

Operation & Maintenance Manual

DUMP TRUCK

HD325-6
HD405-6

SERIAL NUMBERS

HD325-6370

HD405-2178

and up

WARNING

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

NOTICE

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

KOMATSU

FOREWORD

CALIFORNIA

Proposition 65 Warning

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

CALIFORNIA

Proposition 65 Warning

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

Wash hands after handling.

FOREWORD

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



WARNING

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 in the storage location for the operation and maintenance manual given below, and have all personnel read it periodically.

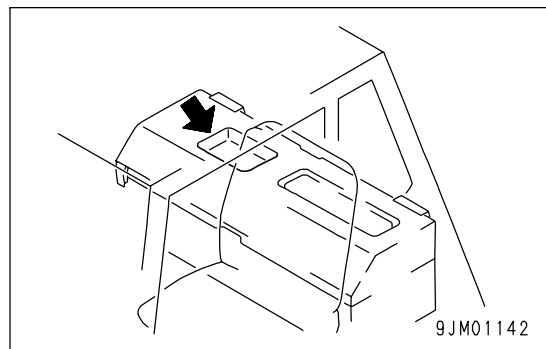
If this manual has been lost or has become dirty and cannot be read, request a replacement manual immediately from Komatsu or your Komatsu distributor.

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.

Place to Keep the Manual

It is located behind the operator's seat.



EMISSION CONTROL WARRANTY**EMISSION CONTROL WARRANTY STATEMENT (APPLIES TO CANADA ONLY)****1. Products Warranted**

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

2. Coverage

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

3. Limitations

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

KOMATSU IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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

GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS**ÉNONCÉ DE GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS (APPLICABLE AU CANADA SEULEMENT):****1. Produits garantis:**

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

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

IMPORTANT ENGINE INFORMATION THIS ENGINE CONFORMS TO YYYY MODEL YEAR U.S. EPA REGULATION AND THE CALIFORNIA REGULATIONS LARGE NON ROAD COMPRESSION IGNITION ENGINES. THIS ENGINE IS CERTIFIED TO OPERATE ON DIESEL FUEL.									
WARNING INJURY MAY RESULT AND WARRANTY IS VOIDED IF FUEL RATE RPM OR ALTITUDES EXCEED PUBLISHED MAXIMUM VALUES FOR THIS MODEL AND APPLICATION.									
ENGINE MODEL	SERIAL NO.	DISPLACEMENT	LITERS		NO. SÉRIE				
ENGINE FAMILY	EXHAUST EMISSION CONTROL SYSTEM	FIRING ORDER	1 - 5 - 3 - 6 - 2 - 4		DÉPLACEMENT				
ADV. LOAD OUTPUT	Kw (HP)	RPM		LITRES				
VALVE LASH COLD (mm)	IN.	EX.	FUEL RATE AT ADV.	mm ³ /STROKE		SÉQUENCE DE MISE À FEU			
IDLE SPEED	RPM	FAMILY EMISSION LIMIT	DATE OF MANUFACTURE		TAUX D'ESSENCE À ADV.		LIMITÉ D'ÉMISSION DE LA FAMILLE		
INITIAL INJECTION TIMING	DEG. BTDC	KOMATSU LTD. MADE IN JAPAN		DATE DE FABRICATION					
VITESSE STATIQUE		RÉGLAGE DE L'ALLUMAGE - INJECTION INITIALE		DEG. BTDC					

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.



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



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



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

Example of safety message using signal word



When standing up from the operator's seat, always place the lock lever in the LOCK position.

If you accidentally touch the control levers when they are not locked, this may cause a serious injury or death.

Other signal words

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

NOTICE

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

REMARKS

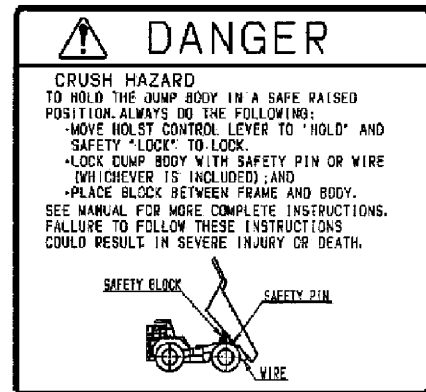
This word is used for information that is useful to know.

• Safety labels

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

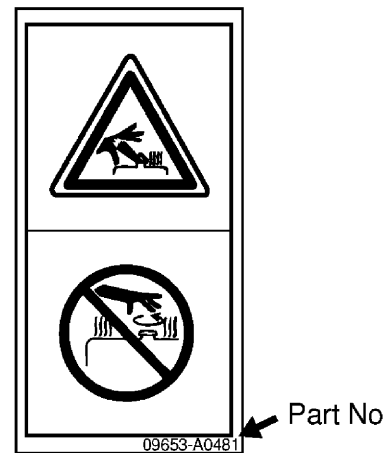
This machine uses "Safety labels using words" and "Safety labels using pictograms" to indicate safety procedures.

Example of safety label using words



Safety labels using pictogram

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



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

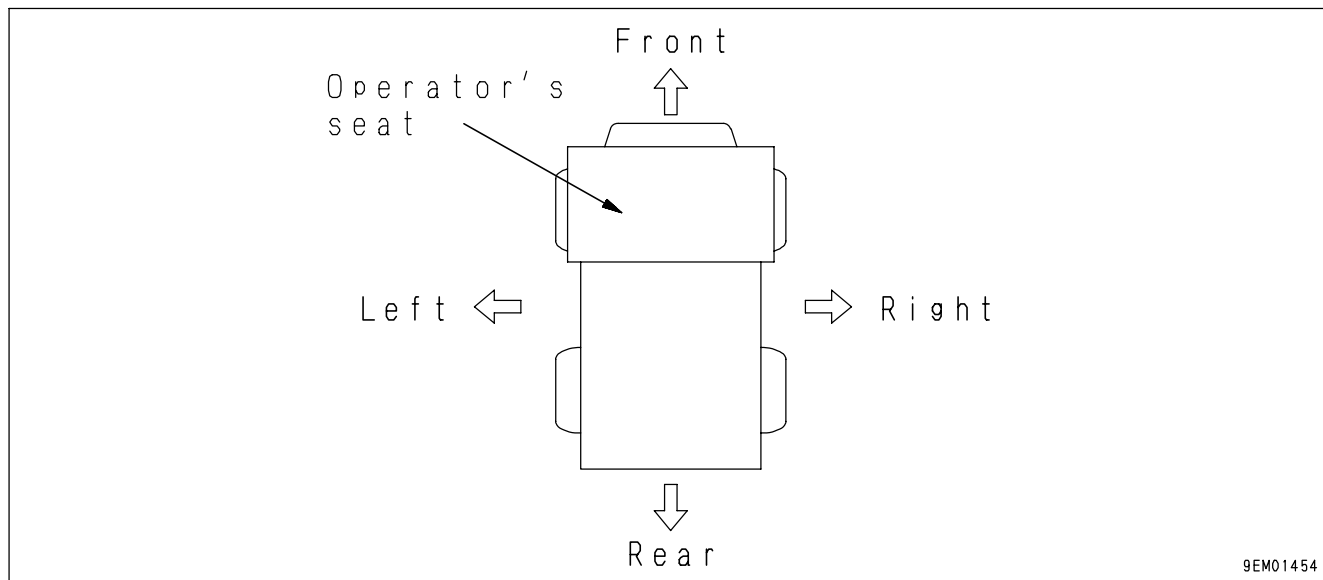
In no event should you engage in prohibited uses or actions described in this manual.

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

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

INTENDED USE

DIRECTIONS OF MACHINE



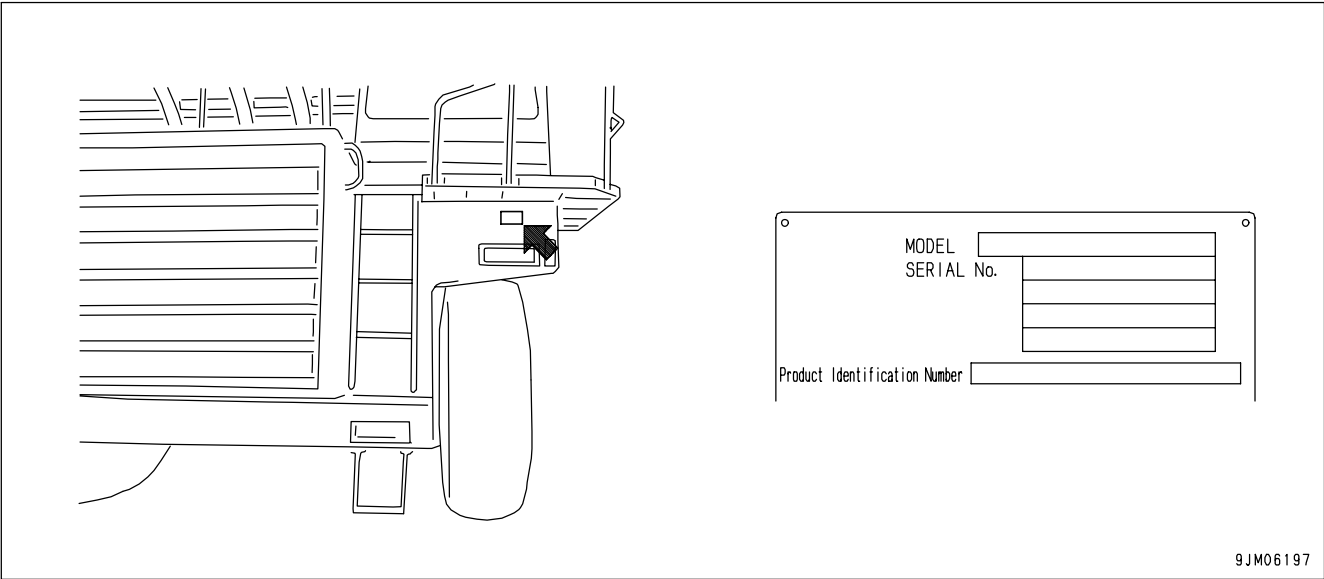
In this manual, the directions of the machine (front, rear, left, right) are determined according to the view from the operator's seat in the direction of travel (front) of the machine.

LOCATION OF PLATES, TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

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

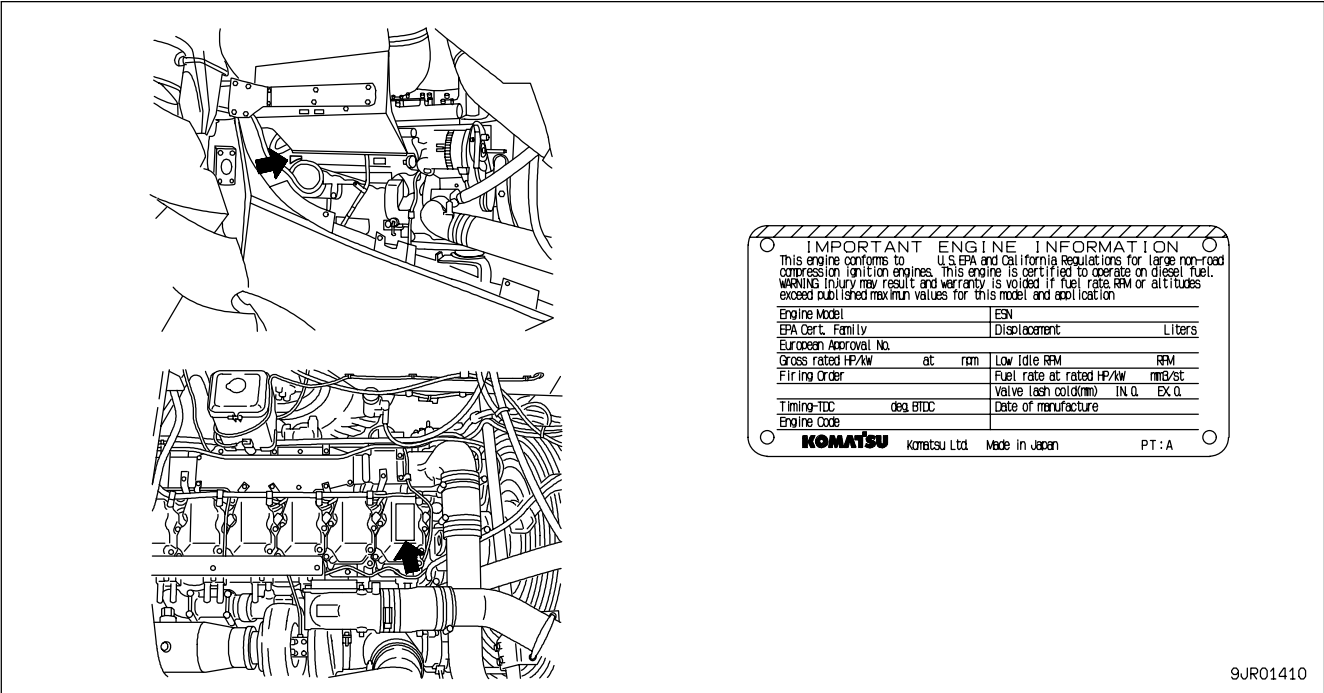
PRODUCT IDENTIFICATION NUMBER (PIN)/MACHINE SERIAL NO. PLATE

It is located on the left front end of the frame.
The design of the nameplate differs according to the territory.



ENGINE SERIAL NO. PLATE POSITION

It is at the top left side of the engine cylinder block and the engine cylinder head as seen from the fan.



SERVICE METER POSITION

It is located on the right side of the meter section.

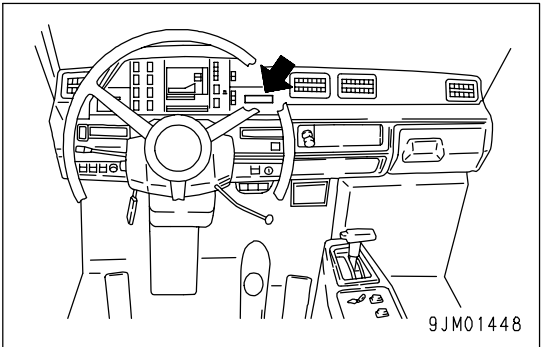


TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

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

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SAFETY

WARNING

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

SAFETY

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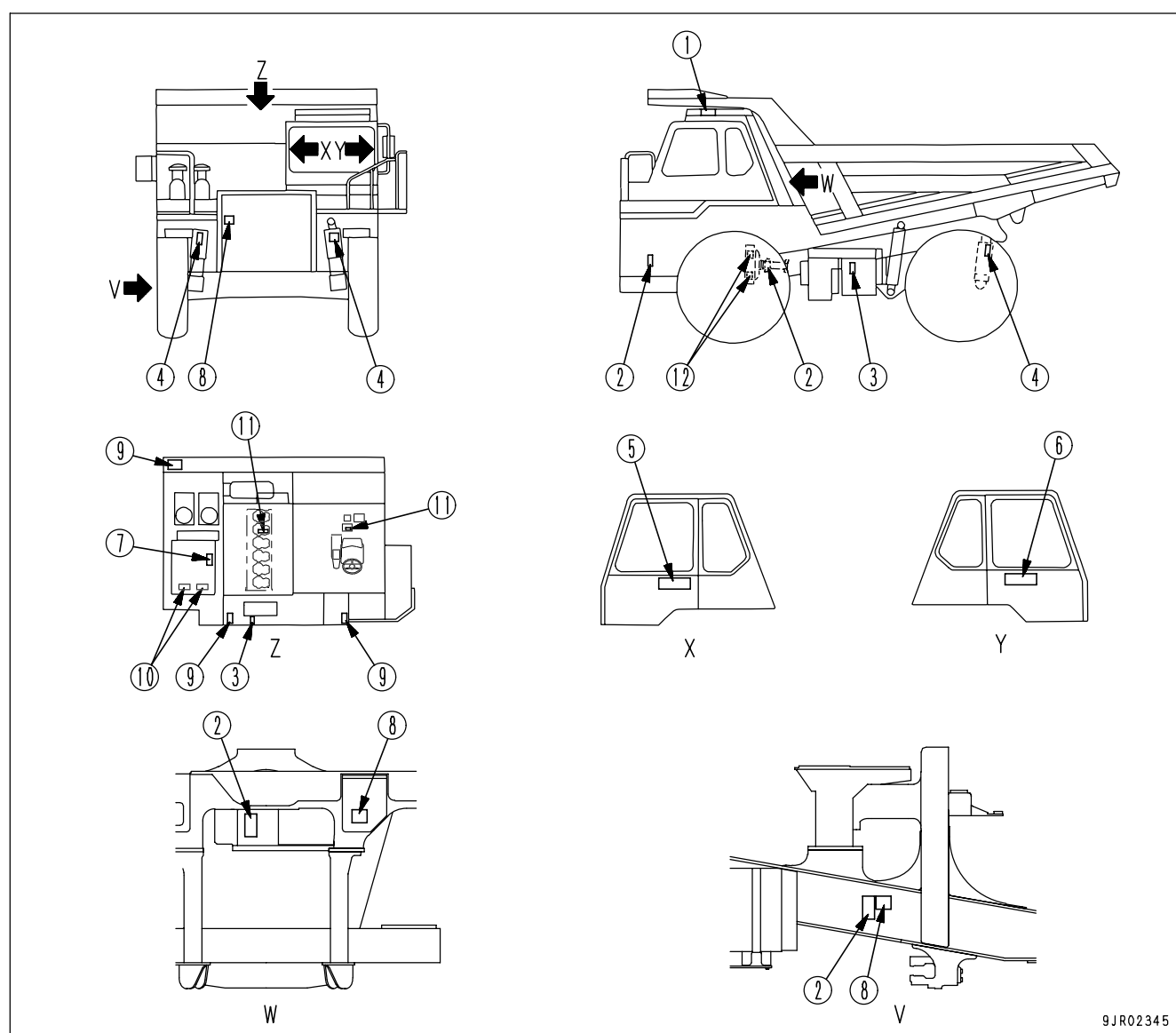
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SAFETY LABELS

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

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

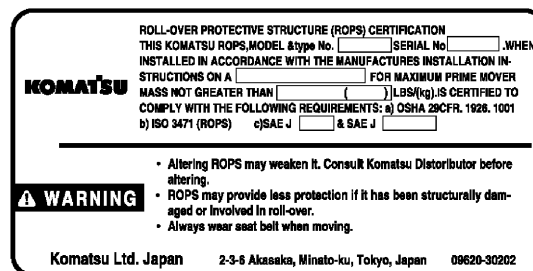
POSITION FOR ATTACHING SAFETY LABELS



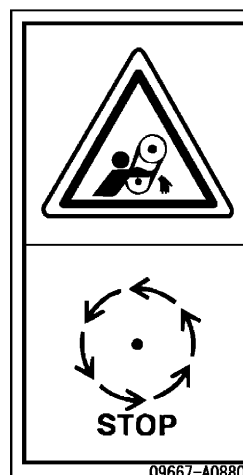
9JR02345

SAFETY LABELS

(1) Roll-over protective structure (ROPS) (09620-30202)



(2) Caution for checking engine room (09667-A0880)



Sign indicates a hazard of rotating parts, such as belt.

Turn off before inspection and maintenance.

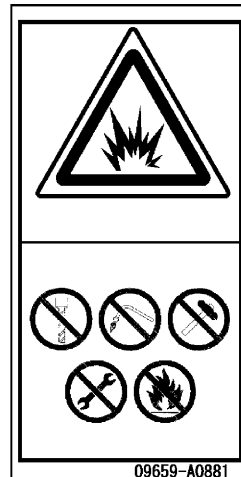
(3) Caution for opening hydraulic tank cap
Caution for opening radiator cap (09653-A0641)



Sign indicates a burn hazard from spurting hot water or oil if radiator or hydraulic tank is uncapped while hot.

Allow radiator or hydraulic tank to cool before removing cap.

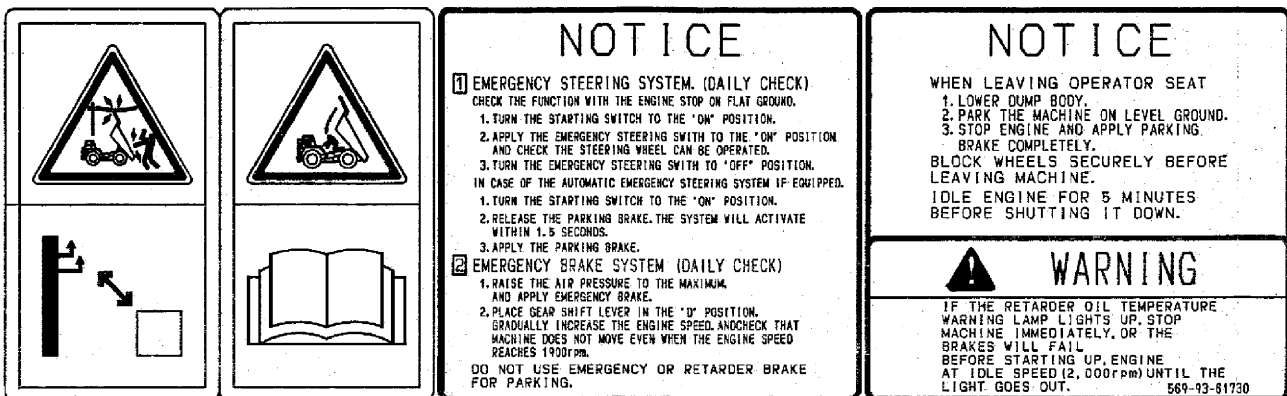
- (4) Warning for handling suspension cylinder
(09659-A0881)



There is the hazard of explosion causing injury.

Do not disassemble the accumulator, make holes in it, weld it, cut it, hit it, roll it or bring it near flame.

- (5) Warnings for electric wire
Warnings for crush hazard when inspection and maintenance
Warnings for inspection of emergency steering system, secondary brake system
Warning for leaving operator's seat, stopping engine
Warning for retarder oil temperature
(569-93-61730)



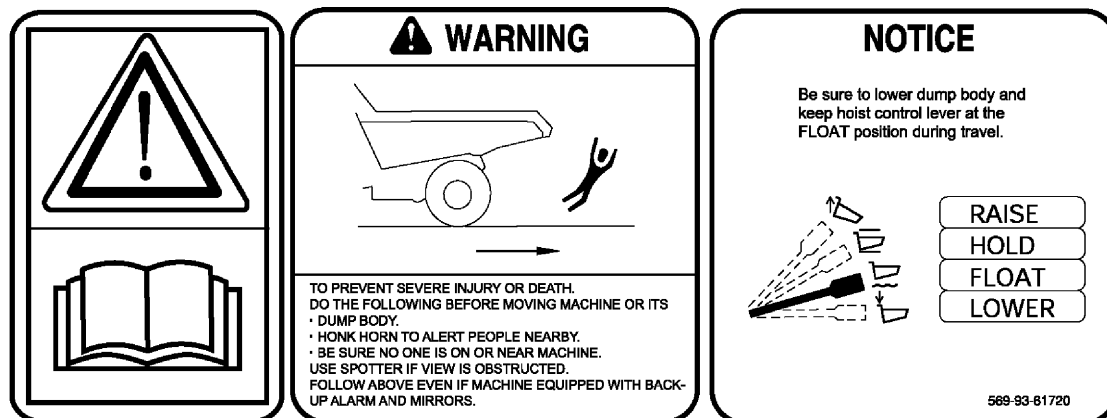
- If the machine comes too close to electric cables, there is danger of electrocution.
Always keep a safe distance from electric cables.
- There is danger that the dump body may come down.
Before carrying out inspection or maintenance with the dump body raised, always read the Operation and Maintenance Manual and take the correct action.

(6) Cautions before starting

Cautions when traveling in reverse

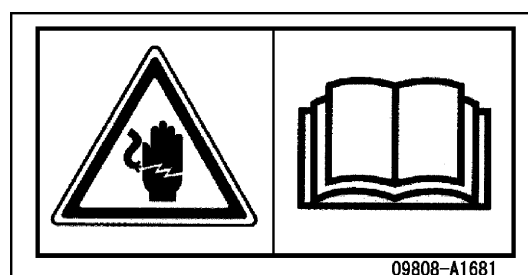
Cautions for operating hoist control lever (dump lever)

(569-93-61720)

**! WARNING**

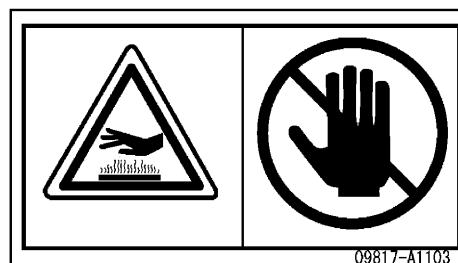
Always read the Operation and Maintenance Manual before carrying out operation, maintenance, disassembly, assembly, or transportation of the machine.

(7) Caution when handling battery cable (09808-A1681)



Sign indicates an electric hazard from handling the cable. Read manual for safe and proper handling.

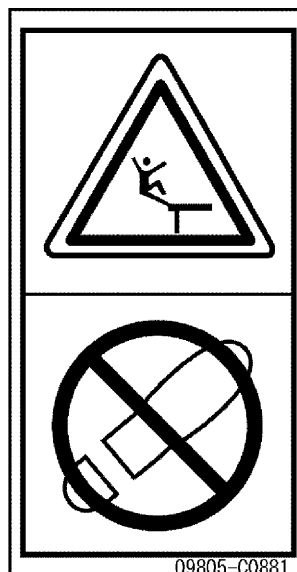
(8) Exhaust pipe is hot! (09817-A1103)



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

Never touch when hot.

(9) Caution for avoiding falling down (09805-C0881)



Sign indicates a hazard of falling.

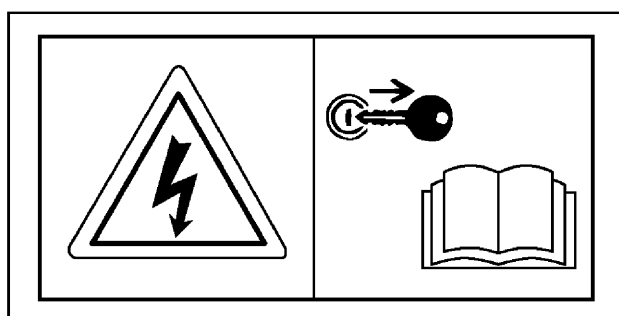
Do not stand on this place here.

(10) Caution when handling battery

(This plate is stick on the machine by the battery maker.)



(11) Precautions for high voltage (7872-10-1600)



There is danger of electrocution.

Turn the starting switch OFF before starting inspection or repairs, and read the Operation and Maintenance Manual.

- (12) Jump start prohibited (09842-A0481)
(This plate is stuck to the starting motor)



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

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

GENERAL PRECAUTIONS

SAFETY RULES

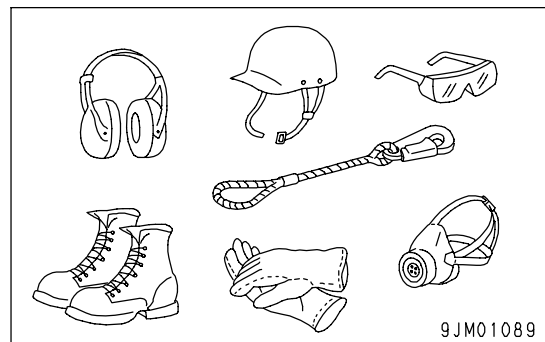
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions in this manual when operating or performing maintenance on the machine.
- If you are not feeling well, or if you are under the influence of alcohol or medication, your ability to safely operate or repair your machine may be severely impaired, putting yourself and everyone else on your job site in danger.
- When working with another operator or with the person on the worksite traffic duty, discuss the content of the operation beforehand and use the determined signals when carrying out the operation.

IF PROBLEMS ARE FOUND

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

CLOTHING AND PERSONAL PROTECTIVE ITEMS

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

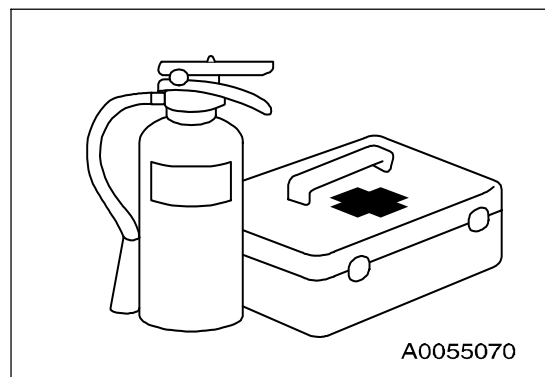


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FIRE EXTINGUISHER AND FIRST AID KIT

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

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



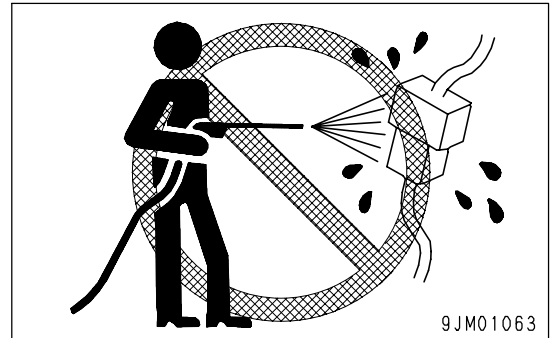
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SAFETY FEATURES

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

KEEP MACHINE CLEAN

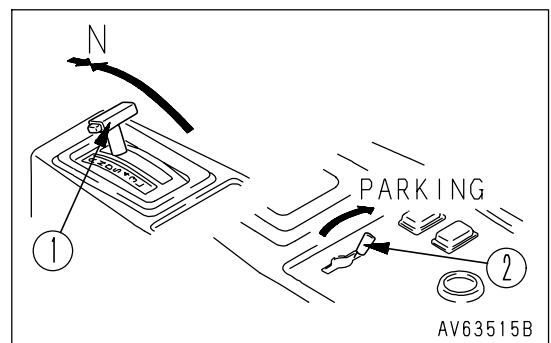
- If water gets into the electrical system, there is a hazard that it will cause malfunctions or misoperation. Do not use water or steam to wash the electrical system (sensors, connectors).
- If inspection and maintenance is carried out when the machine is still dirty with mud or oil, there is a hazard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

**INSIDE OPERATOR'S COMPARTMENT**

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

ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

- Before adjusting or standing up from the operator's seat, always set gear shift lever (1) to the N position and parking brake valve lever (2) to the PARKING position, then stop the engine.
- If the gear shift lever or dump lever are touched by mistake, there is danger that the machine may suddenly move and cause serious personal injury or damage.
- Place the gear shift lever (1) at neutral and set the parking brake valve lever (2) to the PARKING position. Lower the dump body, set the dump lever to the HOLD position, then apply the lock. Stop the engine. Apply all the locks and always remember to take the key with you and keep it in a safe place.



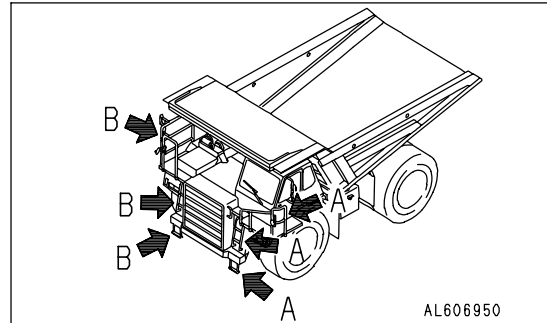
HANDRAILS AND STEPS

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

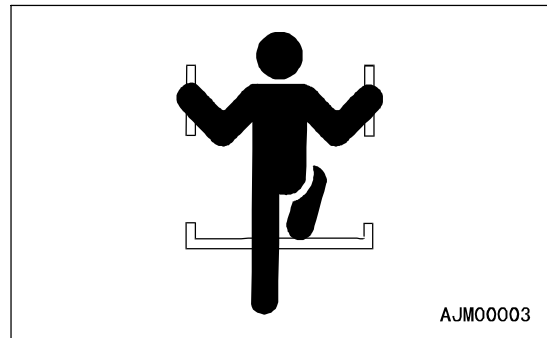
- Use the handrails and steps marked by arrows in the diagram below when getting on or off the machine.

A: For use when getting on or off the operator's seat from the left door

B: For use when getting on or off the operator's seat from the engine hood or right door



- To ensure safety, always face the machine and maintain three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps to ensure that you support yourself.
- Do not grip the dump lever when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- Before getting on or off the machine, check the handrails and steps, and if there is any oil, grease, or mud on them, wipe it off immediately. In addition, repair any damage and tighten any loose bolts.
- Do not get on or off the machine while holding tools in your hand.

**MOUNTING AND DISMOUNTING**

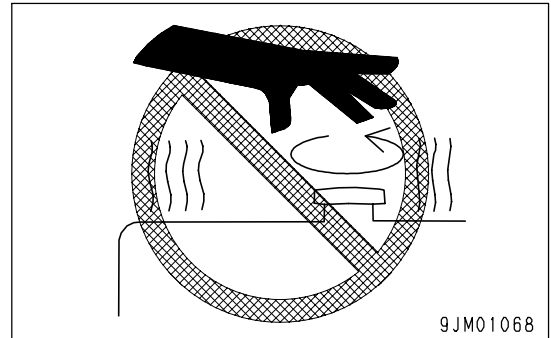
- Never jump on or off the machine. Never get on or off a moving machine.
- If the machine starts to move when there is no operator on the machine, do not jump on to the machine and try to stop it.

CRUSHING OR CUTTING PREVENTION

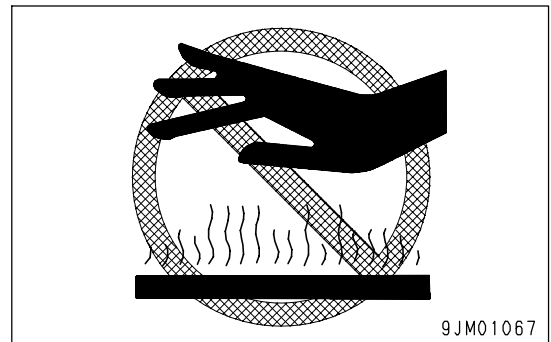
- The clearance in the area around the dump body changes according to the movement of the dump body. If you are caught, you will suffer serious injury. Do not allow anyone near any of the rotating or telescoping parts.

PREVENTION OF BURNS**Hot coolant**

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

**Hot oil**

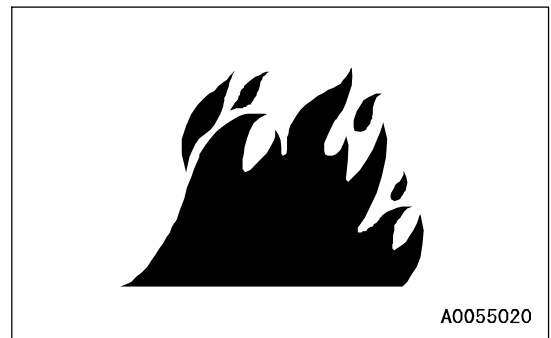
- To prevent burns from hot oil spurting out when checking or draining the oil, wait for the oil to cool to a temperature where it is possible to touch the cap or plug by hand before starting the operation. Even when the oil has cooled down, loosen the cap or plug slowly to relieve the internal pressure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

**FIRE PREVENTION**

- **Fire caused by fuel or oil**

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

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



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

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

- **Fire coming from electric wiring**

Short circuits in the electrical system can cause fire.

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

- **Fire coming from hydraulic line**

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

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

- **Explosion caused by lighting equipment**

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

ACTION IF FIRE OCCURS

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

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

WINDOW WASHER LIQUID

Use an ethyl alcohol base washer liquid.

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

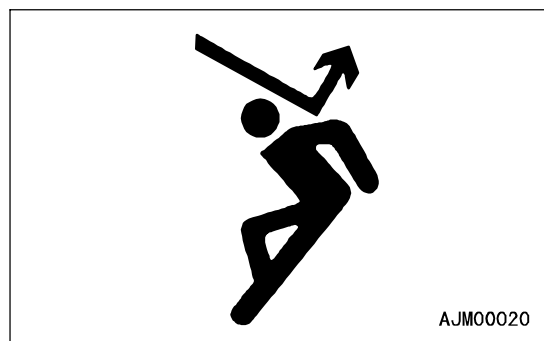
PRECAUTIONS WHEN USING ROPS (Roll Over Protective Structure)

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

- If ROPS is installed, do not remove it when operating the machine.
- ROPS is 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 be reduced. When modifying, consult your Komatsu distributor.

- If ROPS is deformed by falling objects or by rolling over, its strength lowers and its design functions cannot be maintained. In this case, be sure to ask your Komatsu distributor about repair method.

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



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PRECAUTIONS FOR ATTACHMENTS, OPTIONS

- When installing optional parts or attachments, there may be problems with safety or legal restrictions. Therefore contact your Komatsu distributor for advice.
- Any injuries, accidents, product failures or other property damages 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

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

SAFETY AT WORKSITE

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

- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation. Do not operate where there is a hazard of landslides or falling rocks.
- Take necessary measures to prevent any unauthorized person from entering the operating area.
- 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.
- Always design and maintain the roads on the jobsite so that the machines can 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 personal injury or death. On jobsites where the machine may go close to electric cables, always do as follows.

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

Voltage of Cables	Safety Distance
100 V - 200 V	Over 2 m (7 ft)
6,600 V	Over 2 m (7 ft)
22,000 V	Over 3 m (10 ft)
66,000 V	Over 4 m (14 ft)
154,000 V	Over 5 m (17 ft)
187,000 V	Over 6 m (20 ft)
275,000 V	Over 7 m (23 ft)
500,000 V	Over 11 m (36 ft)

ENSURE GOOD VISIBILITY

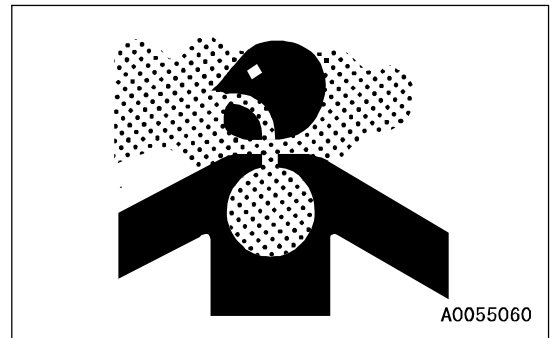
This machine is equipped with mirrors to improve the visibility, but even with mirrors, there are places, which cannot be seen from the operator's seat, so always be careful when operating.

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

- If the visibility cannot be sufficiently assured, position a flagman if necessary. The operator should pay careful attention to the signs and follow the instructions of the flagman.
- The signals should be given only by one flagman.
- When working in dark places, turn on the working lamps and front lamps of the machine, and if necessary, set up additional lighting in the area.
- Stop operations if there is poor visibility, such as in fog, snow, rain, or sand storms.
- Check the mirrors on the machine before starting operations every day. Clean off any dirt and adjust the view to ensure good visibility.

PRECAUTIONS RELATED TO VENTILATION OF EXHAUST GAS

The engine exhaust gas contains substances that may damage your health or even cause death. Start or operate the engine in a place where there is good ventilation. If the engine or machine must be operated inside a building or under ground, where the ventilation is poor, take steps to ensure that the engine exhaust gas is removed and that ample fresh air is brought in.

**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 ESCAPE FROM OPERATOR'S CAB

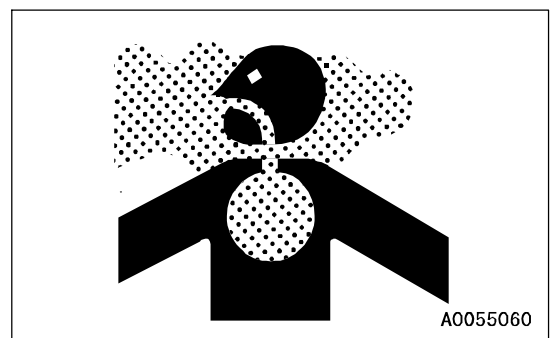
- The cab installed on this machine has doors on the left and right sides. If the door on one side does not open, escape through the door on the other side.

ASBESTOS DUST HAZARD PREVENTION

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

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

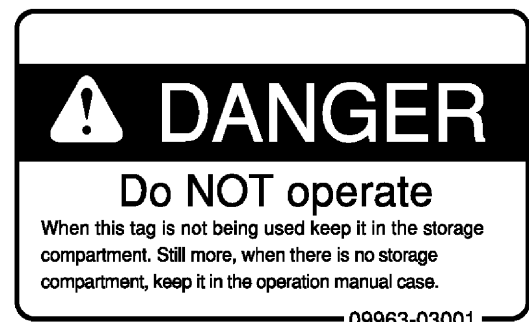
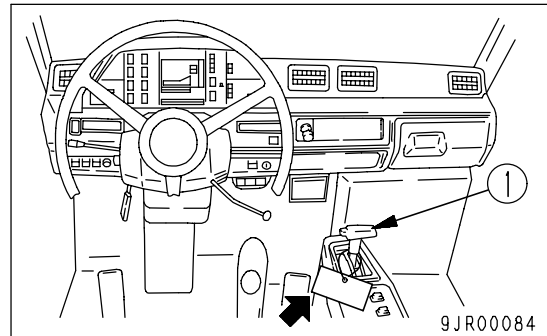
This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.



PRECAUTIONS DURING OPERATION

STARTING ENGINE

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



CHECKS BEFORE STARTING ENGINE, ADJUST

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

- Remove all dirt from the surface of the window glass to ensure a good view.
- Remove all dirt from the surface of the lens of the front lamps, working lamps, and rear combination lamp, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Check that there is no mud or dust accumulated around the movable parts of the accelerator pedal or brake pedal, and check that the pedals work properly.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges and instruments work properly, check the angle of the mirror, and check that the gearshift lever is at neutral and the dump lever is at HOLD.
- Before starting the engine, make sure that the dump lever lock is in the LOCK position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat.
Refer to "WALK-AROUND CHECK (PAGE 3-60)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.
- Check that the parking brake valve lever is in the PARKING position.

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.
- If another person is allowed on the machine, that person may sit only in the assistant's seat.
- For machines equipped with a backup alarm, check that the warning device works properly.

PRECAUTIONS IN COLD AREAS

- Carry out the warming-up operation thoroughly. If the machine is not thoroughly warmed up before the gear shift lever or dump lever are operated, the reaction of the machine will be slow or may change suddenly, and this may cause an accident.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery and cause the battery to explode.
Before charging or starting the engine with a different power source, melt the battery electrolyte and check that there is no leakage of electrolyte before starting.
- Before starting operations and after finishing operations, drain the water from the air tank.
- If there is no sound of the air being released when the service brake or parking brake are operated, check the air tank pressure and remove any snow or ice from around the brake valve.

OPERATION

CHECKS BEFORE STARTING OPERATION

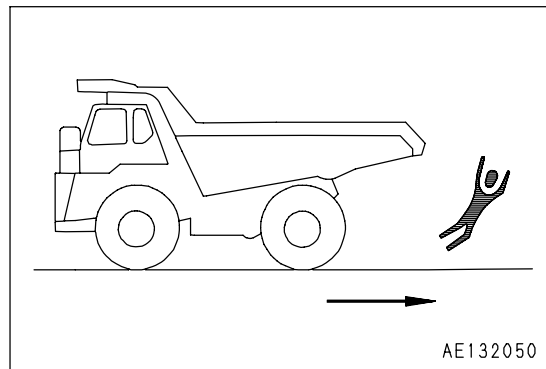
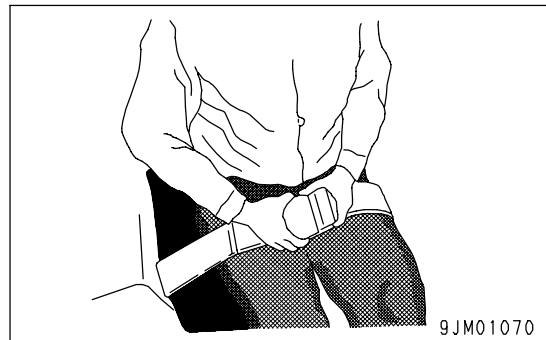
When carrying out the checks, move the machine to a wide area where there are no obstructions, and operate slowly. Do not allow anyone near the machine.

- Always fasten your seat belt.
- Check the operation of the steering, travel, and brake systems.
- Check for any problem in the sound of the machine, vibration, heat, smell, or gauges; check also that there is no leakage of oil or fuel.
- If any problem is found, carry out repairs immediately.

PRECAUTIONS WHEN TRAVELING IN FORWARD OR REVERSE

- Before travelling, check again that there is no one in the surrounding area, and that there are no obstacles.
- Before travelling, sound the horn to warn people in the area.
- Always operate the machine only when seated.
- If another person is allowed on the machine, that person may sit only in the assistant's seat.
- Check that the backup alarm (backup warning buzzer) works properly.
- Always close the door and the window of the operator's compartment and check that the door lock is applied.
- 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

- Do not load the dump body above the maximum payload. The brakes will lose their effect.
- Never turn the starting switch to the OFF position. It is dangerous if the engine stops when the machine is traveling, because the steering becomes heavy.
- Lower the dump body, setting the dump lever at FLOAT position, then travel.
- When traveling on rough ground, travel at low speed and avoid sudden changes in direction to prevent the machine from turning over.
- 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, inside buildings, or under bridges or electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the machine or dump body contact anything.
- Continuous long time traveling at high speed may cause tires to heat up, abnormally increasing the inflation pressure inside the tires, and to blow up. The explosion of the tire is very destructive, and it can lead to serious injury or death.
- Contact with your Komatsu distributor before doing long continuous traveling.

PRECAUTIONS WHEN TRAVELING ON SLOPES

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

- When traveling downhill, use the retarder brake to reduce speed. Do not turn the steering wheel suddenly.
- 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 should stop on a slope, apply the brakes fully and apply the parking brake also to stop the machine.
- Do not shift gear while traveling downhill or travel downhill with the transmission in neutral.
It is dangerous if the engine has no braking effect. Always set the transmission to a lower gear before starting to travel downhill.

PRECAUTIONS WHEN OPERATING DUMP BODY

- Before starting the dumping operation, check to be sure there is no person or object behind the machine.
- Stop the machine in the correct position, and check again that there is no person or object behind the machine. Give the determined signal, then slowly operate the dump body.
If necessary, use blocks for the wheels or position a flagman.
- Do not carry out dumping operations on slopes. The machine stability will become poor and there is the danger that it could tip over.
- Do not travel with the body raised.
- Do not leave or return to the operator's seat during loading work.

PRECAUTIONS WHEN OPERATING

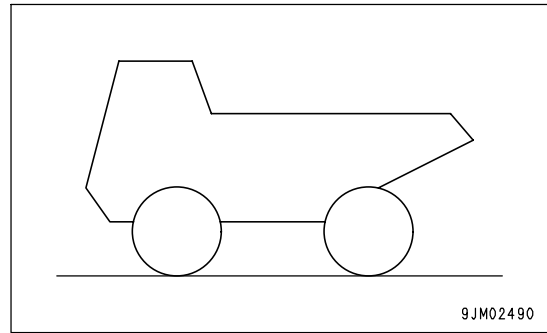
- When using the machine, to prevent the machine from overturning due to overloading and to avoid damage to the dump body, do not exceed the performance or maximum load specified for the machine structure.
- When operating in tunnels, or under bridges or electric wires, or in other places where the height is limited, operate slowly and be extremely careful not to let the dump body contact anything.
- To prevent accidents caused by hitting other objects, always operate the machine at a speed which is safe for operation, particular in confined spaces, indoors, and in places where there are other machines.

PRECAUTIONS FOR ACCUMULATED SNOW, ICE

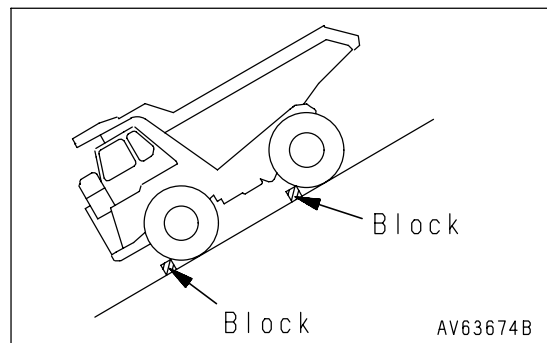
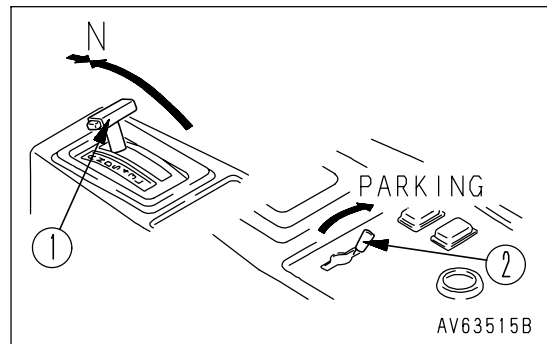
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes soft when the temperature rises, and this may cause the machine to tip over or make it impossible for the machine to escape.
- 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 traveling on snow-covered roads, always fit tire chains.
- When traveling on snow-covered roads, never use the foot brake to make sudden stops. Shift down to use the engine brake and carry out double braking (depress the brake pedal several times) to stop the machine.
- When the loaded materials in the dump body are frozen, do not dump. There is a danger that the machine could tip over.

PARKING MACHINE

- Park the machine on firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.



- When leaving the machine, place the gear shift lever (1) at neutral and set the parking valve lever (2) to the PARKING position. 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, set blocks under the wheels to prevent the machine from moving.



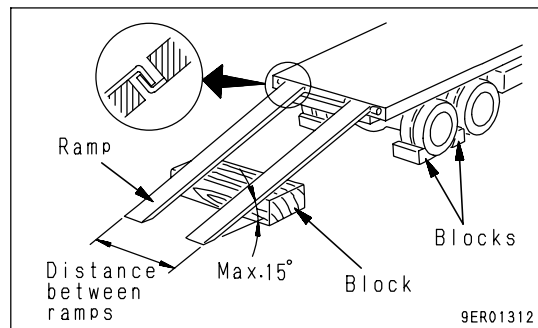
TRANSPORTATION

This machine must be disassembled for transportation. When transporting the machine, please consult your Komatsu distributor.

LOADING AND UNLOADING

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

- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of the road or cliff.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.
- Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from machine-tracks. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Run the engine at low speed, drive the machine at low speed, and operate slowly.
- Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- After loading the machine, always lock the door. There is danger that the door may open during transportation. For details, see "TRANSPORTATION (PAGE 3-107)".



SHIPPING

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

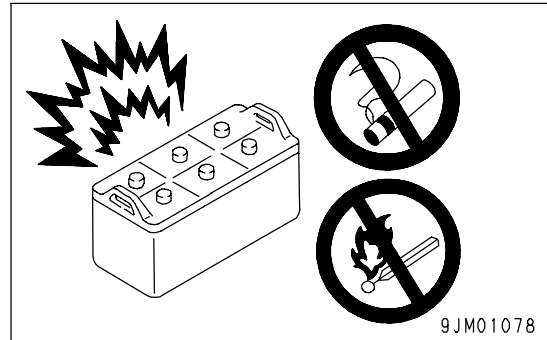
- The weight, transportation height, and overall length of the machine differ according to the attachment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- Lock the articulation lock to prevent the machine from articulating.
- For details of the transportation procedure, see Section "TRANSPORTATION (PAGE 3-107)" in the Operation Section.

BATTERY

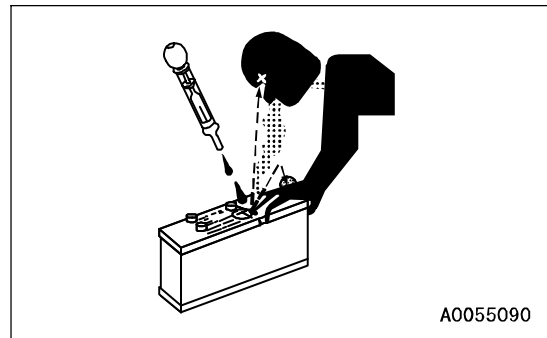
BATTERY HAZARD PREVENTION

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

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



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



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

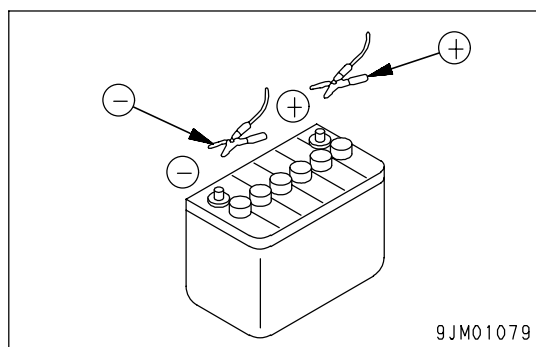
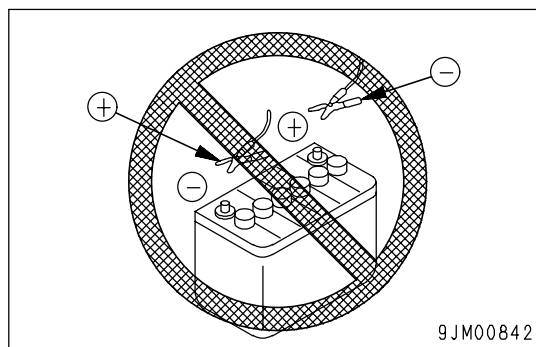
As there is a hazard that sparks will be generated, always do as follows.

- Do not let tools or other metal objects make any contact between the battery terminals. Do not leave tools or other metal objects lying around near the battery.
- 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 CABLES

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

- When starting with a booster cable, carry out the starting operation with two workers (one worker sitting in the operator's seat and the other working with the battery).
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF position for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the booster cables. Disconnect the negative (-) cable (ground side) first when removing them.
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.
- Always wear safety glasses and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- For details of the starting procedure when using booster cables, see "STARTING ENGINE WITH BOOSTER CABLE (PAGE 3-123)" in the OPERATION section.



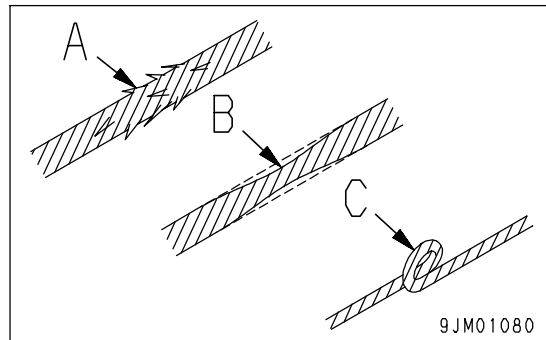
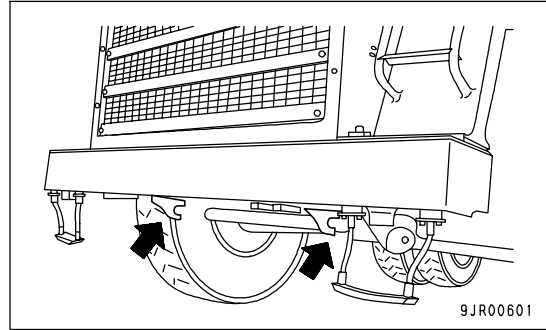
TOWING

WHEN TOWING

When towing or being towed, mistakes in the method of selecting and inspecting the wire rope or drawbar, or in the method of towing may lead to serious personal injury.

For details of the procedure for towing, see the "METHOD OF TOWING MACHINE (PAGE 3-116)"

- Always confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.
- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.
- Always wear leather gloves when handling wire rope.
- Never tow a machine on a slope.
- During the towing operation, never stand between the towing machine and the machine being towed.



PRECAUTIONS FOR MAINTENANCE

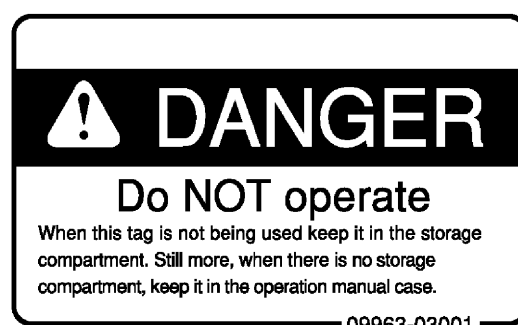
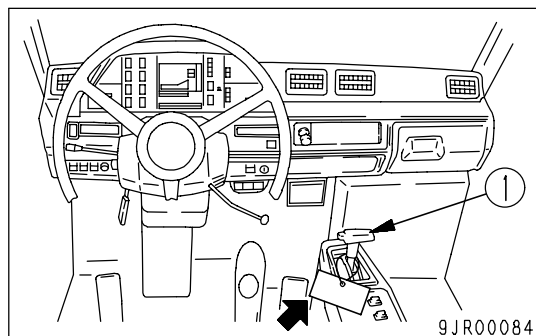
WARNING TAG

- Attach the DO NOT OPERATE warning tag to shift lever in the operator's cab during the inspection and maintenance. Attach additional warning tags around the machine if necessary.

Warning tag Part No. 09963-03001

Keep the warning tag in the tool box when it is not used. If the tool box is unavailable, keep it in the case for operation manual.

- If any person other than the serviceman starts the engine, or touches or operates the gear shift lever or dump lever while the serviceman is carrying out service or maintenance of the machine, it may lead to serious injury.



KEEP WORK PLACE CLEAN AND TIDY

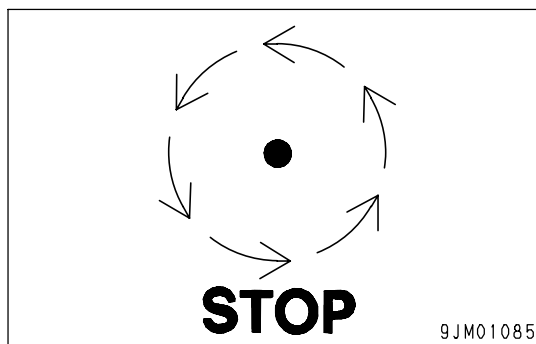
- Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely. If the work place is not kept clean and tidy, there is the danger that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

APPOINT LEADER WHEN WORKING WITH OTHERS

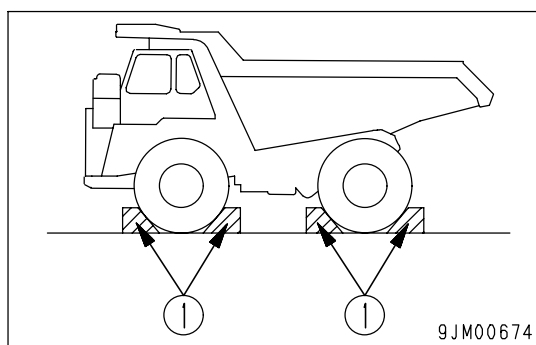
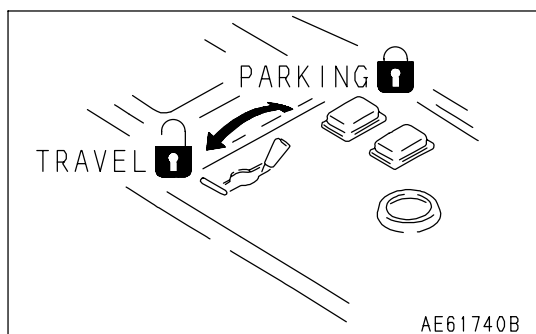
- When repairing the machine or when removing and installing the attachment, appoint a leader and follow his instructions during the operation.
When working with others, misunderstandings between workers can lead to serious accidents.

STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

- Stop the machine on firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.



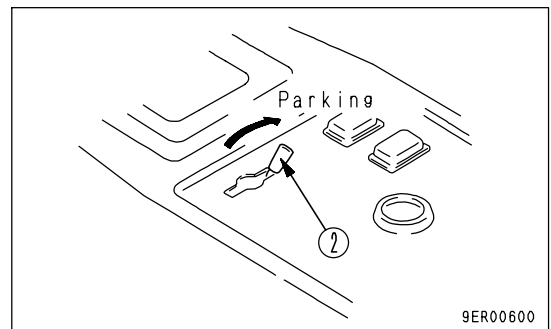
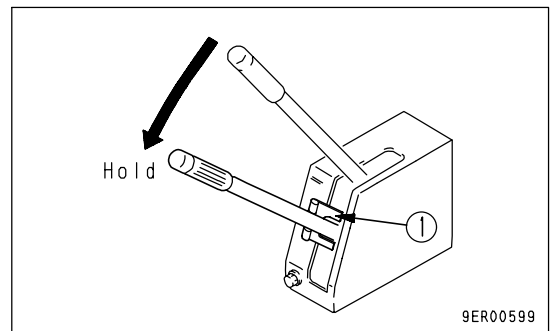
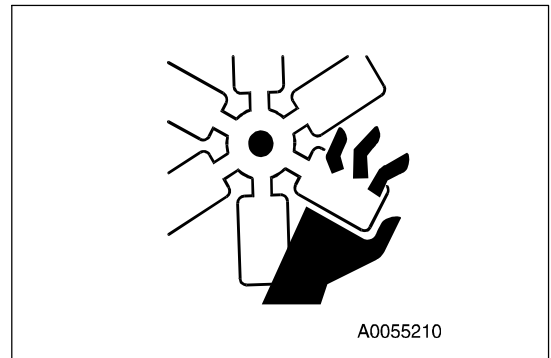
- Lower the dump body and stop the engine.
- Set parking brake valve lever to the **PARKING** position and put blocks (1) under the tires to prevent the machine from moving.



TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

To prevent personal 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.

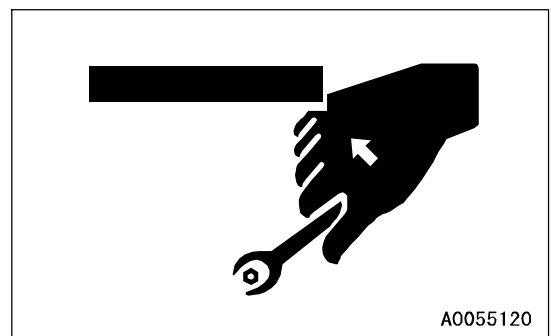
- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- Set the dump lever to the HOLD position, and lock with dump lever lock (1) to prevent the dump body from moving. In addition, set parking brake valve lever (2) to the PARKING position to prevent the machine from moving.



- When carrying out operations near the fan, fan belt, or other rotating parts, there is a hazard of being caught in the parts, so be careful not to come close.
- Do not touch the gear shift lever or dump lever. If the gear shift lever or dump lever must be operated, give a signal to the other workers to warn them to move to a safe place.
- Never drop or insert tools or other objects into the fan or fan belt. Parts may break or be sent flying.

PROPER TOOLS

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



HANDLING SUSPENSION CYLINDER

The suspension cylinder is charged with high-pressure nitrogen gas. If any mistake is made in handling, it may lead to serious injury. To prevent this, always do as follows.

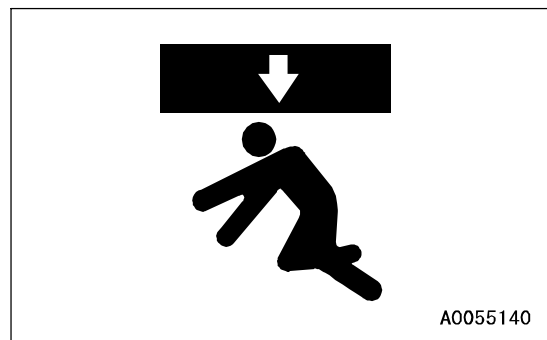
- Do not remove or disassemble the cylinder.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it, weld it, or use a cutting torch.
- Do not bear any shock by hammering, rolling or similar activity.
- Ask for your Komatsu distributor when sealing gas into the cylinder or releasing gas from it.

PERSONNEL

Do not allow any unauthorized personnel into the area when servicing the machine. If necessary, employ a guard.

WORK UNDER THE MACHINE

- If it is necessary to go under the machine when it is raised in order to carry out service or maintenance, support the machine securely with blocks and stands strong enough to support the weight of the machine.
- When carrying out inspection with the dump body raised, always set the dump lever to the HOLD position, and lock it in position, then insert the body pivot pin securely. When you use body pivot pin, see "BODY PIVOT PIN (PAGE 3-37)".

**NOISE**

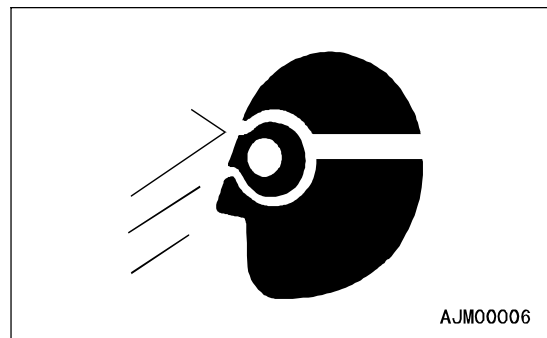
When carrying out maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.

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

PRECAUTIONS WHEN USING HAMMER

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

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

**REPAIR WELDING**

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

REMOVING BATTERY TERMINAL

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

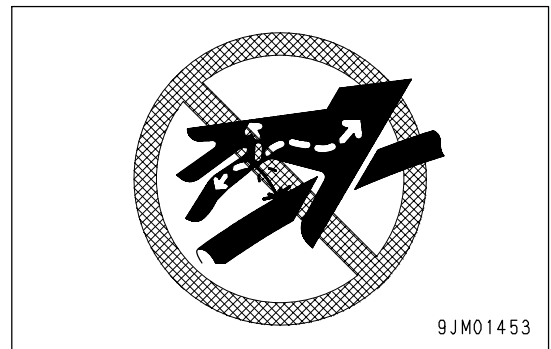
PRECAUTIONS WITH HIGH-PRESSURE OIL

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

- For details of the method of releasing the pressure: see the section on "INSPECTION AND ADJUSTMENT". Do not carry out any inspection or replacement operation before the pressure has been completely removed.
- 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.

**PRECAUTIONS FOR HIGH-PRESSURE FUEL**

When the engine is running, high-pressure is generated in the engine fuel piping. When carrying out inspection or maintenance of the fuel piping system, stop the engine and wait for at least 30 seconds to allow the internal pressure to go down before starting the operation.

HANDLING HIGH-PRESSURE HOSES, PIPING

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

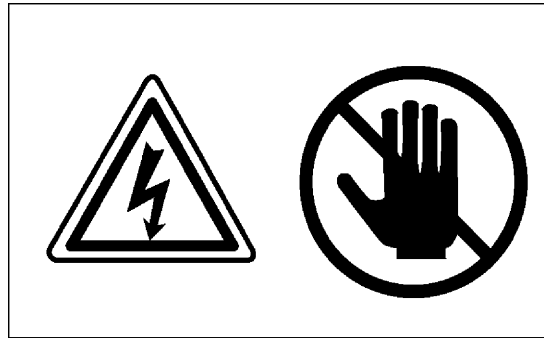
Replace the hose if any of the following problems are found.

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

PRECAUTIONS FOR HIGH VOLTAGE

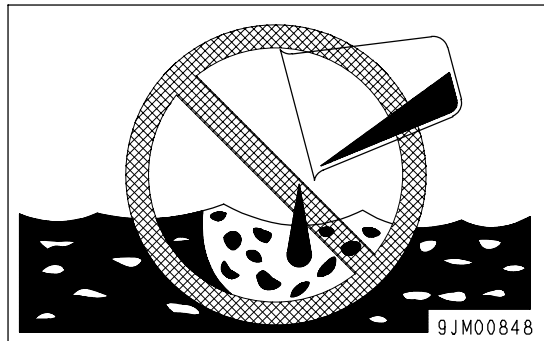
When the engine is running or immediately after it has stopped, high voltage is generated at the injector terminal and inside the engine controller, so there is danger of electrocution. Never touch the injector terminal or the inside of the engine controller.

If it is necessary to touch the injector terminal or the inside of the engine controller, please contact your Komatsu distributor.

**WASTE MATERIALS**

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

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

**MAINTENANCE OF AIR CONDITIONER**

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

COMPRESSED AIR

- When carrying out cleaning with compressed air, there is a hazard of serious injury caused by flying particles.
- When using compressed air to clean elements or the radiator, always wear safety glasses, 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 4-17)".

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

PRECAUTIONS WITH TIRES

HANDLING TIRES

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

To maintain safety, always do as follows.

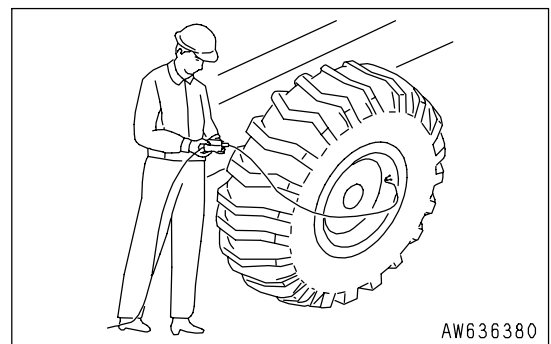
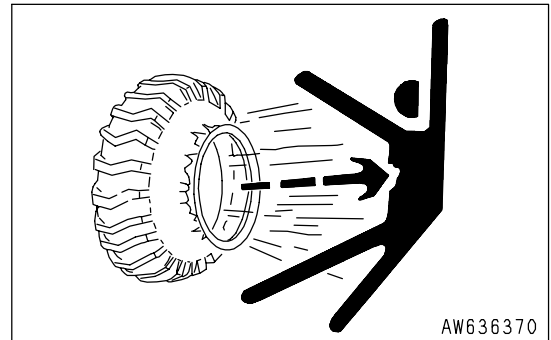
- Maintenance, disassembly, repair, and assembly of the tires and rims requires special equipment and special technology, so always ask your Komatsu distributor to carry out these operations.
- Use only the specified tires and inflate them to the specified pressure.

Suitable inflation pressure: see "SELECTION AND INSPECTION OF TIRES (PAGE 4-37)".

- When pumping up the tires, check that no other person is standing near the tire, and install an air chuck with a clip that can be secured to the air valve.

To prevent the tire inflation pressure from becoming too high, measure the pressure from time to time with an air gauge while pumping up the tire.

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



PRECAUTIONS WHEN STORING TIRE

Tires for construction equipment are extremely heavy, so trying to hold the tire may lead to serious injury.

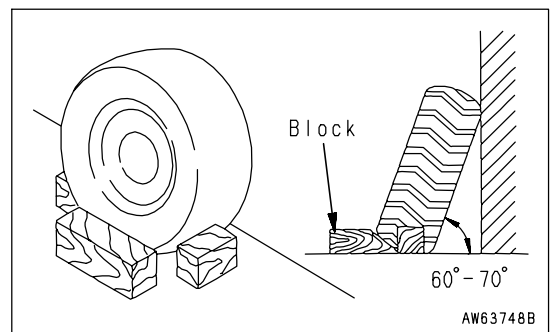
- As a basic rule, store the tires in a warehouse which unauthorized persons cannot enter.

If the tires must be stored outside, always erect a fence and put up "No Entry" signs.

- Stand the tire on level ground, and block it securely so that it cannot roll or fall over if any person should touch it.

Do not lay the tire on its side. This will deform the tire and cause it to deteriorate.

- If the tire should fall over, do not attempt to stop it. Get out of the way quickly.



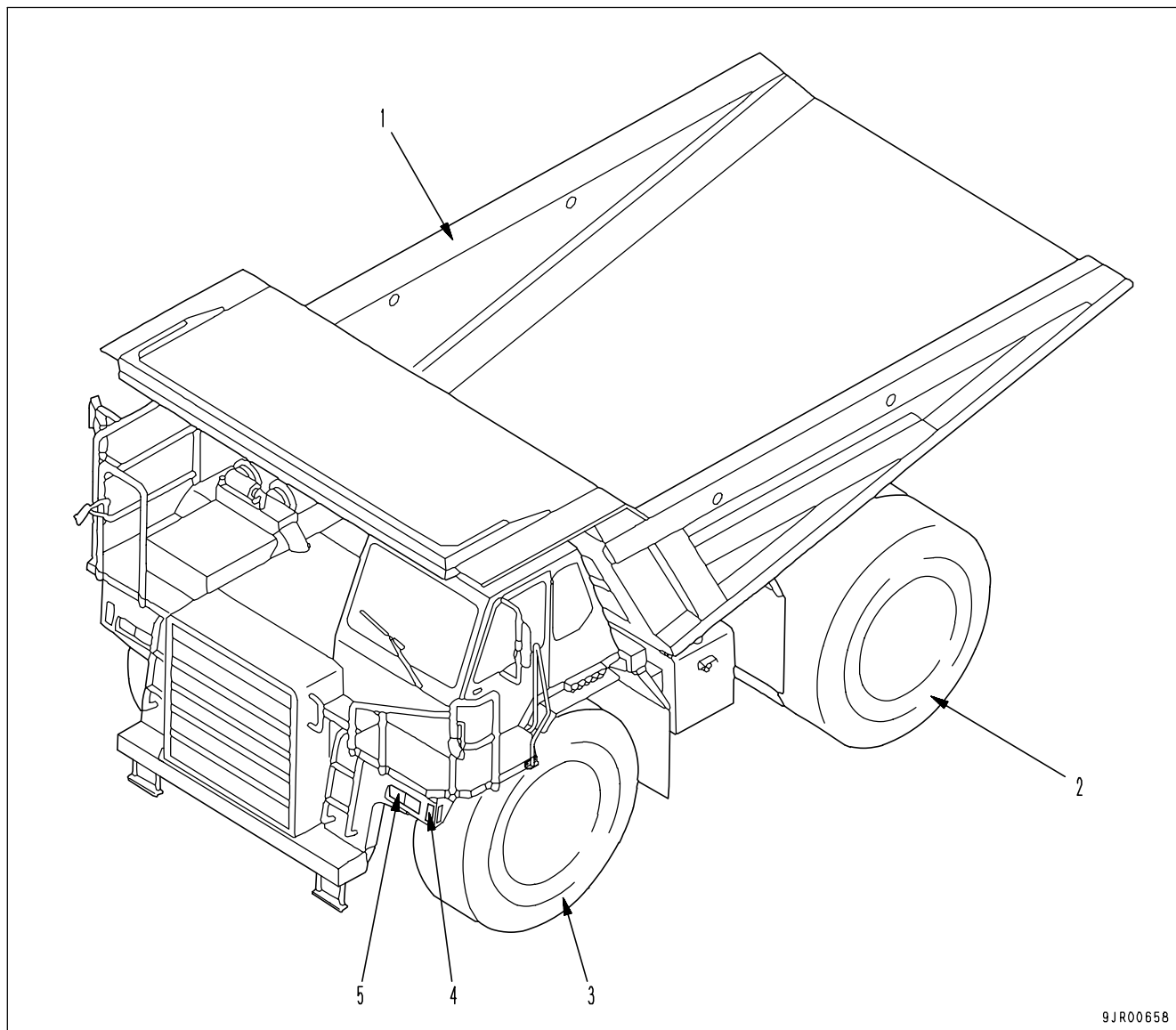
OPERATION

WARNING

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

GENERAL VIEW

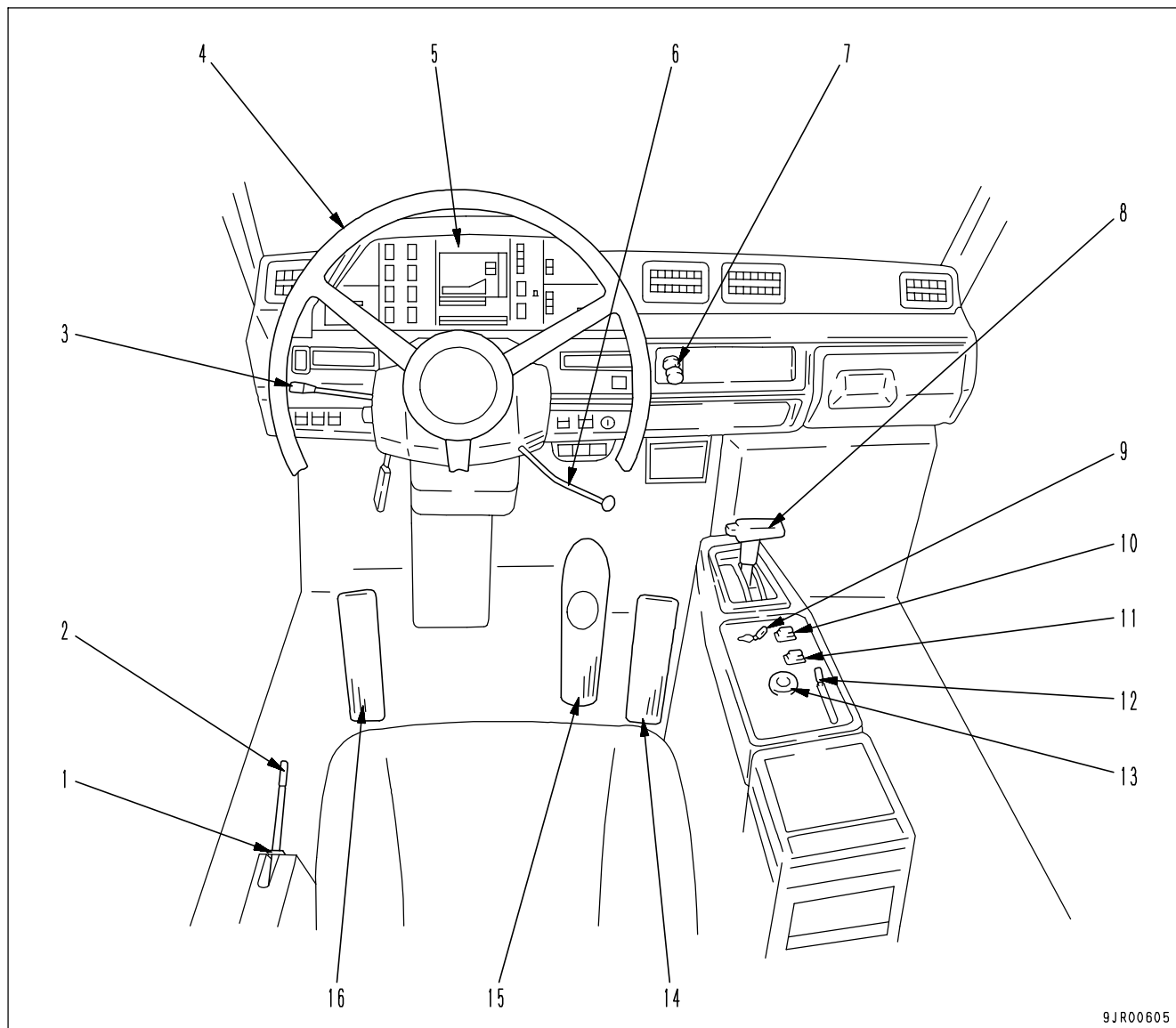
GENERAL VIEW OF MACHINE



9JR00658

- | | |
|-----------------|-----------------------|
| (1) Dump body | (4) Turn signal light |
| (2) Rear wheel | (5) Head lamp |
| (3) Front wheel | |

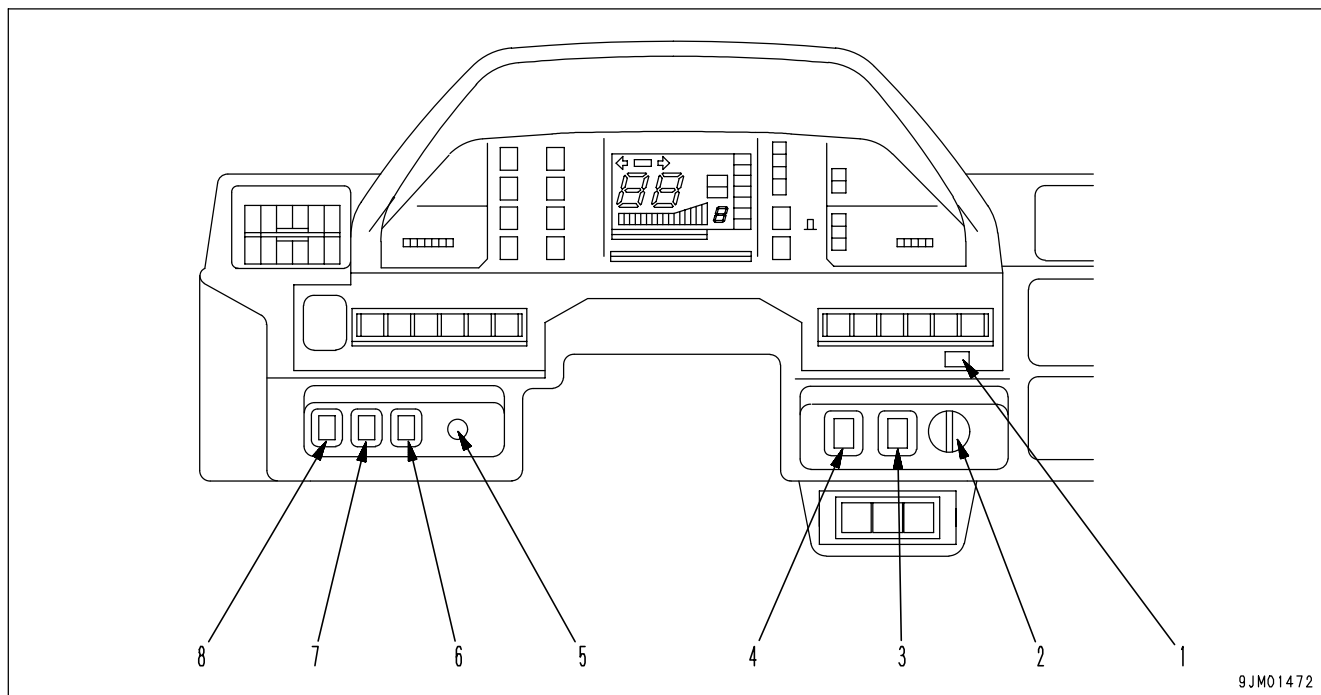
GENERAL VIEW OF CONTROLS AND GAUGES



9JR00605

- | | |
|---|--|
| (1) Dump lever lock | (10) Shift limiter switch |
| (2) Dump lever | (11) Power mode selector switch |
| (3) Lamp switch, Turn signal lever, Dimmer switch | (11) 4WD switch |
| (4) Steering wheel | (HD325 only the machine of 4WD specifications) |
| (5) Machine monitor | (12) Secondary brake lever |
| (6) Retarder control lever | (13) Emergency steering switch |
| (7) Cigarette lighter | (14) Accelerator pedal |
| (8) Shift lever | (15) Brake pedal |
| (9) Parking brake valve lever | (16) Differential lock pedal (if equipped) |

- Enlargement of machine monitor



9JM01472

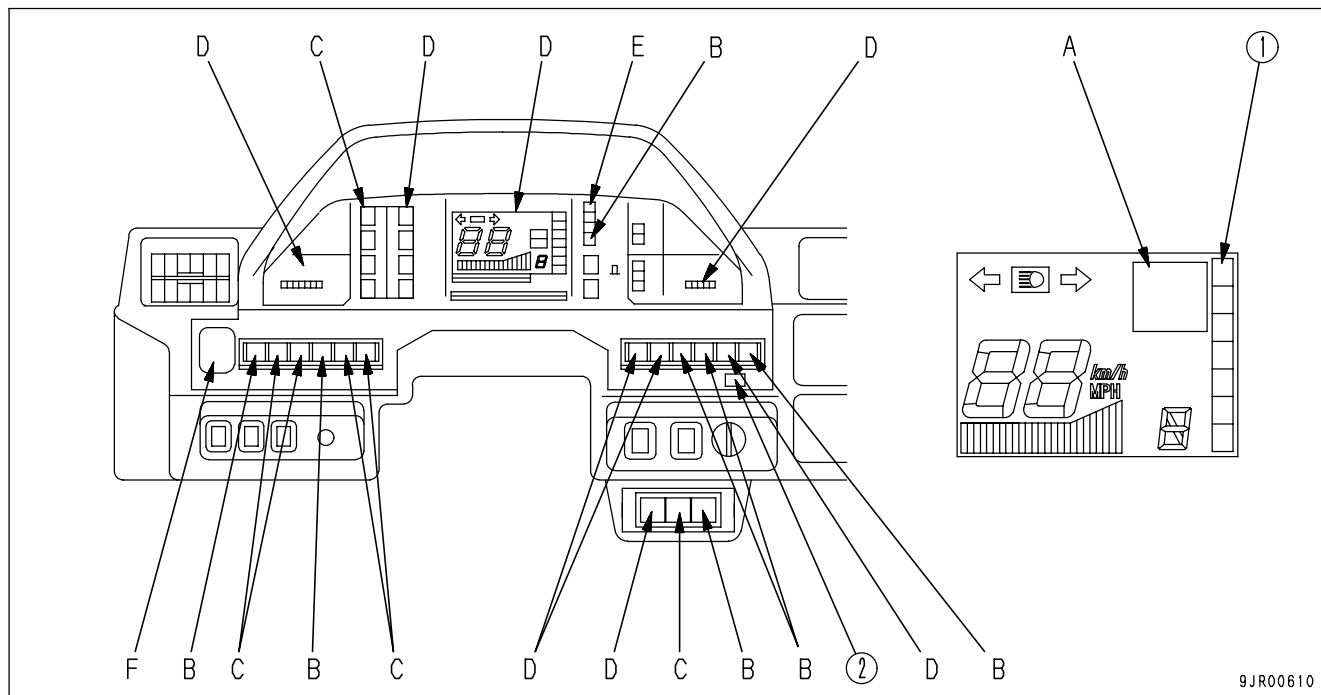
- | | |
|---|--|
| (1) Caution/Pilot lamp bulb check switch | (5) Night lighting dimmer switch |
| (2) Starting switch | (6) Hazard lamp switch |
| (3) AISS LOW switch | (7) Front brake cut-off switch |
| (4) Power mode selector switch | (8) Exhaust brake switch (if equipped) |
| (HD325 The machine of 4WD specifications) | |

EXPLANATION OF COMPONENTS

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

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

MACHINE MONITOR



A: User code display

B: Caution items

C: Emergency stop item

D: Meter display portion

E: Mechatronic caution lamp portion

F: Central warning lamp

NOTICE

When the starting switch is turned to the ON position before the engine is started, all the monitors, gauges, and the central warning lamp will light up for approx. 3 seconds, and the alarm buzzer will sound for approx. one second. When this happens, the speedometer will display 88.

If no monitor lamp lights up, then there is probably a failure or disconnection in that circuit, therefore contact your Komatsu distributor to have the circuit checked.

When the starting switch is at the ON position, if the shift lever is not at the neutral position, then the transmission shift lever position pilot lamp (1) and the central warning lamp will flash and the alarm buzzer will continue to sound intermittently. At this time, when the lever is placed in neutral, letter N is displayed, the central warning lamp goes out and the buzzer stops.

Checking for blown caution lamp or pilot lamp bulbs

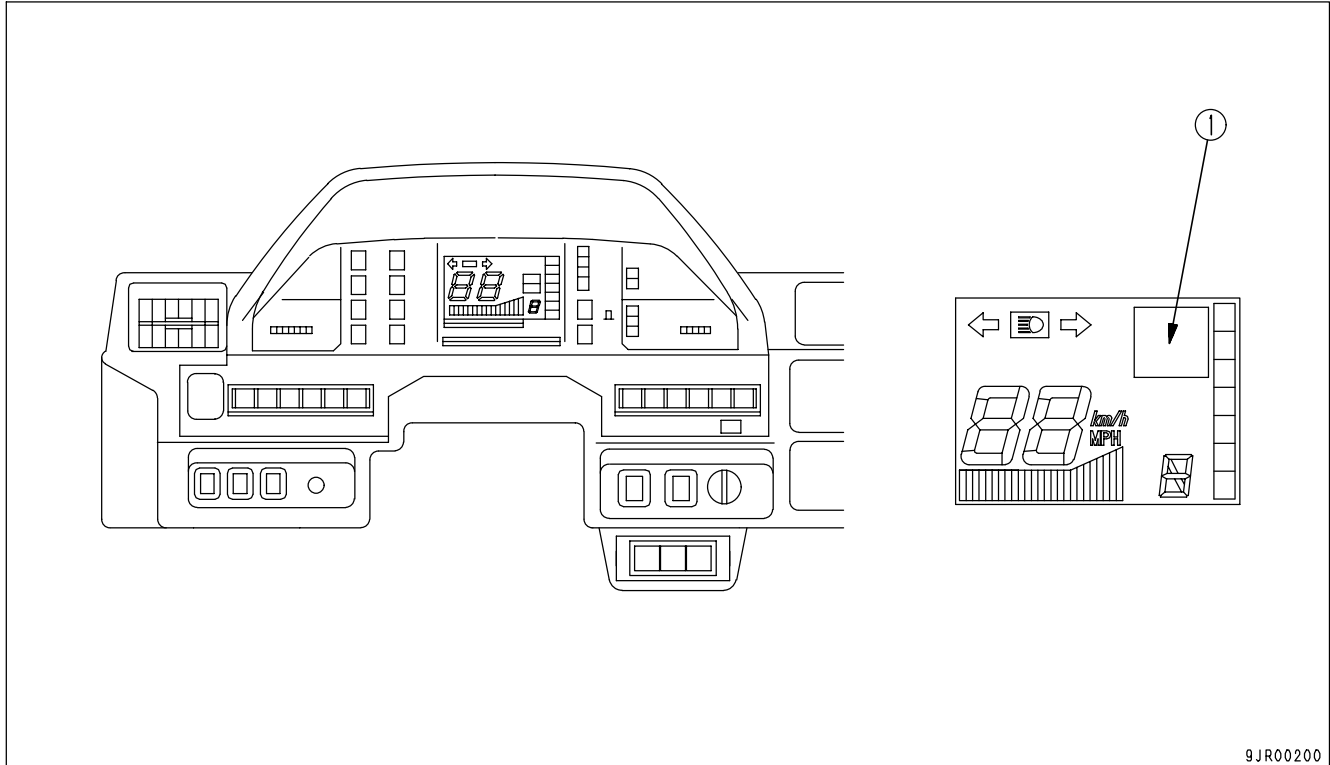
Turn the starting switch to the ON position before starting the engine, press bulb check switch (2) and check that no caution lamp or pilot lamp bulbs are blown.

If any lamp does not light up, the bulb is probably blown, so replace the bulb.

If the lamp does not light up even when the bulb is replaced, there is probably a failure or disconnection, so please contact your Komatsu distributor to have the circuit checked.

USER CODE DISPLAY

If any failure has occurred on the machine, or it is necessary to carry out inspection and maintenance, a user code indicating the appropriate action is displayed on user code display (1). If the user code is "02 - 07", the alarm buzzer will sound intermittently, the monitor indicating the location of the problem will light up or flash, and the central warning lamp also flash.



9JR00200

(1) User code display



WARNING

If user code 02 or 04 is displayed, stop the machine immediately. See "SERVICE CODE (PAGE 3-130)", and check the service code number. Contact Komatsu distributor, telling them the service code number, for repair.

If "E-" and any user code between "01 - 07" are displayed in turn on user code display (1), stop the machine, check the user code, then take the corrective action given below.

User codes

02: Park the machine at a safe location and contact your Komatsu distributor.

04: Carry out an emergency stop. Stop the engine and contact your Komatsu distributor.

01: Carry out inspection and maintenance after completing operation or when changing operators.

03: Operate the machine at low travel speed and run the engine at low speed.

05: Stop the machine. Run the engine at a mid-range speed under no load.

06: Start the engine again and run it at idling for a short time.

07: Do not raise the body.

NOTICE

- If 01 is displayed and the warning monitor lights up, follow the applicable item in "CAUTION ITEMS (PAGE 3-8)" to carry out inspection and maintenance. If only 01 is displayed, check the service code and ask for repairs.
- If 03, 05, 06, or 07 are displayed, and the user code is displayed even after the above corrective action is taken, check the service code and ask for repairs.

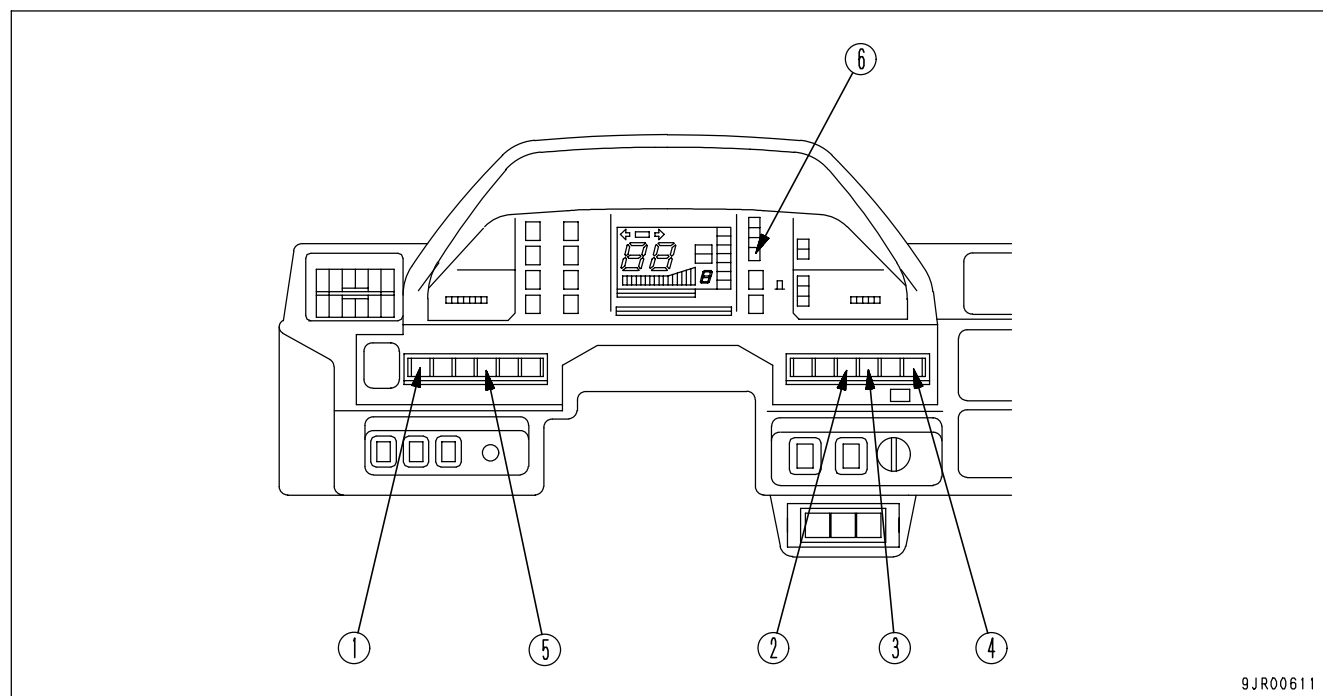
CAUTION ITEMS



CAUTION

If any of the warning monitors lights up, carry out the inspection and maintenance of the appropriate item as soon as possible. If it is left without the inspection and maintenance, it will lead to the trouble or failure.

If there is any abnormality for the caution items, the monitor for the corresponding abnormal area lights up.



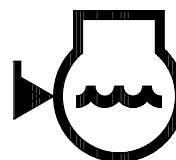
9JR00611

- | | |
|---------------------------------|----------------------------------|
| (1) Radiator water level | (5) Transmission filter clogging |
| (2) Emergency steering | (on the valve side) |
| (3) Parking brake | (6) Fuel level |
| (4) Dump body actuation caution | |

RADIATOR WATER LEVEL

This monitor (1) warns the operator that the radiator water level has dropped.

If it lights up and displays user code "01" at the same time, stop the engine, check the level of the cooling water in the radiator, and add the water.

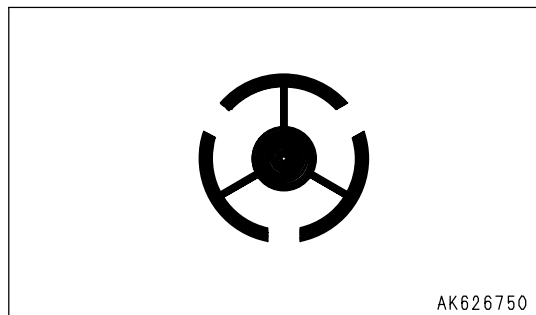


AK626800

EMERGENCY STEERING

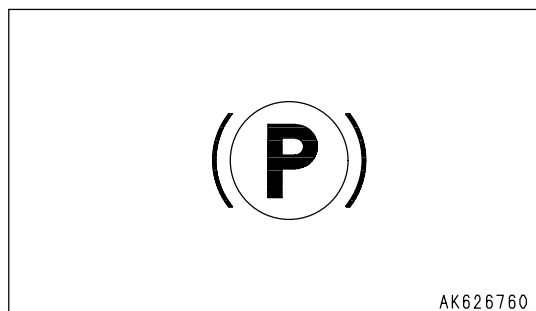
This monitor (2) lights up when the emergency steering is actuated.

If any abnormality should occur in the steering oil pressure circuit when the machine is traveling, the auto emergency steering is actuated and the related lamp lights up.

**PARKING BRAKE**

This (3) lights up when the parking brake is applied.

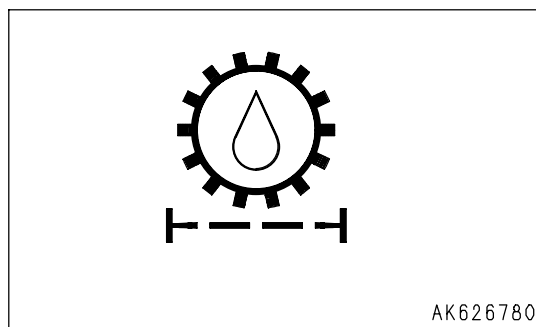
It goes on and out respectively responding to the parking brake lever shifting of PARK/TRAVEL.

**DUMP BODY ACTUATION CAUTION**

This monitor (4) lights up when the dump body control lever is at any position other than FLOAT or when the body is lifted. Always set the lever to the FLOAT position and lower the body during traveling.

**TRANSMISSION FILTER CLOGGING**

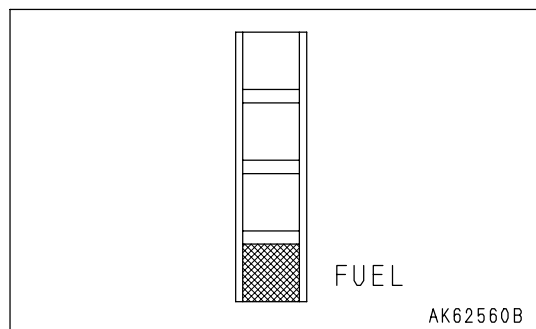
This monitor (5) identifies the operator that the transmission filter (on the bulve side) is clogged. If it lights up and displays user code "01" at the same time, replace the transmission filter.



FUEL LEVEL

This monitor (6) flashes when the level of the fuel in the fuel tank goes below 60 liters (15.84 US gal).

If it flashes, check the fuel level and add fuel.

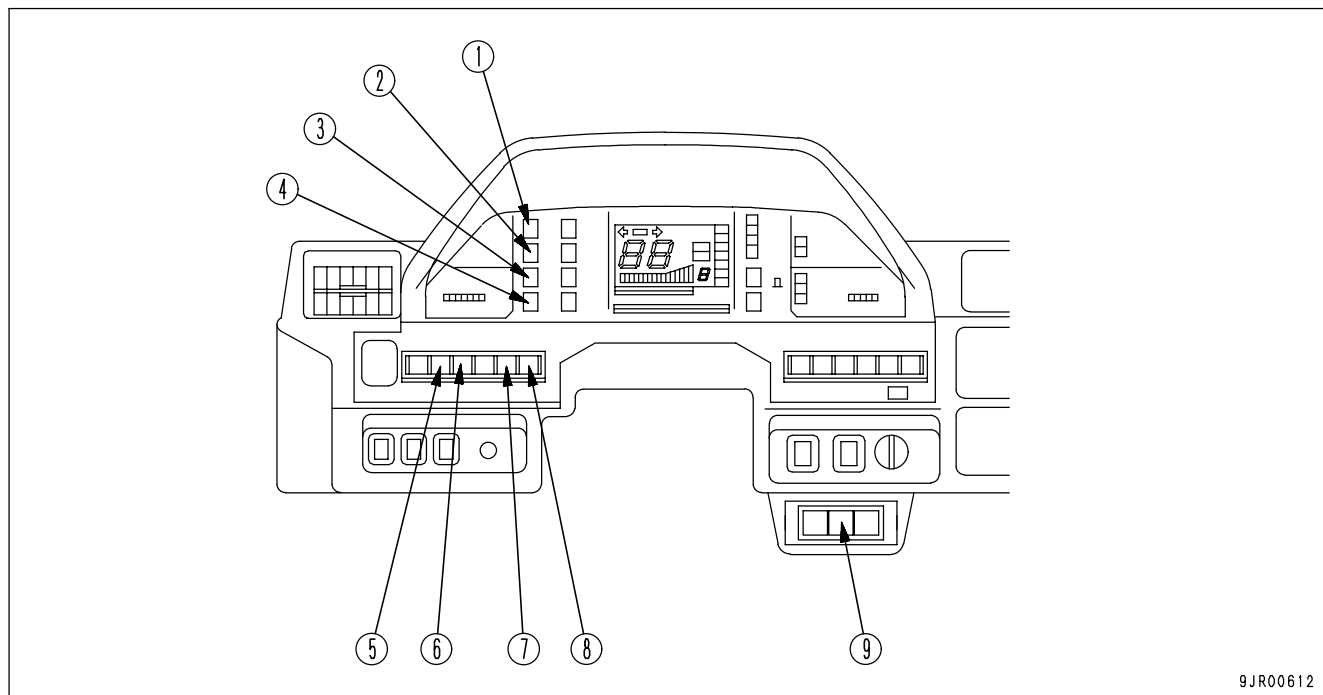


EMERGENCY STOP ITEM

**CAUTION**

If any of these monitor lights up or flashes, stop the engine immediately or put the engine in low idling, then check the corresponding area and carry out the action.

If the abnormality is found in the emergency items, the warning buzzer sounds and the monitor corresponds to the abnormal section lights up or flashes, and the central warning light flashes.

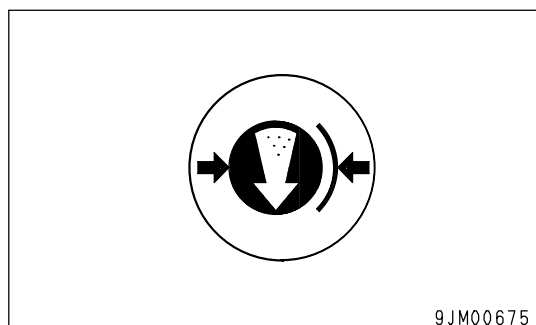


9JR00612

- | | |
|--------------------------------------|--|
| (1) Air pressure | (6) Battery charge |
| (2) Engine water temperature | (7) Angle warning |
| (3) Torque converter oil temperature | (8) Rear brake caution lamp |
| (4) Retarder oil temperature | (9) Steering oil temperature (if equipped) |
| (5) Engine oil pressure | |

AIR PRESSURE

This monitor (1) warns the operator that the air pressure inside the air tank has dropped. If it flashes and displays the user code "05" at the same time, stop the machine, run the engine under no load at a mid-range speed, and wait until the lamp goes out.

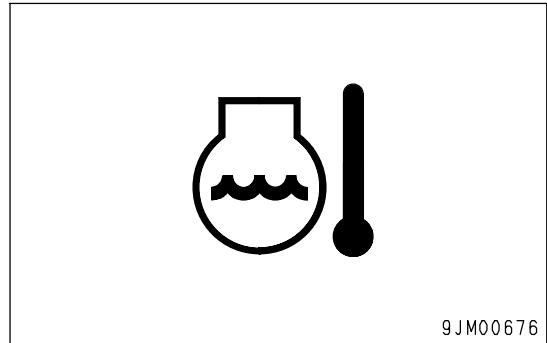


9JM00675

ENGINE WATER TEMPERATURE

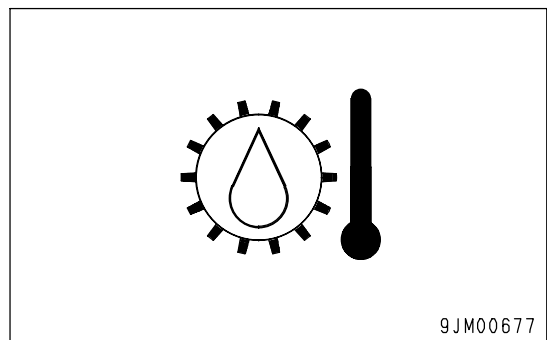
This monitor (2) warns the operator that the engine cooling water temperature has risen. When it is flashing, the engine output is automatically limited.

User code "05" is displayed at the same time when the lamp flashes, so stop machine and run the engine under no load at a mid-range speed until the engine water temperature gauge enters the green range.

**TORQUE CONVERTER OIL TEMPERATURE**

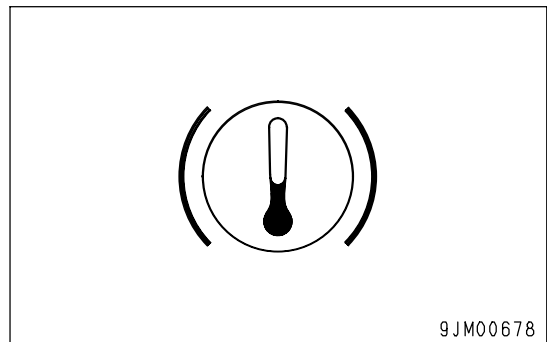
This monitor (3) warns the operator that the torque converter oil temperature has risen.

If it flashes and displays user code "05" at the same time, stop the machine and run the engine under no load at a mid-range speed until the torque converter oil temperature gauges enters the green range.

**RETARDER OIL TEMPERATURE**

This monitor (4) warns the operator that the retarder oil temperature has risen.

If it flashes and displays user code "05" at the same time, stop the machine, place the shift lever at the N (neutral) position, then run the engine under no load at a mid-range speed until the warning lamp goes out.

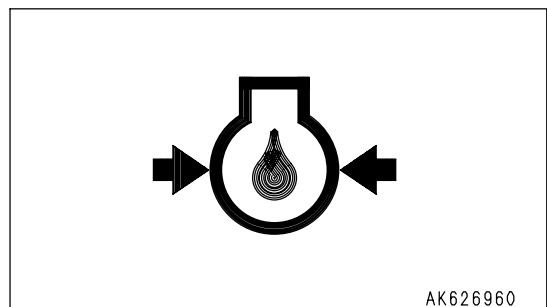
**ENGINE OIL PRESSURE**

This monitor (5) warns the operator that the engine lubricating oil pressure has dropped.

If it lights up and displays user code "04" at the same time, stop the machine safely. Then, stop the engine and carry out inspection

The lamp lights up if the engine lubricating oil pressure goes below the specified value when the engine is running,

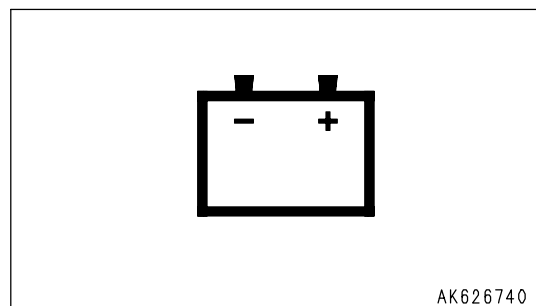
If the engine is not running, the lamp does not light up.



BATTERY CHARGE

This monitor (6) informs the operator that there is an abnormality in the charging system when the engine is running.

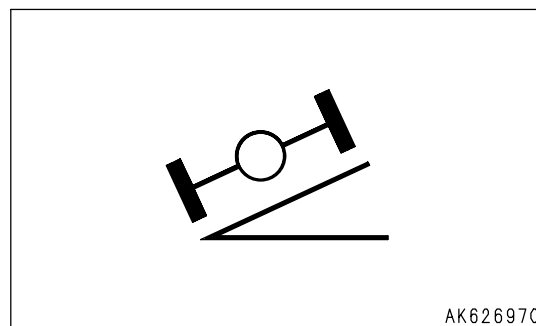
User code "02" is displayed at the same time when the lamp lights up, so stop the machine in a safe place and check the charging circuit.



ANGLE WARNING

When the dump body is raised, this monitor (7) warns the operator that the machine has tilted beyond the safety range to the left or right.

If it lights up and displays action code "07" at the same time, lower the body and move the machine to a safe, stable place.



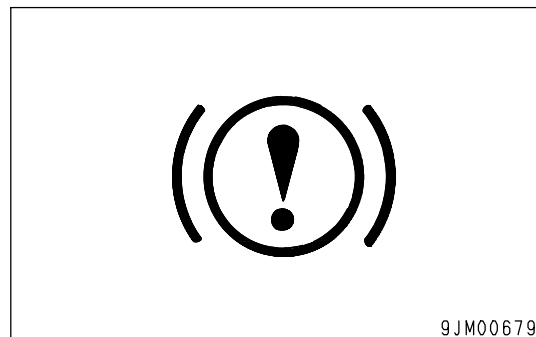
REAR BRAKE CAUTION LAMP

This monitor (8) lights up if the brake oil pressure drops under the normal value.

If it lights up and display user code "04" at the same time, immediately check the rear brake system.

After checking and repairing, depress the rod for the overstroke sensor on the brake chamber.

If depressing is not carried out, the rear brake caution lamp will continue to light up.

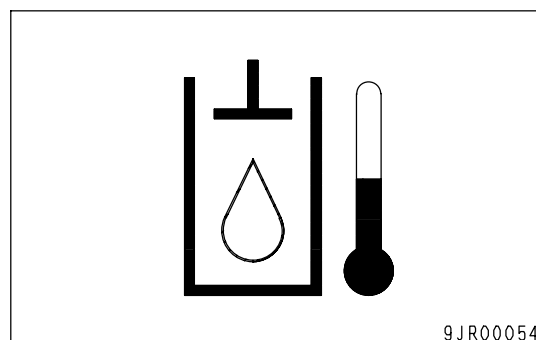


STEERING OIL TEMPERATURE

(If equipped)

This monitor (9) warns the operator that the steering oil temperature has risen.

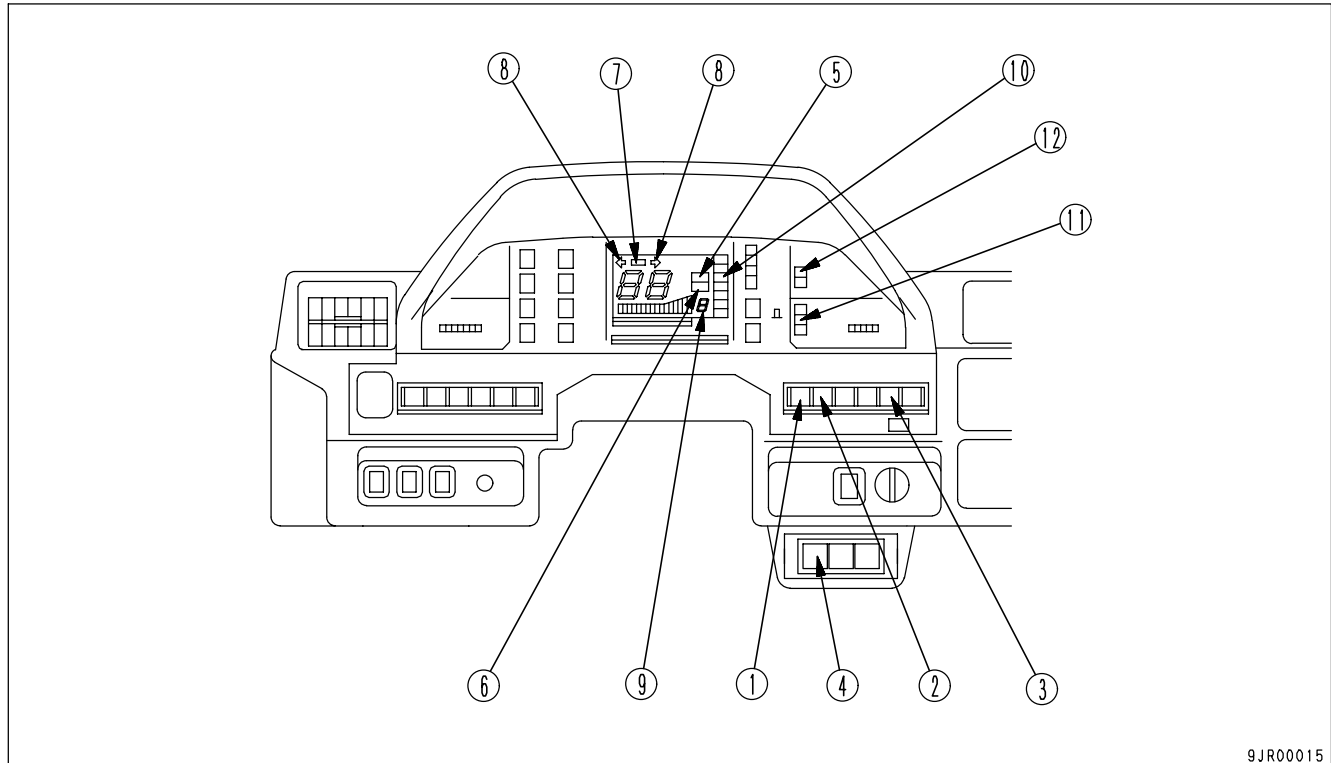
If it lights up and displays user code "05" at the same time, stop the machine, place the shift lever at the N (neutral) position, then run the engine under no load at a mid-range speed until the warning lamp goes out.



METER DISPLAY PORTION

PILOT DISPLAY PORTION

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

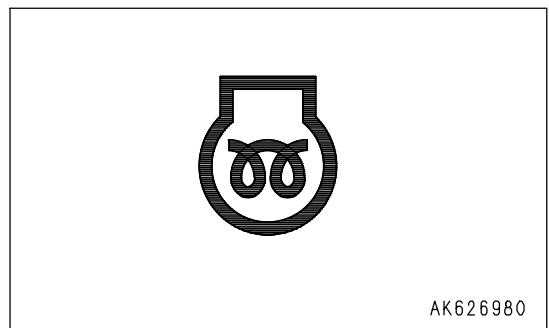


9JR00015

- | | |
|---|---|
| (1) Preheating monitor | (7) High beam |
| (2) Exhaust brake pilot (if equipped) | (8) Turn signal pilot lamp |
| (3) Rear brake pilot (retarder) | (9) Shift indicator (with lockup display) |
| (4) Differential lock pilot (if equipped) | (10) Transmission shift lever position pilot lamp |
| (5) Lockup pilot lamp | (11) Auto suspension mode display lamp |
| (6) Shift limiter pilot lamp | (12) Power mode display lamp |

PREHEATING MONITOR

This monitor (1) lights up when the electrical heater for preheating the engine is being actuated. When the starting switch is turned to the ON position in cold weather, the monitor lights up. It goes out after 20 - 30 seconds to indicate that the preheating has been completed.

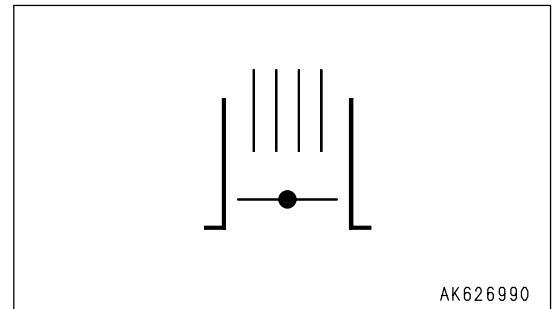


AK626980

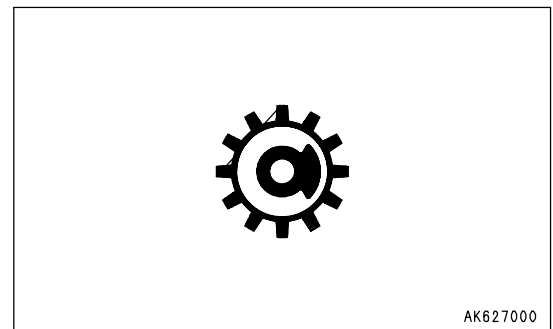
EXHAUST BRAKE PILOT

(If equipped)

This pilot lamp (2) lights up when the exhaust brake is actuated.

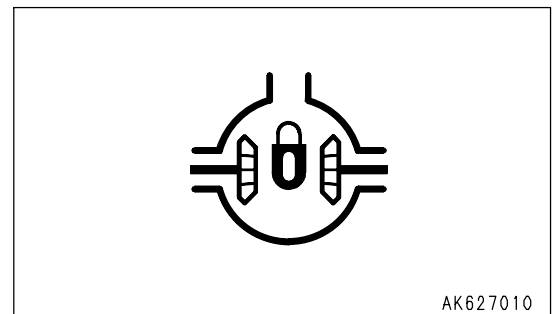
**REAR BRAKE PILOT (Retarder)**

This pilot lamp (3) lights up when the foot brake is depressed or the retarder control lever is pulled, and the rear brake is applied.

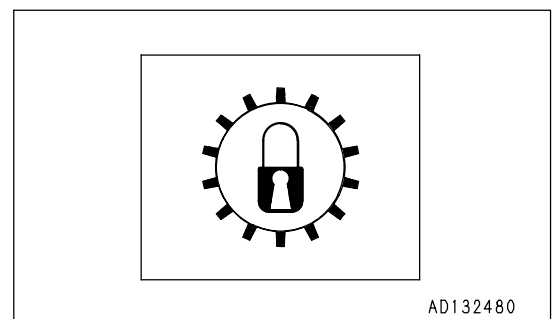
**DIFFERENTIAL LOCK PILOT**

(If equipped)

This pilot lamp (4) lights up when the differential lock pedal (if equipped) is depressed and the differential lock is actuated.

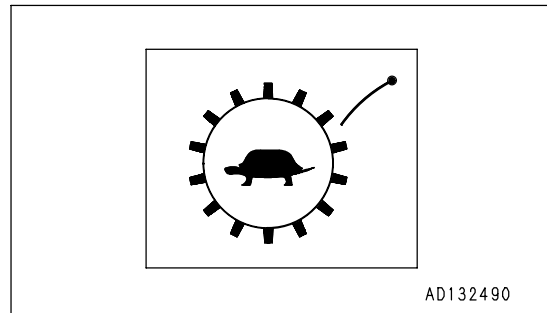
**LOCKUP PILOT LAMP**

This pilot lamp (5) lights up when the torque converter lockup is engaged and the transmission is shifted to direct drive.

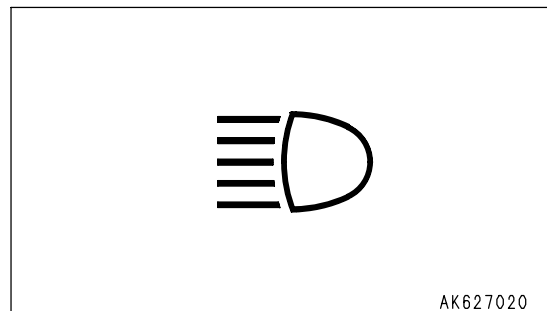


SHIFT LIMITER PILOT LAMP

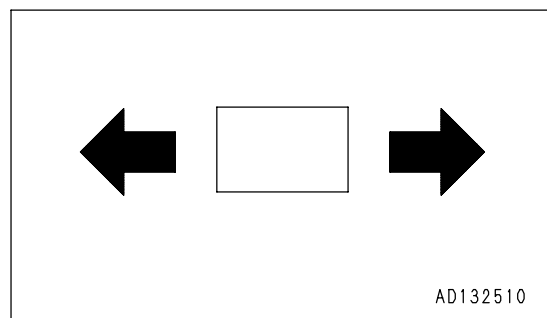
This pilot lamp (6) lights up when the shift limiter switch is actuated.

**HIGH BEAM**

This monitor (7) lights up when the head lamps are set to high beam.

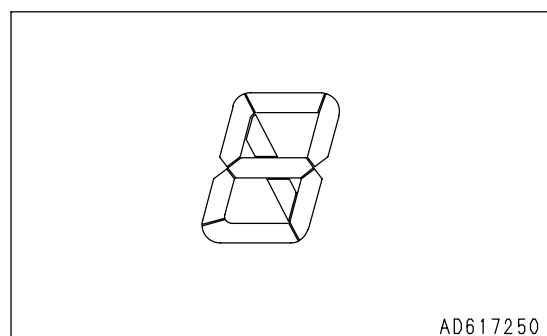
**TURN SIGNAL PILOT LAMP**

This pilot lamp (8) flashes at the same time as the turn signal lamp flashes.

**SHIFT INDICATOR**

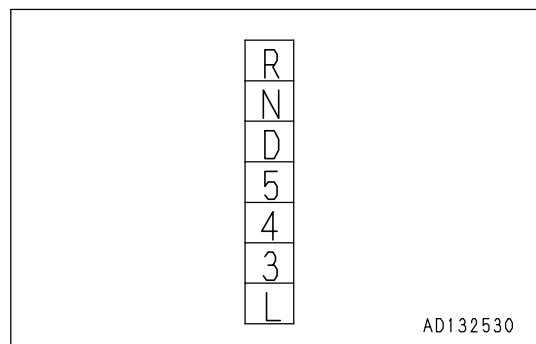
This monitor (9) displays the transmission shift range (speed range).

When the key was turned ON, if the shift lever is operated, it will display "2" at the lever position "D", "1" at the "5" - "L" position, and "R" at the R position even if the engine is stopped.



TRANSMISSION SHIFT LEVER POSITION PILOT LAMP

This monitor (10) indicates the position of the transmission shift lever.

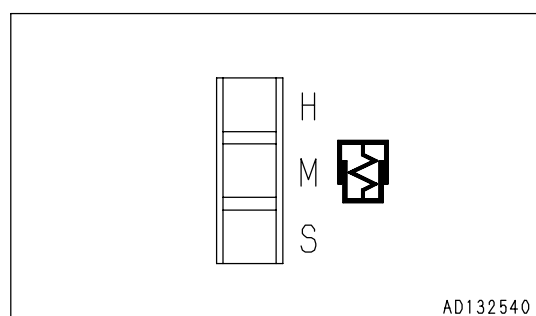
**AUTO SUSPENSION MODE DISPLAY LAMP**

(The machine equipped with automatic suspension)

This monitor (11) displays the suspension mode, when the machine is equipped with the suspension controller.

An automatic suspension system is mounted which automatically switches the damping characteristics of the suspension according to the size of the load, use of the brake, operation of the steering, and operation of the dump control.

Normally it is set to the soft mode when the dump truck is traveling empty and to the medium mode when it is traveling loaded. When the foot brake is operated or the machine is suddenly turned, or the dump control is operated, the suspension mode is switched to insure the stability of the machine to the front and rear, and left and right.



H : Hard mode

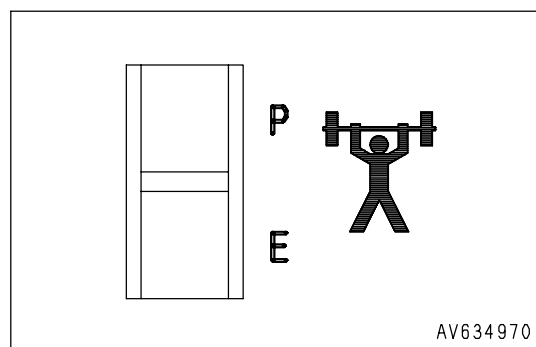
M : Medium mode

S : Soft mode

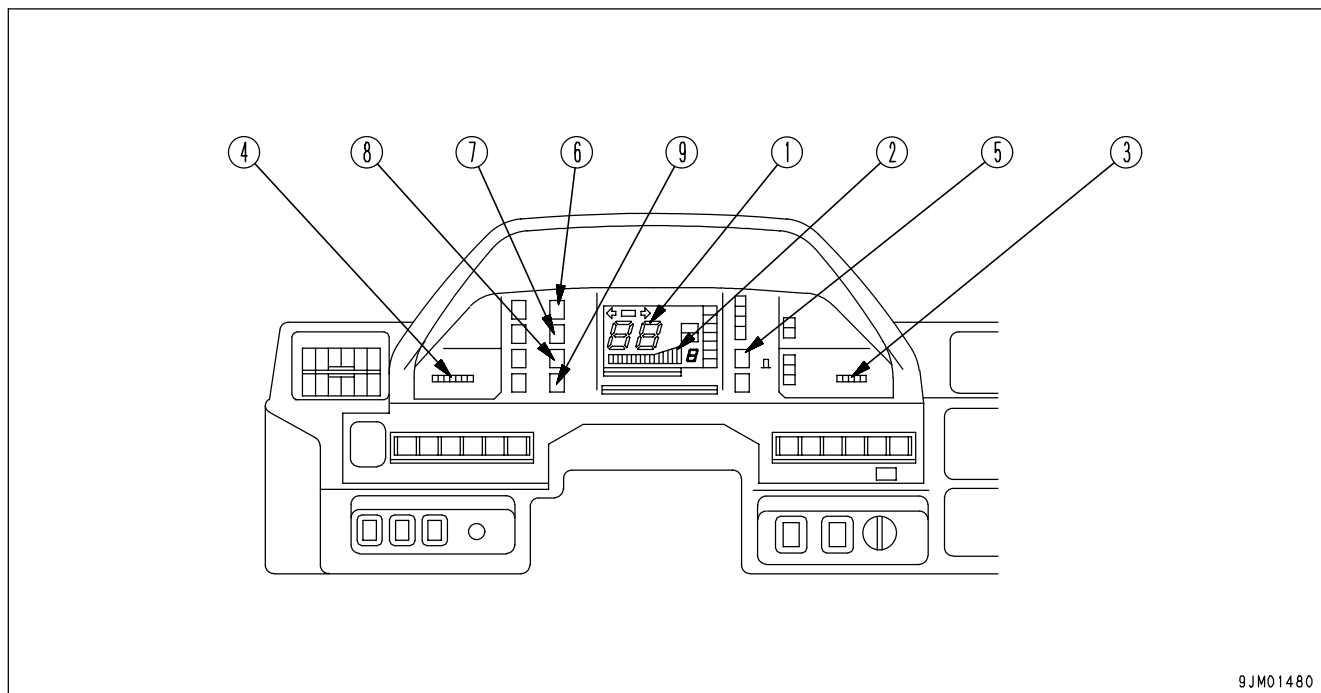
POWER MODE DISPLAY LAMP

This monitor (12) displays the power mode.

Select the mode with the power mode switch.



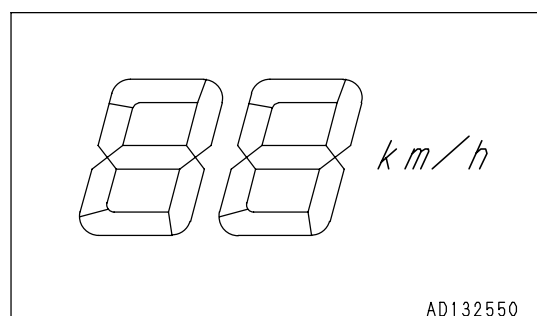
METERS



- | | |
|-----------------------|--|
| (1) Speedometer | (6) Air pressure gauge |
| (2) Engine tachometer | (7) Engine water temperature gauge |
| (3) Service meter | (8) Torque converter oil temperature gauge |
| (4) Odometer | (9) Retarder oil temperature gauge |
| (5) Fuel gauge | |

SPEEDOMETER

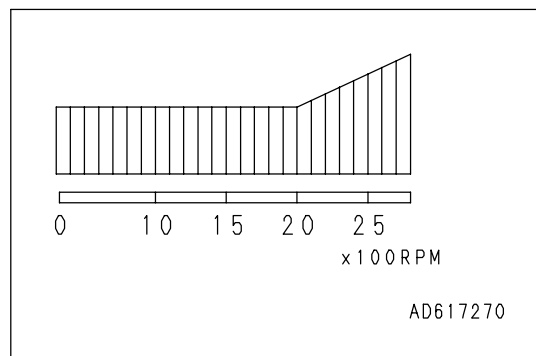
This meter (1) indicates the travel speed of the machine.
A speedometer for MPH is also available.



ENGINE TACHOMETER

This meter (2) indicates the speed of the engine.

While operating the machine, if the red range lights up, simultaneously the warning buzzer sounds and the central warning lamp flashes, then operate the machine while lowering the engine speed and the traveling speed.

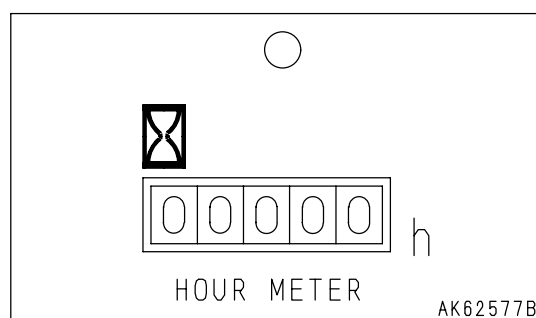


SERVICE METER

This meter (3) shows the total hours of operation of the machine.

If the engine is running, the service meter will advance even if the machine is not moving.

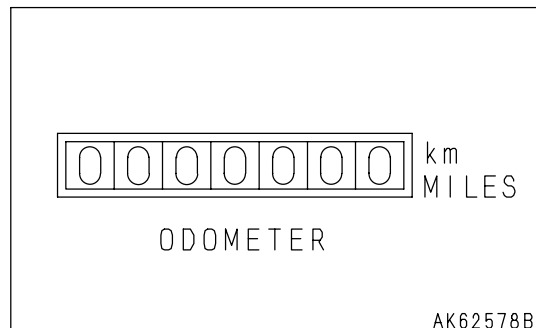
The meter advances by 1 for every one hour of operation, regardless of the engine speed.



ODOMETER

This meter (4) indicates the distance traveled in kilometers.

An odometer for MILES is also available.

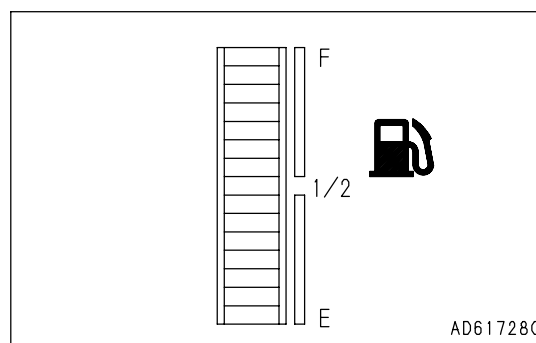


FUEL GAUGE

This gauge (5) indicates the amount of fuel in the fuel tank.

The green range should be lighted up during operation.

If only the red range remains lighted during operation, it indicates that there is less than 60 liters (15.84 US gal) of fuel remaining in the tank, so check and add fuel.



AIR PRESSURE GAUGE

This gauge (6) indicates the air pressure inside the air tank.

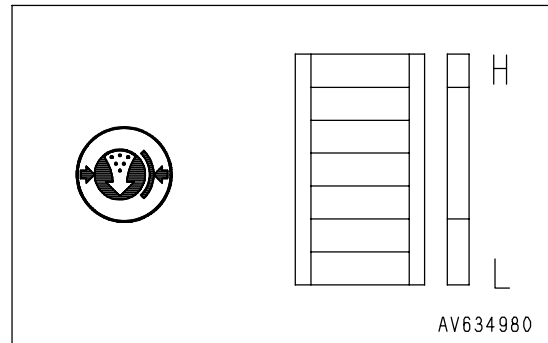
The green range should be lit up during operation.

If the red range lights up during operation, the alarm buzzer will sound, the central warning lamp will flash, and the air pressure monitor lamp will also flash at the same time.

If this happens, stop the machine, raise the engine speed, and wait until the green range lights up.

REMARK

If the air pressure drops further, the parking brake is automatically applied.

**ENGINE WATER TEMPERATURE GAUGE**

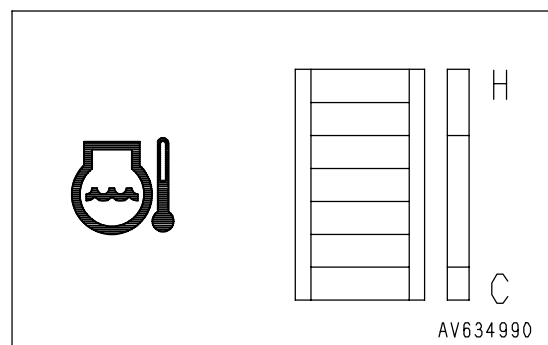
This gauge (7) indicates the engine cooling water temperature.

The green range should be lighted up during operation.

If the red range lights up during operation, the alarm buzzer will sound, the central warning lamp will flash, and the engine water temperature monitor lamp will flash at the same time.

If this happens, stop the machine, run the engine under no load at a mid-range speed, and wait until the green range lights up.

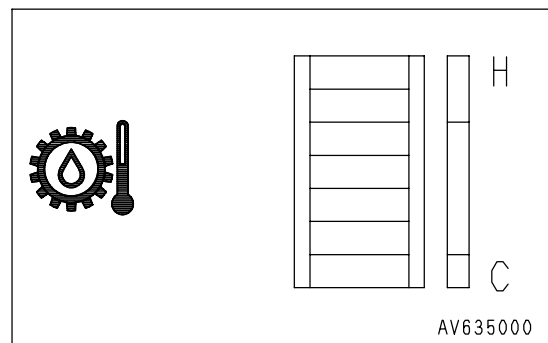
If the red range lights up, the engine output of the machine equipped with an electronic governor is automatically limited.

**TORQUE CONVERTER OIL TEMPERATURE GAUGE**

This gauge (8) indicates the torque converter oil temperature.

The green range should be lit up during operation.

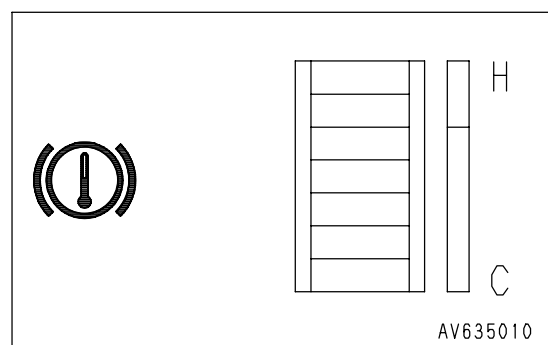
If the red range lights up during operation, the alarm buzzer will sound, the central warning lamp will flash, and the torque converter oil temperature monitor lamp will flash at the same time. If this happens, stop the machine, run the engine under no load at a mid-range speed, and wait until the green range lights up.

**RETARDER OIL TEMPERATURE GAUGE**

This gauge (9) indicates the retarder cooling oil temperature.

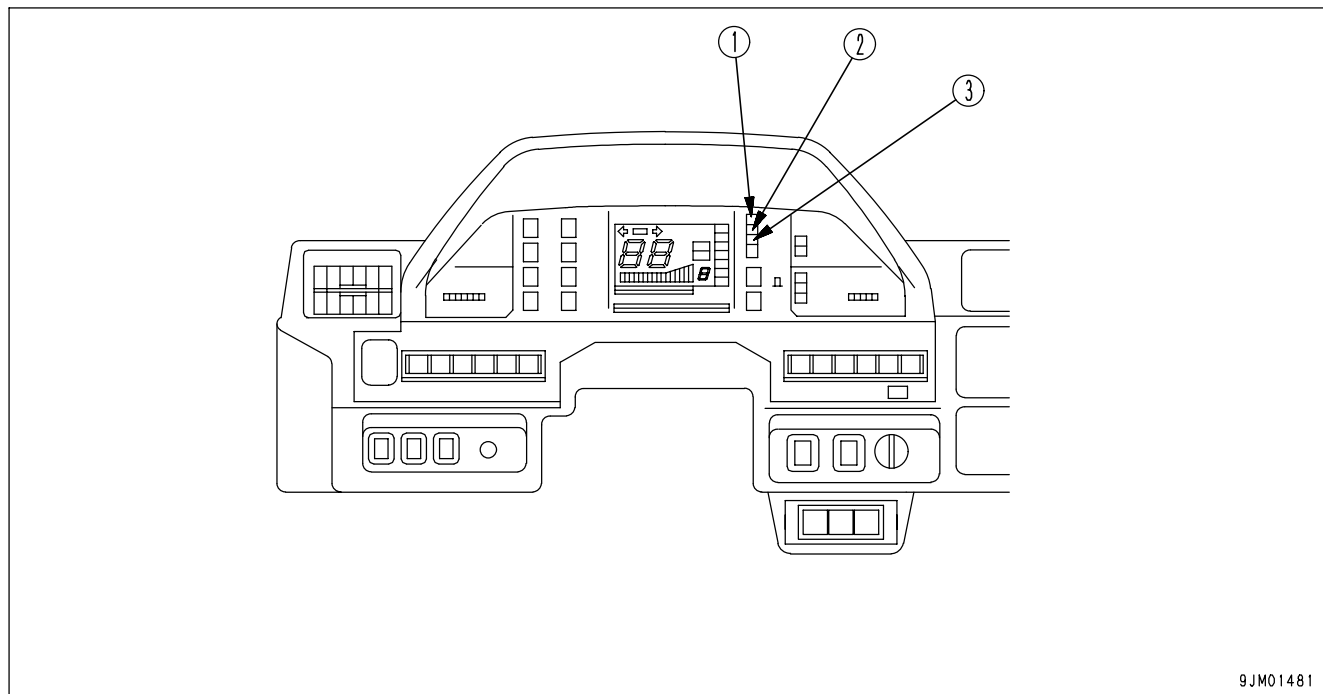
The green range should be lit up during operation.

If the red range lights up during operation, the alarm buzzer will sound, the central warning lamp will flash, and the retarder oil temperature monitor lamp will flash at the same time. If this happens, stop the machine, run the engine under no load at a mid-range speed, and wait until the green range lights up.



MECHATRONIC CAUTION LAMP PORTION

If an abnormality is detected in the mechatronics-related parts of the control system, the monitor lamp and the central warning lamp light up and the alarm buzzer sounds intermittently. Stop the machine, then take appropriate corrective action according to the user code.

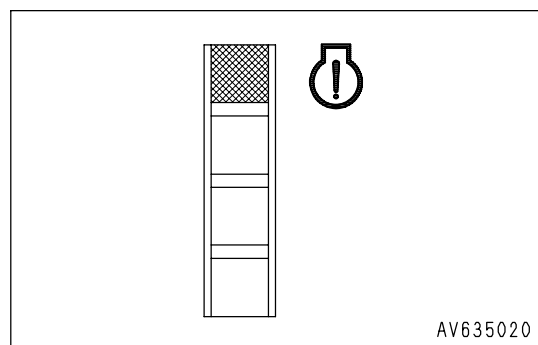


- | | |
|---|--------------------------------|
| (1) Engine (Mechatronics-related) | (3) Mechatronics-related parts |
| (2) Automatic transmission (Mechatronics-related) | (Excluding 1. and 2. above) |

ENGINE

(Mechatronics-related)

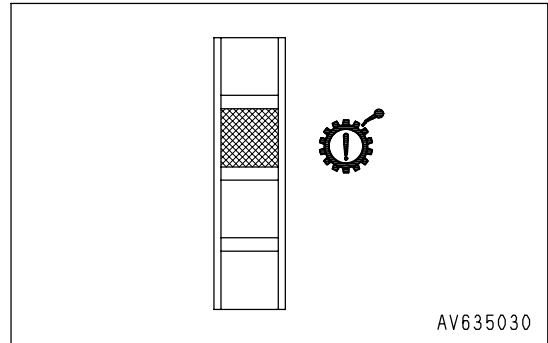
If an abnormality is detected in the mechatronics-related parts of the engine control system, this lamp (1) flashes to warn of the abnormality.



AUTOMATIC TRANSMISSION

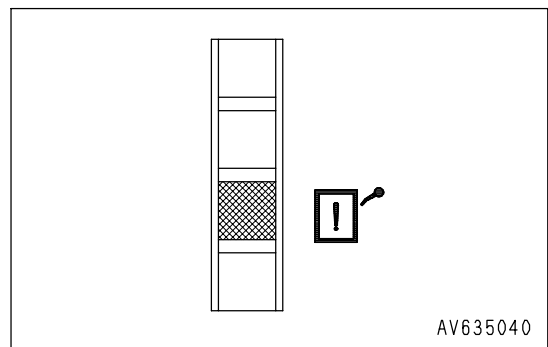
(Mechatronics-related)

If an abnormality is detected in the mechatronics-related parts of the transmission control system, this lamp (2) flashes to warn of the abnormality.

**MECHATRONICS-RELATED PARTS**

(Excluding 1. and 2. above)

If an abnormality is detected in the mechatronics-related parts of the control system other than those of the engine and transmission, this lamp (3) flashes to warn of the abnormality.

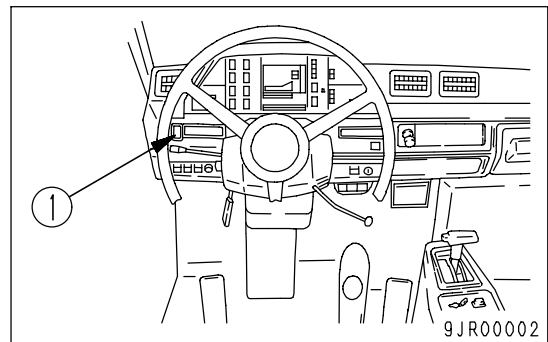
**CENTRAL WARNING LAMP**

If the machine is in the following condition, this lamp will flash.

- If the fuel level goes below 60 liters (15.84 US gal), the fuel level monitor flashes and only the red range on the fuel gauge lights up.

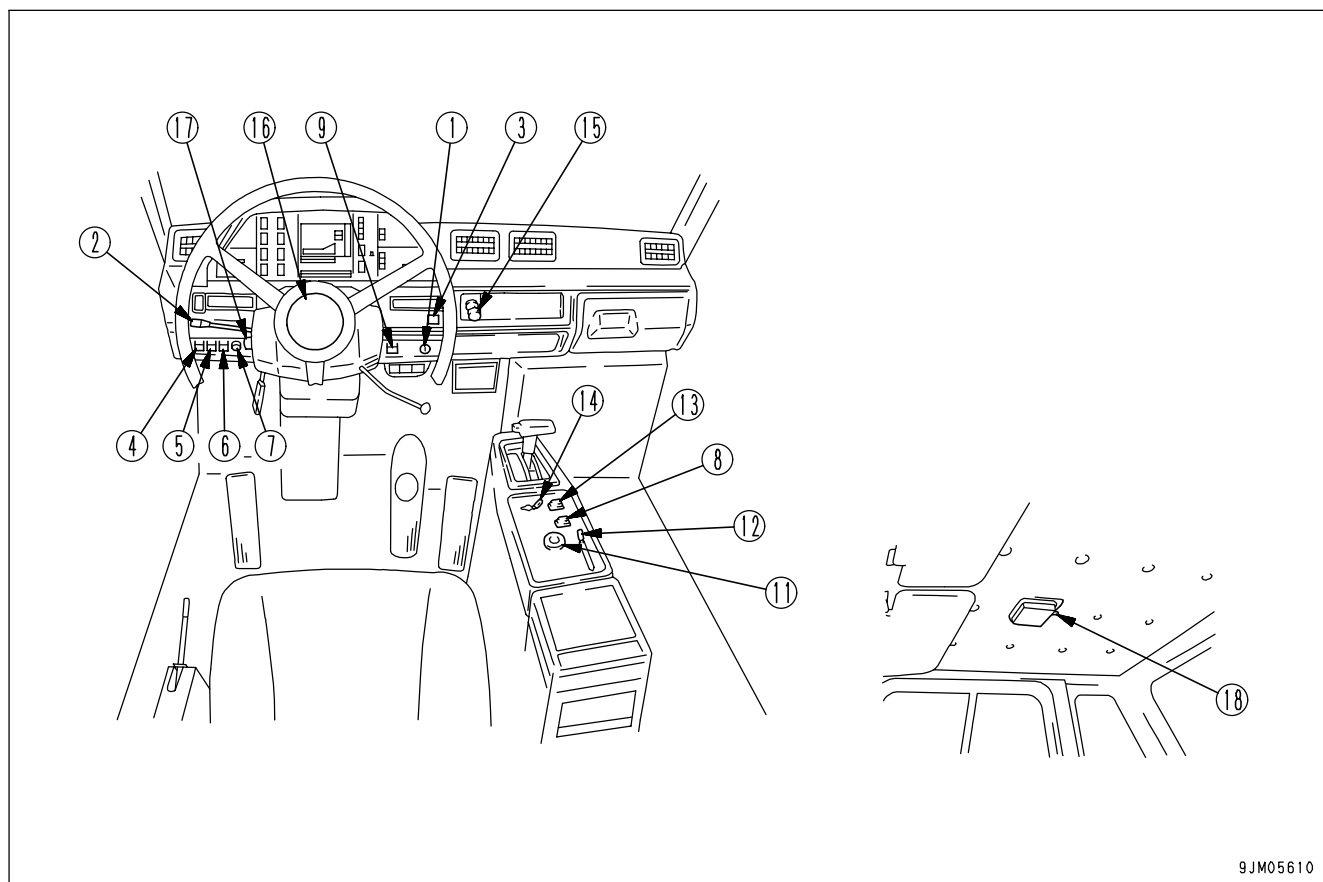
If the machine is in the following condition, this lamp will flash, and at the same time, the alarm buzzer will sound intermittently.

- When an abnormality has occurred in any of "EMERGENCY STOP ITEM (PAGE 3-11)".
- When "MECHATRONIC CAUTION LAMP PORTION (PAGE 3-21)" flashes.
- If the parking brake is applied, but the shift lever is not at neutral.
- When the dump lever is not at the FLOAT position and the shift lever is not at neutral.
- When engine tachometer red range lights up.



SWITCHES

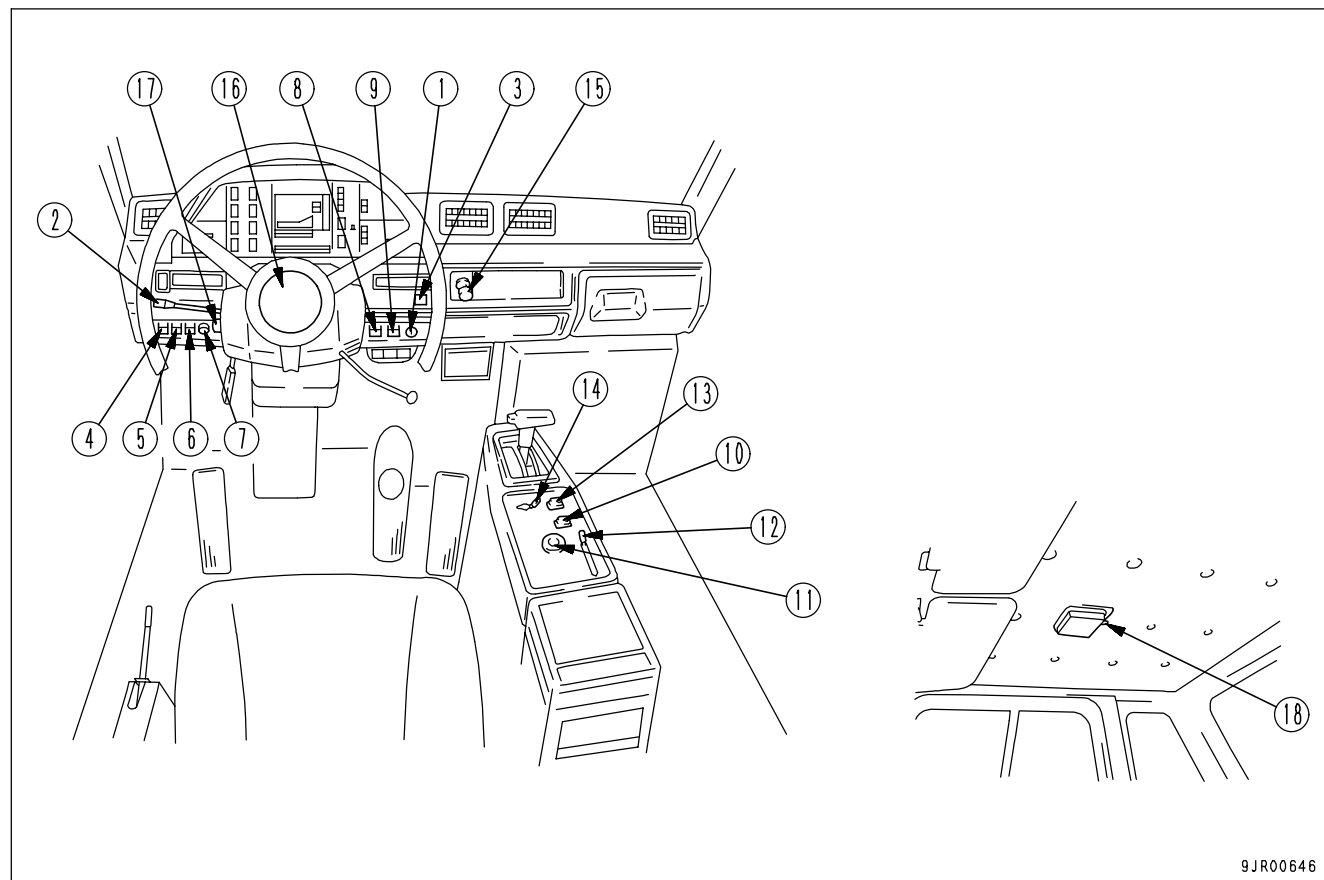
(HD325, HD405)



9JM05610

- | | |
|--|--------------------------------|
| (1) Starting switch | (9) AISS LOW switch |
| (2) Lamp switch | (11) Emergency steering switch |
| Turn signal lever | (12) Secondary brake lever |
| Dimmer switch | (13) Shift limiter switch |
| (3) Caution/Pilot lamp bulb check switch | (14) Parking brake valve lever |
| (4) Exhaust brake switch (if equipped) | (15) Cigarette lighter |
| (5) Front brake cut-off switch | (16) Horn button |
| (6) Hazard lamp switch | (17) Wiper switch |
| (7) Night lighting dimmer switch | (18) Room lamp switch |
| (8) Power mode selector switch | |

(HD325 The machine of 4WD specifications)



9JR00646

- | | |
|--|--------------------------------|
| (1) Starting switch | (9) AISS LOW switch |
| (2) Lamp switch | (10) 4WD switch |
| Turn signal lever | (11) Emergency steering switch |
| Dimmer switch | (12) Secondary brake lever |
| (3) Caution/Pilot lamp bulb check switch | (13) Shift limiter switch |
| (4) Exhaust brake switch (if equipped) | (14) Parking brake valve lever |
| (5) Front brake cut-off switch | (15) Cigarette lighter |
| (6) Hazard lamp switch | (16) Horn button |
| (7) Night lighting dimmer switch | (17) Wiper switch |
| (8) Power mode selector switch | (18) Room lamp switch |

STARTING SWITCH

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

OFF position

The key can be inserted or with drawn. 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.

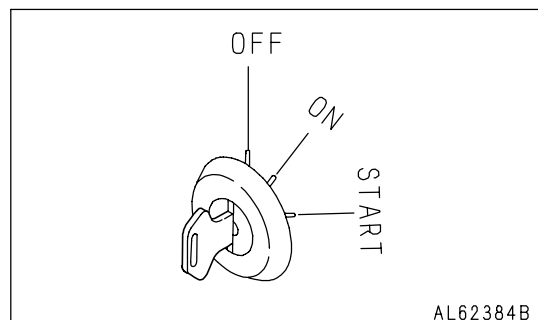
Keep the starting switch key at the ON position while the engine is running.

When turning the starting switch ON or OFF, if the starting switch is held at a position between ON and OFF, the controller may detect this as a problem. If this happens, return the starting switch to the OFF position, then operate it as usual to the ON position.

In cold weather, if the starting switch is turned to the ON position, preheating is automatically started and the preheating monitor lights up. After the preheating is completed, the monitor goes out.

START position

This is the engine-start position. Keep the key at this position during cranking. Immediately after starting the engine, release the key. It will automatically return to the ON position.



LAMP SWITCH

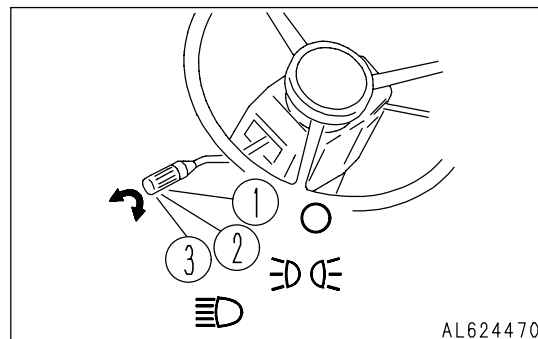
This switch (2) lights up the head lamps, side clearance lamps, tail lamps, machine monitor lighting, and rear lamps.

Position 1: OFF

Position 2: Side clearance lamps, tail lamps, rear lamps, machine monitor lighting light up

Position 3: The head lamps light up in addition to the lamps in the 2 position

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



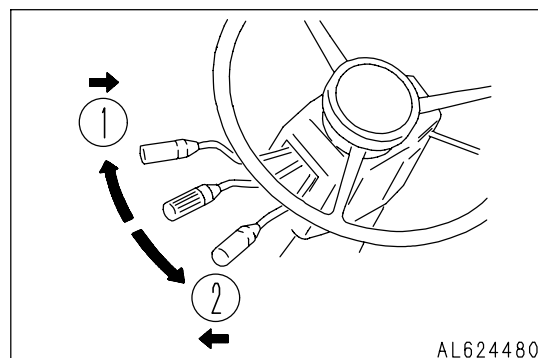
TURN SIGNAL LEVER

This lever (2) operates the turn signal lamp.

1: Right turn: Push the lever forward

2: Left turn: Push the lever back

When the lever is operated, the turn signal pilot lamp also flashes. The lever is automatically returned when the steering wheel is turned back. If the lever does not return, move it by hand.

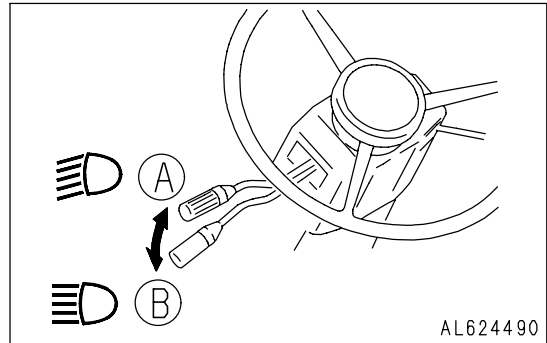


DIMMER SWITCH

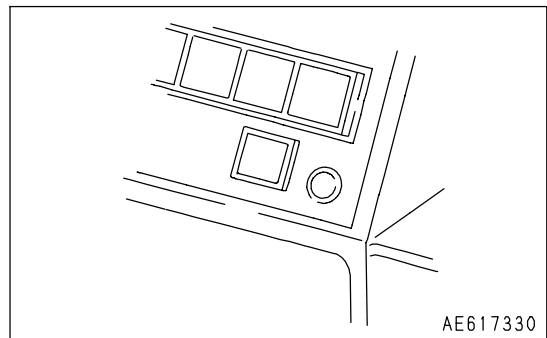
This switch (2) is used to switch the head lamps between high beam and low beam.

(A) Low beam

(B) High beam

**CAUTION/PILOT LAMP BULB CHECK SWITCH**

Press this switch (3) when the starting switch is at the ON position to check for any blown bulbs.

**EXHAUST BRAKE SWITCH**

(If equipped)

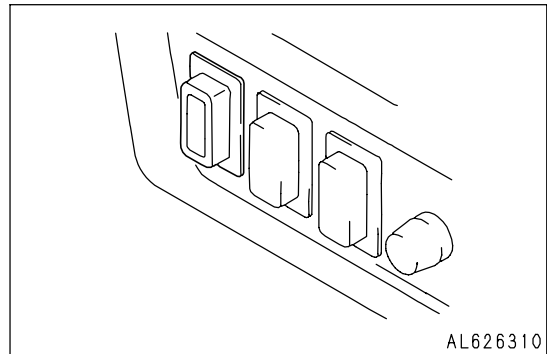
This switch (4) shows the operating condition of the exhaust brake. If it is pushed once, it lights up; and it goes off when it is pushed again.

OFF position (Light is off):

The exhaust brake is actuated when the brake pedal is depressed or the retarder control lever is operated if the torque converter is in the lockup condition.

ON position (Light is on):

The exhaust brake is actuated when the accelerator pedal is released if the torque converter is in the lockup condition.



FRONT BRAKE CUT-OFF SWITCH

**WARNING**

- When traveling on icy roads, on snow, or on other slippery road surfaces, set the front brake cut-off switch to the ON position and travel slowly at a safe speed.
- If the front brake cut-off switch is set to the OFF position when traveling on icy road, on snow, or on other slippery road surfaces, there is danger that the steering will be impossible to control.

This switch (5) switches the braking method according to the road surface conditions.

If the switch is pressed, the lamp lights up, the front brake cut function is actuated, and the brakes are not applied to the front wheels.

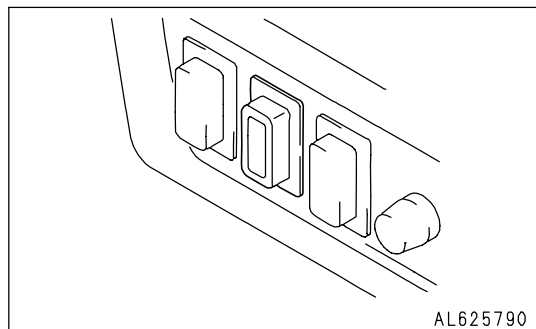
If the switch is pressed again, the lamp goes out and the front brake cut function is canceled.

OFF position (Light is off.):

When the brake pedal is depressed, the brakes are applied to both the front and rear wheels.

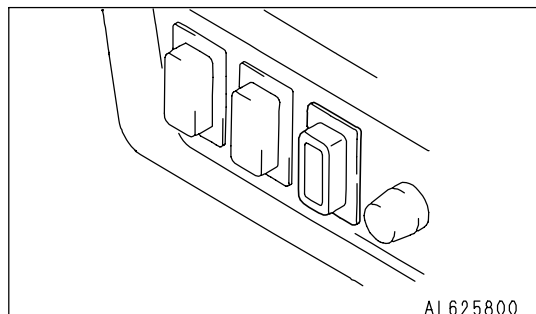
ON position (Light is on.):

When the brake pedal is depressed, the front brakes are not applied. The brakes are applied only to the rear wheels.

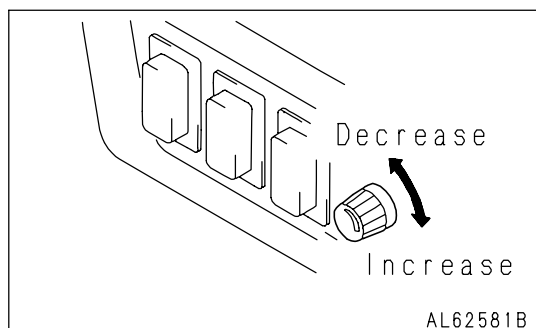
**HAZARD LAMP SWITCH**

This switch (6) flashes the left- and right-hand turn signal lamps.

When the switch is turned on, the turn signal pilot lamp flashes at the same time. If the starting switch is OFF, the turn signal pilot lamp does not flash.

**NIGHT LIGHTING DIMMER SWITCH**

This switch (7) is used to adjust the brightness of the monitor panel lighting and pilot lamps. Turn to the right to make the lighting brighter and turn it to the left to make the lighting dimmer.



POWER MODE SELECTOR SWITCH

The power mode switch (8) can be switched to allow the machine to travel economically in a way suited to the operating conditions. If depressed once, it lights up; if depressed once again, the light goes off.

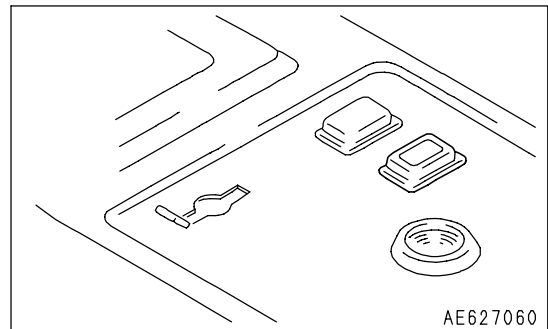
OFF position: High power (general operations)

This is used for general operating conditions.

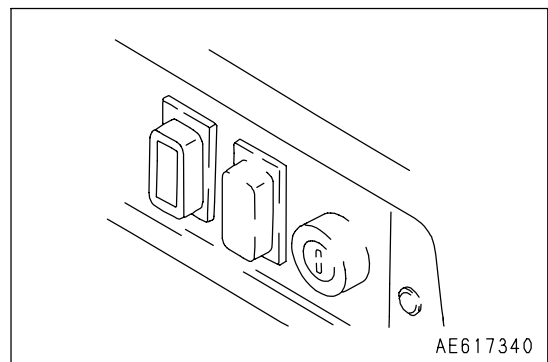
ON position: economy (traveling in flat areas)

This position is used when the emphasis is on reducing fuel consumption, such as when traveling on flat ground where maximum output is not needed.

(HD325, HD405)



(HD325 only the machine of 4WD specifications)

**AISS LOW SWITCH**

Using this switch (9), it is possible to switch the AISS freely between AUTO and LOW. Use each position as follows.

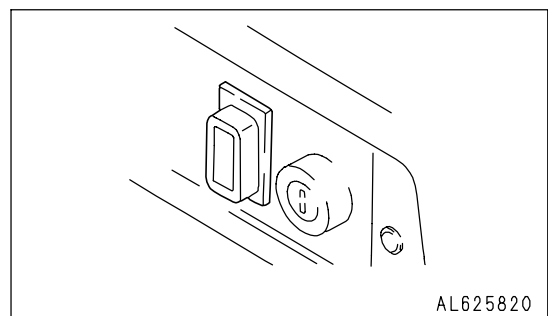
If the switch is depressed, it lights up, and if it is depressed once again, the light goes off.

OFF position (Light is off): AUTO position

At normal operation

ON position (Light is on): Low speed position

When the delicate start and operation is needed like putting the machine into garage



If the switch is at AUTO position:

1. When stopping the machine, by setting either parking brake or retarder brake at ON position, idling is set at low speed. When starting, by setting the parking brake at OFF position, idling is set at high speed.
2. Detecting the water temperature, idle is set at high speed automatically under the low temperature condition, and the warm-up time is shortened.

4WD SWITCH

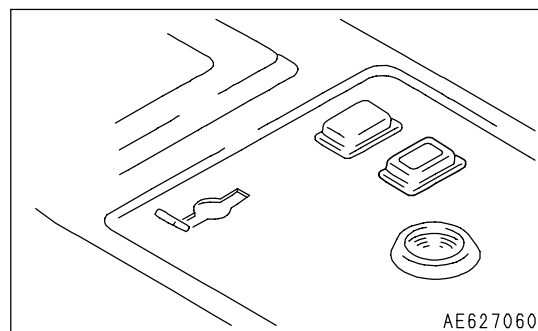
(HD325 only the machine of 4WD specifications)

When the switch (10) is pressed, it lights up; if it is pressed once again, the light goes off.

OFF: 2WD (Rear wheel drive) travel

ON: 4WD (All wheel drive) travel

Change from 4WD travel to 2WD travel and back at a travel speed below 10 km/h (6.2 MPH).

**EMERGENCY STEERING SWITCH**

This switch (11) is used to actuate the emergency steering pump.

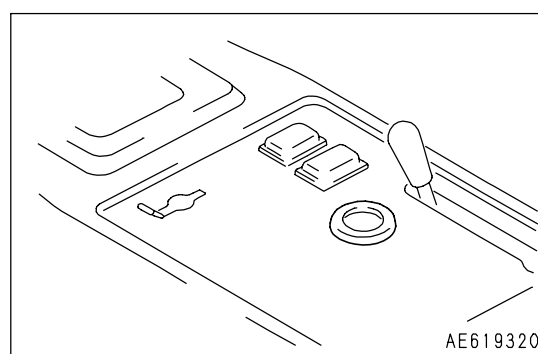
When the switch is pressed, the emergency pump is actuated to make it possible to operate the steering.

When the switch is ON, the pilot lamp (red) inside the switch lights up.

The emergency steering pump can be used for a maximum of 90 seconds.

When the emergency steering is being used, keep the travel speed to a maximum of 5 km/h (3.1 MPH).

When the emergency steering is actuated, it is possible to use the dump lever to raise the dump body.



Automatic emergency steering will be actuated automatically in the following cases:

- When hydraulic pump for steering has trouble
- When engine has stopped during operation

When the automatic emergency steering is actuated, stop the machine promptly and perform inspection.

If the key switch is turned ON when the machine is stopped and the parking brake switch is OFF, the auto emergency steering is actuated after 1 second, so turn the parking brake switch to the ON (PARKING) position.

SECONDARY BRAKE LEVER

This lever (12) is used to actuate the secondary brake.

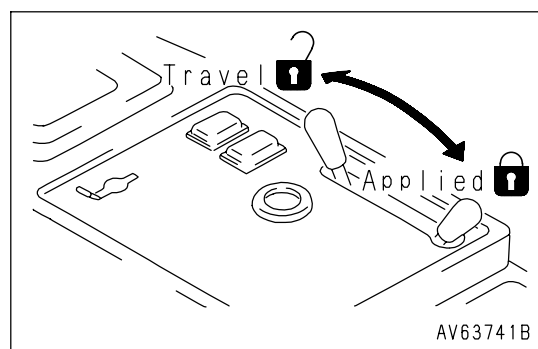
APPLIED: Secondary brake actuated

TRAVEL: Secondary brake released

If the pressure inside the air tank drops below 0.32 MPa (3.2 kg/cm², 45.1 PSI), the secondary brake and parking brake are automatically applied.

If the secondary brake is applied because of a failure in the air system, the central warning lamp flashes and the alarm buzzer sounds.

For details of releasing the brake when the secondary brake has been applied because of a failure in the air system, see "RELEASE METHOD WHEN PARKING BRAKE AND SECONDARY BRAKE HAVE BEEN ACTUATED IN EMERGENCY (PAGE 3-119)".



SHIFT LIMITER SWITCH

This switch (13) is used to limit the maximum speed range when the transmission shift lever is in the "D" or "L" position.

When the switch is pressed, the shift-limit function is actuated to limit the maximum speed to F6 in the D range and to only F1 in the L range.

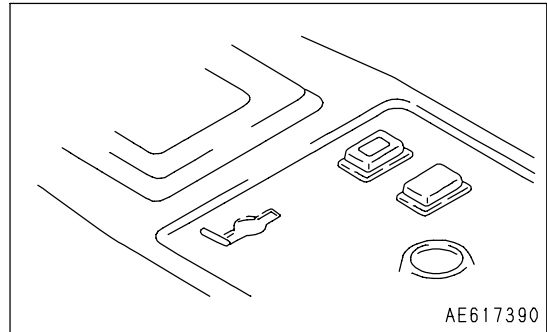
When the switch is pressed again, the light goes off.

OFF position: D range F2 - F7

L range F1 - F2

ON position: D range F2 - F6

L range F1

**PARKING BRAKE VALVE LEVER****WARNING**

- When parking or leaving the machine, always apply the parking brake.
- During loading operations, do not apply the parking brake. Pull the retarder lever to apply the brake.

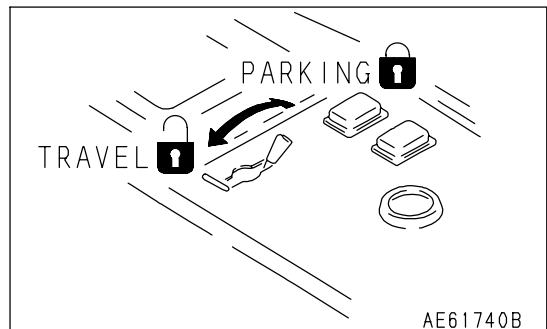
This lever (14) is used to actuate the parking brake valve.

PARKING: Parking brake actuated

TRAVEL: Parking brake is released.

When the lever is set to the PARKING position, the parking brake pilot lamp lights up.

When the lever is set to the PARKING position, if the gear shift lever is at any position other than N, the central warning lamp will flash and the alarm buzzer will sound.



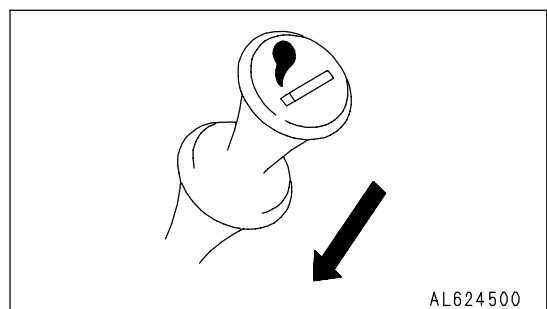
If the air pressure drops and goes below 0.32MPa {3.2kgf/cm², 45.4 PSI}, the secondary brake and parking brake are automatically applied.

For details of releasing the brake when the emergency brake has been applied because of a failure in the air system, see "RELEASE METHOD WHEN PARKING BRAKE AND SECONDARY BRAKE HAVE BEEN ACTUATED IN EMERGENCY (PAGE 3-119)"

CIGARETTE LIGHTER

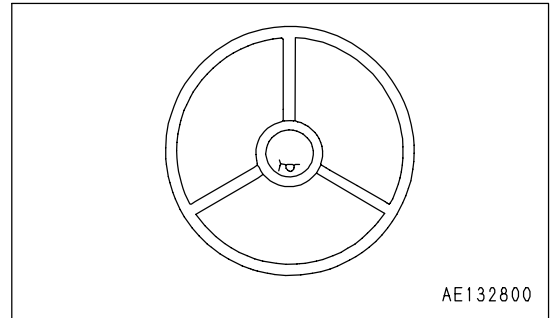
This switch (15) is used to light cigarettes.

When the cigar lighter is pushed in, it will return to its original position after several seconds, then pull it out and use it to light your cigarette.



HORN BUTTON

When the horn button (16) in the center of the steering wheel is pressed, the horn will sound.

**WIPER SWITCH**

This switch (17) is used to operate the wiper.

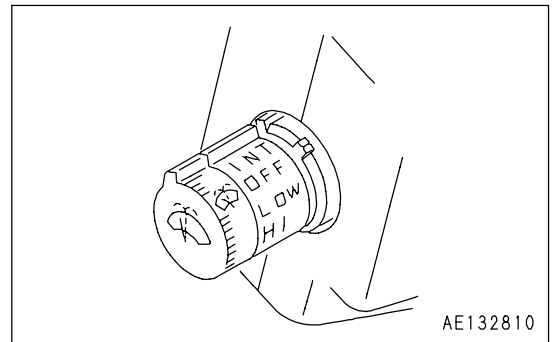
INT position: Wiper moves intermittently

OFF

LOW position: Wiper moves at low speed

HI position: Wiper moves at high speed

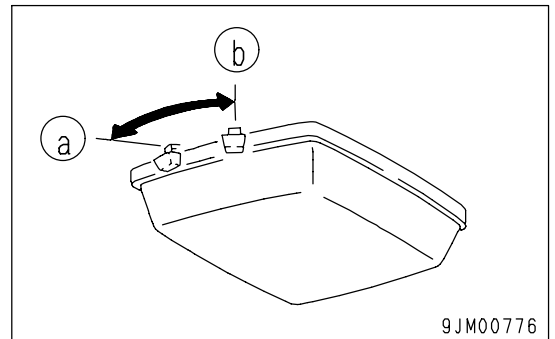
When the switch is pressed, washer fluid is sprayed out.

**ROOM LAMP SWITCH**

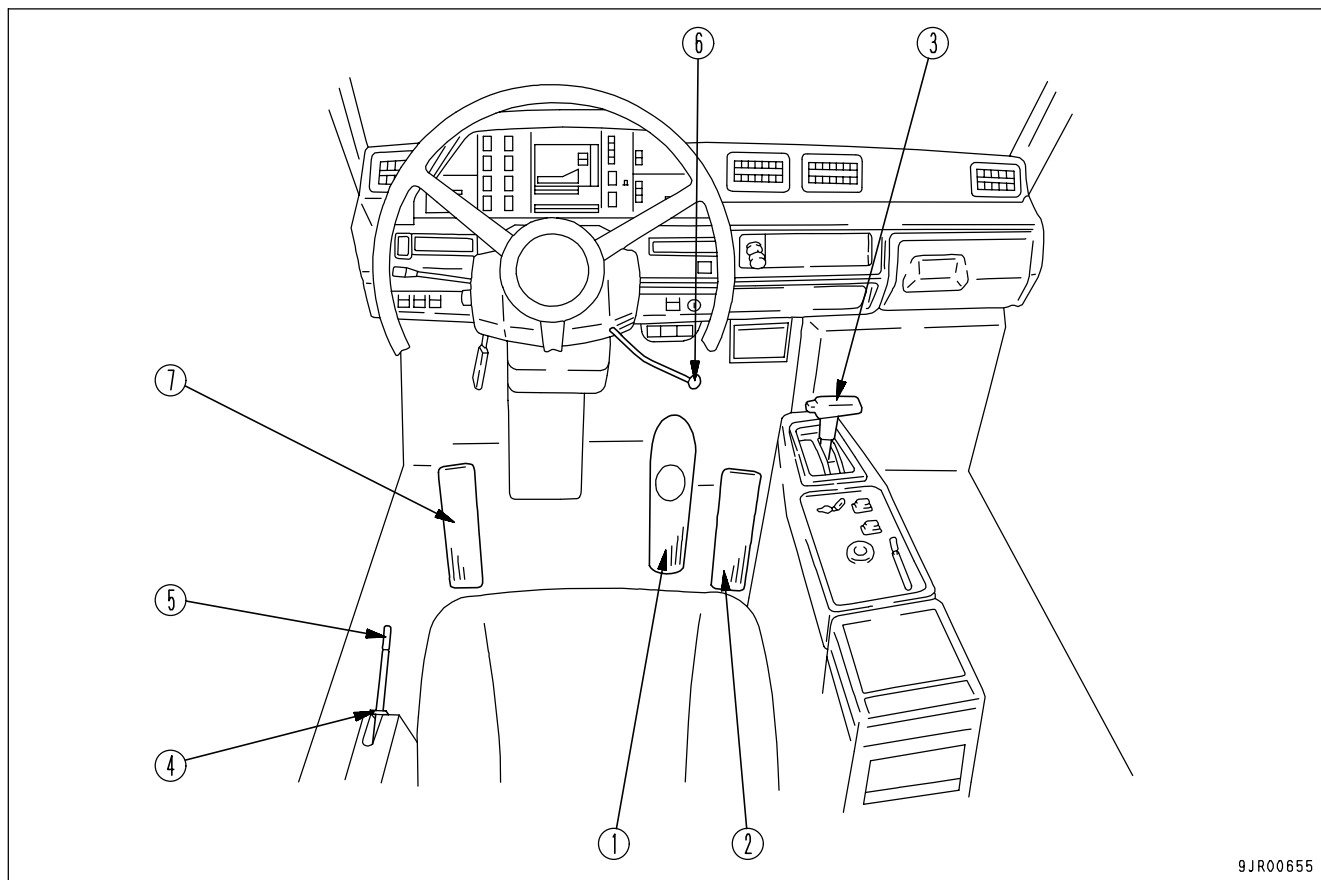
This switch (18) is used to switch the room lamp on or off.

(a) OFF

(b) ON



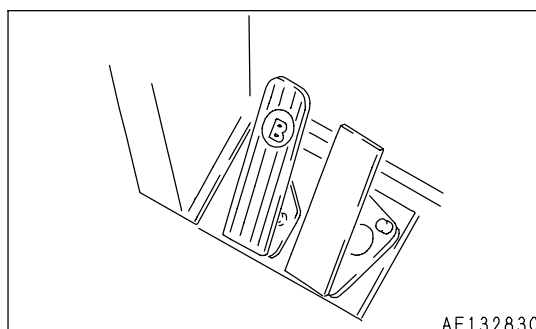
CONTROL LEVERS AND PEDALS



- | | |
|-----------------------|---|
| (1) Brake pedal | (5) Dump lever |
| (2) Accelerator pedal | (6) Retarder control lever |
| (3) Shift lever | (7) Differential lock pedal (if equipped) |
| (4) Dump lever lock | |

BRAKE PEDAL

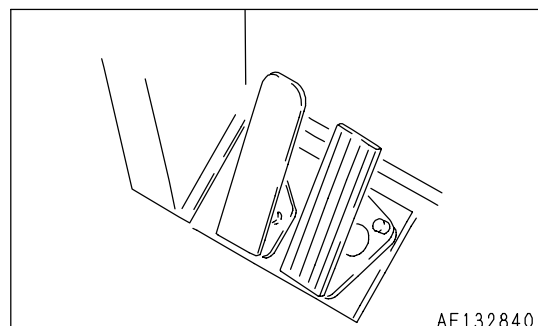
This pedal (1) is used to apply the wheel brakes.



ACCELERATOR PEDAL

This pedal (2) is used to adjust the engine speed.

It can be operated freely between the engine low idle position and the full throttle position.

**GEAR SHIFT LEVER**

The gear range can be selected with this lever (3) to match the travel conditions.

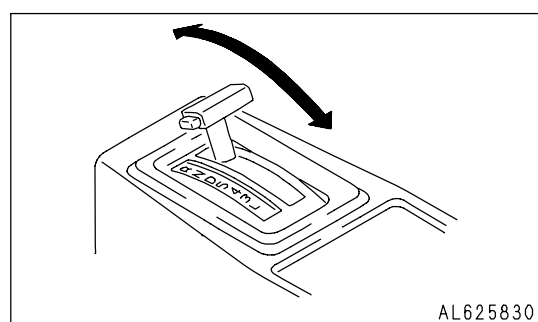
D position:

This is used for normal travel.

If the lever is placed in this position, the transmission is shifted automatically from 2nd torque converter drive to 7th speed to match the travel speed of the machine.

If the dump body is raised, the shift lever is fixed at 2nd. Always lower the dump body when traveling.

The maximum speed in this position is 70 km/h (43.5 MPH).



R position:

This is used when traveling in reverse.

This position uses the torque converter drive.

The machine cannot travel in reverse if the dump lever is not at the FLOAT position. Set the dump lever to the FLOAT position before moving the shift lever to the R position.

5 - L position:

These positions are used in places where it is difficult to travel at high speed, or when traveling on soft ground, or when starting the machine off on a slope when it is loaded. They are also used when going downhill if it is needed to use the braking force of the engine.

If the dump body is raised, it is impossible to shift up from 1st. Always lower the dump body when traveling.

- The speed ranges for each position are as follows.

Position	Speed range	Max. speed [km/h (MPH)]
5	1st torque converter - 5th direct	39.8 (24.7)
4	1st torque converter - 4th direct	29.6 (18.4)
3	1st torque converter - 3rd direct	21.8 (13.5)
L	1st torque converter - 2nd direct	16.3 (10.1)

When operating the shift lever, be sure to set it in position securely.

If the lever is not placed in position properly, the shift position display on the panel may go out and the transmission warning monitor lamp may light up.

Before shifting between forward and reverse, stop the machine completely and then run the engine at low idle.

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

When the starting switch is turned to the ON position, if the shift lever is not at the N (neutral) position, the transmission shift lever position pilot lamp and the central warning lamp will flash and the alarm buzzer will sound.

If shift lever is not at N (neutral) position when the parking brake is applied, the central warning lamp will flash and the alarm buzzer will sound.

If the shift lever is set to any position other than N (neutral) when the dump lever is at a position other than FLOAT or the body is still raised, the central warning lamp will light up and the alarm buzzer will sound.

The shift lever must not be returned to the N (neutral) position while traveling.

Release the accelerator pedal and run the engine at low idle when moving the shift lever from the N position to the forward or reverse position.

When moving the gear shift lever from the N (neutral) position to the R (reverse) position or from the D positions to position 5 (or other lower position), press the lock button on the gear shift lever before moving it.

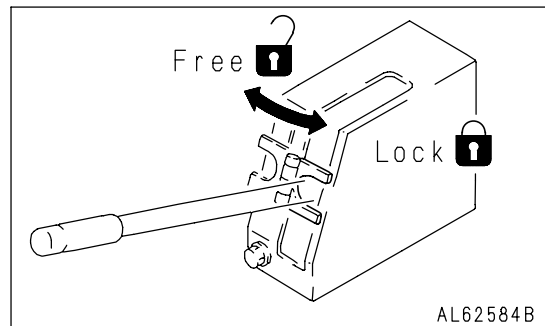
DUMP LEVER LOCK



WARNING

When raising the dump body to inspect the machine, always place the dump lever at the HOLD position, apply the lock, and then use the body pivot pins.

This device (4) is used to lock the dump lever.



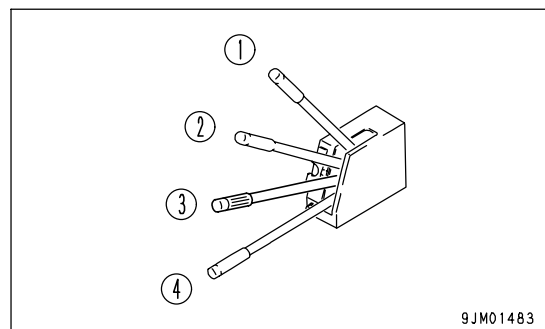
DUMP LEVER



CAUTION

To prevent damage to the dump body through vibration from the road surface, always lower the dump body and set at FLOAT position before traveling.

This lever (5) is used to operate the dump body.



1: RAISE

2: HOLD: The dump body stops and is held in position.

3: FLOAT: The dump body moves freely under external force.

4: LOWER

For details, see "DUMP OPERATIONS (PAGE 3-98)".

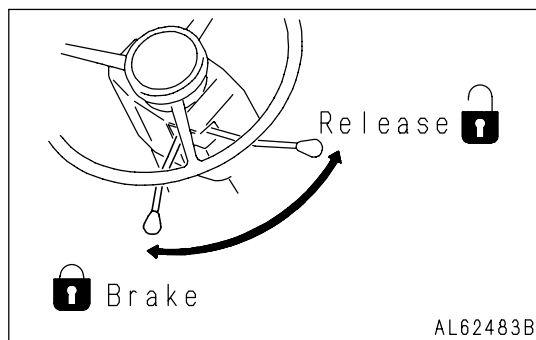
RETARDER CONTROL LEVER**CAUTION**

The retarder must not be used as a parking brake.

This lever (6) is used to operate the retarder, which applies the rear wheel brake when going downhill.

The more the lever is pulled, the greater the braking force becomes.

When the retarder is actuated, the rear brake pilot lamp lights up.



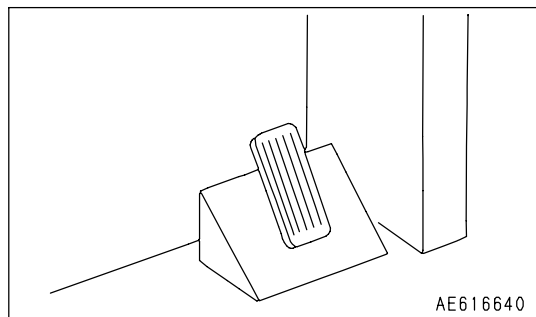
For details, see "TRAVELING DOWNHILL (PAGE 3-88)". When leaving the operator's seat, always apply the parking brake.

DIFFERENTIAL LOCK PEDAL

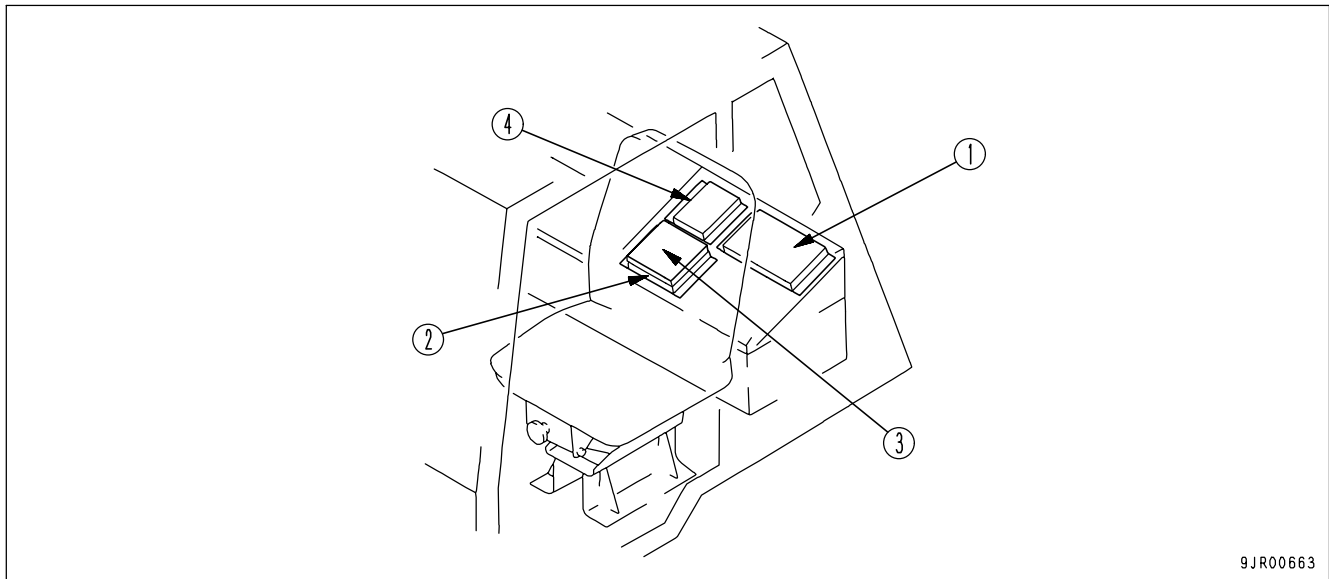
(If equipped)

This pedal (7) is used to actuate the differential lock control.

When the pedal is depressed, the differential lock is actuated, and when it is released, the differential lock is canceled.



MECHATRONICS EQUIPMENT CONTROLLER



9JR00663

- | | |
|-----------------------------|---|
| (1) Transmission controller | (3) 4WD controller |
| (2) Engine controller | (HD325 the machine of 4WD specifications) |
| | (4) Suspension controller (if equipped) |

TRANSMISSION CONTROLLER

A two-digit number followed by the service code is displayed in the inspection window of this controller (1) to identify the location of the abnormality. When the condition is normal, "0.0" or "0.C" is displayed.

For the method of checking the service code when an abnormality occurs, see "TRANSMISSION CONTROLLER (PAGE 3-131)".

ENGINE CONTROLLER

A two-digit number followed by the service code is displayed in the inspection window of this controller (2) to identify the location of the abnormality. When the condition is normal, "0.0" is displayed.

For the method of checking the service code when an abnormality occurs, see "TROUBLESHOOTING (PAGE 3-114)".

4-WHEEL DRIVE CONTROLLER

(HD325 The machine of 4WD specifications)

A 2-digit failure code is displayed in the inspection window of this controller (3) to inform of the location of the abnormality.

When the condition is normal, "3.2" is displayed when in 2-wheel drive and A □ (□ indicates the speed range) is displayed when in 4-wheel drive.

SUSPENSION CONTROLLER

(If equipped)

A two-digit number followed the action code is displayed in the inspection window of this controller (4) to identify of the location of the abnormality. When the condition is normal, "0.0" is displayed.

For detail of the checking of service code when an abnormality occurs, see "TROUBLESHOOTING (PAGE 3-114)".

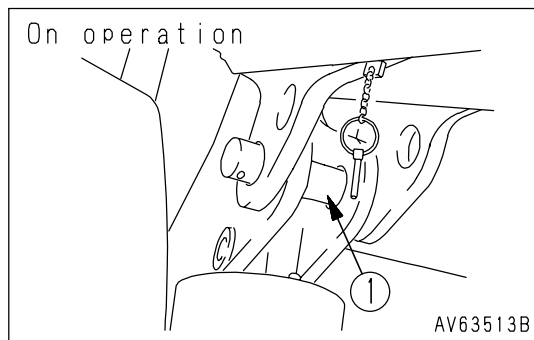
BODY PIVOT PIN



WARNING

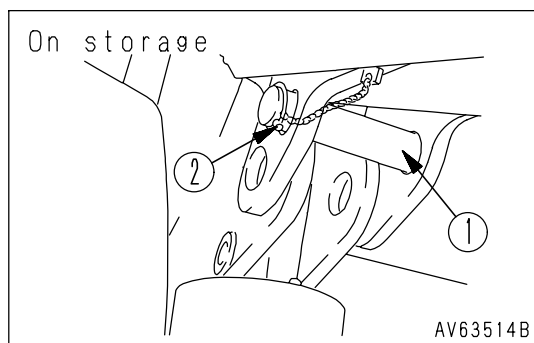
When raising the dump body to inspect the machine, always place the dump lever at the HOLD position, apply the lock, and then use the body pivot pins.

This is a safety device for the dump body, and is used when carrying out inspection or maintenance with the dump body raised. Raise the dump body fully, insert body pivot pins (1). Always insert the body pivot pins on both sides.



STOWING BODY PIVOT PIN

The safety pins are stored at the bottom rear of the dump body. Insert body pivot pins (1), then insert lock pins (2) to stow in position.

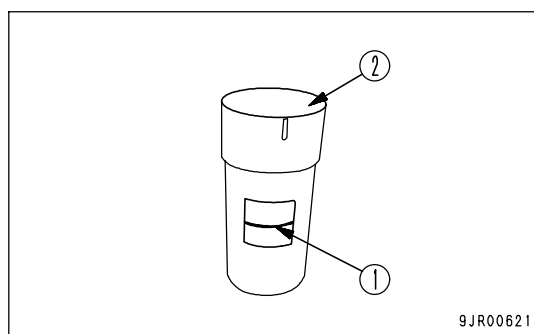


DUST INDICATOR

This device indicates clogging of the air cleaner.

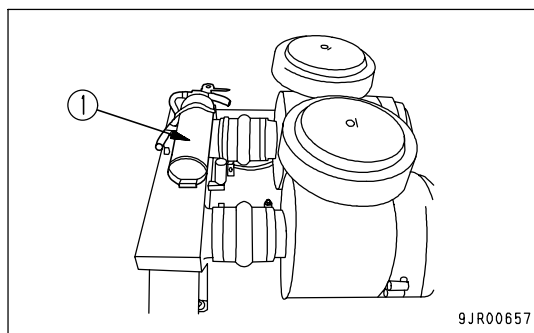
Depending on the degree of clogging of the element, red line (1) appears in the transparent portion. If red line (1) indicates 0.0075 MPa (30 INCHES H₂O) (0.076 kg/cm², 1.1 PSI), clean the element immediately.

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



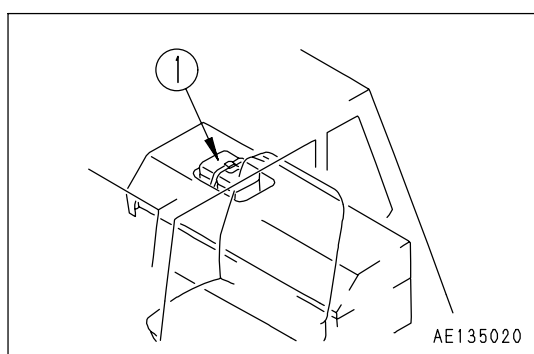
LOCATION OF FIRE EXTINGUISHER

Fire extinguisher (1) is on top of the piping at the front of the air cleaner.



LOCATION OF FIRST AID KIT

First aid box (1) is in the rear cover inside the cab.



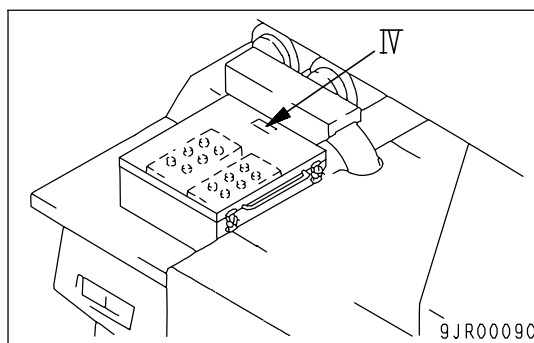
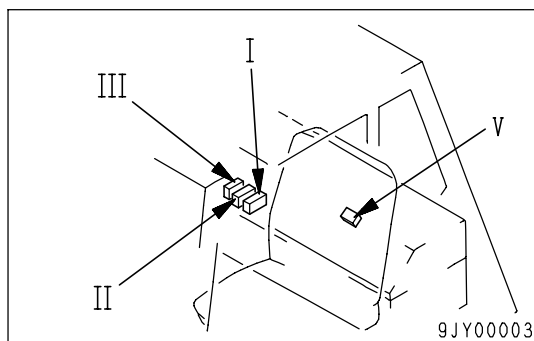
FUSES

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.

NOTICE

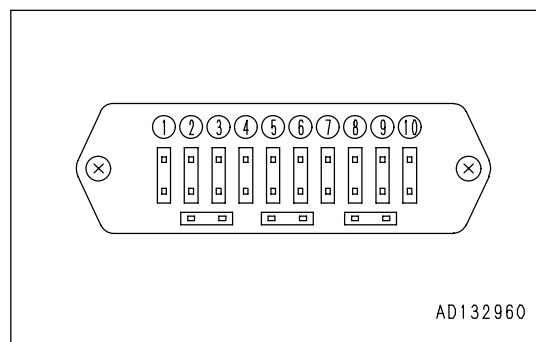
- When replacing any fuse, always turn the power off (turn the starting switch to OFF).
- When replacing the fuse, always use a fuse of the same capacity and type.



FUSE CAPACITY AND CIRCUIT NAME

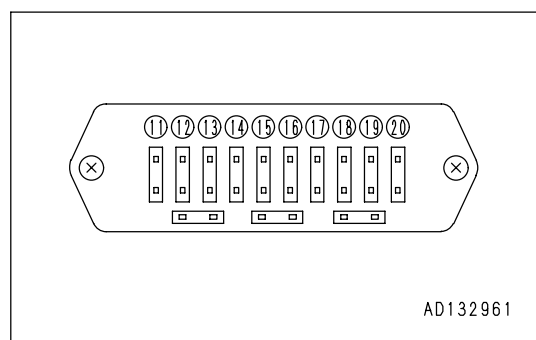
Fuse box I

No.	Fuse capacity	Circuit name
(1)	10A	Car radio, car stereo
(2)	10A	Horn relay
(3)	10A	Cigarette lighter
(4)	20A	Fog lamp (if equipped)
(5)	10A	Engine start relay, transmission neutral relay
(6)	20A	Head lamp (low beam), service brake relay, rear brake pilot relay, room lamp
(7)	20A	Head lamp (high beam), side clearance lamp, tail lamp, night lighting
(8)	10A	Backup alarm relay
(9)	10A	Front brake cut solenoid
(10)	10A	T/M controller, exhaust brake switch, shift limiter switch, power mode selector switch, transmission cut relay



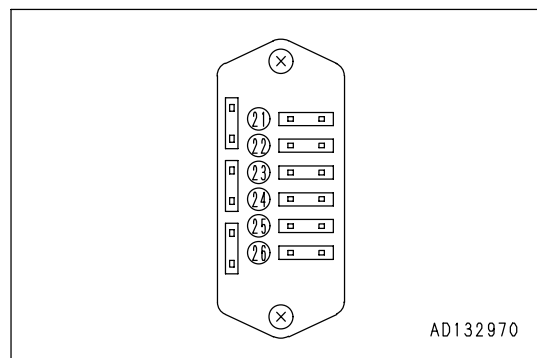
Fuse box II

No.	Fuse capacity	Circuit name
(11)	10A	Engine controller, fuel cut relay, hazard relay, hazard lamp relay
(12)	10A	Electronic display panel, caution pilot lamp, central warning lamp, buzzer, AISS switch
(13)	5A	Suspension controller
(14)	5A	Payload meter (if equipped), Payload meter relay (if equipped)
(15)	20A	Payload external display lamp (if equipped), Payload meter relay (if equipped)
(16)	5A	Spare
(17)	10A	Start switch, hazard switch, hazard flasher
(18)	10A	T/M controller, engine controller
(19)	10A	Emergency steering
(20)	10A	Direct from battery (Spare)



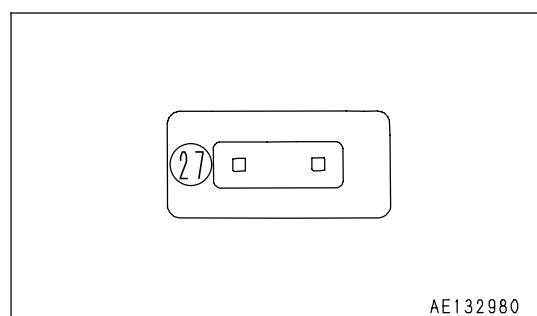
Fuse box III

No.	Fuse capacity	Circuit name
(21)	20A	Pre-heater relay, engine controller
(22)	20A	Wiper motor, washer motor
(23)	20A	Air conditioner blower motor
(24)	10A	Air conditioner compressor
(25)	10A	Spare
(26)	10A	Spare



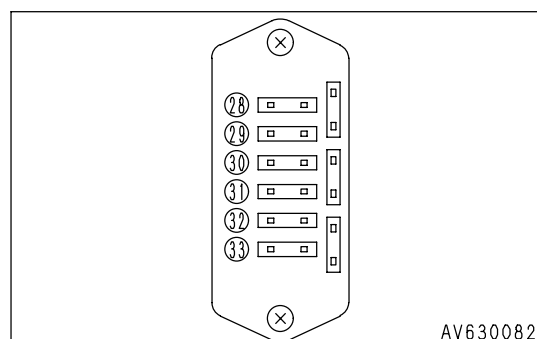
Fuse box IV

No.	Fuse capacity	Circuit name
(27)	30A	Power source for fuse box



Fuse box V (HD325 Only the machine of 4WD specifications)

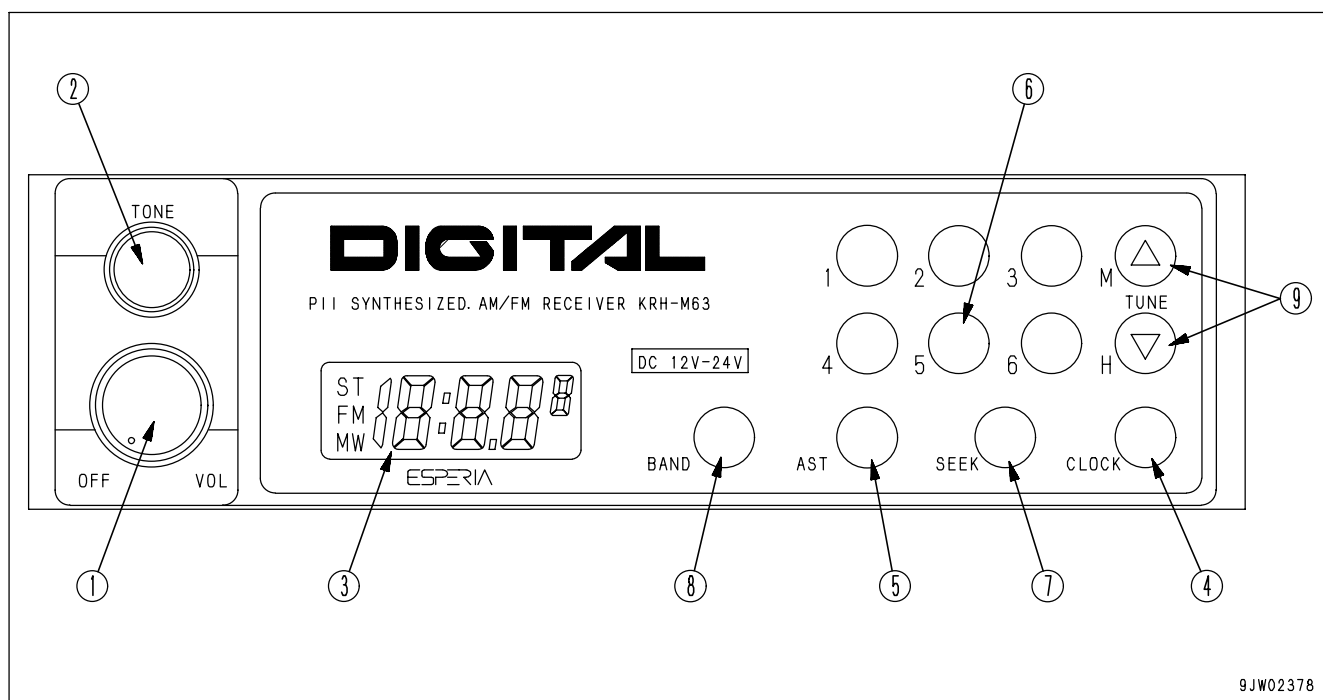
No.	Fuse capacity	Circuit name
(28)	5A	4WD controller
(29)	5A	4WD controller
(30)	5A	Spare
(31)	5A	Spare
(32)	5A	Spare
(33)	5A	Spare



Contact your Komatsu distributor before using any spare fuse terminal.

CAR RADIO

EXPLANATION OF COMPONENTS

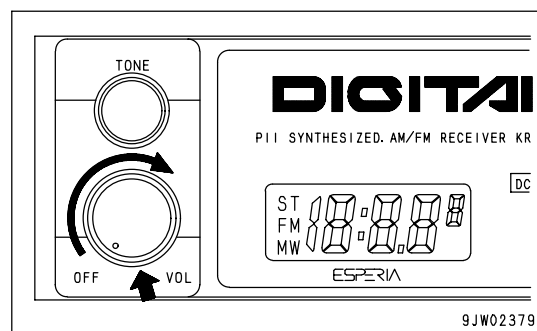


9JW02378

- | | |
|---------------------------------------|--------------------------|
| (1) Power switch/Volume | (6) Preset switch |
| (2) Tone control knob | (7) Seek |
| (3) Display | (8) Band selector switch |
| (4) Clock button/Displaying frequency | (9) Tuning switch |
| (5) AST | |

POWER SWITCH/VOLUME

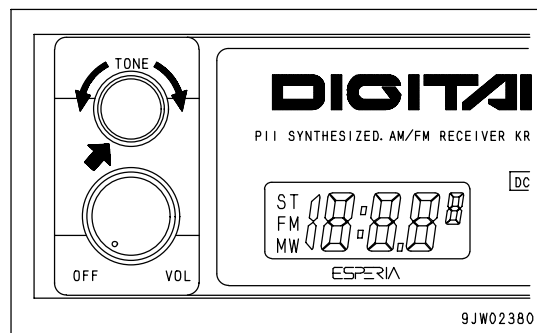
When this switch (1) is turned to the right, it clicks and the power is turned on. If it is turned further, the speaker volume is adjusted.



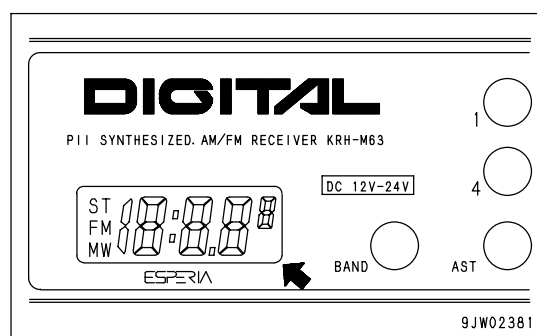
9JW02379

TONE CONTROL KNOB

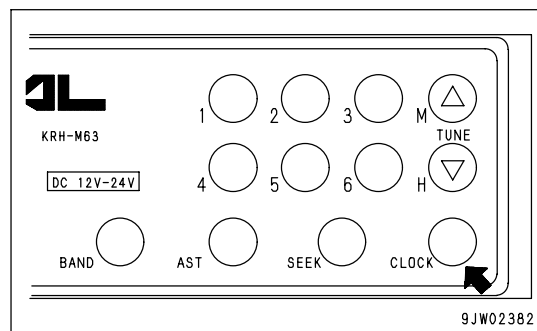
If this knob (2) is turned to the right, the high tone is emphasized;
if it is turned to the left, the high tone is reduced.

**DISPLAY**

This display (3) shows the radio reception frequency and the operating mode.

**CLOCK BUTTON/DISPLAYING FREQUENCY**

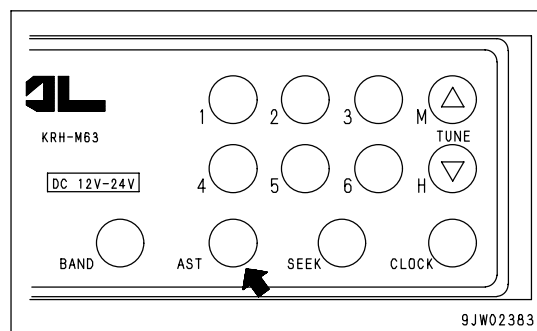
When this button (4) is pressed, the display changes to the time.
If it is pressed again, it displays the frequency.

**AST**

When this button (5) is pressed, the preset stations are called up in turn.

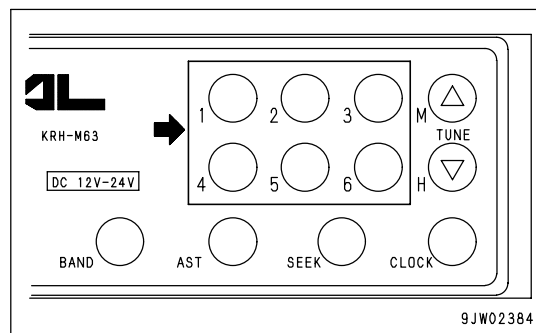
When the desired broadcasting station is reached, press the button again to stop it.

If the button is kept pressed continuously for 2 seconds, it is set to auto memory.



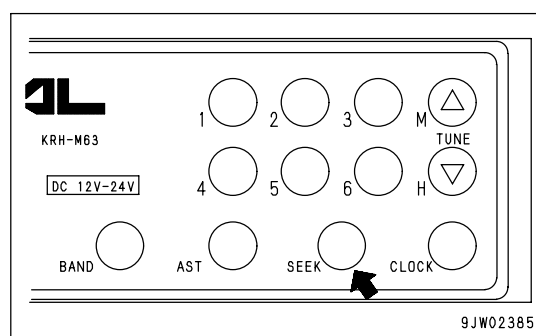
PRESET SWITCH

With this switch (6), each button can be set to one station each for FM and MW (AM). (For details of the method of resetting, see "METHOD OF PRESET (PAGE 3-45)".)



SEEK

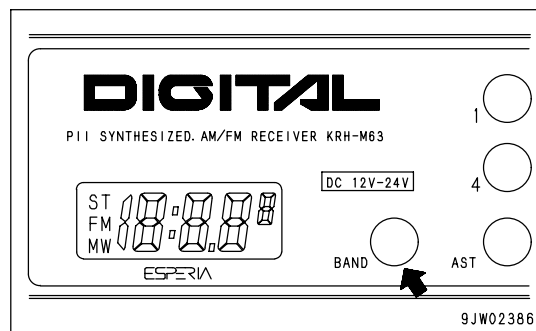
When this switch (7) ("SEEK") is pressed, it automatically searches for stations that can be received, and when it receives a station, it stops.



BAND SELECTOR SWITCH

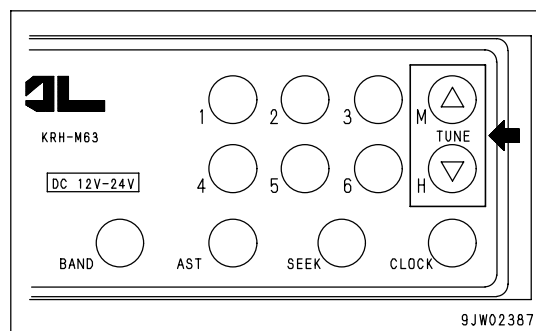
When this switch (8) ("BAND") is pressed, the band is switched between FM and MW (AM).

The reception band and frequency are displayed on the display.



TUNING SWITCH

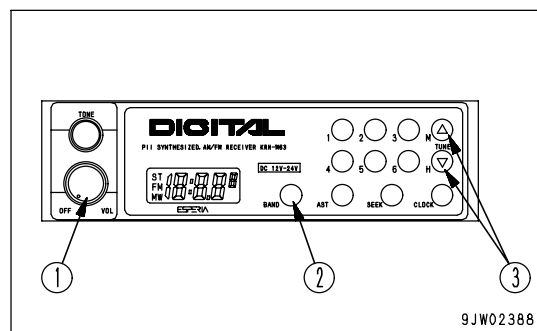
When the "TUNE" button \triangle of switch (9) is pressed, the frequency goes up; when the ∇ button is pressed, the frequency goes down. If it is kept pressed, the frequency changes continuously.



METHOD OF OPERATION

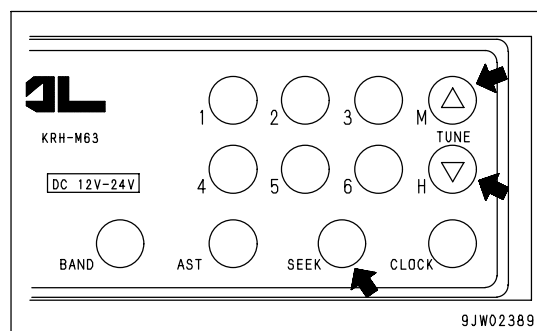
LISTENING TO RADIO

1. This switches on power (1) for the radio.
2. "BAND" switch (2) is used to select MW (AM) or FM.
3. Use the preset switch or tuning switch (3) to select the station.
4. Adjust the volume and tone as desired.
5. To turn the radio OFF, turn VOL knob (1) to the left until a click is heard.



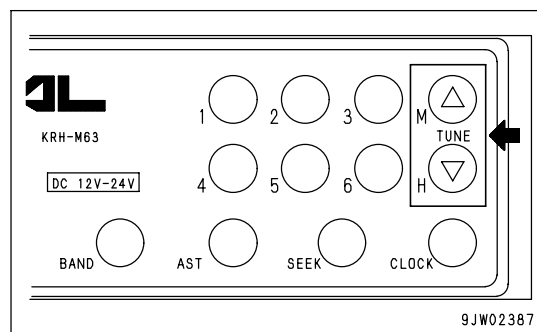
METHOD OF AUTOMATIC TUNING

When the "SEEK" switch is pressed, it moves up to higher frequencies and when it finds a station that can be received, it stops automatically.



METHOD OF MANUAL TUNING

When the TUNE button \triangle is pressed, the frequency goes up; when the ∇ button is pressed, the frequency goes down. If it is kept pressed, the frequency changes continuously.



METHOD OF PRESET

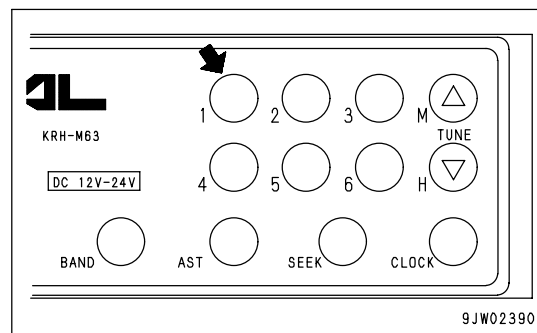
1. Select the desired preset station.

Use the "BAND" button to select MW (AM) or FM, and use the "TUNE" button to select the frequency of the broadcasting station.

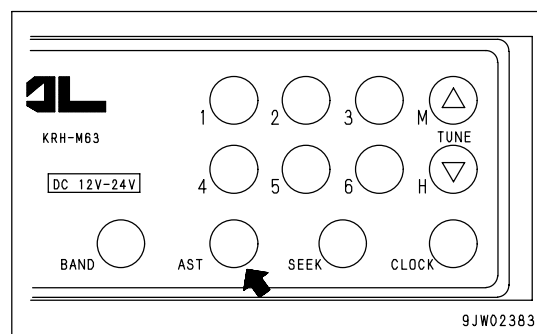
2. Decide the number of the button to be preset, and keep it pressed for 2 seconds. The number of the button will be displayed and the presetting is completed.

3. Repeat Steps 1 to 2 to preset other broadcasting stations.

- To change the setting of a preset switch to another station, repeat Steps 1 to 2.
- If the battery is replaced or the power is switched off, all the preset settings are deleted. Carry out the presetting operation again.
- It is possible to preset 6 AM (MW) stations and 6 FM stations.

**METHOD OF AUTOMATIC MEMORY**

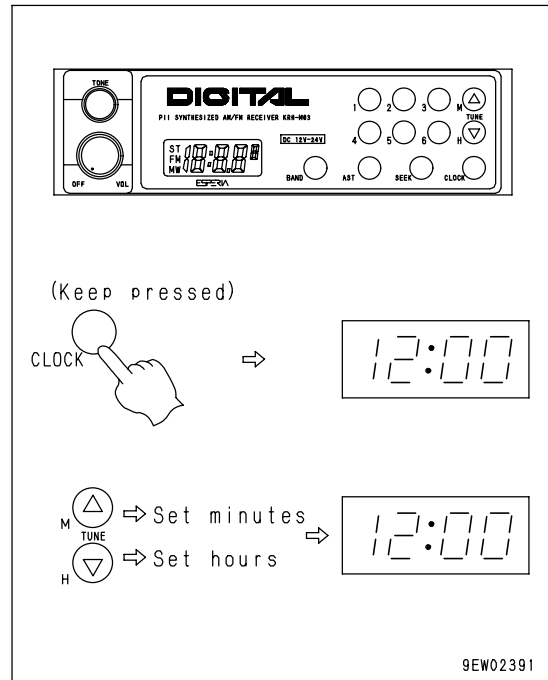
If the "AST" button is pressed for 2 seconds, the broadcasting stations that can be received in the area are called up in turn, and the broadcasting stations are automatically saved in the preset memory.

**AUTOMATIC SWITCHING RECEPTION OF MONAURAL/STEREO**

If the reception of the FM stereo broadcast being received is weak (when you are far from the broadcasting station or are surrounded by hills), the radio is automatically switched from stereo to monaural to reduce the interference. When the stereo broadcast becomes stronger, it automatically switches back to stereo broadcasting.

ADJUSTING TIME

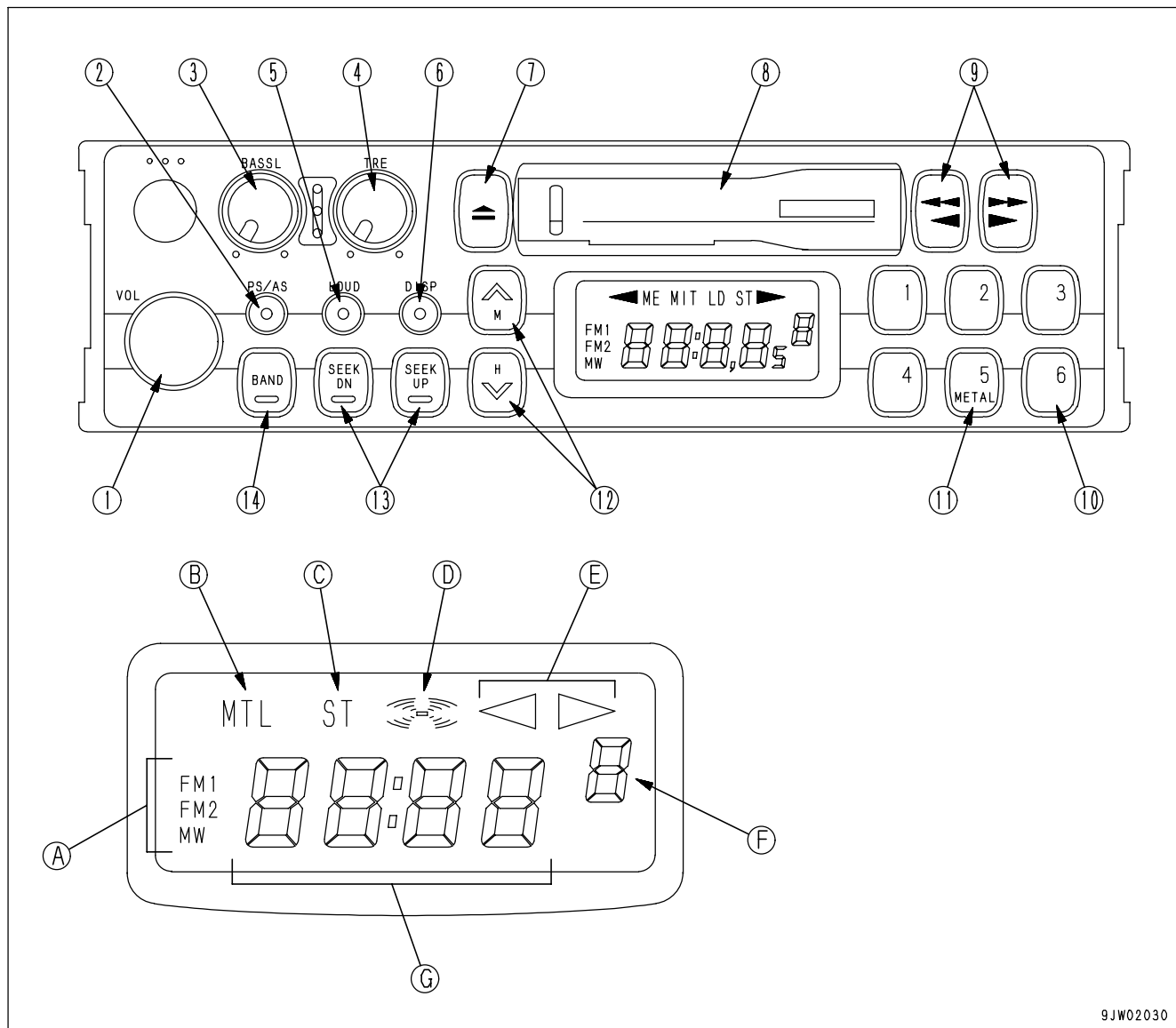
1. Turn the radio power ON. If the display shows the frequency, set the CLOCK button to the time display.
2. To set the time, keep the CLOCK button pressed and
Press the \triangle button to change the minutes
Press the ∇ button to change the hours

**PRECAUTIONS FOR USE**

- Stow the antenna when traveling in places with low overhead clearance.
- To ensure safety, always keep the sound to a level where it is possible to hear outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to an unexpected failure, so be careful not to get water on the equipment.
- Do not wipe the scales or buttons with solvent such as benzene or thinner. Wipe with a dry soft cloth. If the dirt cannot be removed easily, soak the cloth with alcohol.

CAR STEREO

(If equipped)

EXPLANATION OF COMPONENTS

9JW02030

- (1) Power switch/Volume
- (2) Auto-store/Preset scan button
- (3) Bass control knob
- (4) Treble control knob
- (5) Loudness button
- (6) Time/Radio display selector button
- (7) Tape eject button

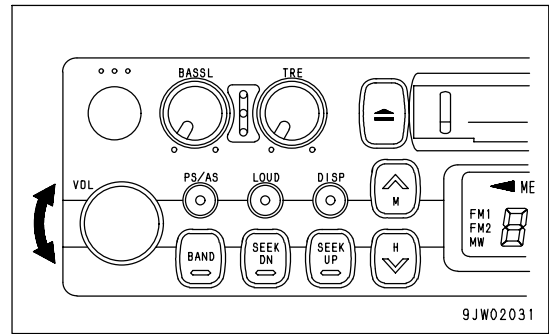
- (8) Cassette door
- (9) Fast forward, rewind buttons
- (10) Preset buttons
- (11) Metal tape button
- (12) Manual tuning buttons
- (13) Seek tuning buttons
- (14) Band selector button

- (A) Band display
- (B) Metal tape display
- (C) FM stereo reception display
- (D) Loudness display

- (E) Tape direction display
- (F) Preset channel display
- (G) Time/Frequency display

POWER SWITCH/VOLUME

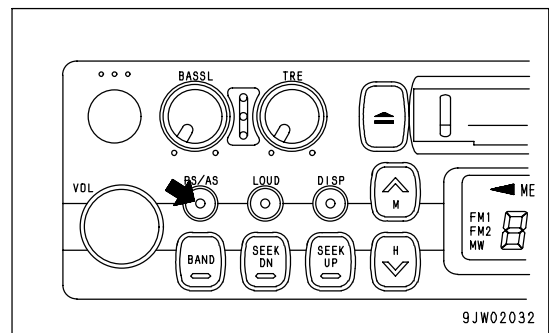
Turn this knob (1) to the right until it clicks to turn the power on.
Turn it further to increase the volume.

**AUTO-STORE/PRESET SCAN BUTTON**

Use this button (2) to actuate the preset scan and auto-store functions.

- Auto-store

Each time this button is pressed for more than 2 seconds while in radio reception, this auto-store function automatically starts to search for the desired station within a receivable band, and memorize the frequency in the preset memory. During this scanning process, the frequency shown in the right side of display continues to change. This indicates that each frequency is memorized in the auto-store.

**REMARK**

The auto-store function cannot be used when the channel display is flashing.
When the display is flashing, the preset scan function is being used.

- Preset scan

If this button is pressed for less than 0.5 second while in radio reception, programs from the six preset stations in the same band will be broadcast one after another for 5 seconds each, starting from No. 1 through No. 6 stations consecutively.

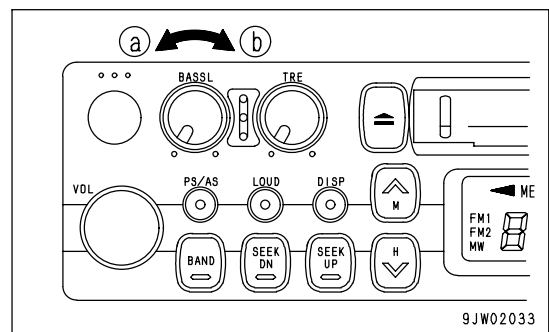
When the desired station is found, press the button again. This stops the preset scan tuning process and switches to ordinary broadcasting. The same process will be repeated continuously until the button is pressed again.

BASS CONTROL KNOB

Turn this button (3) to the left to reduce the low tones; turn it to the right to emphasize the low tones.

Direction (a): Low tone reduced

Direction (b): Low tone emphasized

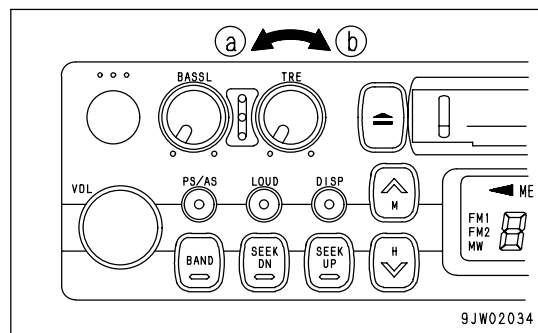


TREBLE CONTROL KNOB

Turn this button (4) to the left to reduce the low tones; turn it to the right to emphasize the high tones.

Direction (a): High tone reduced

Direction (b): High tone emphasized

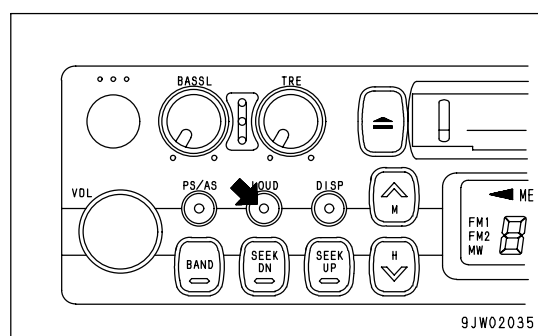


LOUDNESS BUTTON

This button (5) is used when playing at low volume. It makes it possible to hear more easily by emphasizing the low tone when the low tones are weak.

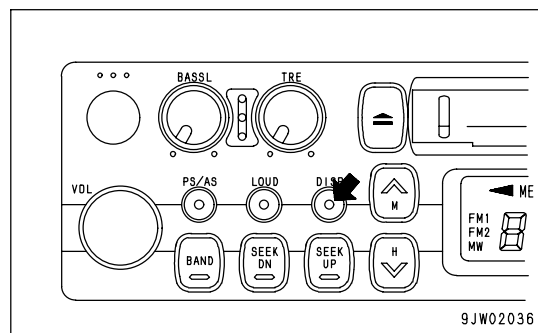
Push button: Actuated (ON)

Push button again: Canceled (OFF)



TIME/RADIO DISPLAY SELECTOR BUTTON

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



• Correcting the time

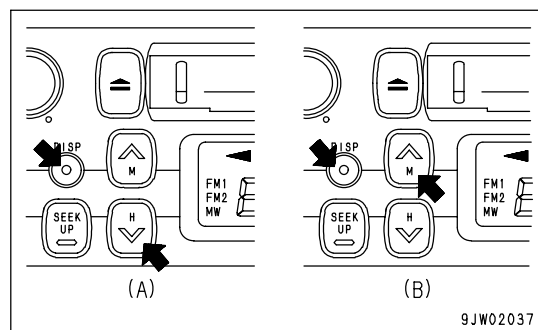
Press the button to set the time display.

(A) Correcting hour:

Keep the DISP button pressed and press the bottom (H) of the TUNING button to correct the hour.

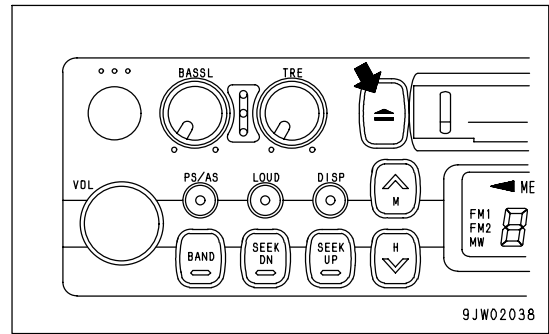
(B) Correcting minute:

Keep the DISP button pressed and press the top (M) of the TUNING button to correct the minute.

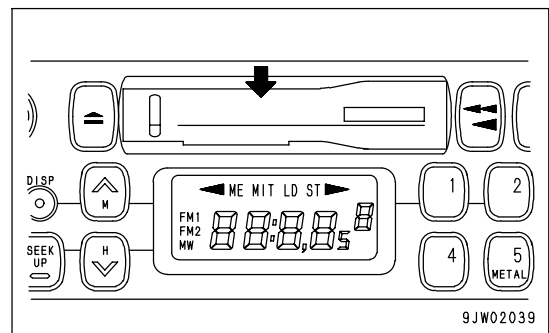


TAPE EJECT BUTTON

This button (7) is used to stop the tape and to eject the cassette. When this button is pressed, the tape is ejected and the radio plays.

**CASSETTE DOOR**

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

**FAST FORWARD, REWIND BUTTONS**

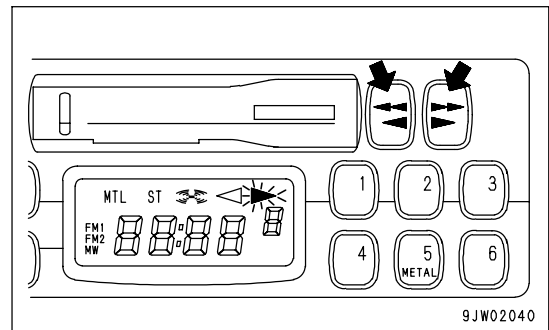
These buttons (9) are used to fast-forward or rewind the tape.

- Fast-forward/rewind

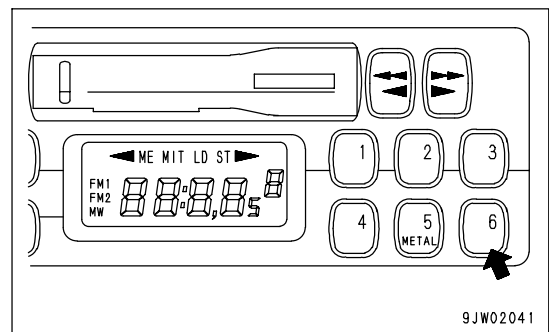
If you press the button pointing in the same direction as the lighted arrow indicating the direction of play, the tape will be fast-forwarded; if you press the button pointing in the opposite direction, the tape will rewind.

To stop the tape, lightly press the button that is not locked. The fast-forward or rewind operation will be canceled.

If the fast-forward and rewind buttons are pressed at the same time, the tape will change sides.

**PRESET BUTTONS**

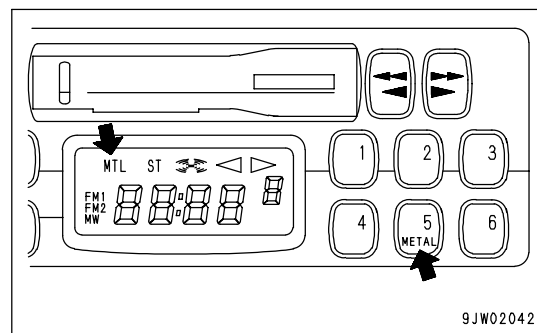
These buttons (10) are used to call up the broadcast station frequencies preset in memory for each of buttons No. 1 to No. 6. It is possible to preset 18 stations (FM: 12; AM: 6) with these buttons.



METAL TAPE BUTTON

(used also for preset button No. 5)

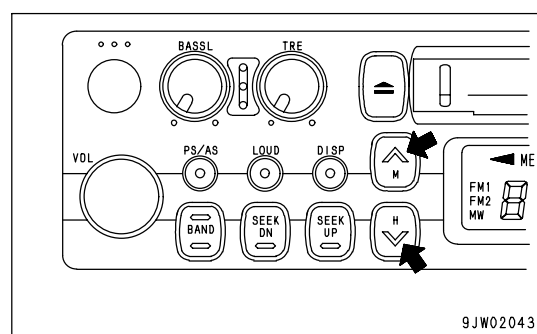
This button (11) is used when playing a metal or chrome tape. This button is also used for preset button No. 5. When it is pressed, "MTL" appears on the display.

**MANUAL TUNING BUTTONS**

These buttons (12) are used for manual tuning.

When "TUN ^" button is pressed, the frequency goes up 9 kHz for AM or 0.1 MHz for FM; when "TUN v" button is pressed, the frequency goes down 9 kHz for AM or 0.1 MHz for FM.

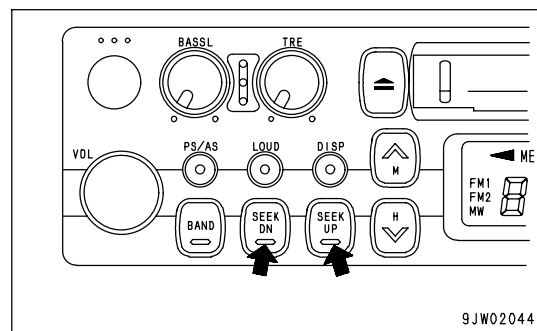
If the button is pressed down and held, the frequency will change continuously.

**SEEK TUNING BUTTONS**

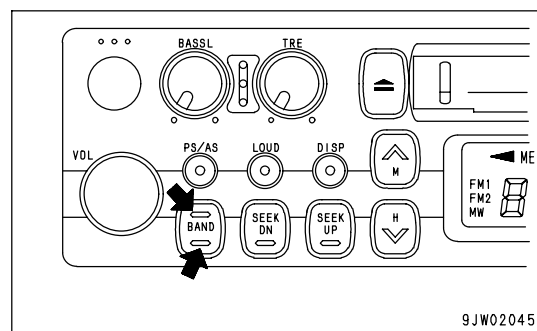
These buttons (13) are used to seek tuning.

When the "SEEK UP" button is pressed, the search automatically goes up; when the "SEEK DN" button is pressed, the search automatically goes down.

When the next station that can be received is found, it automatically stops.

**BAND SELECTOR BUTTON**

When this button (14) is pressed, the band is switched between FM1, FM2, and MW (AM). The band is shown on the display.



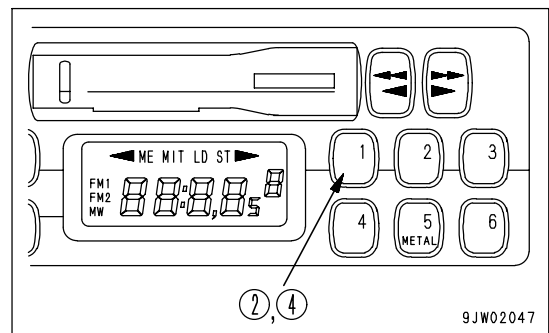
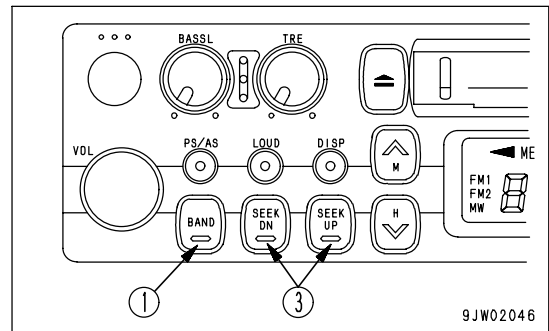
METHOD OF OPERATION

METHOD OF SETTING PRESET BUTTONS

To listen to a preset station, use band selector button (1) to select AM, FM1, or FM2, then press the preset switch number to listen to the desired station.

It is possible to preset six AM stations and 12 FM stations (FM1: 6, FM2: 6).

1. If you are playing a cassette, press the tape eject button to stop the tape.
2. Select the station to be preset.
Use band selector button (1) to select MW (AM), FM1, or FM2, then use the manual tuning button to select the frequency of the broadcasting station.
3. Press manual memory button (2) or seek tuning button (3).
4. Press preset button (4) of the number to be preset for 2 seconds while the frequency display is being shown on the display. (The preset channel and frequency are displayed and the presetting is completed).
5. Repeat Steps 2 to 4 to preset other stations.

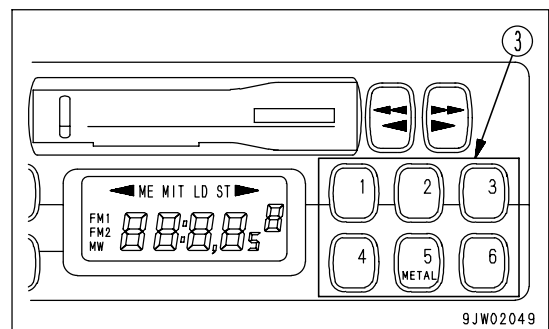
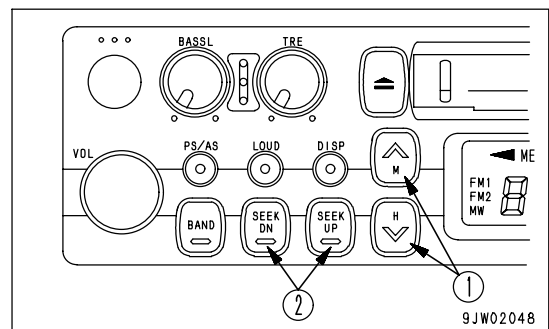


REMARK

- Use Steps 2 to 4 also when changing the setting of a preset switch to another station.
- When the power is disconnected, such as when the battery is replaced, all the settings are deleted, so preset the stations again.

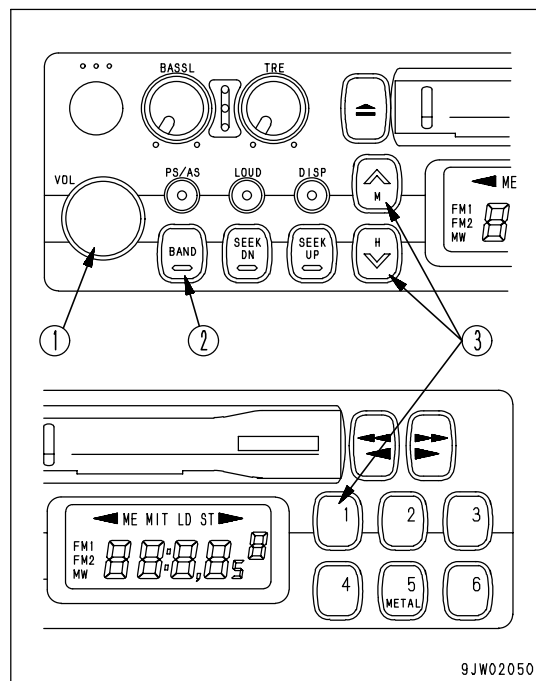
MANUAL MEMORY BUTTON

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



LISTENING TO RADIO

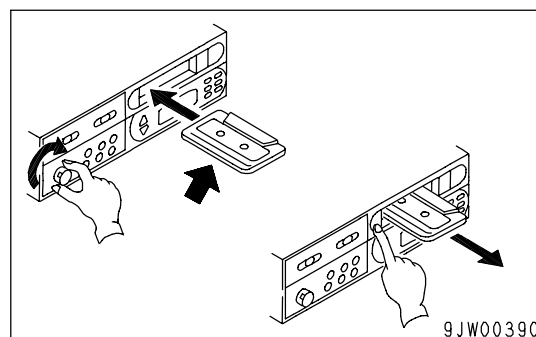
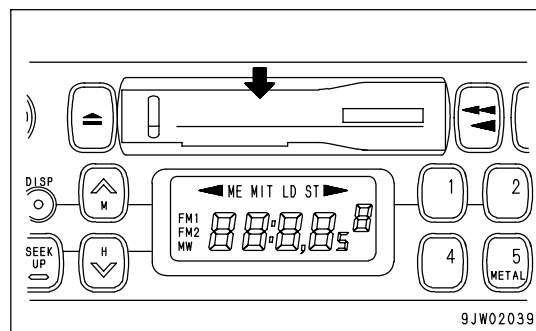
1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set band selector button (2) to AM or FM.
3. Select the station with the preset buttons or manual tuning button (3).
4. Adjust the volume, balance, and tone as desired.
5. When turning the radio OFF, turn power switch (1) to the left until it clicks.

**REMARK**

- To switch to the radio when listening to a cassette, press the cassette eject button to stop the tape.
- If you insert a cassette when listening to the radio, the tape will start to play.

LISTENING TO CASSETTE TAPE

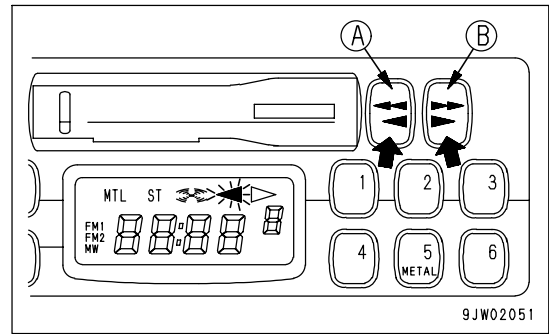
1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set the cassette with the exposed portion of the tape on the right side and push it past the cassette door. The tape will automatically start playing.
If the arrow indicating the direction of play is pointing to the right, the top side is being played; if the arrow is pointing to the left, the bottom side is being played.
When the tape reaches the end, it is automatically reversed and the other side starts to play.
3. When finished with the tape, press the cassette eject button to eject the tape and automatically switch to the radio.



REVERSING TAPE

When listening to the tape, press both FAST FORWARD, REWIND buttons (A) and (B) at the same time lightly.

When this is done, the tape direction display will be reversed.

**PRECAUTIONS FOR USE**

- Stow the antenna when traveling in places with low overhead clearance.
- To ensure safety during operations, keep the volume at a level where it is possible to hear other machines.
- If water gets inside the speaker case or radio (auto tuning), it may cause a serious problem, take care not to let water get in these items.
- Do not wipe the scales or buttons with solvent such as benzene or thinner. Wipe with a dry soft cloth. If the dirt cannot be removed easily, soak the cloth with alcohol.

NOTICE**Handling cassette tape**

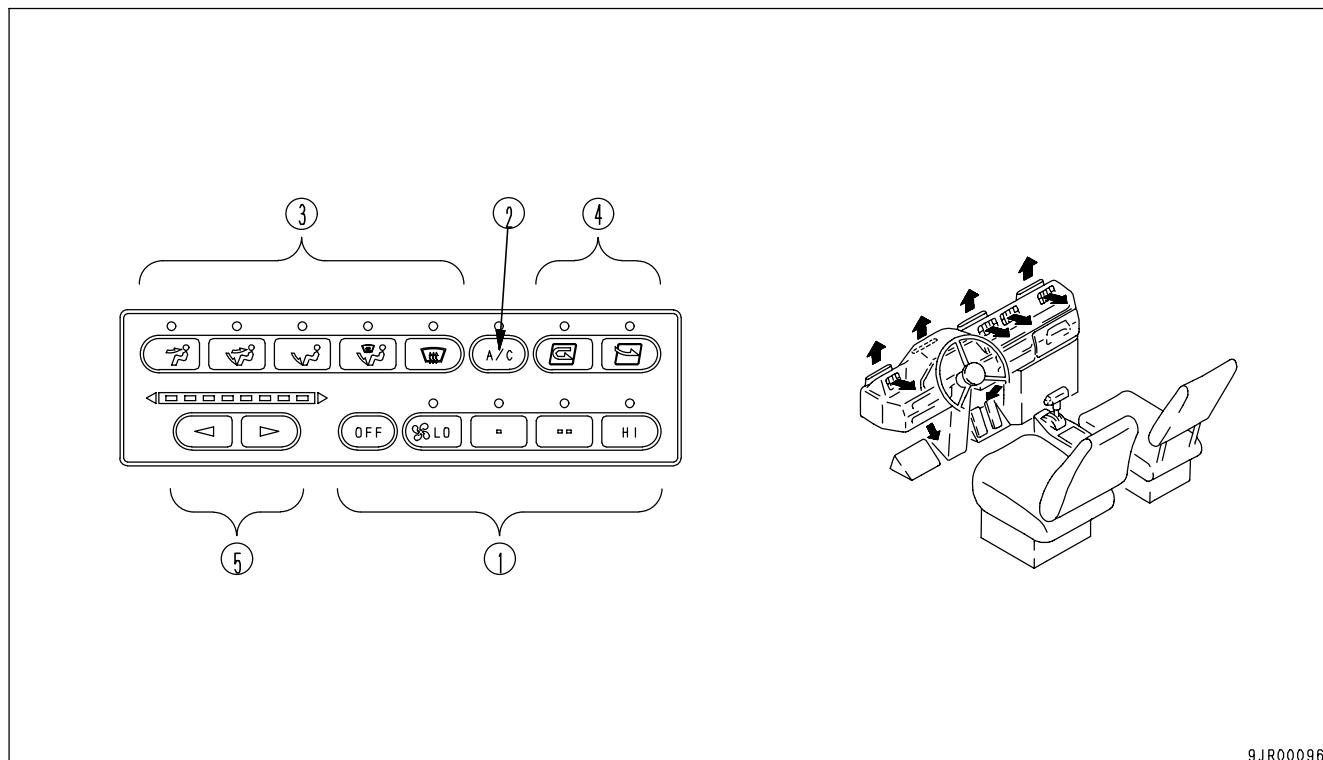
- Clean the tape head approx. once a month with a commercially available head cleaning tape.
- Do not leave the tape any place where it is exposed to direct sunlight, any place that is excessively dusty, or any place where there is a magnetic field.
- Do not use 120-minute tapes. The tape is thin and it easily gets caught up inside the machine.
- If the tape is slack, it easily gets caught up inside the machine. Use a pencil to wind in the tape to remove any slack.
- Do not use any cassette tape if the label has started to come off. It may cause defective rotation, or it may be impossible to get the tape out of the machine.

AIR CONDITIONER

(If equipped)

By taking fresh air into the cab through a filter, it is possible to raise the pressure inside the cab. This makes it possible to provide a pleasant working environment even on dusty jobsites.

GENERAL LOCATIONS ON CONTROL PANEL



9JR00096

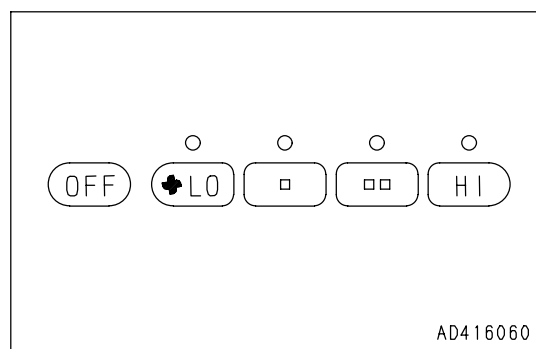
- | | |
|----------------------------|----------------------------------|
| (1) Fan switch | (4) RECIRC/FRESH selector switch |
| (2) Air conditioner switch | (5) Temperature control switch |
| (3) Mode selector switch | |

FAN SWITCH

This switch (1) can be used to adjust the air flow to 4 stages.

This switch also acts as the main switch for the air conditioner.

When the switch is pressed, the indicator lamp above the switch lights up to indicate the air flow.



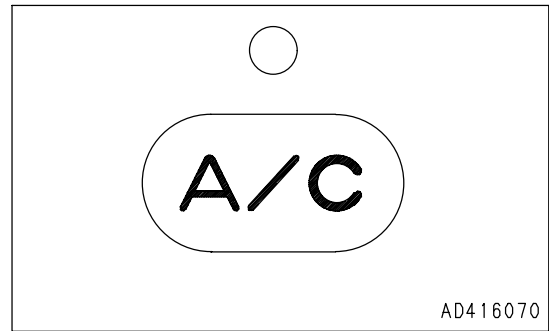
AD416060

AIR CONDITIONER SWITCH

This switch (2) is used to start or stop the cooling or dehumidifying function.

When the fan switch is turned ON and the air conditioner switch is pressed, the indicator lamp above the switch lights up.

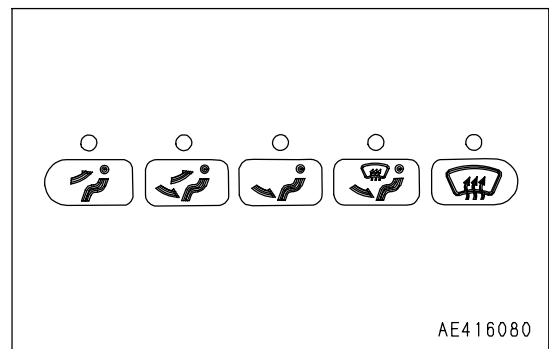
When the switch is pressed again, the switch is turned OFF and the indicator lamp goes out.

**MODE SELECTOR SWITCH**

This switch (3) is used to select the vents.

The following five vent modes are available: FACE, FACE/FOOT, FOOT, FOOT/DEF, DEF.

When the switch is pressed, the indicator lamp above the switch lights up to display the vent mode.

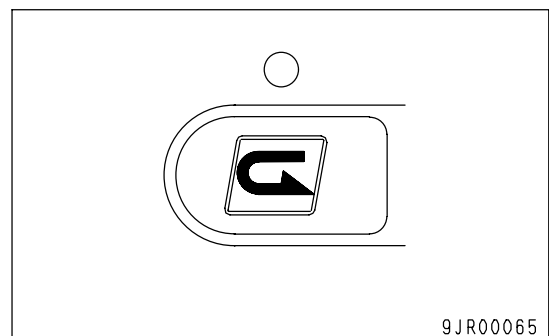
**RECIRC/FRESH SELECTOR SWITCH**

This switch (4) changes between recirculation of the internal air (RECIRC) or intake of external air (FRESH).

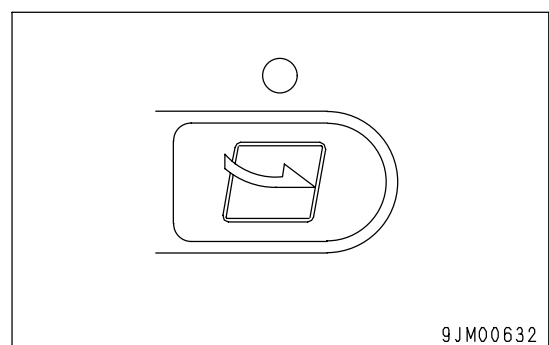
When pressing the switch, the indicator lamp on the top of switch lights up.

RECIRC

This switch (4) is used when wishing to quickly cool or warm the cab or when the air inside the cab is stale.

**FRESH**

This switch (4) is used to cool or warm the cab with the fresh. Also, it is used for fresh air intake or to remove condensation on windows.



TEMPERATURE CONTROL SWITCH

The temperature can be adjusted with this switch (5) steplessly from low temperature to high temperature.

The temperature level indicator lamps light up to display the temperature of the air coming from the vents.

The more the green lamps light up, the lower the temperature is.

The color of the indicator lamp changes while the switch is being pressed.

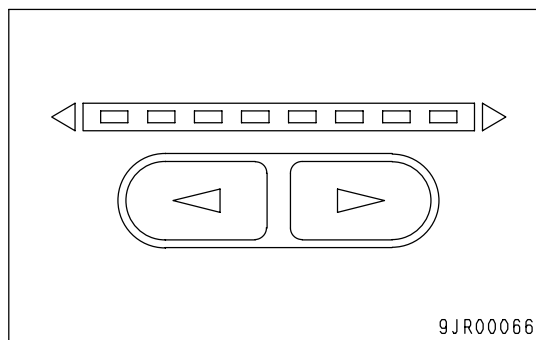
When the temperature reaches the desired level, release the switch to set the temperature.

The settings for each mode are retained in memory even when the starting switch is turned OFF.

However, in the following cases, the settings must be made again.

- When the machine has been out of use for more than 7 days
- When the battery voltage is extremely low
- When there has been abnormal interference from outside
- When the fan switch is turned OFF (the setting is not kept in memory with only the air conditioner switch)

If the air conditioner is used at the FRESH position, the inside of the cab will be pressurized and this will prevent the entry of dust. The higher the position of the fan switch, the more effective the pressurizing becomes.



METHOD OF OPERATION

Switch		Fan switch	Air conditioner switch	Temperature control switch	RECIRC/FRESH selector switch	Mode selector switch
Condition of use						
Cooling	Rapid	HI	ON	All green	RECIRC	FACE
	Normal	HI - LO	ON	More than half are green	FRESH	FACE
Dehumidifying, heating		HI - LO	ON	More than half are red	FRESH	FOOT
Heating	Rapid	HI	OFF	All red	RECIRC	FOOT
	Normal	HI - LO	OFF	More than half are red	FRESH	FOOT
Defroster		HI	ON	More than half are red	FRESH	DEF
Ventilation or pressurizing		HI - LO	OFF	All green	FRESH	FACE

When carrying out the defrosting, if the temperature control switch is set so that all lamps are red, this will improve the performance for defrosting and demisting.

With the FACE vents, it is possible to adjust the direction of the air flow and to turn it on or off.

However, do not set to the FACE mode with the vents closed.

• WHEN NOT USING THE AIR CONDITIONER REGULARLY

To lubricate each part of the compressor, operate cooling, dehumidifying and heating for 3 to 5 minutes once a month at low idle. Also, check the amount of cooling gas twice a year.

REMARK

If the temperature inside the cab is low, the air conditioner may not work. In such cases, use the recirculated air to warm up the inside of the cab, then turn the air conditioner switch on. The air conditioner will be run.

PRECAUTIONS WHEN USING AIR CONDITIONER

Carry out ventilation from time to time when using the cooling.

- If you smoke when using the air conditioner, your eyes may start to itch or burn, therefore ventilate the cab every so often to remove the smoke.
- When using the air conditioner for a long period of time, carry out ventilation process at least once every hour.

Be careful not to cool the cab too much.

When using the air conditioner, it is recommended for health reasons, that it should only feel slightly cooler (5 or 6 °C (9 or 10.8°F) lower than the outside temperature) when you enter the cab.

Therefore, adjust the temperature to a suitable level.

INSPECTION AND MAINTENANCE

Even when not using the air conditioner, run the compressor at low speed for several minutes once a week to prevent the loss of the oil film at various parts of the compressor. (Run the engine at low speed and set the temperature control lever to the central position.)

Clean the air filter and check the refrigerant. For details, see "CLEAN AIR CONDITIONER AIR FILTER (PAGE 4-28)" and "CHECK REFRIGERANT (GAS) LEVEL (PAGE 4-29)".

To enable the air conditioner to perform to the full and to maintain a pleasant working environment, always contact your Komatsu distributor to have the air conditioner refilled with refrigerant and to carry out other checks.

OPERATION

CHECK BEFORE STARTING ENGINE

WALK-AROUND CHECK

Before starting the engine, look around the machine and under the machine to check for loose nuts or bolts, or leakage of oil, fuel, or coolant, and check the condition of the hydraulic system.

Check also for loose wiring, play, and accumulation of dust in places that get very hot and are exposed to extremely high temperatures.



WARNING

- Always hang the warning tag from the shift lever.
- Leakage of oil or fuel, or accumulation of flammable material around the battery or high temperature parts of the engine, such as the engine muffler or turbocharger, may cause fire. Check carefully, and if any problem is found, repair it or contact your Komatsu distributor.

Always carry out the following items before starting the engine each day.

1. Check the dump body, frame, tires, cylinders, linkage, and hoses for cracks or excessive wear or play.
Check the dump body, frame, tires, cylinders, linkage, and hoses for cracks or excessive wear or play, and carry out repairs if any problem is found.
2. Remove dirt from around engine, battery, radiator, and aftercooler.
Check that there is no dirt or dust accumulated around the engine, radiator or aftercooler. Check also that there is no flammable material (dry leaves, twigs, etc.) accumulated around the battery, or engine, muffler, turbocharger, or other high temperature parts of the engine. Remove any dirt or flammable materials that are found.
3. Check for leakage of water or oil around engine
Check that there is no oil leakage from the engine or coolant leakage from the cooling system. If any problem is found, repair it.
4. Check for oil leakage from transmission case, differential case, final drive case, brake oil tank, hydraulic tank, hose, joint
Check that there is no oil leakage. If any problem is found, repair the place where the oil is leaking.
Check for leakage of oil from the undercover. Check the ground for traces of oil leakage.
5. Check for loose air cleaner mounting bolts.
Check for the loose bolts. If loose, tighten them.
6. Check dump body mount rubber
Check for any cracks, embedded foreign objects, or loose bolts.
7. Check for damage to handrail, loose bolts
Repair any damage and tighten any loose bolts.

8. Check for damage to gauges, lamps on the instrument panel and loose bolts.
Check for damage to the panel, gauges and lamps. If any problem is found, replace the parts. Clean off any dirt on the surface. Tighten any loose bolts.

9. Check rear view mirror, under view mirror
Check that the mirrors are not damaged. Replace them if they are damaged. Clean the surface of the mirrors and adjust the angle so that the operator can see the area to the rear and under the machine from the operator's seat.

10. Check for damage to the seat belt and mounting clamps.

Check for damage to seat belt and mounting clamps. If damages are found, replace with the new one.

- Check for any loose bolts of the clamps mounting the equipment to the machine. Tighten any loose bolts.
- When the belt has been used for a long time, if any external damage or fraying of the belt can be seen, or if the clamps are broken or deformed, replace the seat belt.

11. Check cracks and damage of ROPS (if equipped) and check for loose bolts

Check if any bolt is loose or damaged. If it is loose, tighten it (torque: 1520 to 1910 Nm (155 to 195 kgm , 1121.1 to 1410.4 lbft).

If it is broke then replace it with Komatsu genuine bolt.

12. Inspect tires.



WARNING

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

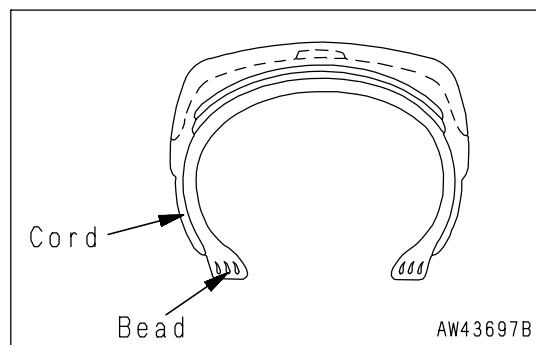
To ensure safety, do not use the following tires.

Wear:

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

Damage:

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



13. Inspect rims.



WARNING

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

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

CHECK BEFORE STARTING

Always perform the procedures in this section before starting the engine each day.

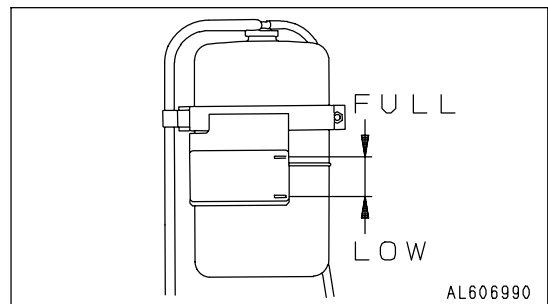
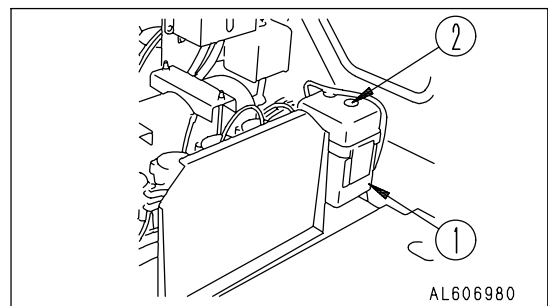
CHECK COOLANT LEVEL, ADD COOLANT



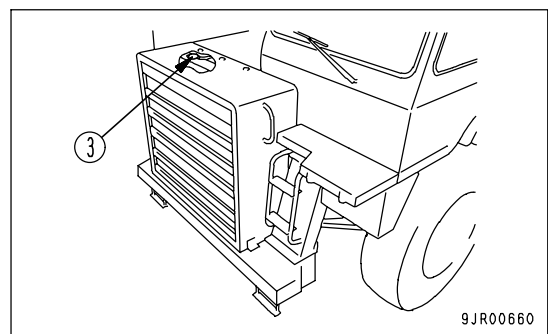
WARNING

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

1. Check that the cooling water in sub tank (1) is between the FULL and LOW marks.
2. If the level is LOW, remove cap (2) and add the engine coolant up to the FULL mark.



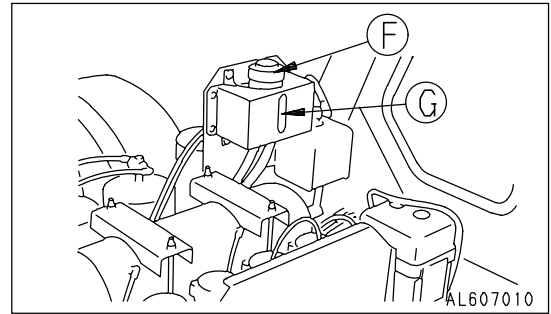
3. If there is no cooling water in the sub tank, remove the cover at the top of the radiator guard, add water to the radiator through water filler (3), then add water to the sub tank.
4. Check that there is no oil in the engine coolant or any other problem.
5. After adding coolant, tighten the cap securely.
6. If more coolant is added than normal, then check for water leakage.



CHECK OIL LEVEL IN FRONT BRAKE OIL TANK, ADD OIL**CAUTION**

When adding oil to the brake oil tank, always use the recommended oil. For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-10)".

1. Check that the oil is between the FULL and LOW marks on sight gauge (G).
If the oil level is low, add oil through oil filler (F).
2. After adding the oil, then tighten the cap securely.
3. If the oil level goes down right after oil has been added, then check for leakage in the oil lines.

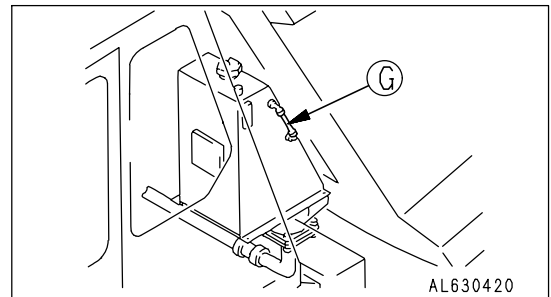
**CHECK OIL LEVEL IN FRONT DRIVE OIL TANK, ADD OIL**

(HD325 only the machine of 4WD specifications)

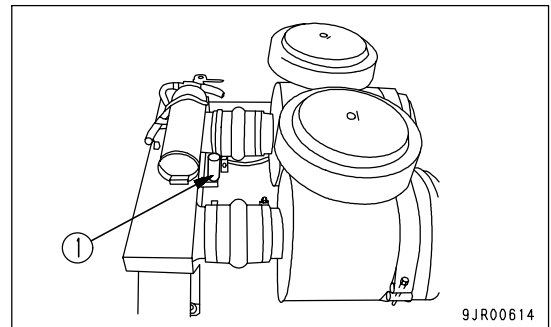
1. Check the oil level with sight gauge (G).
2. If the oil is not between the H and L marks on sight gauge (G), then add oil through the oil filler.

NOTICE

When checking the oil level, park the machine on level ground, lower the body, and check with the engine idling.

**CHECK DUST INDICATOR**

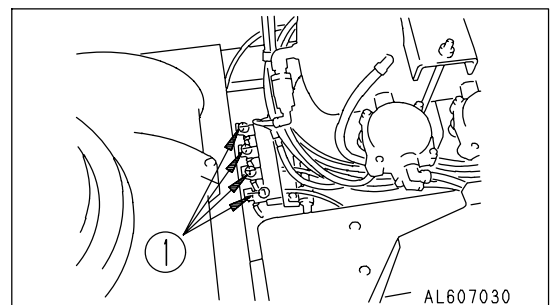
1. Check that the red line in the transparent portion of dust indicator (1) does not indicate 0.0075 MPa (30 INCHES H₂O) (0.076 kg/cm², 1.1 PSI).
2. If the red line indicates 0.0075 MPa (30 INCHES H₂O) (0.076 kg/cm², 1.1 PSI), clean or replace the air cleaner element immediately.
For details of the method of cleaning the element, see "CHECK, CLEAN OR REPLACE AIR CLEANER (PAGE 4-23)".
3. After checking, cleaning, or replacing, press the top of dust indicator (1) to return the red line to its original position.

**DRAIN WATER FROM AIR TANK**

1. After starting the engine, pull ring (1) of the tank drain valve to drain the water from the tank.
2. Carry out the same operation after completing work.

NOTICE

In cold areas, there is danger of the water freezing, so drain the water from the air tank after operations when it is still warm.

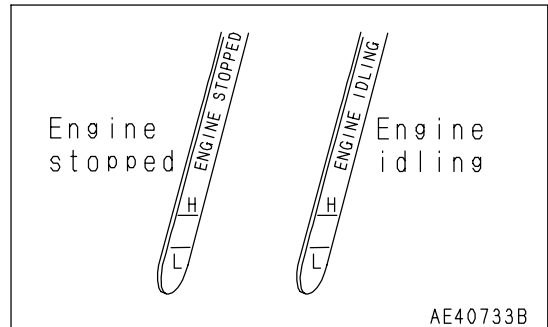
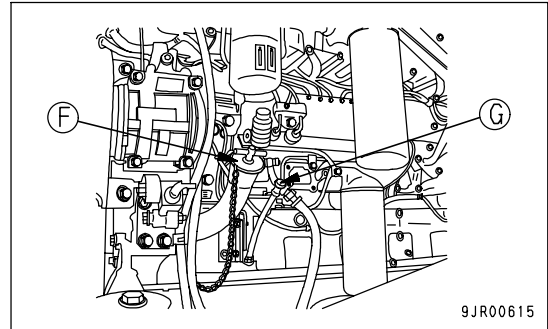


CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

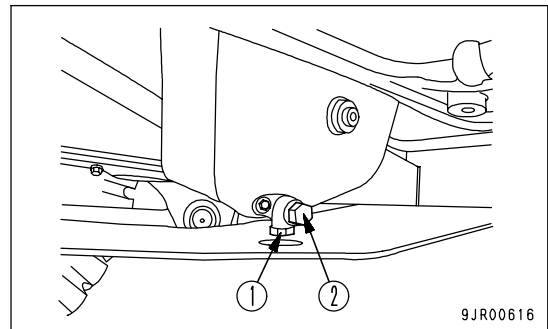
**WARNING**

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

1. Check the oil level with dipstick (G).
2. Take out the dipstick (G) and wipe off the oil with cloth.
3. Fully insert dipstick (G) into filler pipe (F), then remove it.
4. The oil level should be between the H and L marks on the ENGINE STOPPED side of dipstick (G).
If the oil is below the L mark, add oil through oil filler (F).



5. If the oil is above the H mark, remove drain plug (1), and loosen drain valve (2) to drain the excess engine oil, then check the engine oil level again.
6. If the oil level is correct, tighten the handle of the oil filler cap securely.

**REMARK**

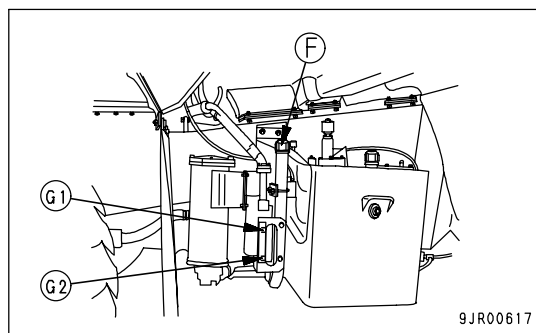
- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine.
- The dipstick has the oil level marked on both sides: ENGINE STOPPED for measuring when the engine is stopped, and ENGINE IDLING for measuring when the engine is idling.
- When checking the oil level, stop the engine and check with the ENGINE STOPPED side of the dipstick. It is also possible to check when the engine is idling, but the following procedure must be used.
 - Check that the engine water temperature is in the green range.
 - Use the ENGINE IDLING side of the dipstick.
 - Remove the oil filler cap.

CHECK OIL LEVEL IN TRANSMISSION CASE, ADD OIL

1. After starting the engine, run the engine at low idle and check the oil level with sight gauge (G2).
2. If the oil level is low, add oil through oil filler (F).

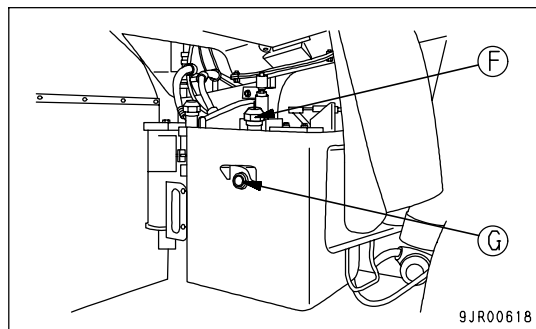
NOTICE

- The oil level changes according to the oil temperature, so carry out the check after completing the warming-up operation.
- During operations, or when the engine is running at idle after operations, the oil level should be above (G2).
- When checking the oil level with the engine stopped, check with sight gauge (G1) as a guide line, and make the final check with (G2).
- When checking the oil level with the engine stopped, wait for 20 minutes after stopping the engine and check with sight gauge (G1).

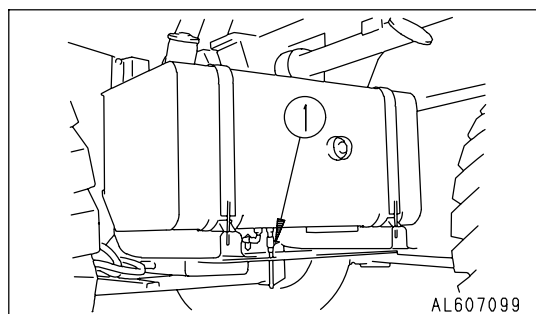
**CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL****WARNING**

If the oil filler cap is removed without releasing the internal pressure, oil will spurt out, so turn the oil filler cap slowly to release the internal pressure, then remove it carefully.

1. Check with sight gauge (G).
2. If the oil level is not up to the window of sight gauge (G), add oil through oil filler (F).

**DRAIN WATER, SEDIMENT FROM FUEL TANK**

Loosen valve (1) at the bottom of the fuel tank, and drain the water and sediment collected at the bottom of the tank together with the fuel.

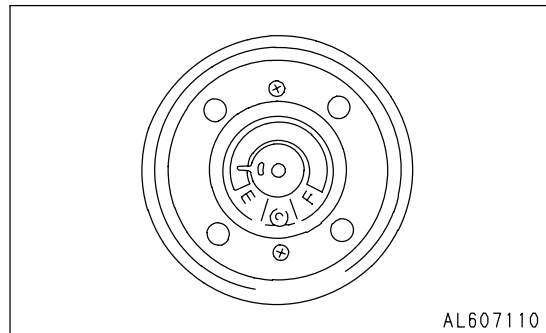
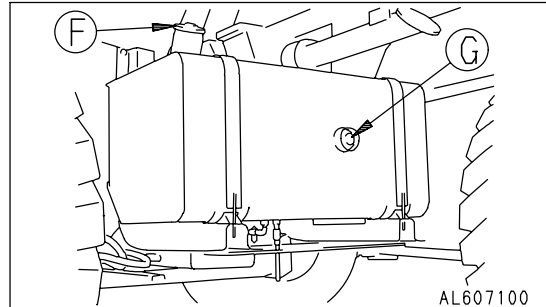


CHECK FUEL LEVEL, ADD FUEL

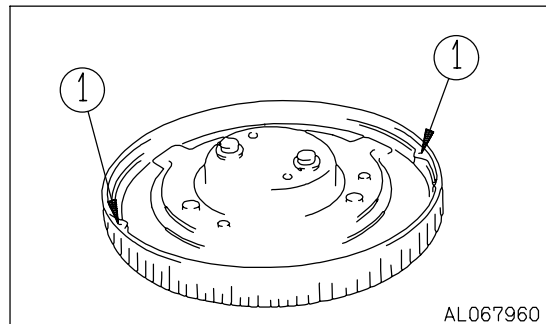
**WARNING**

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

1. Check the fuel level with fuel gauge (G), which is installed in the side of the fuel tank.
2. After completing operations, add fuel through fuel filler (F) to fill the tank.
Fuel tank capacity: 500 liters (132.1 US gal)
3. After adding fuel, tighten the cap securely.

**REMARK**

- If breather hole (1) in the cap becomes clogged, the pressure inside the tank will go down and the fuel may not flow, so clean the breather hole from time to time.
- To prevent the engine from sucking in air, check carefully that the amount of fuel remaining in the tank is not too low.



CHECK WHEEL HUB NUTS, TIGHTEN

Check for loose hub nuts, and if any are loose, tighten 2 or 3 times to the specified torque in the order given in the diagram.

Tightening torque:

$1210 \pm 118 \text{ Nm}$ ($123 \pm 12 \text{ kgm}$, $889.7 \pm 86.8 \text{ lbft}$)

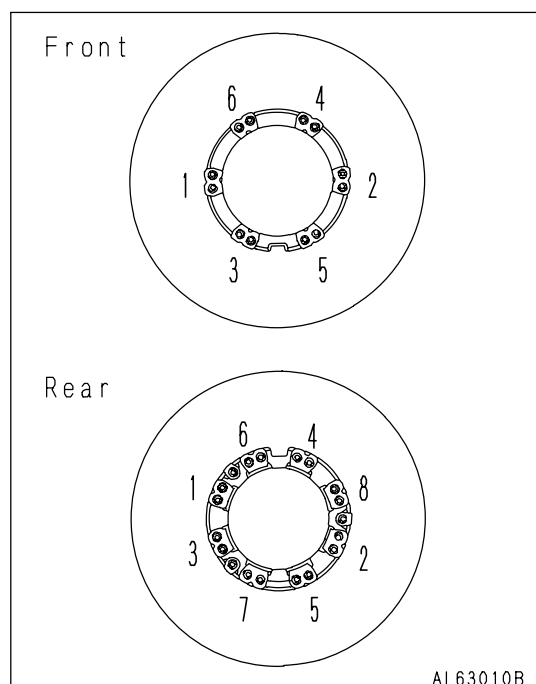
(When thread and nut seat are not coated with grease)

$927 \pm 103 \text{ Nm}$ ($94.5 \pm 10.5 \text{ kgm}$, $683.5 \pm 75.9 \text{ lbft}$)

(When thread and nut seat are coated with molybdenum disulphide grease)

Insert a socket wrench in a pipe, and apply a force of 1210 N (123 kg) at a point 1 m from the fulcrum to give a tightening torque of 1210 Nm (123 kgm).

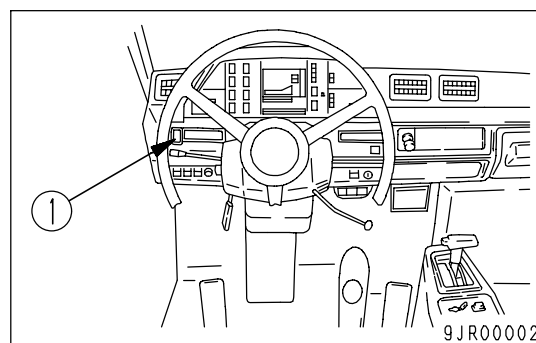
If any stud bolt used to install the rim is broken, replace all the stud bolts for that wheel.

**CHECK CENTRAL WARNING LAMP**

Carry out the following checks to prevent warning failures caused by a broken lamp bulb in central warning lamp (1) or defective operation of the buzzer.

If there is any problem, please ask your Komatsu distributor to carry out inspection.

- Stop the engine, turn the starting switch to the ON position, set the parking brake valve lever to the PARK position, move the shift lever to any position other than N, and check. If the lamp flashes and buzzer sounds, it is normal.
- If the air pressure is below the specified pressure, the lamp should flash and the buzzer should sound when the starting switch is turned ON.

**CHECK BRAKING EFFECT**

Check if the braking capacity of the parking brake, foot brake, and retarder brake.

If any abnormality is found, ask Komatsu distributor to repair.

CHECK MACHINE MONITOR SYSTEM

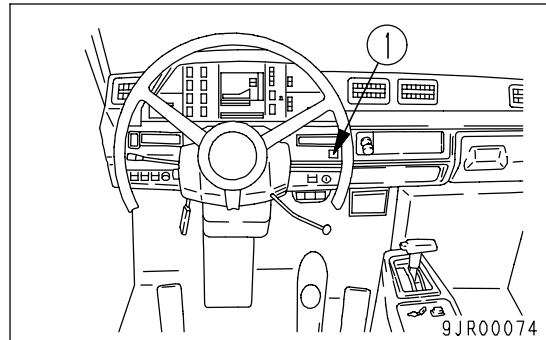
1. Before starting the engine, turn the starting switch to the ON position.
2. Check that all monitor lamps, gauges, and the central warning lamp light up for approx. 3 seconds and that the alarm buzzer sounds for approx. 1 second.

REMARK

- When this is done, the speedometer should display 88.
- When the starting switch is turned to the ON position, the pilot lamp at the transmission shift lever position will flash if the shift lever is not at the N position. When the shift lever is moved to the N position, N is displayed.
- After the engine is stopped, the monitor cannot be checked until at least 30 seconds have passed.

3. When checking the monitor, check for blown bulbs in the the caution lamps and pilot lamps at the same time. Before starting the engine, turn the starting switch to the ON position, press bulb check switch (1), and check that no caution lamp or pilot lamp bulb is blown.

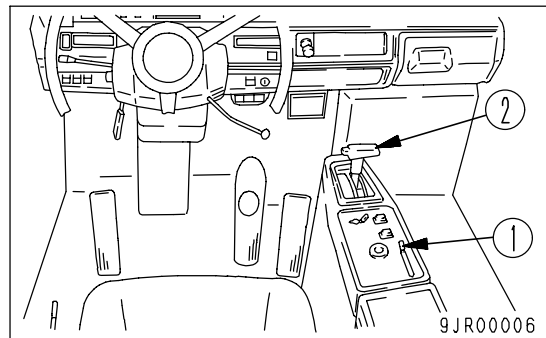
If the monitor lamp, caution lamp, or pilot lamp do not light up, there is probably a failure or disconnection, therefore contact your Komatsu distributor for inspection.

**CHECK BRAKING CAPACITY OF SECONDARY BRAKE****WARNING**

If the machine moves, it will lead to the serious human injury. If the machine starts to move while checking the braking capacity, lower the engine speed and set the shift lever to N position. Then set the parking brake lever to PARKING position.

Check the braking capacity of the secondary brake as follows.

1. Set the air pressure to the maximum, stop the machine on level ground, place the parking brake valve lever at TRAVEL, and move secondary brake lever (1) to the APPLIED position.
2. Set gear shift lever (2) to the D position, gradually raise the engine speed, and check that the machine does not move even when the engine reaches full speed. If the machine does not move, it is normal.
3. Lower the engine speed and set the shift lever to N position. Set parking brake valve lever to PARKING position.

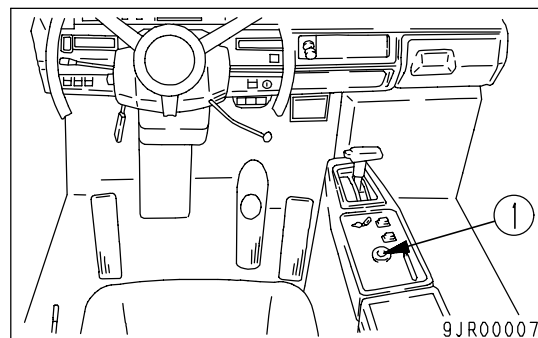


CHECK EMERGENCY STEERING

Check manual emergency steering

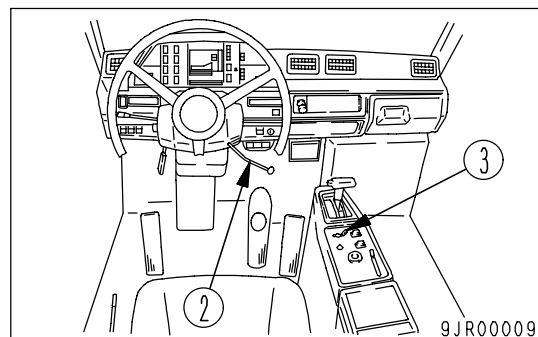
1. Turn the starting switch key to the ON position.
2. Turn emergency steering switch (1) ON, and check that the steering wheel can be operated.

If the steering wheel cannot be operated, contact your Komatsu distributor.



Check auto-emergency steering

1. Turn the starting switch key to the START position and start the engine.
2. Check that the air pressure gauge is in the green range, then pull retarder lever (2) fully and stop the engine.
3. Turn the starting switch key to the ON position.
4. Check that the emergency motor is actuated and the steering can be operated one second after parking brake lever (3) is set to the TRAVEL position.



CHECK BACKUP ALARM

1. Turn the engine starting switch to the ON position.
2. Place the gear shift lever in the R position and check that the backup alarm is working.

CHECK ELECTRIC WIRING



WARNING

- If the fuses frequently blow or if there are traces of short circuits in the electrical wiring, locate the cause and immediately perform repairs, or contact your Komatsu distributor for repairs.
- 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 for damage and wrong capacity of the fuse and any sign of disconnection or short circuit in the electrical wiring. Check also for loose terminals and tighten any loose parts.

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

Always check if there is any accumulation of flammable material around the battery, and remove such flammable material.

Please contact your Komatsu distributor for investigation and correction of any problems found.

CHECK INFLATION PRESSURE OF TIRES

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

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

Check for loose wheel hub nuts (bolts).

The proper inflation pressure is shown below.

- HD325

Tire size	Inflation pressure
18.00-33-28PR (standard)	0.49 MPa (5.00 kg/cm ² , 71.0 PSI)
18.00-33-32PR (if equipped)	0.56 MPa (5.75 kg/cm ² , 81.7 PSI)
18.00R33 ★ ★ (if equipped)	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)

- HD325 4WD specifications

Tire size	Inflation pressure
18.00R33 ★ ★ (standard)	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)
18.00-33-32PR (if equipped)	0.56 MPa (5.75 kg/cm ² , 81.7 PSI)
18.00-33-28PR (if equipped)	0.49 MPa (5.00 kg/cm ² , 71.0 PSI)

- HD405

Tire size	Inflation pressure
18.00R33 ★ ★	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)

NOTICE

If the tires are used when the inflation pressure is less than the value given in the table above, the rim may be damaged.

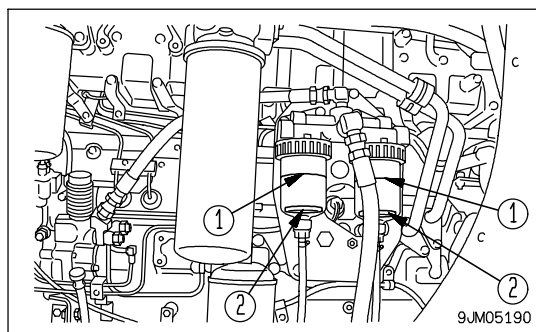
Always keep the tire inflation pressure within +0 to +0.03 MPa (0.3 kg/cm², 4.3 PSI) of the value in the table above.

CHECK WATER SEPARATOR

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

For the draining procedure, see section "DRAIN WATER FROM WATER SEPARATOR (PAGE 4-39)".

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



ADJUSTMENT BEFORE OPERATION

ADJUSTING OPERATOR'S SEAT



WARNING

- Park the machine in a safe place and stop the engine when carrying out adjustment of the operator's seat.
- Adjust the seat before starting operations or when changing operators.
- Adjust the position of the operator's seat so that you can depress the brake pedal fully with your back against the seat backrest.

(A) Fore-and-aft adjustment

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

Adjustment range: 140 mm (5.5 in) (7 stages)

(B) Adjusting seat angle

Pull lever (2) up, set the seat angle to the desired position, then release the lever.

Adjustment range: Seat surface approx. 2.7° up and down

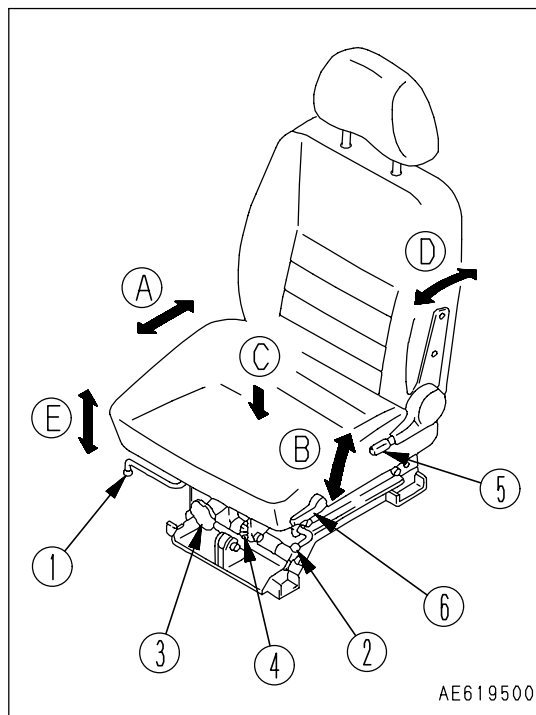
(C) Setting seat for operator's weight

Turn grip (3) under the seat to adjust weight adjustment scale (4) to your own weight.

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

REMARK

To make the seat softer, adjust the weight to make it lighter; to make the seat harder, adjust the weight to make it heavier. When traveling on rough road surfaces, make the seat harder before starting operations.



(D) Adjusting backrest angle

Pull lever (5), set the backrest to the desired position, then release the lever.

Adjustment range: 28 stages (56°)

(E) Seat height adjustment

Move lever (6), set the seat to the desired position, then release the lever.

Adjustment range: 50 mm (2.0 in)

ADJUST SEAT BELT

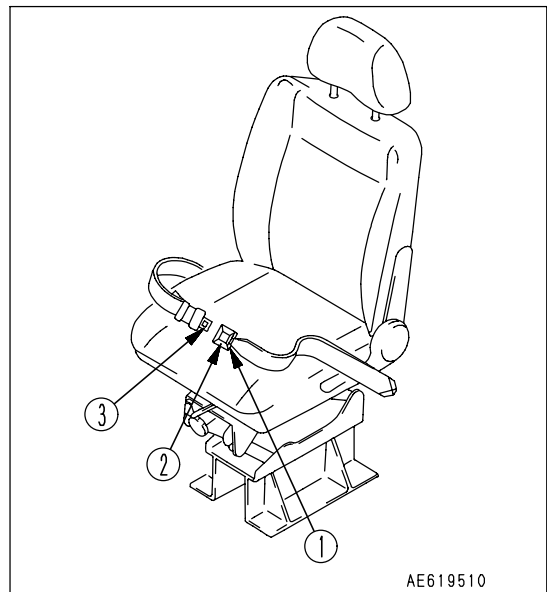
**WARNING**

- Before fastening the seat belt, check that there is no problem in the securing brackets or belt. If there is any wear or damage, replace.
- Even if there appears to be no problem in the seat belt, replace the seat belt once every 3 years. The date of manufacture is woven on the reverse side of the belt.
- Adjust and fasten the seatbelt before starting to travel.
- Always use the seatbelt when traveling.
- Do not use the seat belt with either half of the belt twisted.

Fastening and removing belt

1. Sit on the seat, depress the brake pedal fully, and adjust the seat so that your back is pressed against the backrest.
2. Sit on the seat, take buckle (1) and tongue (3) in your left and right hands, insert tongue (3) into buckle (1), and pull the belt to check that it is securely locked.
3. When removing the belt, press button (2) of buckle (1) to release the belt.

Fasten the 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 front, mid-point of your body.

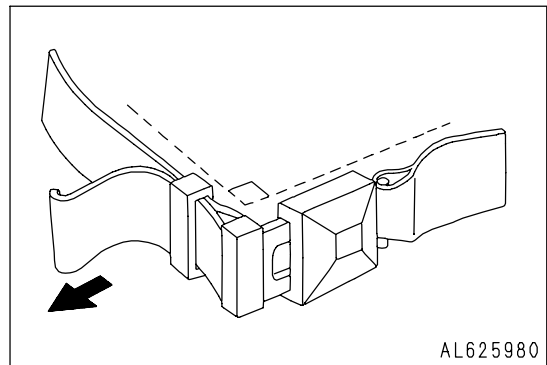


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Adjust belt length

To make belt shorter:

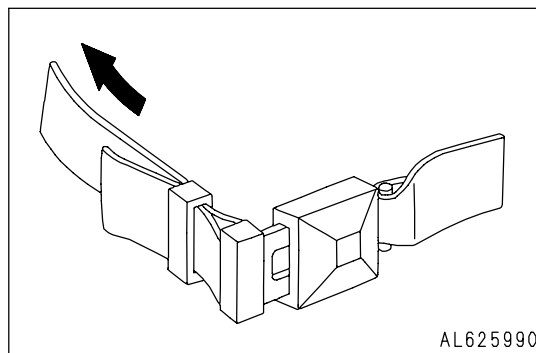
Pull the free end of the belt at the buckle end or tongue end.



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To make belt longer:

Set the belt holding the buckle or tongue end at right angles to the buckle or tongue, and pull.



ADJUST STEERING WHEEL TILT



WARNING

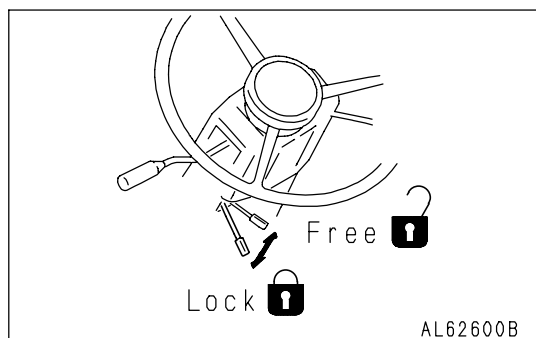
Always stop the machine before adjusting the tilt of the steering wheel.

The tilt of the steering wheel can be adjusted to the front and rear, and up and down. Pull lever up and set the steering wheel to the desired position, then push lever down to lock the steering wheel securely in position.

Adjustment range: Front-rear: 5 degrees

Up: 30 mm (1.2 in)

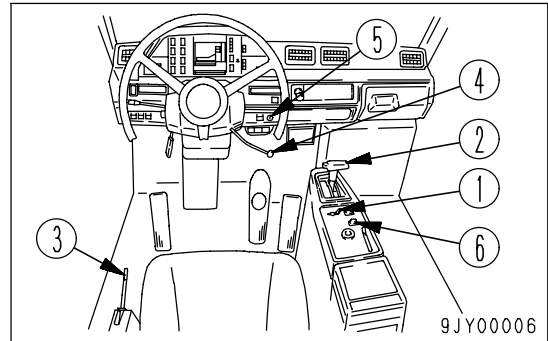
Down: 20 mm (0.8 in)



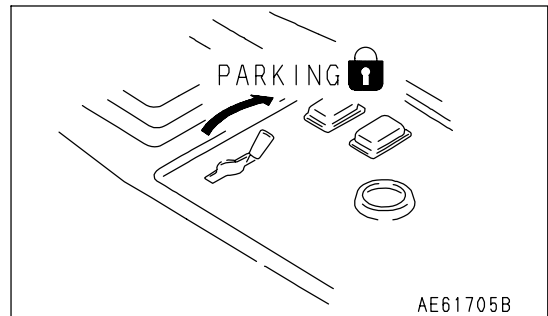
OPERATIONS, CHECKS BEFORE STARTING

**WARNING**

- When starting the engine, check that the gear shift lever is set in the N (neutral) position and that the parking brake valve lever is at PARKING position.
- Before standing up from the operator's seat, place the gear shift lever at neutral, and set the parking brake valve lever to the PARKING position.



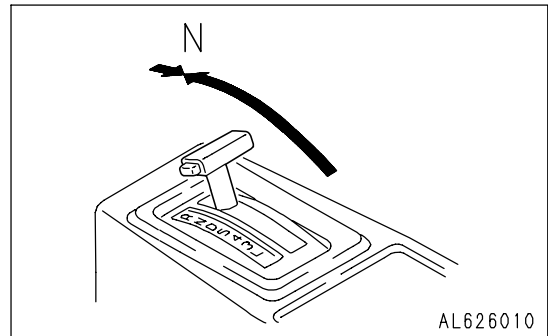
1. Check that parking brake valve lever (1) is at the PARKING position.



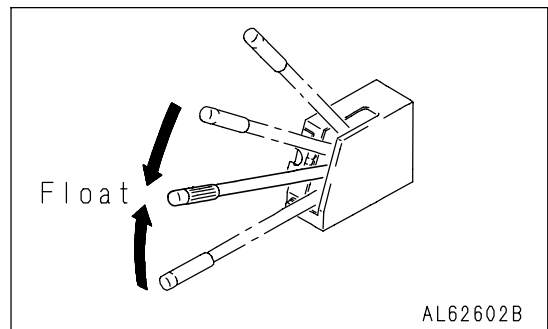
2. Check that gear shift lever (2) is at the N position.

REMARK

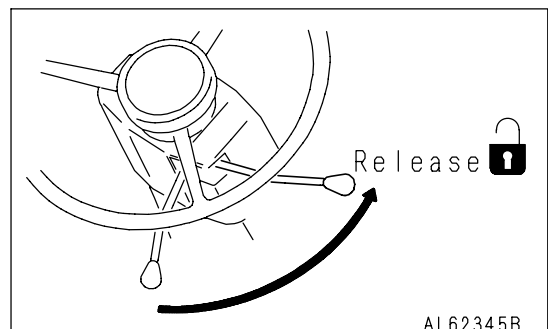
If the shift lever is not at the N (neutral) position, the engine will not start. If the starting switch is turned to the ON position when the shift lever is not at N (neutral), the transmission shift lever position pilot lamp and the central warning lamp will flash and the alarm buzzer will sound.



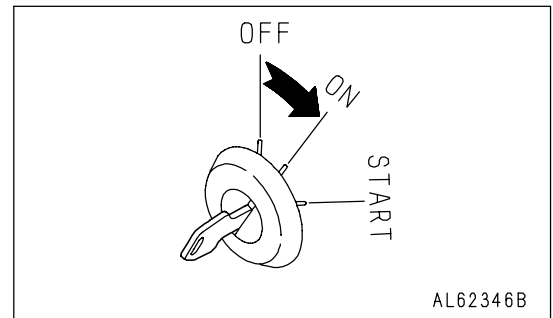
3. Check that dump lever (3) is at the FLOAT position.



4. Check that retarder control lever (4) is at the RELEASED position.

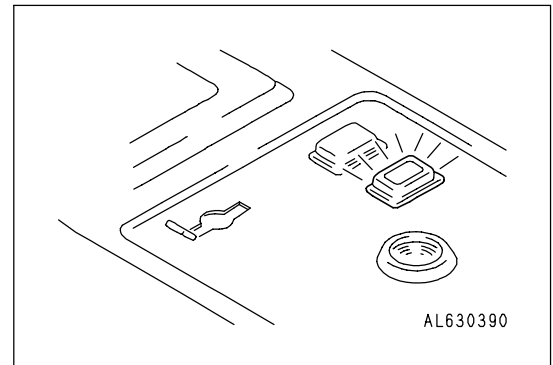


5. Check that there is no abnormality on the machine monitor or maintenance caution lamp (if equipped) when the key in starting switch (5) is turned to the ON position.



(HD325 only the machine of 4WD specifications)

6. Check that 4-wheel drive switch (6) does not flash when the key in starting switch (5) is turned to the ON position. If it flashes, then contact your Komatsu distributor.



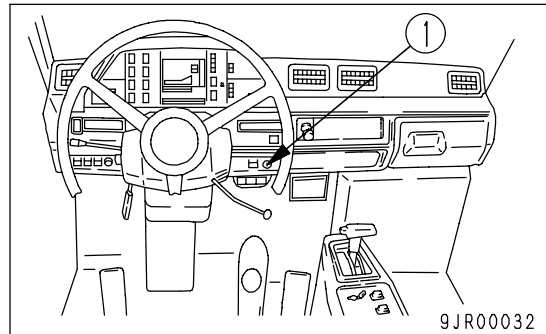
STARTING ENGINE

NORMAL STARTING



WARNING

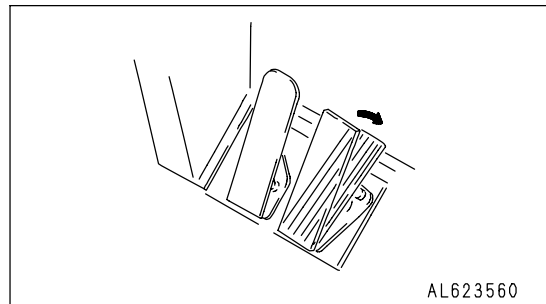
- Sit down in the operator's seat before starting the engine.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause serious bodily injury or fire.
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start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



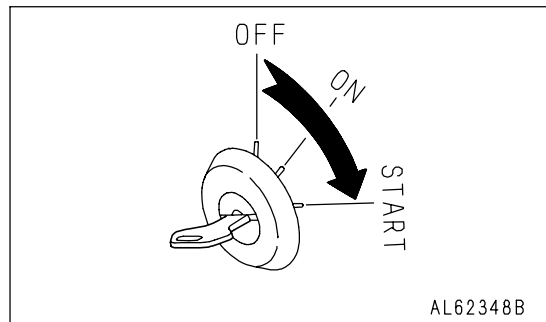
NOTICE

- Do not accelerate the engine suddenly before completing the warming-up operation.
- Do not keep the starting motor rotating continuously for more than 20 seconds.
- If the engine does not start, wait for at least 2 minutes before trying to start the engine again.

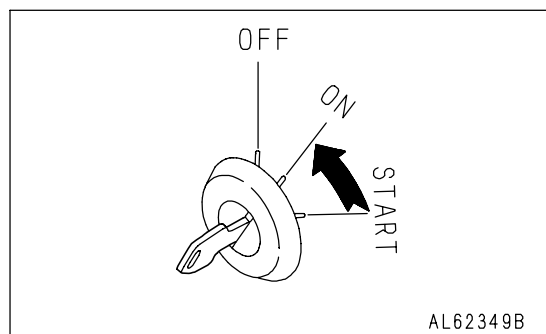
1. Release the accelerator pedal or depress it lightly.



2. Turn the key of starting switch (1) to the START position to start the engine.



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



4. Immediately after starting the engine, run it at idling. Do not put your foot on the accelerator pedal during this time.

Guideline for idling time

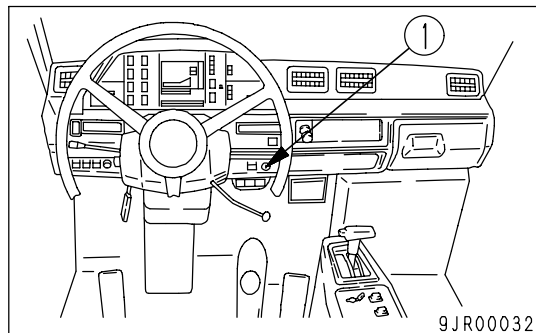
- Normal temperature: 10 seconds
- When first starting engine after changing engine oil or replacing engine oil filter: 20 seconds

STARTING IN COLD WEATHER



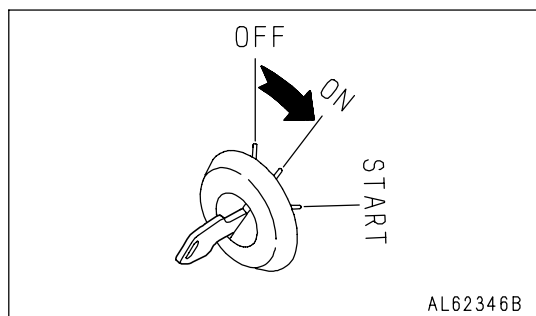
WARNING

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



NOTICE

- Do not accelerate the engine suddenly before completing the warming-up operation.
- Do not keep the starting motor rotating continuously for more than 20 seconds.
- If the engine does not start, wait for at least 2 minutes before trying to start the engine again.
- If the accelerator pedal is kept depressed after starting the engine, the engine speed will suddenly rise after the turbo protect time, this may damage the turbocharger.



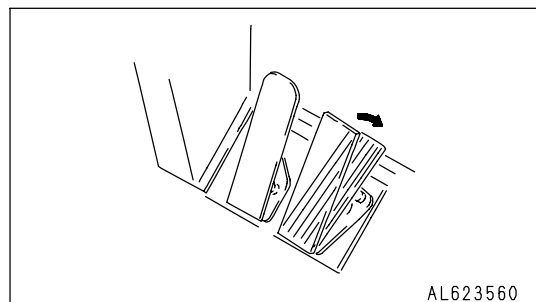
1. Turn the key of starting switch (1) to the ON position.
2. The pre-heating will start automatically according to the engine water temperature and the pre-heating pilot lamp will light up.

The pre-heating times are as shown below.

Ambient temperature	Preheating time
above 5°C (41°F)	—
0°C to 5°C (32°F to 41°F)	20 to 30 sec
below 0°C (32°F)	30 sec

3. When the pre-heating is completed, the pre-heating pilot lamp will go out.

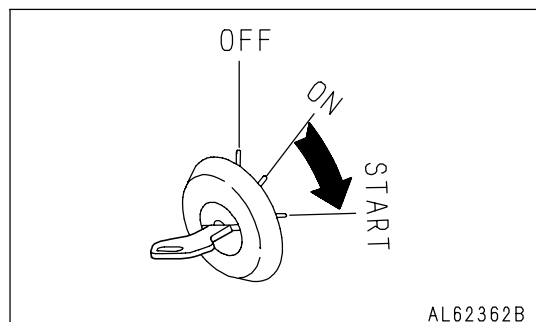
4. Release the accelerator pedal or depress it lightly.



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

REMARK

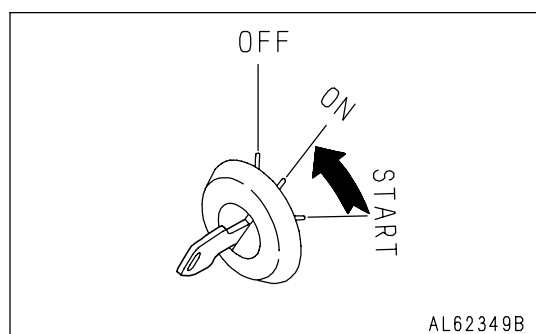
When starting the engine, the monitor may flash while the starting motor is turning, but if the monitor lamp goes out after the engine is started, there is no problem.



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

REMARK

If the engine does not start, turn the key in starting switch (1) to the OFF position, then turn it back to the ON position. The pre-heating will automatically start again according to the engine water temperature.



7. Immediately after starting the engine, run it at idling. Do not put your foot on the accelerator pedal during this time.

Guideline for idling time

- Cold temperature: 15 seconds or more
- When first starting engine after changing engine oil and replacing engine oil filter: 20 seconds

REMARK

- Immediately after the engine is started, the turbo protect function is actuated. Even if the accelerator pedal is depressed, the engine speed will not rise above 1,000 rpm.

Cooling water temperature	Turbo protect time
above 10°C (50°F)	0 sec
-10°C to 10°C (14°F to 50°F)	0 to 5 sec
below -10°C (14°F)	5 sec

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

- To improve the ease of starting in cold weather, the low idling speed becomes slightly higher for the time given below and the engine sound is different. In addition, it functions to make the acceleration gradual during this time.

Engine water temperature	Injection characteristics change time
Above 20°C (68°F)	0 sec
0°C to 20°C (32°F to 68°F)	0 to 6 sec
-20°C to 0°C (-4°F to 32°F)	6 to 12 sec
-30°C to -20°C (-22°F to -4°F)	12 to 15 sec

OPERATIONS, CHECKS AFTER STARTING ENGINE

BREAKING-IN THE MACHINE



CAUTION

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

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

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

- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Immediately after starting the engine, avoid sudden starts, sudden acceleration, unnecessary sudden stops, and sudden changes in direction.

WARMING-UP OPERATION

NOTICE

Do not accelerate the engine suddenly until the warming-up operation has been completed.

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

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

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

1. Immediately after starting the engine, do not operate the accelerator pedal or dump body for the time given below. Even after this time has passed, avoid sudden acceleration of the engine for 5 minutes.
 - Normal temperature: 10 seconds
 - Cold temperature: 15 seconds or more
 - When first starting engine after changing engine oil or replacing engine oil filter: 20 seconds
2. After the warming-up operation, check that the machine monitor is normal.

If there is any problem, carry out maintenance or repair.

Operate under a light load until the engine water temperature gauge and air pressure gauge enter the green range.

When the AISS LOW switch is at the AUTO position and the engine water temperature is still low, high idle revolution is automatically maintained.
3. Check if there is no abnormality in the steering operation, flashing of lights, sound of horn, exhaust gas color, noise, or vibration. If any abnormality is found, repair it.

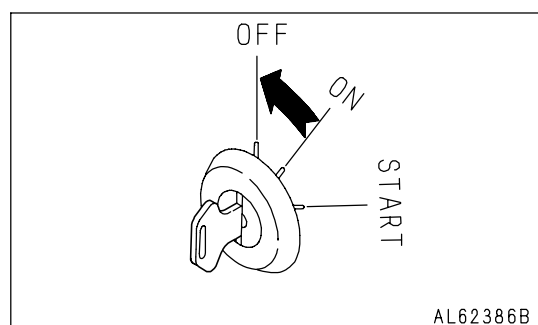
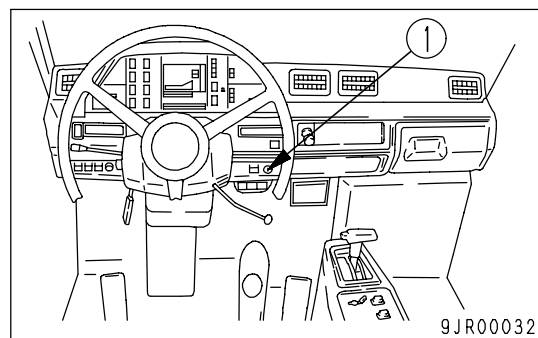
STOPPING ENGINE

NOTICE

If the engine is suddenly stopped without allowing it to cool down, there is danger that the life of the engine parts will be shortened, so never stop the engine suddenly except in emergency.

Allow the engine to cool down gradually before stopping it.

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



CHECKS AFTER STOPPING ENGINE

1. Walk around the machine and check the work equipment, bodywork, and undercarriage, and check also for oil and water leakage.
2. Fill the fuel tank.
3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.
4. Remove any mud affixed to the undercarriage.

MOVING MACHINE OFF (FORWARD, REVERSE), STOPPING

MOVING MACHINE FORWARD



WARNING

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

1. Switch 4-wheel drive switch (1) (HD325 only the machine of 4WD specifications).

Lights-off position: 2-wheel drive (rear wheel drive)

Lights-on position: 4-wheel drive (all wheel drive)

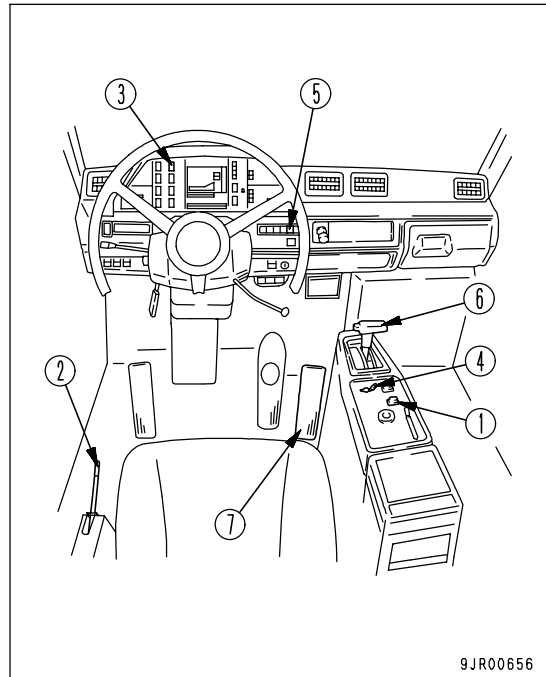
NOTICE

Switch 4-wheel drive ↔ 2-wheel drive only when the travel speed is less than 10 km/h (6.2 MPH). Shifting at a higher speed will cause failure.

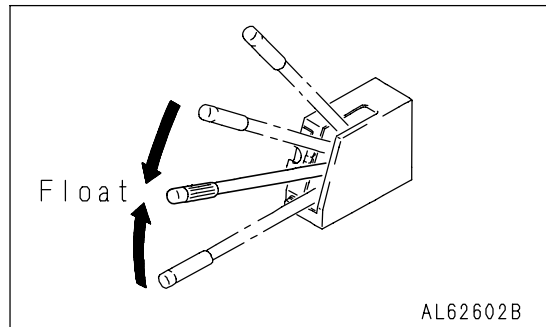
REMARK

When the engine speed is 1080 rpm or above, the front wheel starts to drive.

2. Check that there is no warning display on the machine monitor.
3. Check that your seat belt is fastened and that dump lever (2) is at the FLOAT position.

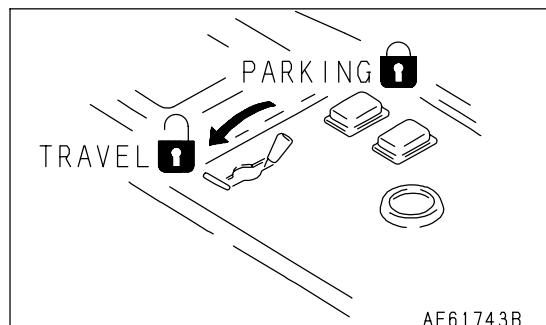


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4. Depress the brake pedal fully. Check that air pressure gauge (3) is in the green range, then set parking brake lever (4) to the TRAVEL position to release the parking brake.

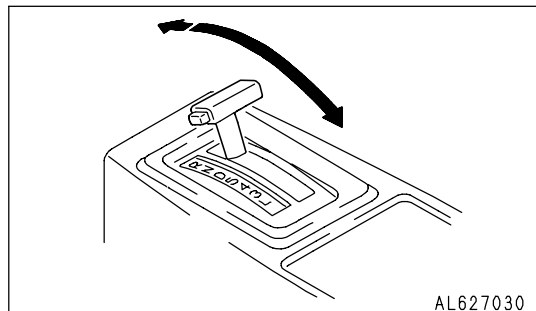


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5. Check that retarder pilot lamp (5) has gone out, then set shift lever (6) to the desired position.

NOTICE

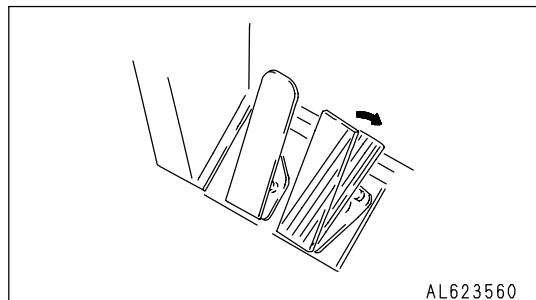
- When operating the shift lever, be sure to set it in position securely. If the lever is not placed in position properly, the shift position display on the panel may go out and the transmission warning monitor lamp may light up.
- Always release the accelerator pedal before shifting from N to R or F.



6. Depress accelerator pedal (7) to move the machine off.

NOTICE

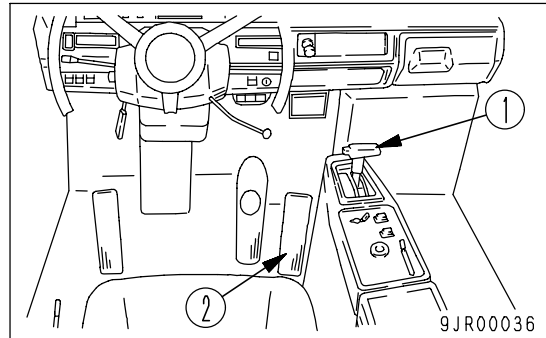
- If the gearshift lever is shifted to a position other than N when the parking brake has not been released, the central warning lamp will flash and the alarm buzzer will sound.
- If the gearshift lever is shifted to a position other than N when the dump lever is at a position other than FLOAT or the body is raised, the central warning lamp will flash and the alarm buzzer will sound.
- Do not operate the gearshift lever with the accelerator pedal depressed. This will cause a big shock and will also reduce the service life of the machine.



MOVING MACHINE IN REVERSE

**WARNING**

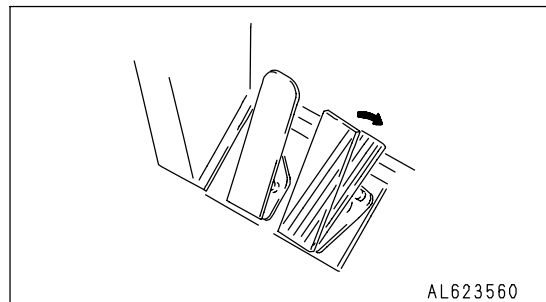
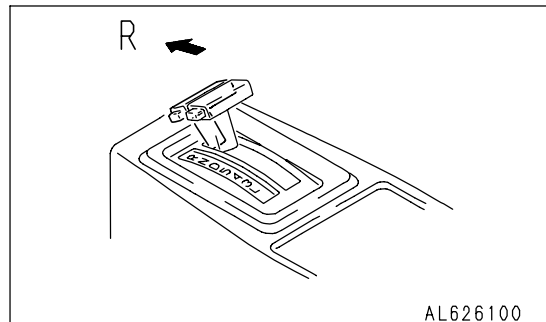
- When switching between FORWARD and REVERSE, check that the new direction of travel is safe.
There is a blind spot behind the machine, so use extreme caution when reversing the machine.
- Always stop the machine completely before shifting between FORWARD and REVERSE.



Place gear shift lever (1) in the R position, then gradually depress accelerator pedal (2) to move the machine off.

NOTICE

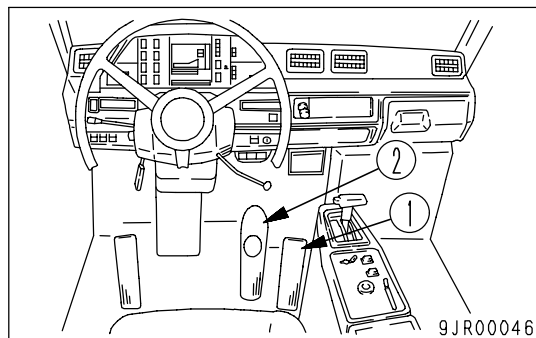
- The machine cannot travel in reverse if the dump lever is not at the FLOAT position. Place the dump lever at the FLOAT position before operating to the R position.
- When shifting between FORWARD and REVERSE, stop the machine completely, and run the engine at low idle when shifting the lever.
After moving the gear shift lever, do not depress the accelerator until you detect that the transmission clutch has engaged.
- Do not operate the gear shift lever with the accelerator pedal depressed.
This will cause a big shock, and will also reduce the life of the machine.



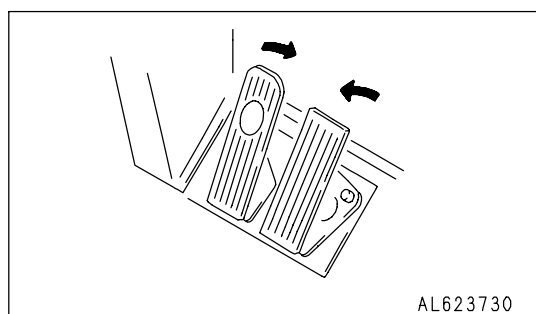
STOPPING MACHINE

**WARNING**

- Avoid stopping suddenly. Give yourself ample room when stopping.
- If the foot brake is used repeatedly or is kept depressed for a long time, the brake may overheat and its life will be shortened.
- If the parking brake is used to stop the machine, the brake will be damaged. Do not use the parking brake except when stopping in emergencies or when parking the machine after stopping it.

**NORMAL STOPPING**

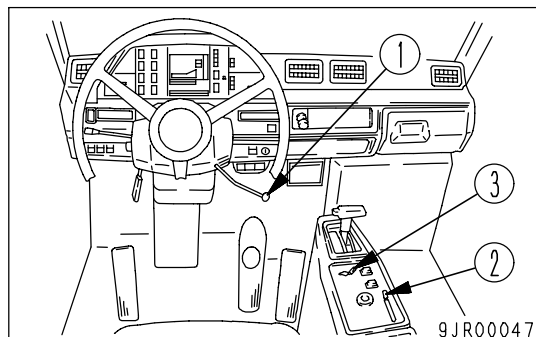
Release accelerator pedal (1), and depress brake pedal (2) to stop the machine.

**STOPPING IN EMERGENCY**

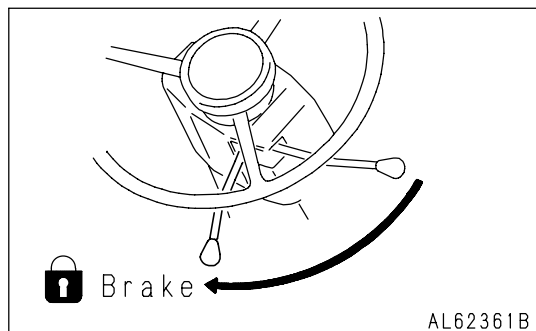
If there should be a failure in the foot brake, stop the machine as follows.

**WARNING**

- When the machine stops, put blocks under the tires immediately.
- Immediately after making an emergency stop, the parking brake disc will be at high temperature, so wait for it to cool before carrying out repair or adjustment. Ask Komatsu distributor for repair and adjustment.

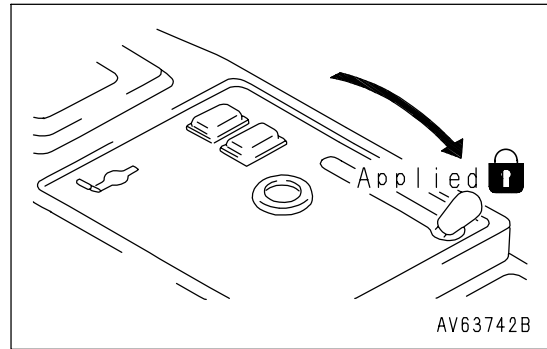


1. Pull retarder control lever (1) fully to apply the retarder.



2. If operating the retarder control lever dose not give enough braking force, set secondary brake lever (2) to the actuation position to apply the secondary brake.

When secondary brake lever (2) is placed at the actuation position, the parking brake is automatically applied.

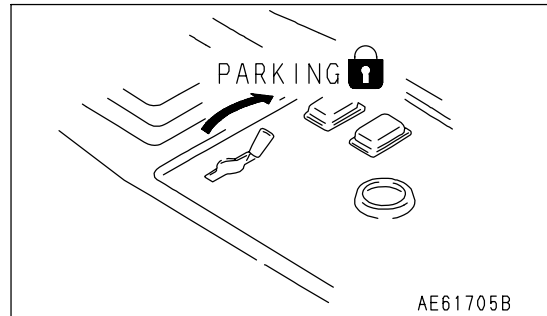


3. Set parking brake valve lever (3) to the right (to the PARKING) position.

4. If an emergency stop has been made, put blocks under the tires immediately, then try to find the cause, and repair it on site.

5. After the emergency operation of parking brake and secondary brake, see "RELEASE METHOD WHEN PARKING BRAKE AND SECONDARY BRAKE HAVE BEEN ACTUATED IN EMERGENCY (PAGE 3-119)" in case that it is necessary to release the brake.

6. If emergency stop has been made, it is necessary to re-adjust the parking brake. Ask Komatsu distributor for adjustment.



SHIFTING GEAR

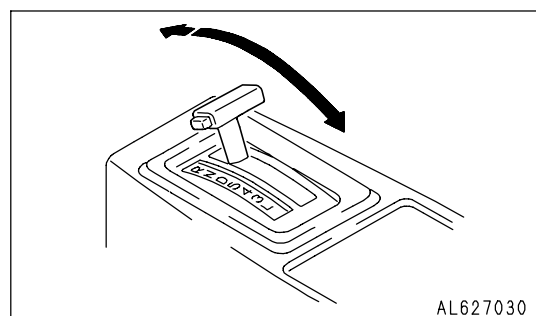
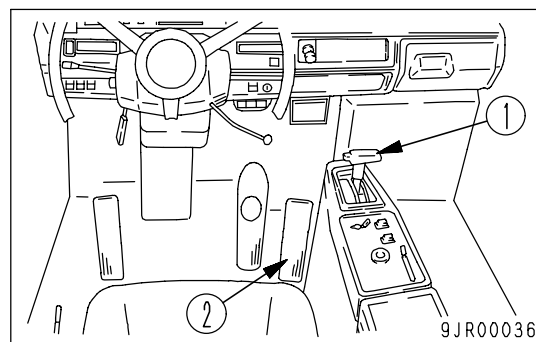
When shifting gear, do as follows.

This machine has an automatic transmission, so set gear shift lever (1) to the desired position, and the transmission will automatically shift to a position to match the travel speed.

When the dump body has risen, the speed range is locked to 2nd speed at the D position and 1st speed at the 5 - L position. While traveling, lower the dump body.

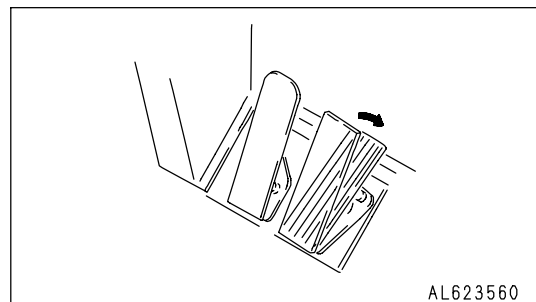
NOTICE

- When shifting between **FORWARD** and **REVERSE**, stop the machine completely, and run the engine at low idle when shifting the lever. After moving the gear shift lever, do not depress the accelerator until you detect that the transmission clutch has engaged.
- Do not operate the gear shift lever with the accelerator pedal depressed. This will cause a big shock, and will also reduce the service life of the machine.



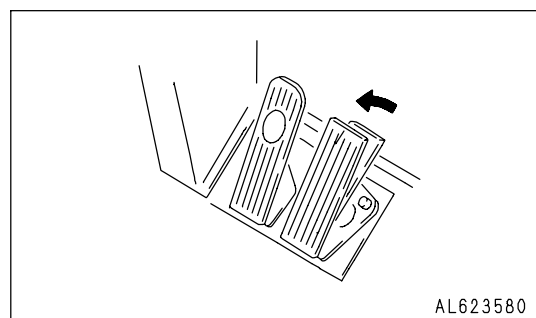
SHIFTING UP

1. When accelerator pedal (2) is depressed to accelerate the machine, the lockup clutch is engaged to shift the transmission to direct drive.
2. If the machine is accelerated further, the transmission will automatically shift up.



SHIFTING DOWN

If accelerator pedal (2) is released, the machine speed will be reduced, and the transmission will automatically shift down.



DOWN SHIFT INHIBIT

If the shift lever is operated when the machine is traveling, and the travel speed is faster than the maximum speed for each gear position, the transmission is not shifted immediately but is shifted down when the travel speed drops. This prevents overrunning of the engine.

SKIP SHIFT

For normal gearshifting, the transmission shifts one gear range at a time.

When traveling uphill and the travel speed drops suddenly, the transmission jumps one gear range when shifting down to reduce the transmission shock.

OVERRUN PREVENTION DEVICE

While operating the machine, if the red range lights up, simultaneously the warning buzzer sounds and the central warning lamp flashes, then operate the machine lowering the engine speed and the traveling speed. If the travel speed goes above the maximum speed for the range of the shift lever, the overrun prevention device is actuated to act the retarder and to reduce the travel speed.

TRAVELING DOWNHILL

When traveling downhill, travel at a safe speed which matches the width of the road, the condition of the road surface, and other conditions of the jobsite.



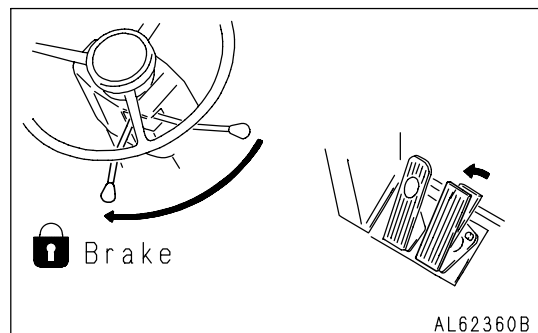
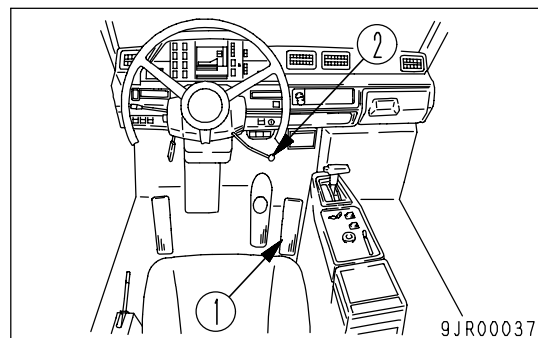
WARNING

- If the machine is stopped, put blocks under the wheel immediately.
- For the maximum permissible speed when traveling downhill using the retarder, see the brake performance graph for the downhill distance and grade. Traveling continuously downhill at a speed greater than the maximum permitted speed on the brake performance graph is dangerous as the retarder brake may be damaged.
- If the retarder oil temperature monitor on the machine monitor flashes when using the retarder, shift down to travel downhill. (When this happens, the central warning lamp flashes and the alarm buzzer sounds.)
If the monitor lamp does not go out even when the transmission is shifted down, stop the machine immediately, set the shift lever to the N position, run the engine at the 2000 rpm, and wait for the monitor to go out.
- If the retarder loses its effect when it is used for traveling downhill, do as follows.
 1. Release the retarder brake completely, then operate the retarder lever again.
 2. If the retarder still has no effect even when the retarder lever is operated again, return the retarder lever completely to the released position, then depress the brake pedal to stop the machine, and contact your Komatsu distributor for repairs.
- Operate the retarder slowly. If the brakes are applied suddenly, there is danger that the machine will skid.

NOTICE

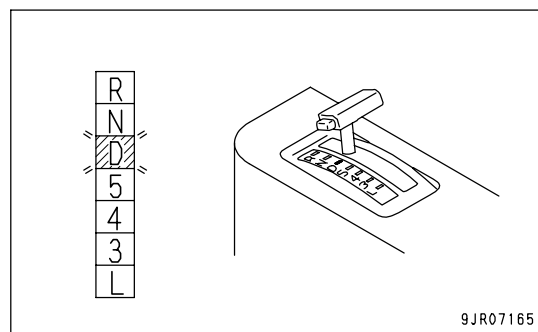
- If the retarder lever is operated when traveling downhill, the transmission can be shifted down sooner than with normal deceleration. It is also possible to travel without shifting up.
- When traveling downhill, do not use the foot brake except in an emergency. Using the foot brake will cause overheating of the front brake and reduce the life.
- Do not accelerate or shift up when using the retarder. The engine speed will rise and this may cause the alarm buzzer to sound and the central warning lamp to flash.

1. Before starting to travel downhill, release accelerator pedal (1) and operate retarder control lever (2) to slow the machine down.

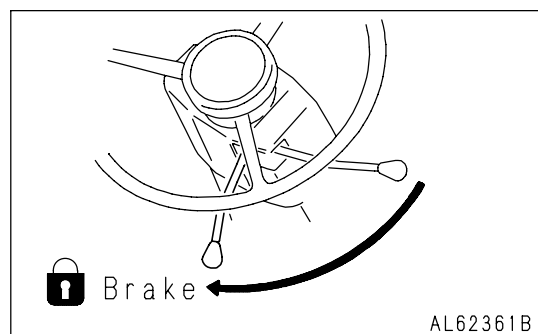


2. Leave the gear shift lever in position D.
When the machine reduces speed, the transmission will automatically shift down to the appropriate gear range.

If the condition of the road makes it necessary to travel downhill in 1st, set the gear shift lever to any position except D (5, 4, 3, L).



3. When traveling downhill, operate retarder control lever (2), run the engine at a speed of 1800 to 2200 rpm, and travel so that the retarder brake oil temperature gauge is in the green range.



For machines equipped with an exhaust brake, using the exhaust brake can provide more secure braking force for increased safety, and will also improve the durability of the brake.

For details of handling the exhaust brake, see "EXHAUST BRAKE SWITCH (PAGE 3-26)".

BRAKE PERFORMANCE CURVE

- Method of using graph

Example: Downhill distance: 1500 m (4921 ft)

Travel resistance -11% [grade resistance -13%, rolling resistance 2%]

Load: 32 tons for HD325, HD325(4WD specifications), 40 tons for HD405

Obtain the maximum permissible speed and the transmission speed range from the graph when traveling downhill under the above conditions.

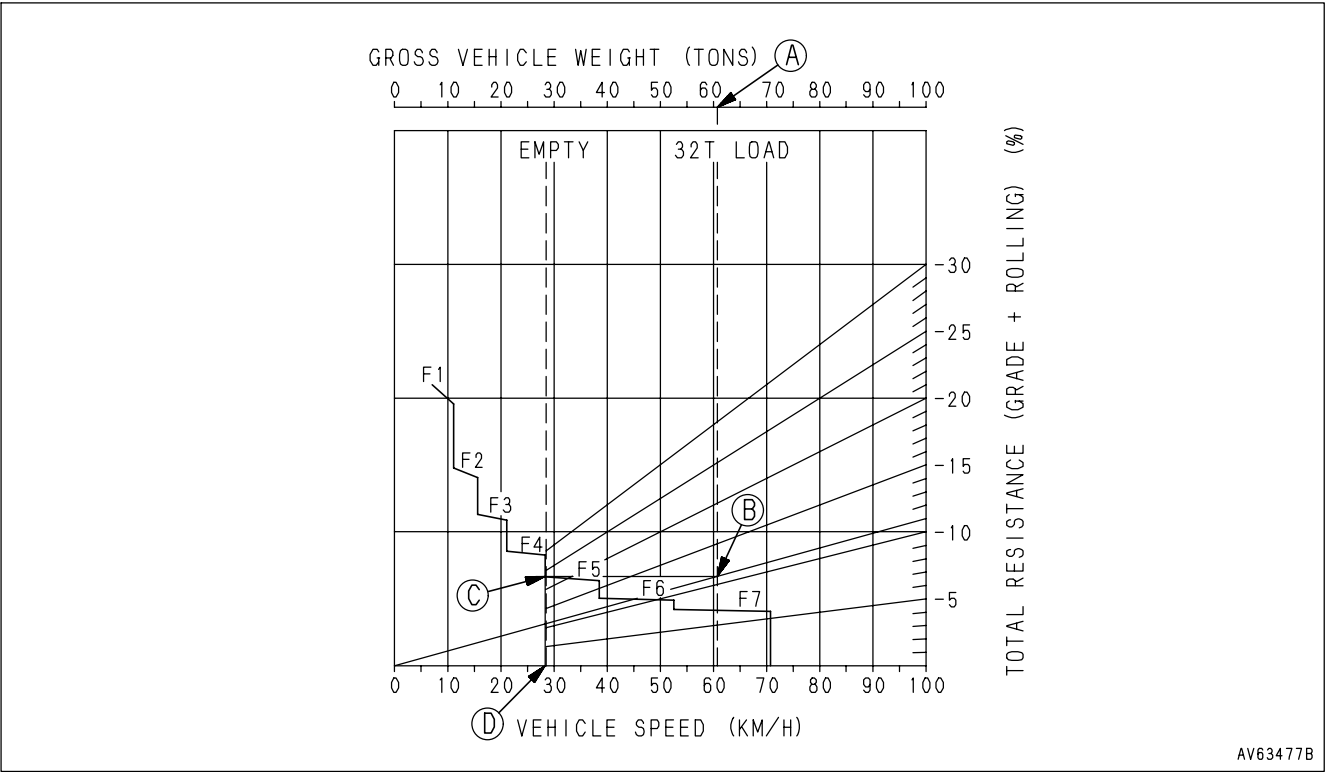
1. Use the brake performance graph for the downhill distance of 1500 m (4921 ft).
2. Starting from point (A) which corresponds to the overall weight of the machine, draw a perpendicular line down.
3. Take the point where it crosses the line for travel resistance -11% as (B) and draw a horizontal line.
4. Take the point where it crosses the performance curve as (C), and draw a perpendicular line down. Take the point where this line crosses the travel speed scale as (D).
5. The following information can be obtained from this procedure.

From point (D): Maximum permissible speed = 28 km/h (17.4 MPH)

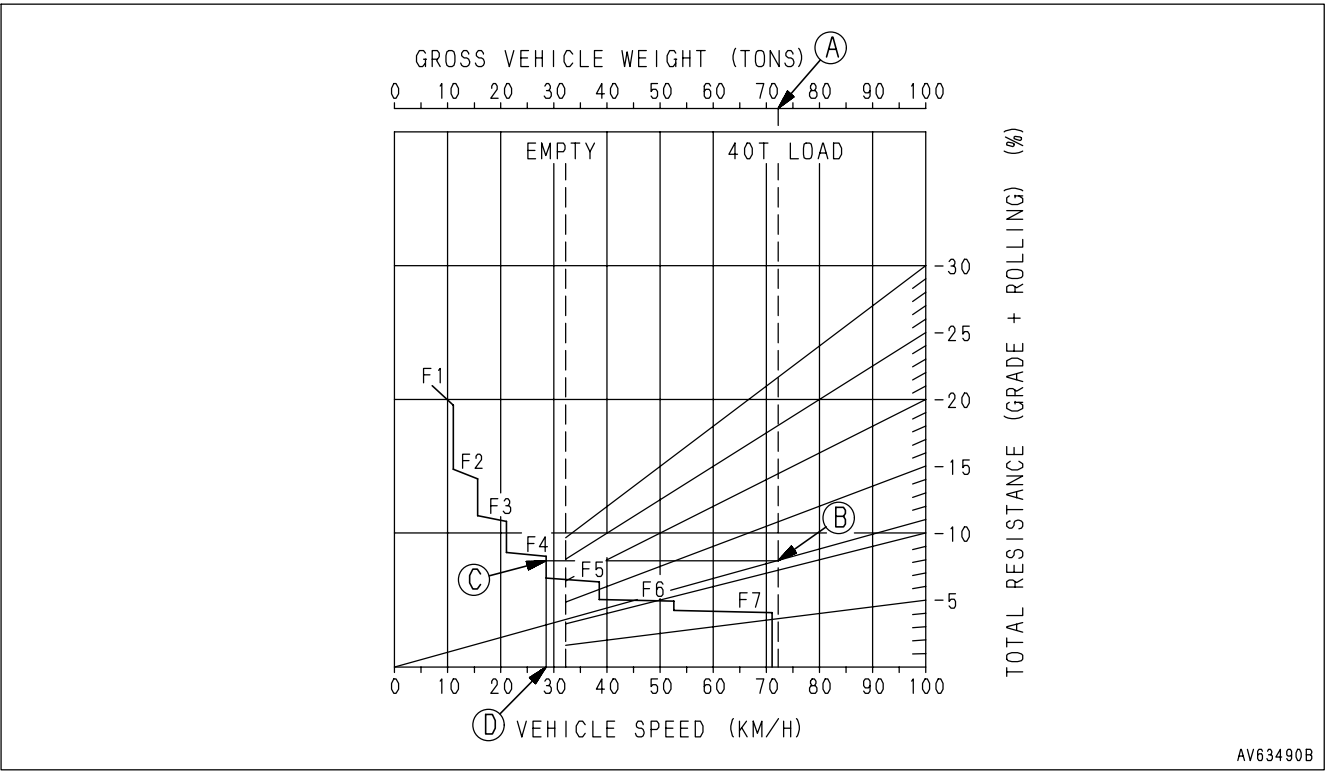
From point (C): Speed range = F4

This maximum permissible speed is one guideline determined from the retarder brake performance, so on an actual jobsite, determine a safe downhill travel speed (below the maximum permissible speed) to match the conditions of the jobsite so that the retarder brake oil temperature gauge is always in the green range.

HD325, HD325 of 4WD specifications



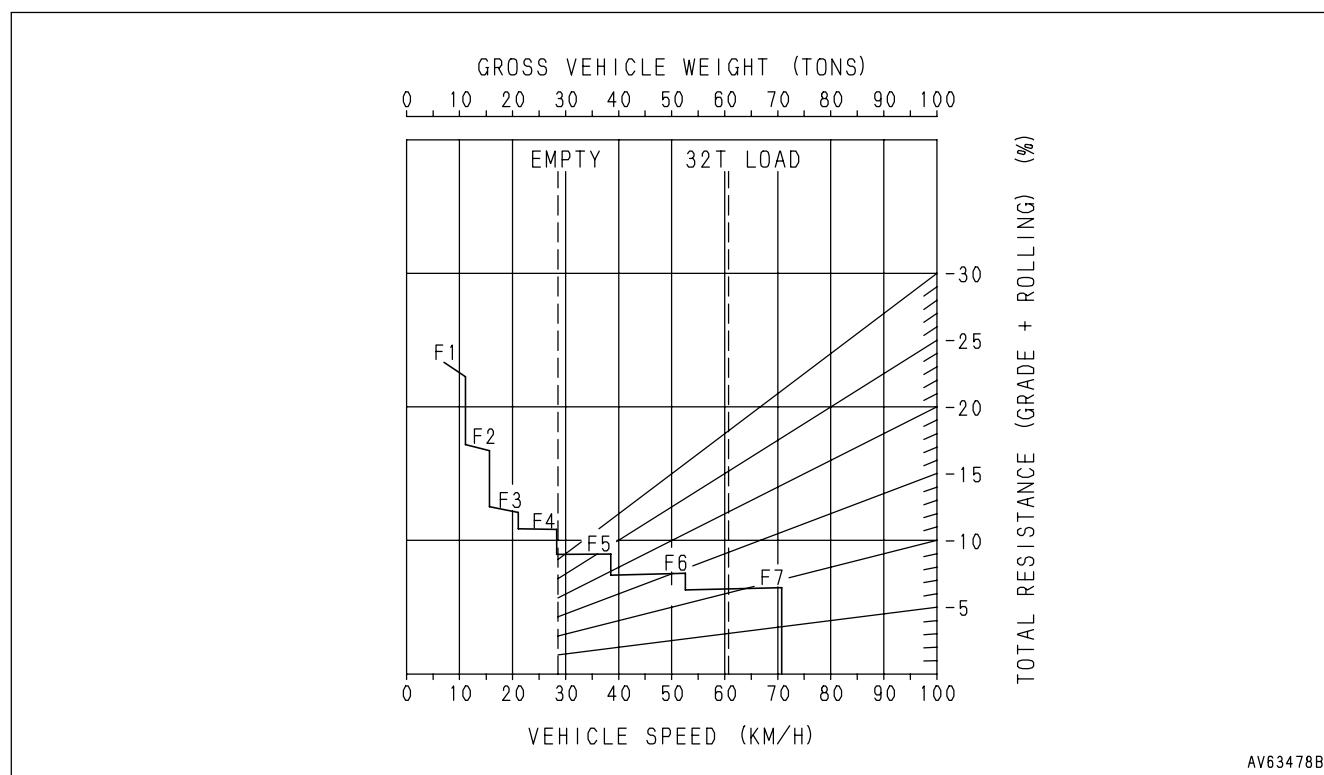
HD405



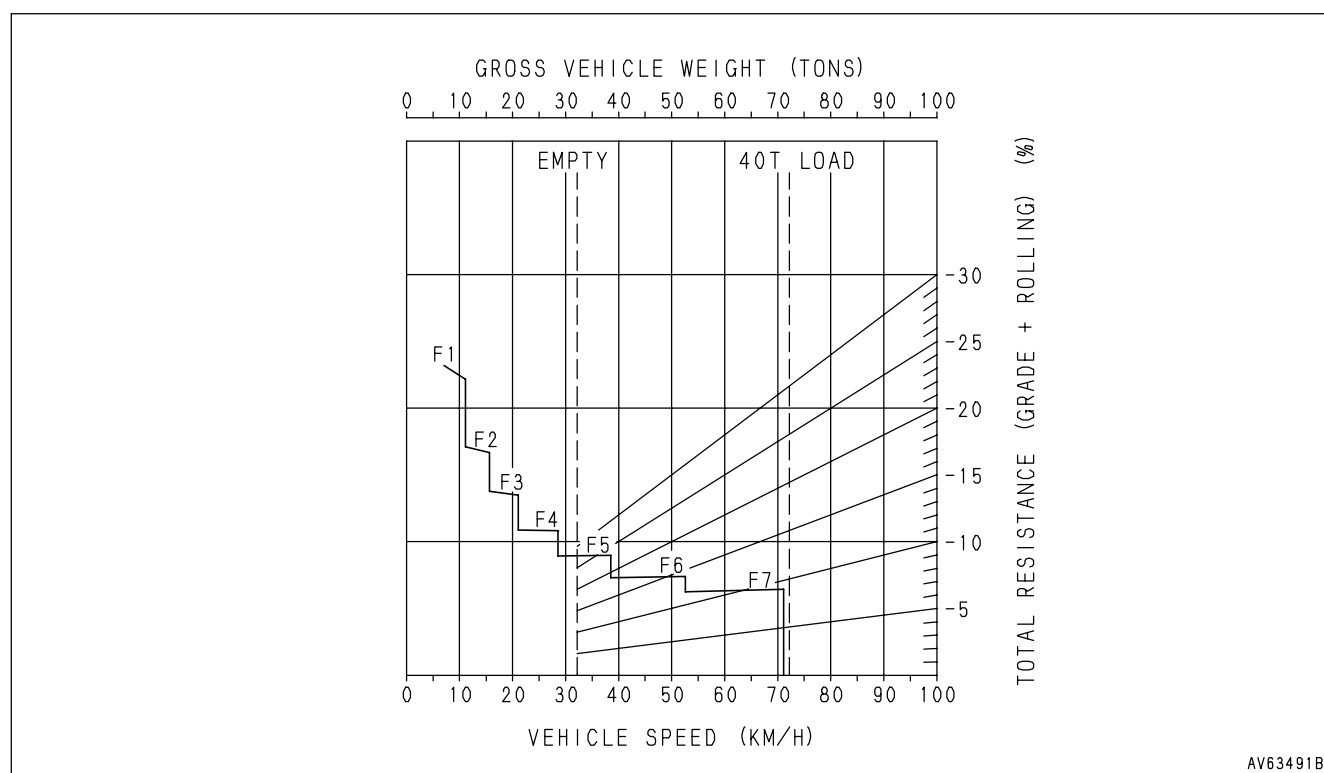
- Brake performance

[Downhill distance: 450 m (1476 ft)]

HD325, HD325 of 4WD specifications



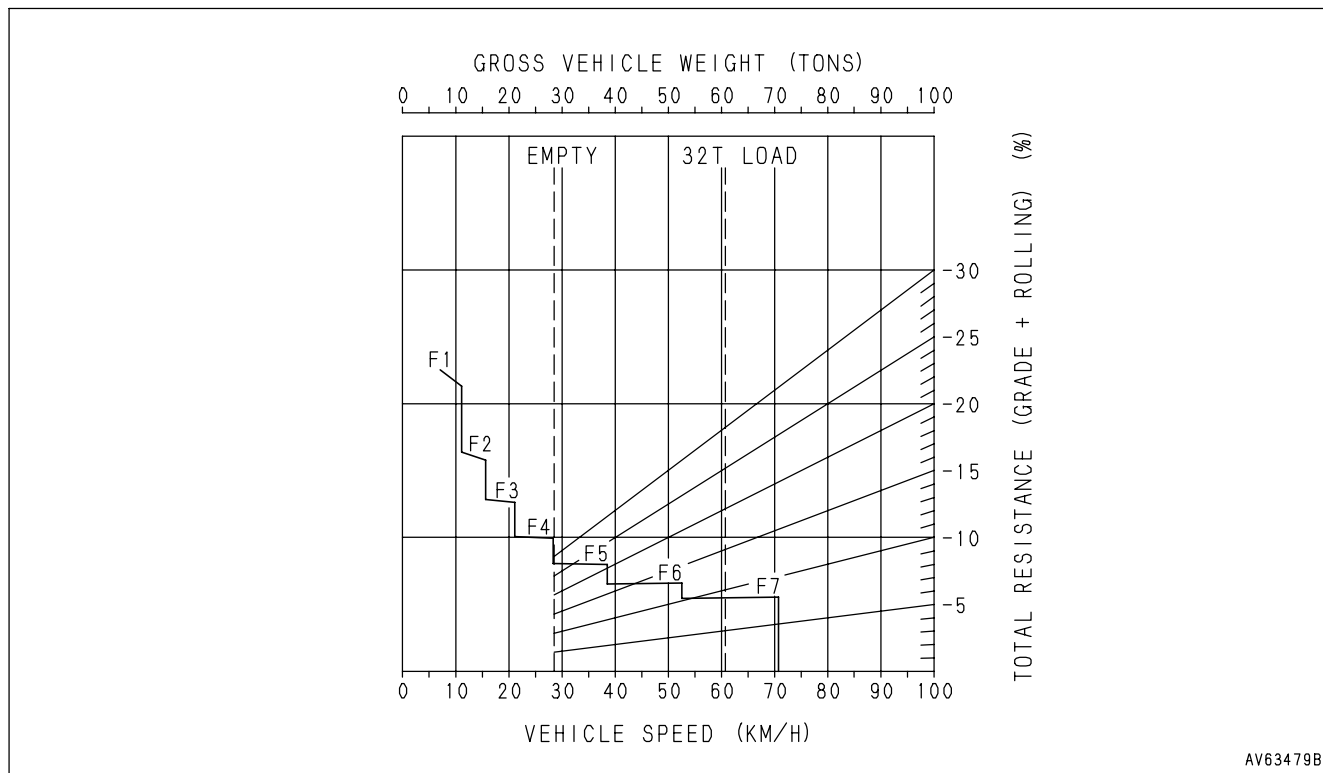
HD405



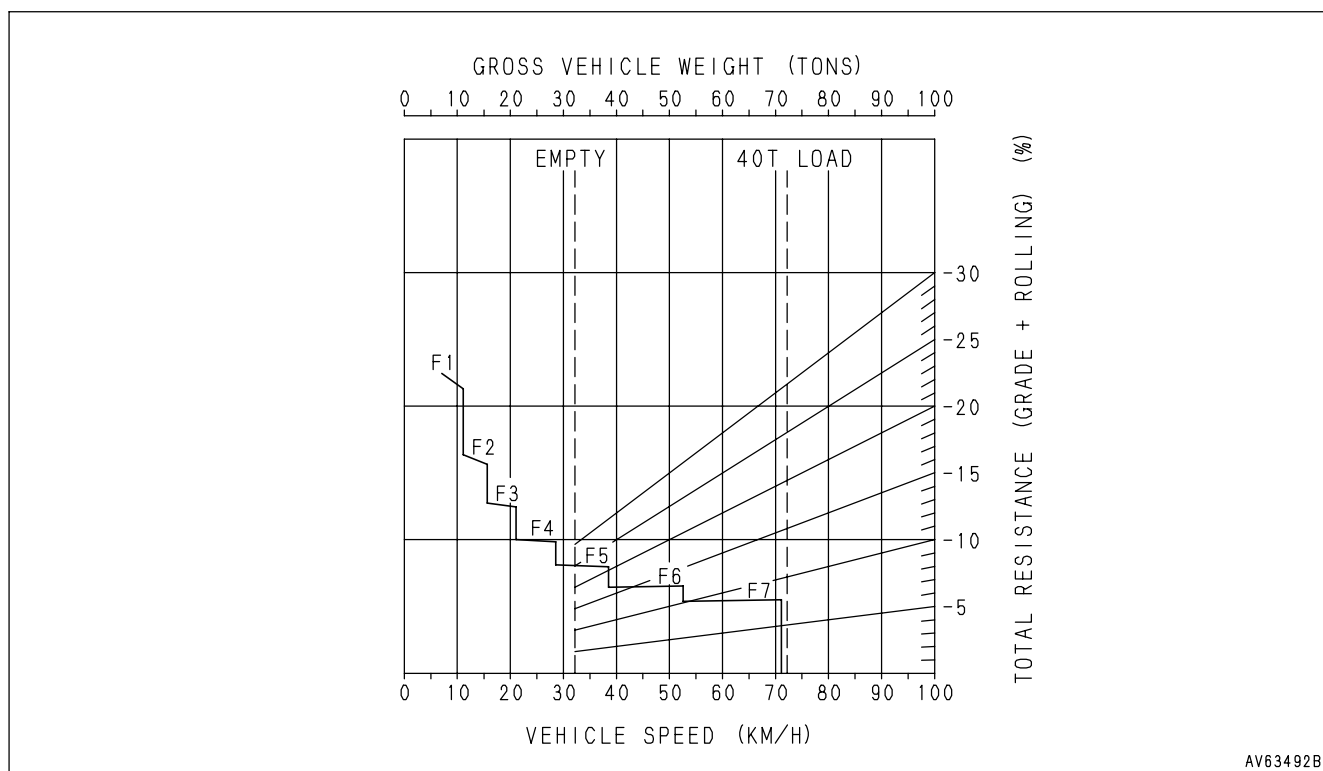
- Brake performance

[Downhill distance: 600 m (1968 ft)]

HD325, HD325 of 4WD specifications



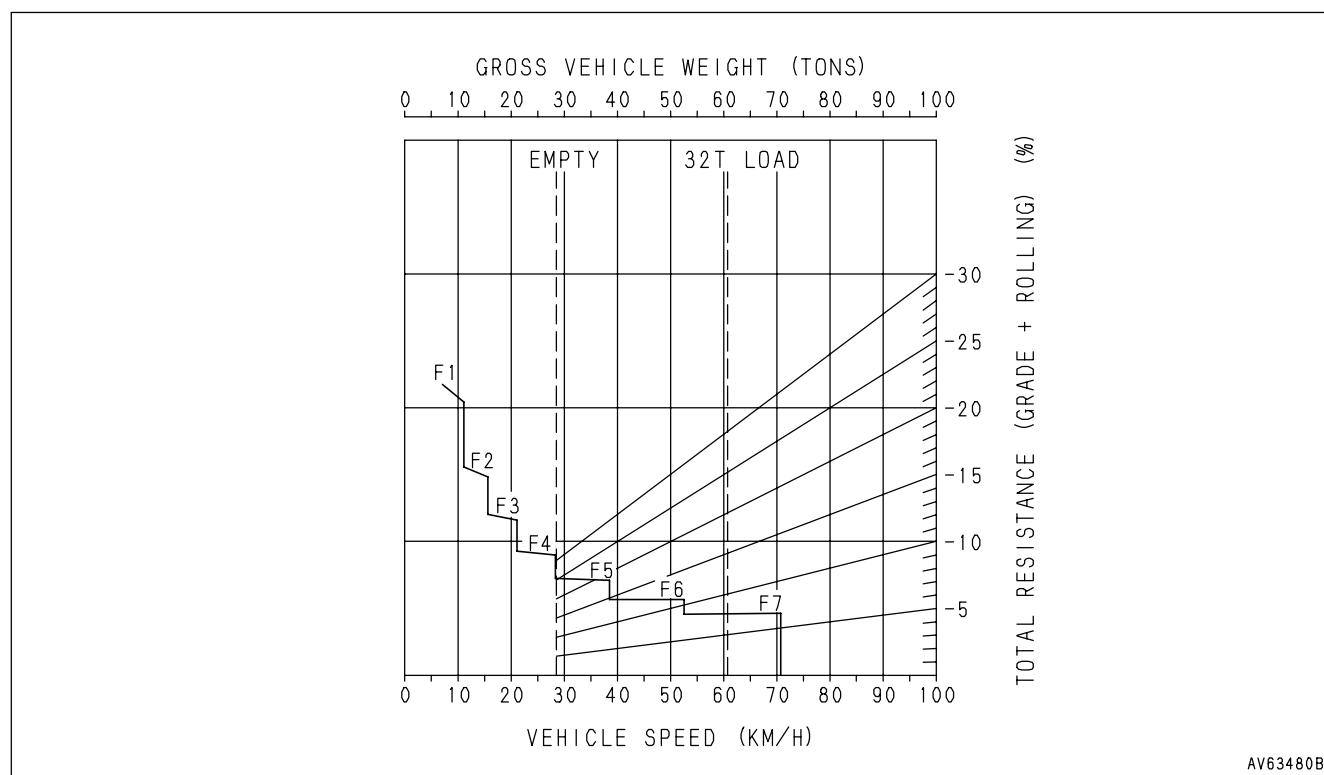
HD405



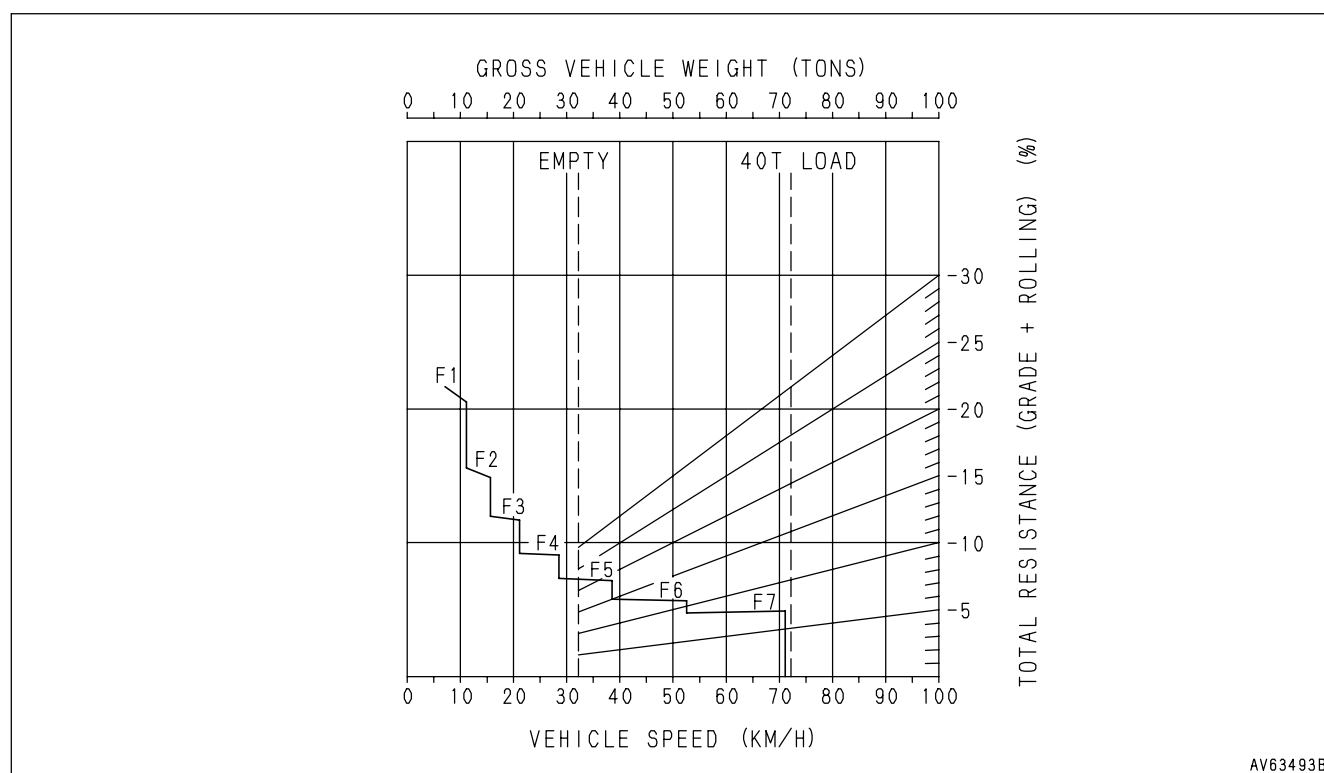
- Brake performance

[Downhill distance: 900 m (2952 ft)]

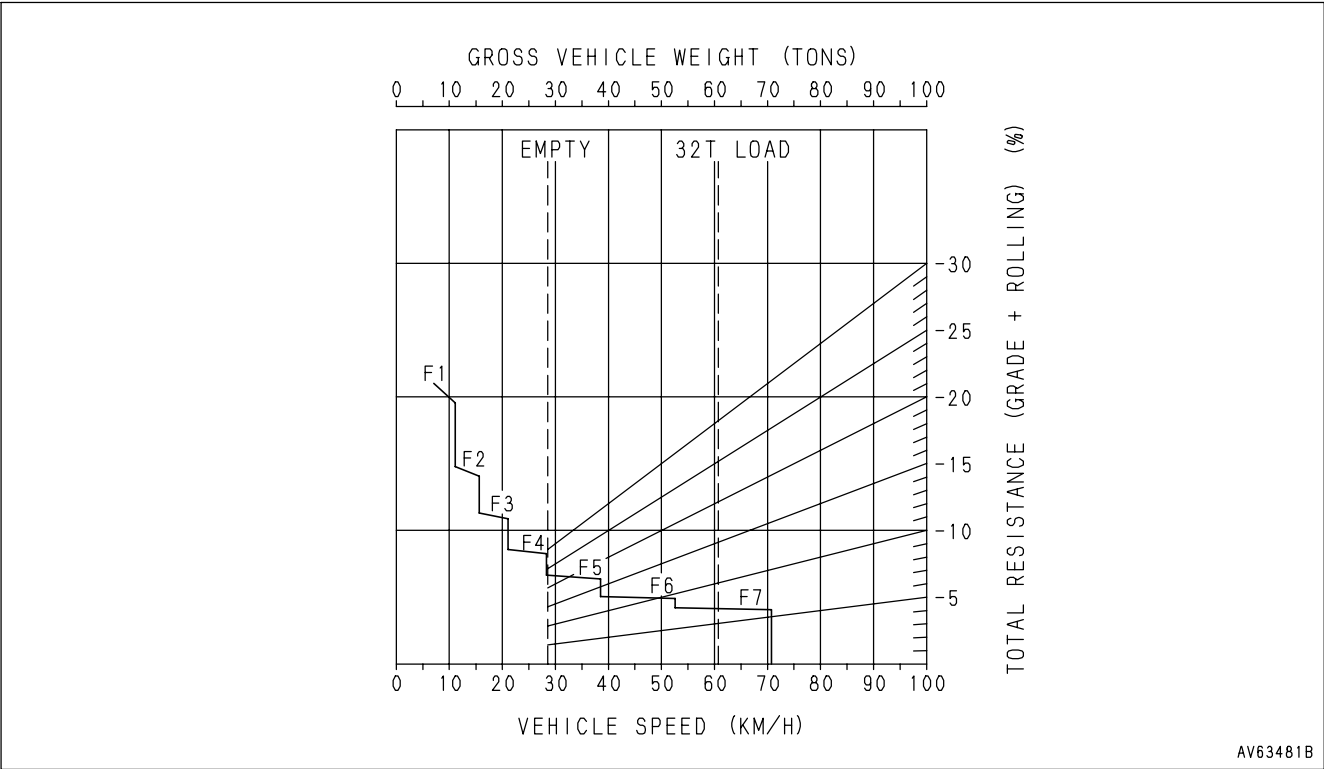
HD325, HD325 of 4WD specifications



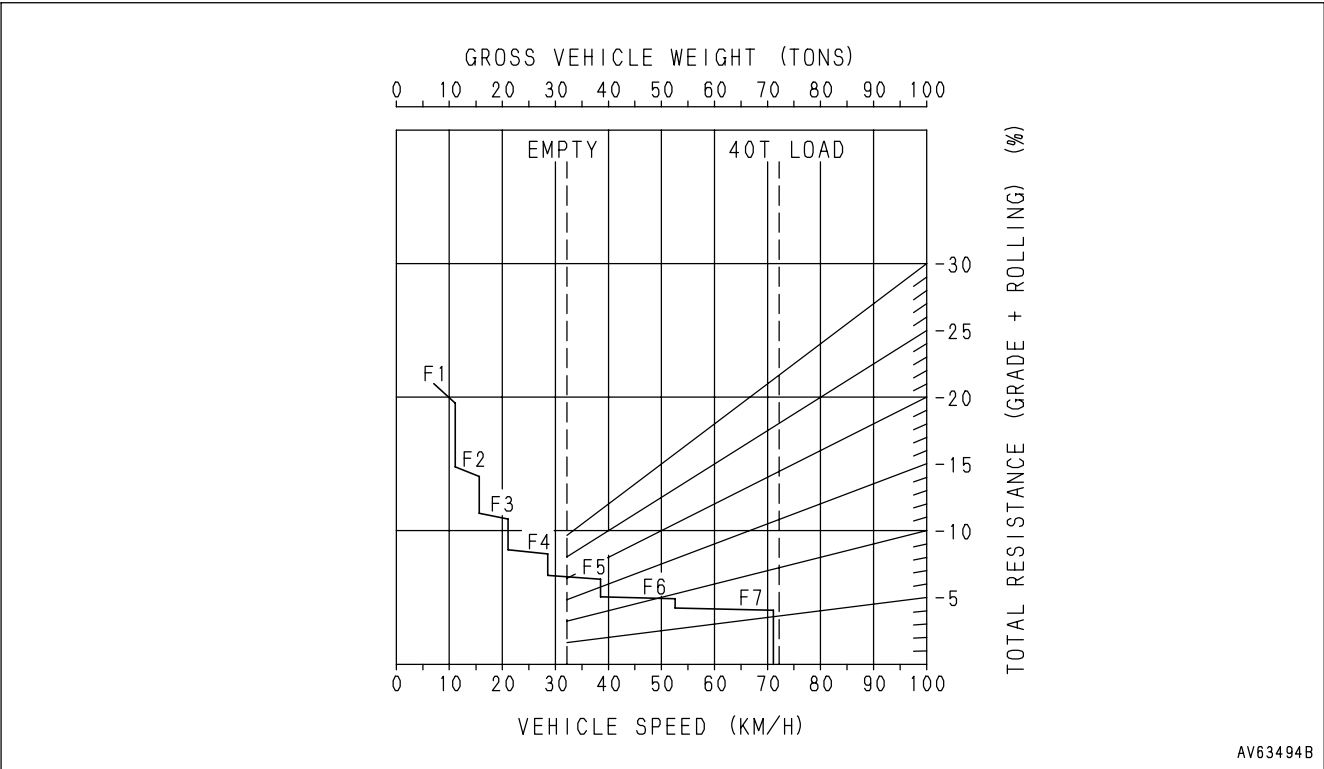
HD405



- Brake performance
[Downhill distance: 1500 m (4921 ft)]
HD325, HD325 of 4WD specifications



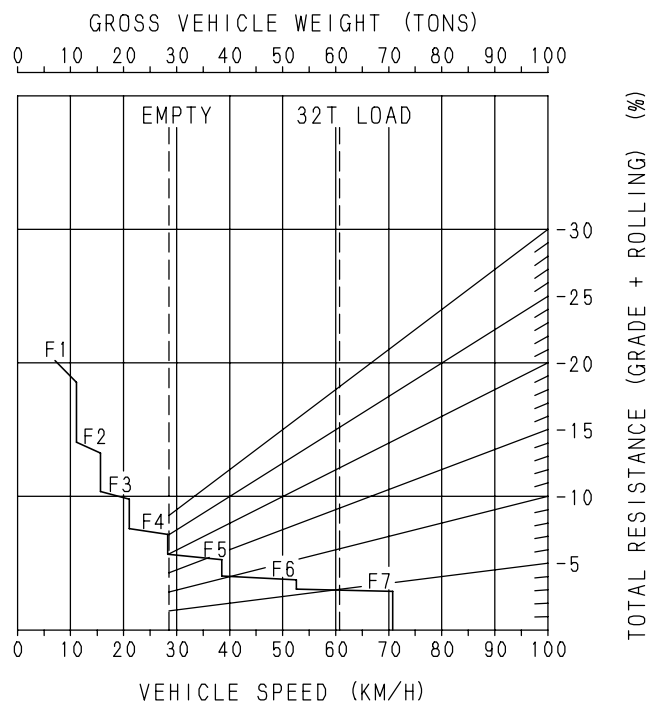
HD405



- Brake performance

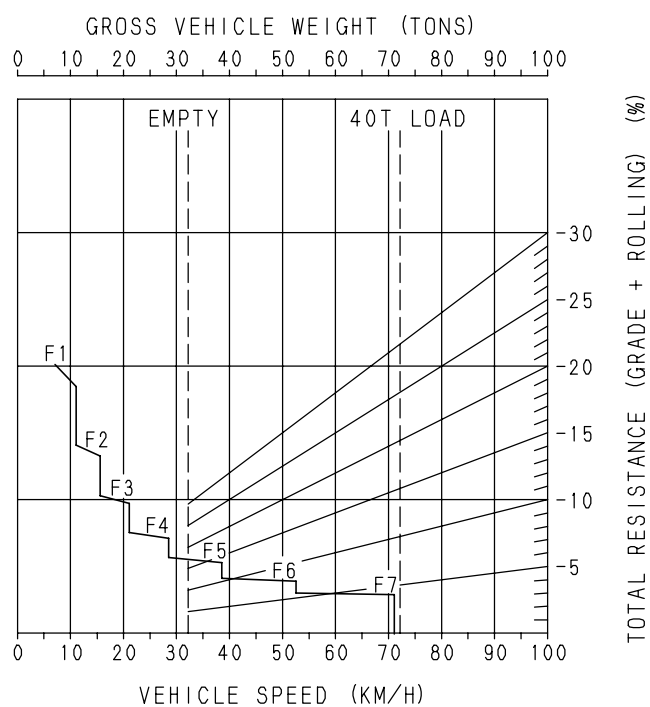
[Downhill distance: Continuous]

HD325, HD325 of 4WD specifications



AV63482B

HD405



AV63495B

STEERING THE MACHINE



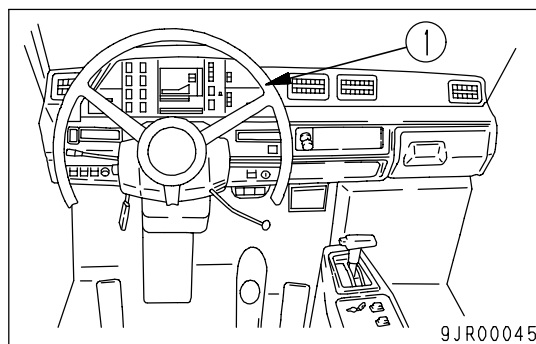
WARNING

If the machine is turned at high speed or on a steep slope, there is danger that it will turn over, so do not operate the steering in such conditions.



CAUTION

Do not continue to apply force to the steering wheel when it has been turned fully to the left or right. This will make the oil temperature in the circuit rise and will cause overheating.



To turn the machine when traveling, turn steering wheel (1) in the direction of the turn.

When traveling around a curve, release the accelerator pedal before entering the curve, shift down to a lower speed range, then depress the accelerator pedal to travel around the curve. Never coast around the curves at high speed.

REMARK

- The angle of the steering wheel may change (the position of the spoke may change slightly) when the machine is traveling, but this is not a failure.
- If force is applied to the steering wheel when the tires have been turned fully to the left or right, the steering wheel will turn a little at a time, but this is not a failure.

LOADING OPERATIONS

When using a large wheel loader to load large rocks, if the rocks are loaded directly into the dump body parts of the dump body may be deformed. To prevent this, when loading large rocks, first load sand or soil to act as a cushion, then load the rocks on top of this to reduce the impact on the dump body.

In addition, when loading rocks that exceed the following conditions, install the optional dump body reinforcement plate.

- Rocks with one side over 0.5 m (1 ft 8 in)
- Rocks of hardness more than 4.5 (Mohs scale)
- Rocks with a weight of more than 300 kg (662 lb)
- When transporting steel ingots

For details of the types and selection procedure of dump body for HD325 and HD325 of 4WD specifications, see "SELECTING DUMP BODY (PAGE 6-14)".

NOTICE

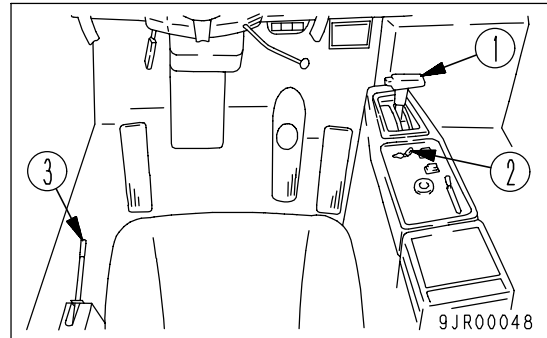
- When traveling, always set the dump lever to the FLOAT position regardless of whether the dump body is empty or loaded.
- If the dump lever is not at the FLOAT position and the shift lever is not at the N position, the central warning lamp will flash and the alarm buzzer will sound.

DUMP OPERATIONS



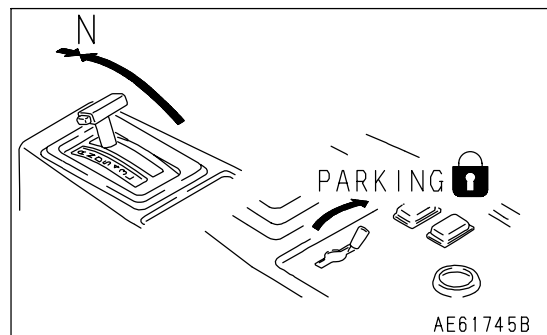
WARNING

- When dumping a load, always carry out the dumping operation in accordance with the signals from the flagman.
- When dumping large rocks, operate the dump body slowly.
- Do not load the dump body while it is still raised.
- When carrying out inspection with the dump body raised, always use the body pivot pins, set the dump lever to the HOLD position and lock it securely. For details, see "BODY PIVOT PIN (PAGE 3-37)".



Operate the dump body as follows.

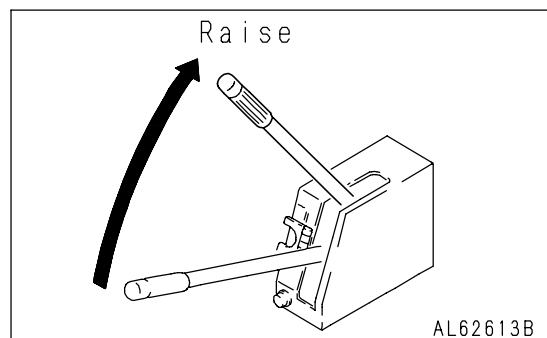
1. Place shift lever (1) at the N position, and set parking brake valve lever (2) to the PARKING position.



2. Move dump lever (3) to the RAISE position, then depress the accelerator pedal to raise the dump body.

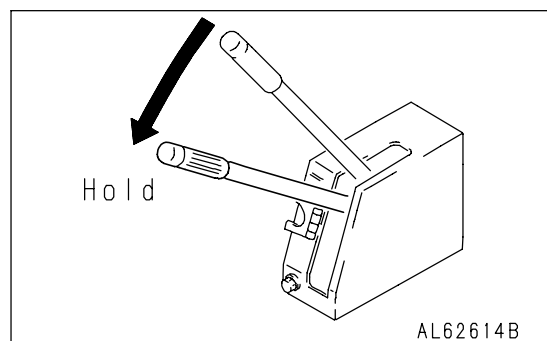
If the dump lever is released when it is at the RAISE position, it is held at the RAISE position and the dump body will continue to rise.

The dumping speed increases in proportion to the engine speed.

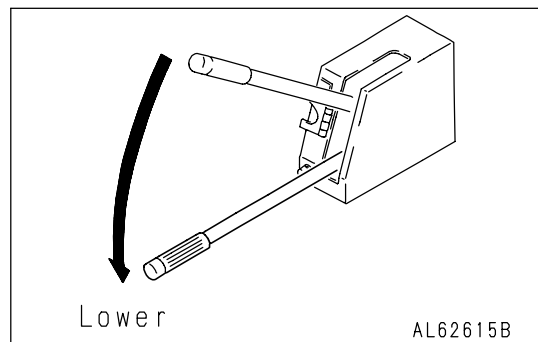


3. When the dump body rises to the previously set position (dump body positioner adjustment position), dump lever (3) is returned to the HOLD position. The dump body is then held at that position.

If it is necessary to raise the dump body further, move dump lever (3) back to the RAISE position and the dump body will rise. If dump lever (3) is released when doing this, it will return to the HOLD position and the dump body will stop at that position.



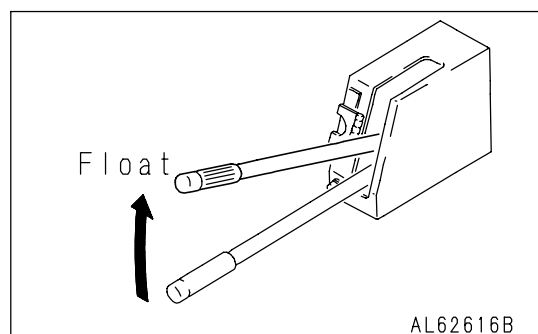
4. When dump lever (3) is moved to the LOWER position, the dump body will start to move down.



5. When the dump body has moved down a certain distance, move dump lever (3) to the FLOAT position. (When the lever is released, it will return to the FLOAT position.) The dump body will then move down under its own weight.

When raising the dump body, let the accelerator pedal back near the maximum angle to avoid any impact load on the hydraulic circuit or hoist cylinders.

When the dump body is raised, if the shift lever is at the D position, the transmission is fixed in 2nd. Keep the dump body lowered when traveling.



PRECAUTIONS FOR OPERATION

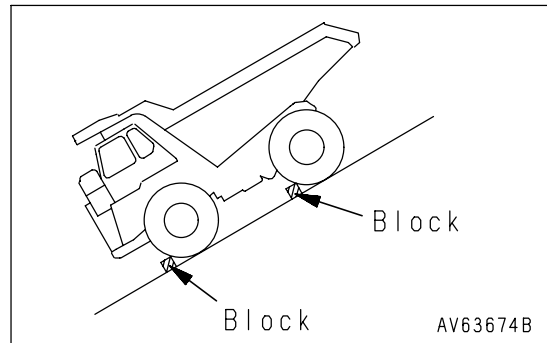
- When traveling on roads in rain or snow, or when traveling on muddy or soft ground, consider the loaded condition of the machine and be extremely careful not to let the tires slip or the machine spin and sink into the ground.
- If the engine should stop when the machine is traveling, stop the machine immediately, then move the gear shift lever to the N position, and start the engine again.
- If the central warning lamp and pilot lamp for any EMERGENCY item on the machine monitor should flash and the buzzer sounds during operation, stop the machine immediately and investigate the cause.
For details, see "TROUBLESHOOTING (PAGE 3-114)".
- When loading, be careful to load the dump body uniformly, and be particularly careful to avoid loading too much at the front.
- On slippery road surfaces, apply the retarder control lever slowly and shift the transmission down to prevent the rear wheels from locking.
- When traveling through pools of water, water may get inside the front brakes and cause a big drop in the braking force, so drive carefully in such areas. If water should get into the brakes, apply the brakes several times while traveling to produce friction heat between the pad and disc to remove the water.

PARKING MACHINE



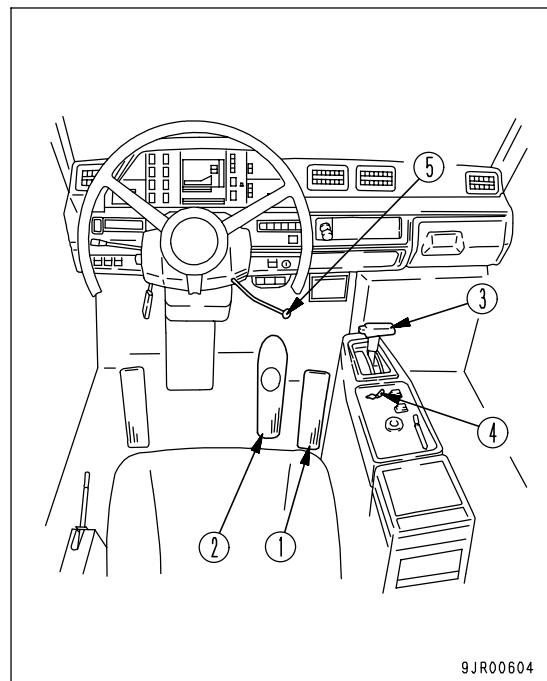
WARNING

- Avoid stopping suddenly. Give yourself ample room when stopping.
- Park the machine on firm, horizontal ground.
Do not park the machine on a slope.
If it is unavoidably necessary to park the machine on a slope, put blocks under the tires to prevent the machine from moving and set parking brake valve lever to the PARKING position.
- If the shift lever is touched by mistake, the machine may move suddenly, and this may lead to a serious injury or death. Before leaving the operator's compartment, always set the parking brake valve lever securely to the PARKING position.
- The retarder must not be used as a parking brake.
- Do not use the retarder for long-term parking, regardless of the engine speed.

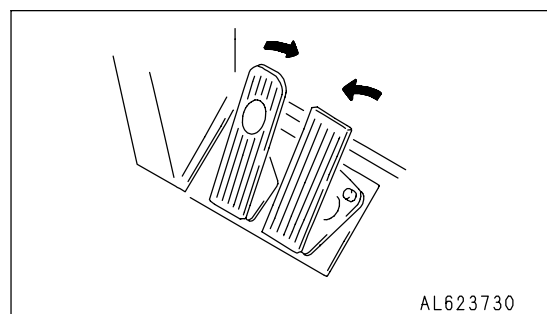


CAUTION

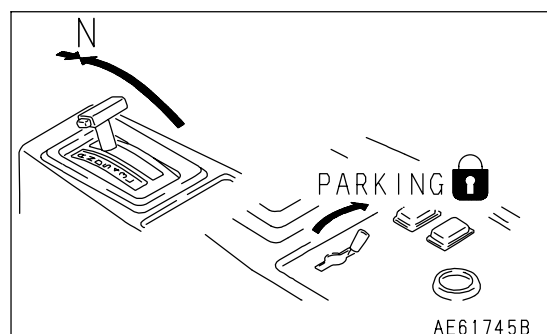
To prevent damage to the parking brake, apply the parking brake only when parking the machine.



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



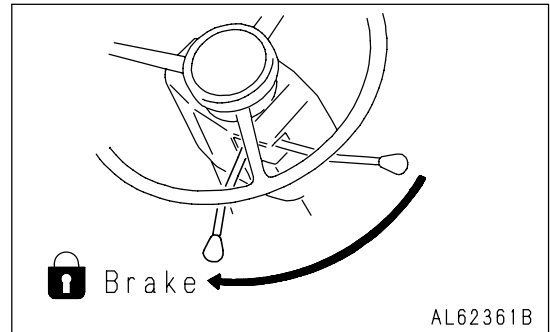
2. Move shift lever (3) to the N position, then move parking brake valve lever (4) to the PARKING position to apply the parking brake.



- When in the operator's compartment, pull retarder control lever (5) fully to apply the retarder.

NOTICE

- The retarder must not be used as a parking brake.
- Do not use the retarder for long-term parking, regardless of the engine speed.

**CHECKS AFTER COMPLETION OF WORK**

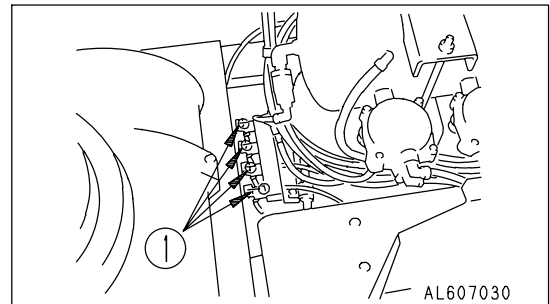
Use the machine monitor to check the engine water temperature, engine oil pressure, and fuel level. If the engine has overheated, do not stop the engine suddenly. Run it at a mid-range speed to cool it gradually before stopping.

DRAIN WATER FROM AIR TANK

- After starting the engine, pull ring (1) of the tank drain valve to drain the water from the tank.
- Carry out the same operation after completing work.

NOTICE

In cold areas, there is danger of the water freezing, so drain the water from the air tank after operations when it is still warm.

**LOCKING**

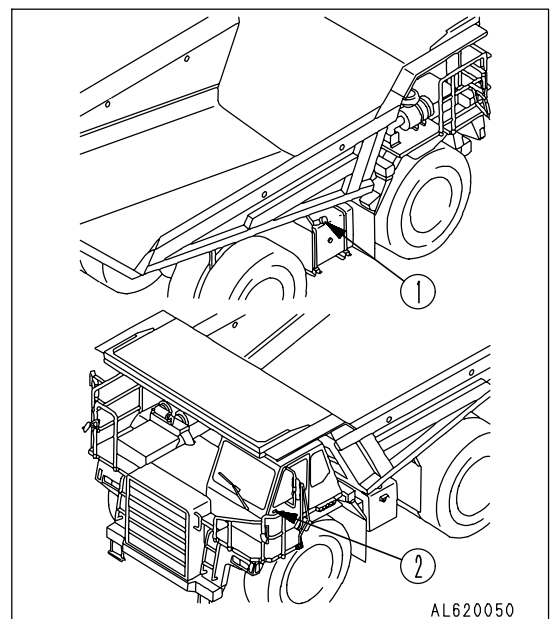
Always lock the following places.

- Fuel filler cap of fuel tank
- Cab door (left)

Lock the right side door manually from the inside (operator's seat).

REMARK

The starting switch key is used for locking places (1) and (2).



HANDLING TIRES

PRECAUTIONS WHEN HANDLING TIRES

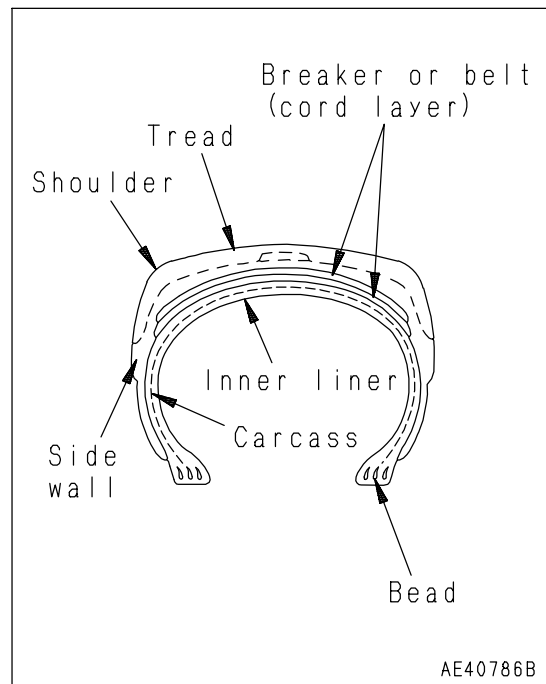


WARNING

To ensure safety, the defective tires given below must be replaced with new tires.

- Tires where the bead wire has been cut, broken, or greatly deformed
- Excessively worn tires where more than 1/4 of the circumference of the carcass ply (excluding the breaker) is exposed
- Tires where damage to the carcass exceeds 1/3 of the tire width
- Tires where ply separation has occurred
- Tires where radial cracks extend to the carcass
- Tires where there is abnormal deterioration, deformation, and damage, and the tire cannot withstand use.

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



AE40786B

T.Km.P.H (Ton-Km-Per-Hour Rating)

Tires for construction equipment are used under severe conditions that bear no comparison with the tires used on cars, buses, or ordinary trucks, so they are specially designed to withstand these conditions.

Compared with ordinary tires, far greater heat is produced in the rubber internal parts of off-road tires when the machine is traveling. If they are used continuously under conditions which exceed the permitted load and travel speed of the tire, the internal temperature will exceed the limit, and the rubber may become soft and heat separation occur.

To prevent such problems from occurring, the T.Km.P.H. is used as a standard to allow the machine to travel safely. If operations are carried out which exceed the T.Km.P.H. of the tire (when the T.Km.P.H. of the work exceeds the T.Km.P.H. of the tires), tire trouble will occur more frequently. In such cases, do as follows.

- Make the operating conditions easier so that the operation T.Km.P.H. of the work is lowered.
- Increase the size of the tires to a tire with a high T.Km.P.H.

TIRE T.Km.P.H.AND MAXIMUM SPEED FOR CONTINUOUS TRAVEL (REFERENCE)

- HD325

	Tire T.Km.P.H.for ambient temperature				Max.speed for continuous travel for ambient temperature (km/h)				
	16°C	27°C	38°C	49°C		16°C	27°C	38°C	49°C
Size 18.00-33-32PR (standard) structure CR(ELS2) Code No.E4 (TRA)	182	171	161	150	When empty (front wheel standard)	26	24	23	21
					When loaded (rear wheel standard)	17	16	15	14
Size 18.00-33-32PR (if equipped) structure CR(RL) Code No.E3 (TRA)	215	202	190	177	When empty (front wheel standard)	30	28	27	25
					When loaded (rear wheel standard)	20	19	18	17
Size 18.00R33 ★ ★ (if equipped) structure CR Code No.E4 (TRA)	214	192	170	158	When empty (front wheel standard)	27	24	21	20
					When loaded (rear wheel standard)	17	15	14	13

- HD325 4WD specifications

	Tire T.Km.P.H.for ambient temperature				Max.speed for continuous travel for ambient temperature (km/h)				
	16°C	27°C	38°C	49°C		16°C	27°C	38°C	49°C
Size 18.00R33 ★ ★ (standard) structure CR Code No.E4 (TRA)	214	192	170	158	When empty (front wheel standard)	27	24	21	20
					When loaded (rear wheel standard)	17	15	14	13
Size 18.00-33-32PR (if equipped) structure CR(ELS2) Code No.E4 (TRA)	182	171	161	150	When empty (front wheel standard)	26	24	23	21
					When loaded (rear wheel standard)	17	16	15	14
Size 18.00-33-32PR (if equipped) structure CR(RL) Code No.E3 (TRA)	215	202	190	177	When empty (front wheel standard)	30	28	27	25
					When loaded (rear wheel standard)	20	19	18	17

- HD405

	Tire T.Km.P.H.for ambient temperature				Max.speed for continuous travel for ambient temperature (km/h)				
	16°C	27°C	38°C	49°C		16°C	27°C	38°C	49°C
Size 18.00R33 ★ ★ (standard) structure CR Code No.E4 (TRA)	214	192	170	158	When empty (front wheel standard)	27	24	21	20
					When loaded (rear wheel standard)	17	15	14	13

METHOD OF CALCULATING WORK T.Km.P.H.

Work T.Km.P.H. = average load per tire x average travel speed for one day

Average travel speed = round trip distance x number of round trips per day / total operating hours per day

Average load = (load when empty + load when loaded) / 2

The total operating hours per day includes the stopping time and rest periods.

* The T.Km.P.H. in the table may differ slightly according to the tire maker, so concerning operations which require travel near the travel speed given in the table, consult your Komatsu distributor.

PRECAUTIONS FOR LONG DISTANCE TRAVEL

If the machine travels continuously at high speed for a long distance, there will be a marked increase in the generation of heat in the tire. This may cause premature damage to the tire, so be careful of the following points.

- Travel only when empty.
- Check the tire inflation pressure before starting for the day when the tires are cold, and adjust to the following inflation pressure.
- Do not reduce the tire inflation pressure when traveling.

• HD325

Tire size	Inflation pressure
18.00-33-28PR (standard)	0.49 MPa (5.00 kg/cm ² , 71.0 PSI)
18.00-33-32PR (if equipped)	0.56 MPa (5.75 kg/cm ² , 81.7 PSI)
18.00R33 ★ ★ (if equipped)	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)

• HD325 4WD specifications

Tire size	Inflation pressure
18.00R33 ★ ★ (standard)	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)
18.00-33-32PR (if equipped)	0.56 MPa (5.75 kg/cm ² , 81.7 PSI)
18.00-33-28PR (if equipped)	0.49 MPa (5.00 kg/cm ² , 71.0 PSI)

• HD405

Tire size	Inflation pressure
18.00R33 ★ ★	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)

NOTICE

If the tires are used when the inflation pressure is less than the value given in the table above, the rim may be damaged.

Always keep the tire inflation pressure within +0 to +0.03 MPa (0.3 kg/cm², 4.3 PSI) of the value in the table above.

- The maximum travel speed must be kept to less than 40 km/h (24.9 MPH). Stop for at least one hour for every one hour of travel to allow the tires and other components to cool down.
- Never travel with water or dry ballast in the tires.

DETERMINING AND MAINTAINING TRAVEL ROAD

Determining and traveling the road in the jobsite is an extremely important factor both for reasons of safety and for reducing the cycle time. To ensure safety in operations, do as follows.

DETERMINING TRAVEL ROAD

- As far as possible, restrict the travel road to one-way travel.
- If it is impossible to keep to one-way traffic, make the road with ample width to enable trucks traveling in opposite directions to pass each other. If it is impossible to provide a sufficient road width, provide passing places at various points along the road.
- Always design the road so that the loaded truck passes on the side closest to the hill face.
- If there are curves with poor visibility along the road, set up mirrors.
- In places where the road should be weak or likely to collapse, set up a sign at a point at least 1.5 m (4 ft 11 in) from the road shoulder to warn of the danger.
- It is important to set up lighting or reflectors to enable the road to be traveled at night.
- The grade of slope should be kept within 10% (approx. 6°) as far as possible, and emergency escape points should be set up on downhill slopes in case of any brake failure.
- Make the road as straight as possible, and particularly in intermediate areas with curves, where the machine is traveling at high speed, make the radius of the curve as large as possible.
- Small S curves are particularly dangerous, so avoid such curves. The radius of the curve must be a minimum of 12 to 15 m (39 ft 4 in to 49 ft 3 in).
- Make the radius of curves as large as possible.
- Make the road wider at curves than it is in straight areas.
- Make the outside of the curve slightly higher.
- Be particularly careful to strengthen the road shoulder on the outside of curve.
- As far as possible, design the road so that no other roads cross it. In particular, if roads cross at an angle on slopes, a stepped difference is formed in the road. This is extremely dangerous, as it causes the machine to roll when traveling at high speed.
- Cut the slope face to provide a special road for the trucks.

MAINTAINING TRAVEL ROAD

Carry out the necessary action according to the conditions to insure that the road can always be traveled in safety.

- Remove any unevenness in the travel surface, sloping to the left or right, or drooping of the road shoulder. Make the road of ample strength and remove such obstacles as rocks and tree stumps.
- Maintain the road from time to time with a bulldozer or motor grader.
- Spray the road with water at suitable intervals to prevent dust from rising and reducing the visibility.

TRANSPORTATION

PRECAUTIONS WHEN TRANSPORTING

Always obey the traffic regulations when transporting the machine by road.



WARNING

This machine must be disassembled for transportation. When transporting the machine, please consult your Komatsu distributor.

STEPS FOR TRANSPORTATION

As a basic rule, always transport the machine on a trailer.

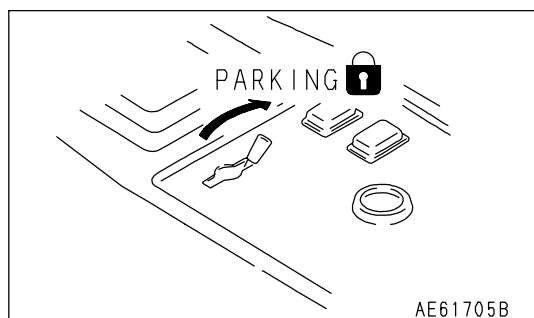
When selecting the trailer, see the weights and dimensions given in "SPECIFICATIONS (PAGE 5-2)".

Note that the specifications for the weights and dimensions for transportation differ according to the type of tires and type of dump body.

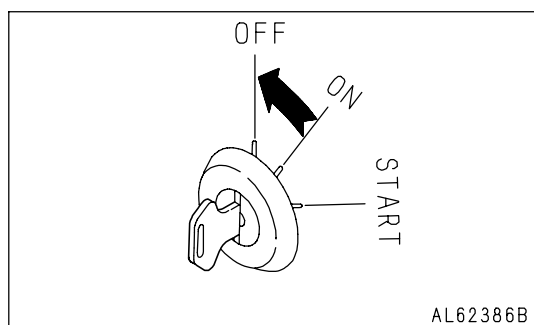
METHOD OF SECURING MACHINE

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

1. Set the parking brake valve lever to the PARKING position to apply the parking brake.

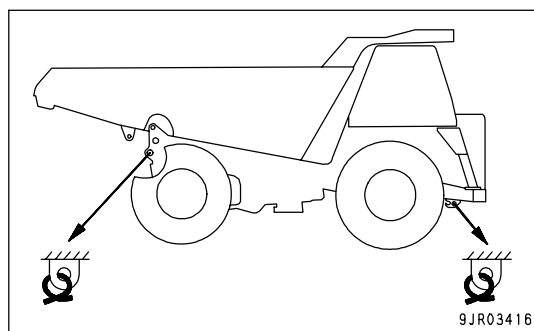


2. Turn the key in the starting switch to the OFF position to stop the engine.



3. Remove the key from the starting switch.

4. To prevent the machine from moving during transportation, insert blocks under the front and rear of each tire and secure the machine firmly in position with chains or wire rope. Be particularly careful to secure the machine firmly so that it does not slide to the side.



NOTICE

Always retract the antenna and reassemble the mirrors so that they are within the width of the machine.

METHOD OF LIFTING MACHINE

When lifting the machine at a port or any other place, always use the following procedure to lift it.



WARNING

- The operator carrying out the lifting operation using a crane must be a properly qualified crane operator.
- Never raise the machine with any worker on it.
- Always make sure that the wire rope is of ample strength for the weight of this machine.
- When lifting, keep the machine horizontal.
- Always stop the engine and apply the brake before starting the lifting operation.
- Never enter the area around or under the machine when it is raised.

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

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

NOTICE

This method of lifting applies to the standard specification machine.

The method of lifting differs according to the attachments and options installed.

For details of the procedure for machines that are not the standard specification, please consult your Komatsu distributor.

For the weight of the standard specification machine, see "SPECIFICATIONS (PAGE 5-2)"

NOTICE

- Use protectors to prevent the wire rope from being cut on sharp corners and to prevent the wire rope from cutting into the machine bodywork.
- When using a spreader bar, select an ample width to prevent contact with the machine.

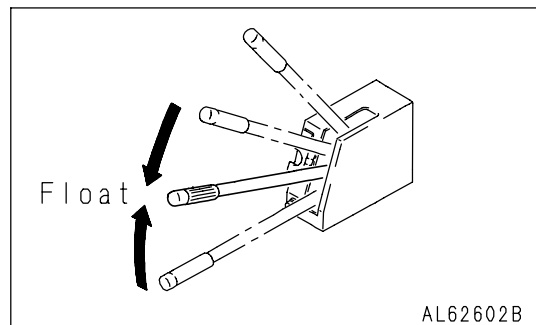
Please consult your Komatsu distributor before carrying out lifting work.

LIFTING PROCEDURE

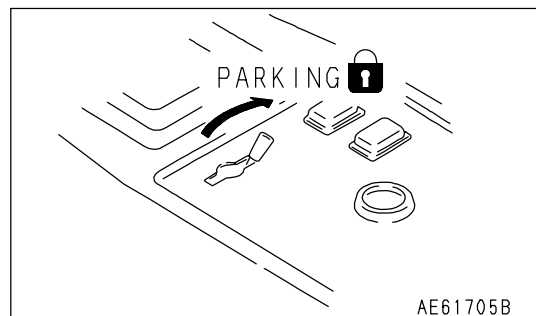
Lifting work can be carried out only with machines displaying a lifting mark.

When carrying out the lifting operation, stop the machine on firm level ground, and do as follows.

1. Start the engine, set the dump lever to the FLOAT position, and check that the body operation caution lamp goes out.



2. Stop the engine, apply the brake, and check that the area around the operator's compartment is safe.



3. Select wire ropes, slings, spreader bars and other lifting equipment to match the weight of the machine, and fit the wire ropes to the lifting positions.

REMARK

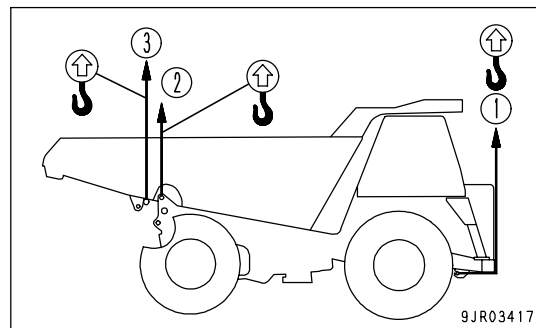
The lifting positions for the machine differs according to the conditions.

Machine with body: Positions (1) and (3)

Total: 4 places (2 at front, 2 at rear)

Machine without body: Positions (1) and (2)

Total: 4 places (2 at front, 2 at rear)



4. Fit protector blocks at the contact points between the lifting equipment and the body to prevent damage to the King equipment.
5. When the machine comes off the ground (raised 10 to 20 cm(3.9 to 7.9 in)), stop the lifting operation, check carefully that the machine is balanced and that the wire ropes are not loose, then continue the lifting operation slowly.

COLD WEATHER OPERATION

PRECAUTIONS FOR LOW TEMPERATURE

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

FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components. For details of the specified viscosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-10)".

COOLANT



WARNING

- Antifreeze is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large amounts of fresh water and see a doctor at once.
- When changing the coolant or when handling coolant containing antifreeze that has been drained when repairing the radiator, please contact your Komatsu distributor or request a specialist company to carry out the operation. Antifreeze is toxic. Do not let it flow into drainage ditches or spray it onto the ground surface.
- Antifreeze is flammable. Do not bring any flame close. Do not smoke when handling antifreeze.

NOTICE

- Use Komatsu Supercoolant wherever available, or use permanent type antifreeze coolant.
- Never use methanol, ethanol, or propanol-based antifreeze.
- Do not use any water leakage prevention agent, either alone, or in combination with antifreeze.
- Do not mix one brand of antifreeze with a different brand.

For details on the amount of antifreeze mixture and on when to change the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-25)".

BATTERY

**WARNING**

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

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

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

Electrolyte Temperature Charging Rate (%)	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

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

INSTALLATION OF RADIATOR CURTAIN

(If equipped)

If the engine water temperature gauge does not enter the green range, install a radiator curtain. The amount that the radiator curtain is opened can be adjusted from fully closed, to one window open or two windows open. Adjust the amount of opening according to the ambient temperature so that the engine water temperature gauge enters the green range.

PRECAUTIONS AFTER COMPLETION OF WORK

To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, 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 water in mud or dirt getting inside the seal and freezing.
- 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.
- Bleed the air from the tank to prevent moisture from collecting inside the tank.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
- 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 water after the day's work to prevent diluted electrolyte in the battery from freezing during the night.

AFTER COLD WEATHER

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

- Replace the fuel and oil for all parts with oil of the viscosity specified.
For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-10)".

LONG-TERM STORAGE

BEFORE STORAGE

When keeping in long-term storage (more than one month), store as follows.

- After every part is washed and dried, house the machine in a dry building. Never leave it outdoors.
In case it is indispensable to leave it outdoors, park the machine on the flat ground and cover it with canvas etc.
- Completely fill the fuel tank. This prevents moisture from collecting.
- Lubricate and change the oil before storage.
- Coat the exposed portion of the hydraulic cylinder piston rod with grease.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
- Set the parking brake valve lever to the PARKING position to apply the parking brake.
- Set the tire inflation pressure for each tire to within the range of the specified inflation pressure for the type of tire.
- Open the drain valve of the air tank, release the air, then tighten the drain valve again.
- Push the retarder control lever forward to the OFF position.
- Place the gear shift lever at the N position and turn the starting switch OFF.
- To prevent corrosion, be sure to fill the cooling system with Supercoolant (AF-NAC) or permanent type antifreeze (density between 30% and 68%).

DURING STORAGE



WARNING

If it is necessary to perform the rust-prevention operation while the machine is indoors, open the doors and windows to improve ventilation and prevent gas poisoning.

During the storage period, operate the machine once a month to prevent loss of the oil film at the lubricated parts. At the same time, charge the battery.

Before operating the dump body, wipe off the grease on the hydraulic piston rod.

AFTER STORAGE

NOTICE

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

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

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

PRECAUTIONS BEFORE TRAVELING AFTER LONG-TERM STORAGE

1. Check all the oil and water levels before traveling.
2. When traveling after long-term storage, travel forward at a speed of 10 to 15 km/h (6.2 to 9.3 MPH) for 5 minutes or 1 km to run the machine in, then change to normal travel.

TROUBLESHOOTING

AFTER RUNNING OUT OF FUEL

When starting the engine after it has run out of fuel, fill the fuel tank with clean fuel, then fill the fuel filter cartridge with clean fuel and bleed the air from the fuel system before starting.

PROCEDURE FOR BLEEDING AIR



CAUTION

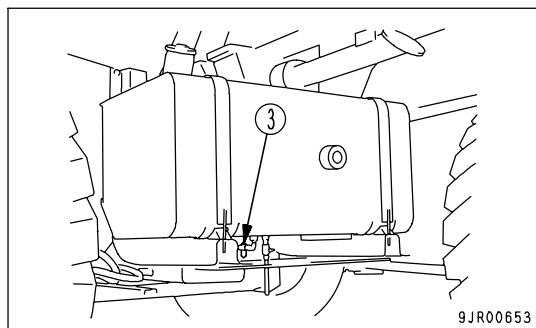
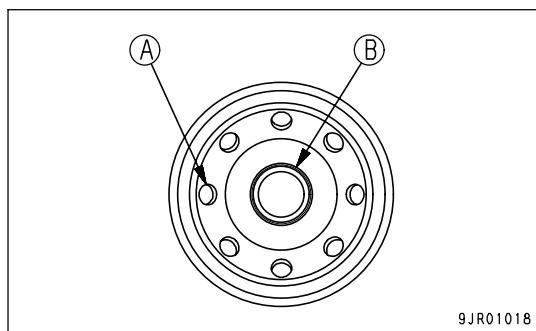
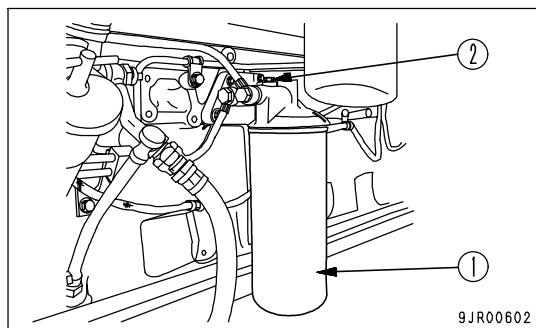
- This engine consists of higher precision parts than on the conventional fuel injection pump and nozzle, so if dirt gets in, it will cause problems. If there is any dirt stuck to the fuel line, use fuel to wash it off completely.
- Be careful when opening the air bleed plug at the fuel filter head and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

1. Remove fuel filter cartridge (1), fill the inside of the filter with clean fuel, taking care not to let dirt or dust get in, then install it again.

Add fuel from small hole (A) (dirty side) at eight places. Do not add fuel from hole (B) (clean side) at the center.

If clean fuel is not available, go on to Step 2.

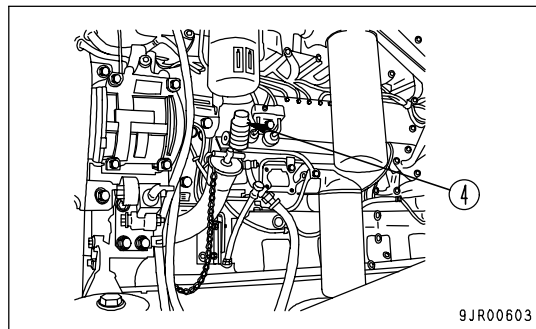
2. Loosen air plug (2) of the fuel filter head and open supply valve (3) at the bottom of the fuel tank.



3. Loosen the knob of priming pump (4), then pump the knob and check that fuel comes out from air bleed plug (2).

4. Tighten air bleed plug (2).

Tightening torque: 7.8 to 9.8 Nm (0.8 to 1 kgm , 5.8 to 7.2 lbft)



5. Loosen air bleeder (5) of the supply pump.

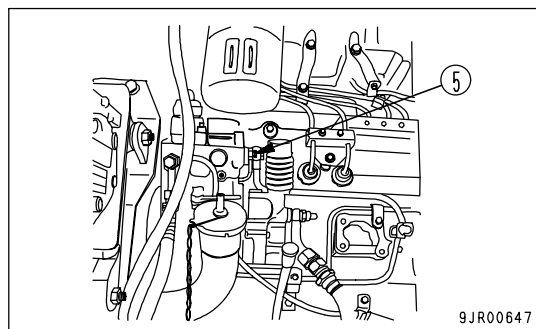
6. Pump priming pump (4) approx. 90 to 100 times until no more bubbles come out with the fuel from air bleeder (5), then tighten air bleeder (5).

Tightening torque: 4.9 to 6.9 Nm (0.5 to 0.7 kgm , 3.6 to 5.1 lbft)

7. Continue pumping until priming pump (4) becomes stiff.

8. Push in the knob of priming pump (4) and tighten it.

9. Turn the key in the starting switch to the START position and start the engine. If the engine does not start, repeat the procedure from Step 3.



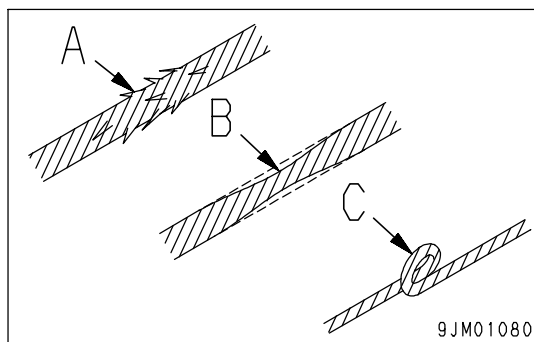
METHOD OF TOWING MACHINE



WARNING

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

- Always confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.
- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.
- Always wear leather gloves when handling wire rope.
- Never tow a machine on a slope.
- Never go between the towing machine and the towed machine during the towing operation.
- If the machine moves suddenly, a load is applied suddenly to the towing wire or drawbar, and the towing wire or drawbar may break. Move the machine gradually to a constant speed.
- Be extremely careful if there is a failure in the engine or brake system: the brakes will not work.
- If the steering and the brakes on the disabled machine cannot be operated, do not let anyone ride on the disabled machine.



NOTICE

- The permissible towing capacity for this machine is as shown below. Do not tow any load greater than this.
HD325 (standard specification): 210945N (21000kg)
HD325 (4WD specification): 239242N (24396kg)
HD405 (standard specification): 235567N (24020kg)
- Towing is only permitted in order to move a disabled machine to a place where it is possible to carry out inspection and maintenance. It must not be towed for long distances.
- Please consult your Komatsu distributor for information about towing a disabled machine.

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

- When towing a machine, tow it at a low speed of less than 2 km/h (1.2 MPH), and for a distance of a few meters to a place where repairs can be carried out. The machine should be towed only in emergencies. If the machine must be moved long distances, use a transporter.
- Use a towing machine of the same class as the machine being towed.
Check that the towing machine has ample braking power, weight, and rimpull to allow it to control both machines on slopes or on the tow road.
- Use the specified hook for both the towing machine and the machine being towed.
- To protect the operator if the towing wire or towing bar breaks, install protective plates on both the towing machine and the machine being towed.
- There are towing hooks installed to the bottom of the front frame and to the rear axle. Do not use any other place as a towing hook.
- When fitting the towing wire, check the condition of the hook to make sure that there is no problem.
- Keep the angle of the towing wire as small as possible.

Keep the angle between the center lines of the two machines to within 30 degrees.

- Towing may be carried out under various differing conditions, so it is impossible to determine beforehand the requirements for towing.

Towing on flat horizontal roads will require the minimum rimpull, while towing on slopes or on uneven road surfaces will require the maximum rimpull.

- If the pressure in the air tank has dropped abnormally because of leakage of air from the air circuit, the parking brake and secondary brake are applied, so release both brakes before towing the machine.
- Before releasing the parking brake, always put blocks under all four wheels. If the wheels are not blocked, there is danger that the machine may move.

Connect with the towing wire or drawbar, and remove the blocks from the wheels when the disabled machine is in a condition where it cannot run away.

- When carrying out the operation to release the parking brake, check that the surrounding area is safe.
- If the parking brake is released, the brakes will not work, so pay careful attention to safety.
- When towing down a slope, use two towing machines. One machine should be uphill from the disabled machine and should be connected with towing wire or a drawbar to pull the disabled machine back and keep it stable. The other machine should tow the disabled machine downhill.

WHEN ENGINE RUNS

- If the transmission and steering wheel can be operated, and the engine is running, it is possible to tow the machine out of mud or to move it for a short distance to the edge of the road.
- Check the effect of the brakes, and if the brakes do not work properly, take the action given in "When engine does not run".
- Check if it is possible to steer the machine. If the machine cannot be steered, follow the procedure given in "WHEN ENGINE DOES NOT RUN".
- The operator should sit on the machine being towed and operate the steering in the direction that the machine is towed.
- Always run the engine to allow the steering and brakes to be used.

WHEN ENGINE DOES NOT RUN

- The brakes will not work, so be extremely careful.
- Connect the towing machine securely to the towed machine. Use two towing machines of the same class or larger than the machine being towed: connect one machine each to the front and rear of the machine being towed.
- If it is necessary to change the direction of the machine being towed, it is possible to use the emergency steering, but it can be used for a maximum of only 90 seconds.
- If the emergency steering cannot be used, disconnect two hydraulic hoses each on the left and right from the steering cylinders, then carry out the towing operation. When removing the hoses, block the hoses with plugs and fit oil containers to the mouthpiece of the cylinder to prevent oil from draining to the ground.

RELEASE METHOD WHEN PARKING BRAKE AND SECONDARY BRAKE HAVE BEEN ACTUATED IN EMERGENCY

If the pressure in the air tank has dropped abnormally because of leakage of air from the air circuit, the parking brake and secondary brake are applied automatically. After emergency actuation of the brakes, if they are not released, release the brakes as follows.

METHOD OF RELEASING PARKING BRAKE

Please ask your Komatsu distributor to release the parking brake.

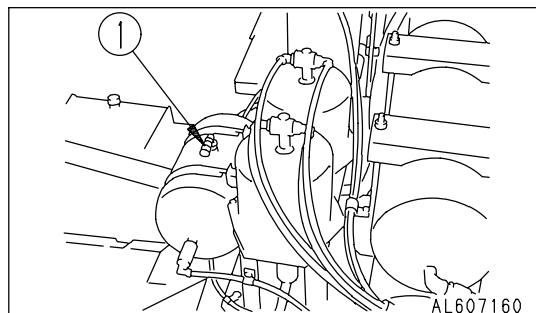


WARNING

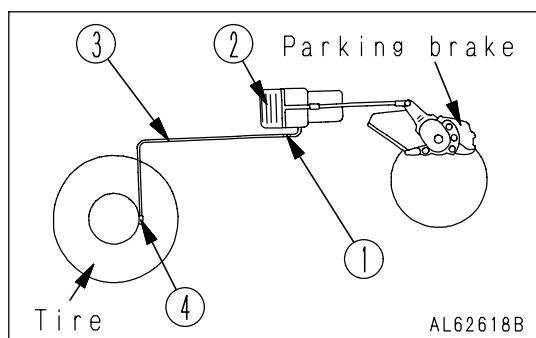
- If there is a failure in the air circuit, the brakes will not work. It is dangerous to drive the machine in this condition, so always tow the machine at low speed. When towing, run the engine so that it is possible to steer the machine.
- When releasing the parking brake, carry out the operation on flat ground and check that the surrounding area is safe. If the parking brake must be released on a slope because of an emergency or some other unavoidable reason, put blocks under the wheels before releasing the brake.

After the parking brake has been actuated in an emergency, if the parking brake is not released when the parking brake valve lever is set to the TRAVEL position, do as follows to release the parking brake.

1. Remove air charge socket (1) installed to the front air tank.
2. Remove the air hose from parking brake chamber (2), then install removed socket (1) to chamber (2).
3. Install one end of air charge hose (3) (supplied with the machine) to air charge socket (1). (The hose and socket can be installed at a touch.)
4. Push the other end of air charge hose (3) into valve (4) of the tire. Air is supplied to the parking brake chamber, and the parking brake is released.



5. When the parking brake is released, tow the machine immediately to a safe position. For details of the method of towing, see "METHOD OF TOWING MACHINE (PAGE 3-116)".



METHOD OF RELEASING SECONDARY BRAKE

Please ask your Komatsu distributor to release the secondary brake.

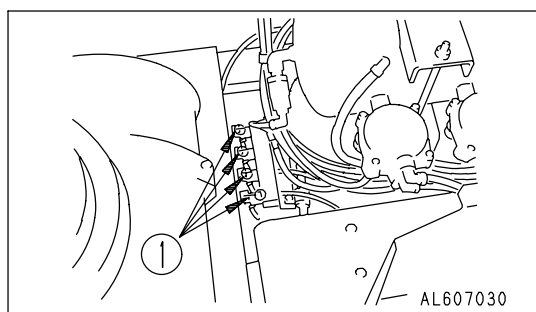


WARNING

- When the secondary brake has been actuated, never drive the machine. This will cause burning out of the brake disc or lining, or failure of the torque converter or transmission.
- When releasing the air pressure from the secondary brake tank, check that the surrounding area is safe, and always put blocks under the tires before starting the operation.

After actuation of the secondary brake, if the secondary brake is not released when the secondary brake valve lever is placed at the TRAVEL position, release the secondary brake as follows.

1. When the preparations for towing the machine are completed, pull rings (1) of the air tank drain valve (4 places), and release the air pressure to release the secondary brake.
2. After releasing the secondary brake, release rings (1).



IF BATTERY IS DISCHARGED



WARNING

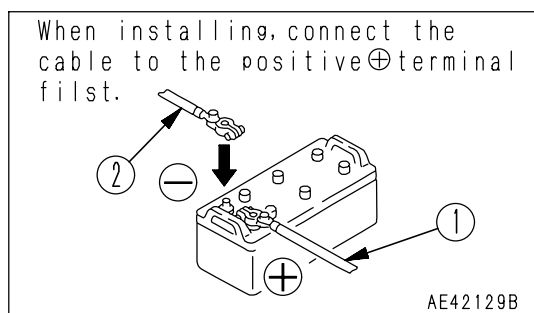
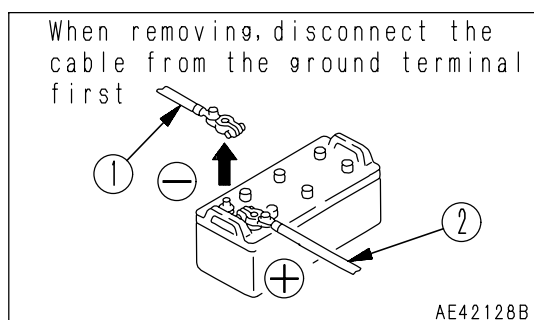
- It is dangerous to charge a battery when mounted on a machine. Make sure that it is dismantled before charging.
- When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.
- The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.
- Battery electrolyte is dilute sulfuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, immediately wash it off with a large amount of water. If it gets in your eyes, wash it out with fresh water and consult a doctor.
- When handling batteries, always wear safety glasses and rubber gloves.
- When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, install the positive (+) terminal first.
If a tool touches the positive terminal and the chassis, there is danger that it will cause a spark, so be extremely careful.
- If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.
- When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.

REMOVAL AND INSTALLATION OF BATTERY

- Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal).

If any tool touches between the positive terminal and the chassis, there is a hazard of sparks being generated.

- When installing the battery, connect the ground cable last.

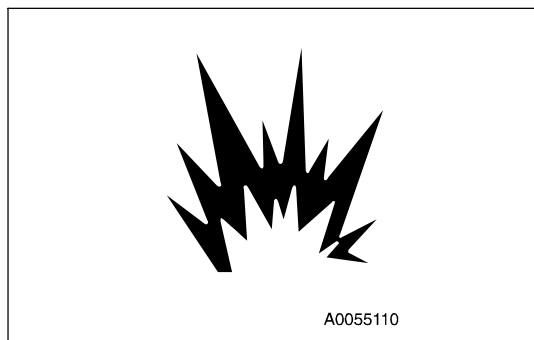


PRECAUTIONS FOR CHARGING BATTERY

CHARGING BATTERY WHEN MOUNTED ON MACHINE

When charging the battery, if the battery is mistakenly handled, there is danger of explosion. Follow the precautions in "IF BATTERY IS DISCHARGED (PAGE 3-121)" and the instructions given in the charger manual, and always do as follows.

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



STARTING ENGINE WITH BOOSTER CABLE

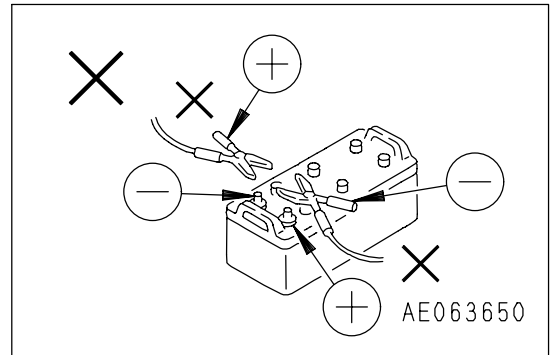
When starting the engine with a booster cable, do as follows.

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, wear safety glasses and rubber gloves.
- Be careful not to let the normal machine and problem machine contact each other. This prevents sparks from generating near the battery which could ignite the hydrogen gas given off by the battery.
- Make sure that there is no mistake in the booster cable connections. The final connection is to the engine block of the problem machine, but sparks will be generated when this is done, so connect to a place as far as possible from the battery.
- When disconnecting the booster cable, take care not to bring the clips in contact with each other or with the machine body.



NOTICE

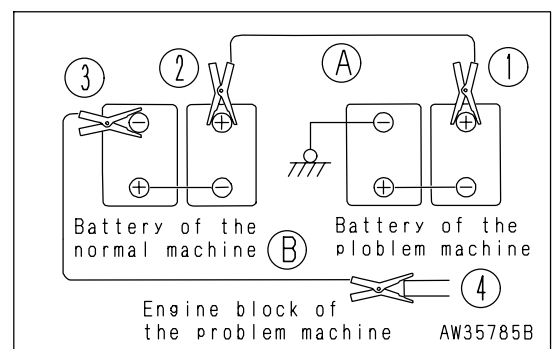
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the problem machine.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.

CONNECTING THE BOOSTER CABLES

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

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

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



STARTING THE ENGINE

**CAUTION**

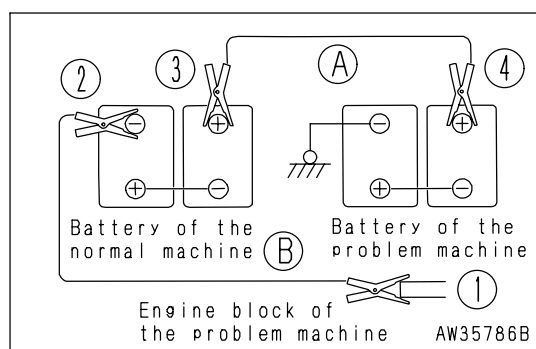
Make sure that the parking brake valve lever is at **PARKING** position and the shift lever is at **N (neutral)** position for both normal machine and the problem machine.

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

DISCONNECTING THE BOOSTER CABLES

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

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



OTHER TROUBLE

ELECTRICAL SYSTEM

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

Problem	Main causes	Remedy
Lamp does not glow brightly even when engine runs at high speed	• Defective wiring	(• Check, repair loose terminals, disconnections) • Charge, Add distilled water • Adjust alternator belt tension See EVERY 250 HOURS SERVICE
Lamp flickers while engine is running	• Insufficient battery charge • Defective adjustment of belt tension	
Charge monitor lights up while running engine	• 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 switch • Insufficient battery charge • Defective battery switch	(• Check, repair) (• Replace switch) • Charge (• Replace switch)
Starting motor turns engine sluggishly	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Starting motor disengages before engine starts	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge

CHASSIS

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

Problem	Main causes	Remedy
Torque converter oil temperature monitor flashes	<ul style="list-style-type: none"> • Leakage of oil or entry of air due to damage or defective tightening of oil pipe, pipe joint • Wear, scuffing of gear pump • Insufficient oil in transmission case • Loose fan belt • Clogged oil cooler • Long distance traveled in torque converter range • Disconnected, broken wiring to sensor 	<ul style="list-style-type: none"> (• Check, repair) (• Check, repair) • Add oil to specified level. See CHECK BEFORE STARTING • Replace belt. See EVERY 500 HOURS SERVICE (• Clean or replace) • Drive in direct range (• Repair, connect wiring)
Steering wheel is heavy	<ul style="list-style-type: none"> • Lack of grease at link • Internal leakage inside steering cylinder 	<ul style="list-style-type: none"> • Add grease (• Replace cylinder seal)
Steering wheel pulls	<ul style="list-style-type: none"> • Tire inflation pressure not uniform on left and right • Dragging, pulling of front brake 	<ul style="list-style-type: none"> • Make tire inflation pressure uniform. See CHECK BEFORE STARTING • Check wear of front brake pad For details, see EVERY 500 HOURS SERVICE
Braking effect is poor when brake pedal is depressed	<ul style="list-style-type: none"> • Pad has reached wear limit • Rear disc has reached wear limit • Insufficient air pressure • Insufficient brake oil • Air in brake circuit 	<ul style="list-style-type: none"> (• Replace pad) (• Replace pad) • Charge to specified pressure • Add brake oil. See CHECK BEFORE STARTING • Bleed air See WHEN REQUIRED
Brake pulls to one side		
Dump body speed is slow	<ul style="list-style-type: none"> • Defective gear pump • Insufficient oil 	<ul style="list-style-type: none"> (• Replace gear pump) • Add oil to specified level. See CHECK BEFORE STARTING
Suspension is hard	<ul style="list-style-type: none"> • Entry of soil or sand due to breakage of dust seal, gas leakage due to breakage of U-packing • Gas leaking from valve core 	<ul style="list-style-type: none"> (• Replace U-packing) (• Replace valve core)
Wheel on one side tends to slip	<ul style="list-style-type: none"> • Air in rear brake circuit (between slack adjuster and rear brake) • Excessive difference in wear between left and right tires • Excessive difference in division of load between left and right wheels (unbalanced load) • Excessive deformation of disc 	<ul style="list-style-type: none"> • Bleed air from rear brakes (left, right). See WHEN REQUIRED (• Replace tires) • Make load uniform (• Disassemble and adjust brake)

IF ACCELERATOR PEDAL HAS FAILED

In addition to the potentiometer detecting the pedal depression depth, the switch is installed on the accelerator pedal assembly in order to detect whether the accelerator pedal is depressed or not.

If the pedal depression depth is not detected correctly due to a failure of the accelerator pedal or incorrect electric wiring, the engine controller controls the engine speed responding to the signal from this check switch. The engine runs at 1500 rpm when the accelerator pedal is depressed, while the engine runs at low idling when the pedal is released. The engine speed varies depending on the load.

After moving the machine to a safe place by operating the accelerator pedal, contact your Komatsu distributor for repairs.

There are two methods when operating the accelerator pedal: either release the pedal and set to the OFF (low idling) position, or depress the pedal fully (1500 rpm).

If the accelerator pedal is held at an intermediate position, the system may not be able to judge if the accelerator pedal is being operated or not.

REMARK

If the engine controller cannot perform normal reception of the signal of the accelerator pedal depth, the central warning lamp flashes and simultaneously the alarm buzzer sounds and user code 02 appears.

ENGINE

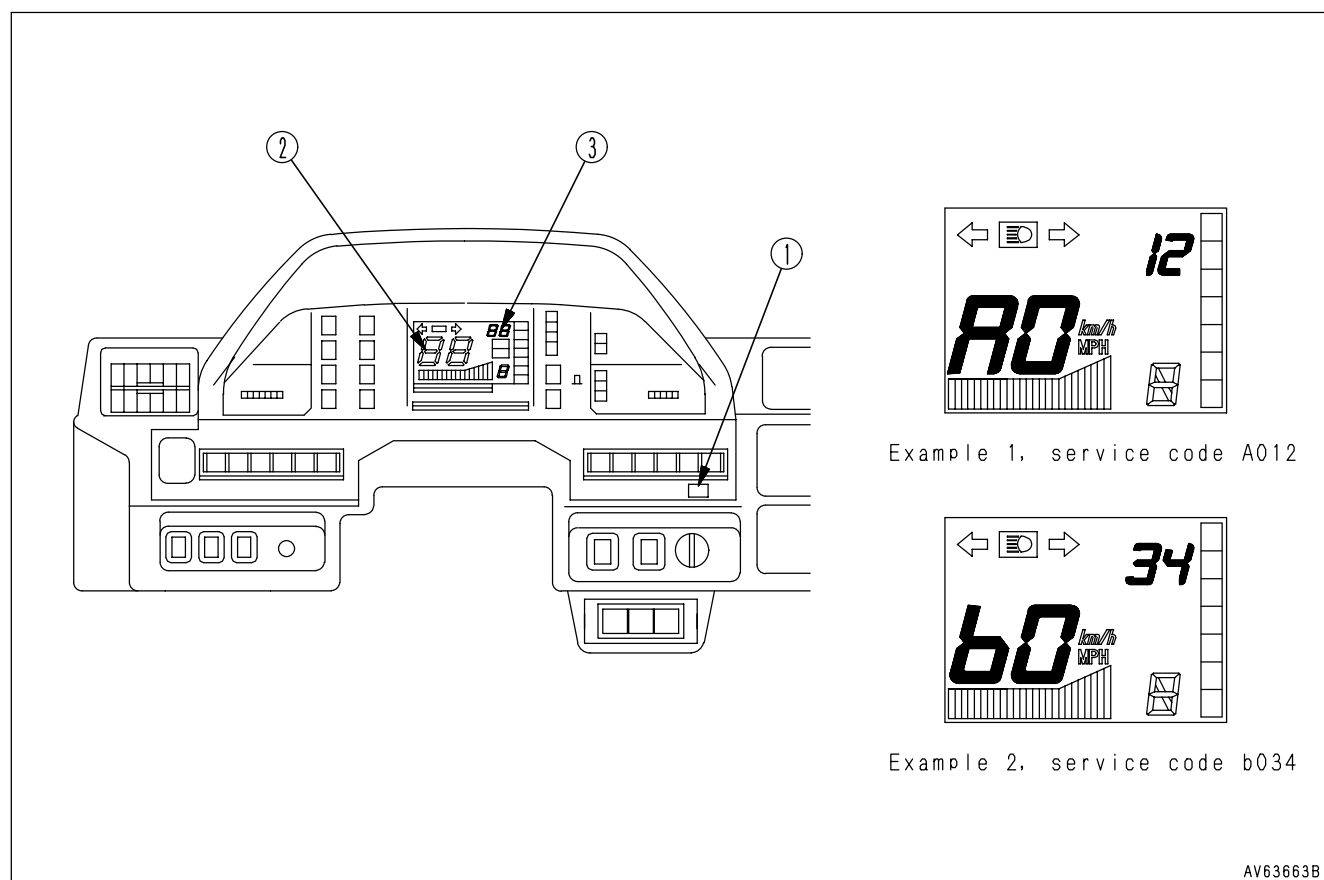
- (): Always contact your Komatsu distributor when dealing with these items.
- In cases of problems or causes which are not listed below, contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Engine oil pressure monitor lights up	<ul style="list-style-type: none"> • Insufficient oil in oil pan • Clogged oil filter cartridge • Oil leakage due to damage caused by defective tightening of oil pan, pipe joint • Disconnection, broken wiring to sensor 	<ul style="list-style-type: none"> • Add oil to specified level. See CHECK BEFORE STARTING • Replace cartridge, see EVERY 500 HOURS SERVICE (• Check, repair) (• Repair, connect wiring)
Steam spurts out from top of radiator (pressure valve)	<ul style="list-style-type: none"> • Insufficient coolant, water leakage • Loose fan belt 	<ul style="list-style-type: none"> • Check, add cooling water. See CHECK BEFORE STARTING • Replace belt. See EVERY 250 HOURS SERVICE • Change coolant, clean inside of cooling system. See WHEN REQUIRED • Clean or repair. See EVERY 500 HOURS SERVICE
Radiator cooling water level monitor lights up	<ul style="list-style-type: none"> • Dirt or scale accumulated in cooling system 	<ul style="list-style-type: none"> (• Replace water temperature gauge) (• Replace thermostat) (• Replace thermostat seal) • Tighten or replace cap (• Repair, connect wiring)
Engine water temperature gauge is in red range	<ul style="list-style-type: none"> • Radiator fins clogged or damaged • Defective water temperature gauge 	<ul style="list-style-type: none"> (• Replace water temperature gauge) (• Replace thermostat) (• Replace thermostat seal) • Tighten or replace cap (• Repair, connect wiring)
Engine water temperature monitor flashes	<ul style="list-style-type: none"> • Defective thermostat • Defective thermostat seal • Loose radiator filler cap • Disconnection, broken wiring to 	<ul style="list-style-type: none"> (• Replace water temperature gauge) (• Replace thermostat) (• Install radiator curtain)
Engine water temperature gauge display stays at lowest level and does not rise	<ul style="list-style-type: none"> • Defective water temperature gauge • Defective thermostat • In cold weather, cold wind is blowing strongly against engine 	<ul style="list-style-type: none"> (• Replace water temperature gauge) (• Replace thermostat) (• Install radiator curtain)
Engine does not start even when starting motor is turned	<ul style="list-style-type: none"> • Insufficient fuel • Air in fuel system • No fuel in fuel filter • Starting motor cranks engine too slowly • Starting motor does not turn • Defective valve clearance (defective compression) 	<ul style="list-style-type: none"> • Add fuel. See CHECK BEFORE STARTING (• Repair place where air is leaking in) • Fill filter with fuel. See EVERY 500 HOURS SERVICE • See electrical components • See electrical components (• Adjust valve clearance)
Fuel stops from time to time	<ul style="list-style-type: none"> • Crushed fuel tank breather tube 	<ul style="list-style-type: none"> (• Replace breather tube)

Problem	Main causes	Remedy
Excessive oil consumption	<ul style="list-style-type: none"> • Oil leakage • Excessive oil in oil pan 	<ul style="list-style-type: none"> (• Check, repair) • Add oil to specified level. See CHECK BEFORE STARTING
Exhaust gas is white or bluish	<ul style="list-style-type: none"> • Worn piston, ring, cylinder liner • Improper fuel • Defective turbocharger 	<ul style="list-style-type: none"> (• Replace) • Replace with specified fuel (• Check, replace)
Exhaust gas is black	<ul style="list-style-type: none"> • Clogged air cleaner element • Worn piston, ring, cylinder liner • Defective compression • Defective turbocharger • Defective exhaust brake • Defective injector 	<ul style="list-style-type: none"> • Clean or replace. See WHEN REQUIRED (• Check, repair) • See "Defective valve clearance" above (• Check, replace) (• Check, replace, repair) (• Check, adjust, repair)
Engine hunts	<ul style="list-style-type: none"> • Air entering suction side of fuel line 	<ul style="list-style-type: none"> (• Repair place where air is leaking in)
Combustion noise occasionally makes breathing sound	<ul style="list-style-type: none"> • Defective nozzle 	<ul style="list-style-type: none"> (• Replace nozzle)
There is knocking (combustion or mechanical)	<ul style="list-style-type: none"> • Poor quality fuel being used • Overheating 	<ul style="list-style-type: none"> • Replace with specified fuel • See "Engine water temperature gauge is in red range" above

SERVICE CODE

If any abnormality occurs, stop the machine, apply the parking brake and check the service code, then contact your Komatsu distributor for repairs.



If user code appears, check as follows:

1. Stop the machine safely and apply the parking brake.
2. While the user code is displayed, continue to depress check switch (1) for the caution pilot lamp bulb.
3. If the service code indicating possible cause is displayed on speedometer (2) and user code display (3), release the check switch for caution pilot lamp bulb and check the service code.
Immediately after checking the service code, stop the engine.
4. After checking the service code, contact your Komatsu distributor for repairs.

REMARK

- The first two digits are shown on speedometer (2) and the last two digits are displayed on user code display panel (3).
- The first digit is a letter, and the other three digits are numerals.
- The service code is displayed for 3 seconds, then the screen returns to the normal display. If more than one failure has occurred at the same time, each failure is displayed for 3 seconds each.

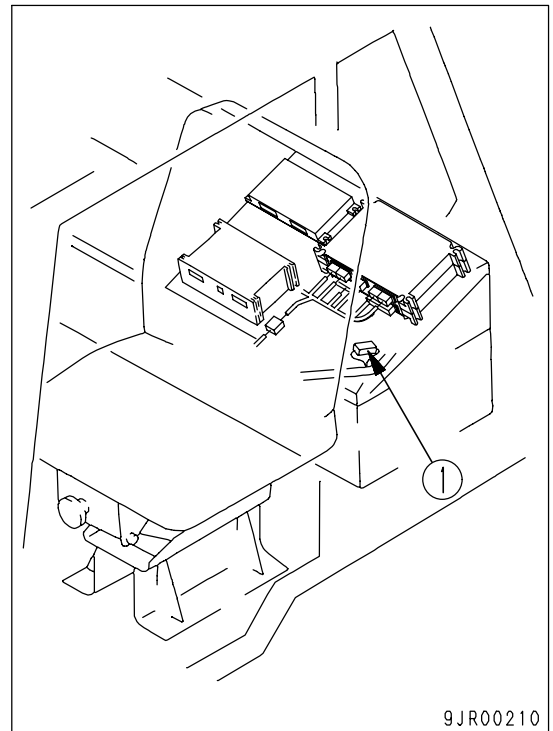
TRANSMISSION CONTROLLER

If any abnormality occurs in the transmission, reduce the travel speed by using the brake, stop the machine on a safe place. Gear shifting may not work for some failure modes.

If necessary, move the shift lever to the N position, remove emergency escape connector (1) (connector No. A-1, A-2, black 1-pin connector) and insert again, then operate the shift lever to move the machine without depressing the accelerator pedal.

If the shift lever is operated with the accelerator pedal depressed, the emergency escape function will not work. Furthermore, the emergency escape function may also not work for some failure modes.

While the emergency escape function is working, the shift indicator of machine monitor panel alternately displays E and transmission shift range.



4-WHEEL DRIVE CONTROLLER

(HD325 only the machine of 4WD specifications)



WARNING

If only the transmission controller shows abnormalities on the display, remove the connector part of the 4WD controller, then take action for the failure.

If the central warning lamp and 4-wheel drive lamp flash when the machine is traveling and the alarm buzzer sounds at the same time, keep calm and do as follows.

1. Use the brake to reduce the speed, and stop the machine in a safe place.
2. Open the cover at the rear of the operator's compartment, and check the numerals on the self-diagnostic display at the top of the 4-wheel drive controller.
3. Turn the 4-wheel drive switch OFF.

When the central warning lamp and 4-wheel drive switch stop flashing and the alarm buzzer stops, then it is possible to travel in 2-wheel drive. Travel in 2-wheel drive to move the machine.

4. If the central warning lamp and 4-wheel drive switch do not stop flashing or the alarm buzzer continues to sound even when the 4-wheel drive switch is turned OFF, do not try to move the machine.
5. Check the self-diagnostic display, then contact your Komatsu distributor for repairs.

REMARK

The normal self-diagnostic display shows 2WD "3.2" 4WD "A□".

The □ indicates the gearshift range.

Example: I=F1, B=R, A=shifting

PAYLOAD METER (PRINTER TYPE)

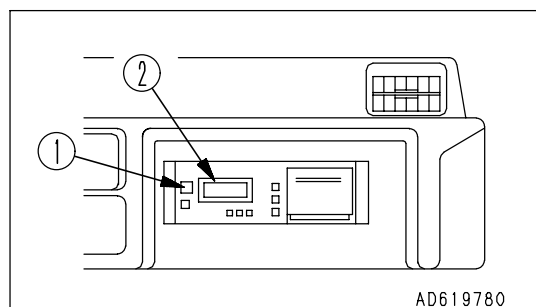
If any abnormality occurs in the payload meter, an error message is displayed on the controller display.

If "E-33", "PAPE", "FULL", "CAL_" are displayed, see "HANDLING PAYLOAD METER (PAGE 6-2)" for details. If any other error message is displayed, please contact your Komatsu distributor for repairs.

REMARK

Once an error has been displayed, it continues to be displayed in display unit (2) until CAL switch (1) is pressed.

If the controller detects the abnormality, all the external display lamps light up.



PAYLOAD METER II (CARD TYPE)

If any abnormality occurs in the payload meter, an error message is displayed on the controller display. See the separate Operation and Maintenance Manual for "Payload Meter II".

MAINTENANCE

WARNING

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

GUIDES TO MAINTENANCE

Do not perform 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 performed.

KOMATSU GENUINE REPLACEMENT PARTS:

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

KOMATSU GENUINE OILS:

For lubrication of the machine, use the Komatsu genuine lubricants. Moreover use oil of the specified viscosity according to the ambient temperature.

ALWAYS USE CLEAN WASHER FLUID:

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

ALWAYS USE CLEAN OIL AND GREASE:

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

CHECKING FOREIGN MATERIALS IN DRAINED OIL AND ON FILTERS:

After changing the oil or replacing the filter, check the drained oil and filter 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. In addition, when replacing the engine oil filter, fill the new filter with the specified clean oil, then install it.

OIL CHANGE:

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

WELDING INSTRUCTIONS:

- Turn off the engine starting switch.
- Do not apply more than 200 V continuously.
- Connect grounding the cable within 1 m (3.28 ft) from the area to be welded. Connecting grounding cable near meters and connectors will lead to the failure of meters.
- If a seal or bearing happens to come between the part being welded and grounding point, change the grounding point to avoid such parts.
- Do not use the area around the pins or the hydraulic cylinders as the grounding point.
Sparks will cause damage to the plated portion.

DO NOT DROP THINGS INSIDE MACHINE:

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

DUSTY WORKSITES:

When working at dusty worksites, do as follows:

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

AVOID MIXING OILS:

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

LOCKING INSPECTION COVERS:

Lock inspection cover securely into position with the lock bar. If inspection or maintenance is performed with inspection cover not locked in position, there is a danger that it may be suddenly blow shut by the wind and cause injury to the worker.

BLEEDING AIR FROM HYDRAULIC CIRCUIT:

If the hydraulic components have been repaired or replaced and if the hydraulic hoses, pipes, etc. have been disconnected, it is necessary to bleed air in the circuit. See "WHEN REQUIRED (PAGE 4-23)".

PRECAUTIONS WHEN INSTALLING HYDRAULIC HOSES:

- When removing parts at locations where there are O-rings or gasket seals, clean the mounting surface, and replace with new parts.
When doing this, be careful not to forget to assemble the O-rings and gaskets.
- When installing the hoses, do not twist them or bend them sharply. If they are installed so, their service life will be shortened extremely and they may be damaged.

CHECKS AFTER INSPECTION AND MAINTENANCE:

If you forget to perform the checks after inspection and maintenance, unexpected problems may occur, and this may lead to serious injury or property damage. Always do the following:

- Checks after operation (with engine stopped)
 - Have any inspection and maintenance points been forgotten?
 - Have all inspection and maintenance items been performed correctly?
 - Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside the machine and get caught in the lever linkage mechanism.
 - Are there any leakage of coolant or oil? Have all nuts and bolts been tightened?
- Check when the engine is running
 - See "TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-29)" in the section on safety for checking when the engine is running. Pay enough attention for safety.
 - Check if the inspected and serviced area is normally operated.
 - Increase the engine speed to check for the leak of fuel and oil.

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)
Transmission case	Power train oil TO30 (Komatsu genuine parts)
Front brake oil tank Hydraulic tank	Power train oil TO10 (Komatsu genuine parts)
Front suspension Rear suspension	Hydraulic oil HO-MVK (Komatsu genuine parts)
Differential case Final drive case	Power train oil TO30 (Komatsu genuine parts)
Radiator	Supercoolant AF-NAC (Density:30% or above) (Komatsu genuine parts)

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.
Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in the Operation and Maintenance Manual. Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
The majority of problems with the machine are caused by the entry of such impurities.
Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
Having too much oil or too little oil are both causes of problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, please contact your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend you have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.
- When using commercially available oil, it may be necessary to reduce the oil change interval.
We recommend that you use the Komatsu oil clinic to carry out a detailed checks of the characteristics of the oil.

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 in the Operation and Maintenance Manual.
Fuel may congeal depending on the temperature when it is used (particularly in low temperatures below -15°C (5°F)), so it is necessary to use the fuel that is suitable for the temperature.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.
- If there is any foreign material in the fuel tank, wash the tank and fuel system.

NOTICE

Always use diesel fuel. Never use any other fuel.

The engine on this machine uses electronic control and high-pressure fuel injection equipment to enable it to provide good fuel consumption and good exhaust gas characteristics. For this reason, high-precision parts and lubricating ability are demanded. Using low-viscosity fuel with poor lubricating ability will cause a marked reduction in the durability of the engine.

COOLANT AND WATER FOR DILUTION

- The coolant has the important function of preventing corrosion as well as preventing freezing.
Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.
Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.
- When 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 4-25)".
Supercoolant (AF-NAC) may be supplied already mixed. In such cases, never dilute with 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)

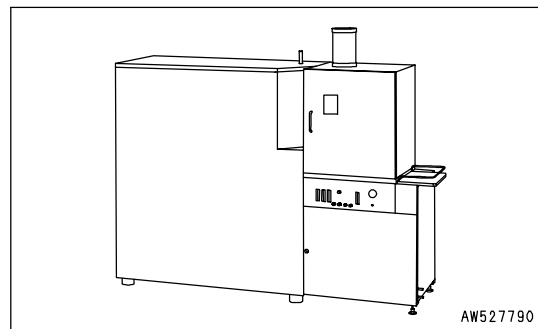
KOWA is a maintenance service that makes it possible to prevent machine failures and downtime. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other problems.

We strongly recommend you to use this service. The oil analysis is carried out at actual cost, so the cost is low, and the results of the analysis are reported together with recommendations which will reduce repair costs and machine downtime.

KOWA ANALYSIS ITEMS

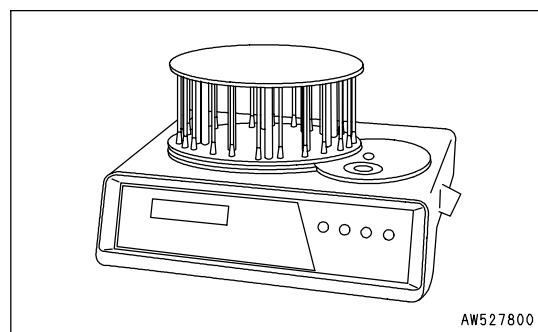
- Measurement of density of metal wear particles

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



- Measurement of quantity of particles

This uses a PQI (Particle Quantifier Index) measurer to measure the quantity of iron particles of 5 μ m or more, enabling early detection of failures.



- Others

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

OIL SAMPLING

- Sampling interval

250 hours: Engine

500 hours: Other components

- Precautions when sampling

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

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

STORING OIL AND FUEL

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

FILTERS

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

OUTLINE OF ELECTRIC SYSTEM

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

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.

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

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

WEAR PARTS LIST

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

- HD325, HD405

Item	Part No.	Part Name	Q'ty	Replacement frequency
Engine oil filter	600-211-1340	Cartridge	1	EVERY 500 HOURS
Additional fuel filter	600-319-3440	Cartridge	1	
Transmission oil filter (Valve inlet side)	424-16-11140	Element	1	
	(424-16-11130)	(O-ring)	(1)	
	(424-16-11630)	(O-ring)	(2)	
Transmission oil filter (Return side)	07063-01210 (07000-15195)	Element (O-ring)	1 (1)	EVERY 1000 HOURS
Fuel filter	600-319-3520	Cartridge	1	
Hydraulic filter	07063-01142 (07000-F5175)	Element (O-ring)	1 (1)	
Corrosion resistor	600-411-1171	Cartridge	1	
Air cleaner	600-185-5100	Element Ass'y	2	-
	600-185-5110	Outer element	2	-
Payload meter paper (if equipped)	7818-27-2910	Paper	1	-
Payload meter inner battery (if equipped)	7818-27-2860	Battery	1	-

- HD325 The machine of 4WD specifications

Item	Part No.	Part Name	Q'ty	Replacement frequency
Engine oil filter	600-211-1340	Cartridge	1	EVERY 500 HOURS
Additional fuel filter	600-319-3440	Cartridge	1	
Transmission oil filter (Valve inlet side)	424-16-11140	Element	1	
	(424-16-11130)	(O-ring)	(1)	
	(424-16-11630)	(O-ring)	(2)	
Transmission oil filter (Return side)	07063-01210 (07000-15195)	Element (O-ring)	1 (1)	EVERY 1000 HOURS
Front drive oil filter	363-18-31470 (07000-22060)	Element (O-ring)	2 (2)	
Fuel filter	600-319-3520	Cartridge	1	
Hydraulic filter	07063-01142 (07000-F5175)	Element (O-ring)	1 (1)	
Corrosion resistor	600-411-1171	Cartridge	1	-
Air cleaner	600-185-5100	Element Ass'y	2	
	600-185-5110	Outer element	2	-
Payload meter paper (if equipped)	7818-27-2910	Paper	1	-
Payload meter inner battery (if equipped)	7818-27-2860	Battery	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 conditioner for long periods of time, it is essential to follow the instructions in this Operation and Maintenance Manual.

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

If the fuel sulfur content is more than 0.5%, change the oil according to the following table.

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

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

- HD325, HD405

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius										Recommended Komatsu Fluids
		-22	-4	14	32	50	68	86	104	122 °F		
		-30	-20	-10	0	10	20	30	40	50 °C		
Engine oil pan	Engine oil	(Note.1)										Komatsu EOS0W30
		(Note.1)										Komatsu EOS5W40
												Komatsu EO10W30DH
												Komatsu EO15W40DH
												Komatsu EO30DH
Transmission Case	Power train oil (Note.2)											TO10
												TO30
Front brake oil tank Hydraulic tank	Power train oil											TO10
	Hydraulic oil											HO46-HM
												HO-MVK
Front suspension Rear suspension	Hydraulic oil											HO-MVK
Differential case Final drive case	Power train oil											TO30
												TO50
Grease fitting	Hyper grease (Note.3)											G2-T, G2-TE
	Lithium EP grease											G2-LI
Cooling system	Supercoolant AF-NAC(Note.4)											AF-NAC
Fuel tank	Diesel fuel											ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
												ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

- ASTM: American Society of Testing and Material

Reservoir		Engine oil pan	Transmission case	Front brake oil tank	Hydraulic tank	Front suspension (each)	Rear suspension (each)
Capacity							
Specified	Liters	56	195	2	165	13.8	8.1
	US gal	14.80	51.48	0.53	43.56	3.64	2.14
Refill	Liters	52	90	-	129	-	-
	US gal	13.74	23.78	-	34.06	-	-

Reservoir		Differential case	Final drive case (each)	Fuel tank	Cooling system
Capacity					
Specified	Liters	50	17	500	89
	US gal	13.2	4.49	132.1	23.51
Refill	Liters	45	13	-	-
	US gal	11.88	3.43	-	-

NOTICE

Use only diesel fuel.

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

Note 1: SAE0W30EOS and SAE5W40EOS must be fully synthetic and HTHS (High-Temperature High-Shear Viscosity 150°C) must be equal to or higher than 3.5 cP. Komatsu EOS0W30 and EOS5W40 are the most suitable oils. If these oils are not available, follow the instruction "RECOMMENDED BRANDS, RECOMMENDED QUALITY FOR PRODUCTS OTHER THAN KOMATSU GENUINE OIL (PAGE 4-15)" at the end of this chapter.

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

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

Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.

2) For details of the ratio when diluting super coolant with water, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-25)".

When the machine is shipped from the factory, it may be filled with coolant containing 30% or more Supercoolant (AF-NAC). In this case, no adjustment is needed for temperatures down to -10°C (14°F). (never dilute with water)

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

- HD325 4WD specifications

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius										Recommended Komatsu Fluids
		-22	-4	14	32	50	68	86	104	122 °F		
		-30	-20	-10	0	10	20	30	40	50 °C		
Engine oil pan	Engine oil	<div>(Note.1)</div>										Komatsu EOS0W30
		<div>(Note.1)</div>										Komatsu EOS5W40
												Komatsu EO10W30DH
												Komatsu EO15W40DH
												Komatsu EO30DH
Transmission Case (Note.2)	Power train oil (Note.3)											TO10
												TO30
Front brake oil tank Front drive oil tank Hydraulic tank	Power train oil											TO10
	Hydarulic oil											HO46-HM
												HO-MVK
Front suspension Rear suspension	Hydarulic oil											HO-MVK
Differential case Final drive case	Power train oil											TO30
												TO50
Grease fitting	Hyper grease (Note.4)											G2-T, G2-TE
	Lithium EP grease											G2-LI
Cooling system	Supercoolant AF-NAC(Note.5)											AF-NAC
Fuel tank	Diesel fuel											ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
												ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

- ASTM: American Society of Testing and Material

Reservoir		Engine oil pan	Transmission case	Front final drive (each)	Front brake oil tank	Front drive oil tank	Hydraulic tank
Capacity							
Specified	Liters	56	239	-	2	52	165
	US gal	14.80	63.1	-	0.53	13.7	43.56
Refill	Liters	52	90	22	-	36	129
	US gal	13.74	23.78	5.8	-	9.5	34.06

Reservoir		Front suspension (each)	Rear suspension (each)	Differential case	Final drive case (each)	Fuel tank	Cooling system
Capacity							
Specified	Liters	13.8	8.1	50	17	500	89
	US gal	3.64	2.14	13.2	4.49	132.1	23.51
Refill	Liters	-	-	45	13	-	-
	US gal	-	-	11.88	3.43	-	-

NOTICE

Use only diesel fuel.

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

Note 1: SAE0W30EOS and SAE5W40EOS must be fully synthetic and HTHS (High-Temperature High-Shear Viscosity 150°C) must be equal to or higher than 3.5 cP. Komatsu EOS0W30 and EOS5W40 are the most suitable oils. If these oils are not available, follow the instruction "RECOMMENDED BRANDS, RECOMMENDED QUALITY FOR PRODUCTS OTHER THAN KOMATSU GENUINE OIL (PAGE 4-15)" at the end of this chapter.

Note 2: Amount of oil in transmission case includes the amount of oil in front final drive.

Note 3: Powertrain oil has different properties from engine oil. Be sure to use the recommended oils.

Note 4: 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 5: Supercoolant (AF-NAC)

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

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

Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.

2) For details of the ratio when diluting super coolant with water, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-25)".

When the machine is shipped from the factory, it may be filled with coolant containing 30% or more Supercoolant (AF-NAC). In this case, no adjustment is needed for temperatures down to -10°C (14°F). (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, or when checking the latest specifications, refer to the Komatsu web page or consult your Komatsu distributor.

STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

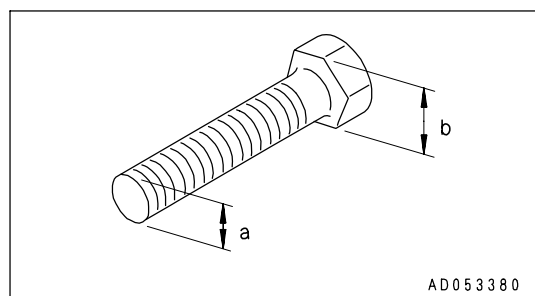
TORQUE LIST

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 (b) 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 of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		Nm	kgm	lbft	Nm	kgm	lbft
6	10	13.2	1.35	9.8	11.8-14.7	1.2-1.5	8.7-10.8
8	13	31	3.2	23.1	27-34	2.8-3.5	20.3-25.3
10	17	66	6.7	48.5	59-74	6.0-7.5	43.4-54.2
12	19	113	11.5	83.2	98-123	10.0-12.5	72.3-90.4
14	22	177	18	130.2	157-196	16.0-20.0	115.7-144.7
16	24	279	28.5	206.1	245-309	25.0-31.5	180.8-227.8
18	27	382	39	282.1	343-425	35.0-43.5	253.2-314.6
20	30	549	56	405.0	490-608	50.0-62.0	361.7-448.4
22	32	745	76	549.7	662-829	67.5-84.5	488.2-611.2
24	36	927	94.5	683.5	824-1030	84.0-105.0	607.6-759.5
27	41	1320	135.0	976.5	1180-1470	120.0-150.0	868.0-1085.0
30	46	1720	175.0	1265.8	1520-1910	155.0-195.0	1121.1-1410.4
33	50	2210	225.0	1627.4	1960-2450	200.0-250.0	1446.6-1808.3
36	55	2750	280.0	2025.2	2450-3040	250.0-310.0	1808.3-2242.2
39	60	3280	335.0	2423.1	2890-3630	295.0-370.0	2133.7-2676.2

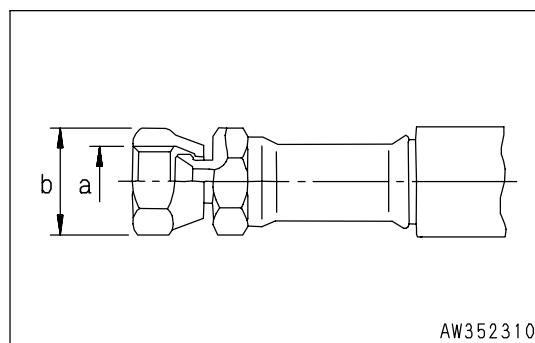


NOTICE

When tightening panels or other parts having tightening fixtures made of plastic, be careful not to use excessive torque: doing so will damage the plastic parts. Pay enough attention when you tighten up.

Apply the following table for Hydraulic Hose.

Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		Nm	kgm	lbft	Nm	kgm	lbft
10	14	14.7	1.5	10.8	12.7-16.7	1.3-1.7	9.4-12.3
14	19	29.4	3.0	21.7	27.5-39.2	2.8-4.0	20.3-28.9
18	24	78.5	8.0	57.3	58.8-98.1	6.0-10.0	43.4-72.3
22	27	117.7	12.0	86.8	88.3-137.3	9.0-14.0	65.1-101.3
24	32	147.1	15.0	108.5	117.7-176.5	12.0-18.0	86.8-130.2
30	36	215.7	22.0	159.1	176.5-245.2	18.0-25.0	130.2-180.8
33	41	255.0	26.0	188.1	215.7-284.4	22.0-29.0	159.1-209.8



PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

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

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

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

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

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

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

SAFETY CRITICAL PARTS

No.	Safety critical parts for periodic replacement	Replacement interval	Remarks
1	Fuel hose (fuel tank - injection pump)	Every 4000 hours or 2 years, whichever comes sooner	Replace as assembly
2	Fuel hose (injection pump - fuel tank)		
3	Spill hose (engine output connector - fuel tank)		
4	Water separator (case, O-ring, plug)		
5	Rubber hoses of brake piping		
6	High-pressure hoses in steering circuit (pump ↔ demand valve ↔ hoist valve ↔ hoist cylinder)		
7	High-pressure hose in hoist circuit (pump ↔ demand valve ↔ hoist valve ↔ hoist cylinder)		
8	Outlet hose of retarder cooling oil pump		
9	Outlet hose of transmission oil pump		
10	Brake valve parts	Every 2000 hours or every one year, whichever comes first	Replace as a service kit
11	Parking brake valve parts		
12	Relay valve parts		
13	Air governor parts		
14	Retarder control valve parts		
15	Emergency relay valve parts		
16	Secondary brake valve parts		
17	Parking brake chamber parts		
18	Brake chamber parts (Front and rear)		
19	Front caliper brake parts		
20	Slack adjuster parts		
21	Seat belt	Every 3 years	Replace

MAINTENANCE SCHEDULE CHART

MAINTENANCE SCHEDULE CHART

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

Change oil in engine oil pan, replace engine oil filter cartridge	4- 55
Replace fuel filter cartridge	4- 62
Replace transmission oil filter element (valve inlet side, return side)	4- 58
Change oil in transmission case	4- 65
Replace hydraulic filter element	4- 68
Change oil in hydraulic tank	4- 71
Change oil in final drive case	4- 72
Change oil in differential case	4- 72

WHEN REQUIRED

Check, clean or replace air cleaner	4- 23
Clean inside of cooling system	4- 25
Check level of window washer fluid, add fluid	4- 28
Clean air conditioner air filter	4- 28
Check refrigerant (gas) level	4- 29
Check dump body	4- 29
Check electric intake air heater	4- 29
Check length of suspension cylinder, check oil level	4- 30
Bleed air from rear brake	4- 31
Bleed air from front brake	4- 32
Adjust parking brake	4- 33
Bleed air from hydraulic circuit of front drive	4- 34
Adjust body positioner	4- 35
Check play of output coupling of output shaft	4- 36
Selection and inspection of tires	4- 36
Drain water from water separator	4- 39

CHECK BEFORE STARTING

EVERY 50 HOURS SERVICE

Lubrication	4- 41
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EVERY 100 HOURS SERVICE

Check alcohol level in alcohol injector, add alcohol	4- 43
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EVERY 250 HOURS SERVICE

Check oil level in differential case, add oil	4- 44
Check oil level in final drive case, add oil	4- 44
Lubricate drive shaft (5 places)	4- 45
Check drive shaft	4- 45
Check level of battery electrolyte	4- 46
Check alternator belt tension, adjust	4- 48
Check air conditioner compressor belt tension, adjust	4- 49
Clean breathers	4- 50
Check frame	4- 51
Check braking capacity of foot brake	4- 51
Check braking capacity of retarder brake	4- 52
Check braking capacity of parking brake	4- 52
Check wear of parking brake pads	4- 52
Check, clean automatic suspension	4- 53
Clean central breather box and central breather air cleaner	4- 54

EVERY 500 HOURS SERVICE

Change oil in engine oil pan, replace engine oil filter cartridge	4- 55
Replace additional fuel filter cartridge	4- 56
Clean fuel tank strainer	4- 57
Replace transmission oil filter element (valve inlet side, return side)	4- 58
Replace element of front drive oil filter	4- 59
Check wear of front disc brake pads	4- 59
Clean, check radiator fins and after cooler fins	4- 60
Check fan belt tension, adjust	4- 60
Lubricate tension pulley (1 place)	4- 61

EVERY 1000 HOURS SERVICE

Replace fuel filter cartridge	4- 62
Replace corrosion resistor cartridge	4- 64
Change oil in transmission case, clean transmission case strainer	4- 65
Change oil in front final drive	4- 66
Change oil in front drive oil tank, clean front drive oil tank strainer	4- 67
Replace hydraulic filter element	4- 68
Lubrication	4- 69
Check wear of rear brake disc	4- 70
Check tightening parts of turbocharger	4- 70

EVERY 2000 HOURS SERVICE

Change oil in hydraulic tank -----	4- 71
Change oil in final drive case -----	4- 72
Change oil in differential case -----	4- 72
Clean differential case breather -----	4- 73
Clean engine breather element -----	4- 73
Clean air dryer filter and deflector (if equipped) -----	4- 74
Clean emergency relay valve -----	4- 75
Check alternator, starting motor -----	4- 75
Check, adjust engine valve clearance -----	4- 75
Check injector (EPA exhaust gas regulation areas only) -----	4- 75
Clean, check turbocharger -----	4- 75
Check play of turbocharger rotor -----	4- 75

EVERY 4000 HOURS SERVICE

Check water pump -----	4- 76
Check air compressor -----	4- 76
Check fan pulley and tension pulley -----	4- 76
Check vibration damper -----	4- 76
Check injector (all areas except EPA exhaust gas regulation areas) -----	4- 76
Replace injector assembly (EPA exhaust gas regulation areas only) -----	4- 76
Checking for looseness of high-pressure clamp, hardening of rubber -----	4- 76
Checking for missing fuel spray prevention cap, hardening of rubber -----	4- 77

EVERY 8000 HOURS SERVICE

Replace injector nozzle tip (all areas except EPA exhaust gas regulation areas) -----	4- 78
Replace high-pressure piping clamp -----	4- 78
Replace fuel spray prevention cap -----	4- 78

EVERY 15000 HOURS SERVICE

Check, replace steering A arm mounting bolt -----	4- 79
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ADJUST INJECTOR

This machine uses an engine that conforms with all exhaust gas regulations.

The exhaust gas regulations differ according to the applicable area. To ensure that the engine conforms with the regulations in the area of use and can fully display its performance, keep to the following periodic maintenance intervals when adjusting the injector.

If the periodic maintenance intervals are not observed correctly, the engine may not be able to display its performance fully, and it may also not conform with the regulations.

NOTICE

When transporting a machine from an A regulation area to a B regulation area, always replace all the injector assemblies before transporting the machine to the new area.

Check with your Komatsu distributor to confirm if your area of operation is an A regulation area or a B regulation area.

A REGULATION AREA

EPA regulation areas and areas with the regulations equivalent to EPA regulations

EVERY 2000 HOURS SERVICE

Check injector

Check the exhaust gas color visually. If there is any abnormality in the exhaust gas color, please ask your Komatsu distributor to carry out inspection or replacement. For details of the procedure if any abnormality is found, see Section "ENGINE (PAGE 3-128)".

EVERY 4000 HOURS SERVICE

Replace injector assembly

Ask your Komatsu distributor to carry out this work.

B REGULATION AREA

Areas not applying EPA regulations or areas not applying regulations equivalent to EPA regulations

EVERY 4000 HOURS SERVICE

Check injector

Check the exhaust gas color visually. If there is any abnormality in the exhaust gas color, please ask your Komatsu distributor to carry out inspection or replacement. For details of the procedure if any abnormality is found, see Section "ENGINE (PAGE 3-128)".

EVERY 8000 HOURS SERVICE

Replace injector nozzle tip

Ask your Komatsu distributor to carry out this work.

SERVICE PROCEDURE

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

Perform the following maintenance only after the first 250 hours.

- Change oil in engine oil pan, replace engine oil filter cartridge
- Replace fuel filter cartridge
- Replace transmission oil filter element (valve inlet side, return side)
- Change oil in transmission case
- Replace hydraulic filter element
- Change oil in hydraulic tank
- Change oil in final drive case
- Change oil in differential case

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

WHEN REQUIRED

CHECK, CLEAN OR REPLACE AIR CLEANER

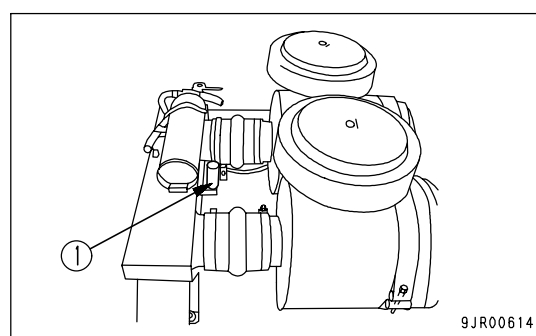


WARNING

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

CHECKING

1. Check that the red line in the transparent portion of dust indicator (1) does not indicate 0.0075 MPa (30 INCHES H₂O) (0.076 kg/cm², 1.1 PSI).
2. If the red line indicates 0.0075 MPa (30 INCHES H₂O) (0.076 kg/cm², 1.1 PSI), clean or replace the air cleaner element immediately.
3. After checking, cleaning, or replacing, press the top of dust indicator (1) to return the red line to its original position.

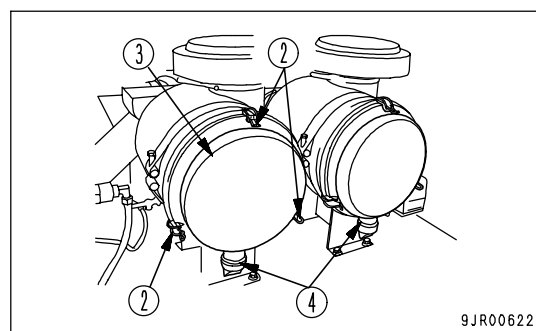


NOTICE

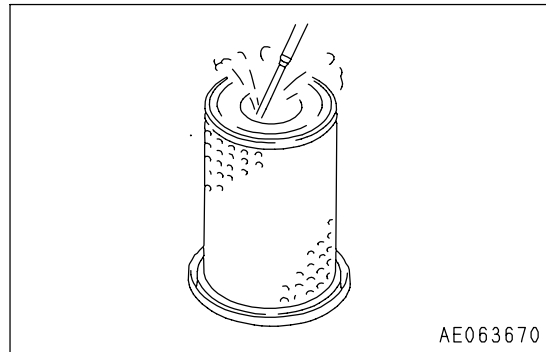
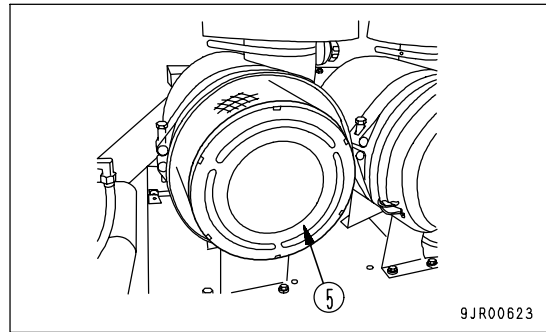
- Do not clean the element until the dust indicator shows 0.0075 MPa (30 INCHES H₂O) (0.076 kg/cm², 1.1 PSI).
- If the element is cleaned frequently before the dust indicator shows 0.0075 MPa (30 INCHES H₂O) (0.076 kg/cm², 1.1 PSI), the air cleaner will not be able to display its basic performance fully, and the cleaning efficiency will also go down. In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.
- If the pressure rises to 0.005 MPa (20 INCHES H₂O) (0.051 kg/cm², 0.7 PSI) immediately after it is cleaned, replace the air cleaner elements (outer element and inner element). Even if the rise in pressure is slow, replace the air cleaner element once a year.

CLEANING OR REPLACING OUTER ELEMENT

1. Release lock (2) of cover (3), then remove the cover.

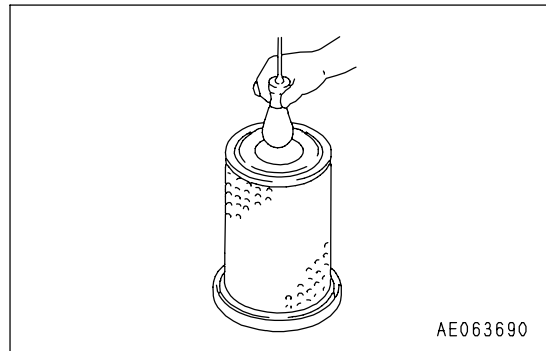


2. Remove outer element (5).
3. Clean the air cleaner body interior and the cover.
4. Direct dry compressed air (less than 0.69 MPa (7 kg/cm², 99.4 PSI)) along the folds of the element from the inside. Next, blow with air along the folds from the outside, then blow with air again from the inside.
 - 1) Remove one seal every time the element is clean.
 - 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) Remove evacuator valve (4) and clean it with compressed air. After cleaning, install it again.



NOTICE

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



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

REPLACING INNER ELEMENT

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

Do not clean and re-use an inner element.
5. Install the outer element and the cover.
6. Remove evacuator valve (4) and clean it with compressed air. After cleaning, install it again.
7. After replacing the element, return the red piston in the dust indicator to its original position.

CLEAN INSIDE OF COOLING SYSTEM



WARNING

- Immediately after the engine is stopped, the engine coolant is hot and the pressure inside the radiator is high. Removing the cap and draining the water under this condition could cause burns. Allow the engine to cool down, then turn the cap slowly to release the pressure.
- Start the engine and flush the system. When standing up or leaving the operator's seat, set the shift lever to the N position and set the parking brake valve lever to the PARKING position.
- For details of starting the engine, see "OPERATIONS, CHECKS BEFORE STARTING (PAGE 3-74)", "STARTING ENGINE (PAGE 3-76)" in the OPERATION section of the Operation and Maintenance Manual.
- When the undercover is removed, there is danger of touching the fan.
Never go to the front of the machine when the engine is running.

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

Antifreeze coolant	Interval of cleaning inside of cooling system and changing antifreeze coolant	Replacing corrosion resistor
Komatsu supercoolant (AF-NAC)	Every two years or every 4000 hours whichever comes first	Every 1000 hours and when cleaning the inside of the cooling system and when changing coolant.
Permanent type antifreeze (All-season type, *)	Every year (autumn) or every 2000 hours whichever comes first.	

*: Permanent type antifreeze shall meet the requirements of ASTM D3306-03.

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

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

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

Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.

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

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

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

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

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

Mixing rate of water and antifreeze

Min. atmospheric temperature	°C	Above -10	-15	-20	-25	-30
	°F	Above 14	5	-4	-13	-22
Amount of antifreeze	Liters	26.7	32.1	36.5	41.0	44.5
	US gal	7.06	8.49	9.65	10.84	11.76
Amount of water	Liters	62.3	56.9	52.5	48.0	44.5
	US gal	16.46	15.03	13.87	12.68	11.76

**WARNING**

Antifreeze coolant is flammable, so keep it away from flame.

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

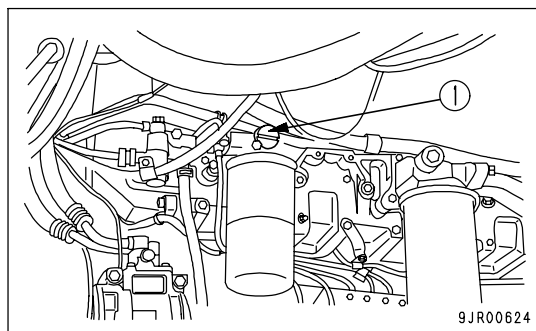
Use antifreeze and appropriate water for diluting (for details, see "COOLANT AND WATER FOR DILUTION (PAGE 4-5)")

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

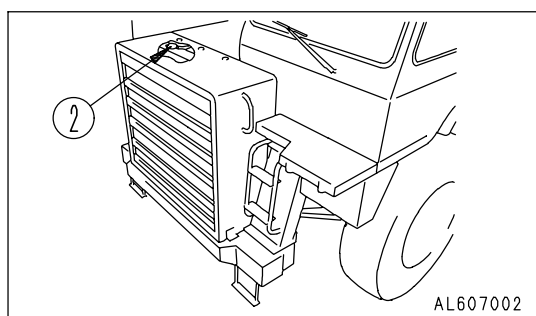
Prepare a container whose capacity is larger than the specified coolant volume to catch drained coolant.

Prepare a hose to supply antifreeze coolant and water.

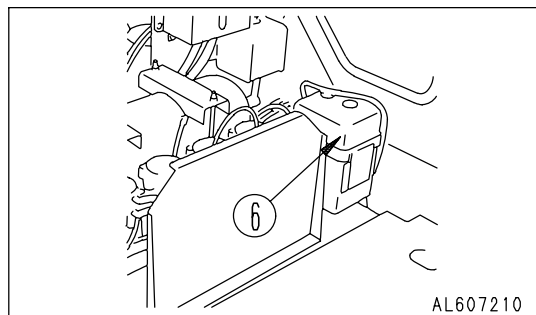
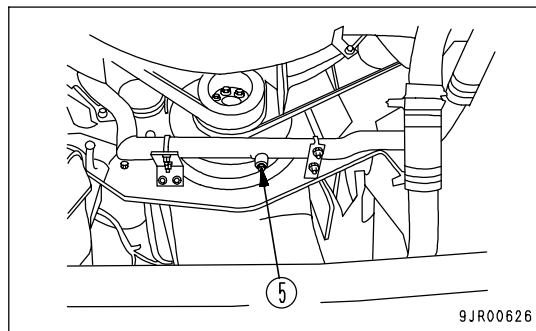
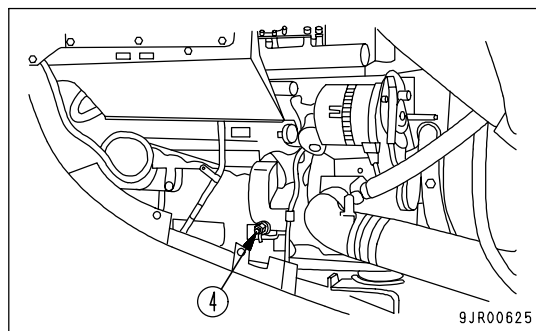
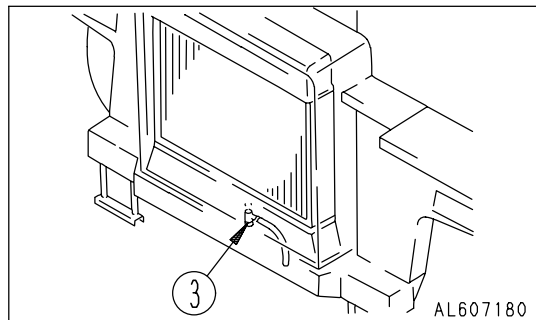
1. Stop the engine, set valve (1) of the corrosion resistor to the CLOSED position, and close it.



2. Turn radiator cap (2) slowly to remove it.



3. Open drain valve (3) under the radiator, drain plug (4) at the side face of the engine, and drain plug (5) under the vibration damper, and drain the coolant.
4. After draining the coolant, close drain valve (3) and drain plugs (4) and (5), and fill with city water.
5. When the radiator is full, start the engine, and run it at low idle. Keep the engine running at low idle for 10 minutes until the water temperature reaches more than 90°C (194°F).
6. Stop the engine, open drain valve (3) and drain plug (4) and (5), and drain the water. After draining the water, close them.
7. After draining the water, clean the cooling system with cleaning agent.
For the cleaning method, see the instructions for the cleaning agent.
8. After the cleaning, open drain valve (3) and drain plug (4) and (5), and drain all of the water.
9. Close drain valve (3) and drain plug (4) and (5).
10. Replace the corrosion resistor, then set valve (1) to the OPEN position to open it.
For replacing corrosion resistor, see "REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-64)".
11. Add coolant mixed with antifreeze until it overflows from the water filler.
Decide the proportions of antifreeze and water according to the table for the mixing rate of water and antifreeze.
12. To remove the air contained in the coolant, run the engine at low idle for 5 minutes, then run for another 5 minutes at high idle. (When doing this, leave the coolant filler cap OFF.)
13. Stop the engine. About 3 minutes later, supply the coolant up to the coolant filler, then close radiator cap.
14. Drain the coolant from inside of subtank (6), flush the inside of the subtank, then fill with the coolant to a point between the FULL and LOW marks.



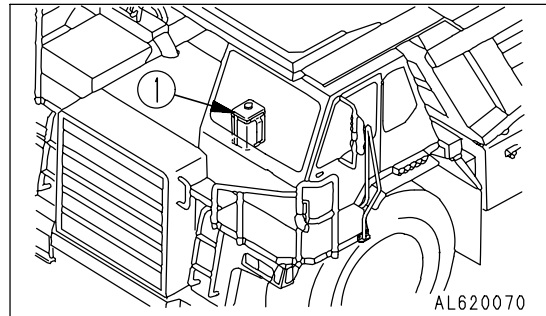
CHECK LEVEL OF WINDOW WASHER FLUID, ADD FLUID

Carry out this check 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, fill with automobile window washer fluid.

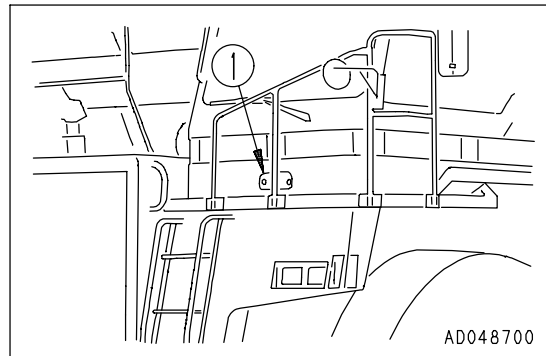
Be careful not to let dirt or dust get in when adding fluid.

When operating at below freezing point, use fluid with antifreeze.

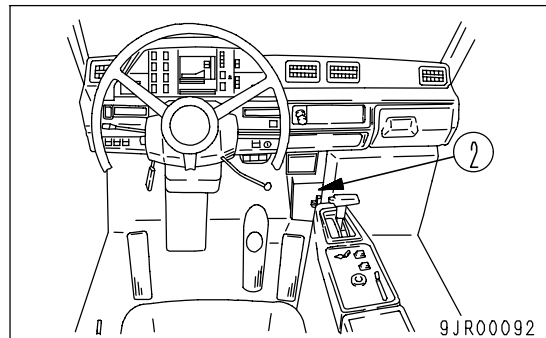
**CLEAN AIR CONDITIONER AIR FILTER**

If the air filter at the suction port of the air conditioner unit or the air filter at the fresh air intake port become clogged, the cooling or heating capacity will drop, so clean the filters once a week.

1. Remove cover (1) at the front of the cab.
2. Pull out the air filter and clean it by blowing it with compressed air.



3. Release the catch of cover (2) on the right side of the accelerator pedal to open it.
4. Pull out the air filter (recirculated air filter) in the air conditioner unit suction port at the end of the duct, and blow off the dust with a weak flow of compressed air or with a soft brush.



CHECK REFRIGERANT (GAS) LEVEL



WARNING

If the refrigerant used in the air conditioner gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the refrigerant. Never loosen any part of the refrigerant circuit.

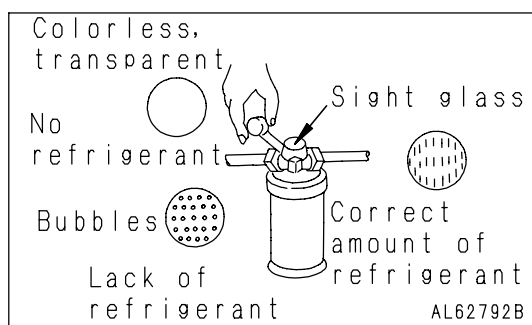
Do not bring any flame close to any point where the refrigerant gas is leaking.

If the cooling effect is poor, the level of the refrigerant (gas) is probably low.

Check the sight glass of the receiver dryer on the inside left of the radiator guard.

REMARK

Run the engine at idle, and if bubbles appear in the sight glass when the air conditioner is set to cooling, the refrigerant level is low, so please contact your Komatsu distributor to have it refilled.



CHECK DUMP BODY

Check that there are no cracks in the dump body.

1. Clean the dump body to make it easier to check.
2. Check all parts of the dump body for damage.
 - If any cracks or abnormal wear are found, carry out repairs.
 - Contact your Komatsu distributor for details of the repair procedure.

CHECK ELECTRIC 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.

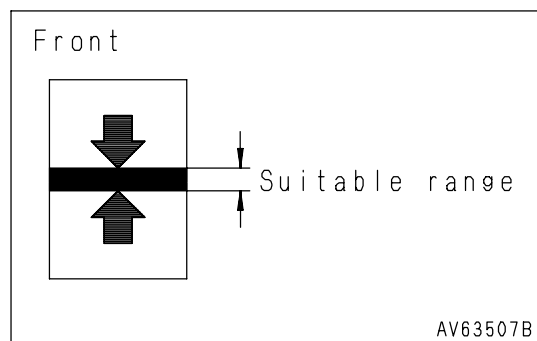
CHECK LENGTH OF SUSPENSION CYLINDER, CHECK OIL LEVEL

When traveling, if the unevenness of the road surface is transmitted directly to the chassis (the machine bounces or the cylinders retract and hit the stopper), carry out the following checks.

CHECK LENGTH OF CYLINDER

Front

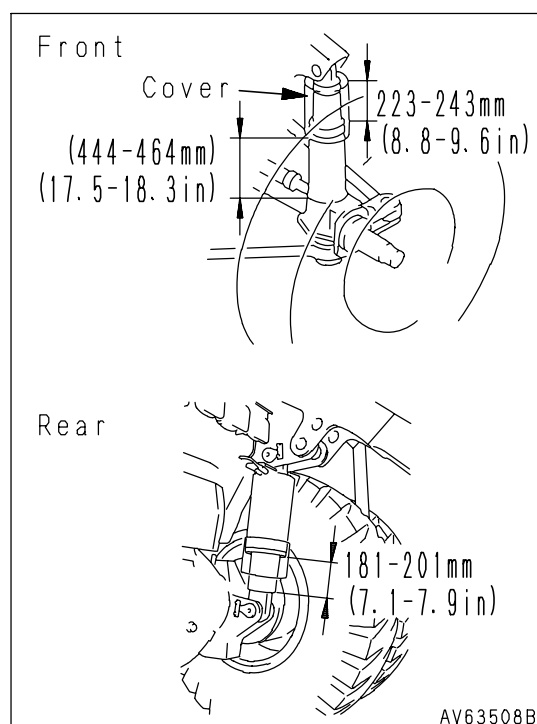
Check that the bottom of the suspension cylinder cover is within the proper range on the label when the machine is unloaded and on flat ground.



Front and rear

At the same time, measure the distance from the shoulder at the head of the suspension cylinder rod to the top of the flange with the machine unloaded.

After checking the front and rear suspension cylinders, contact your Komatsu distributor if any abnormality is found.

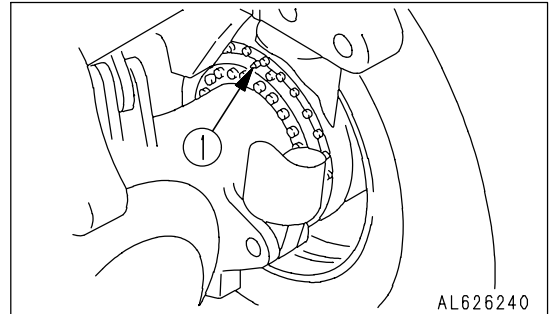


BLEED AIR FROM REAR BRAKE**WARNING**

Stop the machine on level ground and put blocks under the wheels before bleeding the air.

To make it easier to bleed the air, warm the oil up to a temperature of at least 40°C (104°F) before bleeding the air.

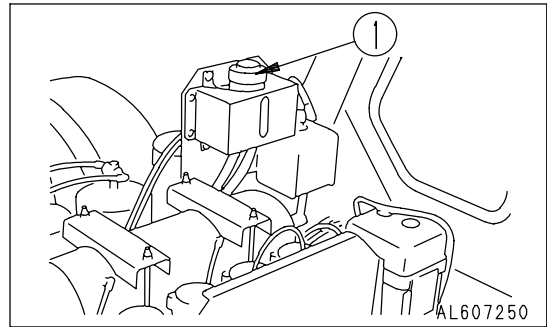
1. Pull the retarder brake lever, loosen air bleed plug (1) to bleed the air from the circuit, then tighten plug (1) and release the retarder brake lever.
2. Remove the cap of bleeder plug (1), insert a vinyl hose (inside diameter: 8 mm (0.31 in)) to release the air, then loosen the bleeder screw approx. 3/4 turns and depress the foot brake pedal slowly. Repeat this procedure until no more bubbles come out from the vinyl hose. After releasing air, securely tighten bleeder plug (1).



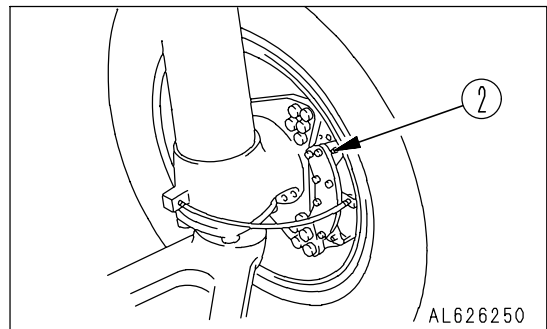
BLEED AIR FROM FRONT BRAKE**WARNING**

Stop the machine on level ground and put blocks under the wheels before bleeding the air.

1. Start the engine and raise the pressure to the maximum position in the green range on the air pressure gauge.
2. Fill oil reservoir (1) with oil.



3. Remove the cap of bleeder screw (2), insert a vinyl hose (inside diameter: 8 mm (0.31 in)), then loosen the bleeder screw approx. 3/4 turns and depress the brake pedal slowly. After tightening the bleeder screw, release the brake pedal. Repeat this procedure until no more bubbles come out from the vinyl hose.



Do not keep the brake pedal depressed continuously. Depress it each time slowly to bleed the air. After bleeding the air, tighten bleeder screw (2) securely and fit the cap.

4. After completion of the air bleeding procedure, fill the oil reservoir to the specified level (MAX).

Repeat the same procedure on the left and right sides.

When bleeding the air from the front brakes and rear brakes at the same time, bleed the air from the rear brakes first.

ADJUST PARKING BRAKE

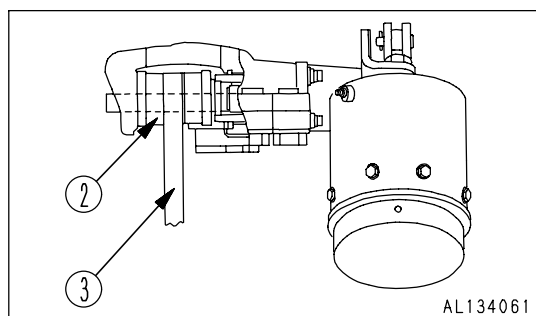
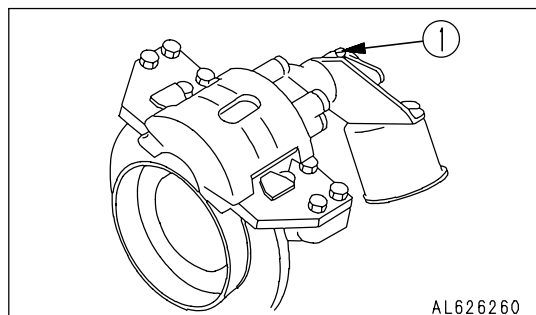


WARNING

- When carrying out the adjustment, raise the air pressure high enough to prevent the parking brake from being applied automatically, and hang a warning sign on the parking brake switch to prevent any other person from operating it.
- Never put any oil or grease on the surface of the pad or disc.

If the parking brake effect is poor, adjust as follows.

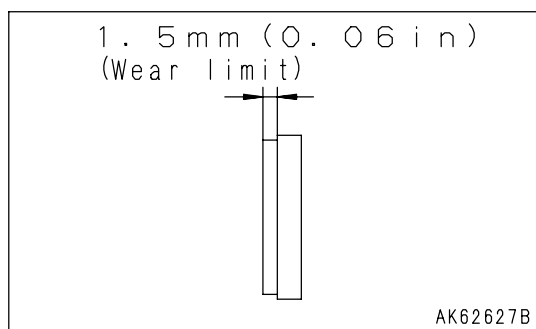
1. Check that the air pressure gauge is in the green range, then release the parking brake.
2. Turn bolt (1) clockwise to bring pad (2) into tight contact with disc (3).
3. Turn bolt (1) back 2/3 turns (4 clicks) in the counterclockwise direction.



Measure the thickness of the pad, and if it is less than 1.5 mm (0.06 in), contact your Komatsu distributor to have it replaced.

When making the first adjustment after replacing the pad, turn bolt (1) turn (6 clicks) in the counterclockwise direction.

After adjusting, check the braking capacity of the parking brake. See "CHECK BRAKING CAPACITY OF PARKING BRAKE (PAGE 4-52)". If the machine moves, contact your Komatsu distributor for inspection.



BLEED AIR FROM HYDRAULIC CIRCUIT OF FRONT DRIVE

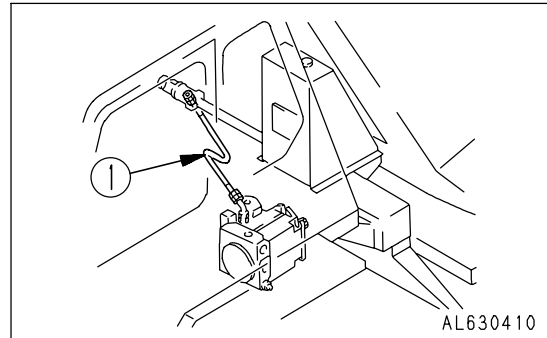
(HD325 only the machine of 4WD specifications)

If the hydraulic pump or motor for the front drive has been removed or installed and if the hydraulic hoses, pipes, etc. has been disconnected, bleed air according to the following procedure.

WHEN PIPING AROUND PUMP HAS BEEN REPLACED

After the pump or its piping is replaced, if the engine is started without filling the pump case with oil, the pump may have trouble. Accordingly, be sure to fill the case with oil according to the following procedure.

1. Loosen and remove the hose adapter (1).
2. Supply about 2 liters (0.53 US gal) of oil through the hose.
3. Connect the hose and supply oil to the tank up to a level a little higher than the specified level.

**WHEN PIPING AROUND MOTOR HAS BEEN REPLACED**

After the motor or its piping has been replaced, its case must be filled with oil, similarly to the pump. The motor case is filled with oil, however, if oil is supplied to the tank. Accordingly, it is not necessary to supply oil to the motor case particularly.

Since the hydraulic circuit of the front drive is closed one. To bleed air, accordingly, supply a little more oil than the specified quantity to the tank after the parts have been replaced.

1. Run the engine at low idling for about 5 minutes.
2. Then, turn on the 4WD switch and travel at a low speed (below 10 km/h (6.2 MPH)) for 10 minutes.
3. Check the oil level and adjust it to the specified level.

If the all air is not bled, abnormal pressure is generated, and it will damage the pump, motor and piping.

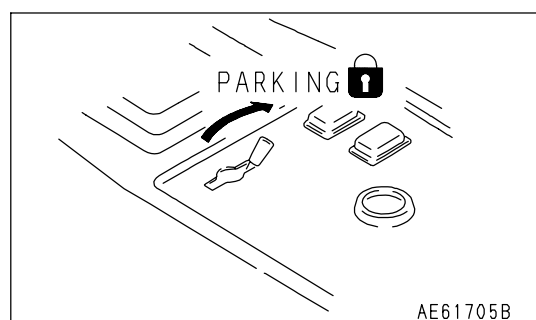
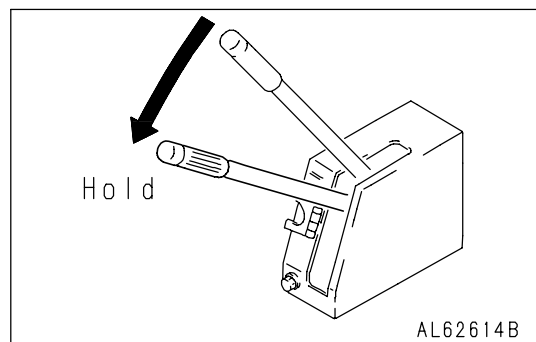
ADJUST BODY POSITIONER



WARNING

If for any reason the maintenance is performed while the engine is running, strictly follow the next rules.

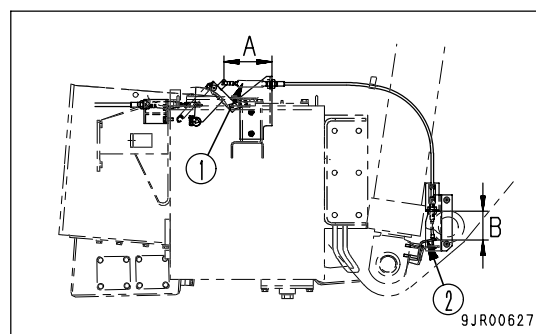
- One should sit on the operator's seat, preparing to stop the engine at any moment, and contact with the other.
- Set the dump lever at **HOLD** position to prevent the dump body from moving. Also, set the parking brake valve lever at **PARKING** position to prevent the machine from moving.
- When working near fan or belts, do not bring your body or any materials closer that can be dragged into.
- Do not touch the gear shift lever or dump control lever. If you have to operate the gear shift lever or dump control lever for any reason, always give a signal to your fellow workers to tell them to move to a safe place.
- If the materials or tools are dropped onto fan or belts, they fly away or cut. Never drop or insert materials or tools.



With the positioner device, it is possible to automatically stop the dump body when it rises to the desired position (to the dump body elevation). Adjust if it does not automatically stop or if the shock still remains.

ADJUSTING

1. Set the dump lever to the **HOLD** position.
2. Adjust push cable (1) to the standard length.
Standard length A: 180 mm (7.1 in)
3. Raise the dump body until the hoist cylinder is 50 mm (2.0 in) before the end of its stroke, and adjust plate (2) so that the hoist valve lever is released from the detent.
Reference dimension B: 149 mm (5.9 in)



CHECK PLAY OF OUTPUT COUPLING OF OUTPUT SHAFT

If any abnormal noise occurs around the output shaft or front drive shaft, the rubber inside the output shaft may be deteriorated or damaged, so check the play of the coupling as follows.

Play in circumferential direction

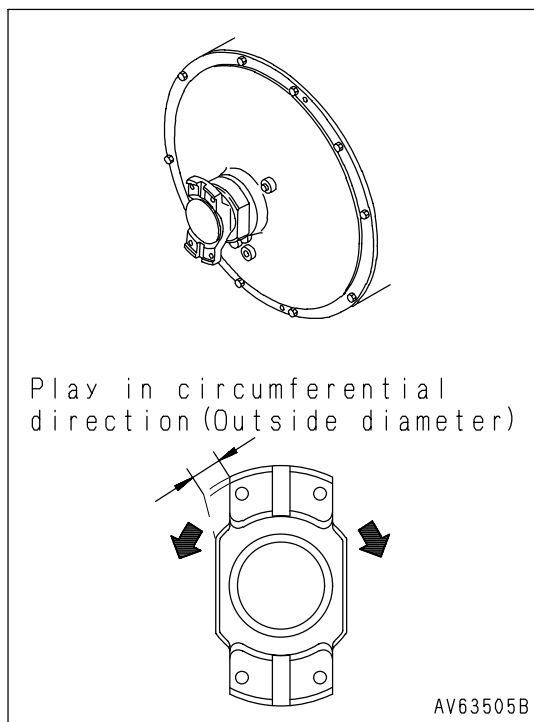
Using a bar, move the coupling in the direction of the circumference and check the play in the circumferential direction at the outside diameter of the coupling.

Standard: Max. 15 mm (0.6 in)

REMARK

If the play range is exceeded, the engine fan will start to rotate, so when inspecting the play, check first that the engine fan is not rotating.

If the result of the measurement shows that it is greater than the standard value, please contact your Komatsu distributor for disassembly and inspection.



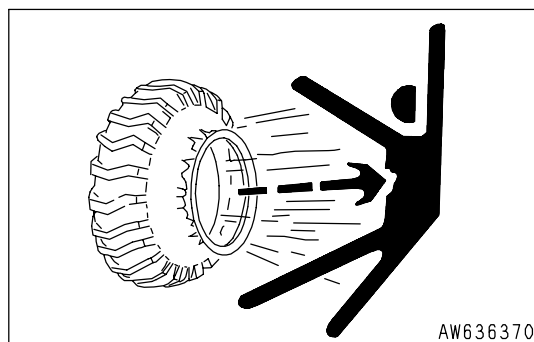
SELECTION AND INSPECTION OF TIRES



WARNING

If a tire or a rim is handled improperly, the tire may burst or may be damaged and the rim may be broken and scattered, and that can cause serious injury or death.

- Since maintenance, disassembly, repair and assembly of the tires and rims require special equipment and skill, be sure to ask a tire repair shop to do the work.
- Do not heat or weld the rim to which the tire is installed. Do not make a fire near the tire.



AW636370

SELECTION OF TIRES



WARNING

Select the tires according to the conditions of use and the weight of the attachments on the machine. Use only specified tires and inflate them to the specified pressure.

Select the tires according to the conditions of use and the weight of the attachments of the machine. Use the following table.

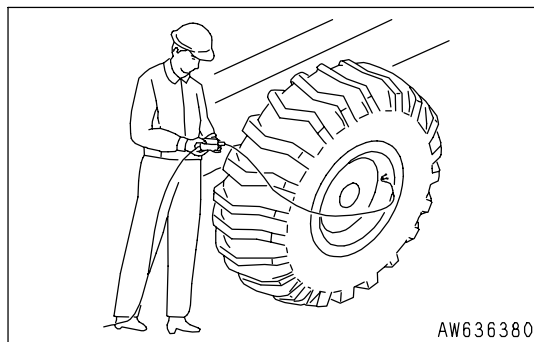
Since the travel speed indicated on the speedometer varies with the tire size, consult your Komatsu distributor when using optional tires.

	Max. load [kg (lb)]	Size	Operating model	Remarks
Front wheel	10,900 (24,035)	18.00R33 ★ ★	HD325: if equipped HD325 4WD specifications: standard HD405: standard	Type 1 for construction equipment
	10,300 (22,712)	18.00-33-32PR	HD325: if equipped HD325 4WD specifications: if equipped HD405: not applicable	
	9,250 (20,396)	18.00-33-28PR	HD325: standard HD325 4WD specifications: if equipped HD405: not applicable	
Rear wheel	10,900 (24,035)	18.00R33 ★ ★	HD325: if equipped HD325 4WD specifications: standard HD405: standard	
	10,300 (22,712)	18.00-33-32PR	HD325: standard HD325 4WD specifications: if equipped HD405: not applicable	
	9,250 (20,396)	18.00-33-28PR	HD325: if equipped HD325 4WD specifications: if equipped HD405: not applicable	

CHECK OF INFLATION PRESSURE OF TIRES AND INFLATION OF THEM

**WARNING**

- When inflating a tire, check that any person will not enter the working area and use an air chuck which has a clip and which can be fixed to the air valve.
- While inflating the tire, check the inflation pressure occasionally so that it will not rise too high.
- If the rim is not fitted normally, it may be broken and scattered while the tire is inflated. Accordingly, place a guard around the tire and do not work in front of the rim but work on the tread side of the tire.
- Abnormal drop of inflation pressure and abnormal fitting of the rim indicate a trouble in the tire or rim. In this case, be sure to ask a tire repair shop for repair.
- Be sure to observe the specified inflation pressure.
- Do not adjust the inflation pressure of the tires just after high-speed travel or heavy-load work.

**Check**

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

Inflation of tires

Adjust the inflation pressure properly.

When inflating a tire, use an air chuck which can be fixed to the air valve of the tire as shown in the figure. Do not work in front of the rim but work on the tread side of the tire.

The proper inflation pressure is shown below.

- HD325

Tire size	Inflation pressure
18.00-33-28PR (standard)	0.49 MPa (5.00 kg/cm ² , 71.0 PSI)
18.00-33-32PR (if equipped)	0.56 MPa (5.75 kg/cm ² , 81.7 PSI)
18.00R33 ★ ★ (if equipped)	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)

- HD325 4WD specifications

Tire size	Inflation pressure
18.00R33 ★ ★ (standard)	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)
18.00-33-32PR (if equipped)	0.56 MPa (5.75 kg/cm ² , 81.7 PSI)
18.00-33-28PR (if equipped)	0.49 MPa (5.00 kg/cm ² , 71.0 PSI)

- HD405

Tire size	Inflation pressure
18.00R33 ★ ★	0.69 MPa (7.00 kg/cm ² , 99.4 PSI)

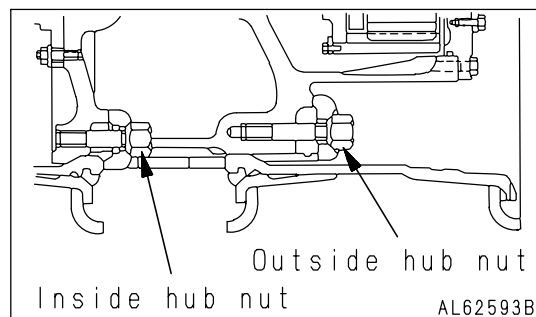
NOTICE

If the tires are used when the inflation pressure is less than the value given in the table above, the rim may be damaged. Always keep the tire inflation pressure within +0 to +0.03 MPa (0.3 kg/cm², 4.3 PSI) of the value in the table above.

PRECAUTIONS WHEN REPLACING TIRE

If the hub nuts have been tightened again after replacing the tire, travel for 5 to 6 km, then tighten again to settle all the contacting parts.

In particular, there are more contacting parts on the rear wheels than on the front wheels, so it will take time for the parts to settle. For this reason, repeat the tightening process for the first 50 hours after installation. However, on the rear wheels, there are hub nuts at 3 places on the inside, but these are for temporary assembly, so there is no need to tighten the inside hub nuts after the outside hub nuts are tightened.

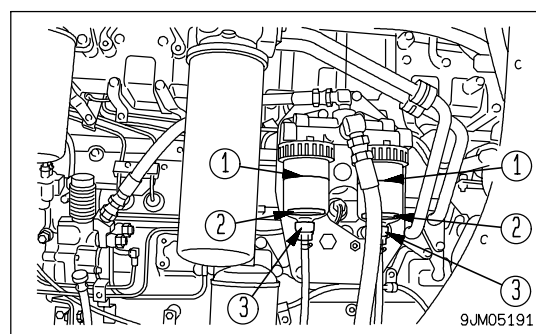


DRAIN WATER FROM WATER SEPARATOR

When float (2) is at or above red line (1), drain the water according to the following procedure:

1. Loosen drain plug (3) and drain the accumulated water until the float reaches the bottom.
2. Tighten drain plug (3).
3. If the air is sucked into fuel line when drain the water, be sure to bleed air in the same manner as for the fuel filter.

See Fuel Filter Cartridge in "REPLACE FUEL FILTER CARTRIDGE (PAGE 4-62)" section.



CHECK BEFORE STARTING

For details of the following items, see "CHECK BEFORE STARTING (PAGE 3-62)".

- Check coolant level, add coolant
- Check oil level in front brake oil tank, add oil
- Check oil level in front drive oil tank, add oil
- Check dust indicator
- Drain water from air tank
- Check oil level in engine oil pan, add oil
- Check oil level in transmission case, add oil
- Check oil level in hydraulic tank, add oil
- Drain water, sediment from fuel tank
- Check fuel level, add fuel
- Check wheel hub nuts, tighten
- Check central warning lamp
- Check braking effect
- Check machine monitor system
- Check braking capacity of secondary brake
- Check manual emergency steering
- Check auto-emergency steering
- Check backup alarm
- Check electric wiring
- Check inflation pressure of tires
- Check water separator

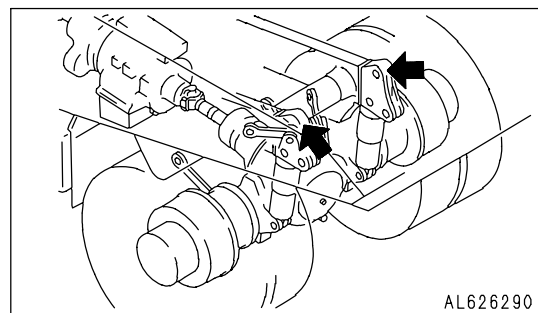
EVERY 50 HOURS SERVICE

LUBRICATION

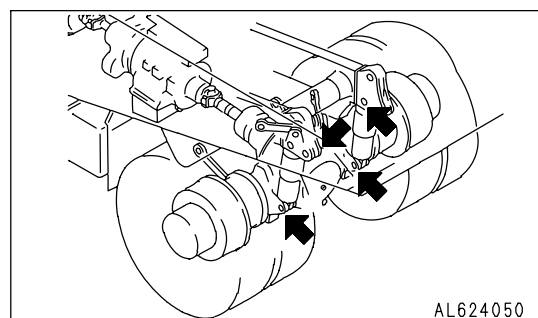
1. Stop the engine.
2. Use the grease pump to pump in grease through the grease fitting marked by the arrow.
3. After greasing, wipe off any old grease that was pushed out.

Carry out the greasing operation every day when operating in places where the grease flows out easily, such as when traveling through mud or water.

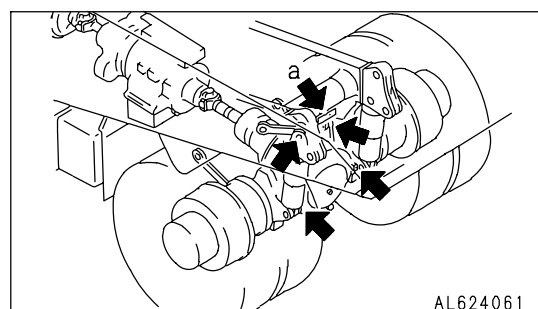
(1) Dump body hinge pin (left and right: 1 place each)



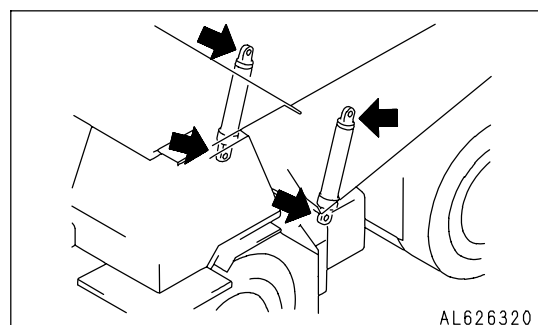
(2) Rear suspension (left and right: 2 places each)



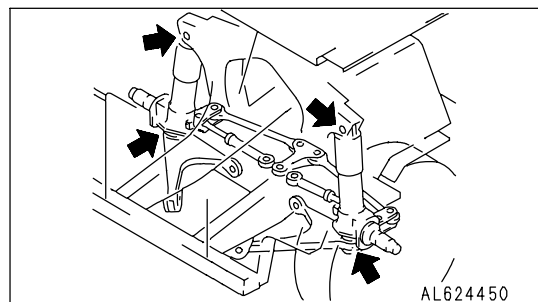
(3) Rear axle support (left and right: 4 places each)
Portion a is for centralized greasing (4 places)



(4) Hoist cylinder pin (left and right: 2 places each)

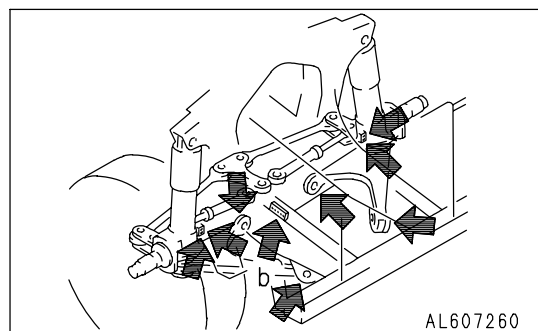


(5) Front suspension (left and right: 2 places each)



(6) Steering linkage (13 places)

Portion "b" is for centralized greasing (5 places)



EVERY 100 HOURS SERVICE

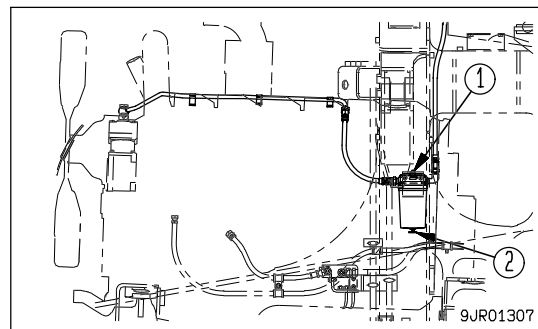
Maintenance for every 50 hours service should be carried out at the same time.

CHECK ALCOHOL LEVEL IN ALCOHOL INJECTOR, ADD ALCOHOL

(Machines equipped with alcohol injector)

Before the cold season starts, loosen filler (1) (safety valve) of the alcohol injector gradually to release the remaining pressure inside the injector, then remove the cap and fill with 1.4 liters (0.37 US gal) of methyl alcohol through the filler port.

During the season, check every 100 hours on the service meter and add methyl alcohol. At the end of the season, loosen drain valve (2), and drain the methyl alcohol together with the moisture.



REMARK

This machine uses compressed air for operating. When operating the machine in cold areas, there is danger that the moisture in the air may freeze and cause problems such as defective actuation of the valve, so add methyl alcohol to the air system to lower the freezing point.

EVERY 250 HOURS SERVICE

Maintenance for every 50 and 100 hours service should be carried out at the same time.

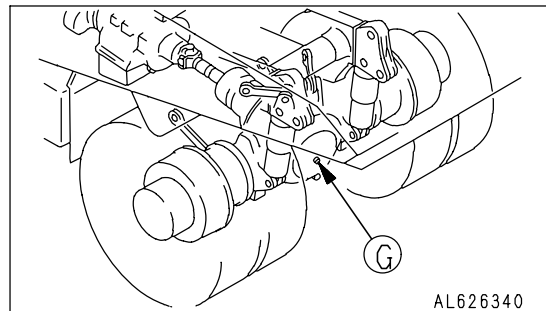
CHECK OIL LEVEL IN DIFFERENTIAL CASE, ADD OIL



WARNING

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

1. Remove plug (G) and check that the oil level is near the bottom of the plug hole.
2. If the oil level is too low, add oil through the plug hole until the oil overflows.



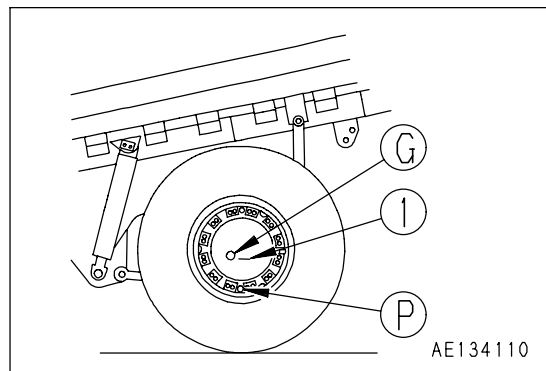
CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL



WARNING

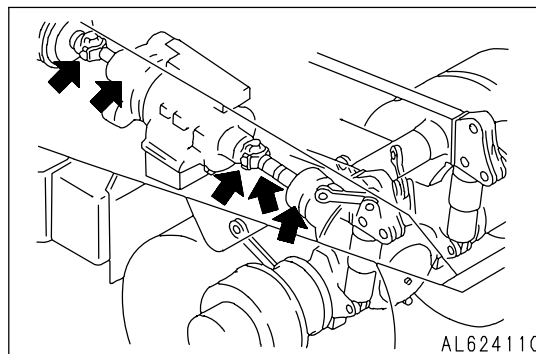
- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- If there is still pressure remaining inside the case, the oil or plug may fly out. Turn the plug slowly to release the pressure, then remove it carefully.

1. Stop the machine so that casting line (1) is horizontal and drain plug (P) is immediately at the bottom.
2. Remove plug (G) and check that the oil level is near the bottom of the plug hole.
3. If the oil level is too low, add oil through the plug hole until the oil overflows.



LUBRICATE DRIVE SHAFT (5 PLACES)

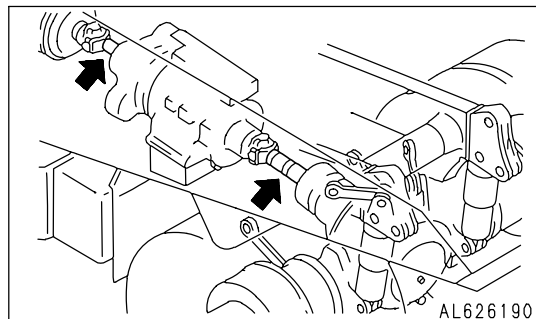
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. Add grease to the spider portion until grease comes out from the cap seals (5 places).
3. After greasing, wipe off any old grease that was pushed out.



Carry out the greasing operation every day when operating in places where the grease flows out easily after traveling through mud or water.

CHECK DRIVE SHAFT

If there is any problem, such as looseness of the drive shaft connection, play in the spline or bearing portion, or runout of the shaft, please contact your Komatsu distributor for repair.



CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this procedure before operating the machine.



WARNING

- Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may cause an explosion.
- The battery generates flammable gas and there is danger of explosion, do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.
- When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.

NOTICE

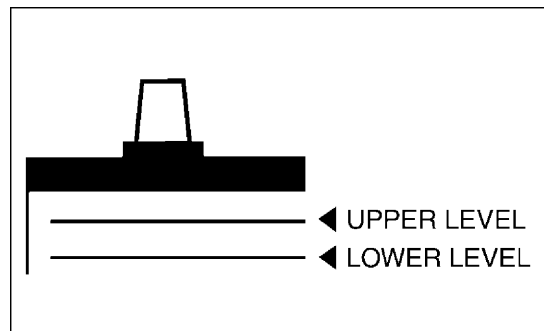
If there is a fear that the battery water may freeze after refilling with purified water (e.g. commercially available replenishment water for a battery), do the replenishment before the day's work on the next day.

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

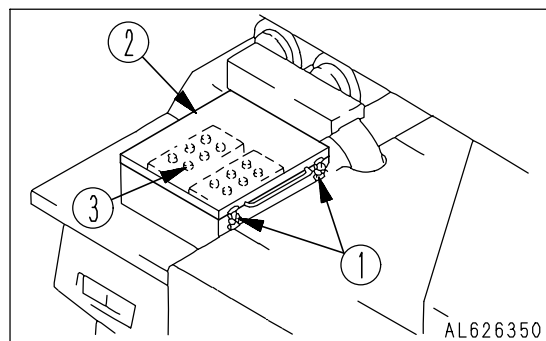
WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

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

1. Remove hook (1), then open inspection cover (2).
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. If the battery electrolyte level is below the mid point between the UPPER LEVEL and LOWER LEVEL, immediately remove cap (3) and add distilled water (or commercially available battery filler solution) to the UPPER LEVEL.
4. After adding distilled water, tighten cap (3) securely.



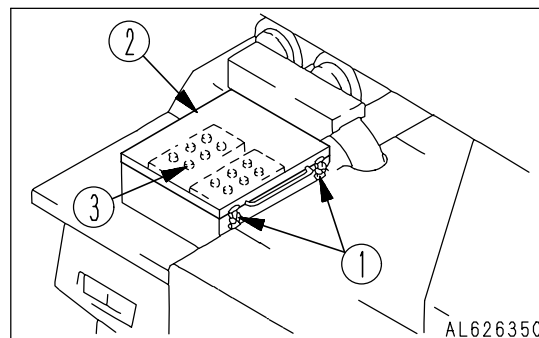
REMARK

If distilled water is added to above the U.L. line, use a syringe to lower the level to the U.L. line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

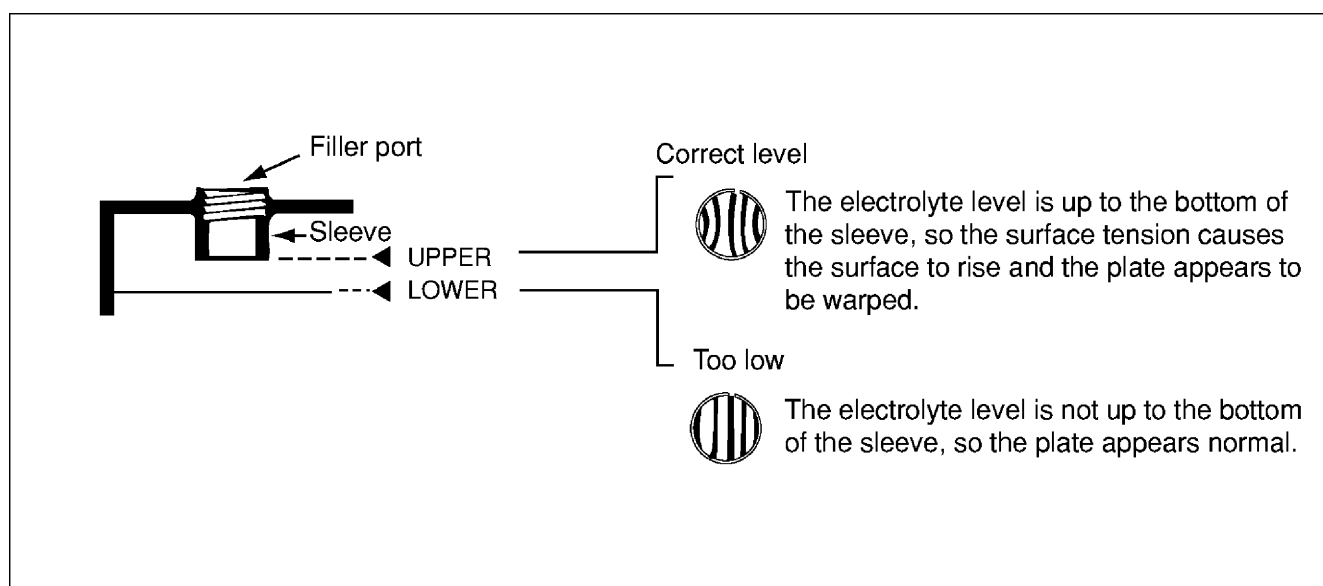
WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

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 hook (1), then open inspection cover (2).
2. Remove cap (3) at the top of the battery and look through the filler port to check the electrolyte level. If the electrolyte is not up to the sleeve, immediately add distilled water (or commercially available battery filler solution) to the bottom of the sleeve (UPPER LEVEL).



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



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

REMARK

If water is added to above the bottom tip of the sleeve, use a pipette to remove electrolyte. Neutralize the removed electrolyte with sodium bicarbonate, then flush it away with a large amount of water. If necessary, contact your Komatsu distributor or your battery maker.

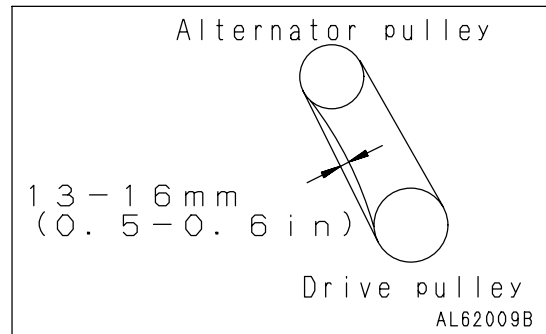
WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL

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

CHECK ALTERNATOR BELT TENSION, ADJUST

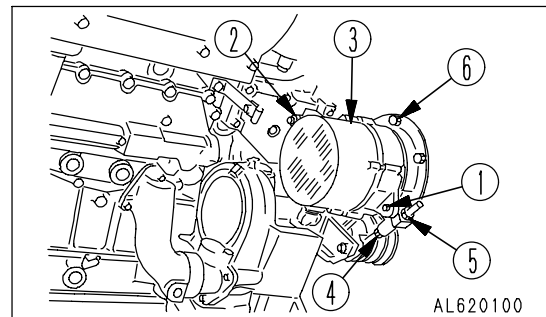
CHECKING

The deflection should be 13 to 16 mm (0.5 to 0.6 in) when a point midway between the drive pulley and alternator pulley is pressed with the thumb with a force of 98.1 N (10 kg).



ADJUSTING

1. Remove cover mounting bolts (6) (2 places), and remove the cover.
2. Loosen bolts and nuts (1), (2) and (5), then turn nut (4) to adjust the tension of the belt.
3. After adjusting, tighten bolts and nuts (1), (2) and (5) to secure alternator (3).
4. Reinstall the cover removed in step 1. Confirm that no part of the cover touches any moving part of the alternator.



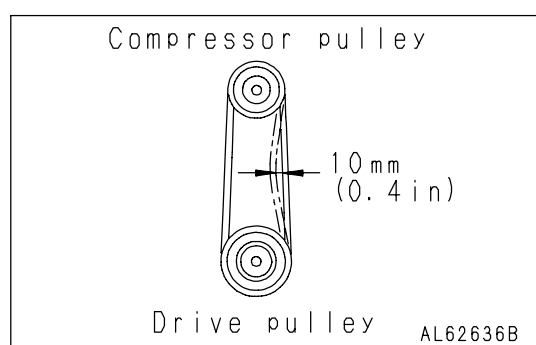
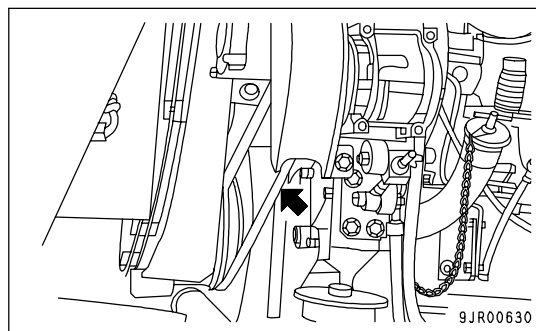
REMARK

- Check each pulley for breakage and wear of the V-groove. In particular, check that the V-belt does not touch the bottom of the V-groove.
- If any abnormality is found, ask your Komatsu distributor for replacement of the pulley.
- If the V-belt is so lengthened that it cannot be adjusted any more or if it has any cuts or cracks, replace it.
- If the V-belt has been replaced with a new part, there will be initial elongation, so inspect and adjust it again after one-hour of operation.

CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST

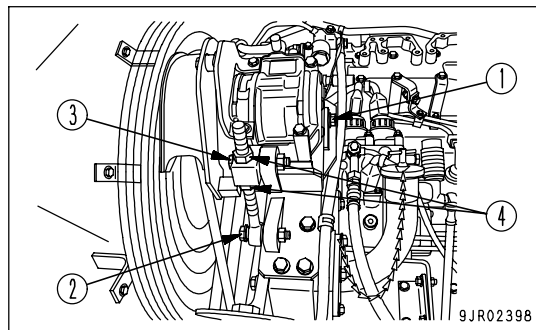
CHECKING

The belt should normally deflect by 10 mm (0.4 in) when pressed with the thumb (with a force of approx. 58.8 N (6 kg)) at a point midway between the air compressor pulley and drive pulley.



ADJUSTING

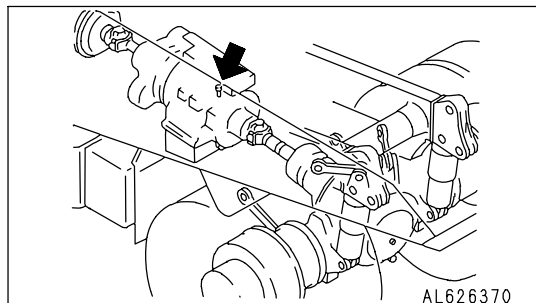
1. Loosen nut (1) and bolts (2) and (3).
2. Turn nut (4) to adjust so that the deflection at a point midway between the air compressor pulley and drive pulley is approx. 10 mm (0.4 in) when pressed with a finger force of approx. 58.8 N (6 kg).
3. Tighten nuts (1) and (4) and bolts (2) and (3) to secure the compressor in position.
4. Check each pulley for damage, wear of the V-groove, and wear of the V-belt. In particular, be sure to check that the V-belt is not touching the bottom of the V-groove.
5. Replace the V-belt if there is no more tolerance to adjust for the elongation of the V-belt, or if there are any cuts or cracks.
6. If the V-belt has been replaced with a new part, there will be initial elongation, so adjust the belt again after operating for 2 to 3 days.



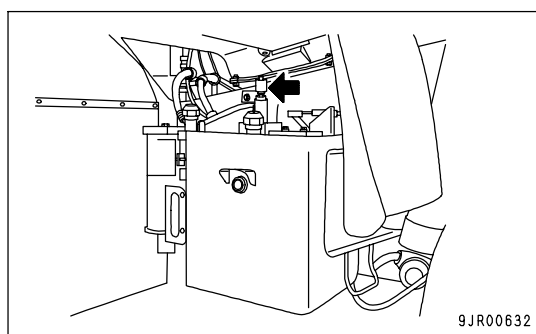
CLEAN BREATHERS

Remove the mud and dirt from around the breather, then remove the breather and wash out the dirt from inside with clean diesel oil or flushing oil.

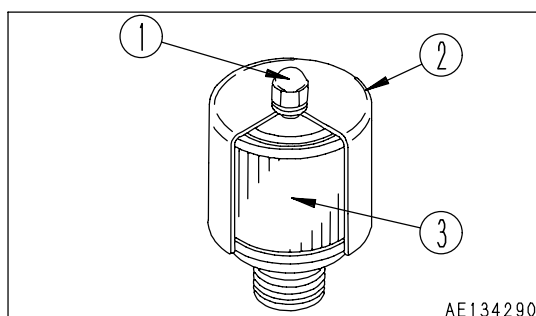
- Transmission case



- Hydraulic tank



1. Remove nut (1), then remove cover (2) and wash element (3).
2. Install element (3), then install cover (2) and nut (1).



CHECK FRAME



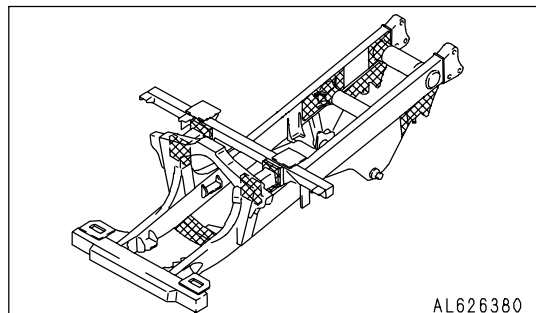
WARNING

When raising the dump body to inspect the machine, always place the dump lever at the HOLD position, apply the lock, and then use the body pivot pins.

1. Wash the frame to make it easier to check.

2. Check all parts of the frame for damage.

In particular, check the colored portions in the diagram and if any cracks or damage are found, repair the damage. Please contact your Komatsu distributor for details of the repair procedure.



AL626380

CHECK BRAKING CAPACITY OF FOOT BRAKE



WARNING

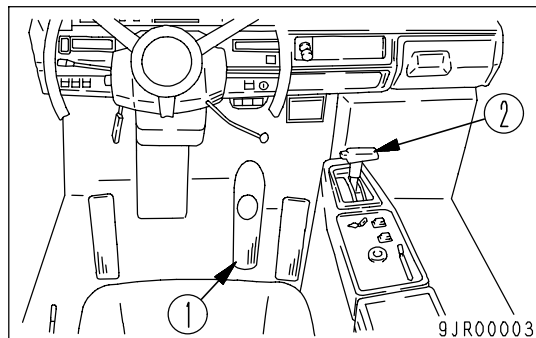
If the machine moves, it will lead to serious injury or death. If machine begins to move during the inspection of braking capacity, lower the engine speed immediately, set shifting lever at N position, and then set parking brake valve lever at PARKING position.

Check the braking capacity of the foot brake as follows.

1. Set the air pressure to the maximum with the machine on flat ground, and depress foot brake (1).

2. Set shift lever (2) to the D position, gradually raise the engine speed, and check that the machine does not move even when the engine speed reaches 1550 rpm.

3. Lower the engine speed, set shift lever at N position, and then set parking brake valve lever at PARKING position. If any abnormality is found, ask your Komatsu distributor for repair.



9JR00003

CHECK BRAKING CAPACITY OF RETARDER BRAKE

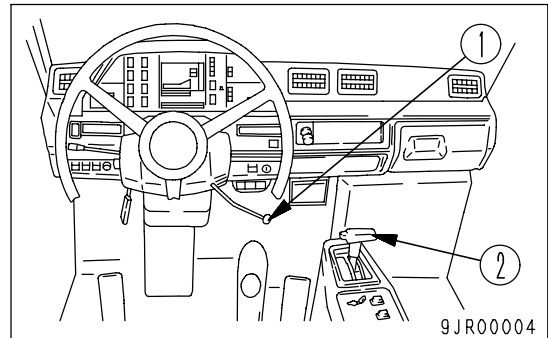


WARNING

If the machine moves, it will lead to serious injury or death. If machine begins to move during the inspection of braking capacity, lower the engine speed immediately, set gear shift lever at N position, and then depress the foot brake.

Check the braking capacity of the retarder brake as follows.

1. Set the air pressure to the maximum with the machine on flat ground, and pull retarder lever (1) fully.
2. Set shift lever (2) to the D position, gradually raise the engine speed. If the machine does not move even when the engine speed reaches 1200 rpm, it is normal.
3. Lower the engine speed, set gear shift lever at N position. If any problem is found, ask your Komatsu distributor for repair.



CHECK BRAKING CAPACITY OF PARKING BRAKE

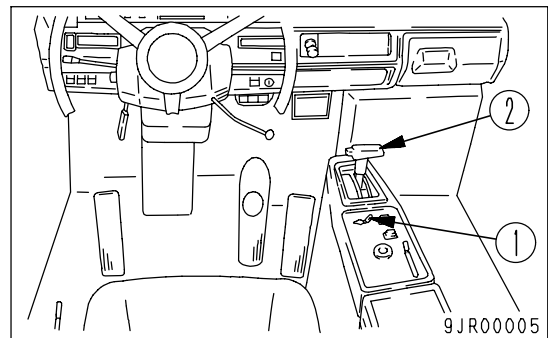


WARNING

If the machine moves, it will lead to serious injury or death. If machine begins to move during the inspection of braking capacity, lower the engine speed immediately, set gear shift lever at N position, and then depress the foot brake.

Check the braking capacity of the parking brake as follows.

1. Set the air pressure to the maximum with the machine on flat ground, and set parking brake valve lever (1) to the PARKING position.
2. Set shift lever (2) to the D position, gradually raise the engine speed. If the machine does not move even when the engine speed reaches 1200 rpm, it is normal.
3. Lower the engine speed, set gear shift lever at N position. If any problem is found, ask your Komatsu distributor for repair.



CHECK WEAR OF PARKING BRAKE PADS

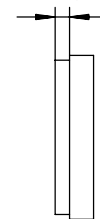


WARNING

Never put any oil or grease on the surface of the pad or disc.

Measure the thickness of the pad, and if it is less than 1.5 mm (0.06 in), contact your Komatsu distributor.

1.5 mm (0.06 in)
(Wear limit)



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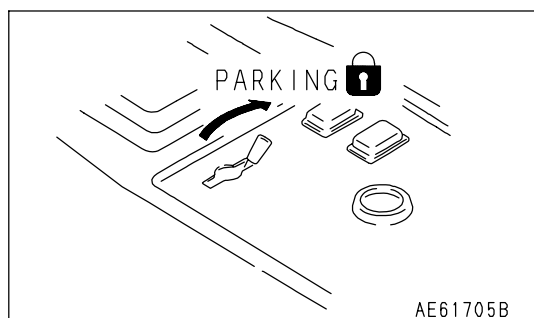
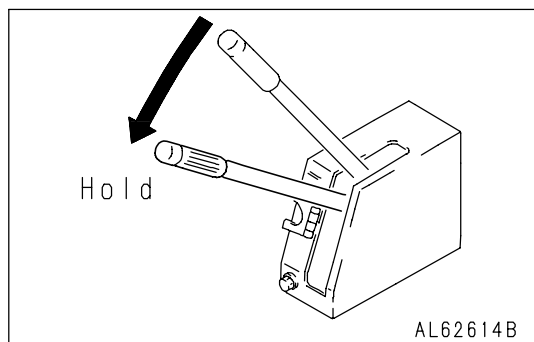
CHECK, CLEAN AUTOMATIC SUSPENSION



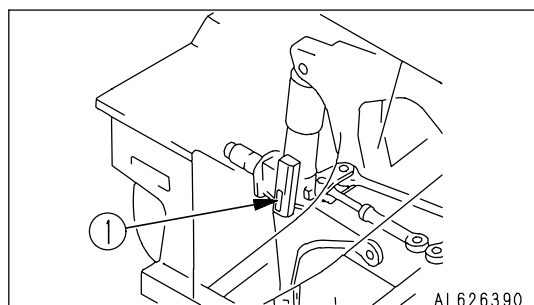
WARNING

If for any reason the maintenance is performed while the engine is running, strictly follow the next rules.

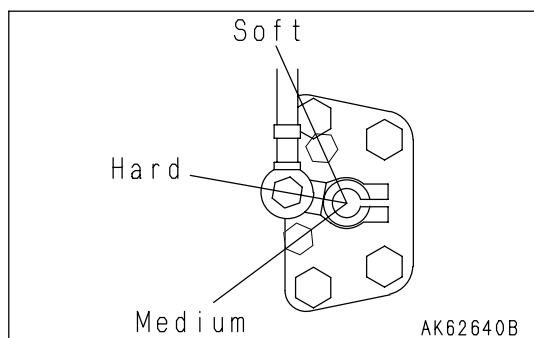
- One should sit on the operator's seat, preparing to stop the engine at any moment, and contact with the other.
- Set the dump lever at HOLD position to prevent the dump body from moving. Also, set the parking brake valve lever at PARKING position to prevent the machine from moving.
- When working near fan or belts, do not bring your body or any materials closer that can be dragged into.
- Do not touch the gear shift lever or dump control lever. If you have to operate the gear shift lever or dump control lever for any reason, always give a signal to your fellow workers to tell them to move to a safe place.
- If the materials or tools are dropped onto fan or belts, they fly away or cut. Never drop or insert materials or tools.



1. When bolts of inspection cover (1) are loosened and the cover is moved to the side, the inspection hole can be seen.



2. Check the positions of the link. Check that it moves to the following positions:
For normal travel when empty: soft
When the brake is depressed: medium
When the dump lever is at any position other than FLOAT: hard.



If any problem is found, please contact your Komatsu distributor for inspection and adjustment.

If operations are carried out on muddy or wet ground, mud will stick to the link, and the movement may become slow, so check and clean.

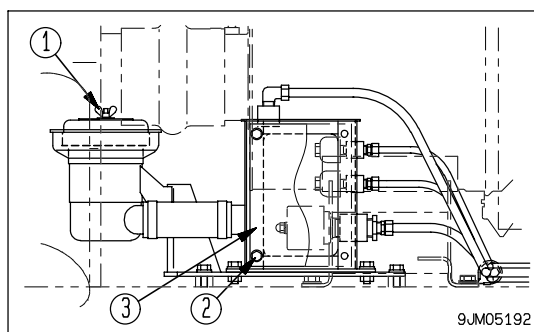
CLEAN CENTRAL BREATHER BOX AND CENTRAL BREATHER AIR CLEANER

(Dusty area specification machine)

**WARNING**

If compressed air scattered around dust and debris, there is danger of injury. Always wear protective equipment such as protective glasses and mask.

1. Remove wing nut (1), then remove the element from the air cleaner.
2. Direct dry compressed air (less than 0.69 MPa (7 kg/cm², 99.4 PSI)) to the element from inside along its folds, then direct it from outside along its folds and again from inside.
3. Install the element in the air cleaner, then install wing nut (1).
4. Remove bolts (2), then remove cover (3).
5. Remove 3 breathers from inside the box, then rinse out the dirt inside with cleaner diesel fuel or flushing oil.
6. Check that there is no oil or fuel collected inside the box. If there is any oil or fuel, clean the inside of the box.
7. Install cover (3) with bolts (2).



EVERY 500 HOURS SERVICE

Maintenance for every 50, 100 and 250 hours service should be carried out at the same time.

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



WARNING

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

- Refill capacity: 52 liters (13.74 US gal)
- Prepare a filter wrench

1. Set a container to catch the oil immediately under the drain valve under the chassis.

2. Remove drain plug (1), then loosen drain valve (2) slowly to avoid getting oil on yourself, and drain the oil. Be careful not to loosen the drain valve too far and deform the stopper pin inside the valve.

3. Check the drained oil, and if there are excessive metal particles or foreign material, please contact your Komatsu distributor.

4. Tighten drain valve (2) and drain plug (1).

Tightening torque

Drain plug (1), drain plug (2): $68.6 \pm 9.8 \text{ Nm}$

($7 \pm 1 \text{ kgm}$, $50.6 \pm 7.2 \text{ lbft}$)

5. Using the filter wrench, turn filter cartridge (3) to the left to remove it.

When doing this, to prevent getting oil on yourself, do not carry out this operation from immediately under the cartridge.

In particular, if this operation is carried out immediately after stopping the engine, a large amount of oil will come out, so wait for 10 minutes before starting the operation.

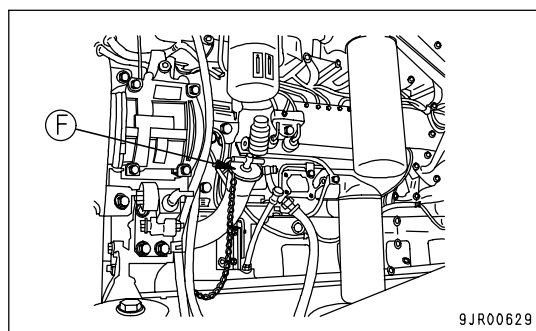
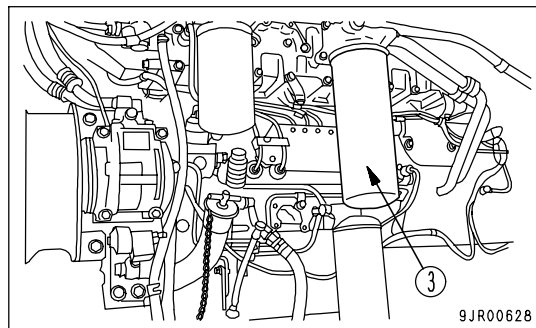
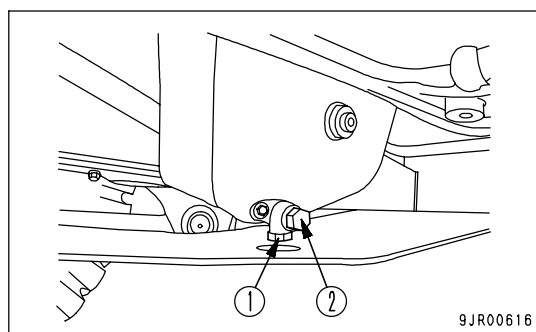
6. Clean the filter holder, fill the new filter cartridge with oil, coat the packing face and thread with oil (or coat thinly with grease), then install the filter cartridge.

7. Install the filter cartridge. When doing this, be careful not to damage the outside cylinder of the cartridge.

When installing the filter cartridge, tighten until the packing face is in contact with the filter holder, then tighten a further $3/4$ to 1 turn.

8. Pour in the specified amount of engine oil from oil filler (F).

9. Run the engine for a short time at idle, then check the oil if it is filled up to a specified level. For details, see "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-64)".



REPLACE ADDITIONAL FUEL FILTER CARTRIDGE



WARNING

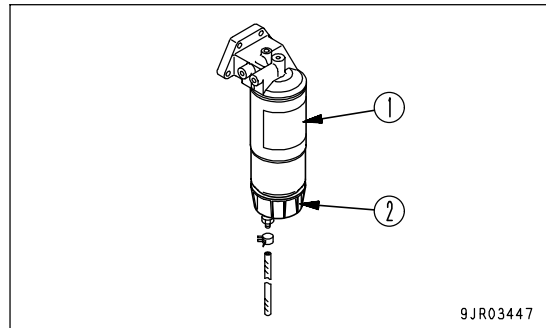
- Immediately after the engine is stopped, all parts are at high temperature, so do not replace the filter immediately. Wait for the engine to cool down before starting the operation.
- The inside of fuel piping system of the engine is under high-pressure when the engine is running. When replacing the filter, wait for at least 30 seconds after the engine stops to let the internal pressure go down before replacing the filter.
- Do not bring any fire or spark close.
- Be careful when opening the air bleed plug at the fuel filter head and the air bleeder of the supply pump. The system is still under pressure and fuel may spurt out.

NOTICE

- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
- The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.
If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.

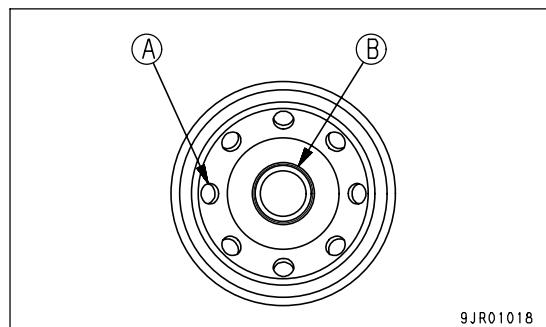
- Container to catch the oil
- Prepare a filter wrench

1. Set the container to catch the fuel under the additional fuel filter cartridge.
2. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.
3. After removing the cartridge, turn cup (2) of the water separator installed to the bottom of the cartridge counterclockwise. (This cup is used again.)
4. Install cup (2) to the bottom of the new additional fuel filter cartridge. (When doing this, always replace the O-ring with a new part.)
 - Cup tightening torque: 10 Nm (1.0 kgm , 7.2 lbft)
5. Clean the filter holder, fill the new filter cartridge with clean fuel, coat the packing surface thinly with oil, then install to the filter holder.



NOTICE

- When adding fuel, do not remove cap (B). Always add fuel from the 8 small holes (A) on the dirty side.
- After adding fuel, remove cap (B) and install the fuel filter.
- Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (B) when adding fuel. Be careful not to let dirt or dust get into center portion on the clean side.



6. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.

If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten the correct amount.

- When tightening with a filter wrench, be extremely careful not to dent or damage the filter.

7. Check that the drain plug at the bottom of the water separator cup is tightened securely.

Tightening torque: 0.2 to 0.45 Nm (0.02 to 0.046 kgm, 0.1 to 0.3 lbft)

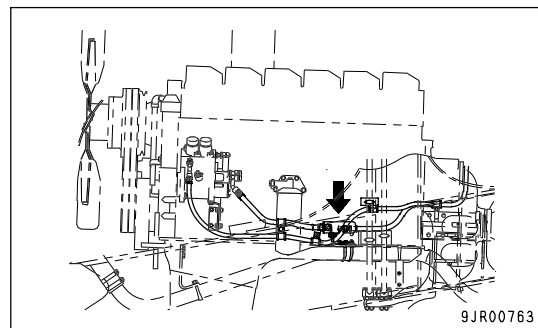
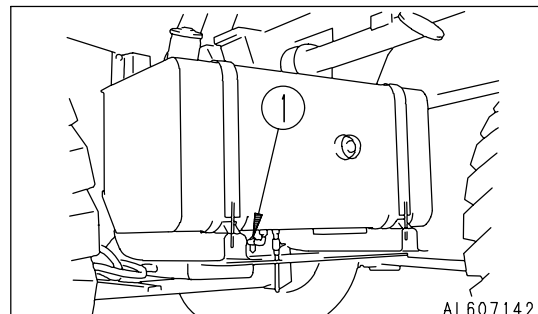
8. When carrying out standard replacement of the fuel filter cartridge (every 1000 hours), replace the cartridge and bleed the air. For details, see "REPLACE FUEL FILTER CARTRIDGE (PAGE 4-62)".
9. Start the engine, check that there is no leakage of fuel from the filter seal surface or water separator mounting surface, then run for approx. 10 minutes at low idling.

CLEAN FUEL TANK STRAINER

1. Tighten fuel supply valve (1) under the fuel tank, then remove the cap, and wash the strainer and strainer case.

The strainer forms one unit with the cap.

2. After checking and cleaning the strainer, set it in the case, then tighten the cap.
3. After installing, open fuel supply valve (1).

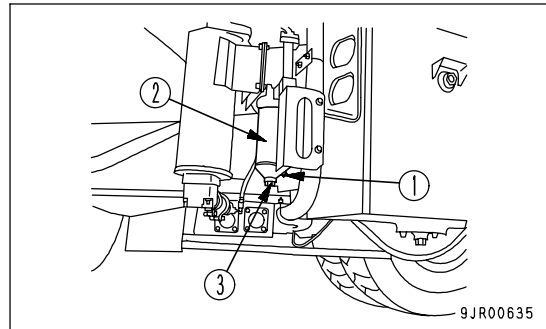


REPLACE TRANSMISSION OIL FILTER ELEMENT**WARNING**

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

VALVE INLET SIDE

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

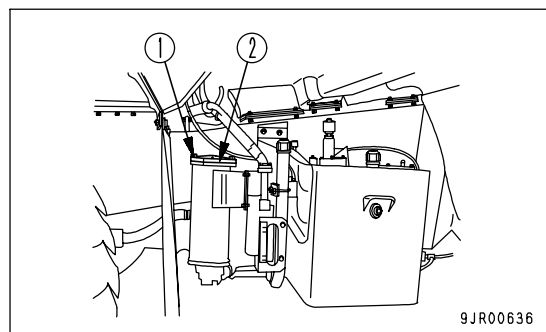


6. Assemble the new element to the case, set the case in position, and install with center bolt (3).
Be careful not to tighten center bolt (3) too far.
Tightening torque: 167 to 196 Nm (17 to 20 kgm , 123 to 144.7 lbft)
7. Run the engine for a short time at idling, then stop the engine, and check that the oil is up to the specified level.
For details, see "CHANGE OIL IN TRANSMISSION CASE, CLEAN TRANSMISSION CASE STRAINER (PAGE 4-65)".

Run the engine at high idling, and when the oil is warmed up, if the transmission filter (valve end) clogging monitor lamp flashes, replace the element immediately.

RETURN SIDE

1. Remove bolt (1), then remove cover (2).
2. Take out the element, then clean the inside of the case and removed parts.
3. Install the new element, then install cover (2) with bolt (1).

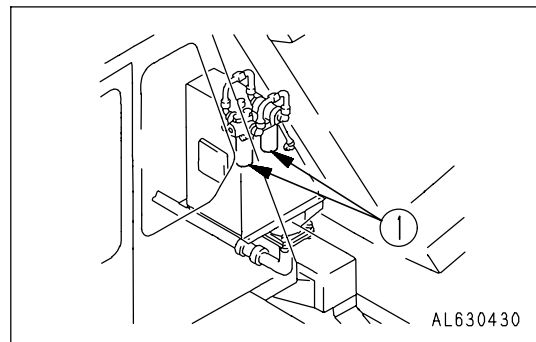


Run the engine at high idling, and when the oil is warmed up, if the transmission filter (tank end) clogging monitor lamp on the maintenance monitor (if equipped) flashes, replace the element immediately.

REPLACE ELEMENT OF FRONT DRIVE OIL FILTER

(HD325 only the machine of 4WD specifications)

1. Using a wrench, turn front drive oil filter case (1) to the left and remove it.
2. Install a new filter, then tighten the case.
3. Run the engine at idling for a short time, then stop the engine and check that the oil is up to the specified level. For details, see "CHECK OIL LEVEL IN FRONT DRIVE OIL TANK, ADD OIL (PAGE 3-63)".



NOTICE

- Always use a genuine Komatsu element.
- Replace the filter gasket and O-ring with new parts.
Coat thinly with clean oil when installing.

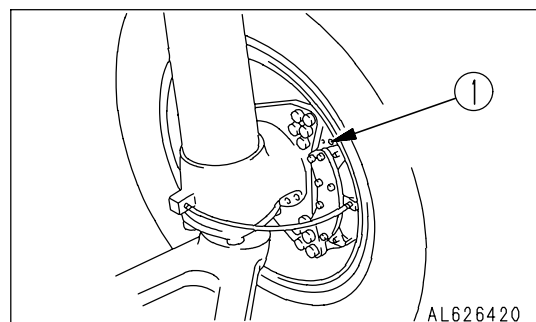
CHECK WEAR OF FRONT DISC BRAKE PADS



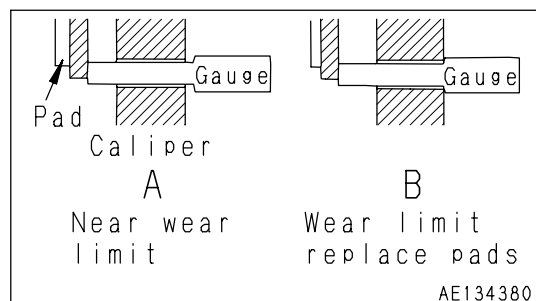
WARNING

- If the pad is continued to use after the period of wear limit, not only the disc will be damaged but also the brake will lose its effect, and it is dangerous. If the period of wear limit approaches, check frequently the condition to change the pad at proper time.
- Perform inspection every 250 hours if the work site is covered by lots of earth and sand and if it is at the location where the foot brake is frequently used.

1. Insert the inspection gauge into the wear inspection hole (1) and check.



2. When the stepped part of the gauge touch the caliper, it indicates wear limit (remaining thickness of pad: 3 mm (0.12 in)). So, change the pad.



After the inspection, if it is necessary to change the pad, contact your Komatsu distributor.

Left and right wheels are not always the same in terms of the amount of wear of the pad. So, perform the inspection for both left and right. If either side shows the wear limit, be sure to change all 8 pads.

If the work is performed on the muddy and watery ground, the mud sticks to caliper or disc. Leaving the mud will increase the wear of pad, so wash out thoroughly with water.

CLEAN, CHECK RADIATOR FINS AND AFTER COOLER FINS



WARNING

If compressed air scattered around dust and debris, there is danger of injury. Always wear protective equipment such as protective glasses and mask.

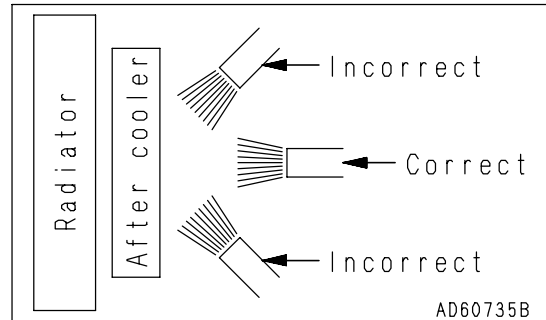
If the radiator fins become clogged or bent, this may cause overheating of the engine, so always clean or carry out inspection and take the necessary actions.

- Cleaning can be carried out by using jets of air, steam, or water, but be careful not to let the nozzle contact the fin.

Air pressure : Max. 0.98 MPa (10 kg/cm², 142 PSI)

Steam pressure : Max. 0.39 MPa (4 kg/cm², 56.8 PSI)

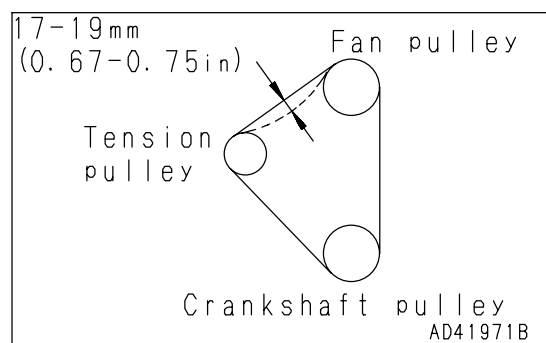
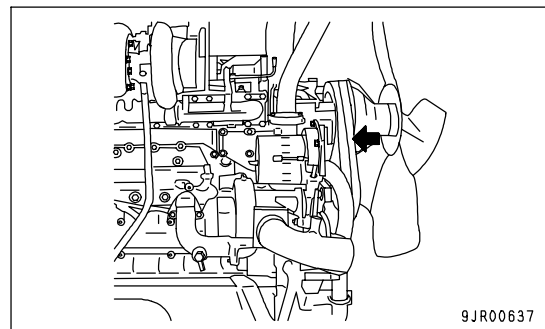
- When using compressed air or steam, keep the nozzle at a right angle to the radiator and after cooler.
- Examine the rubber hose, and if any cracks or brittle places are found, replace the hose. In addition, check also for loose hose clamps.



CHECK FAN BELT TENSION, ADJUST

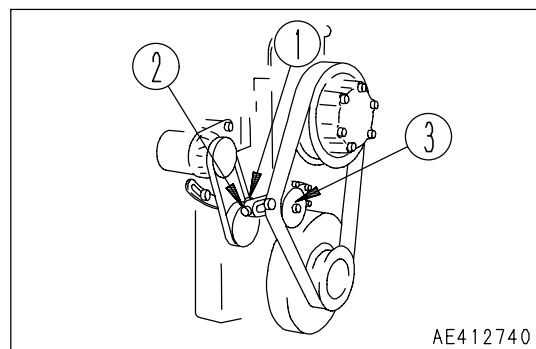
TESTING

The deflection should be approx. 17 to 19 mm (0.67 to 0.75 in) when a point midway between the fan pulley and tension pulley is pressed with the thumb with a force of 98 N (10 kg).

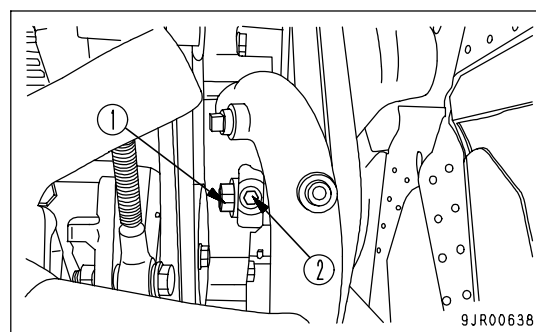


ADJUSTING

1. Loosen nut (1).
2. Use adjustment bolt (2) to move pulley (3) so that the deflection is approx. 17 to 19 mm (0.67 to 0.75 in) when a point midway between the fan pulley and tension pulley is pressed with the thumb with a force of 98 N (10 kg).
When the belt is replaced with a new belt, the standard deflection is 13 to 15 mm (0.51 to 0.59 in).
3. Check for damage to the pulleys, and wear of the groove and belt. Be particularly careful to check that the belt is not in contact with the bottom of the groove.

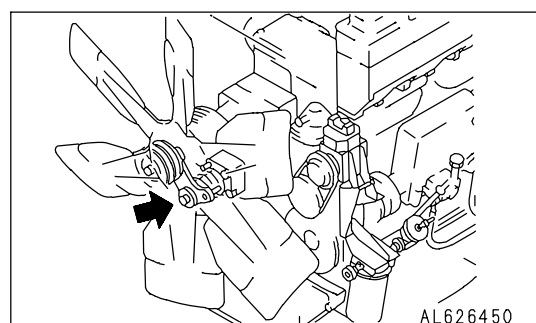


If the belt is stretched and there is no allowance for adjustment, or it is cut or cracked, replace it with a new belt.



LUBRICATE TENSION PULLEY (1 PLACE)

1. Using a grease pump, pump in grease through the grease fitting marked by the arrow until the grease is pushed out from the seal portion.
2. After greasing, wipe off any old grease that was pushed out.



EVERY 1000 HOURS SERVICE

Maintenance for every 50, 100, 250 and 500 hours service should be carried out at the same time.

REPLACE FUEL FILTER CARTRIDGE



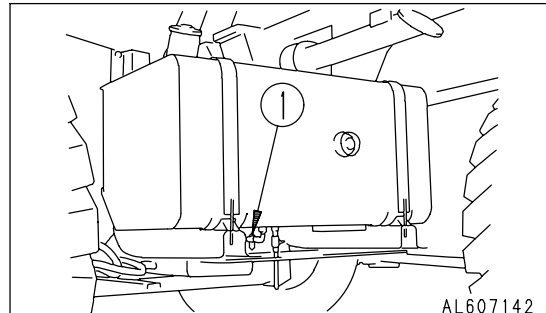
WARNING

- Immediately after the engine is stopped, all parts are at high temperature, so do not replace the filter immediately. Wait for the engine to cool down before starting the operation.
- The inside of fuel piping system of the engine is under high-pressure when the engine is running. When replacing the filter, wait for at least 30 seconds after the engine stops to let the internal pressure go down before replacing the filter.
- Do not bring any fire or spark close.
- Be careful when opening the air bleed plug at the fuel filter head and the air bleeder of the supply pump. The system is still under pressure and fuel may spurt out.

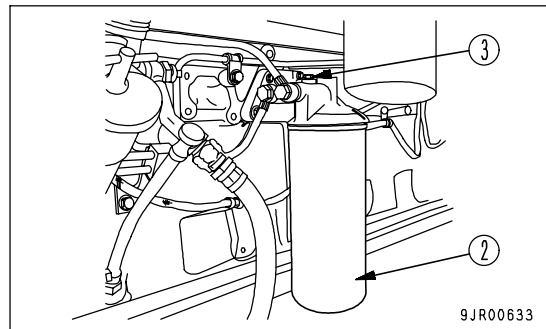
NOTICE

- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
 - The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.
If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
 - When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.
- Prepare a filter wrench

1. Close supply valve (1) of the fuel tank.



2. Set the container to catch the fuel under the filter cartridge.
3. Using a filter wrench, turn filter cartridge (2) counterclockwise to remove it.
4. Clean the filter holder.

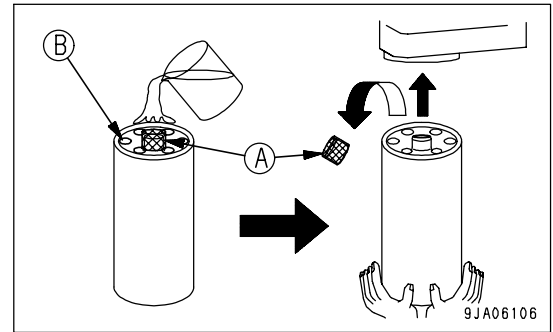


NOTICE

When filling the filter cartridge with fuel, carry out the filling operation with cap (A) fitted.

Cap (A) acts to prevent the entry of dirt or dust into the filter cartridge.

5. Fill the filter cartridge with clean fuel through the 8 small holes (B) in the new filter cartridge.
6. Coat the packing surface of the filter cartridge with oil.
7. Remove filter cartridge cap (A) and install to the filter holder.



8. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 1/2 to 3/4 of a turn.

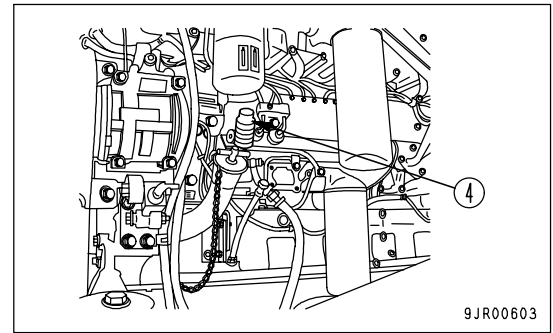
If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten to the correct amount.

9. After replacing filter cartridge (2), loosen air bleed plug (3), and open supply valve (1).

10. Loosen the knob of priming pump (4), then pump the knob and check that fuel comes out from air bleed plug (3).

11. Tighten air bleed plug (3).

Tightening torque: 7.8 to 9.8 Nm (0.8 to 1 kgm , 5.8 to 7.2 lbft)



12. Loosen air bleeder (5) of the supply pump.

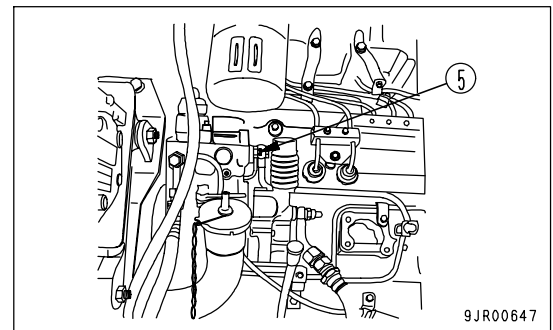
13. Pump priming pump (4) until no more bubbles come out with the fuel from air bleeder (5), then tighten air bleeder (5).

Tightening torque: 4.9 to 6.9 Nm

(0.5 to 0.7 kgm , 3.6 to 5.1 lbft)

14. Continue pumping until priming pump (4) becomes stiff.

15. Push in the knob of priming pump (4) and tighten it.



16. After replacing the filter cartridge, start the engine and check that there is no leakage of fuel from the filter cartridge. If there is any leakage of fuel, check the tightening condition of the filter cartridge. If the filter cartridge is properly tightened and there is still fuel leakage, follow Steps 2 and 3 to remove the filter cartridge, and check the packing surface. If damage or foreign material is found in the packing surface, replace the cartridge with a new part, and repeat Steps 4 to 16.

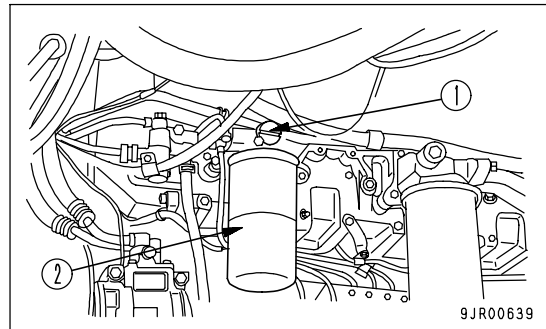
REPLACE CORROSION RESISTOR CARTRIDGE**WARNING**

All the engine parts are at high temperature after the engine has been operated, so never replace the cartridge immediately after finishing operations.

Wait for the oil to cool down before replacing the cartridge.

- Prepare a filter wrench

1. Set valve (1) at the top of the corrosion resistor to the CLOSED position, to close it.
2. Set the container to catch the water under the cartridge.
3. Using a filter wrench, remove cartridge (2).
4. Clean the filter holder, coat the steel surface of the new filter cartridge with clean engine oil, then install it.
5. When installing, tighten until the gasket contacts the seal surface of the filter holder, then tighten a further 2/3 turns. If the filter cartridge is tightened too far, the gasket will be damaged and this will lead to leakage of water. If the filter is too loose, water will also leak from the gap at the gasket, so always tighten the correct amount.



6. Set valve (1) to the OPEN position to open it.
7. After replacing the cartridge, start the engine and check that there is no leakage of water from the filter seal surface. If there is any leakage of water, check the tightening of the filter cartridge.

CHANGE OIL IN TRANSMISSION CASE, CLEAN TRANSMISSION CASE STRAINER



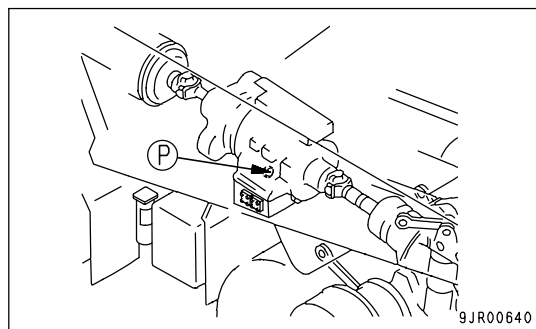
WARNING

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

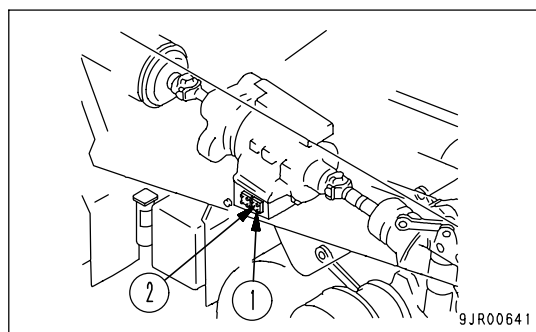
- Refill capacity: 90 liters (23.78 US gal)

1. Set the container to catch the oil directly under the drain plug (P).

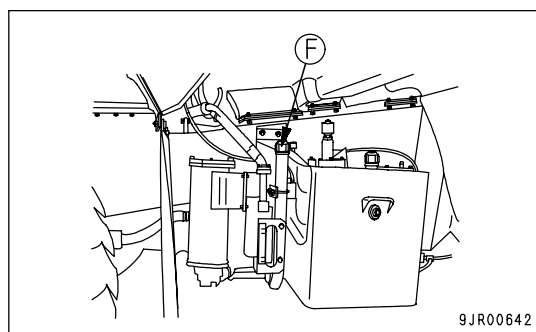
Remove drain plug (P), drain the oil, then tighten the plug again.



2. Remove bolt (1), then remove cover (2) and take out the strainer.
3. Remove any dirt stuck to the strainer, then wash in clean diesel fuel or flushing oil. If the strainer is damaged, replace it.



4. After installing the strainer, add oil through oil filler (F) to the specified level.
5. After adding oil, check that the oil is at the specified level. See "CHECK OIL LEVEL IN TRANSMISSION CASE, ADD OIL (PAGE 3-65)".



CHANGE OIL IN FRONT FINAL DRIVE

(HD325 only the machine of 4WD specifications)

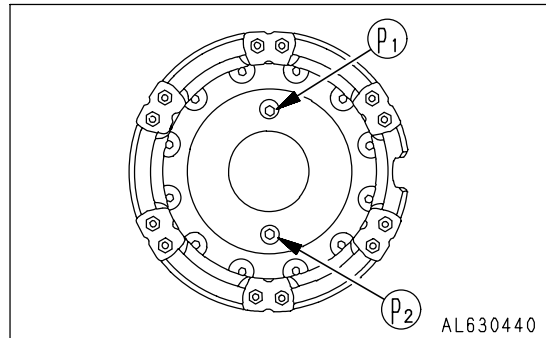


WARNING

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

The oil in the front final drive is the same as the oil for the transmission case, so when changing the oil, change the transmission oil at the same time. The oil is drained from the front final drive cover, but the oil is added and the oil level is checked at the transmission end. Add oil after adding oil at the transmission end.

- Refill capacity: 22 liters (5.8 US gal) each (both left and right)
1. Stop the machine so that drain plugs (P1) and (P2) are at the top and bottom.
 2. Remove drain plug (P2), then remove (P1), drain the oil, and tighten (P2) again.
 3. Add oil through the hole in (P1) to the specified level.
 4. Tighten drain plug (P1), start the engine, then run the engine at idling and check that the oil in the transmission is at the specified level.



CHANGE OIL IN FRONT DRIVE OIL TANK, CLEAN FRONT DRIVE OIL TANK STRAINER

(HD325 only the machine of 4WD specifications)

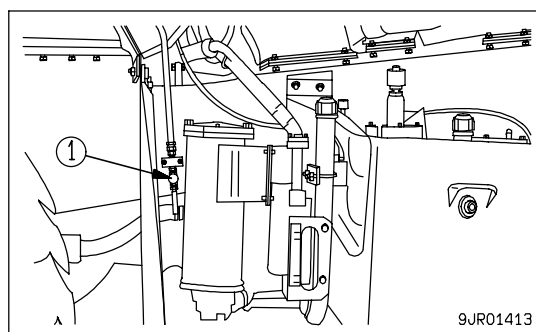


WARNING

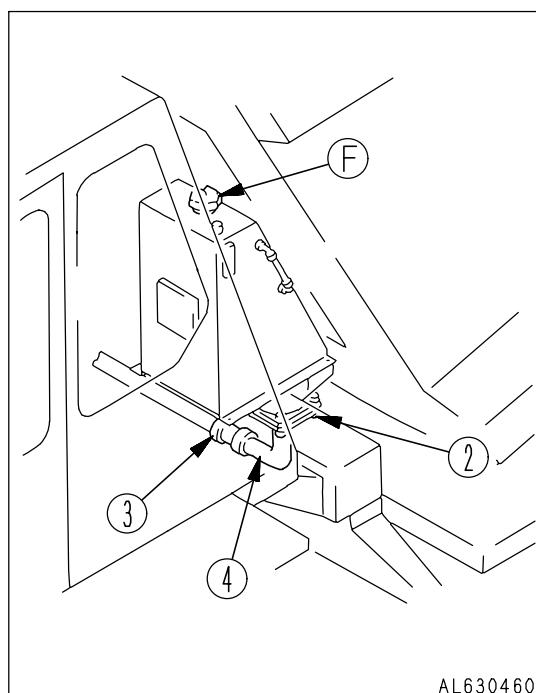
- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the plug, oil may spurt out, so turn the plug slowly to release the internal pressure, then remove it carefully.

- Refill capacity: 36 liters (9.5 US gal)

1. Open drain valve (1), drain the oil, then close drain valve (1) again.



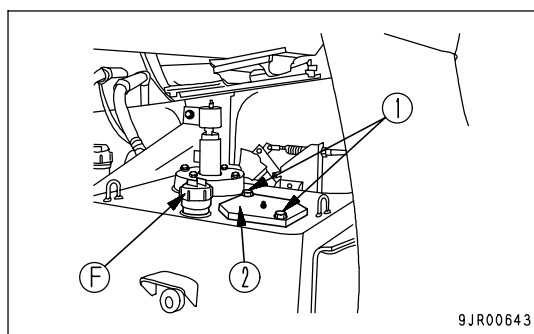
2. Remove bolt (2) and coupling (3), then remove piping (4).
3. Remove the strainer.
4. Remove any dirt stuck to the strainer, then wash it in clean diesel oil. Replace the strainer if it is damaged.
5. Install the strainer, piping, and coupling.
6. After installing the strainer, add oil through oil filler (F) to the specified level.
7. After adding oil, check that the oil is at the specified level.
For details, see "CHECK OIL LEVEL IN FRONT DRIVE OIL TANK, ADD OIL (PAGE 3-63)".



REPLACE HYDRAULIC FILTER ELEMENT**WARNING**

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

1. Turn the cap of oil filler (F) slowly to release the internal pressure, then remove the cap.
2. Remove bolt (1), then remove cover (2).
3. Take out the element, then wash the inside of the case and the removed parts.
4. Install the new element, then install cover (2) with bolt (1).

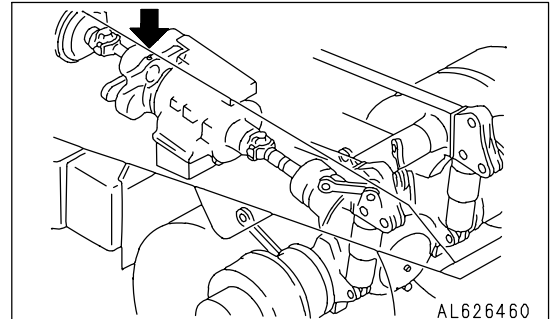


Run the engine at high idling, and when the oil is warmed up, if the hydraulic filter clogging monitor lamp (if equipped) flashes, replace the element immediately.

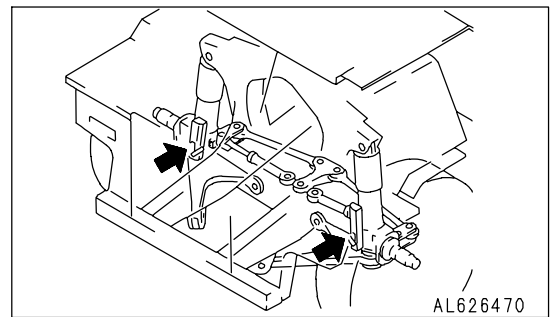
LUBRICATION

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

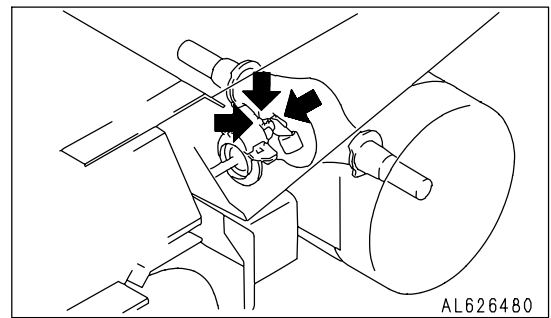
(1) Transmission mount (1 place)



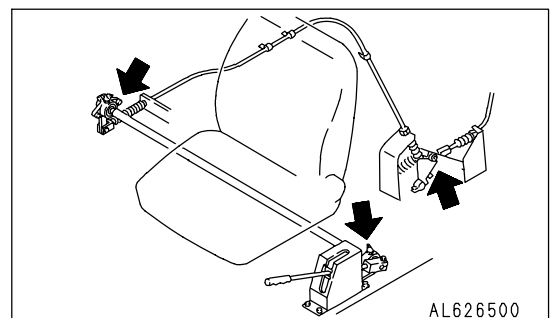
(2) Automatic suspension link (left and right: 1 place each)



(3) Parking brake linkage (3 places)



(4) Dump control link (3 places)



CHECK WEAR OF REAR BRAKE DISC



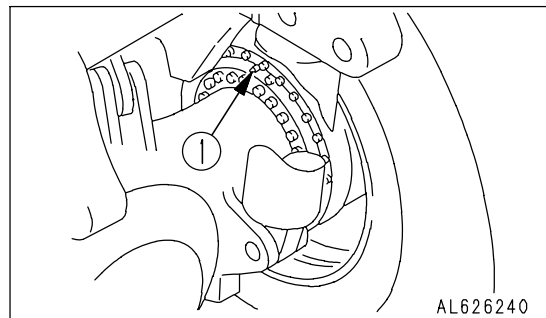
WARNING

- Carry out this check when the brake oil temperature is below 60°C (140°F).
- When carrying out the work with two workers, if the retarder control lever is pulled suddenly, there is danger that the rod of the disc wear measurement gauge may fly out suddenly under hydraulic pressure. Pull the rod out fully, and operate the retarder control lever slowly over a period of approx. 10 seconds.
- If the disc wear approaches the wear limit, check the condition frequently, regardless of the maintenance interval. In addition, check the retarder capacity carefully.

1. Stop the machine on level ground, set the parking brake valve lever to the PARKING position, then check that the other brakes are not applied before starting inspection.
2. Remove air bleed plug (1) from the rear brake and install the disc wear measurement gauge.

When doing this, tighten the nipple fully and pull the rod of the disc wear measurement gauge out fully. If it is not pulled out, there is danger that the rod may fly out under hydraulic pressure when the retarder lever is pulled.

Gauge Part No.: 567-98-41301

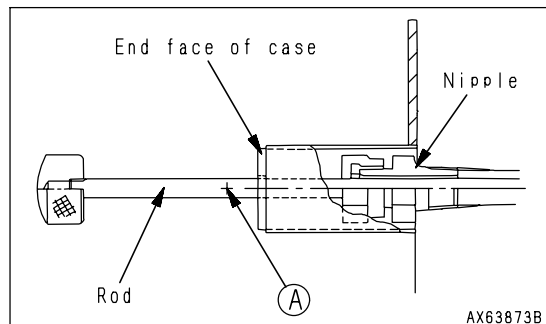


3. Turn the starting switch to the ON position and check that the air pressure gauge is in the green range.
4. If the air pressure is low, start the engine and run the engine at 2,000 rpm until the air pressure gauge enters the green range. When it enters the green range, turn the starting switch OFF.
5. Operate the retarder control lever slowly over approx. 10 seconds to apply the brake. In this condition, push the gauge rod in slowly until it contacts the piston.

6. If mark (A) of the disc wear measurement gauge goes in beyond the end face of the case, this means that the disc has reached the wear limit.

If this happens, please contact your Komatsu distributor for inspection and maintenance.

If the rod is released suddenly after measurement, there is great danger that the rod may fly out under hydraulic pressure. Keep the rod held down and let it back slowly. When it reaches the end of its stroke, release it.



7. Return the retarder control lever.
8. Remove the disc wear measurement gauge and install air bleed plug (1).
9. Bleed all the air from the circuit. For details, see "BLEED AIR FROM REAR BRAKE (PAGE 4-31)".

CHECK TIGHTENING PARTS OF TURBOCHARGER

Contact your Komatsu distributor to have the tightening portions checked.

EVERY 2000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500 and 1000 hours service should be carried out at the same time.

CHANGE OIL IN HYDRAULIC TANK

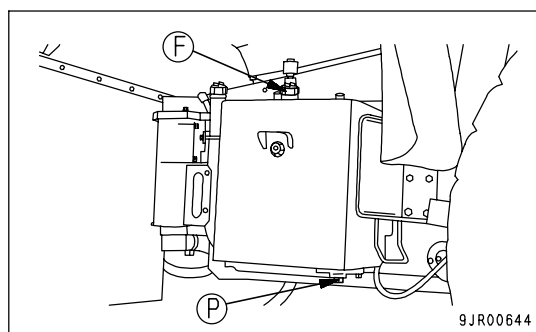


WARNING

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

- Refill capacity: 129 liters (34.06 US gal)

1. Lower the dump body and stop the engine.
2. Turn the cap of oil filler (F) to release the internal pressure before removing the cap.
3. Taking care not to get any oil on you, remove drain plug (P), drain the oil, then tighten the plug again.
4. Pour in the specified amount of engine oil from oil filler (F).
5. After adding oil, check that the oil is at the specified level. For details of the oil to use, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 3-65)".



CHANGE OIL IN FINAL DRIVE CASE

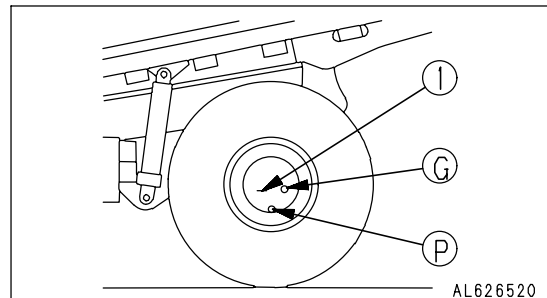


WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- If there is still pressure remaining inside the case, the oil or plug may fly out. Turn the plug slowly to release the pressure, then remove it carefully.

- Refill capacity: 13 liters (3.43 US gal) for each (left and right)

1. Stop the machine so that casting line (1) is horizontal and drain plug (P) is at the bottom.
2. Remove drain plug (P), drain the oil, then tighten the plug again.
3. Add oil through the hole for plug (G) to the specified level.
4. After adding oil, check that the oil is at the specified level. See "CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL (PAGE 4-44)".



CHANGE OIL IN DIFFERENTIAL CASE

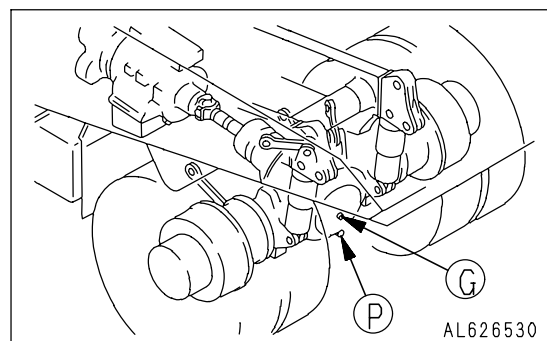


WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.
- If there is still pressure remaining inside the case, the oil or plug may fly out. Turn the plug slowly to release the pressure, then remove it carefully.

- Refill capacity: 45 liters (11.88 US gal)

1. Remove drain plug (P), drain the oil, then tighten the plug again.
2. Add oil through the hole for plug (G) to the specified level.
3. After adding oil, check that the oil is at the specified level. See "CHECK OIL LEVEL IN DIFFERENTIAL CASE, ADD OIL (PAGE 4-44)".

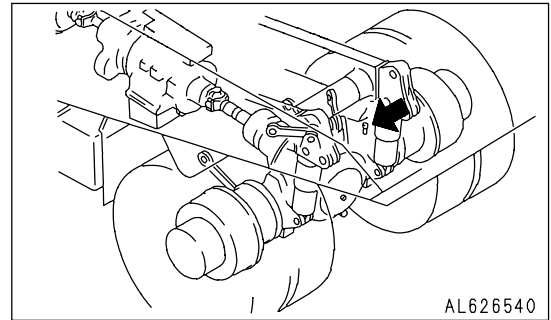


CLEAN DIFFERENTIAL CASE BREATHER



WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the engine breather.
- When using compressed air, there is a hazard that dirt may be blown up and cause serious injury.
Always use safety glasses, dust mask, or other protective equipment.



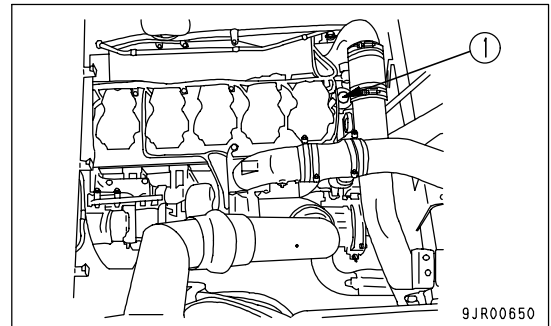
Remove the mud and dirt from around the breather, then remove the breather and wash out the dirt from inside with clean diesel oil or flushing oil.

CLEAN ENGINE BREATHER ELEMENT

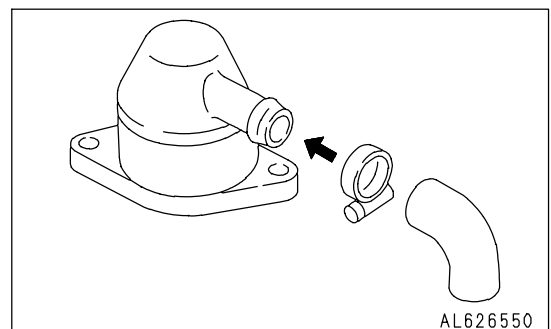


WARNING

- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the engine breather.
- When using compressed air, there is a hazard that dirt may be blown up and cause serious injury.
Always use safety glasses, dust mask, or other protective equipment.



1. Wipe off the dirt from around the breather.
2. Loosen the clamp, then remove the hose.
3. Remove the bolt, then remove breather (1).
4. Rinse the whole breather in diesel oil or flushing oil.
5. After washing, pass diesel oil through in the direction of the arrow.
6. Dry with compressed air, then coat the O-ring with oil, and install.
Check the element and O-ring, and replace them with new parts if necessary.
7. Check the breather hose, and if any deteriorated oil is stuck to the inside, replace the hose with a new hose.

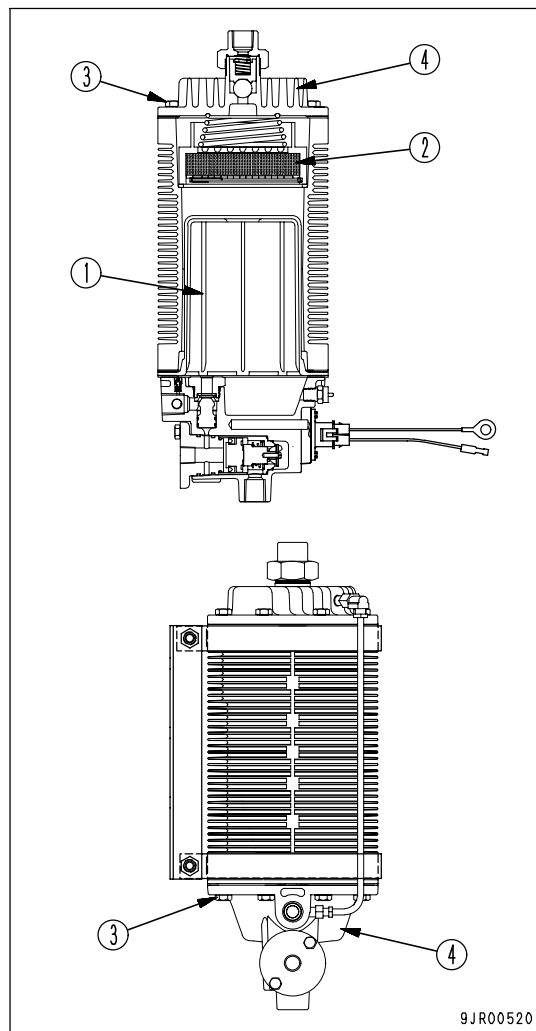


CLEAN AIR DRYER FILTER AND DEFLECTOR

(If equipped)

Always clean once every 6 months regardless of the operating hours.

1. Remove bolt (3), then remove cap (4).
2. Disassemble deflector (1) and filter (2) and wash in diesel oil.



CLEAN EMERGENCY RELAY VALVE

Check the breather hose, and if any deteriorated oil is stuck to the inside, replace the hose with a new hose.

CHECK ALTERNATOR, STARTING MOTOR

The brush may be worn or have no grease on the bearing, so contact your Komatsu distributor for inspection or repair.

If the engine is started frequently, carry out inspection every 1000 hours.

CHECK, ADJUST ENGINE VALVE CLEARANCE

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

CHECK INJECTOR

See Section "A REGULATION AREA (PAGE 4-21)".

CLEAN, CHECK TURBOCHARGER

Contact your Komatsu distributor for cleaning or inspection.

CHECK PLAY OF TURBOCHARGER ROTOR

Contact your Komatsu distributor to have the rotor play checked.

EVERY 4000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours service should be carried out at the same time.

CHECK WATER PUMP

Check for play in the pulley, leakage of grease or water, or clogging of the drain hole. If any problem is found, contact your Komatsu distributor for disassembly and repair or replacement.

CHECK AIR COMPRESSOR

Ask your Komatsu distributor to carry out this work.

CHECK FAN PULLEY AND TENSION PULLEY

Check for play of the pulley and leakage of grease. If any problem is found, please contact your Komatsu distributor.

CHECK VIBRATION DAMPER

There is the possibility of drop in the level of the damper fluid and runout of the concave surface. So, please contact your Komatsu distributor to inspect or replace.

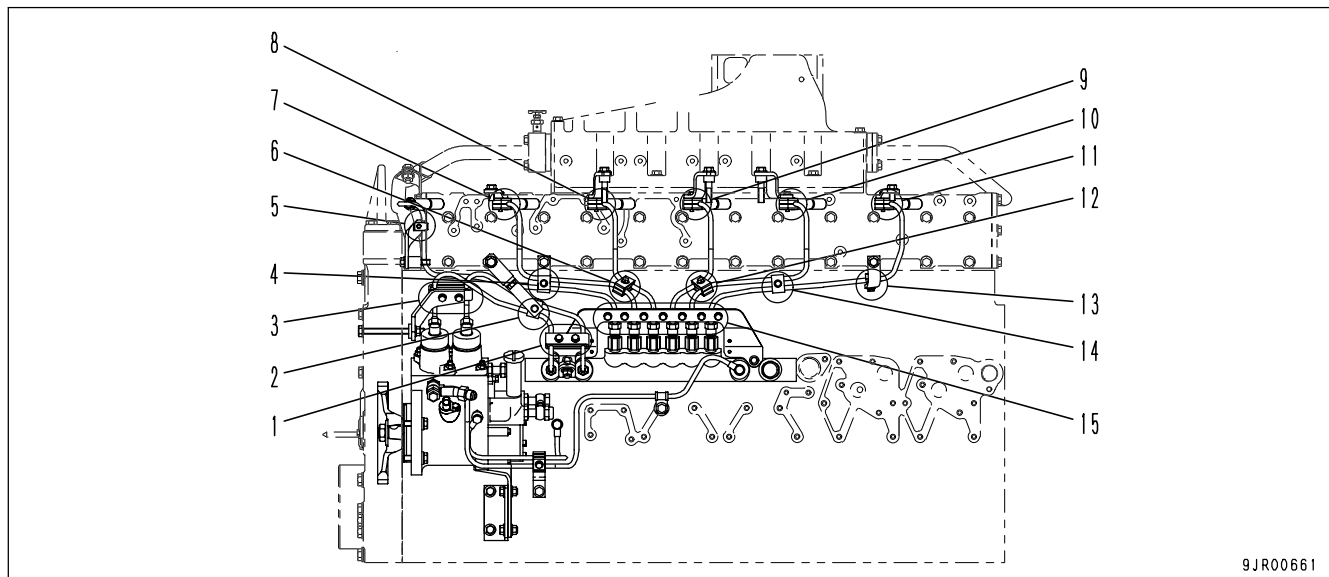
CHECK INJECTOR

See Section "B REGULATION AREA (PAGE 4-21)".

REPLACE INJECTOR ASSEMBLY

See Section "A REGULATION AREA (PAGE 4-21)".

CHECKING FOR LOOSENESS OF HIGH-PRESSURE CLAMP, HARDENING OF RUBBER

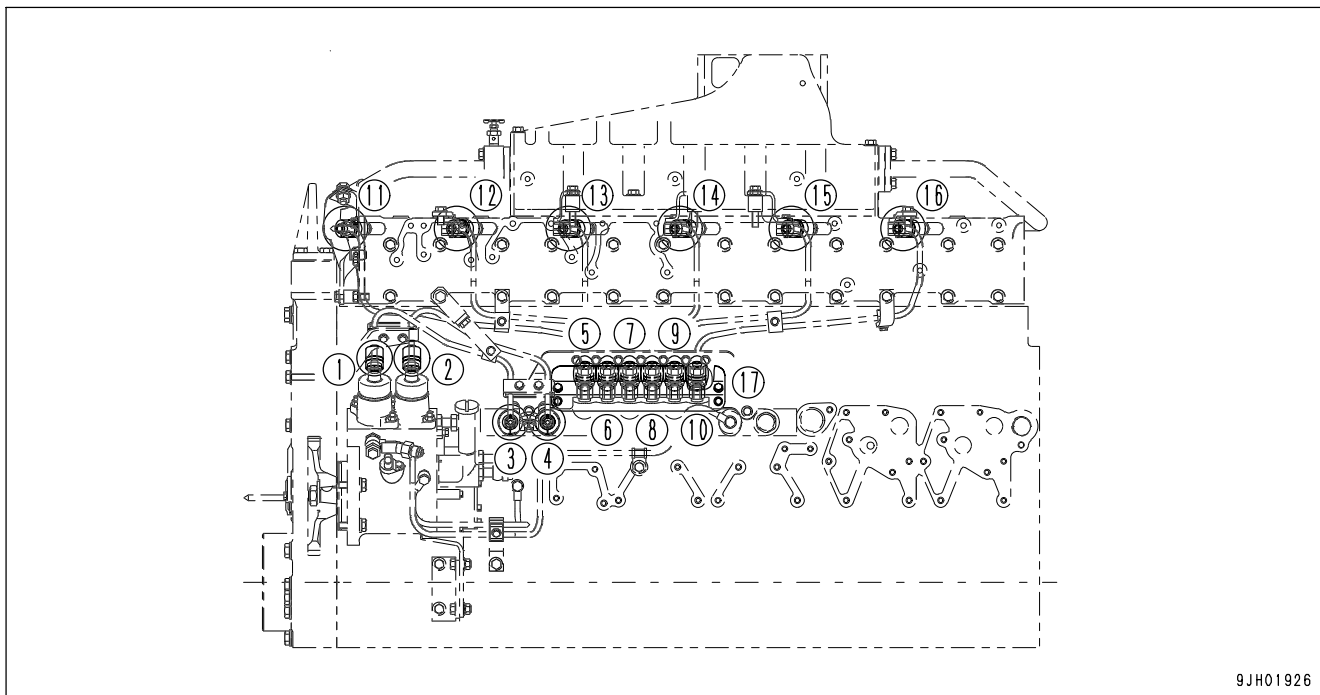


Check visually and touch with your fingers to check that there are no loose bolts or hardening of rubber parts at clamps (1) to (15). If there is any looseness or hardened rubber, contact your Komatsu distributor for replacement.

NOTICE

The fuel spray prevention cap and fuel spray prevention cover are protective parts to prevent fire if leaking fuel should spray on high-temperature parts of the engine.

Always check that the fuel spray prevention cap and fuel spray prevention cover are installed correctly.

CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

9JH01926

Check for any missing fuel spray prevention caps (1) to (16) or fuel spray prevention cover (17), and check also for any hardened rubber portions.

If there are any missing caps or cover or the rubber is hardened, please contact your Komatsu distributor for repairs.

Install rubber caps (1) to (10) with the slit facing the cylinder block.

Install rubber caps (11) to (16) with the slit facing down.

NOTICE

The fuel spray prevention cap and fuel spray prevention cover are protective parts to prevent fire if leaking fuel should spray on high-temperature parts of the engine.

Always check that the fuel spray prevention cap and fuel spray prevention cover are installed correctly.

EVERY 8000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500, 1000, 2000 and 4000 hours service should be carried out at the same time.

REPLACE INJECTOR NOZZLE TIP

See Section "B REGULATION AREA (PAGE 4-21)".

REPLACE HIGH-PRESSURE PIPING CLAMP

Ask your Komatsu distributor to carry out this work.

REPLACE FUEL SPRAY PREVENTION CAP

Ask your Komatsu distributor to carry out this work.

EVERY 15000 HOURS SERVICE

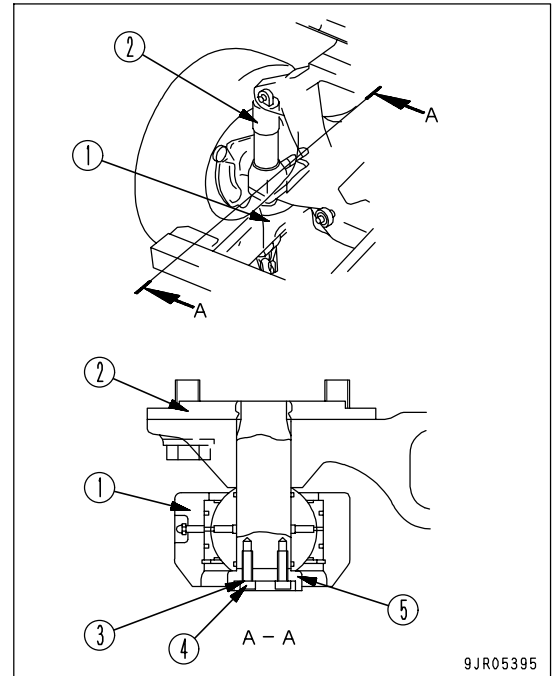
Maintenance for every 50, 100, 250, 500, 1000, 2000, 4000 and 8000 hours service should be carried out at the same time.

CHECK, REPLACE STEERING A ARM MOUNTING BOLT

Check and replace the A arm mounting bolts, lock plate, and holder.

Please consult your Komatsu distributor when checking and replacing.

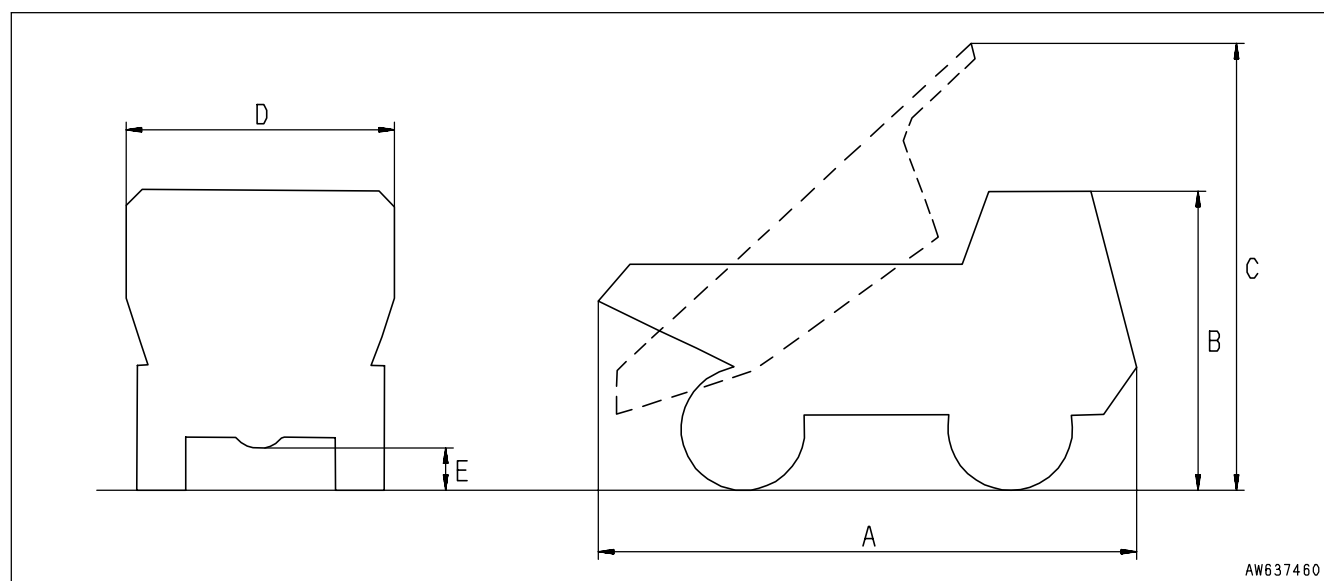
- (1) A arm
- (2) Front suspension
- (3) Lock plate
- (4) Bolt
- (5) Holder



SPECIFICATIONS

SPECIFICATIONS

Item			Unit	HD325-6	HD325-6W	HD405-6
Overall weight(unladen weight + max. payload + 1 operator(75kg(165lb)))			kg (lb)	60775 (134009)	64325 (141837)	72125 (159038)
Unladen weight			kg (lb)	28700 (63284)	32550 (71773)	32050 (70670)
Unladen weight (without body)			kg (lb)	20520 (45247)	24350 (53692)	21170 (46680)
Max. payload			kg (lb)	32000 (70560)		40000 (88200)
Dump body capacity		Struck	m³ (cu·yd)	18 (23.5)		20 (26.2)
		Heaped (2 : 1)	m³ (cu·yd)	24 (31.4)		27.3 (35.7)
Dumping speed (at 2100 rpm) (raised)			sec	10		
Name of engine			-	Komatsu SAA6D140E-3 diesel engine		
Flywheel horsepower			kW (HP)/rpm	379 (508)/2000		
Max. torque			Nm(kgf·m, lbf·ft)/rpm	2166 (221, 1598.5)/1400		
A	Overall length		mm (ft in)	8365 (27' 5")		
B	Overall height		mm (ft in)	4000 (13' 1")		
C	Overall height when dumping		mm (ft in)	7960 (26' 1 1/2")		
D	Overall width		mm (ft in)	3660 (12')		
E	Min. ground clearance (bottom of rear axle)		mm (ft in)	500 (1' 8")		
Min. turning radius			mm (ft in)	7200 (23' 7")		
Travel speed		Forward	1st	km/h (MPH)	11.6 (7.2)	
			2nd	km/h (MPH)	16.3 (10.1)	
			3rd	km/h (MPH)	21.8 (13.5)	
			4th	km/h (MPH)	29.6 (18.4)	
			5th	km/h (MPH)	39.8 (24.7)	
			6th	km/h (MPH)	54.0 (33.6)	
			7th	km/h (MPH)	70.0 (43.5)	
		Reverse		1st	km/h (MPH)	12.0 (7.5)



ATTACHMENTS, OPTIONS

WARNING

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

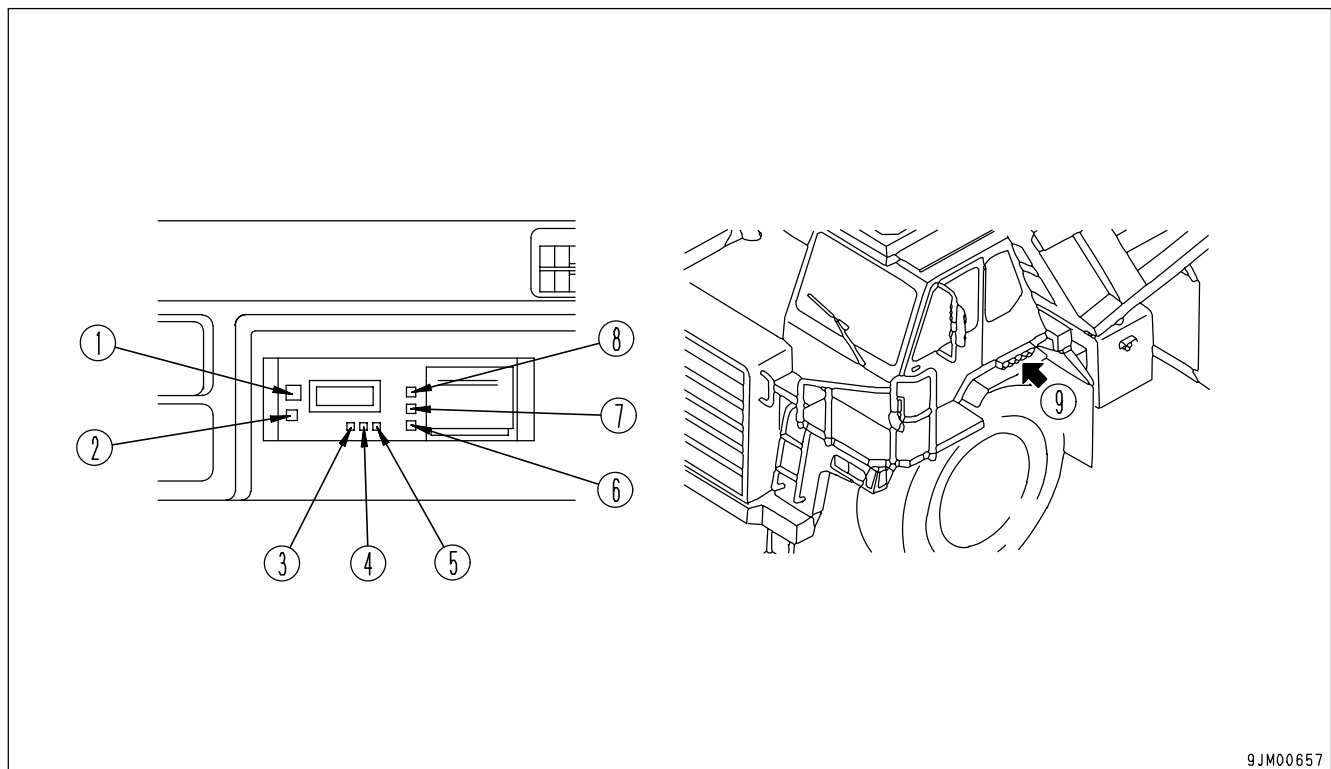
HANDLING PAYLOAD METER

There are two types of payload meter: a card type and a printer type. The explanation for the payload meter given here is for the printer type. For details of handling the card type payload meter, see the separate operation manual for payload meter II.

The payload meter inputs the signals from the pressure sensors, clinometer, body float detection, neutral detection, and other signals, and calculates the weight of the load using its built-in micro computer. It displays the results on the panel and also uses the external display lamps to show the condition of the load.

In addition, the data saved in memory can be printed out together with the date the load was dumped and the number of loads.

NAME OF PARTS



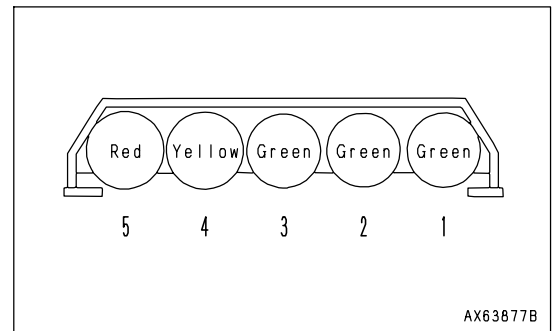
9JM00657

- | | |
|--------------------------------------|------------------------------|
| (1) Calibration switch | (6) Memory data clear switch |
| (2) Night lighting dimmer switch | (7) Printer feed switch |
| (3) Clock setting adjustment switch | (8) Print switch |
| (4) Clock adjustment shift switch | (9) External display lamps |
| (5) Clock adjustment increase switch | |

EXTERNAL DISPLAY LAMPS

- When the actual load is displayed, the lamps light up as follows.
- HD325, HD325 of 4WD specifications

Lamp 1 (green): Displays load between 10 tons and 14 tons
 Lamp 2 (green): Displays load between 14 tons and 29 tons
 Lamp 3 (green): Displays load between 29 tons and 35 tons
 Lamp 4 (yellow): Displays load between 35 tons and 38 tons
 Lamp 5 (red): Displays load over 38 tons



- HD405

Lamp 1 (green): Displays load between 12 tons and 18 tons
 Lamp 2 (green): Displays load between 18 tons and 36 tons
 Lamp 3 (green): Displays load between 36 tons and 40 tons
 Lamp 4 (yellow): Displays load between 40 tons and 42 tons
 Lamp 5 (red): Displays load over 42 tons

- If the shift lever is not at neutral and the dump lever is not at the FLOAT position, none of the display lamps light up.
- All the lamps light up for 10 seconds after the power is turned ON.
- To prevent overloading, use the lamps for loading up to the point where the 3 green lamps light up.

PREDICTION DISPLAY

- In the case where the weight of the load changes as each bucket is emptied into the dump body, the average weight of the load up to that point is calculated to predict what the weight of the load will be if one more bucket is loaded. The appropriate lamp flashes, so it is possible to adjust the weight of the next load when operating the loader.

The prediction display for the load level and the actual load display are shown at the same time.

Example (HD325, HD325 of 4WD specifications):

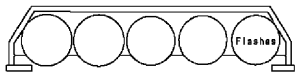
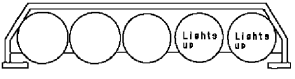
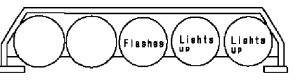
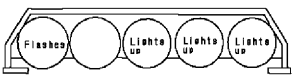
1st bucket: 6.5 tons
 2nd bucket: 8 tons (14.5 tons)
 3rd bucket: 8 tons (22.5 tons)
 4th bucket: 8 tons (30.5 tons)

Example (HD405):

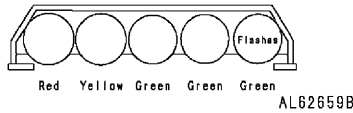
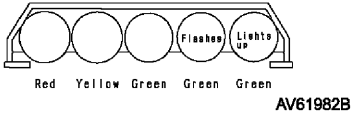
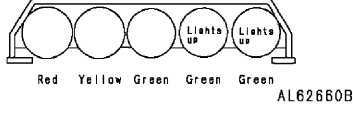
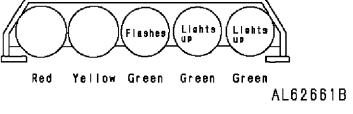
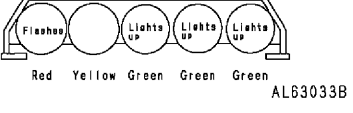
1st bucket: 8 tons
 2nd bucket: 8 tons (16 tons)
 3rd bucket: 7.5 tons (23.5 tons)
 4th bucket: 8 tons (31.5 tons)
 5th bucket: 8 tons (39.5 tons)

If the load changes as above, the external display lamps will give the display in the table below.

- HD325, HD325 of 4WD specifications

No. of loads	External display lamp	Remarks
1st bucket	 Red Yellow Green Green Green AL62659B	<ul style="list-style-type: none"> • The weight actually loaded is 6.5 tons, so no lamp lights up. • The predicted load is 13 tons (6.5 tons x 2), so the first green lamp flashes
2nd bucket	 Red Yellow Green Green Green AL62660B	<ul style="list-style-type: none"> • The weight actually loaded is 14.5 tons (6.5 tons +8 tons), so two green lamps light up. • The predicted load is 21.8 tons (14.5 tons +14.5/2 tons), so no lamp flashes.
3rd bucket	 Red Yellow Green Green Green AL62661B	<ul style="list-style-type: none"> • The weight actually loaded is 22.5 tons (14.5 tons +8 tons), so two green lamps stay lighted up. • The predicted load is 30 tons (22.5 tons +22.5/3 tons), so the 3rd lamp flashes.
4th bucket	 Red Yellow Green Green Green AL63033B	<ul style="list-style-type: none"> • The weight actually loaded is 30.5 tons (22.5 tons +8 tons), so three green lamps light up. • The predicted load is 38.1 tons (30.5 tons +30.5/4 tons), so the red lamp flashes.

• HD405

No. of loads	External display lamp	Remarks
1st bucket	 <p>AL62659B</p>	<ul style="list-style-type: none"> • The weight actually loaded is 8 tons, so no lamp lights up. • The predicted load is 16 tons (8 tons x 2), so the first green lamp flashes
2nd bucket	 <p>AV61982B</p>	<ul style="list-style-type: none"> • The weight actually loaded is 16 tons (8 tons + 8 tons), so first green lamps light up. • The predicted load is 24 tons (16 tons + 16/2 tons), so 2nd lamp flashes.
3rd bucket	 <p>AL62660B</p>	<ul style="list-style-type: none"> • The weight actually loaded is 23.5 tons (16 tons + 7.5 tons), so two green lamps light up. • The predicted load is 31.8 tons (24 tons + 23.5/3 tons), so no lamp flashes.
4th bucket	 <p>AL62661B</p>	<ul style="list-style-type: none"> • The weight actually loaded is 31.5 tons (23.5 tons + 8 tons), so two green lamps stay lighted up. • The predicted load is 39.4 tons (31.5 tons + 31.5/4 tons), so the 3rd lamp flashes.
5th bucket	 <p>AL63033B</p>	<ul style="list-style-type: none"> • The weight actually loaded is 39.5 tons (31.5 tons + 8 tons), so three green lamps light up. • The predicted load is 47.4 tons (39.5 tons + 39.5/5 tons), so the red lamp flashes.

OPERATING PAYLOAD METER

Resetting power (the power can be reset by turning the power ON.)

- The display for the first 3 seconds is 88:88, and after that, the time is displayed for 7 seconds.
- After 10 seconds, the normal display is given.
- The printer feeds one line of paper and stops at the home position.

CONTENT OF DISPLAY

- When the dump lever is at FLOAT and the shift lever is at neutral, the actual load is displayed.
- When the load is less than 2.0 tons, or if the dump lever is not at FLOAT, the display is 0.
- If the dump lever is at FLOAT but the shift lever is not at neutral, the time display is given.
A maximum of 200 cycles of data can be written to memory. If this level is exceeded, FULL is displayed. If FULL is displayed, print out the data and clear the data from the memory. For details, see "DELETING DATA FROM MEMORY (PAGE 6-8)".
- After completion of operations, we recommend that you stop the machine, print out the data, and clear the data from memory.
- There may be a slight change between the load displayed at the loading point and the load displayed at the dumping point.
- Save the data to memory when the dump lever is raised.
When the machine is completely stopped, it is possible to carry out accurate calculation if the load is dumped when the swaying of the machine has completely stopped. We recommend that the slope at the dumping point be kept to within ± 5 degrees.
- When the value displayed by the payload meter becomes stable, move the dump lever to the RAISE position. If the machine is still swaying violently when the dump lever is moved to the RAISE position, ***** is printed when the print out is made.
- When the dump lever is returned from LOWER to FLOAT, wait for at least 5 seconds before turning the starting switch OFF.

OPERATION OF SWITCHES

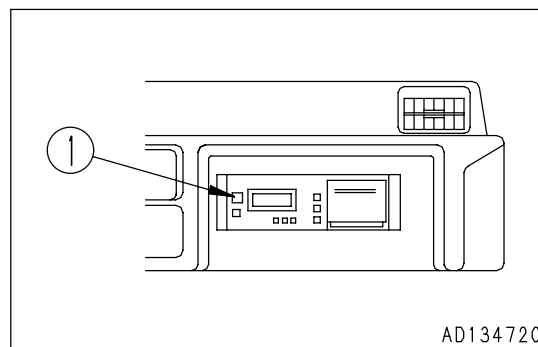
WHEN CARRYING OUT CALIBRATION

Carry out calibration at the following occasions.

- When the machine is delivered, and once every month after that.
- When the gas pressure and oil have been adjusted in the suspension cylinder.
(When the suspension has been adjusted.)
- When the machine has been modified and the unladen weight has changed more than 100 kg (221 lb).
- When the suspension pressure sensor has been replaced.
- When other modifications have been made around the suspension.
- When the built-in battery has been replaced.
- When CAL is displayed.

METHOD OF CARRYING OUT CALIBRATION

1. Set the machine with the dump body empty.
2. Place the shift lever at the N position, and press calibration switch (1) for at least 2 seconds. (The letters CAL flash)
3. Drive the machine slowly and when the travel speed reaches approx. 10 km/h (6.2 MPH), press calibration switch (1) again. (The letters CAL light up) The display returns to the time display to show that the operation is completed.



Carry out calibration on a flat even road surface.

Travel in a straight line. (Distance: Approx. 100 m (328 ft))

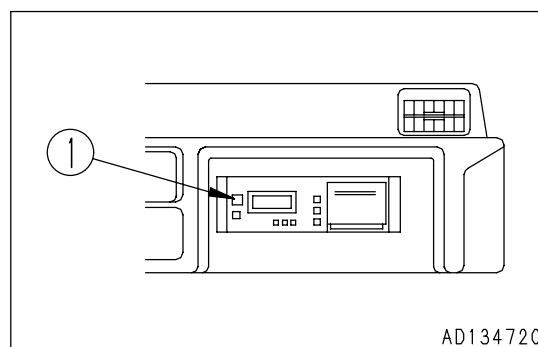
Keep the machine traveling at a constant travel speed.

The calibration data are written to the internal RAM, and are retained even when the power is turned off.

To stop the calibration operation (when in neutral), press calibration switch (1) again. The display will change from a flashing CAL to a flashing SCH. When calibration switch (1) is pressed again, the display will return to the normal display.

CARRYING OUT SENSOR CHECK

1. Drive the machine unloaded on flat ground.
2. Set the shift lever to N and press calibration switch (1) for at least 2 seconds, then press calibration switch (1) again for at least 2 seconds. (The letters SCH will flash)
3. When traveling at a speed of approx. 10 km/h (6.2 MPH), press calibration switch (1) again. (The letters SCH will light up) If the display returns to the time display, the operation is completed. If there is an abnormality in any sensor, the error code is displayed.



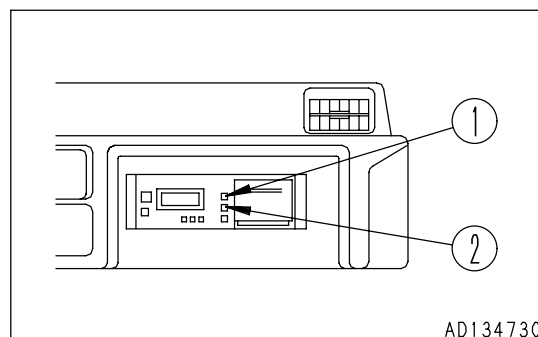
Carry out the sensor check at least once every month.

PRINTING OUT

1. When print out switch (1) is pressed for at least 2 seconds, the data are printed out.
2. When print feed switch (2) is pressed for at least 2 seconds, the paper is fed.

To stop the print during the printout, press the print switch again for at least 2 seconds.

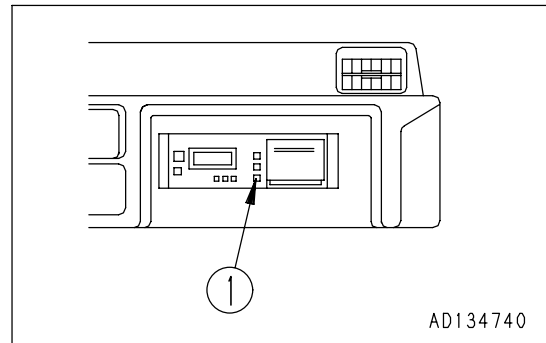
Do not hold the paper coming out from the printer during the printout. This will cause the print to overlap.



DELETING DATA FROM MEMORY

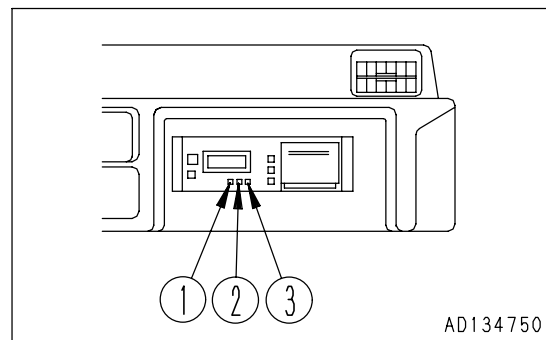
1. Print out the necessary data before clearing the memory.
2. Press memory data clear switch (1) for at least 2 seconds. (The letters CLEA will flash)
3. Press memory data clear switch (1) again for at least 2 seconds to complete the data clearing operation.

After completion of work, we recommend that you stop the machine, print out the data, and clear the data from memory.

**RESETTING TIME****WARNING**

Never try to reset the time when traveling.

1. When time set adjustment switch (1) is pressed for at least 2 seconds, the minute display will flash. Press time adjustment increase switch (3) to set the minute display correctly.
2. When time adjustment switch (2) is pressed for at least 2 seconds, the hour display will flash. Press time adjustment increase switch (3) to set the hour display correctly.
3. Following this, each time that time adjustment switch (2) is pressed, the flashing point changes to day, month, and year. Press time adjustment increase switch (3) to correct any item that needs correcting.
4. After setting the time correctly, press time set adjustment switch (1).

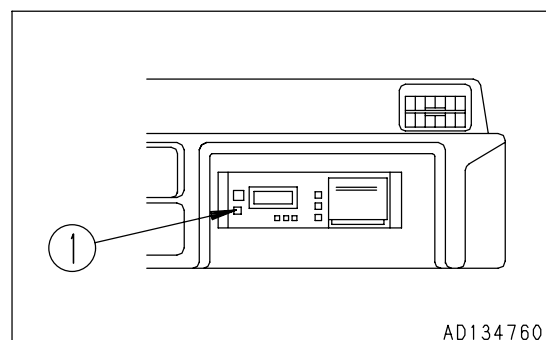
**OPERATING LIGHTING DIMMER SWITCH**

To change the brightness of the display, do as follows.

1. Each time dimmer switch (1) is pressed, the lighting becomes one stage dimmer. If the switch is pressed again after it reaches the dimmest level, it will change to the brightest level.

The brightness can be changed in 10 stages.

If it is pressed continuously, the brightness will change continuously.



SETTING PAPER IN PRINTER

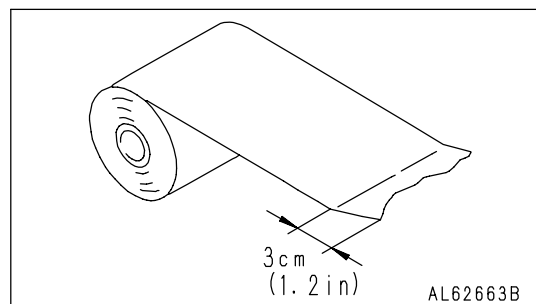
When there is only 30 cm (12 in) of paper remaining in the printer, a red line will appear on the left edge to show that it is time to replace the paper.

Press the FEED switch to feed out the remaining paper.

Never try to pull the paper out forcibly.

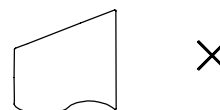
Always use Komatsu genuine printer paper (7818-27-2910).

1. Open the roll of printer paper, fold the paper at a point approx. 3 cm (1.2 in) from the end of the paper, then cut the paper straight along the fold.



Never cut the paper in the way shown on the right. It will cause the paper to jam.

- Do not cut at an angle.



- Do not cut to a point.

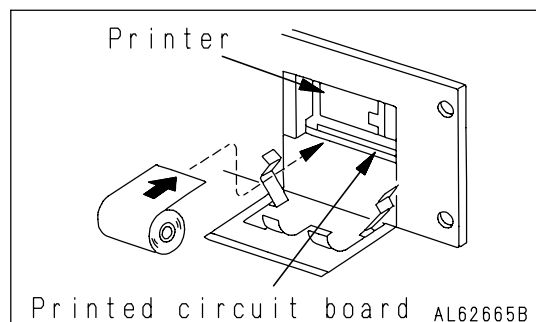


- Do not leave a rough edge.



AL62664B

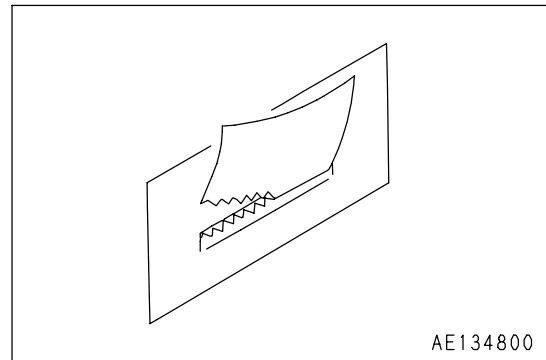
2. Set the print paper with the printing side facing up, and insert it straight into the paper feed hole. If the FEED switch is pressed while feeding in the paper, the paper will feed automatically.
3. When the paper comes out from the printer, pass it through the slit in the lid of the printer, then close the lid.



METHOD OF CUTTING PRINTER PAPER

1. Press the FEED switch to feed the paper out to the necessary position.
2. Put the paper in contact with the cutter on the lid, then pull up to cut the paper from one side to the other.

Do not pull the paper out and cut it without using the paper cutter.

**STORING PRINTER PAPER**

The printer paper is thermal paper, so store it in a place where the temperature range is between 0°C (32°F) and 40°C (104°F).

Do not keep it in a place exposed to direct sun light.

IF ERROR MESSAGE "E-33" IS DISPLAYED

When the starting switch key is turned to the OFF position, the payload meter uses the internal battery to prevent the load data from being deleted.

If the battery voltage drops, error message E-33 is displayed, so replace the battery as follows.

Replacing battery

Move the machine to a place where it is safe to carry out the replacement operation.

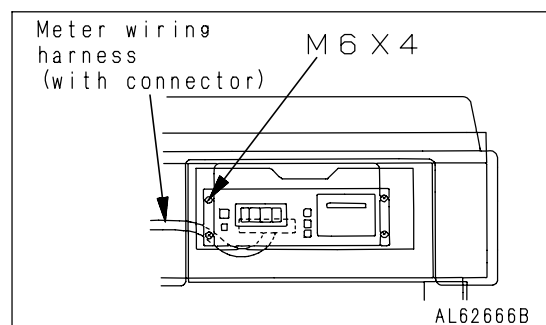
- Parts to prepare

Crosshead screwdriver

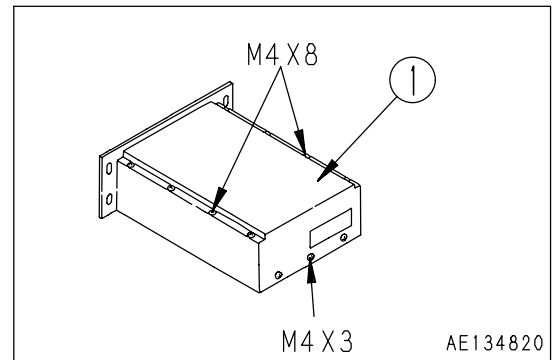
Socket wrench (for M4 nut)

New battery (7818-27-2860)

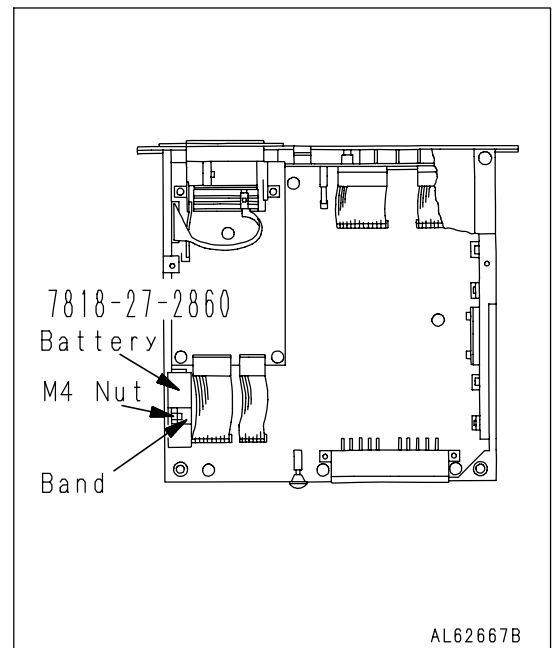
1. Turn the starting switch key to the ON position, press the PRINT switch for at least 2 seconds, and print out the load data from memory.
Do not start the engine when doing this.
2. Turn the starting switch back to the OFF position.
3. Remove the screws (M6 x 4) holding the payload meter, then pull the payload meter out to the front.



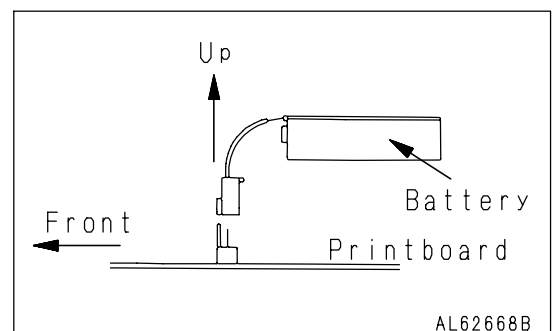
4. Remove the connectors, remove the screws (top: M4 x 8, rear: M4 x 3) of top cover (1) of the payload meter, then remove top cover (1).



5. Remove the nut (M4) and the band holding the battery.
Do not wear gloves when carrying out this operation.
Be careful not to let dirt, dust, or metal particles get inside the controller. Be careful not to drop any nuts or washers inside the controller.



6. Pull the battery connectors up directly from the printboard to remove them.
7. Push the connectors of the new battery down straight to connect them to the printboard.
8. Fit the battery band, then fix the battery to the payload meter with the nut (M4) and washer (flat spring).
Check that the battery has not moved out of position.
9. Install the top cover.
10. Install the payload meter to its original position on the panel.



After replacing the battery, do as follows.

- 1) Turn the starting switch to the ON position.
- 2) Press the memory data clear switch (CLR) twice to delete the data from memory. (The first time, it will flash; the second time, it will light up and then display the load.)
- 3) Carry out calibration.
- 4) After carrying out calibration, operate the dump lever once FLOAT → LOWER → FLOAT with the dump body empty.

Replace the battery within 48 hours.

The life of the battery is approx. 2 years.

OPERATION AFTER REPLACING CONTROLLER

After replacing the controller, always carry out calibration, and operate the dump lever FLOAT → LOWER → FLOAT with the dump body empty.

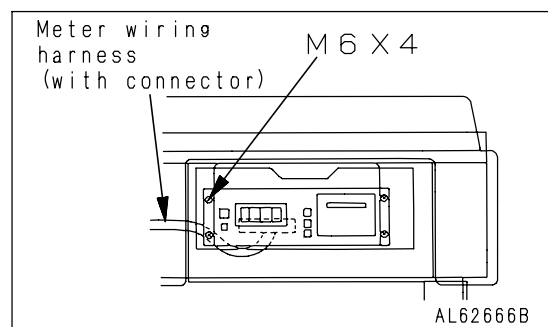
IF ERROR MESSAGE "PAPE" FLASHES (PAPER JAM)**NOTICE**

Never touch the printer head (white). If the printer head is removed, it is impossible to install it again.

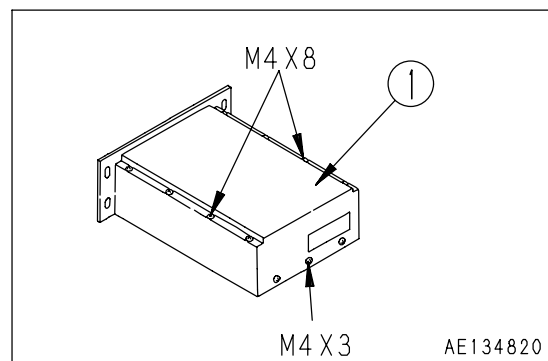
Always be extremely careful not to let any dust or metal particles inside the controller.

If the paper jams, PAPE is displayed on the load display, so move the machine to a safe place and clear the paper jam as follows.

1. Turn the starting switch key to the OFF position.
2. Remove the screws (M6 x 4) holding the payload meter, then pull the payload meter out to the front.



3. Remove the connectors, remove the screws (top: M4 x 8, rear: M4 x 3) of top cover (1) of the payload meter, then remove top cover (1).



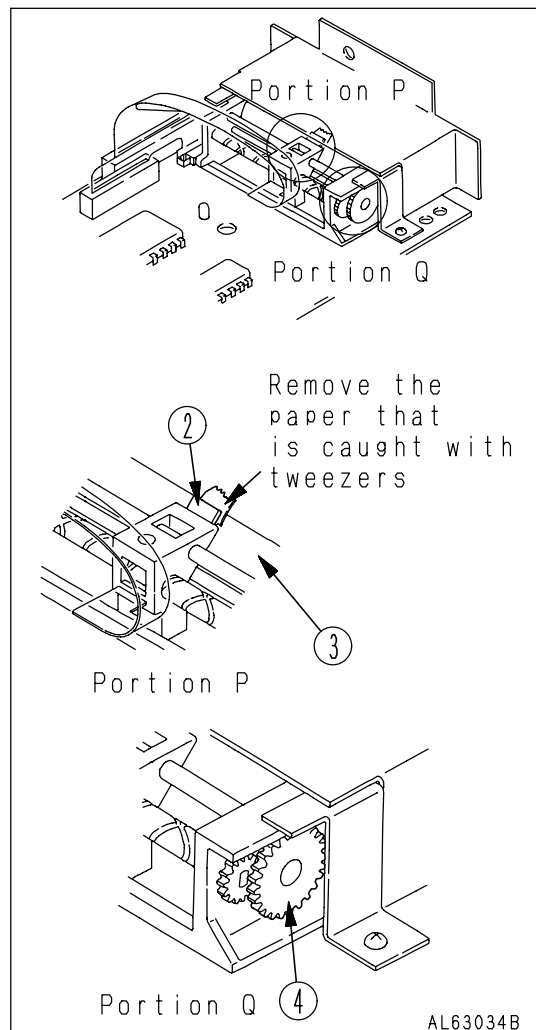
4. Use tweezers to remove the paper caught between printer head (2) and guide (3).

Do not wear gloves when carrying out this operation.

When using tweezers to remove the jammed paper, press the guide with your finger to make a clearance between the printer head and guide to make it easier to remove the paper.

If there is any paper remaining immediately under the printer head, turn gear (4) with the flat of your fingers to move the head. If gear (4) is turned counterclockwise, the head will move to the right.

5. After removing the paper, install the connectors before installing the top cover.



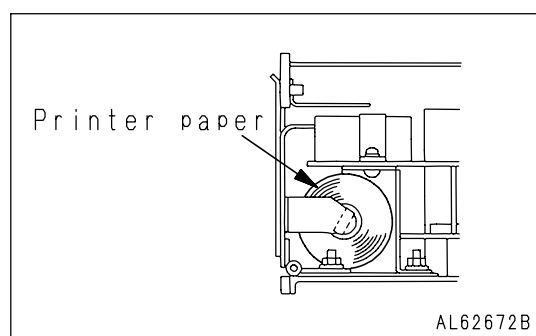
6. Remove the printer paper remaining inside the printer, and cut the leading end of the paper.

For details of the method of cutting the end of the paper, see "METHOD OF CUTTING PRINTER PAPER (PAGE 6-10)".

7. Turn the starting switch key to the ON position, and press the FEED switch.

For details of the method of inserting the paper, see "SETTING PAPER IN PRINTER (PAGE 6-9)".


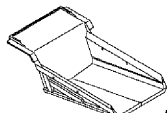

8. Turn the starting switch key to the OFF position, remove the connectors, then assemble to the original condition.



SELECTING DUMP BODY

(HD325, HD325 only the machine of 4WD specifications)

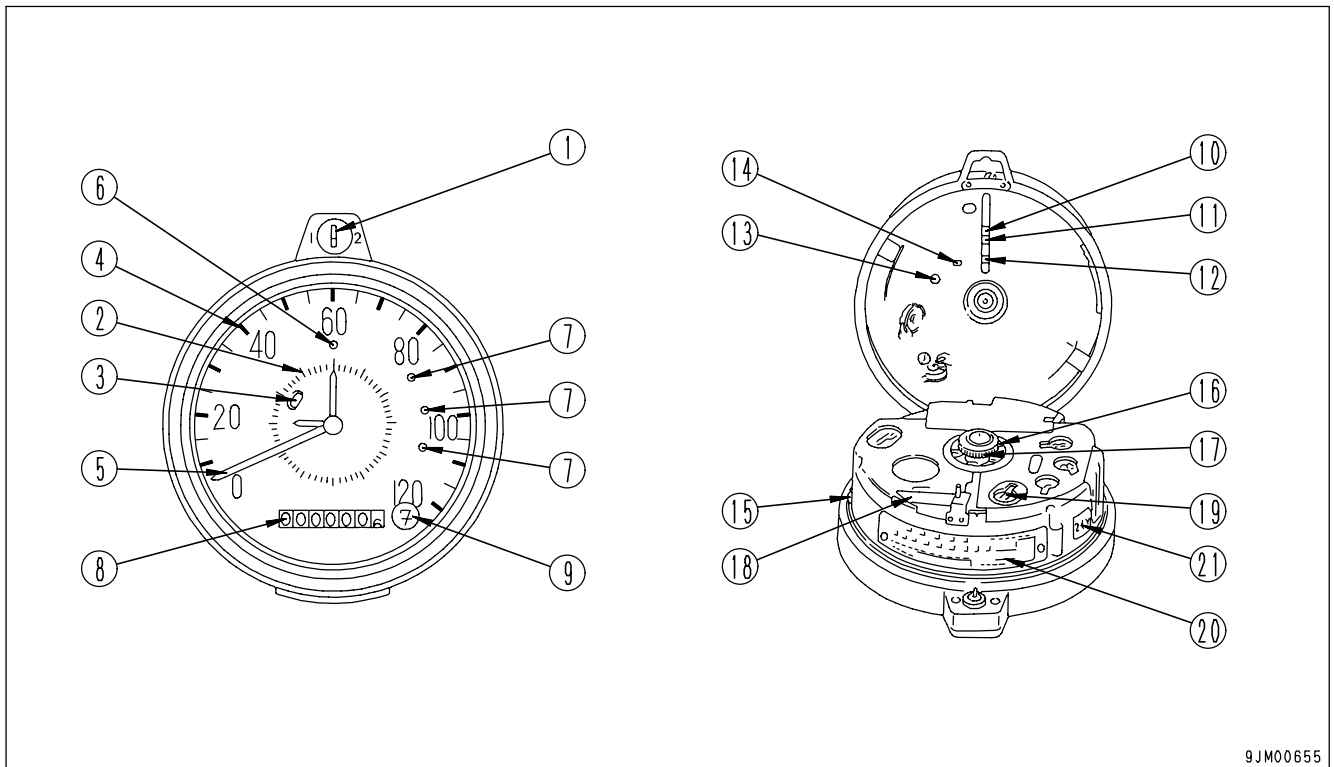
Select the dump body from the following table.

Purpose	Body type	Features	Body shape
Transporting rocks	Rock body	<ul style="list-style-type: none"> A liner is installed to the whole inside surface of the dump body to allow the loading of crushed rock, coal, or timber. Example: Coal mine 	 ※ AE134880
Transporting soil or sand	Linerless body	<ul style="list-style-type: none"> This is suitable for jobsites where soil or sand is loaded. No liner is installed. Example: Loading loose soil for landfills 	 ※ AE134890
(Special specification) Transporting rubble	Rubber liner body	<ul style="list-style-type: none"> This is suitable for jobsites where rubble or large rocks are loaded. A rubber liner is installed. This is also effective in reducing noise when loading. Example: Jobsites handling rubble 	 ※ AE134900

※: It is possible to install a side extension (if equipped) to these dump bodies.

TACHOGRAPH (TCO 15-6)

EXPLANATION OF COMPONENTS



9JM00655

- | | |
|---|--|
| (1) Instrument lock | (12) Travel distance recording stylus |
| (2) Clock dial | (13) Adjustment screw for speed warning lamp |
| (3) Clock operation confirmation aperture | (14) Speed confirmation aperture for speed warning lamp indication |
| (4) Speed scale | (15) Clock setting knob |
| (5) Speed indicator | (16) Chart support |
| (6) Speed warning lamp | (17) Pressing ring |
| (7) Speed indication confirmation lamp | (18) Cutting knife |
| (8) Odometer | (19) Instrument lighting lamp |
| (9) Period indicating label | (20) Name plate |
| (10) Speed recording stylus | (21) Voltage indication label |
| (11) Operator change recording stylus | |

INSTRUMENT LOCK

This (1) can be used for the instrument lock key when replacing the charts, or for operator change identification keys 1 and 2.

CLOCK DIAL

One line here (2) indicates one minute.

CLOCK OPERATION CONFIRMATION APERTURE

It is possible to check the action of the second hand with this (3) when the clock is working.

SPEED SCALE

This (4) is the scale for the machine travel speed.

SPEED INDICATOR

This (5) indicates the machine travel speed.

SPEED WARNING LAMP

When the machine exceeds the maximum set speed, the lamp (6) lights up to warn the operator.

Models with the speed warning lamp do not have the speed indication confirmation lamp.

SPEED INDICATION CONFIRMATION LAMP

This lamp (7) is interconnected with the speedometer and is used to confirm the speed indication. When using the confirmation switch to light up the confirmation lamp during checks before starting, always check for any disconnection in the three indication confirmation lamps.

Models with the speed warning lamp do not have the speed indication confirmation lamp.

ODOMETER

This meter (8) displays the total distance (km) traveled by the machine.

PERIOD INDICATING LABEL

This label (9) indicates that it is for 7 days.

SPEED RECORDING STYLUS

This (10) records the momentary speed of the machine on the chart.

OPERATOR CHANGE RECORDING STYLUS

When the operator change key is used, the operator change is recorded on the chart (11).

TRAVEL DISTANCE RECORDING STYLUS

This (12) records the distance travel by the machine on the chart. One up-and-down recording motion is 10 km.

ADJUSTMENT SCREW FOR SPEED WARNING LAMP

The speed at which the lamp gives a warning can be set as desired with this screw (13).

SPEED CONFIRMATION APERTURE FOR SPEED WARNING LAMP INDICATION

This (14) is the speed indication aperture for setting the desired speed.

CLOCK SETTING KNOB

Turn this knob (15) clockwise to advance the hand, and counterclockwise to turn the hand back.

CHART SUPPORT

This (16) is the rotating part of the clock and has teeth to prevent the chart from slipping.

PRESSING RING

This ring (17) is a ring that presses the chart and holds it against the chart support.

CUTTING KNIFE

This knife (18) cuts the tape connecting the charts.

INSTRUMENT LIGHTING LAMP

This lamp (19) is used for light up the instrument.

NAME PLATE

This (20) indicates the type and model.

VOLTAGE INDICATION LABEL

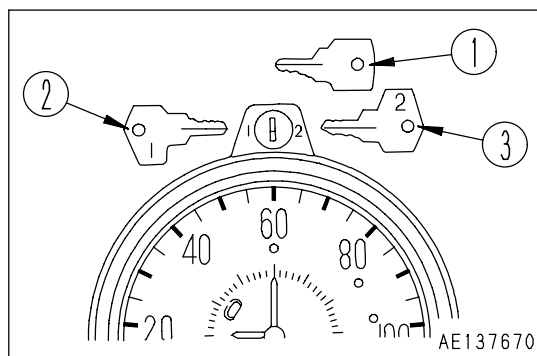
This label (21) indicates the voltage.

METHOD OF USING KEY

There are three types of key. Key (1) with no mark is used for opening and locking the instrument. Key (2) (marked with No. 1) is change key 1, and key (3) (marked with No. 2) is change key 2. With these three keys, it is possible to know the details of the operation and the change of operator.

To use the change key, remove the instrument open/lock key and insert change key 1 in the same key hole, then turn 45° in the No. 1 direction.

Use change key 2 in the same way and turn to the No. 2 direction.



The change key will only turn in the direction of its number.

The change keys cannot be used to open the instrument.

Recording width of chart

When using key with no mark: 1.45 mm (0.057 in)

When using key with No. 1 mark: 2.15 mm (0.085 in)

When using key with No. 2 mark: 0.7 mm (0.028 in)

METHOD OF USE

1. Check the operation of clock.

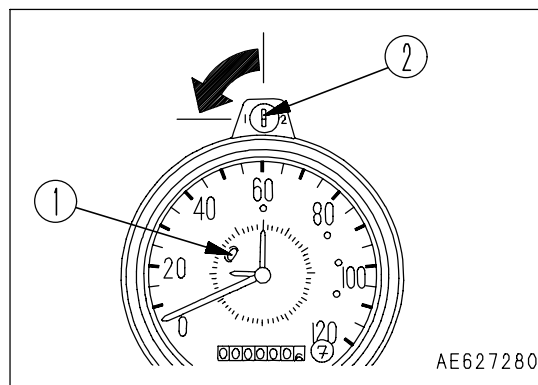
Watch through clock operation confirmation aperture (1) to confirm that the clock is working.

The clock is electric, so there is no need to wind it up.

2. Open the cover.

Insert the instrument open/lock key in hole (2), turn counterclockwise 90°, then pull open carefully.

The cover can be opened approx. 115°. Do not open it further than that, or pull it strongly, or put anything heavy on the cover, as these will cause failures.



3. Turn time setting knob (3) to set the time.

Precautions when setting time

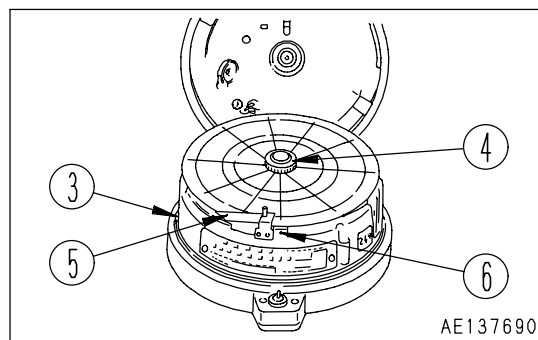
Always set the time with the time setting knob. Turn the hand in the direction of rotation 10 minutes beyond the correct time, then turn back to the correct time.

4. Fill in chart.

Before inserting new chart paper, always fill in the required items. (Operator code No., machine code No., date, etc.)

Fill in the above items with a steel pen.

Handle the charts carefully with clean hands, and do not fold or scratch them.



5. Push down pressing ring (4) holding the charts, turn counterclockwise, and pull out the pressing ring at the point where it contacts the stopper, then remove the charts.

6. Insert new charts.

Remove pressing ring (4), then set the charts under cutting knife (5). When doing this, align the time on the charts (for example when the starting time is 9 am) exactly with red point (6) on the instrument body.

Precautions when replacing the charts

When aligning the charts with the center of the chart support, do not force them into position or use your finger to make the hole in the center of the chart paper larger. If the size of the hole changes, it may cause an error in the recording.

Stop the engine completely before inserting the new charts.

Use Komatsu genuine charts (P/N: YZ762929-980) for 90 km/h (55.9 MPH) 7 days.

7. Close the cover.

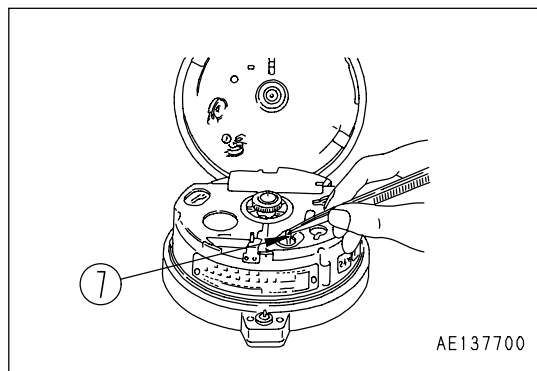
Lift up the cover to close it, then turn the instrument open/lock key 90° clockwise.

Replacing instrument lighting lamp bulb

Raise contact piece (7), and take out the old bulb with a pincette. It comes out easily.

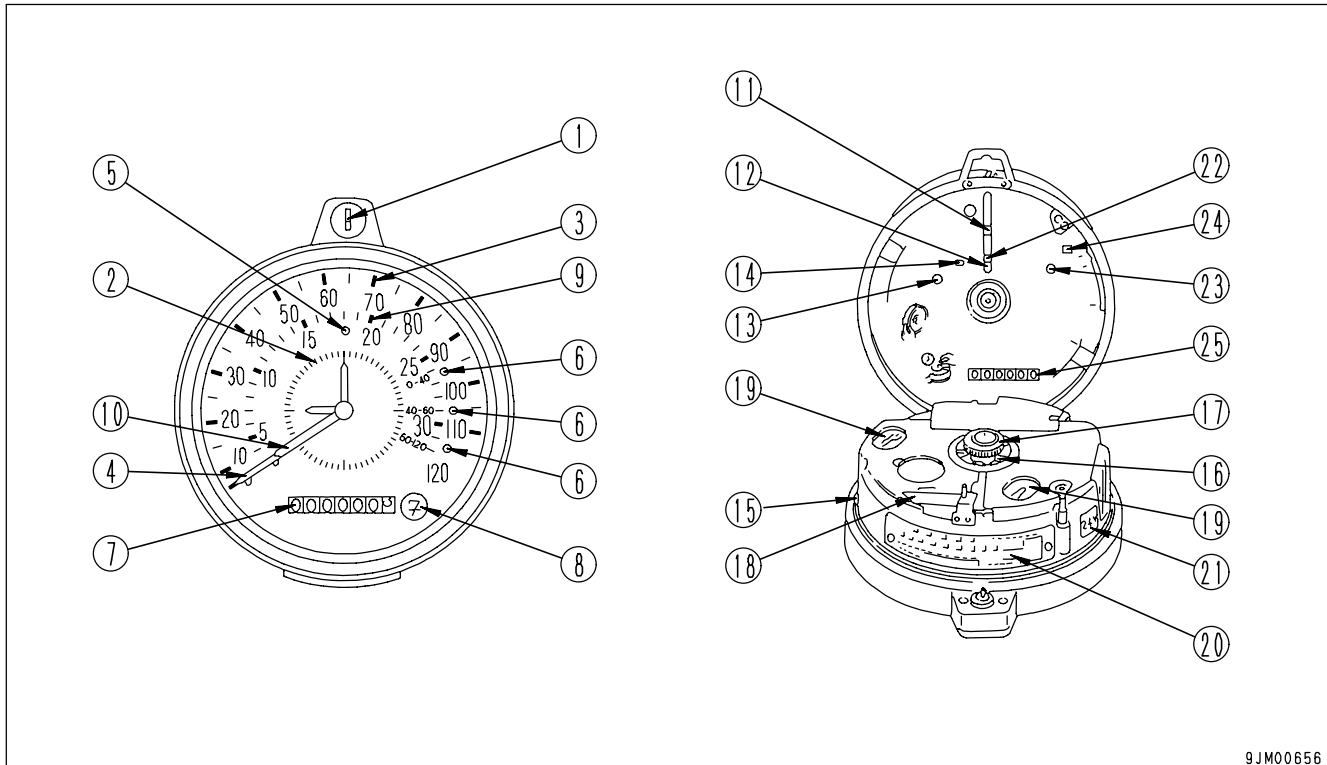
After replacing, check that the contact piece is holding down the lamp base firmly.

Use a 24 V bulb.



REVO TACHOGRAPH (TCO 15-7)

EXPLANATION OF COMPONENTS



9JM00656

- | | |
|--|--|
| (1) Instrument lock | (14) Speed confirmation aperture for speed warning lamp indication |
| (2) Clock dial | (15) Clock setting knob |
| (3) Speed scale | (16) Chart support |
| (4) Speed indicator | (17) Pressing ring |
| (5) Speed warning lamp | (18) Cutting knife |
| (6) Speed indication confirmation lamp | (19) Instrument lighting lamp |
| (7) Odometer | (20) Name plate |
| (8) Period indicating label | (21) Voltage indication label |
| (9) RPM scale | (22) RPM recording stylus |
| (10) RPM indicator | (23) Adjustment screw for RPM warning lamp |
| (11) Speed recording stylus | (24) Speed confirmation aperture for RPM warning lamp indication |
| (12) Travel distance recording stylus | (25) Total revolution counter |
| (13) Adjustment screw for speed warning lamp | |

INSTRUMENT LOCK

This (1) can be used for the key to open when replacing the chart.

CLOCK DIAL

One line here (2) indicates one minute.

SPEED SCALE

This (3) is the scale for the machine travel speed.

SPEED INDICATOR

This (4) indicates the machine travel speed.

SPEED WARNING LAMP

When the machine exceeds the maximum set speed, the lamp (5) lights up to warn the operator.

Models with the speed warning lamp do not have the speed indication confirmation lamp.

SPEED INDICATION CONFIRMATION LAMP

This lamp (6) is interconnected with the speedometer and is used to confirm the speed indication. When using the confirmation switch to light up the confirmation lamp during checks before starting, always check for any disconnection in the three indication confirmation lamps.

Models with the speed warning lamp do not have the speed indication confirmation lamp.

ODOMETER

This meter (7) displays the total distance (km) traveled by the machine.

PERIOD INDICATING LABEL

This label (8) indicates that it is for 7 days.

RPM SCALE

This (9) is the scale for the momentary speed in revolutions per minute (rpm).

RPM INDICATOR

This (10) shows the momentary speed in revolutions per minute (rpm).

SPEED RECORDING STYLUS

This (11) records the momentary speed of the machine on the chart.

TRAVEL DISTANCE RECORDING STYLUS

This (12) records the distance travel by the machine on the chart. One up-and-down recording motion is 10 km.

ADJUSTMENT SCREW FOR SPEED WARNING LAMP

The speed at which the lamp gives a warning can be set as desired with this screw (13).

SPEED CONFIRMATION APERTURE FOR SPEED WARNING LAMP INDICATION

This (14) is the speed indication aperture for setting the desired speed.

CLOCK SETTING KNOB

Turn this knob (15) clockwise to advance the hand, and counterclockwise to turn the hand back.

CHART SUPPORT

This (16) is the rotating part of the clock and has teeth to prevent the chart from slipping.

PRESSING RING

This ring (17) is a ring that presses the chart and holds it against the chart support.

CUTTING KNIFE

This knife (18) cuts the tape connecting the charts.

INSTRUMENT LIGHTING LAMP

This lamp (19) is used for light up the instrument.

NAME PLATE

This (20) indicates the type and model.

VOLTAGE INDICATION LABEL

This label (21) indicates the voltage.

RPM RECORDING STYLUS

This (22) records the momentary engine speed on the chart.

ADJUSTMENT SCREW FOR RPM WARNING LAMP

The speed at which the lamp gives a warning can be set as desired with this screw (23).

SPEED CONFIRMATION APERTURE FOR RPM WARNING LAMP INDICATION

This (24) is the speed indication aperture for setting the desired speed of revolution.

TOTAL REVOLUTION COUNTER

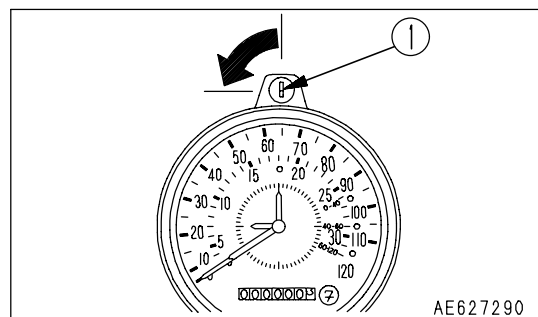
This meter (25) indicates the total number of revolutions (x 1000) of the engine.

METHOD OF USE

1. Open the cover.

Insert the instrument open/lock key in hole (1), turn counterclockwise 90°, then pull open carefully.

The cover can be opened approx. 115°. Do not open it further than that, or pull it strongly, or put anything heavy on the cover, as these will cause failures.

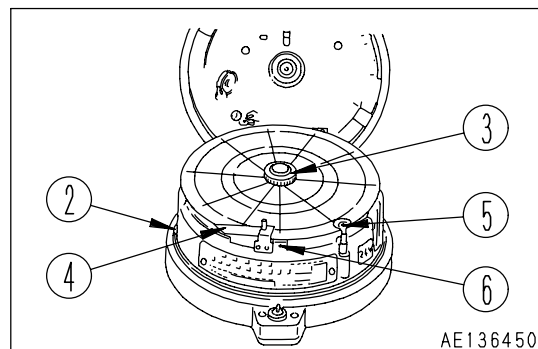


2. Set the time.

Turn time setting knob (2) to set the time.

Always set the time with the time setting knob. Turn the hand in the direction of rotation 10 minutes beyond the correct time, then turn back to the correct time.

Check the clock operation with the movement of minute hand. The clock is electric, so there is no need to wind it up.



3. Fill in chart.

Before inserting new chart paper, always fill in the required items. (Operator code No., machine code No., date, etc.)

Fill in the above items with a steel pen.

Handle the charts carefully with clean hands, and do not fold or scratch them.

4. Removing used charts

Push down pressing ring (3) holding the charts, turn counterclockwise, and pull out the pressing ring at the point where it contacts the stopper, then remove the charts.

Handle the charts carefully with clean hands, and do not fold or scratch them.

5. Insert new chart.

Remove pressing ring (3), then set the charts under cutting knife (4), and below fan-shaped rotating transfer shaft (5) on the right. When doing this, align the time on the charts (for example when the starting time is 9 am) exactly with red point (6) on the instrument body.

Precautions when replacing the charts

When aligning the charts with the center of the chart support, do not force them into position or use your finger to make the hole in the center of the chart paper larger. If the size of the hole changes, it may cause an error in the recording.

Stop the engine completely before inserting the new charts.

Use Komatsu genuine charts (P/N: YZ762929-730) for 90 km/h (55.9 MPH) 7 days.

6. Close the cover.

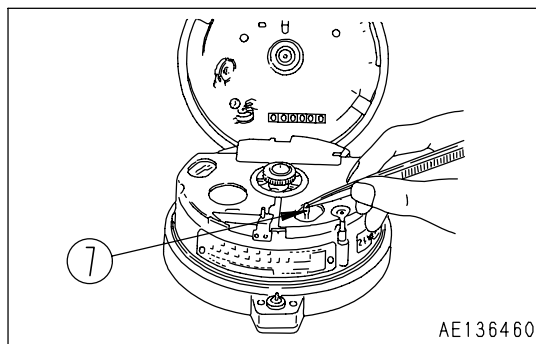
Lift up the cover to close it, then turn the instrument open/lock key 90° clockwise. When operating the machine, remove the instrument open/lock key.

Replacing instrument lighting lamp bulb

Raise contact piece (7), and take out the old bulb with a pincette. It comes out easily.

After replacing, check that the contact piece is holding down the lamp base firmly.

Use a 24 V bulb.

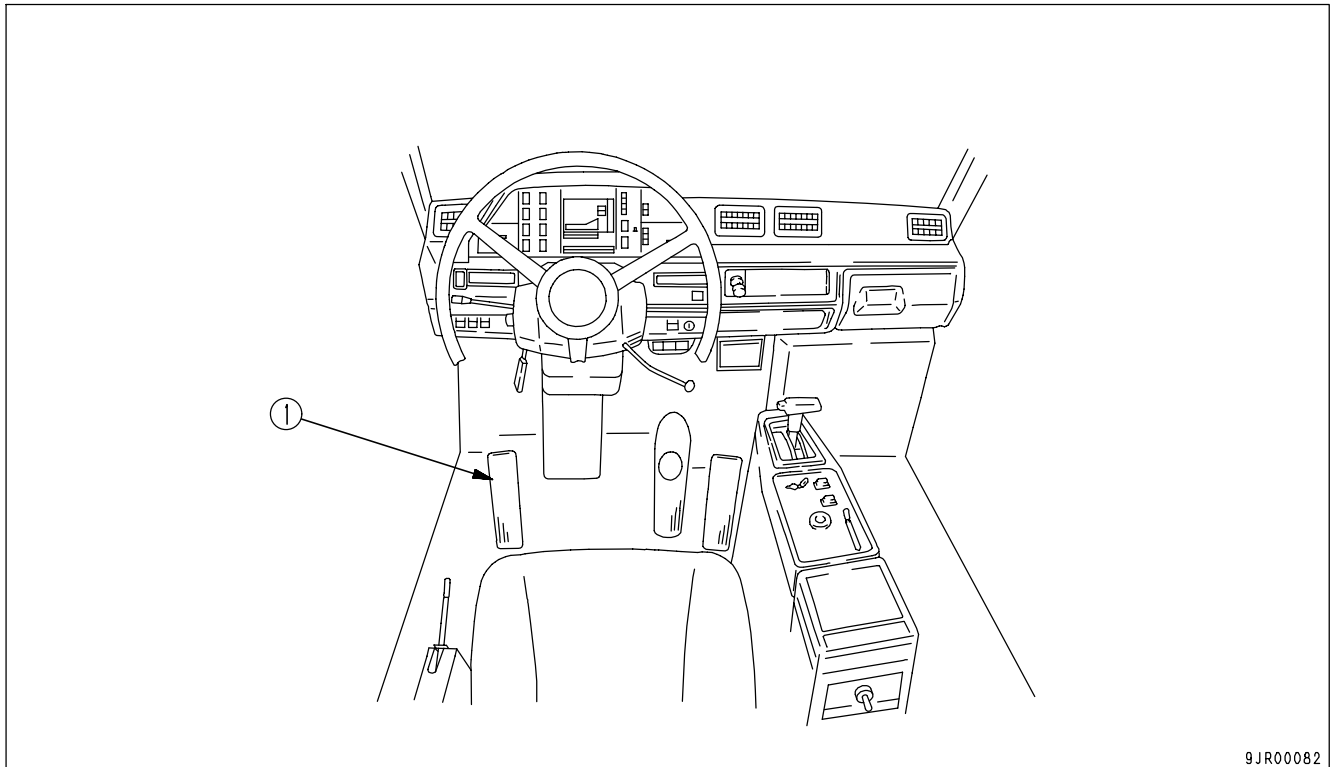


USING DIFFERENTIAL LOCK

DIFFERENTIAL LOCK PEDAL

The differential lock is used on snow-covered or muddy areas where the tires are likely to slip.

The left and right wheels on the rear axle are locked together to prevent slipping and to provide a powerful drive force. This also helps to extend the service life of the tires.



9JR00082

(1) Differential lock pedal



WARNING

- Do not use the differential lock pedal when traveling at high speed (4th gear, 20 km/h (12.4 MPH) and above).
- Do not use the differential lock pedal when turning.

NOTICE

Do not use the differential lock pedal when the wheels are already slipping. This may reduce the durability. First, stop the machine, then depress the differential lock pedal, and start the machine again.

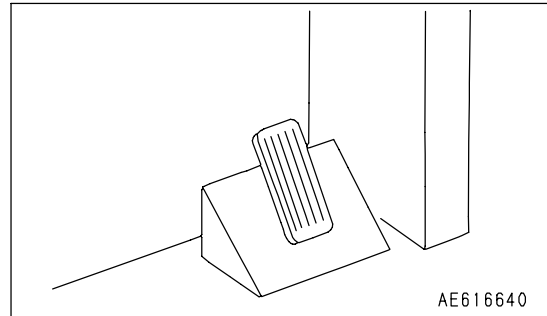
DIFFERENTIAL LOCK PEDAL

This pedal (1) actuates the differential lock control.

When the pedal is depressed, the differential lock is actuated; when the pedal is released, the differential lock is cancelled.

REMARK

When traveling on soft ground where the wheel on one side slips, or when traveling on road surfaces where the tires are likely to slip, depress the differential lock pedal. This actuates the differential lock and makes both the left and right wheels rotate at the same speed to prevent slipping.

**PRECAUTIONS AND METHOD OF USE**

- Depress the differential lock pedal to actuate the differential lock 5 to 10m (16 ft 5 in to 32 ft 10 in) before entering the area where the tires may slip.

REMARK

Using the differential lock before the tires slip makes it possible to obtain the full capacity of the differential lock, and also extends the tire life.

- If the differential lock is applied when the tires are already slipping, the durability may be reduced. Do not actuate the differential lock when the tires are slipping.
- If the tires should slip and it becomes impossible to escape, stop the machine, then depress the differential lock pedal and start the machine again.
- When traveling on road surfaces where the tires may slip, be particularly careful to avoid sudden changes in travel speed (decelerating or accelerating).
- Do not use the differential lock pedal when traveling at high speed (4th gear, 20 km/h (12.4 MPH) and above).
- Do not use the differential lock pedal when turning.

If the differential lock is used when turning, it will cause the following problems.

- It will be more difficult to turn than when the differential lock is not used, so the truck may be unable to turn on curves where it could normally turn easily.
- The inside wheels and outside wheels will turn at the same speed when turning, so one side will spin and reduce the tire life, and it may also damage the road surface.
- In order to absorb the difference in rotation of the left and right tires which is caused when the machine turns, the differential lock disc will slip, and this will reduce the durability of the differential lock.
- An excessive load will be brought to bear on the final drive, and this may reduce the life of the final drive.

NOTICE

If the tires are likely to slip on the road surface on curves, carry out maintenance of the road surface to reduce this problem.

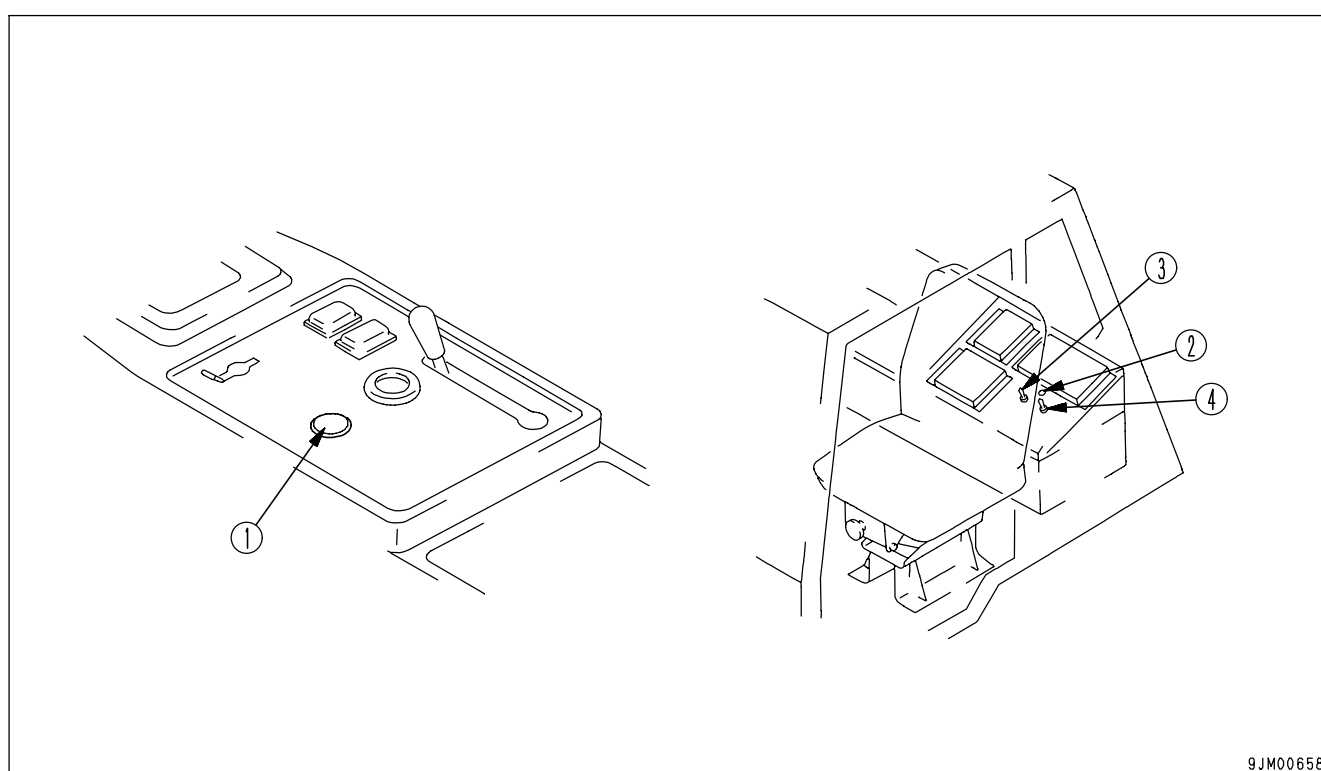
OPERATION OF ABS AND ABS/ASR

[ABS (ANTI-SKID BRAKE SYSTEM), ASR (AUTOMATIC SPIN REGULATOR)]

ABS: When the machine is braked suddenly or braked on a slippery snow-covered road, etc., this system works to prevent the tires from locking and skidding. Accordingly, a stable machine behavior and good steering performance is secured.

ABS/ASR: In addition to the above functions of the ABS, this system has a function to prevent slipping of the drive wheels caused by excessive torque. Accordingly, the machine can start and travel normally even on a bad or frozen road surface.

EXPLANATION OF COMPONENTS



(1) Warning lamp

(2) ASR information lamp

(3) ABS/ASR main switch

(4) Troubleshooting switch

WARNING LAMP

(Red)

This lamp (1) lights up at engine start (continues to light up until the speed exceeds approximately 10 km/h (6.2 MPH)) and when the ABS/ASR is turned off or system malfunctions.

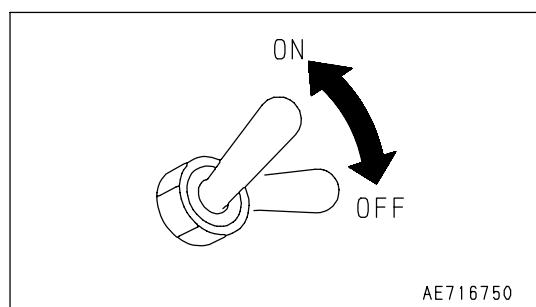
ASR INFORMATION LAMP

(Yellow) (Also used as troubleshooting lamp)

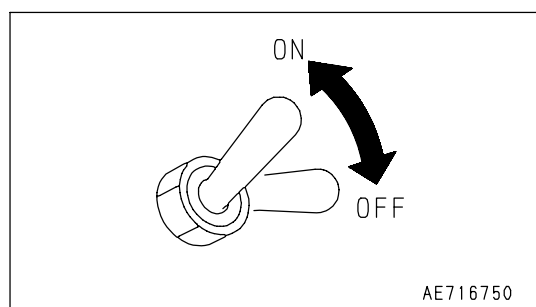
This lamp (2) lights up when the ASR operates and during troubleshooting.

ABS/ASR MAIN SWITCH

This switch (3) is used to turn the ABS/ASR system on/off.

**TROUBLESHOOTING SWITCH**

This switch (4) is used for troubleshooting.



OPERATION METHOD

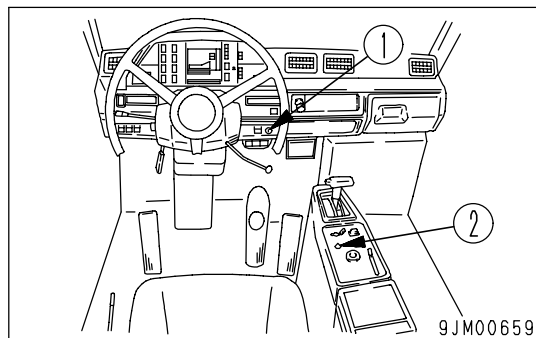
ABS OPERATION



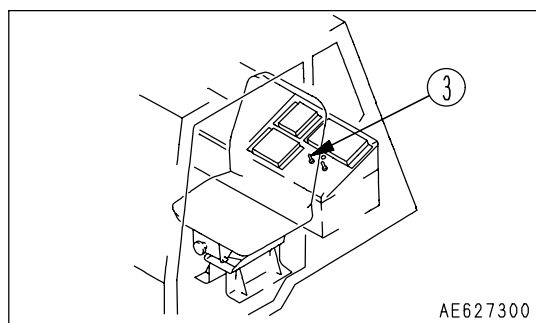
WARNING

Always stop the machine before turning on the ABS/ASR main switch (3). If it is turned on while the machine is running, the ABS/ASR may not function normally.

1. Turn on the starting switch (1). At this time, warning lamp (2) will light up.



2. Turn on the ABS/ASR main switch (3). Start the truck. When the speed rises to about 10 km/h (6.2 MPH), the warning lamp (2) will go off.



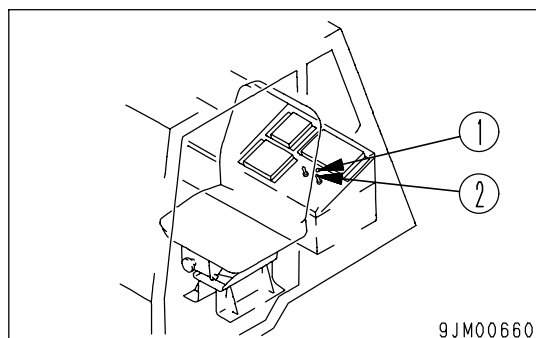
ASR OPERATION



WARNING

Turn on the troubleshooting switch (1) only when performing troubleshooting on the machine. The ABS/ASR system will not function while the troubleshooting switch is turned on.

1. Since the ASR and ABS are interlocked, if the ABS is turned on, the ASR is also turned on automatically.
2. The ASR information lamp (2) lights up when the system detects slippage of the rear wheels, and the ASR starts functioning.



PRECAUTIONS FOR USE



WARNING

- If the ABS functions while traveling on a slippery road, the braking distance may be slightly lengthened. Even if the ABS is turned on, the tires may lock when the machine is braked when running at a very low speed. Accordingly, take care when driving on slippery roads.
- If the machine is braked while running at high speed or on a slippery road, more air is consumed by the ABS/ASR. If the air pressure drops and the warning buzzer sounds, stop the machine in a safe place. Wait until the air pressure is restored sufficiently, then start again.
- Even with the ABS/ASR system installed, there may be instances where the machine can not travel safely such as on a road having an extremely low coefficient of friction (a frozen road, etc.) or on a steep slope. In this case, repair the road surface before driving.

- The machine can be travel normally even if the ABS/ASR main switch is turned off. In this case, however, watch out for lateral skidding of the machine.
- Even if the ABS/ASR system malfunctions, the machine can be travel normally. Watch out for lateral skidding in this case, however, while traveling on slippery roads. If the warning lamp lights up, the system is automatically turned off and the ABS/ASR system does not function.
- Even if the ABS/ASR system is installed, the secondary brake function is maintained.
- If the ABS/ASR main switch is turned on with the brake pedal depressed or the retarder control lever pulled, exhaust sound will be momentarily emitted from the ABS valve. This does not indicate a fault.
- If both rear wheels slip at the same speed, the ASR will not function. In this case, adjust the engine output with the accelerator pedal.
- When installing a wireless device on the machine, select one which does not violate the wireless device-related laws/regulations and use it according to law. Mount it as far away from the devices and wiring harness of the ABS/ASR system as possible.

TROUBLESHOOTING

- When the starting switch is turned on, if the warning lamp does not light up, it may be broken. In this case, replace the lamp.
- If the ABS/ASR system malfunctions while being used, the warning lamp (Red) will light up. In this case, stop the machine at a safe place immediately, then ask your Komatsu distributor to carry out repair.

The positions of each switch and the statuses of the corresponding warning lamps are as follows.

Starting switch	ABS/ASR Main switch	Warning lamp
OFF	OFF	Goes off
OFF	ON	Goes off
ON	OFF	Lighted (Normal)
ON	ON	<ul style="list-style-type: none"> • Stays lighted until travel speed rises to about 10 km/h (6.2 MPH), then goes off (Normal). • Lights up when a fault occurs (Malfunction).

HANDLING AUTO-GREASING SYSTEM

With this system, the grease is automatically supplied through the computer controls.

METHOD OF OPERATING AUTO-GREASING SYSTEM

1. Turn the starting switch ON.

REMARK

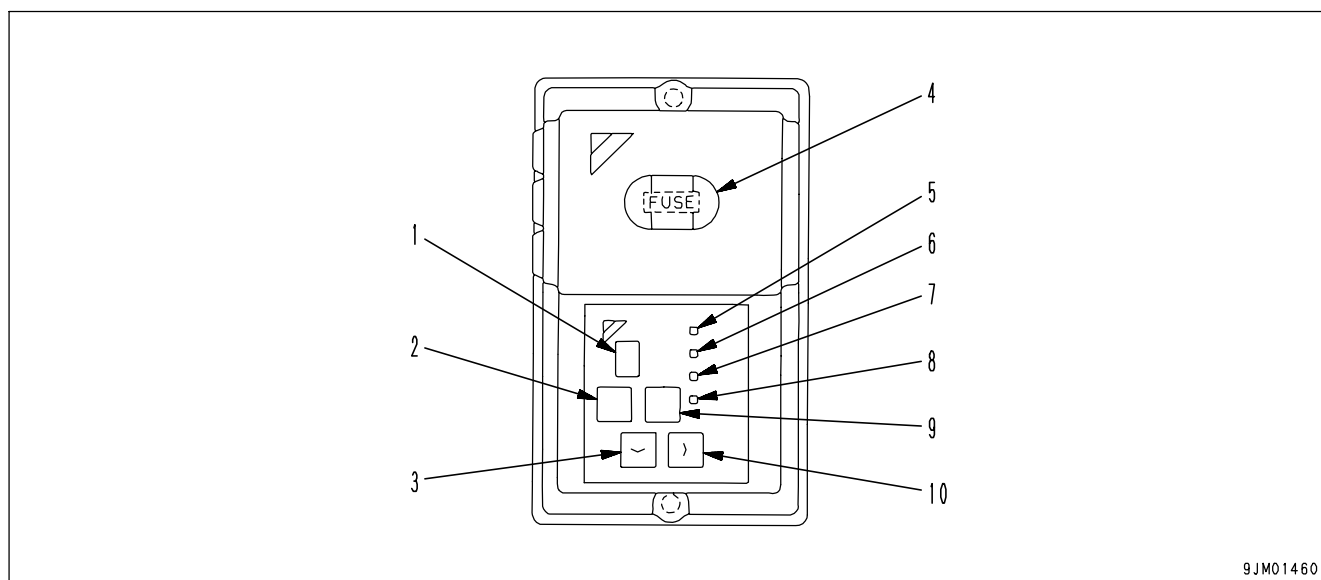
Immediately after the power is turned on, all display lamps on the lubrication controller inside the console box will light up for several seconds. This is a self-check for the lamps, and does not indicate any abnormality.

The display portion for starting the calculation of the greasing interval will flash, but all other displays will go out after a few seconds.

However, even if the greasing interval has not been reached, if the switch is turned ON/OFF repeatedly, greasing will automatically start due to the function of the supplemental circuit, immediately after the starting switch is turned ON. After display of the 7-segment LED and greasing-in-progress LED, as shown in the "LUBRICATION CONTROLLER DISPLAY TABLE", the above condition will be returned.

2. Centralized greasing is carried out in accordance with the set time and frequency limit for greasing.

• LUBRICATION CONTROLLER DISPLAY TABLE

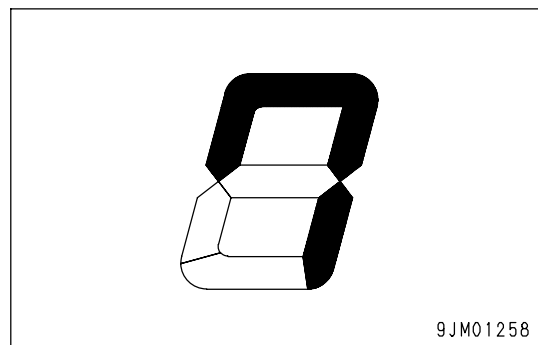


- (1) 7-segment LED
- (2) Cancel key
- (3) Level selector key
- (4) Blade-type fuse
- (5) Power source LED

- (6) Greasing LED
- (7) Warning LED
- (8) Setting LED
- (9) Starting key
- (10) Item selector key

• Remaining number of times of greasing

If the remaining number of times of greasing is less than 10, remaining number is displayed and it flashes. If the remaining number of times is 10 or more, only the flashing is shown without displaying the number.



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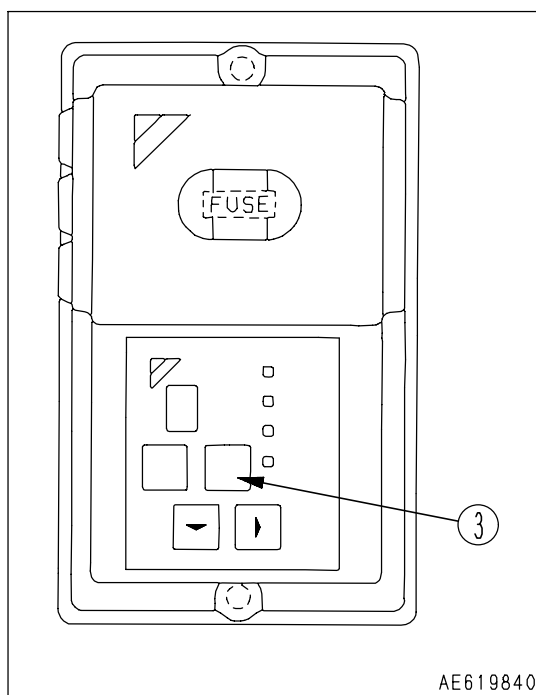
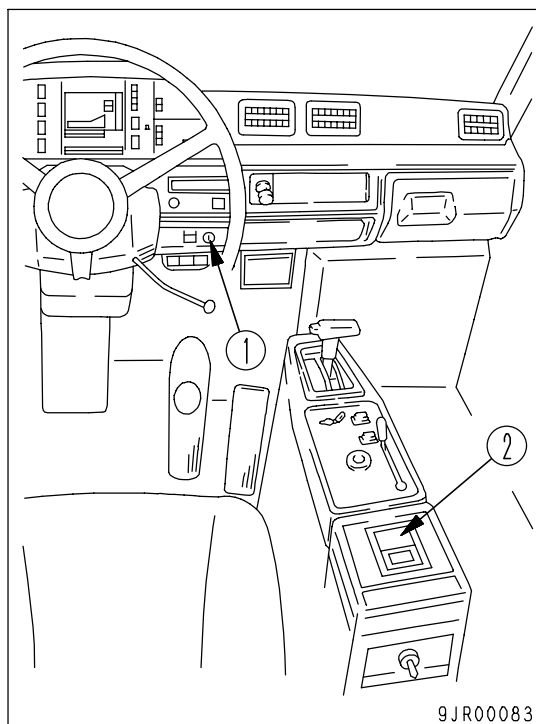
ACTUATION OF AUTO-GREASING

When engine starting switch (1) is turned one stage, the auto-greasing system is automatically set to the actuation condition.

Do not press start button (3) of lubrication controller (2).

- Operating when desired

It is possible to start the system and carry out one cycle of greasing regardless of the time count. To do this, press the button (3) for the lubrication controller inside the console box. The count for the greasing time is canceled, and the electric pump starts the count again automatically after it is stopped.



SETTING GREASING TIME

The set time and greasing frequency limit differs according to the operating condition and greasing plan for the machine, so set the following items to carry out suitable centralized greasing.

- Greasing interval (Hr): Greasing interval for automatic operation
- Greasing time (min): Length of time pump is operated for each greasing operation
- Greasing frequency limit (times):
No. of times for operating pump before the 1600 cc grease cartridge becomes empty

The settings when shipping from the factory are as follows.

Greasing interval: 3 hours

Greasing time: 15 minutes

Greasing frequency limit: 75 times

The grease level alarm is set to sound after 300 hours on the hourmeter (when normal operation).

NOTICE

Be careful since the life of grease cartridge will be shortened if the greasing interval becomes shorter. Also, if the greasing interval becomes shorter, the amount of grease dripping from the tip of the working machine increases. It may make the machine and surrounding area dirty.

Setting greasing time in cold areas

In cold temperatures, the viscosity of the grease increases and the resistance inside the piping becomes greater, so it is necessary to extend the length of the greasing operations in order to ensure that the greasing is carried out properly. If the machine is used in ambient temperatures below -20°C (-4°F), set the greasing time to 20 minutes (code No. 7). In addition, use lithium-based grease No. 0.

For details of setting the time, see "METHOD OF SETTING (PAGE 6-34)".

When changing the set value, please contact your Komatsu distributor.

METHOD OF SETTING

When setting the various items, the value is not input directly. Select the code number from the set code table below, and set as follows.

Setting code table

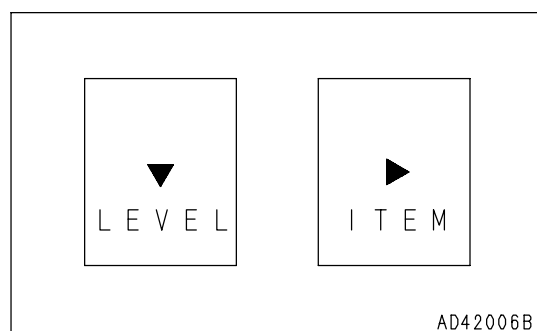
Code no.	0	1	2	3	4	5	6	7	8	9
Greasing interval (a)	/	1	1.5	2	3	4	5	6	8	/
Greasing time (min) (b)	/	2	3	5	7	10	15	20	25	/
Greasing frequency limit (c)	/	25	50	75	100	150	200	250	/	/

NOTICE

When using the machine at ambient temperatures of below -20°C (-4°F), set to greasing time (b) at code No. 7.

• Procedure for setting

1. Stop the working machine on the flat and hard ground, and stop the engine.
2. Set the dump lever lock at LOCK position and set the starting switch at ON position.
3. Turn the starting switch ON and start the engine.
4. Press the LEVEL and ITEM keys at the same time to set to the setting mode.



5. Press the ITEM key one or more times to select the item to be set.

REMARK

Each time the ITEM key is pressed, the setting item is changed: a → b → c → a.

6. When the item to be set flashes, press the LEVEL key.

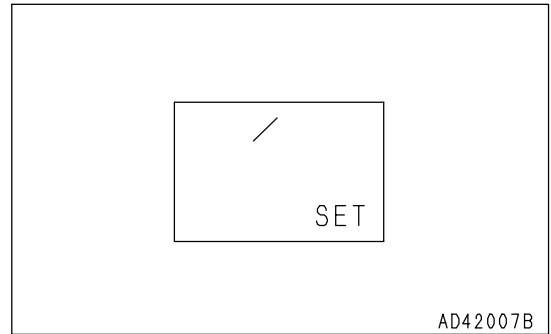
The set item and numeral are displayed alternately (a →→ 0 →→ a →→ 0).

7. Refer to the setting code table and press the ITEM key one or more times to select the code number to be set.

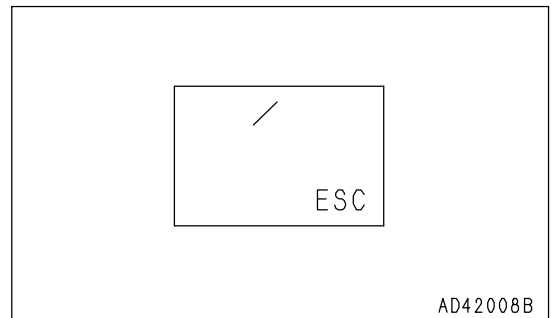
REMARK

Each time the ITEM key is pressed, the code number (numeric portion) goes up by 1.

8. When the code number that is to be set flashes, press the SET key to carry out the setting.



9. Repeat Steps 6 to 8 to set all of the items a, b, and c. After completing the setting, press the ESC key to leave the setting mode.

**REMARK**

Even if it is desired to change only one item, always carry out the setting according to Steps 1 to 5. After completing the setting, always press the ESC key to leave the setting mode.

If the power is then turned ON, the count for the greasing interval will start immediately after the ESC key is pressed. Part of the display segment flashes to indicate that the system is counting. After setting, the set value is retained in memory even if the power is turned OFF.

GREASING



WARNING

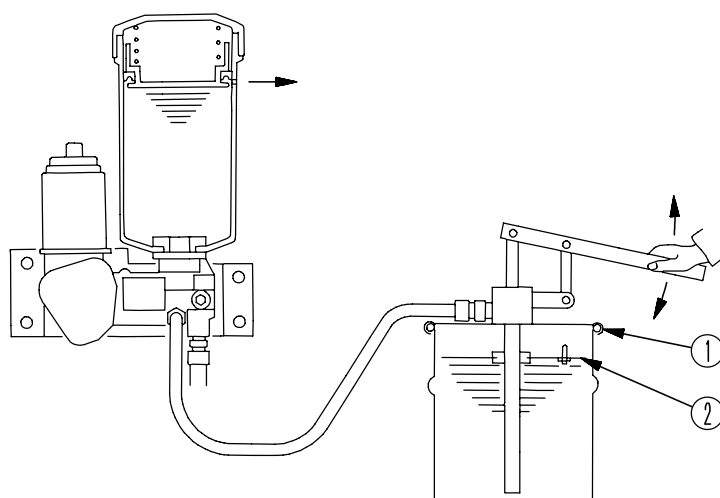
Air bleeding of pump involves danger because of high pressure. Ask your Komatsu distributor for air bleeding.

NOTICE

After greasing, be sure to reset the count of the controller. (See "TROUBLESHOOTING (PAGE 6-37)".)

Be sure to use the special grease pump (566-96-6A840) and supply grease with it according to the following procedures, taking care not to let air or dust get in to the grease. Supply grease while the ambient temperature is above -10°C (14°F) .

1. Prepare a new 18-kg (40 lb) grease pail and remove the cover. Press the follower plate of the grease pump against the greasing surface, then insert the pump and set special cover (1) to the pail. Then, operate the handle of the pump and confirm that clean grease comes out of the hose end.
2. Remove the cap of the grease filler of the pump and screw in the hose fitting, then operate the pump.
3. When grease is supplied for the first time, there is usually some air under the follower plate (2). If grease is supplied to the upper limit, however, the air is bled through the small hole on the side of the tank. When supplying grease next time and there after, stop supplying it when it reaches the bottom of this air bleed hole.
4. After supplying grease, remove the hose fitting and fit the cap to the grease filler of the grease pump without fail. Keep the pump and pail in a clean place.



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PRECAUTIONS WHEN HANDLING AUTO-GREASING SYSTEM

- Basically, the power source input to the lubrication controller should be DC24V, but use a maximum limit of 30V.
- The grease nipple installed to the service port used for initial charging of the divider valve has a ball check structure, so it may leak if dirt gets stuck in it.
Check it from time to time, and replace the grease nipple immediately if any grease is leaking.
- When carrying out initial operation or when the grease tank is empty, air may get into the piston portion of the pump. If the pressure does not rise within the specified time when running the pump, and an error is displayed for the controller, bleed the air.
- If the divider valve or grease piping are removed when replacing the attachment on the machine, handle carefully to prevent any damage. When storing or installing again, be extremely careful to prevent the entry of air, and particularly dirt. If there is any air in the system, bleed the air immediately.

TROUBLESHOOTING

If any problem occurs in the greasing system, the error codes will flash alternately to display the type of problem.

Error code	Item	Cause	Remedy
E → a	Defective pressurizing of pump	<ul style="list-style-type: none"> • Air in main piping • Air inside pump • Grease tank is empty • Grease leaking from main piping 	<ul style="list-style-type: none"> • Run pump as necessary and release grease from end of piping to bleed air • Release grease from air bleed in pump to bleed air • Add grease • Check, tighten connections of main piping (including hoses)
E → b	Abnormality in release of pressure	<ul style="list-style-type: none"> • Abnormality in pressure-releasing structure built into pump • Abnormality in pressure-detection equipment built into pump 	<ul style="list-style-type: none"> • Disassemble pressure-releasing portion carefully, then check and clean • Check limit switch at pressure-detection portion
E → c	Abnormality in pressure detection	<ul style="list-style-type: none"> • Abnormality in pressure-releasing structure built into pump • Abnormality in pressure-detection equipment built into pump 	<ul style="list-style-type: none"> • Check limit switch • Check limit switch at pressure- detection portion
E → 0	Empty tank	<ul style="list-style-type: none"> • Greasing frequency limit has been reached • Grease added during frequency count 	<ul style="list-style-type: none"> • Add grease • Confirm that 0 flashes three times on 7-segment LED by pressing reset button on controller for more than 5 seconds.

ARSC (AUTOMATIC RETARDER SPEED CONTROL)

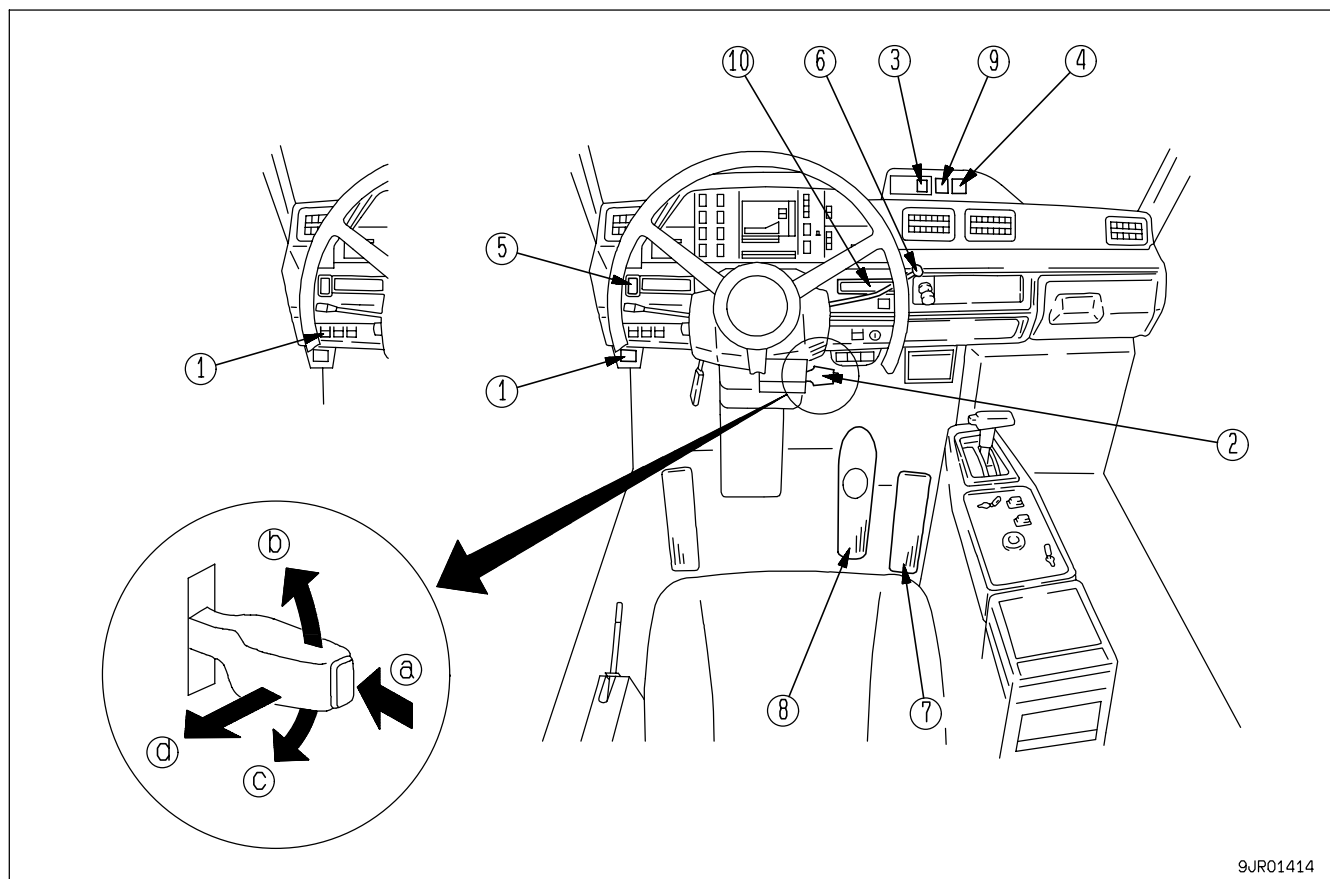
When traveling downhill, if the switch is pressed at the speed that is to be maintained, the retarder is automatically actuated to prevent the travel speed from exceeding the set speed, so this makes retarder operations easy.



WARNING

- The ARSC system is actuated when the system switch is ON. Before traveling downhill, check that the system switch is ON.
- If the speed is set to a speed that exceeds the maximum permissible speed obtained from the brake performance graph, there is danger that there will be overheating and that the retarder brake may be damaged. Always set the speed so that it does not exceed the maximum permissible speed.
- When the ARSC is actuated on slippery roads, the tires may lock. If this happens, cancel the ARSC.
- If any abnormality occurs in the system and braking cannot be carried out properly, the alarm sounds and the system is turned OFF to cancel the ARSC. If necessary, control the machine with the retarder control lever and foot brake to stop the machine in a safe place, then turn the system switch OFF.

EXPLANATION OF COMPONENTS



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The position of system switch (1) may differ according to the combination of optional equipment.

- | | |
|--------------------------|----------------------------|
| (1) System switch | (6) Retarder control lever |
| (2) ARSC set lever | (7) Accelerator pedal |
| (3) Set speed display | (8) Brake pedal |
| (4) ARSC caution lamp | (9) Ready lamp |
| (5) Central warning lamp | (10) Rear brake pilot lamp |

- | | |
|--------------------|--------------------|
| (a) Set | (c) Decrease speed |
| (b) Increase speed | (d) Cancel |

SYSTEM SWITCH

This switch (1) is used to turn the ARSC system ON/OFF.

ARSC SET LEVER

This lever (2) is used in the following cases:

When setting the travel speed

When making fine adjustments to the set speed (tap up/tap down)

When canceling the speed setting

SET SPEED DISPLAY

This (3) displays the speed (km/h) that has been set.

The display goes out when the system switch is OFF.

It displays 0 when the set value is canceled.

When the starting switch is ON or the system switch is ON, the display shows -- and then shows 0.

ARSC CAUTION LAMP

This lamp (4) flashes if there is any abnormality in the ARSC system when the system switch is ON.

It lights up for 3 seconds when the starting switch is turned ON to check the bulb.

CENTRAL WARNING LAMP

This lamp (5) lights up together with the ARSC caution lamp if there is a serious abnormality in the ARSC system when the system switch is ON.

RETARDER CONTROL LEVER

Even when the ARSC is in operation, the retarder can be operated with this lever (6).

ACCELERATOR PEDAL

The ARSC is actuated only when the accelerator pedal (7) is not being pressed.

BRAKE PEDAL

This pedal (8) operates the wheel brake even when the ARSC is being operated.

READY LAMP

When this lamp (9) is lighted up, it shows that the travel speed is set and that operation of the ARSC is possible.

When it is out, the ARSC is not actuated.

It lights up for 3 seconds when the starting switch is turned ON to check the bulb.

REAR BRAKE PILOT LAMP

This lamp (10) lights up when the retarder or brake pedal are operated, even when the ARSC is being operated.

METHOD OF OPERATION

ACTUATION OF ARSC SYSTEM

The ARSC system is actuated when the system switch is ON.

If the set switch on the ARSC set lever is pressed, the travel speed at that moment is set as the downhill travel speed. If the travel speed exceeds the set downhill speed, the retarder is automatically actuated.

The set travel speed is displayed on the set travel speed display and is stored in memory.

If the accelerator pedal is pressed while the ARSC is being operated, the ARSC is canceled and the speed increases.

If the brake pedal or retarder control lever are operated while the ARSC is being operated, it is possible to reduce the machine speed or stop in the same way as during normal brake operations.

METHOD OF SPEED SETTING



WARNING

If the speed is set to a speed that exceeds the maximum permissible speed obtained from the brake performance graph, there is danger that there will be overheating and that the retarder brake may be damaged. Always set the speed so that it does not exceed the maximum permissible speed.

If the actual machine speed during the setting operation is less than 10 km/h (6.2 MPH), the speed is set to 10 km/h (6.2 MPH). In all other cases, it is set to the travel speed.

The travel speeds that can be set depend on the selection of the gearshift lever as follows.

When the gearshift lever is at the D, 5, 4, 3, or L positions, the range for the set speed is 10 to 55 km/h (6.2 to 34.2 MPH).

It is impossible to set the speed when the gearshift lever is at the N or R positions.

METHOD OF CARRYING OUT FINE ADJUSTMENT OF SET TRAVEL SPEED

To raise the set travel speed 1 km/h (0.6 MPH), push the ARSC set lever forward once.

To decrease the set travel speed 1 km/h (0.6 MPH), pull the ARSC set lever back once.

REMARK

Release the ARSC set lever after changing the set travel speed.

If the set switch and cancel are operated at the same time, the cancel operation is given priority.

If the set switch and tap up are operated at the same time, the tap up operation is given priority.

If the set switch and tap down are operated at the same time, the tap down operation is given priority.

The tap up and tap down operations are used for making fine adjustment of the set travel speed.

It is possible to adjust the set travel speed up to ± 5 km/h (3.1 MPH) when traveling in ARSC (when the accelerator pedal is released). When the accelerator pedal is being depressed, the ARSC is canceled, so it is possible to operate freely in a range from 10 to 55 km/h (from 6.2 to 34.1 MPH).

METHOD OF INCREASING SET TRAVEL SPEED

If it is desired to increase the set speed, depress the accelerator pedal to increase speed, and when the desired set travel speed is reached, press the set switch on the ARSC set lever. The set travel speed will be changed to the new speed.

METHOD OF DECREASING SET TRAVEL SPEED

If it is desired to decrease the set speed, operate the retarder control lever to reduce speed, and when the desired set travel speed is reached, press the set switch on the ARSC set lever. The set travel speed will be changed to the new speed.

REMARK

After using the retarder control lever to reduce the speed, return it to its original position.

TRAVELING AGAIN AT SET TRAVEL SPEED

If the machine repeatedly travels on the same slope, once the travel speed has been set, it is possible to operate the ARSC without carrying out the setting operation each time.

Before entering a downhill slope, if the travel speed has been adjusted to a speed lower than the set speed displayed on the travel speed display, the READY lamp (green) lights and the ARSC is actuated when the accelerator pedal is released.

REMARK

When traveling at a speed greater than the set speed displayed on the travel speed display, the ARSC is not actuated even when the accelerator pedal is released. When this happens, the READY lamp (green) also does not light up. Always adjust the travel speed to a speed lower than the set speed displayed on the travel speed display, and check that the READY lamp lights up.

METHOD OF CANCELING SET TRAVEL SPEED

Method 1: If the cancel operation is carried out for more than 1 second, the control is stopped. When this happens, the set speed display shows 0.

Method 2: If the system switch is turned OFF, the control is canceled. When this happens, the set speed display goes out.

REMARK

For Method 1, cancel operation must be continued for at least 1 second (different from other switches) to cancel the control. This is to prevent any problem of the control being canceled if the switch is touched by mistake.

RELATIONSHIP WITH EXHAUST BRAKE

If the exhaust brake switch is at ON position (light is on), the exhaust brake is actuated in the normal way when the accelerator pedal is released if the torque converter lock-up is ON (Lock-up pilot lamp lights up). When the machine attempts to travel at a speed greater than the set speed, the ARSC is also actuated if the speed is set in the way stated above.

If the exhaust brake switch is at OFF position (light is off), the exhaust brake is not actuated when the ARSC is being operated. If the foot brake or retarder control lever are operated, the exhaust brake is actuated in the same way as normal.

If the downhill slope is not steep and the engine brake and exhaust brake have ample effect, the machine will not accelerate to the set travel speed, so the ARSC may not be actuated.

RECOMMENDED SET TRAVEL SPEED

Set the travel speed so that the engine speed is at least 1,800 rpm, and travel so that the retarder oil temperature gauge is in the green range.

OVERHEAT WARNING

If there is danger that the retarder oil may overheat, the ARSC caution lamp lights up and the set travel speed is automatically reduced 1 km/h (0.6 MPH) every 3 seconds. The lower value for the set travel speed when the speed is automatically reduced is 10 km/h (6.2 MPH).

TROUBLESHOOTING

WHEN A PROBLEM OCCURS IN THE SYSTEM

This system is equipped with a self-diagnostic function. If any problem occurs, a failure code is displayed by the controller LED under the assistant's seat.

No.	Failure code	Detail	Remedy pattern*
1	0.1	Abnormality in power source	1
2	1.0	Disconnection, short circuit with ground, short circuit in engine speed sensor system	1
3	1.3	Disconnection, short circuit with ground, short circuit in transmission output shaft speed sensor system	1
4	1.5	Short circuit with ground in retarder oil temperature sensor system	1
5	1.7	Disconnection, short circuit with ground, short circuit in accelerator signal	1
6	1.8	Disconnection, short circuit with ground in suspension pressure sensor (left) system	1
7	1.9	Disconnection, short circuit with ground in suspension pressure sensor (right) system	1
8	4.2	Disconnection, short circuit in exhaust brake signal system	2
9	4.3	Disconnection, short circuit in ARSC caution lamp system	1
10	4.4	Disconnection in READY lamp system	2
11	4.5	Disconnection, short circuit in central warning lamp system or buzzer system	2
12	5.2	Short circuit with ground in exhaust brake signal system	2
13	5.3	Short circuit with ground in ARSC caution lamp system	1
14	5.4	Short circuit with ground in READY lamp system	2
15	5.5	Short circuit with ground in central warning lamp system or buzzer system	2
16	6.0	Failure in engine speed sensor system	1
17	7.0	Disconnection, short circuit in set speed display up output	2
18	7.1	Disconnection, short circuit in set speed display down output	2
19	7.2	Disconnection, short circuit in set speed display clear output	2
20	7.3	Short circuit with ground in set speed display up output	2
21	7.4	Short circuit with ground in set speed display down output	2
22	7.5	Short circuit with ground in set speed display clear output	2
23	8.1	Short circuit with ground in pressure control valve system	1
24	8.3	Short circuit with ground in pressure control valve system	1
25	8.5	Failure in pressure control valve (retarder remains applied) or failure in pressure switch 1 system	1
26	8.7	Failure in pressure control valve (retarder has no effect) or failure in pressure switch 1 system	1
27	8.9	Short circuit with ground in pressure cracking valve	1
28	9.0	Disconnection, short circuit in pressure cracking valve	1
29	9.1	Failure in pressure cracking valve (remains open) or failure in pressure switch 2 system	1
30	9.2	Failure in pressure cracking valve (does not open) or failure in pressure switch 2 system	1
31	9.3	Disconnection, short circuit in system switch system	1
32	9.4	Short circuit with ground in system switch system	1
33	9.5	Disconnection, short circuit with ground in travel speed set switch system	1

*See next page.

Remedy pattern 1

If the central warning lamp and the ARSC caution lamp flash and the buzzer sounds, it means that a serious problem has occurred in the ARSC system.

Operation of the ARSC system is stopped. Operate the brake pedal or retarder lever as necessary to ensure safety. When the system switch is turned OFF, the central warning lamp and ARSC caution lamp go out and the buzzer stops.

REMARK

If the starting switch is turned ON when the air pressure in the air tank has dropped, failure code "9.2" may be displayed. If this happens, start the engine and raise the air pressure to the normal level, then start again.

If the failure code is "9.3" or "9.4", it shows that there is a failure in the system switch, so even if the system switch is turned OFF, the central warning lamp and ARSC caution lamp will flash and the buzzer will sound.

Remedy pattern 2

When only the ARSC caution lamp flashes

The ARSC system continues to be actuated, but an abnormality has occurred in the system.

Turn the system switch OFF to stop use of the ARSC.

When the system switch is turned OFF, the ARSC caution lamp will go out.

In the case of patterns 1 and 2 above, turn the system switch OFF quickly, stop use of the ARSC and contact your Komatsu distributor for repairs.

The set travel speed display is also equipped with a self- diagnostic function, and a failure code is displayed on the set travel speed display

No.	Failure code	Detail	Method of resetting
1	E1	Abnormality in CPU	Turn the starting switch ON again or turn the system switch ON again.
2	E2	Abnormality in memory	Turn the starting switch ON again or turn the system switch ON again.

WHEN SYSTEM IS NORMAL

The code is displayed on the controller LED under the assistant's seat.

No.	Code	Condition
1	0.0	When accelerator pedal is being depressed ("." is not shown for 0 on the right)
2	0.0.	When accelerator pedal is not being depressed ("." is shown for 0 on the right)

REMARK

If the above code is not displayed when the accelerator pedal is being depressed or not being depressed, it is necessary to adjust the accelerator link. If it is not properly adjusted, the ARSC system will not be able to judge correctly if the accelerator pedal is being depressed or not, so the ARSC may not work normally.

METHOD OF DISPLAYING MODEL SELECTION, TIRE LARGE DIAMETER/SMALL DIAMETER, FAILURE CODE

When the starting switch is turned ON, the codes below are automatically displayed in the following order on the controller LED.

1. LEDs all light up.
2. Model
Code: 32
3. Tire diameter
Code: --
4. Latest failure code
5. Failure code that occurred immediately before the failure code in 4.
6. Failure code that occurred immediately before the failure code in 5.

METHOD OF CLEARING FAILURE CODE

Turn machine starting switch to ON (the engine is not started) and disconnect connectors CR1 and CR2 under the assistant's seat.

When this is done, "--" is displayed on the controller LED.

When the "--" changes from flashing and stays lighted up (3 seconds), the failure code has been cleared.

REMARK

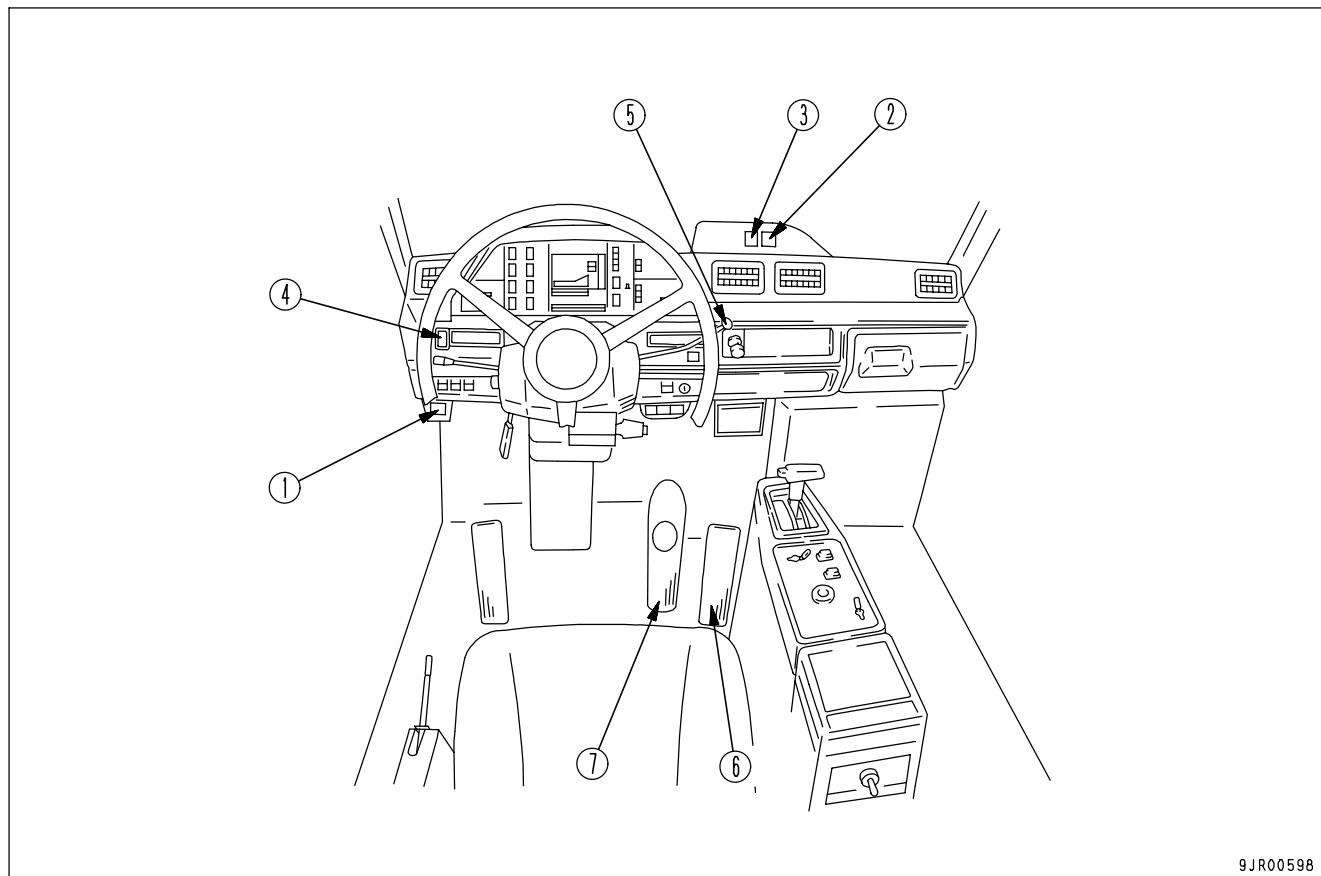
When using the ARSC for the first time, always clear the failure codes.

After clearing the codes, connect connectors CR1 and CR2.

ASR-II (AUTOMATIC SPIN REGULATOR II)

ASR is a function to prevent slipping of the drive wheels caused by excessive torque. Accordingly, the machine can start and travel normally even on a bad or frozen road surface.

EXPLANATION OF COMPONENTS



- | | |
|--------------------------|----------------------------|
| (1) System switch | (5) Retarder control lever |
| (2) ASR operation lamp | (6) Accelerator pedal |
| (3) ASR caution lamp | (7) Brake pedal |
| (4) Central warning lamp | |

SYSTEM SWITCH

This switch (1) is used to turn the ASR system on/off.

ASR OPERATION LAMP

This lamp (2) lights up when the system detects slippage of the rear wheels, and the ASR starts functioning.

ASR CAUTION LAMP

This (3) flashes if there is any abnormality in the ASR system when the system switch is ON. It lights up for 3 seconds when the machine starting switch is turned ON to check the bulb.

CENTRAL WARNING LAMP

This (4) lights up together with the ASR caution lamp if there is a serious abnormality in the ASR system when the system switch is ON.

RETARDER CONTROL LEVER

When ASR is operated, if the retarder gets started with this lever (5), ASR system stops its operation.

ACCELERATOR PEDAL

ASR system operates only when the pedal (6) is depressed with the travel speed range of 0 to 30km/h (0 to 18.6 MPH). If stops depressing the pedal, ASR system stops its operation.

BRAKE PEDAL

When ASR is operated, if this pedal (7) is depressed, ASR system stops its operation.

ACTUATION OF ASR-II SYSTEM

ASR system can function under the condition that the system switch is turned on. ASR operation lamp lights up when the system detects slippage of the rear wheels and the ASR starts functioning.

PRECAUTIONS WHEN USING**WARNING**

- ASR system operates when the system switch is turned on.
 - If abnormality occurs in the system and the travel cannot be controlled securely, the system is turned off with the warning buzzer sound and the operation of the system stops. Stop the machine in a safe place immediately to turn off the system switch.
 - Even with the ASR system installed, there may be instances where the machine can not travel safely such as on a road having an extremely low coefficient of friction (a frozen road, etc.) or on a steep slope.
 - On a slippery road, more air is consumed by the operation of ASR. If the air pressure drops and the warning buzzer sounds, stop the machine in a safe place. Wait until the air pressure is restored sufficiently, then start again.
-
- The machine can be driven normally even if the ASR system switch is turned off. In this case, however, watch out for lateral skidding of the machine on slippery roads.
 - If both rear wheels slip at the same speed, the ASR will not function. In this case, adjust the engine output with the accelerator pedal.

TROUBLESHOOTING

WHEN A PROBLEM OCCURS IN THE SYSTEM

This system is equipped with a self-diagnostic function. If any problem occurs, a failure code is displayed by the controller LED behind the assistant's seat.

No.	Failure code	Details	Remedy pattern
1	0.1	Abnormality in power source	1
2	1.0	Disconnection, short circuit with ground, short circuit in engine speed sensor system	1
3	1.1	Disconnection in RR wheel revolution sensor	1
4	1.2	Disconnection in RL wheel revolution sensor	1
5	1.3	Disconnection, short circuit with ground, short circuit in transmission output shaft speed sensor system	1
6	1.6	Failure of steering rudder angle sensor	2
7	1.7	Disconnection, short circuit with ground, short circuit in accelerator signal system	1
8	4.3	Disconnection, short circuit in ARSC & ASR caution lamp system	1
9	4.5	Disconnection, short circuit in central warning lamp system or buzzer system	2
10	5.3	Short circuit with ground in ARSC & ASR caution lamp system	1
11	5.5	Short circuit with ground in central warning lamp system or buzzer system	2
12	6.0	Failure in engine speed sensor system	1
13	6.1	Failure in RR wheel revolution sensor system	1
14	6.2	Failure in RL wheel revolution sensor system	1
15	6.3	Failure in transmission output axis revolution sensor system	1
16	8.1	Short circuit with ground in pressure control valve system (right)	1
17	8.2	Short circuit with ground in pressure control valve system (left)	1
18	8.3	Disconnection, short circuit in pressure control valve system (right)	1
19	8.4	Disconnection, short circuit in pressure control valve system (left)	1
20	8.5	Failure in pressure control valve (right) or failure in pressure switch 1 system	1
21	8.6	Failure in pressure control valve (left) or failure in pressure switch 1 system	1
22	8.7	Failure in pressure control valve (right) or failure in pressure switch 1 system	1
23	8.0	Failure in pressure control valve (left) or failure in pressure switch 1 system	1
24	8.9	Short circuit with ground in pressure cracking valve	1
25	9.0	Disconnection, short circuit in pressure cracking valve	1
26	9.1	Failure in pressure cracking valve (remains open) or failure in pressure switch 2 system	1
27	9.2	Failure in pressure cracking valve (does not open) or failure in pressure switch 2 system	1

Remedy pattern 1

If the central warning lamp and the ASR caution lamp flash and the buzzer sounds, it means that a serious problem has occurred in the ASR system.

Operation of the ASR system is stopped.

Stop in a safe place quickly and stop using the ASR by turning the system switch off.

When the system switch is turned OFF, the central warning lamp and ASR caution lamp go out and the buzzer stops.

Remedy pattern 2

When only the ASR caution lamp flashes

The ASR system continues to be actuated, but an abnormality has occurred in the system.

Stop at the safe place quickly and turn the system switch OFF to stop use of the ASR.

When the system switch is turned OFF, the ASR caution lamp will go out.

In the case of patterns 1 and 2 above, turn the system switch OFF quickly, stop use of the ASR and contact your Komatsu distributor for repairs.

WHEN SYSTEM IS NORMAL

The code (0.0) is displayed by the controller LED behind the assistant's seat.

METHOD OF DISPLAYING MODEL SELECTION, TIRE LARGE DIAMETER/SMALL DIAMETER, FAILURE CODE

When the starting switch is turned ON, the codes below are automatically displayed in the following order on the controller LED.

1. LEDs all light up.
2. Model
Code: 32
3. Tire diameter
Code: --
4. Latest failure code
5. Failure code that occurred immediately before the failure code in 4.
6. Failure code that occurred immediately before the failure code in 5.

METHOD OF CLEARING FAILURE CODE

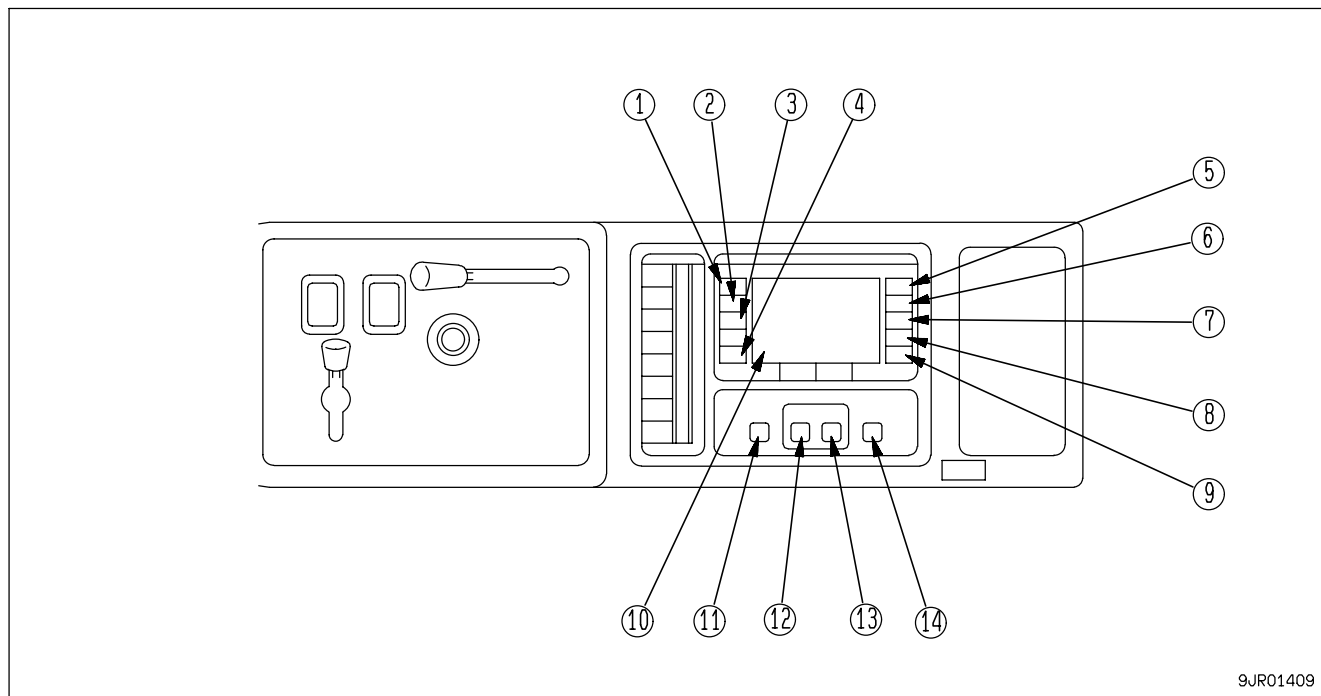
When the starting switch is at ON position (when the engine is not started), disconnect the connectors CR1 and CR2 located behind the operator's seat. At this time, "--" is displayed on controller LED. When the flashing of "--" turns to the lighting up of "--" (3 seconds), then failure code is cleared.

REMARK

When the ASR is used at the first time, be sure to clear the failure code. Connect the connectors CR1 and CR2 after the clearance.

HANDLING OIL FILTER CAUTION

The oil filter caution is a device to warn the operator by using a caution lamp to inform that the filter is clogged or that the replacement interval for the oil or filters has passed.



• Display items for oil filter replacement interval

- (1) Engine oil
- (2) Transmission oil
- (3) Hydraulic oil
- (4) Final drive case oil
- (4) Differential case oil
- (5) Engine oil filter
- (6) Fuel filter
- (7) Corrosion resistor
- (8) Transmission oil filter
- (9) Hydraulic filter

• Timer switch related items

- (10) Maintenance timer
- (11) Replacement interval check switch (oil)
- (12) Replacement switch
- (13) Cancel switch
- (14) Replacement interval check switch (filter)

METHOD OF USE

CHECK BEFORE STARTING

These all light up for 3 seconds when the starting switch is turned ON, and after 3 seconds, only the items requiring maintenance stay lighted up or flash.

For details of the meaning of lighted or flashing lamps, see Section "SERVICE PROCEDURE (PAGE 4-22)" and replace the oil or filters.

ABNORMALITY DISPLAYED DURING OPERATION

If any abnormality occurs during operation, this lamp flashes.

Note that it flashes when the filters are clogged and lights up when the replacement interval has passed.

WHEN CHECKING OIL, FILTER REPLACEMENT INTERVAL

1. All lamps light up when the starting switch is turned ON, and after 3 seconds, the display shows the engine oil replacement interval.
2. When checking the oil replacement interval, press the left replacement interval check switch; when checking the filter replacement interval, press the right replacement interval check switch. The display is given in the order shown in the table below.

The default set intervals are as follows.

Item	Replacement interval
Engine oil	500
Transmission oil	1000
Hydraulic oil	2000
Final drive case oil	2000
Differential case oil	2000
Engine oil filter	500
Fuel filter	500
Corrosion resistor	1000
Transmission oil filter	500
Hydraulic filter	1000

3. When the displayed time lights up, it shows the time remaining to replacement. If the time display flashes, it shows the time that has elapsed since replacement was due.

OPERATING SWITCH WHEN REPLACING OIL, FILTERS

1. After replacing the oil and filters, use the procedure for checking the replacement interval to reset the display for the item that has been replaced.
2. Keep the replacement switch pressed for at least 2 seconds. The display will change to the time until the next replacement, and the switch operation is complete.
3. After completing the switch operation, start the engine.
If the wrong replacement item is selected when operating the switch, press the cancel switch to return to the condition before the switch was operated, then operate the switch again.

Always stop the engine before operating the switch.

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HD325-6, HD325-6 (4-WHEEL DRIVE), HD405-6 DUMP TRUCK

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