
Operation & Maintenance Manual

RUBBER CRAWLER CARRIER

MST110C

(Model name : MST-2200VD-VIB)

Serial No. 540001 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 come into contact with it.

MOROOKA

MOROOKA CO., LTD.

[To Dealer]

Please fill following columns before passing this manual to your customer.

Machine serial No.	
Distributor Name	
Address	
Phone	
FAX	
Service Personnel	

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ABOUT THIS BOOK

This manual describes procedures for operation, handling, testing, and maintenance required for extended use of the machine.

Please be sure to read this manual carefully before using this machine.

Please make sure that you read the separate engine operation manual for details on how to operate the engine, except for those described in this manual.

WARNING

Careless use of this machine may lead to a serious accident, so those who operate the machine and those who perform inspections and maintenance should read this manual carefully before performing any work. Always keep this manual near the operator's seat and read it before use by those who handle the machine. Failure to follow the instructions in this manual may result in serious injury.

- Do not use this machine until you understand the instructions described in this manual.
- Always keep this book handy and read it repeatedly.
- If this manual is lost or damaged, order it from your distributor immediately.
- When lending this machine to another person, be sure to read the instruction manual and instruct them to understand the contents of this manual before starting work.
In particular, please give guidance on safe work.
- Due to machine improvements, the details of the contents of this manual may differ from the machine you purchased.
If you have any questions, please contact your distributor.
- The description about safety is given in SAFETY INFORMATION on page 10 and in PRECAUTIONS on page 14.

INTRODUCTION

BREAKING IN THE MACHINE

Your Morooka 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 life of the machine. Ensure proper break-in of the machine for the initial 100 hours (as indicated by the hour meter).

Unreasonable use from the beginning will quickly reduce performance and life of the machine.

Perform proper break-in of the machine to give you many years of service.

During break in, pay particular attention to the following points.

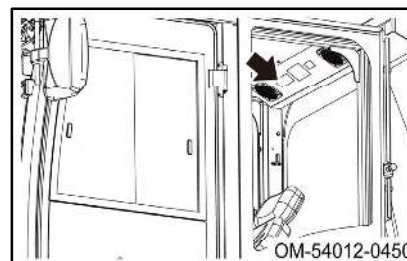
- After starting the engine, let it idle for 5 minutes to carry out the warming-up operation.
- Avoid operations with heavy loads or high speeds.
- Avoid sudden starts, sudden acceleration, sudden turns and sudden stops except in cases of emergency.

WARRANTY

If any failure that is considered to be the responsibility of Morooka should occur within 1 year of delivery of the new machine or within 1000 hours on the hour meter, whichever comes first, repairs will be carried out free of charge in accordance with the warranty.

LOCATION OF NAME PLATE

On this machine, a plate stamped with the machine serial number is affixed on the upper rear part of the operator's seat.



When inquiring about service or ordering parts, please quote the machine serial number, engine serial number, and hour-meter reading.

SAFETY INFORMATION

TO PREVENT ACCIDENTS

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TO PREVENT ACCIDENTS

Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines.

To avoid accidents, read, understand and follow all precautions in this manual and on the machine before performing operation and maintenance.

Do not operate or carry out maintenance of the machine unless you are sure that you thoroughly understand them.

To identify safety messages in this manual and on machine labels, the following signal words are used.

 DANGER	It indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	It indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	It indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or serious damage to the machine.
NOTICE	It means that failure to do what is written could result in damage or shorten the life of the machine.

The safety precautions is given in PRECAUTIONS on page 12. Morooka 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 be sure that you and others can do such procedures and actions safely and without damaging the machine. Under any circumstances, however, never perform work and operations that are prohibited in this manual.

PRECAUTIONS

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GENERAL PRECAUTIONS

WARNING

Read and follow all safety precautions.

Failure to do so may result in serious injury or death.

SAFETY RULES

- Only trained and required qualified personnel, or personnel authorized by the company (or superior) can operate and maintain the machine.
- Follow all safety rules, prohibitions, precautions, procedures, and instructions when operating or performing maintenance on the machine, and pay careful attention to safety.
- Operating the machine when you are not in good physical condition reduces the power of judgment needed to avoid danger and leads to accidents.

People in the following conditions should not operate the machine.

- When people cannot operate normally because they are tired, ill, or suffering from the effects of medication
- When people have been drinking
- When women are pregnant

SAFETY FEATURES

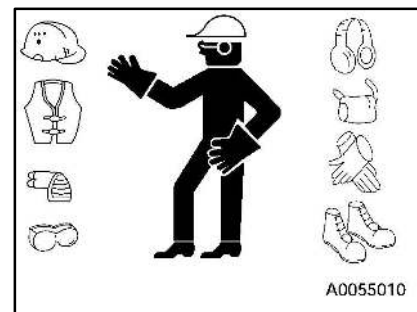
- Be sure that all guards and covers are in their proper position. Have guards and covers repaired if damaged.
- Use safety features such as safety lock levers and seat belts properly.

Improper use of safety features could result in serious injury or death.

- Emergency stop switch: See “EXPLANATION OF COMPONENTS” on page 55.
- Parking brake switch: See “EXPLANATION OF COMPONENTS” on page 54.
- Safety lock lever: See “EXPLANATION OF COMPONENTS” on page 74.
- Seat belt: See “EXPLANATION OF COMPONENTS” on page 80.

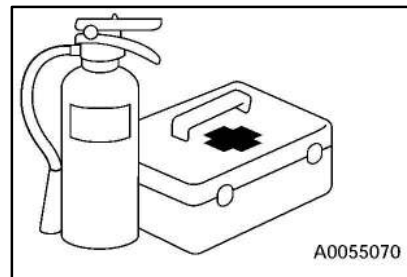
WEAR SUITABLE CLOTHING

- Always wear properly fitting clothes which allow ease of movement. If there are buttons, always button the cuffs.
- Avoid loose clothing, towels, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death.
- Do not wear oily clothes as they can easily catch fire.
- Wear a hard hat, safety glasses, non-slip safety shoes, and gloves when operating or maintaining the machine.



FIRE EXTINGUISHER AND FIRST AID KIT

- Have fire extinguishers ready to use in case of fire and read the labels to ensure that you know how to use them.
- Provide a first aid kit at the storage point.
- Be sure that you know the phone numbers of persons you should contact in case of an emergency.
- Immediately replace the fire extinguisher that has passed the expiration date with a new one.

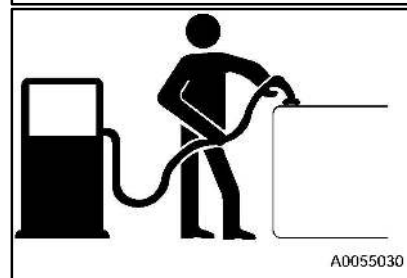
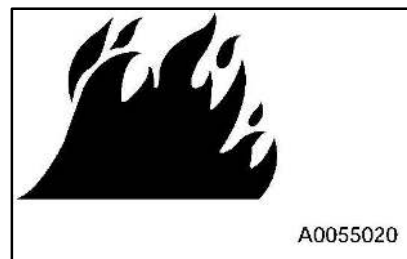
**UNAUTHORIZED MODIFICATION**

Modifications to the machine without approval may not only void the warranty, but may also affect the performance and safety of the machine.

FIRE PREVENTION FOR FUEL, OIL, AND ANTIFREEZE

Fuel, oil, and antifreeze can be ignited by a flame. Fuel is particularly flammable and can be hazardous.

- Use well-ventilated areas for adding or storing oil and fuel.
- Keep oil and fuel in a fixed place and do not allow unauthorized persons to enter.
- Tighten all fuel and oil caps securely.
- Keep any flame away from flammable fluids. Do not leave any cloths or rags soaked in oil or fuel lying in the fuel or oil storage area. Clean such materials up immediately.
- Do not bring any flame such as a lit cigarette or cigarette lighter close to flammable items.



USE HANDRAILS AND STEPS FOR GETTING ON OR OFF

Get on or off the machine as follows.

- Never jump on or off the machine. In particular, never get on or off a moving machine.
- When getting on or off the machine, always face the machine and use the handrails and steps.
- To ensure safety, maintain a three-point contact with the steps and handrails.
- If there is any oil, grease, or mud on the handrails or steps, wipe it off immediately. Always keep these parts clean.
- Never get on and off the machine with tools in your hands.



FOLLOW PRESCRIBED LAW WHEN HANDLING FREON GAS

Follow the prescribed law when handling Freon gas (refrigerant).

See the caution labels attached to the machine for the type and quantity of Freon gas.

BE CAREFUL OF FALLS

Hold the handrail while working and be careful not to fall out of the machine.

Never ride on places where there are no work instructions or where there is no slip protection such as on the engine hood or covers.



PRECAUTIONS FOR HANDLING EXHAUST CLEANING SYSTEM

[OVERVIEW OF EXHAUST CLEANING SYSTEM]

The exhaust cleaning system is installed on the upper part of the engine and removes the components (carbon monoxide, hydrocarbons, nitrogen oxides, etc.) contained in the exhaust gas. This function is called "Exhaust cleaning". If exhaust cleaning is executed continuously, the performance of the exhaust cleaning system will be degraded.

The process of restoring the performance of the degraded exhaust cleaning system is called "Exhaust cleaning system regeneration".

THE EXHAUST CLEANING SYSTEM IS REGENERATED BY TWO METHODS, "AUTOMATIC REGENERATION" AND "MANUAL REGENERATION"

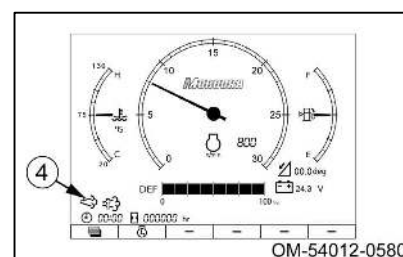
The exhaust cleaning system regeneration is divided into "Automatic regeneration" and "Manual regeneration".

Normally "Automatic regeneration" is executed, so "Manual regeneration" is not needed.

If "Automatic regeneration" is not performed normally, or if you want to perform exhaust cleaning system regeneration at a different time or place, perform "Manual regeneration".

When the "Automatic regeneration" is started, the exhaust temperature warning lamp (🔥) (4) on the monitor display may light up.

During the exhaust cleaning system regeneration, the engine automatically sets its optimum speed, so the operation of the engine throttle lever becomes invalid.

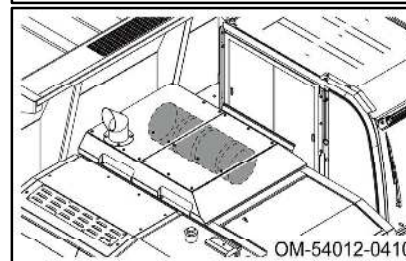
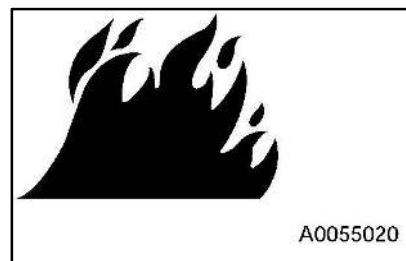


TAKE CARE NOT TO BURN AND WATCH FOR FIRES DURING EXHAUST CLEANING REGENERATION

When the exhaust cleaning system automatic regeneration starts, the air temperature around the muffler becomes extremely high. If you touch such a high-temperature muffler or exhaust pipe, you can get burned or it can cause a fire.

Observe the following precautions in preparation for exhaust cleaning system manual regeneration.

- Move and park the machine in a safe, flat, and large open space where there is no flammable wood or living trees around the machine.
- Avoid inside of the building with poor ventilation. There is a risk of carbon monoxide poisoning.
- Make sure that no flammable items are around the muffler and exhaust pipes. Remove them if they are attached.
- Take measures to prevent people from accessing the machine.
- Stop the exhaust cleaning system automatic regeneration if anyone other than authorized personnel enter the space during the regeneration.
- If you are compelled to leave the machine during exhaust cleaning system automatic regeneration, be sure to stop it and also stop the engine.



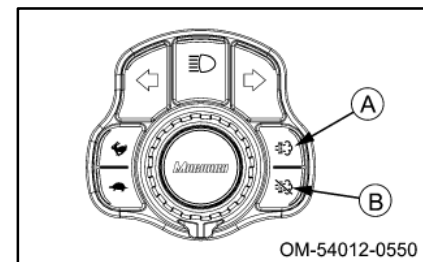
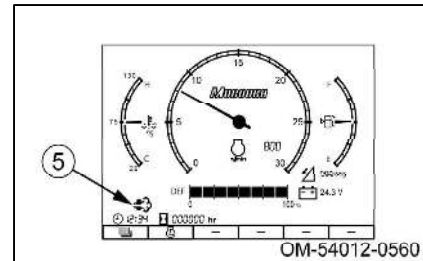
PRECAUTIONS FOR EXHAUST CLEANING SYSTEM AUTOMATIC REGENERATION

DO NOT PERFORM LOW-SPEED IDLE, LIGHT LOAD OPERATION

- If low-speed idle rotation, light load operation, or repeated start / stop operation is continued, engine oil consumption will increase, and carbon may accumulate in the cylinder. Accumulation of carbon in the cylinder will reduce engine output and performance.
- When operating the machine, it is recommended to operate at an engine speed of 1200 rpm or more.

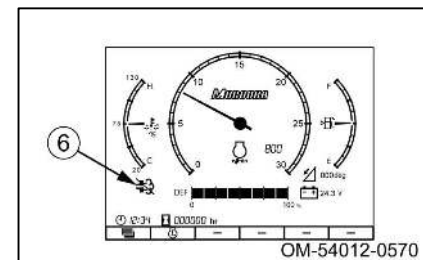
DO NOT INTERRUPT OR STOP AS MUCH AS POSSIBLE DURING EXHAUST CLEANING SYSTEM AUTOMATIC REGENERATION

- If you press the exhaust cleaning system regeneration prohibition switch in advance, the exhaust cleaning system automatic regeneration will not be performed.
- If the engine does not automatically start the exhaust cleaning system regeneration even if the exhaust cleaning system regeneration lamp (≡) (5) is lit, the engine has an abnormality. Please contact your distributor.
- Normal work is possible during exhaust cleaning system regeneration. However, operate the machine under heavy load for at least 20 minutes. If the machine repeatedly starts and stops or travels continuously at a low speed, the automatic regeneration process may not finish. At that time, the manual regeneration lamp (≡) (5) blinks to notify the need for manual regeneration.
- Exhaust cleaning system regeneration can be interrupted manually but do this only when there is a risk of fire or in an emergency.



If it is necessary to interrupt or stop the exhaust cleaning system regeneration urgently, operate as follows.

- When press and hold the exhaust cleaning system regeneration prohibition switch (B), the engine stops the exhaust cleaning system regeneration. The exhaust cleaning system regeneration lamp (≡) (5) goes off, and the exhaust cleaning system regeneration prohibition lamp (≡) (6) is lit.
Or turn the starting switch to the "OFF" position to stop the machine.



To restart the exhaust cleaning system regeneration, operate as follows.

- Press and hold the exhaust cleaning system regeneration prohibition switch (B) to cancel the regeneration stop, then press and hold the exhaust cleaning system regeneration switch (A). The engine will restart the exhaust cleaning system regeneration. The exhaust cleaning system regeneration prohibition lamp (≡) (6) goes out, and the exhaust cleaning system regeneration lamp (≡) (5) is lit.

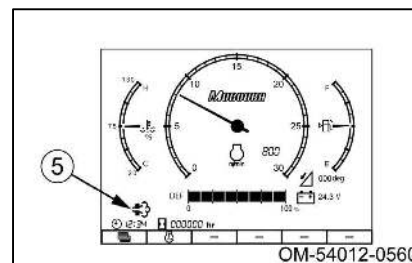
PRECAUTIONS FOR EXHAUST CLEANING SYSTEM MANUAL REGENERATION

CHECK WHETHER A WARNING THAT PROMPTS YOU TO EXECUTE THE MANUAL REGENERATION IS ISSUED

While the exhaust cleaning system automatic regeneration is in progress, if the machine repeats start and stop or continues low-speed traveling, the automatic regeneration may not complete successfully. In these instances, a warning that prompts you to execute the exhaust cleaning system manual regeneration is issued as below.

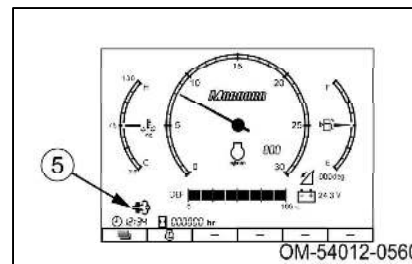
- The exhaust cleaning system regeneration lamp (☹️) (5) lights up to warn you.

When the exhaust cleaning system regeneration lamp (☹️) (5) lights up, immediately perform manual regeneration.



IGNORING THE WARNING THAT PROMPTS YOU TO EXECUTE THE MANUAL REGENERATION CAN CAUSE ENGINE FAILURE

If the machine is operated without manual regeneration even though the exhaust cleaning system regeneration lamp (☹️) (5) on the monitor display screen is lit, the engine output will decrease.



DO NOT INTERRUPT OR STOP AS MUCH AS POSSIBLE DURING EXHAUST CLEANING SYSTEM MANUAL REGENERATION

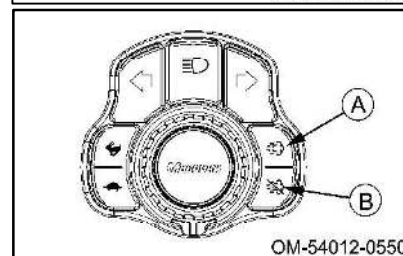
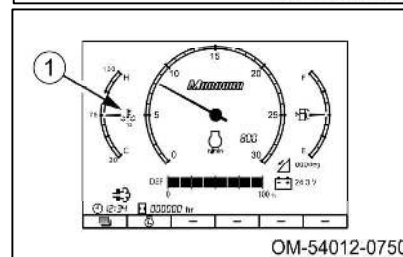
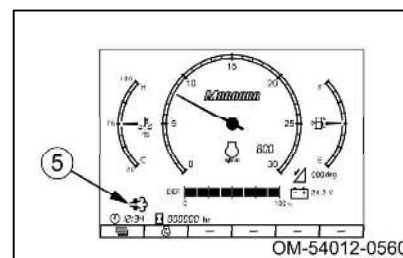
When the exhaust cleaning system regeneration lamp (☹️) (5) on the monitor display lights up, immediately perform manual regeneration.

1. Start the engine and continue the warming-up operation until engine water temperature gauge (1) reads "40°C" or above.
2. When press and hold the exhaust cleaning system regeneration switch (A), the engine starts the exhaust cleaning system regeneration. The exhaust cleaning system regeneration lamp (☹️) (5) continues to light during the regeneration.
3. When the exhaust cleaning system regeneration is completed, the exhaust cleaning system regeneration lamp (☹️) (5) goes out.

Carrying out the exhaust cleaning system regeneration will clean the exhaust gas and improve fuel efficiency. Performing manual regeneration between work (such as lunch break or before starting work) will save time.

If it is necessary to interrupt or stop the exhaust cleaning system regeneration urgently, operate as follows.

- When press and hold the exhaust cleaning system regeneration prohibition switch (B), the engine stops the exhaust cleaning system regeneration. The exhaust cleaning system regeneration lamp (☹️) (5) goes off, and the exhaust cleaning system regeneration prohibition lamp (⚡) (6) is lit.



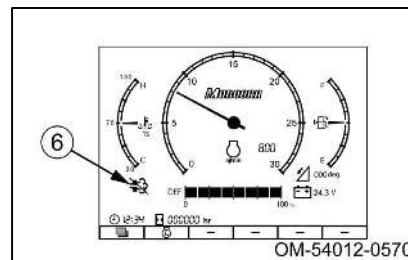
PRECAUTIONS

Or turn the starting switch to the "OFF" position to stop the machine.

To restart the exhaust cleaning system regeneration, operate as follows.

- Press and hold the exhaust cleaning system regeneration prohibition switch (B) to cancel the regeneration stop, then press and hold the exhaust cleaning system regeneration switch (A). The engine will restart the exhaust cleaning system regeneration.

The exhaust cleaning system regeneration prohibition lamp () (6) goes out, and the exhaust cleaning system regeneration lamp () (5) is lit.



PRECAUTIONS WHEN STOPPING ENGINE

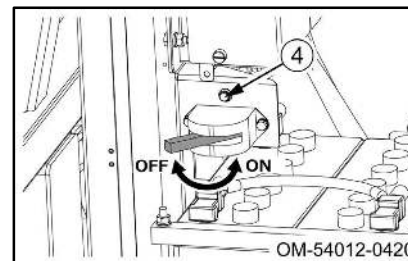
DO NOT TURN OFF THE MAIN SWITCH DURING PURGING

When the purge (wait to disconnect) lamp (4) is lit after the engine is stopped, the DEF in the DEF pipe is automatically returned to the DEF tank.

Be sure to observe the following while purge lamp (4) is lit.

- Do not turn OFF the main switch during purging unless it is an emergency.

When purge lamp (4) is lit after the engine is stopped, the purging operation is performed using the electric power charged in the battery. If the battery is removed while purge lamp (4) is lit, DEF will remain in the DEF piping, which may cause the exhaust cleaning system to malfunction due to deterioration or freezing of DEF.



PRECAUTIONS DURING INSPECTION AND MAINTENANCE

NO UNAUTHORIZED PERSONS

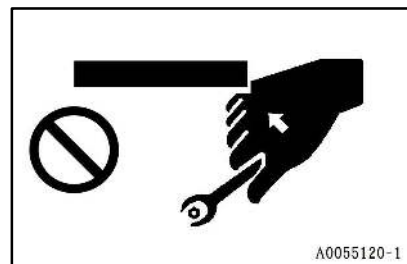
Never allow unauthorized persons into the area when carrying out inspection and maintenance.

When leaving the operator's seat to carry out operations, hang a "DO NOT OPERATE!" sign (Part No.: 1-41010-1210) on the operator's station door or the control lever to prevent any other person from operating the machine.



USE SUITABLE TOOLS

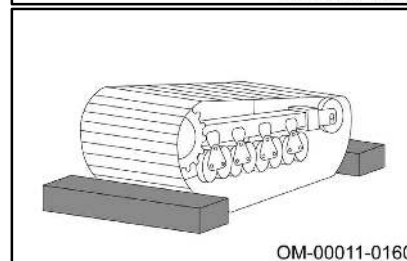
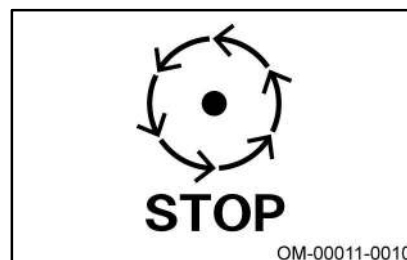
Handle the proper tools correctly. Do not use broken or deteriorated tools.



STOP THE ENGINE FOR INSPECTIONS AND MAINTENANCE

When carrying out inspections and maintenance, always follow the precautions below.

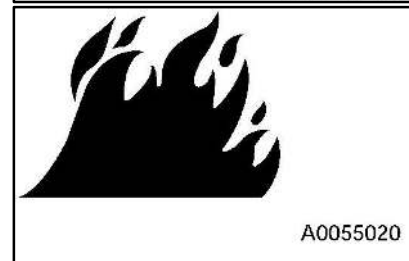
- Select firm, level ground to park the machine.
- Unload the dump body, engage the parking brake, and stop the engine.
- Check that the control levers are in the "N" (NEUTRAL) position.
- Always put blocks to prevent the tracks from moving.
- If it is unavoidable to carry out inspections and maintenance with the engine running, make sure that the engine can be stopped at any time.
- When a work is to be performed by two or more workers, confirm the work procedure and the signals, and follow the instructions of the manager.



ALWAYS KEEP THE MACHINE CLEAN

Always do the following to keep the machine clean.

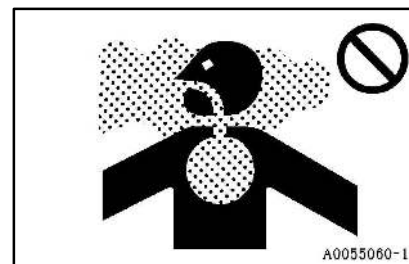
- Always keep the floor, steps, and handrails free of oil, grease, mud, or water. There is a danger that you may slip and be injured.
Wipe off any oil, grease, mud, water, or snow immediately.
- Do not leave tools or parts lying around on the floor or steps. There is a danger that you may trip over them.
Clear up tools and parts immediately.
- Dry wood chips, leaves, grass, paper, oil, and other flammable items around the engine, muffler, battery, or hydraulic tank may cause a fire.
Always remove any flammable objects and wipe off any oil.
- Always remove any mud accumulated around the undercarriage.
There is a danger that you may slip and fall when stepping onto the rubber crawler.
- Do not place any parts or tools around the operator's seat.
Keep them in the proper place to prevent them from obstructing operation.



VENTILATION FOR ENCLOSED AREAS

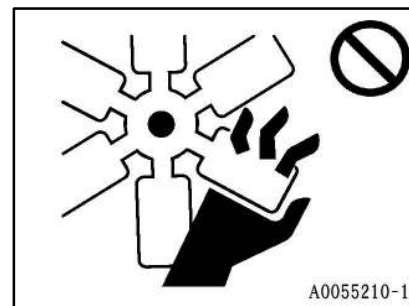
Exhaust gas from the engine is extremely dangerous.

If it is necessary to start the engine within an enclosed area, open the doors and windows to provide adequate ventilation.



KEEP AWAY FROM ROTATING AND MOVING PARTS

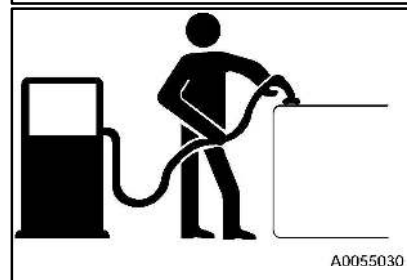
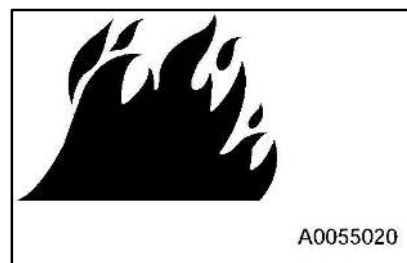
- Do not go close to the fan when it is rotating.
Do not bring anything that can be caught up close to the fan.
- Do not come close to the machine and dump body while they are moving and swinging.
There is a danger of getting shocked, caught, or crushed.



KEEP AWAY FROM FLAME WHEN ADDING FUEL

When filling the fuel tank with fuel, or when draining the water, always follow the precautions below.

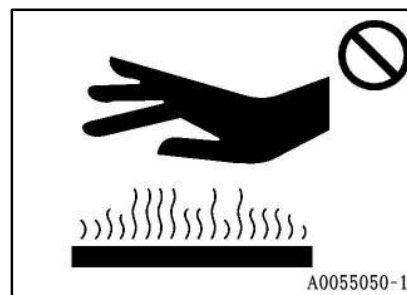
- Stop the engine.
- Do not smoke or bring any flame close to the machine.
- After adding fuel, tighten the cap securely and wipe up any spilled fuel.
- Do not bend the fuel hose or hit it with any sharp object.
- If any hose is loose or damaged, always repair or replace it.

**DO NOT TOUCH HIGH-TEMPERATURE, HIGH-PRESSURE PARTS IMMEDIATELY AFTER STOPPING THE ENGINE**

Immediately after stopping the engine, many parts are at high temperature or under high pressure.

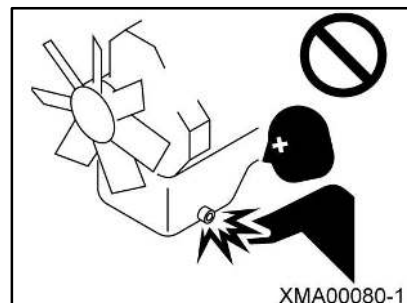
Removing parts or touching on them may result in a burn.

For the cooling system device, always wait for the machine to cool down before inspecting.

**WAIT FOR ENGINE TO COOL BEFORE CHANGING ENGINE OIL**

When changing the engine oil, always follow the precautions below.

- Stop the engine and wait for the engine and oil temperature to go down before changing the oil.
- After adding oil, tighten the cap and drain valve securely and wipe up any oil that was spilled.



WAIT FOR WATER TEMPERATURE TO GO DOWN BEFORE ADDING COOLANT

Do not remove the radiator cap immediately after stopping the engine. Always follow the precautions below.

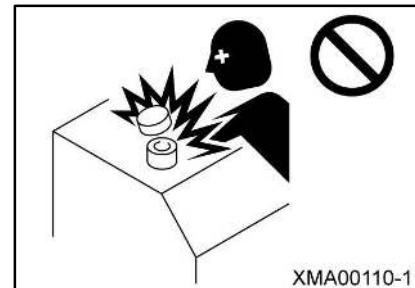
- Stop the engine and wait for the water temperature to go down.
- Turn the radiator cap slowly to release the internal pressure completely, then remove the cap.
- After adding, tighten the cap securely and wipe up any spilled coolant.



WAIT FOR PRESSURE TO GO DOWN BEFORE ADDING HYDRAULIC OIL

When adding oil to the hydraulic tank or when changing the oil, always follow the precautions below.

- Lower the dump body and stop the engine.
- Loosen the hydraulic tank cap slowly to release the internal pressure completely, then remove the cap.
- After adding oil, tighten the cap and drain plug securely and wipe up any spilled oil.



TAKE CARE WHEN HANDLING HIGH-PRESSURE HOSES

High pressure oil is always flowing in the hydraulic hose. Do not remove the hoses before the internal pressure has been released. When handling the high-pressure hoses, always follow the precautions below.

- Do not bend the high-pressure hoses or hit them with any sharp object.
- If any hose is loose or damaged, always repair or replace it.
- It is extremely dangerous if oil is leaking from even small holes in the hoses or hydraulic equipment. Consult Morooka or your Morooka distributor.

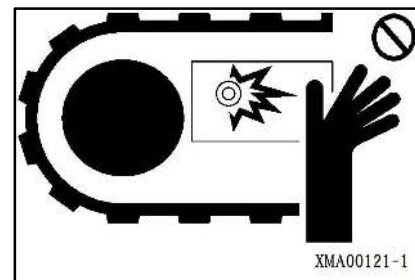


BE CAREFUL OF HIGH-PRESSURE GREASE WHEN ADJUSTING RUBBER CRAWLER TENSION

The tension adjuster for the rubber crawler is charged with grease. The grease is kept under high pressure by the recoil spring inside the tension adjuster.

Always follow the precautions below when adjusting the tension. If these precautions are not followed, the valve may fly out and cause serious injury.

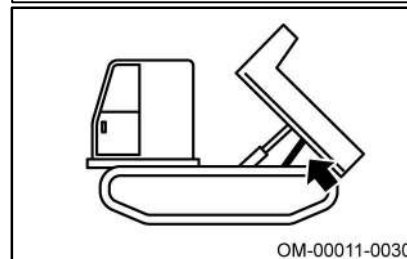
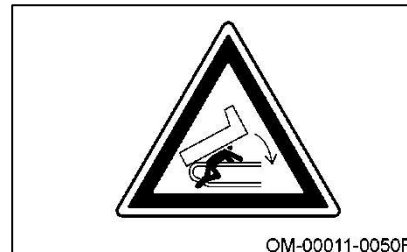
- Never loosen the tension adjustment valve more than one turn. There is a danger that the valve may fly out.
- When adjusting the tension, never stand directly in front of the valve. It is dangerous.



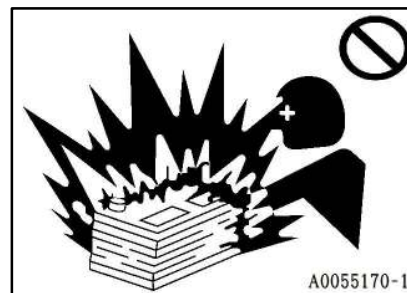
USE SAFETY BAR

When raising the dump body to carry out operations, always follow the precautions below.

- Always use the safety bar.
Safety bar: See “OPERATING SAFETY BAR” in “OPERATION” on page 128.

**BE CAREFUL WHEN HANDLING BATTERY**

- When checking or repairing the electrical system, always remove the negative (-) terminal from the battery to stop the flow of electricity.
Failure to do so may cause burns or a fire due to a short circuit.
- Be careful not to get battery electrolyte on your skin or clothes.
If the battery electrolyte gets on you, wash it off immediately with water.

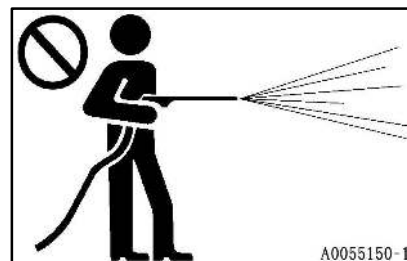
**DO NOT SPRAY WATER ON ELECTRICAL COMPONENTS**

When washing the machine, do not spray water on the electrical components.

If water gets into the electrical system, it will cause defective operations which may lead to malfunctions.

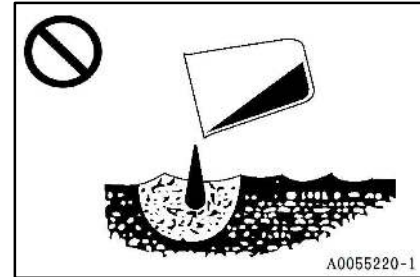
Cover the following parts with a sheet to prevent water from getting on them.

- Instrument panel and control panel switches, sensors, connectors
- Starting motor, alternator, sensors, connectors around the engine
- Batteries, relays, and connectors



DISPOSE OF WASTE MATERIAL CORRECTLY

- When draining and changing the oil, always put a container under the engine and tank to catch the oil.
Do not drain or throw the oil directly into the ground, rivers or the sewage system.
- When disposing of harmful substances such as oil, fuel, coolant, DEF, filters and batteries, follow the applicable laws and regulations.



PRECAUTIONS BEFORE STARTING ENGINE

ALWAYS CARRY OUT DAILY INSPECTIONS

Before starting the engine, always carry out the walk-around checks and checks before starting given in this manual.

- Check the ground under the machine to see if there is any trace of oil or water leakage.
- In particular, check the undercarriage thoroughly for loose or missing nuts and bolts.
- If any abnormalities are found during checks before starting, carry out simple repairs.
If the repairs are difficult, consult Morooka or your Morooka distributor.
The machine must not be used before repairs are carried out.

CHECK SAFETY PARTS AND LIGHTING

Check the operation of the following parts and devices needed for operation.

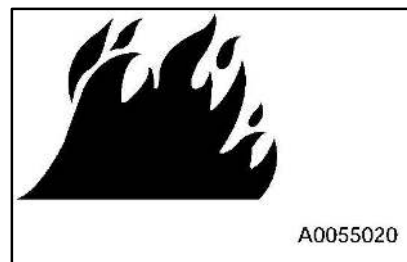
- Check that the horn, buzzer, lights work normally.
- Check that the headlights light up normally.
- Check that the side mirrors are adjusted so that they give a clear view from the operator's seat.
- Clean the lights to ensure that they give good visibility.

For the machine with an operator's seat

- Adjust the operator's seat to a suitable position for operation.
Always adjust the seat belt if it has been used by another operator.
- Check that the seat belt can be locked properly.
Always adjust the seat belt if it has been used by another operator.

FIRE PREVENTION

- Completely remove all wood chips, dead leaves, paper, and other flammable items accumulated in the engine compartment. They could cause a fire.
- Check fuel, lubrication, and hydraulic systems for leaks.
Have any leaks repaired. Wipe up any excess oil, fuel, or other flammable fluids.



SAFETY AT WORKSITE

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

- Check the terrain and condition of the ground at the worksite, and determine the best and safest method of operation. If there are any dangerous places, erect signs and take other steps to ensure safety.
- Check the depth and flow of water and the ground condition before operating in water or crossing a river. NEVER be in water which is in excess of the permissible water depth.
- If there are bridges or any other structure, check that they are of sufficient strength to support the weight of the machine.
- Do not allow any person other than the signalman to come close the worksite.

Restrict the entry even of related workers.

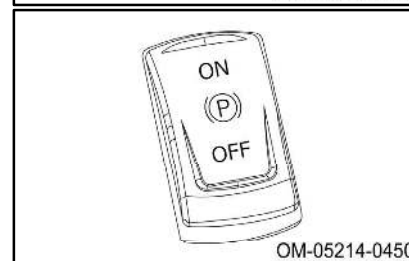
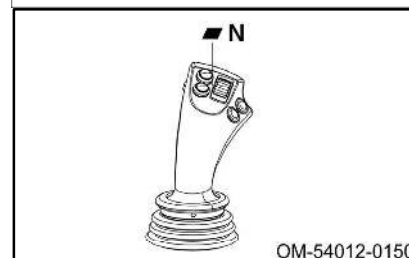
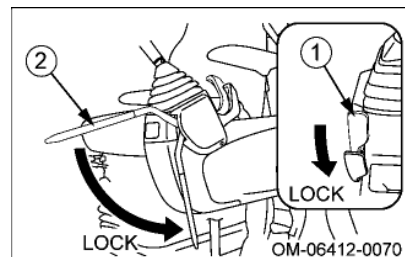


PRECAUTIONS WHEN STARTING ENGINE

PLACE LEVERS INTO NEUTRAL

Always place the levers into the following positions.

- Raise safety lock lever (1) and set safety lock lever (2) into the "LOCK" position.
- Check that the travel control lever is in the "N" (Neutral) position.
- Push the ON (Parking) side of the parking brake switch to apply the parking brake.
- Sit in the operator's seat and fasten the seat belt.



CHECK FOR SAFETY IN SURROUNDING AREA

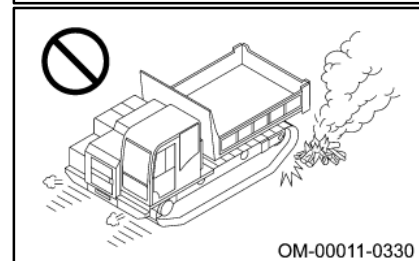
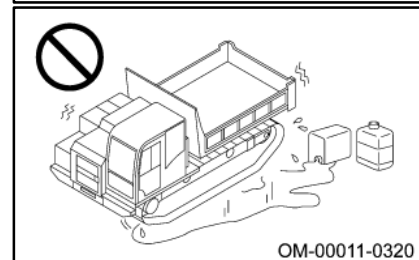
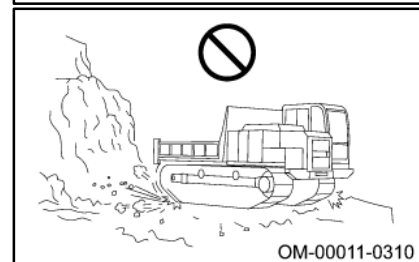
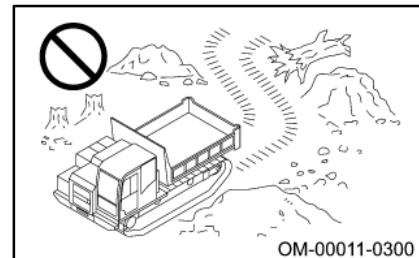
Always check to make sure that there is no one in the surrounding area. In particular, make sure that there is no one under the machine.

- Never start the engine if a warning tag has been attached to the controls.
- When starting the engine, sound the horn to warn people in the area.
- Do not allow anyone other than the operator to ride on the machine.

HANDLING RUBBER CRAWLER

PROHIBITED OPERATIONS FOR RUBBER CRAWLER

- Turning operations or other operations on ground with crushed stones, extremely uneven hard ground, in places with many tree stumps, on steel rods or steel scrap, or places with many sharp objects, or on concrete surfaces can cause damage to the rubber crawlers.
- On riverbeds or other worksites where there are large numbers of rocks of different sizes, the rocks will get caught in the rubber crawler and damage the crawler or cause it to come off the roller.
- Do not let oil, fuel, or chemical solvent get on the rubber crawlers. Do not travel in places where there is oil on the road surface.
- Do not let the machine enter any place where the ground is at high temperature, such as on asphalt or steel plates that have been left in the sun or in places where there have been fires.
- When putting the machine in long-term storage (3 months or more), store the machine indoors where it is out of direct sunlight and rain.

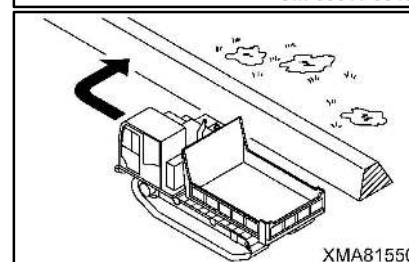
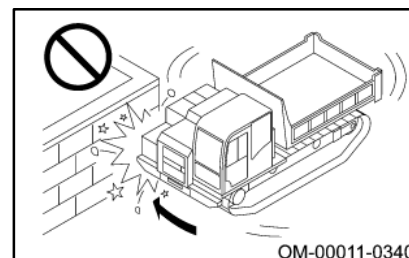


PRECAUTIONS WHEN USING RUBBER CRAWLER

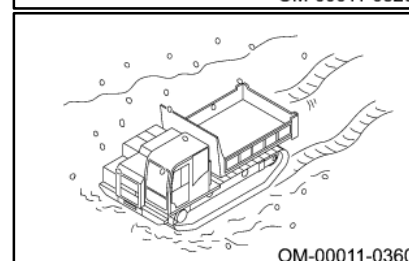
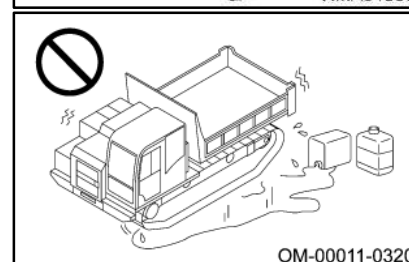
WARNING

Always follow these precautions when using rubber crawlers. Failure to do so may lead to a serious injury or accident.

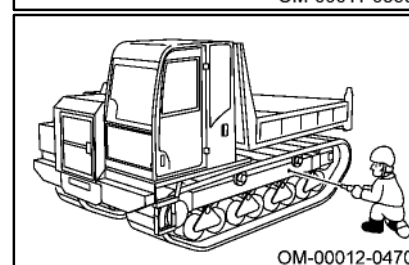
- Do not make sharp turns on concrete surfaces.
- Do not operate the machine in such a way that the rubber track scrapes against concrete walls.
- Sudden changes of direction can cause damage and premature wear to the rubber crawlers, so avoid sudden turns as much as possible.
- Avoid traveling and turning in places where there is a large ridge. When traveling over a ridge, approach the ridge at a right angle.



- As far as possible, avoid handling loads that produce oil when crushed (soybeans, corn, vegetables, etc.). If the machine is used for handling such products, be sure to wash the track thoroughly after use.
- When handling loads such as salt, ammonium sulphate, potassium chloride, potassium sulphate, or phosphates, be sure to wash the track thoroughly after use.
- On snow or frozen road surfaces, the rubber crawler slips very easily. Be careful of slipping especially when traveling or operating on slopes.



- To prevent the rubber shoe from coming off, always check that the tension is correct.
If the tension is too loose, the rubber crawler may come off and it can cause abnormal wear on the steel core and sprocket.
If the tension is too tight, it can reduce the travel speed and cause premature wear or damage to the undercarriage.



PRECAUTIONS WHEN TRAVELING

CHECK FOR SAFETY IN SURROUNDING AREA

Always check to make sure that there is no one in the surrounding area. In particular, make sure that there is no one behind the machine.

- If the dump body is raised, always lower it.
- Sound the horn to warn people in the area that you are about to start the machine.

AVOID SUDDEN OPERATIONS EXCEPT IN EMERGENCIES

Do not suddenly start, suddenly stop, or suddenly turn the machine (left turn and right turn) or carry out any other operation suddenly. Such operations may cause the crawler to come off and the machine to tip over.

- When starting or turning the machine (left turn and right turn), operate the travel control lever slowly.
- Run the engine at low speed.
- Return the travel lever slowly to the N (neutral) position. The brake will be applied to stop the machine.
- If the travel control lever is moved too far beyond the “N” (NEUTRAL) position to the REVERSE (or FORWARD) position, the pump will be overloaded and may cause a malfunction.
- Do not use the emergency stop switch and parking brake to stop the machine except in cases of emergency.
- If a dangerous state occurs for some reason, and it becomes necessary to stop the machine immediately, push the emergency stop switch or turn the key of the starting switch to the “OFF” position to stop the engine.

TRAVEL CAREFULLY ON UNEVEN GROUND OR ON CURVES

When traveling on uneven ground or in places where there are many curves, reduce the travel speed and travel carefully.

If the machine is traveling at high speed, it may cause the machine to turn over or the crawler may come off.

NO TRAVELING ON PUBLIC ROADS

By law, this machine is not permitted to travel on public roads.

When moving the machine, always transport it by a haulage trailer or truck.

BE CAREFUL OF ROAD SHOULDERS

When traveling on narrow roads such as agricultural roads, always follow the precautions below.

- Do not travel too close to the road shoulder, and travel at reduced speed.
- Do not travel on any soft road shoulder or place covered with grass.
- Especially, during or after rain and after an earthquake, the danger of landslides and falling rocks increases.

After ensuring that the surrounding area is safe, reduce the travel speed and operate the machine carefully.

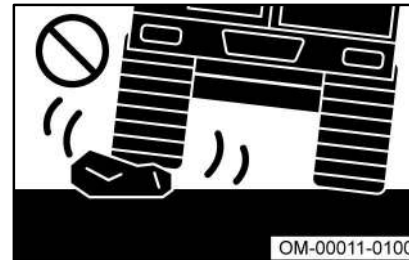
AVOID OBSTACLES

Avoid traveling over obstacles or earth embankments as much as possible.

If the machine has to travel over an obstacle, do as follows.

Never travel over large boulders, breakable objects, pieces of concrete, or other sharp objects.

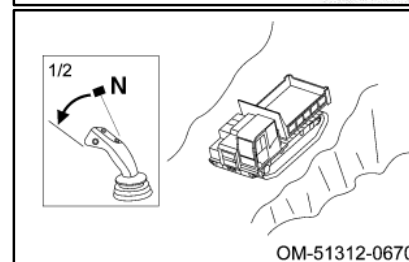
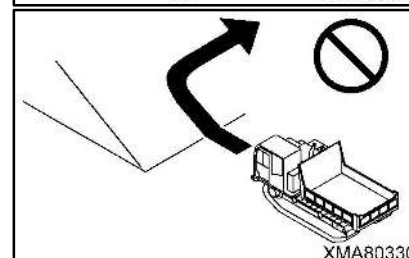
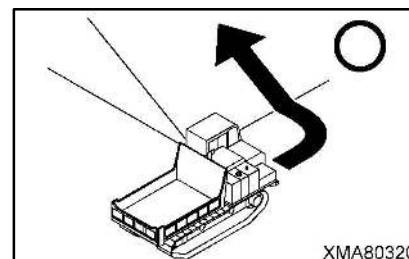
- Reduce the travel speed and travel carefully.
- Steer the machine so that the center of the rubber crawler passes directly over the obstacle. Mount the obstacle slowly, and when the machine goes over the top and starts to tip forward, stop the machine. Then slowly start the machine again.
Never change direction when doing this.
- Earth embankments may collapse under the weight or vibration of the machine and cause the machine to slip, so drive the machine slowly and do not change speed or direction.
Be particularly careful when traveling over freshly dug ditches. They may collapse.



TRAVELING ON SLOPES

When traveling on hills or slopes, always follow the precautions below.

- When traveling up or down on hills or slopes, select a place where the slope angle is 9 degrees or less. When the machine inclination angle exceeds 9 degrees, the slope warning lamp in the monitor display will light up in red.
If operating the machine on a large inclination angle is unavoidable, operate the machine only on a place where its maximum inclination angle is 20 degrees or less.
- Do not travel at an angle on a hill or slope, or parallel to the slope. Such action could result in the machine tipping over or slipping.
- When traveling up hills or slopes, always travel directly up the slope. Set the travel speed in a low range and keep the travel control lever close to the "N" (NEUTRAL) position (low speed).
- Do not suddenly change speed on the slope.
There is a danger that the direction of the machine may suddenly change and the machine may slip.
- When traveling down a slope, set the travel speed to a low range, run the engine at low speed, and operate the travel control lever to a position less than 1/2 of the full stroke from the "N" (NEUTRAL) position.
If the machine travels too fast, there is a danger that the engine may overrun, causing the machine to slip.
- When the slope warning lamp (Z!) in the monitor display lights up in red, slow down the engine speed, set the travel lever in a position close to "N" (NEUTRAL), and travel carefully.



PRECAUTIONS

- Do not travel on grass, fallen leaves and branches, wet steel plates, or other slippery objects.
- If a dangerous state occurs for some reason, and it becomes necessary to stop the machine urgently, push the parking brake switch or turn the starting key to the “OFF” position to stop the engine.

ENSURE GOOD VISIBILITY

When working in dark places or at night, turn on the headlights.

Also turn on the headlights when visibility is poor due to mist, snow, or rain.

Depending on how the sunlight hits, it may be difficult to see the unevenness of the road surface. Check the road surface condition carefully and travel the machine at a slower speed.

OPERATE CAREFULLY ON SNOW

- When working on snow or icy roads, even a slight slope may cause the machine to slip to the side, so always travel at low speed and avoid sudden starting, stopping, or turning.
- When there has been heavy snow, the road shoulder and objects placed beside the road are buried in the snow and cannot be seen, so always carry out operations carefully.

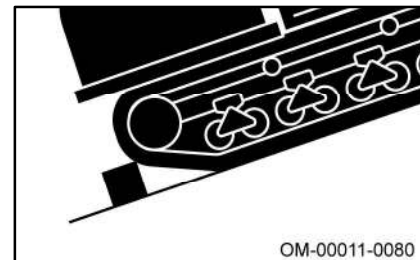
PARKING MACHINE

Park the machine on firm, level ground.

Select a place where there will be no problems from falling rocks, landslides, or floods.

If the machine has to be parked on a slope, do as follows.

- Stop the machine facing directly up or down the slope.
- Always put blocks under the tracks to prevent the machine from moving.
- Lower the dump body fully.

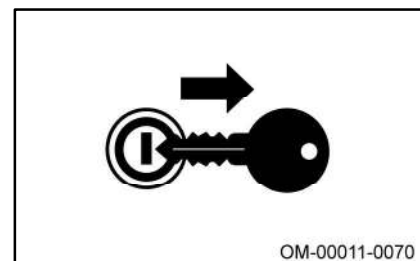


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REMOVE KEY WHEN LEAVING MACHINE

When leaving the machine, always do as follows.

- Lower the dump body fully.
- Apply the parking brake and stop the engine.
- Set the safety lock lever to the “LOCK” position.
Check that the safety lock lever is lowered.
- Remove the key from the engine starting switch and always take it with you.



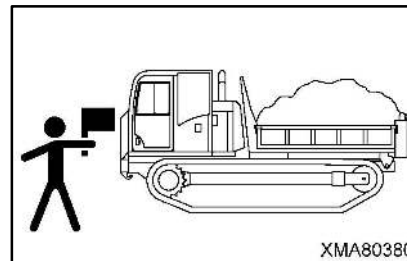
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PRECAUTIONS FOR OPERATION

USE SIGNALS

When carrying out work with one or more workers, or when using a signalman, determine the signals and the person in charge before starting work, and always follow the agreed procedure. Even when using a signalman, always pay careful attention to the following.

- When working in confined spaces or indoors, be careful not to hit the surroundings or the ceiling.
- When operating in urban areas or on roads, put up fences around the worksite and take steps to ensure the safety of passing traffic and pedestrians.



MAKE WORKSITE FLAT

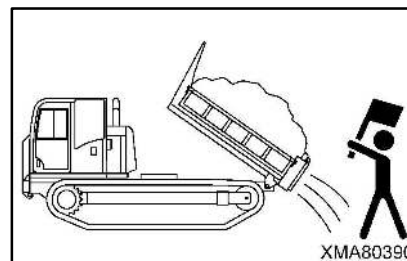
Make the worksite flat. This not only increases the efficiency but also ensures safety. If the worksite is dusty, spray water to ensure the visibility.

OPERATE DUMP BODY CAREFULLY

When carrying out dumping operations, be careful of the following.

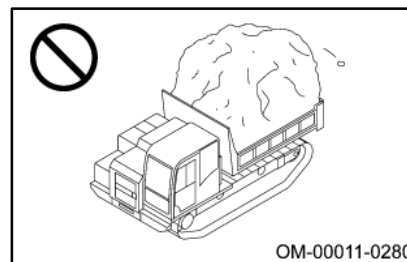
- Check that there is no person or obstacle near the machine.
- Park the machine on the determined point and operate the dump in accordance with signals from the signalman.
- Block the tracks to prevent the machine from moving in reverse.
- When dumping on slopes, there is a danger of the machine tipping over.

If you feel that the machine is not stable, stop the operation immediately.



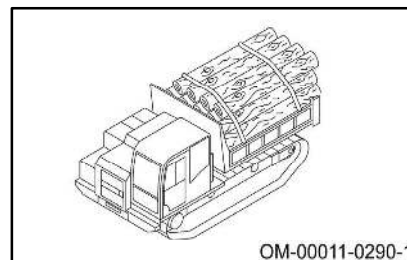
NO OVERLOADING

- Never load the machine above its capacity. Overloading not only causes failures, but also causes overrunning and tipping over on slopes.



LOAD DUMP BODY EVENLY

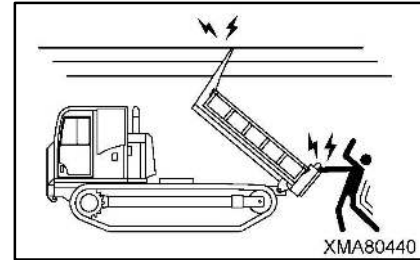
- Do not load the dump body on one side. Always spread the load to maintain the balance in the dump body.
- When carrying long objects, such as timber or steel beams, carefully consider the position of the center of gravity of the load, and secure with ropes.
- When loading stacks of U-shaped ditch liners or concrete blocks, lay a steel sheet and secure with rope, and take other steps to prevent the load from slipping.



DO NOT GO CLOSE TO HIGH-VOLTAGE POWER LINE

When carrying out operations on worksites where there are transmission lines, use a signalman and take steps to protect the power lines. Check with the electricity company before starting operations.

- Going close to high-voltage power lines can cause electric shock, even if the machine does not touch the lines. Always maintain the safe distance given below between the machine and power lines. In the case of high-voltage cables, there is a danger of electric shock simply by approaching.



	Voltage of Power Line	Minimum Safe Distance
Low voltage (Distribution line)	100/200 V	2 m
Special voltage (Transmission line)	6600 V	2 m
	22000 V	3 m
	66000 V	4 m
	154000 V	5 m
	187000 V	6 m
	275000 V	7 m
	500000 V	11 m

- If the dump body will touch a power line, the operator should not leave the operator's station. He should call another worker to report the situation.

The following actions are effective in preventing accidents.

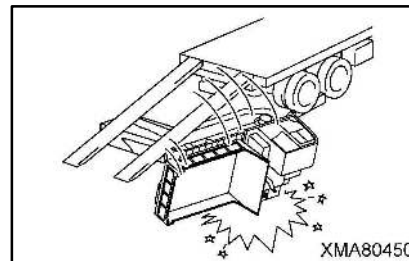
- Wear shoes with rubber soles and rubber gloves.
- Use a signalman to give warning if the machine approaches too close to the power lines.
Determine the signals to use in case of an emergency.
- Inquire with the electricity company about the voltage of power lines at the worksite.
- When carrying out operations near high-voltage lines, do not let anyone come close to the machine.

PRECAUTIONS FOR TRANSPORTATION

LOADING AND UNLOADING

Loading and unloading the machine always involves potential hazards. **EXTREME CAUTION SHOULD BE USED.** Always do as follows

- Perform loading and unloading on firm level ground only.
- Stop the engine of the hauler, apply the parking brake securely, then block the tires.
- Set the ramps parallel and in line with the width of the crawlers.
- Secure the ramps to the dump body with the hooks.
- Set the machine to be loaded in line with the ramps, then approach the ramps at low speed.
- Do not change the direction of travel when on the ramps.
If it is necessary to turn the travel direction, drive the machine off the ramps, and set the machine to the correct direction.
- After loading, put blocks under the front and rear of the rubber crawlers to prevent the machine from moving, then tie the machine down with chains or wire rope.



SHIPPING

- When shipping the machine on a hauling vehicle, obey all state and local laws governing the weight, width, and length of a load. Also obey all applicable traffic regulations.
- Take into account the width, height and weight of the load when determining the shipping route.

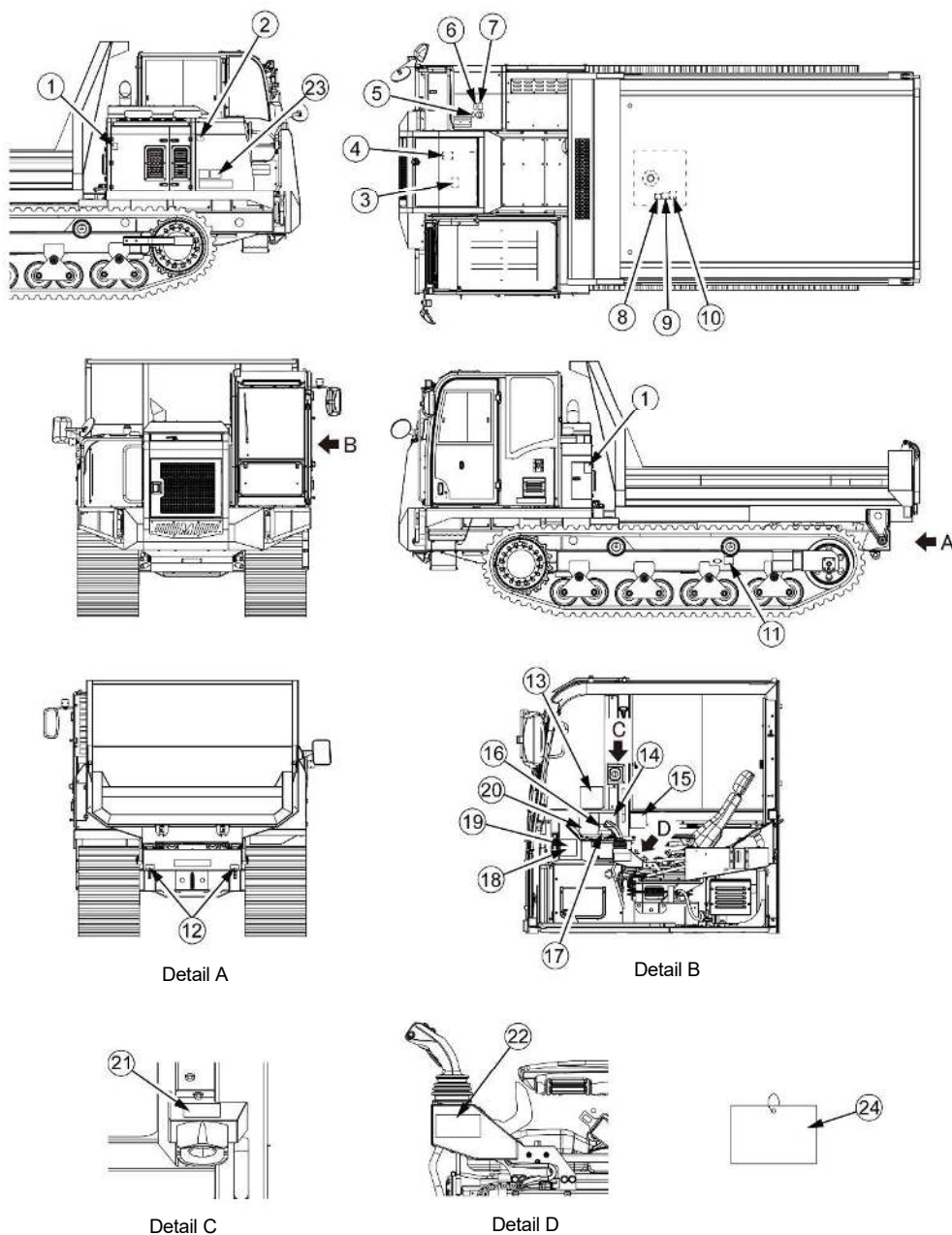
POSITION FOR ATTACHING SAFETY LABELS

Always keep these labels clean.

If they are lost or damaged, always attach them again or replace them with a new label.

There are other labels in addition to the safety labels listed as follows, so handle them in the same way.

The information on the safety labels shown in the diagram with numbers are provided at the end of this chapter.



OM-54011-0010E

- (1) Be careful of rotating crawler
(A-54001-3680)



- (2) Precautions for DEF
(A-09693-2020)



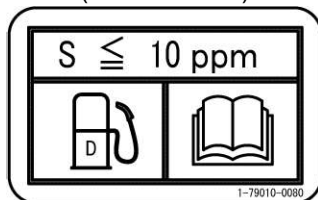
- (3) Be careful of high-temperature coolant in radiator
(A-54001-3660)



- (4) Be careful of rotating fan and pulley
(A-54001-3650)



- (5) Ultra low sulfur diesel oil only
(1-79010-0080)



- (6) Precaution for diesel fuel
(A-54001-3620)



(7) Precautions when adding fuel
(A-54001-3610)



(8) Precaution for oil inside the hydraulic tank
(A-54001-3630)



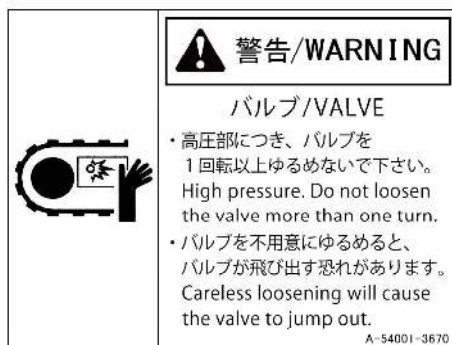
(9) Be careful of burns
(A-54001-3640)



(10) Do not get on the hydraulic tank
(A-54001-3700)



(11) Precautions for crawler adjustment valve
(2 locations, left and right)
(A-54001-3670)



(12) For machine fixing only
(A-03501-1030)



(13) Precautions when traveling on slopes
(A-54001-3550)

警告/WARNING

降坂時の運転方法/DRIVE SO DOWN HILL

オーバースピード走行は制動、操向不遂等の重大事故を引き起こす原因になります。
Over speed driving may cause serious accidents such as braking and inability to steer.

1. エンジン回転数をフルスロットル時の 1/2 以下にする。
Reduce the engine speed to 1/2 or less of the full throttle.
2. 2 速モーター仕様の場合は、必ず LOW レンジにする。
Machine models of 2-speed motor specification, be sure to set the Low range.

進入前/
Before approach



降坂時 /
Descending slope

1. 走行レバーを全降時の 1/2 以上減速側にする。
Travel lever to the deceleration side by 1/2 or more fully tilt.
2. エンジン回転数が自然に上昇する場合は
エンジンスロットルを減少させ走行レバーを中立にする。
If engine speed rises naturally,
reduce the engine throttle and make the travel lever neutral.

A-54001-3550

(15) Be careful of overheating
(A-54001-3590)

注意/CAUTION

- ・熱交換器の清掃を毎日必ず行つて下さい。
Be sure to clean the radiator every day.
- ・熱交換器等の目詰まりはオーバーヒート等の故障の原因になります。
Clogged radiator may cause malfunctions such as overheating.
- ・エンジンルーム内の清掃・点検を毎日必ず行つて下さい。
Be sure to clean and inspect the engine room every day.
- ・エンジンルーム内に溜まったゴミ(木屑等)は火災や故障の原因になります。
Dust (wood chips, etc.) collected in the engine room may cause a fire or malfunction.

※清掃不足による火災やオーバーヒート等の故障は保障の対象外となります。
The warranty does not cover failures such as fire and overheating due to insufficient cleanig.

A-54001-3590

(17) Precautions for parking brake / engine start
(A-54001-3510)

注意/NOTICE

駐車ブレーキスイッチ ON (掛り) の状態にしないとエンジン始動できません。
Engine is can't start without the parking brake to ON.

A-54001-3510

(14) Precautions for seat belt
(A-54001-3520)

警告/WARNING

シートベルト/SEAT BELT

・運転中は、必ずシートベルトを着用して下さい。
Always fasten the seat belt during operation.

A-54001-3520

(16) Precautions for warming-up operation
(A-54001-3530)

注意/CAUTION

暖機運転/WARMING UP

・暖機運転を十分に行わない場合、各装置が正常に機能せず、オペレーターの意図しない動作をしたり、各機器が破損する事があります。
The machine must be properly warmed up, or the equipment will operate abnprmlly or unexpectedly, and may by damaged.

A-54001-3530

(18) Precautions for collecting fluorocarbons
(A-54001-1100)

フロン回収・破壊法 第一種特定製品
(Act for Rationalized Use and Proper Management of Fluorocarbons)

- 1) フロン類をみだりに大気中に放出することは法律で禁じられています。
It's prohibited to release fluorocarbon without permission.
- 2) この製品を廃棄する場合には、フロン類の回収が必要です。
For the disposal of the product, fluorocarbons must first be collected.

冷媒の種類および数量(Type and Volume of Refrigerant)

種類: Type	冷媒番号: Refrigerant No	数量: Volume (g)
HFC	R134a (GWP:1430)	900±50

A-54001-1100

(19) Periodic replacement parts
(A-54001-3570)



(20) Precautions for operation / inspection
(A-54001-3500)



(21) Emergency stop
(A-03501-1040)



(22) Precautions for gate lever
(A-54001-3560)



(23) LWA 107dB (for EU)
(A-54001-3760)



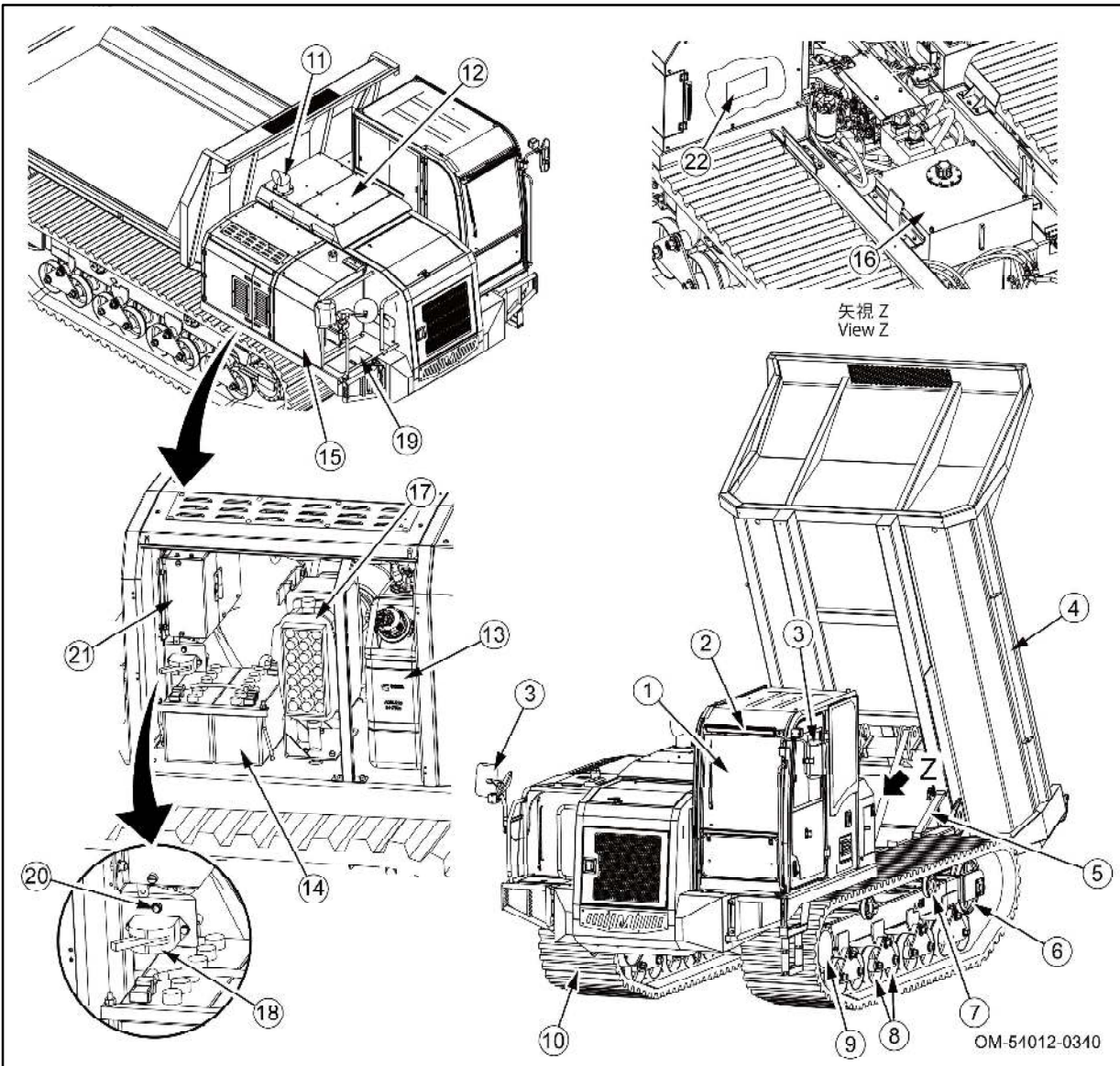
(24) Warning tag to prevent operation during maintenance
(1-41010-1210)



MACHINE STRUCTURE

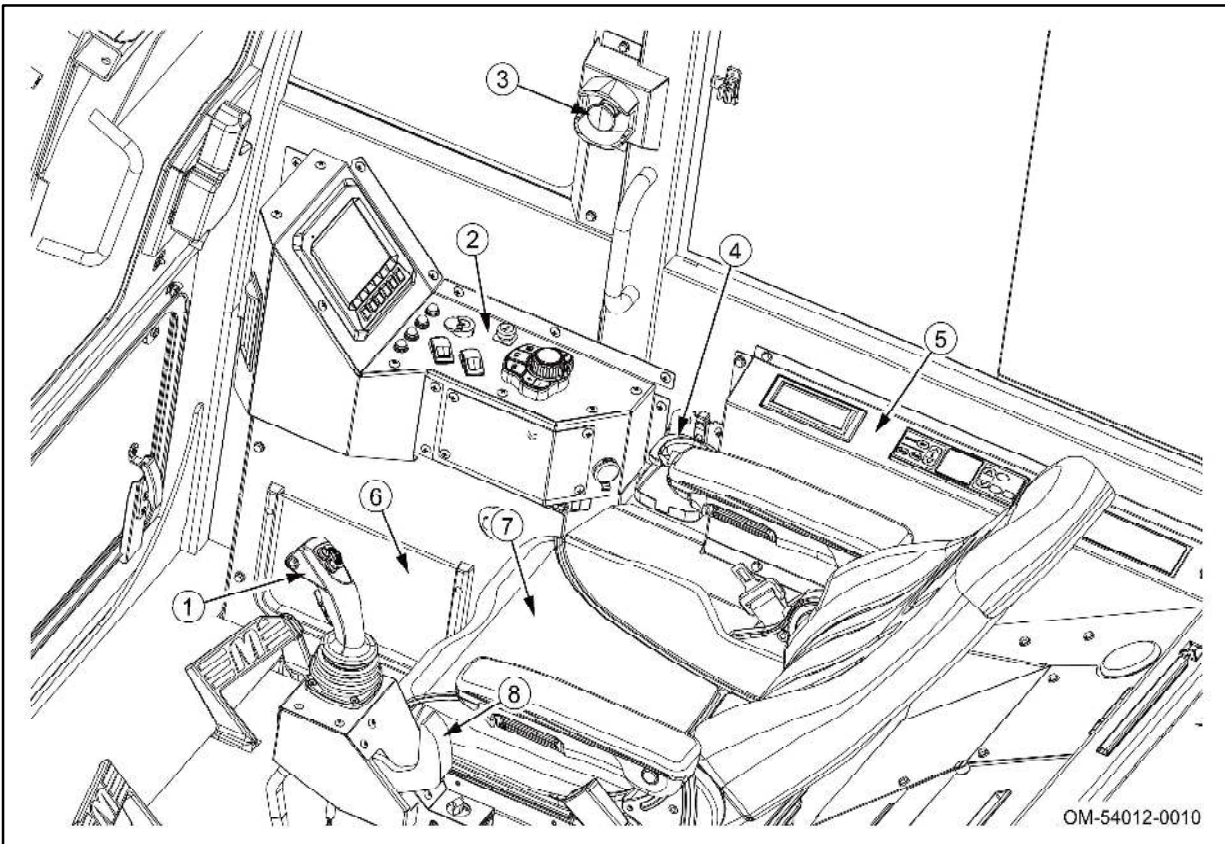
GENERAL VIEW OF MACHINE	43
GENERAL VIEW OF OPERATOR'S COMPARTMENT	44
GENERAL VIEW OF TRAVEL AND DUMP CONTROL LEVER (JOYSTICK TYPE)	45
GENERAL VIEW OF CONTROL PANEL BOX	46
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GENERAL VIEW OF MACHINE



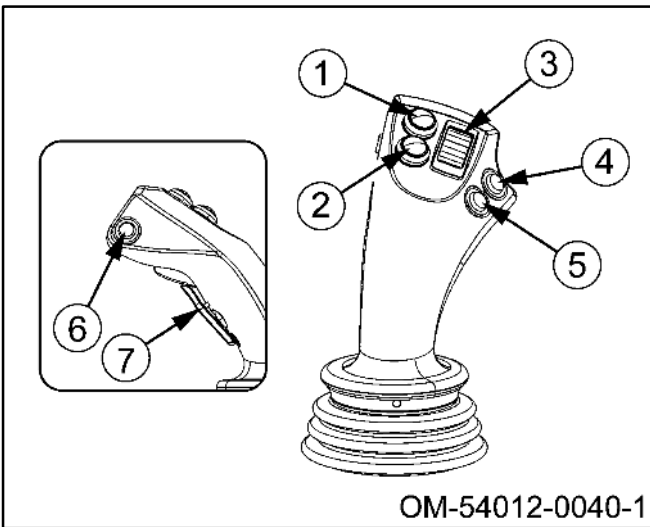
- | | | |
|-------------------|-----------------------------|------------------------|
| 1. Cab | 8. Track roller | 15. Fuel tank |
| 2. Headlight | 9. Travel motor, sprocket | 16. Hydraulic tank |
| 3. Mirror | 10. Rubber crawler | 17. Air cleaner |
| 4. Dump body | 11. Muffler | 18. Main switch |
| 5. Safety bar | 12. Exhaust cleaning system | 19. Tool box |
| 6. Rear idler | 13. DEF tank | 20. Purge lamp |
| 7. Carrier roller | 14. Battery | 21. Terminal block box |
| | | 22. Grease gun holder |

GENERAL VIEW OF OPERATOR'S COMPARTMENT



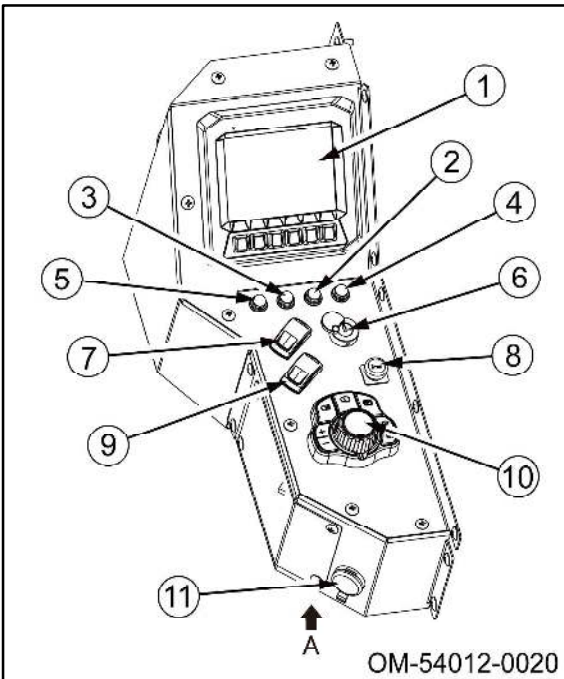
- | | |
|--|---------------------------|
| 1. Travel and dump control lever (joystick type) | 5. Rear control panel box |
| 2. Control panel box | 6. Glove compartment |
| 3. Emergency stop switch | 7. Operator's seat |
| 4. Drink holder | 8. Safety lock lever |

GENERAL VIEW OF TRAVEL AND DUMP CONTROL LEVER (JOYSTICK TYPE)

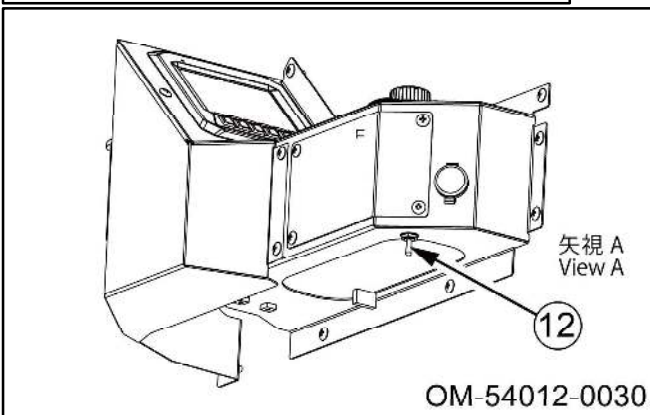


1. Horn button
2. N/A
3. Dump control dial
4. 2-Speed switching (high speed) button
5. 2-Speed switching (low speed) button
6. Super slow mode button
7. Trigger (for dump control)

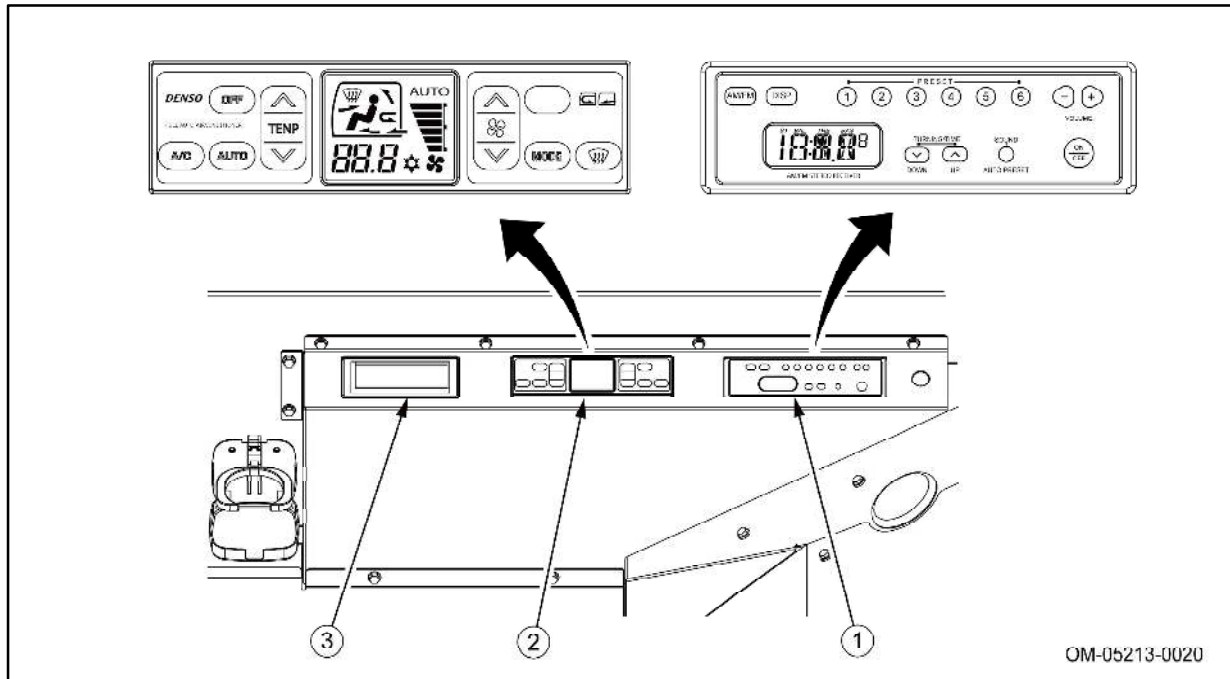
GENERAL VIEW OF CONTROL PANEL BOX



1. Monitor display
2. Battery charge lamp (Red)
3. Air cleaner clogging warning lamp (Red)
4. Emergency stop lamp (Red)
5. DEF residual quantity warning lamp (Orange)
6. Starting switch
7. Parking brake switch
8. Horn switch
9. Wiper switch
10. Multi-switch
11. 24V Power socket
12. DEF override switch



GENERAL VIEW ON THE RIGHT SIDE OF THE CAB



1. Radio
2. Air conditioner control panel
3. Vents for operator

EXPLANATION OF COMPONENTS

LAMPS	49
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SAFETY LOCK LEVER	74
TRAVEL AND DUMP CONTROL LEVER	75
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OPERATOR'S SEAT	78
ACCESSORIES INSIDE CAB	90
EMERGENCY ESCAPE HAMMER (HOW TO ESCAPE IN AN EMERGENCY	92
GREASE GUN HOLDER	93

LAMPS

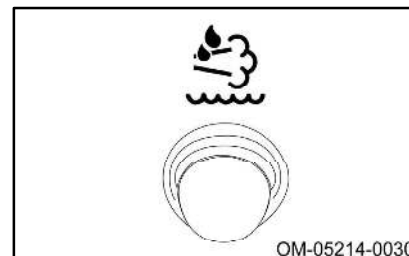
DEF RESIDUAL QUANTITY WARNING LAMP (ORANGE)

This lamp warns the residual amount of DEF in the DEF tank.

If the lamp lights up during operation, the residual quantity of DEF is less than 10%. This lamp brinks when the residual amount of DEF is 0%. Immediately park the machine in a safe place, stop the engine and refill DEF.

DEF residual amount is checked on the monitor display.

See "DEF RESIDUAL QUANTITY GAUGE" in "MONITOR DISPLAY" in the "EXPLANATION OF COMPONENTS" section.



AIR CLEANER CLOGGING WARNING LAMP (RED)

This lamp warns of clogging in the air cleaner.

During operations, when the lamp is lit, the air cleaner is clogged. Stop the engine immediately, clean or replace the air cleaner element.



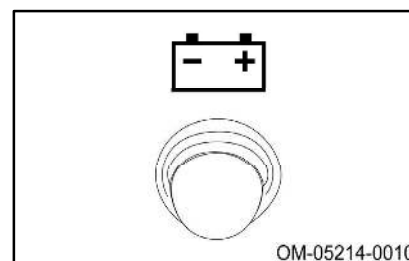
BATTERY CHARGE LAMP (RED)

This lamp warns of any abnormalities in the charging system.

It lights up when the starting switch is turned ON, and when the engine is started and the speed rises, it should go out.

If it lights up during operations, there is an abnormality in the charging system.

- When the charge lamp lights up, immediately stop the operation and check the fan belt for damage and tension.
- If the inspection shows that there is no abnormality, please contact your distributor.



EMERGENCY STOP LAMP (RED)

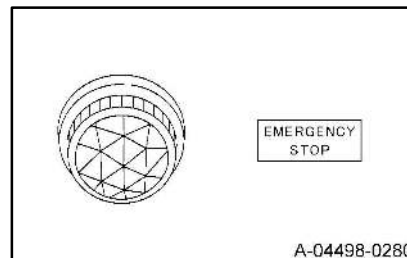
When pressing the emergency stop switch in an emergency, the emergency stop lamp lights and the engine stops.

Turn the emergency stop switch to the right to release the emergency stop, and the light goes out.

If the lamp is lit, investigate the event that caused the emergency stop and eliminate the cause.

After eliminating the cause, turn the emergency stop switch to the right to cancel the emergency stop.

The engine does not start during emergency stop.

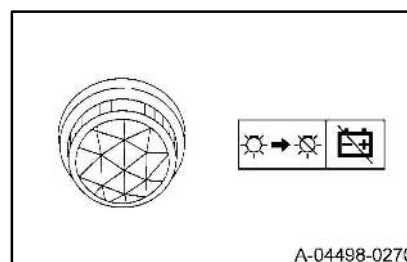


PURGE (WAIT TO DISCONNECT) LAMP (ORANGE)

This lamp lights when the DEF is being extracted from DEF piping (purge). After setting the starting switch to the "OFF" position, purge the urea water piping. When the purge operation completes, the lamp goes out.

★ Before starting the following works, be sure to check that this lamp is off.

- When turning OFF the main switch
- When removing a battery



SWITCHES

MAIN SWITCH

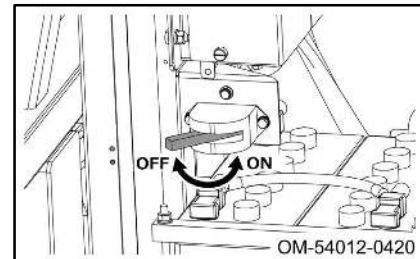
NOTICE

- Do not turn off the main switch while the purge lamp is lit.
Insufficient extraction of DEF from the exhaust cleaning system may cause a malfunction such as engine failure or shortening the life of the exhaust gas purification device.

It is used for turning the battery power ON and OFF.

- ON** : Turn the switch lever to the right.
Battery power flows to the electrical system through the starting switch.
- OFF** : Turn the switch lever to the left.
The battery power is cut off and the flow of electricity after the starting switch is stopped.

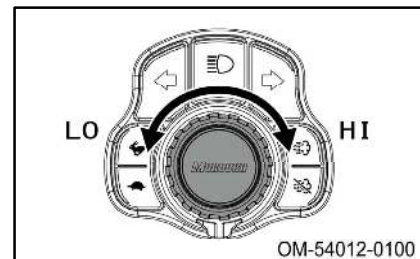
The main switch is equipped to prevent the battery from discharging.
When starting the engine, first turn this switch "ON".
After stopping the engine, make sure that the purge lamp is off, and then turn this switch "OFF" at the end.



ENGINE THROTTLE DIAL

This dial is used to control the engine speed and output.
Turn the dial to adjust the engine speed.
Turning the dial quickly will make a large change in engine speed and turning it slowly will make a small change.

- High speed** : Turn the dial knob to the "HI" direction.
- Low speed** : Turn the dial knob to the "LO" direction.



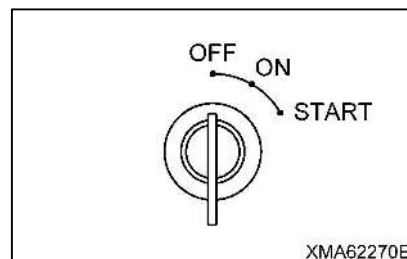
STARTING SWITCH

NOTICE

- Do not try to start the engine immediately when inserting the starting switch.
After turning the switch to the "ON" position, wait until the engine warning lamp () (Orange) and engine stop lamp () (Red) on the monitor display light up and then go out.
- The engine cannot start unless the parking brake switch is in the "ON" (STOP) position.

This switch is used for starting and stopping the engine.

- OFF** : The key can be inserted and removed at this position. When the key is turned to this position, all switches for the electrical systems are turned off and the engine stops.
- ON** : Power is supplied to electrical components other than the engine starting motor.
- START** : This is the position for starting the engine (the starting motor turns).

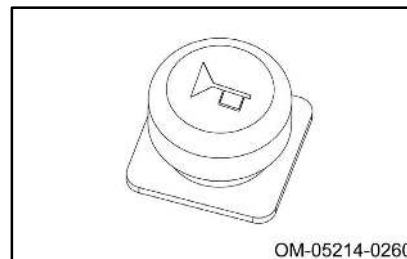


After the engine is started, do not turn the key to the OFF position except when stopping the engine.

HORN SWITCH

This switch is used to sound the horn.

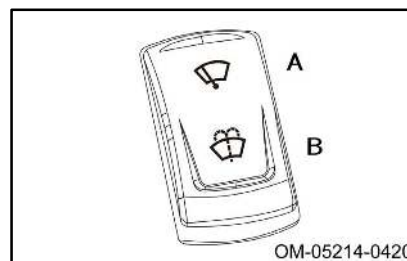
- The horn keeps ringing while you hold down the switch.
- When the switch is released, the horn stops.



WIPER SWITCH

This switch is used for operating the wiper.

- Wiper operation** : Press the "A" side of the switch to operate the wiper.
- Stop** : Return the switch to the NEUTRAL position.
- Washer** : Press the "B" side of the switch.
When the switch is pressed, washer fluid is sprayed from the nozzle while the switch is being pressed.
When the switch is released, washer fluid stops spraying.



HI-LO SPEED RANGE SELECTOR SWITCH

WARNING

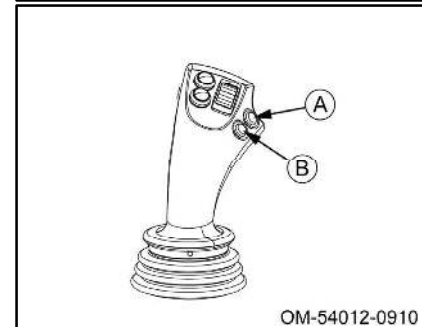
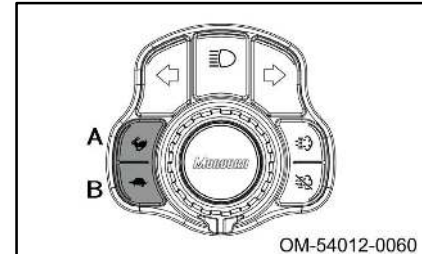
- When traveling on slopes, always set the travel speed range to low speed. If the machine is driven in the high speed range, it will cause the engine to overrun.
- When switching the travel speed range, always stop the machine first before operating the switch.
- When traveling with a load, always set the travel speed range to low speed. If the machine is driven in the high speed range, it will cause the engine to overheat.

This switch is used to select the travel speed range.

The travel speed varies between the high-speed and low-speed ranges even when the engine speed is set at same level and the travel lever is operated to the same amount.

In the high-speed range, the "High speed travel lamp (🔦)" on the monitor display lights up, and in the low-speed range, it goes out.

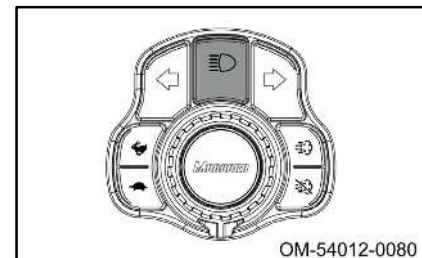
- High speed range : Press the "A" side of the switch.
Alternatively, press button (A) on the travel lever.
- Lo speed range : Press the "B" side of the switch.
Alternatively, press button (B) on the travel lever.



HEADLIGHT SWITCH

This is used for operating the headlights.

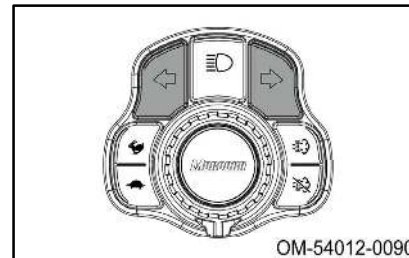
When the headlights are on, the switch lights up.



TURN SIGNAL LIGHT SWITCH

- Flash the turn signal light (Left) : Press the left switch.
Turn OFF : Press the flashing switch.
Flash the turn signal light (Right) : Press the right switch.

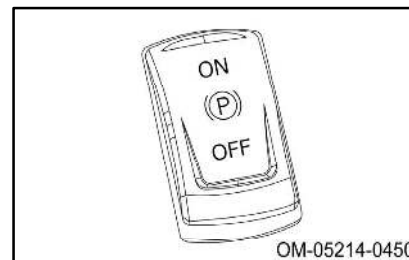
* After 30 seconds, the flashing light will automatically turn off.



PARKING BRAKE SWITCH

This switch is used to operate the parking brake inside the travel motor.
The engine does not start unless the parking brake switch is in the
“ON” position.

- ON (STOP) : The parking brake is applied, “Parking brake pilot lamp (**P**)” lights up on the monitor display, and the alarm buzzer sounds.
OFF (RUN) : The parking brake is released and “Parking brake pilot lamp (**P**)” on the monitor display goes out.



EMERGENCY STOP SWITCH

WARNING

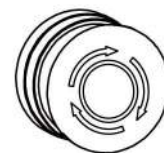
Press the emergency stop switch in an emergency situation during traveling.
When pressing this switch, the engine stops and the parking brake applies, then the machine stops.
NEVER use the emergency stop switch except in an emergency.
Otherwise, the machine stops suddenly, there is a risk of human injury.

NOTICE

- To start the engine again, turn the emergency stop switch clockwise. The switch returns to the original position and the engine can be restarted.
- If the emergency stop switch is used while traveling the machine, ask your distributor for an inspection of the parking brake. Using the emergency stop switch degrades the performance of the parking brake.

Use this switch to stop the machine urgently.

- Press : The engine stops, the parking brake applies, and the machine stops. All warning lamps will go out.
At this time, the switch is locked in the "emergency stop" position.
- Recover : Turn the switch clockwise. The switch returns to the "Release" position and the engine can be restarted.



OM-00012-0010

EXHAUST CLEANING SYSTEM REGENERATION SWITCH

This switch is used for executing the exhaust cleaning system manual regeneration.

When press and hold the exhaust cleaning system regeneration switch, the engine starts the exhaust cleaning system regeneration.

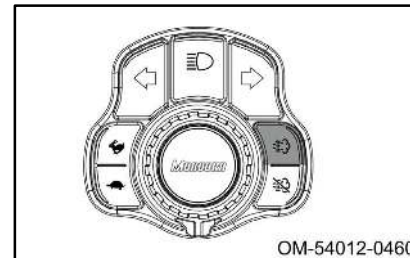
When the exhaust cleaning system regeneration lamp (ⓘ) on the monitor display flashes, immediately perform manual regeneration. The lamp goes out when the exhaust cleaning system regeneration completes.

During the exhaust cleaning system regeneration, the engine automatically controls its optimum speed.

Engine speed setting by the engine throttle dial on the control panel is ignored. Do not operate the engine throttle dial during regeneration.

The exhaust cleaning system regeneration can be interrupted manually, but once it is started, continue until regeneration is completed as much as possible.

Before performing the exhaust cleaning system manual regeneration, park the machine in a safe place. And perform it between work (such as lunch break or before starting work) will save time.



EXHAUST CLEANING SYSTEM REGENERATION PROHIBITION SWITCH

This switch is used for interrupting exhaust cleaning system regeneration under way. Use this switch mainly in emergencies.

When press and hold the switch, the exhaust cleaning system regeneration prohibition lamp (ⓘ) on the monitor display is lit and the regeneration stops.

Use this switch to immediately stop the exhaust cleaning system regeneration when the engine unexpectedly starts regeneration during operations or an unauthorized person enters the workplace during the regeneration.



DEF OVERRIDE SWITCH

NOTICE

When the DEF override switch is pressed, you can make normal travel operation for 30 minutes up to 3 times after the output is limited.

If you continue the operation after the 3rd time travel operation without the error disappearing, the engine may not be restarted after the engine is stopped.

Move the machine to a safe place and contact your distributor immediately.

If any of the following conditions are met, the engine alarm lamp will light up, the output will be limited, the engine speed will drop, and the machine will not operate normally.

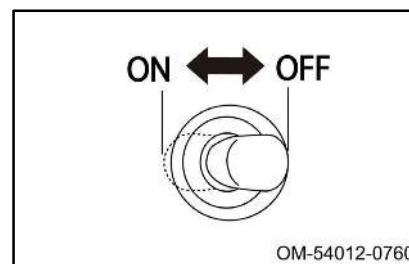
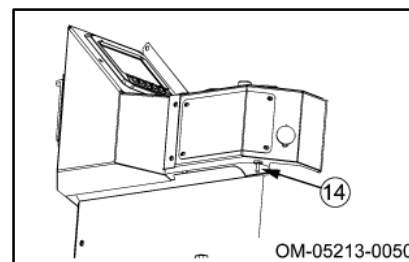
(1) 30 minutes have passed since the remaining amount of DEF in the DEF tank became 0% or less.

(2) 240 minutes have passed since the engine abnormality was detected.

DEF override switch (14) is located at the bottom of the console panel.

ON : The override function is enabled.
(Tilt to the left)

OFF : The override function is disabled.
(Tilt to the right)



When the DEF override switch is pressed, you can make normal travel operation for 30 minutes up to 3 times even if the engine warning lamp is lit.

After moving the machine to a safe place, check the remaining amount of DEF, and if an error occurs under the condition (1), refill DEF.

After a while, the error and engine alarm lamp will go out.

* If the error persists after a while after refilling the DEF, contact your distributor immediately.

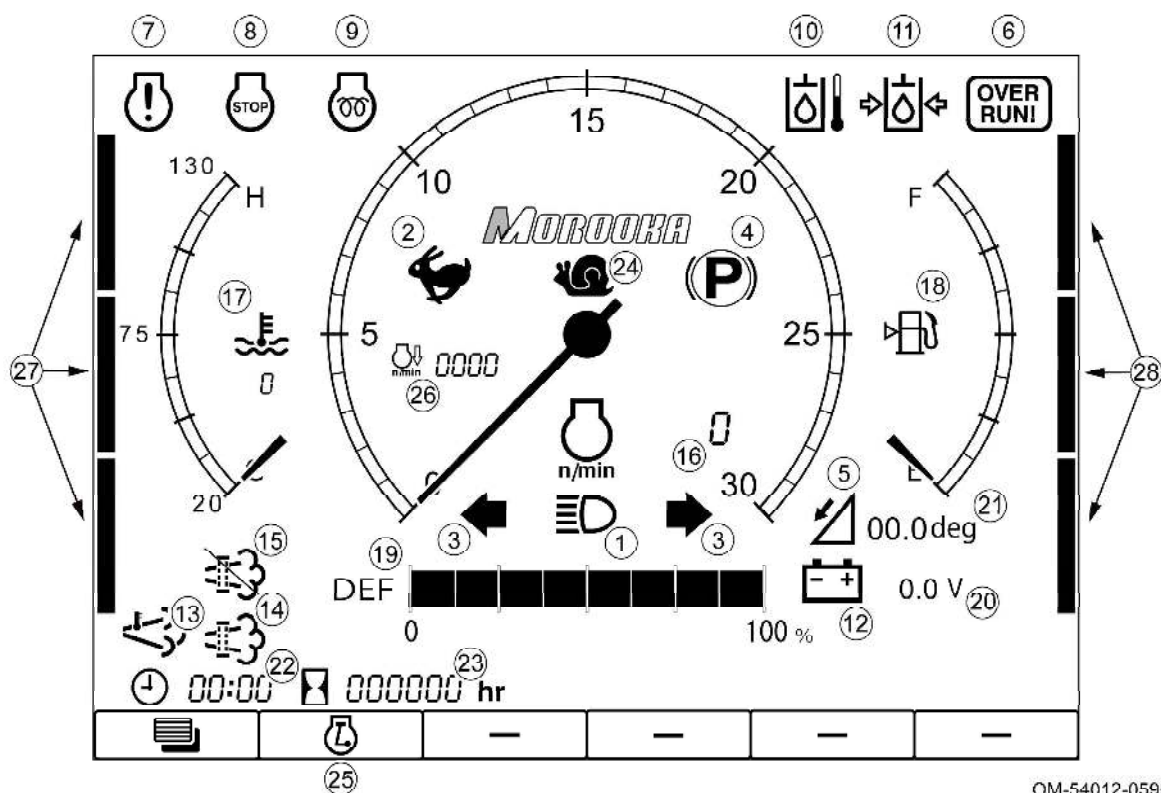
MONITOR DISPLAY

⚠ WARNING

- When traveling uphill or downhill, be sure to regularly check the tachometer to ensure the engine is running at an appropriate speed. In particular, when traveling downhill, run the machine at a slow speed as much as possible to prevent an overrun.
- During operation, check the tachometer on the monitor display screen from time to time to identify any increases or decreases in engine speed.

INITIAL SCREEN DISPLAY

When the starting switch is set to the "ON" position, the following opening screen is displayed. And then the indication check screen (all items) shown below will be displayed.



OM-54012-0590

- | | |
|---|---|
| 1. Headlight pilot lamp (Blue) | 16. Engine speed (rpm) |
| 2. High speed travel pilot lamp (Green) | 17. Engine coolant temperature gauge (°C) |
| 3. Turn signal pilot lamp (Green) | 18. Fuel gauge |
| 4. Parking brake lamp (Red) | 19. DEF residual quantity gauge |
| 5. Slope warning lamp (Normal: white / Alarm: red) | 20. Voltmeter (Normal: white / Alarm: red) |
| 6. Overrun warning lamp (Red) | 21. Inclinator (Normal: white / Alarm: red) |
| 7. Engine warning lamp (Orange) | 22. Clock |
| 8. Engine stop lamp (Red) | 23. Hour meter |
| 9. Engine glow lamp (Orange) | 24. Super slow mode lamp |
| 10. Hydraulic oil temperature warning lamp (Orange) | 25. Auto decel enable / disable icon |
| 11. Hydraulic oil pressure warning lamp (Red) | 26. Auto decel mode |
| 12. Battery voltage drop lamp (Normal: white / Alarm: red) | 27. Left side warning lamp |
| 13. Exhaust temperature warning lamp (Orange) | 28. Right side warning lamp |
| 14. Exhaust cleaning system regeneration lamp (Orange) | |
| 15. Exhaust cleaning system regeneration prohibition lamp (Red) | |

HEADLIGHT PILOT LAMP (1)

When the headlight switch on the control panel is set to the "ON" position, this lamp lights up.

HIGH SPEED TRAVEL PILOT LAMP (2)

When the Hi-Lo speed range selector switch or the "high speed" side of the travel control lever button on the operation panel, the lamp lights up.

TURN SIGNAL PILOT LAMP (3)

When the turn signal lever of the combination switch on the control panel is operated, the lamp on the operation side lights up.

PARKING BRAKE PILOT LAMP (4)

When the parking brake switch on the control panel is set to the "ON" position, the parking brake is applied and this lamp lights up. The engine does not start unless the parking brake switch is in the "ON" position.

• **SLOPE WARNING LAMP (5)**

 WARNING

While the machine is traveling downhill in forward, if this lamp lights up in red, the machine inclination angle is "9 deg." or above.

Perform the following operations promptly to avoid the risk of overrun and go down the slope.

1. Return the travel lever to the "N" (Neutral) position where the travel speed cannot increase naturally.
2. Operate the engine speed control dial to reduce the engine speed to 1,200 rpm or below.
3. If above operations cannot turn off the overrun warning lamp, the travel speed exceeds a safe speed.

Immediately stop the machine and reduce the load on the dump body.

During operation, this lamp should be lit in white.

While the machine is traveling downhill in forward, if the machine inclines "9 deg." or above, this lamp lights up in red to issue a warning.

• **OVERRUN WARNING LAMP (6)**

 WARNING

- When this lamp flashes while traveling downhill, the machine is under dangerous conditions. Perform the following operations promptly to avoid the risk of overrun and go down the slope.
 1. Return the travel lever to "Neutral" position and apply the brake.
 2. After the machine is stopped, to reduce the load, operate the swing and dump control lever to "Raise" position to dump the load on the dump body.
 3. Set the engine throttle lever to the "LOW SPEED" position to lower the engine speed.
 4. Move the travel lever to a position as close as possible to the "Neutral" position, and go down the slope again.
- When this lamp lights up during traveling downhill, the machine is under dangerous conditions. Urgently perform the following operations and stop the machine.
 1. Return the travel lever to "Neutral" position and apply the brake.
 2. Set the engine throttle lever to the "LOW SPEED" position to lower the engine speed.
 3. If you cannot stop the machine completely, press the emergency stop switch to stop the machine.
- When you have used the emergency stop switch to avoid danger, be sure to inspect the parking brake and repair it if needed. If the brake is used as is, the parking brake may not work, incurring danger.

During operation, this lamp should be off.

The lamp flashes when the engine speed reaches 2150 rpm. The lamp is lit and the buzzer sounds when the engine speed further increases and reaches 2250 rpm.

• **ENGINE STOP LAMP (7)**

This lamp warns about engine troubles.

When the starting switch is set to the "ON" position, the opening screen (MOROOKA) appears and this lamp lights up. If this lamp goes out after several seconds, the system is normal. When the lamp does not go out, do not start the engine.

During operation, this lamp should be off.

If any troubles occur during operation, the lamp lights up or flashes to issue a warning. Before starting the engine, be sure to check that this lamp is off. If the lamp lights up during operations, the engine power may lower.

When any warning is issued, immediately stop the operation and contact your distributor.

- **ENGINE WARNING LAMP (8)**

This lamp indicates whether the engine can be started. This lamp also warns about engine troubles.

When the starting switch is set to the "ON" position, the opening screen (MOROOKA) appears and this lamp lights up. If this lamp goes out after several seconds, the system is normal. When the lamp does not go out, do not start the engine.

During operation, this lamp should be off.

If any troubles occur during operation, the lamp lights up or flashes to issue a warning. Before starting the engine, be sure to check that this lamp is off. If the light does not go out, consult your distributor. If exhaust cleaning system regeneration lamp (14) is blinking even if this lamp does not turn off, perform the exhaust cleaning system manual regeneration. When any warning is issued, immediately stop the operation and contact your distributor.

- **ENGINE GLOW LAMP (9)**

This lamp automatically indicates the preheat conditions of the engine.

In cold weather, the intake heater automatically operates to preheat the intake air depending on the conditions of the intake air temperature and the cooling water temperature.

When the starting switch is turned to the "ON" position and the glow plug is activated, the lamp lights up.

When preheating the engine is completed, the lamp goes out. When the glow relay lamp lights up, start the engine after the lamp goes out.

- **HYDRAULIC OIL TEMPERATURE WARNING LAMP (10)**

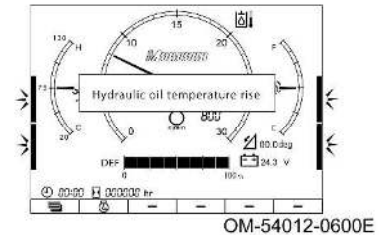
This lamp warns about abnormal hydraulic oil temperature during operation.

During operation, this lamp should be off.

When the temperature of the hydraulic oil is "20°C" or below, the lamp lights up and right and left orange warning lamps flash.

If the temperature of the hydraulic oil exceeds "100°C", the lamp lights up and right and left red warning lamps flash, a pop-up is displayed and the alarm buzzer sounds.

If this alarm is issued, stop the engine and check the oil level in the hydraulic tank, check clogging of the oil cooler core, and check operating conditions of the electric fan.



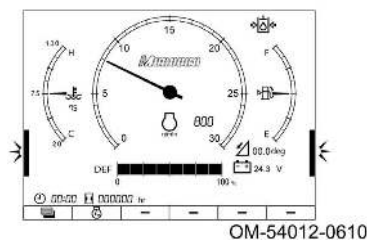
- **HYDRAULIC OIL PRESSURE WARNING LAMP (11)**

This lamp warns about a drop in the HST oil pressure during operation.

During operation, this lamp should be off.

When the HST oil pressure drops below "9.5 bar", the lamp lights up and right and left warning lamps (red) flash and the alarm buzzer sounds.

If this warning is issued, stop the engine, and check the hydraulic oil level in the hydraulic tank, check for clogging of hydraulic oil line filters and hydraulic tank strainer, and check for oil leaks from the hydraulic piping.



- **BATTERY VOLTAGE DROP LAMP (12)**

When the battery voltage drops, the lamp is lit in red.

Check the battery, and charge or replace if necessary.

During operation, this lamp should be lit in white.

- **EXHAUST TEMPERATURE WARNING LAMP (13)**

This lamp warns you that the engine exhaust temperature has become high during operation.

This lamp lights mainly during the exhaust cleaning system regeneration.

If the lamp is off during operation, the exhaust cleaning system is not regenerated.

During exhaust cleaning system regeneration, the lamp may turn on and off repeatedly.

The lamp lights up when the engine exhaust temperature becomes high, not only during the exhaust cleaning system regeneration.

- **EXHAUST CLEANING SYSTEM REGENERATION LAMP (14)**

During operation, if exhaust cleaning system regeneration is required, this lamp lights up.

When the exhaust cleaning system regeneration lamp lights up and the regeneration is not performed for a long time, engine warning lamp (7) () will light up.

The lamp goes out when the exhaust cleaning system regeneration completes.

During operation, this lamp should be off.

When this lamp lights up, immediately perform the manual regeneration.

Exhaust cleaning system regeneration can be interrupted manually, but do this only when there is a risk of fire or in an emergency.

- **EXHAUST CLEANING SYSTEM REGENERATION PROHIBITION LAMP (15)**

When the exhaust cleaning system regeneration prohibition switch on the multi-switch is set to the "ON" position, this lamp lights up.

When press and hold the exhaust cleaning system regeneration switch or press the exhaust cleaning system regeneration prohibition switch again, the lamp goes out.

Alternatively, the lamp goes out by turning the starting switch "OFF" to stop the engine and then turning the starting switch "ON" again.

If something goes wrong with the machine, the exhaust cleaning system regeneration prohibition lamp may continue to light. In that case, please contact your distributor.

- **ENGINE SPEED METER (16)**

This meter indicates the engine speed in figures and on a scale during operation.

- **ENGINE WATER TEMPERATURE GAUGE (17)**

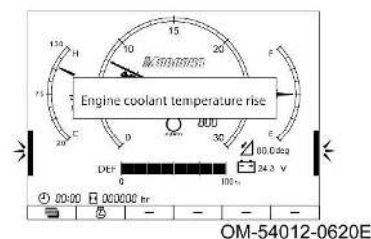
It displays the temperature of the engine coolant with numbers and a scale.

If the gauge points in the green range during operation, the engine water temperature is normal.

If the gauge exceeds the red range "105°C" or above, right and left warning lamps (red) start to flash, pop-up is displayed, and the alarm buzzer sounds.

If this alarm is issued, reduce the engine speed to a low speed and wait until the gauge points in the green range.

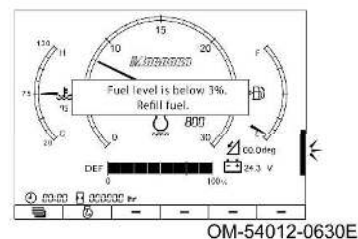
If this alarm is issued, stop the engine and check for a water leak from the radiator, clogging of radiator core, and damage and tension of the fan belt.



- **FUEL GAUGE (18)**

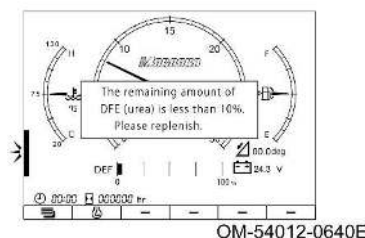
This gauge indicates fuel level in the fuel tank on a scale.

When the fuel gauge reads "15% or below", the right warning lamp (Red) flashes. The warning lamp (Red) lights up and pop-up is displayed when the gauge reads "3% or less".



- **DEF RESIDUAL QUANTITY GAUGE (19)**

This lamp warns the residual quantity of DEF in the DEF tank.
When the scale of the remaining amount of DEF becomes "10% or less", the left warning lamp lights up in red, and pop-up is displayed.



- **VOLTAGE METER (20)**

This meter displays battery voltage numerically.
The battery is normal when the value shows "24 V" or more after warming up operation.
When the value is less than "24 V", stop the engine, and then check the battery.

- **CLINOMETER (21)**

This meter numerically displays the current front-rear tilt of the machine.
It lights red at the time of alarm.
During operation, this lamp should be lit in white.

- **CLOCK (22)**

It displays the current time numerically.

- **HOURL-METER (23)**

It shows the total number of hours of the operation of the machine.
When the starting switch is at the ON position, the meter will advance even if the machine is not moving.
Use the hour-meter reading as the standard for periodic inspection and maintenance.
When you stop the engine, always turn the starting switch to the "OFF" position.

- **SUPER SLOW MODE LAMP (24)**

It lights when the super slow mode is enabled.

- **AUTO DECEL ENABLE/DISABLE ICON (25)**

You can check whether the auto decel function is enabled / disabled with the icon.

- ON (Enabled): (Green)

- OFF (Disabled): (Red)

* Once the hydraulic oil temperature reaches 85°C or higher, the auto-decel will be disabled. After that, the auto-decel will continue to be disabled until the temperature drops below 80°C. The auto-decel enable/disable icon (26) lights up in yellow when the auto-decel is disabled

- **AUTO DECEL ICON (26)**

It lights when the auto decel function is enabled.
Next to the icon, the engine speed when auto-decel is released is displayed.

NORMAL SCREEN (Before starting engine)

When the starting switch is set to the "ON" position, the following standby screen is displayed.

This screen is displayed after the starting switch is set to the "ON" position and before the engine is started.

Engine speed meter (16) displays "0" and engine water temperature gauge (17) displays "current coolant temperature".

It also displays the "current status" of fuel gauge (18), DEF residual quantity gauge (19), voltmeter (20), inclinometer (21), and hour meter (23).

Parking brake lamp (4) indicates that the parking brake switch is in the "ON" position in preparation for starting the engine.

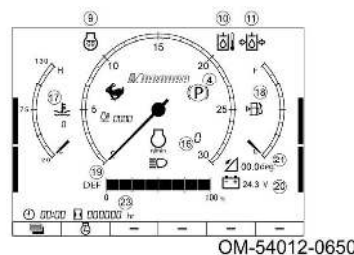
When the ambient temperature is low and the hydraulic oil temperature is "20°C" or less, hydraulic oil temperature warning lamp (10) is displayed until the engine starts and the hydraulic oil temperature rises to the specified value.

Hydraulic oil pressure warning lamp (11) stays displayed until the engine is started and hydraulic oil pressure rises to the specified value.

Engine glow lamp (9) continues to light up in cold weather conditions, and goes out when engine preheating process has finished.

Battery voltage drop lamp (12) stays displayed until the engine is started and the alternator starts generating electricity.

However, it may turn off depending on the battery charge status.

**NORMAL SCREEN (During engine running)**

After the engine is started, the following operation screen is displayed.

Engine speed meter (16) and engine water temperature gauge (17) indicate "current engine speed" and "current temperature" respectively.

It also displays the "current status" of fuel gauge (18), DEF residual quantity gauge (19), voltmeter (20), inclinometer (21), and hour meter (23).

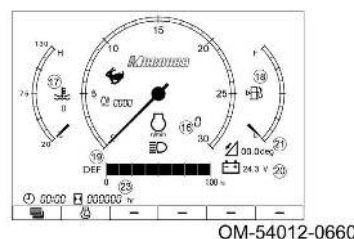
The parking brake lamp disappears from the above-mentioned normal standby screen when the parking brake switch is set to the "OFF" position in preparation for traveling.

The hydraulic oil temperature warning lamp (10) disappears from the above-mentioned normal standby screen when the engine is started and hydraulic oil temperature rises to "20°C" or higher.

Hydraulic oil pressure warning lamp (11) turns off from the above normal standby screen when the engine is started and hydraulic oil pressure rises enough.

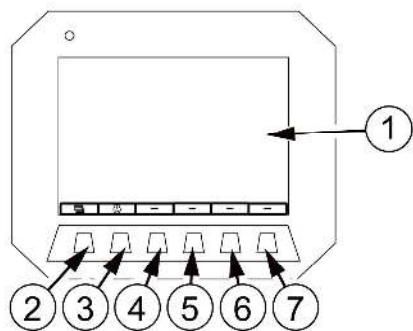
Battery voltage drop lamp (12) turns OFF on the above normal standby screen when the engine is started and the alternator starts generating electricity.

However, it may already be turned OFF depending on the battery charge status.



If an alarm lamp does not turn OFF even though the conditions for turning it OFF are met, or if an alarm pop-up not described in this chapter is displayed, stop the operation immediately and contact your distributor.

DESCRIPTION OF EACH SWITCH



OM-54012-0670

You can select the items shown at the bottom of the screen.

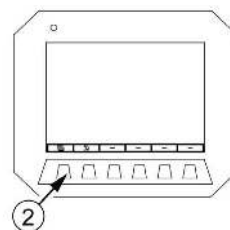
1. Screen
2. Menu switch
3. Auto-decel switch
4. No function is assigned.
5. No function is assigned.
6. No function is assigned.
7. No function is assigned.

MENU SWITCH ()

This switch is used to switch screens.

Seven changeover screens are available.

Pressing menu switch (2) changes the icon of each switch. For details, see "SWITCHING SCREEN DURING NORMAL OPERATION" section.

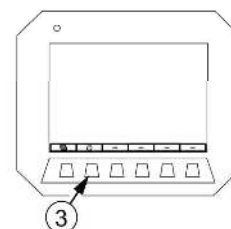


OM-54112-0610

AUTO-DECEL SWITCH ()

After turning the starting switch to the "ON" position and the "normal standby screen" is displayed on the screen, start the engine and press button (3) below the softkey () to switch enable/disable of the auto-decel.

* When the starting key is turned OFF and ON with the auto-decel is disabled, the auto-decel will be enabled.



OM-54112-0600

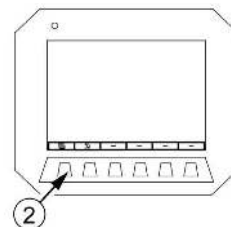
SWITCHING SCREENS DURING NORMAL OPERATION

The following 8 screens are available during normal operation.

1	Data	It displays current condition of pressure at each part and engine load.
2	Maintenance	It displays the operating hours of filters and oil at each part.
3	EDC Error	Check this screen when an error occurs in the electric control of the travel lever.
4	Error	If an error occurs, an error code will be displayed.
5	Crawler Mounting	This screen will not be described on this manual, as it is required by service personnel of the distributor. It is dangerous to change the contents, so please do not select it.
6	Time	It allows adjustment of current time.
7	Brightness	It allows to adjust the backlight brightness of the screen.
8	Language	It allows you to specify the language (Japanese or English) to be displayed on the "Data", "Maintenance", "EDC Error" screens and the pop-up display.

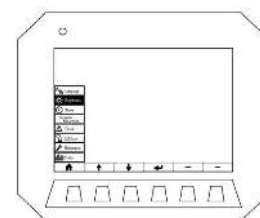
HOW TO SELECT MENU

- 1 After turning the starting switch to the "ON" position and the "normal standby screen" is displayed on the screen, start the engine and press button (2) below the softkey ().
- 2 The screen switches to the "Menu selection screen".
Press the button below the softkey () or (), move the cursor to the item you want to select, and press the button below the softkey ().



OM-54112-0610

Menu selection screen

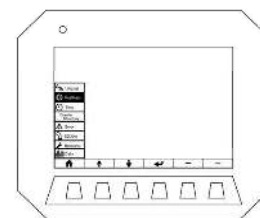


OM-54012-0690

HOW TO RETURN FROM EACH MENU TO THE NORMAL SCREEN

To return to the "Menu selection screen" from a current menu screen, press button below the softkey ().

Menu selection screen



OM-54012-0690

CONTENTS OF EACH MENU

(1) "Data screen"

On the "Data screen", the current conditions of respective items on the right figure are displayed numerically.

To return to the "Menu selection screen" from the "Data screen", press button below the softkey ().

Data screen

Data		
(A) 0.0bar LFポンプ圧力	(D) 0.0bar RFポンプ圧力	(G) 00.0°C 作動油温度
(B) 0.0bar LRポンプ圧力	(E) 0.0bar RRポンプ圧力	(H) 0.0bar チャージ圧
(C) 0.0bar エンジンオイル圧	(F) 0% エンジン負荷	(I) 00-00-00 00-00-00 Time
	-	-

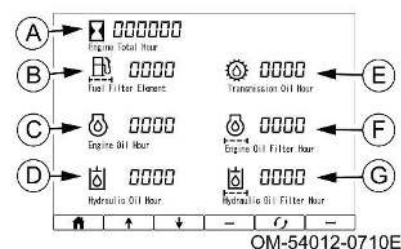
OM-54012-0700-1

- (A) Left front pump pressure
- (B) Left rear pump pressure
- (C) Engine oil pressure
- (D) Right front pump pressure
- (E) Right rear pump pressure
- (F) Engine torque
- (G) Hydraulic oil temperature
- (H) Charge pressure
- (I) Time

(2) "Maintenance screen"

The "Maintenance screen" displays the current operating hours of each display item on the right. Refer to these indications for the regular replacement timing of each item.

To return to the "Menu selection screen" from the "Maintenance screen", press button below the softkey (.

Maintenance Screen

- (A) Total engine operating hours
- (B) Elapsed time after replacement of fuel filter element
- (C) Elapsed time after changing engine oil
- (D) Elapsed time after changing hydraulic oil
- (E) Elapsed time after changing transmission oil
- (F) Elapsed time after replacement of engine oil filter
- (G) Elapsed time after replacement of hydraulic oil filter

After executing replacement of each display item on "Maintenance screen", set the operating hours of these display items to "0" by following the below procedures so that the next replacement time can be calculated.

(1) Press button under the softkey () or () to move the cursor to the corresponding item on the "Maintenance screen".

(2) Press and hold the button under the softkey (). The operating hours of the corresponding item is set to "0000".

Once the operating hour of a display item is set to "0", the original operating hour cannot be restored.

Take care when selecting a display item.

Among display items, the cursor does not move to "Total engine operating hours".

If the total engine operating time is shorter than the displayed item operating time, it is judged as abnormal and an error icon is displayed.

When the mark "" lights up next to the icon, immediately contact your distributor.

To switch display area to the "Normal operation screen" after checking the "Maintenance screen", press button under the softkey (.

Maintenance Screen
Error icon display example

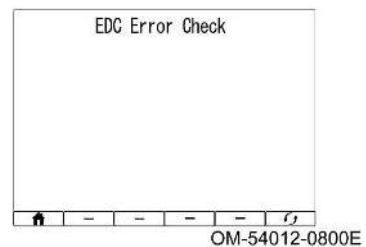


(3) "EDC Error screen"

Nothing is displayed on this screen during normal operation.

When an EDC error occurs, the monitor screen automatically switches to the EDC error screen.

During normal operation



When EDC Error occurs

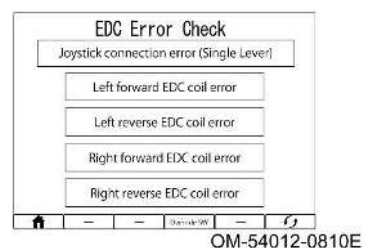
When an EDC error occurs, the monitor screen automatically switches to the EDC error screen.

When an EDC error occurs, the machine will be forced into a state where it cannot travel.

The following code is displayed when the disconnection of the EDC circuit is detected.

- Joystick connection error (1 lever): No input signal for the travel lever (disconnection) is detected.
- Joystick connection error (2 levers): No input signal for the travel lever (disconnection) is detected.

When EDC error occurs



If an above code is generated, please contact your distributor.

- Left forward: EDC coil error: The travel command for left forward is not output normally between the controller and the pump.
- Left reverse: EDC coil error: The travel command for left reverse is not output normally between the controller and the pump.
- Right forward: EDC coil error: The travel command for right forward is not output normally between the controller and the pump.
- Right reverse: EDC coil error: The travel command for right reverse is not output normally between the controller and the pump.

When the above code is displayed, operate the machine by referring to "HOW TO OPERATE OVERRIDE SW" in the next section.

HOW TO OPERATE OVERRIDE SW

The operation of this item is performed when the machine is out of order.
It is very dangerous because it may lead to a serious accident.
Be careful when operating the machine.

Press the button below the softkey (Override SW), it is possible to forcibly move the part where the circuit is not broken for emergency use.

When moving the machine, be sure to keep the engine speed at the lowest speed and operate while giving consideration to safety.

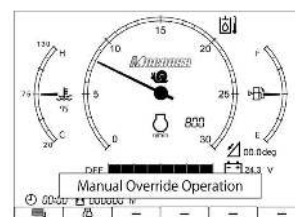
After stopping the machine in a safe place, please contact your distributor.

If you press the Override SW, the "Manual Override Operation" is displayed on the EDC Error check screen.

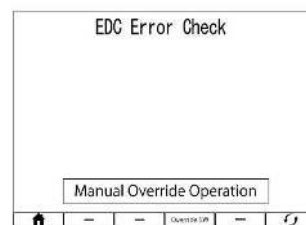
After the inspection and repair are completed, press the button below the softkey (↺).

If you set the starting switch key to "OFF" and then "ON" again, the "Manual Override Operation" and pop-up disappears and the forced release state is reset.

Override SW

Normal screen

OM-54012-0820

EDC error check screen

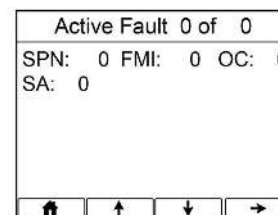
OM-54012-0830E

(4) "Error screen"

When the machine is operating normally, "0" is displayed for each item.

If an error occurs, an error code will be displayed.

If an error code is displayed, immediately contact your distributor.

Error Screen (Normal State)

OM-55012-0950

(5) SWITCH TO THE "TIME SCREEN"

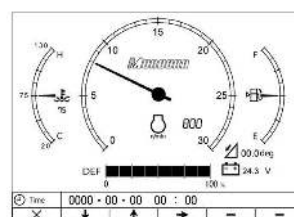
Press the button below (↑) or (↓) to adjust the date and time.

To adjust time after adjusting date, press button below (→).

You can change it in the order of year ⇒ month ⇒ day ⇒ hour ⇒ minute ⇒ year

The clock stops while the "Clock adjustment screen" is displayed. If you keep the "Clock adjustment screen" displayed, the clock will be delayed.

To return to the "Menu screen" from the "Time screen", press the button below the softkey (×).



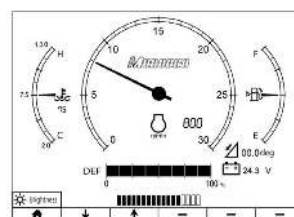
OM-54012-0840

(6) SWITCH TO THE "BRIGHTNESS SCREEN"

Press the button below (↑) or (↓) to adjust the brightness of the desired backlight.

As the graduation on the "Backlight adjustment chart" increases, the backlight brightness increases. The brightness of the backlight will decrease as you decrease the scale.

To return to the "Menu selection screen" from the "Brightness screen", press the button below the softkey (⏠).

Backlight adjustment screen

OM-54012-0850

(7) SWITCH TO THE "LANGUAGE SCREEN"

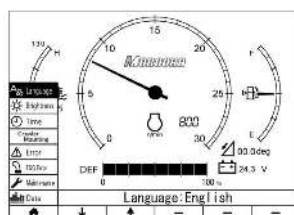
When the shipment of this machine, the language of the monitor display is set to English.

If you want to change the display language to Japanese, follow the below procedure.

If the display language is set to Japanese when shipping the machine from the factory, switch the language to English by following the below procedure.

The screen switches to the "Language screen", and at the same time, "Language: English" is displayed on the screen.

By pressing the button under the softkey (↑) or (↓) to change language.

Language selection screen (English)

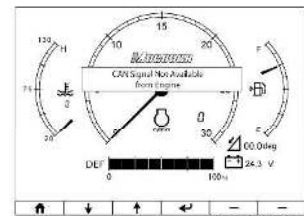
OM-54012-0860

Language selection screen (Japanese)

OM-54012-0870

(8) Others**▪ CAN COMMUNICATION ERROR**

If a CAN communication error appears on the display, immediately contact your distributor.

CAN communication error screen

OM-54012-0740E

SAFETY LOCK LEVER

WARNING

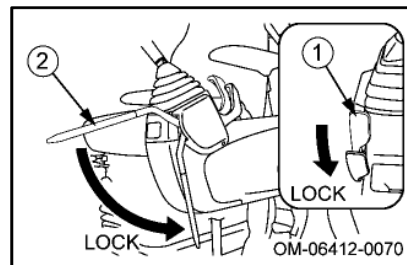
- Before leaving the operator's seat, be sure to stop the engine and set the safety lock lever to the "LOCK" position (the safety lock lever is lowered).
- Before starting the engine, be sure to set the safety lock lever to the "LOCK" position.
- When setting the safety lock lever to the "FREE" position with the engine running, take extra care not to touch the travel and dump control lever.

Use the safety lock lever to prevent the machine from moving even if the operator accidentally touch the travel and dump control lever when getting on and off the machine.

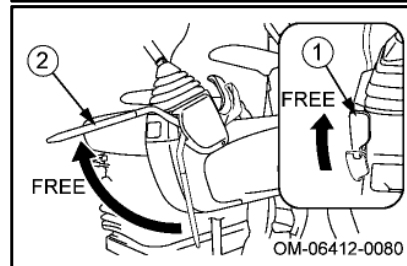
Further, setting the safety lock lever to the "LOCK" position, the safety lock bar is lowered, it facilitates the operator to get in and out of the operator's seat.

There are 2 operating positions, "LOCK" and "FREE".

LOCK : Move safety lock lever (1) downward. This disables operation of each control lever. In addition, since safety lock bar (2) is placed downward, this allows easy access to the operator's seat from outside the machine.



FREE : Move safety lock lever (1) upward. This enables operation of each control lever. Since safety lock bar (2) is raised, this makes it difficult to leave the operator's seat to go outside the machine.



★ The travel and dump control lever can be moved even when the safety lock lever is in the "LOCK" position. However, as their hydraulic circuits are blocked, the machine and dump body cannot be operated.

TRAVEL AND DUMP CONTROL LEVER

TRAVEL LEVER

WARNING

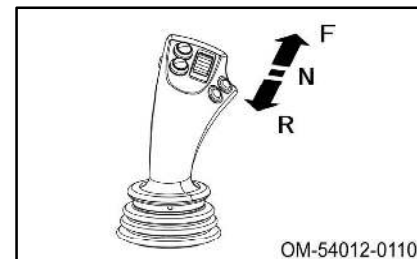
- If the travel lever is suddenly changed to forward or reverse, it may cause a great shock to the machine and body, it may result in a malfunction or injury.
- Always stop the machine before switching the travel lever between forward and reverse.
- Do not operate the travel lever by a large amount suddenly. Always operate them slowly.
- When stopping the machine, do not return the travel lever past the "N" (NEUTRAL) position. If the lever is moved past the "N" (NEUTRAL) position, it may give a big shock to the machine and operator's body, which may cause a malfunction or injury.
- Do not turn the machine at high speeds or make unnecessary spin turns. This will damage the crawler and hydraulic equipment, and there is also danger that the machine may hit other objects.

The travel lever is used for traveling the machine in forward/reverse, stopping, steering, and to control the travel speed.

The travel lever becomes heavier as they are operated in the direction of "F" (FORWARD) or "R" (REVERSE), and become lighter as it is operated back towards "N" (NEUTRAL). When the travel lever is operated to the "R" (REVERSE) direction, the reverse traveling buzzer sounds.

TRAVELING STRAIGHT OR STOPPING

- FORWARD: : Push the lever to the "F" (FORWARD) direction.
 REVERSE: : Pull the lever to the "R" (REVERSE) direction.
 STOP : Return the lever in the "N" (NEUTRAL) position.



* For detailed operation method, see "OPERATION" section (P.94116).

DUMP CONTROL DIAL

WARNING

- Before operating the dump body, be sure to stop the machine, make sure that there are no people around, and sound the horn.
- Position a signalman to ensure safety in the surrounding area and follow his/her signals when carrying out the dumping operation.
- Always operate the dump control dial slowly. Suddenly stopping the dump body or colliding it with the frame to unload the material may not only cause a malfunction but also impair the safety of the surroundings.
- When leaving the operator's seat with the dump body raised, use the safety bar to prevent the dump body from coming down.

DUMP CONTROL

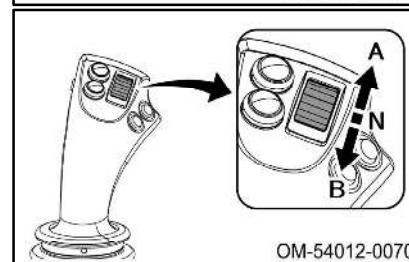
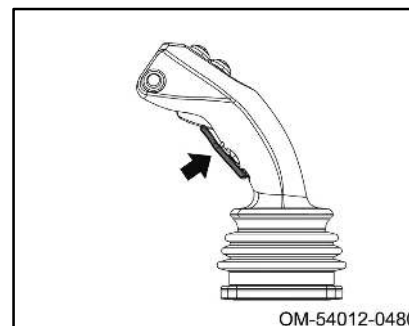
When operating the dump body, operate the dump control dial while holding the trigger of the travel and dump control lever.

A (DOWN) : The dump body is lowered.

N (NEUTRAL) : The dump body stops moving and holds the position.

B (UP) : The dump body is raised.

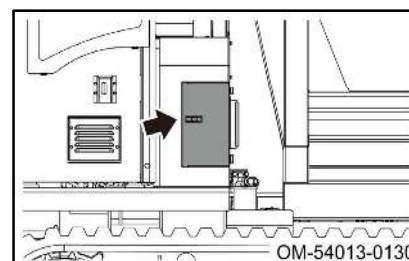
When the control dial is released, it automatically returns to the "N" (Neutral) position.



DUMP OPERATION IN AN EMERGENCY

In an emergency, the dump body can be directly operated by operating the lever of the control valve.

1. Open the buckle and open the cover.



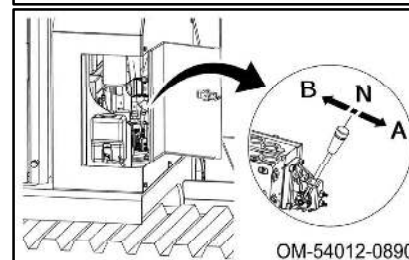
2. Operate the lever of the control valve.

A (DOWN) : The dump body is lowered.

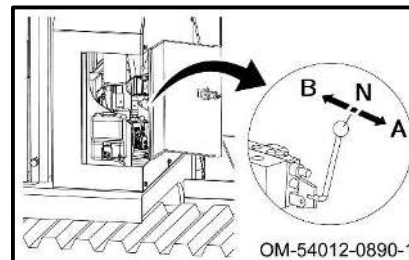
N (NEUTRAL) : The dump body stops moving and holds the position.

B (UP) : The dump body is raised.

When the lever is released, it automatically returns to the "N" (NEUTRAL) position.



#540001 ~ #540049



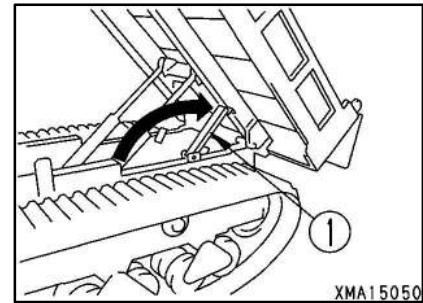
#540050 ~

SAFETY BAR

WARNING

- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- The safety bar is a safety device used during inspections and maintenance.
Do not use the safety bar to support the dump body when replacing equipment that holds the dump body such as the dump cylinder, valve, and hydraulic hoses. In such cases, always support the dump body with a crane.

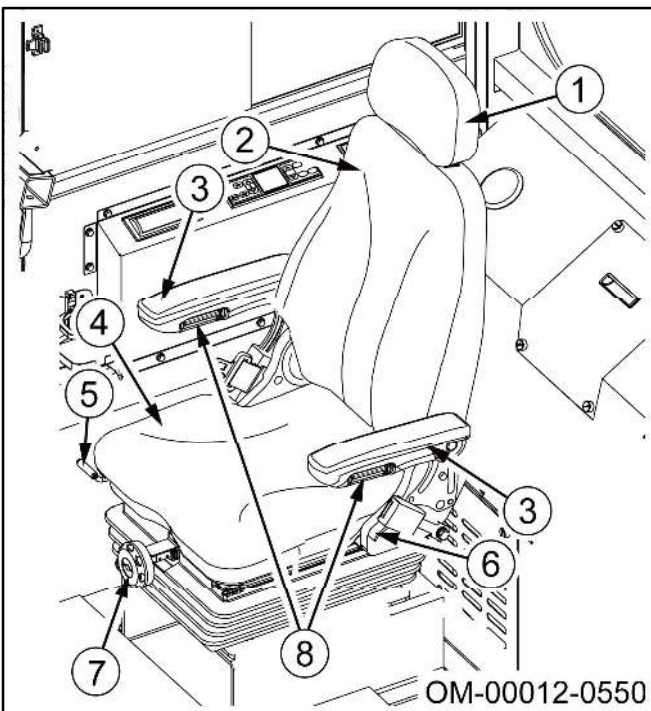
Safety bar (1) is a device used to ensure safety during operations. Always use the safety pin when going under the dump body to carry out inspection or maintenance work.



OPERATOR'S SEAT

⚠ CAUTION

- Adjust the operator's seat before starting operations. Always adjust the operator's seat after it has been used by another operator.
- Adjust the operator's seat so that you can operate the travel lever easily with your back against the seat's backrest.
- Never adjust the seat when traveling, swinging, or dumping the machine.
- Always lower the armrest and fasten the seat belt before starting operations. Otherwise, there is a risk that the operator may fall if the machine leans while traveling.



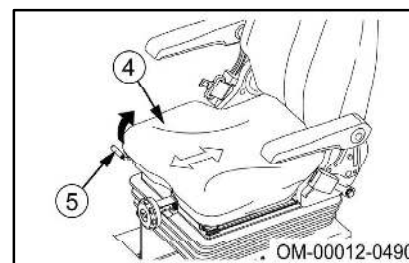
1. Headrest
2. Backrest
3. Armrest
4. Seat
5. Seat fore-and-aft adjustment lever
6. Reclining adjustment lever
7. Seat suspension adjustment dial
8. Armrest adjustment roller

SEAT FORE-AND-AFT ADJUSTMENT

Use seat fore-and-aft adjustment lever (5) to adjust the seat to the front or rear.

Sit in the operator's seat and move seat (4) back and forth while pulling up the lever (5).

After adjusting the seat, release lever (5) and lock the backseat in position.



RECLINING ADJUSTMENT

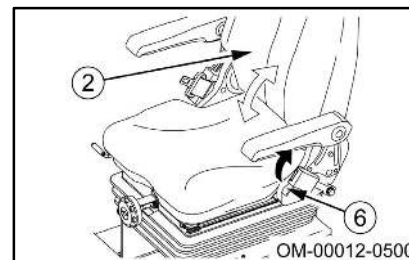
Use reclining adjustment lever (6) to adjust the reclining angle.

Sit in the operator's seat and tilt the backrest back and forth with lever (6) pulled up.

Tilt forward: Keep your back off from the backseat (2).

Tilt backward: Push the back sheet (2) with your back.

After adjusting the seat, release lever (6) and lock the backseat in position.

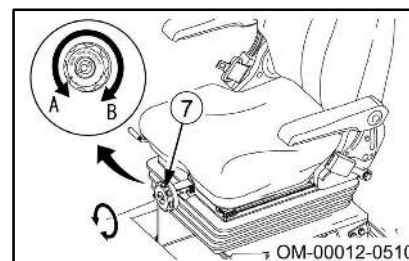


SEAT SUSPENSION (HARDNESS) ADJUSTMENT

You can adjust the stiffness of the seat to be optimal for your weight by using dial (7).

Get up from the operator's seat, turn dial (7) to the right or left, and adjust the indicator on dial (7) to your weight.

- Turn in the A direction : The weight value of the indicator becomes smaller.
- Turn in the B direction : The weight value of the indicator becomes larger.

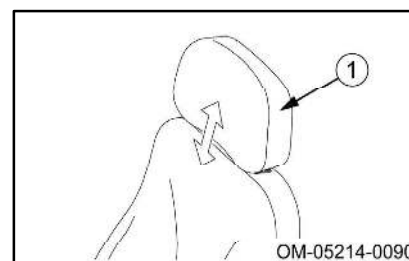


HEADREST ADJUSTMENT

Headrest (1) can be adjusted up and down.

Move headrest (1) up and down.

You can remove it by moving it all the way up.

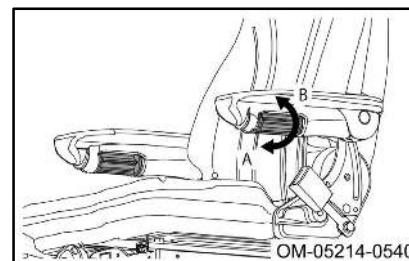


ARMREST ADJUSTMENT

You can change the angle of the armrest by turning the rollers under the left and right armrests.

The operation method is the same for both left and right.

- Turn in the A direction : The armrest goes up.
- Turn in the B direction : The armrest goes down.

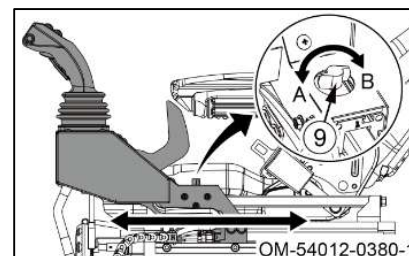


SLIDE ADJUSTMENT OF TRAVEL LEVER STAND

You can adjust the position of the travel lever stand on the left side.

Turn lock (9) in the A direction and slide the travel lever stand.

After adjustment, be sure to turn lock (9) in the B direction to fix the travel lever stand to prevent it from moving.



SEAT BELT

WARNING

- Before fastening the seat belt, always check that there are no abnormalities in the belt mount or seat belt clamps.
If there is any wear or damage, always replace the seat belt with a new one.
- Always adjust and fasten the seat belt before starting operations. Otherwise, there is a risk that the operator may fall if the machine leans while traveling.
- Do not wear twisted seat belt.

NOTICE

When the seat belt has been used for a long period, and the belt is damaged or starting to become fluffy, or if the tongue/clamps are broken or distorted, replace with a new seat belt.

FASTEN AND UNFASTEN THE SEAT BELT

1. Sit in the operator's seat, push your back against the backrest, and adjust the operator's seat to a position where it is possible to operate the travel lever easily. See "OPERATOR'S SEAT" in "EXPLANATION OF COMPONENTS (P. 78)".

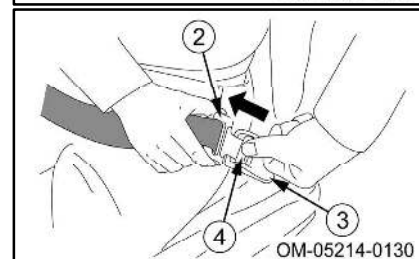
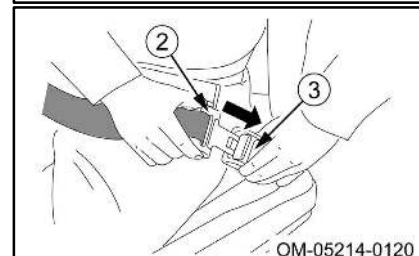
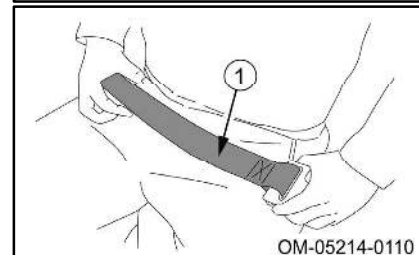
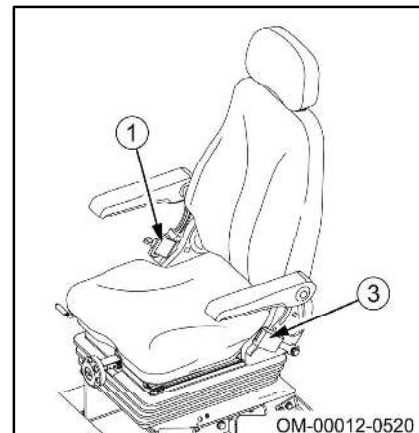
2. Hold tongue (2) of seat belt (1) by hand and pull out seat belt (1) slowly.

3. Fit seat belt (1) as low as possible across your hips and fit it to your body so that there is no slack.

4. Insert tongue (2) into buckle (3) so that seat belt (1) is not twisted.

5. Pull seat belt (1) and check that tongue (2) and buckle (3) are securely locked.

6. When removing seat belt (1), push in tip (4) of buckle (3) and pull out tongue (2).

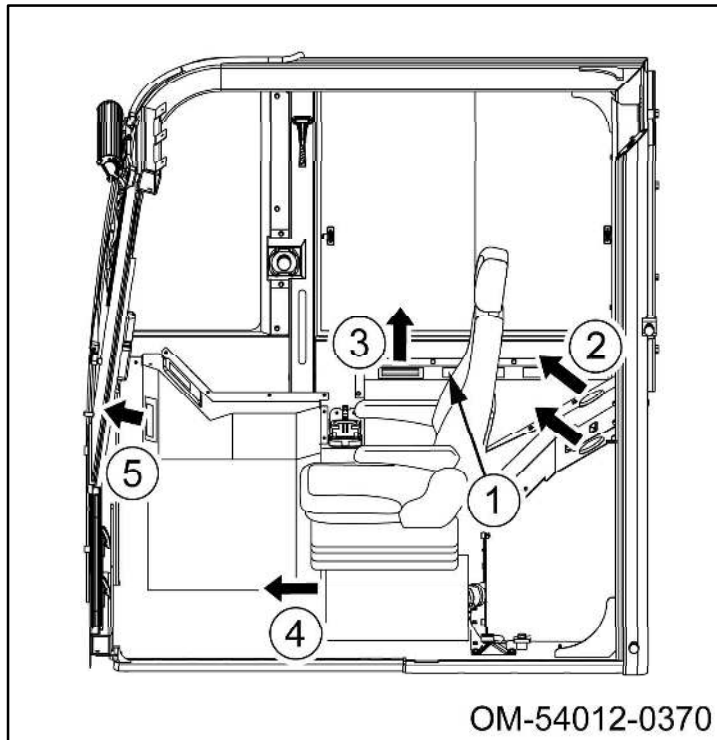


AIR CONDITIONER

NOTICE

- When using an air conditioner, never make sudden rapid high-speed rotation of the engine. Doing so may cause a failure.
- Do not bring any flame close to the controllers.
- Clean the air conditioner filters as often as possible. A clogged filter reduces the efficiency of the air conditioner and may leads to a failure.

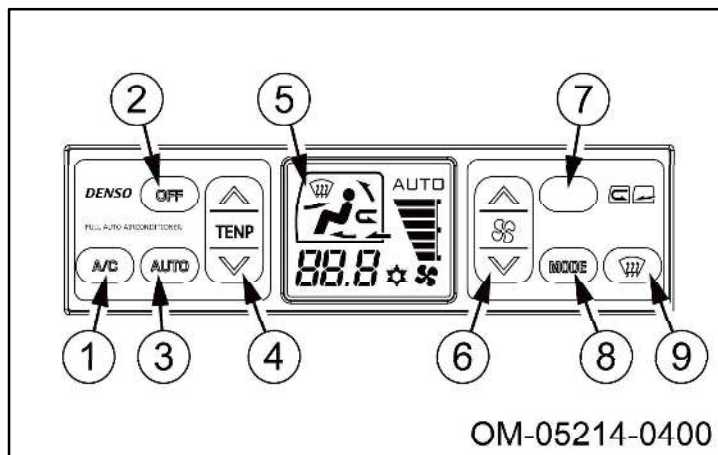
LOCATION OF VENTS



1. Control panel
2. Rear vent
3. Vent for operator
4. Foot vent
5. Defroster

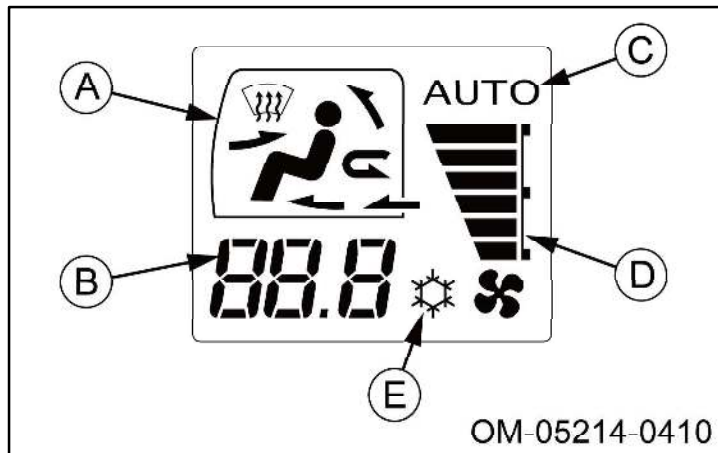
The direction of the wind blowing out of the vents can be adjusted by changing the direction of the louvers. In addition, the louvers can be opened or closed manually.

PARTS ON CONTROL PANEL



1. A/C switch
2. OFF Switch
3. Auto switch
4. Temperature control switch
5. LCD display
6. Blower switch
7. FRESH/RECIRC selector switch
8. Vent selector switch
9. Defroster switch

LCD DISPLAY (5)



- (A) FRESH/RECIRC, Blow-out mode display
- (B) Temperature display
- (C) Auto display
- (D) Blower mode display
- (E) A/C display

- FRESH/RECIRC, Blow-out mode display(A)

Displays the currently set mode.

• FRESH/RECIRC mode display : Circulated mode 

Fresh air mode 

• Blow-out mode display : FACE1 
FOOT/Defroster 
Defroster 

FACE2 
B/L 
FOOT 

- Temperature display (B)

Displays the current set temperature.

- Auto display(C)

Lights up when the blower is auto and the blow-out is auto.

- **Blower mode display (D)**
Displays the currently set blower mode.
- **A/C display (E)**
It lights up when the A/C switch is ON, and goes out when the A/C switch is OFF. It also lights up when the auto switch and defroster switch are ON.

A/C SWITCH (1)

Switches the cooling and dehumidifying function ON/OFF.

OFF SWITCH (2)

Press this switch to turn the blower off.

Auto SWITCH (3)

Press this switch to start full-auto control.

TEMPERATURE CONTROL SWITCH (4)

Use this switch to change the set temperature. Press the upper side of the switch to increase the set temperature, and press the lower side to decrease the set temperature.

BLOWER SWITCH (6)

Use this switch to change the manual steps (air volume) of the blower. Press the upper side of the switch to increase the air volume, and press the lower side to decrease the air volume.

FRESH/RECIRC SELECTOR SWITCH (7)

This switch is used for switching between recirculation of the internal air and intake of outside fresh air.

VENT SELECTOR SWITCH (8)

This switch is used for selecting the vent. Each time the switch is pressed, the vent will switch as shown below.
FACE1→FACE2→B/L→FOOT→FOOT/DEFROSTER....

After FOOT/ DEFROSTER, it returns to FACE1 and repeats in the same order.

DEFROSTER SWITCH (9)

This switch is used for blowing air out from the defroster. If this switch is pressed again during the defroster blow-out mode, the defroster mode turns OFF and switches to the previous set mode.

RADIO

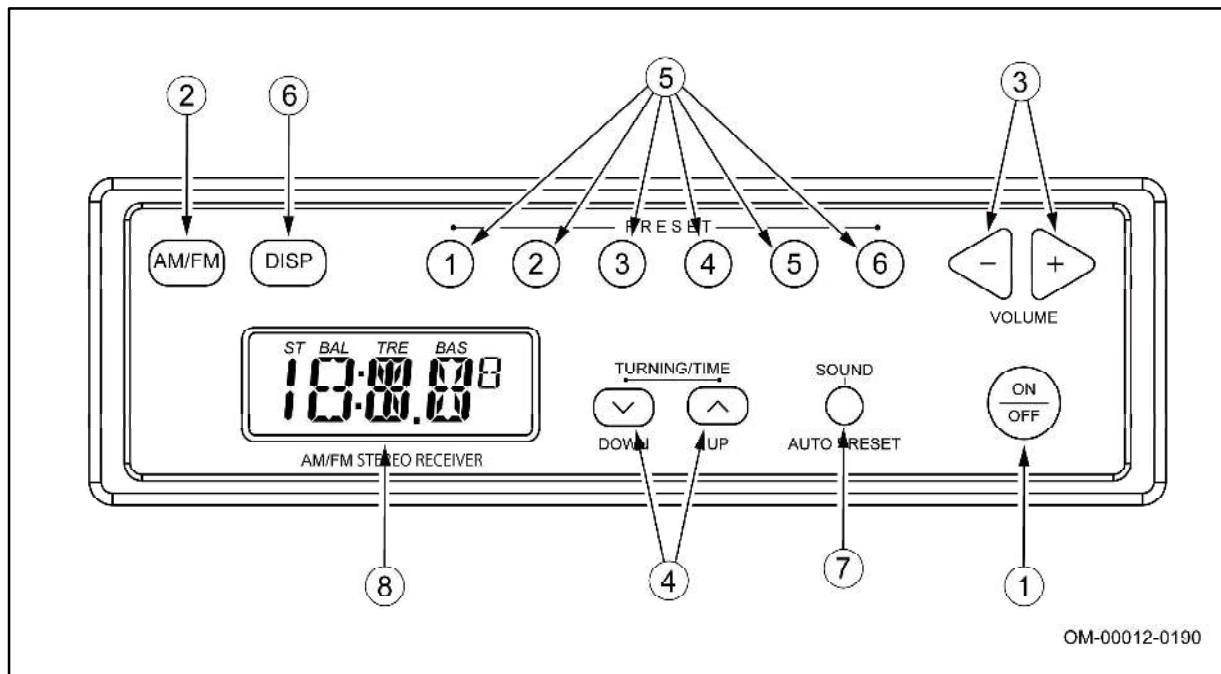
EXPLANATION OF BUTTONS

NOTICE

The radio can be used when the starting switch is in the "ON" position.

If the radio is operated with the engine stopped, the battery will be discharged, and it may be impossible to start the engine.

Always run the engine when using the cameras.



(1) Power button [PWR]

- Press this button to turn the power ON/OFF.

(2) Band button [AM/FM]

- Press to change bands (AM/FM) while in the radio mode.

(3) Volume adjustment button [+/-]

- Press this button to adjust the volume.

(4) Station selection button [UP] [DOWN]

- Press this button to switch frequencies, adjust steps during sound adjustment, and adjust time.

(5) Station selection button [PRESET] (1 to 6)

- Press the button to store radio stations in the memory or recall the stored stations while in radio mode.

(6) Display and clock button [DISP]

- Press this button to switch the display (Frequency/Time)
- Press and hold it to switch to the clock setting mode.

(7) Sound adjustment button [SOUND]

- Press this button to adjust the sound parameters (Balance/Bass/Treble).

(8) Display

- An item corresponding to the set mode is displayed.

BASIC OPERATIONS

CAUTION

Be sure to lower the volume before switching OFF the radio power or turning the starting switch to the "OFF" position.

The unit remembers its last volume setting.

[1] TURNING POWER ON/OFF

1. Press power button (1) while the power is off to turn the power ON.
2. Press power button (1) while the power is on to turn the power OFF.

[2] ADJUSTING THE VOLUME

Press volume control button (3).

- Press [+] button to raise the volume.
Press and hold to turn the volume up continuously.
- Press [-] button to lower the volume.
Press and hold to turn the volume down continuously.

[3] SWITCHING THE DISPLAY

Press display and clock button (6) to select the desired display.

[4] SETTING THE CLOCK

1. Press and hold the display and clock button (6) while the clock is displayed. The "Hour" part of the time flashes on the display screen.
2. Press [] or [] of station selection button (4) to set the time.
 - The clock is displayed in "12-hour" format.
3. After completing the settings, press display and clock button (6). Next, the "Minute" part of the time flashes.
4. Press [] or [] of station selection button (4) to set the time.
5. Press display and clock button (6). This is the end of the time setting.

[5] SOUND PARAMETERS ADJUSTMENT

Press the sound adjustment button (7) to enter the sound adjustment state.

Each time the sound adjustment button (7) is pressed, the adjustment items switch from BAL to TRE to BAS.

Press sound adjustment button (7) in the BAS state to exit from the sound adjustment menu.

(1) Adjusting the BALANCE

1. Press sound adjustment button (7) and select "BAL".
2. Press the [] or [] of station selection button (4) to adjust sound balance.
 - Press the [] button to make the R speaker output larger than the L output.
 - Press the [] button to make the L speaker output larger than the R output.
 - The factory default setting is "0".

(2) Adjusting the TREBLE

1. Press sound adjustment button (7) and select "TRE".
2. Press the [▲] or [▼] of station selection button (4) to adjust the treble.
 - Press the [▲] button to enhance the treble.
 - Press the [▼] button to reduce the treble.
 - The factory default setting is "0".

(3) Adjusting the BASS

1. Press sound adjustment button (7) and select "BAS".
2. Press the [▲] or [▼] of station selection button (4) to adjust bass.
 - Press the [▲] button to enhance the bass.
 - Press the [▼] button to reduce the bass.
 - The factory default setting is "0".

RADIO OPERATIONS**[1] CHANGING THE RECEPTION AREA**

The radio is initially set to the Australian or European frequency interval (9 kHz for AM, 50 kHz for FM).

When using it other than Australian or European, the frequency reception range should be switched to the intervals below.

		Japanese standard [kHz]	U.S. standard [kHz]	Australian/European standard [kHz]
AM	Frequency interval	9	10	9
	Frequency range	522 to 1629	530 to 1710	522 to 1629
FM	Frequency interval	100	200	50
	Frequency range	76. 0 to 90. 0	87. 5 to 107. 9	87. 50 to 108. 00

[2] SETTING THE RECEPTION AREA

Press and hold the band button (2) and [+] of the volume control button (3) at the same time for 5 seconds while power OFF state to enter the reception area setting mode. Press the [▲] or [▼] station selection button (4) to switch "Japanese standard" to "Australian/European standard" to "U.S. standard".

- Press the sound adjustment button (7) to confirm the changes and the memory will be reset.
- The reception area setting mode ends when there is no key operation for 10 seconds or when the power is turned ON.

[3] SELECTING BAND (AM/FM)

Press the band button (2) and select the desired radio band (FM/AM).

Each time the band button (2) is pressed, the band changes as follows:

- FM1 → FM2 → AM → FM1....

[4] TUNING

3 tuning modes are available: seek tuning, manual tuning and preset tuning.

(1) Auto seek tuning

Press and hold the [▲] or [▼] of button (4). Auto seek tuning will start.

When [▲] of station selection button (4) is pressed, the station is sought in the direction of higher frequencies.

When [▼] of station selection button (4) is pressed, the station is sought in the direction of lower frequencies.

(2) Manual tuning

Press and the [▲] or [▼] of station selection button (4). Manual channel selection will start.

(3) Auto preset method

The auto preset function detects frequencies with good reception and automatically registers them in the preset memories [1] to [6].

1. Press the band button (2) and select the desired radio band (FM/AM).
2. Press and hold the sound adjustment button (7) to start auto presetting.

(4) Recalling a preset station

Press one of a direct station selection button (5) ([1] to [6]). The stored station frequency will automatically be selected.

(5) Manual preset memory method

Press one of a desired preset station button (5) ([1] to [6]). The frequency being received is stored in the corresponding preset number.

WIND SHIELD

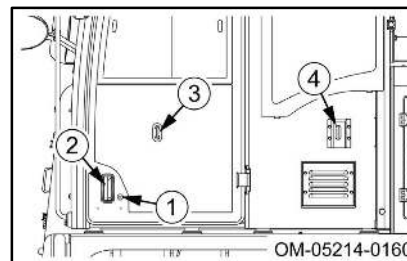
OPENING AND CLOSING CAB DOOR

CAUTION

When keeping the door open, open the door until it is locked securely in the latch on the cab.

METHOD OF OPENING DOOR WHEN GETTING ON MACHINE

1. Unlock the door by using a key.
2. Pull door handle (2) and open the door.
3. Open the door fully and push door hook (3) into latch (4).



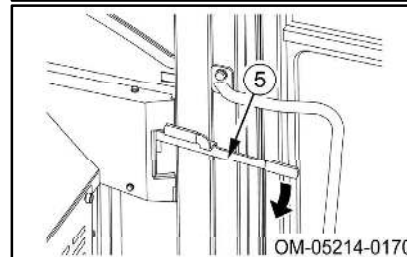
METHOD OF RELEASING DOOR LATCH

CAUTION

When keeping the door open, open the door until it is locked securely in the latch on the cab.

Push door catch release lever (5) down.

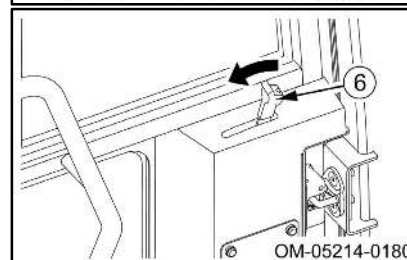
This releases the door latch, allowing you to close the door.



METHOD OF OPENING DOOR WHEN GETTING OFF MACHINE

Pull lever (6) in the door handle.

This releases the door lock, allowing you to open the door.



OPENING AND CLOSING LEFT WINDOW IN THE CAB

CAUTION

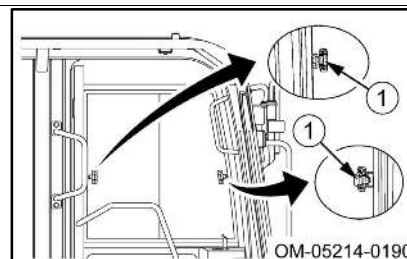
Never put your head or hands outside the window.

If your head or hands are outside the window when loading, there is a danger of them being hit by falling objects.

The left window can be opened or closed by sliding it.

To open the window, pinch lock (1) to unlock it and slide the window.

To close the window, hold lock (1) and slide the window.



OPENING AND CLOSING RIGHT WINDOW IN THE CAB**⚠ CAUTION**

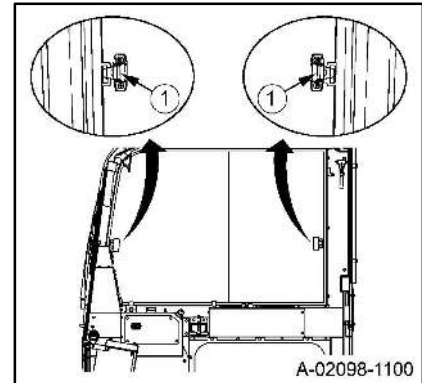
Never put your head or hands outside the window.

If your head or hands are outside the window when loading, there is a danger of them being hit by falling objects.

The right window can be opened or closed by sliding it.

To open the window, pinch lock (1) to unlock it and slide the window.

To close the window, hold lock (1) and slide the window.



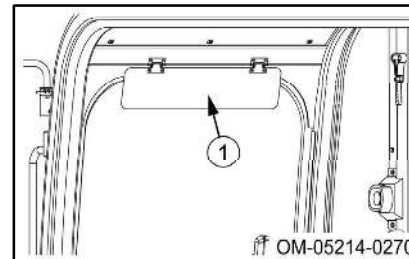
ACCESSORIES INSIDE CAB

SUN VISOR

Sun visor (1) is located above the front window of the cab.

Tilt sun visor (1) toward you and adjust the angle to block the sunlight.

When not in use, lay it down on the ceiling side.



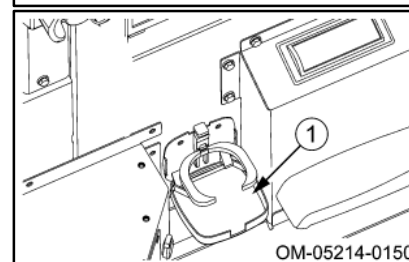
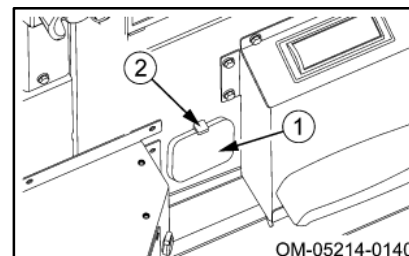
DRINK HOLDER

Drink holder (1) is located on the rear of the control panel box on the right side of the operator's seat.

Use this to hold beverage cans or PET bottles.

To use the drink holder (1), press button (2) at the top of drink holder (1). It opens drink holder (1).

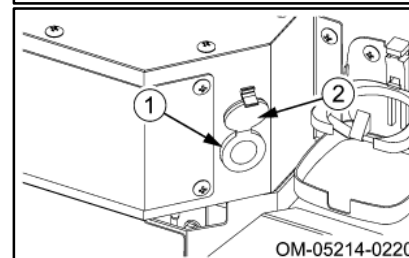
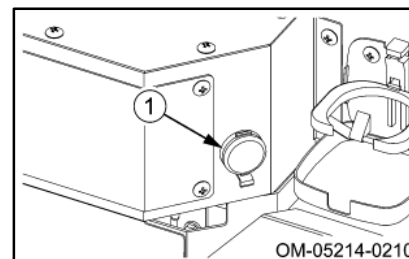
To close drink holder (1), return drink holder (1) to the original position and push it in.



24V POWER SOCKET

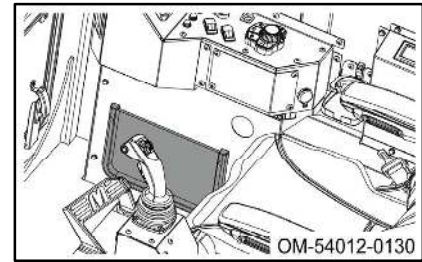
Power socket (1) is located on the rear of the control panel box on the right side of the operator's seat.

Open lid (2) when using. Keep the lid closed when it is not in use.



GLOVE COMPARTMENT

Use this to keep small objects.



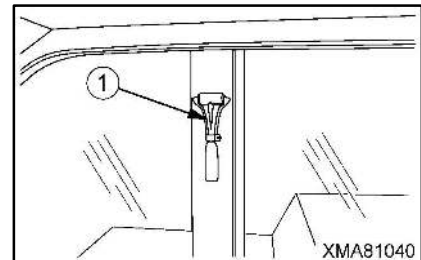
EMERGENCY ESCAPE HAMMER (HOW TO ESCAPE IN AN EMERGENCY)



WARNING

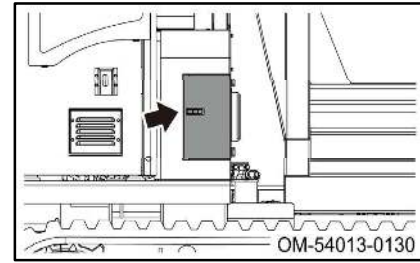
- In an emergency, if the cab door cannot be opened, break the window glass with an emergency escape hammer and escape from the machine.
- Always wear safety glasses when breaking the window. Always keep safety glasses inside the cab for use in emergencies.

If the cab door cannot be opened in an emergency, break the front, left or right window glass with emergency escape hammer (1) Installed in the center of the right side of the cab to escape from the machine.

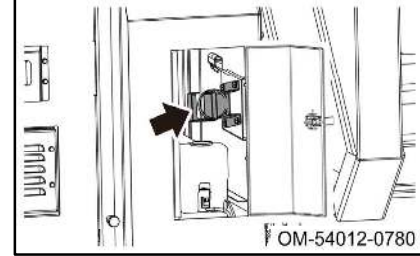


GREASE GUN HOLDER

1. Open the buckle and open the cover.



2. Insert the grease gun and fix it with a band.



OPERATION

CHECKS BEFORE STARTING ENGINE	95
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CHECKS BEFORE STARTING ENGINE

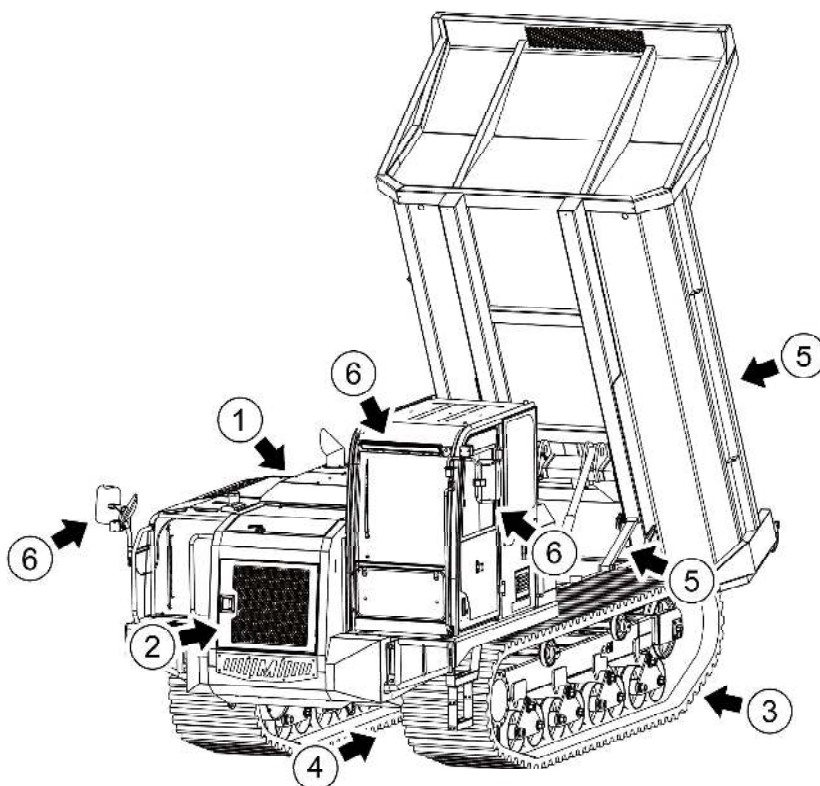
VISUAL INSPECTION

WARNING

- Thoroughly check the muffler, turbocharger, and other engine parts which reach high temperatures and around the battery for dead leaves, wastepaper, oil, grease, and other flammable items. These flammable items can cause a fire.
- Thoroughly check the hydraulic and fuel hoses for oil and fuel leaks. If any cracks, deformation, or other abnormalities are found, repair them immediately. These problems can cause a fire, travel failure, or problems with raising or lowering the dump body.
- Always use the handrails and steps when getting on or off the machine.

Before starting the engine at the beginning of the day's work, look under and around the machine to check the following points.

- Check for dead leaves, wastepaper, dust, oil, or grease at places which reach high temperatures.
- Check for loose or missing bolts, nuts, or connecting pins.
- Check for oil, fuel, or coolant leaks.
- Check for hanging electrical wires or loose connections.



OM-54012-0400

(1) Check around engine

Check for dead leaves, wastepaper, dust, oil, grease, or other flammable items, and check for fuel, oil, or coolant leaks from the engine. Remove any flammable items and repair any abnormalities.

Check for hanging electrical wires, loose connections, or signs of burns around the starting motor, alternator, battery, and battery relay. Repair any abnormalities.

(2) Check inside front grille

Check the front surface of the radiator, oil cooler, and intercooler for dead leaves, wastepaper, dust, or other flammable items or materials which can cause clogging. If they are attached, remove them.

(3) Check undercarriage

Check rubber crawlers, truck rollers, carrier rollers, idlers, and sprockets for any cracks, breaks, or wears. Check bolts and nuts for any loose or missing. Tighten if necessary and repair any abnormalities.

Also, if there is a stone bite in the rubber crawler, remove it.

(4) Check under machine

Check the ground for any leak signs of oil, fuel, cooling water, and DEF, and check for leaks from the hydraulic oil tank, fuel tank, and DEF tank. Inspect the area above the leak sign and repair any abnormalities.

Check bolts and nuts on under covers for loose or missing and tighten if necessary.

(5) Check dump body, safety bar

Check for any wear, breaks, or cracks. Check for any loose or missing nuts, bolts, or connecting pins. Tighten if necessary and repair any abnormalities.

Check for any leakage of oil from the hydraulic hoses or hydraulic cylinders, and repair any abnormalities.

(6) Check mirrors, lamps, control parts, and instrument panel

Check for any damage to the mirrors, lamps, meters, or monitor panel, and repair or replace if there is any abnormality.

CHECK COOLANT LEVEL AND ADD WATER

WARNING

Allow the engine and radiator to cool before starting work. Boiling water may spurt out and cause burns. Be careful when removing the radiator cap.

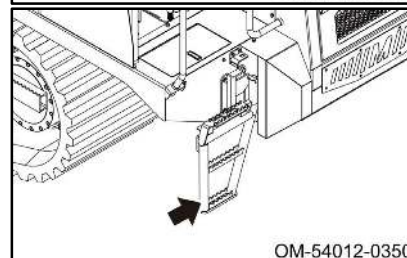
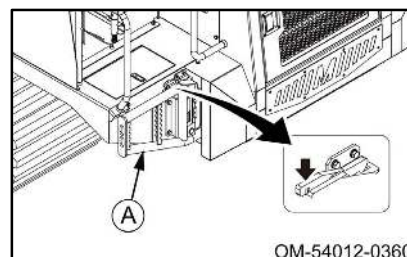
- Wait for the water temperature to cool down before starting works.
- Turn the radiator cap slowly to release the internal pressure completely, then remove the radiator cap.

The coolant is flammable, so never put it close to a fire.

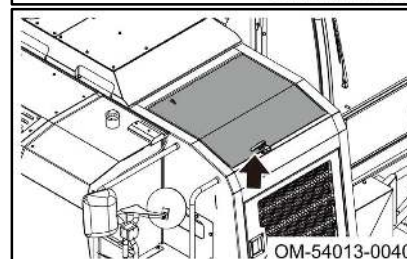
NOTICE

If the result of the coolant level check shows that more water must be added than usual, there is probably a water leak, so search for the cause and repair the problem immediately.

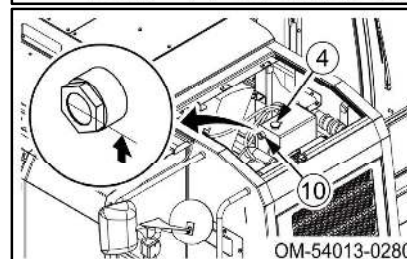
- 1 While holding step (A) by hand, push the lever down to slowly expand step (A).
Step on the expanded steps and get in the machine.



- 2 Twist the handle and open the cover.



- 3 Check the amount of cooling water with level gauge (10) of the reserve tank. If the amount of cooling water is insufficient, slowly turn cap (4) to remove it and replenish the cooling water.



- 4 After adding coolant, tighten cap (4) of the reserve tank securely.

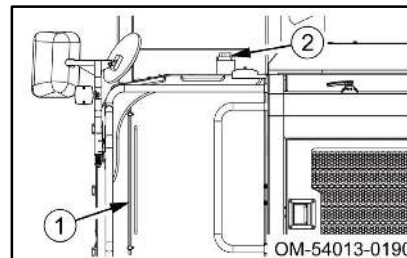
OPERATION

- 5 After finishing the work, close the cover in the reverse order of opening it.

CHECK FUEL LEVEL AND ADD FUEL IF NECESSARY **DANGER**

When adding fuel, never let the fuel overflow from the tank. Otherwise, this can cause a fire.

- 1 Check the fuel level with level gauge (1) at the side face of the fuel tank.
If fuel has not been filled up, refill fuel.
- 2 Release the lock on the cap (2) with a key and remove cap (2) from the fuel tank and add fuel through the fuel filler port.
- 3 Check the breather hole on the inside of the cap, and if it is clogged, wash it.
- 4 After adding fuel, tighten cap (2) securely and lock up it with a key.
 - Use ultra-low sulfur diesel fuel (light oil with sulfur content of 10 ppm or lower) as fuel.
 - Always fill the fuel tank after completing the day's operation.



CHECK DEF LEVEL, ADD DEF IF NECESSARY

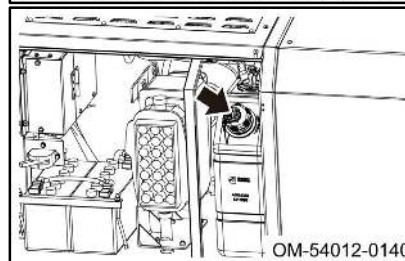
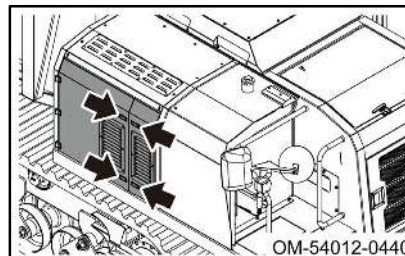
WARNING

- Remodeling or removal of a part of the aftertreatment system is prohibited by law. It is also prohibited by law to use DEF that does not meet the specifications, and to operate a machine or device without DEF is strictly prohibited.
- Be sure to prevent any DEF from entering your eyes. In case it get in your eyes, rinse with tap water for at least 15 minutes and seek medical attention.
- Do not swallow DEF. If you accidentally swallow some, consult your doctor immediately.

CAUTION

- Do not expose your skin to DEF for long periods. If such exposure occurs, clean affected skin immediately using soap. If you do not remove DEF immediately, it will dry and be difficult to remove.
- Do not mix urea for agricultural use with water to use it as a substitute for DEF. If agricultural urea does not meet the required specifications, the aftertreatment system can be damaged.
- When refilling the DEF, set the starting switch key to the "OFF" position.
- If DEF overflows from the DEF tank while you are refilling, wipe off using a cloth. If you neglect to carry out cleaning, the resulting situation can be diagnosed as a system error.

- 1 Check the DEF residual quantity on the monitor display. See "DEF RESIDUAL QUANTITY GAUGE" in "MONITOR DISPLAY" in the "EXPLANATION OF COMPONENTS" section on page 65. And check the DEF level warning lamp on the console box. See "DEF RESIDUAL QUANTITY WARNING LAMP (ORANGE)" in the "EXPLANATION OF COMPONENTS" section on page 49. If DEF has not been filled up, refill DEF.
- 2 Open the buckle and open the cover.
- 3 Remove cap from the DEF tank and add DEF through the filler.
- 4 Check the breather hole on the inside of the cap, and if it is clogged, wash it.
- 5 After adding DEF, close the cap securely.
 - Use a DEF that meets ISO 2241-1.
 - Always fill the DEF tank after completing the day's operation.

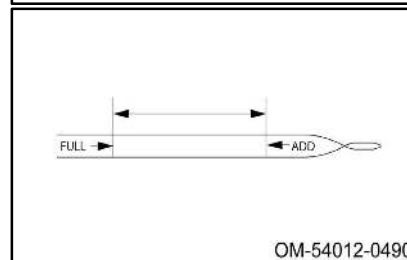
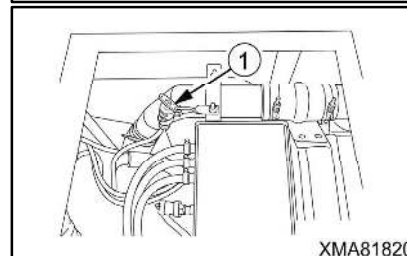
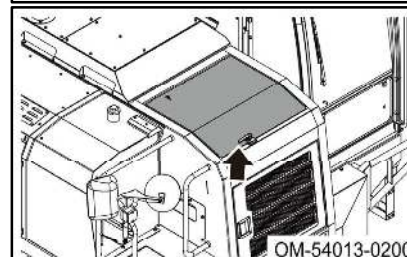
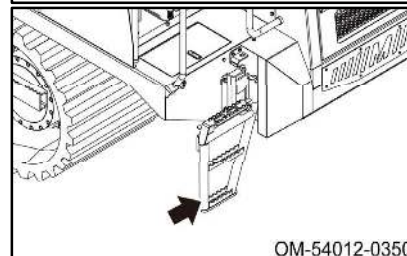
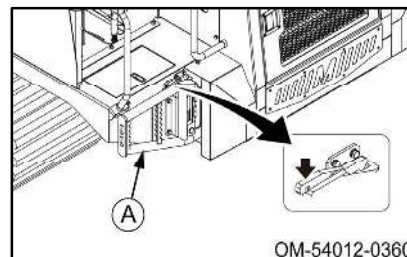


CHECK ENGINE LUBRICATING OIL LEVEL, ADD OIL IF NECESSARY**⚠ WARNING**

Do not spill oil. Otherwise, it may cause a fire.
 If it spills, wipe it off completely.
 Stop the engine and wait for the oil temperature to cool down.

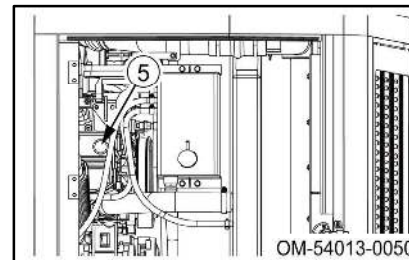
• CHECK OIL LEVEL

- 1 While holding step (A) by hand, push the lever down to slowly expand step (A).
 Step on the expanded steps and get in the machine.
- 2 Twist the handle and open the cover.
- 3 Pull out dipstick (1) wipe the oil off with a cloth.
- 4 Insert dipstick (1) fully into the gauge guide, then pull it out again.
- 5 The oil level should be between the “ADD - FULL” range on the dipstick. If the oil level is below the “ADD - FULL” mark, add engine oil.
- 6 Insert dipstick (1) fully into the gauge guide.



▪ **ADDING OIL**

- 1 Remove oil filler cap (5) and add engine oil.
 - For details of engine oil, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE" in the "MAINTENANCE" section on page 149.
 - Use a container with an attached hose when filling with oil.
 - 2 After adding oil, check the oil level again to check that the oil level is in normal range.
When the oil level is in normal range, close filler cap (5) securely.
- After finishing the work, close the cover in the reverse order of opening it.



DRAIN WATER AND SEDIMENT FROM WATER SEPARATOR

WARNING

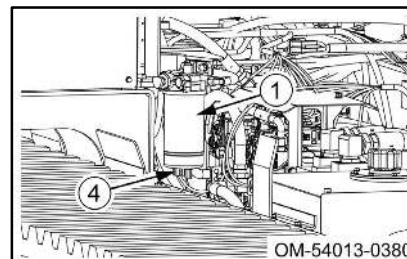
Keep away from fire such as cigarettes and writers while bleeding air from the fuel filter. Also, be sure to stop the engine before bleeding air. Otherwise, this can cause a fire.

CAUTION

- The fuel filter is hot right after the engine is stopped, thus there is a danger of burns if you start work immediately after stopping the engine. Wait for the engine to cool down before starting work.
- If oil is spilled or adhered to the surrounding area, wipe it off immediately. Otherwise, this can cause a fire.
- During the air bleeding work of the fuel filter, the work space is small, so be careful not to get injured by the edges of surrounding parts.
- Make sure there are no fuel leaks around the water separator. Leaking fuel can cause a fire.

NOTICE

- If the engine warning lamp lights up during operation, check if water has accumulated in the water separator, and if water has accumulated, drain the water immediately.
 - While draining the water, fuel flows out from the drain plug and adheres to surrounding parts. Attach a hose to the drain plug and let it flow into the container that receives the fuel.
- The water separator is located on the inner surface of the left side of the main frame (rear left side of the engine).
 - Set a container to receive fuel under the water separator.
- 1 Loosen drain valve (4) on the underside of water separator (1) about "3 1/2 turns" to the left (counterclockwise).
Sediment accumulated at the bottom of the water separator and water are drained together.
 - 2 After draining water and sediment, turn drain valve (4) on the bottom of water separator (1) to the right (clockwise) to close drain valve (4).



DRAIN WATER AND SEDIMENT FROM FUEL TANK

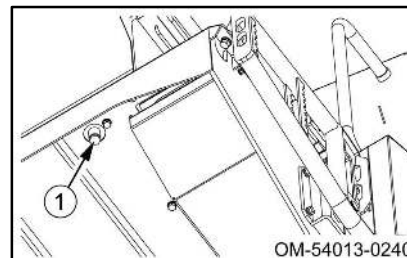
CAUTION

Keep away from fire.

If any fuel leaks or overflows, always wipe it up immediately. If fuel gets on any high-temperature part, it can cause a fire.

Place a container under the fuel tank to catch the fuel.

- 1 Slightly turn drain plug (1) at the bottom of the fuel tank counterclockwise. Sediment accumulated at the bottom of the tank and water are drained together.
- 2 After completely draining the sediment and water, tighten plug (1) under the fuel tank.

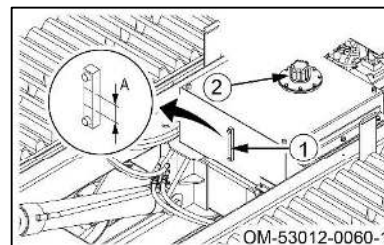


CHECK OIL LEVEL IN THE HYDRAULIC OIL TANK, REFILL IF NECESSARY (# 540001 ~ # 540049)

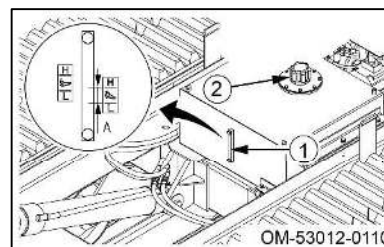
WARNING

- Do not spill oil. Otherwise, it may cause a fire. If it spills, wipe it off completely.
- Stop the engine and wait for the oil temperature to cool down.
- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- The safety bar is a safety device used during inspections and maintenance.
Do not use the safety bar to support the dump body when replacing equipment that holds the dump body such as the dump cylinder, valve, and hydraulic hoses. In such cases, always support the dump body with a crane.

- 1 Raise the dump body and secure the safety bar.
- 2 Use level gauge (1) at the side face of the hydraulic tank to check the oil level and the condition of dirt in the oil.
The oil level should be between (A) on the gauge.
- 3 If the oil level is low, remove cap (2) of the hydraulic tank and add hydraulic oil through the oil filler.
 - For details of hydraulic oil, see the “USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE” in the “MAINTENANCE” on page 149.



#540001~540048



#540049

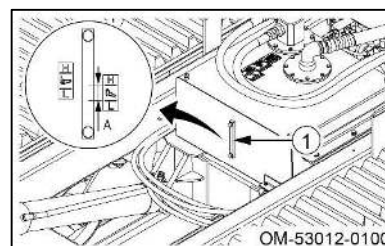
- 4 Check the breather hole inside the cap and clean it if it is clogged.
- 5 After adding oil, tighten cap (2) securely.

CHECK OIL LEVEL IN THE HYDRAULIC OIL TANK, REFILL IF NECESSARY (# 540050 ~)

WARNING

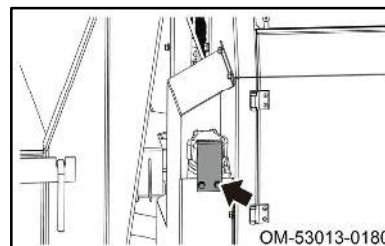
- Do not spill oil. Otherwise, it may cause a fire. If it spills, wipe it off completely.
- Stop the engine and wait for the oil temperature to cool down.
- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- The safety bar is a safety device used during inspections and maintenance.
Do not use the safety bar to support the dump body when replacing equipment that holds the dump body such as the dump cylinder, valve, and hydraulic hoses. In such cases, always support the dump body with a crane.

- 1 Raise the dump body and securely lock the safety bar. See “OPERATING DUMP BODY” in the “OPERATION” section. (P. 127)
- 2 Use level gauge (1) at the side face of the hydraulic tank to check the oil level and the condition of dirt in the oil.
The oil level should be between (A) on the gauge.

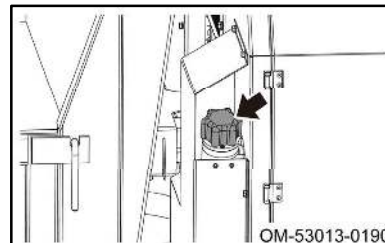


- 3 If oil level is low, refill oil with the following procedure.
The filler port for the hydraulic tank is located on the right side of the machine.

- 4 Remove the cover in front of the filler cap on the hydraulic tank.



- 5 Remove cap of the hydraulic tank and add hydraulic oil through the oil filler.
 - For details of hydraulic oil, see the “USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE” in the “MAINTENANCE” section.



- 6 Check the breather hole inside the cap and clean it if it is clogged.
- 7 After adding oil, tighten cap securely.

CLEAN AIR CLEANER EXHAUST VALVE

• CHECK AIR CLEANER CLOGGING WARNING LAMP

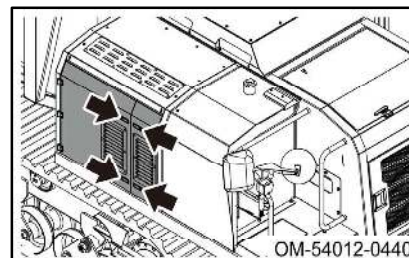
If air cleaner clogging warning lamp (red) on the control panel box on the left side of the operator's seat lights up, clean or replace the air cleaner element.

Detailed explanation for clean or replace the air cleaner element, see "CHECK AIR CLEANER, CLEAN OR REPLACE IF NECESSARY" in the "MAINTENANCE" section (P. 160).



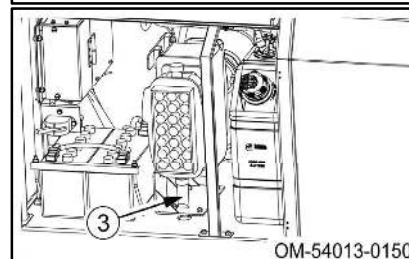
• CLEAN AIR CLEANER EXHAUST VALVE

1 Open the buckle and open the cover.



2 Remove exhaust valve (3) at the bottom of the air cleaner and clean the inside dust and dirt.

- Inspect the exhaust valve and replace it with a new one if it is severely damaged or deteriorated.



3 After finishing the work, close the cover.

CHECK FAN BELT

Check the fan belt for wear, cracks, and tears, and for grease and oil stains.

Small cracks across the width of the belt are fine, but if there are cracks in the circumferential direction, replace the belt.

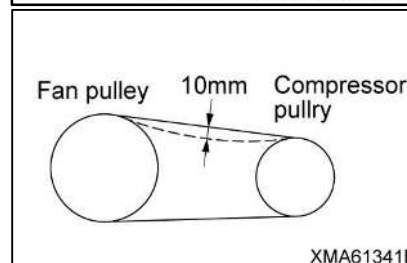
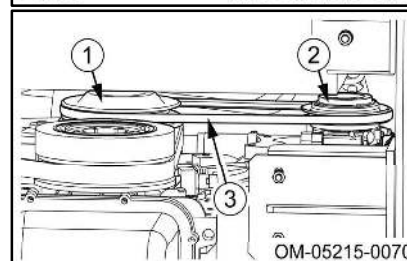
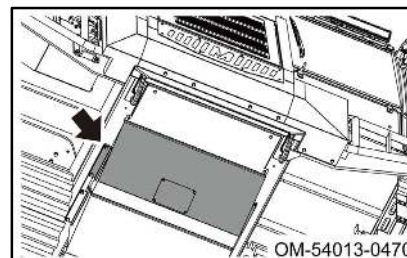
If the belt is worn out or a part of the belt is missing, replace it.

- Ask your distributor for replacement of the fan belt.

CHECK, ADJUST FAN BELT TENSION

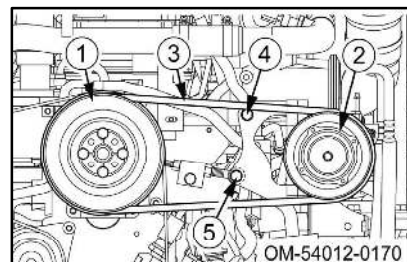
CHECK TENSION

- 1 Remove the mounting bolts and open the cover at the bottom of the machine.
 - When removing the mounting bolts, set a jack under the center of the cover so that the cover does not open suddenly.
- 2 Enter the underside of the machine and press the middle position of belt (3) of the fan pulley (1) and compressor pulley (2) with your finger (about 58.8N).
The deflection should be approx. 10 mm.
- 3 If the deflection is too large, adjust the belt tension. For details, see "ADJUSTING TENSION".

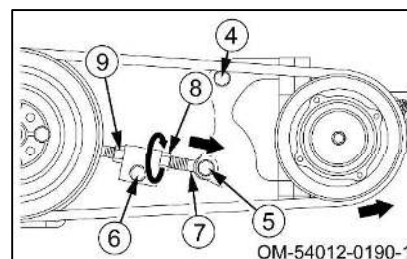


ADJUSTING TENSION

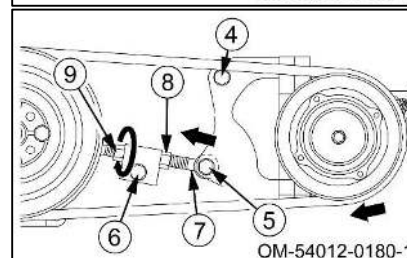
- 1 Loosen nuts (4) and (5) at the top and bottom of the compressor bracket.
- 2 Turn adjustment nuts (8) and (9) at both ends of block (6) to adjust the belt deflection to approx. 10 mm.

**[WHEN INCREASING TENSION]**

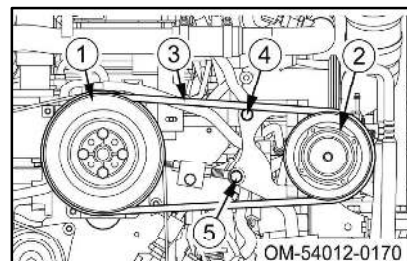
Turn nut (9) counterclockwise and turn nut (8) clockwise. The distance between block (6) and nut (5) becomes longer, the alternator moves outward with nut (4) as the fulcrum, and the belt becomes stronger. After adjustment, turn nut (9) clockwise and lock it at the position.

**[WHEN DECREASING TENSION]**

Turn nut (8) counterclockwise and turn nut (9) clockwise. The distance between block (6) and nut (5) becomes shorter, the alternator moves inward with nut (4) as the fulcrum, and the belt becomes weak. After adjustment, turn nut (8) clockwise and lock it at the position.

**AFTER ADJUSTMENT**

After adjustment, tighten nuts (4) and (5) on the top and bottom of the compressor bracket.



Check the tension again.

After finishing the work, close the cover in the reverse order of opening it.

CHECK ELECTRICAL WIRING



If any tool is in between the battery positive (+) terminal and the chassis, sparks may occur. It is dangerous. Do not put tools and other metal objects in your breast pocket. They may fall out.

- Open the battery inspection cover at the right side of the machine, and check for looseness of the battery terminal, ground wiring, battery relay wiring, and signs of short circuits.
- Open the under cover and check the starting motor wiring from the bottom of the engine for looseness and short circuits.
- Open the under cover and check the alternator wiring from the bottom of the engine for looseness and short circuits.

CHECK OPERATION OF SWITCHES, LAMPS, MONITOR DISPLAY AND GAUGES

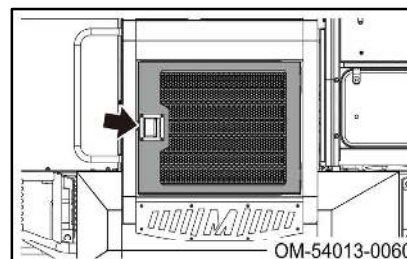
- Turn the starting switch to the "ON" position and check that all indicators on the monitor display light up.
If no indication on the monitor, contact your distributor.
- Turn the starting switch to the "ON" position and operate the headlight switch to check whether each display corresponding to the switch in the monitor display lights up.
If a lamp does not light up, the bulb may be blown or open circuit. Contact your distributor.
If no indication on the monitor, contact your distributor.
- Turn the starting switch to the "ON" position and press the "Hi" side of the speed range selector switch to check whether "High-speed travel  on the monitor display lights up.
If no indication on the monitor, contact your distributor.
- Turn the starting switch to the "ON" position and press the "ON" (parking) of the parking brake switch, check whether "Parking lamp **P**" on the monitor display lights up.
If no indication on the monitor, contact your distributor.
- Turn the starting switch to the "ON" position, operate the wiper switch, and check if the wiper works.
If the wiper does not work, there is probably a failure or disconnection in the wiper, consult your distributor.
- Turn the starting switch to the "ON" position, operate the air conditioner controller, and check if the air conditioner works.
If the air conditioner does not work, there is probably a failure or disconnection in the air conditioner, consult your distributor.

CHECK OPERATION OF HORN AND WARNING BUZZER

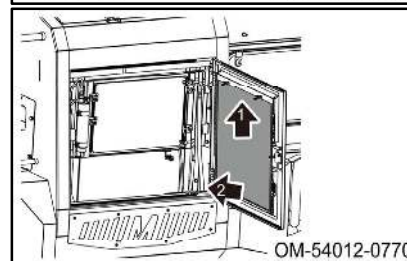
- Turn the starting switch to the “ON” position and push the horn switch inside the combination switch or on the travel lever to check whether the horn sounds.
If the horn does not sound, there is probably a failure or disconnection in the horn. Contact your distributor.
- Turn the starting switch to the “ON” position, push the “ON” (STOP) of the parking brake switch and check if the parking brake buzzer sounds.
If the parking brake buzzer does not sound, there is probably a failure or disconnection in the buzzer. Contact your distributor.

INSPECTION OF GRILLE SCREEN

- 1 Pull the handle to unlock, open the cover and put the stopper on.



- 2 Remove the butterfly bolt.
- 3 Raise the screen until it hits the top and pull the bottom of the screen toward you to remove the screen.
- 4 Clean the grille screen for dust and debris.



- 5 After finishing the work, close the cover in the reverse order of opening it.

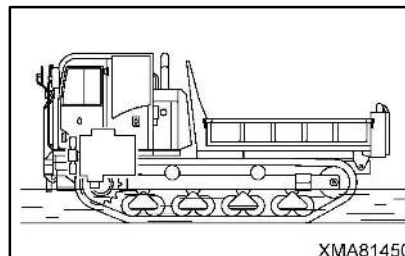
PRECAUTIONS WHEN TRAVELING

WARNING

Always follow these precautions when traveling. Failure to do so may lead to a serious injury or accident.

PERMISSIBLE WATER DEPTH

When working in water, use it at a depth where the water level does not rise above the bottom surface of the frame.



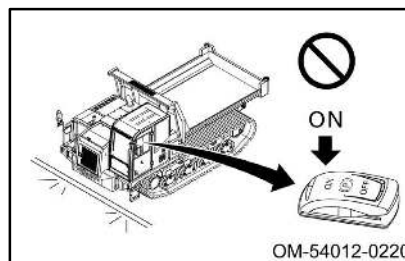
XMA81450

APPLYING PARKING BRAKE

When stopping the machine, return the travel lever in the “N” (NEUTRAL) position. The hydraulic brakes in the HST are automatically applied and the machine stops.

Do not use the parking brake to stop the machine.

Using the parking brake does not only stop the machine suddenly, but also causes failure of the travel motor. Do not use the parking brake to stop unless an emergency stop is required.

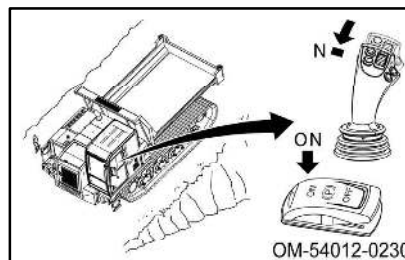


OM-54012-0220

PRECAUTIONS WHEN ENGINE STOPS ON SLOPES

If the engine stops on a slope, do as follows.

1. Place the travel lever in the “N” (NEUTRAL) position.
2. Press the “ON” (STOP) side of the parking brake.
3. Start the engine again.



OM-54012-0230

PRECAUTIONS WITH FUEL LEVEL ON SLOPES

If the fuel level in the fuel tank is low and the machine is on a slope or there is swaying, the engine may suck in air, which may cause the engine to stop.

Always maintain a sufficient level of fuel in the fuel tank.

PRECAUTIONS FOR OIL LEVELS ON SLOPES

When traveling or carrying out operations on a steep slope, check the oil level in the hydraulic tank and engine, and add oil to the high level.

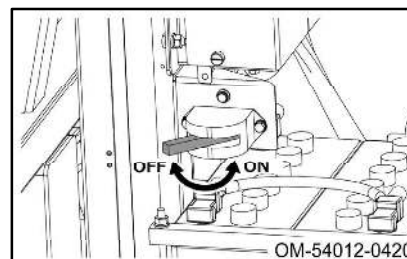
This prevents failure caused by lack of oil.

OPERATION

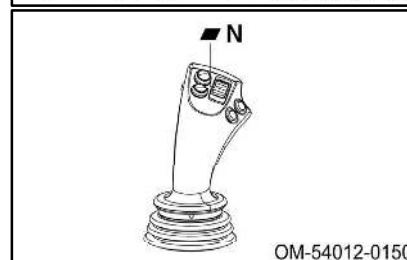
PRECAUTIONS BEFORE STARTING THE ENGINE

Check following items before starting the engine.

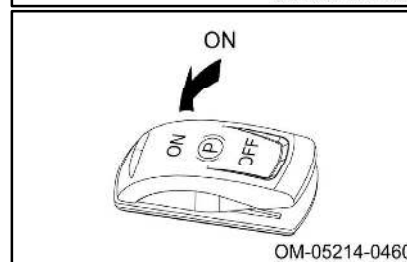
- Make sure that the dump body is completely lowered.
- Check that the main switch in the battery box is in the "ON" position.



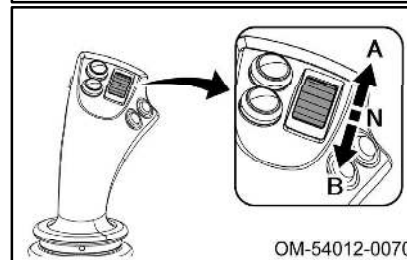
- Check that the travel control lever is in the "N" (NEUTRAL) position.



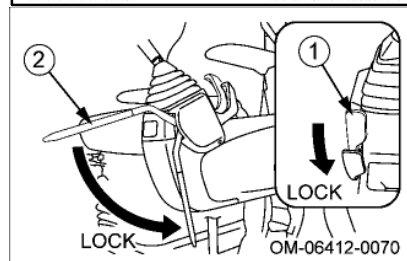
- Check that the "ON" (STOP) side of the parking brake switch is pressed.



- Check that the dump control lever is in the "N" (NEUTRAL) position.



- Make sure that safety lock bar (2) is in the "LOCK" position.



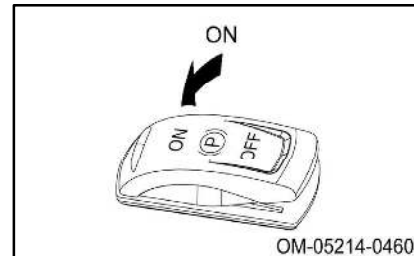
STARTING THE ENGINE

WARNING

Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.

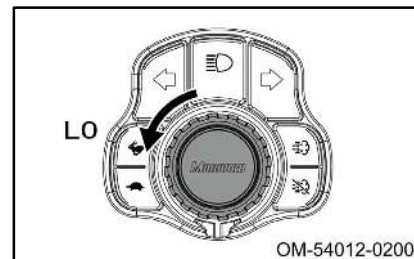
NOTICE

- Before starting the engine, be sure to press the "ON" (STOP) side of the parking brake switch. The engine cannot be started unless the parking brake switch is in the "ON" (STOP) position.
- Do not try to start the engine immediately when inserting the starting switch. Turn the starting switch to the "ON" position and wait until the "Normal screen" is displayed.
- Do not crank the starting motor continuously for more than 15 seconds. If the engine does not start, wait for at least 2 minutes before starting again.



STARTING THE ENGINE

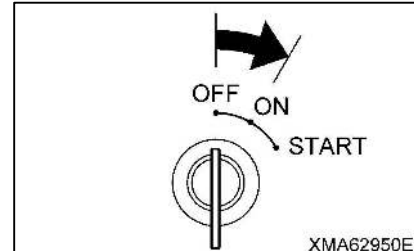
- 1 Turn the engine throttle dial to the "LO" direction to run the engine in the "Lo-speed" range.



- 2 Insert the key into the starting switch, turn it to the "ON" position, and wait until "Normal screen" appears on the monitor display.

CAUTION

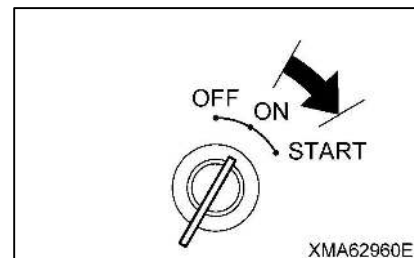
If you turn the starting switch key to the "START" position before the "Normal screen display" is displayed, the starter may be damaged or malfunction.



- 3 Start the engine by turning the starting switch key to the "START" position and activating the starting motor.

- In cold weather, the intake heater automatically operates to preheat the intake air depending on the conditions of the intake air temperature and the cooling water temperature. For this reason, the starting motor may turn over a little longer before the engine starts.

When the intake heater starts operating automatically, the "glow lamp ()" lights up on the monitor display screen.



Before starting the engine, make sure that the "glow lamp
()" is off.

 CAUTION

When starting the engine, do not keep turning over the starting motor for more than 15 seconds at a time. If you do so, the starting motor may be damaged or the battery may be drained.

- 4 If the engine does not start on the first try, return the starting switch key to the "OFF" position, "wait for approx. 2 minutes" for the battery to recover and the starting motor to cool down, then turn the key to the "ON" position again (as explained in steps 2 and 3).

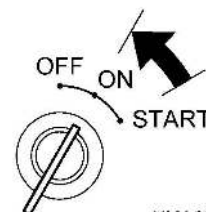
 CAUTION

If the start operation is continued without stopping the starting motor completely, damage may occur to the starter pinion and the ring gear of the engine.

- 5 If the engine does not start even when you have tried to start it twice, there may be some problems with the battery or the engine starting circuit. Check the battery voltage, the electrical wiring of the starting motor, and other factors.
- 6 After the engine starts, release the key. The key automatically returns to the ON position.

 CAUTION

Never turn the starting switch key to the "START" position while the engine is running. Doing so may damage the starting motor pinion, inside parts, or engine ring gears.

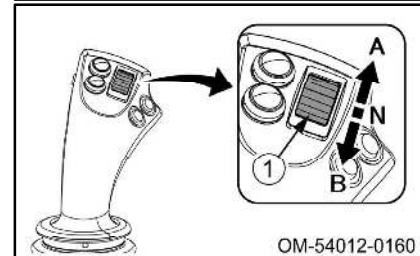
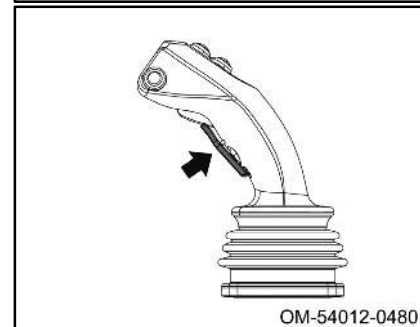
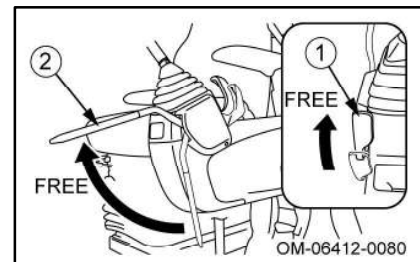
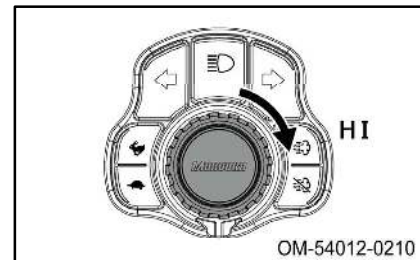
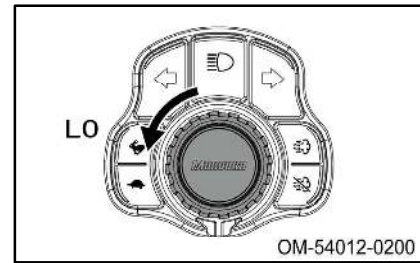


XMA62970E

WARMING-UP OPERATION

When the engine starts, carry out the warming-up operation as follows.

- 1 Turn the engine throttle dial in the "LO" direction to set the engine speed to "Low Speed" and operate without load for about 5 minutes.
- 2 Turn the engine throttle dial to the "HI" direction to run the engine with the "Mid-Speed" range (about 1500 rpm) and operate without load for about 5 minutes.
- 3 Raise safety lock lever (1) and set safety lock bar (2) in the "FREE" position.
- 4 While holding the trigger of the travel and dump control lever, set the dump control dial to the "B" (raised) position, raise the dump body to the maximum height, and run the engine for approx. 5 minutes.
 - Keep dump control dial (1) at the "B" (raised) position.
- 5 While the dump control dial (1) is in the "B" (raised) position, hold the trigger of the travel and dump control lever, turn the engine throttle dial further in the "HI" direction to set the engine speed to "high", and then run the engine for 2 to 5 minutes.
 - This operation warms up the hydraulic oil and makes the operation of the travel and dump body smooth.
- 6 Check that the monitor display, charge lamps, parking brake buzzer and reverse traveling buzzer work normally.
- 7 Check that there is no abnormality in the exhaust gas color, engine noise, or vibration.



TRAVEL OPERATION

The travel operation of this machine is performed by the travel lever.

The travel speed can be adjusted by the amount of tilting the travel lever.



WARNING

MOVING MACHINE

- Check that there is no one in the area around the machine before starting. Check particularly carefully around the dump body at the rear of the machine.
- When starting the machine off, check that the surrounding area is safe, and sound the horn to inform people that you are starting.
- When turning the travel lever to a large extent, the machine will start suddenly. Operate the travel levers slowly to prevent a sudden start.

LEFT TURN AND RIGHT TURN

- Do not turn the machine sharply at high speed (right, left) and do not carry out a spin turn unless necessary. This can damage the crawler and hydraulic equipment, and is also danger that the machine may hit other objects.

ON A SLOPE

When starting and traveling the machine on a slope, be sure to select the low-speed range for travel speed. In addition, set the machine parallel to the slope before starting and traveling.

(UPHILL)

- When starting uphill on slopes, always start in the low speed range and run the engine at high speed. Keep the travel lever as close as possible to the "Neutral" position.
- When traveling up a slope, run the engine at the rated speed and keep the travel lever close to the "N" (NEUTRAL) position.

(DOWNHILL)

- When going down a slope, run the engine at low speed and operate the travel lever a maximum of half way from the "NEUTRAL" position.

Traveling at excessive speed is dangerous and will cause overrunning.

(CHANGE OF DIRECTION)

- Avoid change of direction (left turn/right turn) on a slope as much as possible because the machine may sideslip.

Be particularly careful about change of direction on soft ground or clay-rich ground.

SLOPE ANGLE

- When going down a slope with a load on the dump body, it is dangerous to start or travel if the slope angle exceeds "9 degrees".

Lower the engine speed to a low speed, set the travel lever to a position close to "NEUTRAL", and start the machine carefully.

It is dangerous to make a turn (left turn/right turn) with its dump body loaded. Unload the dump body immediately and slowly make a turn (left turn/right turn).

- During downhill travel with forward gear, check the inclinometer and make sure that the pointer of the inclinometer does not exceed "9 deg.".

When the clinometer reads an angle close to "9 deg.", switch course to one with a gentler incline.

Lower the engine speed to a low speed, set the travel lever to a position close to "NEUTRAL", and start the machine carefully.

SWITCHING FORWARD AND REVERSE

- When switching between FORWARD and REVERSE, always stop the machine before shifting direction.

If the travel direction is switched suddenly between FORWARD and REVERSE, it can cause a malfunction of the machine.

SWITCHING TRAVEL SPEED RANGE

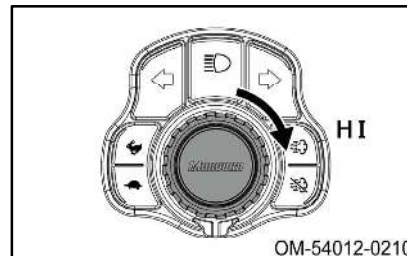
- When switching the travel speed range, always stop the machine first before operating the switch.

*** In case of an emergency and the machine needs to be stopped immediately, press the emergency stop switch. This applies the parking brake and urgently stops the machine.**

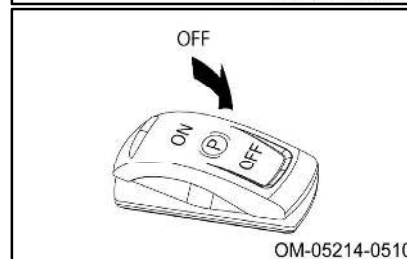
PREPARING TO START

Before starting the machine, be sure to perform the following procedures.

- 1 Turn the engine throttle dial to the "HI" direction to run the engine in the "Mid-speed" range (about 1500 rpm).



- 2 Press the "OFF" side of the parking brake switch to release the parking brake.
Check that "P" on the monitor display screen goes out and the parking brake buzzer stops sounding.



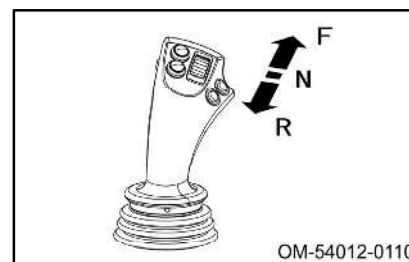
FORWARD/REVERSE TRAVELING

FORWARD TRAVELING

Push the travel lever in the "F" direction.

REVERSE TRAVELING

Pull the travel lever in the "R" direction.



OM-54012-0110

LEFT/RIGHT TURN

TURNING WHILE INCREASING SPEED

AT FORWARD TRAVELING

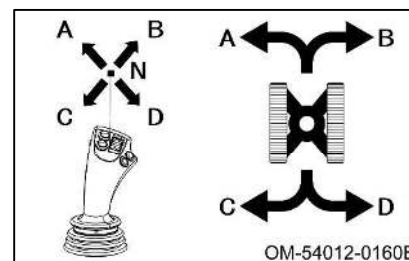
When turning to the left, push the travel lever in the "A" direction.

When turning to the right, push the travel lever in the "B" direction.

AT REVERSE TRAVELING

When turning to the left, pull the travel lever in the "C" direction.

When turning to the right, push the travel lever in the "D" direction.



OM-54012-0160E

TURNING WHILE DECREASING SPEED

AT FORWARD TRAVELING

When turning to the left, tilt the travel lever diagonally forward to the left while returning it to the neutral direction.

When turning to the right, tilt the travel lever diagonally forward to the right while returning it to the neutral direction.

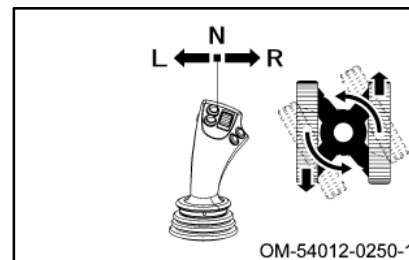
AT REVERSE TRAVELING

When turning to the left, tilt the travel lever diagonally backward to the left while returning it to the neutral direction.

When turning to the right, tilt the travel lever diagonally backward to the right while returning it to the neutral direction.

SPIN TURN

To make a spin turn to the left, tilt the travel lever in the "L" direction.
To make a spin turn to the right, tilt the travel lever in the "R" direction.



● SWITCHING BETWEEN HI-LO SPEED RANGES

The range of travel speed can be changed by operating the Hi-Lo speed range selector switch or the button on the travel lever.

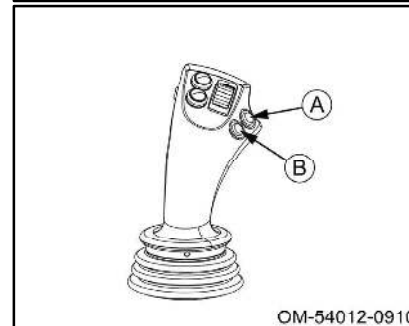
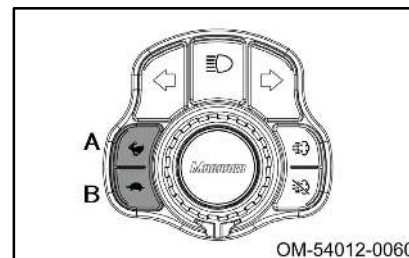
Immediately after starting the engine, "high speed range" is selected.

- When "A (Hi)" side of the Hi-Lo speed range selector switch or "A (Hi)" side of the travel lever button, the mechanism inside the travel motor is switched, and the machine travels at high speed.

At the same time, the Hi speed travel lamp (🔦) on the monitor display lights up to indicate that the machine is traveling in the high speed range.

- When "B (Lo)" side of the Hi-Lo speed range selector switch or "B (Lo)" side of the travel lever button, the mechanism inside the travel motor is switched, and the machine travels at low speed.

At the same time, the Hi speed travel lamp (🔦) on the monitor display goes out to indicate that the machine is traveling in the low speed range.



● SUPER SLOW MODE

Press super slow mode button (6) with the Hi-Lo speed range selector is set in "LO" position and the travel lever is set in the "N" position, the super slow mode lamp will appear on the monitor display screen and the machine travels slower than usual.

To cancel the mode, set the travel lever to the "N" (NEUTRAL) position and press the button again.

Alternatively, setting the travel speed range to "Hi" speed will cancel the super slow mode. In this case, the machine is set in Hi-speed, so be careful of speed changes.



AUTO DECEL (IDLING) MODE

The auto decel can be ON/OFF by pressing button (B) corresponding to the auto decel enable/disable icon (1).

Immediately after starting the engine, "ON (Enabled)" is selected.

- ON (Enabled):  (Green)
- OFF (Disabled):  (Red)

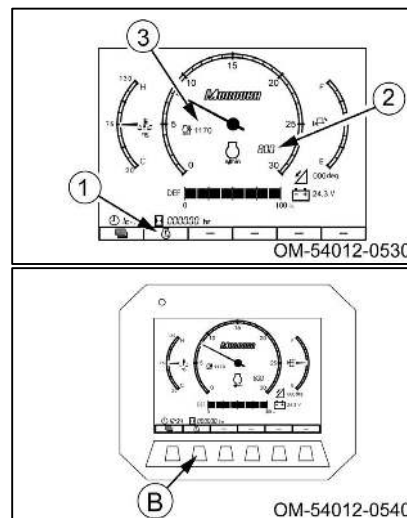
When there is no traveling, dumping, or engine throttle operation for a certain period of time, the engine speed automatically goes into an idling state, in order to reduce fuel consumption.

When performing travel or dump operation, or operating the engine throttle, the machine will return from the auto decel mode.

When the auto-decel is "ON (enabled)", actual engine speed (2) and the engine speed (3) when the auto-decel is released are displayed on the normal screen display.

*Auto-decel is automatically disabled when the hydraulic oil temperature is as follows.

- Hydraulic oil temperature is less than 20°C



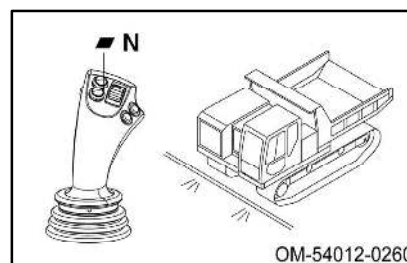
STOPPING MACHINE

WARNING

- Avoid stopping suddenly. Always leave extra room when stopping.
- In case of an emergency and the machine needs to be stopped immediately, press the emergency stop switch. This applies the parking brake and urgently stops the machine.
- When stopping, do not return the travel lever past the N position. Returning the lever excessively from the "Neutral" position can cause engine trouble such as reverse rotation of the engine.

Return the travel lever to the "N" (neutral) position.

The hydraulic brakes are automatically applied and the machine stops.



EMERGENCY STOP

WARNING

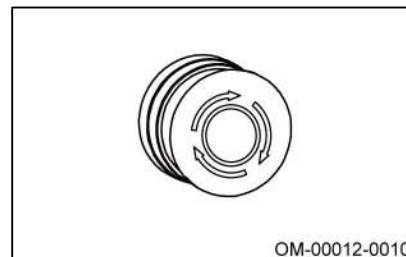
In the unlikely event that a dangerous situation occurs and you want to stop the machine urgently, stop the engine by the following method. When the engine is stopped, the parking brake is applied automatically.

- Press the emergency stop switch in the operator's compartment to stop the engine.

NOTICE

If the emergency stop switch is used while traveling the machine, ask your distributor for an inspection of the parking brake. Using the emergency stop switch degrades the performance of the parking brake.

Press the emergency stop switch in the operator's compartment. The engine stops.



PARKING MACHINE

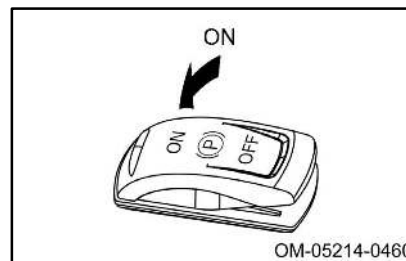
WARNING

Choose firm, level ground to park the machine.

If the machine must be parked on a slope, apply the parking brake and block the tracks to prevent the machine from moving.

Push the "ON" (STOP) side of the parking brake switch to apply the parking brake.

- Check that (**P**) on the monitor display lights up and the parking brake buzzer sounds.

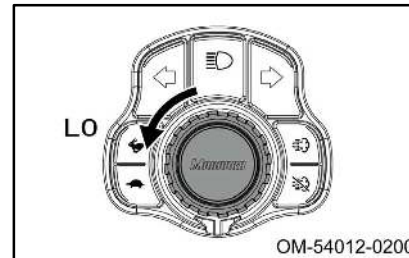


STOPPING ENGINE

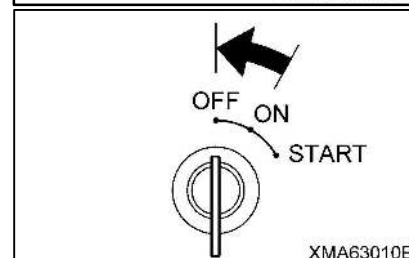
NOTICE

- Do not stop the engine before it has properly cooled down. Stopping the machine before it cools down shortens the service life of the engine. Never stop the engine suddenly except in cases of emergency.
- If the engine has overheated, do not stop it suddenly. Run the engine at a mid-range speed and gradually cool it down before stopping the engine.
However, if the radiator fan is not running or if the cooling water is leaking, stop the engine immediately.

- 1 Turn the engine throttle dial to the "LO" direction and set the engine to "Low speed", then run the engine at idling for 5 minutes to cool the engine.



- 2 Set the starting switch key back to the "OFF" position. The engine stops.



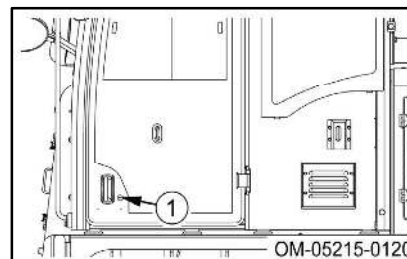
CHECKS AFTER STOPPING ENGINE

- Carry out walk-around checks to check the undercarriage, dump body, and bodywork; check also for oil and water leaks. If any abnormality is found, repair it.
- Fill up the fuel tank with fuel.
- Dead leaves, wastepaper, or other flammable items around the engine may cause a fire. Remove if any.
- Remove any mud or snow stuck to the undercarriage or dump body.

LOCKING

To prevent vandalism, the following locations can be locked.

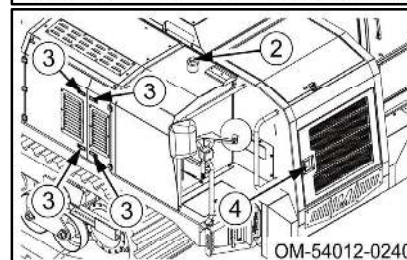
(1) Cab door



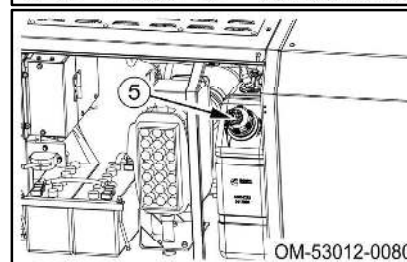
(2) Fuel tank filler cap

(3) Buckle (Serial No. 540001~540089)

(4) Front grille



(5) DEF tank filler cap



HANDLING DUMP BODY

PRECAUTIONS DURING OPERATION

WARNING

Always follow these precautions when carrying out operations. Failure to do so may lead to a serious injury or accident.

PRECAUTIONS FOR JOBSITES

- As much as possible, select firm, level ground.
When working on slopes or extremely uneven ground, the change in the center of gravity when the dump is operated may cause the machine to tip over.
- As much as possible, avoid the edge of cliffs or ground which may collapse.
If work must be carried out in such places, set up blocks to prevent the machine from going near the edge or near retaining walls, or position a signalman and take other necessary steps for ensuring safety.
- When dumping a load from a high point, always position a signalman and follow the signals.
The signalman must always check the safety of the dumping point carefully.

PRECAUTIONS FOR LOAD

- Do not overload the machine.
Do not add side racks or plates, or make other modifications to extend the size of the dump body to increase the load.
- When loading the dump body, always spread the load to maintain the balance in the dump body.
Loading the dump body unevenly will cause instability and may cause the machine to tip over.
- Be careful not to let the loading bucket or crane hook hit the dump body or flaps.
- When loading large rocks, first load the dump body with fine soil, then load the rocks on top.
- When handling long objects, such as logs or steel beams, load carefully and pay careful consideration to the center of gravity so that the load does not collapse or sway excessively during hauling operations.
Tie down such loads securely with rope. If necessary, use blocks and take steps to prevent the rope from slipping.
- When loading stacks of U-shaped ditch liners or concrete blocks, lay a steel sheet and secure with rope, and take other steps to prevent the load from slipping.

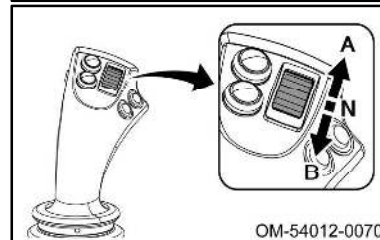
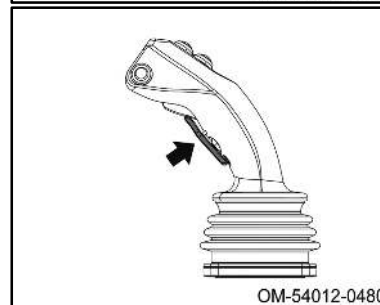
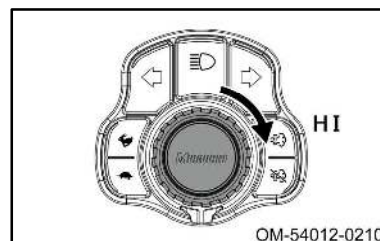
OPERATING DUMP BODY

WARNING

- Always stop the machine before operating the dump body to the dumping position.
- Position a signalman to ensure safety in the surrounding area and follow his/her signals when carrying out the dumping operation.
- Always operate the dump control dial slowly. If the dump body is suddenly stopped or it is allowed to hit the frame when it is lowered, it may cause a failure and compromise the safety in the surrounding area.
- When leaving the operator's seat with the dump body raised, use the safety bar to prevent the dump body from coming down.

Operate the dump body as follows.

- The further the dump control dial is operated, the faster the dump body moves. When the dump control dial is released, it automatically returns in the "N" (NEUTRAL) position.
- 1 Make sure to stop the machine.
 - 2 Turn the engine throttle dial in the "HI" direction to fully increase the engine speed.
-
- 3 While holding the trigger of the travel and dump control lever, turn the dump control dial to the "B" direction.
The dump body rises.
 - When the dump body comes near the maximum height, return the dump control dial to the "N" (NEUTRAL) position to reduce the raising speed of the dump body.
 - 4 While holding the trigger of the travel and dump control lever, push the dump control dial in the "A" direction.
The dump body goes down.
 - When the dump body comes near the frame, return the dump control dial to the "N" (NEUTRAL) direction to reduce the lowering speed of the dump body.



OPERATING SAFETY BAR

WARNING

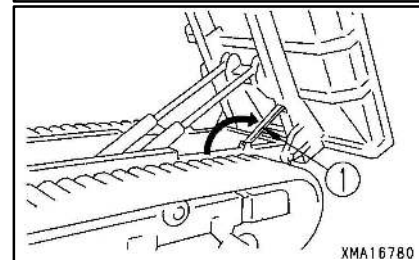
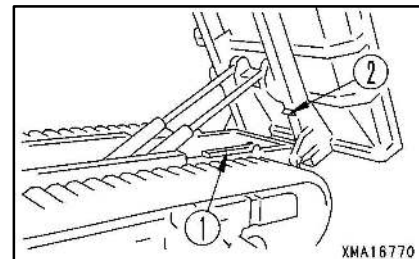
- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- The safety bar is a safety device used during inspections and maintenance.
When replacing equipment that holds the dump body, such as a dump cylinder, valves, and hydraulic hoses, be sure to suspend and hold the dump body with a crane, etc., not with the safety bar.

NOTICE

- The safety bar is located in the rear of the machine.
- When setting the safety bar, do NOT set the dump control dial in the “LOWER” position with the engine running. Otherwise, the safety bar and the dump body may collide and cause damage.
When the work is done, be sure to return the safety bar to its original position, and then lower the dump body.

INSTALLING SAFETY BAR

- 1 Raise the dump body to the maximum height. For details, see the “OPERATING DUMP BODY” in “OPERATION” section on page 127.
- 2 Raise safety bar (1) and set it in holder (2) at the bottom of the dump body.
- 3 Stop the engine.



STORING SAFETY BAR

- 1 Raise the dump body to the maximum height. For details, see the “OPERATING DUMP BODY” in “OPERATION” section on page 127.
- 2 Restore safety bar (1) to the specified position on top of the frame.

COLD WEATHER OPERATION

PRECAUTIONS FOR LOW TEMPERATURE	130
AFTER COMPLETION OF WORK	132
AFTER COLD WEATHER	133

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 of oil and fuel, see “USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE” in the “MAINTENANCE” section on page 149.

MIXING RATIO OF TAP WATER AND COOLANT

WARNING

The coolant is flammable, so never put it close to a fire.

NOTICE

Do not use anything other than ethylene glycol (EG) type coolant.

Use a mixture of coolant and tap water for coolant to prevent overheating, rust, corrosion, and freezing of the cooling system.

The coolant has rust prevention, anti-corrosion, and antifreeze properties, so it can be used throughout the year. Be sure to make the coolant mixing ratio to 50% in order to maintain rust and corrosion prevention effects.

At the time of shipment from the factory of this machine, the following coolant is used in a mixing ratio of 50%.
Bear Brand coolant [Green]: Non-amine type coolant

DEF

CAUTION

To prevent freezing, do not add chemicals, additives to DEF.

In case it gets in your eyes, rinse with tap water for at least 15 minutes and seek medical attention.

When the temperature reaches about -11°C, DEF will freeze.

Control the temperature inside the DEF tank so that the liquid temperature is -10°C or higher.

BATTERY**DANGER**

- To avoid gas explosions, do not bring fire or sparks near the battery.
- Battery electrolyte is dangerous. Do not get in eyes or on skin. If it gets in your eyes or on your skin, wash it off with large amounts of water, and consult a doctor.

The performance of the battery drops at low temperatures.

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

When adding distilled water, to prevent the electrolyte from freezing, always add the distilled water immediately before starting operations the next morning.

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

Charge rate (%)	Temp. of battery electrolyte (°C)			
	20	0	-10	-20
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
70	1.23	1.24	1.25	1.26

AFTER COMPLETION OF WORK

To prevent the undercarriage and dump body from freezing due to mud, water, or snow on them and becoming inoperable the next morning, always observe the following precautions.

- Mud, water, or snow on the machine body, dump body and undercarriage should be completely removed.
In particular, thoroughly wipe off the hydraulic cylinder rod surface on the dump body. This is to prevent damage to the seal caused by mud or dirt getting inside the seal with frozen drops of water.
- The machine should be housed in a dry building. Never leave it outdoors.
If it is unavoidable to leave it outdoors, park the machine on the firm, flat ground and place wooden blocks underneath the machine. Doing so prevents the surface of the ground touching the undercarriage from freezing, making it easier to start the machine the next morning.
- Remove the drain plug on the fuel tank and drain any water collected in the fuel tank 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.

AFTER COLD WEATHER

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

- Replace the oil and fuel for all parts with high viscosity oil or fuel.
For details of the specified viscosity of oil and fuel, see “USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE” in the “MAINTENANCE” section on page 149.
- Drain the coolant completely and clean the inside of the cooling system thoroughly.

TRANSPORTATION

LOADING, UNLOADING MACHINE	135
PRECAUTIONS FOR LOADING	137
PRECAUTIONS FOR TRANSPORTATION	138

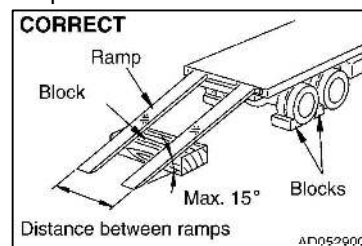
LOADING, UNLOADING MACHINE

WARNING

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

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

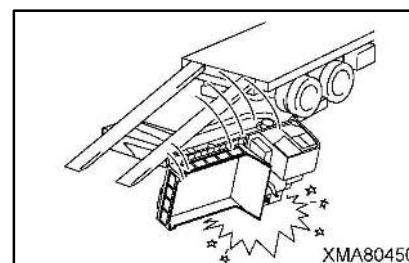
- 1 Apply the brake securely to the hauler or trailer and put blocks under the tires to prevent the machine from moving.
- 2 Set the ramps so that the center of the machine is aligned with the center of the transport trailer, and fix them securely in position. Check that the left and right ramps are at the same height.
- 3 Align the machine with the ramps, and travel up or down the ramps slowly to the load or unload the machine.
- 4 To prevent the machine from moving during transportation, put wooden blocks under the front and rear of the rubber crawler and secure the machine with chains or wire rope. Fasten securely so that it does not slip to the side. This machine is equipped with a hook for fixing the machine to the truck frame.
- 5 Fold the side mirrors and side cameras (only for machines equipped with them).
- 6 Ensure that the dump body is completely lowered.



PRECAUTIONS FOR LOADING AND UNLOADING

Loading and unloading the machine always involves potential hazards. **EXTREME CAUTION SHOULD BE USED.** Always do as follows

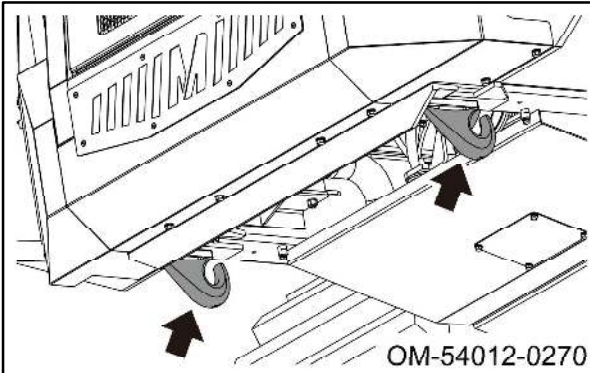
- Perform loading and unloading on firm level ground only.
- Stop the engine of the hauler, apply the parking brake securely, then block the tires.
- Set the ramps parallel and in line with the width of the crawlers.
- Secure the ramps to the dump body with the hooks.
- Set the machine to be loaded in line with the ramps, then approach the ramps at low speed.
- Do not change the direction of travel when on the ramps.
If it is necessary to turn the travel direction, drive the machine off the ramps, and set the machine to the correct direction.



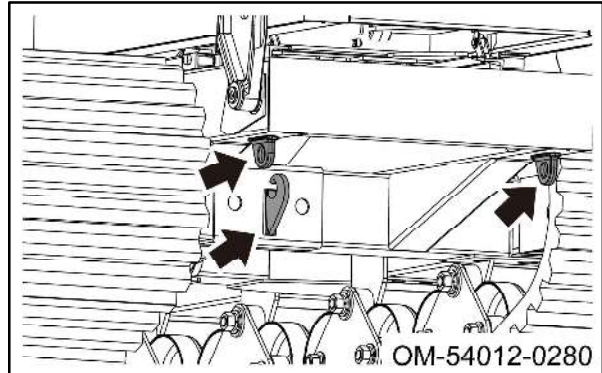
- After loading, put blocks under the front and rear of the rubber crawlers to prevent the machine from moving, then tie the machine down with chains or wire rope.

LOCATION OF MACHINE FIXING BRACKETS

Front Hook (Both Left And Right)



Rear Hook



* Never use them for towing the machine.

PRECAUTIONS FOR LOADING

WARNING

When loading and unloading the machine, park the trailer on a flat firm roadbed. Keep a fairly long distance between the road shoulder and the machine.

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

1. Lower the dump body slowly.
2. Push the parking brake switch in to apply the parking brake.
3. Return the engine throttle dial to the low-speed position, turn the starting switch to the OFF position and stop the engine. Remove the starting key.
4. When transporting the machine, place rectangular timber underneath the front and rear track shoes to prevent the machine from moving about. Also, hold it down with chains or rope. Be particularly careful to ensure that the machine does not slip sideways.
5. Store the side mirrors and side camera (optional).

PRECAUTIONS FOR TRANSPORTATION

WARNING

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

When transporting a machine, obey all state and local laws governing the mass, width and length of the machine.

LONG-TERM STORAGE

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PRECAUTIONS BEFORE STORAGE

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

- The machine should be housed in a dry building. Never leave it outdoors.
If it is unavoidable to leave it outdoors, park the machine on a firm, flat ground and place wooden blocks underneath the machine. Also, cover it completely with canvas, etc.
- After cleaning and lubricating every part, completely fill the fuel tank, apply grease, and change the oil before storage.
- Apply a sufficient amount of grease to the exposed parts such as piston rods and shafts of the hydraulic cylinders.
- Before storing the battery, disconnect the negative (-) terminals of the battery and cover the open end, or remove the battery from the machine and store it separately.
- If the temperature goes below 0°C (32°F), add anti-freeze to the coolant.
Or drain all the cooling water and put a "No coolant" sign in the operator's station.
- When the DEF temperature drops below -10°C or the storage period exceeds 6 months, completely remove DEF and tag the driver's seat with "NO DEF".

STORAGE PERIOD OF DEF

The life of DEF varies depending on the storage temperature, as shown in the table below.

When storing DEF, store it in as low a temperature as possible. For the machines that may be stored unused, it is recommended to store it without removing the DEF when storing it, and to replace the DEF when using it.

Temperature (°C)	Minimum storage period
10°C or lower	36 months
25°C or lower	18 months
30°C or lower	12 months
35°C or lower	6 months
36°C or higher	—

PRECAUTIONS DURING STORAGE

WARNING

If warming-up operation must be carried out inside a building, open the windows and doors to ensure good ventilation to prevent carbon monoxide poisoning.

When the machine is in long-term storage, start the engine once a month and carry out a thorough warming-up operation. In addition, move the machine for a short distance, and carry out the raise and lower operations sufficiently for the dump body.

- If the cooling water has been drained from the machine, always add the cooling water before starting the engine.
- Before operating the dump body, wipe off the coat of grease from the piston rods of the hydraulic cylinders.

PRECAUTIONS AFTER STORAGE

Carry out the following procedure when using the machine after long-term storage.

- Be sure to replenish the DEF on the machine without the DEF.
- Be sure to replace the DEF stored in the machine's DEF tank.
- If the cooling water was drained from the machine, be sure to add it.
- Wipe off the coat of grease from the piston rods of the hydraulic cylinders.
- Remove the drain plugs from the hydraulic tank, fuel tank, engine oil pan, and travel motors, and drain the water.
- Drain the water from the engine oil filter, fuel filter, and hydraulic oil line filter.
- Carry out daily checks before starting and warm up the machine thoroughly.

MAINTENANCE

BASIC OUTLINE OF MAINTENANCE	144
PRECAUTIONS FOR MAINTENANCE	147
USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE	149
TOOLS AND TIGHTENING TORQUES	151
MAINTENANCE PROCEDURE	156

BASIC OUTLINE OF MAINTENANCE

OIL

- Oil is used under extremely heavy-duty conditions (high temperature, high pressure) in the engine, hydraulic pump, motor, and work equipment. Therefore, it deteriorates as time passes.
Always use the grade of oil which matches the ambient temperature as listed in this operation manual. Even if the oil is not dirty, always change it at the specified interval.
- When adding oil, do not mix oils of different grades or brands.
- Always add oil to the specified oil level. Too much oil and too little oil are both causes of problems.
- When changing the oil, always replace the related oil filter at the same time.
- Always be careful when handling oil to prevent water, dirt, or other impurities from getting into the oil.
A large proportion of problems with the machine are caused by impurities getting into the oil, so be extremely careful not to let them get into the oil. Always store the oil indoors and fill the oil in a dust-free environment.
- If the oil is milky white, there is probably water or air in the circuit. In such cases, consult Morooka or your Morooka distributor.

FUEL

- Use ultra-low sulfur light oil (light oil with sulfur content of 10 ppm or lower) as fuel for this machine.
- Do not use any fuel except diesel oil.
- Always use fuel of the grade specified according to the ambient temperature as listed in this operation manual.
- The fuel injection pump is a precision instrument. If fuel containing water or dirt is used, the fuel pump stops working. Be extremely careful not to let impurities get into the fuel. Always store the fuel indoors and refuel in a dust-free environment.
- If fuel is stored in drum cans, store the drum cans on their sides so that the ports in the drum cans are in a straight line to the side. This prevents damp air from being sucked in.
- To prevent moisture in the air from getting into the fuel tank, always fill the tank after the completion of each day's work.
- If the machine runs out of fuel, or when the fuel filter has been replaced, it is necessary to bleed the air from the circuit. Always read the separate operation manual for the engine when carrying out this operation.

DEF

- Use DEF that conforms to one of the following standards.
 - JIS (Japanese Industrial Standards): AUS 32 JIS K2247
 - ISO (International Organization for Standardization): AUS 32 ISO 22241
- Never add liquids other than those specified to the DEF tank.
- To prevent freezing, do not add chemicals, additives to DEF.
- The major factors that determine the life of DEF are temperature and duration. To maintain quality and longevity during long-term transportation and storage, please note the following:
 - (1) Storage temperature maintained between -5°C and 25°C
 - (2) Storage in an airtight container (polyethylene or polypropylene container is recommended)
 - (3) Store in a well-ventilated place away from direct sunlight and fire.
 - (4) Do not store in the same place as dangerous materials such as light oil or gasoline.
- DEF is not harmful, but over time it will corrode on some materials. (Aluminum, iron, zinc, etc.)
- Do not dispose of unused DEF in rainwater drains, lakes, rivers, the sea, etc. Dispose of DEF properly in accordance with local laws and regulations.
- Avoid long-term storage (more than 6 months) in a machine.

- If any DEF is spilled, rinse it away and then clean the affected area.

COOLANT

- Do not use river water, well water, or water from simple water lines as the coolant. Such kinds of water contain many impurities, such as calcium and dirt, so scale collects on the inside of the engine and radiator. This can cause improper heat exchange, leading to overheating.
- If the engine overheats, allow the engine to cool down, then add coolant.
- When using coolant, always follow the precautions given in the operation manual.

GREASE

- Grease is used at the connecting points of the dump body and travel lever linkages to prevent gouging or noise.
- The grease nipples not listed in this manual are nipples used for overhaul, so there is no need to add grease to them.
However, if any gouging or noise occurs during use, add grease.
- When adding grease, pump in grease until the old grease is completely forced out, then wipe off all the old grease. In particular, thoroughly wipe off the grease at points where mud and dirt may stick and cause wear of the rotating parts.

FILTERS

- Filters are used to prevent trouble caused when impurities in the oil, fuel, or air enter important equipment. When the replacement interval listed in this manual is reached, always replace or clean the filters.
However, when using the machine under heavy-duty conditions, replace the filters before the specified replacement interval has passed.
- Do not wash and reuse oil filters or fuel filters. Always replace them with new ones.
- When replacing the oil filter, check the old filter for any metal particles or pieces of rubber from the hoses. If any rubber or metal is found, consult Morooka or your Morooka distributor. This is important to prevent any failure before it occurs.
- When using new filters, do not unwrap them until just before use.

ELECTRICAL COMPONENTS

- It is extremely dangerous if electrical components become wet or the film covering them is broken. This may lead to an electrical short, resulting in a malfunction of the machine.
When washing the machine, take care not to get water onto the electrical components.
- Never remove any electrical components from the machine or disassemble them.
- Always consult Morooka or your Morooka distributor before installing additional electrical components to your machine.
- After the machine has been used near the sea or after it has been used for spreading fertilizer, wipe the electrical components carefully with a dry cloth to prevent corrosion.

HYDRAULIC SYSTEM

- The hydraulic equipment is at high temperature and high pressure during operations and immediately after operations have been completed.
When carrying out inspections and maintenance of the hydraulic equipment, always do as follows.
 - Park the machine on a level ground, and lower the dump body so that there is no pressure in the hydraulic cylinder circuit.
 - Always stop the engine.
 - Loosen the hydraulic tank cap slowly, then remove it.
 - Always wait for the temperature to cool down before starting maintenance. Even when the temperature cools down, the circuits are still under internal pressure, so when removing plugs or hoses, do not stand directly in front of them, and loosen the connections slowly before removing.

- When high pressure hoses, connections or hydraulic equipment have been removed, always replace the O-rings and packings with new ones.
- When replacing or cleaning the hydraulic oil line filter or strainer, or when replacing or repairing the hydraulic equipment or hoses, always bleed the air from the circuit after completion of the operation.

PRECAUTIONS FOR MAINTENANCE

WARNING

- Before carrying out inspection and maintenance, always read “PRECAUTIONS DURING INSPECTION AND MAINTENANCE” in “PRECAUTIONS” on page 19 and make sure that you understand the safety procedures for operations.
- Do not carry out any operation not listed in this manual for inspections and maintenance. When carrying out inspections and maintenance of the engine, thoroughly read and understand the contents of the separate engine operation manual.

CHECK HOUR METER

- Read the hour meter every day to check if the required interval has been reached for any maintenance item.

USE GENUINE PARTS

- When replacing parts, always use the genuine parts specified in the parts list.

PRECAUTIONS WHEN ADDING OR CHANGING OIL OR GREASE

- When adding or changing fuel, oil, or grease, always use the type specified by Morooka. Be sure to use the viscosity specified for the ambient temperature.
- Never mix oils of different types or brands.
- The oil filled in the machine when the machine is shipped from the factory is as shown in the table below. It is recommended to use the oil in the table below when changing.

Item	Type	Brand
Engine oil pan	CK-4 15W-40	Cummins Premium Blue CK-4 15W-40
Hydraulic tank	Hydraulic oil #46	Morooka Genuine ESPECIAL HYD X
DEF tank	DEF	AdBlue
Travel motor reduction gear case	SAE90 GL-4	Showa Shell Sekiyu Spirax EP90
General grease point	Chassis Grease	-
Rear Idler Shaft	Bearing grease	Epnoc grease AP(N)0

PRECAUTIONS WHEN WASHING OR CLEANING MACHINE

- Wash or clean the machine to make it easier to locate problem areas. In particular, wash the oil filler, level gauge, and greasing plugs to prevent dirt or mud from entering when adding oil or grease.
- Cover electrical components, such as the starting motor or alternator, with a sheet to prevent water from getting on them.
- Do not carry out high-pressure washing for the radiator or oil cooler parts.

BE CAREFUL OF OIL/COOLANT TEMPERATURE

- It is dangerous to drain the oil/coolant or replace the filters immediately after stopping the engine. Wait for the machine to cool down before carrying out such operations.
- When draining the oil, warm up the oil to a suitable temperature [approx. 20 to 40°C (68 to 104°F)].

PRECAUTIONS WHEN CHECKING OIL LEVEL, ADDING OIL

- When checking the oil level or adding oil, choose a place where there is no dust to prevent dirt from getting in.
- Use clean oil and grease. Use a clean container to prevent dirt from getting in.
- If there is a strainer fitted to the oil filler port, do not remove the strainer when adding oil.
- The oil level should not be too high or too low. Check that the lubricating oil is at the correct level.

CHECKING DRAINED OIL, FILTER

- When the oil has been changed or the filter replaced, always check the drained oil and removed filter to check for metal particles or other foreign matter.

SETTING UP WARNING SIGNS

- When the oil or coolant is drained, put warning signs (Part No.: 1-41010-1210) in the operator's station to prevent anyone from starting the engine by mistake.

PRECAUTIONS WHEN WASHING PARTS

- When washing parts, use a non-flammable cleaning agent or diesel oil. When using diesel oil, do not bring lighted cigarettes or cigarette lighters close.

PRECAUTIONS WHEN INSTALLING PARTS

- When O-rings, gaskets, or other seals are used for the mounting surface, clean the mounting surface and always replace the seals with new ones.

PRECAUTIONS WHEN CARRYING OUT INSPECTIONS AND MAINTENANCE ON A MACHINE AFTER OPERATIONS IN DUSTY AREAS

- Frequently check the air cleaner for clogging (check the dust indicator), and clean the air cleaner element at shorter intervals.
- Clean the radiator core, oil cooler core and intercooler core at shorter intervals to prevent clogging.
- Replace the fuel filter at shorter intervals.
- Clean electrical components, such as the starting motor and alternator frequently

PRECAUTIONS WHEN CARRYING OUT INSPECTIONS AND MAINTENANCE ON MACHINES BEFORE STARTING OPERATIONS IN SWAMPY AREAS, RAIN, RIVERBEDS, OR SNOW

- Before starting operations, check that the drain plug under the engine and the greasing plugs for the track rollers are securely tightened.
- After completion of operations, wash the machine carefully and check for cracks and damage, and for loose or missing nuts and bolts.

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

NOTICE

Engine oil has a substantial impact on the performance, service life, and starting performance of the engine. Be sure to use engine oil with the grade API CK-4 or CK-4 class.

Be sure to use the specified viscosity (see the table below) according to the ambient temperature. Use the appropriate engine oil depending on the temperature.

Be sure to use ultra-low sulfur light oil (sulfur 10 ppm or lower) as fuel.

Never use the followings that can cause the machine failure.

- Substitute fuels such as irregular bio-based fuel heating oil
- Additives such as antifreeze agents, water solubilizes, etc.
- The refill capacity is the amount of oil added when changing the oil during inspections and maintenance.
- When starting the engine in an ambient temperature of 0°C or lower, always use a grade specified for temperatures below 0°C, even if the temperature goes up to 10°C during the daytime.
- For the antifreeze mixing rate of coolant, see "PRECAUTIONS FOR LOW TEMPERATURE" in "COLD WEATHER OPERATION" section.

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE								CAPACITY	
		-22 -30	-4 -20	14 -10	32 0	50 10	68 20	86 30	104 F 40 °C	Specified	Refill
Engine oil pan	Engine oil									—	19 ℓ 5.02 US gal 4.18 UK gal (With Filter)
Hydraulic oil tank	Hydraulic oil										
Travel motor reduction gear case(each)	Gear oil									—	6 ℓ 1.59 US gal 1.32 UK gal
Fuel tank	Diesel fuel										
DEF tank	Urea										
Cooling system	Water										

OM-54022-0010E

REMARK

- When starting the engine in an atmospheric temperature of lower than 0°C (32°F), be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C (50°F) more or less in the day time.
- There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30, 15W-40), but be sure to add single grade oil that matches the temperature in the table.
- We recommend genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

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

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

ASTM: American Society of Testing and Material

SAE: Society of Automotive Engineers

API: American Petroleum Institute

- Hydraulic oil: Morooka Genuine ESPECIAL HYD X.
- When changing the hydraulic oil, please contact your distributor.

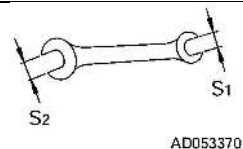
TOOLS AND TIGHTENING TORQUES

INTRODUCTION OF NECESSARY TOOLS

The following tools are required for maintenance.

If a tool is broken or worn, consult Morooka or your Morooka distributor to place an order.

No.	Name of tool	Part No.	Remarks
1	Wrench set	0-9100-00000 0-9100-00709 0-9100-00810 0-9100-01113 0-9100-01214 0-9100-01719 0-9100-02224	Width across flats (S1 × S2) 7 mm x 9 mm 8 mm x 10 mm 11 mm x 13 mm 12 mm x 14 mm 17 mm x 19 mm 22 mm x 24 mm
2	Grease gun	0-9500-00000	
3	Grease cartridge	0-9501-00000	



TORQUE LIST FOR BOLTS AND NUTS

NOTICE

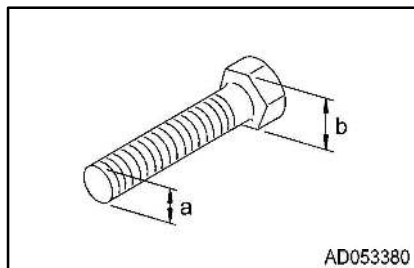
For parts with tightening fixtures made of resin, do not tighten bolts or nuts with excessive tightening torque. Overtightening can damage the resin parts. Be extremely careful when tightening.

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

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

REFERENCE VALUES

Thread diameter x Pitch (a) (mm x mm)	Width across flats (b) (mm)	Tensile strength 4T		Tensile strength 8T		Tensile strength 11T	
		kgf-m	N-m	kgf-m	N-m	kgf-m	N-m
M3×0.5	5.5	0.06	0.6	0.13	1.23	0.17	1.7
M4×0.7	7	0.2	1.5	0.29	2.87	0.4	3.96
M5×0.8	8	0.3	2.99	0.59	5.8	0.82	8.01
M6×1	10	0.5	5.08	1	9.8	1.4	13.6
M8×1.25	13	1.3	12.34	2.4	23.9	3.4	33
M10×1.5	17	2.5	24.44	4.8	47.3	6.7	65.4
M12×1.75	19	4.3	42.63	8.4	82.6	11.6	114.1
M14×2.0	22	6.9	67.85	13.4	131.4	18.5	181.7
M16×2.0	24	10.8	105.87	20.9	205	28.9	283.4
M18×2.5	27	14.9	145.65	28.8	282.1	39.8	389.9
M20×2.5	30	21.1	206.51	40.8	400	56.4	552.9
M22×2.5	32	28.6	280.94	55.5	544.1	76.7	752.1
M24×3.0	36	36.4	357.05	70.5	691.5	97.5	955.9
M27×3.0	41	53.3	522.3	103.1	1011.6	142.6	1398.3
M30×3.5	46	72.3	709.3	140.1	1373.7	193.6	1899
M33×3.5	50	98.4	965.21	190.6	1869.3	263.5	2584.1
M36×4.0	55	126.4	1239.57	244.8	2400.7	338.4	3318.6
M39×4.0	60	163.6	1604.21	316.8	3106.9	437.9	4294.8



PERIODIC REPLACEMENT OF CRITICAL PARTS

PERIODIC REPLACEMENT INTERVAL (EVERY 2 YEARS)

In order to further increase the safety of the machine Morooka recommends periodic inspection and replacement of critical parts (hydraulic hoses, fuel hoses, etc.) which are related to causes of fire and to efficiency in the raising and lowering of the dump body and traveling and stopping functions of the machine.

With these parts, the material changes as time passes, and they easily wear or deteriorate. However, it is difficult to judge the condition of the parts simply by periodic maintenance, so they should always be replaced after a fixed time has passed, regardless of their condition. Always replace them with new genuine parts to ensure that the machine always maintains its function completely.

PERIODIC INSPECTION**WARNING**

- Check the hydraulic hoses, fuel hoses and DEF hoses carefully for cracks, wear, gouging, swelling, crushing, and check that there is no leakage from the connections. When carrying out checks before starting, always check the ground under the machine for traces of leakage.
- When replacing the hoses for hydraulic, fuel and DEF lines, always order genuine parts. Never use any imitation or substitute parts.
- When any hydraulic hose is replaced, always replace the O-rings at the same time. Failure to do can cause leakage.

If the monthly inspection or checks before starting show any abnormality, such as leakage, deformation, or cracking, tighten the parts immediately or replace them with new genuine parts.

When doing this, check the hose clamps at the same time, and replace them if they are deformed or cracked.

Check and repair any hydraulic hoses, even if they are not listed as critical parts.

The table below shows the checks to be carried out during periodic maintenance.

Periodic maintenance interval	Inspection items
Checks before starting	• Leakage from connected/crimped sections of fuel hoses and hydraulic hoses
Monthly inspection	• Leakage from connected/crimped sections of fuel hoses and hydraulic hoses • DEF hose and connection of DEF hose • Damage of fuel hose, DEF hose, and hydraulic hose (cracks, wear, gouging, swelling, crushing) • Interference with other parts
Every 2 years inspection	• Replacement of critical parts • Leakage from connected/crimped sections of engine hoses, fuel hoses and hydraulic hoses • DEF hose and connection of DEF hose • Damage of fuel hose, DEF hose, and hydraulic hose (cracks, wear, gouging, swelling, crushing) • Interference with other parts

SPECIFIED PERIODIC REPLACEMENT PARTS

CAUTION

- For the fuel hoses in the engine, see the separate engine parts list. Carry out inspection in the same way as the periodic replacement parts specified by Morooka. Replace if there is any abnormality.
- See the parts list for part numbers for the periodic replacement parts specified by Morooka and consult Morooka or your Morooka distributor to place an order.

The parts shown in the table below are specified as the periodic replacement parts.

See the parts list specified by Morooka for details on each part.

Periodic replacement parts	Replacement interval
Fuel hose	Replace every 2 years
Hydraulic hose	
Engine oil hose	
Seat belt	Replace every 3 years

- Fuel tank: Fuel gauge hose
If the gauge hose is deteriorated, replace it.

MAINTENANCE PROCEDURE

OUTLINE OF INSPECTION AND MAINTENANCE PROCEDURES

This section explains the methods for inspection and maintenance operations.

Always observe the precautions related to safety for each item and carry out the procedures.

Do not attempt to carry out the procedure if you feel it is difficult. Consult Morooka or your Morooka distributor.

MAINTENANCE SCHEDULE CHART

Maintenance item
WHEN REQUIRED
CHECK, ADJUST RUBBER CRAWLER TENSION (P.158)
CHECK RUBBER CRAWLER FOR DAMAGE AND WEAR (P.159/159)
CHECK AIR CLEANER, CLEAN OR REPLACE IF NECESSARY (P.160)
CHECK, CLEAN RADIATOR, OIL COOLER, INTER COOLER, AND AIR CONDITIONER CONDENSER FINS (P.163)
CHECK COOLER REFRIGERANT (GAS) VOLUME (P.165)
CHECK THE WINDOW WASHER FLUID LEVEL AND ADD FLUID IF NECESSARY (P.167)
CLEAN AIR FILTER FOR AIR CONDITIONER, REPLACE IF NECESSARY (P.168)
AIR BLEEDING FROM FUEL SYSTEM (P.170)
WEAR CHECK OF BUSH AT TRACK ROLLER PIVOT SHAFT (P.171)
CHECK FUSE FOR ENGINE PREHEATING CIRCUIT, REPLACE IF NECESSARY (P.172)
HANDLING BATTERY (P.173)
CHECK FUSE AND RELAY (P.177)
INITIAL 50 HOURS SERVICE
CHECK ENGINE LUBRICATING OIL LEVEL, ADD OIL IF NECESSARY (P.101)
REPLACE WATER SEPARATOR (P.192)
REPLACE FUEL FILTER (P.190)
EVERY 50 HOURS SERVICE
GREASE MOVING PARTS (P.182)
INITIAL 1-0 HOURS SERVICE
CHANGE OIL INSIDE TRAVEL MOTOR REDUCTION GEAR CASE (P.205)
EVERY 100 HOURS SERVICE
CHECK COOLING FAN FOR DAMAGE (ENGINE) (P.185)
EVERY 250 HOURS SERVICE
GREASE REAR IDLER SHAFT (P.185)
EVERY 3 MONTHS SERVICE
CHECK LEAKAGE OF COOLANT (P.187)
EVERY 500 HOURS SERVICE

Maintenance item
CHANGE ENGINE LUBRICATING OIL, REPLACE ENGINE OIL FILTER (P.188)
REPLACE FUEL FILTER (P.190)
REPLACE WATER SEPARATOR (P.192)
REPLACE HYDRAULIC OIL LINE FILTER (P.193)
CHANGE OIL IN HYDRAULIC OIL TANK (P.195)
CHECK BATTERY ELECTROLYTE LEVEL, REFILL DISTILLED WATER IF NECESSARY (P.203)
EVERY 1000 HOURS SERVICE
CHECK FAN BELT (P.204)
CHECK FAN BELT TENSIONER (P.204)
CHECK ALTERNATOR (P.204)
CHECK WATER PUMP (P.204)
REPLACE DEF TANK UNIT FILTER (P.204)
CHANGE OIL INSIDE TRAVEL MOTOR REDUCTION GEAR CASE (P.205)
EVERY 2000 HOURS SERVICE
CLEAN INSIDE OF COOLING SYSTEM, CHANGE COOLANT IF NECESSARY (P.206)
CHECK CRANKSHAFT VIBRATION DAMPER (P.208)
REPLACE CRANKCASE BREATHER FILTER (P.208)
EVERY 4500 HOURS SERVICE
209REPLACE DEF DOSING FILTER (P.209)
EVERY 5000 HOURS SERVICE
CHECK VALVE CLEARANCE (P.209)

WHEN REQUIRED

CHECK, ADJUST RUBBER CRAWLER TENSION

WARNING

The tension adjuster for the rubber crawler is charged with grease. The grease is kept under high pressure by the recoil spring inside the tension adjuster.

Always follow the precautions given below. Failure to do so may cause the valve to fly out, resulting in serious injury or accident.

- Never loosen the tension adjustment valve more than one turn. There is a danger that the valve may fly out.
- When adjusting the tension, never stand directly in front of the valve. It is dangerous.

• **CHECK TENSION**

1. Move the machine a short distance forward and backward, and then stop the engine.

2. Measure distance A from the rear end of the track frame to the center of the idler, and check that it is within the following range.

★Dimension A: 435 ± 20 mm

If the result of the measurement shows that dimension A is larger than the specified range, adjust the rubber crawler tension. For details, see "ADJUST TENSION".

• **ADJUSTING WHEN TENSION IS LOOSE**

(When measured value is smaller than dimension A)

★Before adjusting, prepare a grease pump.

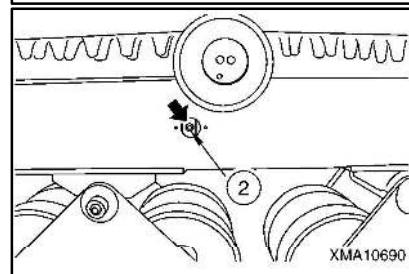
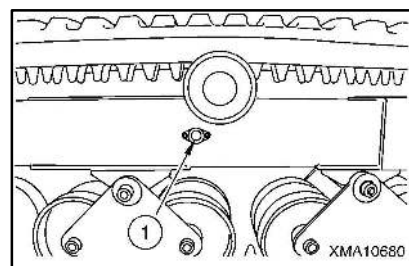
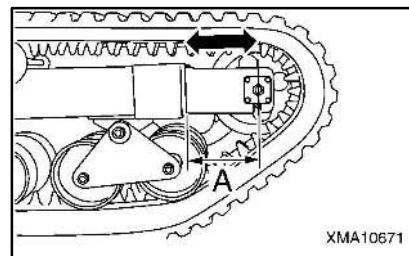
1. Remove bolts and remove grease valve cover (1).

2. Pump in grease through valve (2) until dimension A is within the range given in "CHECK TENSION" by using a grease pump.

If the measured value is not within the range of dimension A even when grease is pumped in, the rubber crawler must be replaced, or there is probably an abnormality in the tension adjuster. Consult Morooka or your Morooka distributor.

3. Move the machine a short distance forward and backward to make the tension uniform, and then repeat the steps in "CHECK TENSION" to measure dimension A.

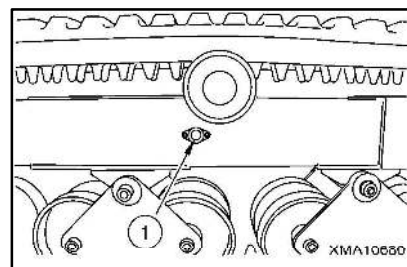
4. Install grease valve cover (1) and tighten the bolts.



• ADJUSTING WHEN TENSION IS TIGHT

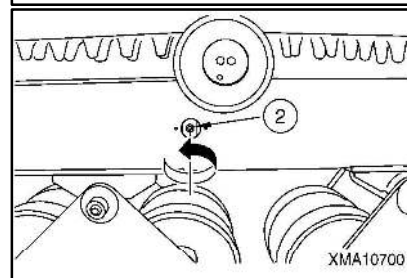
(When measured value is larger than dimension A)

1. Remove bolts and remove grease valve cover (1).



2. Loosen the valve (2), then drain grease through valve (2) until dimension A falls in the range given in "CHECK TENSION".

- ★ If the grease comes out slowly, push the idler end of the rubber crawler firmly. Never loosen valve (2) more than one turn.
- ★ If the grease still comes out slowly, start the engine and move the machine a short distance forward and backward.



3. Tighten valve (2) securely.

4. Move the machine a short distance forward and backward to make the tension uniform, and then repeat the steps in "CHECK TENSION" to measure dimension A.

5. Install grease valve cover (1) and tighten the bolts.

CHECK RUBBER CRAWLER FOR DAMAGE AND WEAR

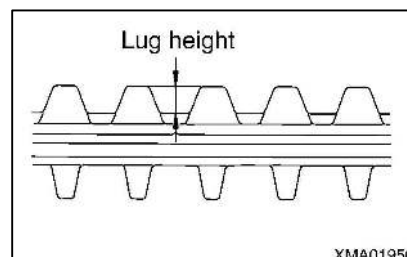
WARNING

If there are any large cracks or damage to the rubber crawler, replace the rubber crawler immediately. The rubber crawler may suddenly break during work.

NOTICE

- When checking the rubber crawler, remove all mud and snow from the crawler beforehand.
- Using the rubber crawler when it has exceeded the wear limit can cause slipping and reduce the drawbar pull. If the rubber crawler is in the following condition, replace it with a new one.

- If the height of the lug is 1/3 or less of the standard dimension, replace the rubber crawler.
 - Standard height: 45 mm
 - Wear limit: 15 mm
- If there are cracks or deep cuts and the wire in the core of the rubber crawler can be seen, replace the rubber crawler.



CHECK AIR CLEANER, CLEAN OR REPLACE IF NECESSARY

WARNING

- Be sure to stop the engine before inspecting, cleaning, or replacing the air cleaner.
- When using compressed air, it is dangerous if dust or dirt scatters and gets into your eyes. Always wear safety glasses when cleaning.
- Be sure to use the safety bar when working with the dump body raised.

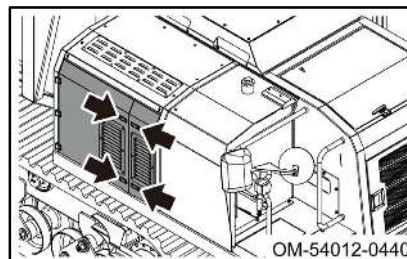
CHECK AIR CLEANER CLOGGING WARNING LAMP

If air cleaner clogging warning lamp (red) on the control panel box on the left side of the operator's seat lights up, clean or replace the air cleaner element.

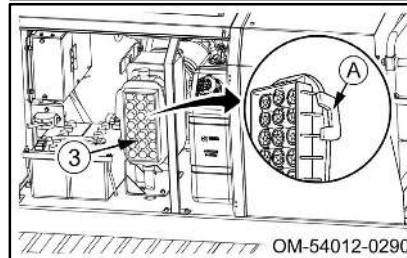


CLEAN OUTER PRE-CLEANER

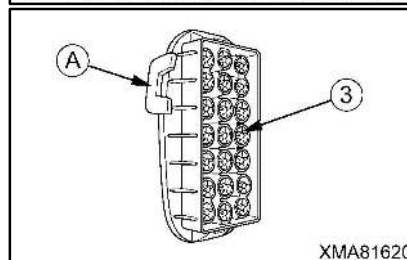
- 1 Open the buckle and open the cover.



- 2 Grasp the handles (A) on the upper left and right of the outer pre-cleaner (3) and spread them outward to unlock and remove outer pre-cleaner (3).



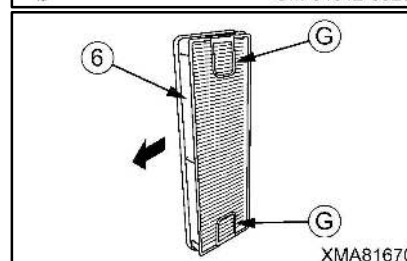
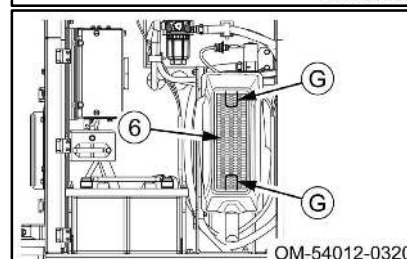
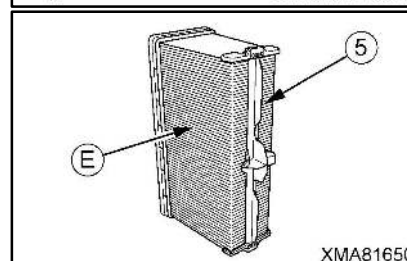
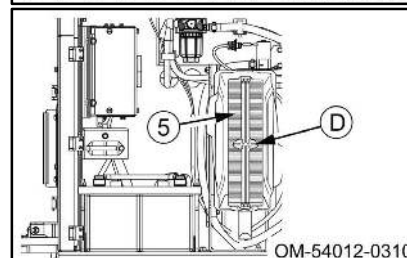
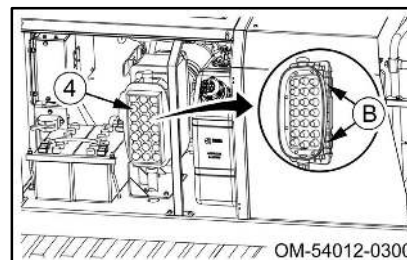
- 3 Clean outer pre-cleaner (3) as follows.
 - Clean with dry compressed air (0.21 MPa or less).
 - If it is very dirty, wash it with warm water with detergent. After that, dry it with compressed air (0.21 MPa or less) so that no moisture remains in the details.
- 4 Align outer pre-cleaner (3) with the air cleaner body and push it in.
 - Make sure that the upper left and right handles (A) of outer pre-cleaner (3) are securely locked.
- 5 Close the inspection cover.



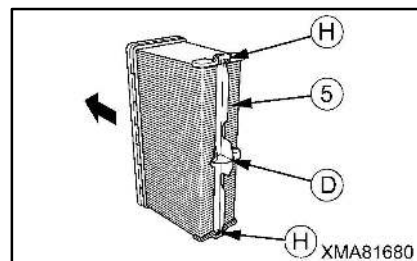
CLEAN AIR CLEANER**NOTICE**

- When cleaning the primary element, do not hit it or knock it against other objects.
- If the folds or seals on the primary element are damaged, replace them with a new one.
- Never clean and reuse the secondary element. Always replace it with a new element.

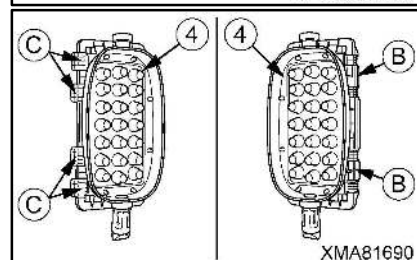
- 1 Remove the outer pre-cleaner by referring the “CLEAN OUTER PRE-CLEANER” section.
- 2 Pull the clips (B) on the upper and lower sides on the right side of inner pre-cleaner (4) (total 4-locations) toward you to unlock, and move inner pre-cleaner (4) to the right to remove it from the air cleaner body.
- 3 Grasp the handle (D) in the center of primary element (5) and pull out primary element (5) toward you.
 - After removing primary element (5), clean the inside of the air cleaner body.
 - Wipe it with a well-wrung cloth to remove dust and foreign matter.
 - When cleaning primary element (5), blow dry compressed air (0.21 MPa or less) from the inside and outside of the element along the folds (E).
 - Inspect the folds of primary element (5), and if there is any damage or wear, replace it with a new one.
 - After cleaning primary element (5), mark the central handle (D) as cleaned. This is a guide for replacing primary element (5) with a new one.
- 4 Grasp the upper and lower ring tabs (G) of secondary element (6) and pull out secondary element (6) toward you.
 - If you replace primary element (5) with a new one, be sure to replace secondary element (6) with a new one as well.
 - After removing secondary element (6), clean the inside of the air cleaner body. At that time, cover the air connector side (air outlet side) with a clean cloth or cloth tape.
 - Be sure to remove the cloth or cloth tape after cleaning.
 - Wipe it with a well-wrung cloth to remove dust and foreign matter. Do not clean with compressed air.
- 5 Insert a new secondary element (6) into the air cleaner body.
 - Make sure the ring tabs (G) are facing toward you.
 - When pushing in secondary element (6), make sure that the force is evenly applied to the four corners so that all sides fit into the air cleaner body.



- 6 Insert primary element (5) into the air cleaner body.
- Make sure the center handle (D) is facing toward you.
 - When pushing in primary element (5), make sure that the upper and lower tabs (H) are evenly pressed so that all surfaces fit into the air cleaner body.



- 7 Insert the tabs (C) (4 tabs) on the left side of inner pre-cleaner (4) into the notches of the air cleaner body, and insert inner pre-cleaner (4) into the air cleaner body.
- Make sure that the clips (B) on the upper and lower right sides of inner pre-cleaner (4) (4 locations) are securely locked.



CHECK, CLEAN RADIATOR, OIL COOLER, INTER COOLER, AND AIR CONDITIONER CONDENSER FINS

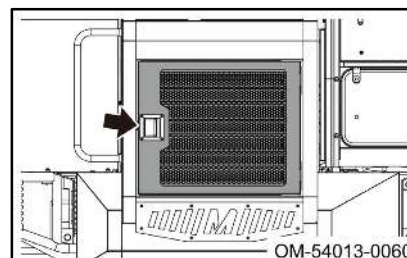
⚠ WARNING

- Always stop the engine before checking and cleaning the fins.
- When using compressed air, there is a danger that dirt and dust may fly and get into eyes. Always wear safety glasses when cleaning.

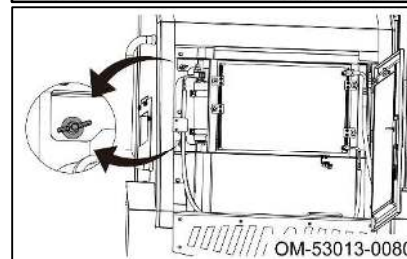
NOTICE

- When cleaning the fins, use compressed air at a pressure of less than "0.29 MPa {3 kgf/cm²}", and blow it away from the fins. If the compressed air is blown directly against the radiator or is blown at high pressure, the fins will be damaged, and this will cause leakage of water or oil.
- When cleaning the fins, use compressed air. Steam or water accelerates clogging of the fins.

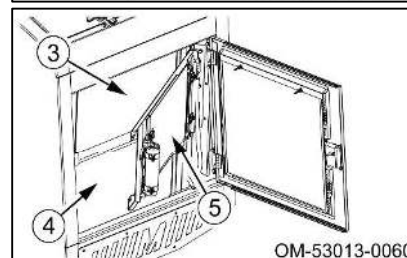
- 1 Open the buckle, open the cover in front of the machine and put a stopper on it.



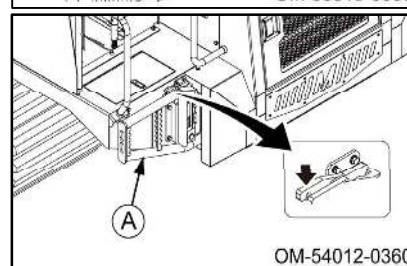
- 2 Opening/closing of the air conditioner condenser.
By removing the wing nuts and washers (2 places), the AC condenser can be opened and closed.



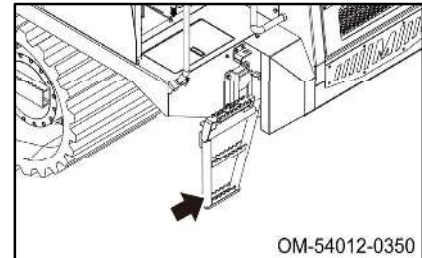
- 3 Check intercooler fins (3), oil cooler fins (4) and condenser fins (5) for clogging of mud, debris, dead leaves and paper debris. If there is clogging, remove it.
If the fins are clogged, blow with dry compressed air (max. 0.29 MPa {3 kgf/cm²}) to clean.



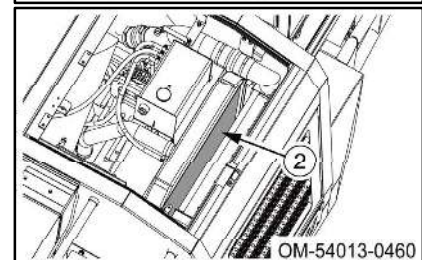
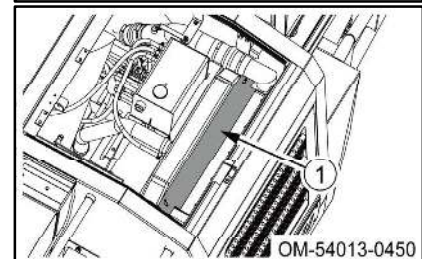
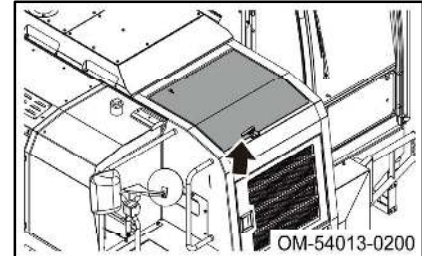
- 4 While holding step (A) by hand, push the lever down to slowly expand step (A).
Step on the expanded steps and get in the machine.



- 5 Open the buckle and pull the handle to open the cover on the top of the machine.



- 6 Remove plate (1) on the radiator and inspect radiator fins (2) for clogging of mud, debris, dead leaves and paper debris.



- 7 When dirt, dead leaves and paper wastes are found during inspection, remove them. If the fins are clogged, blow with dry compressed air (max. 0.29 MPa {3 kgf/cm²}) to clean.
- 8 After inspection and cleaning, close the cover in the reverse order of opening.

CHECK COOLER REFRIGERANT (GAS) VOLUME

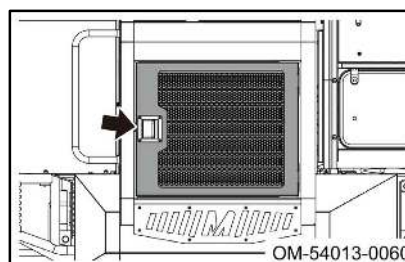
WARNING

- Cooler refrigerant can cause blindness and frostbite if it gets into your eyes or gets in your hands.
Do not remove or loosen the parts of the refrigerant circuit.
- Be sure to ask your distributor to refill the refrigerant.

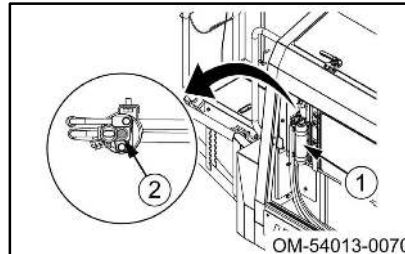
NOTICE

- Continuing operation with insufficient or no refrigerant may cause damage to the compressor. Be sure to check the amount of refrigerant before using the cooler.
- Even during the off-season when the cooler is not used, operate the cooler once a month for about 3 to 5 minutes.

- 1 Open the buckle, open the cover in front of the machine and put a stopper on it.



- 2
 - Check the amount of refrigerant in the cooler with sight gauge (2) (inspection window) above the receiver, which is filled with gas.
Receiver (1) is located at the left side of the capacitor in the front grille.



- Check the amount of refrigerant in the cooler as follows.

- 1 Raise the dump body. See the "OPERATING DUMP BODY" in "OPERATION" on page 127
- 2 Open the cover for inspection.
- 3 Start the engine and set it in a high idling state.
- 4 Set the air conditioner controller in the cab to cooling mode and high-speed operation.
- 5 Look through sight gauge (2) (inspection window) of receiver (1), check the state of the gas flowing in the refrigerant circuit, and compare it with the table below to make a judgment.

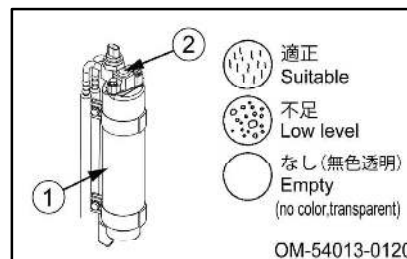
Judgment of refrigerant level	Condition in sight gauge
Suitable	No bubbles in refrigerant flow.
Low level	Continuous bubbles in refrigerant flow
Empty	Sight gauge is colorless, transparent

- 6 Make sure there is no oil bleeding on receiver (1) piping connections. If the oil is bleeding, there is a gas leak.
- 7 Lower the dump body. See the "OPERATING DUMP BODY" in "OPERATION" on page 127.

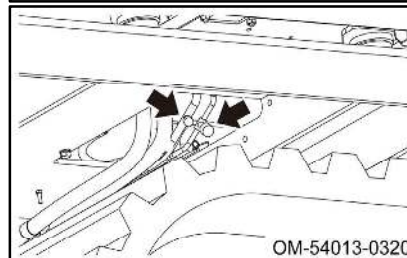
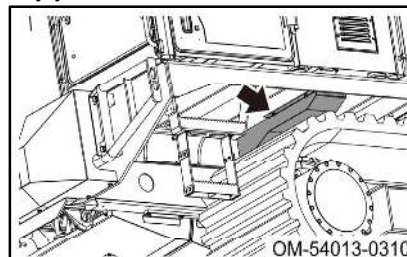
Check the refrigerant amount in the cooler, refill if necessary.

Be sure to ask your distributor to refill the refrigerant. Never refill refrigerant by yourself.

- 1 Remove the lower cover on the left side of the machine.



- 2 There is an inlet. Fill refrigerant.

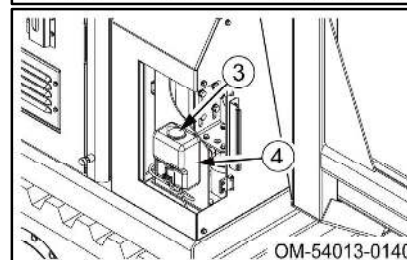
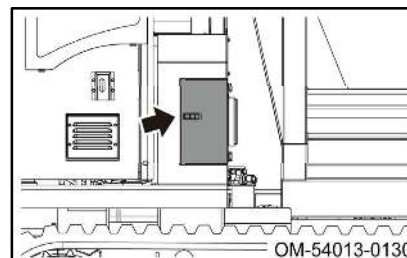


CHECK THE WINDOW WASHER FLUID LEVEL AND ADD FLUID IF NECESSARY

If the window washer fluid does not come out, check the fluid level in washer tank (4).

If the level is low, remove cap (3) from the washer tank and refill automobile window washer fluid.

- When adding washer fluid, be careful not to let dirt get in.
- Washer tank (4) is installed in the cover behind the cabin. Pull the handle to open the cover.



MIXING RATIO OF WINDOW WASHER FLUID

Change the mixing rate of the window washer fluid according to the ambient temperature.

Mix the concentrated window washer fluid with tap water according to the proportions given in the table below, and then fill the washer tank.

- There are two types of undiluted window washer fluid, -10°C (for general use) and -30°C (for cold regions) depending on the freezing temperature, so use them properly according to the area of use and the season.

Region, season	Mixing ratio		Freezing temperature
	Concentrated fluid	Tap water	
Normal	1/3	2/3	-10°C
Winter in cold region	1/2	1/2	-20°C
Winter in cold region	Use undiluted washer fluid	None	-30°C

CLEAN AIR FILTER FOR AIR CONDITIONER, REPLACE IF NECESSARY

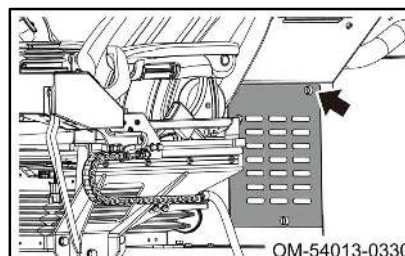
NOTICE

- If the air filters are not cleaned for long periods, the cooling and heating effect of the air conditioner drops and it can cause breakage of the equipment.
- When cleaning the air filters, do not use compressed air or wash with water.
- If the air filters are severely damaged or deteriorated, replace with new ones. We recommend that you replace the air filters once a year even if they are not damaged or deteriorated.

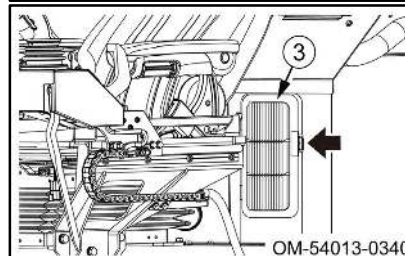
INTERNAL AIR RECIRCULATION SUCTION PORT

The air filter for the internal air circulation intake port is installed in front of the air conditioner box behind the operator's seat.

- 1 Remove the screw with a coin, and then remove the cover.



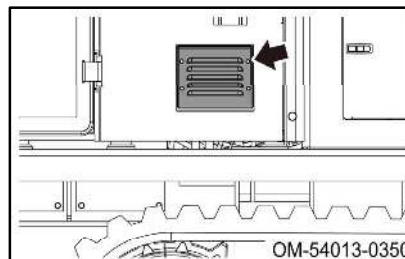
- 2 Grasp the frame of air filter (3) and take out the filter.
- 3 Tap the air filter lightly and remove dust and dirt.
 - If the air filters are severely damaged or deteriorated, replace with new ones.
- 4 After cleaning, insert air filter (3) in its original position.
- 5 Install the cover in the reverse order of removal.



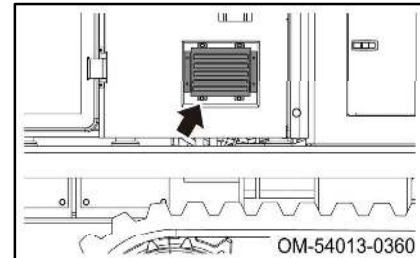
FRESH AIR INLET

The air filter for the fresh air inlet is installed on the left outside of the cab.

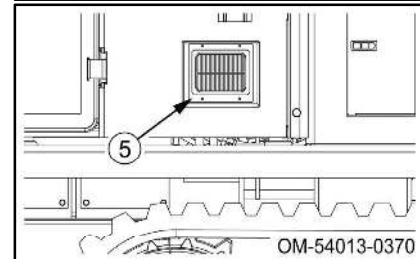
- 1 Remove the mounting bolts and cover.



- 2 Remove mounting bolts and filter cover.



- 3 Grasp the frame of air filter (5) and take out the filter.
- 4 Tap the air filter lightly and remove dust and dirt.
 - If the air filters are severely damaged or deteriorated, replace with new ones.
- 5 After cleaning, insert air filter (5) in its original position.
- 6 Install the cover in the reverse order of removal.



AIR BLEEDING FROM FUEL SYSTEM

WARNING

Keep away from fire such as cigarettes and writers while bleeding air inside the fuel filter.
Also, be sure to stop the engine before bleeding air. Otherwise, this can cause a fire.

CAUTION

- Immediately after the engine is stopped, the fuel filter is hot, so if you bleed the air immediately after stopping the engine, there is a risk of burns. Allow the engine to cool down before bleeding air from the fuel filter.
- If fuel is spilled or adhered to the surrounding area, wipe it off immediately. Otherwise, this can cause a fire.
- During the air bleeding work of the fuel filter, the workspace is small, so be careful not to get injured by the edges of surrounding parts.
- Make sure there are no fuel leaks around the fuel filter case. Leaking fuel can cause a fire.

NOTICE

While bleeding air from the fuel system, fuel may flow out from the air bleeding plug and may adhere to surrounding parts.
Set a container to receive fuel under the water separator.

If air enters the fuel system, bleed the fuel system before starting the engine.

Air enters the fuel system in the following cases.

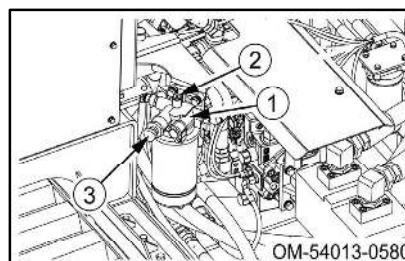
- When the fuel tank is empty or drained
- When replacing the fuel filter

The water separator is located on the inner surface of the left side of the main frame (rear left side of the engine).

Set a container to receive fuel under the water separator.

Follow the procedure below to bleed air from the fuel system.

- 1 Loosen air bleeding plug (2) at the top of water separator (1).
- 2 Turn priming pump (3) counterclockwise to loosen it.
- 3 Press priming pump (3) repeatedly to drain the fuel from air bleeding plug (2).
 - Make sure that the discharged fuel is no longer mixed with air bubbles.
- 4 When the discharged fuel is completely free of air bubbles, tighten air bleeding plug (2).
- 5 Push priming pump (3) several times until the pushing force increases.
- 6 Turn priming pump (3) clockwise to tighten it.
 - Make sure to perform low idling operation at the low speed for 5 minutes.

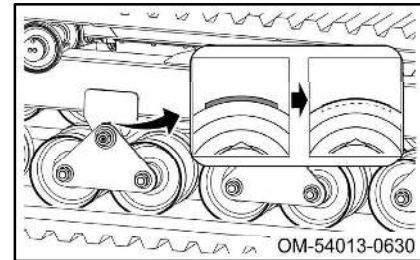


WEAR CHECK OF BUSH AT TRACK ROLLER PIVOT SHAFT

You can check the degree of wear of the bush with the gauge on the top of the track roller pivot shaft.

Looking at the track roller pivot shaft from the front, if the gauge is hidden by the plate in front, it is time to replace the bush.

Please contact your distributor to replace the bush.



CHECK FUSE FOR ENGINE PREHEATING CIRCUIT, REPLACE IF NECESSARY

CAUTION

- When replacing the fuse, be sure to remove the (-) terminal of the battery.
- If a fuse is blown, always check for the cause in that circuit and carry out repairs before replacing the fuse.
- When replacing a fuse, always replace it with a fuse of the same capacity.

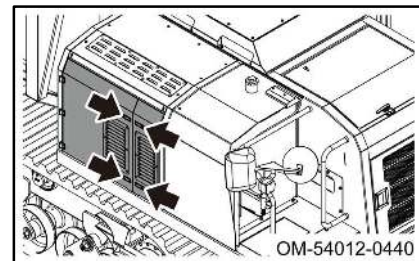
The fuse for air intake (150A) is installed in the cover at the right side of the machine.

This fuse is installed in the circuit between the battery and glow relay.

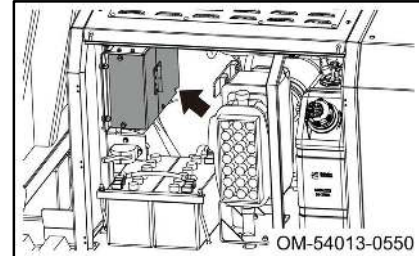
If the engine does not preheat automatically in cold weather, check it and replace if necessary.

Check and replace the fuse as follows.

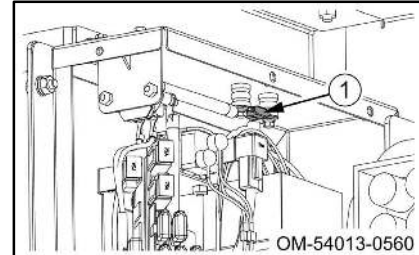
1 Open the buckle and open the cover.



2 Remove the mounting bolts and cover.



3 Check fuses and replace if necessary.



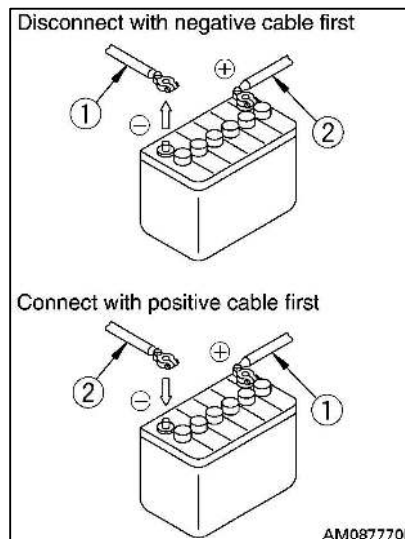
4 After inspecting and replacing the fuse, install it in its original position in the reverse order of removal.

HANDLING BATTERY

When handling the battery, always do as follows.

DANGER

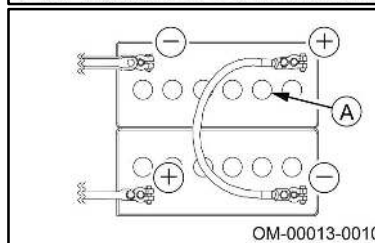
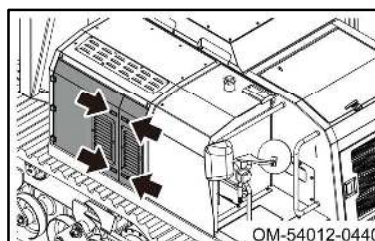
- Before working with the battery, stop the engine and turn the key in the starting switch to the “OFF” position.
- When handling the battery, always wear safety glasses.
- Batteries generate hydrogen gas and can explode. Do not smoke, use a lighter, or create any spark near the battery.
- Battery electrolyte contains sulphuric acid. If you get acid on yourself, immediately flush the area with large amounts of water. If acid gets into your eyes, flush them immediately with large amounts of fresh water, then see a doctor for treatment.
- When removing the battery, first disconnect the negative (-) terminal of the cable from the ground. When installing, be sure to connect the negative (-) terminal last.
- If any tool touches between the battery positive (+) terminal and the chassis, sparks may occur. It is dangerous. Do not put tools and other metal objects in your breast pocket. They may fall out.
- Contact failure caused by loose battery terminals can generate sparks and lead to an explosion. Tighten the battery terminals securely.



● REMOVAL AND INSTALLATION OF BATTERY

REMOVAL

- 1 Open the buckle and open the cover.
- 2 Disconnect the battery cable from negative (-) terminal (ground side), then disconnect positive (+) terminal and cable connecting the batteries in this order.
- 3 Remove the battery.



* The arrangement of the cap and cable may be different.

INSTALLATION

Install the batteries in the reverse order of removal.

- When connecting the battery cables, always install negative (-) terminal (ground side) last.

● PRECAUTIONS WHEN HANDLING BATTERY

- Always be careful not to let the battery become discharged. Do not wait for the battery to become discharged before recharging it; measure the specific gravity of the battery electrolyte beforehand and charge the battery if necessary.

Always keep the battery in good condition to extend the life of the battery.

- When operating the machine in high temperatures, check the level of the battery electrolyte at shorter intervals than specified for periodic inspections and maintenance.
- The performance of the battery significantly drops at low temperatures. Maintain the battery charge rate as close as possible to 100% and insulate it against cold temperatures so that the machine can be started easily the next morning.

When adding distilled water, to prevent the electrolyte from freezing, always add the distilled water immediately before starting operations the next morning.

● PRECAUTIONS WHEN CHARGING BATTERY

If the battery becomes discharged or the battery charge is low, charge the battery.

To charge the battery when it is still mounted on the machine, do as follows.

WARNING

It is dangerous if the temperature of the battery electrolyte exceeds 45°C (113°F) when charging, so stop charging and wait for the temperature to cool down.

- Disconnect the wiring from the battery terminals before charging. Abnormal voltage may be applied to the alternator, causing damage to the alternator.
When disconnecting the wiring, always disconnect the negative (-) terminal wiring first. When connecting the wiring, always connect the negative (-) terminal wiring last.
- When charging, remove all the plugs from the battery cells to allow any gas to escape.
- When the charging is completed, stop the charging immediately. If the battery is overcharged, overheating of the battery causes damage to the battery.

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

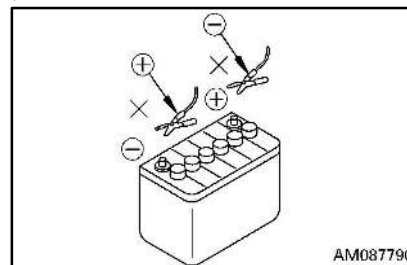
Charge rate (%)	Temp. of battery electrolyte (°C)			
	20	0	-10	-20
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
70	1.23	1.24	1.25	1.26

● STARTING ENGINE WITH BOOSTER CABLES

If the battery is discharged and booster cables are used to start the engine, do as follows.

DANGER

- Be careful not to let the normal machine and problem machine contact each other.
- When connecting the booster cables, never let the positive (+) and negative (-) terminals contact each other.
- Make sure that booster cables are connected correctly. Because sparks are generated when the last negative (-) terminal is connected, do not connect to the negative (-) terminal of the battery on the problem machine. Connect to the engine block.
- When starting the engine with booster cables, always wear safety glasses.



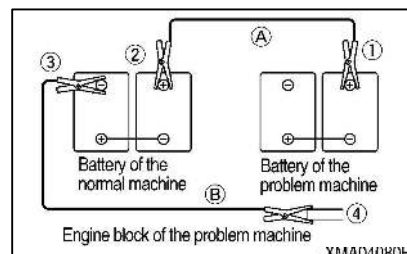
NOTICE

- The size of the booster cables and clip should be suitable for the battery capacity. Check that they are not corroded or damaged.
- The battery on the normal machine must be the same capacity as that on the problem machine.

CONNECTING BOOSTER CABLES

The numbers in the diagram on the right show the order for connecting the cables.

- 1 Make sure that the starting switches of the normal machine and problem machine are both at the OFF position.
- 2 Connect the clips at the ends of booster cable A to the positive (+) terminal of the problem machine and the normal machine.

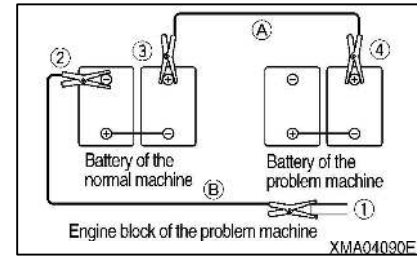


- 3 Connect one clip of booster cable B to the negative (-) terminal of the normal machine.
- 4 Connect the other clip of booster cable B to the engine block of the problem machine.
- 5 Start the problem machine.

DISCONNECTING THE BOOSTER CABLE

The numbers in the diagram on the right indicate the cable disconnection order.

When the engine on the problem machine starts, remove the cables in the reverse order of connecting.



CHECK FUSE AND RELAY

● FUSES TERMINAL BOX AT BATTERY

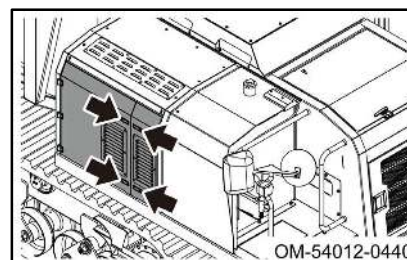
WARNING

- Always turn the starting switch to the OFF position before replacing a fuse.
- If a fuse is blown, always check for the cause in that circuit and carry out repairs before replacing the fuse.
- When replacing a fuse, always replace it with a fuse of the same capacity.

NOTICE

- Fuses are devices that prevent electrical component and wiring from burning out.
- If a fuse is corroded or covered in white powder, always replace it.

Open the buckle and open the cover.



1 SLOW-BLOW FUSE (65 A)

This slow blow fuse is installed in the controller power. Check this fuse and replace if necessary when the switches in the CAB does not work or when the power does not turn on even if the starting switch is turned "ON".

2 SLOW-BLOW FUSE (75 A)

Check this fuse and replace if necessary when any problems occur in the battery charging system with the engine running.

3 SLOW-BLOW FUSE (75 A)

This slow blow fuse is installed in the circuit of ACC power. Check this fuse and replace when the power cannot be turned ON with the starting switch in the "ON" position.

4 FUSE (15 A)

This fuse is installed in the power supply circuit of the aftertreatment system. Check this fuse and replace if necessary when the purge lamp does not light up.

5 FUSE (10 A)

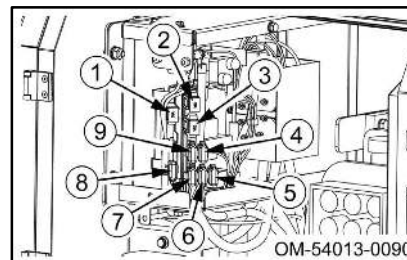
This fuse is installed in the DEF heater power circuit.

6 FUSE (10 A)

This fuse is installed in the DEF power circuit.

7 FUSE (10 A)

This fuse is installed in the diagnostic connector circuit.



8 **FUSE (30 A)**

This fuse is installed in the ECM circuit.

Check this fuse and replace if necessary when the engine cannot be started.

9 **FUSE (30 A)**

This fuse is installed in the RADIO circuit.

Check this fuse and replace if necessary when the radio does not work.

A **HEATER RELAY**

This mini-fuse is installed in the heater circuit.

B **STARTER RELAY**

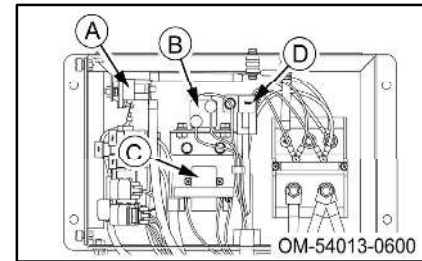
It is a relay to turn the starter.

C **ACC RELAY**

It is a relay for supplying power to each electrical component when the starting switch is in the "ON" position.

D **CONTROLLER RELAY**

It is a relay for supplying power to the machine controller.



● CHECK FUSE BOX

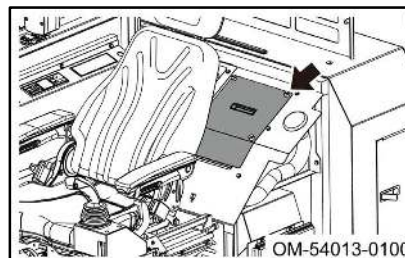
CAUTION

- Always turn the starting switch to the OFF position before replacing a fuse.
- If a fuse is blown, always check for the cause in that circuit and carry out repairs before replacing the fuse.
- When replacing a fuse, always replace it with a fuse of the same capacity.

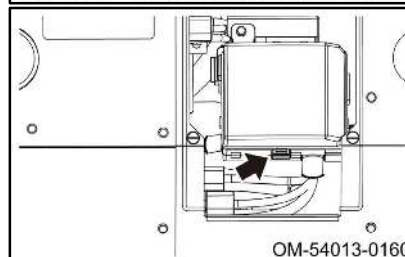
NOTICE

Fuses are devices that prevent electrical component and wiring from burning out.
If a fuse is corroded or covered in white powder, always replace it.

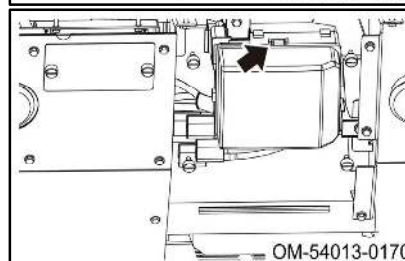
- 1 Remove the cover behind the operator's seat, and inspect the fuse and relay. Replace them if necessary.



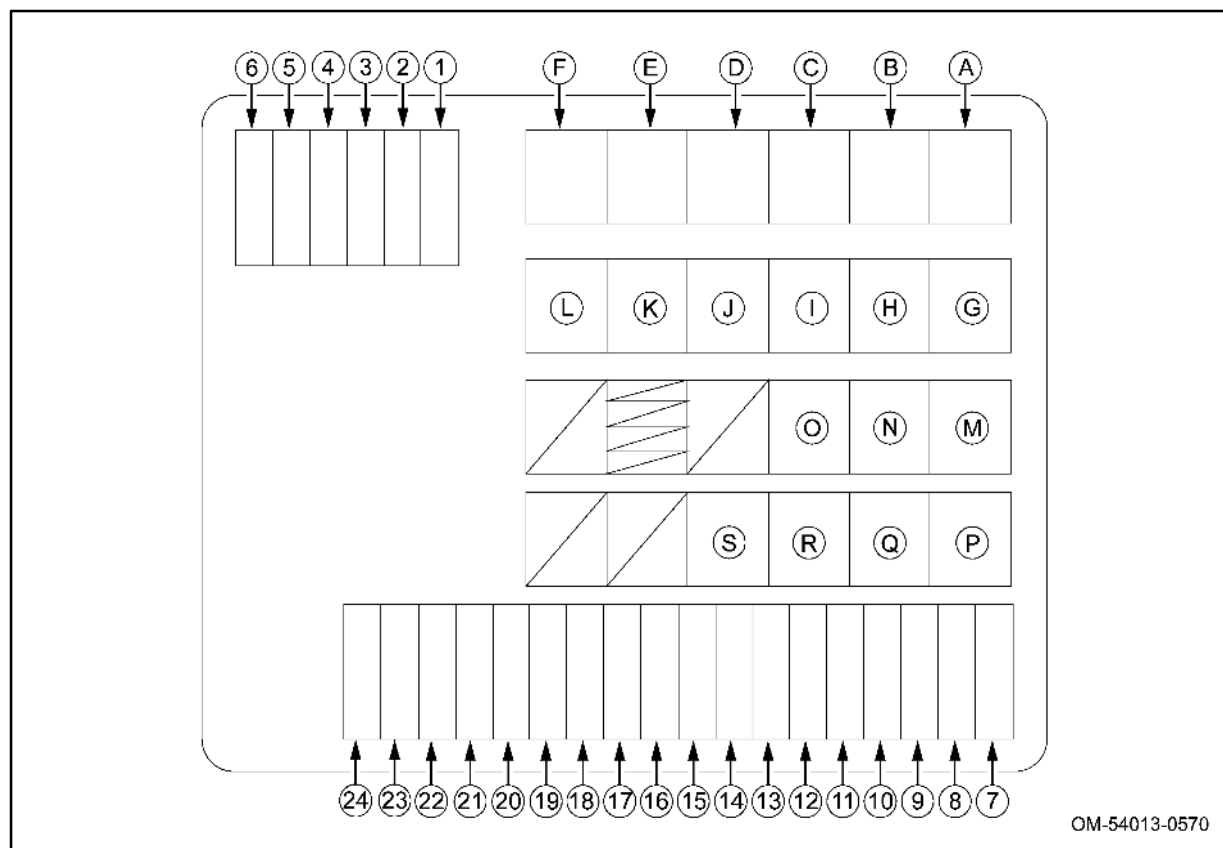
- 2 Unlock the lock under part of the fuse box cover.



- 3 Unlock the upper part of the fuse box cover.



- 4 The fuses inside of the fuse box are used for the circuits shown in the table below.



No.	Capacity	Name of circuit
1	3 A	Spare fuse
2	3 A	Spare fuse
3	5 A	Spare fuse
4	5 A	Spare fuse
5	10 A	Spare fuse
6	10 A	Spare fuse
7	15 A	Spare fuse
8	15 A	Spare fuse
9	20 A	Spare fuse
10	3 A	Key switch (ECM)
11	5 A	A/C panel, servo motor, compressor relay, blower main relay
12	20 A	Radio, writer, wiper motor, washer tank
13	20 A	A/C blower relay
14	3 A	Battery charge lamp
15	15 A	Headlight relay
16	10 A	A/C compressor clutch relay
17	3 A	Monitor display, monitor buzzer, horn switch
18	10 A	Centralized switch (HMR), gate lever, joystick, dump safety switch, EDC valve CCO

No.	Capacity	Name of circuit
19	5 A	Air cleaner lamp, air cleaner sensor, DEF lamp
20	5 A	Parking switch, parking buzzer
21	10 A	Mini ECU (slope sensor)
22	10 A	For spare power supply
23	10 A	For spare power supply
24	5 A	Spare
A	-	DEF heater ① relay
B	-	DEF heater ② relay
C	-	DEF heater ③ relay
D	-	K2 relay
E	-	Module relay
F	-	Wiper relay
G	-	Washer relay
H	-	Aftertreatment system relay
I	-	Emergency stop relay
J	-	Headlight relay
K	-	Auxiliary relay
L	-	Auxiliary relay
M	-	Auxiliary relay
N	-	A/C blower main relay
O	-	Auxiliary relay
P	-	Auxiliary relay
Q	-	Auxiliary relay
R	-	Auxiliary relay
S	-	Auxiliary relay

INITIAL 50 HOURS SERVICE

Carry out the following maintenance after the initial 50 hours operation for new machines.

- CHANGE ENGINE LUBRICATING OIL, REPLACE ENGINE OIL FILTER (P.188)
- REPLACE WATER SEPARATOR (P.192)
- REPLACE FUEL FILTER (P.190)

EVERY 50 HOURS SERVICE

GREASE MOVING PARTS

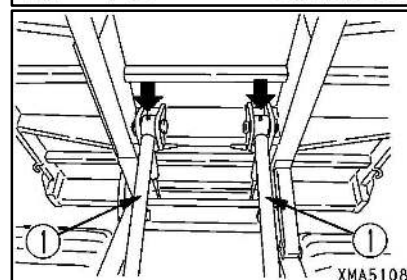
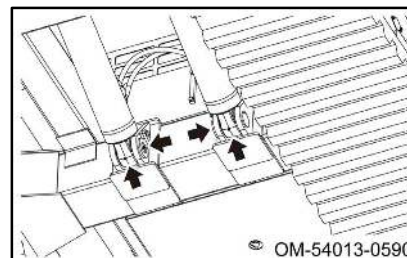
● GREASE DUMP CYLINDER PARTS

WARNING

- When the dump body is raised for inspection, be sure to use the safety bar.

Prepare a grease pump.

- 1 Raise the dump body. See “OPERATING DUMP BODY” in the “OPERATION” section. (P.127)
- 2 Grease the bottom parts (4 places on the left and right) of the dump cylinder.
- 3 Grease the piston rods (2 places on the left and right) of dump cylinder (1).



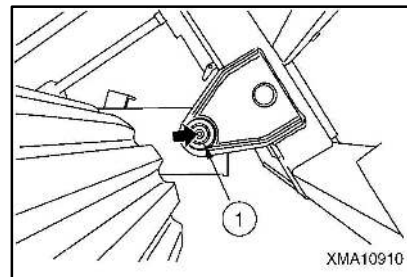
● GREASE DUMP BODY HINGE PINS

WARNING

- When the dump body is raised for inspection, be sure to use the safety bar.

Prepare a grease pump.

- 1 Raise the dump body. See “OPERATING DUMP BODY” in the “OPERATION” section. (P.127)
- 2 Grease dump body hinge pins (1) (left and right: 2 locations). Continue greasing until old grease is extruded.

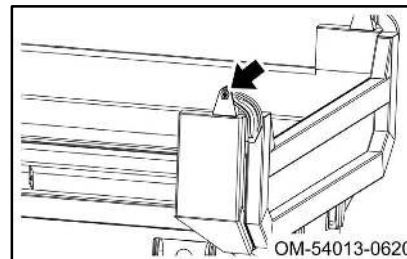


- 3 After greasing, wipe off extruded old grease.

● GREASE FLAP OPEN/CLOSE LEVER AT REAR PART OF DUMP BODY

Prepare a grease pump.

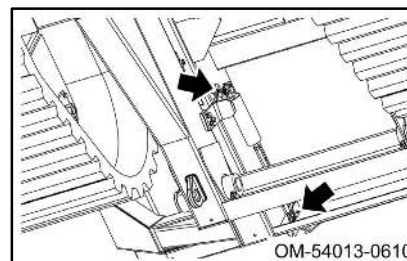
1. Raise the dump body. For details, see “OPERATING DUMP BODY” in the “OPERATION” section.
2. Grease the pin part (2 location at left and right) of flap open/close lever.



● GREASE FLAP OPEN/CLOSE ROD AT REAR PART OF DUMP BODY

Prepare a grease pump.

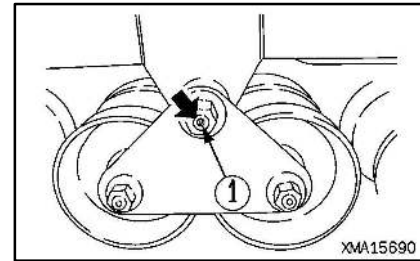
1. Raise the dump body. For details, see “OPERATING DUMP BODY” in OPERATION”.
2. Grease the pin part (4 location at left and right) of flap open/close rod.



● GREASE TRACK ROLLER PIVOT SHAFTS

Prepare a grease pump.

1. Grease track roller pivot shafts (1) (8 places on the left and right).
Continue greasing until old grease is extruded.



2. After greasing, wipe off extruded old grease.

INITIAL 100 HOURS SERVICE

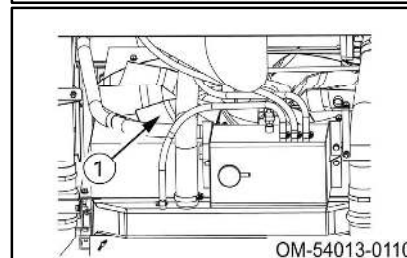
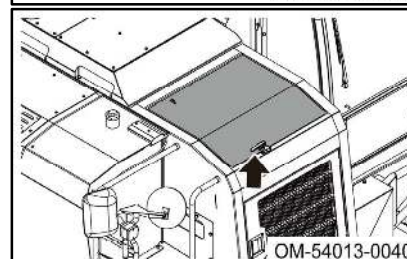
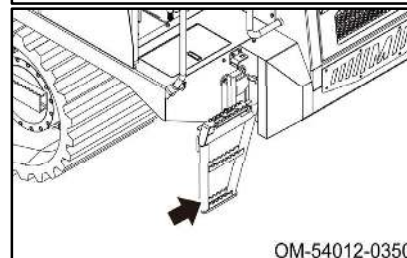
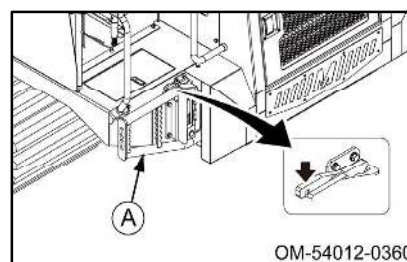
Carry out the following maintenance after the initial 100 hours operation for new machines.

- CHANGE OIL INSIDE TRAVEL MOTOR REDUCTION GEAR CASE (P.205)

EVERY 100 HOURS SERVICE

CHECK COOLING FAN FOR DAMAGE

- 1 While holding step (A) by hand, push the lever down to slowly expand step (A).
Step on the expanded steps and get in the machine.
- 2 Open the buckle and pull the handle to open the cover on the top of the engine.
- 3 Check the fins (1) of the engine cooling fan for cracks and distortion.
- 4 After finishing the work, close the cover in the reverse order of opening it.

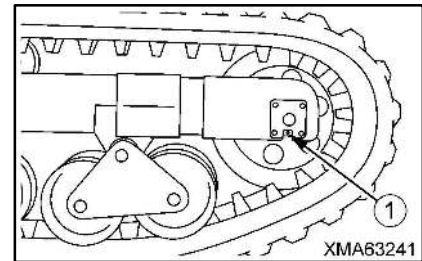


EVERY 250 HOURS SERVICE

● GREASE REAR IDLER SHAFT

Prepare a grease pump.

1. Grease rear idler shafts (1) (2 places on the left and right).
Continue greasing until old grease is extruded.



2. After greasing, wipe off extruded old grease.

EVERY 3 MONTHS SERVICE

CHECK LEAKAGE OF COOLANT

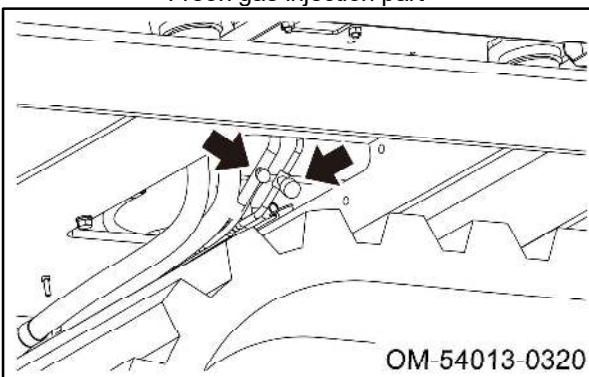
WARNING

- Cooler refrigerant can cause blindness and frostbite if it gets into your eyes or gets in your hands.
Do not remove or loosen the parts of the refrigerant circuit.
- Be sure to ask your distributor to refill the refrigerant.
- Be careful not to get caught in the inspection of rotating parts such as the compressor (air conditioner belt).

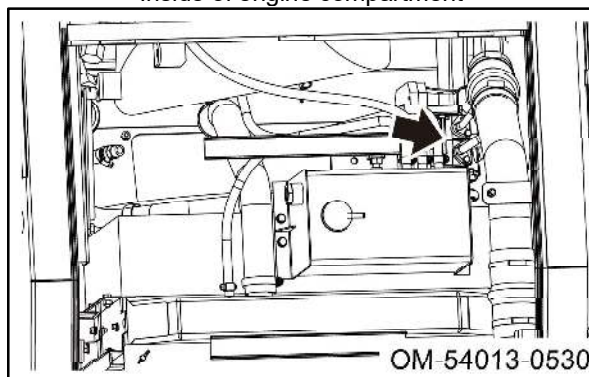
Check the following items for the refrigerant pipe connection.

- Corrosion or damage to the refrigerant hose
- Appearance oil bleeding
- Damage of receiver tank
- Clogging, corrosion or damage of capacitor
- Drive belt tension, wear

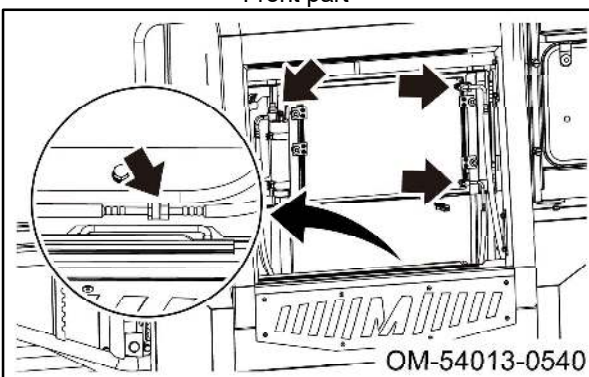
Freon gas injection part



Inside of engine compartment



Front part



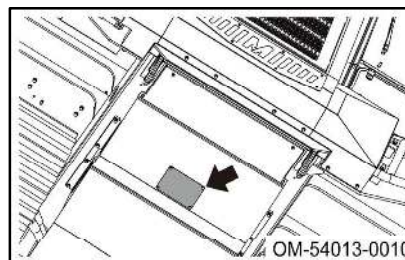
EVERY 500 HOURS SERVICE**CHANGE ENGINE LUBRICATING OIL, REPLACE ENGINE OIL FILTER**
 WARNING

- Each part of the engine is hot right after the engine is stopped, thus there is a danger of burns if you start work immediately after stopping the engine. Wait for the engine to cool down before starting work.
- If oil is spilled or adhered to the surrounding area, wipe it off immediately. Otherwise, this can cause a fire.
- Make sure there are no fuel leaks around the oil filter. Leaking oil can cause a fire.

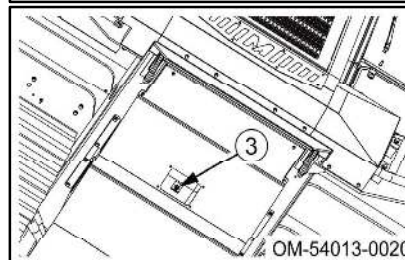
The engine oil filter is located on the inner surface of the right side of the main frame (rear right side of the engine).

Prepare a filter wrench.

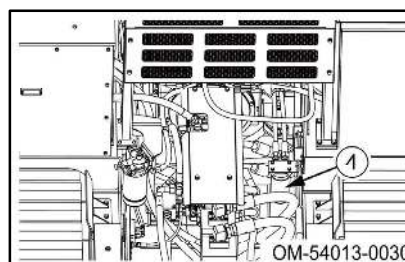
- 1 Remove the mounting bolts of the under-cover at the bottom of the engine.



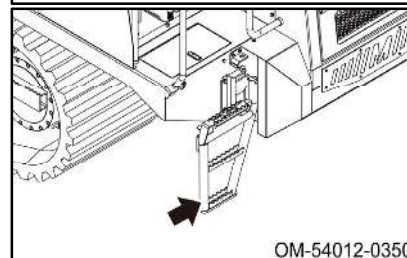
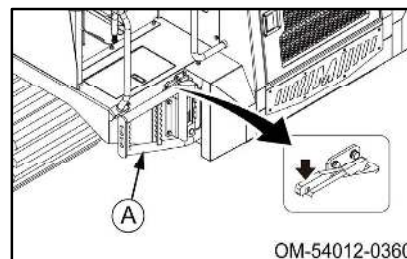
- 2 Set a container under the engine oil pan to catch oil.
- 3 Go under the machine and use a hex wrench to remove drain plug (3) on the engine oil pan.
 - Set a container to catch the oil.
 - Be careful not to get oil on yourself.



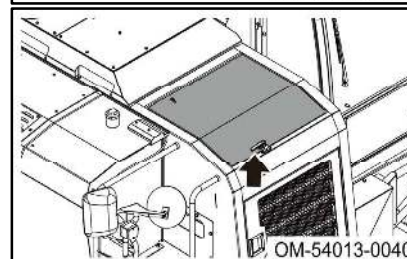
- 4 Inspect the drained oil. If there are large amounts of metal particles or dirt in the drained oil, please contact your distributor.
- 5 After completely draining the oil, tighten drain plug (3).
- 6 Using the filter wrench, turn engine oil filter cartridge (4) to the left (counterclockwise) and remove it.
- 7 Clean the oil filter mount, apply engine oil on the gasket surface of the new oil filter cartridge, and then install it to the mounting position.
 - Fill engine oil into the new filter cartridge.
 - When installing new filter cartridge, be sure to tighten it "3/4 to 1 turn" by hand after the gasket surface comes into contact with the head. When installing new element, always tighten it by hand and be careful not to overtighten.



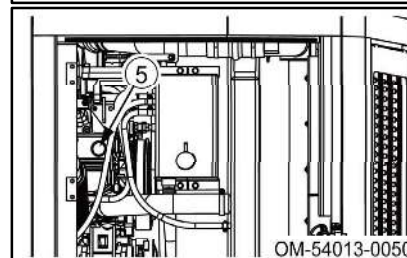
- 8 While holding step (A) by hand, push the lever down to slowly expand step (A).
Step on the expanded steps and get in the machine.



- 9 Open the buckle and pull the handle to open the cover on the top of the engine.



- 10 Remove filler cap (5) and add the specified amount of engine oil.
- For details of engine oil, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE" in the "MAINTENANCE" section on page 149.
 - Use a container with an attached hose when filling with oil.



- 11 Start the engine and run at idle for several minutes, then check the engine lubricating oil level by referring to the "CHECK ENGINE LUBRICATING OIL LEVEL, ADD OIL IF NECESSARY" in "OPERATION" on page 101.
- 12 After adding oil, check the oil level again to check that the oil level is in normal range. When the oil level is in normal range, close filler cap (5) securely.
- 13 After finishing the work, close the cover in the reverse order of opening it.

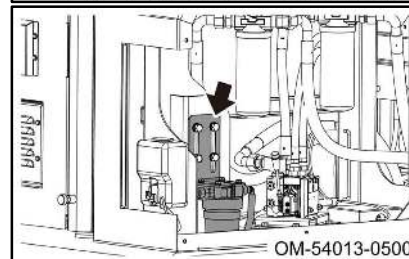
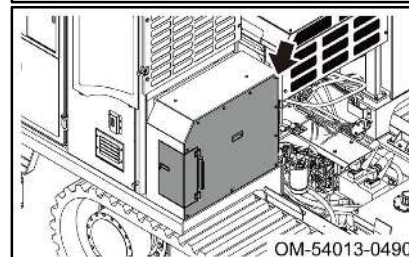
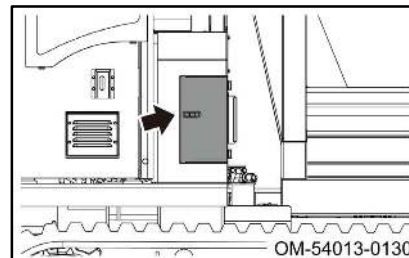
REPLACE FUEL FILTER

WARNING

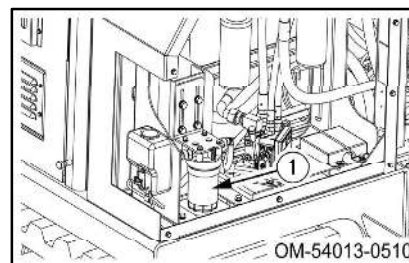
- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- Stop the engine and wait for the engine to cool down.
- Do not smoke or bring any flame close to the machine.
- If any fuel leaks or overflows, always wipe it up immediately. If fuel gets on any high-temperature part, it can cause a fire.

NOTICE

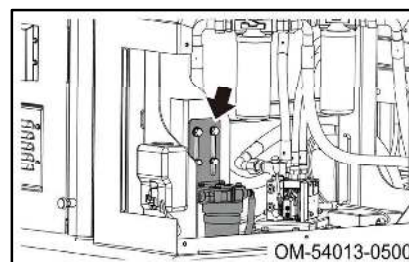
- After replacing the fuel filter, bleed the air from the fuel circuit.
 - When replacing the fuel filter, do not put any fuel inside the new fuel filter. Since this fuel is not filtered and can cause premature wear of the structural parts of the fuel system.
- Fuel filter is located in the engine cover at the rear of the operator's seat.
 - Set a container under the fuel filter to catch the fuel.
 - Prepare a filter wrench.
- 1 Raise the dump body. For details, see "OPERATING DUMP BODY" in the "OPERATION" section.
 - 2 Pull the handle to open the cover.
- 3 Then remove the bolts and remove the cover behind the cab.
- 4 Loosen the bolts on the fuel filter bracket and raise the filter position. Tighten the bolts while holding the filter and secure the filter in the upper position.



- 5 Using a filter wrench, rotate fuel filter (1) to the left (counterclockwise) to remove it.



- 6 Install a new fuel filter (1) in the fuel filter mounting area.
 - Apply clean light oil to the O-ring of fuel filter (1).
 - To install the fuel filter (1), use a filter wrench and tighten with the following torque.
Tightening torque 8 N·m
If there is a torque specified by the manufacturer, follow that value.
- 7 After installing the fuel filter (1), be sure to return the filter position to the lower position.



- 8 After installing the new filter, bleed air from the fuel system. For details, see "AIR BLEEDING FROM FUEL SYSTEM" in the "MAINTENANCE" section (P. 170).
- 9 After finishing the work, close the cover in the reverse order of opening it.

REPLACE WATER SEPARATOR

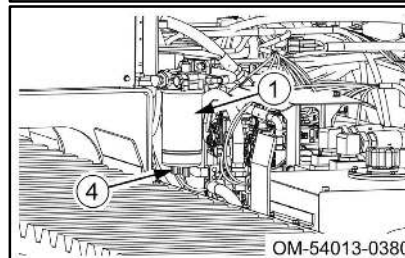
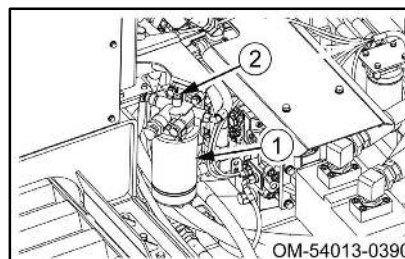
WARNING

- Stop the engine and wait for the engine to cool down.
- Do not smoke or bring any flame close to the machine.
- If any fuel leaks or overflows, always wipe it up immediately. If fuel gets on any high-temperature part, it can cause a fire.

NOTICE

- After replacing the water separator, bleed the air from the fuel circuit.
- When replacing the water separator, do not put any fuel inside the new water separator. Since this fuel is not filtered and can cause premature wear of the structural parts of the fuel system.

- The water separator is located on the inner surface of the left side of the main frame (rear left side of the engine).
 - Set a container to receive fuel under the water separator.
 - Prepare a filter wrench.
- 1 Raise the dump body. For details, see "OPERATING DUMP BODY" in the "OPERATION" section.
 - 2 Loosen air bleeding plug (2) at the top of water separator (1).
 - 3 Loosen drain valve (4) on the underside of water separator (1) about "3 1/2 turns" to the left (counterclockwise).
The fuel in the case is drained.
 - 4 Turn the case of water separator (1) counterclockwise by using a filter wrench to remove it.



- 5 Attach a new water separator (1) to the water separator mounting part.
 - Apply clean light oil to the O-ring of water separator (1).
 - When installing water separator (1), be sure to tighten it "3/4 turn" by hand after the sealing surface comes into contact with the head part.
- 6 After installing water separator (1), bleed air from the fuel system. For details, see "AIR BLEEDING FROM FUEL SYSTEM" in the "MAINTENANCE" section (P. 170).

REPLACE HYDRAULIC OIL LINE FILTER

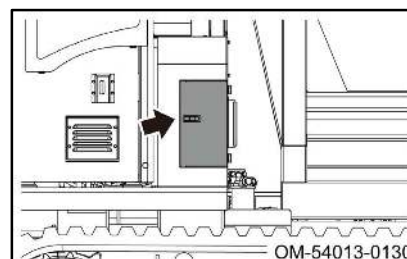
WARNING

- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- Stop the engine and wait for the oil temperature to cool down.
- Gently loosen the filler cap on the hydraulic tank to release the internal pressure completely, then remove the filler cap.
- Operate the travel lever and dump control dial a few times to the end of their stroke to completely release the remaining pressure from the hydraulic circuit.
- If any fuel leaks or overflows, always wipe it up immediately. If fuel gets on any high-temperature part, it can cause a fire.

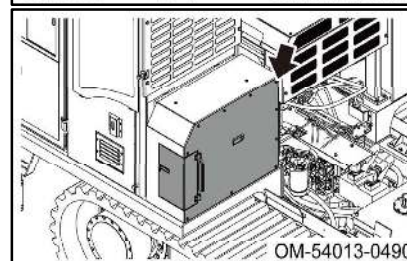
NOTICE

When replacing the hydraulic line filter, always change the oil in the hydraulic tank at the same time.

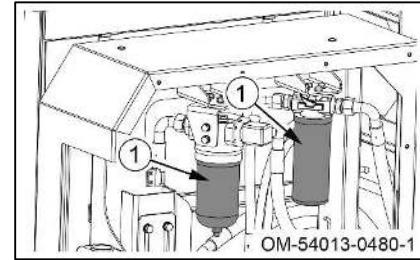
- The hydraulic oil line filter is located in the cover at the rear side of the operator's seat.
 - Set a container under the hydraulic line filter to catch the oil.
 - Prepare a filter wrench.
- 1 Raise the dump body. For details, see "OPERATING DUMP BODY" in the "OPERATION" section.
 - 2 Pull the handle to open the cover.



- 3 Then remove the bolts and remove the cover behind the cab.



- 4 Turn line filter cartridge (1) to the left (counterclockwise) to remove by using a filter wrench.



- 5 Clean the line filter mounting part, apply engine oil on the packing surface of new line filter cartridge (1), and install it on the mounting part.
 - Fill hydraulic oil into new filter cartridge (1).
 - When installing a new filter cartridge (1), always tighten it by hand and be careful not to overtighten.
- 6 After finishing the work, close the cover in the reverse order of opening it.

CHANGE OIL IN HYDRAULIC OIL TANK (# 540001 ~ # 540049)**⚠ WARNING**

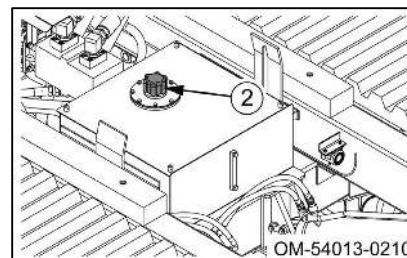
- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- Stop the engine and wait for the oil temperature to cool down.
- Gently loosen the filler cap on the hydraulic tank to release the internal pressure completely, then remove the filler cap.
- Operate the travel lever and dump control dial a few times to the end of their stroke to completely release the remaining pressure from the hydraulic circuit.
- After adding oil, tighten the filler cap and drain plug securely, then wipe up any spilled oil.
- Wear safety glasses when bleeding air.

NOTICE

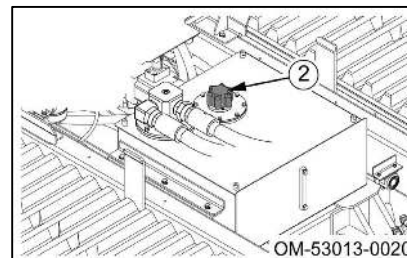
- When changing the oil in the hydraulic tank, always replace the hydraulic oil line filter at the same time.
- Always replace O-rings used for the hydraulic oil tank inspection cover with a new ones.

- Set a container under the hydraulic tank to catch the oil.

- 1 Raise the dump body. See “OPERATING DUMP BODY” in the “OPERATION” section. (P.127)
- 2 Remove filler cap (2) on the hydraulic tank.

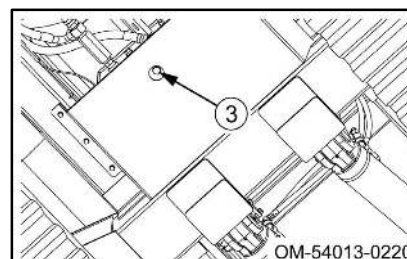


#540001 ~ 540010

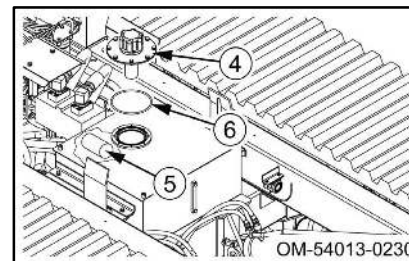


#540011 ~ 540049

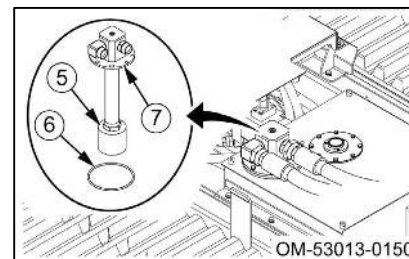
- 3 Turn drain plug (3) at the bottom of the hydraulic tank to the left (counterclockwise), and drain the oil from the hydraulic tank.
 - Set a container to catch the oil.
 - Be careful not to get oil on yourself.
- 4 Inspect the drained oil. If there are large amounts of metal particles or dirt in the drained oil, please contact your distributor.



- 5 After completely draining the oil, tighten drain plug (3).
- 6 Remove mounting bolts, then remove hydraulic tank inspection cover (4) or (7).
- 7 Remove the oil strainer (5) and then wash it in diesel oil.
- 8 Install oil strainer (5), set a new O-ring (6) to the hydraulic tank, then install hydraulic tank inspection cover (4) or (7) and tighten with mounting bolts.

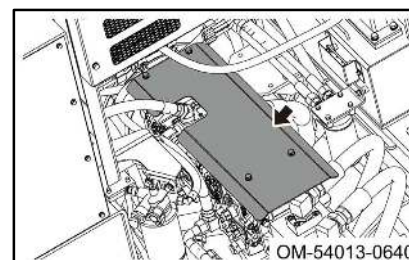


#540001~540010

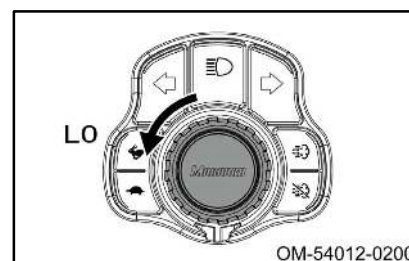


#540011~540049

- 9 Fill specified amount of hydraulic oil through the oil filler.
 - For details of hydraulic oil, see the “USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE” in the “MAINTENANCE” section on page 149.
 - Hydraulic oil refill amount: 125 liters
 - Use a container with an attached hose when filling with oil.
- 10 When changing the oil in the hydraulic tank, always bleed the air from the tank.
Remove the cover on the main pump.

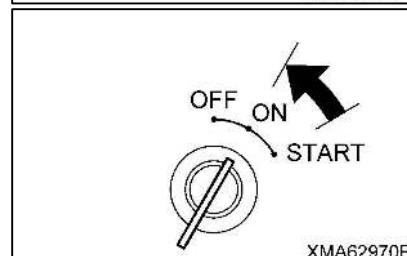
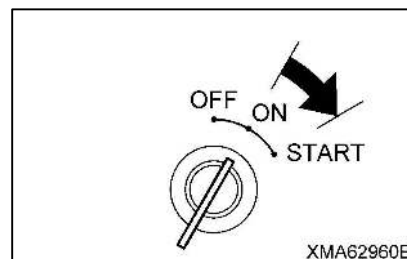


- 11 Turn the engine throttle dial to the “LO” position.



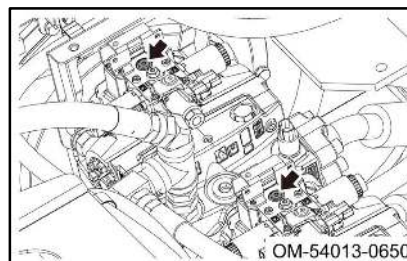
- 12 Turn the starting switch key to the "START" position and turn the starting motor, and release the key before the engine starts. The key automatically returns to the ON position.

Repeat this cycle 5 times.



- 13 After starting the engine and running it without load for about 10 seconds, turn the starting switch key to the "OFF" position to stop the engine.

- 14 Slowly loosen one of the two case gauge port bolts on the main pump. When loosening the bolt, oil may spurt out, so hold the bolt with a waste cloth.



- 15 Make sure that air or oil is discharged when the bolt is loosened, then tighten the bolt.

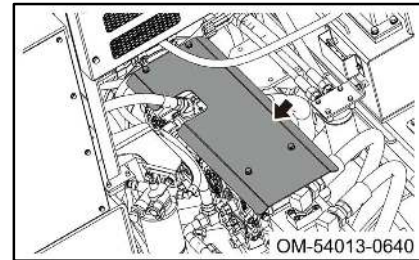
★ Drain gauge port bolt tightening torque: 19 N·m { 1.94 kgf · m }

- 16 Repeat steps 12 to 15 until the air-mixed oil no longer discharged when the bolt is loosened.

- 17 When air-mixed oil is no longer discharged from the case gauge port, perform steps 12 to 16 on another case gauge port.

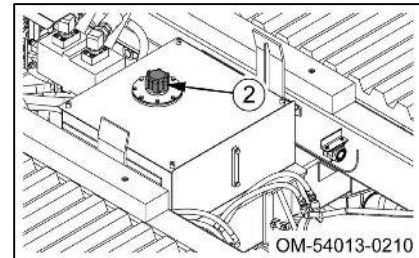
- 18 When air-mixed oil is no longer discharged from both case gauge ports, start the engine, let it idle for about 10 seconds, then stop the engine and check that no oil is leaking from the case gauge ports.

- 19 Install the cover on the main pump.

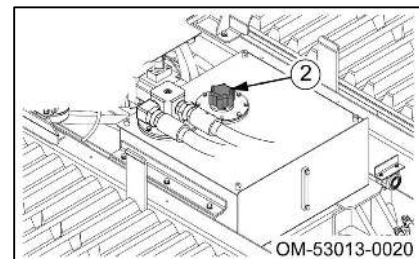


- 20 After starting the engine, let it idle for 10 seconds.

- 21 Stop the engine, remove filler cap (2) from the hydraulic tank and check for air bubbles in the hydraulic tank.
Repeat steps 20 to 21 until there are no more large bubbles.
After checking for air bubbles, securely tighten filler cap (2).

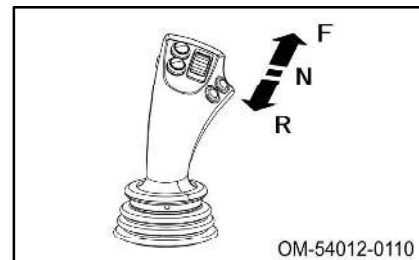


#540001 ~ 540010



#540011 ~ 540049

- 22 Move the machine forward and reverse slowly.
At this time, do not turn the machine left or right.



- 23 Stop the engine, remove filler cap (2) from the hydraulic tank and check for air bubbles in the hydraulic tank.
When no more air bubbles come out, the air bleeding is complete.
If there are bubbles in the hydraulic oil tank, repeat steps 22 to 23.

- 24 Tighten filler cap (2) on the hydraulic tank.

- 25 Check the oil level in the hydraulic tank. For details, see the "

CHECK OIL LEVEL IN THE HYDRAULIC OIL TANK, REFILL IF NECESSARY" in "OPERATION" on page 105.

CHANGE OIL IN HYDRAULIC OIL TANK (# 540050~)

WARNING

- If it is necessary to go under the dump body to carry out inspections and maintenance, always use the safety bar to prevent the dump body from coming down.
- When using the safety bar, check that the bar is fitted securely to the dump body holder.
- Stop the engine and wait for the oil temperature to cool down.
- Gently loosen the filler cap on the hydraulic tank to release the internal pressure completely, then remove the filler cap.
- Operate the travel lever and dump control dial a few times to the end of their stroke to completely release the remaining pressure from the hydraulic circuit.
- After adding oil, tighten the filler cap and drain plug securely, then wipe up any spilled oil.
- Wear safety glasses when bleeding air.

NOTICE

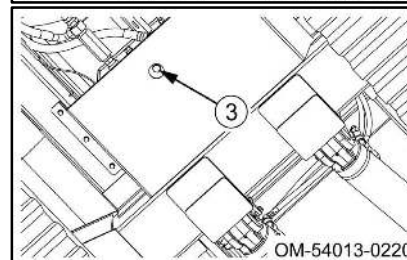
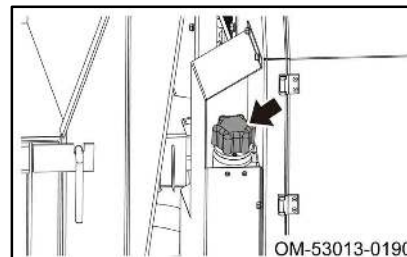
- When changing the oil in the hydraulic tank, always replace the hydraulic oil line filter at the same time.
- Always replace O-rings used for the hydraulic oil tank inspection cover with a new ones.

- Set a container under the hydraulic tank to catch the oil.

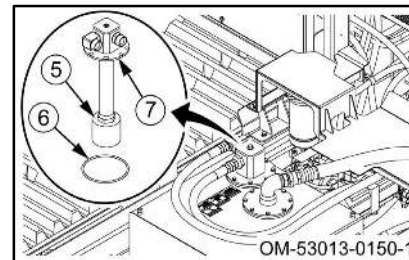
- 1 Raise the dump body. See "OPERATING DUMP BODY" in the "OPERATION" section. (P.127)
Secure the safety bar.
- 2 Remove the filler cap from the hydraulic tank. For details, see the "

CHECK OIL LEVEL IN THE HYDRAULIC OIL TANK, REFILL IF NECESSARY" in "OPERATION" on page 105.

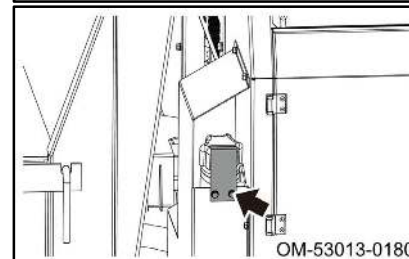
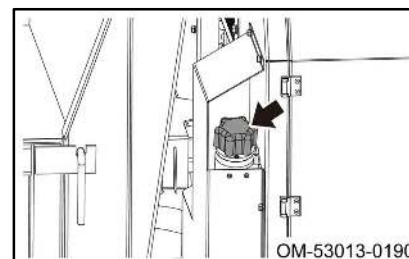
- 3 Turn drain plug (3) at the bottom of the hydraulic tank to the left (counterclockwise), and drain the oil from the hydraulic tank.
 - Set a container to catch the oil.
 - Be careful not to get oil on yourself.
- 4 Inspect the drained oil. If there are large amounts of metal particles or dirt in the drained oil, please contact your distributor.
- 5 After completely draining the oil, tighten drain plug (3).
- 6 Remove mounting bolts, then remove hydraulic tank inspection cover (7).
- 7 Remove oil strainer (5) from the hydraulic tank, and then wash it in diesel oil.



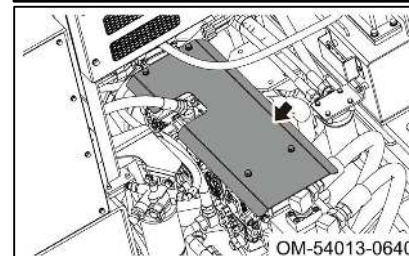
- 8 Install oil strainer (5) in the hydraulic tank, set a new O-ring (6) to the hydraulic tank, then install hydraulic tank inspection cover (7) and tighten with mounting bolts.



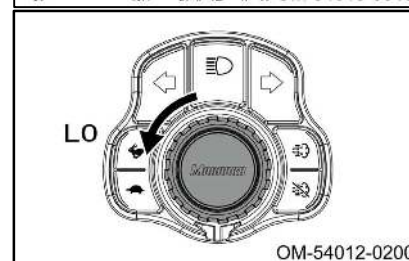
- 9 Fill specified amount of hydraulic oil through the oil filler.
- For details of hydraulic oil, see the “USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE” in the “MAINTENANCE” section on page 149.
 - Hydraulic oil refill amount: 125 liters
 - Use a container with an attached hose when filling with oil.
- 10 After adding oil, tighten the filler cap securely and then install the cover.



- 11 When changing the oil in the hydraulic tank, always bleed the air from the tank.
Remove the cover on the main pump.

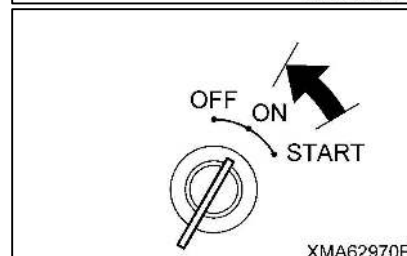
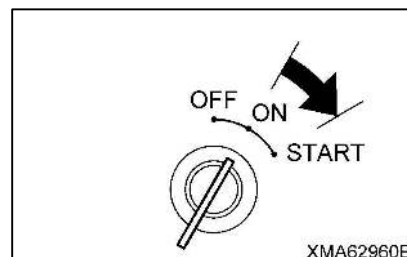


- 12 Turn the engine throttle dial to the “LO” position.

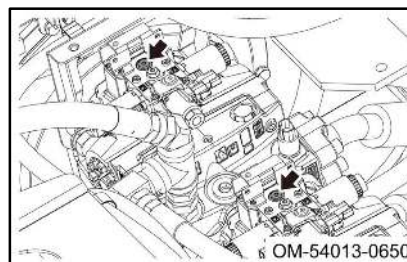


- 13 Turn the starting switch key to the "START" position and turn the starting motor, and release the key before the engine starts.
The key automatically returns to the ON position.

Repeat this operation 5 times.



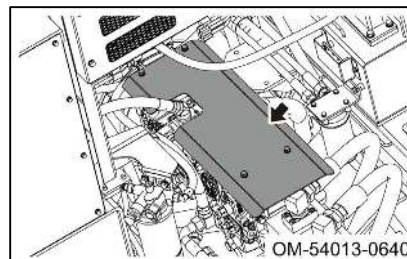
- 14 After starting the engine and running it without load for about 10 seconds, turn the starting switch key to the "OFF" position to stop the engine.
- 15 Slowly loosen one of the two case gauge port bolts (M14) on the main pump.
When loosening the bolt, oil may spurt out, so hold the bolt with a waste cloth.



- 16 Make sure that air or oil is discharged when the bolt is loosened, then tighten the bolt.
 - Case gauge port bolt tightening torque: 19 N·m {1.94 kgf·m}

Repeat steps 13 to 16 until the air-mixed oil no longer discharged from the case gauge port.

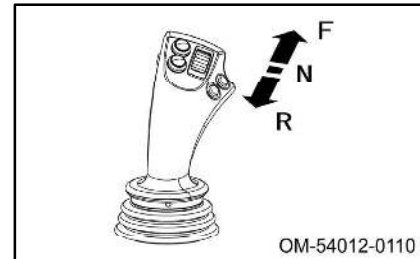
- 17 When air-mixed oil is no longer discharged from the case gauge port, perform the same steps on another case gauge port.
- 18 When air-mixed oil is no longer discharged from both case gauge ports, start the engine, let it idle for about 10 seconds.
Then, stop the engine and check that no oil is leaking from the case gauge ports.
- 19 Install the cover on the main pump.



- 20 After starting the engine and running it without load for about 10 seconds, turn the starting switch key to the "OFF" position to stop the engine.

Repeat this operation 3 times.

- 21 Move the machine forward and reverse slowly.
At this time, do not turn the machine left or right.



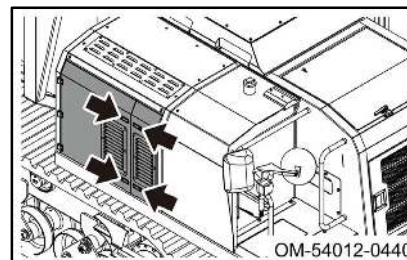
- 22 Stop the engine.
23 Repeat steps 21 to 22 for 3 times.
24 Check the oil level in the hydraulic tank. For details, see the "

CHECK OIL LEVEL IN THE HYDRAULIC OIL TANK, REFILL IF NECESSARY" in "OPERATION" on page 105.

CHECK BATTERY ELECTROLYTE LEVEL, REFILL DISTILLED WATER IF NECESSARY**⚠ DANGER**

- If any tool is in between the battery positive (+) terminal and the chassis, sparks may occur. It is dangerous. Do not put tools and other metal objects in your breast pocket. They may fall out.
- Battery electrolyte contains sulphuric acid. If it gets in your eyes, rinse with plenty of fresh water such as tap water, and then immediately seek medical attention from a doctor (ophthalmologist).
- If the battery electrolyte adheres to your skin or clothes, immediately rinse it with plenty of water and then wash it thoroughly with soap. Otherwise, you may get burned or damage your clothes.
- Batteries generate hydrogen gas and can explode. Do not smoke, use a lighter, or create any spark near the battery.

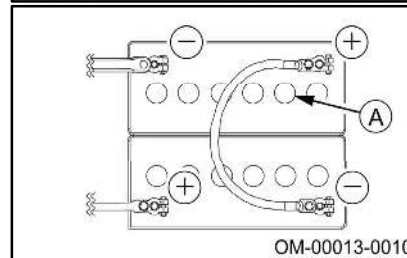
- 1 Open the buckle and open the cover.



- 2 Remove all battery caps (A) and check the battery electrolyte level.

It is normal if the liquid level is about 10 to 12 mm above the electrode plate.

- 3 If the battery electrolyte level is low, add distilled water.
 - From time to time, measure the specific gravity of the electrolyte, and charge if necessary.



* The arrangement of the cap and cable may be different.

- 4 After finishing the work, close the cover in the reverse order of opening it.

EVERY 1000 HOURS SERVICE

CHECK FAN BELT

Check the fan belt for wear, cracks, and tears, and for grease and oil stains.

Small cracks across the width of the belt are fine, but if there are cracks in the circumferential direction, replace the belt.

If the belt is worn out or a part of the belt is missing, replace it.

- Ask your distributor for replacement of the fan belt.

CHECK FAN BELT TENSIONER

It is required to check installed conditions, operating conditions, and damage of the belt tensioner.

Contact your distributor.

CHECK ALTERNATOR

The brush may be worn or bearings may lack grease. Contact your distributor.

CHECK WATER PUMP

It is required to check installed conditions, operating conditions, and damage of the water pump. Contact your distributor.

REPLACE DEF TANK UNIT FILTER

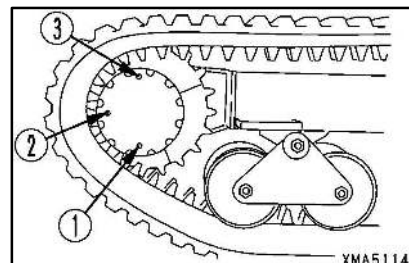
Contact your distributor.

CHANGE OIL INSIDE TRAVEL MOTOR REDUCTION GEAR CASE

WARNING

- Stop the engine and wait for the oil temperature to cool down.
- After adding oil, tighten the plugs securely and wipe up any spilled oil.

- 1 Drive the machine forward or backward to position drain plug (1) of the reduction gear case at the bottom, then stop the engine.
- 2 Set a container under the travel motor reduction gear case to catch the oil.
- 3 Remove oil filler plug (3), oil level inspection plug (2), and drain plug (1), and drain the oil from the case. Set a container to catch the oil.
- 4 Inspect the drained oil. If there are large amounts of metal particles or dirt in the drained oil, please contact your distributor.
- 5 After completely draining the oil, tighten drain plug (1).
- 6 Add the specified amount of gear oil through oil filler port (3), and check that oil comes out from oil level inspection plug (2).
 - For details of gear oil, see the "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE" in the "MAINTENANCE" section (on page 149).
 - Specified amount of gear oil: 6.0 liters
- 7 Tighten oil filler plug (3) and oil level inspection plug (2).



EVERY 2000 HOURS SERVICE

CLEAN INSIDE OF COOLING SYSTEM, CHANGE COOLANT IF NECESSARY

WARNING

Wait for the engine and radiator to cool down before starting works. Boiling water may spurt out and cause burns.

Be careful when removing the radiator cap.

- Wait for the water temperature to cool down before starting works.
- Turn the radiator cap slowly to release the internal pressure completely, then remove the radiator cap.

The coolant is flammable, so never put it close to a fire.

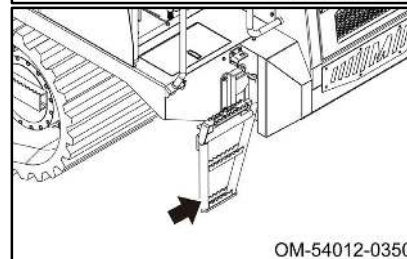
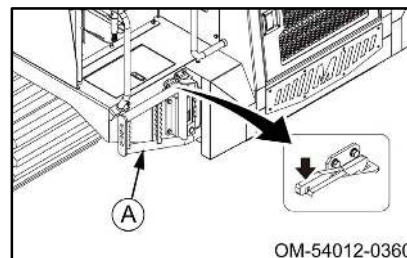
NOTICE

- Change the coolant every year or 2000 operating hours whichever comes first.
- For the antifreeze mixing rate of coolant, see "PRECAUTIONS FOR LOW TEMPERATURE" in "COLD WEATHER OPERATION" on page 130.
- Do not use anything other than ethylene glycol (EG) type coolant.

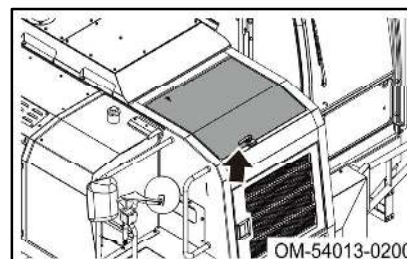
Follow the procedure below to clean the inside of the cooling system.

- Use a mixture of coolant and tap water as the coolant. Do not use river water, well water, or untreated water supplies.

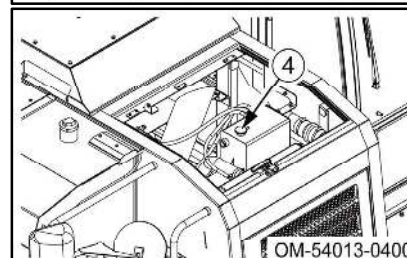
- 1 Park the machine on a level ground and stop the engine.
- 2 While holding step (A) by hand, push the lever down to slowly expand step (A).
Step on the expanded steps and get in the machine.



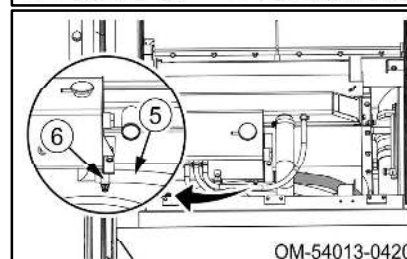
- 3 Open the buckle and pull the handle to open the cover on the top of the machine.



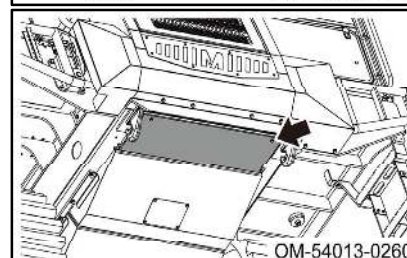
- 4 Slowly turn reserve tank cap (4) to remove it.



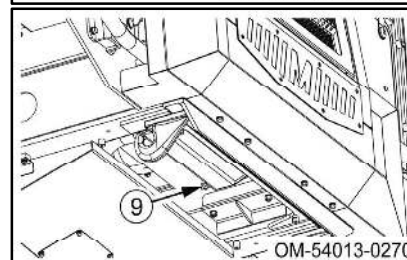
- 5 Remove hose band (6), pull out hose (5) of the reserve tank, and drain the cooling water from the reserve tank.



- 6 Remove the mounting bolts and open the cover at the bottom of the machine.
When removing the mounting bolts, set a jack under the center of the cover so that the cover does not open suddenly.



- 7 Enter the bottom of the machine and open radiator drain valve (9) to drain the cooling water.
 - If coolant is mixed in the cooling water, set the container that receives the mixture under the drain valve.



- 8 After draining the cooling water, close drain valve (9) of the radiator.

- 9 Connect hose (5) of the reserve tank and secure it with hose band (6).

- 10 Fill the radiator with tap water from the water supply port of the reserve tank.

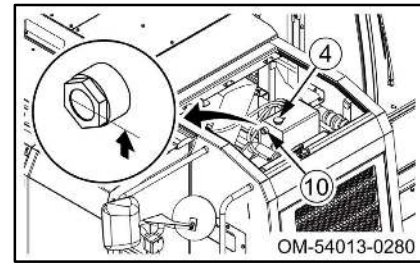
- 11 Start the engine, set the engine in a low idling state, and wash it with running water until clean water comes out. While running water through the cooling system to flush it, adjust the water flow so that the radiator is always full. While running water through the cooling system to flush it, be careful that the water supply hose does not slip out of the water filler.

- 14 When clean water comes out, stop the engine and close radiator drain valve (9).

- 15 Fill the radiator with cooling water from the water inlet.

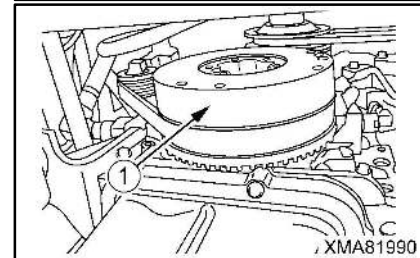
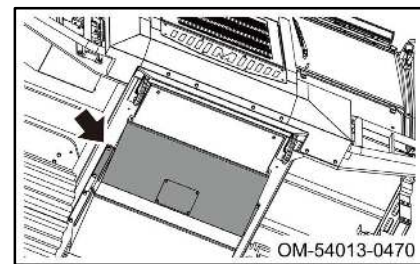
- After pouring water to the high position of the level gauge (10) of the reserve tank, stop pouring water.

- 16 Start the engine, run for 5 minutes at low idling, then run for a further 5 minutes at high idling to bleed the air from the coolant.
 - Leave reserve tank cap (4) removed when doing this.
- 17 Stop the engine, leave it for about 3 minutes, replenish the cooling water to a high position on the level gauge (10) of the reserve tank, and close the cap (4) of the reserve tank.
- 18 Close each cover in the reverse order of opening it.



CHECK CRANKSHAFT VIBRATION DAMPER

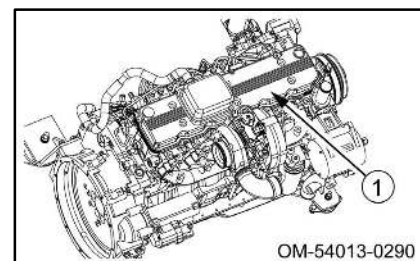
- 1 Remove the mounting bolts and open the cover at the bottom of the machine.
 - When removing the mounting bolts, set a jack under the center of the cover so that the cover does not open suddenly.
- 2 Go under the machine and visually inspect vibration damper (1). If vibration damper (1) has dents, cracks, or liquid leaks, consult your distributor.
- 3 After finishing inspection, close the cover in the reverse order of opening it.



REPLACE CRANKCASE BREATHER FILTER

The crankcase breather filter is mounted inside the rocker cover (1) at the top of the engine.

Replacing the breather filter is complicated, so contact your distributor.



EVERY 4500 HOURS SERVICE

REPLACE DEF DOSING FILTER

Contact your distributor.

EVERY 5000 HOURS SERVICE

CHECK VALVE CLEARANCE

Special tools are required to check. Contact your distributor.

TROUBLESHOOTING

PROBLEMS WITH ENGINE RELATED PARTS	211
PROBLEMS WITH CHASSIS RELATED PARTS	213
PROBLEMS WITH ELECTRIC RELATED PARTS	215

If any abnormality is felt, investigate the cause immediately and take necessary action.

If the cause is unknown, or if troubleshooting mentions contacting the distributor, contact the distributor.

When contacting your distributor, please give the machine serial number and engine number.

PROBLEMS WITH ENGINE RELATED PARTS

Problem	Main causes	Remedy
Starting motor does not turn when starting switch is turned to START	Battery charge is too low	Charge
	Disconnection, poor contact	Check and repair if necessary
	Failure in starting motor or relay	Contact your distributor
	Failure in controllers	Contact your distributor
Starting motor turns, but engine rotates slowly	Battery charge is too low	Charge
	Defective ground connection wiring	Check and repair if necessary
	Viscosity of engine oil is too high	Change to proper viscosity
Starting motor turns, but engine does not start	Insufficient fuel	Check and add fuel
	Air in fuel system	Bleed air
	Failure in fuel injection pump	Contact your distributor
	Failure in engine	Contact your distributor
After the warming-up operation, "engine oil pressure warning lamp" on the monitor display lights up even when engine speed is raised (Engine oil pressure does not rise)	Insufficient engine oil	Check and add fuel
	Clogged engine oil filter	Replace with a new one
	Failure in engine parts	Contact your distributor
The engine coolant temperature gauge on the monitor display screen points around "120°C". or steam spurts out from near the radiator system	Low coolant level	Check and add water
	Leakage of coolant from cooling system	Check and repair if necessary or contact your distributor
	Loose fan belt	Check and adjust if necessary or replace with a new fan belt
	Clogged radiator fin	Check and clean
	Defective thermostat	Replace with a new one
	Overloading, operation under excessive load	Reduce to below max. payload
The pointer of the engine water temperature gauge on the monitor display screen does not reach around "80°C" during operation	Defective thermostat	Replace with a new one
	Defective engine water temperature gauge	Replace with a new one
Engine exhaust color is white	Engine oil level is too high	Adjust to correct amount
	Improper fuel	Change to specified fuel
	Failure in fuel injection device	Contact your distributor
Engine exhaust color is black	Clogged air cleaner	Check and clean
	Improper fuel	Change to specified fuel
	Failure in engine	Contact your distributor
Engine does not run smoothly	Air in fuel system	Bleed air
	Fuel filter clogged with dirt, water in fuel filter	Check and replace with a new one or repair if necessary
	Leakage of fuel from fuel system	Check and repair if necessary
	Failure in engine	Contact your distributor

Problem	Main causes	Remedy
Engine stops when set to low speed	Failure in engine	Contact your distributor
Engine suddenly stops during operation	Insufficient fuel	Check and add fuel
	Insufficient engine oil	Check and add fuel
	Insufficient DEF	Check and add DEF
	Failure in engine	Contact your distributor
Engine warning lamp lights up	The engine is working properly, but there is a minor problem in the engine system	Check the error code and contact your distributor
Engine warning lamp brinks	The engine will continue to run, but the warning becomes more serious. If you continue to operate the engine, the output reduction or the engine damage may occur.	Check the error code and contact your distributor as it is necessary to check the failure immediately.
Engine warning lamp brinks and the stop lamp lights up.	There is a serious problem. The engine stop or is about to stop.	Move the machine in a safe place and contact your distributor

PROBLEMS WITH CHASSIS RELATED PARTS

Problem	Main causes	Remedy
Machine does not move	Parking brake is applied	Release parking brake or check brake piping
	Leakage of oil from hydraulic devices or hoses	Check and repair if necessary
	Failure in travel lever, electrical equipment	Check and replace if necessary
	Disconnection, poor contact	Contact your distributor
	Blown fuse	Check and replace if necessary
	Failure in hydraulic equipment	Check and contact your distributor.
During operation, "hydraulic oil pressure warning lamp" on the monitor display lights up, red warning lamps on both sides of the monitor display flash, and the warning buzzer sounds (Hydraulic oil pressure lowers)	Insufficient oil in hydraulic tank	Check and refill
	Clogged hydraulic oil line filter and strainer in tank	Check and clean or replace with a new one
	Disconnection, poor contact	Check and clean or replace with a new one
	Blown fuse	Check and repair if necessary
	Failure in hydraulic equipment, pressure sensor	Check and contact your distributor.
During operation, "hydraulic oil temperature warning lamp" on the monitor display lights up, red warning lamps on both sides of the monitor display flash, and the warning buzzer sounds (Hydraulic oil temperature exceeds 100°C (212°F))	Insufficient oil in hydraulic tank	Check and refill
	Clogged oil cooler core	Check and clean or replace
	Disconnection, poor contact	Check and repair if necessary
	Blown fuse	Check and replace if necessary
	Failure in hydraulic equipment, pressure sensor	Contact your distributor
	Overloading, operation under excessive load	Reduce to below max. payload
Abnormal noise coming from around pump	Clogged hydraulic oil line filter and strainer in tank	Check and clean or replace with a new one
	Leakage of oil from hydraulic devices or hoses	Check and repair if necessary or contact your distributor
	Air in the circuit	Contact your distributor
	Failure in hydraulic equipment	Check and contact your distributor.
Rubber crawler comes off	Rubber crawler tension too loose	Check and adjust if necessary
Abnormal wear on sprocket	Rubber crawler tension too tight	Check and adjust if necessary
	Overloading, operation under excessive load	Reduce to below max. payload
The raising, lowering speed of dump body is slow Or no power to lift the dump body	Failure in hydraulic equipment	Check and contact your distributor.
	Failure in travel lever, electrical equipment	Check and replace if necessary
	Leakage of oil from hydraulic devices or hoses	Check and repair if necessary or contact your distributor

Problem	Main causes	Remedy
Cannot drive at high speed	Leakage of oil from hydraulic devices or hoses	Check and repair if necessary or contact your distributor
	Disconnection, poor contact	Check and contact your distributor.
	Blown fuse	Check and replace if necessary
The air conditioner does not work	Insufficient refrigerant gas	Check and refill if necessary
	Clogging of condensor core	Check and clean
	Failure in air conditioner	Check and contact your distributor.

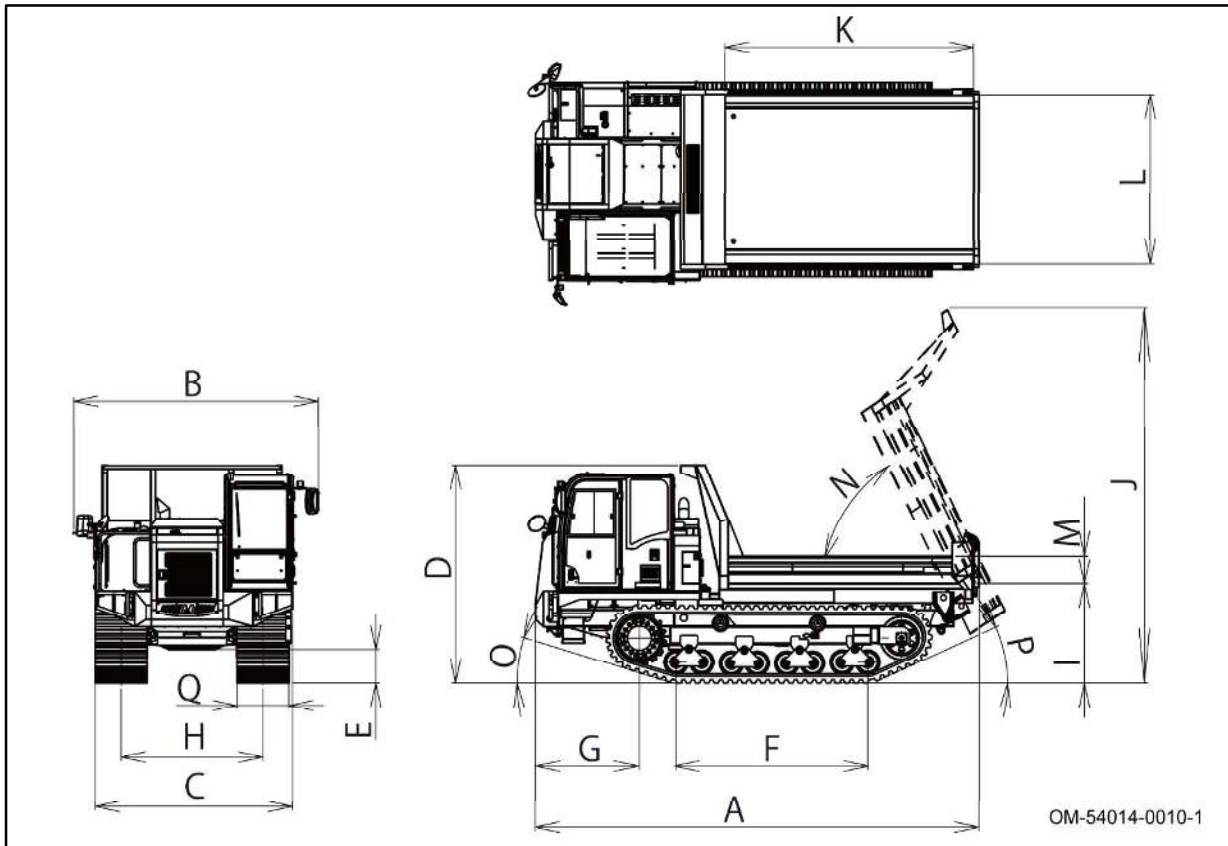
PROBLEMS WITH ELECTRIC RELATED PARTS

Problem	Main causes	Remedy
During operation, "battery charge lamp" on the monitor display lights up.(Battery does not charge up)	Disconnection, poor contact	Check and contact your distributor.
	Blown fuse	Check and replace if necessary
	Loose fan belt	Replace the fan belt with a new ones
	Failure in alternator	Check and contact your distributor.
	Defective battery function	Check and repair or replace if necessary
Lighting devices such as headlights do not turn on	Disconnection, poor contact	Check and contact your distributor.
	Blown fuse	Check and replace if necessary
	Failure in relay	Check and replace if necessary
	Failure in headlights and lighting	Check and replace if necessary
	Defective light switch	Check and replace if necessary
Horn does not sound	Disconnection, poor contact	Check and contact your distributor.
	Blown fuse	Check and replace if necessary
	Defective horn	Check and replace if necessary
	Defective horn switch	Check and replace if necessary
Parking brake buzzer does not sound	Disconnection, poor contact	Check and contact your distributor.
	Blown fuse	Check and replace if necessary
	Defective buzzer	Check and replace if necessary
	Defective parking brake switch	Check and replace if necessary
Reverse traveling buzzer does not sound	Disconnection, poor contact	Check and contact your distributor.
	Defective buzzer	Check and replace if necessary

SPECIFICATIONS

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DIMENSION DRAWING



SPECIFICATIONS TABLE

SPC-22002

		Unit	
Name			MST110C
Model name			MST-2200VD-VIB
A	Overall length	mm	6,420
B	Overall width (for operation)	mm	3,540
C	Overall width (for transportation)	mm	2,850
D	Overall height (for operation)	mm	3,160
E	Minimum ground clearance	mm	480
F	Distance between center of front and rear track roller	mm	2,770
G	Distance between front of machine and center of sprocket	mm	1,510
H	Track gauge	mm	2,050
I	Clearance between ground and bottom of dump body	mm	1,440
J	Overall height (At max. dumping)	mm	5,380
K	Dimension of dump body (length)	mm	3,590
L	Dimension of dump body (width)	mm	2,440
M	Dimension of dump body (depth)	mm	390
N	Maximum dumping angle	deg.	60
O	Approach angle	deg.	17
P	Departure angle	deg.	24
Q	Track width	mm	750
Machine operating mass (including operator 75 kg)		kg	14,200
Max. payload		kg	11,000
Drive system			Fully hydraulic system (HST)
Speed change system			Stepless speed change
Travel speed (at high speed range)		km/h	10.5
Travel speed (at low speed range)		km/h	7.5
Ground contact pressure (unloaded)		kPa	33.5
Ground contact pressure (loaded)		kPa	59.5
Hydraulic oil tank rated capacity		liter	125
Fuel tank capacity		liter	266
DEF tank capacity		liter	33.54
Dump body loading capacity (flat stacking)		m3	3.42
Dump body loading capacity (heaped)		m3	5.79

Engine model		Cummins QSB6.7-4E Japan: 2014 exhaust gas regulation certification model USA: EPA Tier4-Final EU: Stage V
Engine type		Vertical water-cooled 4-cycle common rail type Diesel engine
No. of cylinders - bore x stroke	mm	6-107 × 124
Total engine displacement	liter	6.7
Rated output/engine speed	kW/min ⁻¹	186 / 2,000
Maximum engine torque/engine speed	N·m/min ⁻¹	1,186 / 1,300
Fuel		Diesel fuel
Battery		12V, 92Ah × 2 (130E41R)
Operator protection structure		Supports both ROPS/FOPS

**RUBBER CRAWLER CARRIER
OPERATION AND MAINTENANCE MANUAL
MST110C**

Document No.: OM-540-11-E

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