

# Operation & Maintenance Manual

CRAWLER  
CARRIER

# CD60R-1

SERIAL NUMBERS 2012 and up

## NOTICE

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

## WARNING

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

# KOMATSU

# 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.**

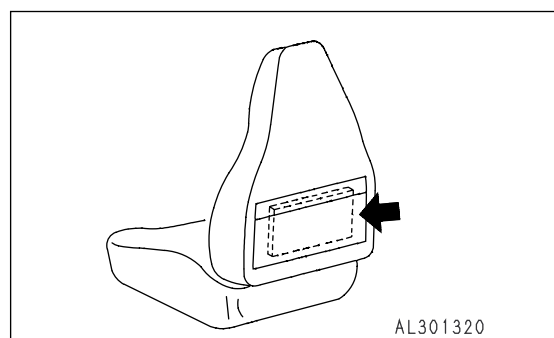
**If this manual has been lost or has become dirty and cannot be read, request a replacement manual immediately from Komatsu or your Komatsu distributor.**

**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.**

Storage location for the Operation and Maintenance Manual:

Back pocket of operator's seat



## EMISSION CONTROL WARRANTY

## EMISSION CONTROL WARRANTY STATEMENT (APPLIES TO CANADA ONLY)

## 1. Products Warranted

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

## 2. Coverage

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

## 3. Limitations

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

**KOMATSU IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

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

## GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS

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

## 1. Produits garantis:

Komatsu America International Company, Komatsu Mining Systems Inc. et Komatsu Utility Corporation (collectivement Komatsu) produisent et/ou font la mise en marché de produits portant les noms de marque Komatsu, Dresser, Dressta, Haulpak et Galion. Cette garantie sur les émissions s'applique à tous les nouveaux moteurs portant le nom Komatsu, installés dans ces produits et utilisés au Canada dans des machines conçues pour utilisation industrielle non-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-relées au moteur, des dépenses encourues suite aux temps d'arrêts, des dommages relatifs, amendes, et de tout autre coût d'affaires ou autres pertes résultant d'un bris couvert par la garantie.

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

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

**INFORMATION IMPORTANTE SUR LE MOTEUR**

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

**AVERTISSEMENT**

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

**IMPORTANT ENGINE INFORMATION**

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

**WARNING**

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

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

MODÈLE DU MOTEUR

FAMILLE DU MOTEUR

SYSTÈME DE CONTRÔLE DES ÉMISSIONS D'ÉCHAPPEMENT

CHARGE DE SORTIE ADV.

PORTÉE DE VALVE À FROID (mm)

VITESSE STATIQUE

RÉGLAGE DE L'ALLUMAGE - INJECTION INITIALE

DEG. BTDC

NO. SÉRIE

DÉPLACEMENT

LITRES

SÉQUENCE DE MISE À FEU

mm<sup>3</sup>/BATTEMENT

TAUX D'ESSENCE À ADV.

LIMITÉ D'ÉMISSION DE LA FAMILLE

DATE DE FABRICATION

KOMATSU LTD.  
FABRIQUÉ AU JAPON

ENGINE DATAPLATE - ENGLISH / FRENCH

# SAFETY INFORMATION

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

## Signal words

The following signal words are used to inform you that there is a potential hazardous situation that may lead to personal injury or damage.

In this manual and on machine labels, the following signal words are used to express the potential level of hazard.

**⚠ DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to most extreme situations.

**⚠ 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. It may also be used to alert against unsafe practices.

## Example of safety message using signal word

**⚠ WARNING**

**To avoid hitting unlocked operation levers, lower equipment to ground and move SAFETY LOCK LEVER (located near seat) to LOCK position before starting up from operator's seat. Sudden and unwanted machine movement can cause 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 are 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.

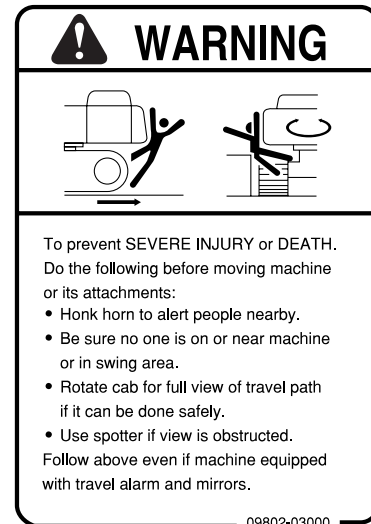
**REMARKS** This gives information that is useful to know.

### 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.

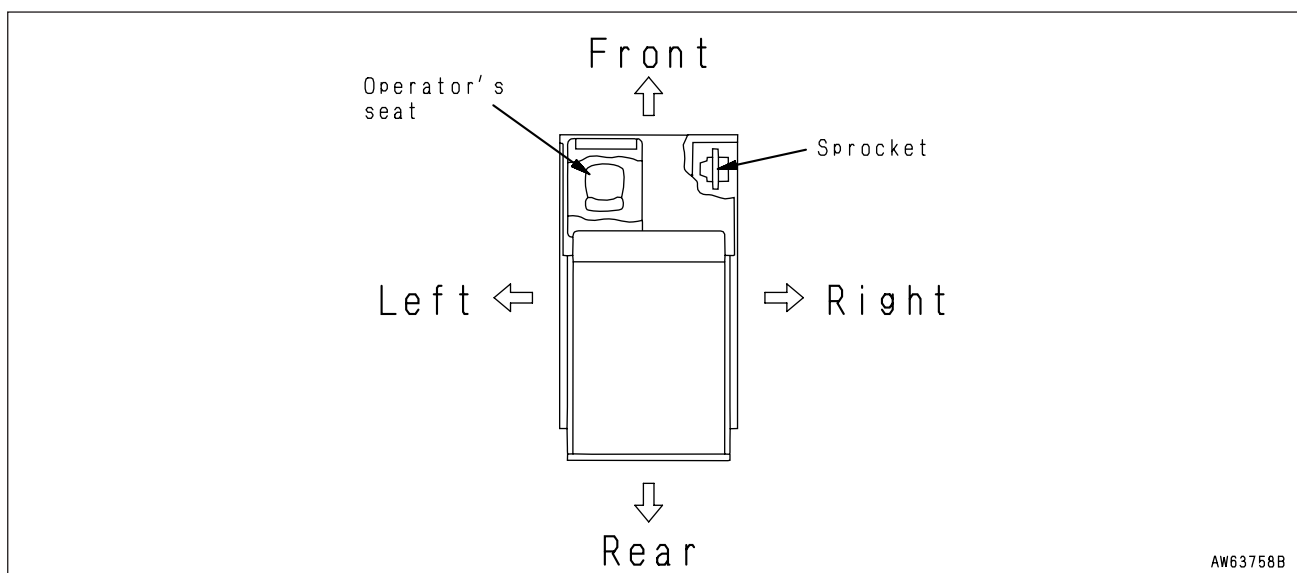
The numbers in circles in the illustrations correspond to the numbers in ( ) in the text. (For example: ① → (1))

# INTRODUCTION

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

- Hauling soil

## 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.

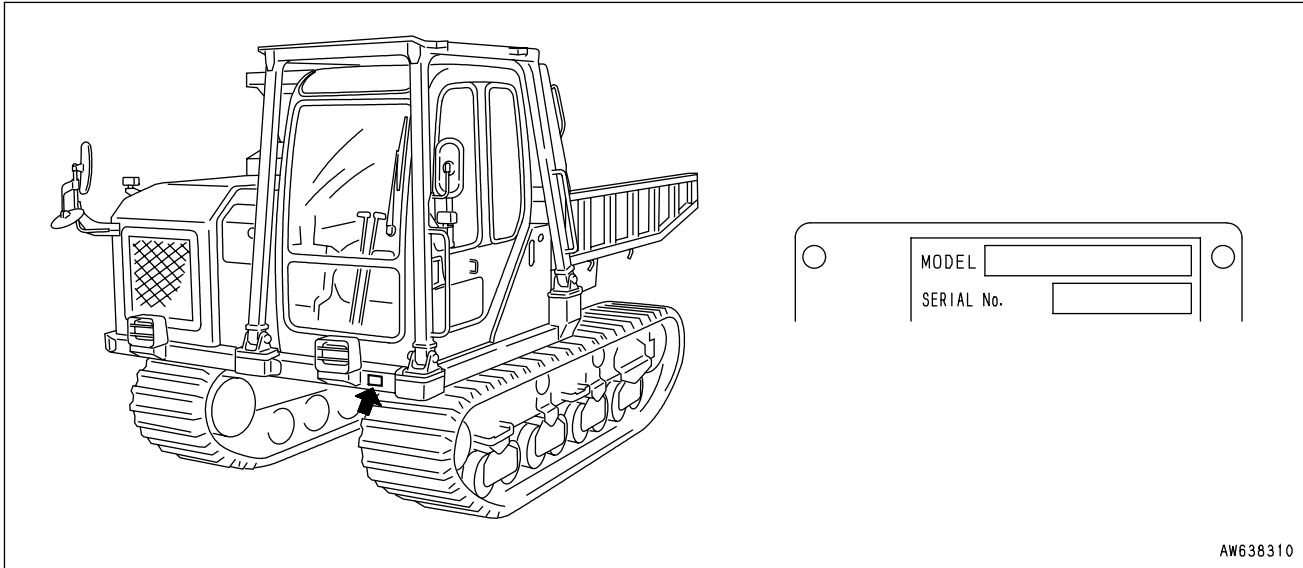


# NECESSARY INFORMATION

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

## MACHINE SERIAL NO. PLATE AND POSITION

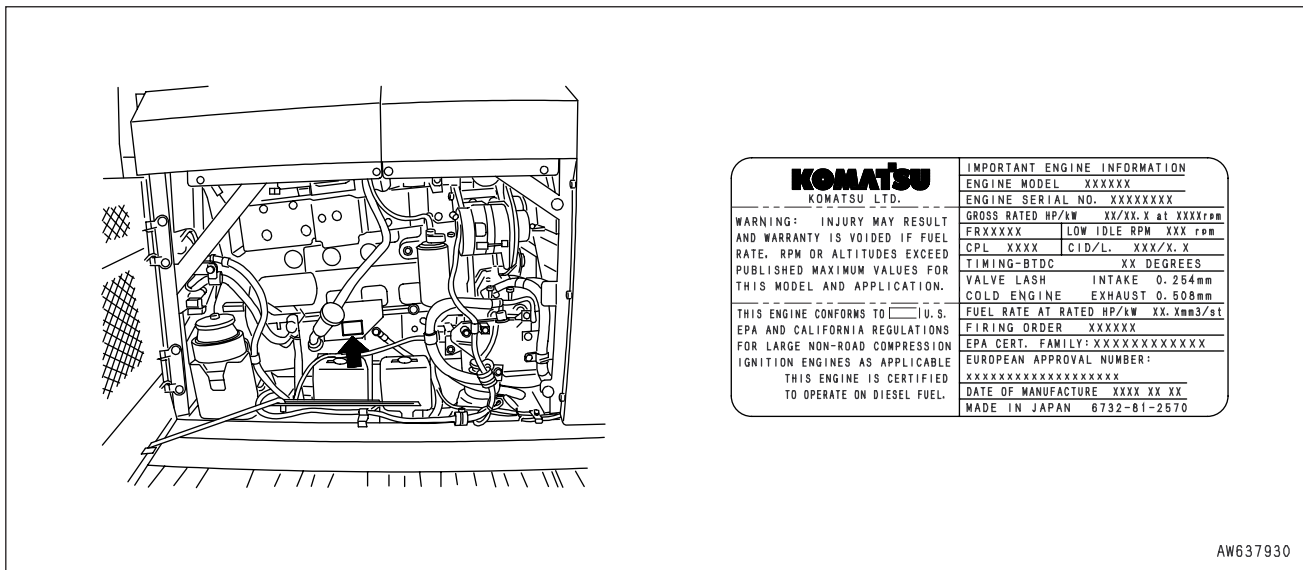
This is at the right bottom of cab.



AW638310

## ENGINE SERIAL NO. PLATE AND POSITION

This is at the right side of engine block.



AW637930

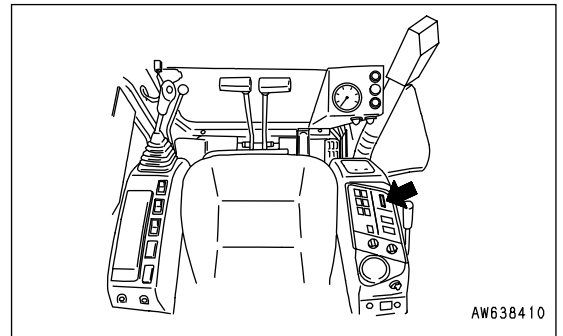
<b>KOMATSU</b> KOMATSU LTD.		<b>IMPORTANT ENGINE INFORMATION</b>	
ENGINE MODEL		XXXXXX	
ENGINE SERIAL NO.		XXXXXXXXXX	
GROSS RATED HP/kW		XX/XX.X at XXXXrpm	
FRXXXXX		LOW IDLE RPM XXX rpm	
CPL XXXX		CID/L. XXX/X.X	
TIMING-BTDC		XX DEGREES	
VALVE LASH		INTAKE 0.254mm	
COLD ENGINE		EXHAUST 0.508mm	
FUEL RATE AT RATED HP/kW		XX.Xmm <sup>3</sup> /st	
FIRING ORDER		XXXXXX	
EPA CERT. FAMILY:		XXXXXXXXXXXXXX	
EUROPEAN APPROVAL NUMBER:		XXXXXXXXXXXXXXXXXX	
DATE OF MANUFACTURE		XXXX XX XX	
MADE IN JAPAN		6732-81-2570	

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

THIS ENGINE CONFORMS TO  U.S. EPA AND CALIFORNIA REGULATIONS FOR LARGE NON-ROAD COMPRESSION IGNITION ENGINES AS APPLICABLE. THIS ENGINE IS CERTIFIED TO OPERATE ON DIESEL FUEL.

## POSITION OF SERVICE METER

On top of machine monitor



## TABLE OF ENTER SERIAL NO. AND DISTRIBUTOR

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

# CONTENTS

## FOREWORD

<b>FOREWORD</b> .....	1-2
<b>SAFETY INFORMATION</b> .....	1-5
<b>INTRODUCTION</b> .....	1-7
FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE .....	1-7
<b>NECESSARY INFORMATION</b> .....	1-8
MACHINE SERIAL NO. PLATE AND POSITION .....	1-8
ENGINE SERIAL NO. PLATE AND POSITION .....	1-8
POSITION OF SERVICE METER .....	1-9
TABLE OF ENTER SERIAL NO. AND DISTRIBUTOR .....	1-9

## SAFETY

<b>SAFETY</b> .....	2-2
<b>SAFETY LABELS</b> .....	2-4
POSITIONS OF SAFETY PICTOGRAMS .....	2-5
SAFETY LABELS .....	2-6
<b>GENERAL PRECAUTIONS</b> .....	2-13
<b>PRECAUTIONS FOR OPERATION</b> .....	2-23
BEFORE STARTING ENGINE .....	2-23
AFTER STARTING ENGINE .....	2-25
TRANSPORTATION .....	2-30
BATTERY .....	2-31
TOWING .....	2-33
<b>PRECAUTIONS FOR MAINTENANCE</b> .....	2-34

## OPERATION

<b>GENERAL VIEW</b> .....	3-2
GENERAL VIEW OF MACHINE .....	3-2
GENERAL VIEW OF CONTROLS AND GAUGES .....	3-3
<b>EXPLANATION OF COMPONENTS</b> .....	3-4
MACHINE MONITOR .....	3-4
INCLINOMETER .....	3-11
SWITCHES .....	3-12

CONTROL LEVERS AND PEDALS .....	3-16
WINDSHIELD .....	3-20
LOWER WINDSHIELD .....	3-23
SLIDING WINDOW.....	3-23
DOOR LOCK .....	3-23
EMERGENCY ESCAPE HAMMER .....	3-24
CAP, COVER WITH LOCK.....	3-25
BODY SUPPORT ROD .....	3-26
FUSE .....	3-27
FUSIBLELINK.....	3-28
POWER SUPPLY TAKE-OFF PORT .....	3-28
TOOL BOX.....	3-28
OPERATION MANUAL STORAGE .....	3-29
GREASE GUN HOLDER.....	3-29
HANDLING ACCUMULATOR.....	3-30
CAR HEATER AND DEFROSTER CONTROLS .....	3-32
<b>OPERATION.....</b>	<b>3-34</b>
CHECK BEFORE STARTING ENGINE, ADJUST.....	3-34
STARTING ENGINE .....	3-47
OPERATIONS AND CHECKS AFTER STARTING ENGINE .....	3-50
STOPPING ENGINE.....	3-53
CHECK AFTER STOPPING ENGINE .....	3-53
MACHINE OPERATION .....	3-54
STEERING MACHINE .....	3-58
SWINGING .....	3-60
OPERATING DUMP BODY.....	3-61
PROHIBITIONS FOR OPERATION .....	3-62
PRECAUTIONS FOR OPERATION.....	3-63
PRECAUTIONS WHEN TRAVELING UP OR DOWN HILLS.....	3-64
PARKING MACHINE .....	3-67
CHECK AFTER FINISHING WORK.....	3-69
LOCKING.....	3-69
HANDLING RUBBER SHOES.....	3-70
<b>TRANSPORTATION.....</b>	<b>3-74</b>
LOADING, UNLOADING WORK .....	3-74
LIFTING MACHINE.....	3-78
<b>COLD WEATHER OPERATION .....</b>	<b>3-79</b>
PRECAUTIONS FOR LOW TEMPERATURE.....	3-79
AFTER COMPLETION OF WORK .....	3-81
AFTER COLD WEATHER.....	3-81
<b>LONG-TERM STORAGE.....</b>	<b>3-82</b>
BEFORE STORAGE.....	3-82
DURING STORAGE .....	3-82
AFTER STORAGE.....	3-82

**TROUBLESHOOTING**..... 3-83

    AFTER RUNNING OUT OF FUEL..... 3-83

    TOWING THE MACHINE ..... 3-83

    LIGHT-WEIGHT TOWING HOOK ..... 3-83

    IF BATTERY IS DISCHARGED ..... 3-84

    OTHER TROUBLE ..... 3-88

**MAINTENANCE**

**GUIDE TO MAINTENANCE** ..... 4-2

**OUTLINE OF SERVICE**..... 4-5

    HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC..... 4-5

    RELATING TO ELECTRIC SYSTEM ..... 4-9

    HANDLING HYDRAULIC SYSTEM..... 4-9

**WEAR PARTS** ..... 4-10

    WEAR PARTS LIST..... 4-10

**RECOMMENDED FUEL, COOLANT, AND LUBRICANT** ..... 4-11

    RECOMMENDED BRANDS, RECOMMENDED QUALITY FOR PRODUCTS OTHER THAN KOMATSU  
    GENUINE OIL..... 4-13

**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 ..... 4-19

    WHEN REQUIRED ..... 4-20

    CHECK BEFORE STARTING ..... 4-30

    EVERY 100 HOURS SERVICE ..... 4-31

    EVERY 250 HOURS SERVICE ..... 4-34

    EVERY 500 HOURS SERVICE ..... 4-40

    EVERY 1000 HOURS SERVICE ..... 4-45

    EVERY 2000 HOURS SERVICE ..... 4-46

    EVERY 4000 HOURS SERVICE ..... 4-49

**SPECIFICATIONS**

**SPECIFICATIONS** ..... 5-2

**ATTACHMENTS, OPTIONS**

**CAR COOLER**..... 6-2

    CONTROL PANEL AND COMPONENTS ..... 6-2

    PRECAUTION WHEN USING ..... 6-3

    CAR COOLER MAINTENANCE ..... 6-3

**INDEX** ..... 7-1



# SAFETY

## WARNING

Please be sure that you fully understand this manual and the precautions related to safety for the machine. When operating or servicing the machine, always follow these precautions strictly.

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# SAFETY

SAFETY LABELS.....	2-4
POSITIONS OF SAFETY PICTOGRAMS .....	2-5
SAFETY LABELS.....	2-6
GENERAL PRECAUTIONS .....	2-13
SAFETY RULES .....	2-13
IF ABNORMALITIES ARE FOUND .....	2-13
CLOTHING AND PERSONAL PROTECTIVE ITEMS .....	2-13
FIRE EXTINGUISHER AND FIRST AID KIT .....	2-13
SAFETY FEATURES.....	2-14
KEEP MACHINE CLEAN.....	2-14
INSIDE OPERATOR'S COMPARTMENT.....	2-14
ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT .....	2-15
HANDRAILS AND STEPS .....	2-16
MOUNTING AND DISMOUNTING .....	2-17
PREVENTION OF BURNS .....	2-17
FIRE PREVENTION .....	2-18
ACTION IF FIRE OCCURS .....	2-19
WINDOW WASHER LIQUID .....	2-19
CAB WINDOW GLASS.....	2-19
PROTECTION FROM FALLING OBJECTS, FLYING OBJECTS, AND INTRUDING OBJECTS.....	2-19
PRECAUTIONS WHEN USING ROPS (Roll Over Protective Structure).....	2-19
PRECAUTIONS FOR ATTACHMENTS .....	2-20
UNAUTHORIZED MODIFICATION .....	2-20
SAFETY AT WORKSITE .....	2-20
WORKING ON LOOSE GROUND.....	2-20
DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES .....	2-21
ENSURE GOOD VISIBILITY .....	2-21
VENTILATION FOR ENCLOSED AREAS.....	2-22
CHECKING SIGNALMAN'S SIGNALS AND SIGNS .....	2-22
EMERGENCY EXIT FROM OPERATOR'S CAB .....	2-22
BE CAREFUL ABOUT ASBESTOS DUST.....	2-22

PRECAUTIONS FOR OPERATION ..... 2-23

    BEFORE STARTING ENGINE ..... 2-23

        CHECKS BEFORE STARTING ENGINE ..... 2-23

        PRECAUTIONS WHEN STARTING ..... 2-24

        PRECAUTIONS IN COLD AREAS ..... 2-24

    AFTER STARTING ENGINE ..... 2-25

        CHECKS AFTER STARTING ENGINE ..... 2-25

        PRECAUTIONS WHEN CHANGING DIRECTION ..... 2-25

        PRECAUTIONS WHEN TRAVELING ..... 2-26

        TRAVELING ON SLOPES ..... 2-27

        PRECAUTIONS WHEN OPERATING DUMP BODY ..... 2-27

        OPERATIONS ON SLOPES ..... 2-28

        PROHIBITED OPERATIONS ..... 2-28

        OPERATE CAREFULLY ON SNOW ..... 2-28

        PARKING MACHINE ..... 2-29

    TRANSPORTATION ..... 2-30

        LOADING AND UNLOADING ..... 2-30

        SHIPPING ..... 2-30

    BATTERY ..... 2-31

        BATTERY HAZARD PREVENTION ..... 2-31

        STARTING WITH BOOSTER CABLE ..... 2-32

    TOWING ..... 2-33

        WHEN TOWING ..... 2-33

PRECAUTIONS FOR MAINTENANCE ..... 2-34

    WARNING TAG ..... 2-34

    KEEP WORK PLACE CLEAN AND TIDY ..... 2-34

    APPOINT LEADER WHEN WORKING WITH OTHERS ..... 2-34

    STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE ..... 2-35

    TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING ..... 2-35

    PROPER TOOLS ..... 2-36

    ACCUMULATOR ..... 2-36

    PERSONNEL ..... 2-36

    PRECAUTIONS FOR WORK UNDER MACHINE ..... 2-36

    NOISE ..... 2-37

    PRECAUTIONS WHEN USING HAMMER ..... 2-37

    REPAIR WELDING ..... 2-37

    REMOVING BATTERY TERMINAL ..... 2-37

    PRECAUTIONS WHEN USING HIGH-PRESSURE GREASE TO ADJUST TRACK TENSION ..... 2-38

    DO NOT DISASSEMBLE RECOIL SPRING ..... 2-38

    PRECAUTION WITH HIGH-PRESSURE OIL ..... 2-39

    HANDLING HIGH-PRESSURE HOSES ..... 2-39

    WASTE MATERIAL ..... 2-39

    MAINTENANCE FOR CAR COOLER ..... 2-40

    COMPRESSED AIR ..... 2-40

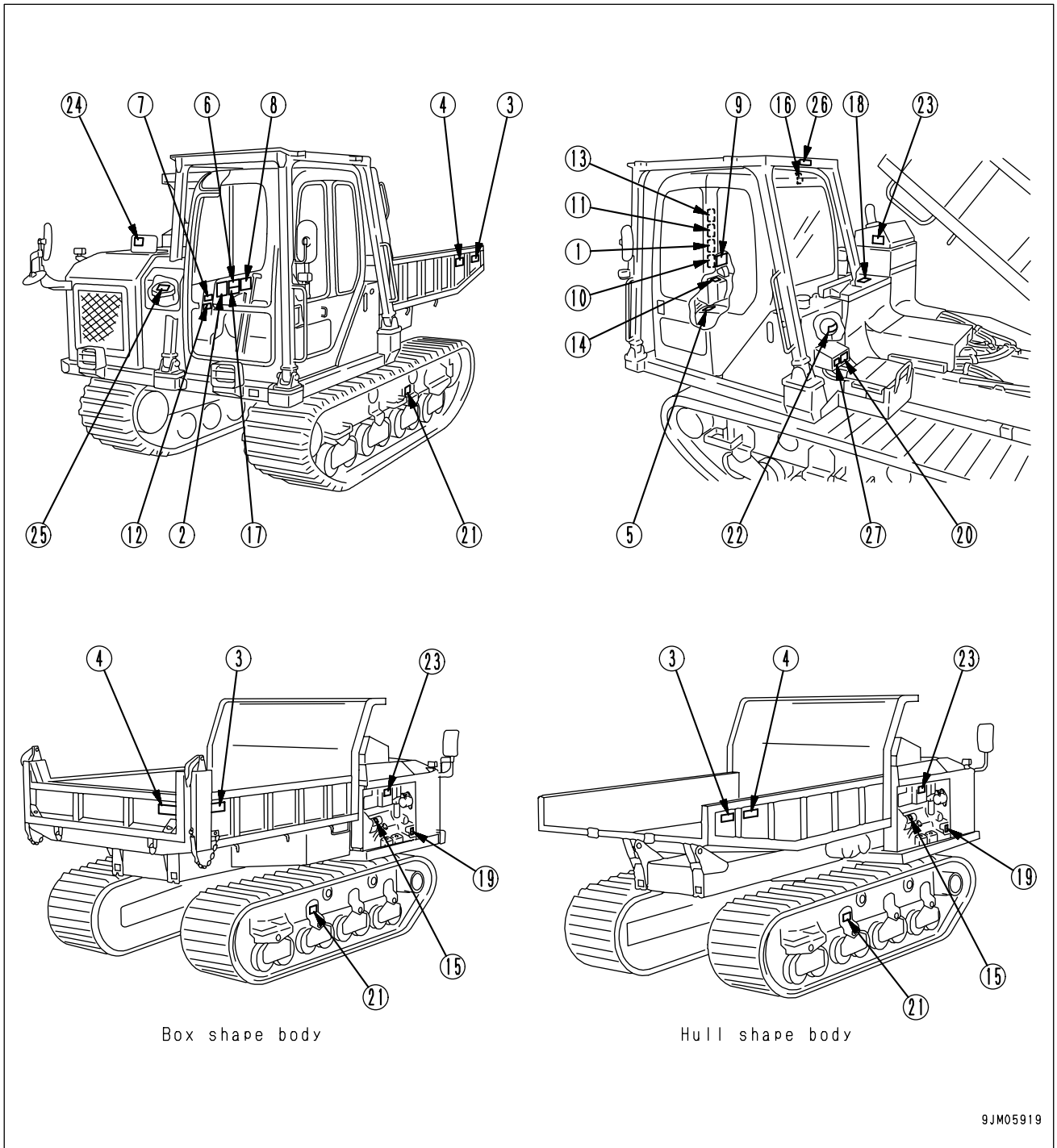
    PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS ..... 2-40

# SAFETY LABELS

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

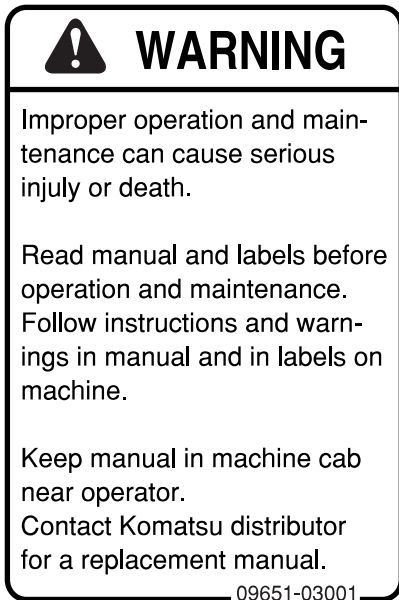
- Be sure that you fully understand the correct position and content of labels.
- To ensure that the content of labels can be read properly. Be sure that they are in the correct place and always keep them clean. When cleaning them, do not use organic solvents or gasoline, there may cause the labels to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

# POSITIONS OF SAFETY PICTOGRAMS

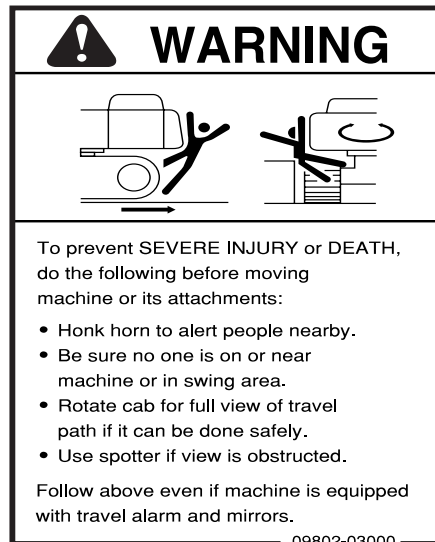


# SAFETY LABELS

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



(2) Precautions for before operation (09802-03000)



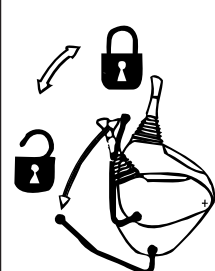
(3) Prohibition for entering swing range (20M-98-73130)



(4) Caution for approach when machine moving (09812-13000)



- (5) Use the safety lock lever when engaging or disengaging the safety lock (13S-00-15340)



**WARNING**

Only hold safety lock lever and do not touch swing lever to lock or unlock the machine movement. Unintended swing may cause serious injury.

13S-00-15340

- (6) Precautions for operation (10S-00-22243)




**WARNING**

**Lower dump body and lock safety lock lever (located on left side of seat) before standing up.**

**Moving unlocked levers can cause sudden and unwanted machine movement.**

13S-00-15270

- (7) Precautions for operation (10S-00-22243)




**WARNING**

To prevent severe injury or death:

1. Before swinging the upper structure of the machine, check in all directions to be sure it can be done safely.
2. Operate the travel levers carefully:
  - When the sprocket is under the cab, push levers forward to move forward.
  - When the sprocket is to the rear of the cab, pull levers to the rear to move forward.
3. Only dump if machine is on level, firm ground.
4. Unless dumping, keep dump body control pedal locked by using lock cover.

10S-00-22243

- (8) Precautions for traveling slope (14S-00-23221)




**WARNING**

Traveling on a slope could cause tipover or rollover, resulting in serious injury or death. Observe the following precautions:


- Never overload dump body.
- Never operate on a slope of more than 15° with or without a load.
- On a slope of more than 10° , drive straight and set the travel speed selector switch to "Low" while opening the engine throttle less than half way.
- Only travel UP or DOWN on a slope. Do not drive across a slope.
- When driving DOWN with a load, go slower as the slope becomes steeper.
- When stopping on a slope, slowly return the travel lever.
- See Operation and Maintenance Manual for more safety precautions.

14S-00-23221

(9) Precautions on slope  
(10S-00-23610)




## WARNING




Traveling on a slope could cause tipover or rollover resulting in serious injury or death. Do not operate machine with or without a load on a slope of more than 15°. On slopes of more than 10°, drive in low speed and half-throttle.

14S-00-23610

(10) Warnings for traveling over obstacles  
(13S-00-15250)



## WARNING




To prevent tip-over and damage, do the following when traveling:


- Always wear seatbelt.
- Lower dump body before starting to travel.
- On rough terrain, travel slowly and avoid sudden changes in direction.
- Avoid traveling over obstacles such as rocks. If it is necessary, do so at very low speed.

13S-00-15250

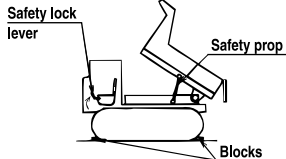
(11) Warnings for wall down of dump body  
(13S-00-15280)



## WARNING



To prevent serious injury or death while working under dump body, after raising dump body:



1. Empty contents of dump body.
2. Lock safety lock lever.
3. Install a safety prop between frame and dump body to prevent dump body from falling.
4. Put block under track shoes to prevent machine from moving.

13S-00-15280

(12) Precautions for operating the machine with dump pedal (10S-00-22332)


## NOTICE

- After checking or maintaining the machine with the state of lifting. Take down the body after removing the body fall preventing safety prop.
- The operation of the machine with the prop not removed result in breakage of the body and safety prop.

10S-00-22332

(13) Precautions for going close to electric cables  
(14S-00-13230)

**⚠ DANGER**



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

Voltage		Safe Distance
LOW Voltage	100V 200V	2 m
	6,600V	2 m
	22,000V	3 m
SPECIAL HIGH Voltage	66,000V	4 m
	154,000V	5 m
	187,000V	6 m
	275,000V	7 m
	500,000V	11 m

14S-00-13230

(14) Precautions for handling brake switch  
(13S-00-15240)

**⚠ CAUTION**

**Emergency brake will stop  
machine suddenly.  
Use only in an emergency.**

13S-00-15240

(15) Jump start prohibited  
(09842-A0481)



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

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

(16) Precautions for stowage  
(09803-03000)

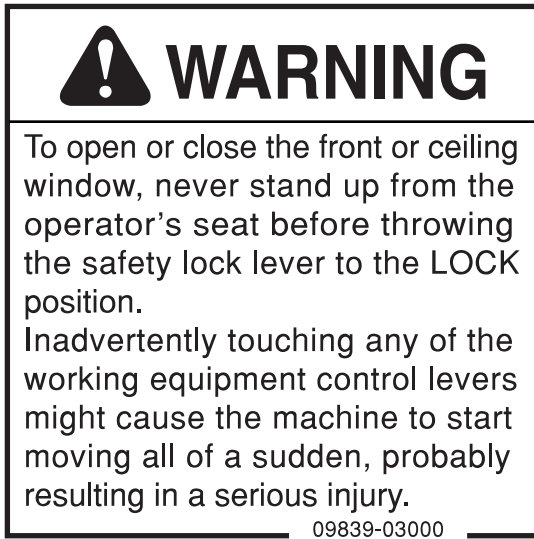
**⚠ WARNING**

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

09803-03000



- (17) Precautions for opening the window  
(09839-03000)



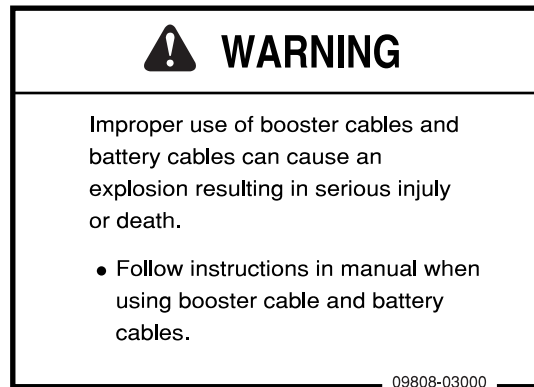
- (18) Precautions for avoiding falling down  
(09805-13000)





- (19) Precautions for opening engine hood  
(09667-03001)



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



(21) Precautions for check and adjust track tension  
(09657-03003)

	<b>WARNING</b>	
<p>Compressed spring lubricator and grease are under hazardous high pressure and can cause serious injury or death.</p> <ul style="list-style-type: none"> <li>• When adjusting track tension only turn lubricator ONE TURN turning lubricator further could cause lubricator and grease to fly off and hurt you.</li> </ul> <p>See manual for adjustment instructions.</p> <ul style="list-style-type: none"> <li>• When loosening track shoe, if it dose not loosen after turning lubricator ONE TURN ask Komatsu dealer or distributor to disassemble.</li> </ul>		
09657-03003		

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

	<b>WARNING</b>	<p>Explosion hazard</p> <ul style="list-style-type: none"> <li>• Keep away from flame</li> <li>• Do not weld or drill</li> </ul>
09659-53000		


(23) Precautions for high temperature parts  
(09817-A0753)

	
09817-A0753	

When touching at high temperature portion during operation or immediately after stopping operation causing burns.

Do not touch at high temperature portions of the machine.

(24) Precautions for high-temperature hydraulic oil  
(09668-03001)

	<b>WARNING</b>
<p>Hot water hazard.</p> <p>To prevent hot water from spurting out:</p> <ul style="list-style-type: none"> <li>• Turn engine of.</li> <li>• Allow water to cool.</li> <li>• Slowly loosen cap to relieve pressure before removing.</li> </ul>	
09668-03001	

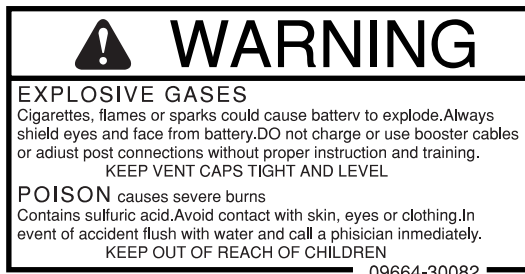
(25) Precautions for high-temperature hydraulic oil  
(09653-03001)



(26) Warnings for ROPS, FOPS  
(09620-30201)



(27) Precautions when handling batter  
(09664-30082)



# GENERAL PRECAUTIONS

## SAFETY RULES

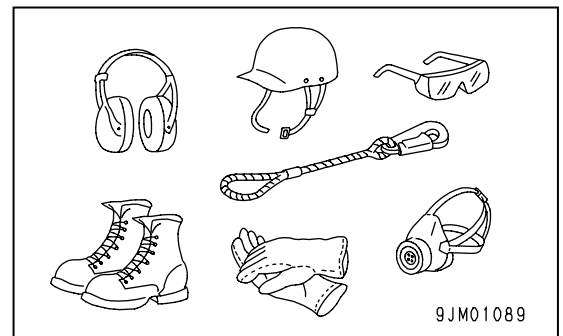
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine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

## IF ABNORMALITIES ARE FOUND

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

## CLOTHING AND PERSONAL PROTECTIVE ITEMS

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

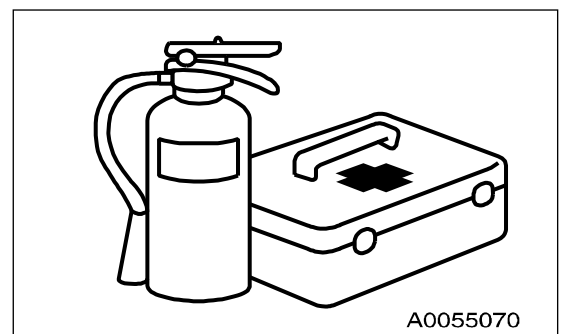


- Check that all protective equipment functions properly before using it.

## FIRE EXTINGUISHER AND FIRST AID KIT

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

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

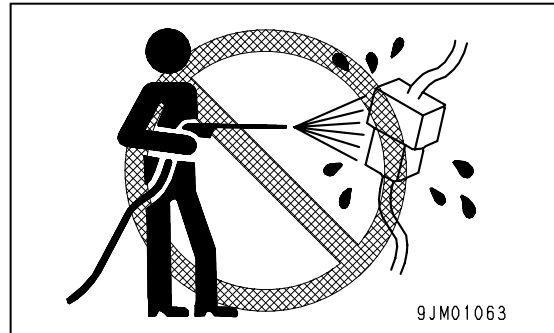


## SAFETY FEATURES

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

## KEEP MACHINE CLEAN

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

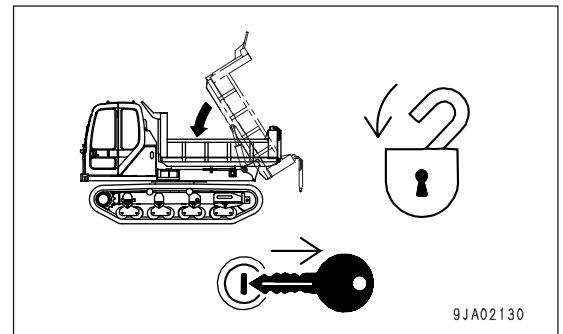
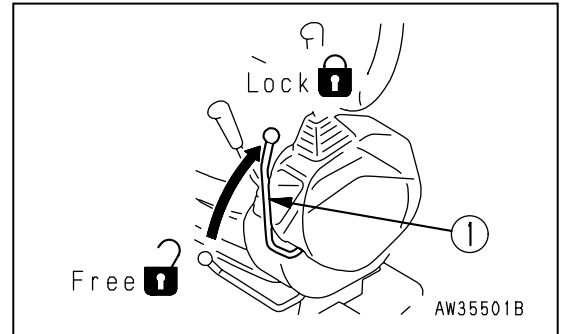


## INSIDE OPERATOR'S COMPARTMENT

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

## ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

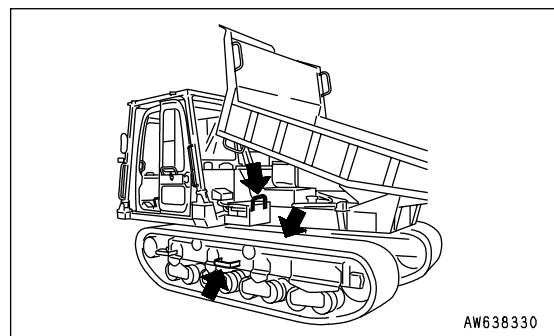
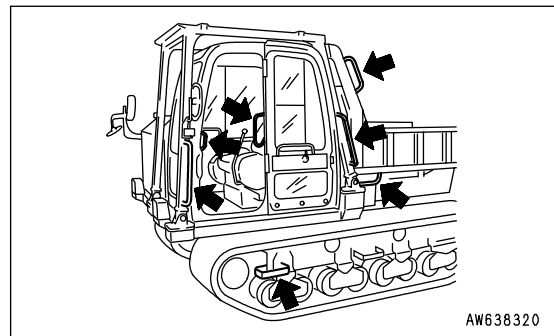
- When opening or closing the front window or roof window, when removing or installing the bottom window, or when adjusting the operator's seat, always lower the body before standing up from the operator's seat, set safety lock lever (1) to the LOCK position, and stop the engine. If you accidentally 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 dump body, set safety lock lever(1) 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.



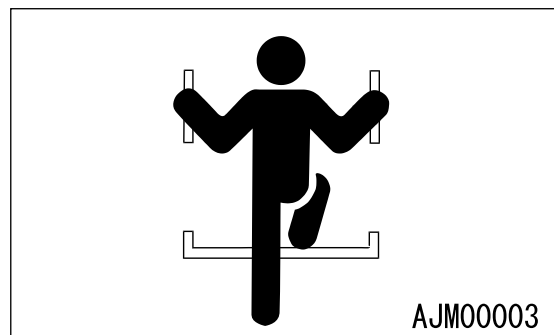
## HANDRAILS AND STEPS

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

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



- To ensure safety, always face the machine and maintain three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps (including the track shoe) to ensure that you support yourself.
- Do not grip the control levers 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.

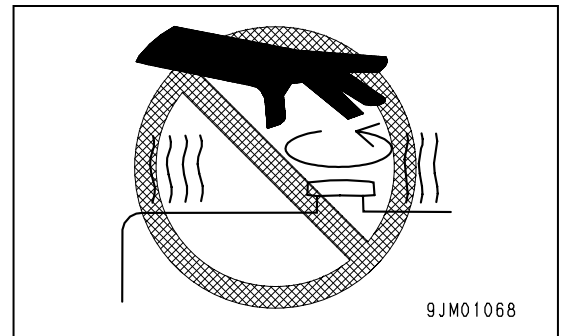
## MOUNTING AND DISMOUNTING

- 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.

## PREVENTION OF BURNS

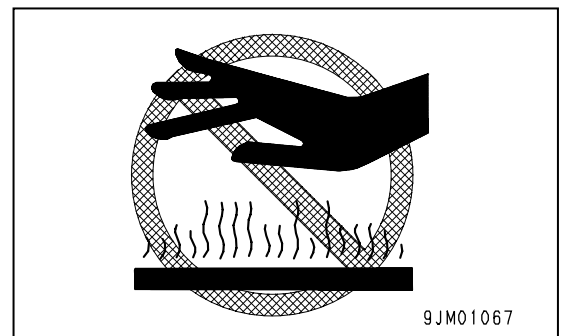
### Hot coolant

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



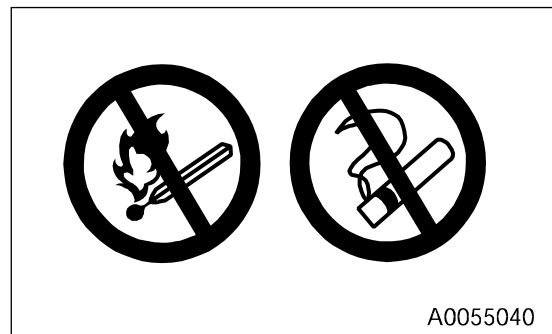


## FIRE PREVENTION

### ● 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, use explosion-proof lighting. If you do not use explosion-proof lighting, there is a hazard of serious injury or damage caused by explosion.
  - When taking the electrical power for the lighting from the machine, follow the instructions in this manual.



## ACTION IF FIRE OCCURS

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

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

## WINDOW WASHER LIQUID

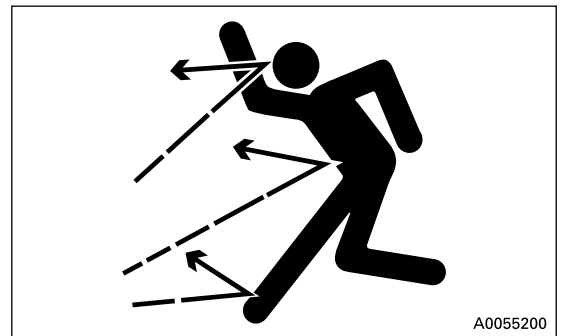
Use an ethyl alcohol base washer liquid. Methyl alcohol base washer liquid may irritate your eyes, so do not use it.

## CAB WINDOW GLASS

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.

## PROTECTION FROM FALLING OBJECTS, FLYING OBJECTS, AND INTRUDING OBJECTS

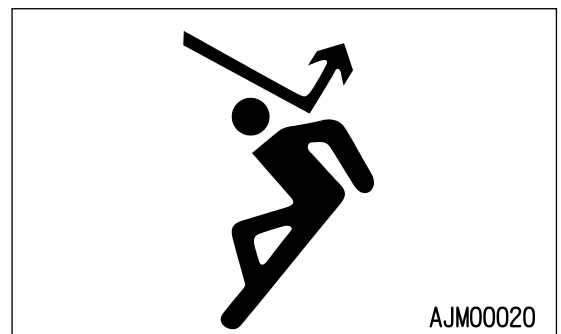
To protect the operator, install any necessary guard on jobsites where there is danger of falling objects, flying objects, or intruding objects entering the operator's cab.



## 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 if ROPS is installed, it does not work normally, if your seat belt is not fastened. Be sure to fasten your seat belt when operating machine.



## PRECAUTIONS FOR ATTACHMENTS

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

## UNAUTHORIZED MODIFICATION

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

- Komatsu will not be responsible for any injuries, accidents, or product failures resulting from modifications made without authorization from Komatsu.
- Do not carry out modifications of dump body such as wall raising. This will reduce the braking capacity or adversely affect the balance of the machine, and may lead to an expected accident.

## 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.
- Set and maintain the haul load on the jobsites so that the machine can always travel safely.

## 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	Min. safety distance
Low voltage	100V 200V	2m
	6,600V	2m
Very high voltage	22,000V	3m
	66,000V	4m
	154,000V	5m
	187,000V	6m
	275,000V	7m
	500,000V	11m

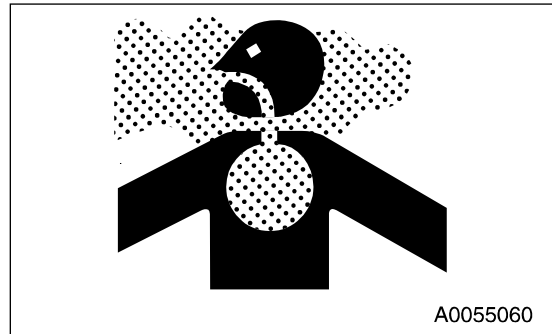
**ENSURE GOOD VISIBILITY**

- 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.
  - 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 you provide adequate ventilation is provided to prevent gas poisoning.



## CHECKING SIGNALMAN'S SIGNALS AND SIGNS

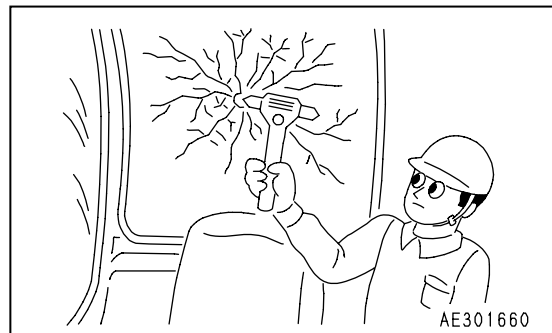
- Set up signs to inform of road shoulders and soft ground. If the visibility is not good, position a signalman if necessary. Operators should pay careful attention to the signs and follow the instructions from the signalman.
- Only one signalman should give signals.
- Make sure that all workers understand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

## EMERGENCY EXIT FROM OPERATOR'S CAB

If it should become impossible to open the cab door for any reason, and it is necessary to make an emergency escape from the operator's compartment, use the hammer provided to break the glass and escape through the window.

For details of the method of using the hammer, see "EMERGENCY ESCAPE HAMMER (PAGE 3-24)".

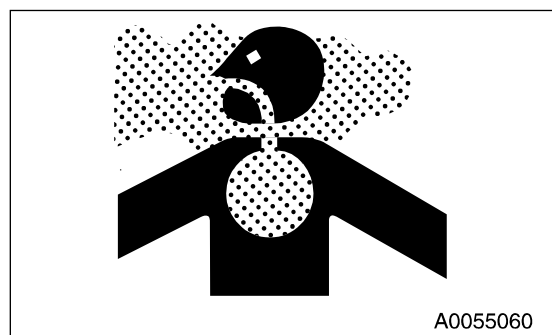
- To prevent injury from pieces of glass, remove all the broken glass from the window frame. Be careful also not to slip on the broken glass that has fallen to the ground.



## 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.

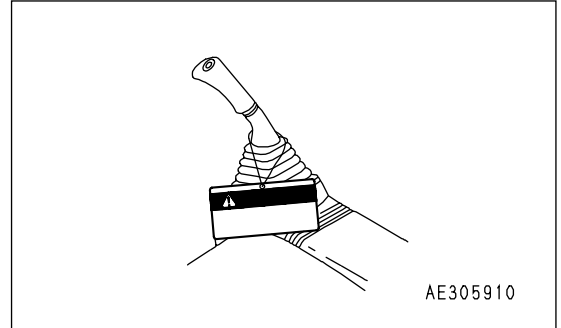


This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.

# 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.

- Remove all dirt from the surface of the window glass to ensure a good view.
- Remove all dirt from the surface of the lens of the front lamps and working lamps, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the lights and working lamps, and check that the control levers are all at the neutral position.
- Before starting the engine, check that the safety lock lever is at the LOCK position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat.  
For details of adjusting, see "ADJUST REAR VIEW MIRROR, UNDER MIRROR (PAGE 3-42)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.

## PRECAUTIONS WHEN STARTING

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

## PRECAUTIONS IN COLD AREAS

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

## AFTER STARTING ENGINE

### CHECKS AFTER STARTING ENGINE

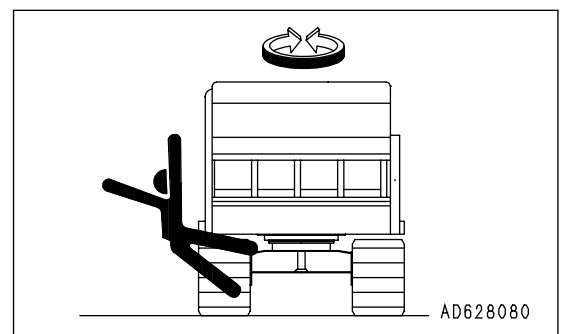
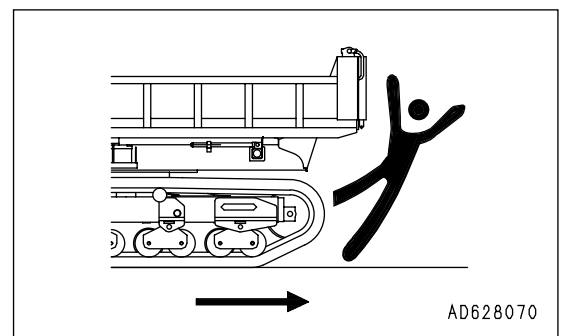
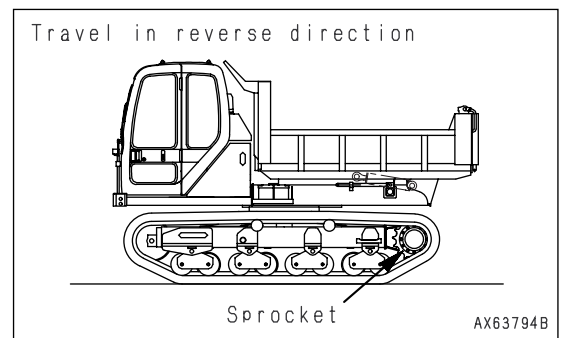
When carrying out the checks, move the machine to a wide area where there are no obstructions, and operate slowly. Do not allow anyone near the machine.

- Always fasten your seat belt.
- Check the actuating condition of the work equipment, travel, and brake systems.
- 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 WHEN CHANGING DIRECTION

- Before operating the travel lever, check the position of the sprocket. If the sprocket is the rear of the machine, the reverse travel pilot lamp will light up, and the direction of operation of the travel levers will be reversed (FORWARD ↔ REVERSE, left ↔ right), so be extremely careful when operating the travel levers.
- 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 travel alarm works properly.
- Fix the operator's compartment doors and windows in position securely.  
On jobsites where there is a hazard of flying objects or of objects entering the operator's compartment, check that the door and windows are securely closed.
- If there is an area to the rear of the machine which cannot be seen, position a signal person. Take special care not to hit other machines or people when turning or swinging the machine.

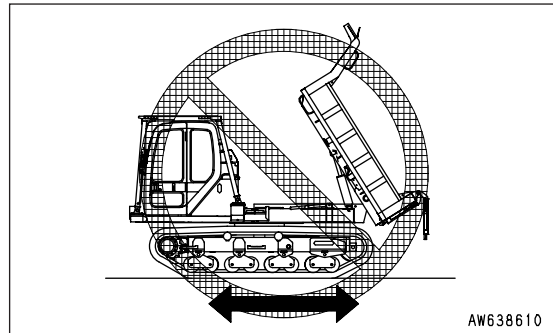
Always be sure to carry out the above precautions even when the machine is equipped with mirrors.





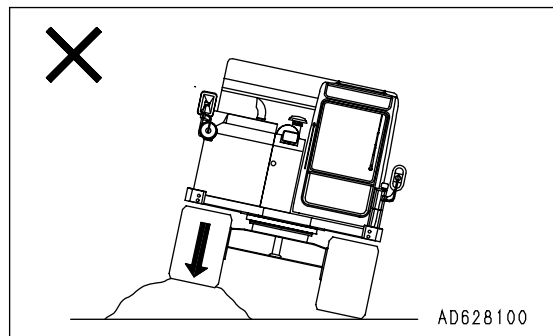
## PRECAUTIONS WHEN TRAVELING

- When using the machine, to prevent the machine from overturning due to overloading and to avoid damage to the work equipment, do not exceed the maximum permitted load or performance of the machine.
- Do not load the dump body above the maximum payload. The brakes will lose their effect.
- Load the dump body uniformly. Do not travel when the load in the dump body is unbalanced.
- When stacking U-pipes or concrete blocks, or when carrying other materials or equipment, lay planks, and secure with ropes to prevent the load from moving or falling
- Stop the engine when raising the body for operation. It is extremely dangerous to carry out operations with any person in the dump body.
- Do not travel with the body raised. Do not operate the dump when traveling.



- Do not go in or out of the operator's compartment during loading operations.
- When not operating the dump body, set the body control pedal to the lock position to prevent the body from being operated by mistake.

- When traveling on rough ground, to prevent the machine from turning over, travel at low speed and avoid sudden changes in direction.
- Avoid traveling over obstacles. If it is necessary to travel over an obstacle, travel at low speed. The machine will easily tip to the left or right side, so never travel over objects which cause the machine to tip strongly to the left or right. Do not travel over any obstacle that causes the machine to tilt strongly (more than 10°).

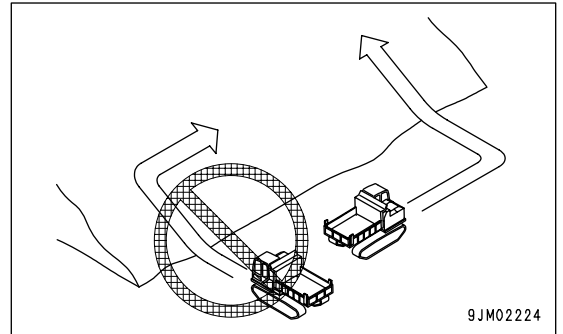


- When traveling or carrying out operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the work equipment hit anything.

## TRAVELING ON SLOPES

When traveling on slopes, there is danger of the machine turning over and causing serious personal injury. To prevent this, always observe the following.

- Lower the dump body.
- When travel up slopes, set the operator's cab facing uphill, when travel down slopes, set the operator's cab facing downhill. Always check the firmness of the ground under the front of the machine when traveling.
- Do not travel on slopes of more than 15°.
- When traveling down a slope of 10 - 15°, set the travel speed selector switch to LOW, reduce the engine speed, and travel at low speed.
- When stopping on a slope, return the travel lever slowly to the neutral position.
- When traveling downhill, do not stop the engine. The brakes may be suddenly applied and the machine may tip over.
- When traveling downhill, do not move the travel lever suddenly to the neutral position. The brakes may be suddenly applied and the machine may tip over.
- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.
- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- If the engine stops when the machine is traveling on a slope, move the control levers immediately to the neutral position and start the engine again.

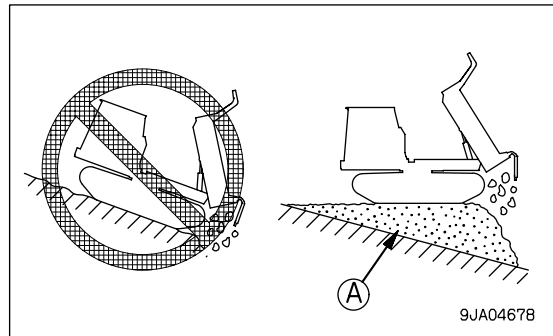


## PRECAUTIONS WHEN OPERATING DUMP BODY

- Stop the machine in the correct position, check that there is no one behind the machine and that there is no obstacle, then starting the dump operation. If necessary, position a flagman or set blocks to stop the machine.
- Before operating the dump, sound the horn to give a warning to people standing in the surrounding area.
- If the dump is operated on a slope, there is danger of the machine tipping over. If you feel that there is any danger, lower the body immediately.

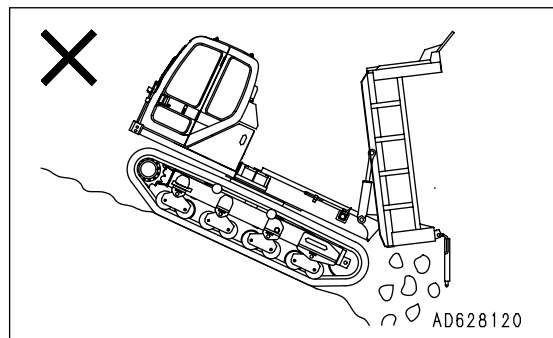
### OPERATIONS ON SLOPES

- When operating on slopes, there is danger that the machine may lose its balance and tip over during turning or dump body operations. Never turn or operate the dump body on slopes.
- It is particularly dangerous to dump in a downhill direction. If the dumping operation has to be carried out in a downhill direction, build a platform of soil (A) on the slope to set the machine horizontal before starting the operation.
- It is dangerous to turn from the uphill direction to the downhill direction when the dump body is loaded. Never carry out such operations.



### PROHIBITED OPERATIONS

- When operating at the bottom of cliffs, there is danger of the soil collapsing or rocks falling. Do not operate in such places.
- The edge of cliffs or road shoulders are unstable and may collapse, so there is danger of the machine falling. Keep away from cliffs or road shoulders.

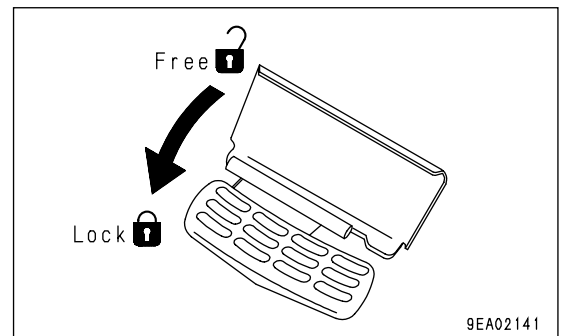
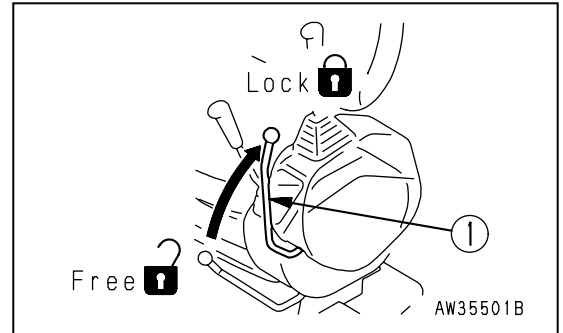


### OPERATE CAREFULLY ON SNOW

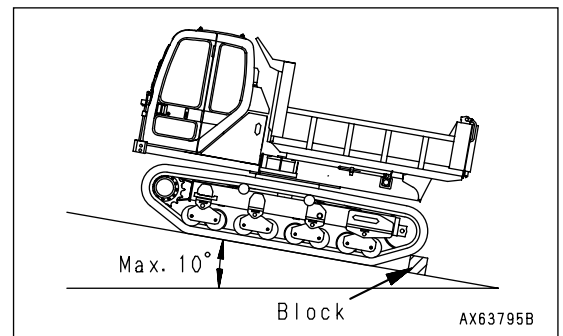
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes 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.
- If the load inside the dump body is frozen, do not operate the dump body. There is danger that the machine may tip over.

## PARKING MACHINE

- Park the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- When leaving the machine, set safety lock lever (1) to the LOCK position, check that the body control pedal is locked, then stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from moving the machine. Always remove the key, take it with you, and leave it in the specified place.



- If it is necessary to park the machine on a slope, always do as follows.
  - When parking on a slope, make sure that the angle of the slope is less than 10°.
  - Put blocks under the tracks to prevent the machine from moving.

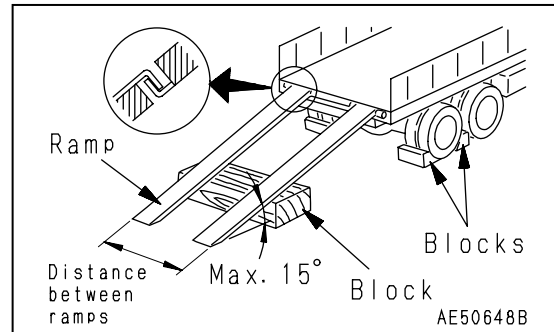


## TRANSPORTATION

### LOADING AND UNLOADING

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

- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of the road or cliff.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.
- Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from machine-tracks. On a rainy day, in particular, take extremely careful since the ramp surface is slippery.
- Run the engine at low idling, travel at low speed, and operate the machine slowly.
- When on the ramps, do not operate any lever except for the travel lever.
- Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.
- The center of gravity of the machine will change suddenly at the joint between the ramps and the track or trailer, and there is danger of the machine losing its balance. Travel slowly over this point.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- For machines equipped with a cab, always lock the door after loading the machine. If this is not done, the door may suddenly open during transportation.
- After loading, block the machine tracks and secure the machine with tie-downs.



### SHIPPING

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

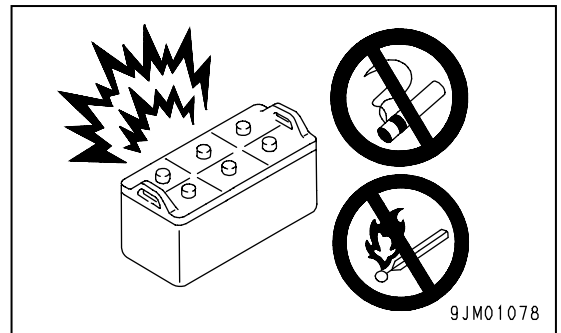
- Investigate all state and local laws governing the weight, width, and length of a load. If necessary, disassemble the work equipment. The width, height and weight of the load differ according to the work equipment, so take this into account when determining the shipping route.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- For details of the shipping procedure, see "TRANSPORTATION (PAGE 3-74)" in the OPERATION section.

## BATTERY

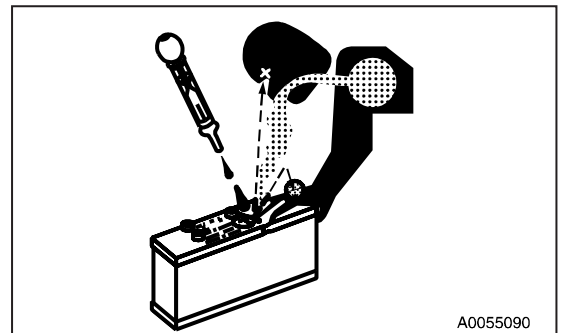
### BATTERY HAZARD PREVENTION

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

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



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



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

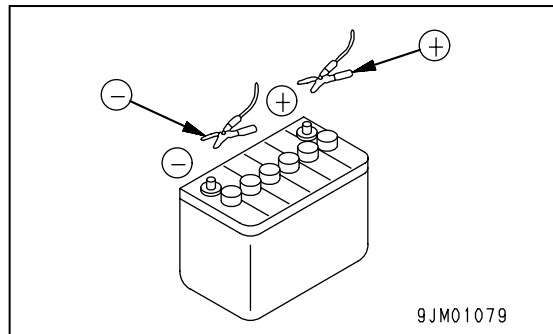
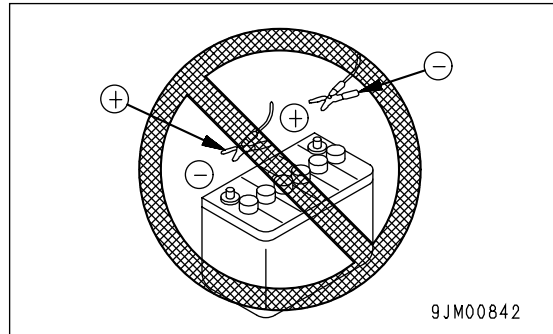
As there is a hazard that sparks will be generated, always do as follows.

- 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.
- 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 ground or negative (-) cable (ground side) first when removing them.
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.
- Always wear safety goggles and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- For details of the starting procedure when using booster cables, see "STARTING ENGINE WITH BOOSTER CABLE (PAGE 3-86)" in the OPERATION section.



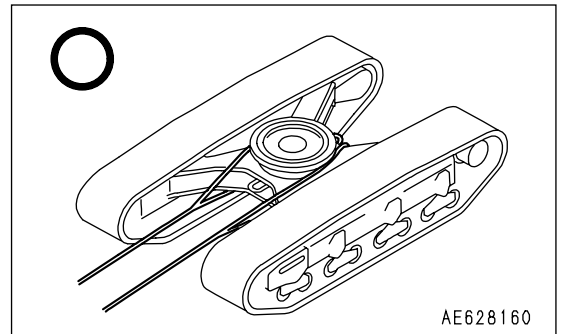
## TOWING

### WHEN TOWING

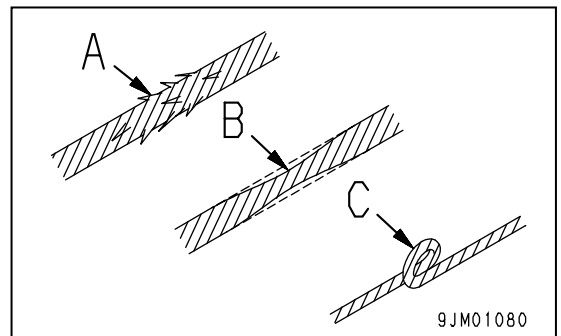
Serious injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection or inspection of the wire rope.

For towing method, see the section of "TOWING THE MACHINE (PAGE 3-83)".

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



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





# PRECAUTIONS FOR MAINTENANCE

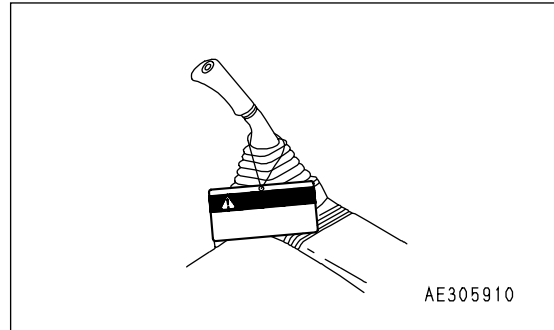
## WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to the work equipment control lever in the operator's cab to alert others that you are performing service or maintenance on the machine. Attach additional warning tags around the machine if necessary.

Warning tag Part No. 09963-03001

Keep this warning tag in the tool box while it is not used. If there is not the tool box, keep the tag in the operation manual pocket.

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



## KEEP WORK PLACE CLEAN AND TIDY

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

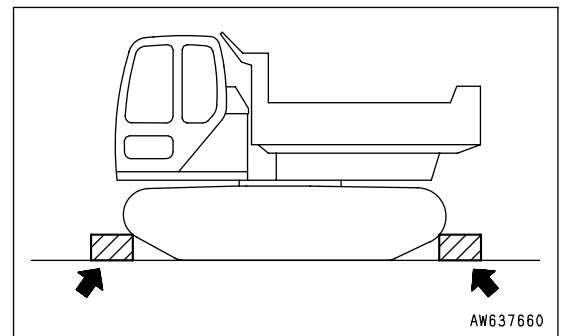
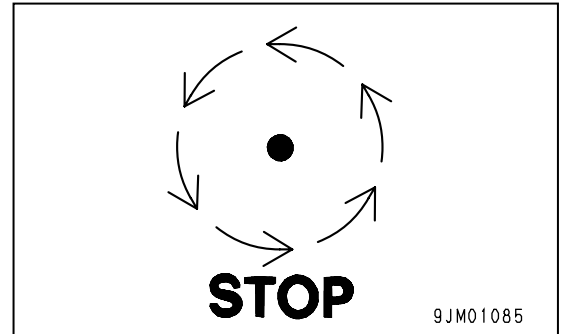
## APPOINT LEADER WHEN WORKING WITH OTHERS

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

When working with others, misunderstandings between workers can lead to serious accidents.

## STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

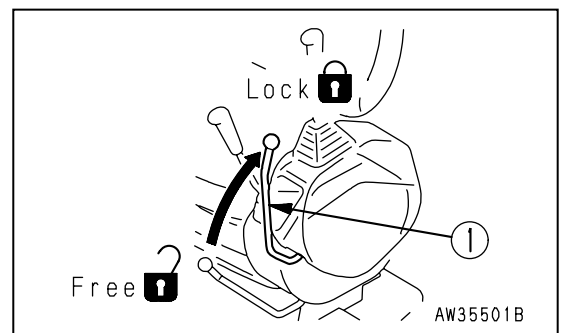
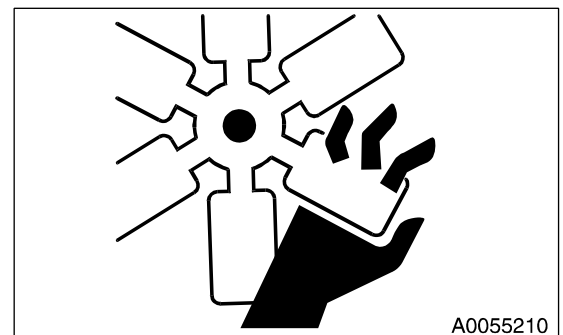
- Stop the machine on firm, level ground.
- Select a place where there is no danger of falling rocks, landslides, or flooding.
- Lower the dump body and stop the engine.
- Put blocks under the track to prevent the machine from moving.



## TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

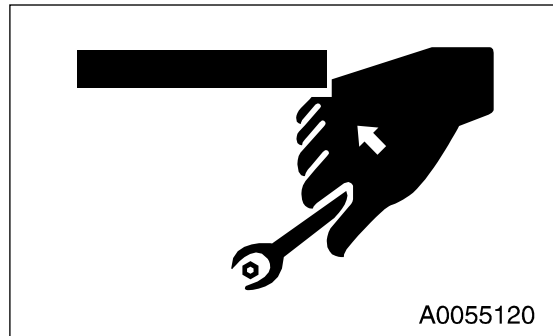
To prevent injury, do not carry out maintenance with the engine running. If maintenance must be carried out with the engine running, carry out the operation with at least two workers and do as follows.

- 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.
- set safety lock lever (1) to the LOCK position.
- 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 extremely careful.
- Do not touch any control levers. If any control lever must be operated, always give a signal to the other workers to warn them to move to a safe place.
- Never drop or insert tools or other objects into the fan or fan belt. 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.



### ACCUMULATOR

The accumulator is charged with high-pressure nitrogen gas.

When handling the accumulator, careless procedure may cause an explosion which could lead to serious injury or property damage. For this reason, always observe the following precautions.

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



### PERSONAL

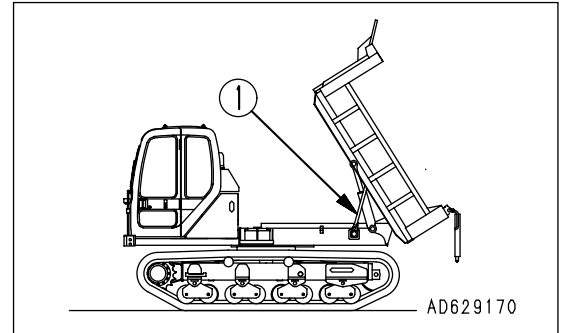
Only authorized personnel can service and repair the machine. Do not allow unauthorized personnel into the area. If necessary, employ an observer.

### PRECAUTIONS FOR WORK UNDER 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.



- When carrying out work with the dump body raised, always stop the engine and use safety bar (1). Always be sure to set the dump body control pedal to the HOLD position.



## **NOISE**

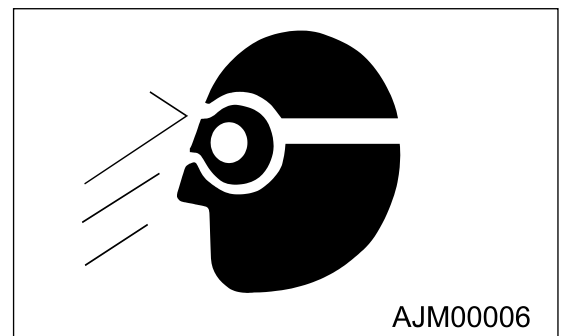
If the noise from the machine is too loud, it may cause temporary or permanent hearing problems.

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

## **PRECAUTIONS WHEN USING HAMMER**

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

- If hard metal parts such as pins, 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, 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.
- If pins are hit with strong force, there is a hazard that the pin may fly out and injure people in the surrounding area.



## **REPAIR WELDING**

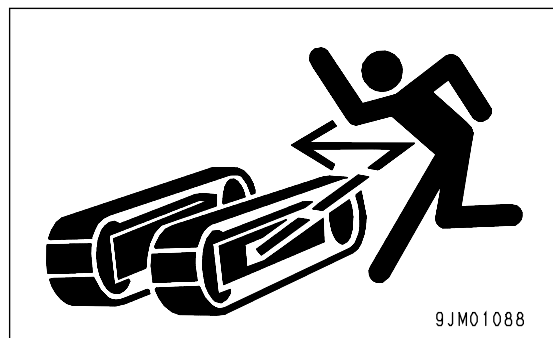
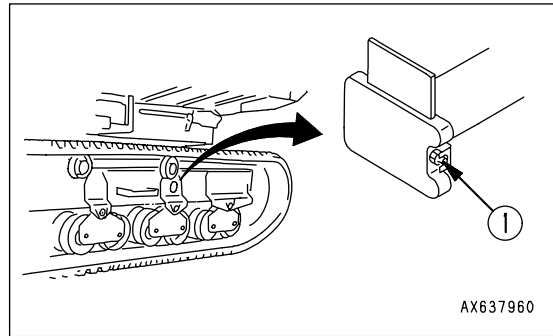
Welding operations must always be carried out by a qualified welder and in a place equipped with a proper equipment. There is a hazard of fire or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

## **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 plug (1) may fly out and cause serious injury or property damage.
- When loosening grease drain plug (1) to loosen the track tension, never loosen it more than one turn. Loosen the grease drain plug slowly.
- Never put your face, hands, feet, or any other part of your body close to grease drain plug (1).



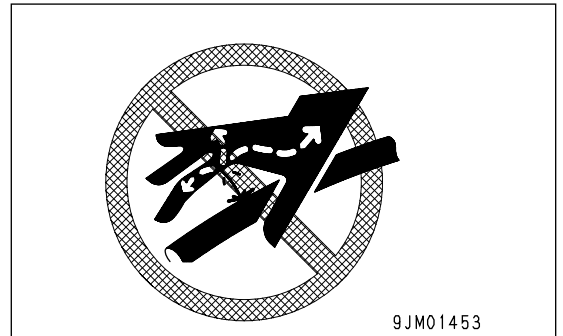
## DO NOT DISASSEMBLE RECOIL SPRING

The recoil spring assembly is used to reduce the impact on the idler. It contains a spring under high pressure, so if it is disassembled by mistake, the spring will fly out and cause serious injury or even death. Never disassemble the recoil spring.

## 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 or property damage, so always do as follows.

- For the releasing procedure of the internal pressure, see "HANDLING HYDRAULIC SYSTEM (PAGE 4-9)". Do not inspect or replace any part while the internal pressure is applied.
- 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 or property damage. 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.

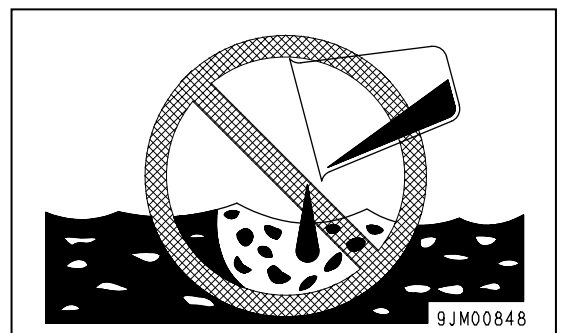
Replace the hose if any of the following problems are found.

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

## 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 CAR COOLER

If car cooler 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 or property damage caused by flying particles.
- When using compressed air to clean elements or the radiator, always wear safety goggles, dust mask, gloves, and other protective equipment.

## PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

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

Replacement of safety critical parts: See "PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (PAGE 4-15)".

- 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 property damage. 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**

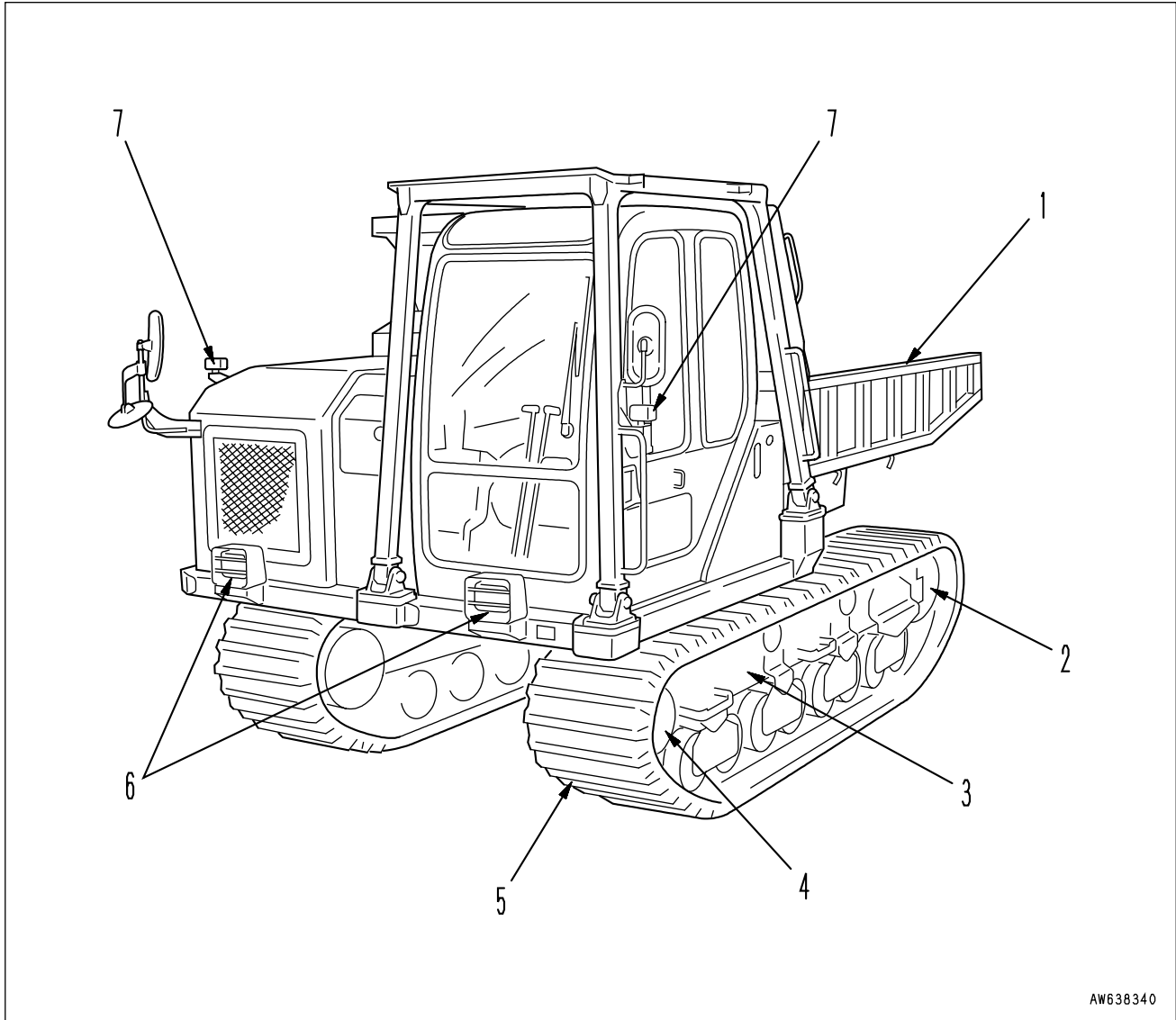
Please read and make sure that you understand the safety volume before reading this section.

---



# GENERAL VIEW

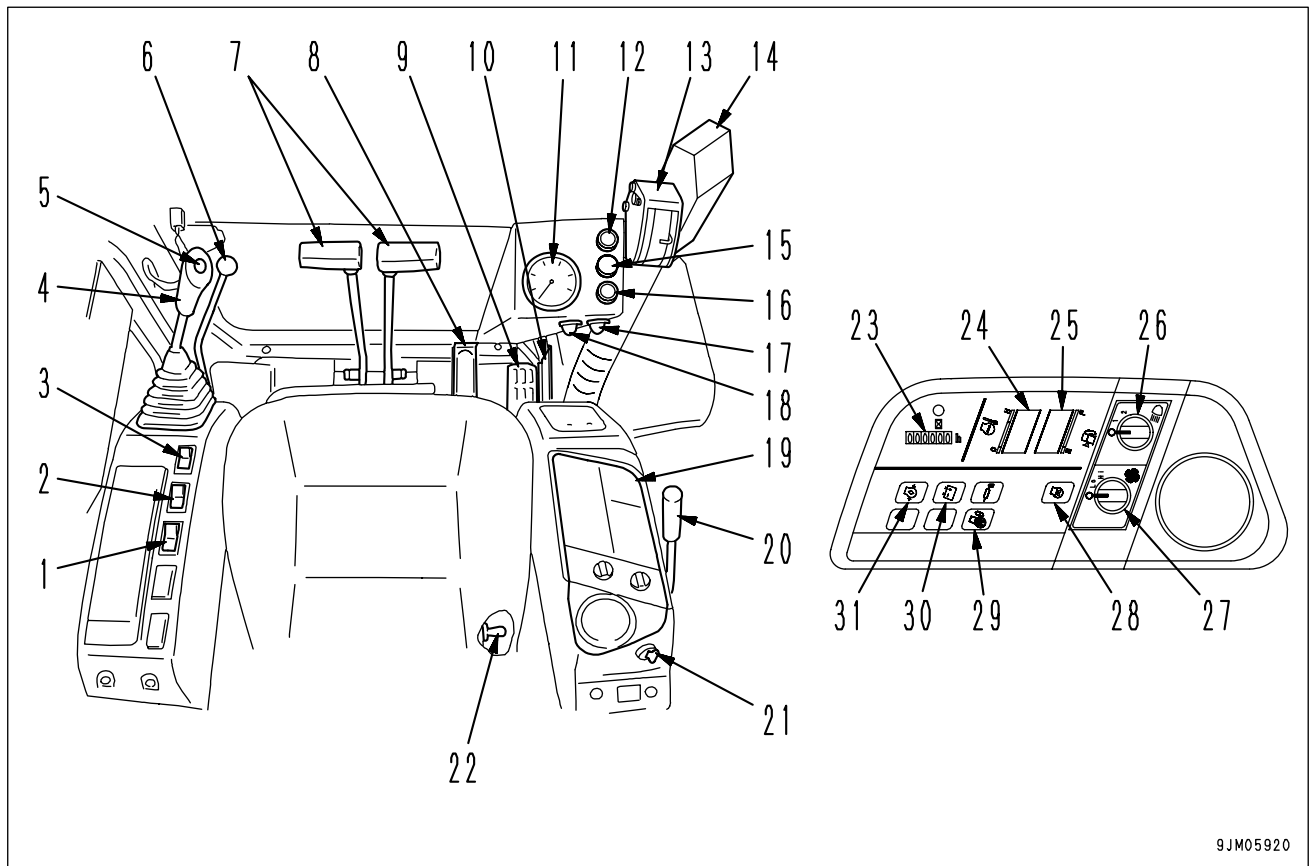
## GENERAL VIEW OF MACHINE



AW638340

- |                 |                          |
|-----------------|--------------------------|
| (1) Dump body   | (5) Track shoe           |
| (2) Idler       | (6) Head lamp            |
| (3) Track frame | (7) Swing indicator lamp |
| (4) Sprocket    |                          |

## GENERAL VIEW OF CONTROLS AND GAUGES



9JM05920

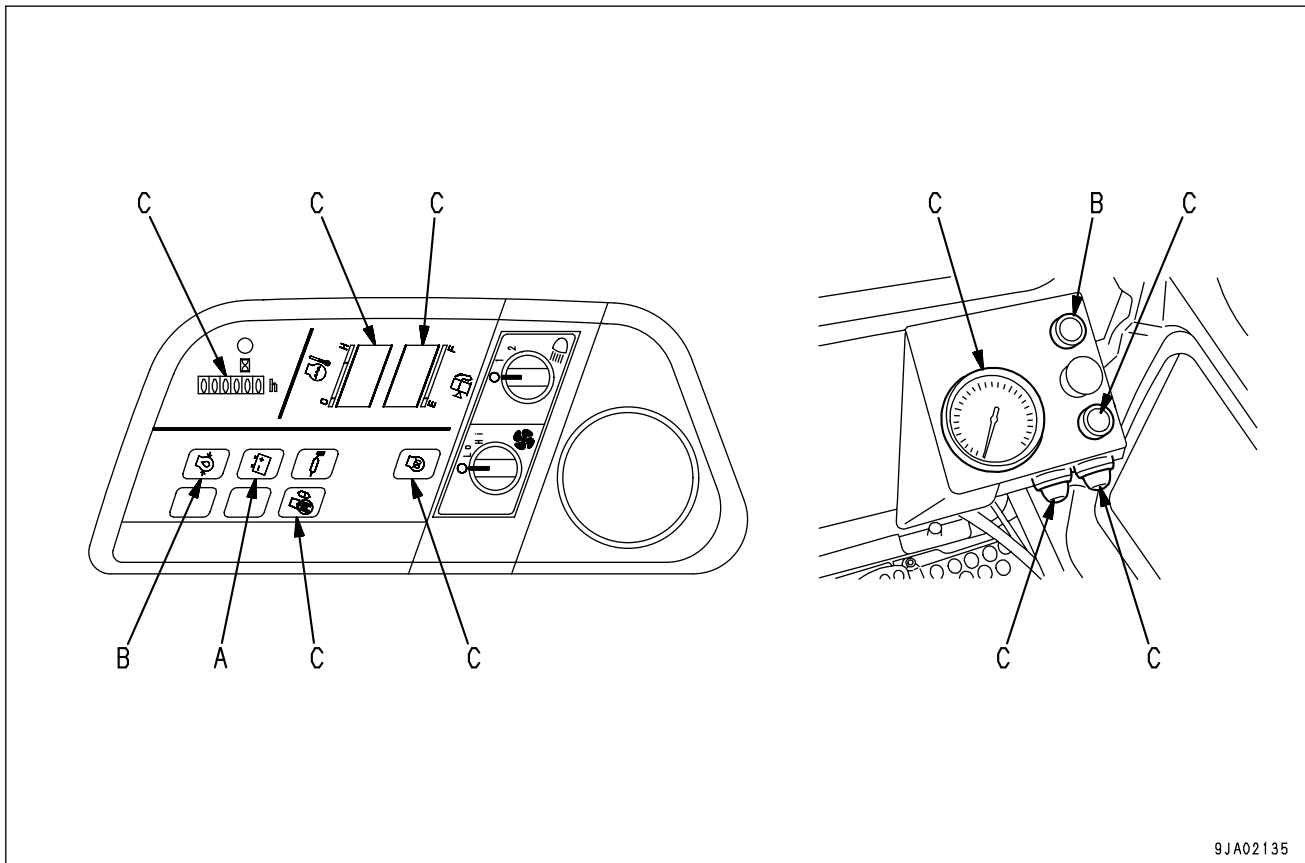
- |   |                                     |
|---|-------------------------------------|
| (1) Wiper switch                                    | (17) Center indicator lamp          |
| (2) Swing lock switch                               | (18) Reverse travel indicator lamp  |
| (3) Travel speed selector switch                    | (19) Monitor panel                  |
| (4) Swing control lever                             | (20) Fuel control lever             |
| (5) Horn button                                     | (21) Starting switch                |
| (6) Safety lock lever                               | (22) Swing lock override switch     |
| (7) Travel lever                                    | (23) Service meter                  |
| (8) Deceleration pedal                              | (24) Engine water temperature gauge |
| (9) Dump body control pedal                         | (25) Fuel gauge                     |
| (10) Pedal lock                                     | (26) Light switch                   |
| (11) Tachometer                                     | (27) Heater switch                  |
| (12) HST charge pressure warning lamp               | (28) Engine pre-heating monitor     |
| (13) Inclinometer (only in front-to-rear direction) | (29) Swing lock monitor             |
| (14) Defroster                                      | (30) Charge level monitor           |
| (15) Brake switch (Emergency and parking)           | (31) Engine oil pressure monitor    |
| (16) Brake switch indicator lamp                    |                                     |

# EXPLANATION OF COMPONENTS

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

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

## MACHINE MONITOR



9JA02135

A: CAUTION ITEMS

C: METER DISPLAY PORTION

B: EMERGENCY STOP ITEMS

### NOTICE

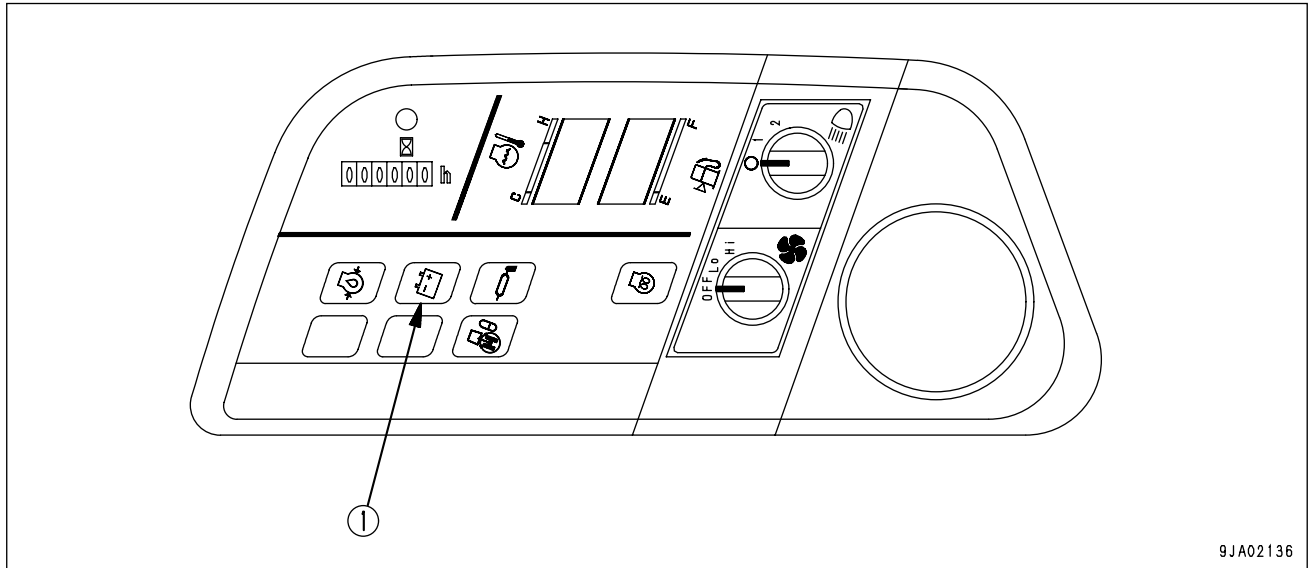
When carrying out checks before starting, do not simply rely on the monitor. Always refer to the periodic maintenance items or "OPERATION (PAGE 3-34)" to carry out the checks.

## CAUTION ITEMS

 **CAUTION**

If the caution monitor lamp lights up, repair the problem as soon as possible.

These are items that must be watched carefully when the engine is running. If any abnormality occurs, the monitor displays the item that should be corrected as soon as possible. If there is any abnormality, the monitor for the location of the abnormality flashes.



(1) Charge level monitor

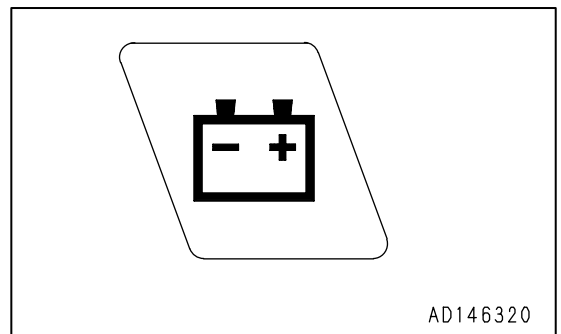
**CHARGE LEVEL MONITOR**

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

If the charging is not being carried out properly when the engine is running, the lamp lights up and the buzzer sounds.

**REMARK**

- This lamp will light up if the starting switch is turned ON when the engine is stopped, but this does not indicate any abnormality.
- When the engine is started or stopped with the starting switch at the ON position, the lamp may light up and the buzzer may sound momentarily, but this does not indicate any abnormality.

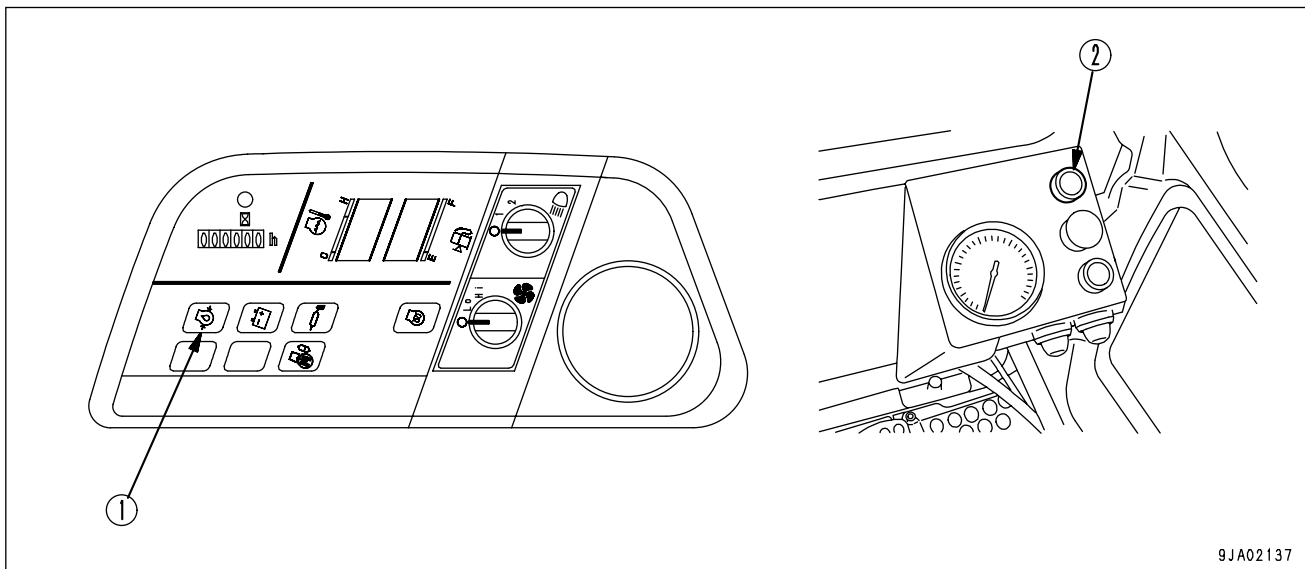


## EMERGENCY STOP ITEMS

**⚠ CAUTION**

If any monitor lamp lights up, stop the engine or run it at low idling, and take the following action.

These are items that must be watched carefully when the engine is running. If any abnormality occurs, the monitor for the location of the abnormality flashes and the buzzer sounds. Take action immediately.



9JA02137

(1) Engine oil pressure monitor

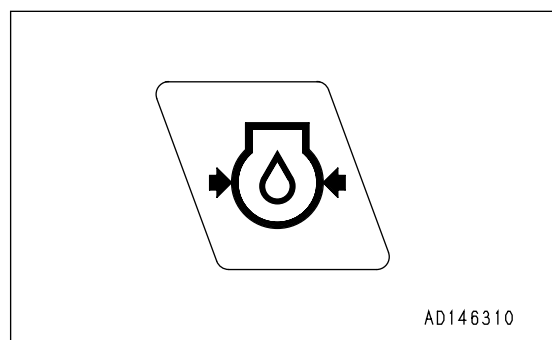
(2) HST charge pressure warning lamp

### ENGINE OIL PRESSURE MONITOR

If the engine lubricating oil pressure goes below the normal value, this monitor when lights up and the buzzer sounds. If the lamp lights up, stop the engine, and check the lubricating system and oil level in the oil pan.

**REMARK**

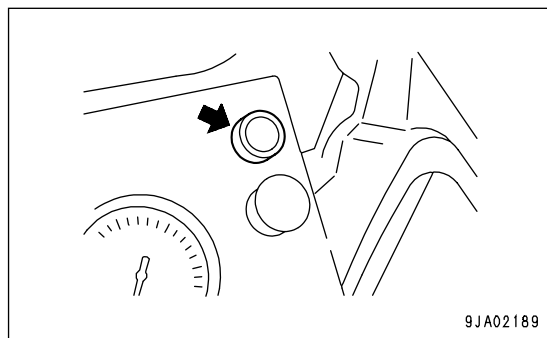
- This lamp will light up if the starting switch is turned ON when the engine is stopped, but this does not indicate any abnormality.
- When the engine is started or stopped, the lamp may light up and the buzzer may sound momentarily, but this does not indicate any abnormality.



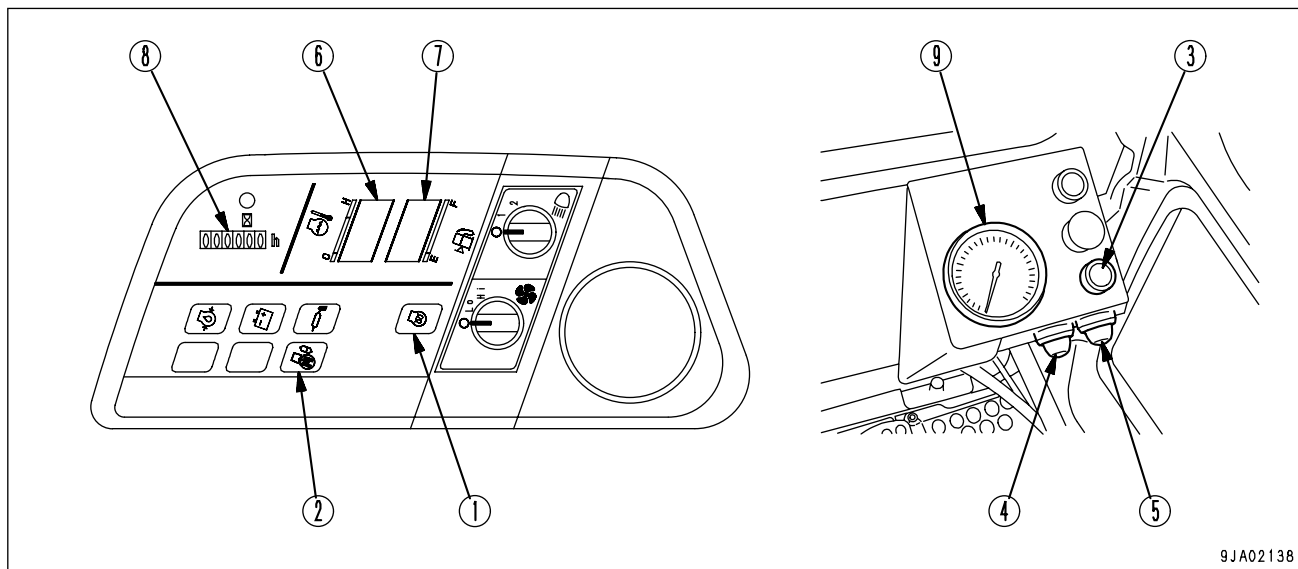
AD146310

**HST CHARGE PRESSURE WARNING LAMP**

If the HST pump charge pressure goes below the normal value, this monitor (2) lights up. If it does not go out, please contact your Komatsu distributor for inspection and repair.



**METER DISPLAY PORTION**



9JA02138

**PILOT DISPLAY PORTION**

- (1) Engine pre-heating monitor
- (2) Swing lock monitor
- (3) Brake switch indicator lamp
- (4) Reverse travel indicator lamp
- (5) Center indicator lamp

**METER PORTION**

- (6) Engine water temperature gauge
- (7) Fuel gauge
- (8) Service meter
- (9) Tachometer

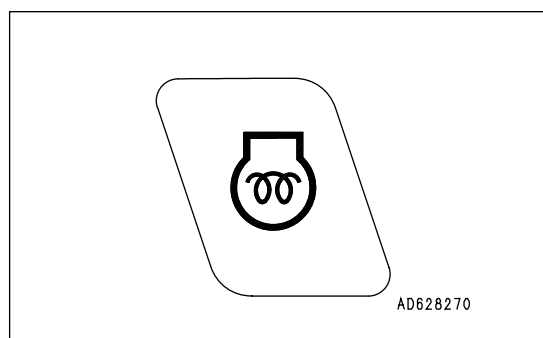
**PILOT DISPLAY PORTION**

When the starting switch is turned ON, the display items light up if they are functioning.

**ENGINE PRE-HEATING MONITOR**

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

When the starting switch is turned to the HEAT position, the lamp lights up, then flashes after approx. 30 seconds to indicate that the preheating is completed. (It flashes for approx. 10 seconds and then goes out.)



AD628270

## SWING LOCK MONITOR

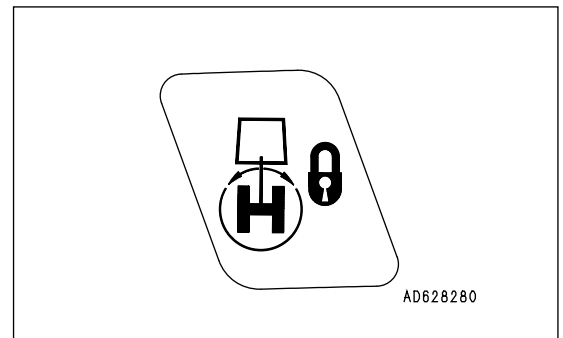
This monitor (2) indicates that the swing lock is actuated.

When actuated: Lights up

The lamp lights up when the swing lock switch is turned ON (LOCK).

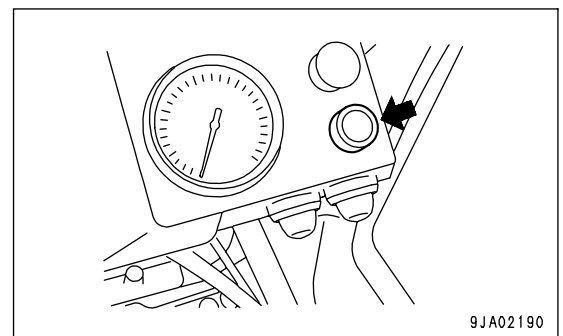
### REMARK

A disc brake is installed inside the swing motor to stop the rotation mechanically. When the swing lock monitor lamp is lighted up, this brake is applied.



## BRAKE SWITCH INDICATOR LAMP

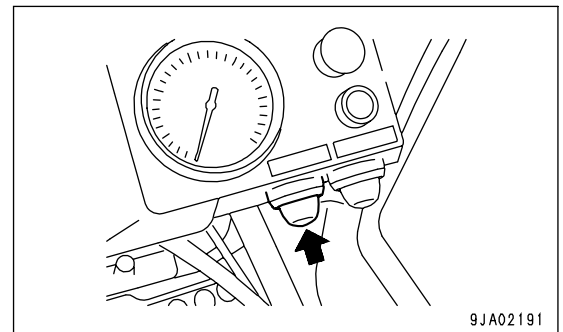
This lamp (3) lights up when the brake switch is actuated.



## REVERSE TRAVEL INDICATOR LAMP

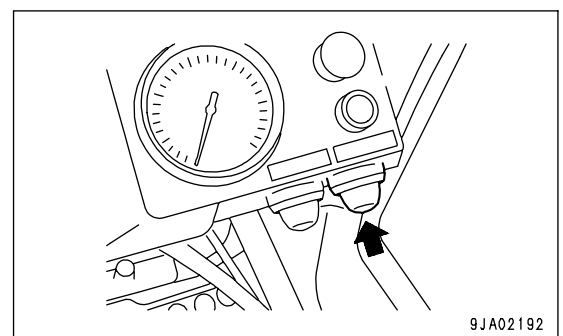
This lamp (4) lights up when the upper structure is swung to face the rear.

Be careful when operating the travel lever. The direction of travel for FORWARD and REVERSE is the opposite.



## CENTER INDICATOR LAMP

This lamp (5) lights up when the upper structure is facing directly to the front or rear.





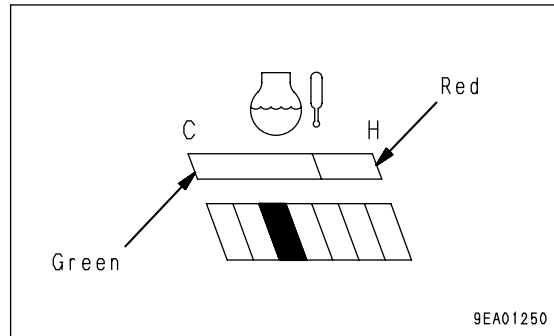
## METER PORTION

### ENGINE WATER TEMPERATURE GAUGE

This gauge (6) displays the engine cooling water temperature. During normal operation, the lamp should light up in the green range.

If the lamp in the red range lights up during operation, run the engine at low idling and wait for the temperature to go down to the green range.

After starting the engine, warm up it until the green range lights up.



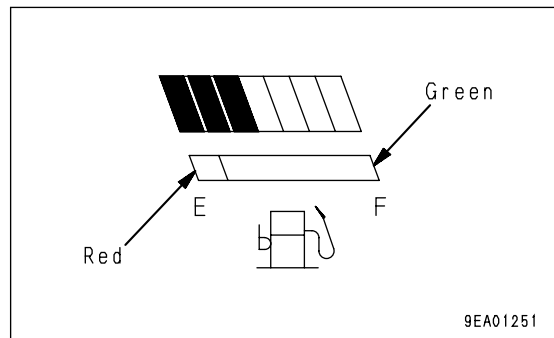
9EA01250

### FUEL GAUGE

This gauge (7) shows the fuel level in the fuel tank. During normal operation, the lamp should light up in the green range.

If only the red range flashes during operation, add fuel.

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



9EA01251

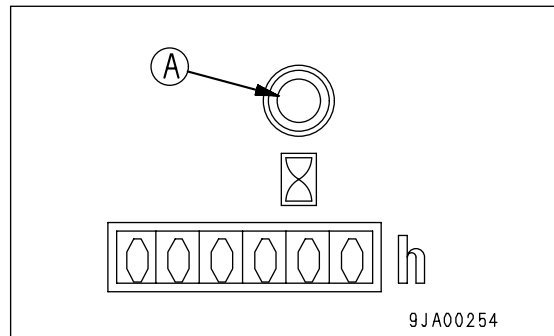
### SERVICE METER

This meter (8) shows the total operation hours of the machine.

Set the periodic maintenance intervals using this display. The service meter advances while the engine is running - even if the machine is not traveling.

While the engine is running, operation display (A) at the top inside of the meter will light to show that the meter is advancing.

The meter will advance by 1 for each 1/10 hour of operation regardless of the engine speed.



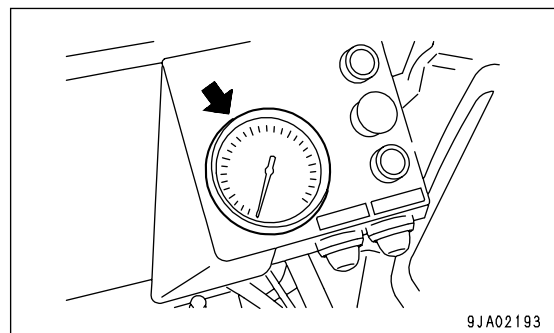
9JA00254

### TACHOMETER

This meter (9) indicates the engine speed in rpm.

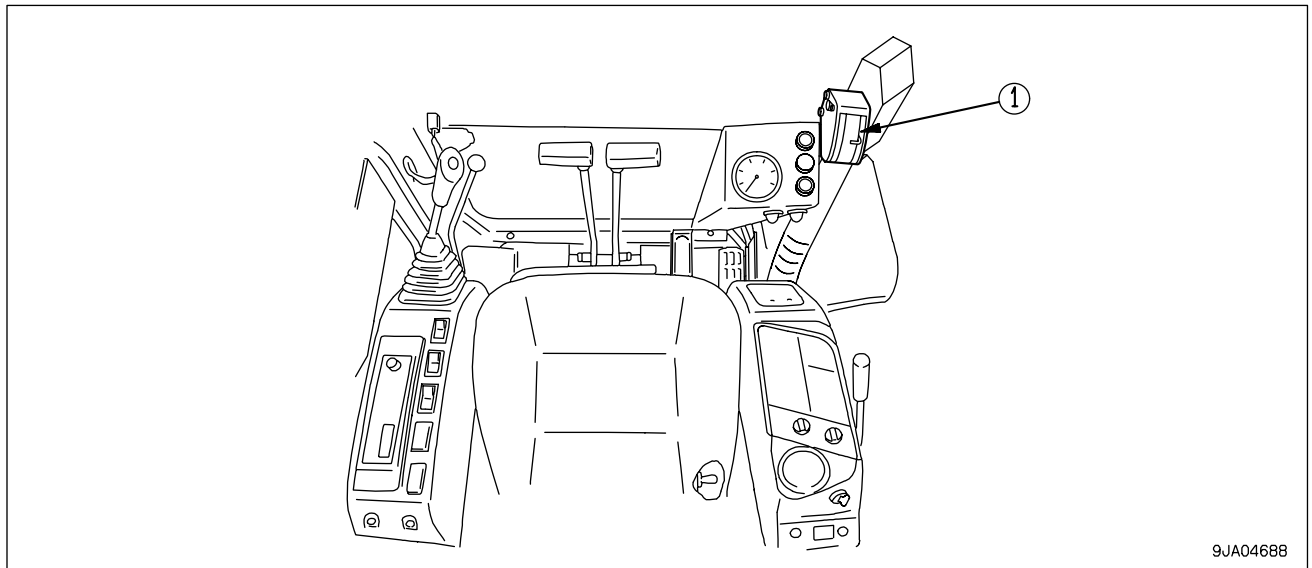
#### REMARK

When traveling downhill, check the tachometer to make sure that the engine does not overrun.



9JA02193

## INCLINOMETER



9JA04688

(1) Inclinometer

### INCLINOMETER

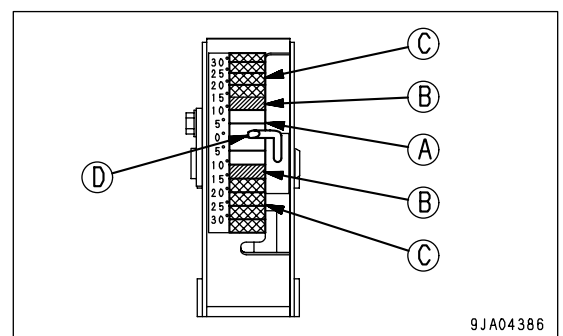
This inclinometer (1) makes it possible to know the angle of the machine.

Green range (A): Indicates that tilt angle is within  $10^{\circ}$

Yellow range (B): Indicates that tilt angle is  $10 - 15^{\circ}$

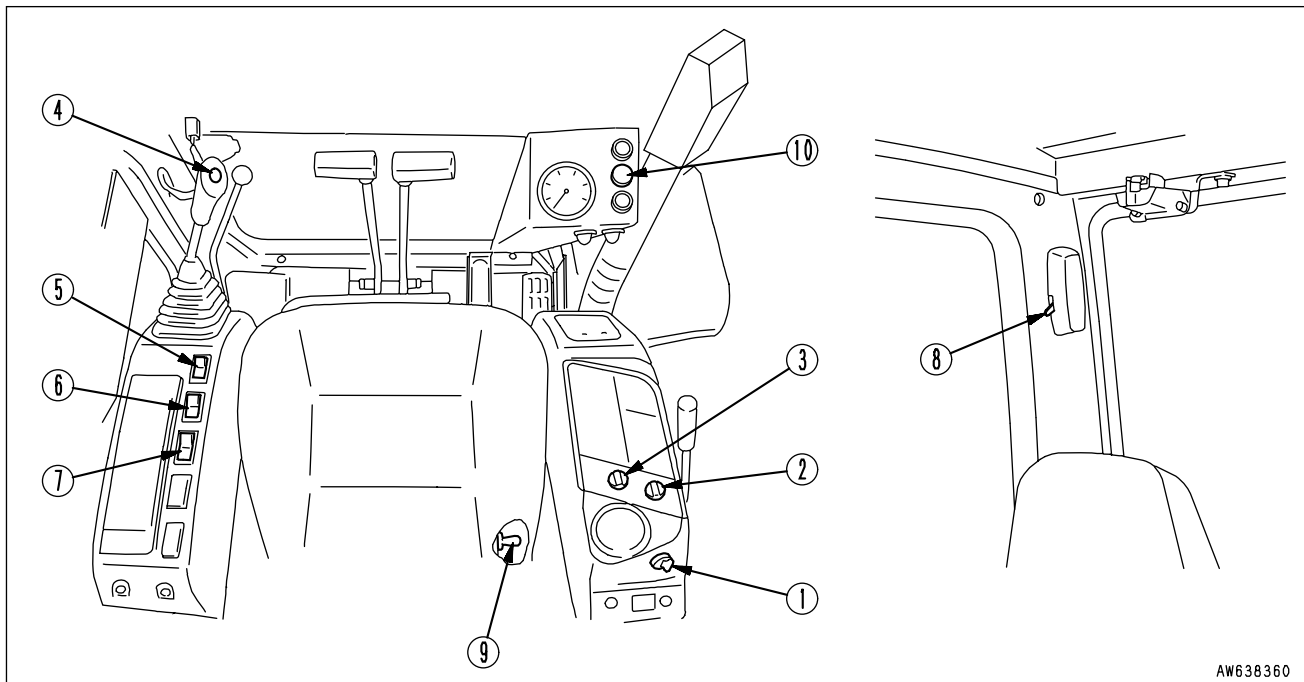
Red range (C): Indicates that tilt angle is more than  $15^{\circ}$  and has exceeded limit for use

This inclinometer is actuated only in the front-to-rear direction of the machine. When the machine is tilted to the front, indicator (D) moves down; when it is tilted to the rear, the indicator moves up.



9JA04386

## SWITCHES



- |                                  |                                |
|----------------------------------|--------------------------------|
| (1) Starting switch              | (6) Swing lock switch          |
| (2) Lamp switch                  | (7) Wiper switch               |
| (3) Car heater switch            | (8) Room lamp switch           |
| (4) Horn button                  | (9) Swing lock override switch |
| (5) Travel speed selector switch | (10) Brake switch (Emergency)  |

## STARTING SWITCH

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

### OFF position:

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

### ON position:

In this position, electric current flows in the charging and lamp circuits.

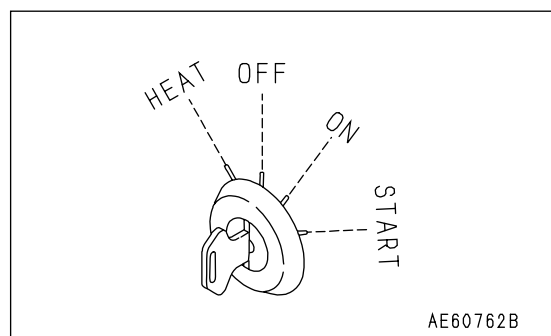
Keep the starting switch key at the ON position while the engine is running.

### START position:

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

### HEAT (preheat) position

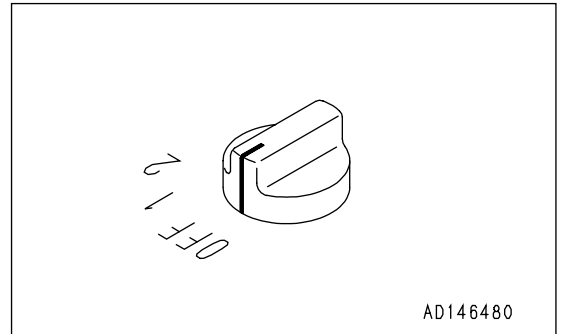
When starting the engine in winter, set the key to this position. When the key is set to the HEAT position, the preheating monitor lights up. Keep the key at this position until the monitor lamp flashes. Immediately after the preheating monitor flashes, release the key. The key automatically returns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



### LAMP SWITCH

This switch (2) lights up the head lamps and the panel lamp.

- Position 1: Panel lamp lights up.
- Position 2: Head lamps and panel lamp light up.
- Position OFF: Lamps go off.



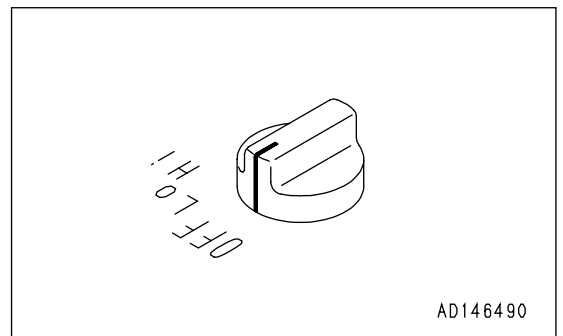
### CAR HEATER SWITCH

This switch (3) is used to carry out heating inside the operator's compartment.

The switch can be used to adjust the hot air flow to two levels.

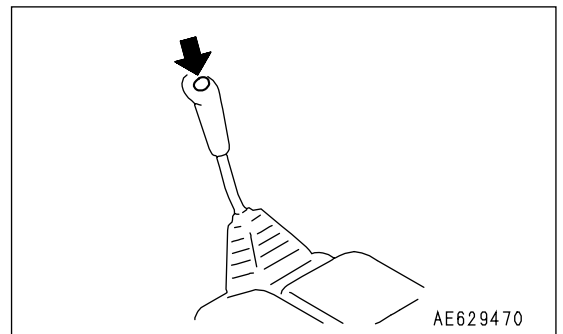
- Hi position: High
- Lo position: Low

The engine cooling water is used to carry out heating, so the heater can be used when the engine coolant is heated up.



### HORN BUTTON

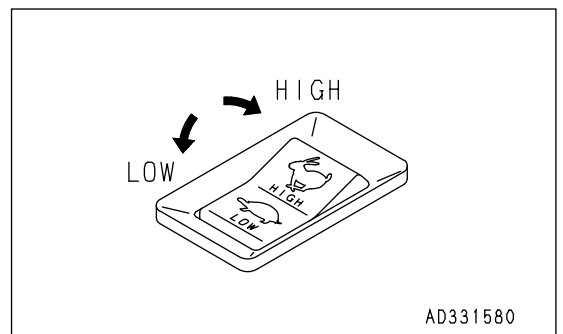
If the center of the left work equipment control lever button (4) is pressed, the horn sounds.



### TRAVEL SPEED SELECTOR SWITCH

This switch (5) is used to switch between the two travel speeds.

- HIGH position: The machine travels at high speed. It automatically switches to LOW when traveling uphill. Set to this position for normal travel.
- LOW position: The machine travels at low speed. Always set the switch to this position before starting to travel downhill. If necessary, reduce the engine speed and make sure that the engine speed does not go above the rated speed when traveling downhill.



## SWING LOCK SWITCH

### ⚠ WARNING

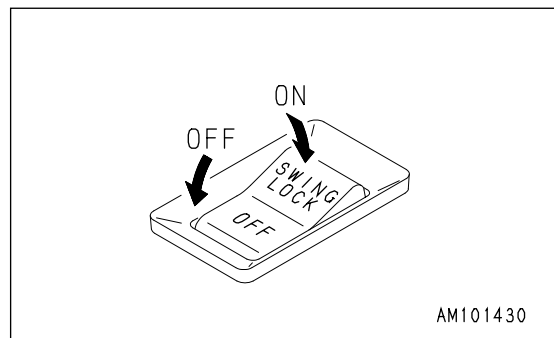
- When traveling or when not operating the swing, set the swing lock switch to the ON position.
- On slopes, depending on the condition of the load on the work equipment, if the swing control lever is operated to the downhill side, the upper structure may swing even when the swing lock switch is at the ON position.

This switch (6) is used to fix the upper structure in position so that it will not swing.

**ON position:** The swing lock is always actuated and the upper structure will not swing even if the swing is operated.

When it is ON, the swing lock monitor lights up.

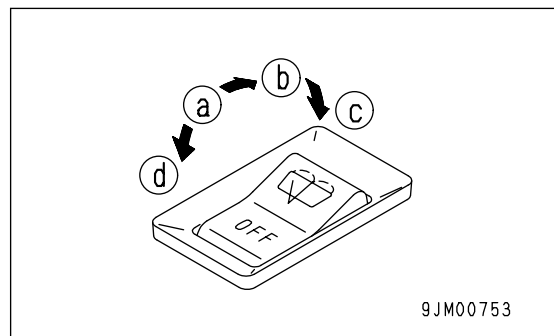
**OFF position:** The swing lock is actuated only when the swing control lever is at the neutral position. When the swing control lever is operated, the swing lock is released. The swing lock is applied approx. 4 seconds after the swing control lever is returned to the neutral position.



## WIPER SWITCH

This switch (7) is used to actuate the front glass wiper.

- (a) OFF: Wiper stopped
- (b) ON: Wiper actuated
- (c) Window washer fluid is sprayed out. When it is released, the switch will return to position (b).
- (d) Window washer fluid is sprayed out. When it is released, the switch will return to position (a).

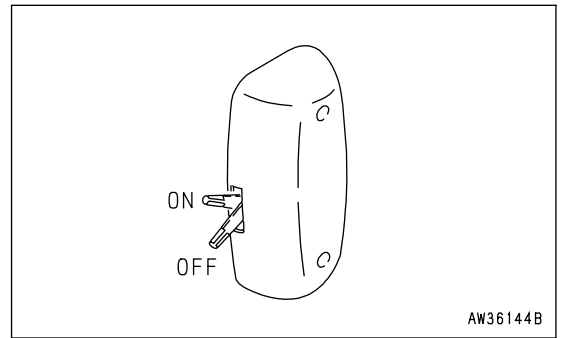


### ROOM LAMP SWITCH

This switch (8) is used to turn on and off room lamp.

ON position: Lamp lights up

The room lamp lights up even when the starting switch key is at the OFF position, so be careful not to forget to turn the switch off.

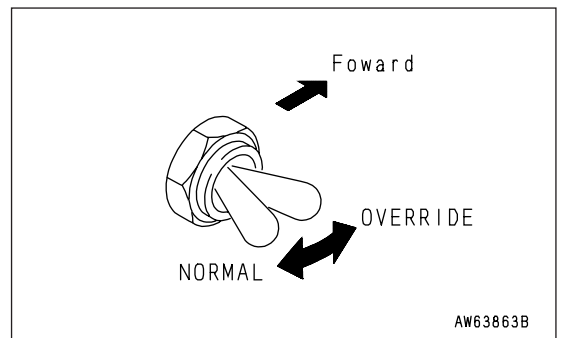


### SWING LOCK OVERRIDE SWITCH

This switch (9) is used to release the swing holding brake when the swing holding brake remains applied.

NORMAL: For normal conditions, set to this position.

OVERRIDE: When the swing holding brake remains applied, set to this position. It then becomes possible to swing.



### BRAKE SWITCH (EMERGENCY)

**⚠ CAUTION**

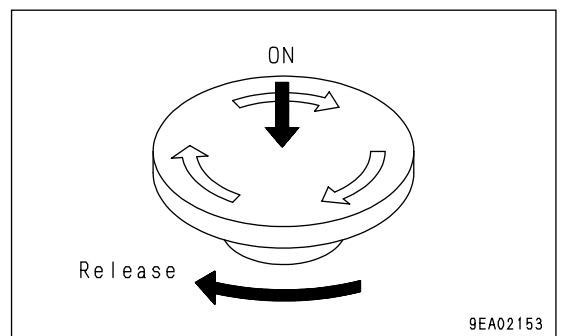
- Do not use the brake switch when the machine is traveling, except in emergencies. If it is used frequently when the machine is traveling, the parking brake performance may be reduced.
- If the brake switch is used in an emergency when the machine is traveling, always contact your Komatsu distributor to have the parking brake inspected.

If the travel/stop lever is placed at the neutral position, the automatic travel parking brake is actuated after approx. 1.5 seconds. However, when stopping on slopes, to prevent the machine from moving down under its own weight before the automatic brake is applied, set the travel/stop lever to the neutral position, then turn the brake switch (10) to the ON position.

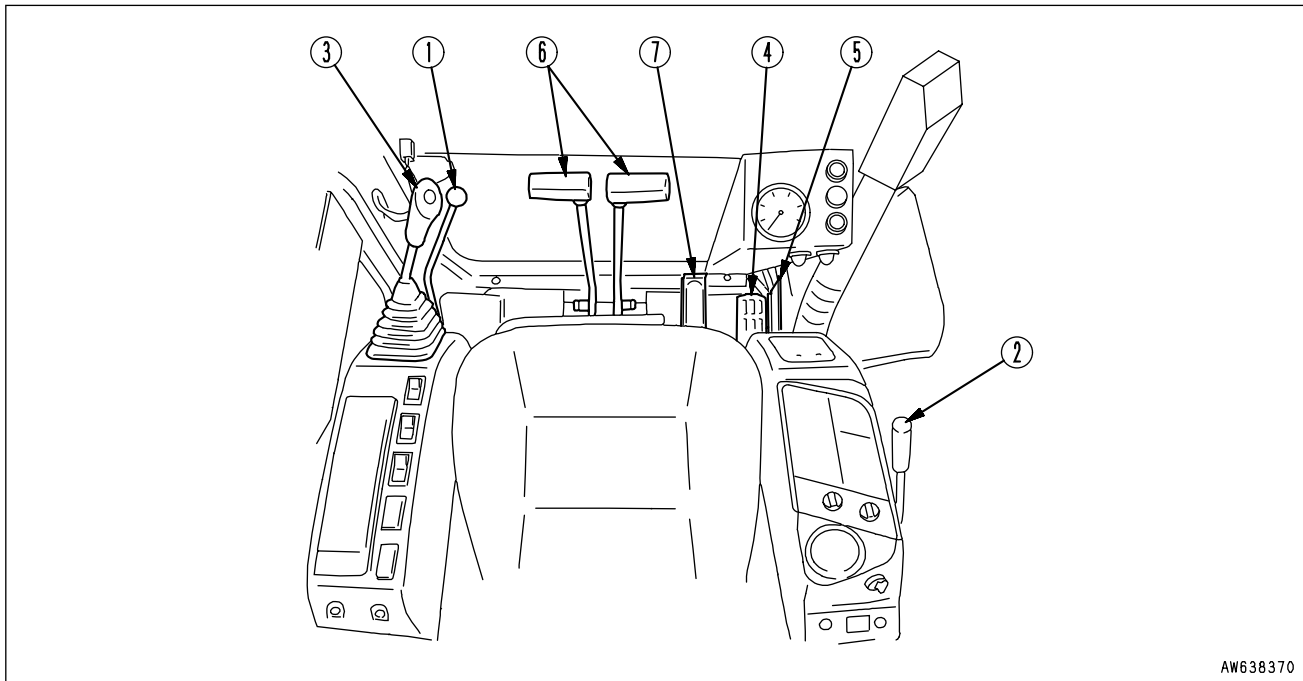
ON position: Press the switch in to actuate the travel parking brake. The travel, swing, and body controls are locked.

When the switch is used, the brake switch indicator lamp lights up.

CANCEL position: Turn the switch 75° to the right to cancel the switch.



## CONTROL LEVERS AND PEDALS



AW638370

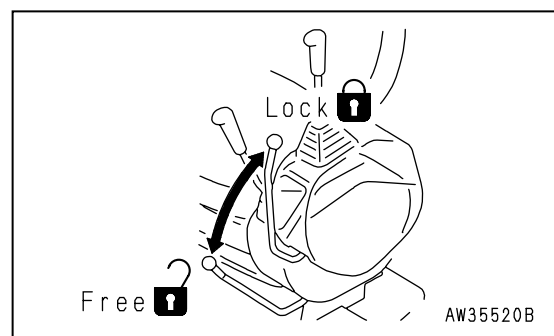
- |                             |  |
|-----------------------------|--|
| (1) Safety lock lever       | (5) Pedal lock (for dump body control pedal) |
| (2) Fuel control lever      | (6) Travel lever                             |
| (3) Swing control lever     | (7) Deceleration pedal                       |
| (4) Dump body control pedal |  |

## SAFETY LOCK LEVER

### WARNING

- When standing up from the operator's seat, always set the safety lever securely to the LOCK position. If the control levers and pedals are not locked and are touched by accident, it may lead to serious injury or damage.
- If the safety lock lever is not placed securely in the LOCK position, the travel lever may not be properly locked. Confirm that it is set as shown in the figure.

This lever (1) is used to lock travel, swing and dump body control lever.

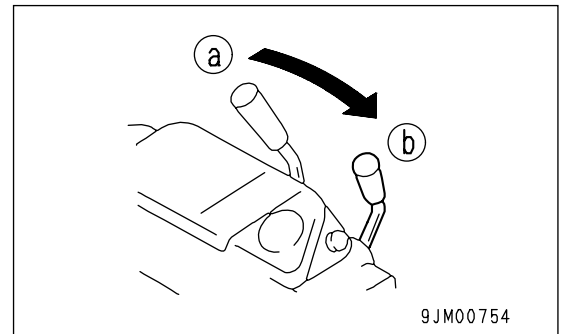


AW35520B

## FUEL CONTROL LEVER

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

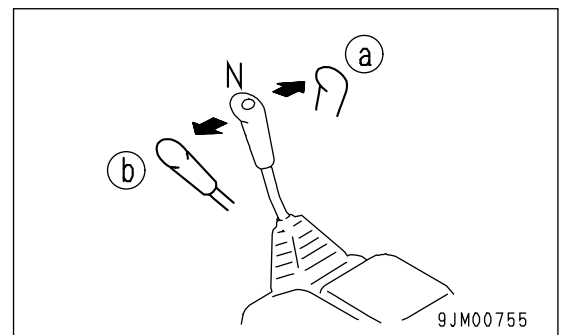
- (a) Low idling position: Push the lever forward fully.
- (b) High idling position: Pull the lever fully



## SWING CONTROL LEVER

This lever (3) is used to operate the upper structure.

- (a) Swing to right
- (b) Swing to left
- N (Neutral) : When the lever in this position, the upper structure will be retained in the position in which they stop.

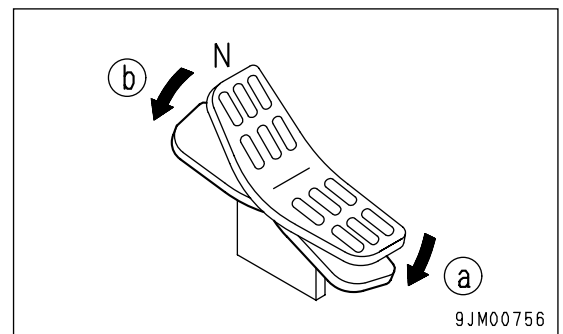


## DUMP BODY CONTROL PEDAL

This pedal (4) is used to raise or lower the dump body.

Dump body pedal

- (a) RAISE
- (b) LOWER
- N (Neutral) : The dump body is stopped and held in position.





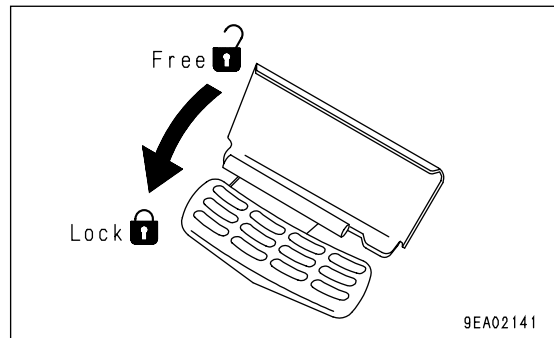
## PEDAL LOCK (FOR DUMP BODY CONTROL PEDAL)

**⚠ WARNING**

Set the pedal lock to the LOCK position when not raising or lowering the dump body.

If you touch the control pedal by mistake when it is not locked, it may cause a serious accident.

This lock (5) is used to lock the dump body control pedal.  
When the cover is fitted on top of the pedal, the pedal is locked.



9EA02141

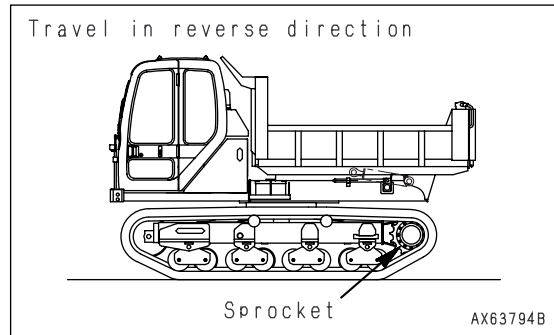
## TRAVEL LEVERS

**⚠ WARNING**

When the track frame is directed back, the operation of the travel lever is reversed.

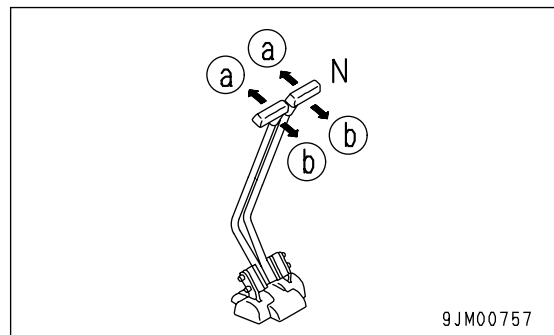
When operating the travel lever, confirm the direction of the track frame (It is directed backward when the sprocket is at the rear of the operator's seat).

This lever (6) is used to drive and stop the machine.



AX63794B

- (a) FORWARD: The lever is pushed forward
- (b) REVERSE: The lever is pulled back
- N (Neutral): The machine stops



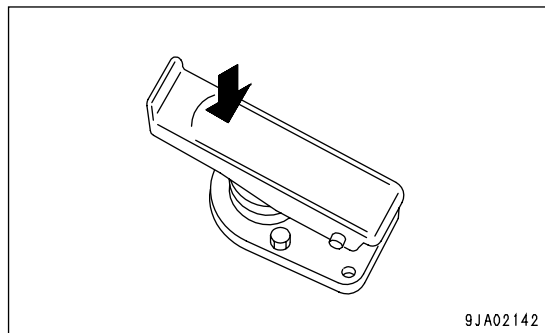
9JM00757

## DECELERATION PEDAL

### WARNING

- Do not place your foot on this pedal unnecessarily.
- When passing over the top of a hill, 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.

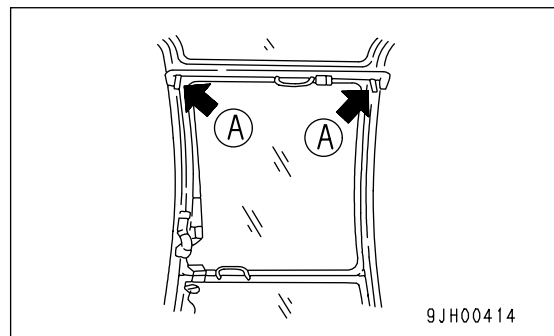
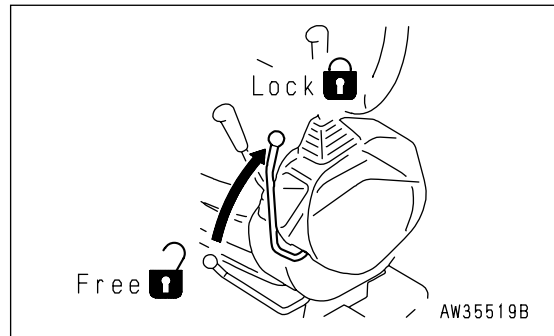
This pedal (7) is used to lower the engine speed. Depress this pedal to reduce the speed when shifting between forward and reverse or when stopping the machine.



## WINDSHIELD

### ⚠ WARNING

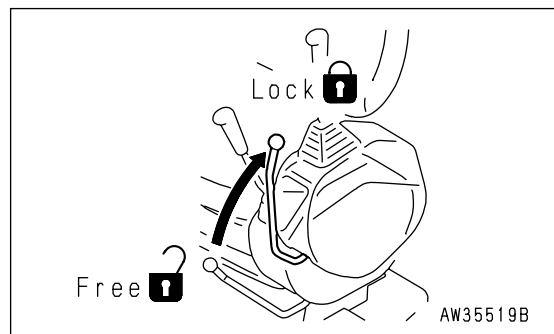
- When opening or closing the front window or door, always set the safety lock lever to the LOCK position. If the control levers are not locked and they are touched by accident, this may lead to a serious accident.
- When opening the front window, hold the grip securely with both hands, pull up, and do not let go until the automatic lock catch is locked.
- There is danger that it will fall, so always lock it with left and right lock pins (A).
- When closing the front window, the window will move quicker under its own weight. Hold the grip securely with both hands when closing it.



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

## OPENING

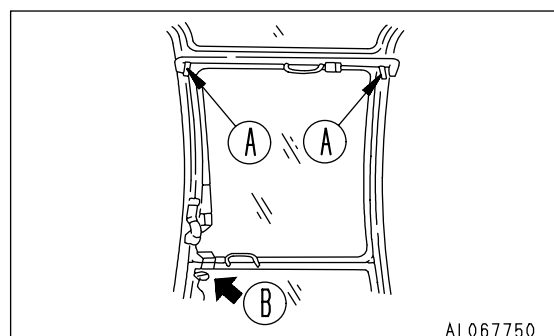
1. Stop the machine on level ground, then stop the engine.
2. Set the lock lever securely to the LOCK position.



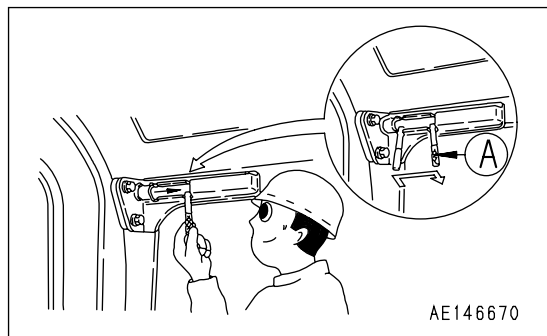
3. Disconnect the wiring for the wiper motor from socket (B).

### NOTICE

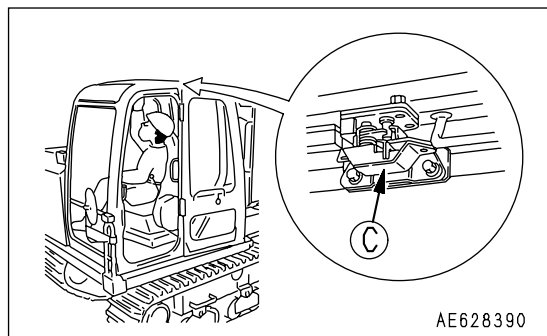
If it is attempted to open the front window without disconnecting the wiring, the wiring will be torn off.



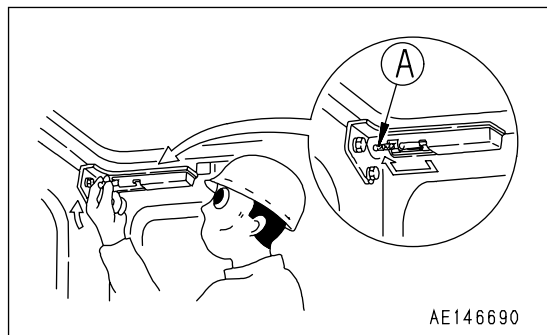
4. Pull lock pins (A) at the top left and right sides of the front window to the inside to release the lock.



5. From the inside of the operator's cab, hold the bottom grip with your left hand and the top grip with your right hand, pull up the window, and push it securely into catch (C).

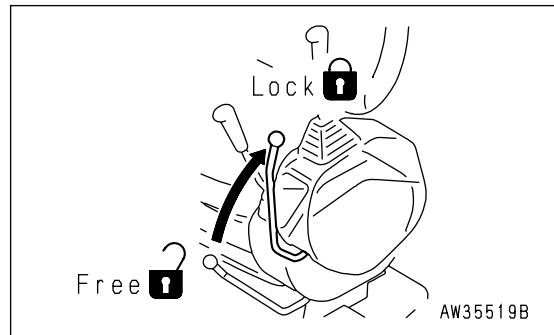


6. Insert left and right lock pins (A) securely to lock it in position.

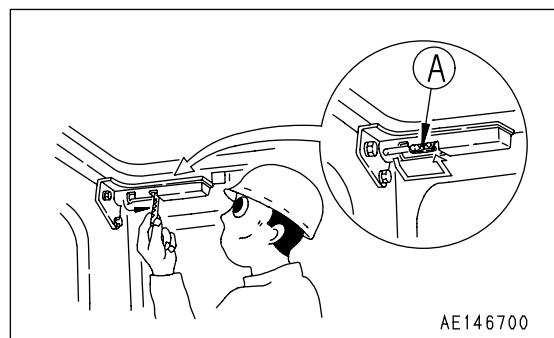


### CLOSING

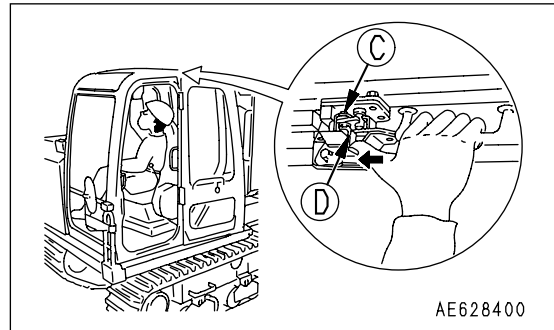
1. Stop the machine on level ground, then stop the engine.
2. Lock the safety lock lever securely.



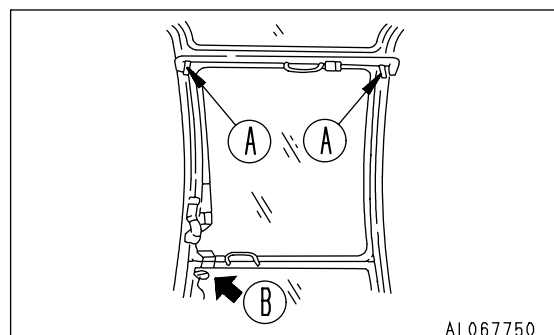
3. Release lock pins (A).



4. Hold the grip at the bottom of the front window with your left hand and the grip at the top with your right hand, release the lock of catch (C) with your right thumb, then pull the top grip slowly and lower the front window. When releasing the lock of catch (C), push release lever (D) in the direction of the arrow to release the lock.

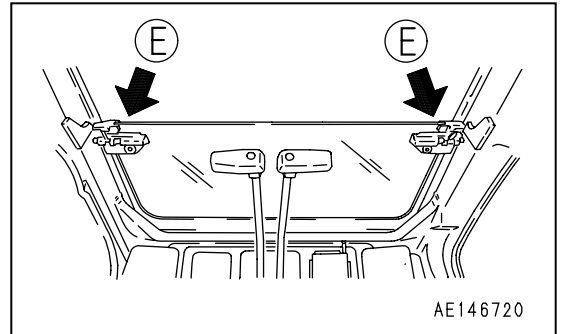


5. Lock securely with lock pins (A) at the left and right sides.
6. Connect the wiper motor wiring to socket (B).

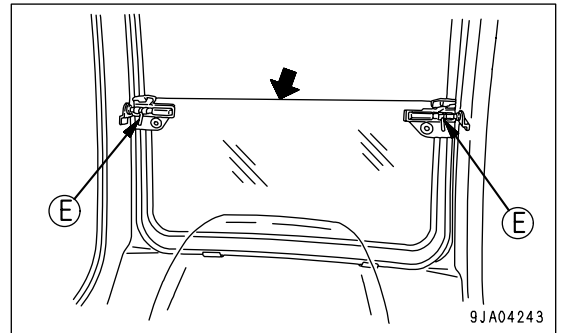


## LOWER WINDSHIELD

With the front window open, remove lock pins (E), and the bottom part of the front window can be removed.



Stop the removed bottom part of the front window at the rear of the operator's cab and lock with lock pins (E).

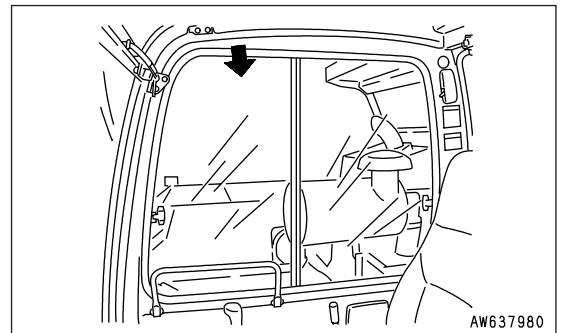


## SLIDING WINDOW

### ⚠ CAUTION

Do not put your head or hands out of the window when traveling or during operations.

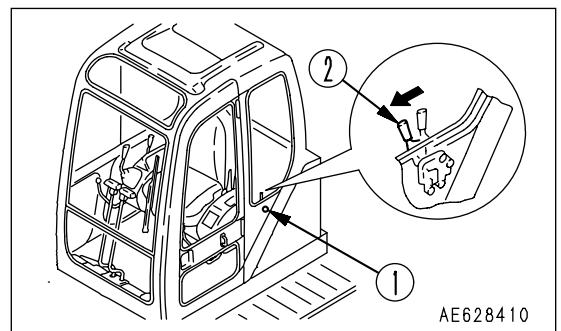
The window on the right side of the cab can be opened.



## DOOR LOCK

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

1. Push the door against catch (1) to fix it in position.
2. To close the door, pull knob (2) forward at the left side of the operator's seat to release the catch.
3. When fixing the door in position, fix it firmly to the catch.

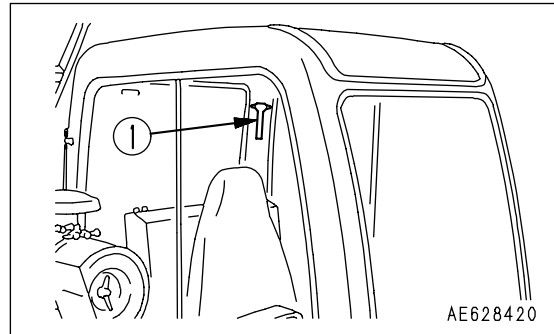


## EMERGENCY ESCAPE HAMMER

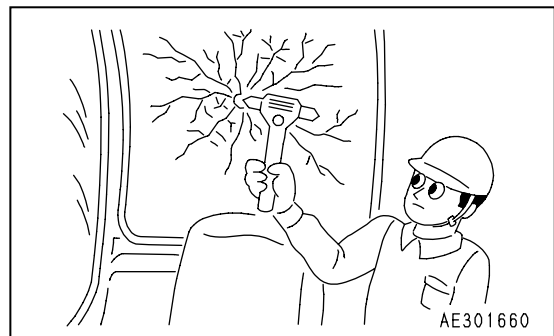
### NOTICE

When escaping, remove the broken pieces of the glass from the sash so that you will not cut yourself with them. Take care not to slip on the broken and scattered pieces.

In case it becomes impossible to open the door, a hammer (1) to be used for escape from the cab is installed.



When escaping, break the window glass with hammer (1).

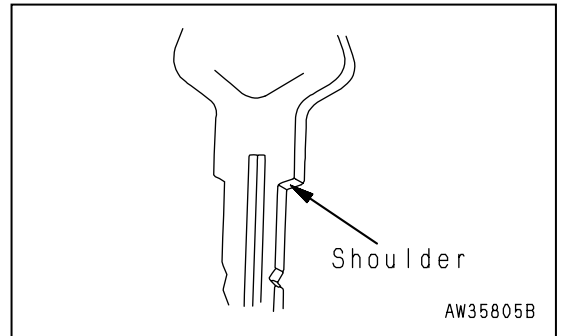


## CAP, COVER WITH LOCK

The fuel tank cap, cab door opener and side cover are equipped with locks.

Use the starting switch to open those caps and covers.

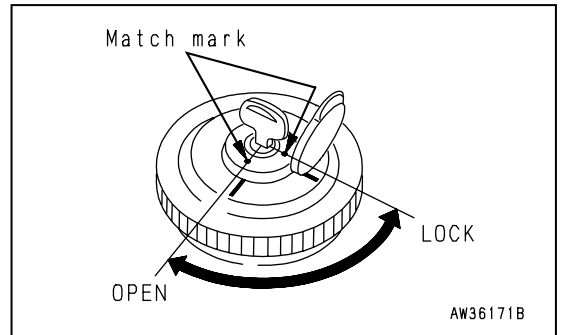
Insert the key as far as it will go to the shoulder. If the key is turned before it is inserted all the way, it may break.



## METHOD OF OPENING AND CLOSING CAP WITH LOCK (Fuel tank cap)

### TO OPEN THE CAP

1. Insert the key into the key slot.
2. Turn the key clockwise, align the key slot with the match mark on the cap, then open the cap.



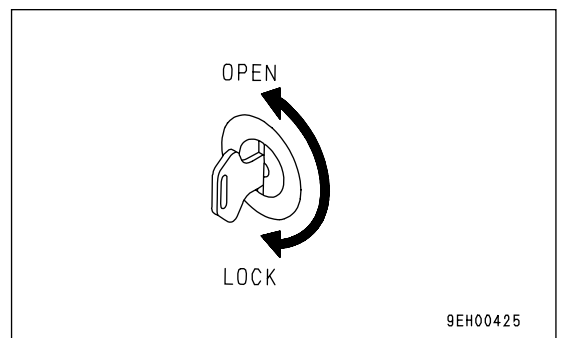
### TO LOCK THE CAP

1. Turn the cap into place and insert the key into the key slot.
2. Turn the key counterclockwise and take the key out.

## METHOD OF OPENING AND CLOSING COVER WITH LOCK

### TO OPEN THE COVER(LOCKED COVER)

1. Insert the key into the key slot.
2. Turn the key counterclockwise and open the cover by pulling the cover grip.



### TO LOCK THE COVER

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



## BODY SUPPORT ROD

### WARNING

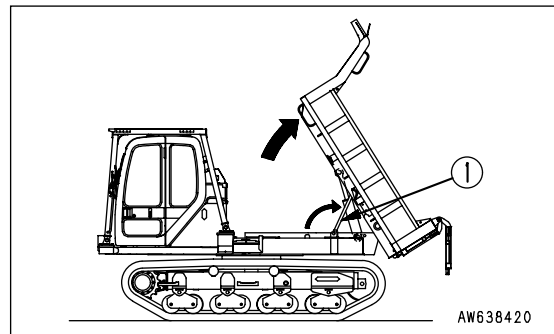
When carrying out inspection or maintenance with the body raised, first raise the body, then lock the body control pedal, and finally set the body support rod securely in position.

### NOTICE

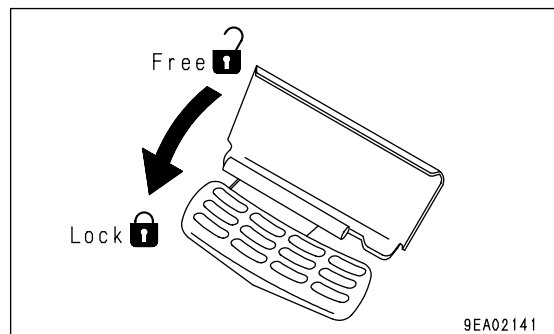
After completing inspection or maintenance with the body raised, remove the body support rod, then lower the body. If the body is lowered before the body support rod is removed, the body or rod will be damaged.

This is a safety device for the body, and acts to prevent the body from coming down when inspection or maintenance operations are carried out with the body raised.

1. Raise the body to the maximum height.
2. Set body support rod (1) securely in position.



3. Set the pedal lock to the LOCK position to prevent the body from being operated by mistake.



## STOWING BODY SUPPORT ROD

Stow body support rod (1) in its original position.

### REMARK

If body support rod (1) is caught in the body and cannot be removed, raise the body again to the maximum height and remove the rod.

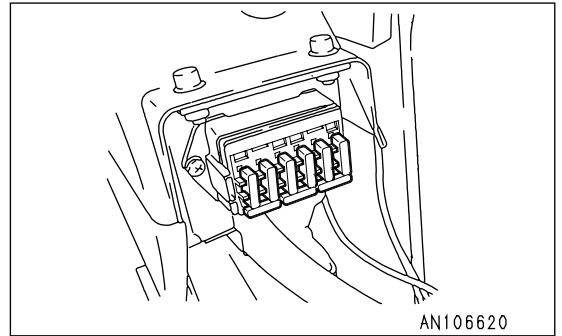
# FUSE

**NOTICE**

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

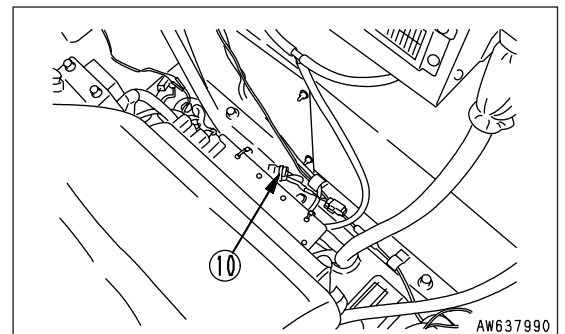
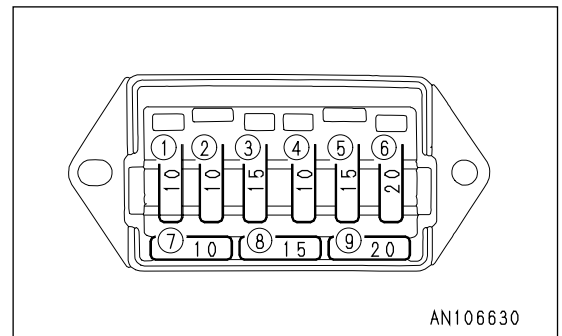
The fuses protect the electrical equipment and wiring from burning out.

If the fuse becomes corroded, or white powder can be seen, or the fuse is loose in the fuse holder, replace the fuse. Replace a fuse with another of the same capacity.



## FUSE CAPACITY AND CIRCUIT NAME

No.	Fuse capacity	Name of circuit
(1)	10A	Radio
(2)	10A	Controller, Monitor panel, Solenoid valve
(3)	15A	Wiper, Reverse travel indicator lamp switch, Center indicator lamp, Horn, Room lamp, Washer, Back-up alarm
(4)	10A	Head lamp
(5)	15A	Heater
(6)	20A	Spare
(7)	10A	Spare
(8)	15A	Spare
(9)	20A	Spare
(10)	15A	Electric power take-out adapter (FB2)

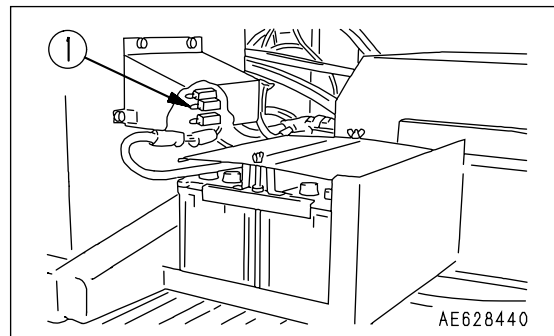


## FUSIBLELINK

If the starting motor does not move even when the starting switch is turned to the ON position, there is probably a break in the wire-shaped fusible link (1), so open the engine hood and check or replace.

### REMARK

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

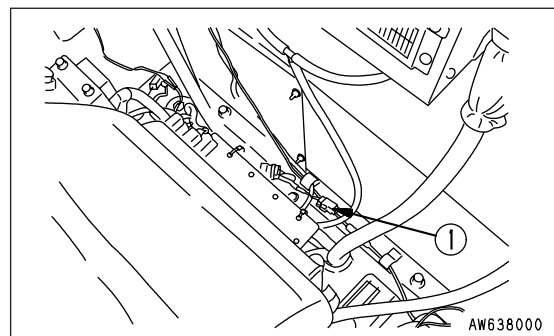


## POWER SUPPLY TAKE-OFF PORT

### NOTICE

When installing electric equipment other than that provided by Komatsu, use equipment with a maximum of 36W (15A or equivalent) on the 24V specification machine. If any electrical equipment with a larger capacity used to be used, please contact your Komatsu distributor.

The power supply take-off connector (1) (M30) for options is at the bottom rear of the operator's compartment.



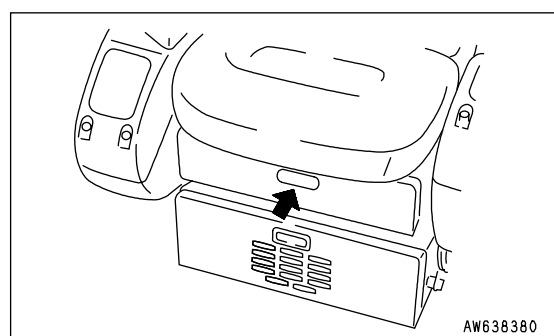
For details of the type of connector, see the table below.

	M type housing (2-pin)		Terminal		
	Body	Rear holder	AVS 0.5	M.AVS 0.85-2	M.AVS3
Komatsu Part No.	08056-00211	08056-00230	08056-00050	08056-00051	08056-00052

## TOOL BOX

This is under the operator's seat.

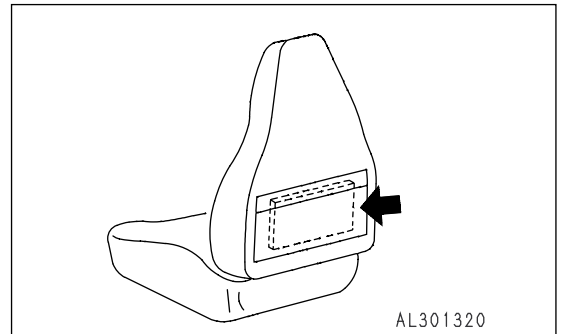
This is used for keeping the tools.



## OPERATION MANUAL STORAGE

There is a pocket in the back of the operator's seat for keeping the Operation and Maintenance Manual.

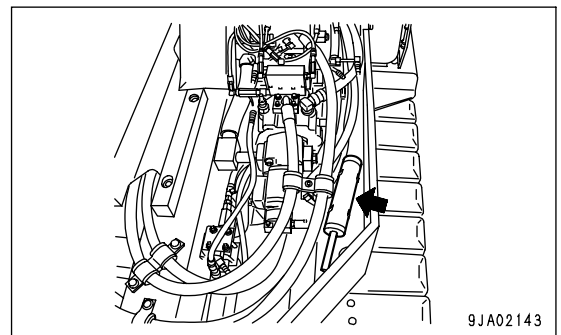
Keep the Operation and Maintenance Manual in the pocket so that it is possible to use it whenever it is needed.



## GREASE GUN HOLDER

This is inside the right pump cover on the machine.

When not using the grease pump, fit it in this holder.



## HANDLING ACCUMULATOR

### **⚠ WARNING**

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

- The pressure in the control circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in 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.

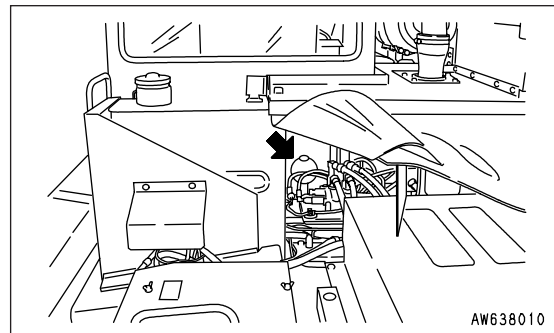
Do not make holes in it or weld it.

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.

This machine is equipped with an accumulator in the control circuit. The accumulator is a device to store oil pressure for the control circuit, and when it is installed, the control circuit can be actuated for a short time even after the engine is stopped. Due to this device, the work equipment lowers under its own weight, if the control lever is moved in the lowering direction.

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



## METHOD FOR RELEASING PRESSURE IN ACCUMULATOR CONTROL CIRCUIT

### **⚠ WARNING**

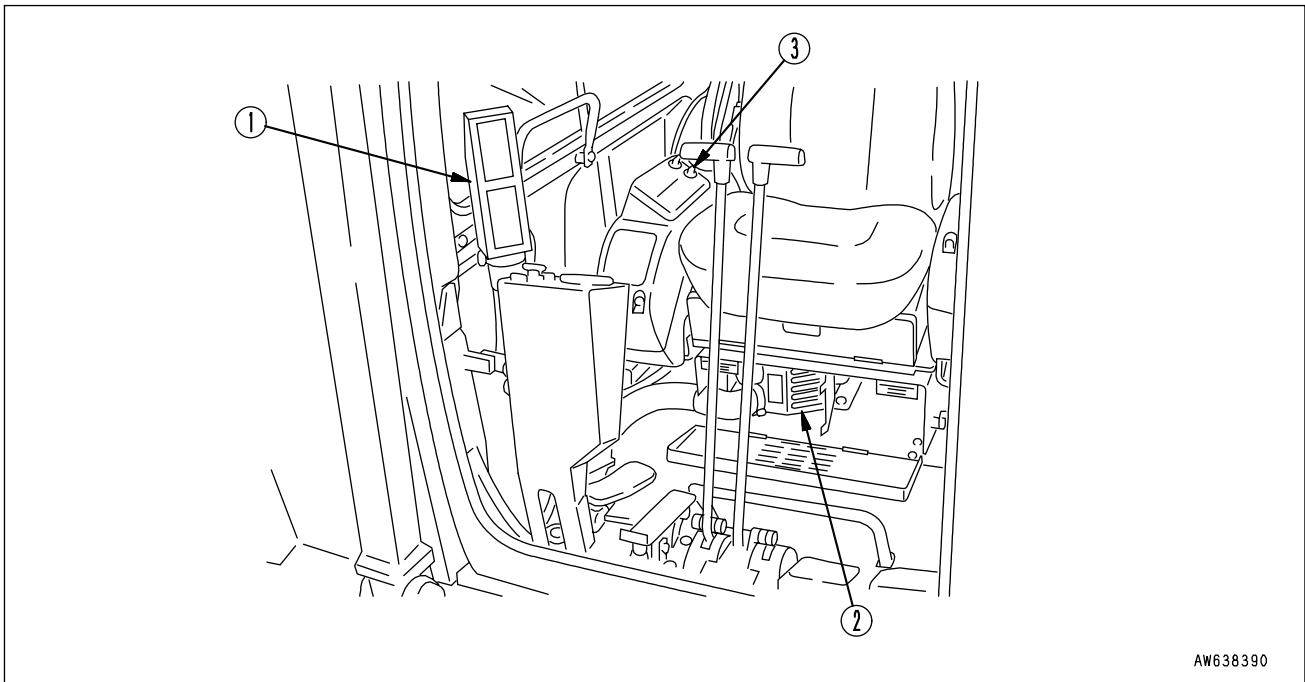
- The hydraulic system is always under internal pressure, so when inspecting or replacing the piping or hoses, always release the pressure in the circuit before starting. If the pressure is not released, high-pressure oil may spurt out and cause serious personal injury.
- When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the pressure before removing the cap.
- Take note, however, that the remaining internal pressure can hardly be released completely. When disconnecting the hydraulic circuit for the work equipment, therefore, loosen the screw slowly and do not stand in the direction that oil may spurt out.

1. Stop the machine on firm level ground.
2. Lower the dump body until it contacts the stopper.
3. Stop the engine, then remove the key from the starting switch.

4. To release the internal pressure, operate the blade control lever in each direction to the end of its stroke within 15 seconds after stopping the engine.
5. Set the safety lock lever to the LOCK position.
6. Loosen oil filler cap (F) at the top of the hydraulic tank slowly to release the internal pressure.

# CAR HEATER AND DEFROSTER CONTROLS

## CONTROL PANEL



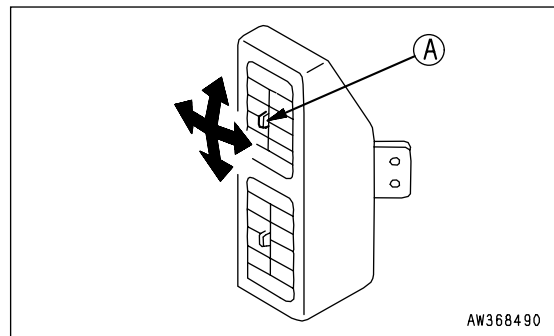
AW638390

- (1) Hot air vent (window side)
- (2) Hot air vent (foot)

- (3) Wind volume selector switch

### HOT AIR VENT

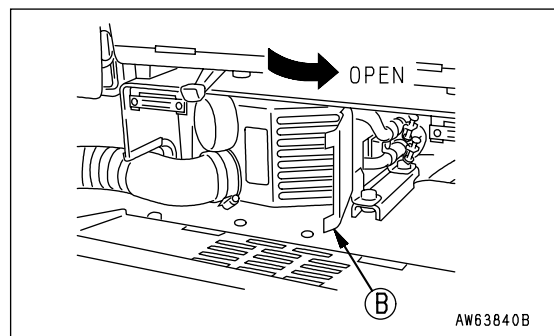
This equipment (1) is used to remove the mist from the window. It is possible to change the direction of the vent by adjusting with knob (A).



AW368490

### FOOT VENT

When cover (B) of this equipment (2) is opened, hot air will flow to the operator's feet.



AW63840B

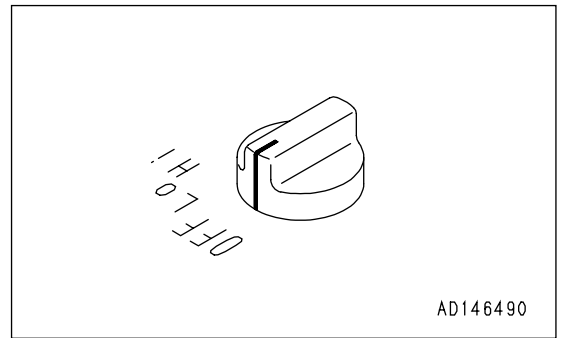
**WIND VOLUME SELECTOR SWITCH**

This switch (3) can be used to adjust the flow of hot air to 2 levels.

H position : High

L position : Low

The air is heated by the hot water from the engine, so it can be used when the engine cooling water is warmed up.





# OPERATION

## CHECK BEFORE STARTING ENGINE, ADJUST

### WALK-AROUND CHECK

#### 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.

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 dump body, cylinders, linkage, hoses

Check that there are no cracks, excessive wear, or play in the dump body, 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 oil leakage of oil from hydraulic equipment, hydraulic tank, hose, joints

Check that there is no oil leakage. If any abnormality is found, repair the place where the oil is leaking.

5. Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers

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, monitor, loose bolts

Check that there is no damage to the gauges and monitor in the operator's cab. If any abnormality is found, replace the parts. Clean off any dirt on the surface.

8. Check for damage or displaced window

Check that there is no damage or displacement of the window. If any damage is found, replace with a new part. If the window comes out of position or breaks during operations, do not continue operations. Stop immediately and repair the window.

9. Clean rear view mirror, check for damage

Check that there is no damage to the rear view mirror. If it is damaged, replace it with a new mirror. Clean the surface of the mirror and adjust the angle so that the view to the rear can be seen from the operator's seat.

10. 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

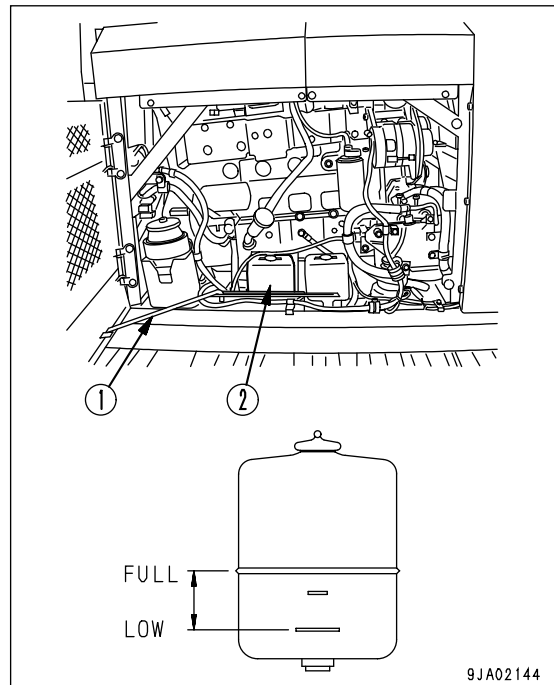
Always carry out the items of the checks in this section before starting the engine.

### CHECK COOLANT LEVEL, ADD WATER

#### WARNING

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

1. Open the side cover and lock it in position securely with side cover support lever (1).
2. Check that the cooling water level is between the FULL and LOW marks on radiator sub-tank (2) (shown in the diagram on the right). If the water level is low, add water through the water filler of sub-tank (2) to the FULL level.
3. After adding water, tighten the cap securely.
4. If the sub-tank is empty, check for water leakage and check the water level in the radiator. If the water level is low, add water to the radiator first, then to the sub-tank.



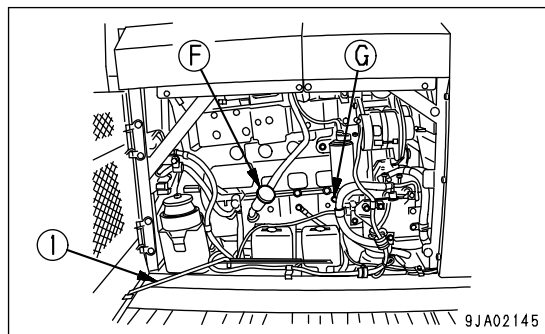
9JA02144

## CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

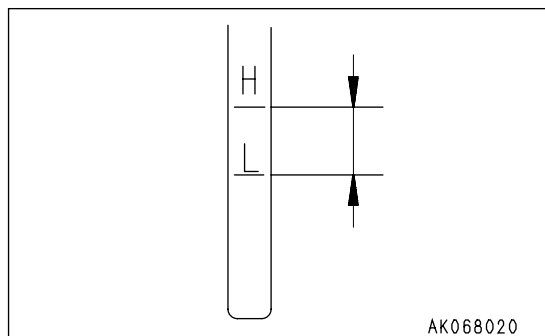
**⚠ WARNING**

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

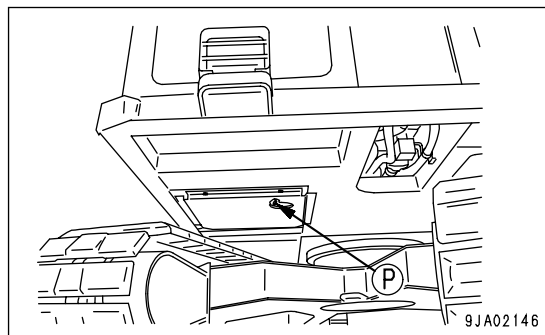
1. Open the side cover and lock it in position securely with side cover support lever (1).
2. Remove dipstick(G) and wipe the oil off with a cloth.
3. Insert dipstick(G) fully in the oil filler pipe, then take it out again.



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, drain the excess engine oil from drain plug(P) at bottom of machine, and check the oil level again.
6. If the oil level is correct, tighten the oil filler cap securely and close the 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.

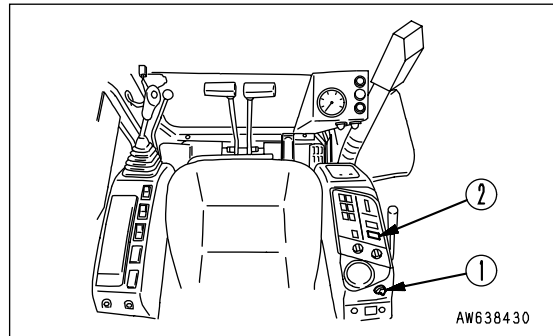
If the machine is at an angle, make it horizontal before checking.

**CHECK FUEL LEVEL, ADD FUEL**

**⚠ WARNING**

**When supplying fuel, take care not to spill it. It can catch fire.  
Wipe off any spilt fuel. If fuel has spilt over soil or sand, remove that soil or sand together.  
Fuel is highly flammable and dangerous. Do not bring fire near fuel.**

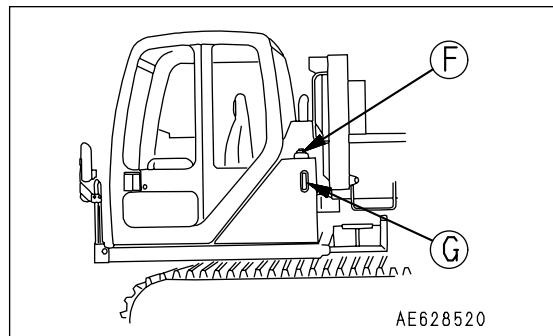
1. Turn starting switch (1) to the ON position, light up the machine monitor, and check the fuel level with fuel level gauge(2). After checking, turn the switch back to the OFF position.



2. If the fuel level is low, watch sight gauge (G) and add fuel through fuel filler port (F).

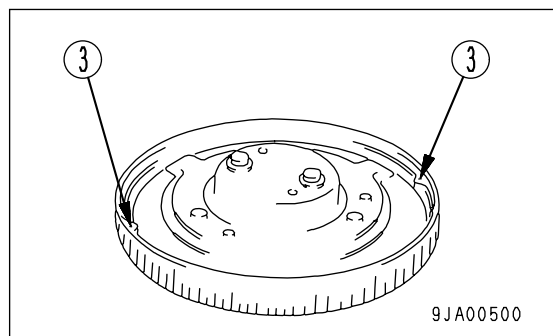
Fuel capacity: 130 liters (34.32 US gal)

3. After adding fuel, tighten the cap securely.



**REMARK**

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

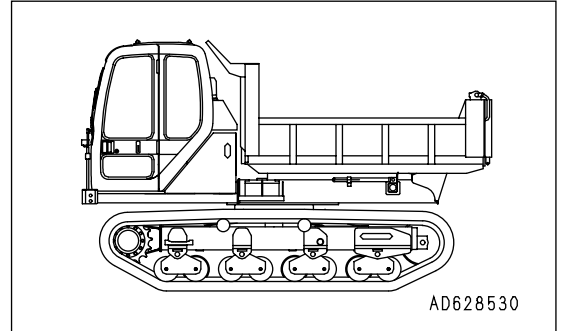


## CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

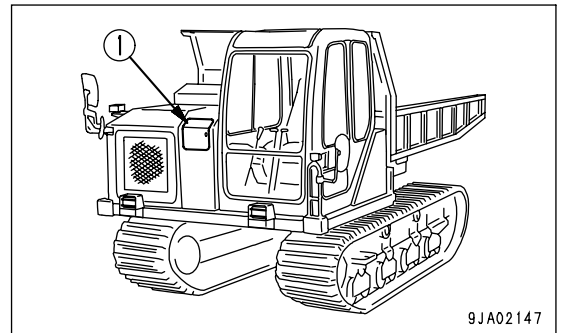
**⚠ WARNING**

When removing the oil filler cap, oil may spurt out, so turn the cap slowly to release the internal pressure before removing the cap.

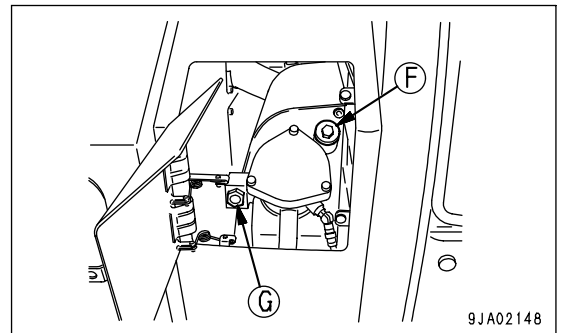
1. If the machine is not in the condition shown in the diagram on the right, start the engine, run the engine at low speed, then lower the dump body, and stop the engine.



2. Open inspection cover (1) at front of machine.

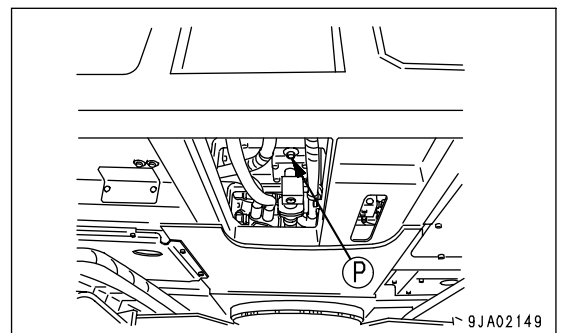


3. Check sight gauge (G). The oil level is normal if between the H and L marks.

**NOTICE**

Do not add oil if the level is above the H line. This will damage the hydraulic equipment and cause the oil to spurt out. If oil has been added to above the H mark, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from drain plug (P).

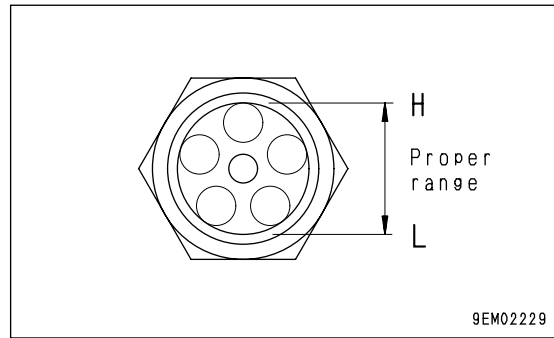
4. If the level is below the L mark, add oil through oil filler (F).



**REMARK**

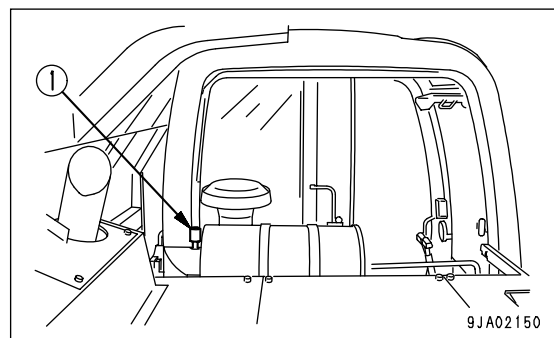
The oil level will vary depending upon the oil temperature. Accordingly, use the following as a guide:

- Before operation: around L level  
(Oil temperature 10 to 30°C (50 to 86°F))
- Normal operation: around H level  
(Oil temperature 50 to 80°C (122 to 176°F))

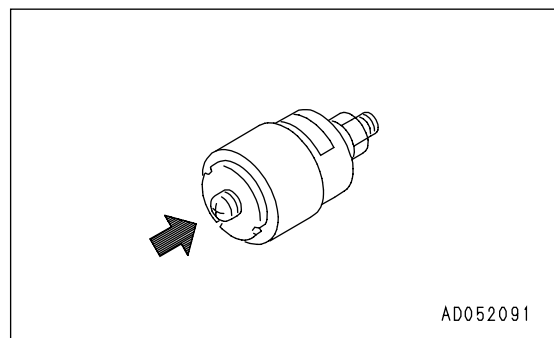


**CHECK DUST INDICATOR**

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 4-20)".



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



## CHECK ELECTRIC WIRINGS

### WARNING

- If the fuses frequently blow or if there are traces of short circuits on the electrical wiring, locate the cause immediately and carry out repairs, or contact your Komatsu distributor for repairs.
- If flammable materials (dead leaves, twigs, dry grass, etc.) accumulate around the battery, they will cause fire, so always remove such material immediately.
- 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 clean the breather hole.

Check that there is no damage to the fuses and that a fuse of the correct capacity is being used. Check that there are no disconnections or traces of short circuits on the electrical wiring. Check also that there are no loose terminals.

Tighten any loose terminals.

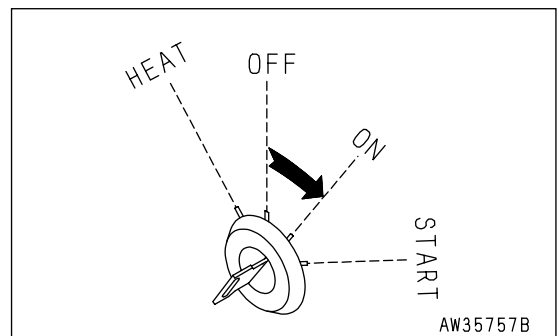
Be particularly careful to check the wiring of the battery, starting motor, and alternator.

Always check also that there is no flammable materials accumulated around the engine. Remove any such flammable materials.

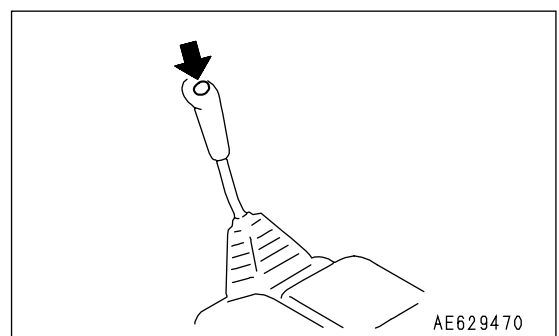
Please contact your Komatsu distributor for advice on investigation and correction of the cause.

## CHECK SOUND OF HORN

1. Turn the starting switch to the ON position.



2. Press the horn switch and check that the horn sounds immediately.  
If the horn does not sound, please contact your Komatsu distributor for repair.





## ADJUSTMENT

### ⚠ WARNING

- Adjust the seat position at the beginning of each shift or when operators change.
- Adjust the seat so that the control levers and switches can be operated freely and easily with the operator's back against the backrest.

### ADJUST OPERATOR'S SEAT

#### (A) Fore-and-aft adjustment

The seat and the left and right console boxes slide to the front and rear.

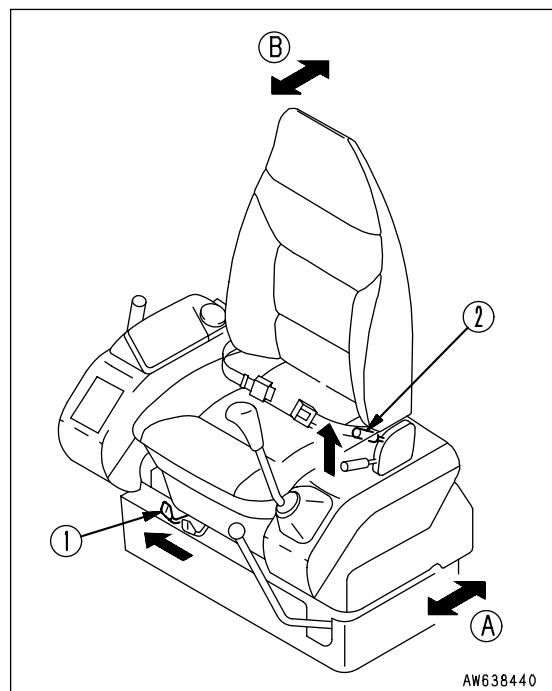
Move lever (1) to the right, set the operator's seat at the desired position, then release the lever.

Fore-and-aft adjustment : 160 mm (1.63 in) (9 stages)

#### (B) Adjuster reclining angle

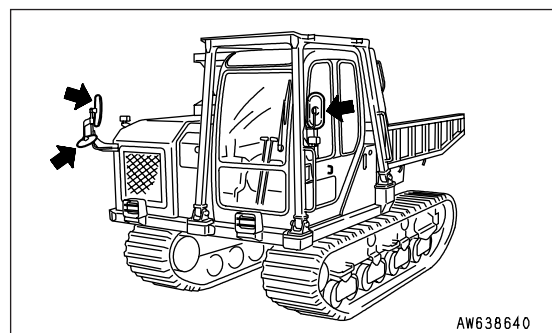
Pull lever (2) up, adjust the seat back to a position where it is comfortable to operate, then release the lever.

When adjusting, keep your back pushed against the seat back. If your back is not contact with the seat back, it may suddenly spring forward.



### ADJUST REAR VIEW MIRROR, UNDER MIRROR

Adjust the rear view mirror and under mirror so that you can see the area to the rear and front of the operator's cab clearly when sitting in the operator's seat.



## USING SEAT BELT

Always install a seat belt on machines equipped with ROPS.

### WARNING

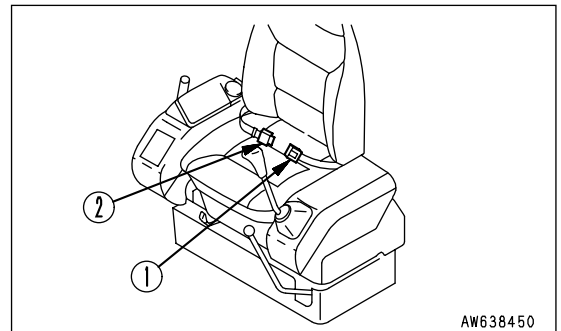
- Before fitting the seat belt, check that there is no abnormality in the mounting bracket and mounting belt of the belt. If the belt is worn or damaged, replace it.
- Replace the seat belt every three years, even if their outside is free from abnormality. The year of manufacture is woven on the back side of the belt.
- Always fasten the seat belt before starting operations.
- Always use the seat belt during operations.
- Do not twist the seat belt when fastening it.

Check that the bolts of the clamp securing the belt to the chassis are not loose. Tighten them if they are loose. The tightening torque for the mounting bolt is  $24.5 \pm 4.9 \text{ N}\cdot\text{m}$  ( $2.5 \pm 0.5 \text{ kgf}\cdot\text{m}$ ,  $18.1 \pm 3.6 \text{ lbf}\cdot\text{ft}$ ).

If the belt surface is scratched or frayed or if the fittings are broken or deformed, replace the seat belt unit.

### FASTENING AND REMOVING BELT

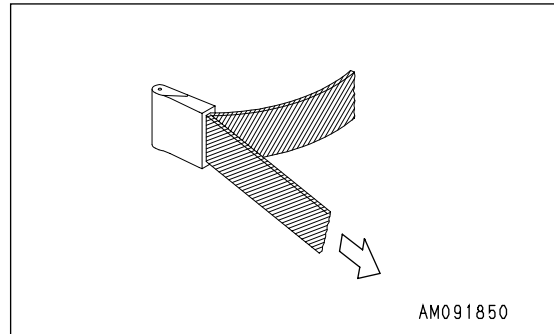
1. Sit in the seat with your back against the seat back, and adjust the belt so that it is easy to carry out operations.
2. After adjusting the seat position, sit in the seat. Grip buckle (1) and tongue (2) in each hand and insert tongue (2) into buckle (1). Confirm by pulling the belt that the tongue is securely locked to the buckle.
3. When removing the belt, raise the tip of buckle (1) lever to release it.



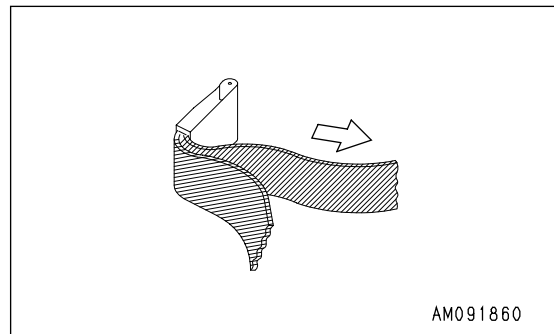
Fasten belt along your body without kinking it. Adjust the lengths of the belt on both the buckle and the tongue sides so that the buckle is located at the mid-point of your body front.

**SEAT BELT ADJUSTMENT****SHORTENING**

Pull the free end of the belt on either the buckle body or tongue side.

**LENGTHENING**

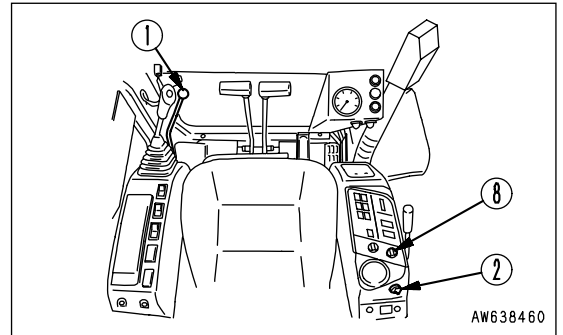
Pull the belt while holding it at a right angle to the buckle or tongue.



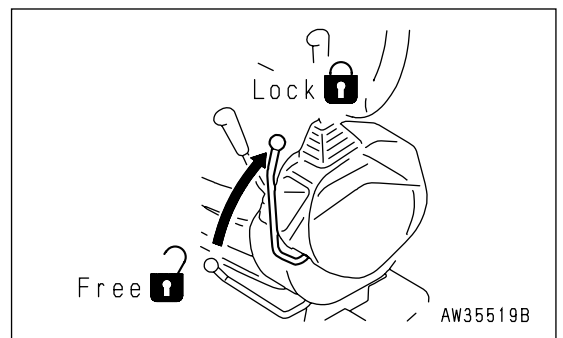
## OPERATION AND CHECK BEFORE STARTING ENGINE

### WARNING

- When starting the engine, check that the safety lock 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 accident.
- 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 safety lock lever (1) is at the LOCK position.
2. Check the position of each lever.

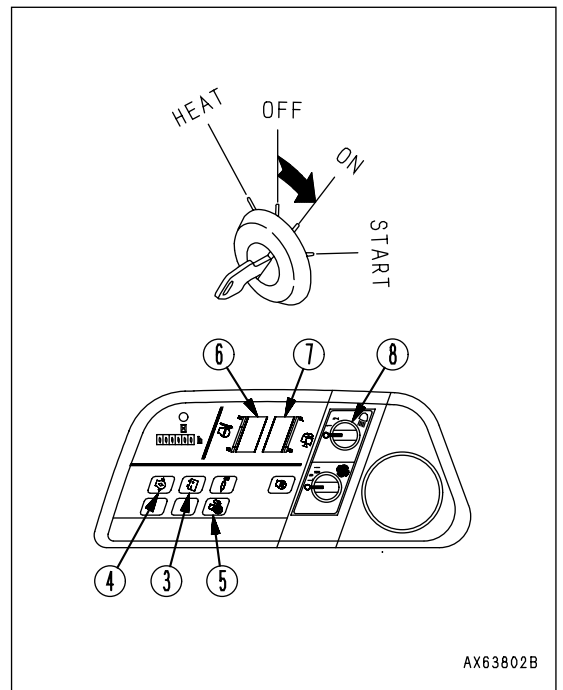


3. Insert the key in starting switch (2), turn the key to the ON position, then carry out the following checks.
  - 1) The buzzer sounds for about one second and the following monitors and meters light up for about 3 seconds.
    - Charge level monitor (3)
    - Engine oil pressure monitor (4)
    - Swing lock monitor (5)
    - Engine water temperature gauge (6)
    - Fuel level gauge (7)

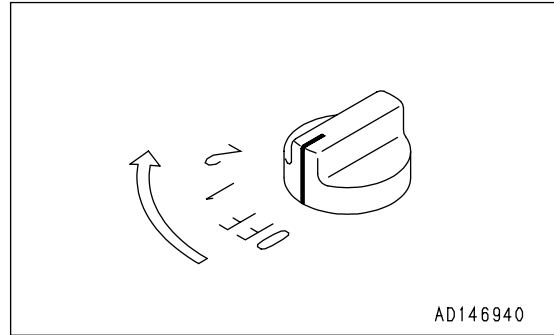
If the monitors or gauges do not light up or the buzzer does not sound, there is probably a broken bulb or disconnection in the monitor wiring, so contact your Komatsu distributor for repairs.

After approx. 3 seconds, only the following meters will light up; the other lamps will go out.

- Charge level monitor (3)
- Engine oil pressure monitor (4)
- Engine water temperature gauge (6)
- Fuel level gauge (7)



- 2) Turn lamp switch (8) to turn on the work lamps.  
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.

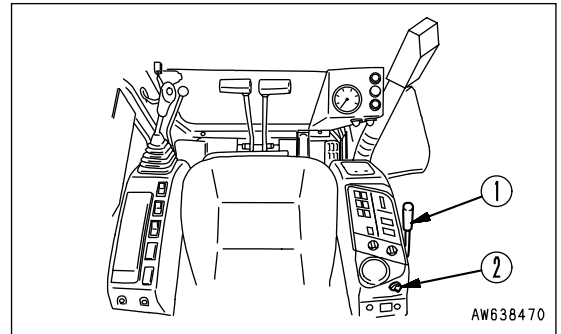


## STARTING ENGINE

### NORMAL STARTING

#### WARNING

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

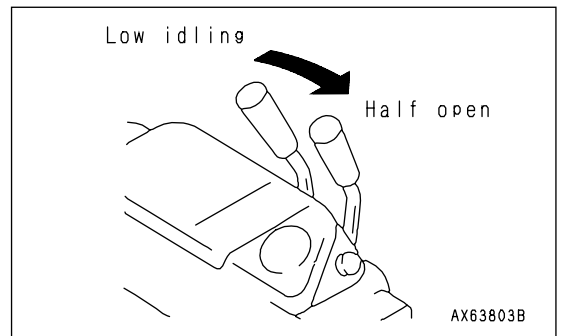


#### NOTICE

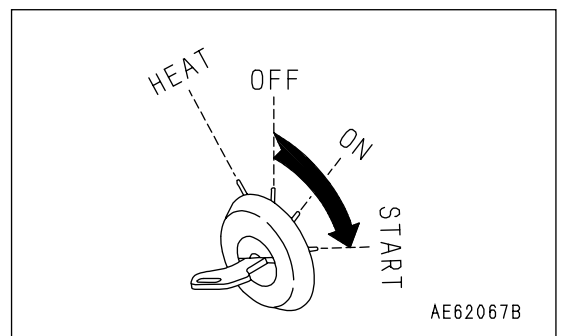
Do not keep the starting motor rotating continuously for more than 20 seconds.

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

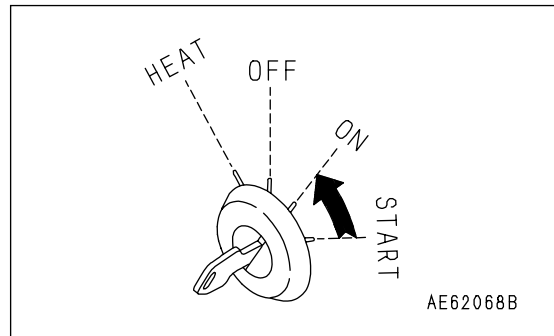
1. Pull fuel control lever(1) to a position midway between the low idling and full speed positions.



2. Turn the key in starting switch(2) to START position. The engine will start.



3. When the engine starts, release the key in starting switch(2). The key will return automatically to the ON position.

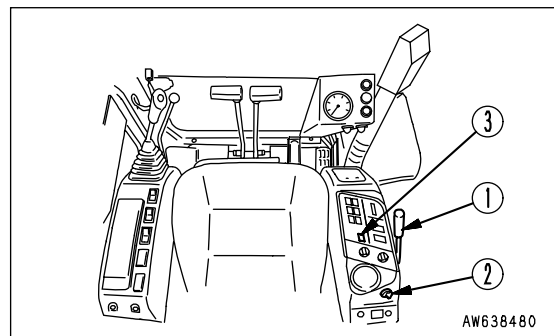


## STARTING IN COLD WEATHER

When starting in low temperatures, do as follows.

### WARNING

- Start the engine only after sitting down in the operator's seat.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.
- Never use starting aid fluids as they may cause explosions.
- Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.

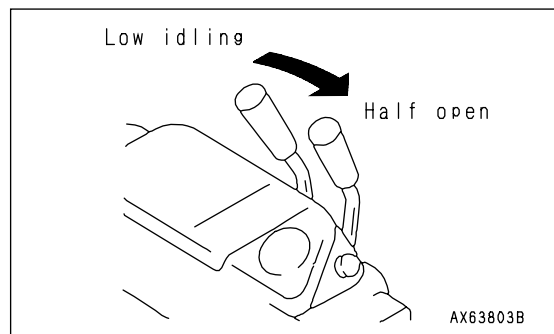


### NOTICE

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

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

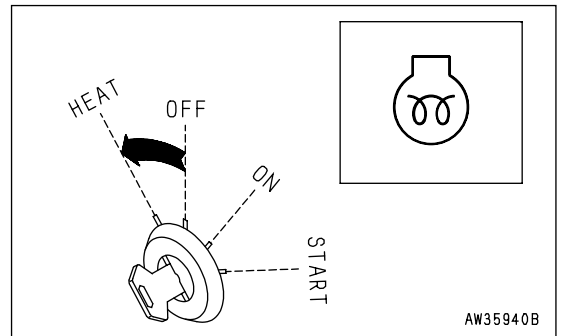
1. Pull fuel control lever(1) to a position midway between the low idling and full speed positions.



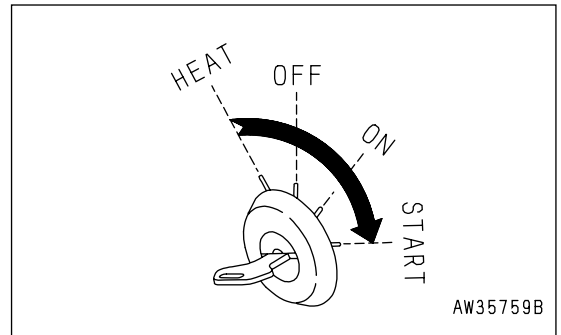
2. Hold the key in starting switch (2) at the HEAT position, and check that preheating monitor (3) lights up. After about 30 seconds, preheating monitor (3) will flash for about 10 seconds to indicate that preheating is finished.

**REMARK**

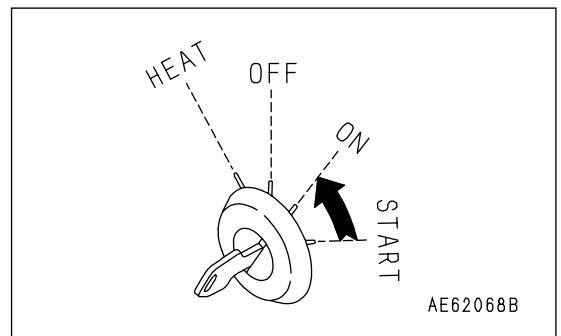
The monitor and gauge also light up when the key is at the HEAT position, but this does not indicate any abnormality.



3. When preheating monitor (3) goes out, turn the key in starting switch (2) to the START position to start the engine.



4. When the engine starts, release the key in starting switch(2). The key will return automatically to the ON position.





## OPERATIONS AND CHECKS AFTER STARTING ENGINE

### WARNING

- **Emergency stop**  
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 NEW 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 running-in the machine for the initial 100 hours (as indicated by the service meter). During running-in operations, follow the precautions described in this manual.

#### Precautions for running-in

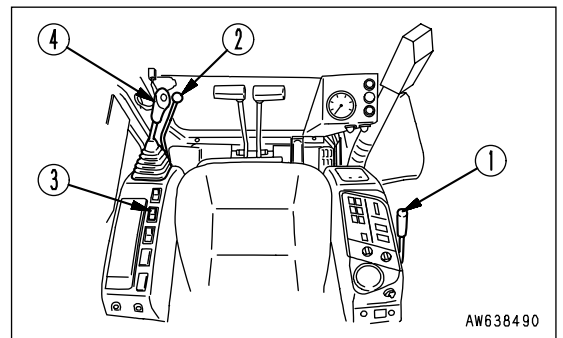
- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Avoid sudden starts, sudden acceleration, sudden steering and sudden stops except in cases of emergency.

## WARMING UP OPERATIONS

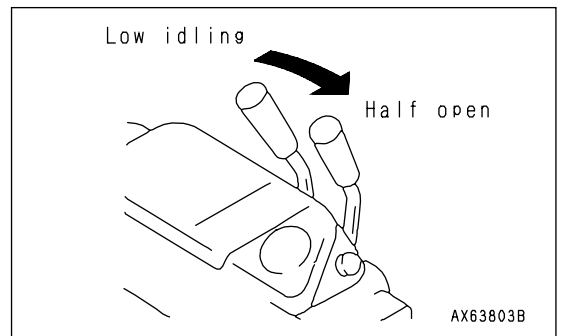
### NOTICE

- The most suitable temperature for the hydraulic oil is 50 - 80°C (122°F - 176°F), but in order to extend the life of the machine, the temperature must be raised to at least 20°C (68°F) before starting work.
- Do not suddenly operate the levers when the hydraulic oil temperature is below 20°C (68°F).
- Do not suddenly accelerate the engine before the warming-up operation is completed. In particular, if the engine is suddenly accelerated in cold weather, white smoke may be emitted, but this does not indicate any abnormality.
- Do not run the engine at low idling or high idling continuously for more than 20 minutes. If it is necessary to run the engine at idling, apply a load from time to time or run the engine at a mid-range speed.

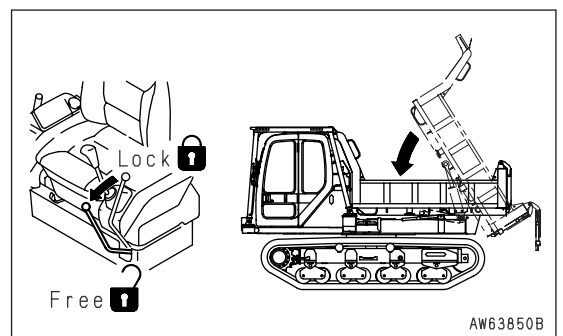
After starting the engine, do not immediately start operations. First, carry out the following operations and checks.



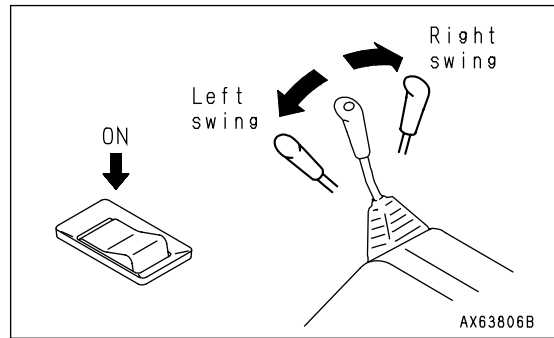
1. Pull fuel control lever(1) to the center position between LOW IDLING and HIGH IDLING and run the engine at medium speed for about 5 minutes with no load.



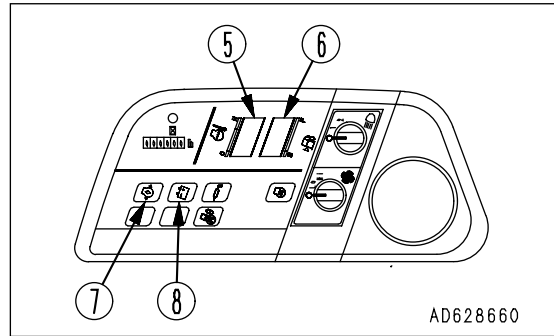
2. Set safety lock lever (2) to the FREE position, then lower the body.  
(When the body is raised)



3. If swing lock switch (3) is turned ON and swing control lever (4) is operated fully, the oil temperature will rise more quickly.

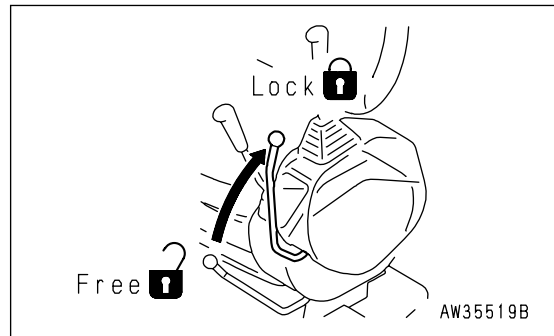


4. After warm-up run is completed, check gauges in the following condition. If any abnormality is found, repair it.
  - Engine water temperature gauge (5). Inside green range
  - Fuel gauge (6). Inside green range
  - Engine oil pressure monitor (7). OUT
  - Charge level monitor (8). OUT



5. Check that there is no abnormal exhaust gas color, noise, or vibration. If any abnormality is found, repair it.

6. Set safety lock lever (2) to the LOCK position. Then operate swing control lever and dump body control pedal and check that the upper structure does not swing and that the dump body cannot be raised or lowered.

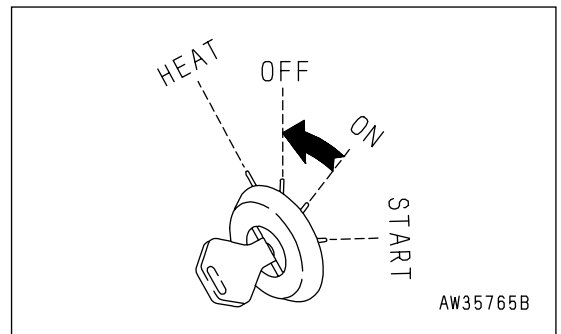
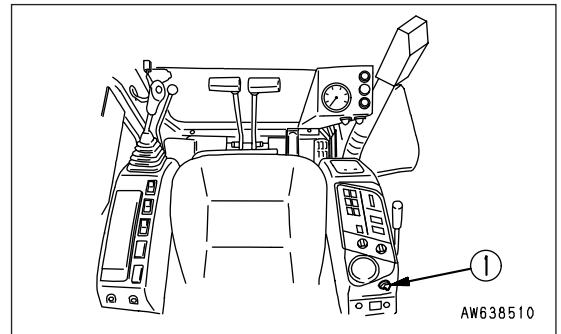


## STOPPING ENGINE

### NOTICE

If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency. In particular, if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.

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



## CHECK AFTER STOPPING ENGINE

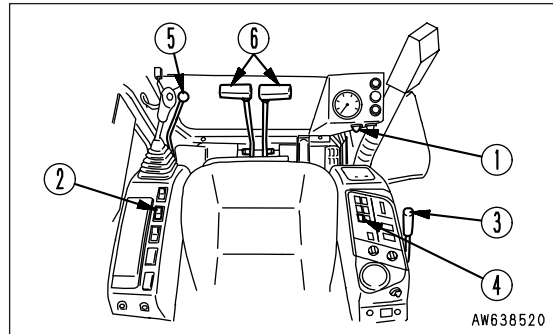
1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, and check also for leakage of oil or water. If any abnormalities are found, repair them.
2. Fill the fuel tank.
3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a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

# MACHINE OPERATION

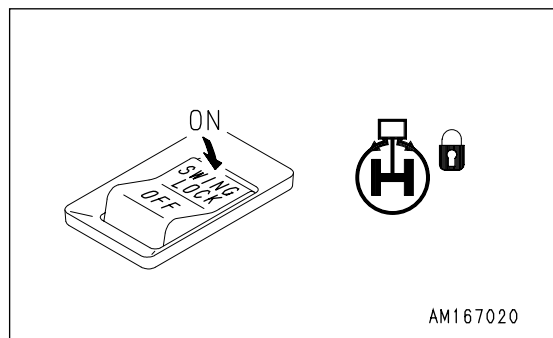
## MOVING MACHINE OFF

**⚠ WARNING**

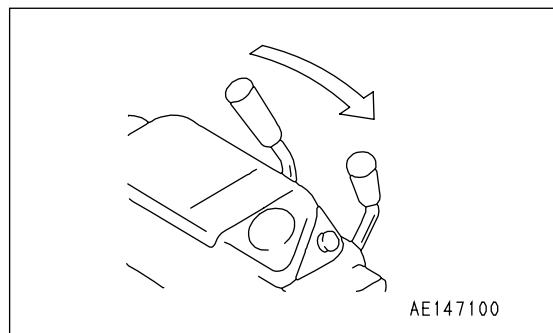
- Before operating the travel levers, check the direction of the sprocket. If the sprocket is at the rear, reverse travel indicator lamp (1) is lighted up, the direction of operation of the travel lever for FORWARD and REVERSE is the opposite, so be extremely careful when operating.
- When moving off, check that the area around the machine is safe, and sound the horn before moving.
- Clear all personnel from the machine and the area.
- Clear all obstacles from the path of the machine.
- Use extreme care when reversing the machine. Note there is an blind spot behind the machine.
- Check that the travel alarm works properly.
- When not operating the dump body, set the body control pedal to the lock position to prevent the body from being operated by mistake.



1. Turn swing lock switch (2) ON and check that swing lock monitor (4) lights up.

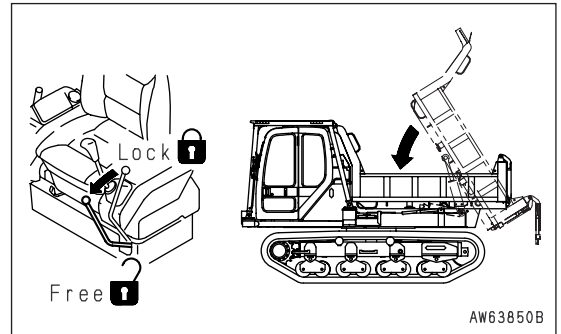


2. Pull fuel control lever (3) towards the high idling position to increase engine speed.

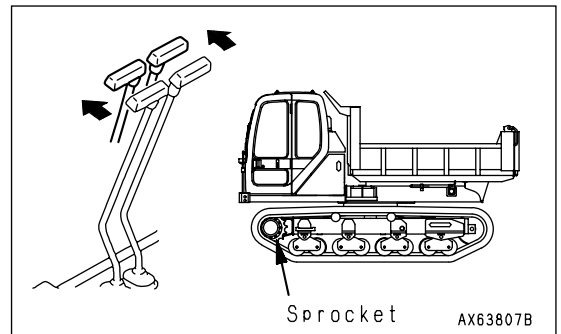


## MOVING MACHINE FORWARD

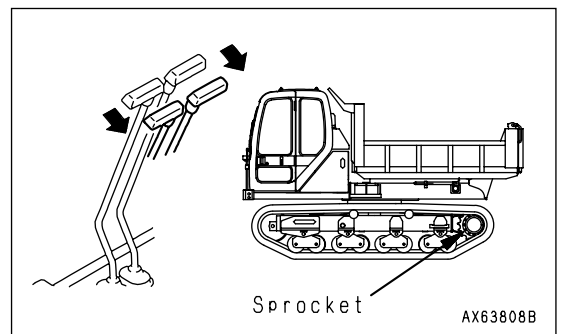
1. Set safety lock lever (5) to the FREE position and lower the body.



2. Operate both travel levers (6) as explained below.
  - When the sprocket is in front of the machine Lever (6) forward slowly to start the machine.



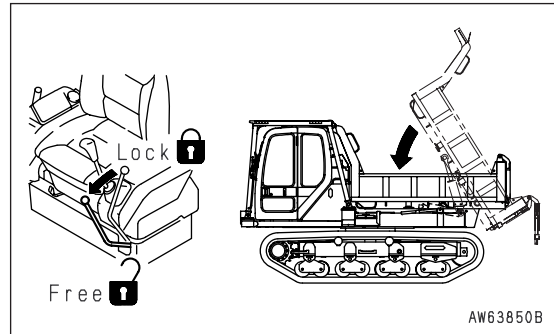
- When the sprocket is at the rear of the machine Lever (6) backward slowly to start the machine.



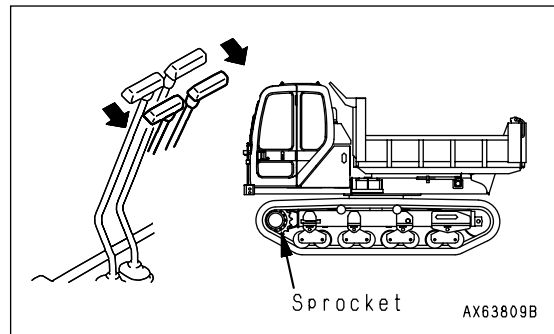
3. Check that the travel alarm sounds. If the travel alarm does not sound, please contact your Komatsu distributor for repairs.

## MOVING MACHINE BACKWARD

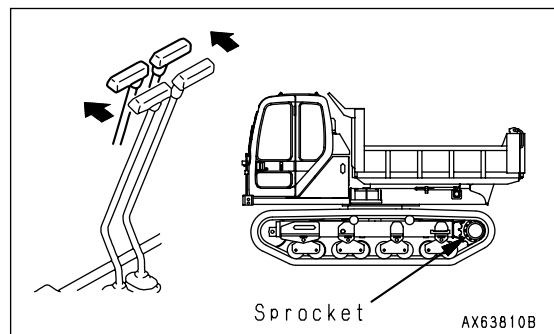
1. Set safety lock lever (5) to the FREE position and lower the body.



2. Operate both travel levers (6) as explained below.
  - When the sprocket is in front of the machine  
Lever (6) backward slowly to start the machine.



- When the sprocket is at the rear of the machine  
Lever (6) forward slowly to start the machine.

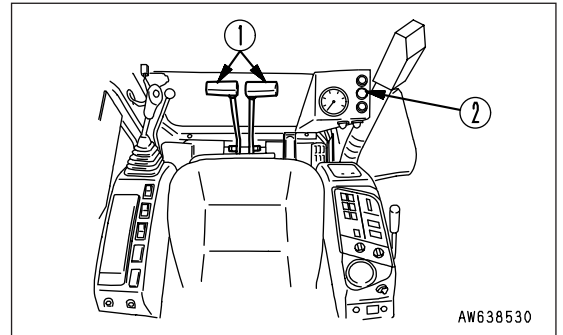


3. Check that the travel alarm sounds. If the travel alarm does not sound, please contact your Komatsu distributor for repairs.

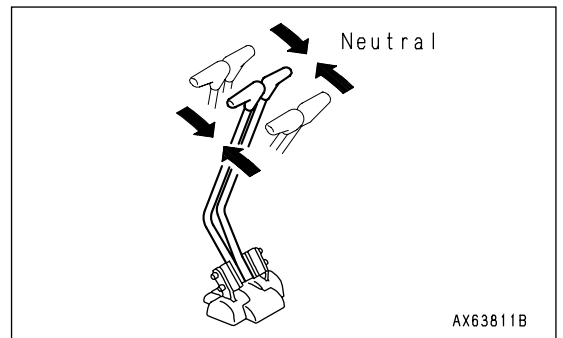
# STOPPING MACHINE

## **WARNING**

Avoid stopping suddenly. Give yourself ample room when stopping.



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

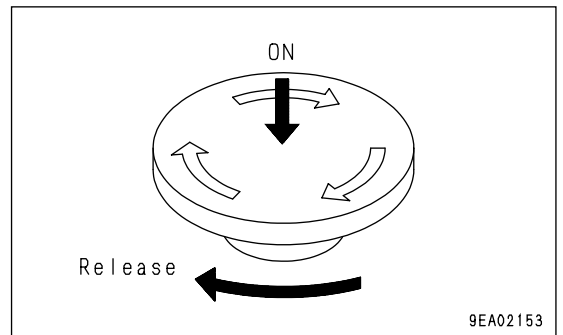


## **CAUTION**

Set travel lever to the neutral position before using brake switch (2).

### REMARK

If the travel/stop lever is placed at the neutral position, the automatic travel parking brake is actuated after approx. 1.5 seconds. However, when stopping in emergencies or when stopping on slopes, to prevent the machine from moving down under its own weight before the automatic brake is applied, set travel/stop lever (1) to the neutral position, then turn brake switch (2) to the ON position.





# STEERING MACHINE

## STEERING (CHANGING DIRECTION)

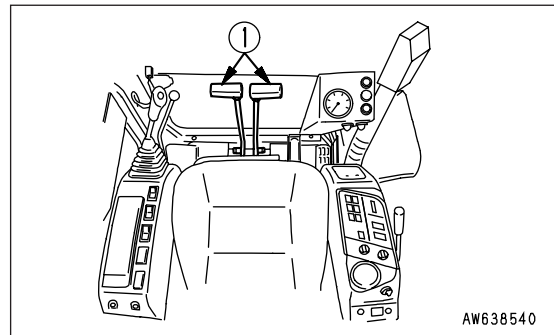
### WARNING

Before operating the travel levers, check the direction of the sprocket. If the sprocket is at the rear, reverse travel indicator lamp is lighted up, the direction of operation of the travel lever for FORWARD and REVERSE is the opposite, so be extremely careful when operating.

Use the travel levers to change the direction of travel.

Avoid sudden changes of direction as far as possible. In particular, when carrying out counter-rotation (spin turn), stop the machine first before turning.

Operate two travel levers (1) as follows.



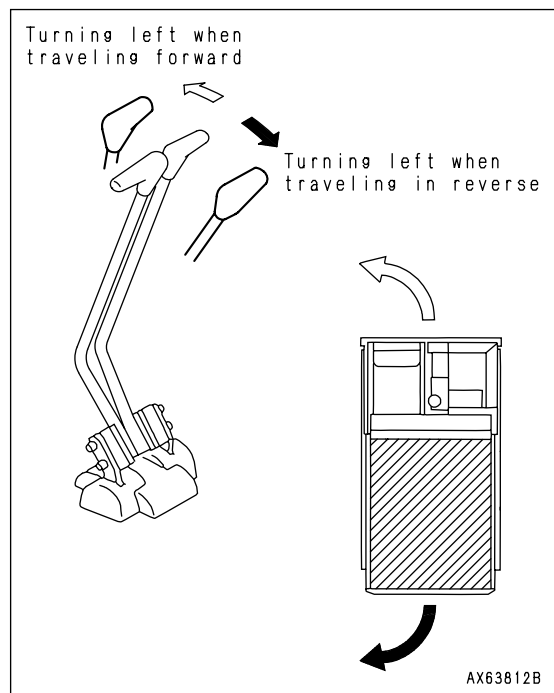
### Changing direction of machine when stopped

When turning to the left:

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

### REMARK

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



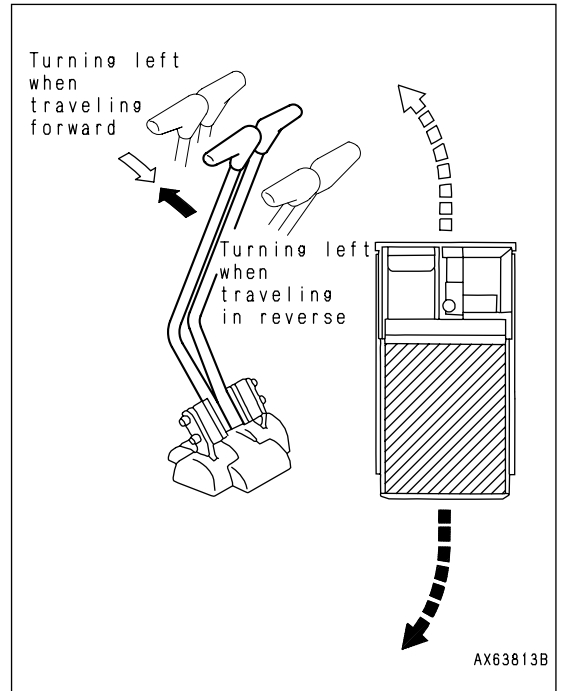
**Changing direction when traveling (both left and right travel levers operated in same direction)**

When turning to the left:

Return the left travel lever to the neutral position to turn to the left.

**REMARK**

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

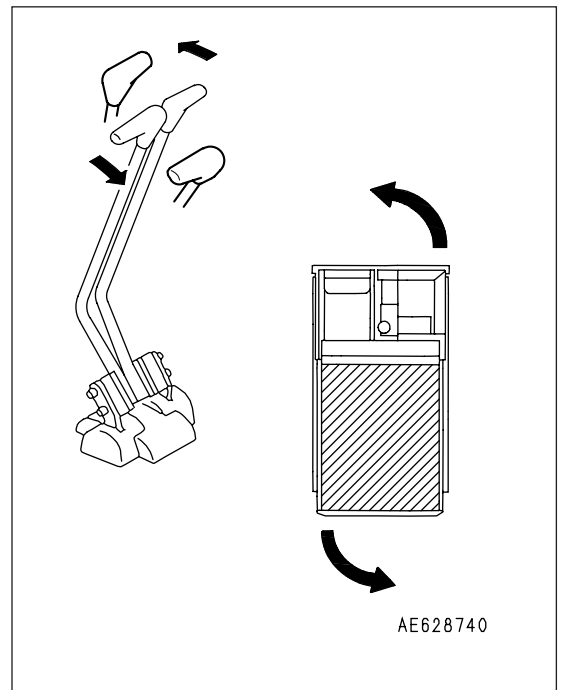


**When making counter-rotation turn (spin turn)**

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

**REMARK**

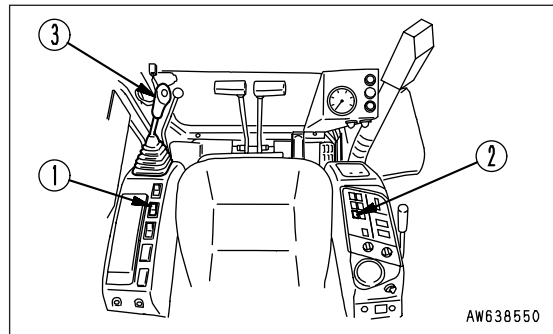
When turning right using counter-rotation, pull the right travel lever back and push the left travel lever forward.



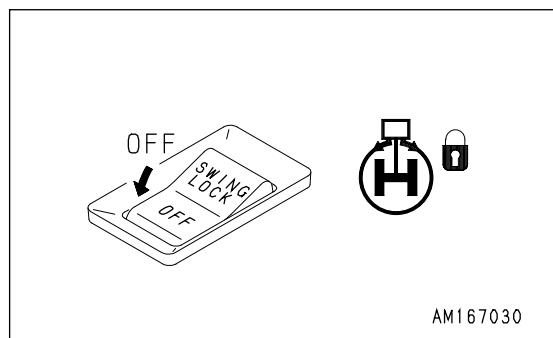
# SWINGING

**⚠ WARNING**

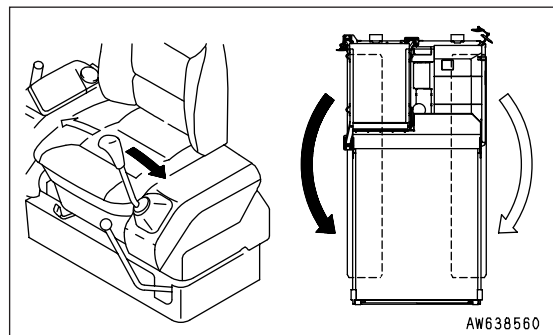
- The tail of the machine extends outside the tracks. Before operating the swing, check that the area around the machine is safe.
- Check that swing lock monitor (2) goes out.
- If the swing control lever (3) is operated quickly, the upper structure will swing quickly; and if it is operated slowly, the upper structure will swing slowly.



1. Before operating the swing, set swing lock switch (1) to the OFF (release) position.

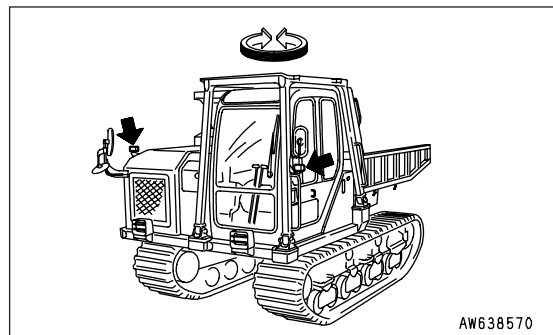


2. Operate the swing control lever (3). The movement of the swing is as shown in the diagram on the right. If the lever is released, it will return to the neutral position, and the upper structure will stop and be held in the same position.

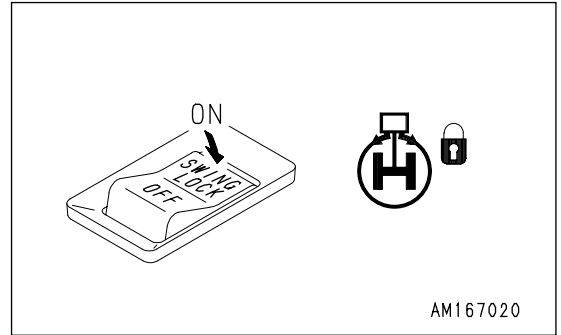


**REMARK**

The swing indicator lamp (both left and right) will flash during the swing operation.



3. When not operating the swing, set swing lock switch (1) to the ON position to prevent the upper structure from swinging if swing control lever (3) is operated by mistake.

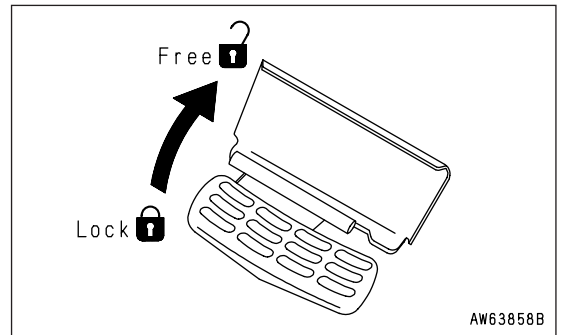


## OPERATING DUMP BODY

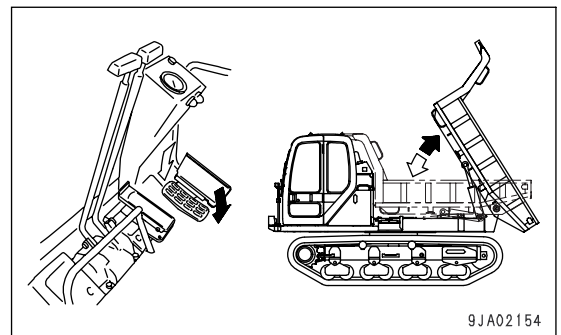
### WARNING

- Stop the machine in the correct position, check that there is no one behind the machine and that there is no obstacle, then starting the dump operation. If necessary, position a flagman or set blocks to stop the machine.
- Before operating the dump, sound the horn to give a warning to people standing in the surrounding area.
- If the dump is operated on a slope, there is danger of the machine tipping over. If you feel that there is any danger, lower the body immediately.

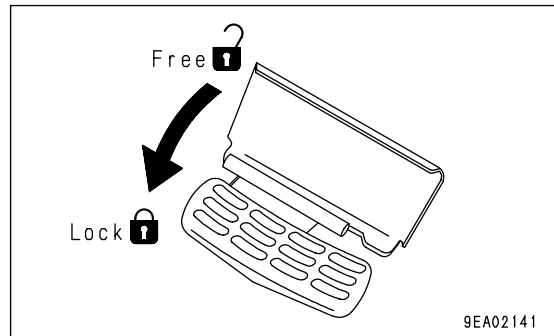
1. Before operating the body, set the pedal lock to the FREE position.



2. The body is operated with the control pedal. The relationship between the pedal and the movement of the body is as shown in the diagram on the right. When the pedal is released, it will return to the center position and the body will be held in its present position.



- After operating the body, set the pedal lock to the LOCK position.



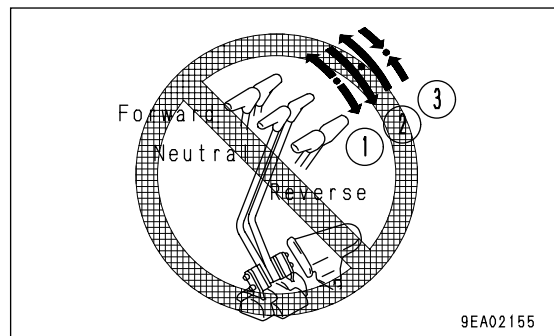
## PROHIBITIONS FOR OPERATION

### WARNING

If it is necessary to operate the dump body or swing control lever when the machine is traveling, stop the machine first then operate the dump body or swing.

### SUDDEN LEVER SHIFTING DURING TRAVEL PROHIBITED

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

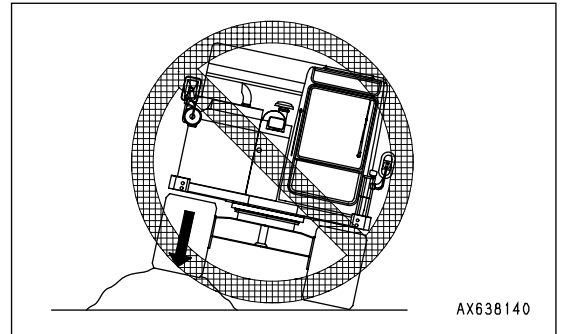


# PRECAUTIONS FOR OPERATION

## PRECAUTIONS WHEN TRAVELING

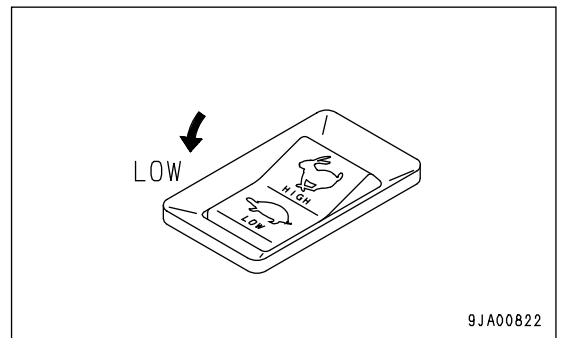
Traveling over boulders, tree stumps, or other obstacles subjects the machine (particularly the undercarriage) to a large impact, and will cause damage, so avoid the obstacle or remove it, or take other steps to avoid traveling over it.

If the machine has to travel over such an obstacle, reduce the travel speed, keep the dump body fully lowered, and try to ensure that the center of the track travels over the obstacle.



## PRECAUTIONS WHEN TRAVELING AT HIGH SPEED

When traveling over uneven bedrock or in places where there are many boulders, switch to LOW speed and travel slowly.



## PERMISSIBLE WATER DEPTH

**⚠ CAUTION**

Set the travel lever to the neutral position before using the brake switch.

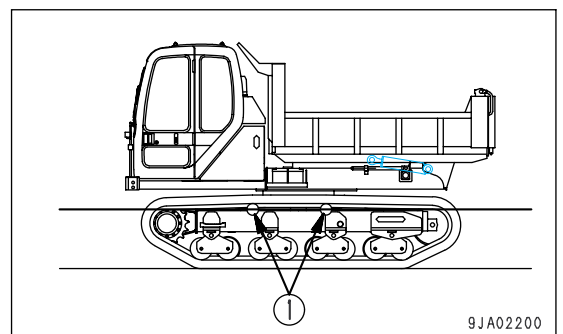
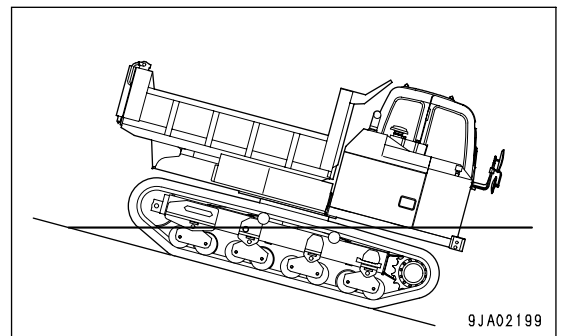
### NOTICE

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

Be extremely careful when driving the machine out of water.

Do not drive the machine in water deeper than of the center of carrier roller (1).

Supply grease to the parts which have been under water for a long time until the used grease is projected out of the bearings (around the bucket pin, in particular).



## PRECAUTIONS WHEN TRAVELING UP OR DOWN HILLS

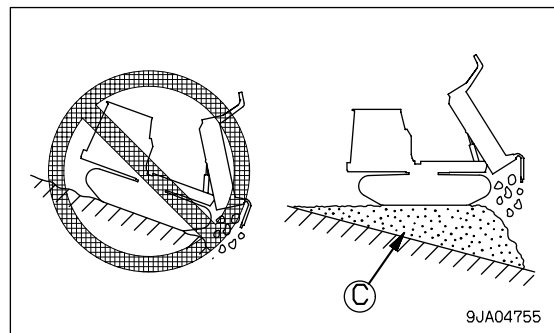
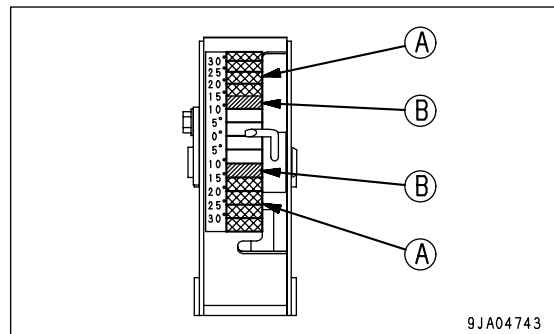
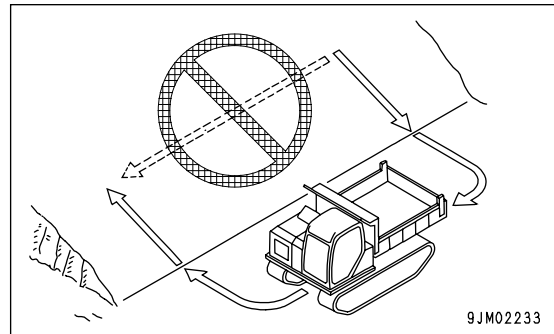
### WARNING

Always observe the following to prevent the machine from tipping over, running away, or slipping to the side.

- Do not turn on slopes or travel across slopes. If it is necessary to change the direction of travel, always go down to a flat place to change the direction of travel.
- It is extremely dangerous to travel across slopes or to travel in a horizontal line on slopes. When traveling on slopes, there is danger of turning over and causing a serious accident.  
Always observe the following.

There is danger of serious damage or injury being caused by the machine tipping over when traveling on slopes, so always observe the following.

- Do not operate the machine on slopes of more than 15° (Green range (A) of Inclinator).
- On slopes of a grade of 10 - 15° (Yellow range (B) of Inclinator), set the speed selector switch to the Low position, run the engine at 1/2 throttle or below, and travel in a straight line.  
The following is a guideline for safety. The stability may vary greatly according to the condition of the road surface. Check carefully that the situation is safe before starting operations.
- Do not travel across slopes, or travel at an angle, or zigzag.
- When dumping a load, the steeper at the slope is, the more the engine speed should be reduced when traveling. If it is too fast, there is danger that the machine may not stop.
- When stopping on slopes, return the travel lever slowly.
- Do not load the machine above the specified maximum payload.
- Travel at a low speed when traveling on grass, fallen leaves, or wet steel plates. Even on slight slopes, there is danger that the machine may slip.
- If the engine stops on a slope, never operate the swing lever.
- The dump body may swing under its own weight.
- Always stop the Machine when opening or closing the door (cab specifications). The operating effort may change suddenly because of the weight of the door,



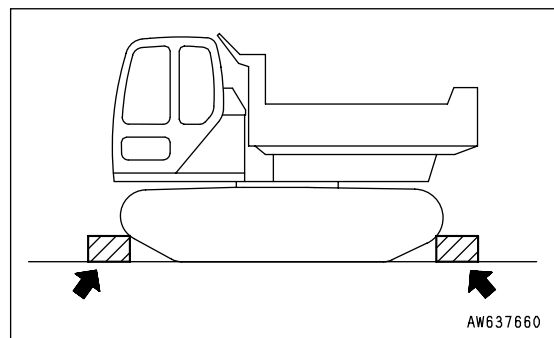
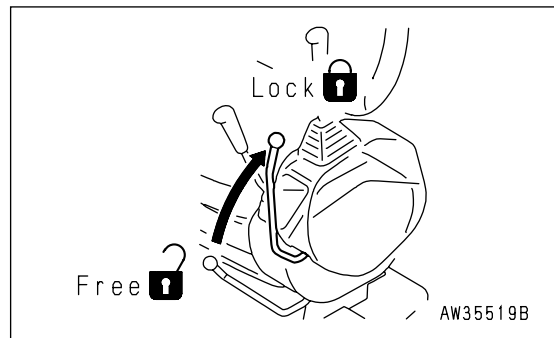
so be extremely careful when opening or closing the door.

- Do not carry out dumping operations on slopes. The machine may lose its balance and roll over. It is particularly dangerous to dump in a downhill direction. If the dumping operation has to be carried out in a downhill direction, build a platform of soil A on the slope to set the machine horizontal before starting the operation.
-



## STOPPING TRAVEL ON SLOPES

- When stopping travel when traveling up or down a slope, return the travel levers slowly to the neutral position (stopping position), then set the safety lock lever to the LOCK position. When leaving the operator's seat, use blocks to prevent the machine from moving.



## IF ENGINE STOPS

- If the engine stops on a slope, return the travel levers immediately to the neutral position, set the safety lock lever to the LOCK position, and start the engine again.

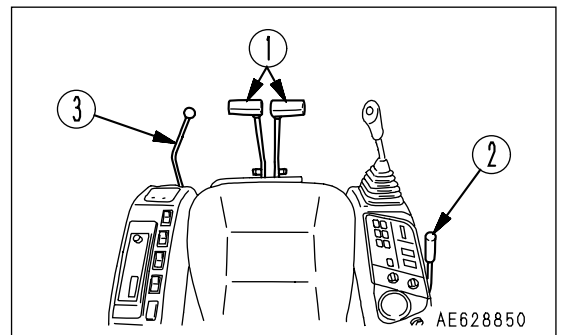
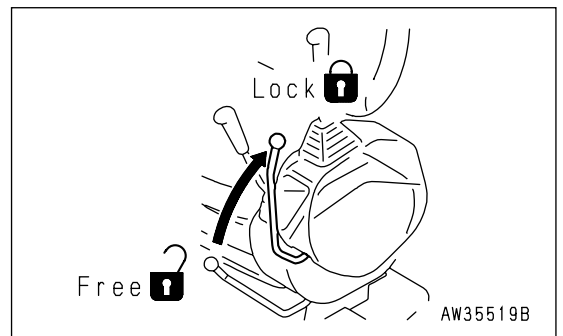
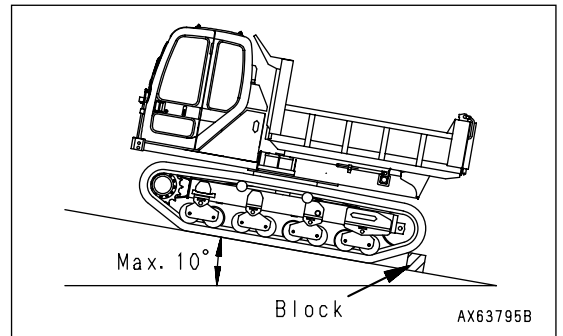
## PRECAUTIONS ON SLOPES

- If the engine stops when the machine is on a slope, never use the right work equipment control lever to carry out swing operations. The upper structure will swing under its own weight.
- Be extremely careful when opening or closing the door on slopes. The weight of the door may cause a sudden change in the operating effort. Always lock the door in position before starting.

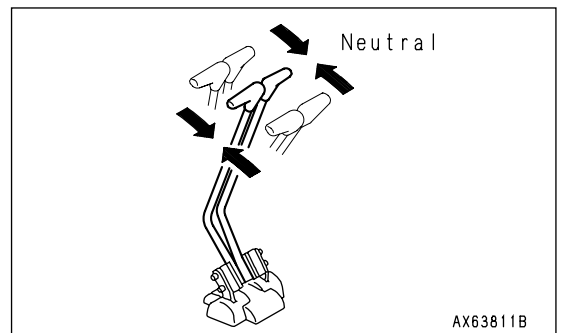
# PARKING MACHINE

## ⚠ WARNING

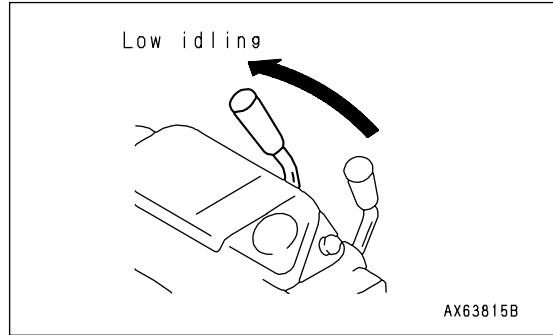
- Avoid stopping suddenly. Give yourself ample room when stopping.
- When stopping the machine, select flat hard ground and avoid dangerous places.  
If it is unavoidably necessary to park the machine on a slope, place the parking lever in the LOCK position and insert blocks underneath the track shoes.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



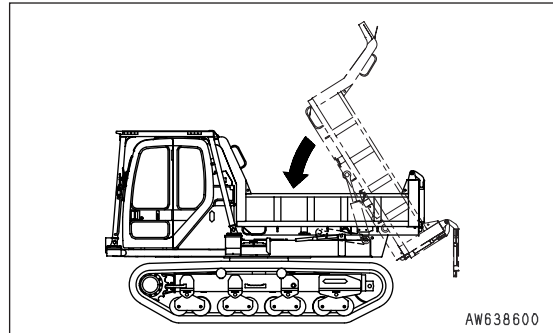
1. Put left and right travel levers (1) in the neutral position, then stop the machine.



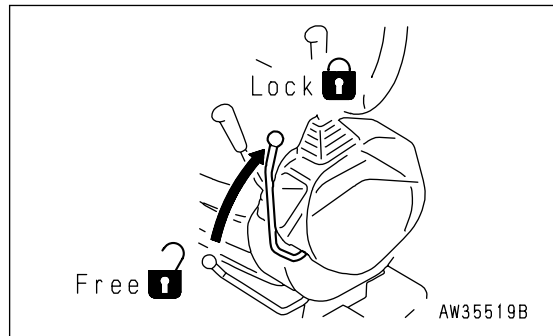
- 2. Use fuel control lever (2) to lower the engine speed to low idling.



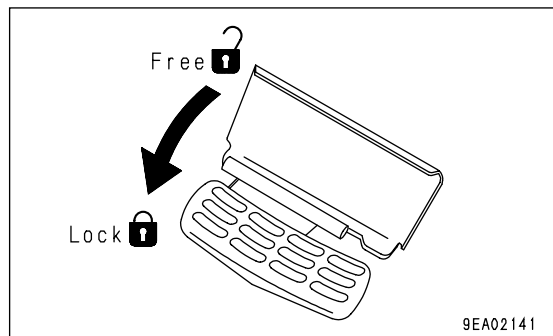
- 3. Lower the dump body.



- 4. Set safety lock lever (3) to the LOCK position.

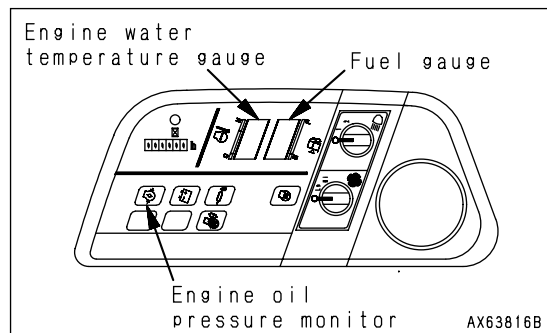


- 5. Check that the body control pedal is locked.



## CHECK AFTER FINISHING WORK

Check the engine water temperature, engine oil pressure and fuel level on the monitor.



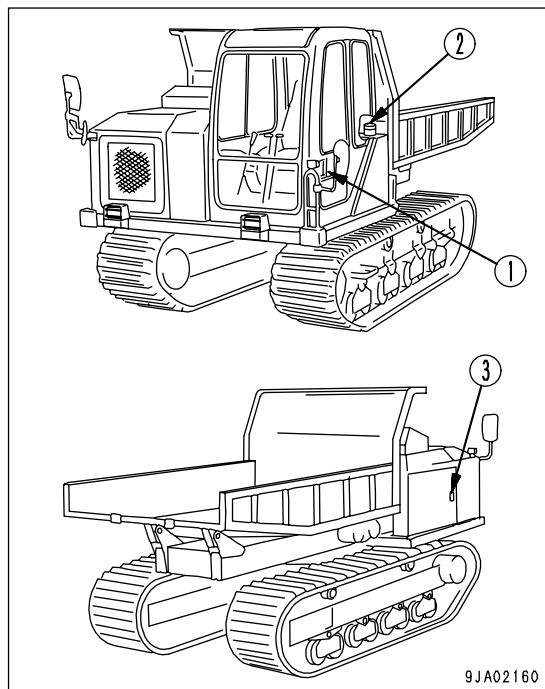
## LOCKING

Always lock the following place.

- (1) Door of operator's cab  
Always remember to close the window.
- (2) Fuel tank filler port
- (3) Side cover

### REMARK

Use the starting switch key to open and close all these place.



## HANDLING RUBBER SHOES

### SKILLFUL USE OF RUBBER SHOES

#### Comparison of rubber shoes and metal shoes

Considering the properties of the material used, rubber shoes offer various advantages. However, their weak point is lack of strength. Therefore, it is important to understand the advantages of rubber shoes, and to follow the precautions regarding handling and prohibited work. This will extend the life of the rubber shoes and will enable the machine to display the advantages of rubber shoes to the maximum. Before using rubber shoes, always read "PRECAUTIONS WHEN USING RUBBER SHOES (PAGE 3-70)".

### WARRANTY FOR RUBBER SHOES

It is important to inspect and maintain the tracks at the correct tension. Furthermore, these shoes must not be used near objects where they are likely to suffer damage, such as the corners of steel plates, U-shaped grooves, and blocks, on crushed rock or the sharp edges of rocks, iron beams or scrap iron.

If the customer carries out prohibited work or does not follow the precautions for operation, the damage resulting from the customer's mistaken use of the machine shall not be included in the scope of the warranty.

### PRECAUTIONS WHEN USING RUBBER SHOES

#### Prohibited work

Do not carry out the following types of work.

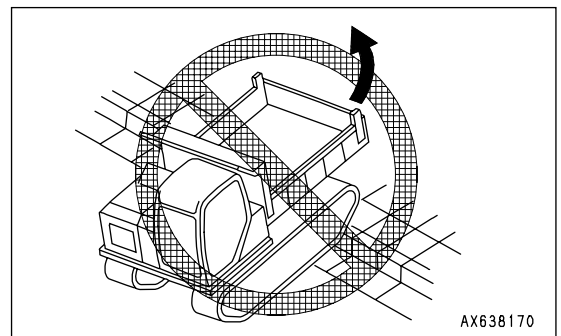
- Carrying out operations and steering on crushed rock, extremely rough hard rock, steel beams, scrap iron, or near the edges of steel plates will cause damage to the rubber shoes.
- In places such as riverbeds where there are large numbers of large and small boulders, the stones may get caught and damage the rubber shoes or make the shoes come off. If travel operations are carried out when the shoes slip, this will also reduce the life of the rubber shoes.
- Be careful not to get oil, fuel, or chemical solvent on the rubber shoes. If such a substance should get on the shoes, remove it immediately. Furthermore, do not travel on road surfaces where oil has collected.
- When putting the machine into long-term storage (3 months or more), store the machine indoors where it is protected from direct sunlight or rain.
- Do not use the machine in high temperature areas, such as areas where there is burning wood, steel plate that have been left under the hot sun, or places where asphalt is being laid.

## PRECAUTIONS WHEN USING

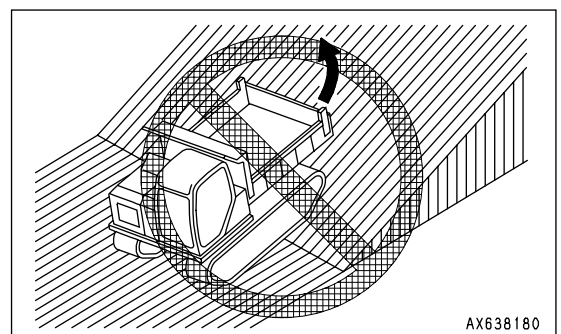
Be careful of the following points when carrying out work.

- Avoid carrying out counterrotation turns on concrete surfaces.
- Avoid making sudden changes in direction. This may cause premature wear or damage to the rubber shoes.
- Avoid operating the steering when traveling over places where there is a big difference in height. When traveling over obstacles or places where there is a difference in height, drive the machine at right angles to the obstacles to prevent the shoes from coming off.
- Avoid doing work with materials that produce oil when crushed (soya beans, corn, or vegetables squeezed for oil), or wash the machine after using it.
- Avoid handling materials that will attach the adhesion of the steel core such as salt, ammonium sulphate, potassium chloride, potassium sulphate, calcium superphosphate; or wash the machine after use.
- The adhesion of the core will be attacked by salt, so avoid using the machine in coastal areas.
- When handling salt, sugar, wheat, or soya beans, if there is any deep cut in the rubber shoes, these substances may get into the lugs or cut portion of the rubber, so always repair the rubber before use.
- Do not carry out work that involves scraping against walls or concrete embankments.
- Rubber shoes slip extremely easily on snow or frozen roads. Be careful not to slip when traveling or working on slopes.
- The properties of rubber shoes change when working in extremely cold places, and this will reduce the life of the rubber shoe.
- Because of the properties of rubber, use the rubber shoes within a range of  $-25^{\circ}\text{C}$  -  $+55^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$  -  $131^{\circ}\text{F}$ ).
- To prevent the shoes from coming off, always maintain the correct tension. If the tracks are slack, the shoes will come off under the following conditions. Even when the tension is correct, be extremely careful when carrying out these operations.

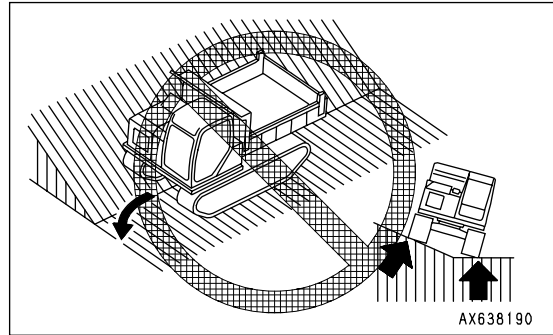
1. When traveling over curbs, rocks, or places where there is a big difference in level (approx. 20 cm (8 in)), do not turn the machine.  
When traveling over such objects, always travel at right angles to the object.



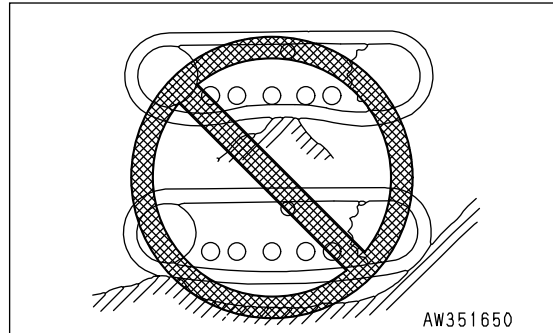
2. When traveling in reverse up a slope, do not turn when moving from flat ground onto the slope.  
If it is necessary to turn on slopes, be sure to turn gradually.



3. Avoid traveling along the edge of a slope or on rough ground with the track on one side raised (with the machine tilting at angle of more than approx. 10°), and one side on the flat ground. To avoid damage to the rubber shoes, travel with both tracks on flat ground.

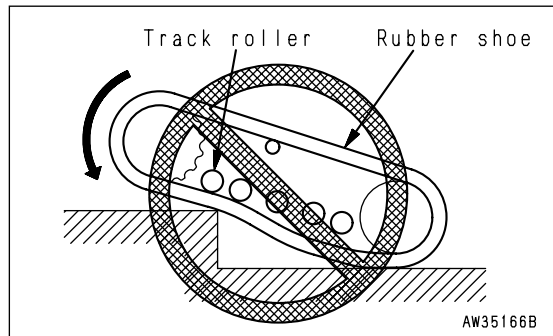


4. In Items 1 - 3, if the rubber track is loose, avoid turning in the posture in the diagram.

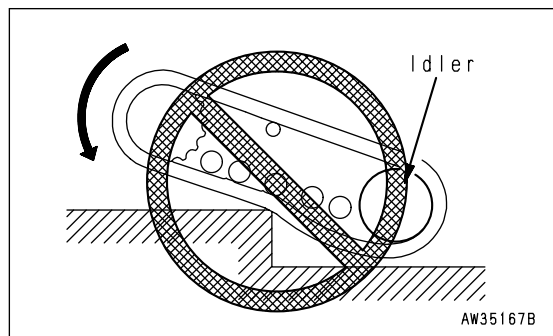


(Mechanism of rubber shoe coming off track)

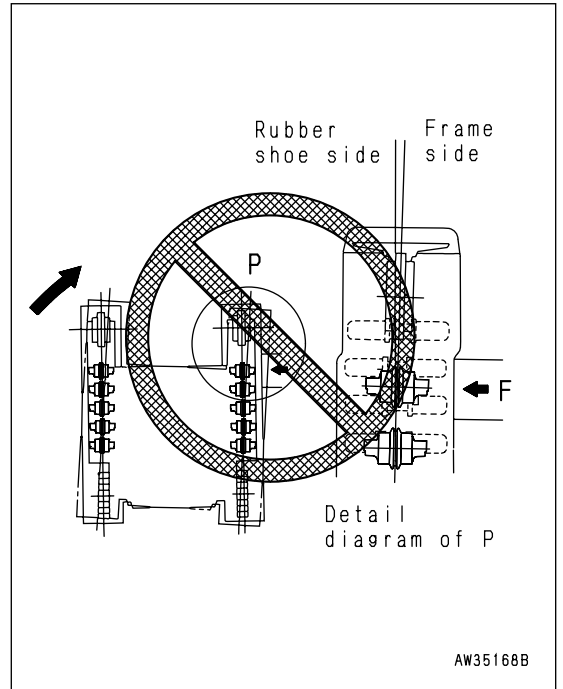
- 1) When traveling over an obstacle, a gap is formed between the track roller and the rubber shoe. In this condition, the rubber shoe may come off.



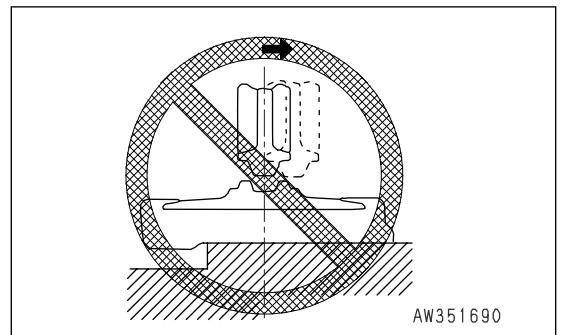
- 2) If the machine travels further in reverse, a gap is formed among the track roller, idler and the rubber shoe.



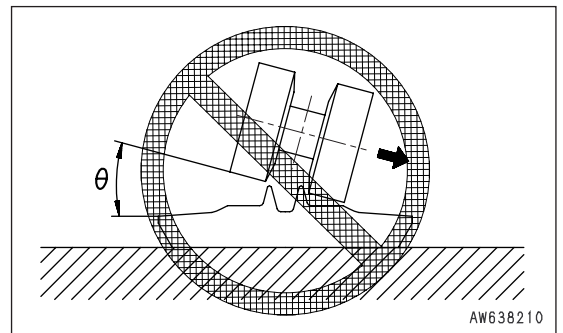
- When turning in a condition where the rubber shoe cannot move to the side because of the object it is passing over, or because of some other object.
- When the idler or track roller are out of alignment with the core because of movement of the rubber shoe out of alignment.



- If the machine travels in reverse in this condition, the rubber shoe will come off.



- If the machine is turned in this condition, the rubber shoe will come off.





# TRANSPORTATION

## LOADING, UNLOADING WORK

### WARNING

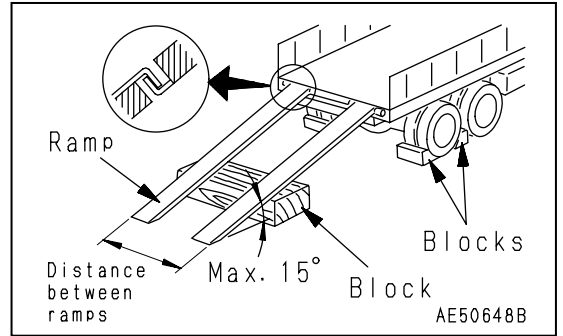
When loading or unloading the machine, mistaken operation may bring the hazard of the machine tipping over or falling, so particular care is necessary. Always do as follows.

- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of the road or cliff.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.
- Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from machine-tracks. On a rainy day, in particular, take extremely careful since the ramp surface is slippery.
- Run the engine at low idling, travel at low speed, and operate slowly.
- Never correct your steering on the ramps. There is danger that the machine may turn over. If necessary, drive off the ramps, correct the direction, then enter the ramps again.
- When on the ramps, do not operate any lever except for the travel lever.
- The center of gravity of the machine will change suddenly at the joint between the ramps and the track or trailer, and there is danger of the machine losing its balance. Travel slowly over this point.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- When swinging the upper structure on the trailer, so lower the dump body and swing slowly. And turn swing lock switch ON to apply swing lock after loading machine.
- After loading, block the machine tracks and secure the machine with tie-downs.

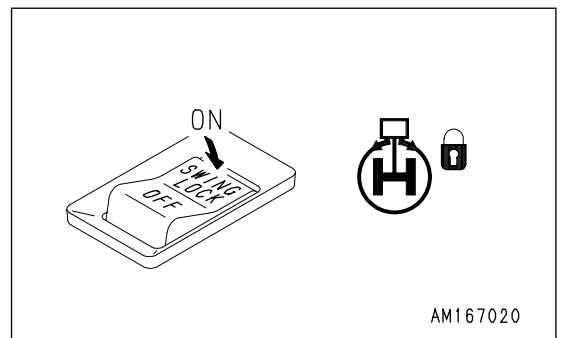
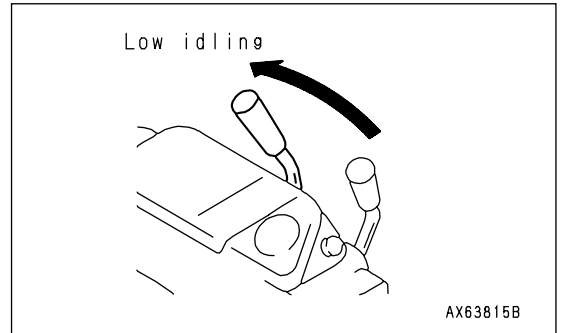
When loading or unloading, always use ramps or a platform and carry out the operation as follows.

**LOADING**

1. Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of a road.
2. Properly apply the brakes on the trailer and put blocks under the tires to ensure that the trailer does not move. Then fix the ramps in line with the centers of the trailer and the machine.  
Be sure that the two sides are at the same level as one another. Make the slope of the ramps a maximum of 15°. Set the distance between the ramps to match the center of the tracks.
3. Lower the body.
4. Set the travel speed selector switch to the LOW position.
5. Lower the engine speed using the fuel control lever.



6. Set the swing lock switch to the ON position to apply the swing lock.
7. Drive the machine toward the ramps, then travel slowly to load or unload the machine.
8. Place the specified position of the trailer correctly.



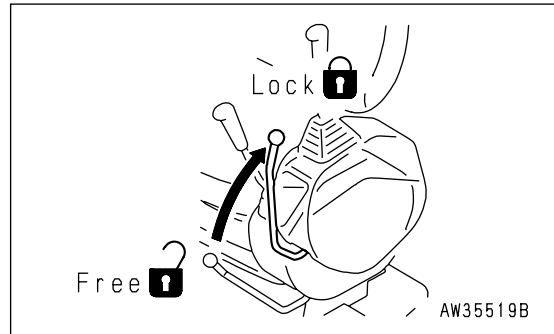
## SECURING MACHINE

### NOTICE

Remove the mirror. Tie any removed parts securely to the trailer.

After loading the machine onto the trailer, secure the machine in position as follows.

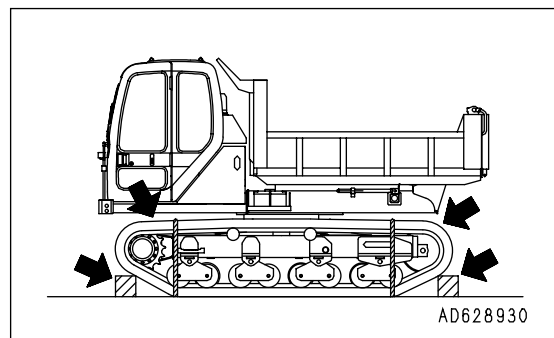
1. Stop the engine and remove the key from the starting switch.
2. Set the safety lock lever securely to the LOCK position.
3. Lock the operator's cab doors, windows, and covers.



4. Put blocks under the front and rear of the tracks to prevent the machine from moving during transportation, and tie the machine down securely with a chain or wire rope of suitable strength.  
Be particularly careful to secure the machine so that it cannot slide to the side.

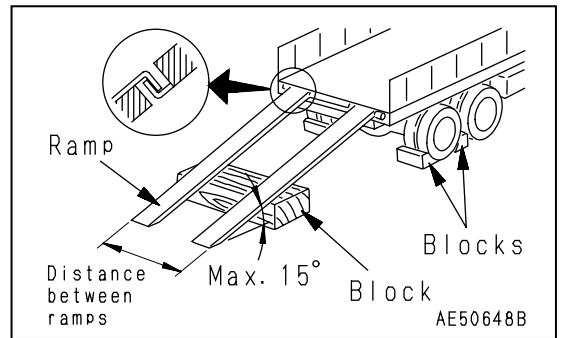
### NOTICE

Check that the body is lowered completely. (If it is not completely lowered, lower it properly.)

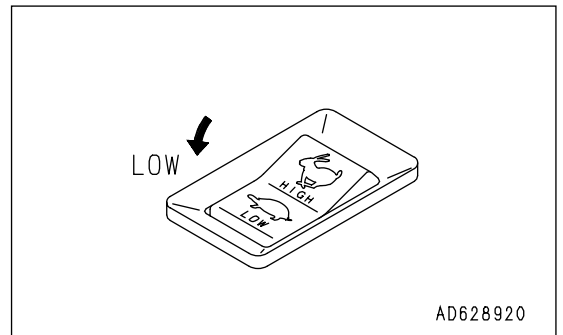


## UNLOADING

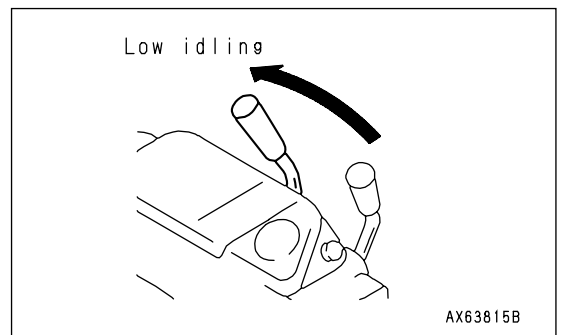
1. Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of a road.
2. Properly apply the brakes on the trailer and put blocks under the tires to ensure that the trailer does not move. Then fix the ramps in line with the centers of the trailer and the machine.  
Be sure that the two sides are at the same level as one another. Make the slope of the ramps a maximum of 15°. Set the distance between the ramps to match the center of the tracks.



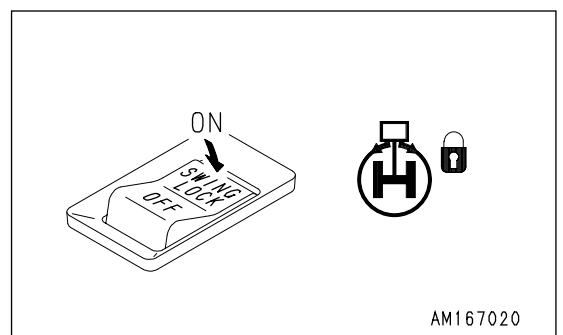
3. Remove the chains or wire rope holding the machine.
4. Start the engine.  
Warm the engine up fully.
5. Set the safety lock lever to the FREE position.
6. Set the travel speed selector switch to the LOW position.



7. Lower the engine speed using the fuel control lever.



8. Set the swing lock switch to the ON position to apply the swing lock.
9. Set the travel direction toward the ramps and drive slowly.



## LIFTING MACHINE

### WARNING

- Do not lift the machine with any worker on it.
- Use wire ropes having sufficient strength for the weight of this machine.
- Lift the machine in only the position shown below. If it is lifted in another position, it may be unbalanced.
- Do not raise the machine with the upper structure swung to the side. Set the upper structure parallel to the undercarriage before lifting.
- Lift the machine horizontally.

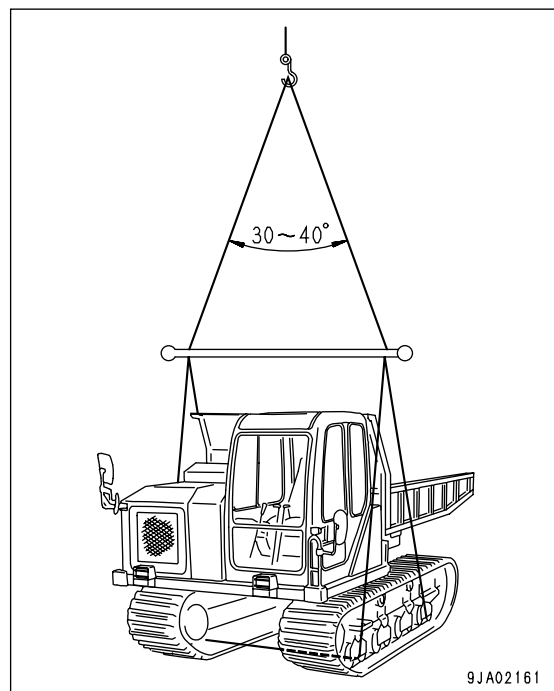
### NOTICE

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)".

1. Stop the engine and confirm that there is nothing around the operator's seat, then get off the machine.
2. Pass the wire rope between the 1st and 2nd track rollers from the front and the 1st and 2nd track rollers from the rear.
3. Set the lifting angle of the wire rope to 30 - 40°, then lift the machine slowly.
4. After the machine leaves the ground, stop lifting once. After the machine is stabilized, lift it up slowly.



# COLD WEATHER OPERATION

## PRECAUTIONS FOR LOW TEMPERATURE

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

## FUEL AND LUBRICANTS

- Change to oil with low viscosity for all components. For details of the specified viscosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-11)".
- If the hydraulic oil temperature is low, the viscosity of the oil will increase, and it will be more difficult for the oil to flow inside the hydraulic circuit. In this condition, if the control levers are operated, it will take time for the work equipment to start moving.  
To prevent this problem, warm up the machine thoroughly to raise the hydraulic oil temperature, then start operations.

## COOLANT

### WARNING

- Antifreeze is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large quantities of fresh water and see a doctor at once.
- Antifreeze is toxic. Be extremely careful when handling it. When replacing coolant containing antifreeze or when handling coolant when repairing the radiator, contact your Komatsu distributor or ask your local antifreeze dealer. Be careful not to let the water flow into drainage ditches or spray on to the ground surface.
- Antifreeze is flammable, so do not bring any flame close. Do not smoke when handling antifreeze.

### NOTICE

**Please use Komatsu genuine supercoolant (AF-NAC) for the coolant. As a basic rule, we do not recommend the use of any coolant other than Komatsu genuine supercoolant.**

For details of the antifreeze mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23)".

## BATTERY

### WARNING

- The battery generates flammable gas, so do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amounts of water, and consult a doctor.
- Battery electrolyte dissolves paint. If it gets on to the bodywork, wash it off immediately with water.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is danger that the battery may explode.

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

### REMARK

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

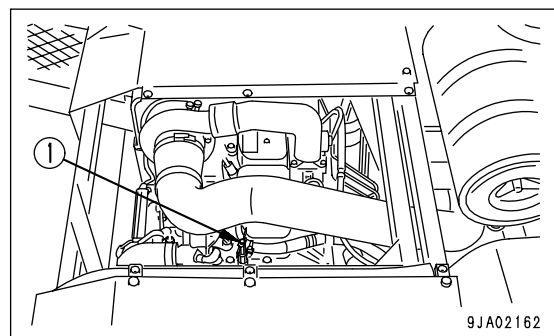
Temp. of fluid Rate of charge	20°C	0°C	-10°C	-20°C
	100	1.28	1.29	1.30
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

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

## PREPARATIONS FOR CAR HEATER

When the temperature goes down, use the car heater. When using the car heater, turn valve (1) on the water pump to the left to open it.

During the off-season, when the car heater is not used for a long time, turn valve (1) to the right to close it.



## AFTER COMPLETION OF WORK

### WARNING

After completion of operations, fill the fuel tank to prevent the formation of water caused by condensation of moisture in the empty space in the tank when the temperature goes down.

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 hard, dry ground.  
If this is impossible, park the machine on wooden boards.  
The boards help protect the tracks from being frozen in soil and the machine can start next morning.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.

## AFTER COLD WEATHER

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

- Replace the fuel and oil for all parts with oil of the viscosity specified.  
For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-11)".



# LONG-TERM STORAGE

## BEFORE STORAGE

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

- Clean and wash all parts, then store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with canvas.
- Completely fill the fuel tank. This prevents moisture from collecting.
- Lubricate and change the oil before storage.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
- Store the machine with the dump body lowered.
- Lock each control lever and pedal with the lock lever and pedal lock.
- To prevent rust, fill with Komatsu genuine supercoolant (AF-NAC) to give a density of at least 30% for the engine coolant.

## 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.

- For machines equipped with car cooler, run the car cooler.

## 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, the moisture in the air will get into the oil. Check the oil at all parts before and after starting the engine. If there is oil in the water, change all the oil.

# TROUBLESHOOTING

## AFTER RUNNING OUT OF FUEL

When starting after running out of fuel, fill with fuel and bleed the air from the fuel system before starting. For details of bleeding the air, see "REPLACE FUEL FILTER CARTRIDGE (PAGE 4-40)".

## TOWING THE MACHINE

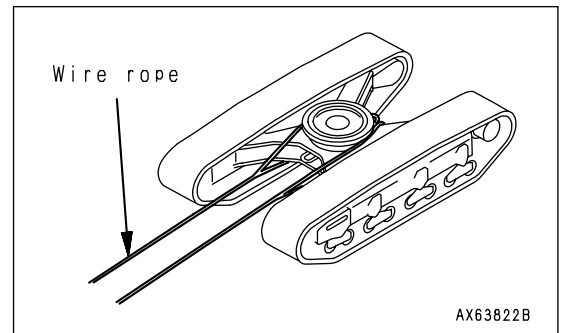
### ⚠ WARNING

- Be sure to use a wire rope sufficiently strong for the towing weight.
- Do not apply a sudden load to the wire rope.

If the machine sinks in mud and cannot get out under its own power, or if the drawbar pull of the excavator is being used to tow a heavy object, use a wire rope as shown in the diagram on the right.

Place piece of wood between wire ropes and body to prevent damage to ropes and body.

At this time, never use the hook for light-weight towing.

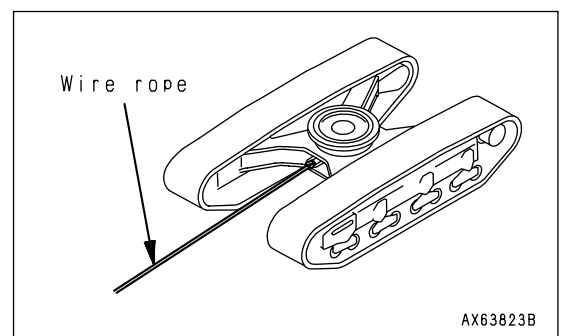


## LIGHT-WEIGHT TOWING HOOK

### ⚠ WARNING

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

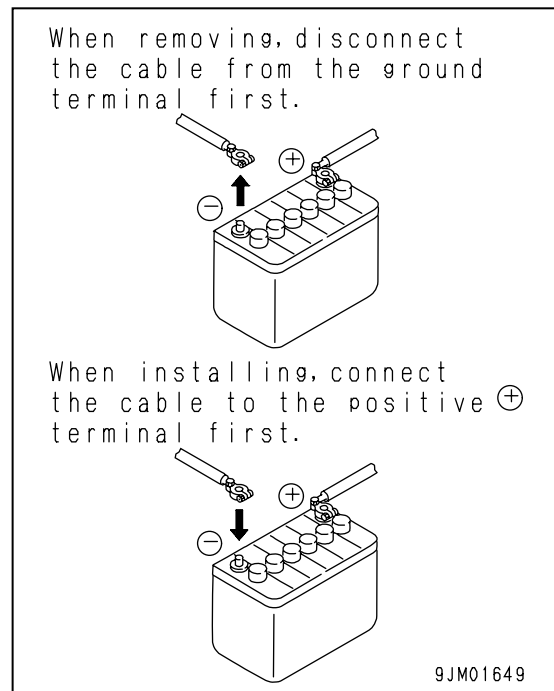
The track frame has been equipped with a hook to pass the shackle for towing light objects.  
(Except machines with blade specification)



## IF BATTERY IS DISCHARGED

### **⚠ WARNING**

- When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.
- The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.
- Battery electrolyte is dilute sulphuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, wash it immediately off with large amounts of water. If it gets in your eyes, wash it out with fresh water, and consult a doctor.
- When handling batteries, always wear protective goggles and rubber gloves.
- When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, install the positive (+) terminal first. If a tool touches the positive terminal and the chassis, there is danger that it will cause a spark, so be extremely careful.
- If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.
- When installing the terminals, install them tightly. When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.
- Green rust around the terminals is a cause of self-discharge of the battery. Polish the terminals with sandpaper. After removing the rust, coat the terminals thinly with grease before installing.



## REMOVE AND INSTALL BATTERY

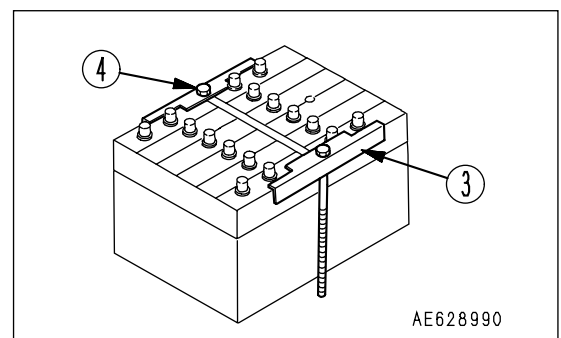
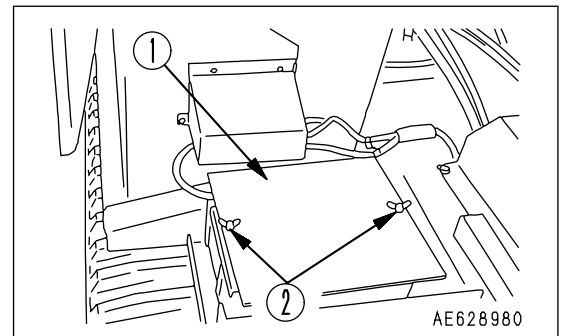
### NOTICE

Secure the battery, and confirm that it does not move. If it moves, secure it again.

- When removing and charging the battery, remove nuts (2) (2 places) of cover (1), then remove the cover.
- Before removing 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.
- When install the battery, connect the ground cable last.
- When replacing the battery, fix the battery securely in position with battery mounting clamps (3).

Tightening torque of mounting nut (4): 9.8 to 14.7N•m  
(1.0 to 1.5kgf•m,  
7.2 to 10.8 lbf)

Tightening torque: 5.88 to 9.81N•m (0.6 to 1.0kgf•m,  
4.3 to 7.2 lbf)



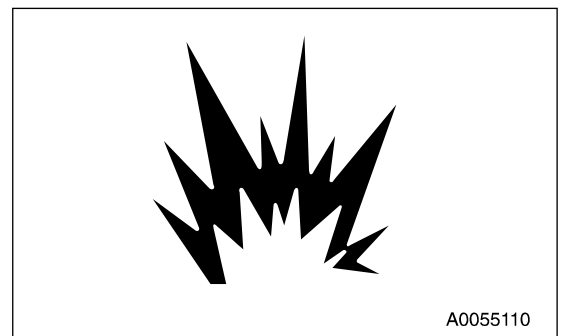
## PRECAUTIONS FOR CHARGING BATTERY

If the battery is charged improperly, it may explode. Accordingly, charge it according to "IF BATTERY IS DISCHARGED (PAGE 3-84)" and the instruction manual attached to the charger, and observe the following items.

- Set the voltage of the charger to match the voltage of the battery to be charged. If the voltage is not selected correctly, the charger may overheat and cause an explosion.
- Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to fix the clips securely.
- Set the charging current to 1/10 of the value of the rated battery capacity; when carrying out rapid charging, set it to less than the rated battery capacity.

If the charger current is too high, the electrolyte will leak or dry up, and this may cause the battery to catch fire and explode.

- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery electrolyte and cause the battery to explode.
- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Always check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.



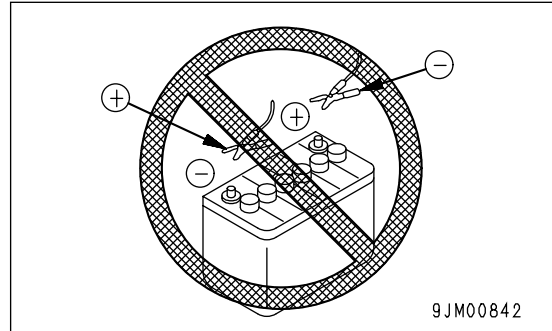
## STARTING ENGINE WITH BOOSTER CABLE

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

### 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 mistaken 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

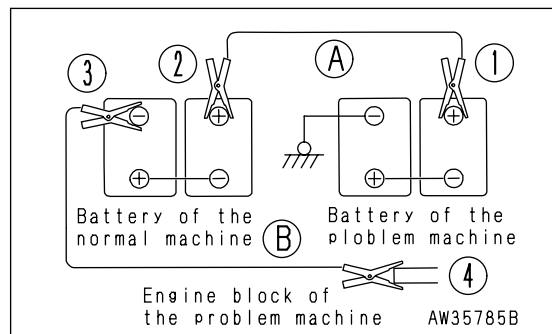
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the engine to be started.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check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

### CONNECTING THE BOOSTER CABLE

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

Keep the starting switch at the OFF position.

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



## STARTING ENGINE

**⚠ CAUTION**

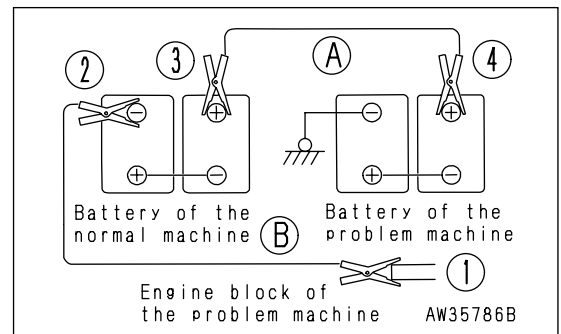
Always check that the safety lock lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Check also that all the control levers are at the HOLD or neutral position.

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

**DISCONNECTING THE BOOSTER CABLE**

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

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



## OTHER TROUBLE

### ELECTRICAL SYSTEM

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

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed	● Defective wiring	( ● Check, repair loose terminals, disconnections)
Lamp flickers while engine is running		
Charge level lamp does not go out even when engine is running	● Defective alternator ● Defective wiring	( ● Replace) ( ● Check, repair)
Abnormal noise is generated from alternator	● Defective alternator	( ● Replace)
Starting motor does not turn when starting switch is turned to ON	● Defective wiring ● Defective starting motor ● Insufficient battery charge ● Defective safety relay	( ● Check, repair) ( ● Replace) ● Charge ( ● Replace)
Pinion of starting motor keeps going in and out	● Insufficient battery charge ● Defective safety relay	● Charge ( ● Replace)
Starting motor turns engine sluggishly	● Insufficient battery charge ● Defective starting motor	● Charge ( ● Replace)
Starting motor disengages before engine starts	● Defective wiring ● Insufficient battery charge	( ● Check, repair) ● Charge
Pre-heating monitor does not light up	● Defective wiring ● Defective heater relay ● Defective monitor ● Disconnection in glow plug	( ● Check, repair) ( ● Replace) ( ● Replace) ( ● Replace)
Oil pressure monitor does not light up when engine is stopped (starting switch at ON position)	● Defective monitor	( ● Replace)
Outside of electrical intake air heater is not warm when touched by hand	● Defective wiring ● Disconnection in electrical intake air heater ● Defective operation of heater relay switch	( ● Check, repair) ( ● Replace) ( ● Check, repair heater relay switch)

## CHASSIS

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

Problem	Main causes	Remedy
Speed of travel, swing, dump body is slow	<ul style="list-style-type: none"> <li>● Lack of hydraulic oil</li> </ul>	<ul style="list-style-type: none"> <li>● Add oil to specified level, see CHECK BEFORE STARTING</li> </ul>
Pump generates abnormal noise	<ul style="list-style-type: none"> <li>● Clogged element in hydraulic tank strainer</li> </ul>	<ul style="list-style-type: none"> <li>● Clean, see EVERY 2000 HOURS SERVICE</li> </ul>
Excessive rise in hydraulic oil temperature	<ul style="list-style-type: none"> <li>● Dirty oil cooler</li> <li>● Lack of hydraulic oil</li> </ul>	<ul style="list-style-type: none"> <li>● Clean, see EVERY 500 HOURS SERVICE</li> <li>● Add oil to specified level, see CHECK BEFORE STARTING</li> </ul>
Track comes off	<ul style="list-style-type: none"> <li>● Track too loose</li> </ul>	<ul style="list-style-type: none"> <li>● Adjust track tension, see WHEN REQUIRED</li> </ul>
Abnormal wear of sprocket		
Dump body rises slowly, does not rise	<ul style="list-style-type: none"> <li>● Lack of hydraulic oil</li> </ul>	<ul style="list-style-type: none"> <li>● Add oil to specified level, see CHECK BEFORE STARTING</li> </ul>
Does not swing	<ul style="list-style-type: none"> <li>● Swing lock switch still at ON position</li> </ul>	<ul style="list-style-type: none"> <li>● Turn swing lock switch to OFF position</li> </ul>



**ENGINE**

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

Problem	Main causes	Remedy
Engine oil pressure monitor lights up	<ul style="list-style-type: none"> <li>● Engine oil pan oil level is low (sucking in air)</li> <li>● Clogged oil filter element</li> <li>● Defective tightening of oil pipe joint, oil leakage from damaged part</li> <li>● Defective engine oil pressure sensor</li> </ul>	<ul style="list-style-type: none"> <li>● Add oil to specified level, see CHECK BEFORE STARTING</li> <li>● Replace cartridge, see EVERY 250 HOURS SERVICE</li> <li>( ● Check, repair)</li> <li>( ● Replace sensor)</li> </ul>
Steam is emitted from top part of radiator (pressure valve)	<ul style="list-style-type: none"> <li>● Cooling water level low, water leakage</li> <li>● Dirt or scale accumulated in cooling system</li> </ul>	<ul style="list-style-type: none"> <li>● Add cooling water, repair, see CHECK BEFORE STARTING</li> <li>● Change cooling water, clean inside of cooling system, see WHEN REQUIRED</li> </ul>
Indicator of engine water temperature gauge is in red range on right side of gauge	<ul style="list-style-type: none"> <li>● Clogged radiator fin or damaged fin</li> <li>● Defective thermostat</li> <li>● Loose radiator filler cap (high altituded operation)</li> </ul>	<ul style="list-style-type: none"> <li>● Clean or replace, see WHEN REQUIRED</li> <li>( ● Replace thermostat)</li> <li>● Tightening cap or replace packing</li> </ul>
Engine dose not start when starting motor is turned	<ul style="list-style-type: none"> <li>● Lack of fuel</li> <li>● Air in fuel system</li> <li>● Defective fuel injection pump or nozzle</li> <li>● Starting motor cracks engine sluggishly</li> <li>● Pre-heating monitor does not light up</li> <li>● Defective compression                             <ul style="list-style-type: none"> <li>● Defective valve clearance</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Add fuel, see CHECK BEFORE STARTING</li> <li>● Repair place where air is sucked in</li> <li>( ● Replace pump or nozzle)</li> <li>● See ELECTRICAL SYSTEM</li> <li>● See ELECTRICAL SYSTEM</li> <li>( ● Adjust valve clearance)</li> </ul>

# MAINTENANCE

 **WARNING**

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

---

# GUIDE TO MAINTENANCE

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

## CHECK SERVICE METER

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

## KOMATSU GENUINE REPLACEMENT PARTS:

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

## KOMATSU GENUINE OILS:

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

## ALWAYS USE CLEAN WASHER FLUID:

Use automobile windshield washer fluid, and be sure 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.

## CHECKING FOREIGN MATERIALS DRAINED OIL:

After oil is changed or filters are replaced, check the old oil and filters for metal particles and foreign materials. If large quantities of metal particles or foreign materials are found, 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.

## DO NOT DROP THINGS INSIDE MACHINE:

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

## DUSTY WORKSITES:

When working at dusty worksites, do as follows:

- Inspect the dust indicator frequently to see if the air cleaner is clogged.
- Clean the radiator core frequently to avoid clogging.
- Clean and replace the fuel filter frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
- When inspecting or changing the oil, move the machine to a place that is free of dust to prevent dirt from getting into the oil.

## AVOID MIXING OILS:

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

## LOCKING THE INSPECTION COVERS:

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

## HYDRAULIC SYSTEM - AIR BLEEDING

After repairing or replacing the hydraulic equipment or after removing the hydraulic piping, it is necessary to bleed the air from the circuit. For details, see "AIR BLEEDING PROCEDURE (PAGE 4-48)".

## HYDRAULIC HOSE INSTALLATION:

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

## CHECK AFTER INSPECTION AND MAINTENANCE WORKS:

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 engine is running
  - For the checks when the engine is running, see "TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-35)" in the SAFETY section, and take care of safety sufficiently.
  - Check that the inspected and maintained parts work normally.
  - Raise the engine speed and check for fuel leakage and oil leakage.

## SELECTING FUEL AND LUBRICANTS TO MATCH AMBIENT TEMPERATURE

It is necessary to use fuel and lubricants that match the ambient temperature.

For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-11)".

# OUTLINE OF SERVICE

- Always use Komatsu genuine parts for replacement parts, grease or oil.
- When changing the oil or adding oil, do not mix different types of oil. When changing the type of oil, drain all the old oil and fill completely with the new oil. Always replace the filter at the same time. (There is no problem if the small amount of oil remaining in the piping mixes with the new oil.)
- Unless otherwise specified, when the machine is shipped from the factory, it is filled with the oil and coolant listed in the table below.

Item	Type
Engine oil pan	Engine oil EO15W40DH (Komatsu genuine parts)
Damper case	Power train oil TO30 (Komatsu genuine parts)
Swing machinery case	
Final drive case	Gear oil GO90
Hydraulic oil system	Power train oil TO10 (Komatsu genuine parts)
Radiator	Supercoolant AF-NAC (density: 30% or above) (Komatsu genuine parts)

## HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

### OIL

- Oil is used in the engine and 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.
- When using commercially available oil, it may be necessary to reduce the oil change interval.  
We recommend that you use the Komatsu oil clinic to carry out a detailed checks of the characteristics of the oil.

## FUEL

- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified for the temperature in the Operation and Maintenance Manual.
  - If the fuel is used at temperatures lower than the specified temperature (particularly at temperatures below -15°C (5°F), the fuel will solidify.
  - If the fuel is used at temperatures higher than the specified temperature, the viscosity will drop, and this may result in problems such as a drop in output.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.
- If there is any foreign material in the fuel tank, wash the tank and fuel system.

## COOLANT AND WATER FOR DILUTION

- The coolant has the important function of preventing corrosion as well as preventing freezing. Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential. Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. As a basic rule, we do not recommend the use of any coolant other than Komatsu genuine supercoolant (AF-NAC). If you use another coolant, it may cause serious problems such as corrosion of the engine and parts of the cooling system that use light metals such as aluminum.
- When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor. For details, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23)".
- When diluting the antifreeze coolant, use distilled water or tap water (soft water). Natural water, such as a river water or well water (hard water), contains large amounts of minerals (calcium, magnesium, etc.), and this makes it easier for scale to form inside the engine or radiator. Once scale is deposited inside the engine or radiator, it is extremely difficult to remove. It also causes overheating due to poor heat exchange, so when you dilute the coolant, we recommend that you use water with an overall hardness of less than 100 PPM.
- When using antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- Antifreeze coolant is flammable, so be sure to keep it away from flame.
- The ratio of Supercoolant (AF-NAC) to water differs according to the ambient temperature. For details of the ratio when mixing, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23)". Even in areas where it is not necessary to prevent freezing, use Supercoolant (AF-NAC) at a mixing ratio of at least 30% to prevent corrosion of the cooling system. Supercoolant (AF-NAC) may be supplied in premix. In this case, never add diluting water.
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating, and will also cause problems with corrosion due to air entering the coolant.

**GREASE**

- Grease is used to prevent seizure and noises at the joints.
- This construction equipment is used under heavy-duty conditions. Always use the recommended grease and follow the change intervals and recommended ambient temperatures given in this Operation and Maintenance Manual.
- Grease fittings not included in the maintenance section are grease fittings for overhaul, so they do not need grease.  
If any part becomes stiff after being used for long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing.  
Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

**CARRYING OUT KOWA (Komatsu Oil Wear Analysis)**

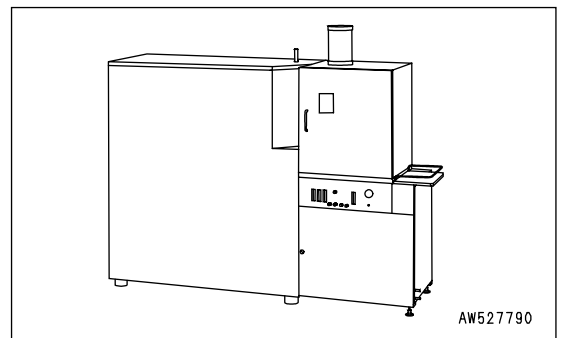
KOWA is a maintenance service that makes it possible to prevent machine failures and down-time. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other abnormalities.

Periodic use of KOWA makes the following possible:

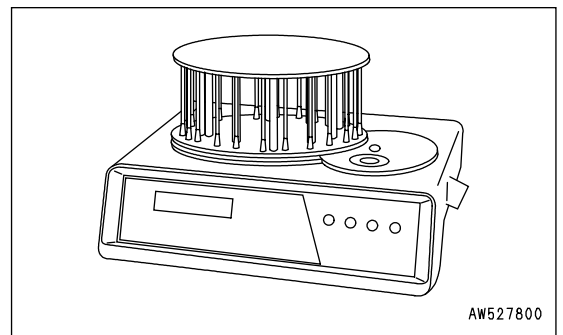
- It enables abnormalities to be detected early, leading to reduction of repair costs and machine downtime.
- It enables repair schedules to be planned, leading to improved machine availability.

**KOWA ANALYSIS ITEMS**

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



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



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



## OIL SAMPLING

- Sampling interval
  - 250 hours: Engine
  - 500 hours: Other components
- Precautions when sampling
  - Make sure that the oil is well mixed before sampling.
  - Carry out sampling regularly at fixed intervals.
  - Do not carry out sampling on rainy or windy days when water or dust can get into the oil.

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

## OIL AND FUEL STORAGE

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

## 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.

## RELATING TO ELECTRIC SYSTEM

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

## HANDLING HYDRAULIC SYSTEM

- The hydraulic equipment is at high temperature during operations or after completion of operations. In addition, it is also under high pressure during operations, so pay careful attention to the following points when carrying out inspection and maintenance of the hydraulic system and components.
  - Stop the machine on level ground, lower the dump body, and take action to ensure that no pressure is applied to the cylinder circuit.
  - Always stop the engine.
  - Immediately after stopping operations, the hydraulic oil and lubricating oil is at high temperature and high pressure, so wait for the temperature at all parts to go down before starting maintenance. Even when the temperature goes down, some parts may be under internal pressure, so when loosening plugs, threads, or hose connections, do not stand immediately in front of the part. Loosen the parts slowly to release the internal pressure before removing them.
  - When carrying out inspection and maintenance of the hydraulic circuit, always release the air from the hydraulic tank to remove the internal pressure.
- Inspection and maintenance includes inspection of the hydraulic oil level, replacement of filters, and changing the hydraulic oil.
- When removing high-pressure hoses, check that there is no damage to the O-ring. If any damage is found, replace.
- If the hydraulic filter element, strainer, or other parts have been replaced or washed, or if any hydraulic equipment has been repaired or replaced, or hydraulic piping has been removed, it is necessary to bleed the air from inside the circuit.

## WEAR PARTS

Wear parts such as the filter element, air cleaner element 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.

When changing parts, use Komatsu genuine parts of excellent quality.

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

## WEAR PARTS LIST

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

Item	Part No.	Part Name	Q'ty	Replacement frequency	
Hydraulic filter	07063-51054 (07000-12135)	Element (O-ring)	1 (1)	Every 250 hours service	
	Engine oil filter	6735-51-5141	Cartridge		1
	Fuel filter	6732-71-6111	Cartridge		1
Hydraulic line filter	424-16-11140	Element	1	Every 500 hours service	
	(424-16-11130)	(O-ring)	(1)		
	(419-15-14860)	(O-ring)	(1)		
	(07002-01223)	(O-ring)	(1)		
	(419-15-14870)	(Gasket)	(1)		
Air cleaner	600-181-6740	Outer and inner element assembly	1	-	
	600-181-6820	outer element assembly	1		

# RECOMMENDED FUEL, COOLANT, AND LUBRICANT

- Komatsu genuine oils are adjusted to maintain the reliability and durability of Komatsu construction equipment and components.  
In order to keep your machine in the best condition for long periods of time, it is essential to follow the instructions in this Operation and Maintenance Manual.
- Failure to follow these recommendations may result in shortened life or excess wear of the engine, power train, cooling system, and/or other components.
- Commercially available lubricant additives may be good for the machine, but they may also cause harm. Komatsu does not recommend any commercially available lubricant additive.
- Use the oil recommended according to the ambient temperature in the chart below.
- Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.
- When starting the engine in temperatures below 0°C (32°F), be sure to use the recommended multi-grade oil, even if the ambient temperature may become higher during the course of the day.
- If the machine is operated at a temperature below -20°C (-4°F), a separate device is needed, so consult your Komatsu distributor.
- When the fuel sulfur content is less than 0.5%, change the engine oil according to the period inspection table given in this Operation and Maintenance Manual.  
If the fuel sulfur content is more than 0.5%, change the oil according to the following table.

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

- \* If these fuels are used, there is danger that serious trouble may occur because of early deterioration of the engine oil or early wear of the internal parts of the engine. If the local situation makes it necessary to use these fuels, always remember the following.
- 1) Be sure to check Total Basic Number (TBN) of oil frequently by TBN handy checker etc., and change oil based on the result.
  - 2) Always be aware that oil change interval is extremely shorter than standard.
  - 3) Be sure to carry out periodic engine inspection by distributor's expert since change interval of periodic replacement parts and overhaul interval are also shorter.

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius										Recommended Komatsu Fluids
		-22 -30	-4 -20	14 -10	32 0	50 10	68 20	86 30	104 40	122°F 50°C		
Engine oil pan	Engine oil	(Note.1)										Komatsu EOS0W30
		(Note.1)										Komatsu EOS5W40
		(Note.1)										Komatsu EO10W30-DH
		(Note.1)										Komatsu EO15W40-DH
		(Note.1)										Komatsu EO30-DH
Swing machinery case Damper case	Powertrain oil (Note.2)	(Note.1)										TO30
Final drive case	Gear oil	(Note.1)										GO90
Hydraulic system	Powertrain oil	(Note.1)										TO10
	Hydraulic oil	(Note.1)										HO46-HM
	Engine oil	(Note.1)										Komatsu EO10W30-DH
		(Note.1)										Komatsu EO15W40-DH
Grease fitting	Hyper grease (Note.3)	(Note.1)										G2-T, G2-TE
	Lithium EP grease	(Note.1)										G2-LI
Cooling system	Supercoolant AF-NAC (Note.4)	(Note.1)										AF-NAC
Fuel tank	Diesel fuel	(Note.1)										ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
		(Note.1)										ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

● ASTM: American Society of Testing and Material

		Engine oil pan	Swing machinery case	Final drive case (each)	Hydraulic system	Fuel tank	Cooling system (incl. reserver-tank)
Specified capacity	liters	21.3	1.5	2.1	65	130	20
	US gal	5.62	0.40	0.55	17.16	34.32	5.28
Refill capacity	liters	19	1.5	2.1	45	-	-
	US gal	5.02	0.40	0.55	11.88	-	-

Note 1: HTHS (High-Temperature High-Shear Viscosity 150°C), specified by ASTM D4741 must be equal to or higher than 3.5 m Pa-S. Komatsu EOS0W30 and EOS5W40 are the most suitable oils.

Note 2: Powertrain oil has different properties from engine oil. Be sure to use the recommended oils.

Note 3: Hyper grease (G2-T, G2-TE) has a high performance.

When it is necessary to improve the lubricating ability of the grease in order to prevent squeaking of pins and bushings, the use of G2-T or G2-TE is recommended.

Note 4: Supercoolant (AF-NAC)

- 1) Coolant has the important function of anticorrosion as well as antifreeze.  
Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.  
Komatsu machines are supplied with Komatsu Supercoolant AF-NAC. Komatsu Supercoolant AF-NAC has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours.  
Komatsu Supercoolant AF-NAC is strongly recommended wherever available.
- 2) For details of the ratio when diluting super coolant with water, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23)".  
Supercoolant AF-NAC may be supplied in premix. In this case, always top off with premix solution. (never dilute with water)
- 3) To maintain the anticorrosion properties of Supercoolant AF-NAC, always keep the density of Supercoolant between 30% and 68%.

## **RECOMMENDED BRANDS, RECOMMENDED QUALITY FOR PRODUCTS OTHER THAN KOMATSU GENUINE OIL**

When using commercially available oils other than Komatsu genuine oil, consult your Komatsu distributor.

# STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

## TORQUE LIST

### ⚠ CAUTION

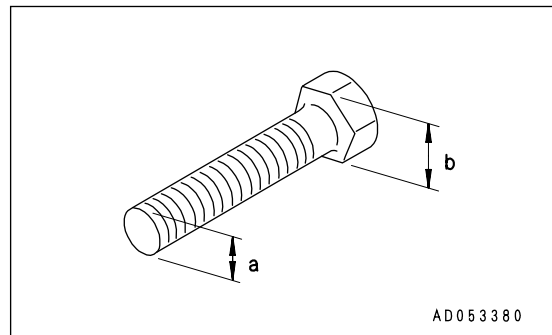
If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation. Always pay careful attention when tightening parts.

Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.

The tightening torque is determined by the width across the flats of the nut and bolt.

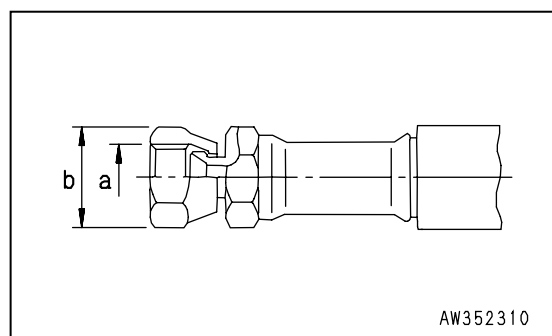
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter a(mm)	Width across flat b(mm)	Tightening torque [N•m (kgf•m)]	
		Target value	Service limit
6	10	13.2 (1.35)	11.8 - 14.7 (1.2 - 1.5)
8	13	31 (3.2)	27 - 34 (2.8 - 3.5)
10	17	66 (6.7)	59 - 74 (6.0 - 7.5)
12	19	113 (11.5)	98 - 123 (10.0 - 12.5)
14	22	177 (18.0)	157 - 196 (16.0 - 20.0)
16	24	279 (28.5)	245 - 309 (25.0 - 31.5)
18	27	382 (39.0)	343 - 425 (35.0 - 43.5)
20	30	549 (56.0)	490 - 608 (50.0 - 62.0)
22	32	745 (76.0)	662 - 829 (67.5 - 84.5)
24	36	927 (94.5)	824 - 1030 (84.0 - 105.0)
27	41	1320 (135.0)	1180 - 1470 (120.0 - 150.0)
30	46	1720 (175.0)	1520 - 1910 (155.0 - 195.0)
33	50	2210 (225.0)	1960 - 2450 (200.0 - 250.0)
36	55	2750 (280.0)	2450 - 3040 (250.0 - 310.0)
39	60	3280 (335.0)	2890 - 3630 (295.0 - 370.0)



Apply the following table for Hydraulic Hose.

Thread diameter a(mm)	Width across flat b(mm)	Tightening torque [N•m (kgf•m)]	
		Target value	Service limit
14	19	44.1 (4.5)	34.3 - 63.7 (3.5 - 6.5)
18	24	78.5 (8.0)	58.8 - 98.1 (6.0 - 10.0)
22	27	117.7 (12.0)	88.3 - 137.3 (9.0 - 14.0)
24	32	147.1 (15.0)	117.7 - 176.5 (12.0 - 18.0)
30	36	215.7 (22.0)	176.5 - 245.2 (18.0 - 25.0)
33	41	255.0 (26.0)	215.7 - 284.4 (22.0 - 29.0)



## PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

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

With these parts, the material changes as time passes, or they easily wear out or deteriorate. However, it is difficult to judge the condition of the parts simply by periodic maintenance, so they should always be replaced after a fixed time has passed, regardless of their condition. This is necessary to ensure that they always maintain their function completely.

However, if these parts show any abnormality before the replacement interval has passed, they should be repaired or replaced immediately.

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

In addition, carry out the following checks for the hydraulic hoses not listed as periodic replacement parts. If any abnormality is found, tighten or replace the parts.

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.



## SAFETY CRITICAL PARTS

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (fuel tank - stop valve)	1	Every 2 years or 4000 hours, whichever comes sooner
2	Fuel hose (stop valve - flow divider tee)	1	
3	Fuel hose (flow divider tee - fuel injection pump)	1	
4	Fuel hose (flow divider tee - fuel feed pump)	1	
5	Fuel hose (fuel feed pump - fuel filter)	1	
6	Fuel hose (priming pump - fuel filter)	1	
7	Fuel hose (fuel filter - injection pump)	1	
8	Spill hose (injection pump - fuel tank)	1	
9	Spill hose (nozzle - fuel tank)	1	
10	Spill hose (between nozzles)	5	
11	Spill hose cap	1	
12	Hydraulic hose (main pump - swivel joint)	4	
13	Hydraulic hose (work equipment pump - control valve)	1	
14	Hydraulic hose (control valve - dump cylinder)	2	
15	Hydraulic hose (left dump cylinder - right dump cylinder)	2	
16	Hydraulic hose (control valve - swing motor)	2	
17	Hydraulic hose (swivel joint - travel motor)	4	
18	Main suction hose (hydraulic tank - main pump)	3	
19	Seat belt	1	Replace 3 years

# MAINTENANCE SCHEDULE CHART

## MAINTENANCE SCHEDULE CHART

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

CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE ..... 4-34  
REPLACE FUEL FILTER CARTRIDGE..... 4-40

### WHEN REQUIRED

CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT ..... 4-20  
CLEAN INSIDE OF COOLING SYSTEM..... 4-23  
CHECK RUBBER SHOES ..... 4-26  
CHECK AND ADJUST TRACK TENSION..... 4-27  
REPLACE RUBBER SHOES ..... 4-28  
CHECK ELECTRICAL INTAKE AIR HEATER ..... 4-29  
CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID ..... 4-29

### CHECK BEFORE STARTING

#### EVERY 100 HOURS SERVICE

DRAIN WATER, SEDIMENT FROM FUEL TANK..... 4-31  
LUBRICATING ..... 4-32

#### EVERY 250 HOURS SERVICE

CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE ..... 4-34  
CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL..... 4-35  
CHECK LEVEL OF BATTERY ELECTROLYTE ..... 4-36  
REPLACE HYDRAULIC FILTER ELEMENT ..... 4-39

**EVERY 500 HOURS SERVICE**

REPLACE FUEL FILTER CARTRIDGE ..... 4-40

CHECK SWING PINION GREASE LEVEL, ADD GREASE ..... 4-41

GREASE SWING CIRCLE (2 points) ..... 4-41

CHANGE OIL IN FINAL DRIVE CASE ..... 4-42

REPLACE HYDRAULIC LINE FILTER ELEMENT..... 4-43

CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS ..... 4-44

**EVERY 1000 HOURS SERVICE**

CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL ..... 4-45

CHECK FAN BELT TANSION, ADJUST ..... 4-45

CHECK ALL TIGHTENING PARTS OF TURBOCHARGER..... 4-45

CHECK PLAY OF TURBOCHARGER ROTOR ..... 4-45

**EVERY 2000 HOURS SERVICE**

CHANGE OIL IN HYDRAULIC TANK AND CLEAN STRAINER..... 4-46

CLEAN, CHECK TURBOCHARGER ..... 4-48

CHECK ALTERNATOR, STARTING MOTOR..... 4-48

CHECK ENGINE VALVE CLEARANCE, ADJUST ..... 4-48

CHECK VIBRATION DAMPER ..... 4-48

**EVERY 4000 HOURS SERVICE**

CHECK WATER PUMP..... 4-49

# SERVICE PROCEDURE

## INITIAL 250 HOURS SERVICE

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

- CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE
- REPLACE FUEL FILTER CARTRIDGE

For details of the method of replacing or maintaining, see the section on EVERY 250 HOURS and 500 HOURS SERVICE.

## WHEN REQUIRED

### CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

#### **⚠ WARNING**

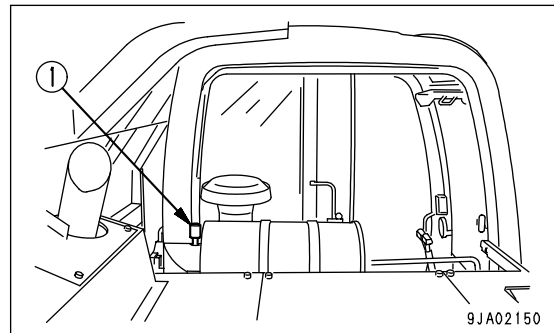
- If inspection, cleaning, or maintenance is carried out with the engine running, dirt will get into the engine and the engine will suffer damage. Always stop the engine before carrying out these operations.
- When using compressed air, there is danger that dirt may be blown around and cause serious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

#### CHECKING

If dust indicator (1) is red, clean the air cleaner element.

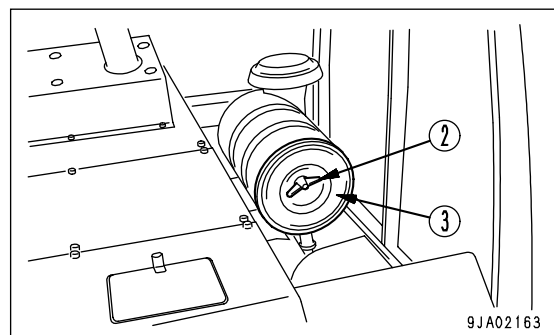
#### NOTICE

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

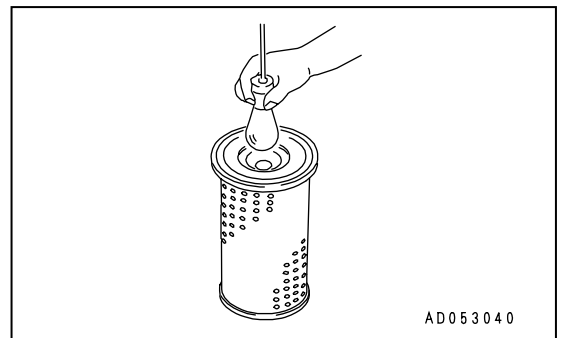
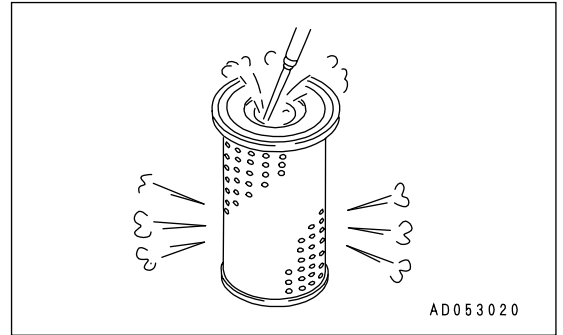
1. Open the right window of the operator's compartment, remove wing nut (2), then take out element (3).
2. Clean the inside of the air cleaner body.



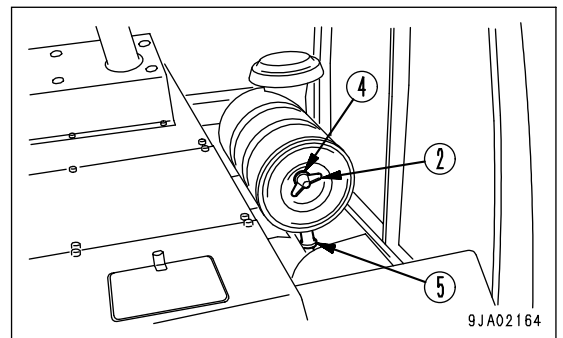
3. Direct dry compressed air (less than 0.69MPa (7kg/cm<sup>2</sup>, 99.4PSI)) to the outer element from inside along its folds, then direct it from outside along its folds and again from inside.
  - 1) Remove one seal from the element whenever the element has been cleaned.
  - 2) Replace the outer element 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.  
(Tightening torque 4.9 to 5.9 N•m (0.5 to 0.6 kgf•m, 3.6 to 4.3 lbft))
  
4. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.

**NOTICE**

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



5. Set the new or cleaned outer element and fix wing nut (2).  
(Tightening torque of wing nut : 5.9 to 7.9 N•m (0.6 to 0.8 kgf•m, 4.3 to 5.8 lbft))
6. Replace seal washer (4) or wind nut (2) with new parts if they are broken.
7. Remove vacuator valve (5) and clean with compressed air.  
After cleaning, install again.
8. Return the red piston in the dust indicator (1) to its original position.



## REPLACING INNER ELEMENT

1. First remove wing nut (2) and the outer element, and then remove the inner element.
2. To prevent dust from getting in, use a clean cloth or tape to cover the air connector (outlet side).
3. Clean the air cleaner body interior, then remove the cover installed in Step 2.
4. Fit a new inner element to the connector and tighten it with nuts.  
(Tightening torque: 4.9 to 5.88 N•m(0.5 to 0.6 kgf•m, 3.6 to 4.3 lbft))

### NOTICE

**The inner element must not be cleaned and used again. When replacing the outer element, replace the inner element at the same time.**

5. Set the outer element in position and secure it with the wing nut.
6. After replacing the element, press the button of dust indicator to return the red piston to its original position.

## CLEAN INSIDE OF COOLING SYSTEM

### WARNING

- Just after the engine is stopped, the cooling water is still hot and the internal pressure in the radiator is still high. If the radiator cap is removed under this condition, you may scald yourself. Accordingly, wait until the temperature lowers, then loosen the cap slowly to release the pressure.
- Start the engine to clean the cooling system. When standing up from the operator's seat or leaving the machine, set the safety lock lever and brake lock lever in the LOCK positions.
- For the starting method of the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (PAGE 3-34)" and "STARTING ENGINE (PAGE 3-47)" in OPERATION in the volume of operation.

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

Clean the inside of the cooling system, change the coolant according to the table below.

Antifreeze coolant	Interval for cleaning inside of cooling system and changing antifreeze coolant
Komatsu supercoolant (AF-NAC)	Every two years or every 4000 hours whichever comes first

The coolant has the important function of preventing corrosion as well as preventing freezing.

Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.

Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. As a basic rule, we do not recommend the use of any coolant other than Komatsu genuine supercoolant (AF-NAC).

If you use another coolant, it may cause serious problems such as corrosion of the engine and parts of the cooling system that use light metals such as aluminum.

When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor.

When no corrosion resistor is used, use the special cover (600-411-9000). Please consult your Komatsu distributor about the method of installing.

To maintain the anticorrosion properties of Supercoolant (AF-NAC), always keep the density of Supercoolant between 30% and 68%.

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

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

The mixing ratio depends on the ambient temperature, but it should always be a minimum of 30% by volume (antifreeze/total amount of coolant x 100).

Even in areas where it is not necessary to prevent freezing, use Supercoolant (AF-NAC) at a mixing ratio of at least 30% to prevent corrosion of the cooling system.

The freezing temperature of undiluted antifreeze is -15°C (5°F). Do not store undiluted antifreeze at a temperature of below -15°C (5°F).



Mixing rate of water and antifreeze

Min. atmospheric temperature	°C	Above -10	-15	-20	-25	-30	-35	-40
	°F	Above 14	5	-4	-13	-22	-31	-40
Amount of antifreeze	Liters	6.0	7.2	8.2	9.2	10.0	10.8	11.6
	US gal	1.59	1.90	2.17	2.43	2.64	2.85	3.06
Amount of water	Liters	14.0	12.8	11.8	10.8	10.0	9.2	8.4
	US gal	3.69	3.38	3.12	2.85	2.64	2.43	2.22
Volume ratio (%)		30	36	41	46	50	54	58

**⚠ WARNING**

- Antifreeze is flammable, so keep it away from flame. Antifreeze is toxic. When open the drain valve, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.
- When changing the coolant or draining the coolant from the radiator before carrying out repairs, ask a specialist company to handle any coolant containing antifreeze, or contact your Komatsu distributor. Antifreeze is toxic, so never pour it into drainage water ditches or drain it onto the ground surface.

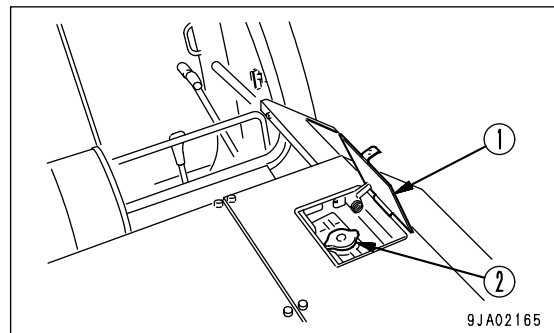
Use antifreeze and appropriate water for diluting (for details, see "COOLANT AND WATER FOR DILUTION (PAGE 4-6)")

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

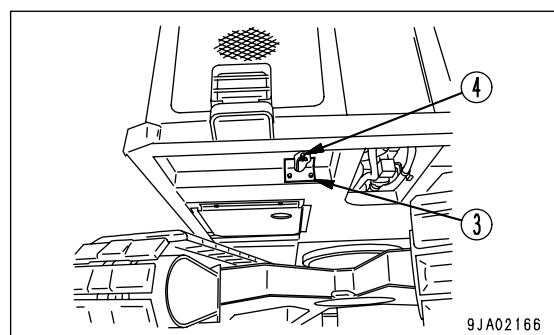
Prepare a container whose capacity is larger than the specified coolant volume to catch drained coolant.

Prepare a hose to supply antifreeze coolant and water.

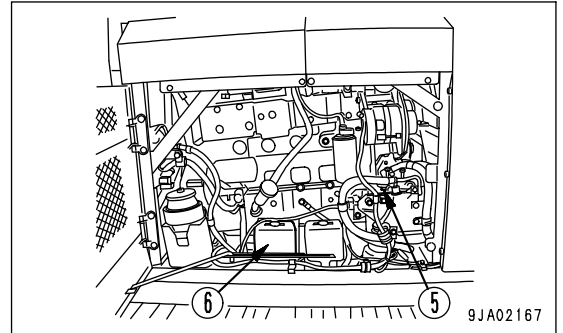
1. Stop the engine.
2. Open cover (1), then turn radiator cap (2) slowly until it contacts the stopper to release the pressure.
3. Push in radiator cap (2), turn it until it contacts the stopper, then remove it.



4. Remove cover (3) under the chassis, then put a container under drain valve (4) to catch the water and antifreeze.
5. Open drain valve (4) and drain the water.
6. Open the side cover, then open drain plug (5) of the engine and drain the water.
7. After draining the antifreeze solution, close drain valve (4) and tighten drain plug (5), then pour city water. After the radiator is filled with the water, start and run the engine at low idling speed. After the water temperature rises above 90°C (194°F), run the engine for about 10 minutes.



8. Stop the engine and open drain valve (4) and remove drain plug (5) to drain the water.
9. After draining the water, clean the cooling system with cleaning agent.  
For the cleaning method, see the instructions for the cleaning agent.
10. Close drain valve (4) and install cover (3). Wind seal tapes onto drain plug (5), then tighten it.
11. Add water through the water filler up to the filler port.  
Decide the proportions of antifreeze and water according to the table for the mixing rate of water and antifreeze.
12. Run the engine idle at a low speed 5 minutes, then at a high speed for 5 minutes to bleed air mixed in the cooling water. (At this time, keep the water filler cap removed.)
13. Drain the cooling water inside sub-tank (6), clean the inside of the sub-tank, then fill again with cooling water to a point midway between the FULL and LOW marks.
  - If the sub-tank is extremely dirty and it is difficult to clean, replace it with a new part.
14. Stop the engine and tighten the radiator cap (2). Check the coolant level and add water if necessary.



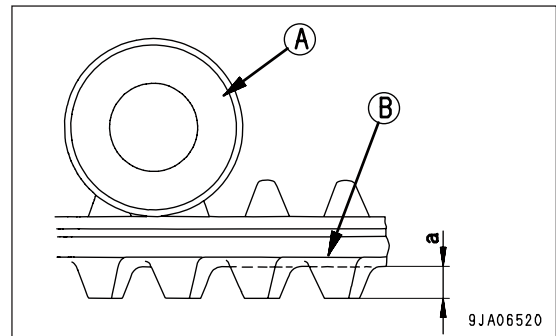
## CHECK RUBBER SHOES

If the rubber shoes are in the following condition, they must be repaired or replaced, so please contact your Komatsu distributor for repair or replacement.

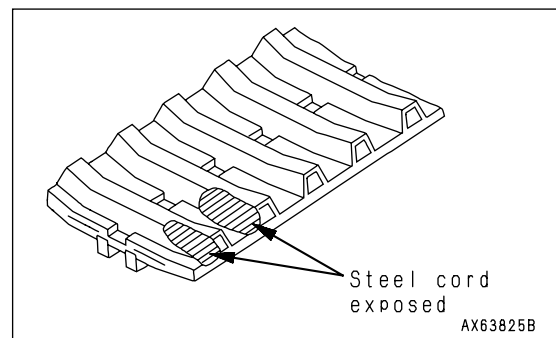
### HEIGHT OF LUG

(A): Track roller (B): Rubber shoe

- If lug height "a" is reduced by wear, the drawbar pull will drop.  
If "a" is less than 5 mm (0.2 in), replace with a new part.

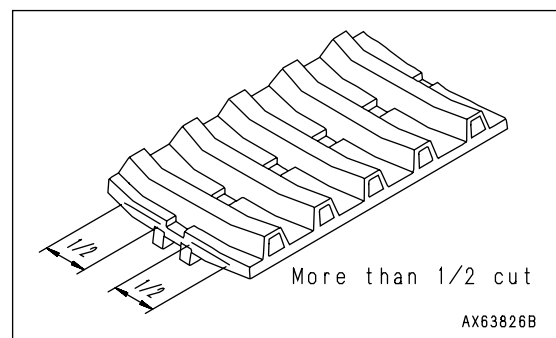


- If the lug wears and the steel cord inside the shoe is exposed for two links or more, replace with a new part.



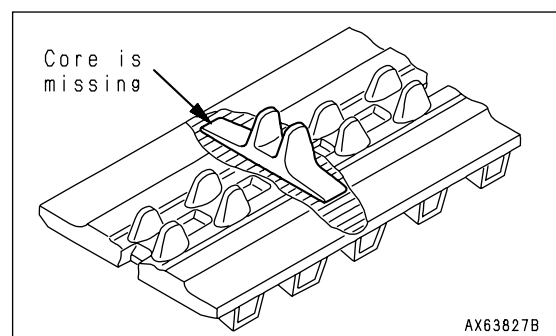
### CUTS IN RUBBER SHOE STEEL CORD

If more than half of the steel cord layer on one side is cut, replace with a new part.



### SEPARATION OF RUBBER SHOE CORE

If the rubber core has separated at one place or more, replace with a new part.

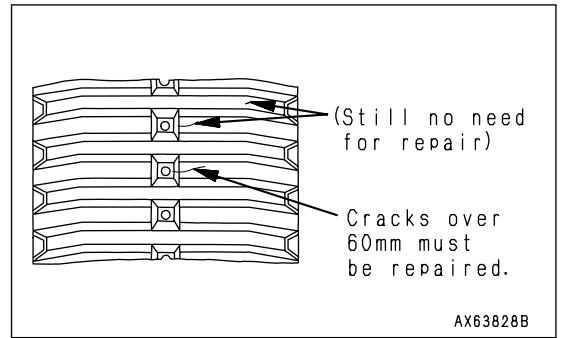


**CRACKS IN RUBBER SHOE**

If the cracks between the rubber shoe lugs increase to a size of approx. 60 mm (2.36 in) the rubber shoe must be repaired. Even if the track is small and short, if the steel cord can be seen inside, carry out repairs immediately.

If the length is less than 30 mm (1.18 in) or the depth of the crack is less than 10 mm (0.39 in), there is no particular need to carry out repairs.

When making judgement whether to replace, repair, or continue using rubber shoes, please contact your Komatsu distributor.



**CHECK AND ADJUST TRACK TENSION**

**⚠ WARNING**

**Carry out this operation with two workers. The operator must move the machine in accordance with the signals from the other worker.**

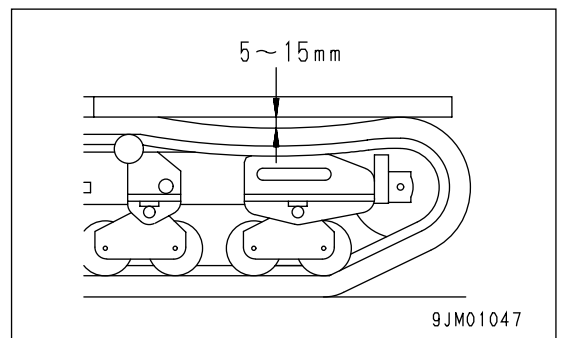
The wear of the rubber shoe will vary with the working conditions and type of soil. Therefore, it is necessary to inspect the wear and track tension frequently.

After new tracks are installed or on a new machine, the track tension lowers in the first 5 - 30 hours of machine operation. If the track tension is adjusted frequently until the initial loosening is completed, the shoes will not detach due to insufficient track tension.

**CHECKING**

Drive the machine in reverse on level ground, stop the machine, then put a straight rod between the No. 2 carrier roller and the idler as shown in the diagram on the right. If the clearance between the rod and the shoe at the center is 5 - 15 mm (0.197 - 0.6 in), the tension is within the standard range.

If the tension is not within the standard range, adjust as follows.



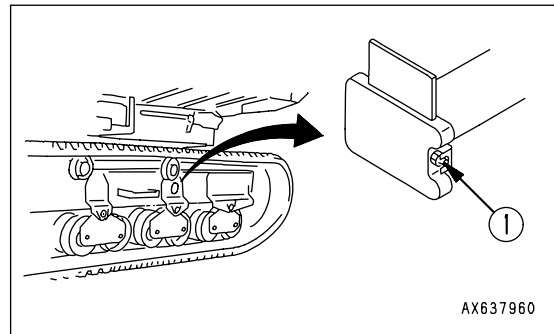
## ADJUSTMENT

### WARNING

Grease inside the adjusting mechanism is under high pressure. Grease coming from grease drain plug (1) under pressure can penetrate the body causing injury or death. For this reason, do not loosen grease drain plug (1) more than one turn. Do not loosen any part other than grease drain plug (1). If the track tension is not relieved by this procedure, please contact your Komatsu distributor.

### WHEN INCREASING TENSION

- Prepare a grease gun
1. Pump in grease through grease drain plug (1) with a grease gun.
  2. To check that the correct tension has been achieved, move the machine backwards and forwards.
  3. Check the track tension again, and if the tension is not correct, adjust it again.
  4. If the tension is still low after supplied grease, the rubber shoe needs to be replaced or the seal in the cylinder needs to be replaced. Ask your Komatsu distributor for replacement.

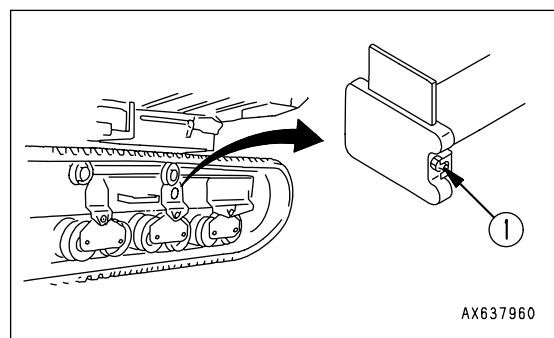


### WHEN LOOSENING TENSION

### 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. Loosen grease drain plug (1) gradually to release the grease.
2. Turn grease drain plug (1) a maximum of one turn.
3. If the grease does not come out smoothly, move the machine backwards and forwards a short distance.
4. Tighten grease drain plug (1).
5. To check that the correct tension has been achieved, move the machine backwards and forwards.
6. Check the track tension again, and if the tension is not correct, adjust it again.



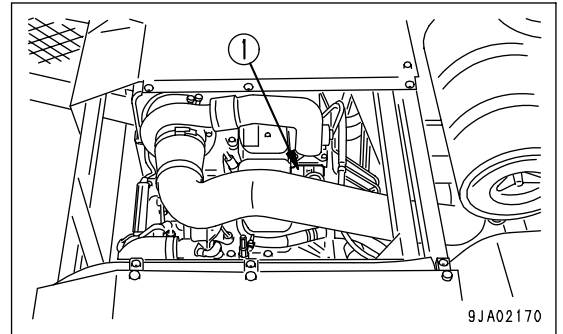
## REPLACE RUBBER SHOES

Ask your Komatsu distributor to replace rubber shoes.

### CHECK ELECTRICAL INTAKE AIR HEATER

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

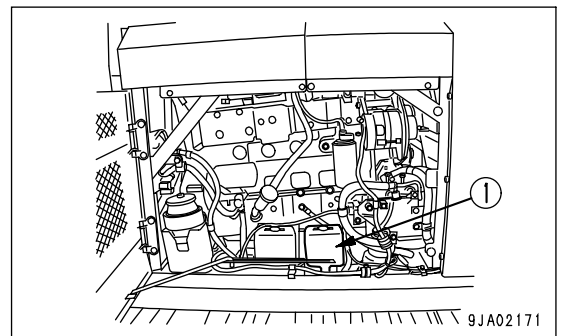
When inspecting or installing, replace the electrical intake air heater gasket with a new part.



### CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

If there is air in the window washer fluid, check the level of the fluid in window washer tank(1), and if it is low, add automobile window washer fluid.

When adding fluid, be careful not to let any dust get in.



### PROPORTION FOR MIXING WASHER FLUID WITH WATER

The proportion differs according to the ambient temperature, so dilute the washer fluid with water to the following proportions before adding.

Area, season	Proportions	Freezing temperature
Normal	Washer fluid 1/3 : water 2/3	-10°C (14°F)
Winter in cold area	Washer fluid 1/2 : water 1/2	-20°C (-4°F)
Winter in extremely cold area	Pure washer fluid	-30°C (-22°F)

There are two types depending on the freezing temperature: -10°C (14°F) (general use) and -30°C (-22°F) (cold area use), so select according to the area and season.

## CHECK BEFORE STARTING

For details of the following items, see "CHECK BEFORE STARTING (PAGE 3-36)" in the OPERATION section.

- Check coolant level, add water
- Check oil level in engine oil pan, add oil
- Check fuel level, add fuel
- Check oil level in hydraulic oil tank, add oil
- Check dust indicator
- Check electrical wiring
- Check horn sound

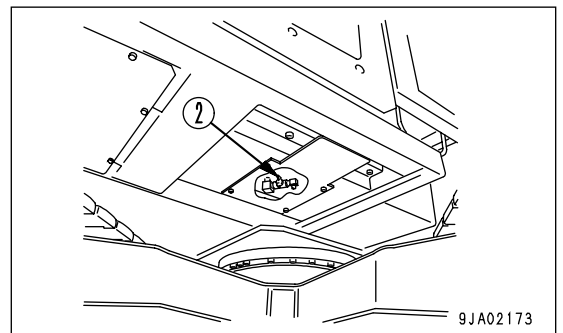
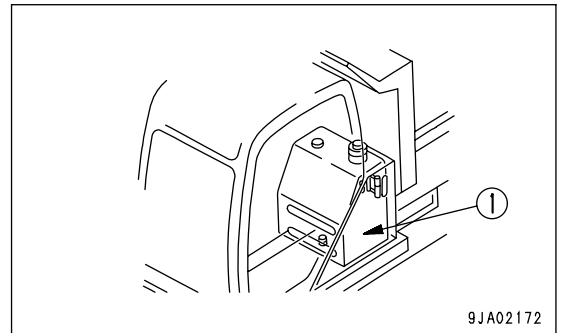
## EVERY 100 HOURS SERVICE

### DRAIN WATER, SEDIMENT FROM FUEL TANK

#### WARNING

If there is any soil at the point where the fuel spilled, remove it. If spilled oil is not removed, it will cause fire.

1. Drain water and sediment before starting the machine.
2. Swing the upper structure so that drain valve (2) at the bottom of fuel tank (1) is between the tracks.
3. Prepare a container to receive fuel to be drained.
4. Open drain valve (2) at the bottom of the tank to drain sediment and water accumulated on the bottom, together with fuel.  
At this time, take care not pour fuel over yourself.
5. After clear fuel comes out, close drain valve (2).





# LUBRICATING

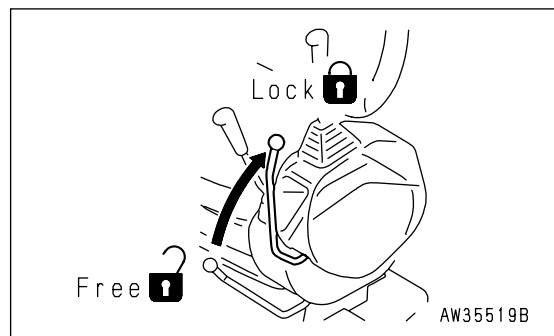
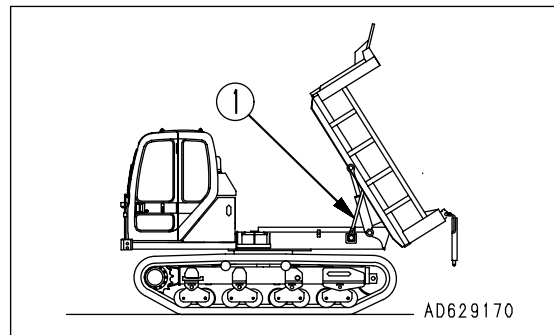
## ⚠ WARNING

- Check that there is no one on the body or in the surrounding area, then raise the body.
- After operating the body, use the pedal lock to lock the body control pedal.
- Set the safety bar securely in position to prevent the dump body from coming down.

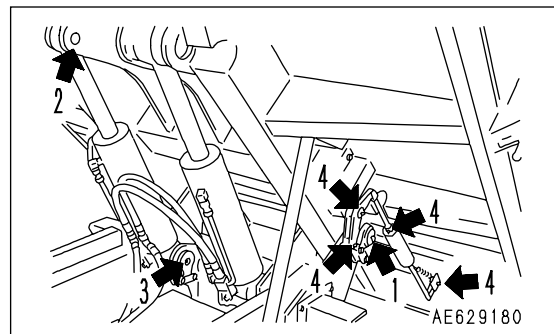
### NOTICE

Carry out the greasing every 10 hours for the first 100 hours on a new machine when the parts are being broken in.

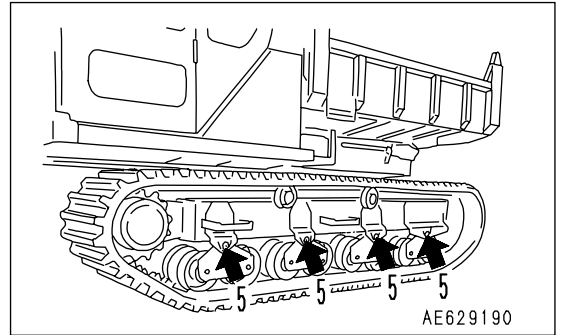
- Prepare a grease gun.
1. Raise the dump body, set safety bar (1) securely in position, stop the engine, then set the safety lock lever to the LOCK position.
  2. Using a grease gun, pump in grease through the grease fittings shown by arrows.
  3. After greasing, wipe off any old grease that was pushed out.



- (1) Dump body mount (2 points)
- (2) Dump body cylinder rod end (2 points)
- (3) Dump body cylinder mount (2 points)
- (4) Rear gate lock lever and link (box type body specification) (10 points)



(5) Bogie mount (8 points)



## EVERY 250 HOURS SERVICE

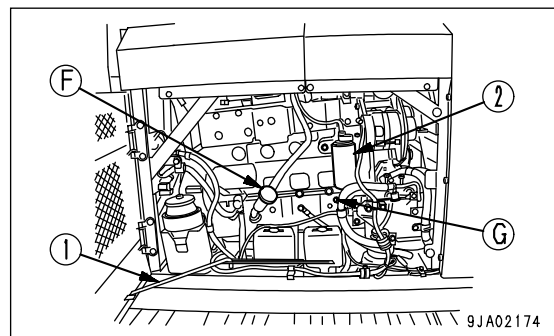
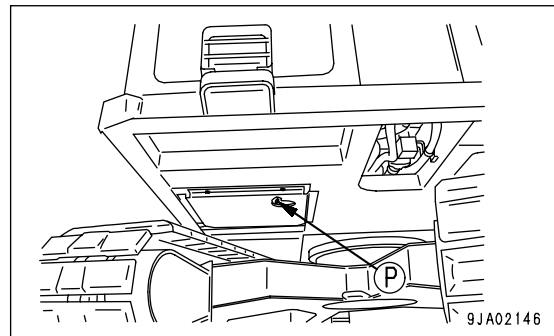
### CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

#### WARNING

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

Prepare the following.

- Container to catch drained oil: Min. 19 liters capacity
  - Refill capacity: 19 liters (10.03 US gal)
  - Filter wrench
1. Swing the upper structure so that drain plug (P) is between the left and right tracks, then stop the engine.
  2. Place a drain container under drain valve (P) located on the bottom of the machine.
  3. Loosen drain valve (P) slowly to avoid getting oil on yourself, and drain the oil.
  4. Check the drained oil, and if there are excessive metal particles or foreign material, please contact your Komatsu distributor.
  5. Install drain valve (P).
  6. Open the side cover and lock it securely in position with the side cover support lever (1).
  7. Using a filter wrench, turn filter cartridge (2) to the left and remove it.
  8. Clean the filter holder, coat the seal surface of the new filter cartridge with engine oil (or coat thinly with grease), then install.



#### REMARK

Check that there is no old packing affixed to the filter holder. If there is any old packing affixed to the filter, it will cause leakage of oil.

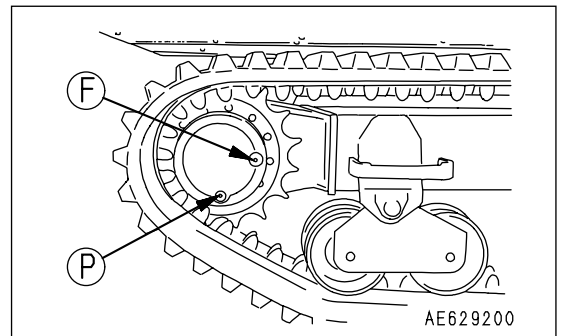
9. When installing, bring the packing surface into contact with the seal surface of the filter holder, then tighten a further 1/2 - 3/4 turns.
10. After replacing the filter cartridge, add engine oil through oil filler port (F) until the oil is between the H and L marks on level gauge (G).
11. Run the engine idle for a while, then stop the engine and confirm that the oil level is between the H and L lines according to "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-37)".

## CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

**⚠ WARNING**

- The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.
- If there is still pressure remaining inside the case, the oil or plug may fly out. Loosen the plug slowly to release the pressure.

- Prepare hexagon wrench (width across flats: 8 mm)
  1. Set so that the height of plug (F) is at the center of the final drive case, and so that plug (P) is lower than plug (F).
  2. Remove plug (F) using the hexagonal wrench. When the oil level reaches a point 10 mm below the bottom of the plug hole, the correct amount of oil has been added.
  3. If the oil level is too low, install plug (F), operate the travel levers, and drive forward or in reverse to rotate the sprocket one turn. Then repeat Step 2 to check again.
  4. If the oil level is still too low, add engine oil through the hole in plug (F) until the oil overflows.
  5. After checking, install plug (F).



## 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

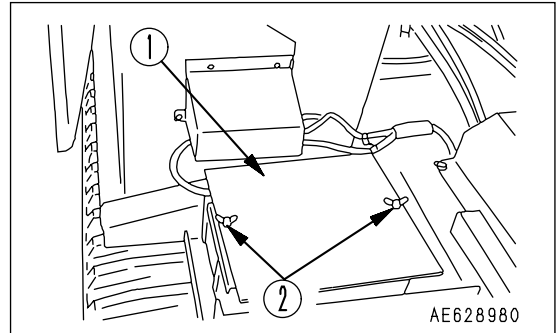
When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.

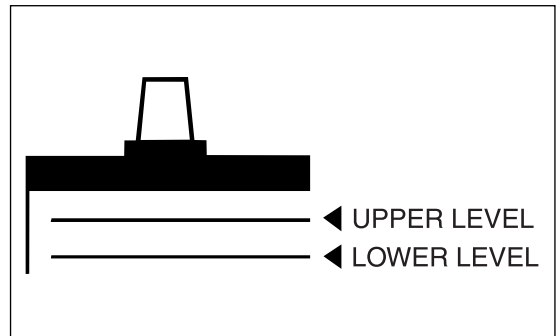
**When Checking Electrolyte Level from side of Battery**

If it is possible to check the electrolyte level from the side of the battery, check as follows.

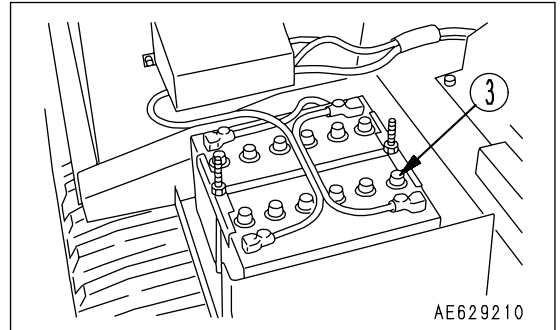
1. Remove nuts (2) (2 places) of cover (1), then remove the cover.



2. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L) and LOWER LEVEL (L.L) lines. If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.



3. Remove cap (3), and check the battery electrolyte is up to the UPPER LEVEL line. If the level is low, add distilled water. Do not add water above the UPPER LEVEL line. This may cause leakage of the electrolyte, which may cause fire.



4. Clean the air hole in the battery cap (3), then tighten the cap securely. Wipe the top surface of the battery with a damp cloth to keep it clean.

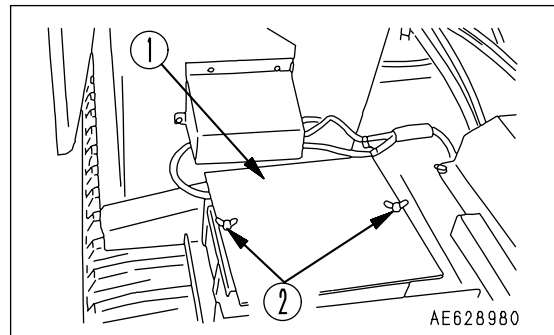
**REMARK**

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

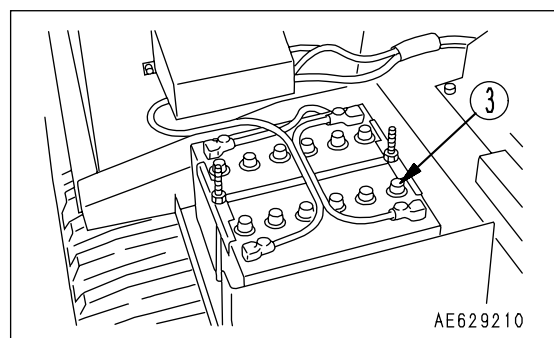
### When It is Impossible to Check Electrolyte Level from Side of Battery

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.

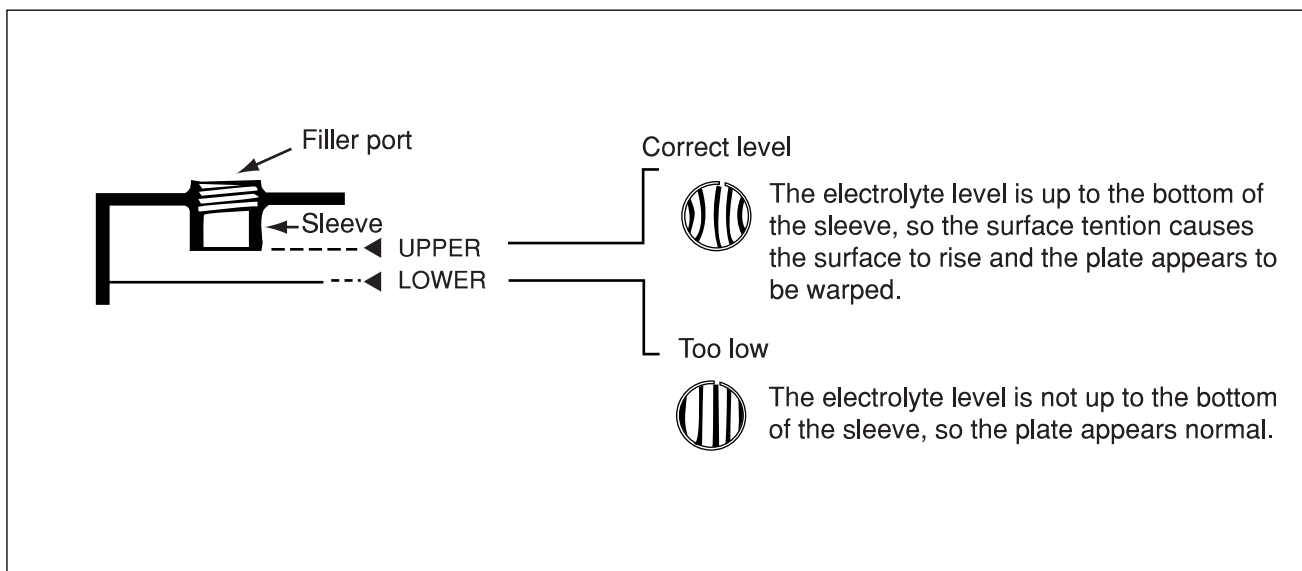
1. Remove nuts (2) (2 places) of cover (1), then remove the cover.



2. Remove cap (3), and check the battery electrolyte is up to the UPPER LEVEL line. If the level is low, add distilled water. Do not add water above the UPPER LEVEL line. This may cause leakage of the electrolyte, which may cause fire.



Use the diagram below for reference, and check if the electrolyte reaches the bottom of the sleeve.



3. After adding distilled water, tighten cap (1) 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

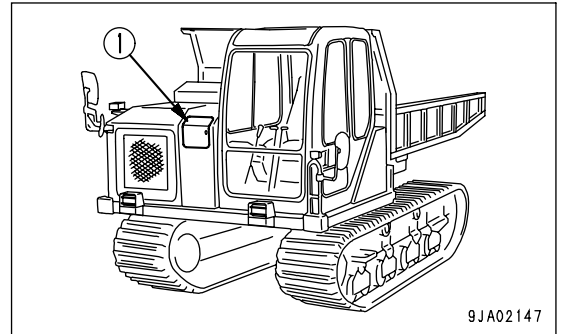
If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

## REPLACE HYDRAULIC FILTER ELEMENT

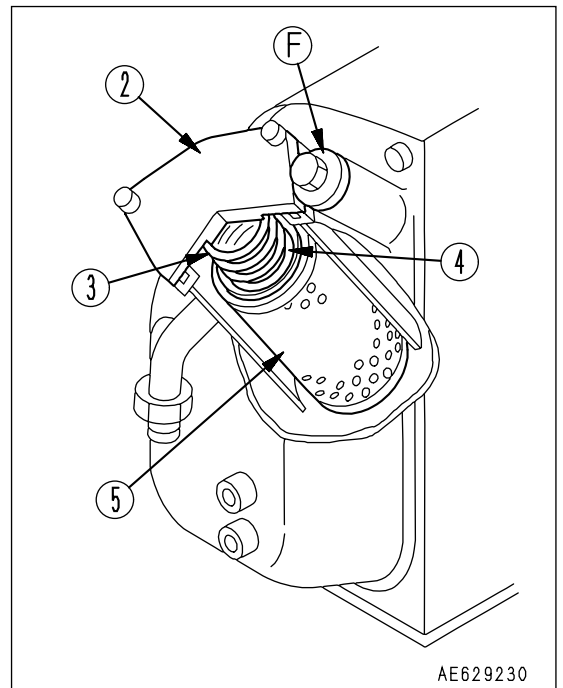
### WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the hydraulic tank strainer.
- When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the internal pressure, then remove it carefully.

1. Open inspection cover (1) at the front of the chassis.
2. Remove the cap from oil filler (F), and release the internal pressure.
3. Loosen 3 bolts, then remove cover (2).  
When doing this, the cover may fly out under the force of spring (3), so hold the cover down when removing the bolts.
4. After removing spring (3) and valve (4), take out element (5).
5. Clean the removed parts in diesel oil.
6. Install a new element in the place where old element (5) was installed. Check the O-ring to be set between the hydraulic tank and cover (2). If it is damaged, replace the O-ring.
7. Set valve (4) and spring (3) on top of the element.
8. Set cover (2) in position, push it down by hand, and install the cover with the mounting bolts.
9. Remove oil filler plug (F), then close cover (1).
10. To bleed the air, start the engine according to "STARTING ENGINE (PAGE 3-47)" and run the engine at low idling for 10 minutes.
11. Stop the engine.



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### REMARK

Operate the machine after halting for more than 5 minutes to eliminate bubbles in the oil inside the tank.

12. Check for oil leakage and wipe off any spilled oil.



## EVERY 500 HOURS SERVICE

Maintenance for every 100 and 250 hours service should be carried out at the same time.

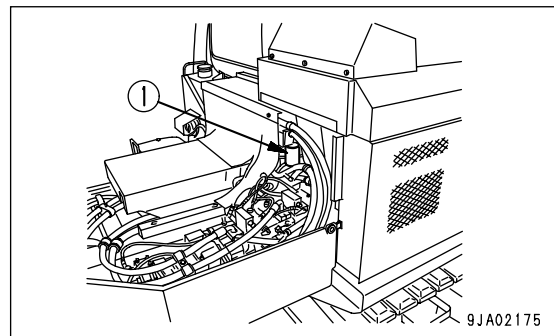
### REPLACE FUEL FILTER CARTRIDGE

#### WARNING

- Raise the body. Fit the dump body support rod securely to prevent the body from coming down.
- 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 carrying out automatic air bleeding, the engine may start, so be careful to check that the area around the engine is safe before cranking.

Prepare a filter wrench and a container to catch the fuel.

1. Set the container to catch the fuel under the filter cartridge.
2. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.
3. Clean the filter holder, fill a new filter cartridge with clean fuel, coat the packing surface with engine oil, then install it to the filter holder.
4. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 2/3 of a turn.



#### NOTICE

**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.**

5. After replacing the fuel filter cartridge, bleed the air. It is possible to bleed the air from the fuel circuit simply by cranking the starting motor with the starting switch. Bleed the air as follows.
6. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
7. Set the fuel control lever to the low idling position.
8. Turn starting motor switch key to ON position, and crank the engine 15 - 20 seconds. Air bleed automatically with automatic air bleeding device.
9. Turn the starting motor switch key to START position, the engine runs.

#### NOTICE

**Do not continue to crank the starting motor for more than 20 seconds. Wait for 1 or 2 minutes, then try again.**

#### REMARK

When the engine stops because of running out of fuel, also operate the above procedure to bleed air.

10. After bleeding the air, start the engine, and check that there is no leakage of oil from the filter seal circuit. If there is any leakage of oil, check the tightening of the filter cartridge. If there is still oil leakage, repeat Steps 1 and 2 to remove the filter cartridge, then check the packing surface for damage or embedded foreign material. If there is any damage or foreign material in the packing, replace the cartridge with a new part, then repeat Steps 3 to 9.

## CHECK SWING PINION GREASE LEVEL, ADD GREASE

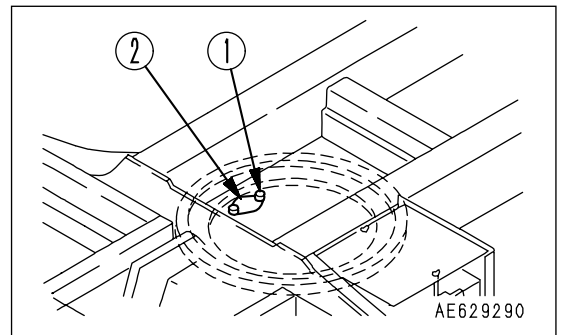
**⚠ WARNING**

- **Raise the body. Fit the dump body support rod securely to prevent the body from coming down.**
- **The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.**

1. Remove bolts (1) (2 bolts) on the front of the revolving frame and remove cover (2).
2. Insert a scale into the grease and check that the height of the grease in the portion where the pinion passes is at least 4 mm (0.158 in). Add more grease if necessary.
3. Check if the grease is milky white. If it is milky white, it is necessary to change the grease. Please contact your Komatsu distributor.

The total amount of grease is 5 liters (4.5 kg) (1.3 US gal)

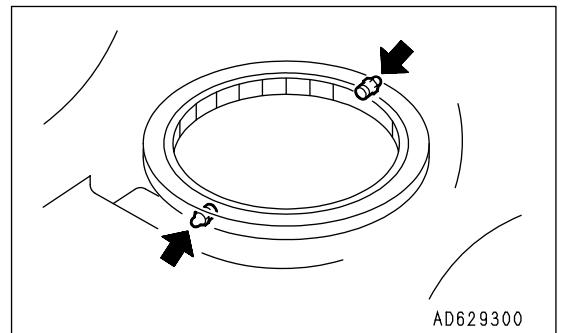
4. Install cover (2) with bolts (1).



## GREASE SWING CIRCLE

### (2 points)

1. Using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off all the old grease that was pushed out.



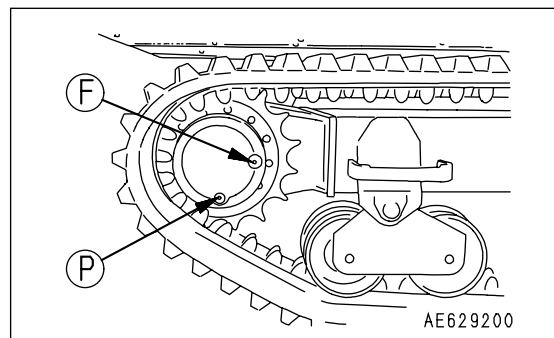
## CHANGE OIL IN FINAL DRIVE CASE

### WARNING

- The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.
- If there is still pressure remaining inside the case, the oil or plug may fly out. Loosen the plug slowly to release the pressure.

Prepare the following.

- Container to catch drained oil: Min. 2.1 liters capacity
  - Refill capacity: 2.1 liters (0.55 US gal)
  - Prepare hexagon wrenches (Width across flats: 8 mm (0.3 in)).
1. Set so that the height of plug (F) is at the center of the final drive case, and so that plug (P) is lower than plug (F).
  2. Set an oil receiving container under plug (P).
  3. Remove plugs (P) and (F) (Two places) with hexagonal wrench (Width across flats: 8 mm) to drain the oil.
  4. Tighten plug (P).
  5. Supply oil through the hole of plug (F) up to the specified level.
  6. After the oil flows out of the hole of plug (G), install plug (F).

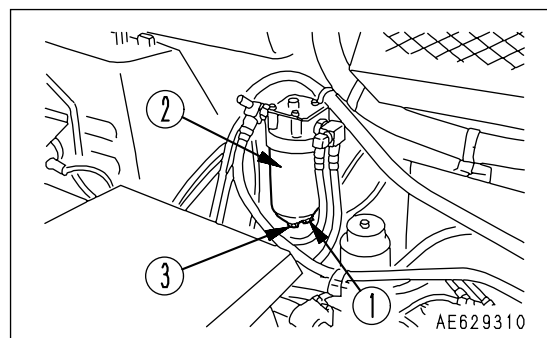


## REPLACE HYDRAULIC LINE FILTER ELEMENT

### WARNING

- Raise the body. Fit the dump body support rod securely to prevent the body from coming down.
- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.

1. Remove drain plug (1) at the bottom of the filter case, drain the oil, then tighten the drain plug again.
2. Hold down case (2), loosen center bolt (3), then remove case (2).
3. Take out the element and wash the inside of the case.
4. Replace the filter gasket and O-ring with new parts. Coat the gasket and O-ring thinly with clean engine oil before installing.



5. Assemble the new element, set the case in position, then install with center bolt (3).  
Tightening torque:  $76.5 \pm 11.8 \text{ N}\cdot\text{m}$  ( $7.8 \pm 1.2 \text{ kgf}\cdot\text{m}$ ,  $56.4 \pm 8.7 \text{ lbft}$ )
6. Run the engine at idling for a short time, then check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 3-39)".

## CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS

### WARNING

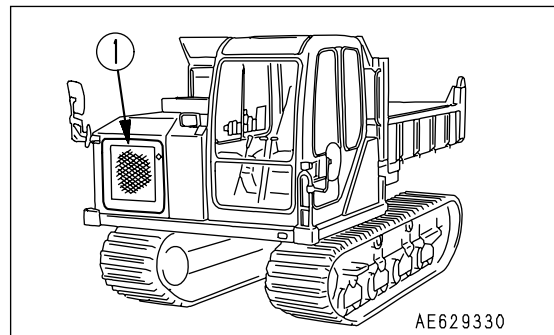
If compressed air, high-pressure water, or steam hit your body directly, or they cause dirt or dust to be blown up, there is a hazard of serious injury. Always use safety glasses, dust mask, or other protective equipment.

### NOTICE

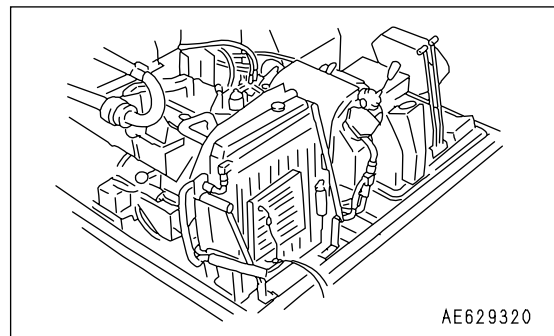
When using compressed air, keep a suitable distance away to prevent damage to the fins. In particular, when cleaning the aftercooler by blowing with compressed air at an angle of 45°, make sure that the nozzle is at least 300 (11.8 in) mm away from the radiator.

As far as possible, blow the core with compressed air at right angles to the core. If the fins are damaged, it will cause leakage of water and overheating. On extremely dusty jobsites, carry out the inspection every day, regardless of the maintenance interval.

1. Open engine front cover (1).
2. Use compressed to blow off mud, dust, or leaves clogging the radiator fins and oil cooler fins. At the same time, clean the net in front of the oil cooler. On machines equipped with an air conditioner, clean the condenser fins also.  
Steam or water can be used in place of compressed air.
3. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by ageing.  
Further, check hose clamps for looseness.
4. Close engine front cover (1).



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## EVERY 1000 HOURS SERVICE

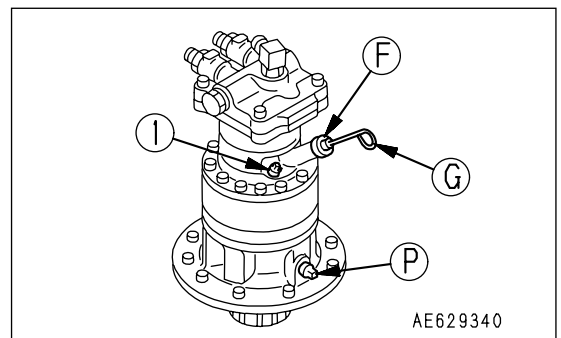
Maintenance for every 100, 250 and 500 hours should be carried out at the same time.

### CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL

#### WARNING

- **Raise the body. Fit the dump body support rod securely to prevent the body from coming down.**
- **The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.**

1. Remove dipstick (G) and wipe the oil off with a clean cloth.
2. Insert dipstick (G) fully in the dipstick guide pipe, then take it out again.
3. The oil level should be between the H and L marks on dipstick (G).
4. If the oil level is below the L mark, add engine oil through oil filler (F).  
When adding oil, remove air bleed plug (1).
5. If the oil is above the H mark, drain the excess engine oil from drain plug (P), and check the oil level again.
6. After inspecting the oil level and adding oil, insert the dipstick, then install air bleed plug (1).



### CHECK FAN BELT TANSION, ADJUST

Special tools are required for inspection an replacement fan belt. Contact your Komatsu distributor for inspection and replacement.

#### REMARK

An auto-tensioner (a device to automatically adjust the fan belt tension) is installed, so it is not necessary to adjust the tension.

### CHECK ALL TIGHTENING PARTS OF TURBOCHARGER

Please contact your Komatsu distributor to have the tightening portions checked.

### CHECK PLAY OF TURBOCHARGER ROTOR

Please contact your Komatsu distributor to have the rotor play checked.

## EVERY 2000 HOURS SERVICE

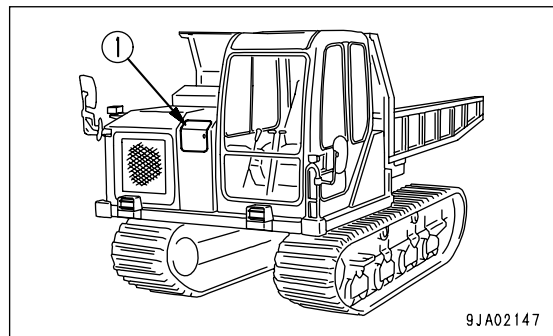
Maintenance for every 100, 250, 500 and 1000 hours service should be carried out at the same time.

### CHANGE OIL IN HYDRAULIC TANK AND CLEAN STRAINER

#### WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the hydraulic tank strainer.
- When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the internal pressure, then remove it carefully.

- Container to catch drained oil: Min. 45 liters capacity
  - Refill capacity: 45 liters (11.88 US gal)
  - Prepare handle
1. Remove inspection cover (1) at the front of machine.



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2. Place a container under the drain plug under the chassis to catch the oil.  
Remove the plug of oil filler port (F) and drain plugs (P) and (Q), and drain the oil.  
Check the O-rings fitted to plugs (P) and (Q), and if any damage is found, replace the O-ring. After draining the oil, tighten drain plugs (P) and (Q) again.

Tightening torque

Drain plug (P) (installed to bottom of tank):

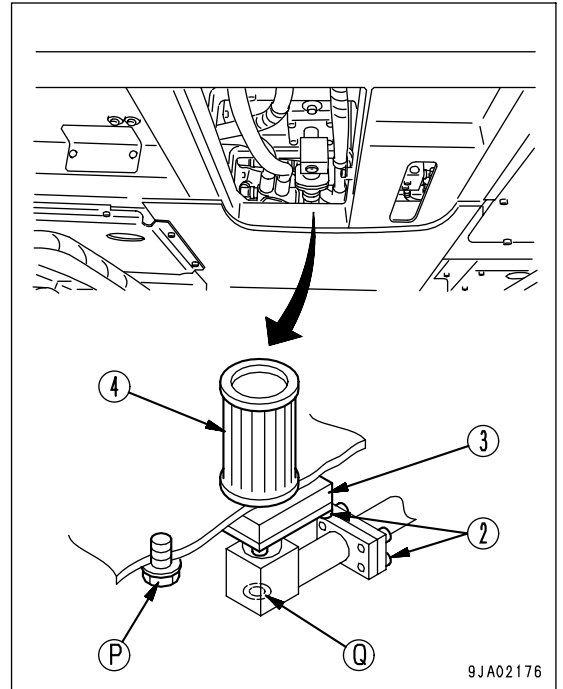
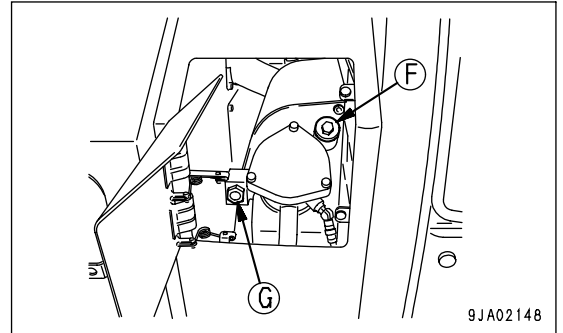
$68.6 \pm 9.81 \text{ N}\cdot\text{m}$   
 $(7 \pm 1 \text{ kgf}\cdot\text{m}, 50.6 \pm 7.2 \text{ lbft})$

Drain plug (Q) (installed to piping):

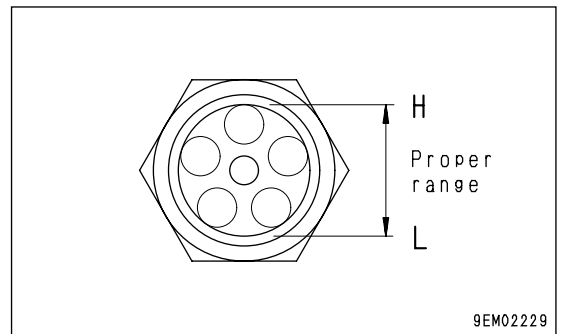
$49.0 \pm 4.9 \text{ N}\cdot\text{m}$   
 $(5 \pm 0.5 \text{ kgf}\cdot\text{m}, 36.2 \pm 3.6 \text{ lbft})$

When removing drain plugs (P) and (Q), be careful not to get oil on yourself.

3. Loosen bolt (2), remove flange (3), then remove strainer (4).
4. Remove all dirt stuck to strainer (4), then wash with clean diesel oil or flushing oil. If strainer (4) is damaged, replace it with a new part.
5. When installing, insert strainer (4) into the protrusion of flange (3) to assemble.



6. Add the specified amount of engine oil through oil filler port (F). Check that the oil level is between the H and L lines on sight gauge (G).

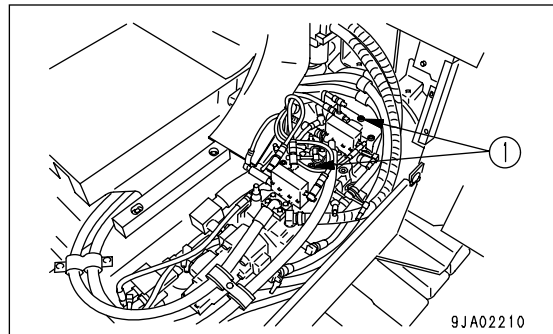


7. After changing the oil, or replacing or washing the filter element and strainer, bleed the air from inside the circuit as follows.



## AIR BLEEDING PROCEDURE

1. Bleeding air from pump
  - 1) Loosen air bleed plug (1) installed to the drain port and check that oil oozes out (air bleeding is completed).
  - 2) After completion of the air bleeding operation, tighten the air bleed plug.



### NOTICE

**If the pump is run when the pump case is not full of oil, there will be abnormal generation of heat, and this will lead to premature failure of the pump.**

2. Start the engine. For details, see "STARTING ENGINE (PAGE 3-47)". Run the engine at low idling for 10 minutes, then do as follows.
3. Bleeding air from cylinders
  - 1) Run the engine at a low idling, and extend and retract the cylinders 4 to 5 times to a point 100 mm (3.9in) from the end of the stroke. (Be careful not to operate to the end of the stroke.)
  - 2) Next, operate each cylinder 3 to 4 times to the end of its stroke.
  - 3) Finally, operate each cylinder 4 to 5 times to the end of its stroke to completely remove the air.

### NOTICE

**If the engine is run immediately at high speed or the cylinder is operated to the end of its stroke, the air inside the cylinder may cause damage to the piston packing.**

4. Operation
  - 1) After completing the air bleeding operation, stop the engine, and leave it for at least 5 minutes before starting operations. This will release any bubbles in the oil inside the tank.
  - 2) Check that there is no oil leakage. If any oil has been spilled, wipe it off.

## CLEAN, CHECK TURBOCHARGER

Contact your Komatsu distributor for cleaning or inspection.

## 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.

## CHECK VIBRATION DAMPER

Check that there are no cracks or peeling in the outside surface of the rubber.

If any cracks or peeling are found, contact your Komatsu distributor to have the parts replaced.

## **EVERY 4000 HOURS SERVICE**

Maintenance for every 100, 250, 500, 1000 and 2000 hours service should be carried out at the same time.

### **CHECK WATER PUMP**

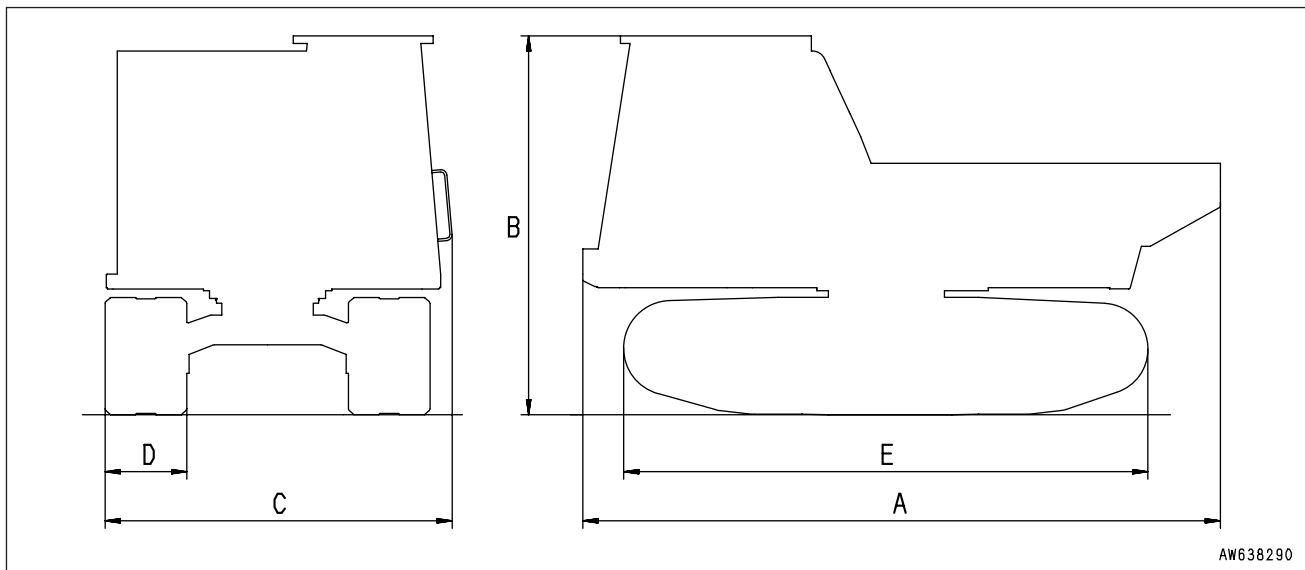
Check that there is no play in the pulley, leakage of oil or water, or clogging of the drain hole. If any abnormality is found, please contact your Komatsu distributor for repairs or replacement.

**MEMO**

# **SPECIFICATIONS**

# SPECIFICATIONS

	Item	Unit	Hull shape body	Box shape body
	Operating weight (without operator)	kg (lb)	8500 (18743)	8565 (18886)
	Name of engine	-	Komatsu S6D102E-1-A diesel engine	
	Engine horsepower	kW (HP)/rpm	99.3 (133)/2000	
A	Overall length	mm (ft in)	4685 (15'4")	4640 (15'3")
B	Overall height	mm (ft in)	2775 (9'1")	
C	Overall width	mm (ft in)	2515 (8'3")	
D	Track width	mm (ft in)	600 (1'12")	
E	Overall width of track	mm (ft in)	3840 (12'7")	
	Min. ground clearance	mm (ft in)	500 (1'8")	
	Dump body capacity	Struck	2.0 (2.6)	2.2 (2.9)
		Heaped	2.0 (4.2)	3.4 (4.4)
	Travel speed (low/high)	km/h (MPH)	6.0 (3.7) / 8.5 (5.3)	
	Swing speed	rpm	4.0	



# ATTACHMENTS, OPTIONS

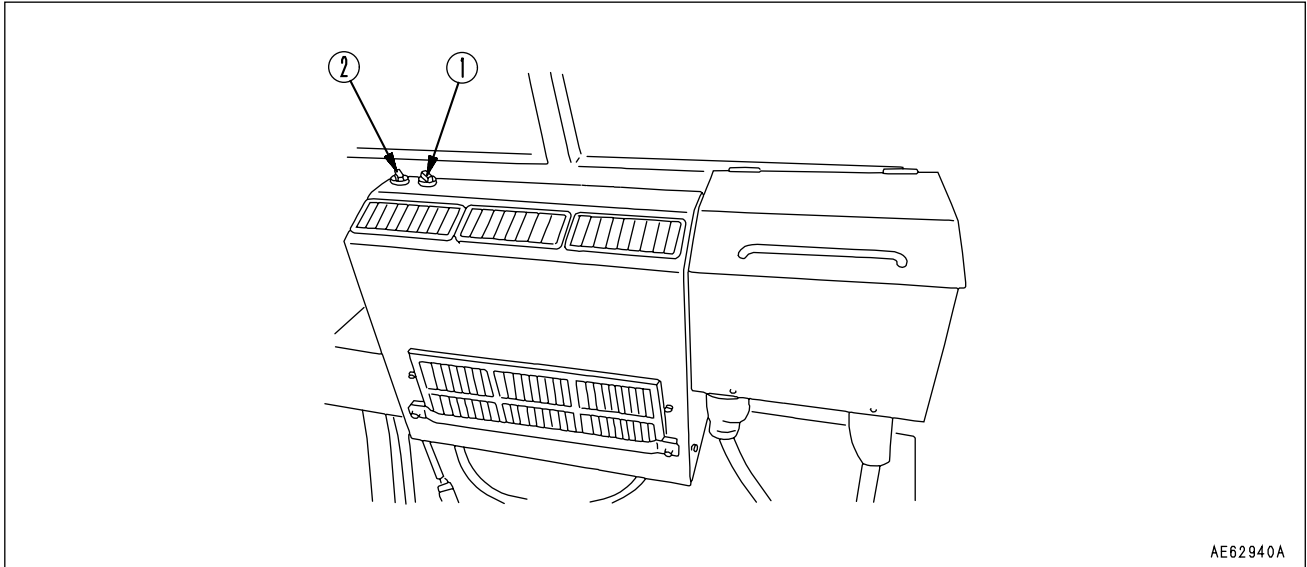
 **WARNING**

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

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# CAR COOLER

## CONTROL PANEL AND COMPONENTS



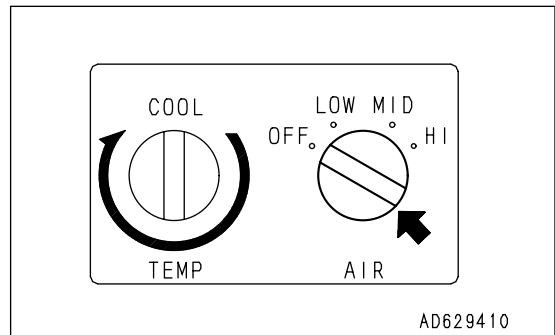
AE62940A

(1) Air flow control knob

(2) Temperature control knob

### AIR FLOW CONTROL KNOB

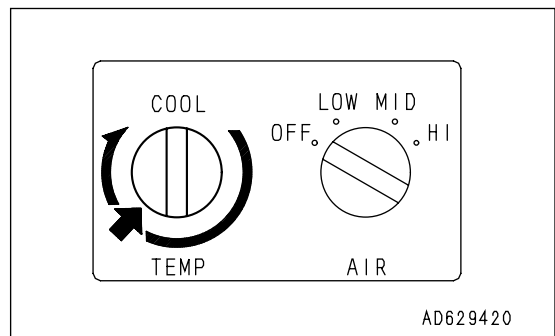
As knob (1) is rotated LOW → MID → HIGH, the air flow becomes stronger.



AD629410

### TEMPERATURE CONTROL KNOB

As knob (2) is turned to the right, the air flow becomes colder.



AD629420

## PRECAUTION WHEN USING

To use the car cooler efficiently, pay careful attention to the following.

If the suction port at the front of the car cooler body is blocked, the cooler efficiency will become poor. Always ensure that there is a good flow of air.

- If the machine has been left in the sun for a long time and the temperature inside the cab is high, open the windows and doors to cool the cab down before turning on the cooling.
- Keep the windows and doors closed when using the cooler.
- If dirt or mud accumulates on the condenser, the cooling efficiency will become poor. When washing or inspecting the machine, wash off all dirt and mud accumulated on the condenser to improve the air flow.
- Generally speaking, when using the cooler, for health reasons, the optimum setting is to have the temperature when entering the cab feel slightly cooler than the outside air (5 - 6°C below the outside temperature). Always keep this in consideration when adjusting the temperature.

## CAR COOLER MAINTENANCE

### WHEN REQUIRED

#### CHECK LEVEL OF REFRIGERANT(GAS)

#### WARNING

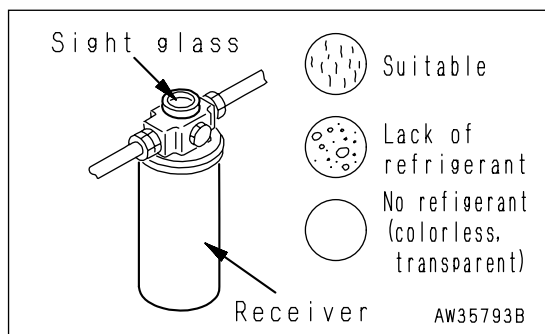
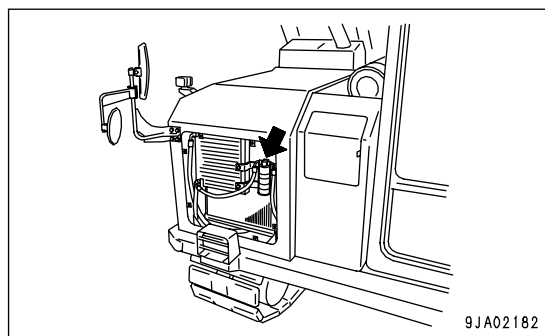
If the refrigerant used in the cooler gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the refrigerant. Never loosen any part of the refrigerant circuit. Do not bring any flame close to any point where the refrigerant gas is leaking.

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

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

#### REMARK

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





## OFF SEASON CHECKS

Even during the off-season, run the compressor at low speed for a few minutes once a week to prevent the loss of the oil film at the lubricated parts of the compressor.

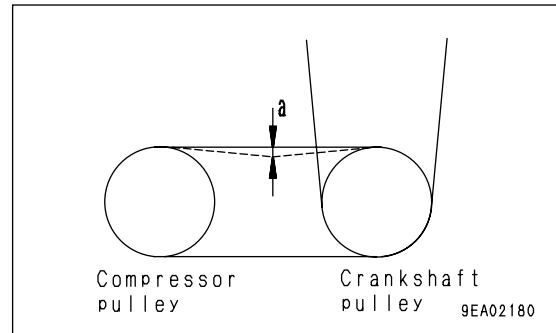
(Run the engine at low speed and turn the cooler temperature control knob fully to the left.)

## EVERY 250 HOURS MAINTENANCE

### CHECK V-BELT TENSION, ADJUST

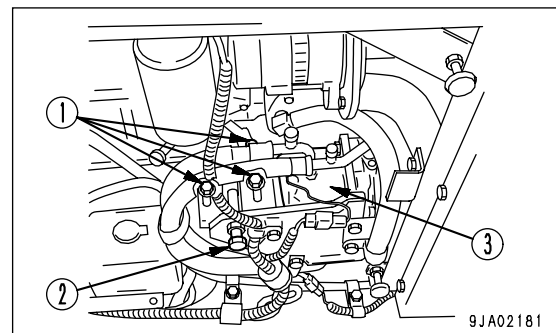
#### CHECKING

1. Stop the engine, and open the side cover.
2. The belt should deflect 15 to 18mm (0.6 to 0.7 in) when pressed with a thumb force of approx. 58.8 N (6 kgf, 13 lb) at "a" point midway between the compressor pulley and the crank pulley.



#### ADJUSTMENT

When adjusting, loosen bolt (1), turn adjustment bolt (2), and move the bracket and compressor (3) to adjust.



## EVERY 500 HOURS SERVICE

### CHECK AND INSPECT AIR CONDITIONER CONDENSER FINS

#### WARNING

If compressed air, high-pressure water, or steam hit your body directly, or they cause dirt or dust to be blown up, there is a hazard of serious injury. Always use safety glasses, dust mask, or other protective equipment.

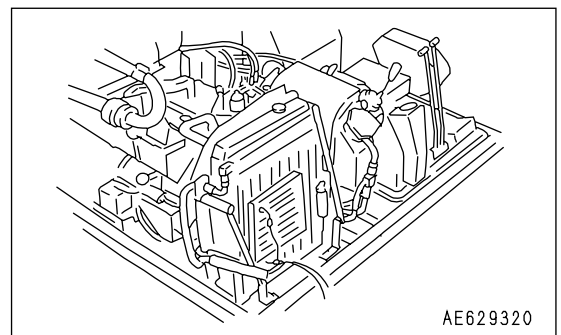
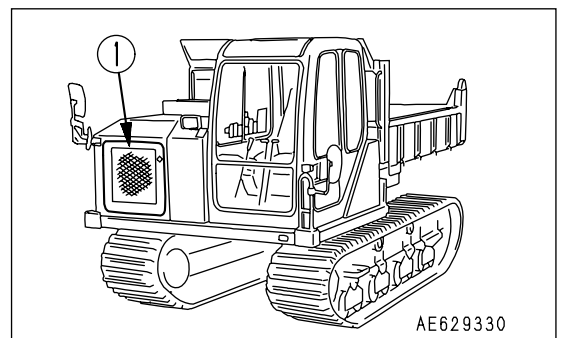
#### NOTICE

When using compressed air, keep a suitable distance away to prevent damage to the fins.

As far as possible, blow the core with compressed air at right angles to the core. If the fins are damaged, it will cause leakage of water and overheating. On extremely dusty jobsites, carry out the inspection every day, regardless of the maintenance interval.

If dirt or mud are stuck to the condenser fins, the cooling efficiency of the condenser will drop greatly, and the cooling performance will drop, so wash off any mud or dirt stuck to the condenser. If any fins are crushed, repair them with a screwdriver.

1. Open engine front cover (1).
2. Use compressed to blow off mud, dust, or leaves clogging the condenser fins. Steam or water can be used in place of compressed air.
3. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by aging. Further, check hose clamps for looseness.
4. Close engine front cover (1).



**CLEAN CAR COOLER AIR FILTER**

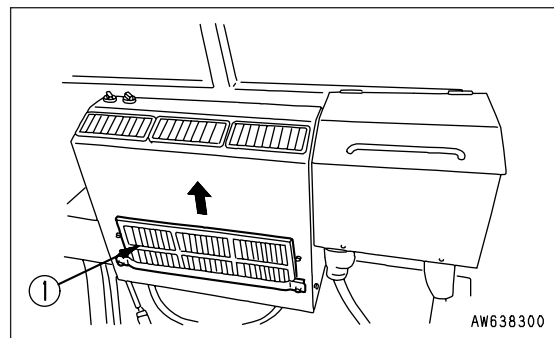
**⚠ WARNING**

If compressed air is used, there is danger that dirt may fly and cause personal injury. Always wear safety glasses, dust mask, and other protective equipment.

**NOTICE**

As a guideline, the filters should be cleaned every 500 hours, but on dusty jobsites, clean the filters more frequently.

1. Pull up RECIRC filter and remove it.
2. Blow filter (1) with compressed air to clean them. If there is oil stuck to the filter or the filter is extremely dirty, wash it in water with a neutral agent. After washing, dry the filter thoroughly before using it again.  
If the dirt clogging the filter cannot be removed by compressed air or washing in water, replace the filter with a new part.



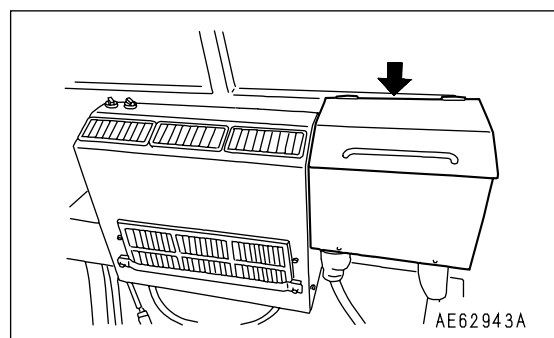
**HOT AND COOL BOX**

This is at the rear left side of operator's seat.

This operates together with the heater or cooler.

When the heater is being used, the box is warm.

When the cooler is being used, the box is cool.



# INDEX

## A

AFTER COLD WEATHER .....	3-81
AFTER COMPLETION OF WORK .....	3-81
AFTER RUNNING OUT OF FUEL .....	3-83
AFTER STARTING ENGINE .....	2-25
AFTER STORAGE .....	3-82

## B

BATTERY .....	2-31
BEFORE STARTING ENGINE .....	2-23
BEFORE STORAGE .....	3-82

## C

CAP, COVER WITH LOCK .....	3-25
CAR COOLER .....	6-2
CAR COOLER MAINTENANCE .....	6-3
CARRYING OUT KOWA (Komatsu Oil Wear Analysis) .....	4-7
CHECK AFTER FINISHING WORK .....	3-69
CHECK AFTER STOPPING ENGINE .....	3-53
CHECK BEFORE STARTING .....	4-30
CHECK BEFORE STARTING ENGINE, ADJUST .....	3-34
COLD WEATHER OPERATION .....	3-79
CONTROL LEVERS AND PEDALS .....	3-16
CONTROL PANEL AND COMPONENTS .....	6-2

## D

DOOR LOCK .....	3-23
DURING STORAGE .....	3-82

## E

EMERGENCY ESCAPE HAMMER .....	3-24
ENGINE SERIAL NO. PLATE AND POSITION ...	1-8
EVERY 100 HOURS SERVICE .....	4-31
EVERY 500 HOURS SERVICE .....	4-40
EVERY 1000 HOURS SERVICE .....	4-45
EVERY 2000 HOURS SERVICE .....	4-46
EVERY 4000 HOURS SERVICE .....	4-49
EXPLANATION OF COMPONENTS .....	3-4

## F

FOREWORD .....	1-2
FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE .....	1-7
FUSE .....	3-27
FUSIBLELINK .....	3-28

## G

GENERAL PRECAUTIONS .....	2-13
GENERAL VIEW .....	3-2
GENERAL VIEW OF CONTROLS AND GAUGES .....	3-3
GENERAL VIEW OF MACHINE .....	3-2
GREASE GUN HOLDER .....	3-29
GUIDE TO MAINTENANCE .....	4-2

## H

HANDLING HYDRAULIC SYSTEM .....	4-9
HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC .....	4-5
HANDLING RUBBER SHOES .....	3-70

## I

IF BATTERY IS DISCHARGED .....	3-84
INCLINOMETER .....	3-11
INITIAL 250 HOURS SERVICE .....	4-19
INTRODUCTION .....	1-7

## L

LIFTING MACHINE .....	3-78
LIGHTWEIGHT TOWING HOOK .....	3-83
LOADING, UNLOADING WORK .....	3-74
LOCKING .....	3-69
LONG-TERM STORAGE .....	3-82
LOWER WINDSHIELD .....	3-23

## M

MACHINE MONITOR .....	3-4
MACHINE OPERATION .....	3-54
MACHINE SERIAL NO. PLATE AND POSITION .....	1-8
MAINTENANCE SCHEDULE CHART .....	4-17

## N

NECESSARY INFORMATION .....	1-8
-----------------------------	-----

## O

OPERATING DUMP BODY .....	3-61
OPERATION .....	3-34
OPERATION MANUAL STORAGE .....	3-29
OPERATIONS AND CHECKS AFTER STARTING ENGINE .....	3-50
OTHER TROUBLE .....	3-88
OUTLINE OF SERVICE .....	4-5

---

**P**  
PARKING MACHINE ..... 3-67  
PERIODIC REPLACEMENT OF  
SAFETY CRITICAL PARTS ..... 4-15  
POSITION OF SERVICE METER ..... 1-9  
POSITIONS OF SAFETY PICTOGRAMS ..... 2-5  
PRECAUTION WHEN USING ..... 6-3  
PRECAUTIONS FOR LOW TEMPERATURE .... 3-79  
PRECAUTIONS FOR MAINTENENCE ..... 2-34  
PRECAUTIONS FOR OPERATION ..... 2-23, 3-63  
PRECAUTIONS WHEN  
TRAVELING UP OR DOWN HILLS ..... 3-64  
PROHIBITIONS FOR OPERATION ..... 3-62

**R**  
RECOMMENDED BRANDS,  
RECOMMENDED QUALITY FOR PRODUCTS  
OTHER THAN KOMATSU GENUINE OIL ..... 4-13  
RECOMMENDED FUEL, COOLANT, AND  
LUBRICANT ..... 4-11  
RELATING TO ELECTRIC SYSTEM ..... 4-9

**S**  
SAFETY ..... 2-2  
SAFETY CRITICAL PARTS ..... 4-16  
SAFETY I INFORMATION ..... 1-5  
SAFETY LABELS ..... 2-4, 2-6  
SERVICE PROCEDURE ..... 4-19  
SLIDING WINDOW ..... 3-23  
SPECIFICATIONS ..... 5-2  
STANDARD TIGHTENING TORQUES  
FOR BOLTS AND NUTS ..... 4-14  
STARTING ENGINE ..... 3-47  
STEERING MACHINE ..... 3-58  
STOPPING ENGINE ..... 3-53  
SWINGING ..... 3-60  
SWITCHES ..... 3-12

**T**  
TABLE OF ENTER SERIAL NO. AND  
DISTRIBUTORN ..... 1-9  
TOOL BOX ..... 3-28  
TORQUE LIST ..... 4-14  
TOWING ..... 2-33  
TOWING THE MACHINE ..... 3-83  
TRANSPORTATION ..... 2-30, 3-74  
TROUBLESHOOTING ..... 3-83

**W**  
WEAR PARTS ..... 4-10  
WEAR PARTS LIST ..... 4-10  
WHEN REQUIRED ..... 4-20  
WINDSHIELD ..... 3-20

# MEMO

**CD60R-1 CRAWLER CARRIER**

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