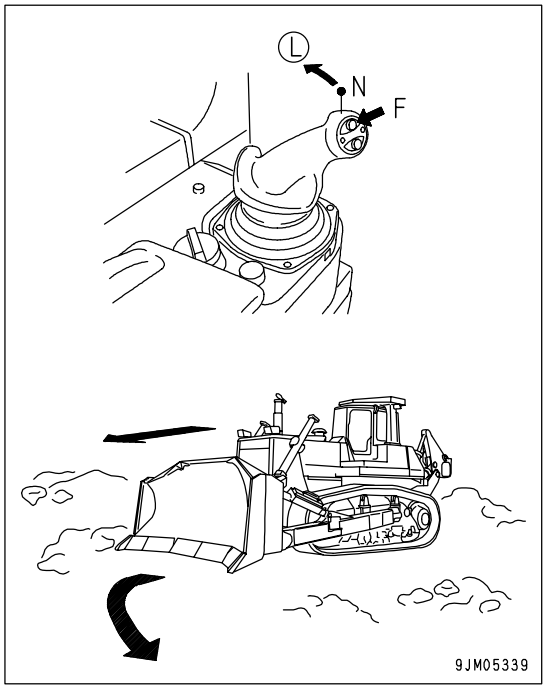
If the FORWARD switch is pressed and the steering, direction, and gearshift lever is operated partially to the left (L), the steering clutch will disengage and the machine will turn gradually to the left.

To turn gradually to the right, press the FORWARD switch and operate the steering, direction, and gearshift lever partially to the right.
The operation is the same when traveling in reverse (but with the REVERSE switch pressed)



MAKING SHARP TURNS TO LEFT WHILE TRAVELING FORWARD

If the FORWARD switch is pressed and the steering, direction, and gearshift lever is operated fully to the left (L), the steering clutch will disengage, the steering brake will be engaged, and the machine will make a pivot turn to the left.



REMARK

To make a pivot turn forward to the right, press the FORWARD switch and operate the steering, direction, and gearshift lever fully to the right.

The operation is the same when traveling in reverse (but with the REVERSE switch pressed)

TURNING WHILE DESCENDING A SLOPE

With machines that can carry out counter rotation turns, on steep downhill slopes where the machine may travel under its own weight, or on downhill slopes where it is being pushed by a towed machine, the machine will not steer in the opposite direction, so do as follows.

REMARK

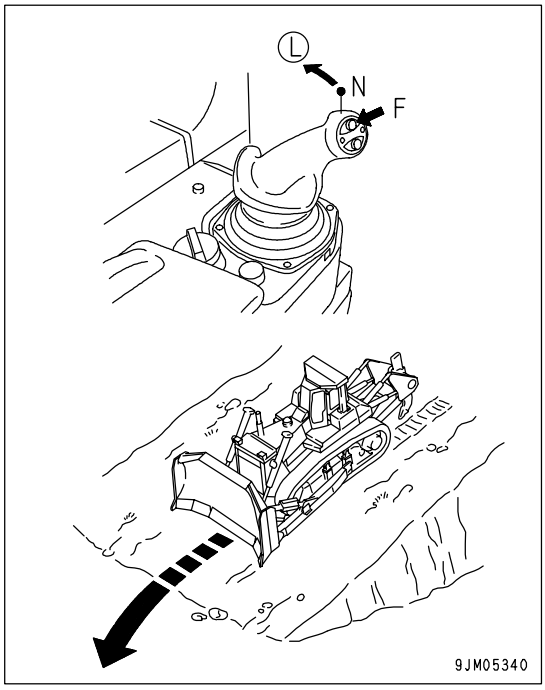
Cross steering means the phenomenon that the machine turns in the opposite direction to the actual steering direction.

TURNING GRADUALLY TO LEFT WHILE TRAVELING FORWARD

If the FORWARD switch is pressed and the steering, direction, and gearshift lever is operated partially to the left (L), the machine will turn gradually to the left.

REMARK

To turn gradually to the right, press the FORWARD switch and operate the steering, direction, and gearshift lever to the right.
The operation is the same when traveling in reverse (but with the REVERSE switch pressed)

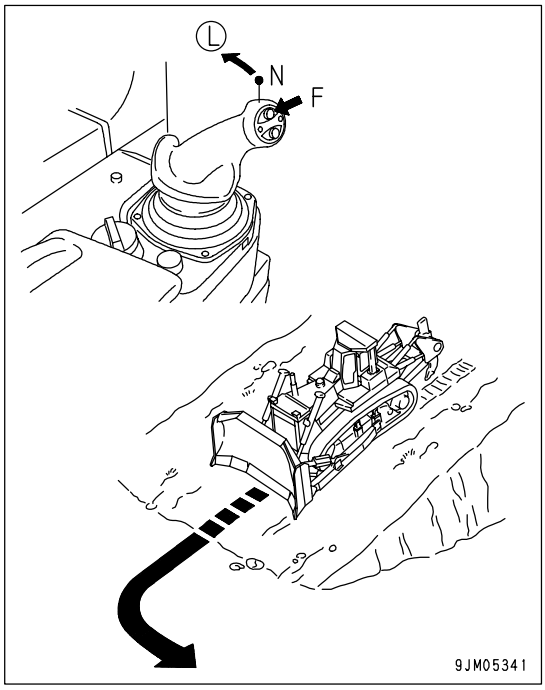


MAKING SHARP TURNS TO LEFT WHILE TRAVELING FORWARD

If the FORWARD switch is pressed and the steering, direction, and gearshift lever is operated fully to the left (L), the machine will make a pivot turn to the left.

REMARK

To make a pivot turn forward to the right, press the FORWARD switch and operate the steering, direction, and gearshift lever fully to the right.
The operation is the same when traveling in reverse (but with the REVERSE switch pressed)



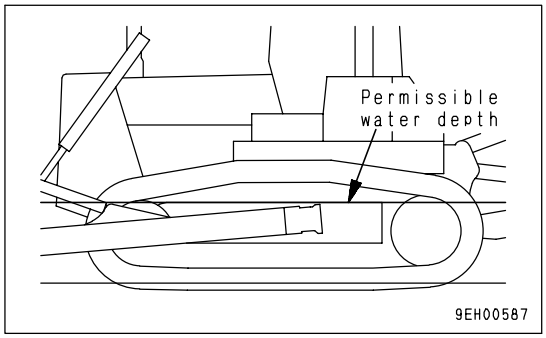
PRECAUTIONS FOR OPERATION

PAY ATTENTION TO GAUGES

When the red range lights on the power train oil temperature gauge while operating, reduce load and wait for lowering of temperature.

PERMISSIBLE WATER DEPTH

When operating in water, always keep top surface of the track frame above the surface of the water.
Also, be careful that the engine cooling fan will not come in contact with water. The fan can be damaged.



PRECAUTIONS WHEN TRAVELING UP OR DOWN HILLS

METHOD OF USING DECELERATOR PEDAL

When stepping on the decelerator pedal while going uphill, climbing ability will be reduced and the machine will stop. Furthermore, the engine sometimes will stall.

USE ENGINE AS BRAKE

When going downhill, shift gear shift lever into low speed to run engine at slow speed and travel down slope using the engine as a brake.
Do not move the joystick to the N position.
When traveling down hills of more than 15-, shift down to 1st speed (R1 or F2).

BRAKING WHEN TRAVELING DOWNHILL

While descending a slope using the engine as a brake, also apply the brakes.
Failure to brake may result in overrunning, causing engine trouble.

PRECAUTIONS ON SLOPE

BE CAREFUL OF FUEL LEVEL

If the fuel level in the fuel tank becomes low when working on slopes, the engine may suck in air because of the angle of the machine or the swaying of the machine. If this makes the engine stop, the braking effect will be reduced, so be careful not to let the fuel level in the fuel tank become too low.

BE CAREFUL OF OIL LEVEL

When operating machine on sloped areas of more than 20°, fill every place with oil to H level.

PRECAUTIONS WHEN ENGINE STOPS ON SLOPE

If the engine stops while working or traveling on a hill, immediately depress the brake pedal to bring the machine to a complete stop.

METHOD OF USING BRAKES

The following actions cause premature damage to the brakes, so avoid such operations.

- Using emergency brake at full speed
- Using brake with engine running at full speed in first gear (F1, R1) (Machine stall condition)

REMARK

Always depress the decelerator pedal to lower the engine speed before actuating the brakes.

PROHIBITED TO KEEP THE DOOR OPEN DURING OPERATIONS

Always keep the door closed when traveling or carrying out operations.
If the door is open, there is danger of damage from obstacles or strong vibration.

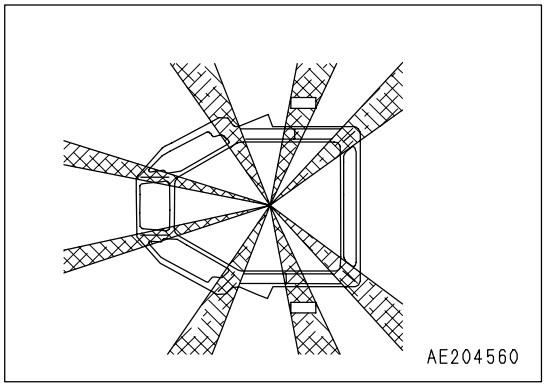
IT IS PROHIBITED TO MODIFY THE CAB GLASS IN ANY WAY THAT WILL OBSTRUCT THE VIEW

- For safety reasons, do not install anything to the cab glass that will obstruct the view.
- Always keep the glass clean to ensure safety during operations.

PRECAUTIONS FOR BLIND SPOTS CAUSED BY CAB STAY AND ROPS STAY

⚠ WARNING

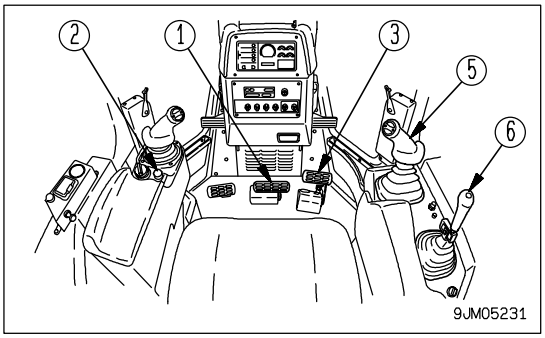
The cab stay and ROPS stay cause blind spots.
When operating, always be sure to check carefully that there is no obstacle or worker in the surrounding area.

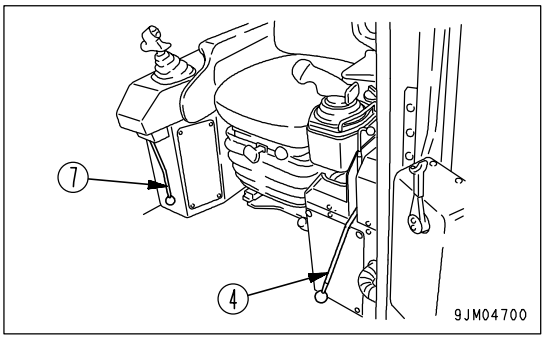


PARKING MACHINE

WARNING

- **Avoid stopping suddenly. Give yourself ample room when stopping.**
- **When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, place the parking lever (4) in the LOCK position and insert blocks underneath the track shoes. As an additional safety measure, thrust the blade into the ground.**
- **If the work equipment control lever is touched by accident, the work equipment may move suddenly, and this may lead to a serious accident. Before leaving the operator's seat, always operate the safety lever (7) to place it securely at the LOCK position.**

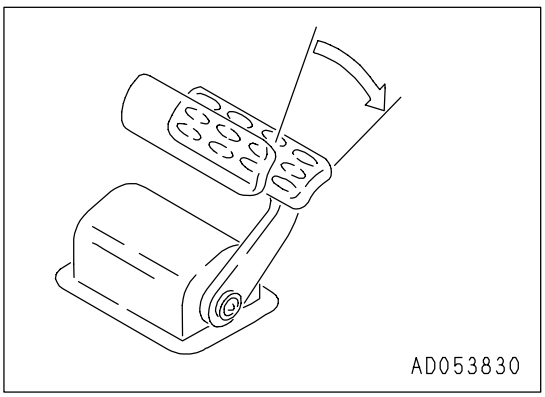




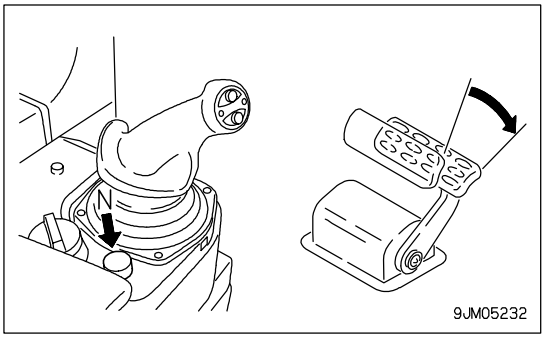
1. Depress brake pedal (1) to stop the machine.

NOTICE

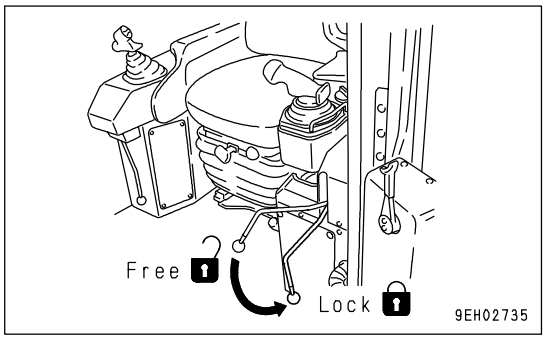
If the brake is depressed when the engine speed or travel speed is high, the brake disc may make a slipping sound. Normally, depress decelerator pedal (2) to reduce the engine speed and travel speed before depressing the brake.



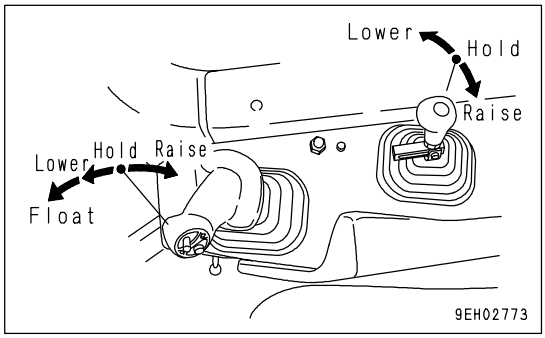
2. Press NEUTRAL switch (2).



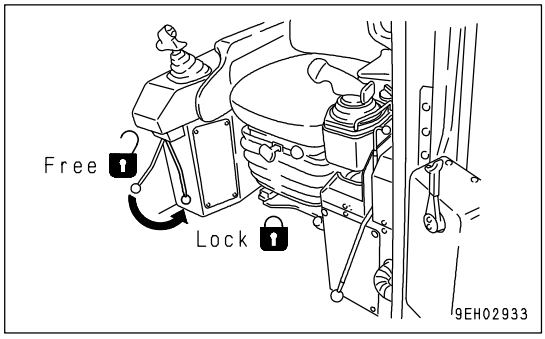
3. Operate parking lever (4) to lock the brakes.



4. Operate blade control lever (5) and ripper control lever (6) to the LOWER position, and lower the blade and ripper to the ground.
5. Set blade control lever (5) and ripper control lever (6) to the HOLD position.

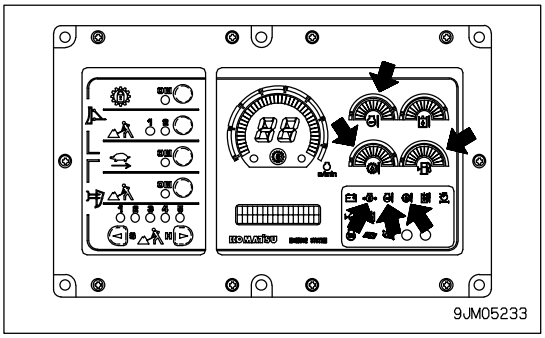


6. Set safety lever (7) for blade control lever (5) and ripper control lever (6) to the FREE position.



CHECK AFTER FINISHING WORK

Use the meters and caution lamps to check the engine water temperature, engine oil pressure, fuel level and power train oil temperature.



LOCKING

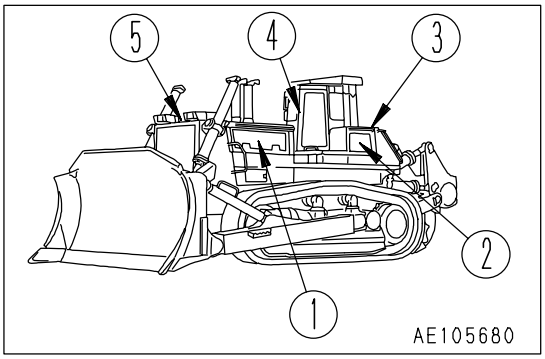
To prevent vandalism, there are locks at the following places.

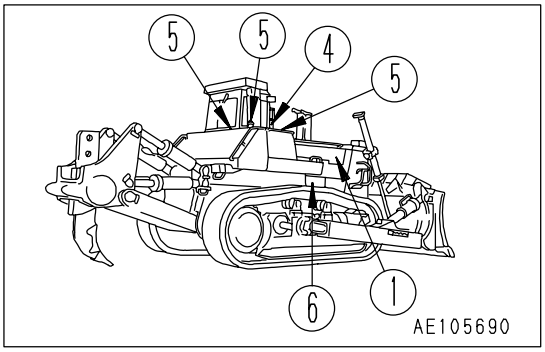
Places that can be locked with the starting switch key.

- Right and left engine side cover (1)
  (left side: 2 places, right side: 2 places)
- Electrical component bow inspection cover (left)(2)
- Cab door opener (4)
- Cap with lock (5)
  - Radiator cap
  - Fuel tank cap
  - Hydraulic oil tank cap
  - Power train oil filler cap
- Battery inspection cover (6)
- Tool box inspection cover (2)

Commercially available locks can be fitted to the following places.

- Power train centralized pressure detection, power train oil level inspection cover (7)



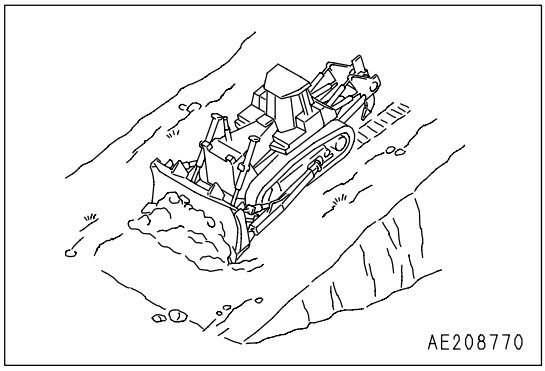


WORK POSSIBLE USING BULLDOZER

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

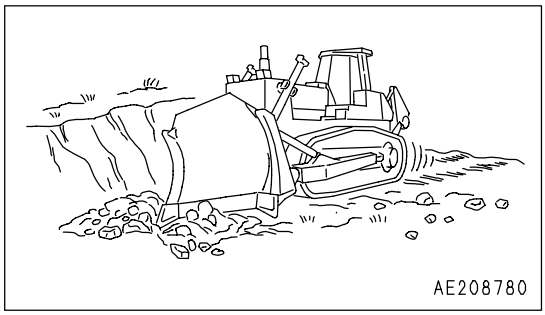
DOZING

A bulldozer digs and transports dirt in a forward direction slope excavation can always be most effectively carried out by proceeding from the top downward.
With the dual tiltdozer, the angle of the blade cutting edge can be changed, so the angle of the cutting edge can be adjusted during the digging operation to improve the efficiency of the work.



CUTTING INTO HARD OR FROZEN GROUND OR DITCHING

For digging and ditch excavation of hard or frozen ground tilt the blade. Even hard ground can be dug effectively by a tilted or angled blade.
If the ground is harder, use a ripper attachment for better efficiency.

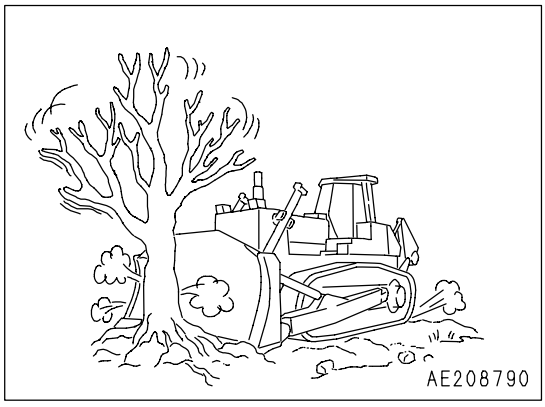


FELLING TREES, REMOVING STUMPS

NOTICE

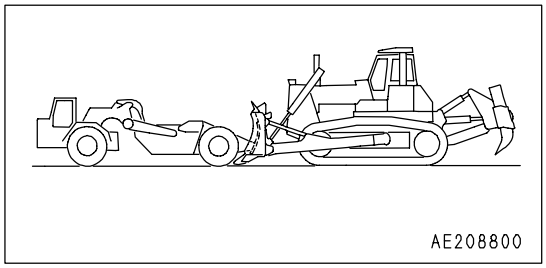
Do not up root trees or stumps or fell trees by angling or tilting the blade.

For trees with a diameter of 10 to 30 cm (3.9 to 11.8 in), raise the blade high and push 2 or 3 times to fell the tree.
Next, travel in reverse, and dig the corner of the blade into the ground to cut and dig up the roots.
When doing this, never hit the tree at high speed or apply shock to fell the tree.



PUSHER OPERATIONS

- When carrying out pusher operations, always install a pusher plate.
- When approaching the other machine, depress the decelerator pedal to reduce the engine speed and approach slowly. After coming into contact, raise the travel speed slowly and push with full power.
- If the pivot turns switch is kept at the ON position, it is possible to carry out pivot turns, and this improves the ease of pusher operation.

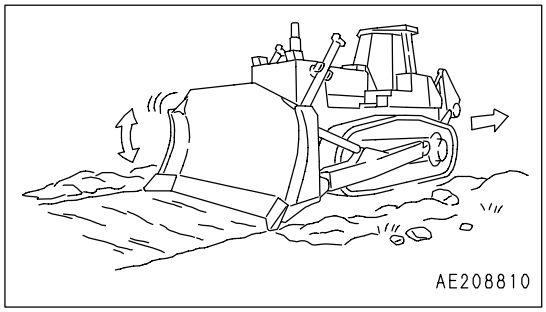


SMOOTHING

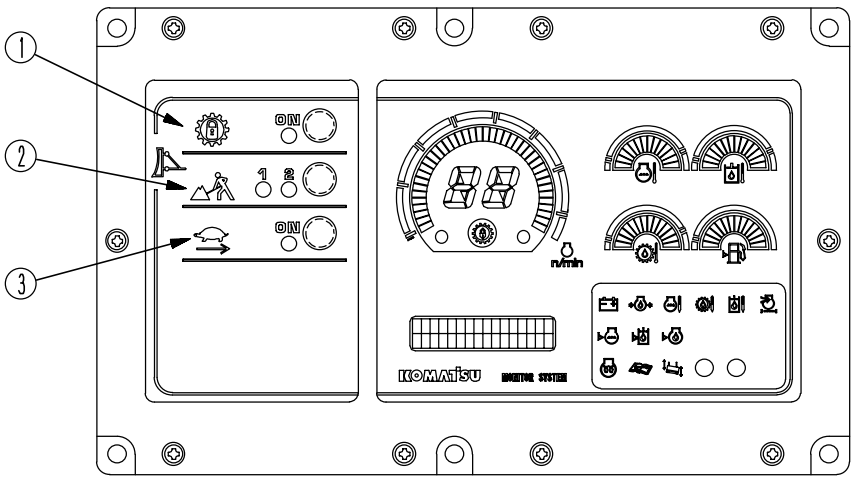
NOTICE

Avoid smoothing on rocky or stony ground. It can damage the blade.

When finishing the ground surface to a smooth finish after digging or filling operations, keep a full load of soil in the blade and operate the blade up or down in small movements while traveling forward. When leveling windrows or ruts left by the tracks, set the blade to the FLOAT position, travel at low speed in reverse and drag the blade over the ground surface.



EFECTIVE USE OF MODE SELECTION SYSTEM



9JM05342

(1) Lock up mode switch
(2) Economy mode selector switch
(3) Reverse slow mode selector switch

Selecting the mode to match the type of work and quality of rock or soil makes it possible to carry out operations effectively.
For the the machine that is solely used for crushed rocks, it can be done that when the key switch is turned ON, all mode switches are turned ON. Contact your Komatsu distributor for such modification of the switches.
When all the mode selection switches are off, the selection is suitable for conventional digging and dozing of bedrock.
The condition when all the mode selection switches are off is called the standard mode.
It is impossible to use any combination of the lock-up mode and any other mode.
The economy mode, reverse slow mode, and shoe slip control mode can be used independently or in combination.

Dozing		Ripping
Lock up mode	Economy mode	Reverse slow mode
○	×	×
×	○	○

○: Possible to use ×: Compound use not possible

SELECTION OF MODE

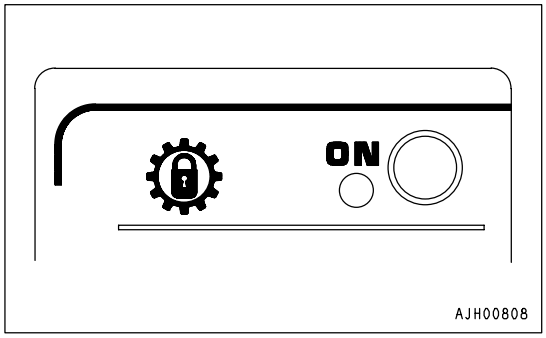
DOZING OPERATIONS

LOCK UP MODE

By using the lock-up mode, the travel speed increases, the operating efficiency is improved, and the fuel consumption is also reduced.

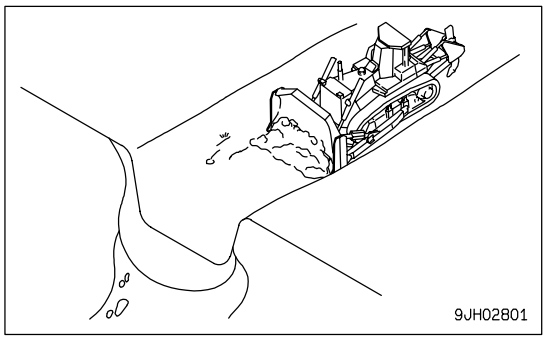
- Speed ranges that can be used: All speed ranges
- Applicable operations: Dozing loose material (suitable for long-distance hauling operations)

When the lock-up mode is turned ON, direct drive or torque converter drive are automatically selected according to the load.

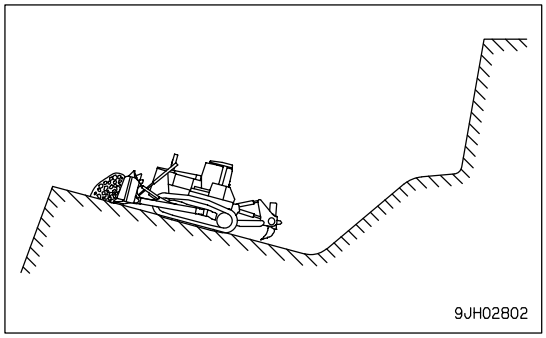


(Example)

- Slot dozing operations

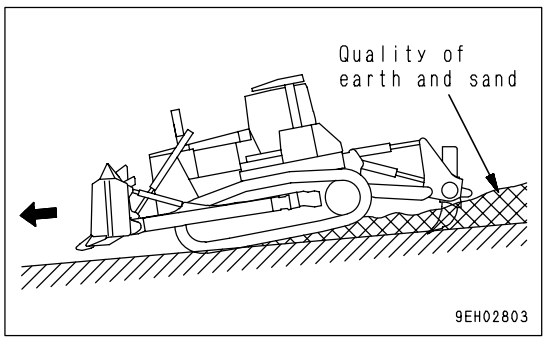


- Hillside dozing operations



REMARK

- If dozing operations power carried out on a slope of an angle of more than 15°, the lock-up may easily be canceled, so operations are easier to carry out in the standard mode.
- For normal ripping operations, if the lock-up mode is used, the lock-up will repeatedly switch between ON and OFF, so use the standard mode.
- Even with ripping operations, if the ground is extremely soft, the lock-up mode can be used.



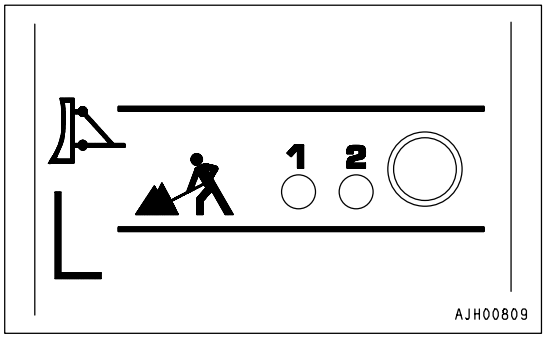
ECONOMY MODE

Using the economy mode makes it possible to reduce wasteful shoe slippage and to reduce the fuel consumption.

- Speed ranges that can be used: F1
- Applicable operations: Hauling after ripping, dozing blasted rock, smoothing

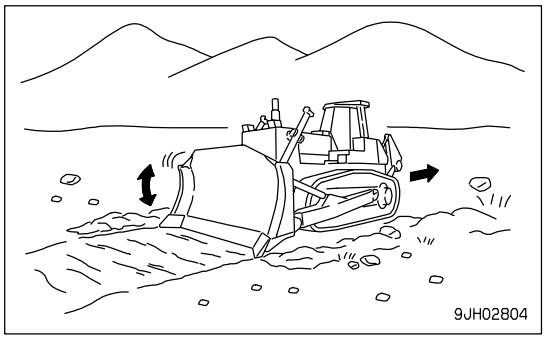
When the economy mode is turned ON, it is automatically set to [1]. Carry out dozing operations in this condition, then set to [2] and carry out operations. From this test, select the matching that gives power and low shoe slip ratio (frequency of deceleration operation).

Mode [1] is set to approx. 90% of full power and mode [2] is set to approx 70%.

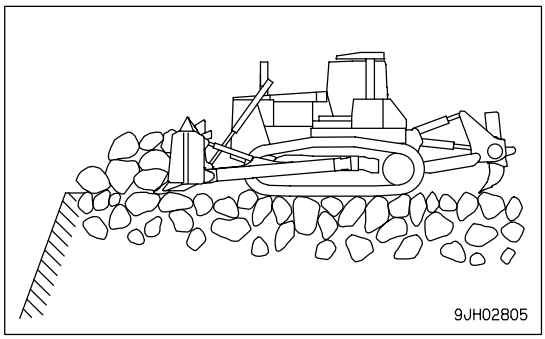


(Example)

- Fine leveling operations



- Ripping and dozing operations



REVERSE SLOW MODE

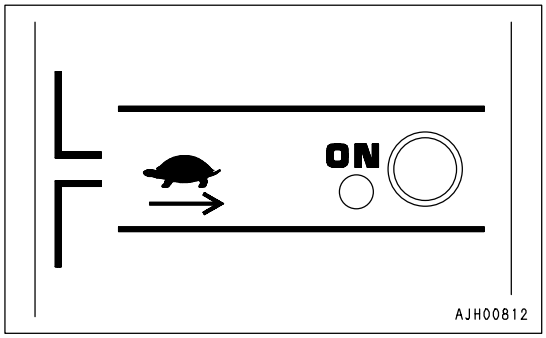
This reduces the travel speed when traveling in reverse, reduces the frequency of operating the deceleration pedal, and improves the riding comfort for the operator.

- Speed ranges that can be used: R1, 2, 3
- Applicable operations: Travelling on bedrock

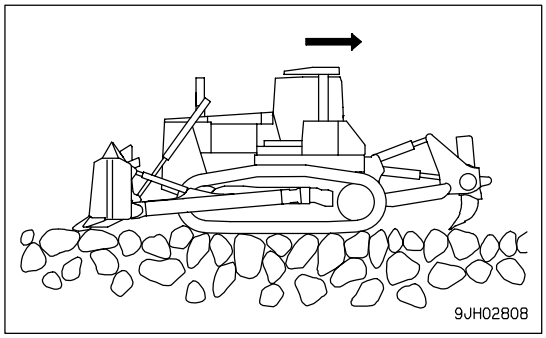
Use this mode to reduce the travel speed when traveling in R1, R2, or R3.

When the reverse slow mode is ON, the travel speed is set to approx. 80% of the full travel speed.

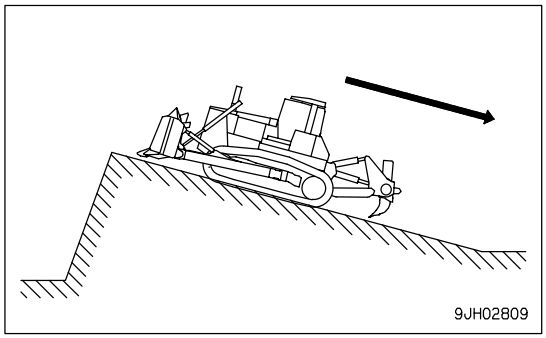
Use this mode to reduce the travel speed when traveling in reverse after ripping and dozing bedrock or when traveling in reverse after dozing on steep slopes. The travel speed differs in each mode according to whether it is used in combination with the economy mode.



When traveling on bedrock, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.

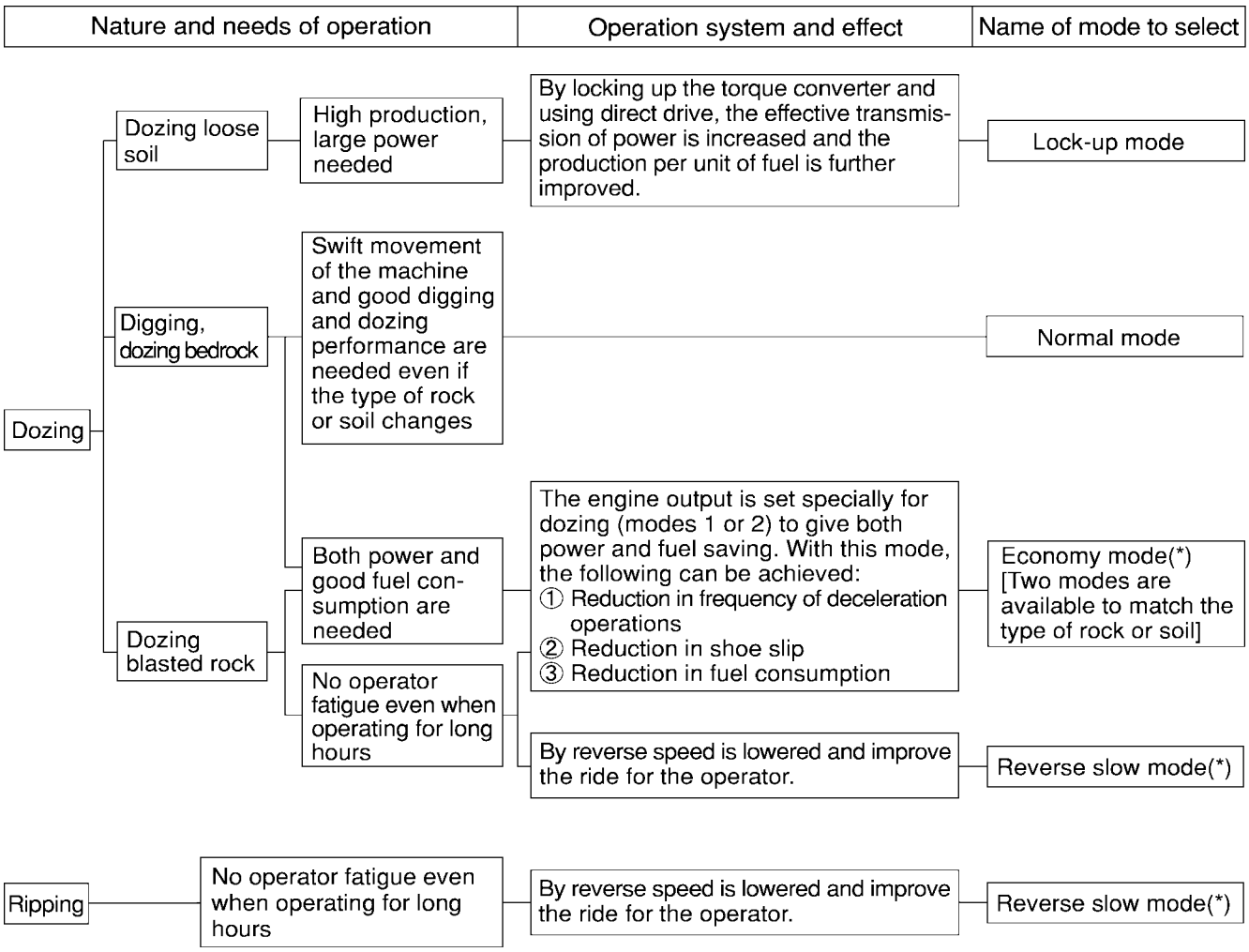


When traveling down slopes, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.



PROCEDURE FOR SELECTING MODE ACCORDING TO NATURE OR NEEDS TO WORK

Use the table below to select the mode that matches the nature or needs of the operation.

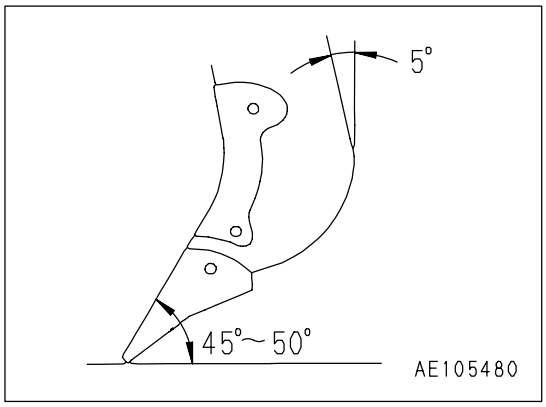


(*): The dozing economy mode, reverse slow mode, and ripping shoe slip control mode can all be selected independently or in combination. In addition, it is possible to select and correct as needed, so it is possible to achieve precise matching for various types of operation.

RIPPER OPERATION

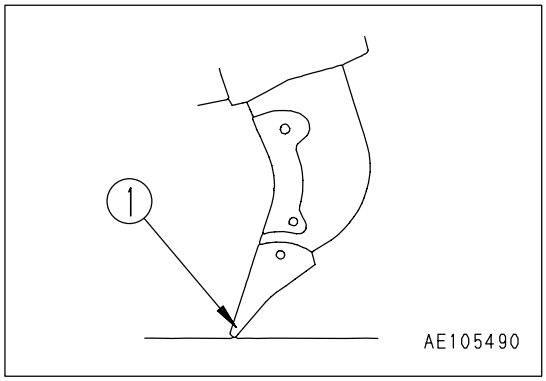
EFFECTIVE METHOD OF USE

- The optimum digging angle for the shank is when the shank is perpendicular to the ground (ripping angle: 45° to 50°).
- In comparatively soft rock (seismic velocity: 1500 m/s or below), it is also possible to carry out ripping with the shank tilted to the rear.
- On comparatively hard rock, if ripping is carried out with the shank tilted to the rear, there will be excessive wear of the point of tip (1), and the self-sharpening ability will be lost.
- During ripping operations, if the shoes slip because of boulders or resistance from the bedrock, use the tilt cylinder.
  When picking up a stone, advance the machine at a fixed gear speed (F1 or F2).



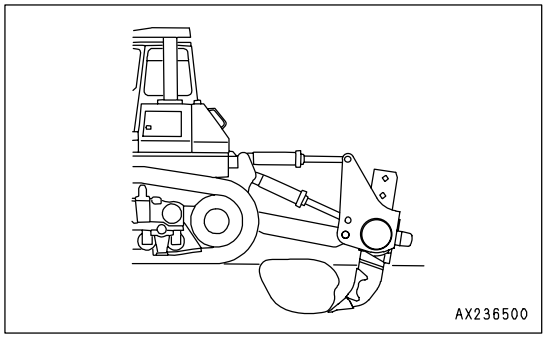
REMARK

- When raising boulders or digging up rockbed, do not put the transmission in neutral. If the transmission is in neutral, the reaction of the tilt cylinder will push the machine back. Always operate the machine with the transmission in FORWARD.
- Choosing a suitable ripper point to match the type of rock is one of the most important elements in using the ripper effectively.
  Ripper points are available for different types of rock, so select the most suitable ripper point from the list. For details, see "PROCEDURE FOR SELECTING RIPPER POINT (PAGE 6-4)".



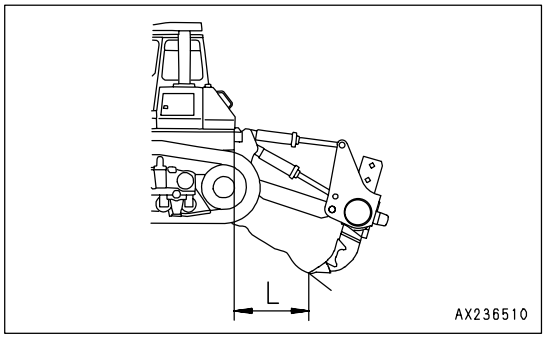
DIGGING UP BOULDERS OR ROCKBED

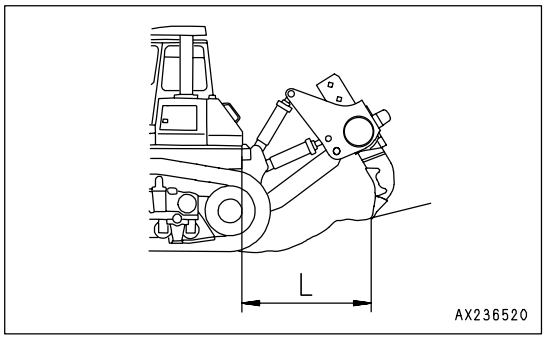
During ripper operations, if stubborn boulders or rockbed cause the travel speed to become slower, operate the tilt cylinder to dig up the boulder/rockbed.



OPERATING ON SLOPES

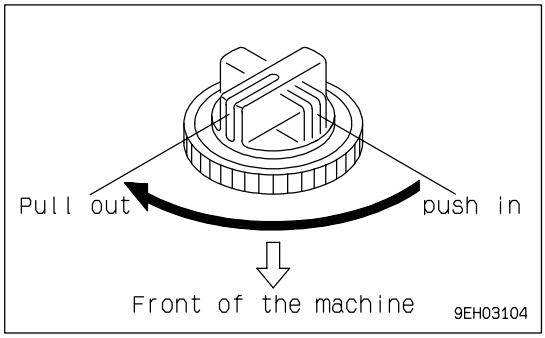
When using the variable ripper, adjust the length of the tilt cylinder to select dimension L.

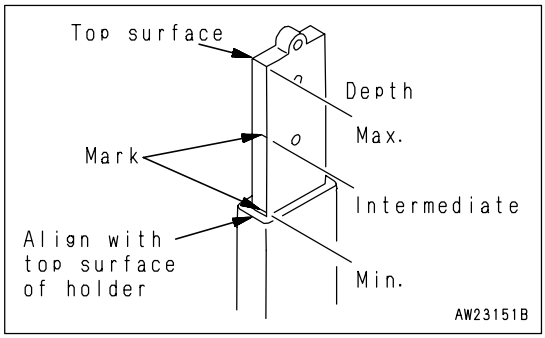




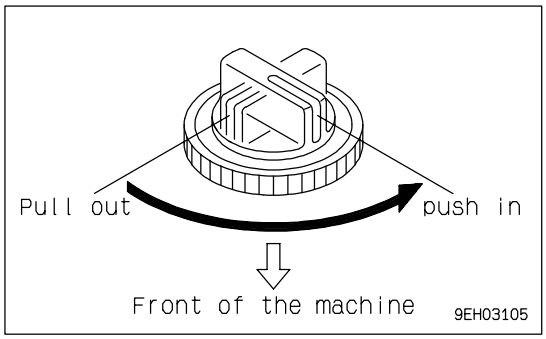
METHOD OF OPERATING PIN PULLER

1. Stop the machine in a safe place and lower the shank to the ground.
2. Operate the pin puller controller switch to the PULL OUT position and remove the mounting pin.
3. Move the ripper up or down to set to the desired shank position.





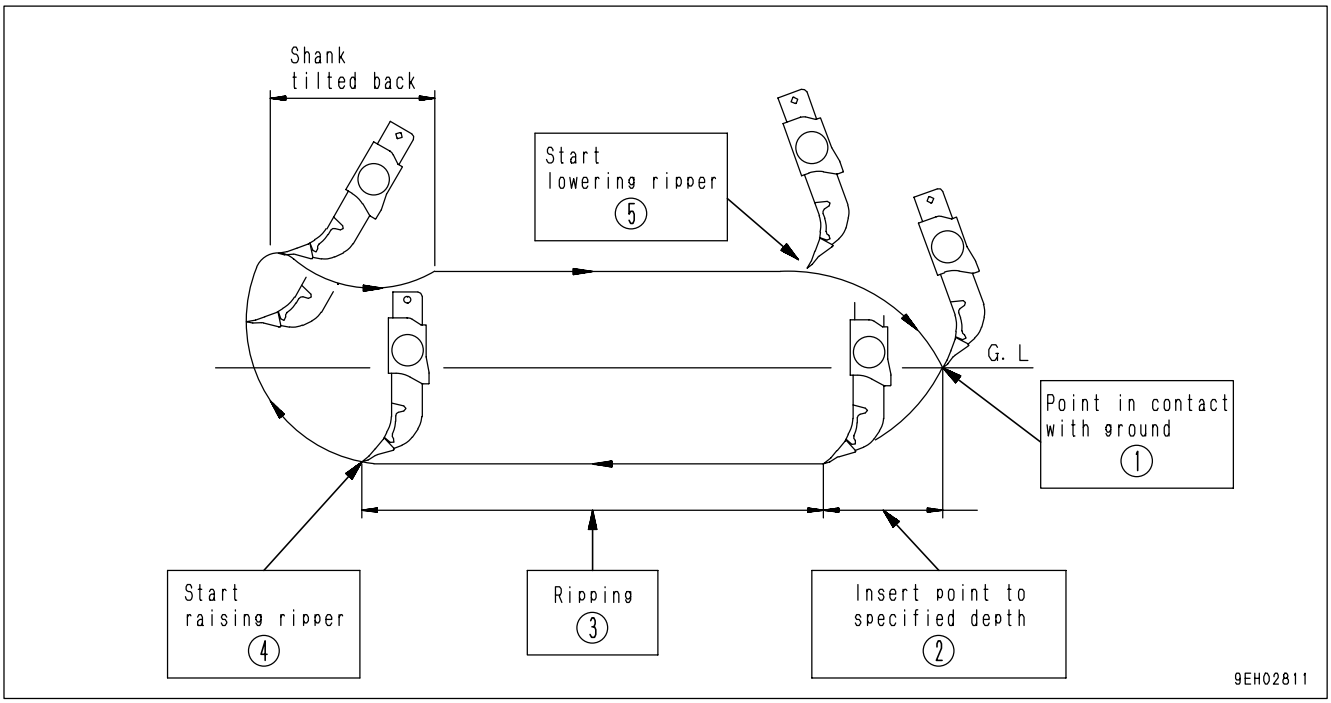
4. Operate the pin puller control switch to insert the mounting pin. If the pin does not match the position of the hole in the shank, set the pin puller control switch to the PUSH IN position and slowly move the ripper up or down.



REMARK
When raising the pin position to increase the digging depth, use a long protector to prevent wear of the shank.

OPERATING METHOD FOR RIPPING OPERATIONS

BASIC OPERATING METHOD



TRACK OF RIPPER SHANK

Carry out the ripping operation as follows, passing through the points shown in the diagram above.

(1) Tilt the ripper back, lower the ripper point to the ground that the place to begin ripping, and raise the rear of the machine.

(2) To press the decelerator pedal and lower the engine speed, set the speed range to F1, and tilt the ripper to insert the point to the specified depth.

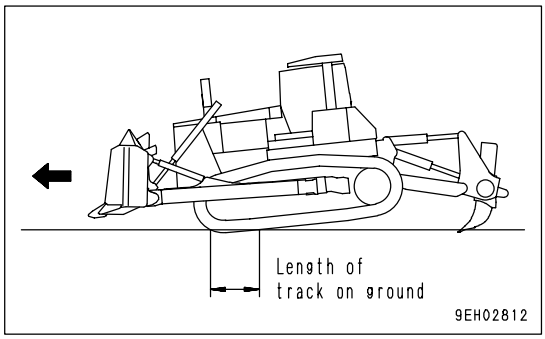
(3) When the ripper point reaches the specified depth, raise the engine speed to full speed and travel forward. Tilt the shank and carry out ripping.
If the circuit is relieved even when the shank is tilted, change the shank mounting hole to the hole below and reduce the ripping depth.

(4) After completing the ripping, travel forward, raise the shank from the bed rock, then travel in reverse.

(5) While traveling in reverse, tilt the ripper back, and when the starting point for the ripping is reached, lower the ripper.

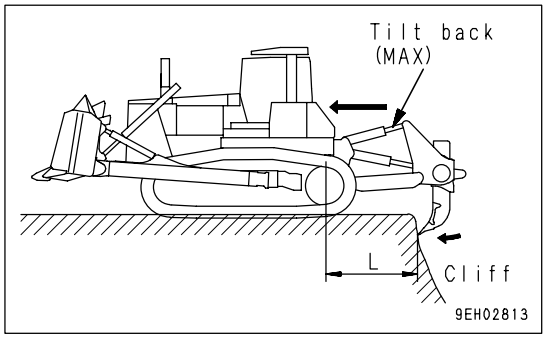
REMARK

- If the ripper is applied with the rear of the machine raised from the ground, the drawbar pull will be low, so the ripping efficiency will be reduced.
- If the ripping depth is kept constant, there will be no unevenness, and this will increase the efficiency of the dozing operation.



RIPPING BY CLIFFS

- When carrying out ripping at the edge of a cliff, tilt the ripper back to make depth (L) longer.
- Depress the decelerator pedal, drive slowly forward, and when the ripper point contacts the cliff, tilt the ripper.



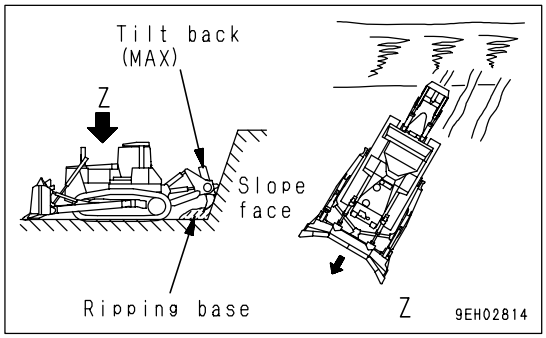
RIPPING BY SLOPE FACES

(Giant ripper)

- When carrying out ripping work at the edge of slope faces, make the ripper tilt back angle small, and if there is an area where the slope face has not been ripped, apply the ripper diagonally.

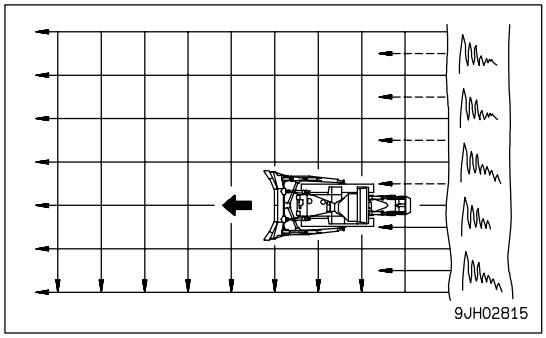
REMARK

In the case of the multi-shank ripper, carry out ripping at right angles to the slope face.

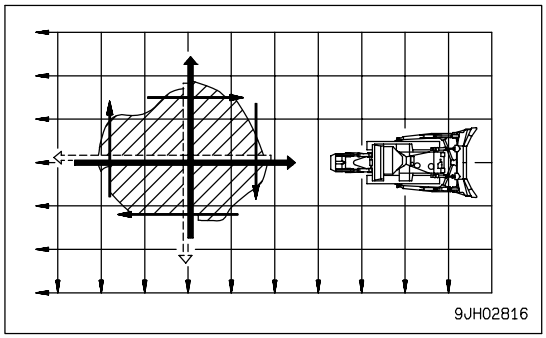


Cross ripping

- On jobsites with hard bedrock, for rocks and boulders which are impossible to break or dig up with one ripping pass, carry out the second ripping pass at right angles to the first ripping direction.
- At the edge of cliffs, where it is impossible to apply the ripper in a cross direction, make the space between the shanks smaller and carry out ripping.



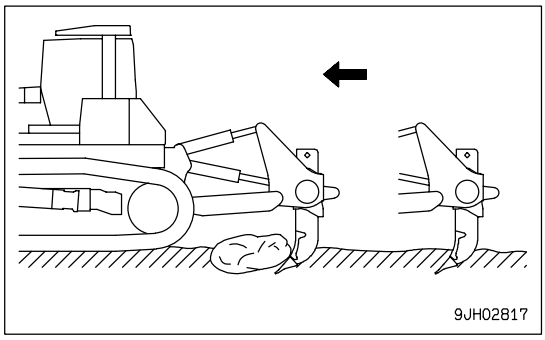
- During the ripping operation, if there is any hard bedrock, carry out ripping in the opposite direction from the direction where the ripper was applied. If it is still impossible to break up the rock, break up the area around the bedrock a little at the time.
- When carrying out concentrated ripping of hard bedrock, the work efficiency is high if the ripper is applied to the whole of the digging face.



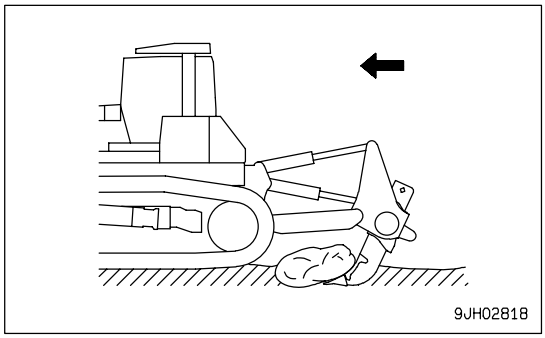
DIGGING UP BOULDERS

During the ripping operation, if boulders are found which are difficult to break and shoe slippage occurs, dig up the boulder as follows.

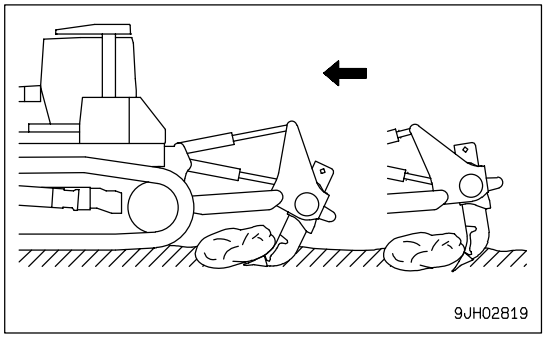
1. Depress the decelerator pedal and lower the engine speed to a point where there is no shoe slippage.



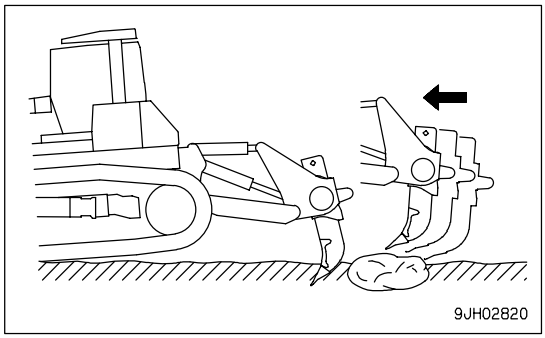
2. Operate the ripper lever to the TILT position and carry out ripping and digging.



3. If there are boulders which are impossible to break or dig up with the tilt operation, move forward slightly and tilt the shank back, then operate the tilt again and dig up the boulder.

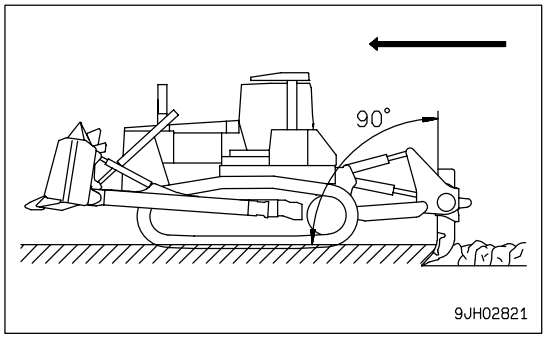


4. Even when the operation in Step 3 is repeated, if it is impossible to break or dig up the boulder, drive back about 10 cm, raise the shank, avoid the rock or boulder that cannot be ripped, then drive forward and start ripping again.

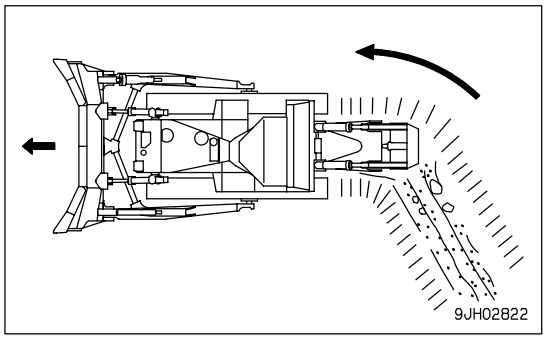


PRECAUTIONS WHEN RIPPING

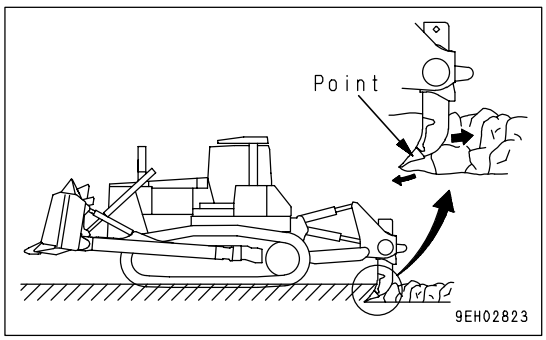
- For the digging angle when ripping, set so that the top of the shank is perpendicular, then lower the ripper.
- Do not carry out ripping for long periods with the shank tilted back. The tip of the point will wear to a round shape.



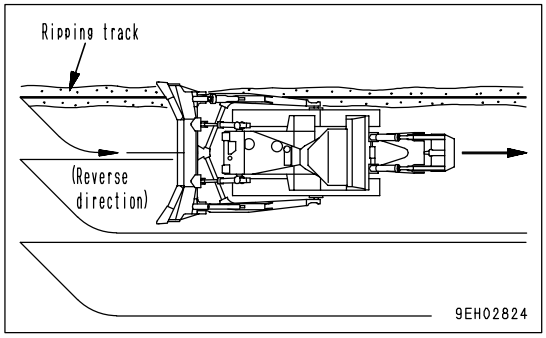
- Do not change the direction of travel during the ripping operation. This will cause breakage of the shank. When changing the direction of travel, remove the shanks from the ground before turning.



- Never drive in reverse when the ripper point is inserted in the bedrock. The pin installing the point will break and the point will fall off.
  Stop the machine, tilt back slightly, then raise the ripper slowly.



- After ripping, if the broken rock is comparatively large, avoid traveling over the ripping path when traveling in reverse. When traveling in reverse, check the rear carefully to avoid heating any large rocks. As far as possible, choose level ground to travel over.



ADJUSTING POSTURE OF WORK EQUIPMENT

WARNING

When adjusting, it is dangerous if the work equipment is moved by mistake. Set the work equipment in a safe condition, then stop the engine and lock the work equipment securely with the safety lock.

BLADE ADJUSTMENT

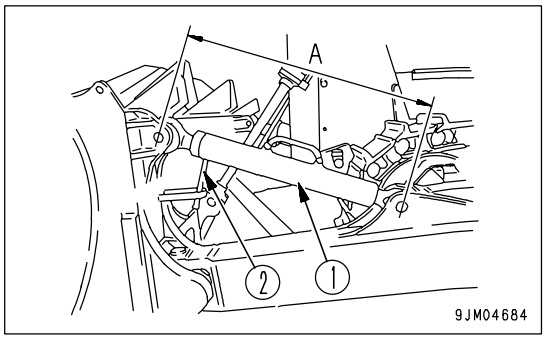
TILTING THE TILTDOZER

NOTICE

The maximum amount of tilt is 1250 mm (4.1 ft).
(When the semi-U blade is used.)
Be sure not to exceed 1250 mm (4.1 ft) for the tilt.
Tilt exceeding the maximum limit imposes unnecessary forces onto sections. This may cause damage to the machine.

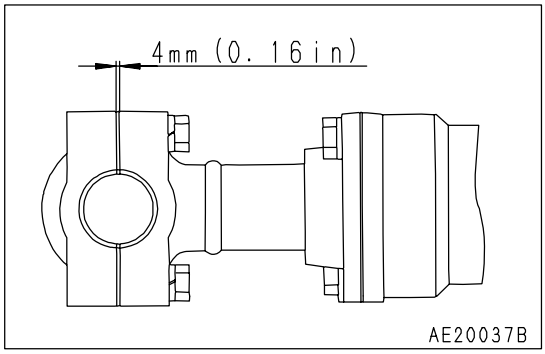
According to the operation of the blade control lever, the following tilt amount can be obtained:
Right side: 600 mm (23.6 in) or more
Left side: 600 mm (23.6 in) or more
If more tilt is required, do as follows.
Use bar handle (2) installed to the left brace to turn brace (1) and change the length (A) of the brace. This makes it possible to obtain a maximum tilt of 1250 mm (49.3 in).

- Standard distance between joints A: 1740 mm (68.6 in).



ADJUSTING SHIM IN BLADE CYLINDER CAP

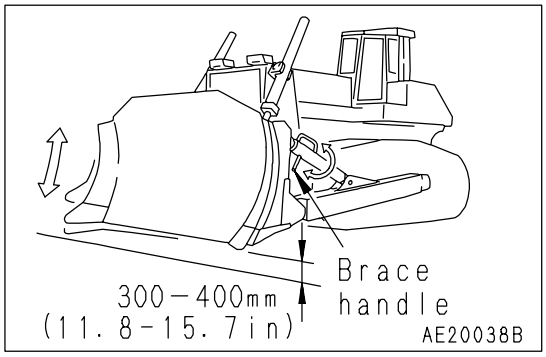
Set the standard shim adjustment in the blade cylinder cap to 4 mm (0.16 in).
Remove shims to balance the wear of the cap and the ball at the end of the piston rod.
The proper clearance to be maintained with the shims is 0.2 to 0.5 mm (0.008 to 0.02 in).



ADJUSTING BRACE

WARNING

If maintenance is carried out with the engine running, always have one worker sitting in the operator's seat while another worker carries out the maintenance. Both workers must mutually confirm the safety during the operation.



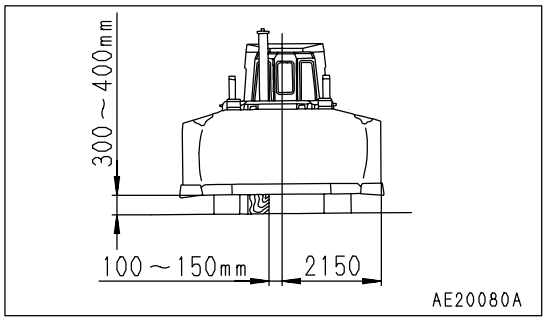
Start the engine and use inching control to tilt to the left and right. Adjustment can be carried out easily by rotating the brace handle while raising and lowering.

- When extending the brace

It is easy to carry out the adjustment if the blade is set on top of a block and the brace handle is turned.

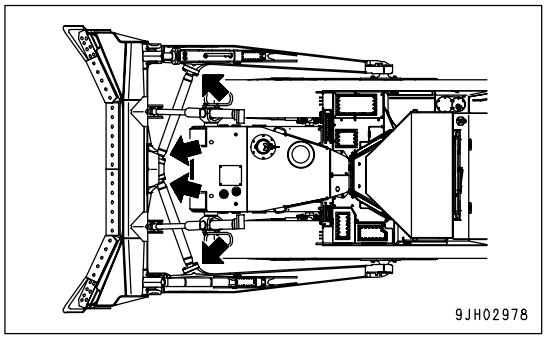
REMARK

When operated in this way, the blade is tilted, so the handle gradually becomes heavier. When this happens, return the blade from the tilt position to the horizontal position and turn the handle again according to the procedure given above.

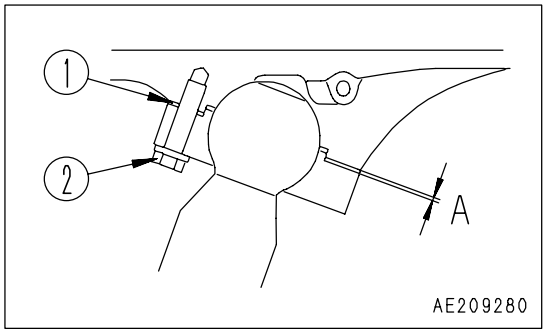


SHIM ADJUSTMENT (In case of U blade)

Adjust the thickness of shim so that the ball joint play (4 points) in the axial direction (shown by the arrow) does not exceed 1 mm (0.04 in).

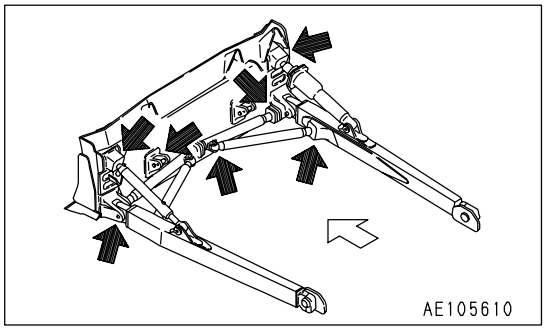


1. Remove shim (1) and tighten bolts (2) to eliminate the ball joint play.
2. Measure clearance "A" and remove bolts (2).
3. Install shim (1) having its thickness of "A" mm to "A + 1" mm ("A" in. to "A + 0.04" in) in place with bolts 2.
4. Confirm that ball joint can move smoothly after tightening bolts.

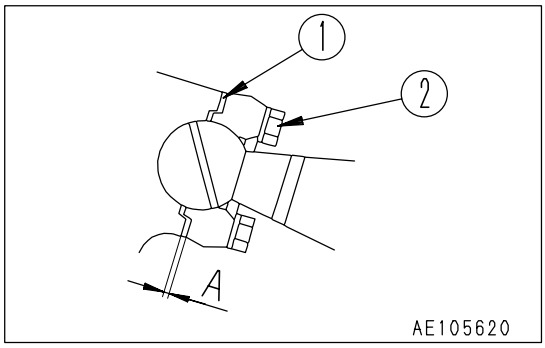


SHIM ADJUSTMENT (In case of semi U blade)

Adjust the thickness of shim so that the ball joint play (7 points) in the axial direction (shown by the arrow) does not exceed 1 mm (0.04 in).



1. Remove shim (1) and tighten bolts (2) to eliminate the ball joint play.
2. Measure clearance "A" and remove bolts (2).
3. Install shim (1) having its thickness of "A" mm to "A + 1" mm ("A" in. to "A + 0.04" in.) in place with bolts (2).
4. Confirm that ball joint can move smoothly after tightening bolts.



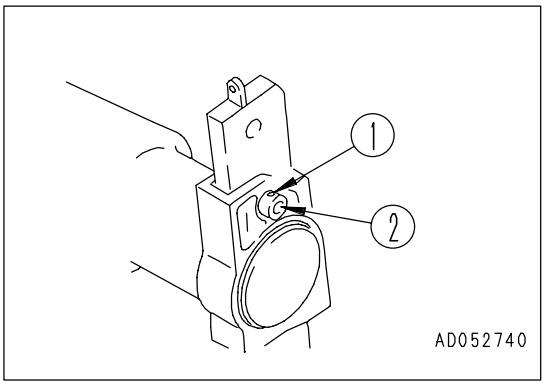
ADJUSTING RIPPER

ADJUSTING DIGGING DEPTH

Mounting pin holes are provided in the shank and these are used according to the desired digging depth. For normal use, use the bottom hole, and when particularly deep digging is needed, use the top hole.

For the method of changing the depth of digging,see "METHOD OF OPERATING PIN PULLER (PAGE 3-119)".

1. Place a pointed object on the tip of pin (1), then hit with a hammer to remove from the opposite side.
2. Remove pin (2) and change the position of the shank hole.
3. Insert pin (1) partially by hand then knock it in with a hammer.
   - The pin is made of one piece, so insert it partially by hand then knock it in with a hammer.
   - When a giant ripper is installed, use the pin puller. For details, see "METHOD OF OPERATING PIN PULLER (PAGE 3-119)".



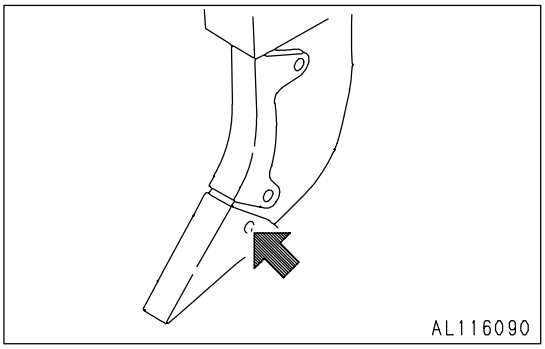
REPLACING POINT AND PROTECTOR

To protect the shank, if the protector and point installed to the tip are worn, replace them.

Place a pin remover on the pin marked by the arrow, then hit with a hammer to remove from the opposite side.

REMARK

The pin is a unitized type, so insert the pin partially by hand, then knock it in fully with a hammer.

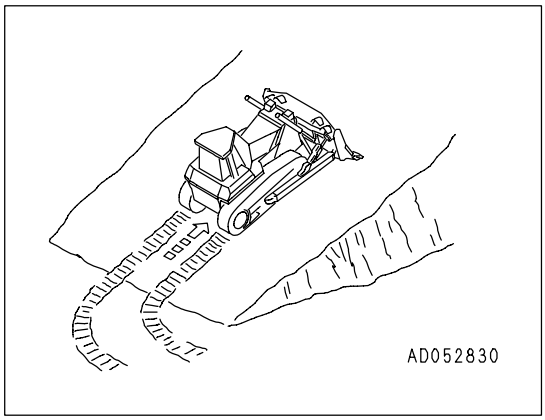


TIPS FOR LONGER UNDERCARRIAGE LIFE

Undercarriage life greatly varies depending on operation method, inspection and maintenance. For most efficient operation, keep the following point in mind.

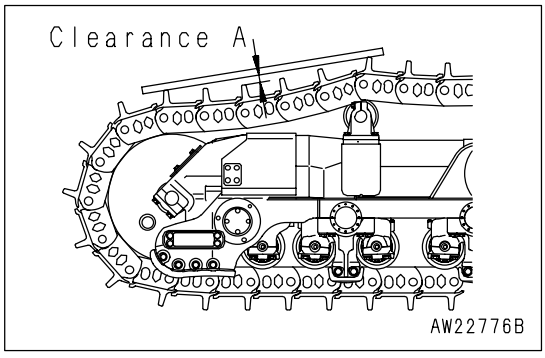
OPERATION METHOD

- Select the track shoe that best suits the type of soil to be encountered in service.
  Please consult your Komatsu distributor When selecting track shoes.
- Do not allow shoe slipping to occur during operation. If shoe slipping occurs, reduce load to the blade until slipping stops.
- Avoid sudden starts, acceleration or stops, unnecessarily high speeds and sharp turns.
- Always operate machine in a straight line whenever possible. When making turns, be careful not to allow the machine to stay to one side, so operation in both turning directions can be done properly. Make turns with the largest possible radius.
- Prior to operation, clear boulders and obstacles to prevent machine from riding over them while operating.
- On a slope, operate the machine parallel to the inclination of the slope. Do not operate across the slope. Also when stopping the machine on a slope, the machine should face toward the top of the slope.
- When ground inclines to left or right during digging operation, do not continue to dig with machine inclined. Move machine back to level ground and start to dig again.
- Do not force the machine to carry out work that exceeds its working capability. Such work includes cases where the idler or sprocket come off the ground when the machine meets obstacles that resist the power of the machine during dozing or ripping operations.



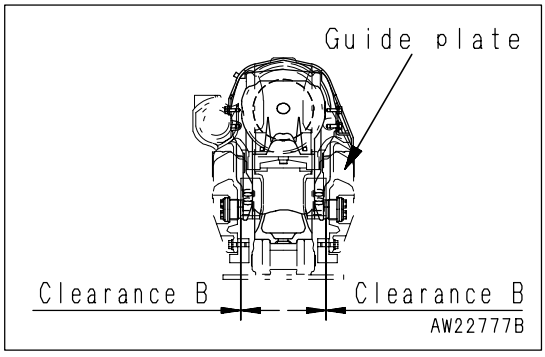
INSPECTION AND ADJUSTING

- Properly adjust track tension.
  Tension should be measured at clearance (A) shown in the diagram - usually 20 to 30 mm (0.8 to 1.2 in) at this point. For rocky terrain, tighten tracks slightly. In clay or sandy areas, slightly loosen them. (For inspection and adjustment procedures, refer to "CHECK TRACK TENSION (PAGE 4-26)").



- Check idler rollers for oil leakage as well as for loose bolts and nuts. If any trouble is detected, repair immediately.

- Check the clearance between the idler guide plate and the track frame. If clearance (B) increases, idler may develop side motion and tracks may come off. (For inspection and adjustment procedures, refer to "ADJUST IDLER CLEARANCE (PAGE 4-29)".



INSPECTION AND REPAIR

Frequent inspection and prompt repair will reduce repair costs.

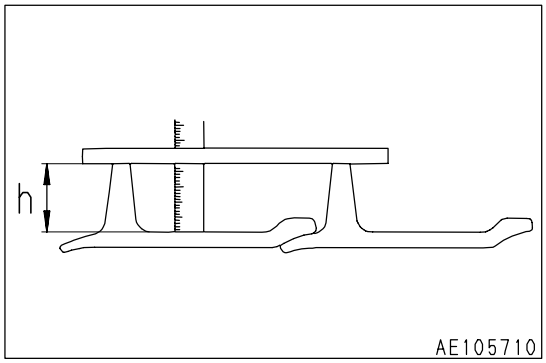
The following items for inspection will serve as a guide to maintenance service of each undercarriage part. Perform periodical inspection and contact the Komatsu distributor in your area when machine has approached repairable limits and reversing limits.

MEASURING HEIGHT OF GROUSER

- After taking up slack in track shoes, measure height at center of shoe as shown below.

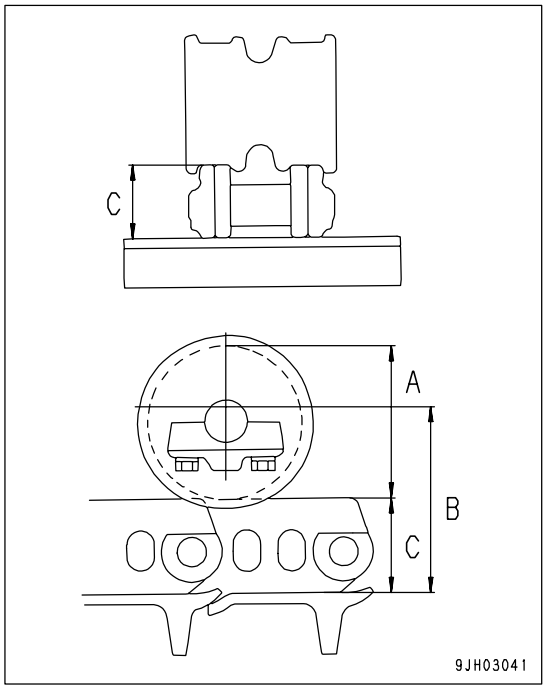
Standard height (h): 105 mm (4.2 in)

Repair limits: 30 mm (1.2 in)



MEASURING OUTSIDE DIAMETER OF TRACK ROLLER

1. Measure height (size C) of link tread as shown.
2. Stop machine at position where link tread, whose size C has been measured completely, contacts roller tread. Then measure size B.
3. Calculate outside diameter of tread (size A)
   A=(B-C)x2
   Standard size (A): 300 mm (12 in)
   Repair limits: 264 mm (10.6 in)



TRANSPORTATION

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

TRANSPORTATION PROCEDURE

A trailer should be used for transporting the machine.

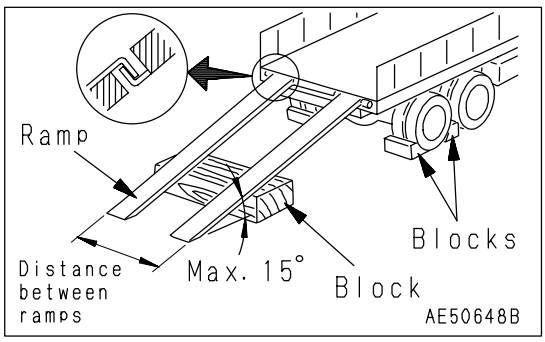
LOADING, UNLOADING WORK

⚠ WARNING

- **Make sure the ramp has sufficient width, length and thickness to enable the machine to be safely loaded and unloaded. If the ramp sags appreciably, reinforce it with blocks, etc.**
- **When loading and unloading the machine, park the trailer on a flat firm roadbed. Keep a fairly long distance between the road shoulder and the machine.**
- **Remove the mud from the undercarriage to prevent the machine from slipping to the side on slopes. Be sure the ramp surface is clean and free of grease, oil, ice and loose materials.**
- **Never change the direction of travel when on the ramps. If it is necessary to change direction, drive off the ramps and correct the direction, then drive on to the ramps again.**

When loading or unloading, always use ramps or a platform and carry out the operations as follows.

1. Properly apply the brakes on the trailer and insert blocks beneath the tires to ensure that it does not move. Then fix the ramps in line with the centers of the trailer and the machine.
2. Set the machine in line with the ramps, then load or unload the machine at slow travel.
3. Load the machine correctly in the specified position on the trailer.



PRECAUTIONS FOR LOADING

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

1. Lower the work equipment slowly.
2. Lock each control lever with the safety lock lever securely.
3. Set the parking lever to the LOCK position.
4. Turn the starting switch to the OFF position, stop the engine, then remove the key.
5. Lock the cab door, left and right engine side covers, and the battery inspection cover.
6. Put blocks under both ends of the tracks to prevent the machine from moving during transportation, and tie the machine down securely with chains or wire rope of suitable strength.
   Be particularly careful to fix the machine in position securely so that it does not slip to the side.

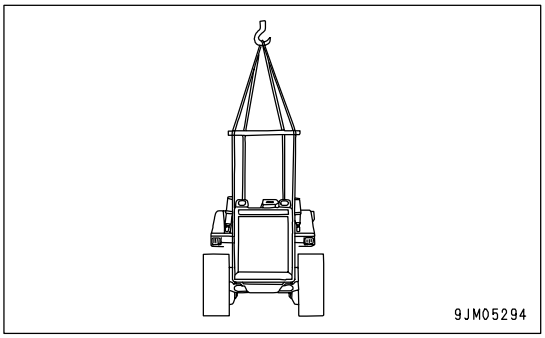
METHOD OF LIFTING MACHINE

WARNING

- **Never carry out the lifting operation with any person on the machine.**
- **Always make sure that the wire rope used for lifting the machine is of ample strength for the weight of the machine.**
- **Never try to lift the machine in any posture other than the posture given in the procedure below. There is danger that the machine may lose its balance.**
- **When lifting the machine,pay careful attention to the center of gravity to maintain the balance.**

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

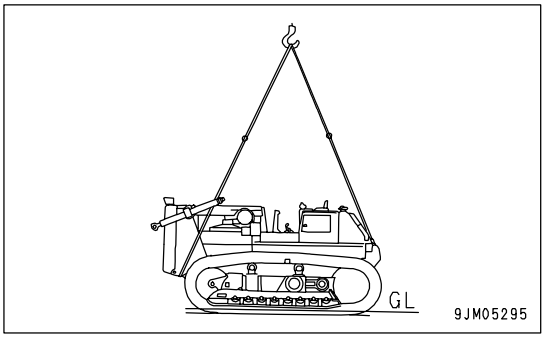
1. Stop the engine and be sure to set the parking lever to the LOCK position.
2. Set the lifting position for the machine as shown in the diagram on the right.



NOTICE

The lifting procedure applies to machines with standard specifications. The method of lifting differs according to the attachments and options actually installed. In such cases, please contact your Komatsu distributor for information.

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

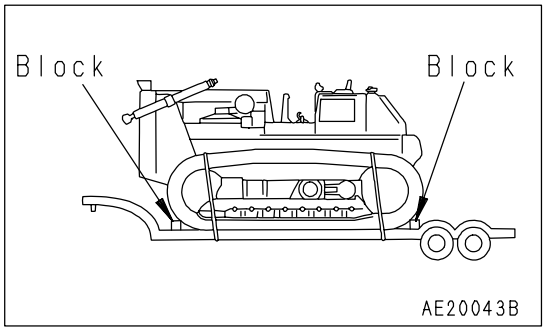


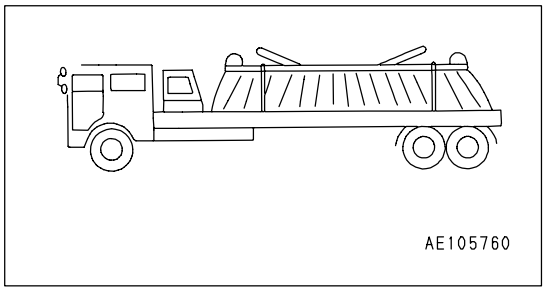
PRECAUTIONS FOR TRANSPORTATION

⚠ WARNING

Determine the route for transporting the machine by taking into account the width, height and weight of the machine.

Obey all state and local laws governing the weight, width and length of a load. Observe all regulations governing wide loads.





TRAVELING ON ROADS

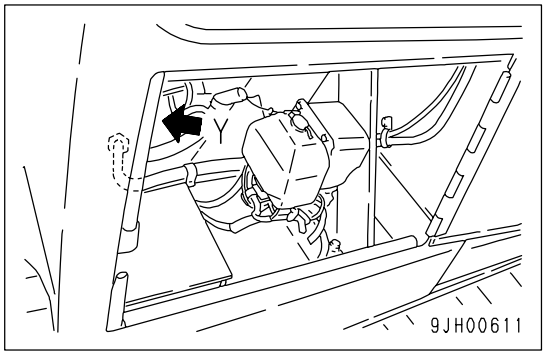
- When travelling paved roads, use flat shoes to protect their surface.
  Even when travelling a short distance, always place boards to protect the road surface.

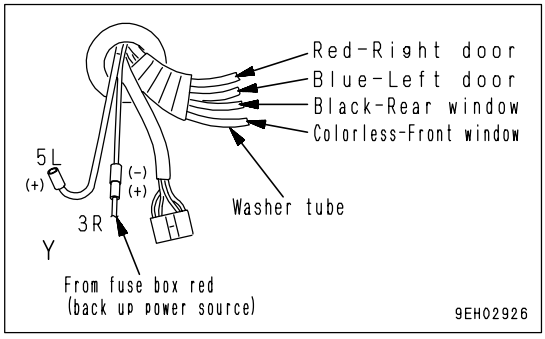
REMARK
Note that the asphalt road becomes soft in summer.

REMOVAL OF CAB

(Machines equipped with cab)
If it is necessary to remove the cab for transportation, disconnect the washer hoses, cab wiring, and washer motor wiring before removing the cab.

1. Pull the grommet portion in towards the cab from the hole in the machine cover, then remove.
2. Disconnect 4 washer hoses and the wiring (single wires x 2, 4-pin plug x 1) from the socket.
   - After removing, cover the washer hoses with a vinyl bag to prevent any dirt or dust from entering.
   - Before removing the cab, measure the clearance between the cab and each lever (joystick and blade control lever, etc.). Note the measurements to use as a standard when installing the cab again.





INSTALLATION OF CAB

(Machines equipped with cab)

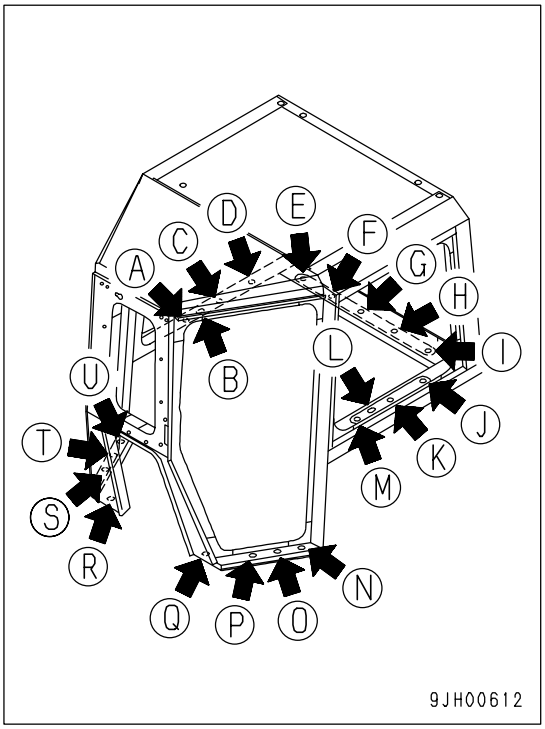
Install the cab parts in the opposite order to removal.

Connect all parts that were disconnected.

Install the cab mounting bolts as follows.

1. Lower the cab slowly on top of the floor frame.
2. Align the cab with the floor frame, then install bolts and washers in holes (A) - (U).
   Do not screw the bolts in fully. Screw them in 3 or 4 turns.
3. Tighten the bolts in holes (N) - (U) fully.
   Tighten in the order (N), (U), (Q), (R), (O), (T), (P), (S).
4. Tighten the bolts, (A) to (M), completely.

   If there are any unclear points about removing or installing the cab, please contact your Komatsu distributor.



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 to oil with low viscosity for all components. For details of the specified visicosity, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-10)".

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 4-20)".

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

WARNING

- **The battery generates flammable gas, so do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large 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.
Measure the specific gravity and calculate the rate of charge from the following conversion table.

Electrolyte 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

REMARK
When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

AFTER COMPLETION OF WORK

WARNING

- **Performing idle-running of the tracks is dangerous, so stay well away from the tracks.**

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

- Mud and water on the machine body should be completely removed. This is to prevent damage to the seal caused by mud or dirt getting inside the seal with frozen drops of water.
- Park the machine on concrete or hard ground. If this is impossible, park the machine on wooden boards.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
- When operating in mud or water, remove the water from the undercarriage to extend the life of the undercarriage.
- 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.

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 4-10)".
- If for any reason permanent antifreeze cannot be used, and an ethyl glycol base antifreeze (winter, one season type) is used instead, or if no antifreeze is used, drain the cooling system completely, then clean out the inside of the cooling system thoroughly, and fill with fresh soft water.

LONG-TERM STORAGE

BEFORE STORAGE

When putting the machine in storage for more than one month, do as follows.

- After every part is washed and dried, the machine shall be housed in a dry building. In case it is unavoidable to leave it outdoors, park the machine on flat ground free from flooding or other disaster and cover it with canvas etc.
- Completely fill the fuel tank, lubricate and change the oil before storage.
- Apply a thin coat of grease to metal surface of the hydraulic piston rods and the idler adjusting 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), always add antifreeze to the cooling water. Komatsu genuine Super Coolant (AF-ACL) is added to the cooling water, so there is no need to change the density for temperatures down to -10°C (14°F).
  If the temperature goes below -10°C (14°F), adjust the density. For details, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-20)".
- Place all control levers at the neutral position, set the safety lever and parking brake lever to the LOCK position, and set the fuel control lever to the low idling position.

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.

Operate the engine and move the machine for a short distance 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.
Before operating the work equipment, wipe off the grease on the hydraulic piston rod.

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

AFTER RUNNING OUT OF FUEL

WARNING

When air bleed plug (2) at the top of the fuel filter head or supply pump air breather (4) are removed, the system is still under pressure, so fuel may spurt out. Loosen these parts slowly before opening them.

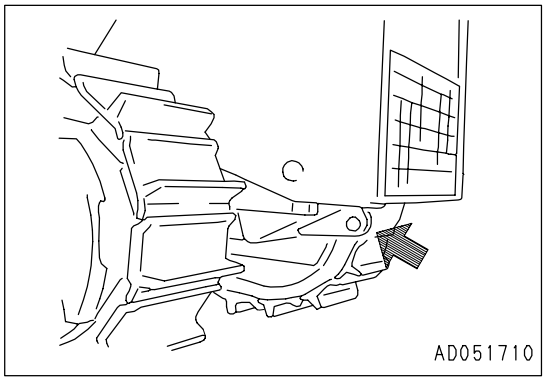
When starting after running out of fuel, fill the filter cartridge with fuel and bleed the air from the fuel system before starting.

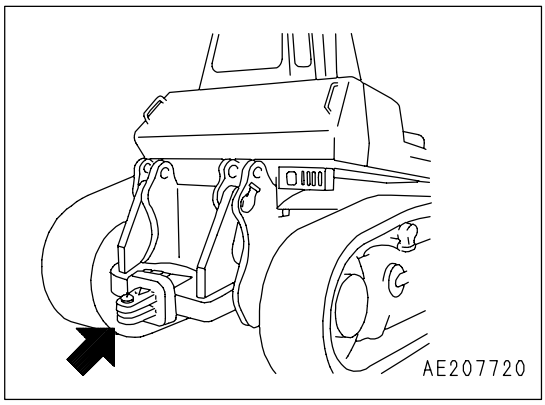
METHOD OF TOWING MACHINE

WARNING

- **Be sure to use a wire rope sufficiently strong for the towing weight.**
- **When using the towing hook, be sure to use a shackle.**
- **Set the wire rope horizontally and align it with the track frame.**
- **Tow the machine slowly.**

If the machine sinks in mud and cannot get out under its own power, or if being used to tow a heavy object, fit the wire to the towing hook as shown in the diagram on the right, or in the case of machines with a drawbar, fit the wire to the drawbar pin when towing.





NOTICE

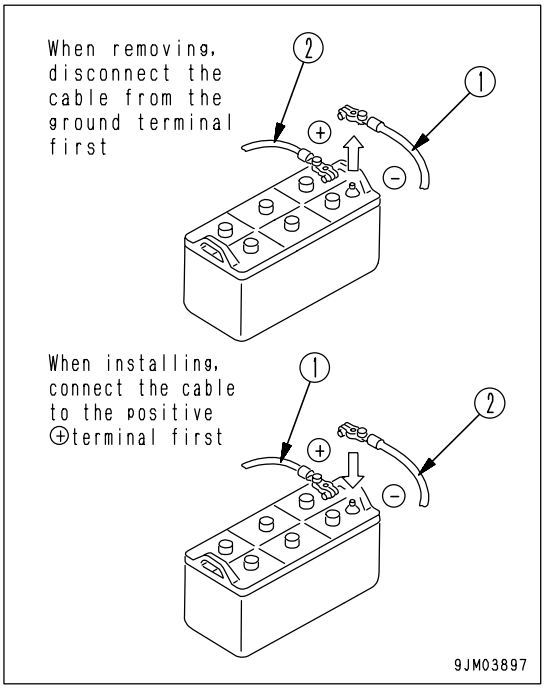
Permissible load for towing hook: 77000 kg (755110 N)

Always carry out towing operations within the specified range for the permissible load.

IF BATTERY IS DISCHARGED

⚠ WARNING

- **When checking or handling the battery, stop the engine and turn the starting key to the OFF position before starting.**
- **The battery generates hydrogen gas, so there is danger of explosion. Do not bring lighted cigarettes near the battery or do anything that will cause sparks.**
- **Battery electrolyte is dilute sulphuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, wash it immediately off with large amounts of water. If it gets in your eyes, wash it out with fresh water, and consult a doctor.**
- **Wear protective glasses and rubber gloves when handling the battery.**
- **When removing the battery, first disconnect the cable fro the ground (normally, from the negative (-) terminal). When installing, install the positive (+) terminal first. If a tool touches the cable connecting the positive terminal and the chassis, there is danger that it will cause sparks.**
- **If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.**
  When installing the terminals, install them tightly.
- **Check the positive (+) and negative (-) terminals carefully when removing or installing.**

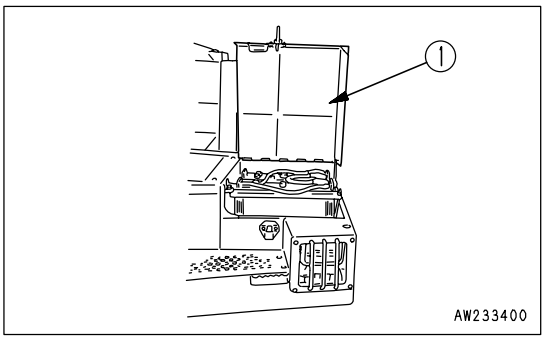


STARTING ENGINE WITH BOOSTER CABLE

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

REMOVAL AND INSTALLATION OF BATTERY

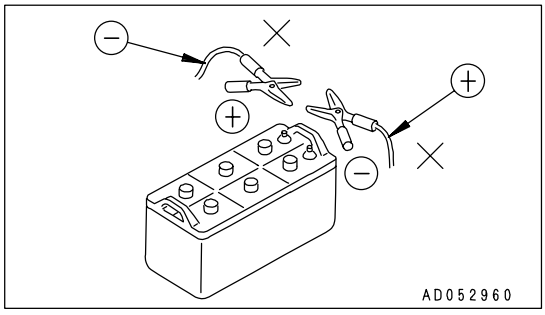
1. Open battery cover (1), (2).
2. Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal). If any tool touches between the positive terminal and the chassis, there is danger of sparks being generated. Loosen the nut of the terminal and remove the wires from the battery.
3. When installing the battery, connect the ground cable last.
   Insert the hole of the terminal on the battery and tighten the nut.
   Tightening torque: 9.8 to 19.6 N·m (1 to 2 kgf·m, 7.2 to 14.5 lbft)
4. Close battery cover (1).



PRECAUTIONS WHEN CONNECTING AND DISCONNECTING BOOSTER CABLE

⚠ WARNING

- **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.**



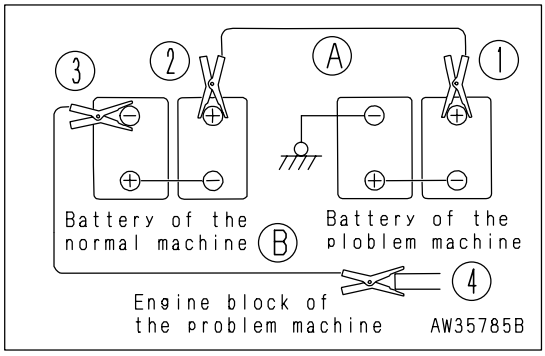
NOTICE

- **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 CABLES

Keep the starting switch of the normal machine and problem machine both at the OFF position.
Connect the booster cable as follows, in the order of the numbers marked in the diagram.

1. Make sure that the starting switches of the normal machine and problem machine are both at the OFF position.
2. Connect one clip of booster cable (A) to the positive (+) terminal of the problem machine.
3. Connect the other clip of booster cable (A) to the positive (+) terminal of the normal machine.
4. Connect one clip of booster cable (B) to the negative (-) terminal of the normal machine.
5. Connect the other clip of booster cable (B) to the engine block of the problem machine.



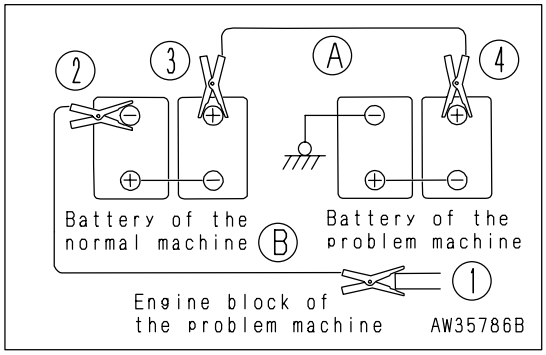
STARTING THE ENGINE

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

DISCONNECTING THE BOOSTER CABLES

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

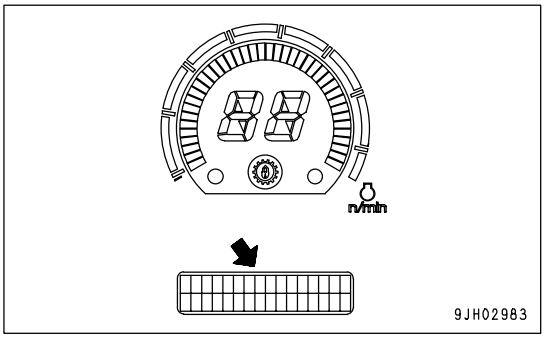
ELECTRICAL SYSTEM

- ( ): 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 cause	Remedy
Lamp does not glow brightly even when the engine runs at high speed	• Defective wiring	(• Check, repair loose terminals, disconnections Check fuses and diodes in fuse box)
Lamp flickers while engine is running	• Fefective adjustment of fan belt tension	• Adjust fan belt tension For details, see EVERY 250 HOURS SERVICE
Charge lamp doe not go out even whhen engine is running	• Defective alternator • Defective wiring	(• Replace) (• Check, repair Check fuse, diode in fuse box)
Abnormal noise is generated from alternator	• Defective alternator	(• Replace)
Starting motor does not turn when starting switch is turned to ON	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Pinion of starting motor keeps going in and out	• Insufficient battery charge	• Charge
Starting motor turns engine sluggishly	• Insufficient battery charge • Defective starting motor	• Charge (• Replace)
Starting motor disengages before engine starts	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Preheating monitor lamp does not light up (When the temperature of the engine cooling water exceed 20°C, this condition is normal)	• Defective wiring • Defective timer • Defective monitor • Disconnection in glow plug	(• Check, repair) (• Replace) (• Replace) (• Replace)
Air conditioner operation is defective	• Blown fuse • Insufficient battery charge • Defective air conditioner switch • Defective blower switch • Defective compressor	(• Check, repair) • Charge (• Replace air conditioner switch) (• Replace blower switch) (• Replace)
Blade does not pitch when pitch operation is carried out (dual tilt specification machine only)	• Defective wiring • Defective switch • Defective solenoid valve	(• Check, repair) (• Replace) (• Replace)

MONITOR PANEL

When an error code appears on the display panel B (multi-information), take appropriate remedies based upon the table below.



Abnormality code	Abnormality	Method of displaying abnormality	Remedy
E01	• Lock-up torque converter does not come ON • Dual tilt does not work	Abnormality code and service hour are displayed in turn on service meter portion	The automatic functions stop and some functions stop, but it is still possible to carry out operations. Please contact your Komatsu distributor immediately for repairs.
E02	• Tilt limit does not work • Does not shift up or shift down • Pitch does not work	Abnormality code and service hour are displayed in turn on service meter portion, caution lamp flashes, buzzer sounds	If user stops engine and then starts again, operations are possible without limit functions. However, user must be careful. Please contact your Komatsu distributor immediately for repairs.
E03+CALL	• Number of speed ranges that can be used is limited • Engine does not run at full speed • Excessive shock when shifting gear • Turning ability becomes poor • Excessive braking shock • Abnormality in engine water temperature sensor • Carries out pitch operation when tilt is operated • Pitch operation stops	Abnormality code and service hour are displayed in turn on service meter portion, caution lamp flashes, buzzer sounds	Move machine to a safe place, then contact your Komatsu distributor immediately for repairs.
E04+CALL	• Engine control impossible • Travel impossible • Machine does not stop	Abnormality code and service hour are displayed in turn on service meter portion, caution lamp flashes, buzzer sounds	Stop machine, then contact your Komatsu distributor immediately for repairs.

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
Oil pressure in torque converter fails to rise	• Improper tightening of oil pipe, pipe joint, air leaking in or oil leaking out because of damage	• Check, repair
	• Wear, scuffing of gear pump	(• Check, replace)
	• Insufficient oil in transmission case	• Add oil to the specified level. For details, see CHECK BEFORE STARTING
	• Clogged oil filter element strainer in transmission case	• Clean. For details, see EVERY 1000 HOURS SERVICE
Torque converter overheats	• Clogged radiator	(• Clean or repalce)
	• Loose fan belt	• Replace fan belt
	• Engine cooling water is high	• See Engine releated parts
	• Clogged oil cooler	(• Clean ore replace)
	• Oil pressure is too low	• Go to "Oil pressure in torque converter fails to rise
	• Lack of flow of lubricant caused by wear of power train gear pump	(• Replace gear pump)
Torque converter oil temperature gauge does not work	• Defective oil temperature gauge	(• Replace oil temperature gauge)
	• Defective contact in wiring connection	(• Check, repair)
Lacks drawbar pull (machine does not pick up speed)	• Lack of engine horse power	• See Engine related parts
	• Oil pressure in torque converter is too low	• Go to "Oil pressure in torque converter fails to rise"
	• Steering clutch is slipping	(• Check, repair)
Machine will not move off when joystick is placed at FORWARD or REVERSE	• Lack of oil in steering clutch case	• Add oil to the specified level. For details, see CHECK BEFORE STARTING
	• Transmission oil pressure does not rise	• Go to "Oil pressure in torque converter fais to rise
	• Steering clutch slips	
	• Wear, scuffing of gear pump	(• Check, replace)
	• Clogged oil strainer element in steering clutch case	• Clean. For details, see EVERY 1000 HOURS SERVICE
Does not steer even when steering is operated	• Brake is not applied on side which is pulled	(• Adjust linkage)
		(• Check brake pressure)
	• Defective wiring of steering, direction, and gearshift lever	(• Adjust wiring)
Machine doesn't stop when brake pedal is depressed	• Defective brake adjustment	(• Adjust linkage)
		(• Check brake pressure)
	• Defective wiring of brake pedal	(• Adjust wiring)
Track comes off	• Track is too loose	• Adjust track tension. For details, see WHEN REQUIRED
Sprocket develops abnormal wear	• Track is too loose or too tight	• Adjust track tension. For details, see WHEN REQUIRED

Problem	Main causes	Remedy
Blade rises too slowly or does not rise at all (or blade tilts too slowly)	• Lack of hydraulic oil	• Add oil to the specified level. For details, see EVERY 250 HOURS SERVICE
	• Defective solenoid valve	• Replace
	• Defective oil pressure switch	• Replace
	• Work equipment lock lever is at LOCK position	• Set to FREE position
Ripper moves too slowly	• Lack of hydraulic oil	• Add oil to the specified level. For details, see EVERY 250 HOURS SERVICE
	• Defective solenoid valve	• Replace
	• Defective oil pressure switch	• Replace
	• Work equipment lock lever is at LOCK position	• Set to FREE position
Insufficient force of ripper	• Leakage from piping	(• Tighten)

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 cause	Remedy
Engine oil pressure monitor flashes when engine speed is raised after completion of warm-up	• Engine oil pan oil level is low (sucking in air)	• Add oil to the specified level. See CHECK BEFORE STARTING
	• Clogged oil filter cartridge	• Replace cartridge. See EVERY 500 HOURS SERVICE
	• Defective tightening of oil pipe joint, oil leakage from damaged part	(• Check, repair)
	• Defective caution lamp	(• Replace)
Steam is emitted from top part of radiator (pressure valve)	• Lack of cooling water, water leakage	• Add cooling water, repair. See CHECK BEFORE STARTING
	• Loose fan belt	• Replace fan belt
	• Dirt or scale accumulated in cooling system	• Change cooling water, clean inside of cooling system. See WHEN REQUIRED
	• Clogged radiator fin or damaged fin	• Clean or repair. See WHEN REQUIRED
Engine water temperature monitor flashes	• Defective thermostat	(• Replace thermostat)
	• Loose radiator filler cap (high altitude operation)	• Tighten cap or replace packing
	• Defective water temperature monitor	(• Replace)
Engine does not start when starting motor is turned	• Lack of fuel	• Add fuel. See CHECK BEFORE STARTING
	• Air in fuel system	• repair where air is sucked in
	• Defective fuel injection pump or nozzle	(• Replace pump or nozzle)
	• Starting motor cranks engine sluggishly	• See ELECTRICAL SYSTEM
	• Defective compression • Defective valve clearance	(• Adjust valve clearance)
Exhaust gas is white or blue	• Too much oil in oil pan	• Add oil to the specified level. See CHECK BEFORE STARTING
	• Improper fuel	• Change to the specified fuel
Exhaust gas occasionally turns black	• Clogged air cleaner element	• Clean or replace. See WHEN REQUIRED
	• Defective nozzle	(• Replace nozzle)
	• Defective compression	(• Adhust valve clearance)
	• Defective turbocharger	(• Clean or replace turbocharger)
Combustion noise occasionally makes breathing sound	• Defective nozzle	(• Replace nozzle)
Abnormal noise generated (combustion or mechanical)	• Low grade fuel being used	• Change to the specified fuel
	• Overheating	• See "Water temperatuer monitor flashes" above
	• Damage inside muffler	(• Replace muffler)
	• Excessive valve clearance	(• Adjust clearance)

WHEN MODE SELECTION SYSTEM FLASHES

If the caution lamp flashes, or it becomes impossible to control the engine speed with the fuel control dial or decelerator pedal, stop operation immediately, check the monitor panel display, then contact your Komatsu distributor for repairs.

In addition to the above problems, if any of the problems in the table below occur, there is probably an abnormality in the work equipment lever switch, transmission speed range sensor, or other part, so please contact your Komatsu distributor for repairs.

Mode	Operation	Abnormality
Economy	Dozing	• Engine speed varies, difficult to carry out operation • No sense of control, engine stays at full or partial
Slow reverse	Reverse	• Ripper RAISE speed is slow • Slow reverse speed is slow
Lock-up	All operations	• Lock-up does not work • Gearshifting shock becomes excessive
-	Traveling under own power	• Engine speed becomes partial when traveling under own power

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.
Stop the machine on flat hard ground when carrying out inspection and maintenance.

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.

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.

CHECK FOREIGN MATERIAL IN DRAINED OIL:

After oil is changed or filters are replaced, check the old oil and filters for metal particles and foreign materials. If large quantitie 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.
- Avoid seals or bearings from being between the area to be welded and the position of grounding point.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

OBJECTS IN YOUR POCKETS:

- 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 OILS:
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.

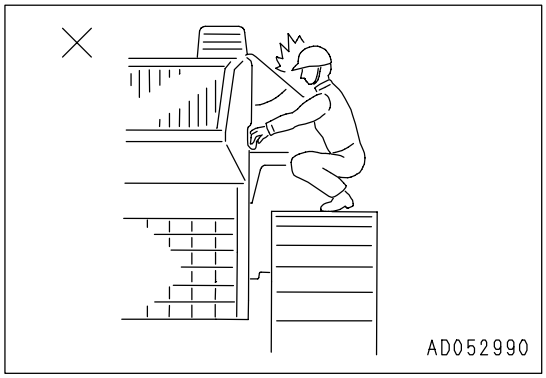
BLEEDING AIR:
When hydraulic equipment has been repaired or replaced, or the hydraulic piping has been removed and installed again, the air must be bled from the circuit. For details, see "BLEEDING AIR IN HYDRAULIC SYSTEM (PAGE 4-41)".

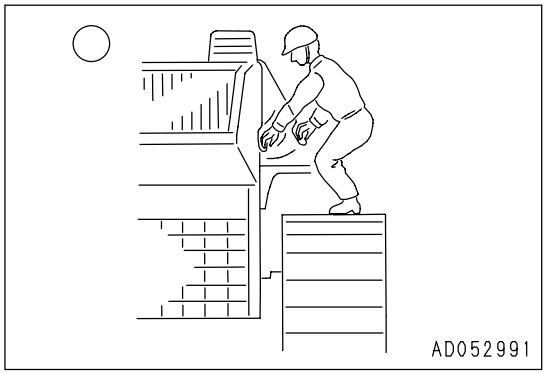
PRECAUTIONS WHEN INSTALLING HYDRAULIC HOSES:
- When removing parts at locations where there are O-rings or gasket seals, clean the mounting surface, and replace with new parts.
  When doing this, be careful not to forget to assemble the O-rings and gaskets.
- When installing the hoses, do not twist them 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 to carry out the checks after inspection and maintenance, unexpected problems may occur, and this may lead to serious injury or property damage. Always do as follows.
- Checks after operation (with engine stopped)
  - Have any inspection and maintenance points been forgotten?
  - Have all inspection and maintenance items been carried out correctly?
  - Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside machine and get caught in the lever linkage mechanism.
  - Is there any leakage of water or oil? Have all the bolts been tightened?
- Checks when operating engine
  - For details of the checks when operating the engine, see "PROPER TOOLS (PAGE 2-29)" and pay careful attention to safety.
  - Are the inspection and maintenance items working properly?
  - Is there any leakage of oil when the engine speed is raised and load is applied to the oil pressure?

PRECAUTIONS WHEN OPENING AND CLOSING ENGINE SIDE COVER:

- When standing on track to open the engine side cover, adopt a standing position, hold the side cover with both thumbs, and open it slowly with your other fingers.
- When the side cover is open, do not open or close the cab. Before opening or closing the cab, always close the engine side cover first.





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 to have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.
- At the time of shipping from the factory, SAE1OWCD is used for hydraulic type of oil. When HO46-hydraulic oil is going to be used, change specified amount of oil (whole amount). The hydraulic oil that is not recommended by Komatsu can cause clogging of oil filter, so do not use it. The portion of the oil that remains in the piping or cylinders will not be a problem even though it will be mixed into new oil.

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.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.

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 proper mixing proportion of the antifreeze depends on the ambient temperature. For the mixing proportion, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-20)".
- 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

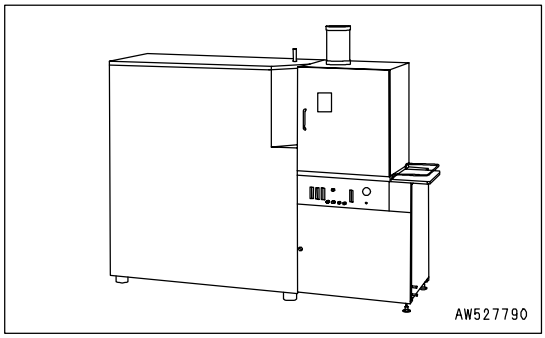
- Grease is used to prevent twisting and noise at the joints.
- The nipples not included in the MAINTENANCE section are nipples used when overhauling, so they do not need grease.
  If any part becomes stiff or generates noise after being used for a long time, grease it.
- Always wipe off all of the old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

CARRYING OUT KOWA (Komatsu Oil Wear Analysis)

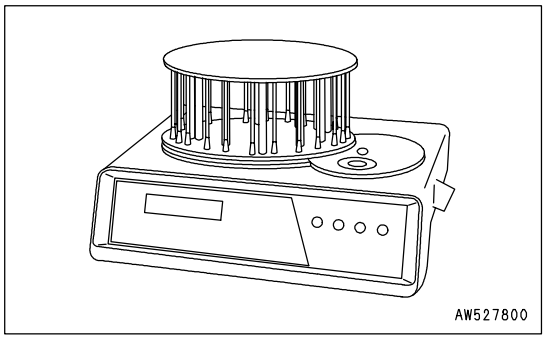
KOWA is a maintenance service that makes it possible to prevent machine failures and down-time. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other abnormalities.
Periodic use of KOWA makes the following possible:
It enables abnormalities to be detected early, leading to reduction of repair costs and machine downtime.
It enables repair schedules to be planned, leading to improved machine availability.

KOWA ANALYSIS ITAMS

- 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.
- Inspection and maintenance works include checking the fan belt for tension and damage as well as the battery for electrolyte level.
- Never remove or disassemble any electric components installed in the machine.
- Never install any electric components other than those specified by Komatsu.
- Be careful to keep the electric system free of water when washing the machine or when it rains.
- When working on the seashore, carefully clean the electric system to prevent corrosion.
- Never connect any opetional power source to the fuse, starting switch, battery relay, etc.

WEAR PARTS LIST

Wear parts such as the filter element, cutting 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 requesting parts, check their part numbers from the parts list.

WEAR PARTS LIST

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

Item	Part No.	Part Name	Weight	Q'ty	Replacement frequency
Engine oil filter	600-211-1231	Cartridge	--	4	Every 500 hours service
By-pass filter	600-212-1511	Cartridge	--	2	
Transmission filter	07063-01142 (07000-E5165)	Element (O-ring)	--	1 (1)	
Transmission lubrication filter	07063-01142 (07000-E5165)	Element (O-ring)	--	1 (1)	
Torque converter filter	07063-01142 (07000-E5165)	Element (O-ring)	--	1 (1)	
Fuel filter	600-311-7132	Cartridge	--	2	
Main corrosion resistor	600-411-1171	Cartridge	--	2	Every 1000 hours service
Hydraulic tank breather element	285-62-17320	Element	--	1	
Sub corrosion resistor	600-411-1511	Cartridge	--	1	
Hydraulic oil filter	07063-01383 (07000-05210)	Element (O-ring)	--	1 (2)	Every 2000 hours service
Air cleaner	6128-81-7042	Element ass'y	--	2	--
	600-181-4400	Outer element ass'y	--	2	--
Blade	198-71-31540 198-71-31550 (198-71-21850) (198-71-21890) (198-71-21911) 198-71-31520 198-71-31530 (198-71-21870) (198-71-21860) (198-71-21880) (198-71-21890) (198-71-21911)	Cutting edge Cutting edge (Bolt) (Washer) (Nut) End bit (left) End bit (right) (Bolt) (Bolt) (Boss) (Washer) (Nut)	--	2 3 (34) (34) (34) 1 1 (8) (8) (8) (8) (16)	--
Ripper (variable giant ripper)	198-78-21330 195-78-21340 (198-71-21410)	Protector Point (Pin ass'y)	--	1 1 (3)	--

NOTICE

When handling parts that weigh more than 25 kg (55 lb), remember that they are heavy objects, and take the necessary care.

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS

RESERVOIR		KIND OF FLUID	AMBIENT TEMPERATURE -4 14 32 50 68 86 104°F -20 -10 0 10 20 30 40°C
Engine oil pan		Engine oil	SAE30CD SAE 10W SAE 10W-30 SAE 15W-40
Power train oil pan (incl. transmission, torque converter and bevel gear case)			SAE30CD SAE 10W
Damper case			SAE 30
Hydraulic system			SAE 10W SAE 10W-30 SAE 15W-40
final drive case (each)		Gear oil	SAE 140 SAE 85W-140 SAE 80W-90
Fuel tank		Diesel fuel	※ ASTM D975 No.2
Grease fitting		Grease	NLGI No.2
Cooling system	Main circuit	Water	Add antifreeze
	Sub circuit		

※ ASTM D975 No.1

		Engine oil pan	Power train oil pan (incl. transmission, torque converter and bevel gear casses)	Damper case	Final drive case (each)	Hydraulic system	Fuel tank	Cooling system	
								Main circuit	Sub circuit
Specified amount	liter	126	410	2.2	75	420	1670	230	65
	US gal	33.27	108.24	0.58	19.8	110.88	440.88	60.72	17.16
Refil capacity	liter	121	210	2.2	75	140	-	-	-
	US gal	31.93	55.44	0.58	19.8	36.96	-	-	-

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 hydrauric 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 pius	Arco HD gear oil	Litholine HEP 2 Arco EP moly D	-
5	BP	Vanellus C3	Gear oil EP Hypogear EP	Energrease LS-EP2	Antifreeze
6	CALTEX	*RPM delo 400 RPM delo 450	Universal thuban Universal thuban EP	Marfak all purpose 2 Ultra-duty grease 2	AF engine coolant
7	CASTROL	*Turbomax *RX super CRD	EP EPX Hypoy Hypoy B Hypoy C	MS3 Spheerol EPL2	Anti-freeze
8	CHEVRON	*Delo 400	Universal gear	Ultra-duty grease 2	-
9	CONOCO	*Fleet motor oil	Universal gear lubricant	Super-sta grease	-
10	ELF	Multiperformance 3C Performance 3C	-	Tranself EP Tranself EP type 2	Glacelf
11	EXXON (ESSO)	Essolube D3 *Essolube XD-3 *Essolube XD-3 Extra *Esso heavy duty Exxon heavy duty	Gear oil GP Gear oil GX	Beacon EP2	All season coolant
12	GULF	Super duty motor oil *Super duty plus	Multi-purpose gear lubricant	Gulfcrown EP2 Gulfcrown EP special	Antifeeze and coolant
13	MOBIL	Delvac 1300 *Delvac super 10W-30, 15W-40	Mobilube GX Mobilube HD	Mobilux EP2 Mobilgease 77 Mobilgrease special	-

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

STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

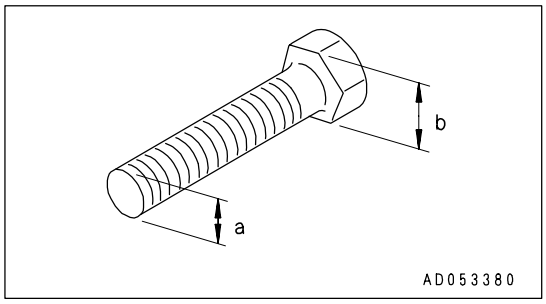
TORQUE LIST

CAUTION

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

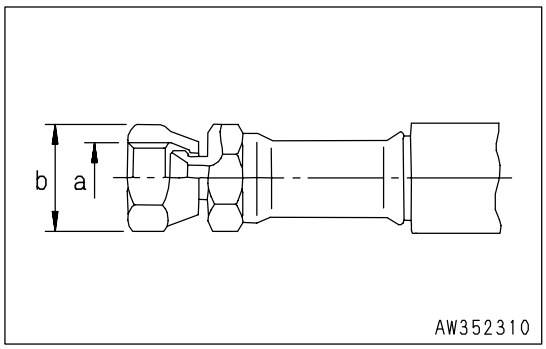
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		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	200.0-25.0	1446.6-1808.3
36	55	2750	280.0	2025.2	2450-3040	250.0-310.0	1808.3-2242.2
39	60	3280	335.0	2423.1	2890-3630	295.0-370.0	2133.7-2676.2



Apply the following table for Hydraulic Hose.

Nominal-No. of threads (a)	Width across flats (b) mm	Tightening torque (N·m (kgf·m, lbft))	
		Target valve	Parmissible range
9/16 -18UNF	19	44 (4.5, 32.5)	35 - 63 (3.5 - 6.5, 25.3 - 47.0)
11/16 -16UN	22	74 (7.5, 54.2)	54 - 93 (5.5 - 9.5, 39.8 - 68.7)
13/16 -16UN	27	103 (10.5, 75.9)	84 - 132 (8.5 - 13.5, 61.5 -97.6)
1 -14UNS	32	157 (16.0, 115.7)	128 - 186 (13.0 - 19.0, 94.0 - 137.4)
1¥3/16 -12UN	36	216 (22.0, 159.1)	177 - 245 (18.0 - 25.0, 130.2 - 180.8)



PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

For using the machine safely for an extended period of time, you are requested to periodically replace the safety -critical and fire prevention- related parts listed in the table of important parts on the following page.
Material quality of these parts can change as time passes and they are likely to wear our 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.
Ask your Komatsu distributor to replace the critical parts.
Check the hydraulic hoses and the fuel hose, too, when carrying out the following periodic inspections.

Interval	Check items
Check before starting	Oil leakage from the connections or the clamps of fuel and hydraulic hose
Monthly inspection	Oil leakage from the connections or the clamps of fuel and hydraulic hose. Damage (crack, wear and tear) of fuel and hydraulic hose.
Yearly inspection	Oil leakage from the connections or the clamps of fuel and hydraulic hose. Interference, deformation, deterioration and damage (crack, wear and tear) of fuel and hydraulic hose.

SAFETY CRITICAL PARTS

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (between nozzles)	5	Every 2 years or 4000 hours, whichever comes sooner
2	Turbocharger lubricating hose	1	
3	Fuel hose (nozzle - fuel return hose)	1	
4	Fuel hose (fuel filter - injection pump)	3	
5	Fuel hose (feed pump - fuel return hose)	1	
6	Hose (torque converter oil cooler - steering case)	1	
7	Hose (blade valve - blade cylinder)	4	
8	Inspection hose ass'y for power train pressure	1	
9	Fuel hose (fuel tank - fuel strainer)	3	
10	Fuel return hose	1	
11	Hose (torque converter outlet - torque converter oil cooler)	2	
12	Fuel hose (fuel strainer - feed pump)	1	
13	Hose (ripper low valve - ripper high valve)	4	
14	Hose (ripper high valve - work equipment pump)	1	
15	Hose (ripper high valve - tank)	1	
16	Hose (ripper high valve - ripper lift cylinder)	4	
17	Hose (ripper high valve - ripper tilt cylinder)	4	
18	Hose (PPC charge valve - PPC lock valve)	1	
19	Hose (PPC lock valve - PPC valve for blade)	1	
20	Hose (PPC lock valve - PPC valve for ripper)	1	
21	Hose (PPC pump - PPC charge valve)	1	
22	Hose (hydraulic oil cooler - relay block)	2	
23	Hose (relay block - PPC charge valve)	1	
24	Hose (relay block - suction tube)	1	
25	Hose (PPC valve for blade - main valve)	4	
26	Hose (PPC valve for blade - PPC drain relay block)	1	
27	Hose (PPC valve for ripper - main valve)	4	
28	Hose (PPC valve for ripper - PPC drain relay block)	1	
29	Hose (PPC charge valve - PPC drain relay block)	1	
30	Hose (PPC drain relay block - suction tube)	1	
31	Hose (work equipment pump - blade lift valve)	1	
32	Hose (work equipment pump - ripper low valve)	1	
33	Hose (blade valve - blade lift divider block)	2	
34	Hose (blade lift divider block - relay tube)	2	
35	Hose (relay tube - blade lift cylinder)	4	
36	Hose (ripper low valve - blade tilt relay tube)	2	
37	Seat belt	1	Every 3 years

MAINTENANCE SCHEDULE CHART

MAINTENANCE SCHEDULE CHART

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

CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE AND BYPASS FILTER CARTRIDGE ---- 4- 52
REPLACE FUEL FILTER CARTRIDGE ---- 4- 54
REPLACE TRANSMISSION FILTER ELEMENT, TRANSMISSION LUBLICATION FILTER ELEMENT AND TORQUE CONVERTER OIL FILTER ELEMENT ---- 4- 55
CHANGE OIL IN POWER TRAIN CASE, CLEAN STRAINERS (INCL. TRANSMISSION CASE, TORQUE CONVERTER CASE AND BEVEL GEAR CASE) ---- 4- 57
CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC OIL FILTER ELEMENT AND HYDRAULIC TANK BREATHER ELEMENT ---- 4- 61
CHANGE OIL IN FINAL DRIVE CASE ---- 4- 63

WHEN REQUIRED

CLEAN INSIDE OF COOLING SYSTEM ---- 4- 20
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT ---- 4- 24
CHECK TRACK TENSION ---- 4- 26
CHECK AND TIGHTEN TRACK SHOE BOLTS ---- 4- 28
ADJUST IDLER CLEARANCE ---- 4- 29
CLEAN, CHECK RADIATOR FINS ---- 4- 32
CLEAN FUEL TANK STRAINER ---- 4- 33
DRAIN WATER AND SEDIMENT IN FUEL TANK ---- 4- 33
CLEAN STEERING CLUTCH CASE BREATHER ---- 4- 33
REPLACE AIE CONDITIONER BELT ---- 4- 34
CLEAN, CHECK HYDRAULIC COOLER FINS ---- 4- 34
CHECK UNDERCARRIAGE OIL ---- 4- 35
CLEAN AIR CONDITIONER AIR FILTER(FRESH/RECIRC FILTER) ---- 4- 36
CHECK, ADJUST AIR CONDITIONER ---- 4- 37
LUBRICATE DOOR HINGE ---- 4- 38
CHECK DOOR LATCH ---- 4- 38
CHECK DOOR LOCK STRIKER ---- 4- 39
REPLACE DOOR DAMPER ---- 4- 39
CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID ---- 4- 39
REPLACE WIPER BLADE ---- 4- 40
BLEED AIR FROM HEAD END OF RIGHT PITCH CYLINDER ---- 4- 41
BLEEDING AIR IN HYDRAULIC SYSTEM ---- 4- 41
CHECK ELECTRICAL INTAKE AIR HEATER ---- 4- 42
LUBRICATING ---- 4- 42

CHECK BEFORE STARTING

EVERY 250 HOURS SERVICE

LUBRICATING ---- 4- 45
CHECK ALTERNATOR DRIVE BELT TENSION, ADJUST ---- 4- 47
CHECK LEVEL OF BATTERY ELECTROLYTE ---- 4- 48
CHECK BRAKE PERFORMANCE ---- 4- 51

EVERY 500 HOURS SERVICE

Change oil in engine oil pan, replace engine oil filter cartridge ---- 4- 52
Replace fuel filter cartridge ---- 4- 54
Replace transmission filter element, transmission lubrication filter element and torque converter oil filter element ---- 4- 55
Check oil level in final drive case, add oil ---- 4- 56
Check replace fan belt ---- 4- 56

EVERY 1000 HOURS SERVICE

Change oil in power train case, clean strainers (incl. transmission case, torque converter case and bevel gear case) ---- 4- 57
Check, clean fuel strainer ---- 4- 59
Grease tension pulley assembly ---- 4- 59
Check for loose ROPS mount bolts ---- 4- 59
Replace main ans sub corrosion resistor cartridges ---- 4- 60
Replace hydraulic tank breather element ---- 4- 61
Check all tightening parts of turbocharger ---- 4- 61

EVERY 2000 HOURS SERVICE

CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAURIC OIL FILTER ELEMENT ---- 4- 62
CHANGE OIL IN FINAL DRIVE CASE ---- 4- 63
CHANGE OIL IN DAMPER CASE, CLEAN DANPER BREATHER ---- 4- 64
CHECK PIVOT BEARING OIL LEVEL, ADD OIL ---- 4- 65
CHECK OIL LEVEL IN RECOIL SPRING, ASSIST CYLINDER CASE, ADD OIL ---- 4- 65
CLEAN ENGINE BREATHER ELEMENT ---- 4- 66
CHECK ALTERNATOR, STARTING MOTOR ---- 4- 66
CHECK ENGINE VALVE CLEARANCE, ADJUST ---- 4- 66

EVERY 4000 HOURS SERVICE

Check water pump ---- 4- 67
Check vibration damper ---- 4- 67
Check fan pulley and tension pulley ---- 4- 67
Clean, check turbocharger ---- 4- 67
Check play of turbocharger rotor ---- 4- 67
Check main frame, work equipment (blade, ripper) ---- 4- 68

SERVICE PROCEDURE

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

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

- Change oil in engine oil pan, replace engine oil filter cartridge and bypass filter cartridge
- Replace fuel filter cartridge
- Replace transmission filter element, transmission lubrication filter element and torque converter oil filter element
- Change oil in power train case, clean strainers (incl. transmission case, torque converter case and bevel gear case)
- Change oil in hydraulic tank, replace hydraulic oil filter element and hydraulic tank breather element
- Change oil in final drive case

For details of the method of replacing or maintaining, see the section on EVERY 500 HOURS, 1000 HOURS and 2000 HOURS SERVICE.

WHEN REQUIRED

CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a hazard of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure before removing it.**
- **Cleaning is carried out with the engine running. When standing up or leaving the operator's seat, set the safety lock lever and the parking lever to the LOCK position.**
- **For details of starting the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (PAGE 3-69)" and "STARTING ENGINE (PAGE 3-87)" in the OPERATION section.**
- **Never enter front the machine when the engine is running. There is danger of touching the fan.**

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, autume) (Drain antifreeze in spring, add antifreeze in autumn)	
When no using antifreeze	Every 6 months or every 1000 hours, whichever come first	

Stop the machine on level ground when cleaning or changing the coolant.
Use a permanent type of antifreeze.
If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol.
Super Coolant (AF-ACL) has an anti-corrosion effect as well as an antifreeze effect.
The ratio of antifreeze to water depends on the ambient temperature, but to obtain the corrosion resistance effect, a minimum ratio of 30% by volume is necessary.
When deciding the ratio of antifreeze to water, check the lowest temperature in the past, and decide from the mixing rate table given below.
It is actually better to estimate a temperature about 10°C (50°F) lower when deciding the mixing rate.

Mixing rate of water and antifreeze

Min. atmospehric temperature	°C	-5	-10	-15	-20	-25	-30
	°F	23	14	5	-4	-13	-22
Amount of antifreeze	liter	68	88	106	121	137	147.5
	US gal	18.0	23.2	28.0	32.0	36.2	39.0
Amount of water	liter	227	207	189	174	158	147.5
	US gal	60	54.7	50.0	42.0	41.7	39.0

⚠ WARNING

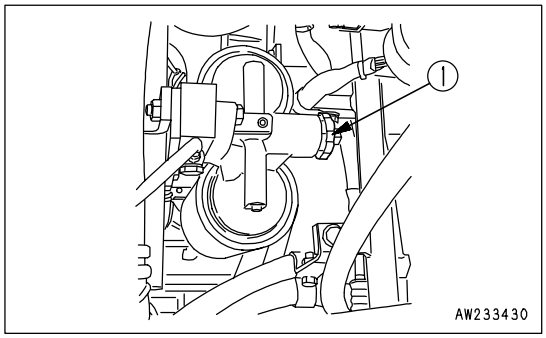
Antifreeze is flammable, so keep it away from flame.
Antifreeze is toxic. When removing the drain plug, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.

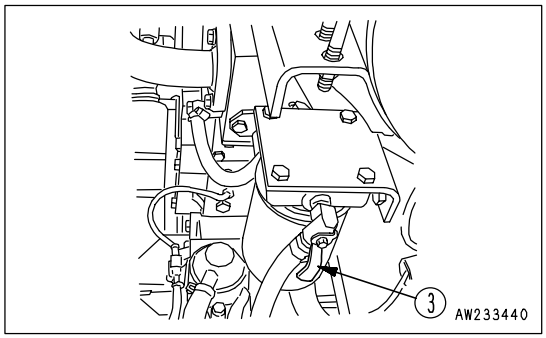
Use city water for the cooling water.
If river water, well water or other such water supply must be used, contact your Komatsu distributor.
We recommend use of an antifreeze density gauge to control the mixing proportions.

⚠ WARNING

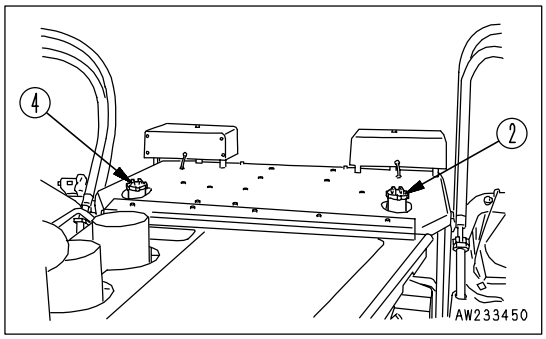
When removing the drain plug, be careful not to be covered with the drained coolant.

1. After stopping the engine, tighten cocks (1), (3) of the main corrosion resistor and sub corrosion resistor.

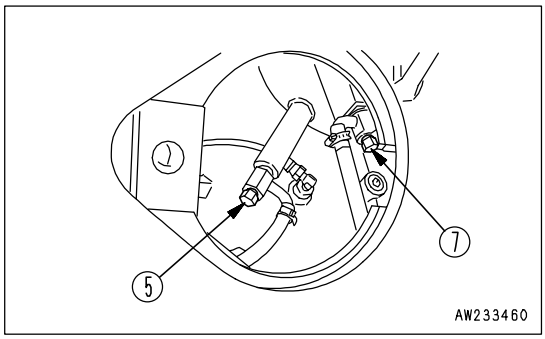


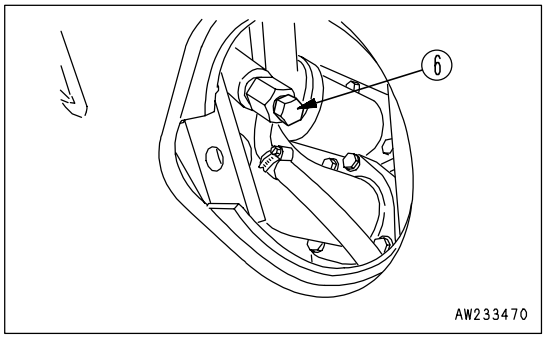


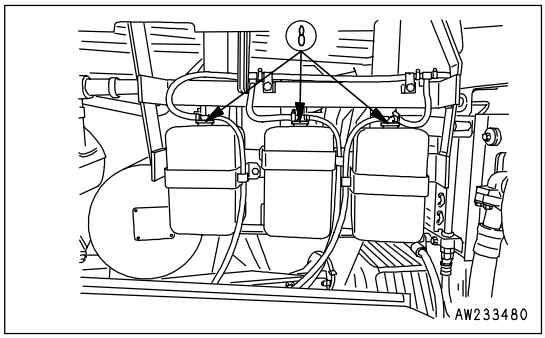
2. Turn main radiator cap (2) and sub radiator cap (4) slowly, and remove them.



3. Set a container to catch the coolant, open main radiator drain cocks (5) and (6) and sub radiator drain cock (7) at the bottom of the radiator, and drain off the cooling water.
4. After draining, close up drain cocks (5), (6) and (7) and por in city water.
5. When the water reaches the vicinity of the water filler, open drain cocks (5), (6) and (7), start the engine and run it at idling. While keeping the engine running at idling, pass water through the cooling system for 10 miniutes.
   When doing this, keep the radiator filled up the filler with water by adjusting the incoming flow of water to match the drain flow. When filling with water, be careful to check that the hose supplying the water does not come out of the water filler port at the radiator cap.
6. After washing the cooling system with water, stop the engine. After confirming that all water has been drained out, close drain cocks (5), (6) and (7).
7. After draining the water, flush the system with a flushing agent. For details of the flushing method, see the instructions on the flushing agent.
8. After flushing, open cocks (5), (6) and (7), completely drain all the water, then close the drain cocks, and fill with city water up to near the filler port.
9. When the tank is filled to near the water filler port, open drain cocks (5), (6) and (7), start the engine, run it at low idling, and continue the flushing operation until clean water comes out.
10. When clean water comes out, stop the engine and close drain cocks (5), (6) and (7).
11. Replace corrosion resistors and open cocks (1) and (3). For the method of replacing the corrosion resistors, see "REPLACE MAIN CORROSION RESISTOR CARTRIDGE AND SUB CORROSION RESISTOR CARTRIDGE (PAGE 4-60)".
12. Add city water until the water overflows from the water filler port.
13. 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.)
14. Open the cap of the coolant reserve tank (8) and add water to the specified level according to "CHECK COOLANT LEVEL, ADD WATER (PAGE 3-72)".
15. Stop the engine, wait for 3 minutes, add city water until the water level reaches near the water filler port, then tighten the cap (2).







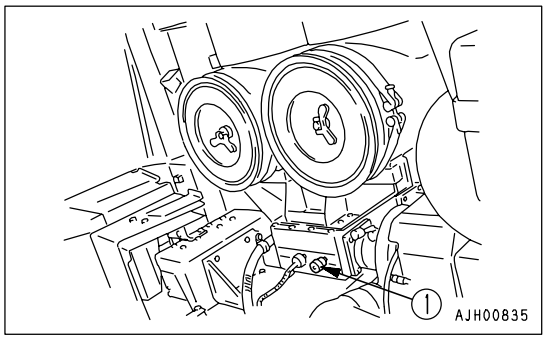
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

⚠ WARNING

- **Never clean or replace the air cleaner element with the engine running.**
- **When using compressed air to clean the element, wear safety glasses or goggles to protect the eyes.**

CHECKING

Whenever the red piston in dust indicator (1) appears, clean the air cleaner element.

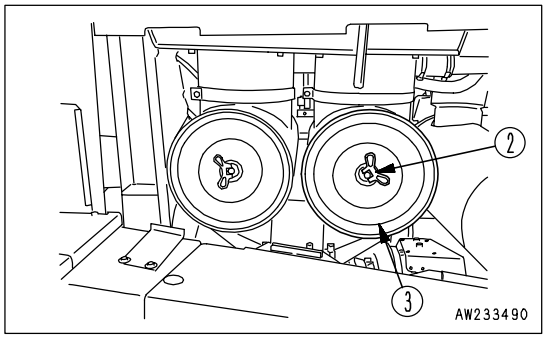


NOTICE

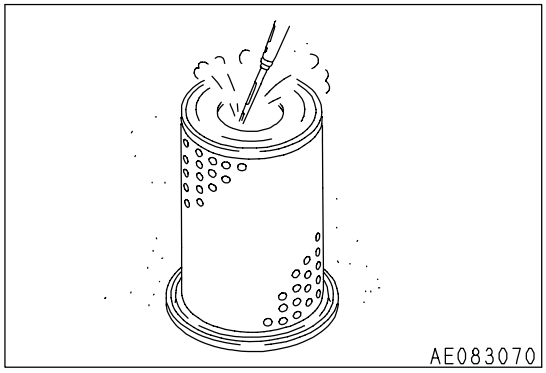
Do not clean the air cleaner element before the dust indicator becomes red. If the element is cleaned frequently before the dust indicator becomes red, the performance of the air cleaner is not used perfectly and the cleaning effect is lowered. In addition, dust sticking to the element falls into the inner element each time the element is cleaned.

CLEANING OR REPLACING OUTER ELEMENT

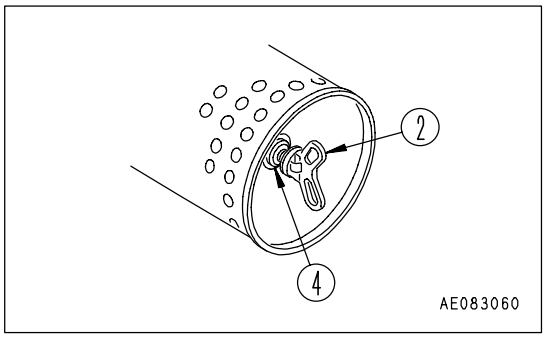
1. Remove the wing nut (2), then remove the outer element (3).
2. Clean the air cleaner body interior and the cover.



3. Direct dry compressed air (Max. 0.69 MPa (7 kgf/cm^2, 99.4 PSI)) from the inside of the outer element along its folds. Then below 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) Replace both inner and outer elements when the dust indicator red piston appears soon after installing the cleaned outer element even though it has not been cleaned 6 times.
   4) Check inner element mounting nuts for looseness and, if necessary, retighten.



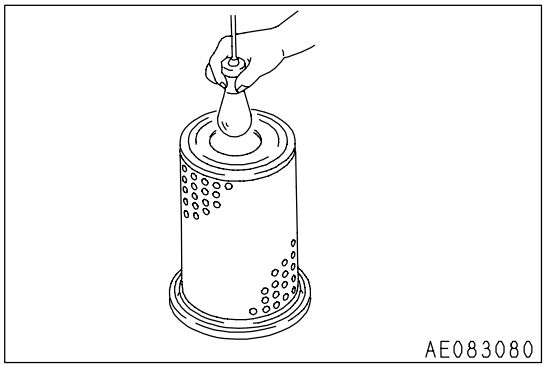
5) Replace seal washer (4) or wing nut (2) with new parts if they are broken.



NOTICE

If small holes or thinner parts are found on the element when it is checked with an electric bulb after cleaning and drying, replace the element.
Do not use an element whose folds or gasket or seal are damaged.
When cleaning the element, do not hit it or beat it against something.

4. Set the cleaned element.
5. Clean and replace outer elements (3 units) at the same time.



REPLACING INNER ELEMENT

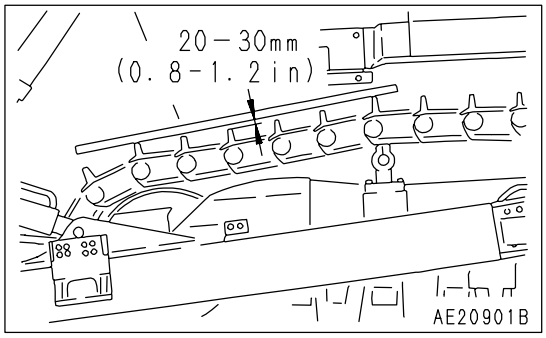
1. First remove the outer element, and then remove the inner element.
2. Cover the air connector side (outlet side) with a clean cloth or tape.
3. Clean the air cleaner body interior, then remove the cover installed in Step 2.
4. Fit new inner element to the connector and tighten it with nuts.
   Do not clean and reinstall a inner element.
5. Install the outer element and the cover.
6. After replacing the element, press button of the dust indicator to return the red piston to its original position.

CHECK TRACK TENSION

The wear of pins and bushings on the undercarriage will vary with the working conditions and types of soil. It is thus necessary to continually inspect the track tension so as to maintain the standard tension.
Carry out the check and adjustment under the same conditions as when operating (on jobsites where the track becomes clogged with mud, measure with the track clogged with mud).

INSPECTION

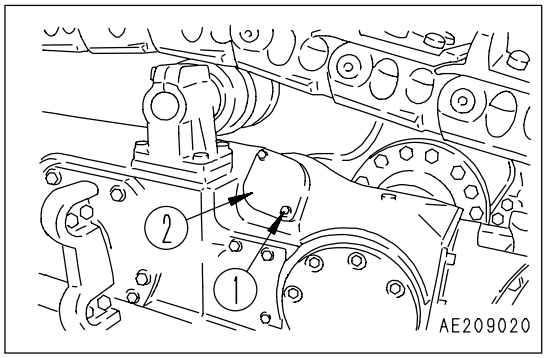
Stop the machine on level ground (stop with the transmission in FORWARD without applying the brake). Then place a straight bar on the track shoes between the carrier roller and the idler as shown in the figure, and measure the clearance between the bar and the grouser at the midpoint. If the clearance (A) is 20 to 30mm (0.79 to 1.18in), the tension is standard.
If the track tension is not at the standard value, adjust it in the following manner.

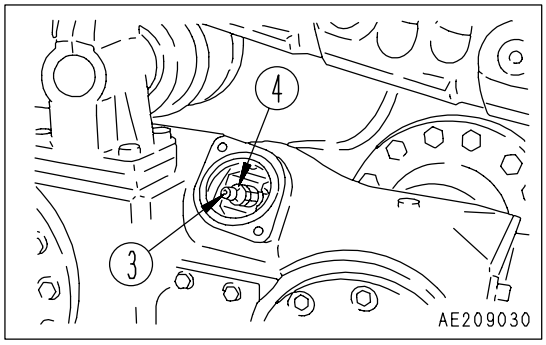


ADJUSTMENT

⚠ WARNING

Grease inside the adjusting mechanism is under high pressure.
Grease coming from plug (4) under pressure can penetrate the body causing injury or death. For this reason, do not loosen plug(4) more than one turn. Do not loosen any part other than plug(4). Furthermore, do not bring your face in front of the grease fitting.
If the track tension is not relieved by this procedure, please contact your Komatsu distributor.





WHEN INCREASING TENSION

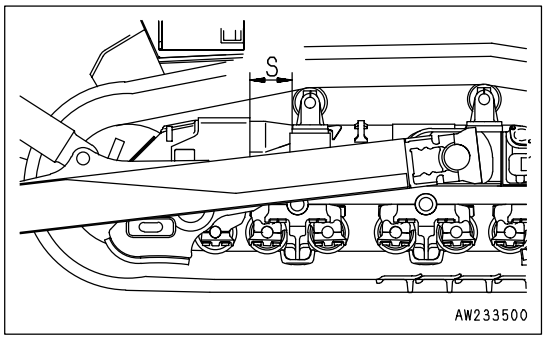
1. First remove the bolt (1) and then remove the cover (2).

NOTICE

- **When removing cover (2), be careful not to let soil get in.**
- **There is a safety label stuck to the back of cover (2). Be careful not to damage the safety label.**

2. Pump in grease through the grease fitting (3) with a grease pump.
3. To check that the correct tension has been achieved, move the machine backwards and forwards.
4. Check the track tension again, and if the tension is not correct, adjust it again.

5. Continue to pump in grease until S becomes 480 mm (18.9 in). If the tension is still loose, the pin and bushing are excessively worn, so they must be either turned or replaced. Please contact your Komatsu distributor.



WHEN LOOSENING TENSION

WARNING

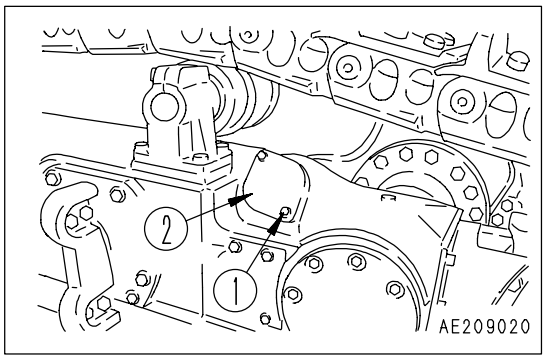
It is extremely dangerous to release the grease by any method except the procedure given below. If the track tension is not relieved by this procedure, please contact your Komatsu distributor.

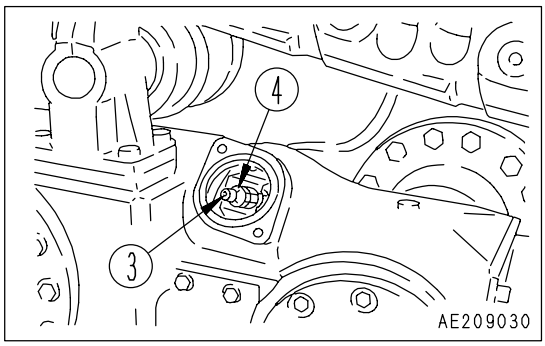
1. Remove both bolts (1), then remove cover (2).

NOTICE

- **When removing cover (2), be careful not to let any dirt get inside.**
- **There is a safety label stuck to the back of cover (2). Be careful not to damage the safety label.**

2. Loosen plug (4) gradually to release the grease.
3. Turn plug (4) a maximum of one turn.
4. If the grease does not come out smoothly, move the machine backwards and forwards a short distance.
5. Tighten plug (4).
6. To check that the correct tension has been achieved, move the machine backwards and forwards.
7. Check the track tension again, and if the tension is not correct, adjust it again.





WHEN REMOVING TRACK

⚠ WARNING

Depending on the situation, the operation to remove the track may be extremely dangerous.
Before removing the track, if the procedure above "WHEN LOOSENING TENSION (PAGE 4-27)" does not loosen the track tension, please contact your Komatsu distributor for repair.

CHECK AND TIGHTEN TRACK SHOE BOLTS

If the machine is used with track shoe bolts being loose, they will break, so tighten any loose bolts immediately.

METHOD OF TIGHTENING SHOE BOLT

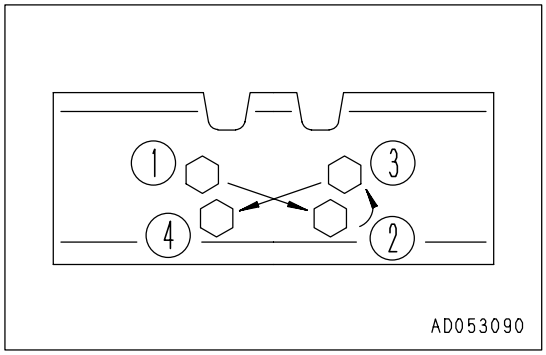
1. First tighten to a tightening torque of 785 ± 79 N·m (80 ± 8 kgf·m, 578.6 ± 57.9 lbft) and then check that the link contact surfaces are in colse contact.
2. After checking, tighten a further 180° ± 10°.

METHOD OF TIGHTENING MASTER LINK CONNECTING BOLT

1. First tighten to a tightening torque of 980 ± 98 N·m (100 ± 10 kgf·m, 723.3 ± 72.3 lbft) then check that the link contact surfaces are in close contact.
2. After checking, tighten a further 180° ± 10°.

ORDER FOR TIGHTENING

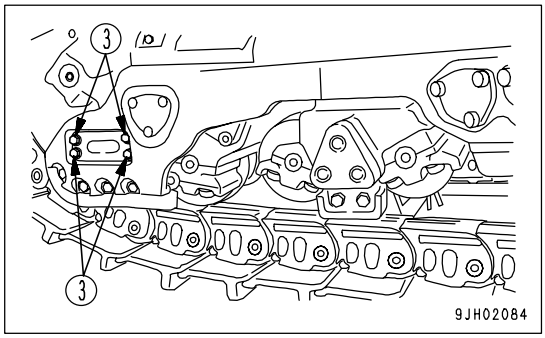
Tighten the bolts in the order shown in the diagram on the right.



ADJUST IDLER CLEARANCE

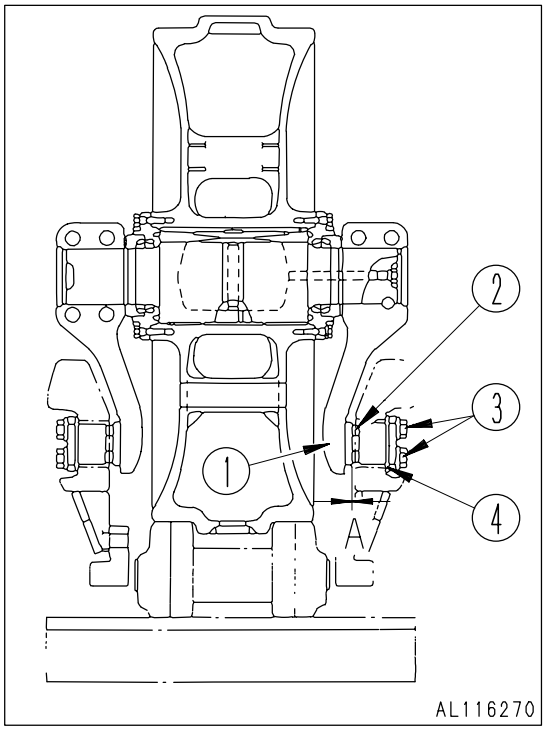
The idler moves forward and backward under external pressure when this happens, side guide (1) and guide plate (2) become worn.

As they become worn, there is side play in the idler, or the idler turns at an angle, causing the track to come off or resulting in uneven wear, so adjust as follows.



ADJUSTMENT

1. Drive the machine for 8 to 12 m (24.4 to 36.6 ft) on flat ground, then measure clearance A (4 places: left, right, inside outside) between the track frame and side guide (1).
2. If clearance A is more than 3 mm (0.1 in), remove bolt (3), then take out shim (4), and adjust to that the clearance on one side is less than 0.5 mm (0.02 in).



REMARK

There are two types of shim (thickness: 0.5 mm (0.02 in) and 1.0 mm (0.04 in).

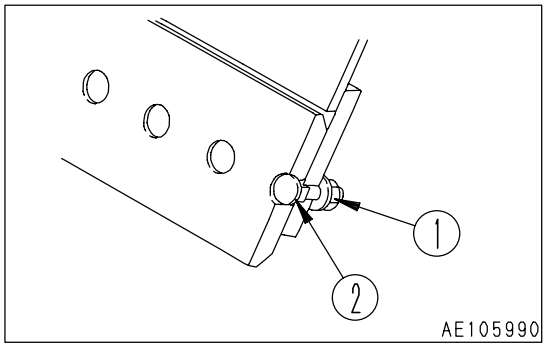
REVERSE AND REPLACE THE END BITS AND CUTTING EDGES

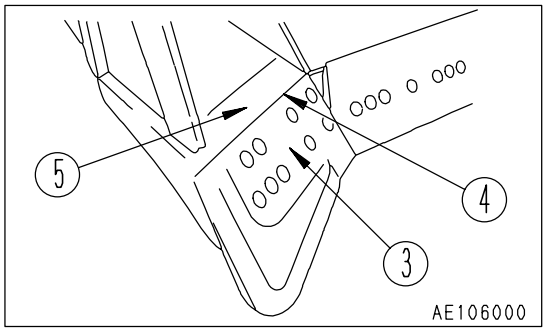
⚠ WARNING

It is dangerous if the work equipment moves by mistake when the cutting edges and end bits are being reversed or replaced. Set the work equipment in a stable condition, then stop the engine and lock the blade control lever securely with the safety lever.

Reverse or replace the end bits and cutting edges before it is worn out to the blade end.

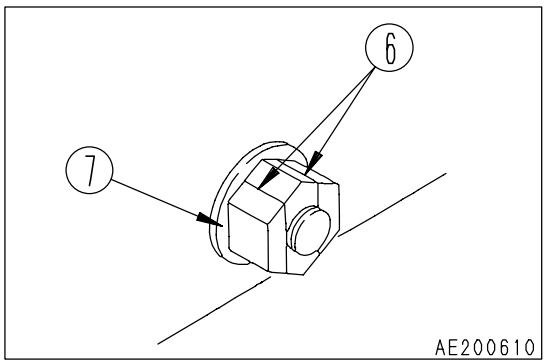
1. Raise the blade to a proper height and apply a block to the frame so as to prevent fall of the blade.
2. Operate the safety lock lever to the LOCK position.
   If the cutting edge and the end bit on both sides are worn out, replace with new one.
   If it has been worn out up to the fitting surface, repair the fitting surface and then reverse or replace.
3. Loosen nut (1) and remove bolt (2). Then remove the cutting edge and the end bit and clean the mounting surface.
4. Reverse or replace the cutting edge and the end bit when worn out.
   If bolt (1) and nut (2) are damaged, replace them with new ones at the same time.
5. Install the edge to the blade, then tighten partially. Drop the blade three to five times on to the ground or rock to remove any play in bolt (2), then tighten it to the correct tightening torque. When installing end bit (3), put top surface (4) of the end bit in close contact with stopper (5), then tighten with the bolts.
   Tightening torque: 3344 ± 373N·m (341 ± 38kgf·m, 2466 ± 275 lbft)
6. After several hours of running, retighten the nuts.





REMARK
The tightening operation is easier if the power wrench that has been supplied is used.

When the nut is rusted and is removed by gas cutting, cut on both side (6) of the nut as shown in the diagram.
Be careful not to damage seat surface (7).
If it is damaged, repair it. Be careful not to get spatter on the mounting surface.



METHOD OF USING POWER WRENCH

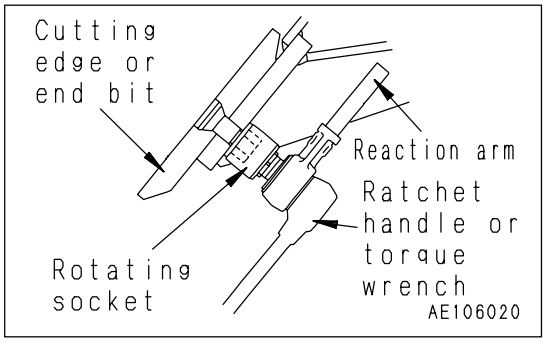
The power wrench set is equipped with a special socket.

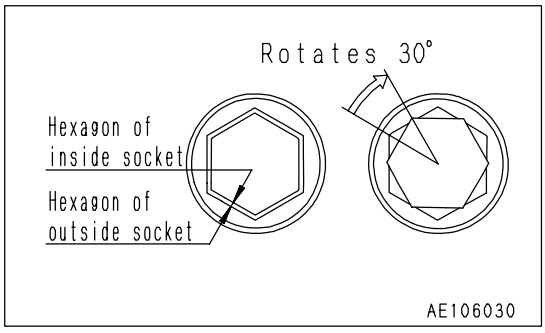
This socket is designed so that it grips the nut and prevents the wrench set from coming pull out. This means that the tightening operation can be carried out by one worker.

This socket has a double construction, and is designed so that the outside can rotate 30°

It is used as follows.

1. Align the hexagons of the inside socket and outside socket, the insert the nut that is to be tightened or loosened.
2. After inserting the nut, turn the outside socket 30° clockwise. When this is done, the outside socket will catch the notch in the nut seat surface, and the wrench will not come off.
3. Put the reaction arm in contact with the blade rib, and tighten or loosen.
4. Turn the outside socket counterclockwise, and remove the wrench.





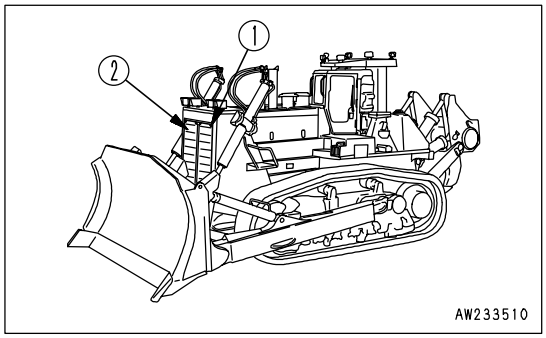
CLEAN, CHECK RADIATOR FINS

WARNING

For the cleaning and check, stop the engine without fail and confirm that the fan is not rotating, and carry out the work.

When the radiator fin block with mud, dirt or leaves, clean it as follows.

1. Loosen bolts (1) and open radiator grille (2).



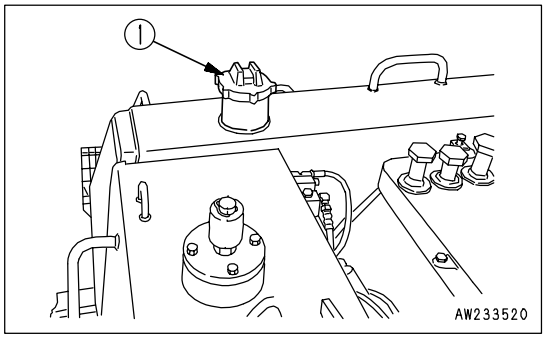
2. Clean the radiator fins clogged with mud, dust and leaves with compressed air. Steam or water may be used instead of compressed air.

REMARK

Check the rubber hose. If the hose is found to have cracks to be hardened by ageing, replace such hose with new one. Further, loosen hose clamp should also be checked.

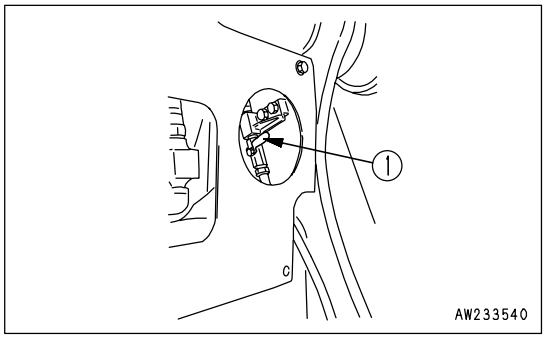
CLEAN FUEL TANK STRAINER

Clean the strainer if there is any dirt collected in it.
Remove the filler cap (1) of the fuel tank and take out strainer.
If the strainer is dirty, clean it with diesel fuel.



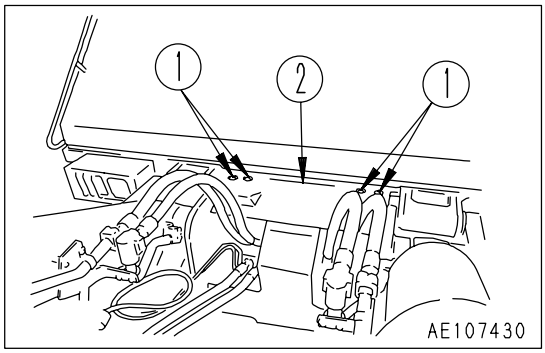
DRAIN WATER AND SEDIMENT IN FUEL TANK

Carry out this procedure after the mchine has been at rest for a long time and after a long spell of rainy days.
Loosen valve (1) at the bottom of the tank and drain sediment accumulated on the bottom together with mixed water and fuel.

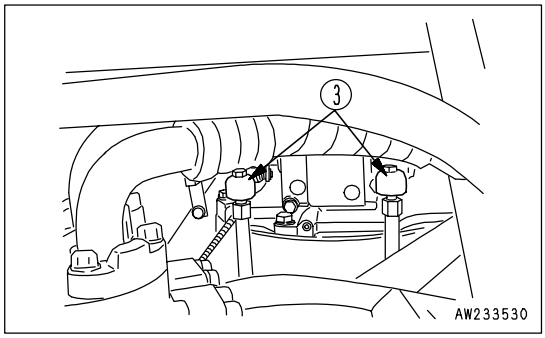


CLEAN STEERING CLUTCH CASE BREATHER

1. Open the rear cover.
2. Remove bolts (1), then remove cover (2).

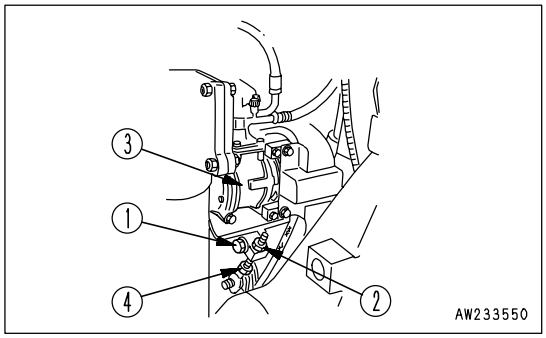


3. Remove breather (3) on steering clutch case, remove any dirt stuck to the breather, then wash with clean diesel oil or flushing oil.



REPLACE AIE CONDITIONER BELT

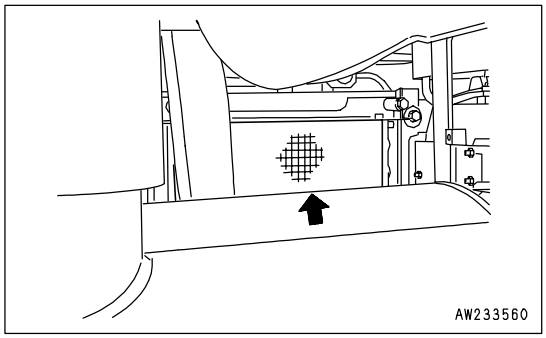
1. Loosen 3 bolts (1) and lock nut (2), then move compressor (3) to the side.
2. Replace the V-belt.
   - When adjusting the V-belt, do not push the compressor directly with a bar. Use adjust nut (4).
     Tighten adjust nut (4) and bolts (1), and apply tension to the V-belt. The standard deflection for the V-belt is approx. 18 to 22 mm (0.71 to 0.88 in) when the belt is pushed by thumb (approx. 6 kg (13.2 lb)) at a point midway between the air compressor pulley and fan pulley.



CLEAN, CHECK HYDRAULIC COOLER FINS

If the hydraulic cooler fins are clogged or there is dirt caught in the fins, clean and check the fins.

1. Open the inspection cover on the right.
2. Use compressed air to remove the mud, dirt, and leaves clogging the hydraulic cooler fins. Steam or water may be used instead of compressed air.

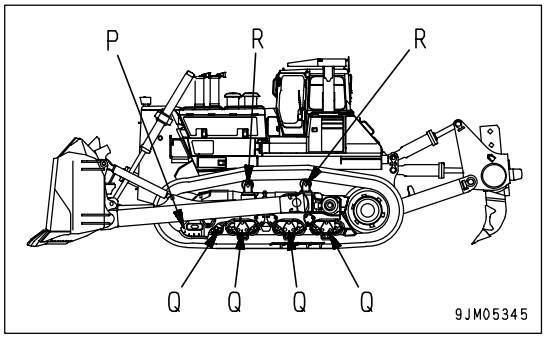


REMARK

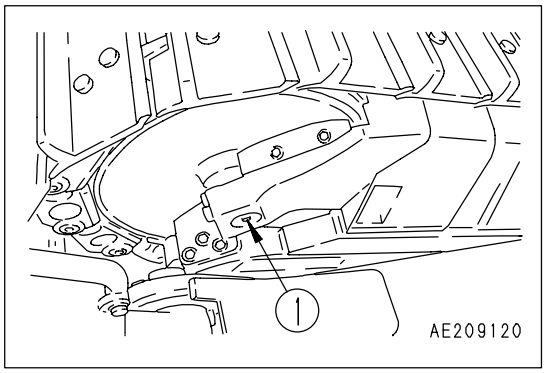
Check the rubber hose. If the hose is found to have cracks to be hardened by ageing, replace such hose with new one. Further, loosen hose clamp should also be checked.

CHECK UNDERCARRIAGE OIL

Stop the machine on level ground, and check for any reduction in the oil at the idler (portion P), track roller (portion Q), bogie shaft (portion S), and carrier roller (portion R).

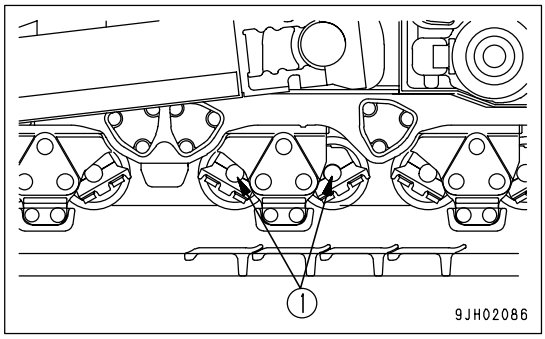


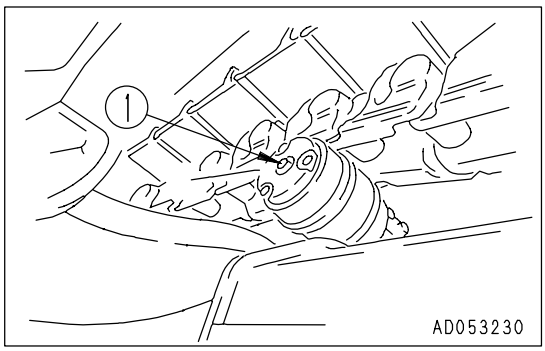
1. Loosen seal bolt (1) slowly and check if oil oozes out from the thread. If oil oozes out, the oil level has not gone down, so tighten the bolt.
2. If no oil comes out even when seal bolt (1) is removed, the oil level is low, so please contact your Komatsu distributor for repair.



REMARK

There is on bogie shaft seal bolt (1) each on the inside and outside.

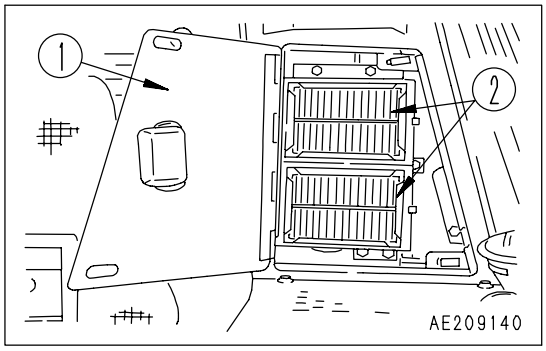




CLEAN AIR CONDITIONER AIR FILTER(FRESH/RECIRC FILTER)

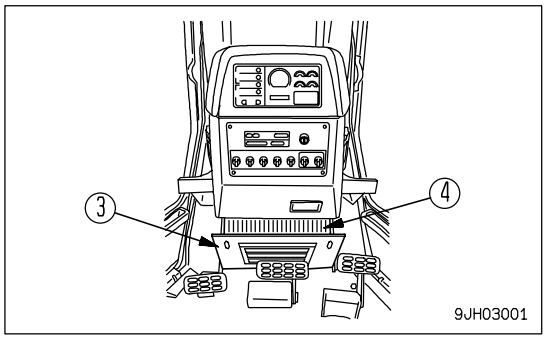
Clean the air conditioner air filter if it becomes clogged or if there is dirt or oil stuck to it.

1. Open inspection cover (1) and remove fresh air filter (2).
2. Open inspection cover (3) under the front panel and pull up recirculation air filter (4) to remove it.
3. Clean filters (2) and (4) with compressed air. If there is oil stuck to the filter, or it is extremely dirty, wash it in a neutral agent. After washing it, dry it completely before installing it again.



REMARK

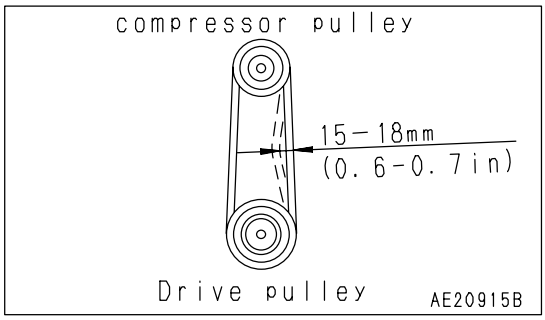
If the filters cannot be cleaned with air or in water, replace them with new ones.



CHECK, ADJUST AIR CONDITIONER

CHECK TENSION OF COMPRESSOR BELT

If the belt is loose, it will slip and the cooling effect will be reduced. From time to time, press a point midway between the drive pulley and compressor pulley with your finger (approx. 6 kg (13.2 lb)) and check that the tension is 15 to 18 mm (0.6 to 0.7 in).
When the belt is new, there will be initial elongation, so always adjust again after 2 or 3 days.



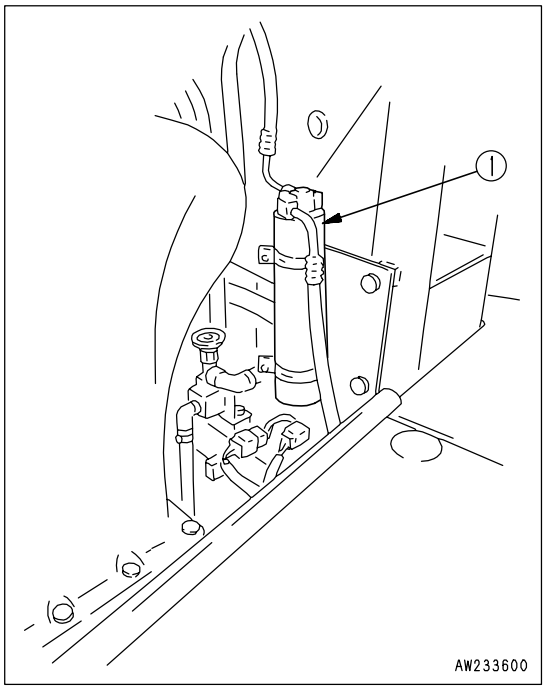
CHECK LEVEL OF REFRIGERANT(GAS)

⚠ WARNING

- **When handling refrigerant gas, always follow local laws and regulations.**
- **The refrigerant used in the cooler is colorless and odorless and does not harm the atmosphere, but if the liquid gets into your eyes or on your hands, it may cause loss of sight or frostbite, so never loosen any part of the refrigerant circuit.**

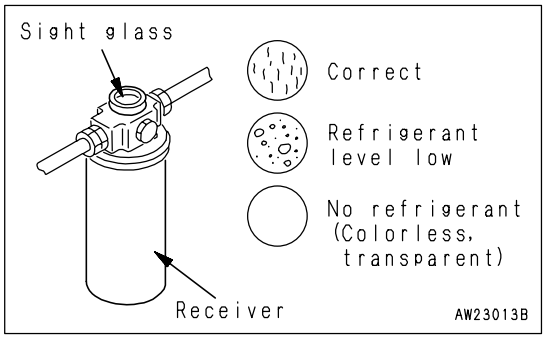
If the level of the refrigerant (gas) is low, the cooling effect will be reduced. Run the engine at high idling, and check the flow of the refrigerant in the refrigerant circuit through the sight glass of the receiver (1) when the cooler is running at high speed.

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



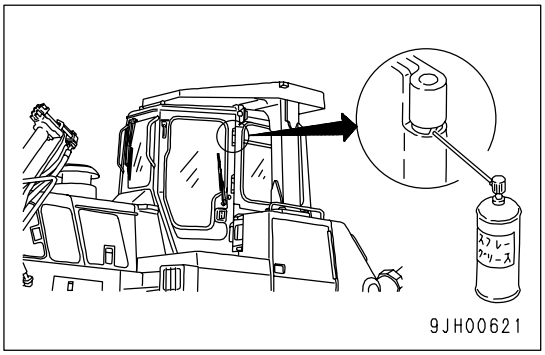
REMARK

- 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.
- New Freon R134a is used as the refrigerant.



LUBRICATE DOOR HINGE

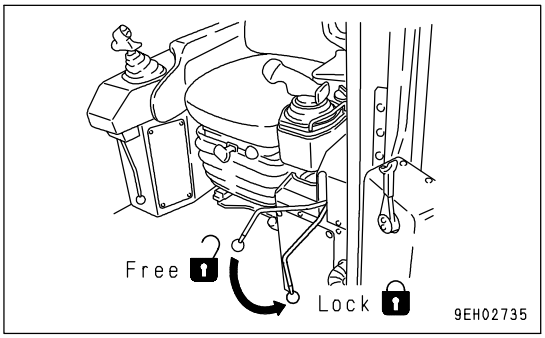
If the door makes a squeaking noise when it is opened or closed, spray lubricant in through the split in the hinge bushing.
If the bushing is worn, replace the hinge.



CHECK DOOR LATCH

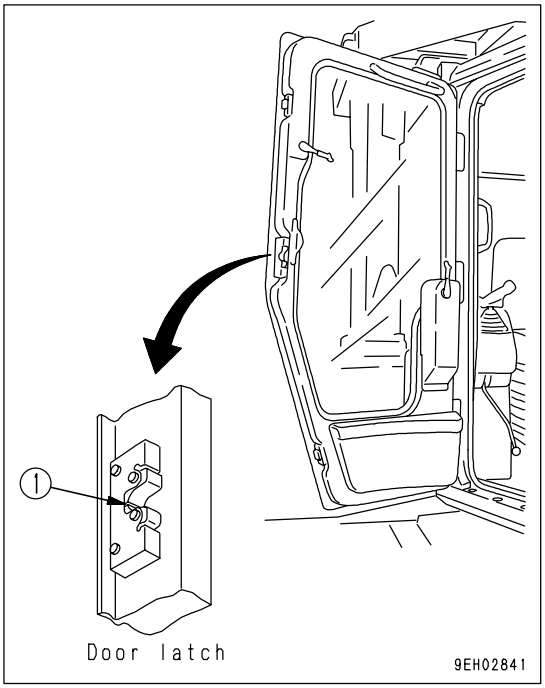
⚠ WARNING

If the control lever is touched by accident during checking, the machine moves off suddenly, and this may lead to serious injury or death.
Before checking door latch, stop the engine and set the parking lever securely to the LOCK position.



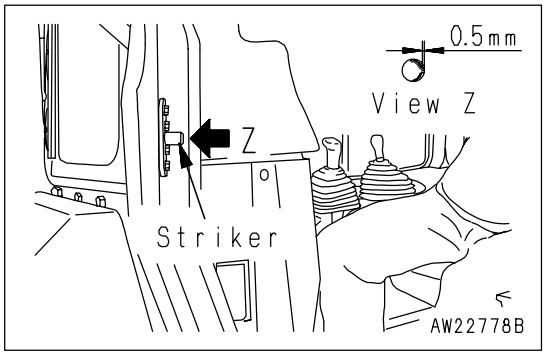
Check
Hold the door open-locked, and check that there is still grease inside the latch. If the amount of grease is low or there is no more grease, coat the inside of the latch with grease from portion (1).

REMARK
If there is no more grease inside the latch, the movement will become poor because of dust inside the latch, and the handle may be stiff when opening the door.



CHECK DOOR LOCK STRIKER

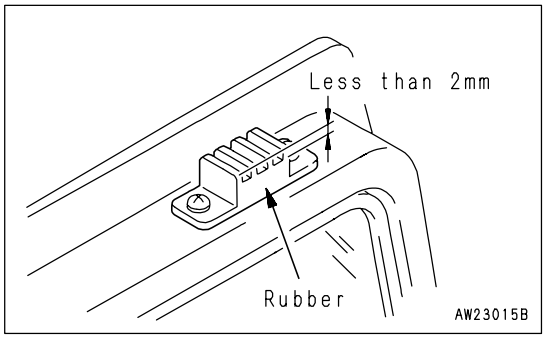
If the wear of the door lock striker exceeds 0.5 mm (0.02 in), replace the striker. If it is used at it is, the play will increase and this may result in breakage of the hinge or door lock.



REPLACE DOOR DAMPER

If the depth of the door damper rubber groove is less than 2 mm (0.08 in), replace the damper.

There are two dampers each at the top and bottom on the left and right doors.

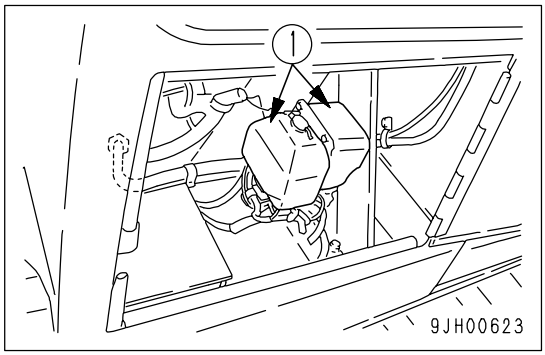


CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

If there is air in the window washer fluid, check the level and add fluid.

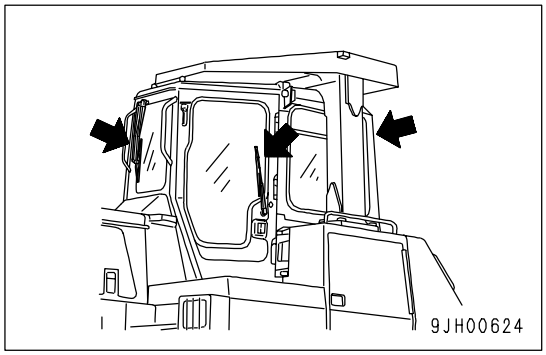
Open the battery cover, check the level of the fluid in window washer tank (1), and if it is low, add automobile window washer fluid.

When adding fluid, be careful not to let any dust get in.



REPLACE WIPER BLADE

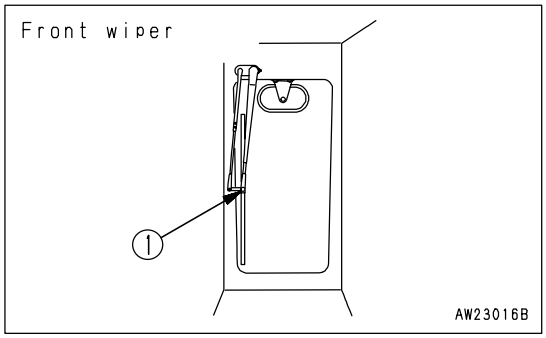
If the blade is damaged, it will not wipe the window clean, so replace the blade.



REPLACEMENT

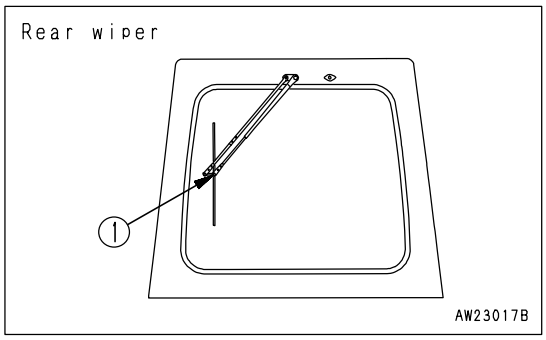
FRONT, REAR WIPER

1. Remove screw (1), then remove the blade.
2. Install a new blade, then tighten screw (1) securely.



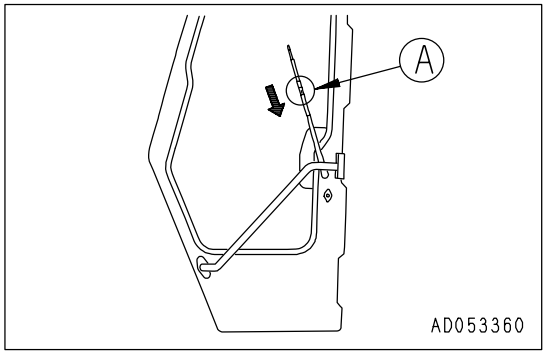
REAR WIPER

1. Remove E-ring (1).
   The blade can then be removed.
2. Install a new blade, then install securely with E-ring (1).



DOOR WIPER

1. It is hooked at portion (A), so move the blade in the direction of the arrow to remove it.
2. Install the new blade and hook it securely.



BLEED AIR FROM HEAD END OF RIGHT PITCH CYLINDER

(DUAL TILT DOZER ONLY)

Bleed the air if the work equipment has been removed or repaired.

1. Raise the blade and run the engine at low idling.
2. Operate the left and right tilt 5 to 10 times to bleed the air from the tilt circuit.
3. Operate the forward and rear pitch 5 to 10 times to bleed the air from the bottom end of the right cylinder.
4. Set the left and right cylinders at the neutral position, then carry out the following operations 5 - 10 times to bleed the air from the head end of the right pitch cylinder.
   (1) Forward pitch → (2) Left tilt → (3) Right tilt → (4) Rear pitch

BLEEDING AIR IN HYDRAULIC SYSTEM

See "OPERATIONS AND CHECKS AFTER STARTING ENGINE (PAGE 3-91)".

Since the engine must be started and the blade must be operated, see OPERATION.

NOTICE

If the engine is run at high speed immediately after startup or a cylinder is pushed up to its stroke end, air taken inside the cylinder may cause damage to the piston packing.

1. Bleeding air from cylinders

   1) Run the engine at low idling, and extend and retract each cylinder 4 to 5 times, taking care so that a cylinder may not be brought up to its stroke end. (Stop the cylinder approx. 100 mm (3.9 in) short of its stroke end)
   2) Next, operate each cylinder 3 to 4 times to the end of its stroke.
   3) Finally, operate each cylinder 4 to 5 times to the end of its stroke to completely remove the air.

CHECK ELECTRICAL INTAKE AIR HEATER

Check before the cold season starts (once a year).

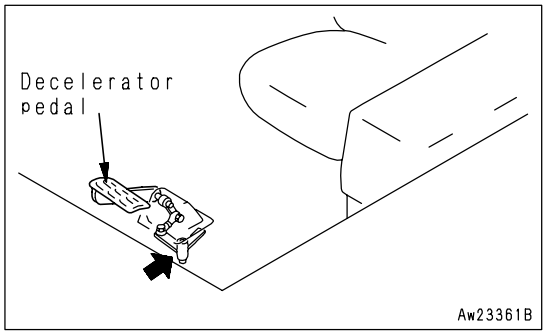
Remove the electric heater from the engine intake manifold and check for wire disconnections and dirt clung to it.

When checking and installing the electric heater, replace its gasket with a new part.

LUBRICATING

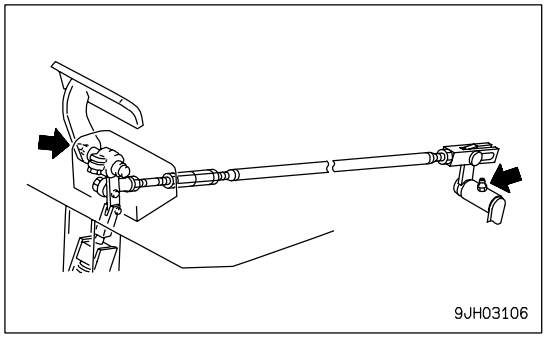
1. Lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.

Fuel control (1 place)

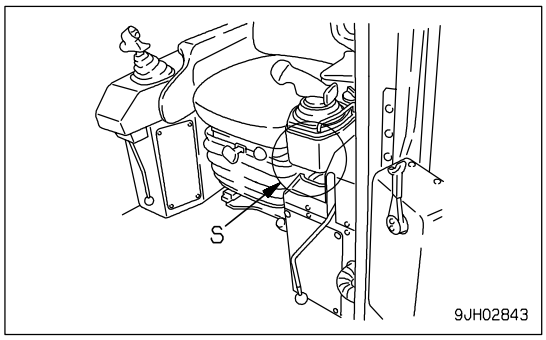


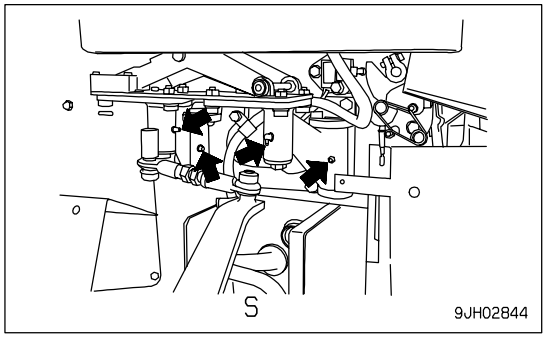
Brake pedal (1 place)

Brake rod lever (1 place)



Steering, directional, gearshift lever rotating link (4 places)

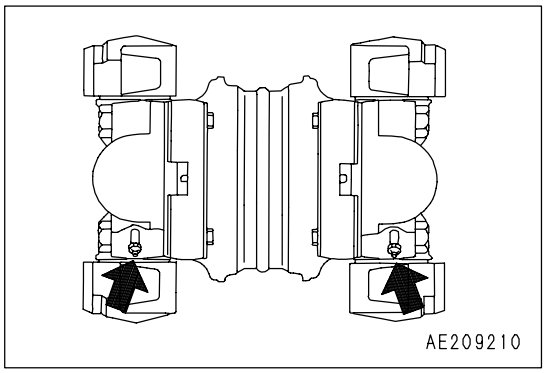




Universal joint (2 places)

WARNING

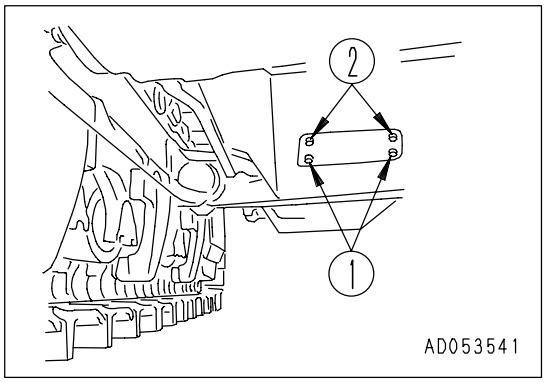
The undercover is heavy. Never try to open or close the cover when directly beneath it. When removing bolts(2), carry out the work from the rear below the cover so that you can easily get out of the way.

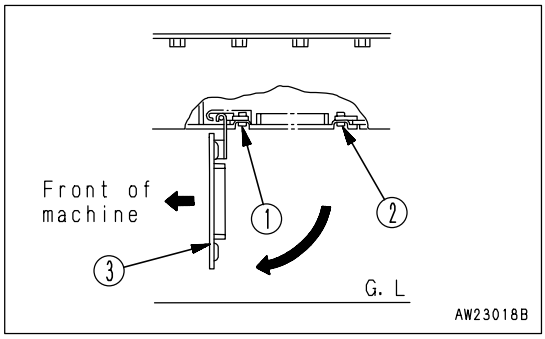


Remove inspection cover (3) of the undercover at the rear bottom of the chassis as follows.

1) Remove 2 bolts (1) at the front of the machine.

2) Support the cover with your elbow while gradually removing 2 bolts (2) at the rear of the machine.
3) Lower the cover gradually to open it.





CHECK BEFORE STARTING

For the following items, see "CHECK BEFORE STARTING (PAGE 3-71)".

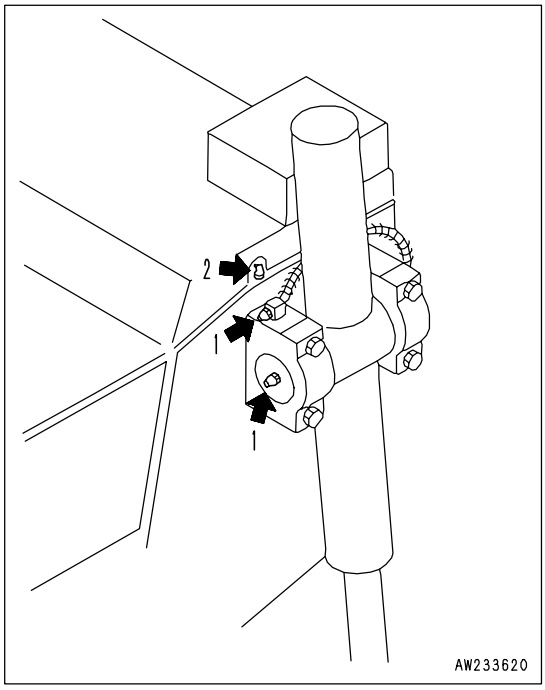
- Checking with machine monitor
- Cooling System Coolant Level - Check/Add
- Fuel Level - Check/Add
- Engine Crankcase Oil Level - Check/Add
- Check oil level in power train case (incl. transmission, torque converter and bevel gear cases), add oil.
- Check damper case oil level, add oil
- Check brake pedal travel
- Check dust indicator
- Hydraulic Oil Level - Check/Add
- Electric Wiring - Inspect
- Check that lamps light up
- Check horn sound
- Check back-up alarm sound
- Check seat belt for wear or damage

EVERY 250 HOURS SERVICE

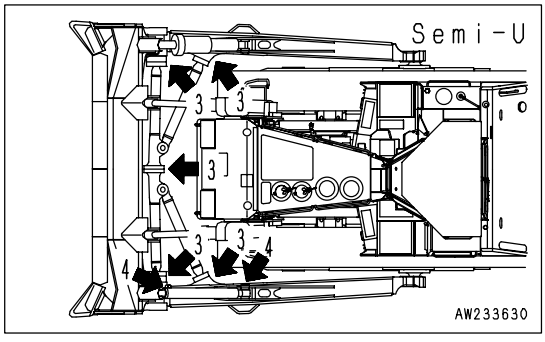
LUBRICATING

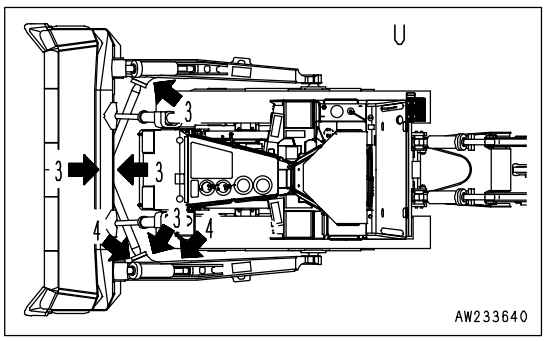
1. Lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.

(1) Blade lift cylinder support yoke (4 places)
(2) Blade lift cylinder support shaft (2 places)

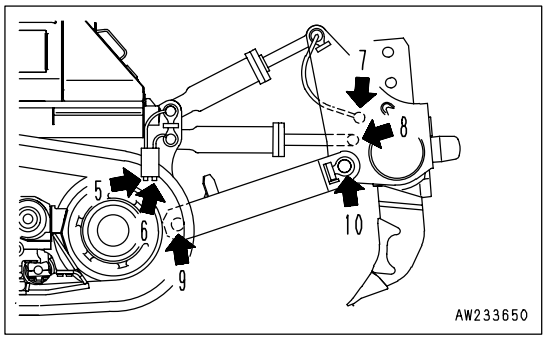


(3) Blade arm ball joint (5 places) - Semi U
Blade arm ball joint (4 places) - U
(4) Brace screw (2 places)

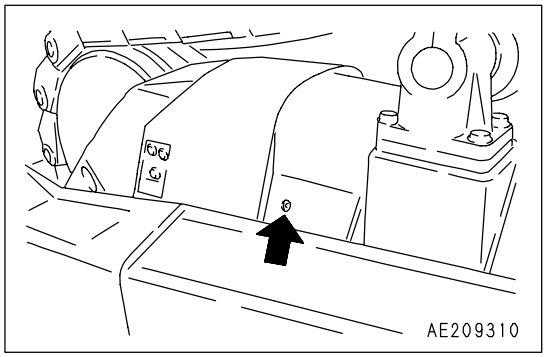




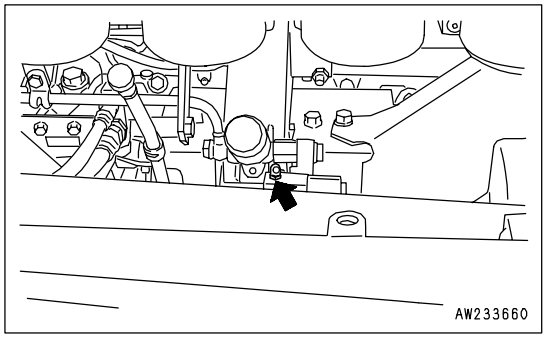
(5) Ripper tilt cylinder bottom pin (2 places)
(6) Ripper lift cylinder bottom pin (2 places)
(7) Ripper tilt cylinder rod end pin (2 places)
(8) Ripper lift cylinder rod end pin (2 places)
(9) Ripper arm pin (front) (2 places)
(10)Ripper arm pin (rear) (2 places)
The illustration on the right shows Giant Ripper (option).



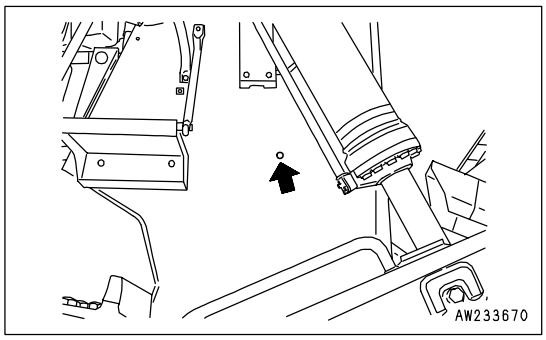
(11) Equalizer bar side shaft (2 places)



(12) Suspension (equalizer bar center shaft) (1 place)
1.Carry out greasing of the suspension (equalizer bar center shaft) through the grease fittings marked by arrows.
2.Pump the greasing lever up and down 3 - 5 times.



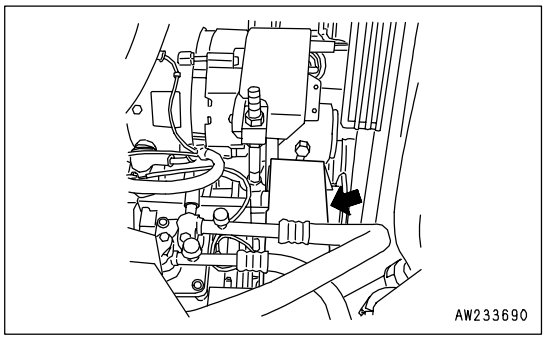
Fan pulley (1 place)

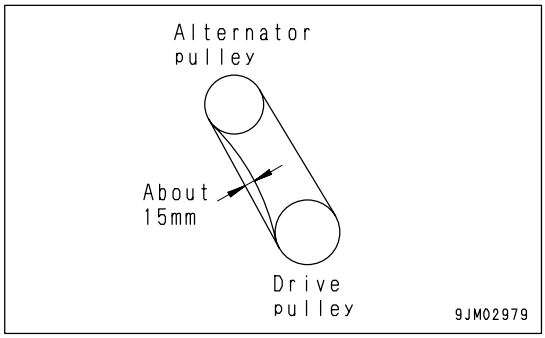


CHECK ALTERNATOR DRIVE BELT TENSION, ADJUST

CHECKING

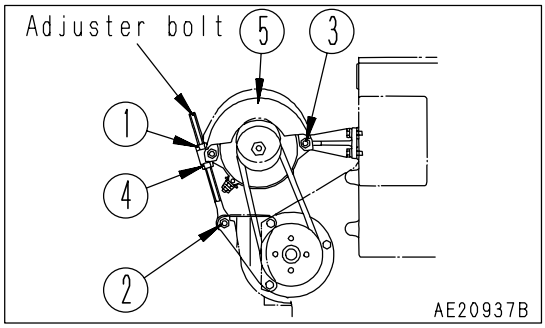
The standard deflection for the drive belt is approx. 15 mm (0.59 in) when pressed by thumb (approx. 6 kg (13.23 lb)) at a point midway between the drive pulley and alternater pulley.





ADJUSTING

1. Loosen bolts and nuts (1), (2) and (3).
2. Turn nut (4) clockwise, then move alternator (5) to adjust the belt tension so that the deflection is approx. 15 mm (0.59 in) when pushed with a force of 6 kg.



REMARK

When adjusting the belt tension, never push the alternator directly with a bar. If it is necessary to push the alternator, insert a piece of wood in-between and push it with a bar.

3. Tighten the bolts and nuts (1), (2) and (3) to fix alternator (5) in position.
4. Check for damage to the pulleys, and wear of the V-groove and V-belt. Be particularly careful to check that the V-belt is not in contact with the bottom of the V-groove.
5. If any belt has stretched and there is no allowance for adjustment, or if there are cuts or cracks on any belt, replace the belt.
6. After replacing the belt, operate for one hour, then adjust again.

CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this check before operating the machine.

⚠ WARNING

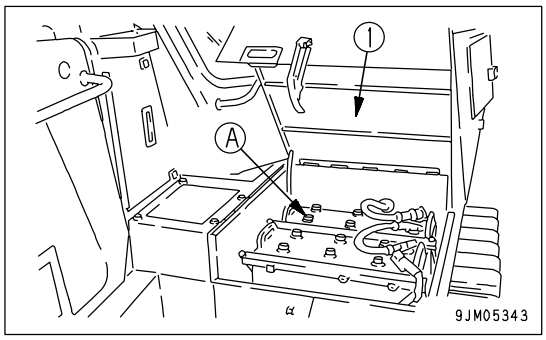
- **Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may also cause an explosion.**
- **The battery generates flammable gas and there is danger of explosion, so do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amount of water and consult a doctor.**
- **When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.**

NOTICE

When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.

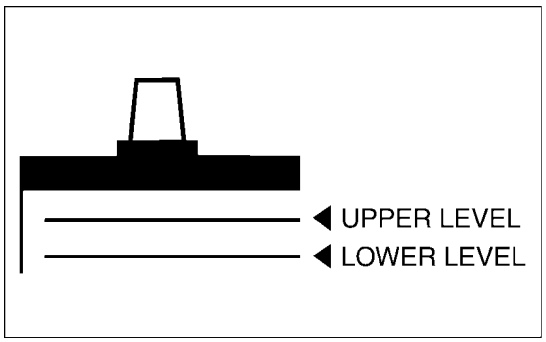
Open cover (1), (2) at the rear left side of the machine. The batteries are installed at (A) part.



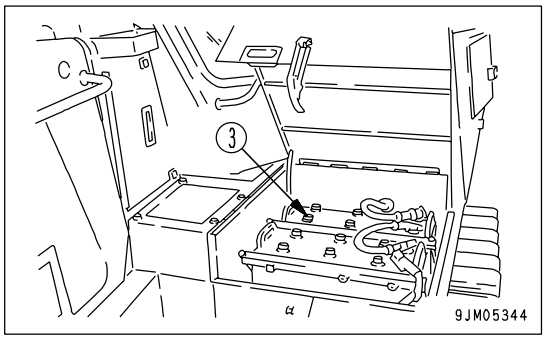
WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L) and LOWER LEVEL (L.L) lines.
   If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.



2. If the electrolyte level is below the midway point between the U.L and L.L lines, remove cap (3) and add distilled water to the U.L line.
3. After adding distilled water, tighten cap (3) securely.



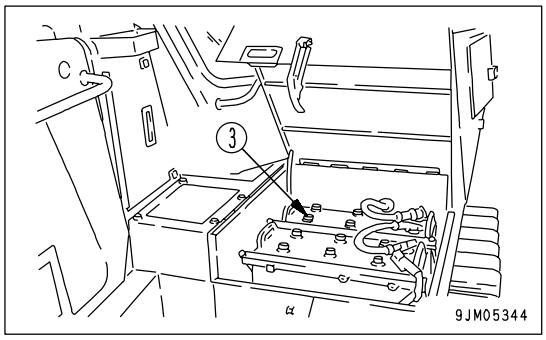
REMARK

If distilled water is added to above the U.L line, use a pipette to lower the level to the U.L line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

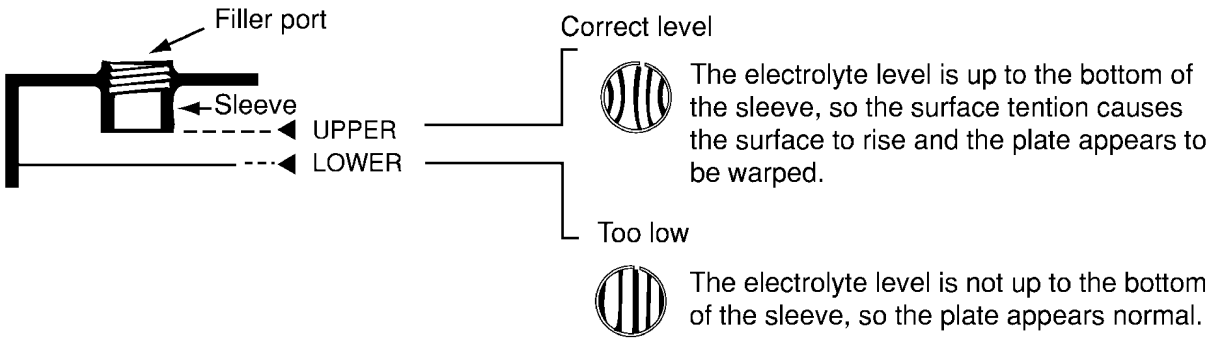
WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

1. Remove cap (3) at the top of the battery, look through the water filler port, and check the electrolyte surface. If the electrolyte does not reach the sleeve, add distilled water so that the level reaches the bottom of the sleeve (UPPER LEVEL line) without fail.



Use the diagram below for reference, and check if the electrolyte reaches the bottom of the sleeve.



2. After adding distilled water, tighten cap (3) securely.

REMARK

If distilled water is added to above the bottom of the sleeve, use a pipette to lower the level to the bottom of the sleeve. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL

If it is possible to use and indicator to check the electrolyte level, follow the instructions given.

CHECK BRAKE PERFORMANCE

⚠ WARNING

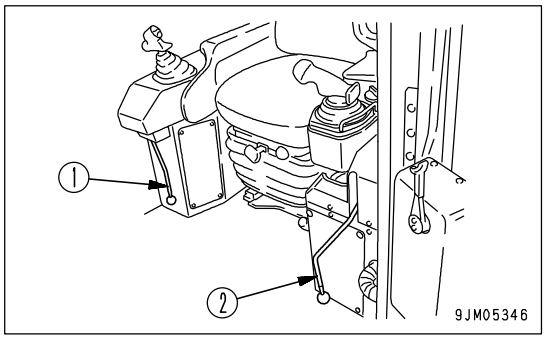
If the machine moves during the following operation, please contact your Komatsu distributor for repairs immediately.

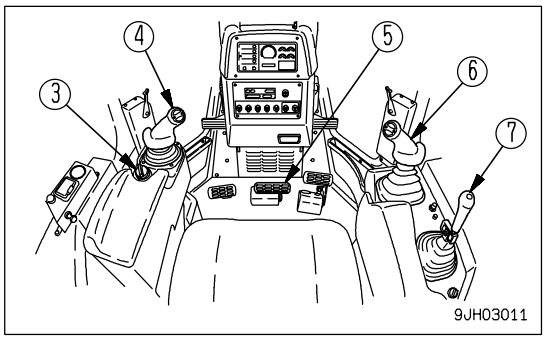
NOTICE

Do not place the joystick in the 1st speed position.
Otherwise, it will cause damage to the machine.

Before starting the engine, check that the area around the machine is safe, then do as follows.

1. Start the engine.
2. Start the engine, and after completing the warming-up operation, set fuel control dial (3) to the SLOW position.
3. Set safety lever (1) to the FREE position then operate blade control lever (6) and ripper control lever (7) to raise the blade and ripper.
   Leave the safety lever (1) to the FREE position.
4. Set parking lever (2) to the FREE position.
5. Depress brake pedal (5), set joystick (4) in FORWARD, then press the shift up button to enter 2nd speed.
6. Operate fuel control dial (3) and gradually raise the engine speed to full throttle. (Keep the brake pedal depressed.)
7. Check that the machine does not move. This indicates that brake performance is normal.





EVERY 500 HOURS SERVICE

Maintenance for every 250 hours service should be carried out at the same time.

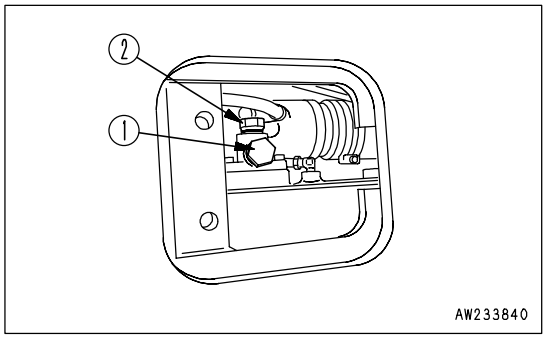
CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE AND BYPASS FILTER CARTRIDGE

(including engine by-pass filter cartridge)

⚠ WARNING

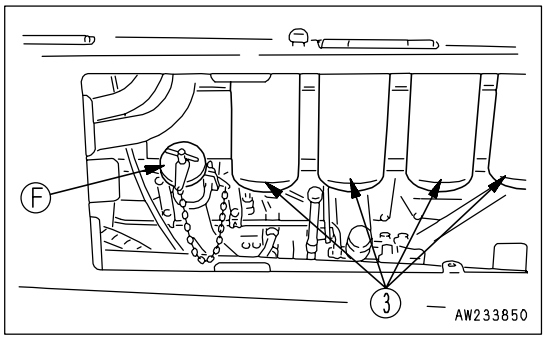
The oil is at high temperature after the engine has been operated, so never change the oil immediately after finishing operations. Wait for the oil to cool down before changing it.

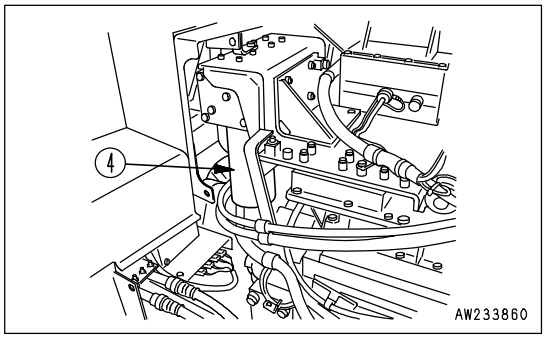
- Refill capacity: 121 liters (31.97 US gal)
- Socket wrench, filter wrench.



1. Remove the covers at the bottom left at the front of the machine and on the side face, and put a container directly underneath to catch the drained oil.
2. Remove drain plug (1) and loosen drain valve (2) slowly to avoid getting oil on yourself, and drain the oil.
   Take care not to loosen drain valve (2) so much that the stopper pin in the valve is distorted.
   Tightening torque for drain plug (1): 68.6 ± 9.81 N·m (7 ± 1 kgf·m, 50.6 ± 7.2 lbft)
   Tightening torque for drain valve (2): 63.7 ± 14.7 N·m (6.5 ± 1.5 kgf·m, 47.0 ± 10.8 lbft)
3. Check the drained oil, and if there are excessive metal particles of foreign material, please contact your Komatsu distributor.
4. Tighten drain valve (2), then tighten plug (1).

5. Using a filter wrench, remove full-flow cartridge (3) and bypass filter cartridge (4) by turning them counterclockwise.
6. Clean the filter holder, fill the new filter cartridge with engine oil, coat the packing surface and thread with engine oil (or coat it thinly with grease), then install the filter cartridge.
7. When installing the filter cartridge, bring the packing surface into contact with the filter holder, then tighten a further 3/4 to1 turn.
8. 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.
9. Run the engine at idling for a shot time, then stop the engine, and check that the oil level is between the H and L marks on the dipstick. For details, see "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-74)".





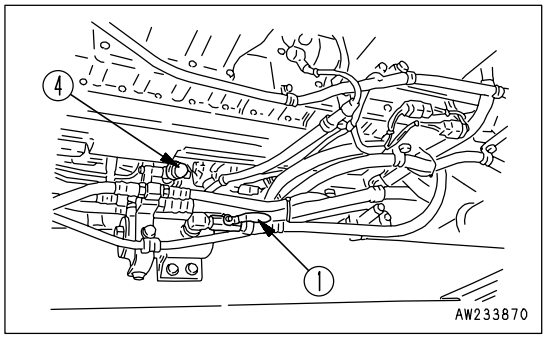
REPLACE FUEL FILTER CARTRIDGE

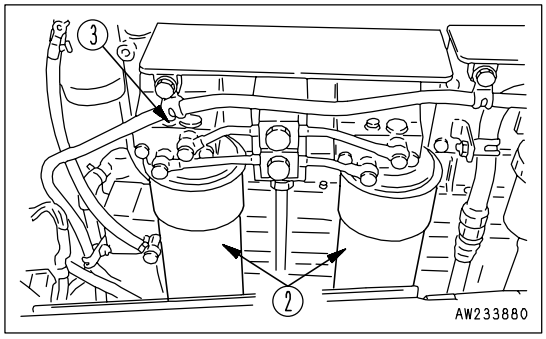
Prepare a filter wrench and a container to catch the fuel.

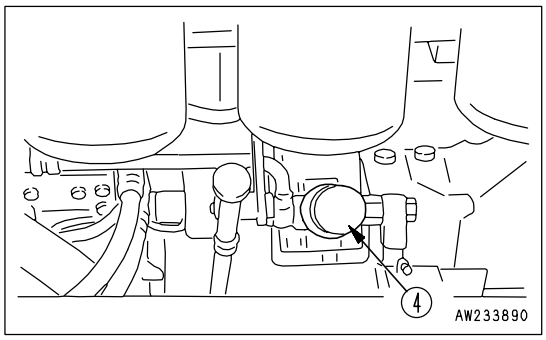
⚠ WARNING

- **Engine is at high temperature immediately after the machine has been operated. Wait for engine to cool down before replacing the filter.**
- **Do not bring fire or sparks near the fuel.**
- **When bleeding the air, be careful not to let the fuel overflow. It may cause a fire.**

1. Set the container under the filter cartridge to catch the drained fuel.
2. Close valve (1) of fuel strainer part.
3. Remove the drain plug at the bottom of the filter to drain fuel. After draining fuel, tighten the drain plug.
4. Using a filter wrench, turn filter cartridge (2) counterclockwise to remove it.
5. Clean the filter holder, fill a new filter cartridge with clean fuel, coat the packing surface with engine oil, then install it to the filter holder.
6. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 3/4 to 1 of a turn.
   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten to the correct amount.
7. Open valve (1) of fuel strainer part and loosen air bleeding plugs (3).
8. Loosen the knob of feed pump (4) and move the pump up and down to draw off fuel until air ceases to come out of plugs (3).
9. Tighten air bleeding plugs (3), then push in the knob of feed pump (4), and tighten it.
10. After replacing the filter cartridge, start the engine and check for oil leakage from the filter seal surface.







REMARK

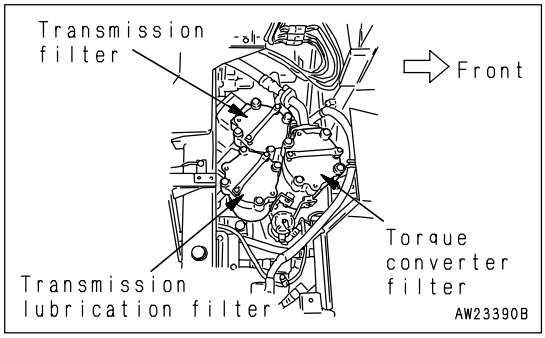
When only the filter cartridge is replaced, it is suffficient that air bleeding is carried out for the filter head alone. But when the fuel piping is removed, air bleeding should also be carried out for the injection pump air-bleeding valve.

REPLACE TRANSMISSION FILTER ELEMENT, TRANSMISSION LUBLICATION FILTER ELEMENT AND TORQUE CONVERTER OIL FILTER ELEMENT

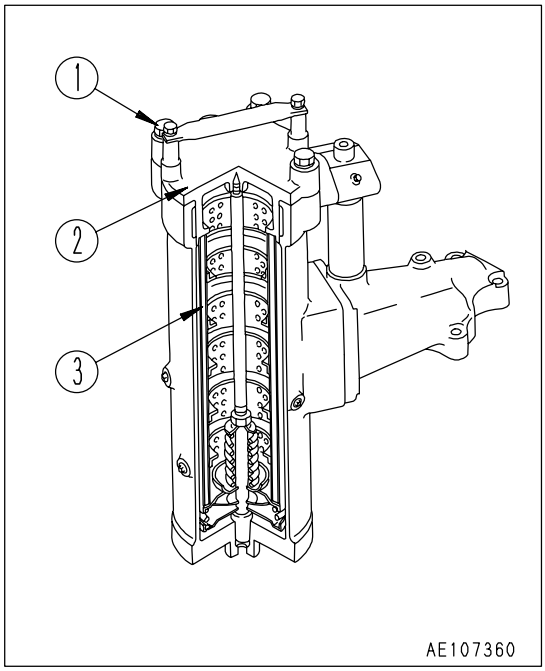
⚠ WARNING

Before opening the filter cases, depress the brake pedal several times to release the pressure, then lock the brake pedal. If there is still pressure inside the filter, the oil may spurt out.

1. Remove the floor cover on right side fender.



2. Remove bolts (1) and cover (2) is lifted up, then take out element (3).
3. Clean the inside of the case and the removed parts, then install a new element.
   Replace the O-ring also at the same time.

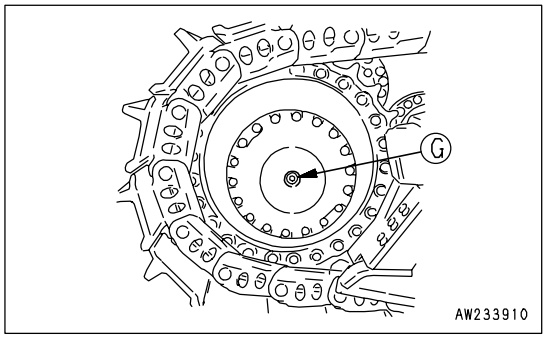


CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

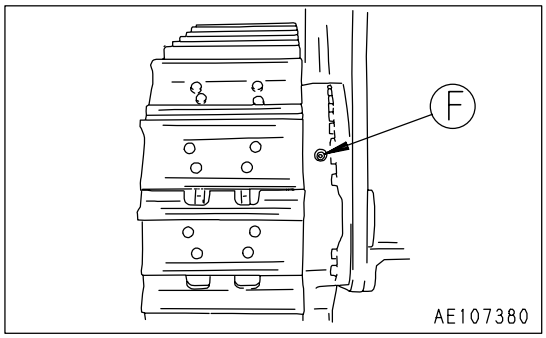
⚠ WARNING

There is danger that the oil may spurt out under internal pressure, so to the side, and gradually turn the plug to release the internal pressure before removing the plug completely.

1. Place the machine on a horizontal place.
2. Remove oil level plug (G) and check whether the final drive case is filled with oil to lower edge of the plug hole.



3. If the oil level is still too low, add gear oil through oil filter plug hole (F) until the oil overflows.
   Before removing oil plug (F), remove all the mud and dirt from around oil filler plug (F). Be careful not to let any dirt or sand get in when adding oil.



CHECK, REPLACE FAN BELT

Check the V-belt, and replace the V-belt if the condition is as follows.

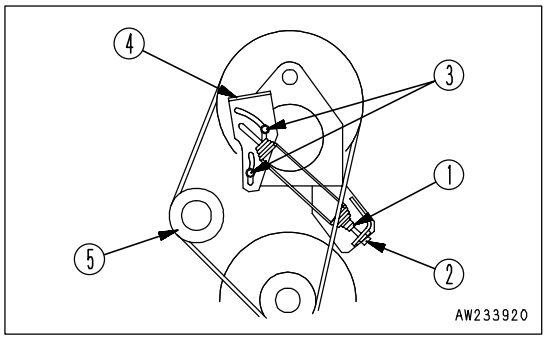
- If the V-belt is in contact with the bottom of the pulley groove.
- If the V-belt is worn and has sunk below the outside diameter of the pulley.
- If the V-belt is cracked or peeling.

REPLACEMENT

When replacing the V-belt, do as follows.

1. Loosen locknut (1) of the tension spring, then loosen bolt (2) to set the spring free.
2. Loosen 2 bolts (3) of stopper bracket (4), then move the stopper bracket to the outside.
3. After setting tension pulley (5) free, remove the old belts and replace with new belts.

   Always replace the V-belts as a set (5 belts).
   An autotensioner is installed, so there is no need to adjust the belt tension until the belt is replaced.



EVERY 1000 HOURS SERVICE

Maintenance for every 250 and 500 hours service should be carried out at the same time.

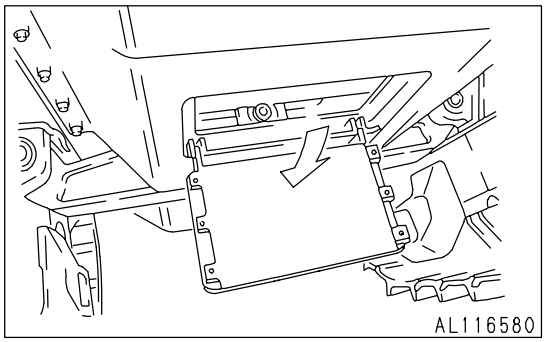
CHANGE OIL IN POWER TRAIN CASE, CLEAN STRAINERS (INCL. TRANSMISSION CASE, TORQUE CONVERTER CASE AND BEVEL GEAR CASE)

⚠ WARNING

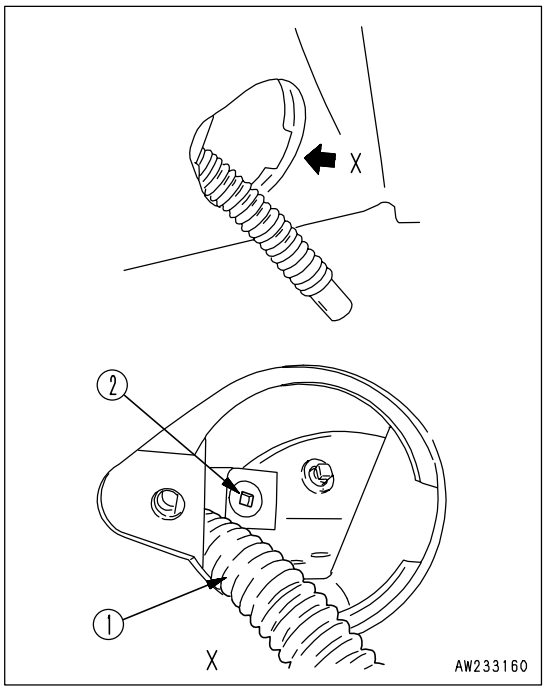
- **The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.**
- **The undercover is heavy. Never open and close operation right below the undercover. When removing bolts, work behind the right below and be ready for escaping at any time.**

- Refill capacity: 210 liters (55.4 US gal)

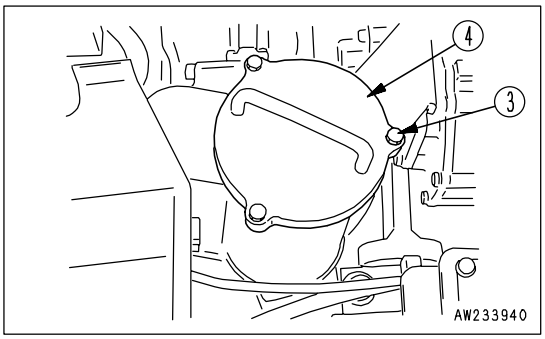
1. Remove the cover on the bottom of the rear body.



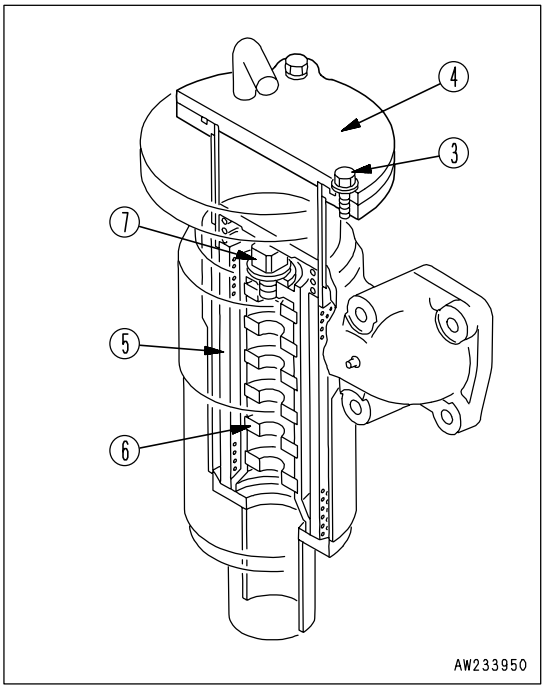
2. Pull out hose (1) slowly to avoid getting oil on yourself, and loosen drain plug (2) to drain the oil.
3. After draining, tighten drain plug (2).
4. Insert hose (1) inside the cover, then install the cover.



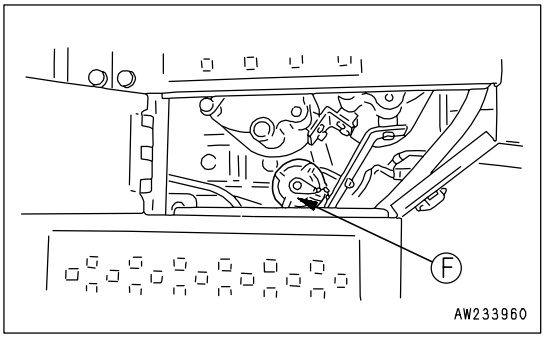
5. Remove the cover on left fender, remove bolts (3) and case (4).



6. Take out strainer (5) and magnet (6).
   If any damage to strainer (5) or magnet (6) is found, replace with a new one.
7. Loosen bolt (7), then divide into strainer (5) and magnet (6).
   Tightening torque of bolt (7): 46 to 59 N·m (4.7 to 5.9 kgf·m, 34 to 43 lbft)
8. Remove all dirt from strainer, then wash in clean diesel oil or flushing oil.
   Clean the case interior and the removed parts.
9. Install the strainers to their original position.
10. After installing, replace the element in the power train oil filter.
    For details, see "EVERY 500 HOURS SERVICE (PAGE 4-52)".

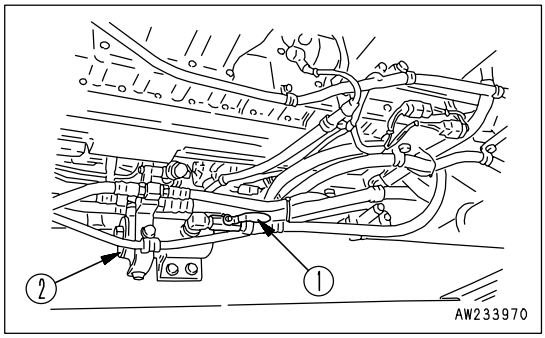


11. Refill the specified quantity of engine oil through oil filler (F).
12. Check that the oil is at the specified level.
    For details, see "CHECK OIL LEVEL IN POWER TRAIN CASE (INCL. TRANSMISSION, TORQUE CONVERTER AND BEVEL GEAR CASES), ADD OIL (PAGE 3-75)".



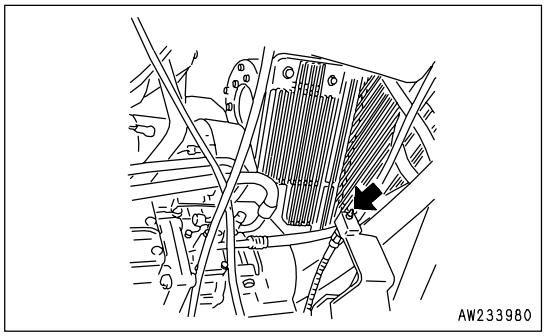
CHECK, CLEAN FUEL STRAINER

1. Tighten valve (1).
2. Remove cap (2), and wash the strainer and strainer case. The strainer forms one unit with the cap.
3. After checking and cleaning, set the strainer in the case, then tighten cap (2).
4. After installing, open valve (1).



LUBRICATE TENSION PULLEY ASSEMBLY

1. Using a grease pump, pump in grease through the grease fitting shown by arrow.
2. After greasing, wipe off any old grease that was pushed out.



CHECK FOR LOOSE ROPS MOUNT BOLTS

Check for loose and damaged bolts. If any loose bolt is found, tighten to a torque of 1960 to 2450 N·m (200 to 250 kgf·m, 1446.6 to 1808.3 lbft).

If any damaged bolt is found, replace the bolt with a genuine Komatsu bolt.

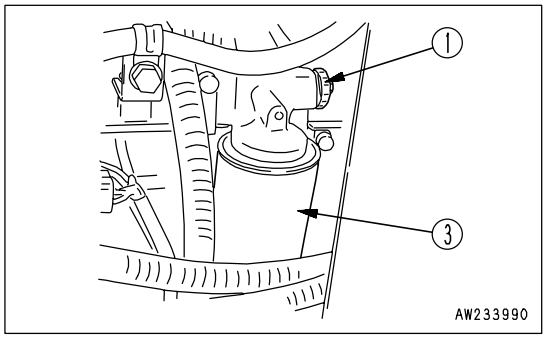
REPLACE MAIN CORROSION RESISTOR CARTRIDGE AND SUB CORROSION RESISTOR CARTRIDGE

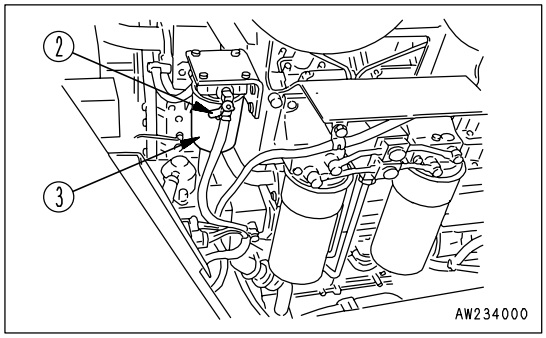
⚠ WARNING

If the engine has been operated, all parts will be at a high temperature, so never try to replace the cartridge immediately after stopping the engine.
Always wait for the engine and other parts to cool down.

- Container to catch drained coolant
- Prepare a filter wrench for fuel filter element.

1. Close main corrosion resistor valve (1) and sub corrosion resistor valve (2).
2. Set a container to catch the coolant under the cartridge.
3. Using the filter wrench, turn cartridge(3) counterclockwise to remove it.
4. Clean the filter holder, coat the packing surface and thread of the new cartridge with engine oil, then install it to the filter holder.
5. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 2/3 of a turn.
   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of coolant.
   If the filter cartridge is too loose, coolant will also leak from the packing, so always tighten to the correct amount.
6. Open valves (1) and (2).
7. After replacing the cartridge, start the engine and check for any leakage of water from the filter seal surface. If there is any water leakage, check if the cartridge is tightened properly.



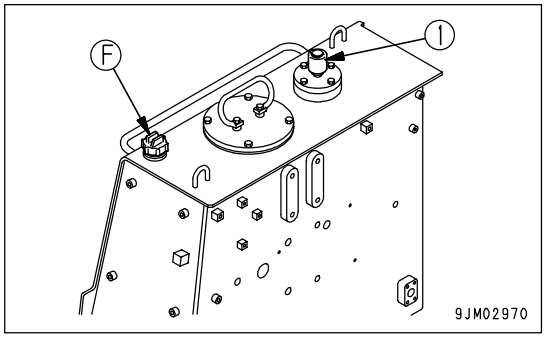


CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC OIL FILTER ELEMENT AND HYDRAULIC TANK BREATHER ELEMENT

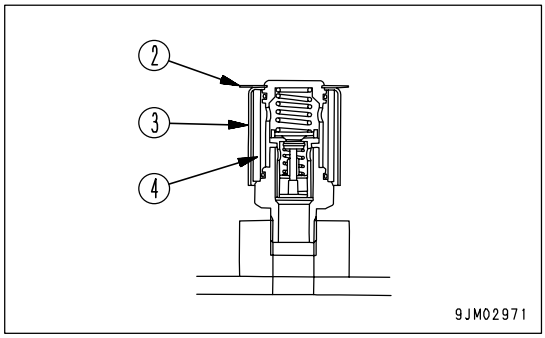
⚠ WARNING

EThe oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing the oil.

EWhen replacing the element, turn oil filler cap (F) slowly to releasee the internal pressure, then remove it carefully.



1. Pull out snap ring (2) of breather assembly (1) and remove cover (3).
2. Replace filter element (4) with a new part.
3. Install cover (3) and snap ring (2).



CHECK TIGHTENING PARTS OF TURBOCHARGER

Please contact your Komatsu distributor to have the tightening portions checked.

EVERY 2000 HOURS SERVICE

Maintenance for every 250, 500 and 1000 hours service should be carried out at the same time.

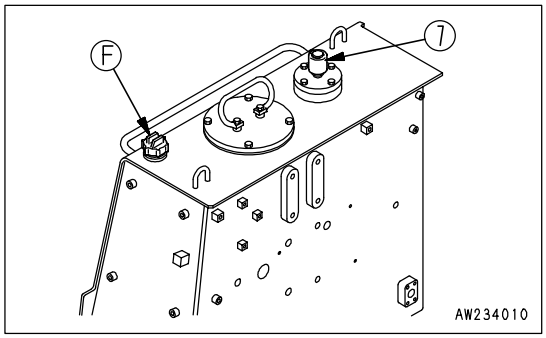
CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAURIC OIL FILTER ELEMENT

⚠ WARNING

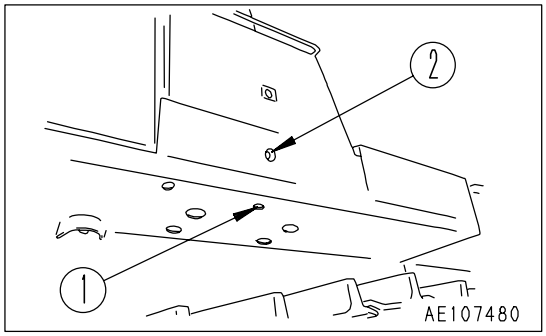
- **The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing the oil.**
- **When removing the oil filler cap (F), turn it slowly to release the internal pressure, then remove it carefully.**

- Container to catch drained oil: 140 liters capacity
- Refill capacity: 140 liters (39.93 US gal)

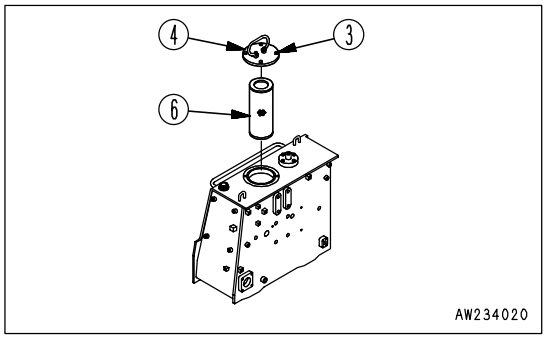
1. Lower the blade and ripper on the ground securely, stop the engine and slowly turn the cap of oil filler (F) to release the internal pressure. Then, remove the cap.



2. Remove drain plug (1) at the bottom of the tank and loosen drain valve (2). After draining the oil, tighten drain plug (1) and drain valve (2). When loosening drain valve (1), be careful not to get oil on yourself.



3. Remove bolts (3), then remove cover (4), and take out element (6).
4. Clean the inside of case and removed parts and install a new element.
5. Add engine oil through oil filler port (F) to the specified level.



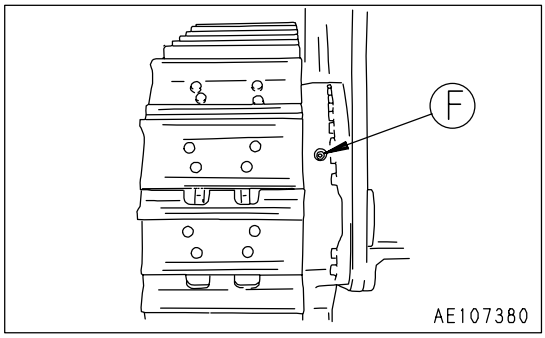
CHANGE OIL IN FINAL DRIVE CASE

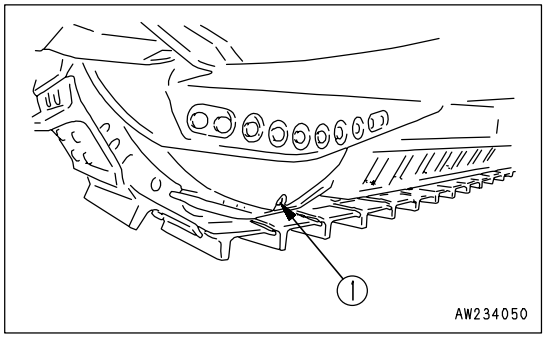
⚠ WARNING

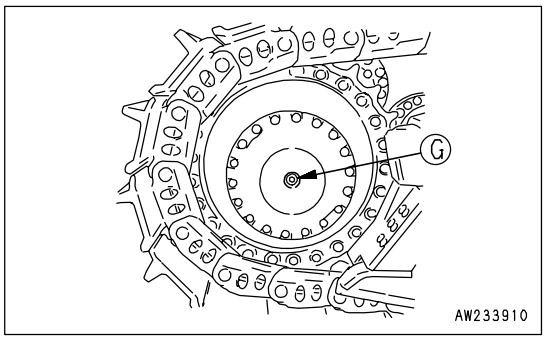
- **The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.**
- **There is danger that oil spouts out due to the internal pressure. When removing the plug, work from the side, turn the plug slowly to release the internal pressure, and remove it carefully.**

- Refill capacity: each 75 liters (19.8 US gal)

1. Remove oil filler plug (F), then remove drain plug (1) and level plug (G), and drain the oil.
   Remove all the mud and dirt from around oil filler plug (F) before removing it. Be careful not to let any dirt or sand get in when adding oil.
2. After draining the oil, tighten the drain plug (1).
3. Remove level plug (G), refill gear oil from oil filler plug hole (F) until the oil overflows the level plug hole.
   After refilling, tighten the plugs.







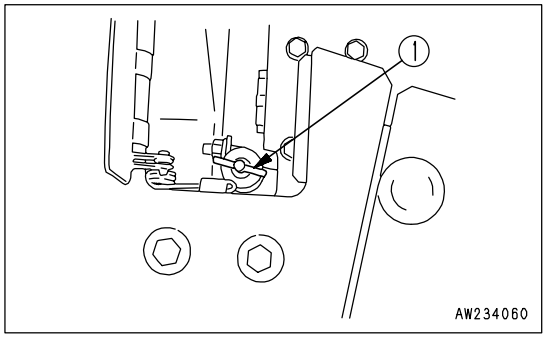
CHANGE OIL IN DAMPER CASE, CLEAN DANPER BREATHER

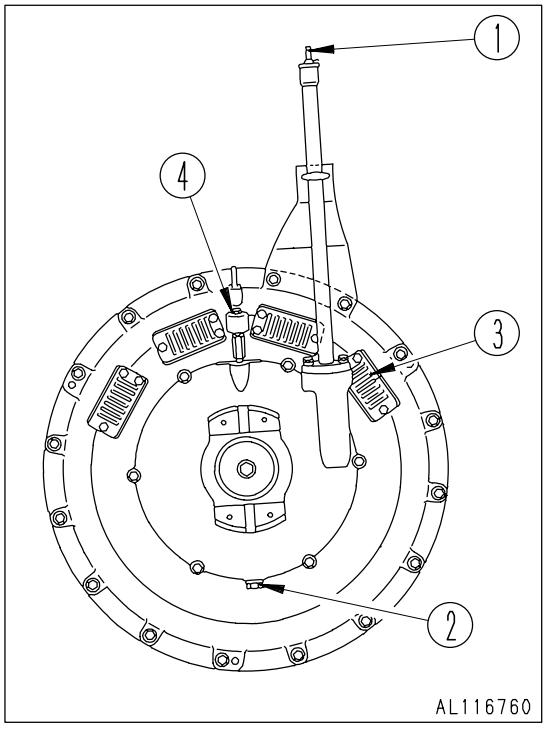
WARNING

The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing the oil.

- Refill capacity: 2.2 liters (0.58 US gal)

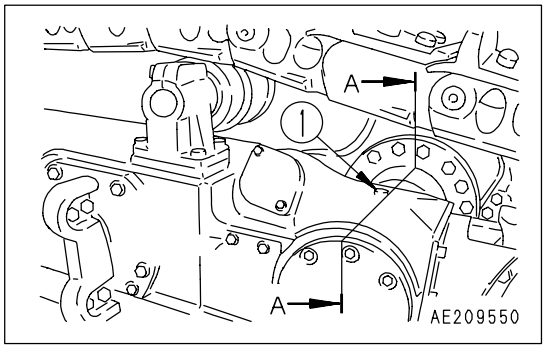
1. Remove breather (4) at the top of the damper.
2. Wash out dust remaining inside of breather with diesel oil and flushing oil.
3. Install breather (4) to the original position.
4. Remove air hole plate (3) (4 places) from the top of the damper cover.
5. remove any dirt or dust, then wash it in clean diesel oil or flushing oil.
6. Open the inspection cover under the chassis.
7. Remove drain plug (2) slowly to avoid getting oil on yourself, and drain the oil.
   After draining the oil, tighten plug (2).
8. Pull out dipstick (1), and add engine oil to the specified level through oil filler.
9. Check that the oil level is between the H and L marks on dipstick (1). For details, see " (PAGE 888-888)".
10. Close the inspection cover.



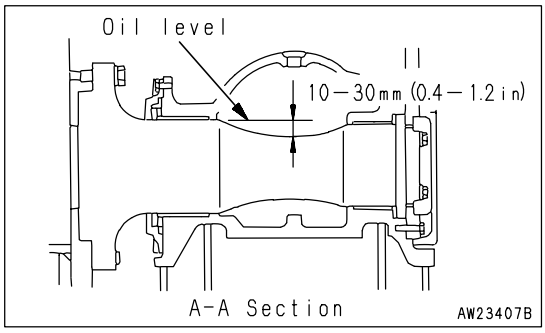


CHECK PIVOT BEARING OIL LEVEL, ADD OIL

1. Remove plug (1).
   When removing plug (1), be careful not to let dirt or dust get it.

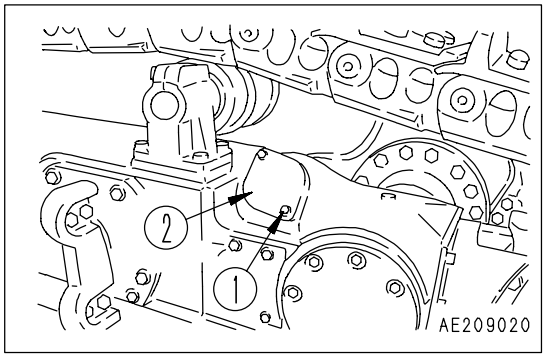


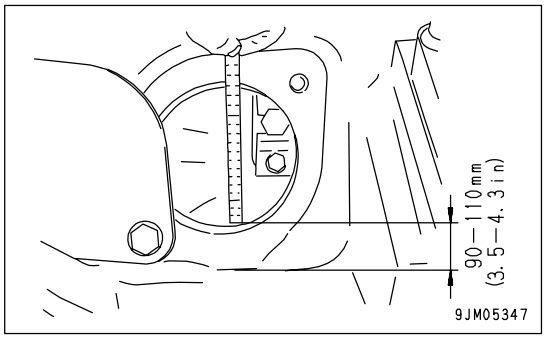
2. Check that the oil is at the level shown in the diagram. If the oil level is low, add engine oil through the hole of plug (1).
   Use class CD SAE 30 engine oil regardless of the ambient temperature.



CHECK OIL LEVEL IN RECOIL SPRING, ASSIST CYLINDER CASE, ADD OIL

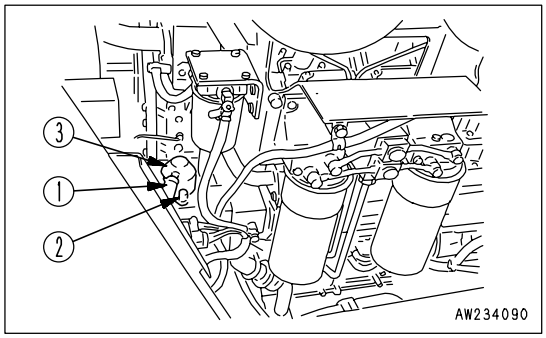
1. Remove bolts (1), then remove cover (2).
   When removing the cover, be careful not to let dirt or sand get in.
2. Loosen the plug and confirm that the internal pressure is released.
   Insert a scale and check that the oil level is 90 to 110 mm (3.6 to 4.4 in) from the bottom edge of the inspection port.
   If the oil is insufficient, add engine oil.

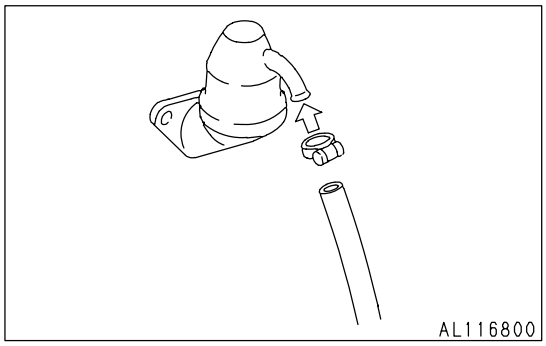




CLEAN ENGINE BREATHER ELEMENT

1. Loosen clamp (1), then remove the hose.
2. Remove bolt (2), then remove breather (3).
3. Rinse the whole breather in diesel oil or flushing oil. Dry with compressed air, then install it.
4. Check the breather hose, and if any deteriorated oil is stuck to the inside, replace the hose with a new hose.





CHECK ALTERNATOR, STARTING MOTOR

The brush may be worn or the bearing may have run out of grease, so contact your Komatsu distributor for inspection or repair.

If the engine is started frequently, have this inspection carried out every 1000 hours.

CHECK ENGINE VALVE CLEARANCE, ADJUST

As special tool is required for removing and adjusting the parts, you shall request Komatsu distributor for service.

EVERY 4000 HOURS SERVICE

Maintenance for every 250, 500, 1000 and 2000 hours service should be carried out at the same time.

CHECK WATER PUMP

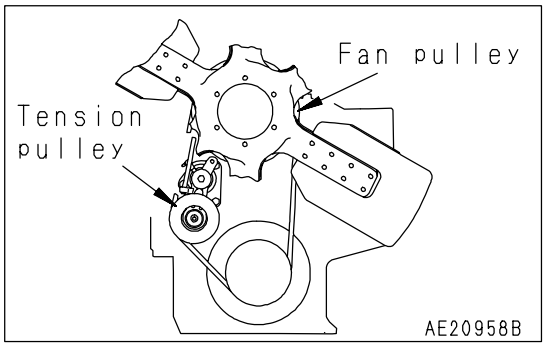
Check that there is oil leakage, water, leakage, or clogging of drain hole. If any abnormality is found, contact your Komatsu distributor for disassemble and repair or replacement.

CHECK VIBRATION DAMPER

Check decrease of damper fluid, dent or out-of-flat. If there is any abnormality, contact Komatsu distributor for repair.

CHECK FAN PULLEY AND TENSION PULLEY

Check the pulley for play and leakage of grease. If there is any abnormality, please contact your Komatsu distributor for disassembly and repair or replacement.



CLEAN, CHECK TURBOCHARGER

Contact your Komatsu distributor for cleaning or inspection.

CHECK PLAY OF TURBOCHARGER ROTOR

Please contact your Komatsu distributor to have the rotor play checked.

CHECK MAIN FRAME, WORK EQUIPMENT (BLADE, RIPPER)

Check after the first 4000 hours, and every 1000 hours after that.

• Preparation

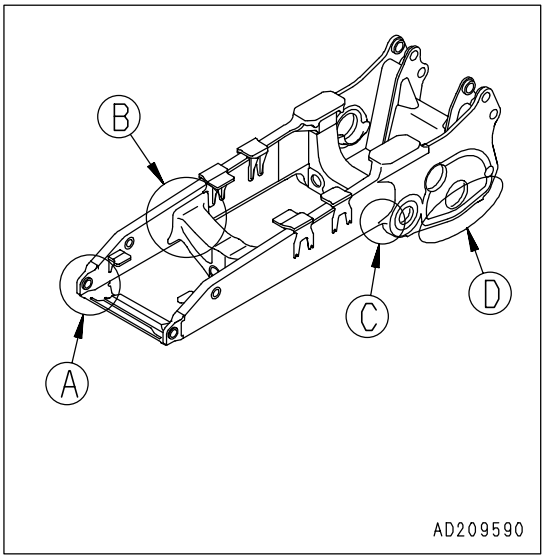
Wipe off all the mud that is stuck around portions (A) - (L) of the work equipment and frame to make it easier to carry out the check.

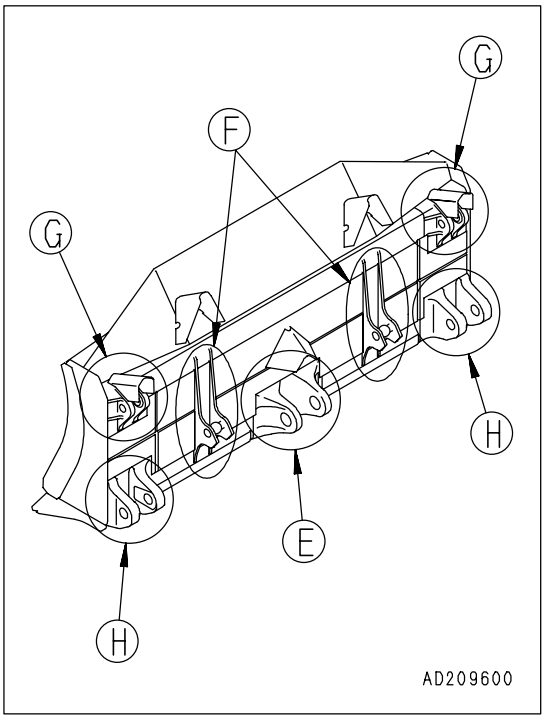
• Visual check

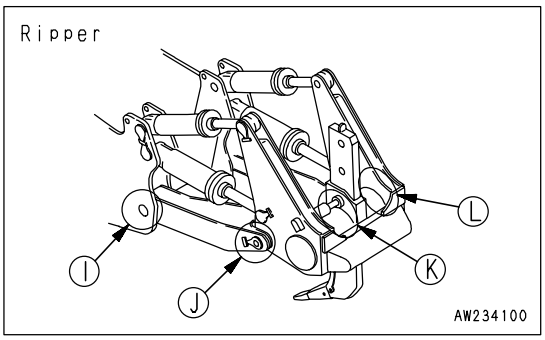
Carefully check the base material of the steel casting and welding at portions (A) - (L), and check that there is no damage.

If any cracks or other damage are found, carry out repairs.

Please contact your Komatsu distributor for details of the repair procedure.





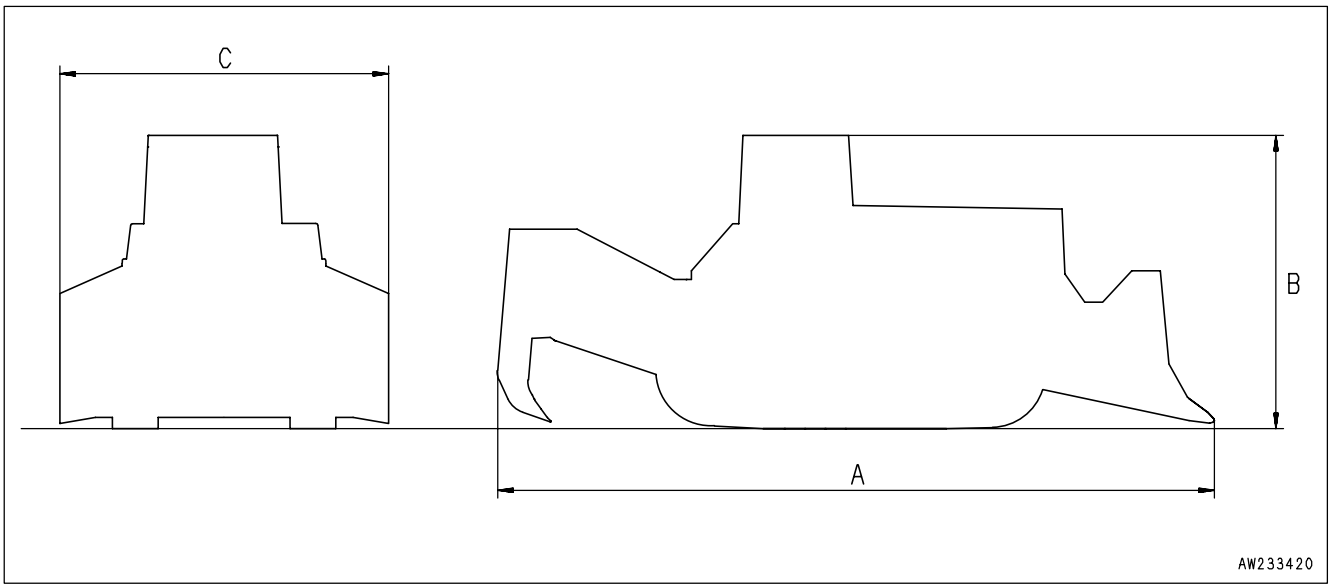


SPECIFICATIONS

SPECIFICATIONS

	Item		Unit	D475A-3
	Operating weight (without operator)		kg (lb)	100000 (220500)*1
	Blade (straight tilt dozer) Weight of attachment (incl. cylinder)		kg (lb)	14600 (32193)
	Ripper Weight of attachment		kg (lb)	7360 (16229)
	Engine model		-	Komatsu SDA12V140E-1 diesel engine
	Engine flywheel horsepower		kW(HP)/rpm	632 (860)/2000
A	Overall length		mm (ft in)	11570 (37'10")
B	Overall height		mm (ft in)	4570 (14'10")
C	Overall width		mm (ft in)	5265 (17'5")
	Travel speed (1st/2nd/3rd)	Forward	km/h (MPH)	3.5(2.2)/6.3(3.9)/10.9(6.8)
		Reverse	km/h (MPH)	4.7(2.9)/8.4(5.2)/14.3(8.9)

With semi-U dozer, variable giant ripper, 710 mm (28 in) shoe, ROPS cab, and air conditioner



ATTACHMENTS, OPTIONS

⚠ WARNING

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

GENERAL PRECAURIONS

PRECAUTIONS RELATED TO SAFETY

If attachments or options other than those authorized by Komatsu are installed, this will not only affect the life of the machine, but will also cause problems with safety.
When installing attachments not listed in this Operation and Maintenance Manual, contact your Komatsu distributor first.
If you do not contact Komatsu, we cannot accept any responsibility for any accidents or failures.

⚠ WARNING

General precautions

- **Attachments are strong tools. Handle them correctly to prevent serious injury.**
- **Read the operation manual for each attachment carefully, and do not use the machine before you understand the operation method completely.**
  If you lose your operation manual, be sure to order another copy from the manufacturer or your Komatsu distributor.
- **Place your foot on a pedal only when necessary for prevention of serious injury caused by malfunction.**

Precautions for removal and installation

When removing or installing an attachment, observe the following items and work safely.

- **Install or remove an attachment on a level and hard place.**
- **When working by two persons or more in cooperation, decide signs and work according to them.**
- **When carrying a heavy part (25kg (55lb) or heavier), use a crane.**
- **When removing a heavy part, be sure to prepare a support for it in advance.**
- **When removing it with a crane, take care of its center of gravity particularly.**
- **It is dangerous to work on a part lifted up with a crane. Be sure to place the part on a stand and check safety.**
- **When leaving an attachment removed or installing it, place it in a stable position.**
- **Do not stand under a part lifted up with a crane. Stay where your are safe even if the part falls.**

NOTICE

Qualifications are required to operate a crane. Never allow the crane to be operated by an unqualified person.
For details of removal and installation operations, contact your Komatsu distributor.

SELECTION OF TRACK SHOE

SELECTION OF TRACK SHOES

Select suitable track shoes to match the operating conditions.

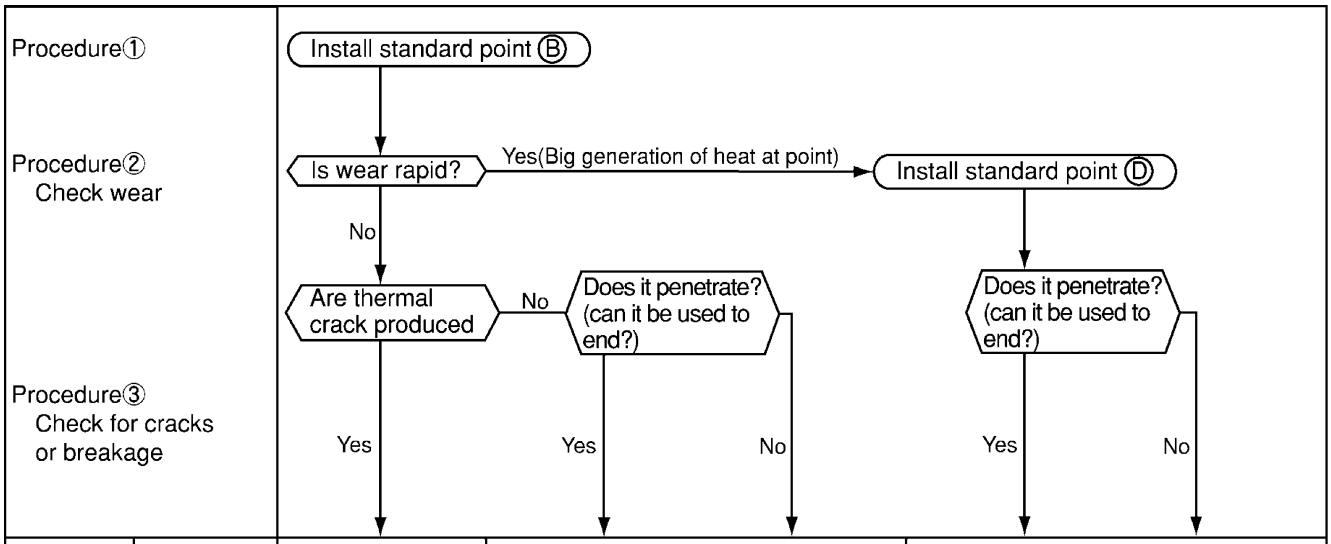
METHOD OF SELECTING SHOES

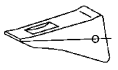
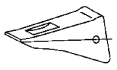
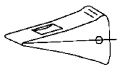
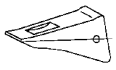
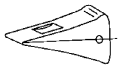
If a wider shoe than necessary is used, the load on the track will increase, and this will cause the shoes to bend, links to crack, pins to break, shoe bolts to come loose, and various other problems.

Category	Use	Precautions when using	Track shoe width
A	Bedrock, normal soil	This shoe can be used for a wide range of work from crushed rock to general civil engineering work such as reclamation of residential land. There is no particular limit to its use.	710 mm (28 in)
B	Normal soil	Use this shoe for general soil, such as where the main work is scraper work and pusher work, reclaiming land for golf courses, or stripping the overburden for coal mines. This shoe cannot be used on bedrock. On jobsites where there are rocks in the soil, be careful to avoid letting the machine mount the rocks.	810 mm (32 in)
C	Soft soil	Use this shoe on soft ground where the shoe in category B sinks into the ground. Do not use this shoe on jobsites where there are rocks in the soil.	910 mm (36 in)

PROCEDURE FOR SELECTING RIPPER POINT

PROCEDURE FOR SELECTING RIPPER POINT



Typical rock	Hardness	Soft ◄► Hard	Soft ◄► Hard		Soft ◄► Hard	
	Type of rock	Shale,lime stone	General rock		Basalt, andesite, granite, chert	
	Features	● Little quartz, little wear ● Deposited in layers, so ripping is easy	—		● Fairly high proportion of quartz (40 - 70%) ● Dose not form seams or layers, so there is excessive generation of heat from the point, the tip wears repidly, and ripping is difficult	
Suitable point	Features	Ⓐ Point for lime stone ● Non-symmetrical shape ● Yellow ● Short	Ⓑ Standard point ● Non-symmetrical shape ● Yellow ● Short	Ⓒ ● Symmetrical shape ● Yellow ● Short	Ⓓ ● Non-symmetrical shape ● Red ● Short	Ⓔ ● Symmetrical shape ● Red ● Short
	Shape	 AE107610	 AE107610	 AE107630	 AE107610	 AE107630
	Part No.	198-78-21420	198-78-21340	198-78-21370	198-78-21350	198-78-21380

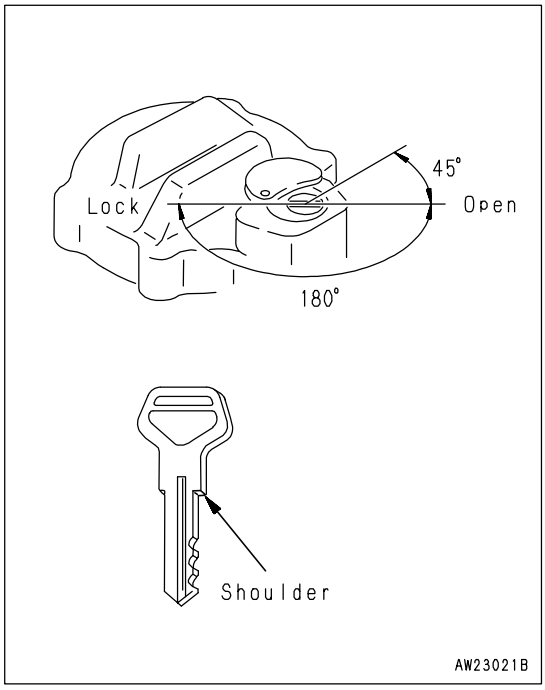
CAP WITH LOCK, HANDLING

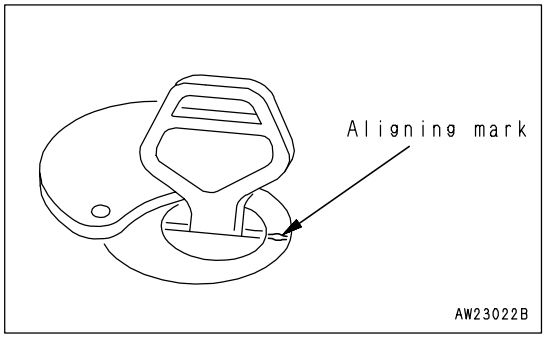
METHOD OF OPENING AND CLOSING CAP WITH LOCK

Lock-type caps are available for the radiator water filler cap, fuel tank filler cap, power train case oil filler cap, hydraulic tank oil filler cap, and hydraulic tank breather cap. The cap opening and closing method is as follows.

TO OPEN THE CAP

1. Insert the key. Make sure that you have inserted the key fully before turning it. If the key is turned when only partially inserted, it may break.
2. Turn the key counterclockwise to align the match mark on the cap with the rotor groove, then turn the cap slowly. When a click is heard, the lock is released, enabling the cap to be opened.





TO LOCK THE CAP

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

EFECTIVE METHOD OF OPERATION FOR DUAL TILT DOZER

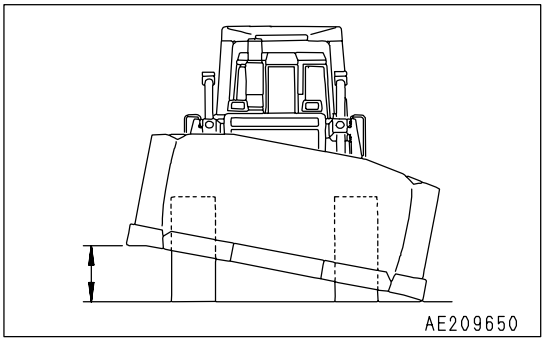
BLADE CONDITION

SINGLE TILT

Operate single/dual tilt selector switch to the SINGLE position, then operate the tilt.

Applicable operation

- Normal operations

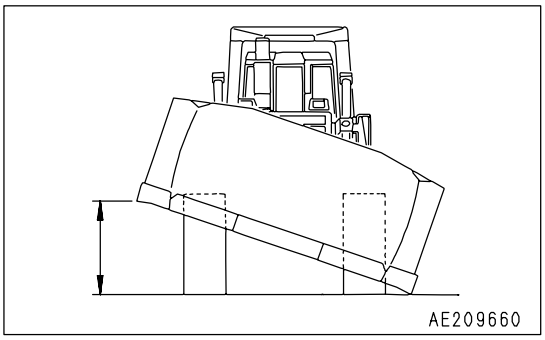


DUAL TILT

Operate single/dual tilt selector switch to the DUAL position, then operate the tilt.

Applicable operation

- Side cutting operations (high places)
- Horizontal dozing operations form side slope (rough ground)
- Ditching work

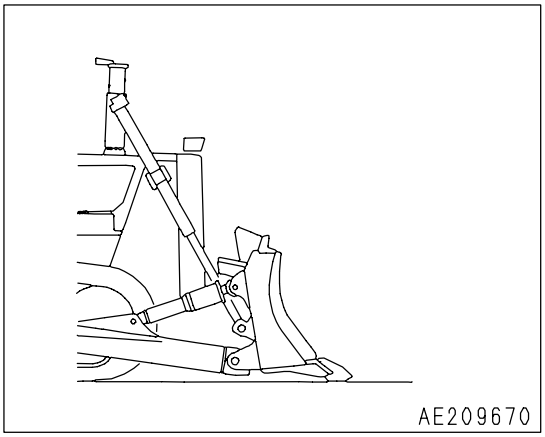


R PITCH (PITCH BACK)

Keep the pitch button pushed in and operate the left tilt.

Applicable operation

- Hauling
- Dozing soft soil (filling)
- Leveling operations (spreading)

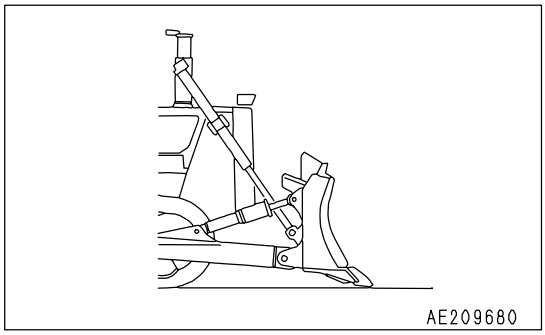


S PITCH (STANDARD)

Normal operations

Applicable operation

- Normal operations

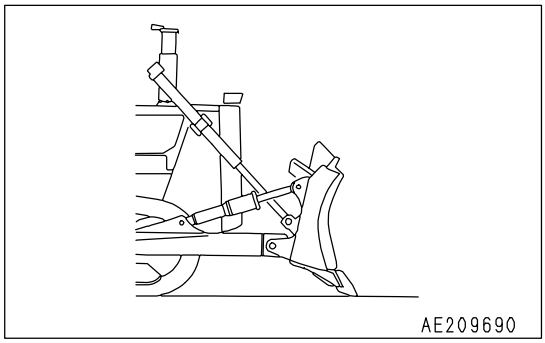


F PITCH (PITCH DUMP)

Keep the pitch button pushed in and operate the right tilt.

Applicable operation

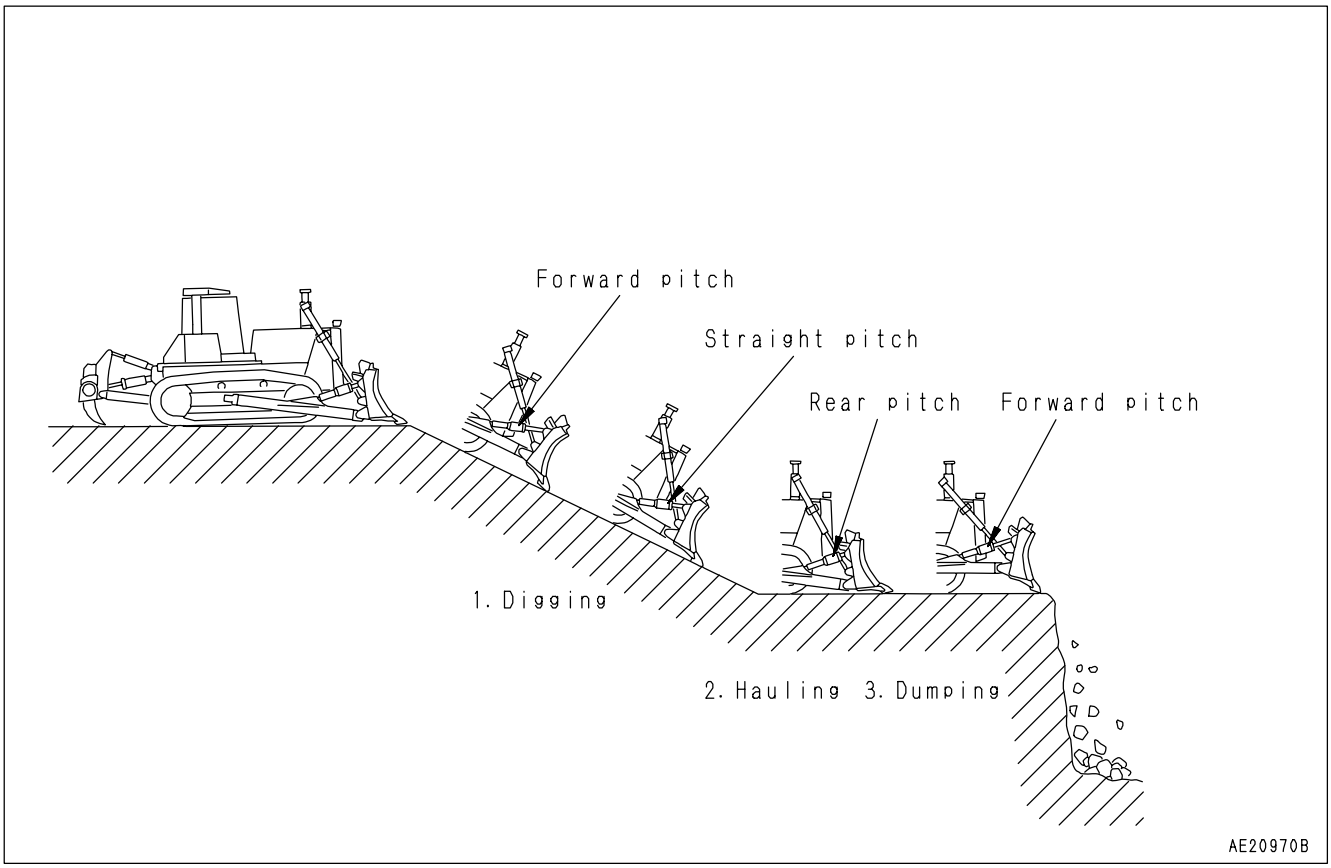
- Digging natural ground and bed-rock (digging hard soil)
- Pushing soil over cliffs
- Pushing-up soil
  (Reduces spillage of soil over the top surface of the blade, and reduces amount of soil carried back)



DOZING WORK

DOZING ON LEVEL GROUND, OR DOWNHILL

NATURAL GROUND, BEDROCK



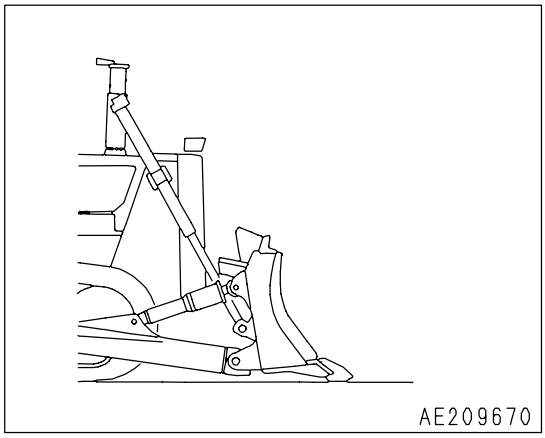
⚠ WARNING

If you feel that the situation is dangerous when dumping the soil, for safety reasons, use two movements to push the soil over the edge.

1. Dig with the F (Front) pitch, and when the load on the blade is approx. 80%, return to S (Straight) pitch and continue digging.
2. Set to R (Rear) pitch which gives a larger load, and haul the soil. Adjust the cutting angle to the most effective angle for rolling the soil.
3. Use F pitch to dump the soil.

FILLING, SOFT SOIL

Carry out digging in R pitch or S pitch, and haul in R pitch.

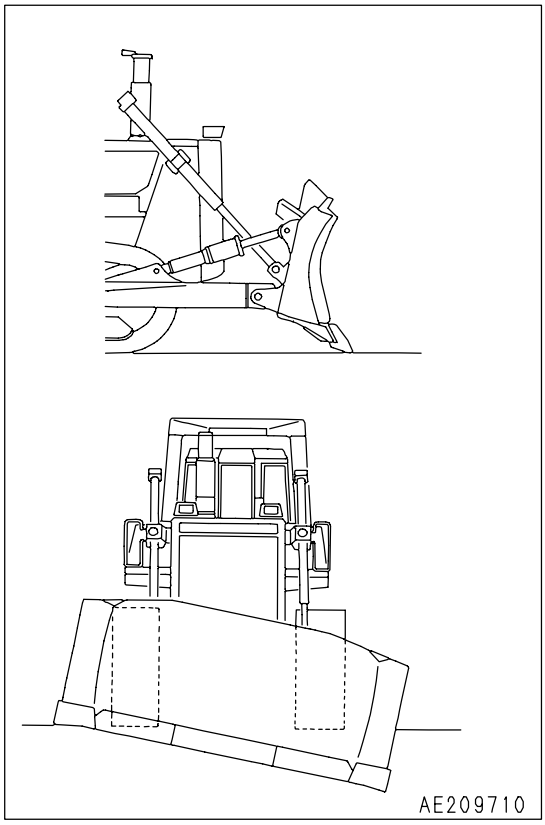


REMARK

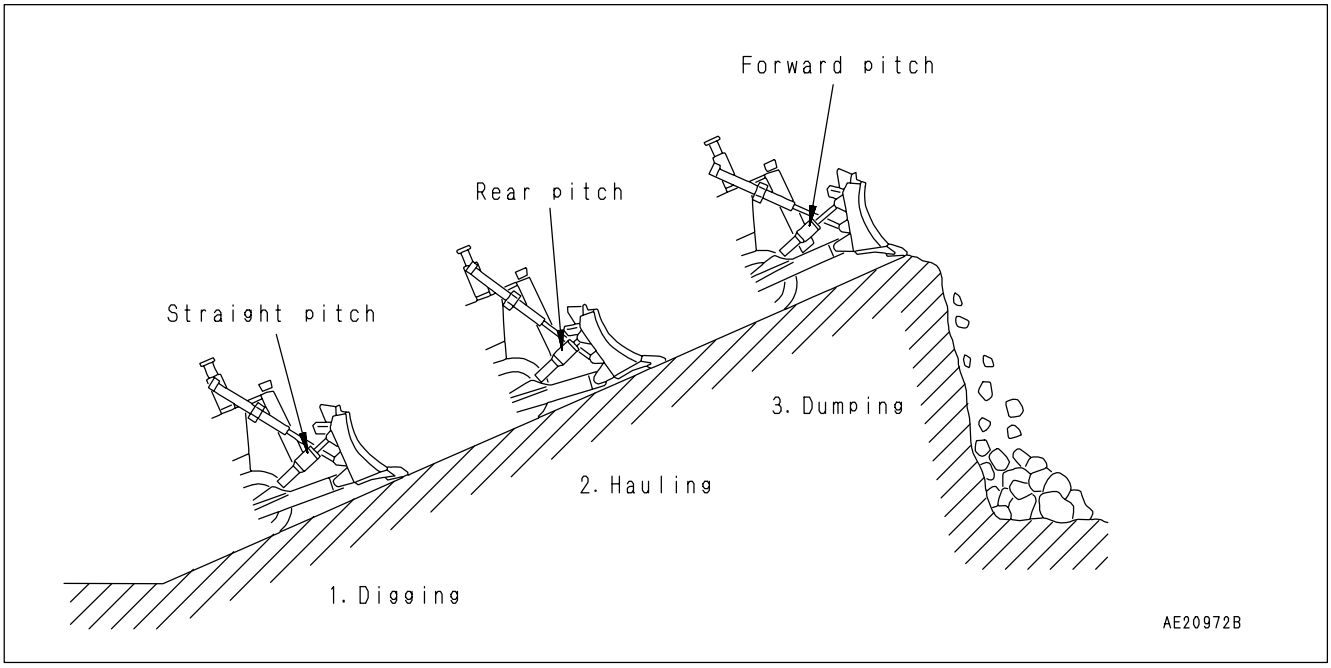
If the digging is carried out in R pitch, there is no sudden digging into the soil, and the operation can be carried out smoothly.

HARD SOIL (HARD CLAY, SHALE, ETC.)

If digging is carried out in F pitch, and the chassis is raised and the blade is tilted, the end bit will dig in better.



PUSHING-UP SOIL

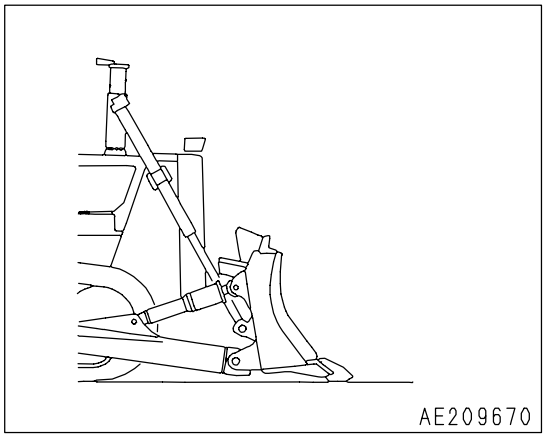


1. Dig with S pitch.
   When digging gradually, use R pitch.
   If the ground is hard, use F pitch.
2. Haul with R pitch.
   If there is any spillage of soil over the top of the blade, change to S pitch.
3. Dump the soil with F pitch.
   This dumps the soil more effectively, and less soil is carried back.

LEVELING (SPREADING) OPERATION

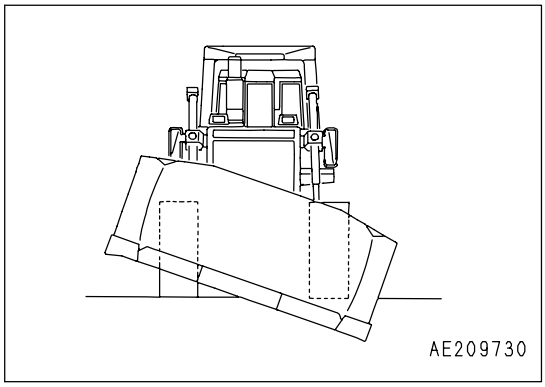
Carry out this operation with R itch.
When carry out this operation with R pitch, the end bit does not dig in, and the ground can be leveled (or the soil can be spread smoothly.)

REMARK
If the tilt cylinder is moved completely to the end of its stroke, the tilt operation cannot be carried out on one side, so move the cylinder back slightly from the end of its stroke to the S pitch position.



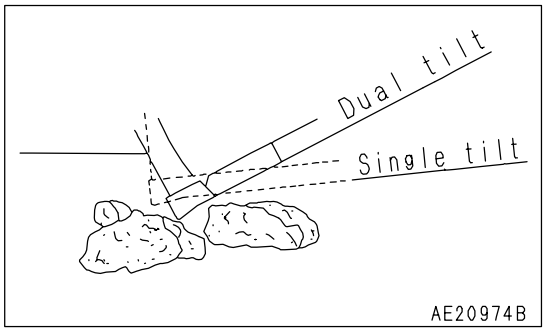
DITCHING OPERATION

If the dual tilt is used, the digging width becomes smaller and a deeper ditch can be dug.
If R pitch is used, the digging can be carried out gradually, and this reduces the unevenness.



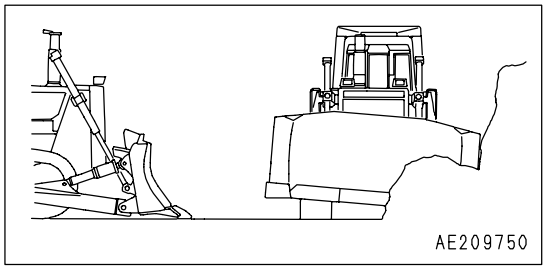
BOULDER RAISING OPERATION

Because the dual tilt greatly increases the amount of tilt, the blade can dig in deep and hook under the boulder. In addition, the operating stroke is large, so operations to raise boulders can be carried out effectively.



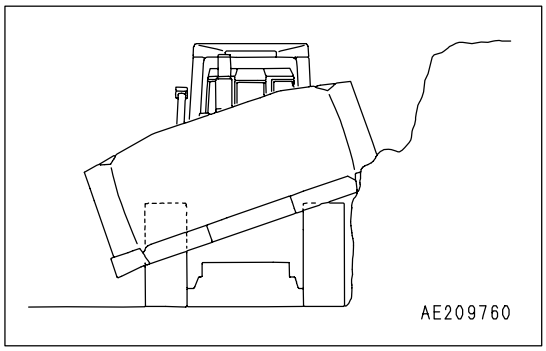
SIDE-CUTTING OPERATIONS

Carry out this operation in R pitch, and set the end face of the end bit in contact with the rock face to carry out cutting.



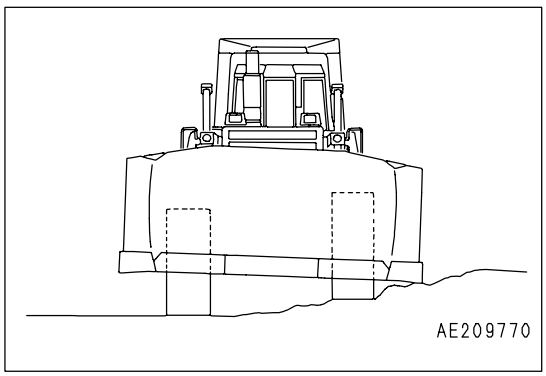
REMARK

With the dual tilt it is possible to increase the amount of tilt and to carry out side-cutting operations on higher walls.



HORIZONTAL DOZING OPERATIONS FROM SIDE SLOPE (ROUGH GROUND)

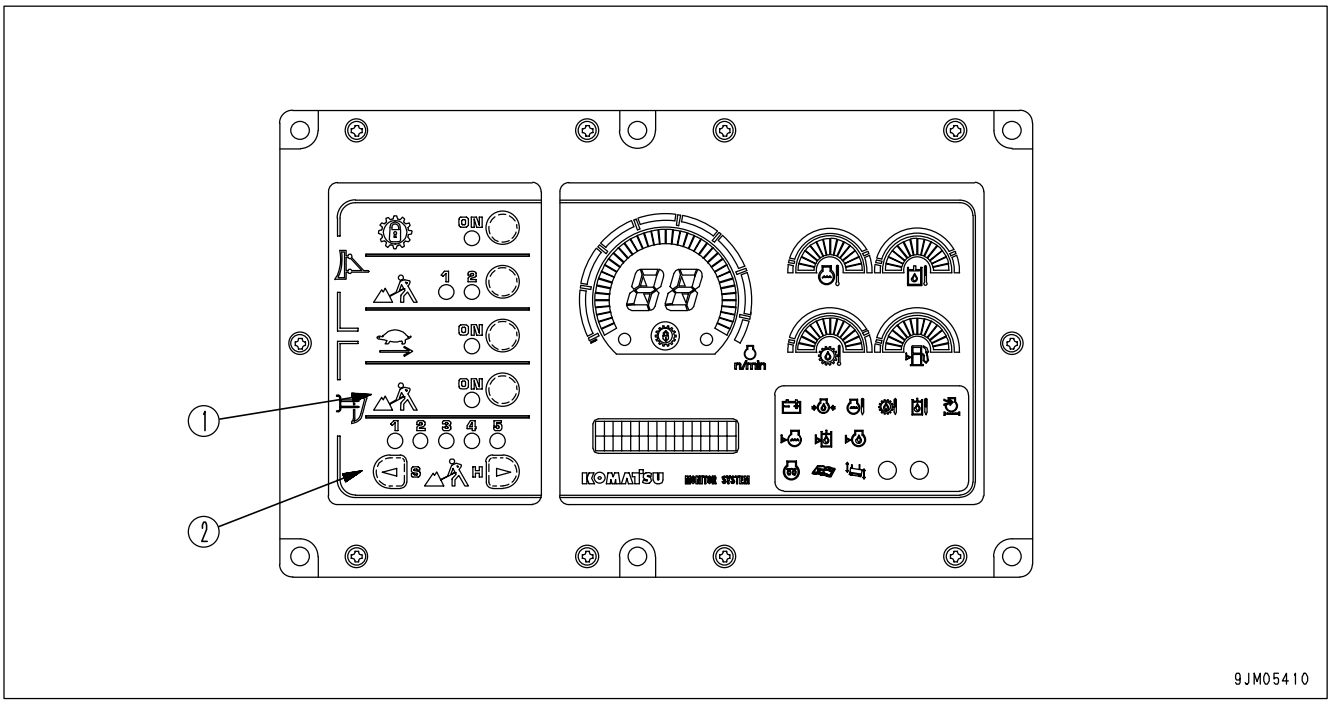
The dual tilt can give a larger amount of tilt, so when dozing from a side slope, this is effective because the chassis becomes horizontal after a short digging distance.



SHOE SLIP CONTROL

MODE SELECTION SWITCH PANEL (SHOE SLIP CONTROL)

- Press each mode switch to turn it ON or OFF and to select the mode.
- For details of of the setting of the mode to use, see "EFECTIVE USE OF MODE SELECTION SYSTEM (PAGE 3-113)".
- The economy mode, reverse slow mode, and shoe slip control mode can be used independently or in combination.



(1) Shoe slip control switch

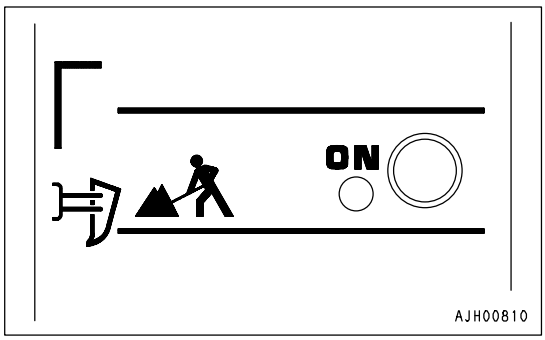
(2) Rockbed selection mode selector switch

SHOE SLIP CONTROL SWITCH

This switch (1) is used for ripping operations.
When it is switched ON, the lamp lights up.

NOTICE

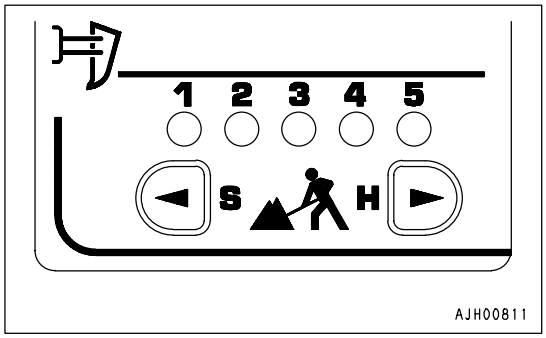
If the shoe slip control is switched ON, the rock selection mode is automatically set to [3], so switch the rock selection mode to match the type of rock.



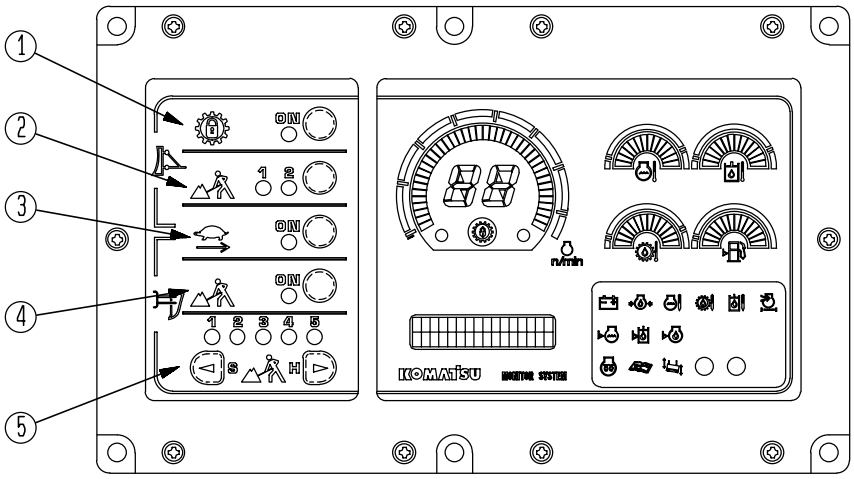
ROCK SELECTION MODE SELECTOR SWITCH

Using this switch (2) during ripping operations, turn the shoe slip control ON and select mode [1] - [5] according to the shoe slip ratio.

The lamp for the selected mode lights up.



EFECTIVE USE OF MODE SELECTION SYSTEM



(1) Lock up mode switch
(2) Economy mode switch
(3) Reverse slow mode selector switch
(4) Shoe slip control switch
(5) Rock selection mode selector switch

Selecting the mode to match the type of work and quality of rock or soil makes it possible to carry out operations effectively.
The condition when all the mode selection switches are off is called the standard mode.
It is impossible to use any combination of the lock-up mode and any other mode.
The economy mode, reverse slow mode, and shoe slip control mode can be used independently or in combination.

Dozing			Ripping
Lock up mode	Economy mode	Reverse slow mode	Shoe slip control
○	×	×	×
×	○	○	○

○: Possible to use ×: Compound use not possible

SELECTION OF MODE

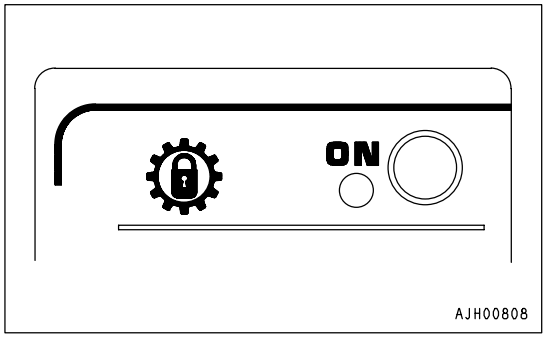
DOZING OPERATIONS

LOCK UP MODE

By using the lock-up mode, the travel speed increases, the operating efficiency is improved, and the fuel consumption is also reduced.

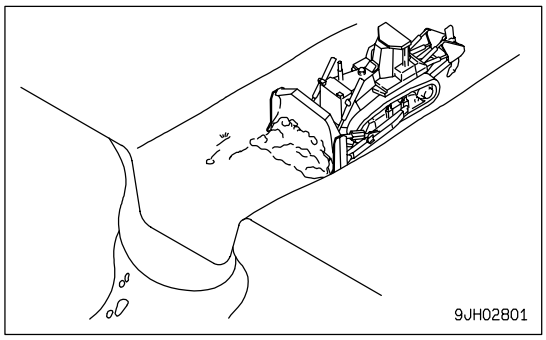
- Speed ranges that can be used: All speed ranges
- Applicable operations: Dozing loose material (suitable for long-distance hauling operations)

When the lock-up mode is turned ON, direct drive or torque converter drive are automatically selected according to the load.

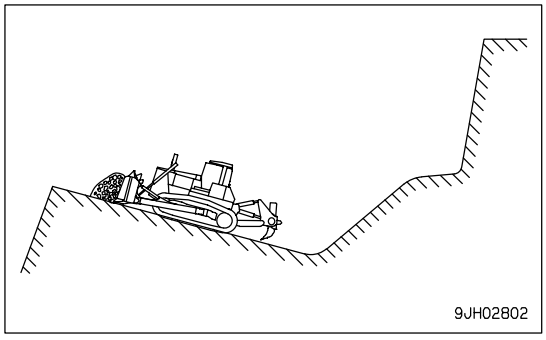


(Example)

- Slot dozing operations

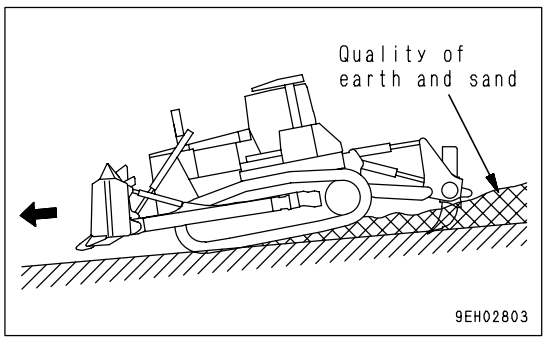


- Hillside dozing operations



REMARK

- If dozing operations power carried out on a slope of an angle of more than 15°, the lock-up may easily be canceled, so operations are easier to carry out in the standard mode.
- For normal ripping operations, if the lock-up mode is used, the lock-up will repeatedly switch between ON and OFF, so use the standard mode or shoe slip control mode.
- Even with ripping operations, if the ground is extremely soft, the lock-up mode can be used.



ECONOMY MODE

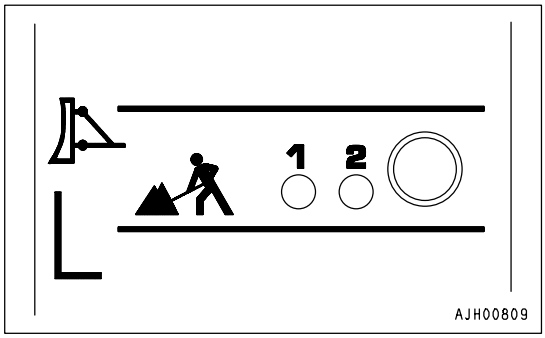
Using the economy mode makes it possible to reduce wasteful shoe slippage and to reduce the fuel consumption.

- Speed ranges that can be used: F1
- Applicable operations: Hauling after ripping, dozing blasted rock, smoothing

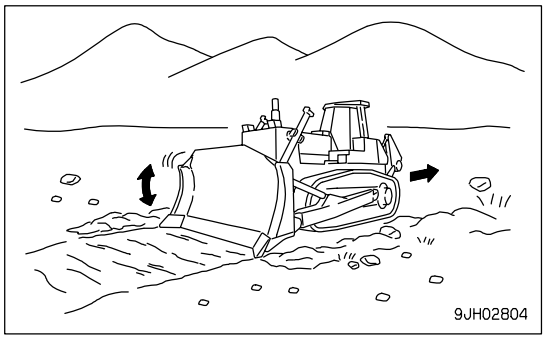
When the economy mode is turned ON, it is automatically set to [1]. Carry out dozing operations in this condition, then set to [2] and carry out operations. From this test, select the matching that gives power and low shoe slip ratio (frequency of deceleration operation).

Mode [1] is set to approx. 90% of full power and mode [2] is set to approx 70%.

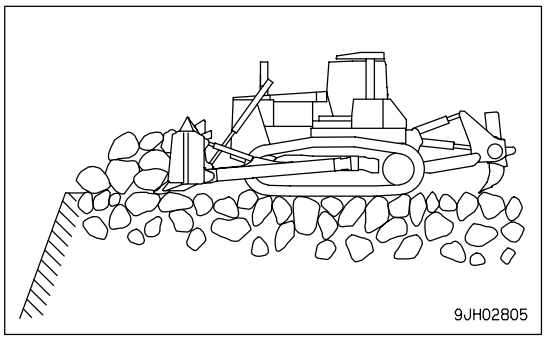
(Example)



- Fine leveling operations



- Ripping and dozing operations



REMARK

- If the shoe slip control switch is turned ON and the ripper is lowered during dozing operations in the standard mode, the system will enter the shoe slip control mode. If this happens, return to the N position, set the speed range to F1, and this will return to the standard mode.
- If the economy mode and shoe slip control switches are turned ON and the ripper is lowered during dozing operations in the economy mode, the system will enter the shoe slip control mode. If this happens, return to the N position, set the speed range to F1, and this will return to the standard mode.

RIPPING OPERATIONS

SHOE SLIP CONTROL

This makes it possible to reduce the frequency of operation of the decelerator pedal by the operator, and contributes to reduction in operator fatigue. It also prevents wasteful shoe slippage, improves the service life of the undercarriage, and reduces fuel consumption.

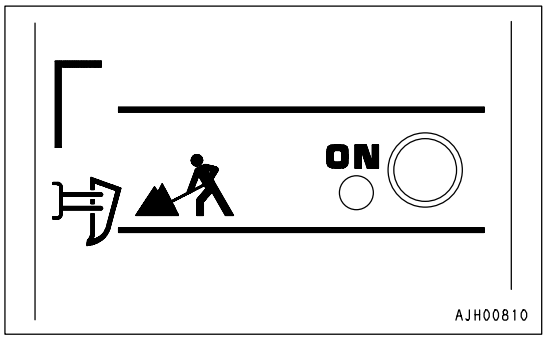
- Speed ranges that can be used: F1
- Applicable operations: Ripping

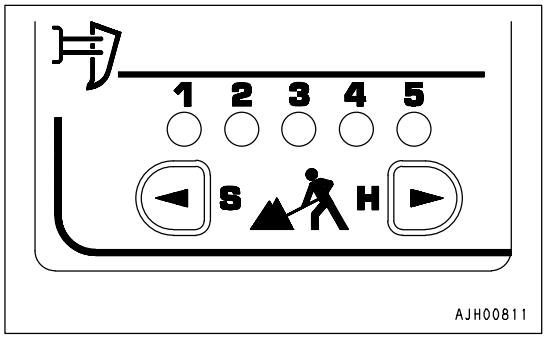
In normal ripping operations, the operator uses the decelerator pedal to control the engine speed while carrying out ripping. If the shoe slip control is turned ON, the shoe slip control system aids the operator in carrying out this control.

When the shoe slip control switch is turned ON, the rock selection mode is automatically set to [3].

Carry out operations in this condition, and if the shoe slip ratio is too high, press a switch in the hard direction to set the mode to [4] or [5].

If the shoe slip ratio is low and there seems to be lack of power, press the switch in the soft direction to set the mode to [2] or [1].

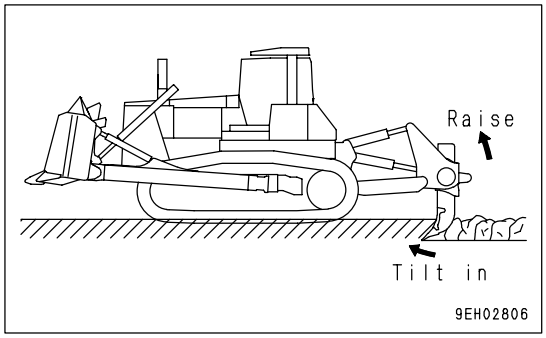


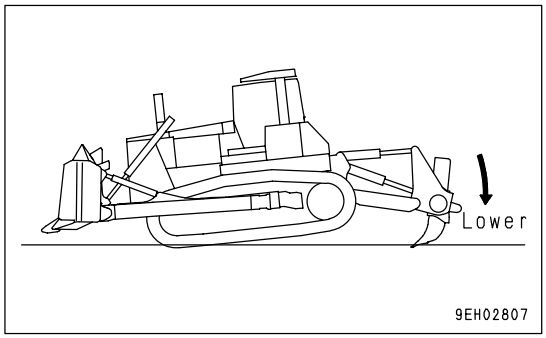


REMARK

- After the joystick is set to F1, the shoe slip control starts when the ripper lever is operated to LOWER or TILT. Even when the operation alternates between dozing and ripping, there is no need to turn the switch ON or OFF.
- With this system, if shoe slippage occurs during ripping operations, the engine speed is lowered to prevent wasteful shoe slippage.

  If shoe slippage occurs during ripping operations and the engine speed goes down, if the ripper lever is operated to TILT IN or RAISE, the engine speed will rise (output is increased) to make it easier to carry out breaking operations.
- When carrying out ripping operations on hard rock, if the rear of the machine comes off the ground and there is sudden shoe slippage, it is possible to reduce the shoe slippage by operating the ripper to LOWER and reducing the engine speed.





REVERSE SLOW MODE

This reduces the travel speed when traveling in reverse, reduces the frequency of operating the deceleration pedal, and improves the riding comfort for the operator.

- Speed ranges that can be used: R1, 2, 3

(If this mode is only necessary when traveling in R2 or R3, it is possible to change the setting of the service mode. To do this, please contact your Komatsu distributor.)

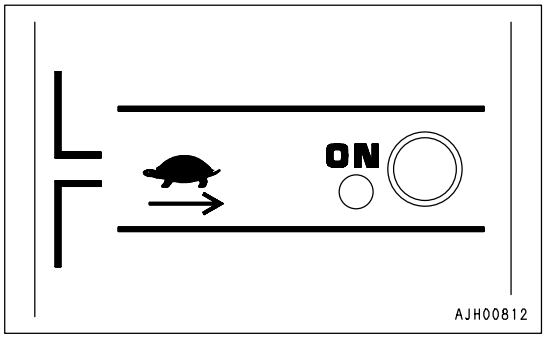
- Applicable operations: Traveling on bedrock, traveling down steep hills

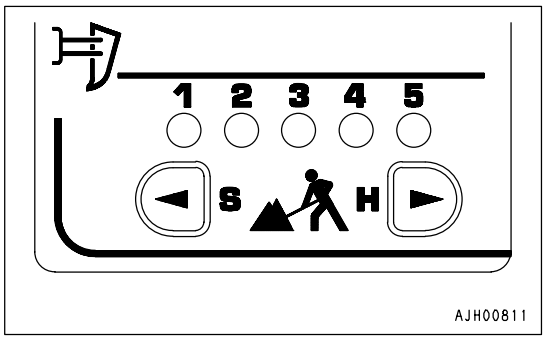
Use this mode to reduce the travel speed when traveling in R1, R2, or R3.

When the reverse slow mode is ON, the travel speed is set to approx. 80% of the full travel speed.

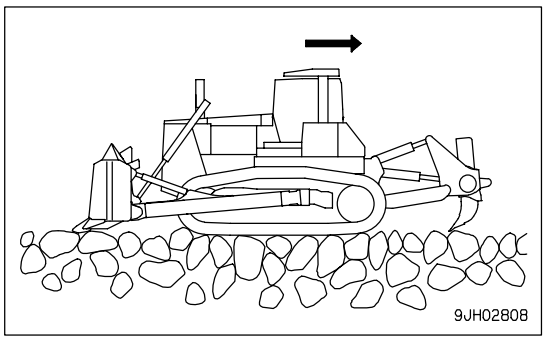
Use this mode to reduce the travel speed when traveling in reverse after ripping and dozing bedrock or when traveling in reverse after dozing on steep slopes. The travel speed differs in each mode according to whether it is used in combination with the economy mode or with shoe slip control.

When using shoe slip control, the travel speed for bedrock setting modes [1] - [5] is set at approx. 70 - 90% of the full travel speed.

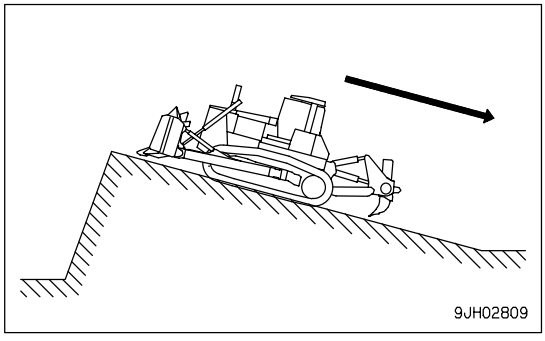




When traveling on bedrock, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.

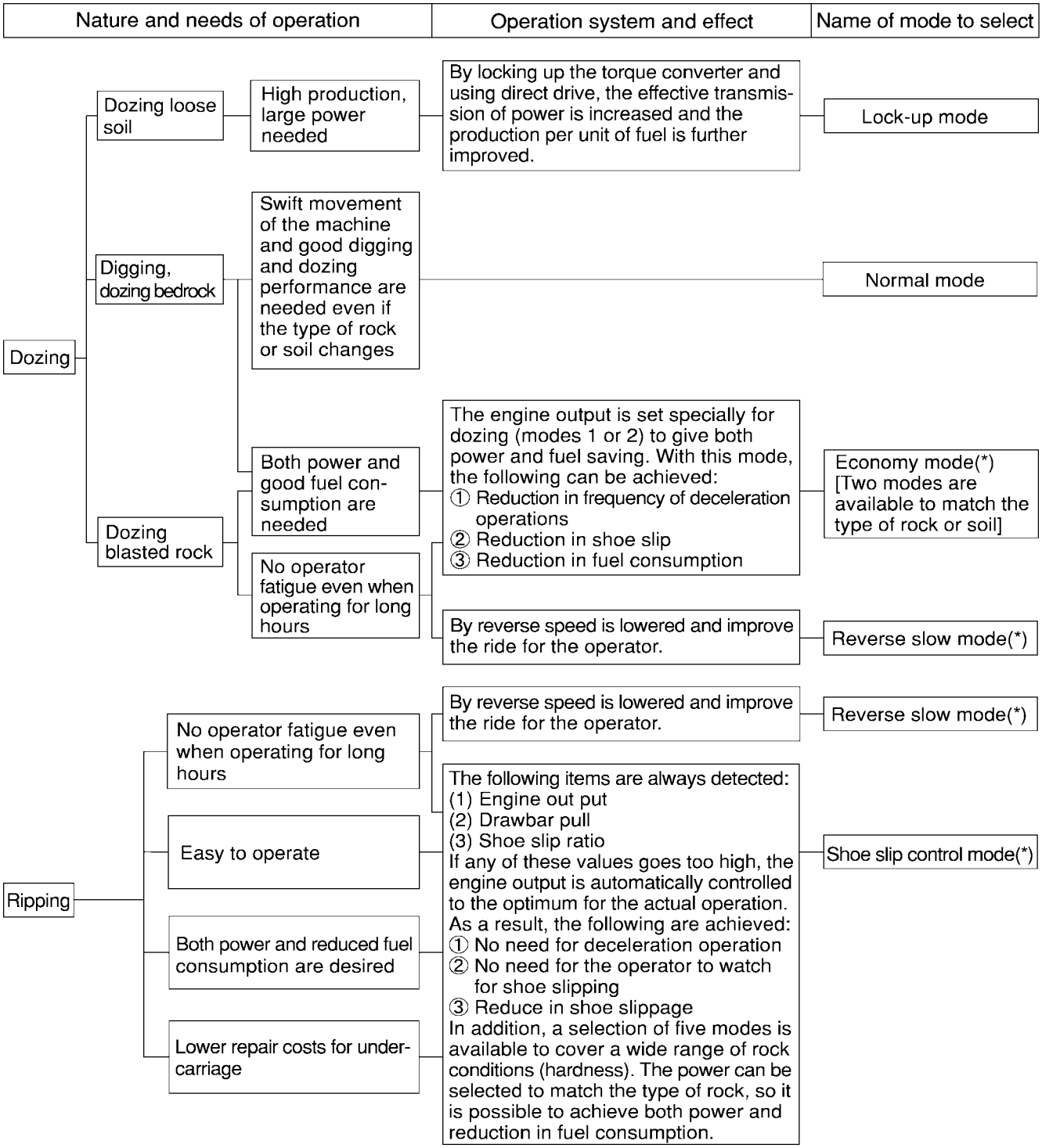


When traveling down slopes, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.



PROCEDURE FOR SELECTING MODE ACCORDING TO NATURE OR NEEDS TO WORK

Use the table below to select the mode that matches the nature or needs of the operation.



(*): The dozing economy mode, reverse slow mode, and ripping shoe slip control mode can all be selected independently or in combination. In addition, it is possible to select and correct as needed, so it is possible to achieve precise matching for various types of operation.

IF MODE SELECTION SYSTEM FLASHES

If the caution lamp flashes, or it becomes impossible to control the engine speed with the fuel control dial or decelerator pedal, stop operation immediately, check the monitor panel display, then contact your Komatsu distributor for repairs.

In addition to the above problems, if any of the problems in the table below occur, there is probably an abnormality in the work equipment lever switch, transmission speed range sensor, or other part, so please contact your Komatsu distributor for repairs.

Mode	Operation	Abnormality
Shoe slip control	Ripping	• When shoe slip occurs, it is impossible to throttle power • Even when there is shoe slippage, it is impossible to control • After slippage stops, it takes a long time for power to recover • It becomes difficult to break rock by operating lever to TILT or RAISE • Travel speed increases when shank is inserted • Travel speed is slow and drawbar pull is lacking • No sense of control, engine stays at full or partial • Chassis flies when starting ripping

INDEX

<A>
ACCUMULATOR, HANDLING ---------- 3- 68
ADJUSTING POSTURE OF WORK EQUIPMENT ---------- 3-125
AIR CONDITIONER, HANDLING ---------- 3- 63
ASHTRAY ---------- 3- 54

<B>
BLADE SERIAL NO. PLATE POSITION ---- 1- 9

<C>
CAP WITH LOCK, HANDLING ---------- 6- 5
  METHOD OF OPENING AND CLOSING CAP WITH LOCK ---------- 6- 5
CAR STEREO, HANDLING ---------- 3- 55
CHECK AFTER FINISHING WORK --------- 3-110
CHECK AFTER STOPPING ENGINE ------- 3- 94
CHECK BEFORE STARTING ENGINE, ADJUST ---------- 3- 69
COLD WEATHER OPERATION ---------- 3-135
  AFTER COLD WEATHER ---------- 3-137
  AFTER COMPLETION OF WORK ------- 3-136
  PRECAUTIONS FOR LOW TEMPERATURE ---------- 3-135
CONTROL LEVERS, PEDALS ---------- 3- 39

<D>
DOOR OPEN LOCK ---------- 3- 53
DOOR POCKET ---------- 3- 54
DUST INDICATOR ---------- 3- 48

<E>
EFECTIVE METHOD OF OPERATION FOR DUAL TILT DOZER ---------- 6- 6
  BLADE CONDITION ---------- 6- 6
  BOULDER RAISING OPERATION ------- 6- 11
  DITCHING OPERATION ---------- 6- 11
  DOZING WORK ---------- 6- 8
  HORIZONTAL DOZING OPERATIONS FROM SIDE SLOPE (ROUGH GROUND) ---------- 6- 12
  LEVELING (SPREADING) OPERATION ---------- 6- 11
  SIDE-CUTTING OPERATIONS ---------- 6- 12
ENGINE SERIAL NO. PLATE AND POSITION ---------- 1- 8
EXPLANATION OF COMPONENTS -------- 3- 5

<F>
FOREWORD ---------- 1- 2
FRONT PANEL ---------- 3- 5
FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE ---------- 1- 7
FUSE BOX ---------- 3- 49
FUSIBLE LINK ---------- 3- 52

<G>
GENERAL PRECAUTIONS ---------- 2- 9
GENERAL PRECAUTIONS ---------- 6- 2
  PRECAUTIONS RELATED TO SAFETY ---------- 6- 2
GENERAL VIEW ---------- 3- 2
  GENERAL VIEW OF CONTROLS AND GAUGES ---------- 3- 3
  GENERAL VIEW OF MACHINE ---------- 3- 2
GUIDES TO MAINTETNANCE ---------- 4- 2

<H>
HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC ---------- 4- 5

<I>
INSTALLATION OF CAB ---------- 3-134
INTRODUCTION ---------- 1- 7

<L>
LOADING, UNLOADING WORK ---------- 3-131
LOCKING ---------- 3-110
LONG-TERM STORAGE ---------- 3-138
  AFTER STORAGE ---------- 3-138
  BEFORE STORAGE ---------- 3-138
  DURING STORAGE ---------- 3-138

<M>
MACHINE SERIAL NO. PLATE AND POSITION ---------- 1- 8
MAINTENANCE SCHEDULE CHART ------ 4- 17
METHOD OF LIFTING MACHINE ---------- 3-132
MOVING MACHINE OFF ---------- 3- 95

<N>
NECESSARY INFORMATION ---------- 1- 8

<O>
OPERATING METHOD FOR RIPPING OPERATIONS ---- 3-121
OPERATION ---- 3- 69
OPERATIONS AND CHECKS AFTER STARTING ENGINE ---- 3- 91
OUTLINE OF ELECTRIC SYSTEM ---- 4- 8
OUTLINES OF SERVICE ---- 4- 5

<P>
PARKING MACHINE ---- 3-108
PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS ---- 4- 15
POSITIONF OF SERVICE METER ---- 1- 9
POWER SOURSE ---- 3- 48
PRECAUTIONS FOR LOADING ---- 3-131
PRECAUTIONS FOR MAINTENANCE ---- 2- 27
PRECAUTIONS FOR OPERATION ---- 2- 17
  BATTERY ---- 2- 24
  BEFORE STARTING ENGINE ---- 2- 17
  OPERATION ---- 2- 19
  TOWING ---- 2- 26
  TRANSPORTATION ---- 2- 23
PRECAUTIONS FOR OPERATION ---- 3-106
PRECAUTIONS FOR TRANSPORTATION ---- 3-133
PROCEDURE FOR SELECTING RIPPER POINT ---- 6- 4
  PROCEDURE FOR SELECTING RIPPER POINT ---- 6- 4

<R>
REMOVAL OF CAB ---- 3-133
RIPPER OPERATION ---- 3-118
RIPPER SERIAL NO. PLATE POSITION --- 1- 9

<S>
SAFETY ---- 2- 2
SAFETY CRITICAL PARTS ---- 4- 16
SAFETY INFORMATION ---- 1- 5
SAFETY LABELS ---- 2- 4
  POSITIONS OF SAFETY PICTOGRAMS ---- 2- 4
  SAFETY LABELS ---- 2- 5
SASH GLASS INTERMEDIATE LOCK ---- 3- 53
SELECTION OF TRACK SHOE ---- 6- 3
  SELECTION OF TRACK SHOES ---- 6- 3
SERVICE PROCEDURE ---- 4- 19
  CHECK BEFORE STARING ---- 4- 44
  EVERY 1000 HOURS SERVICE ---- 4- 57
  EVERY 2000 HOURS SERVICE ---- 4- 62
  EVERY 250 HOURS SERVICE ---- 4- 45
  EVERY 4000 HOURS SERVICE ---- 4- 67
  EVERY 500 HOURS SERVICE ---- 4- 52
  INTIAL 250 HOURS SERVICE(ONLY AFTER THE FIRST 250 HOURS) ---- 4- 19
  WHEN REQUIRED ---- 4- 20
SHIFTING BETWEEN FORWARD AND REVERSE ---- 3-101
SHIFTING GEAR ---- 3- 98
SHOE SLIP CONTROL ---- 6- 13
  EFECTIVE USE OF MODE SELECTION SYSTEM ---- 6- 15
  IF MODE SELECTION SYSTEM FLASHES ---- 6- 21
  MODE SELECTION SWITCH PANEL (SHOE SLIP CONTROL) ---- 6- 13
SPECIFICATIONS ---- 5- 2
STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS ---- 4- 14
STARTING ENGINE ---- 3- 87
STEERING MACHINE ---- 3-103
STOPPING ENGINE ---- 3- 94
STOPPING MACHINE ---- 3- 97
SWITCH ---- 3- 35

<T>
TABLE OF ENTER SERIAL NO. AND DISTRIBUTOR ---- 1- 10
TIPS FOR LONGER UNDERCARRIAGE LIFE ---- 3-129
TOOL BOX ---- 3- 54
TORQUE LIST ---- 4- 14
TRANSPORTATION ---- 3-131
TRANSPORTATION PROCEDURE ---- 3-131
TRAVELING ON ROADS ---- 3-133
TROUBLESHOOTING ---- 3-139
  AFTER RUNNING OUT OF FUEL ---- 3-139
  IF BATTERY IS DISCHARGED ---- 3-140
  METHOD OF TOWING MACHINE ---- 3-139
  OTHER TROUBLE ---- 3-143
  WHEN MODE SELECTION SYSTEM FLASHES ---- 3-148

<U>
USE OF FUEL, COOLANT AND
LUBRICANTS ACCORDING TO
AMBIENT TEMPERATURE ---------- 4- 10
PROPER SELECTION OF FUEL,
COOLANT AND LUBRICANTS ---------- 4- 10

<W>
WEAR PARTS LIST ---------- 4- 9
WEAR PARTS LIST ---------- 4- 9
WORK POSSIBLE USING BULLDOZER --- 3-111

D475A-3 BULLDOZER (PALM CONTROL SPECIFICATION)

Form No. SEAM046800T