TEN01038-03

Operation & Maintenance Manual

MOTOR GRADER **GD655-7**

SERIAL NUMBERS 65217 and up

⚠ WARNING

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

NOTICE

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

KOMATSU

FOREWORD

⚠ WARNING

Komatsu recommends that any service parts used for maintenance, repair or replacement of emission control systems be genuine new Komatsu or Komatsu approved parts or Komatsu approved rebuilt parts or assemblies or others parts of equivalent quality, and that the engine be serviced by an authorized Komatsu distributor. Failure to follow these recommendations could result in ineffective service, damage to the product, or safety risks (including serious personal injury or death).

In the United States, the owner may choose to have maintenance, replacement or repair of the emissions-related parts performed by a facility other than an authorized Komatsu distributor.

⚠ WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engines in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www. P65warnings.ca.gov/diesel

⚠ WARNING: This product can expose you to chemicals including lead, which is known in the State of California to cause cancer and birth defects or other reproductive harm.

For more information go to www. P65warnings.ca.gov.

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FOREWORD

This manual explains the operation, and the inspection and maintenance procedures necessary for the safe use of the machine. Most accidents occur by the failure to obey basic safety rules for the operation and maintenance of machines. Obey the precautions in the Operation and Maintenance Manual at all times.

Make sure that you know the work conditions in advance to prevent accidents caused by dangerous conditions.

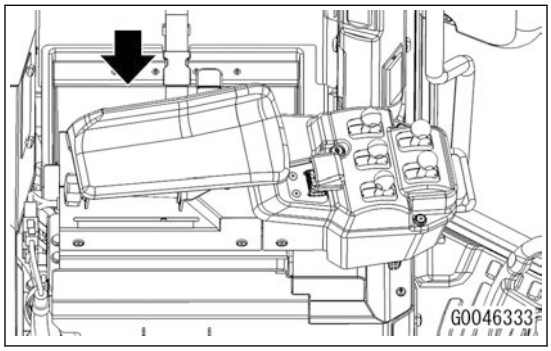
Komatsu cannot predict each circumstance that might involve a possible danger when the machine is used. The precautions and warning indications in the Operation and Maintenance Manual and on the machine cannot include all possible safety precautions.

Do operation, inspection, and maintenance of the machine on the user's responsibility if a situation is not included in the Operation and Maintenance Manual. Take the necessary precautions for safety. Make sure you avoid operations and procedures that are not allowed in the Operation and Maintenance Manual.

Read and understand all precautions and warnings in the Operation and Maintenance Manual and on the machine before operation, inspection, and maintenance. Obey all the contents. Failure to comply can cause serious personal injury or death.

If you operate the machine incorrectly, or do checks and maintenance incorrectly, it is dangerous. It can result in serious personal injury or death.

Keep the Operation and Maintenance Manual in the storage door shown on the illustration for all personnel to read.



If you are transferring the machine, make sure that the Operation and Maintenance Manual comes with the machine.

Komatsu supplies machines that conforms with all applicable rules and standards of the country to which it is supplied. If the machine is used in a country other than that of the shipping destination, there is possibility that it does not meet the safety device requirements and standards of that country. When you are not sure if your machine conforms to the standard and regulations in your country or region, consult your Komatsu distributor.

Explanations, values and illustrations in the Operation and Maintenance Manual are prepared with the latest information available on the date of publication. For up-to-date information about your machine or information contained in the Operation and Maintenance Manual, consult your Komatsu distributor.

Unit uses the International System of Units (SI). For reference, gravitational units are given in { }.

The numbers in illustrations refer to the numbers in ( ) in the text. 1 is shown as (1).

When you consult your Komatsu distributor for questions or repair, tell them the information in "MACHINE INFORMATION (1-10)".

If the Operation and Maintenance Manual is lost or damaged, consult your Komatsu distributor.

Some of Komatsu machines have the software based on the Open Source Software (OSS).

By the license of the OSS, Komatsu publishes the license information of the software to be used in the website that follows.

https://www.komatsu.jp/en/ProductInfo/opensoft/

SAFETY INFORMATION

Make sure to obey the precaution and warning indications in the Operation and Maintenance Manual and on the machine to avoid personal injury in operation, inspection, or maintenance, and for the safety of the personnel around the machine.

In the Operation and Maintenance Manual or on the machine, the safety alert symbols are used to identify important messages.

Safety alert symbols show the risk of accidents that can cause serious injury or death. Obey the instruction of the safety alert symbol.

The signal words that follow are used to identify important safety messages in the Operation and Maintenance Manual or on the machine.

⚠ DANGER	Shows a very dangerous situation which, if not avoided, will result in serious injury or death.
⚠ WARNING	Shows a possibly dangerous situation which, if not avoided, can result in serious injury or death.
⚠ CAUTION	Shows a possibly dangerous situation which, if not avoided, can result in injury, or damage to the machine or the surrounding area.

The signal words that follow are used to tell you there is a possible danger that can cause damage to the machine.

NOTICE	Failure to follow the precautions results in damage to the machine or a personal injury or death.
REMARKS	Shows useful information.

INTRODUCTION

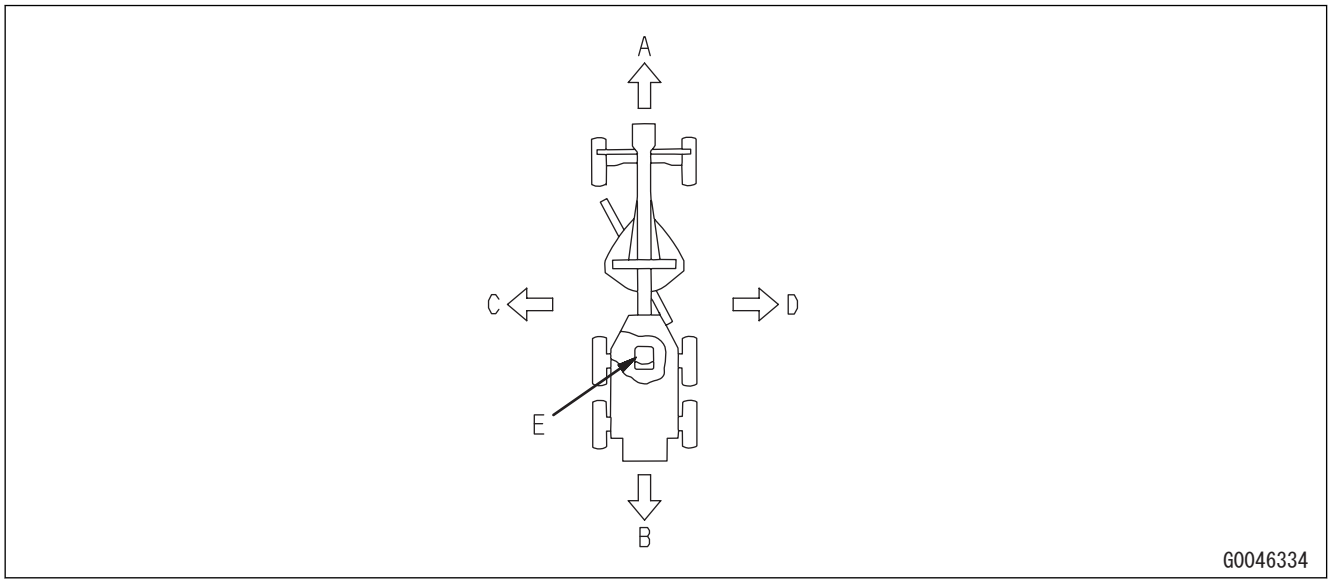
Main application of the machine

Use this machine mainly for the operations that follow.

- Leveling work
- Gravel road repair work
- Snow removal work
- Grooving work
- Slope excavating work
- Digging work
- Mixing work
- Spreading work

For details of work procedure, see OPERATION, “RECOMMENDED APPLICATIONS (3-276)”.

Front, rear, right, and left positions of the machine



(A) Front
(B) Rear
(C) Left
(D) Right
(E) Operator's seat

In the Operation and Maintenance Manual, the directions of the machine (front, rear, right, left) are based on the direction when operator in operator's seat views the direction of forward travel.

Visibility from operator's seat

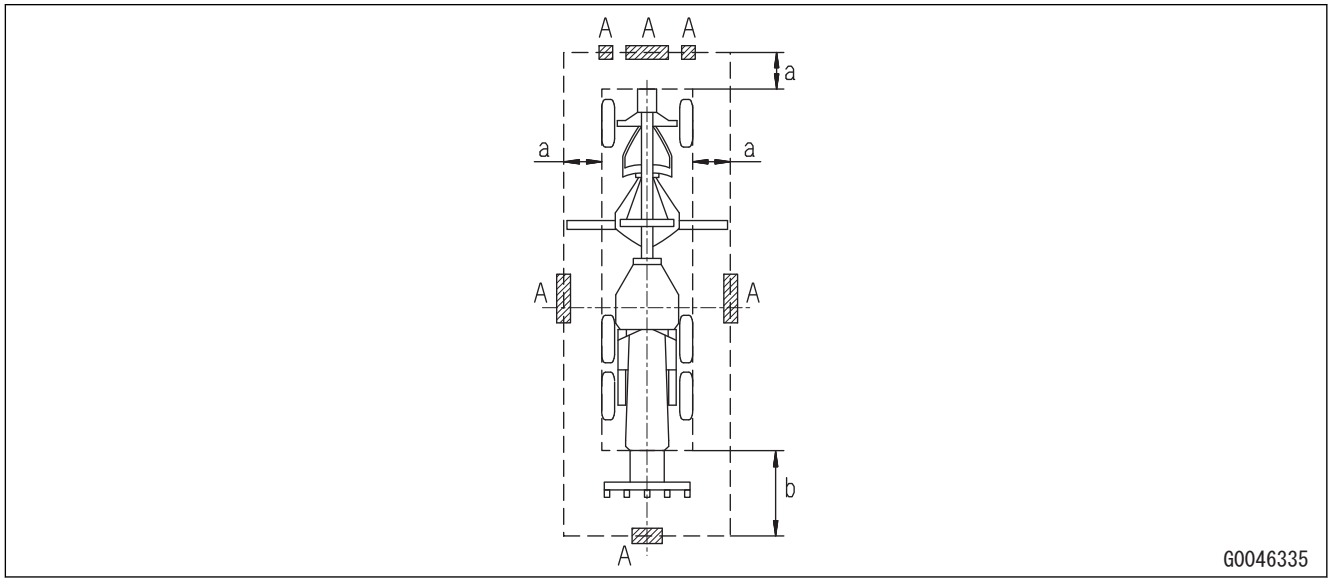
The visibility of this machine required by visibility standard (ISO 5006) is shown as follows.

Proximity visibility

The figure shows the visibility at 1 m {3 ft 3 in} away from the machine and 1.5 m {4 ft 11 in} above the ground.

The shaded area (A) in the figure is blocked by a part of the machine such as the mirrors, rearview camera even when visibility aid devices are installed to the machine and adjusted adequately.

Keep in mind the areas that you cannot see when you operate the machine.



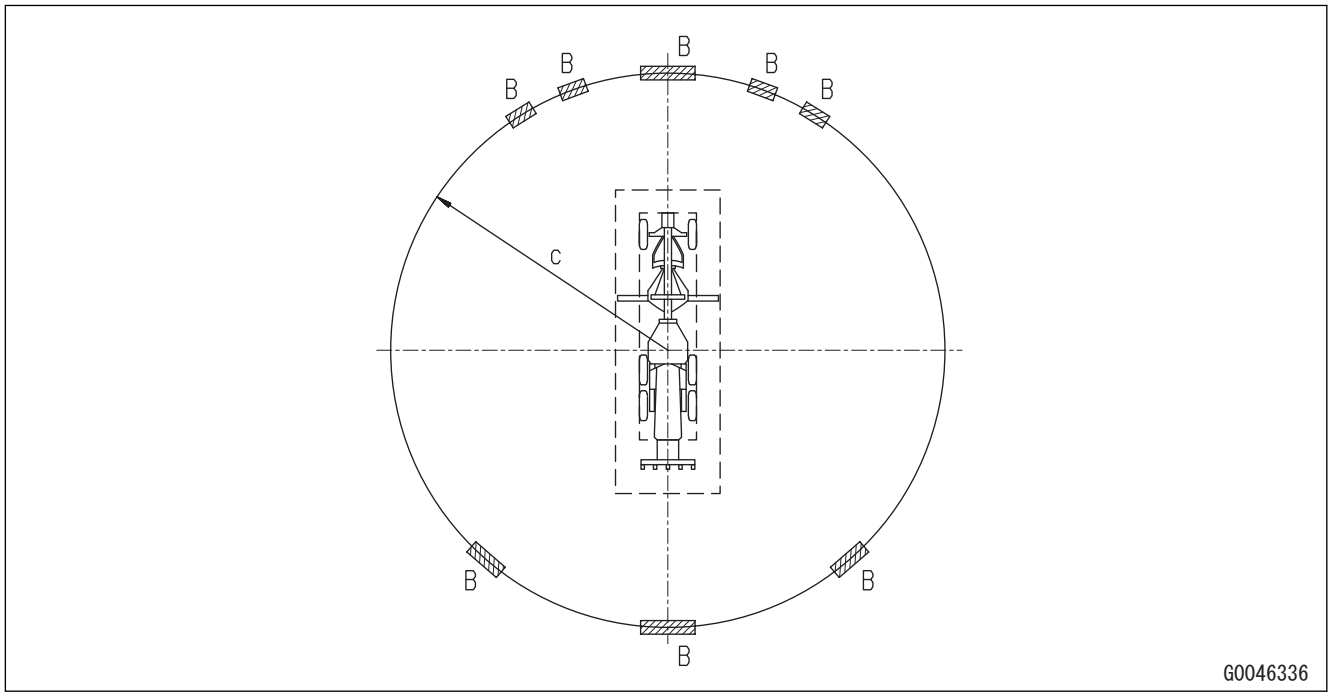
(a): 1 m {3 ft 3 in} (b): 2 m {6 ft 7 in}

12 m {39 ft 4 in} radius visibility

The circumference visibility at a radius of 12 m {39 ft 4 in} from the operator's seat of this machine is as shown in the figure.

The shaded area (B) in the figure is blocked by a part of the machine such as the mirrors, rearview camera even when visibility aid devices are installed to the machine and adjusted adequately.

Keep in mind the areas that you cannot see when you operate the machine.



(c): 12 m {39 ft 4 in}

Protective structures

This machine has a structure to protect the operator (ROPS) which conforms to ISO3471: 2008.

ENGINE TECHNOLOGY TO CONFORM EXHAUST GAS EMISSION

About Engine Technology

This engine technology combines a Komatsu Diesel Particulate Filter (KDPF) and Komatsu's Urea Selective Catalytic Reduction (SCR) to conform EPA Tier4 Final emission regulation in North America.

- Komatsu Diesel Particulate Filter (KDPF): A device which catches diesel particular matter or soot in the exhaust gas to clean exhaust gas. If soot is accumulated to a level in the filter, a purification step (called as “regeneration”) to burn the soot is done automatically to keep the filtering performance of KDPF high.
- Komatsu' Urea SCR system: A device which decomposes the poisonous nitrogen oxides (NOx) mixed in the exhaust gas into harmless nitrogen and water. When the reagent (Diesel Exhaust Fluid) is sprayed into the exhaust gas, a reaction occurs between the nitrogen oxides and ammonia discharged from the urea solution and the nitrogen oxides are decomposed into nitrogen and water.

REMARK

The catalyzer to clean the exhaust gas absorbs some materials. If the temperature of catalyzer rises immediately after the start or during the aftertreatment devices regeneration, the absorbed materials could come off and be discharged. At this time, the exhaust gas can has a color temporarily.

About Diesel Exhaust Fluid (DEF)

Diesel Exhaust Fluid is the aqueous urea solution for the SCR system.

DEF is the abbreviation for Diesel Exhaust Fluid, and is represented as DEF throughout this manual.

DEF is a colorless transparent and aqueous urea solution made with 32.5 % urea (AUS32) and 67.5 % deionized water. Urea as main constituent is a material which is used for cosmetics, medical and pharmaceutical products, and fertilizer, etc.

Commercial DEF, that is API (American Petroleum Institute) certified and satisfies the quality requirements in accordance with ISO22241-1, is to be used. The certified DEF has the API DIESEL EXHAUST FLUID Certification Mark shown as follows. Look for the API DEF Certification Mark when you purchase DEF.

API Diesel Exhaust Fluid Certification Mark is the trademark of API (American Petroleum Institute).



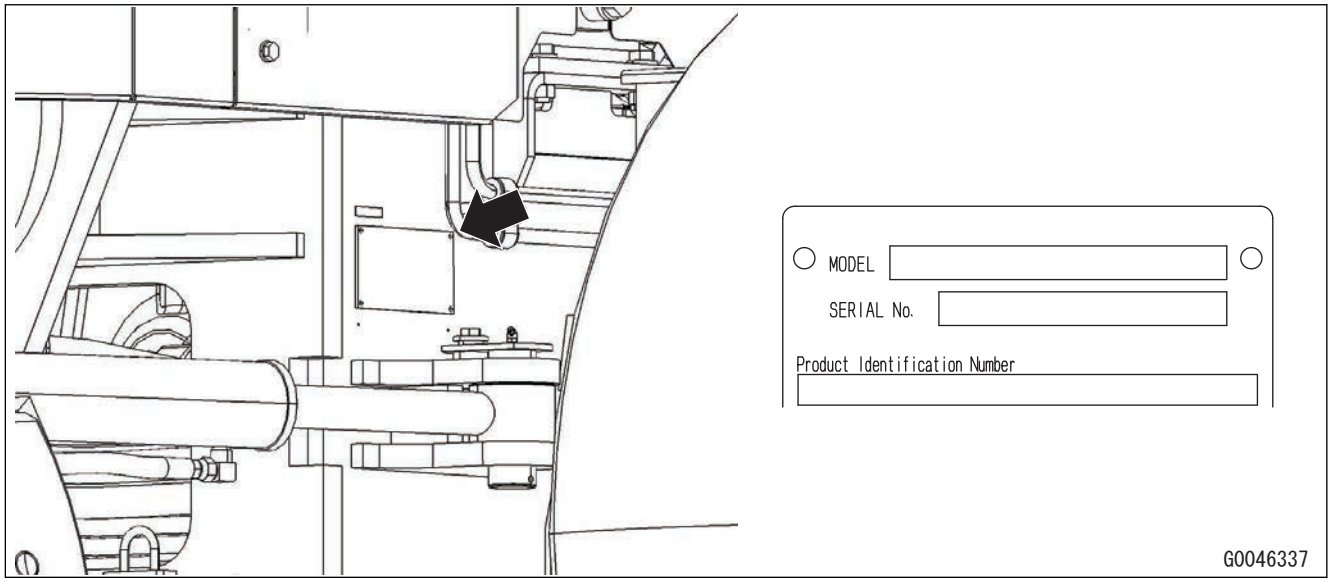
MACHINE INFORMATION

When you consult your Komatsu distributor for repair or replacement of parts, tell them the items that follow.

LOCATION OF PRODUCT IDENTIFICATION NUMBER (PIN) AND MACHINE SERIAL NO. PLATE

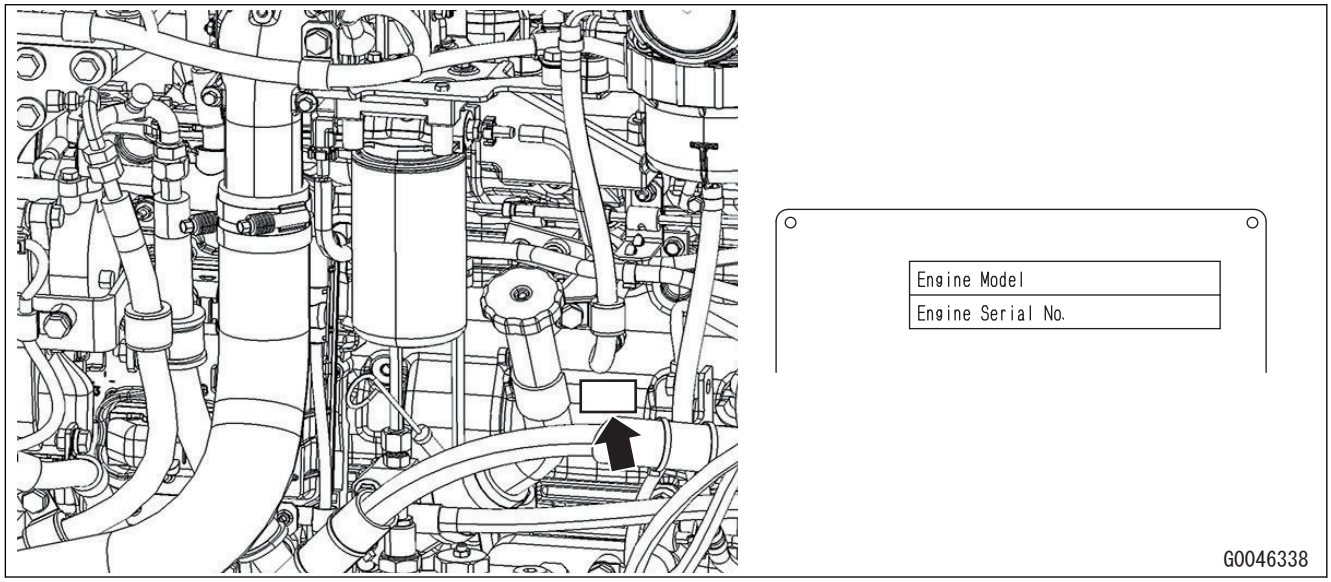
The nameplate is located at the position on the figure.

The design of the nameplate can be different by the district.



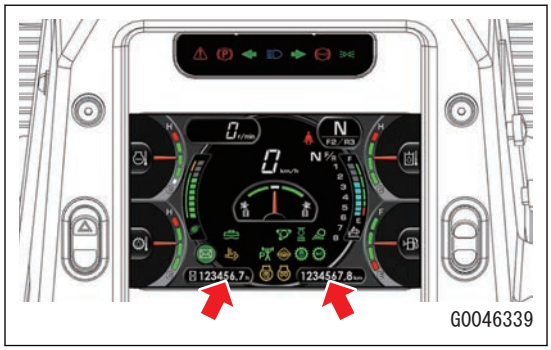
LOCATION OF ENGINE NUMBER PLATE

The nameplate is located at the position on the figure.



SERVICE METER LOCATION

The service meter is shown on the machine monitor.



YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR

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

ABBREVIATION LIST

- This list of abbreviations includes the abbreviations for functions, devices, and parts which are used in the operation and maintenance manual.
- Commonly used abbreviations are not included.
- Special abbreviations which are not shown frequently are included in the text as additional information.

List of abbreviations used in the text

Abbreviation	Actual word spelled out	Explanation
API	American Petroleum Institute	API is the abbreviation for American Petroleum Institute.
CAN	Controller Area Network	CAN is one of networks that communicate between the machine monitor and controllers.
DEF	Diesel Exhaust Fluid	DEF is a urea solution that is used for the SCR system.
ECSS	Electronically Controlled Suspension System	ECSS is a function that decreases bucket vibration during travel to reduce load spillage and operator's fatigue.
EGR	Exhaust Gas Recirculation	EGR is a function that recirculates part of exhaust gas to the intake side to control NOx emissions.
FOPS	Falling Object Protective Structure	FOPS is a structure that protects operators from falling objects.
GNSS	Global Navigation Satellite System	GNSS is a general term for satellite positioning systems.
GPS	Global Positioning System	GPS is one of satellite positioning systems.
KCCV	KOMATSU Closed Crankcase Ventilation	KCCV is a function that isolates oil from blowby gas in the engine and returns the blowby gas to the intake side.
KDOC	KOMATSU Diesel Oxidation Catalyst	KDOC is a device that purifies exhaust gas.
KDPF	KOMATSU Diesel Particulate Filter	KDPF is a device that is composed of the KCSF and KDOC, and catches soot (Particulate Matter, PM) in exhaust gas.
KOWA	Komatsu Oil and Wear Analysis	KOWA is a preventive maintenance service that collects and analyzes oil in the machine at the specified interval so that wear of the machine and other problems can be found at short time.
PPC	Proportional Pressure Control	PPC is a function that controls the pressure of the hydraulic circuit in proportion to the degree of the lever operation.
PTO	Power Take Off	PTO is a mechanism that takes out the engine power.
ROPS	Roll-Over Protective Structure	ROPS is a structure that protects operators from falling objects or in the event of a machine roll-over.
SCR	Selective Catalytic Reduction	SCR is a device that purifies nitrogen oxides (NOx) in exhaust gas from the engine.

SAFETY

⚠ WARNING

Fully understand the safety precautions which are shown in the Operation and Maintenance Manual and on the machine. Obey the precautions when you operate the machine and when you do the inspection and maintenance.

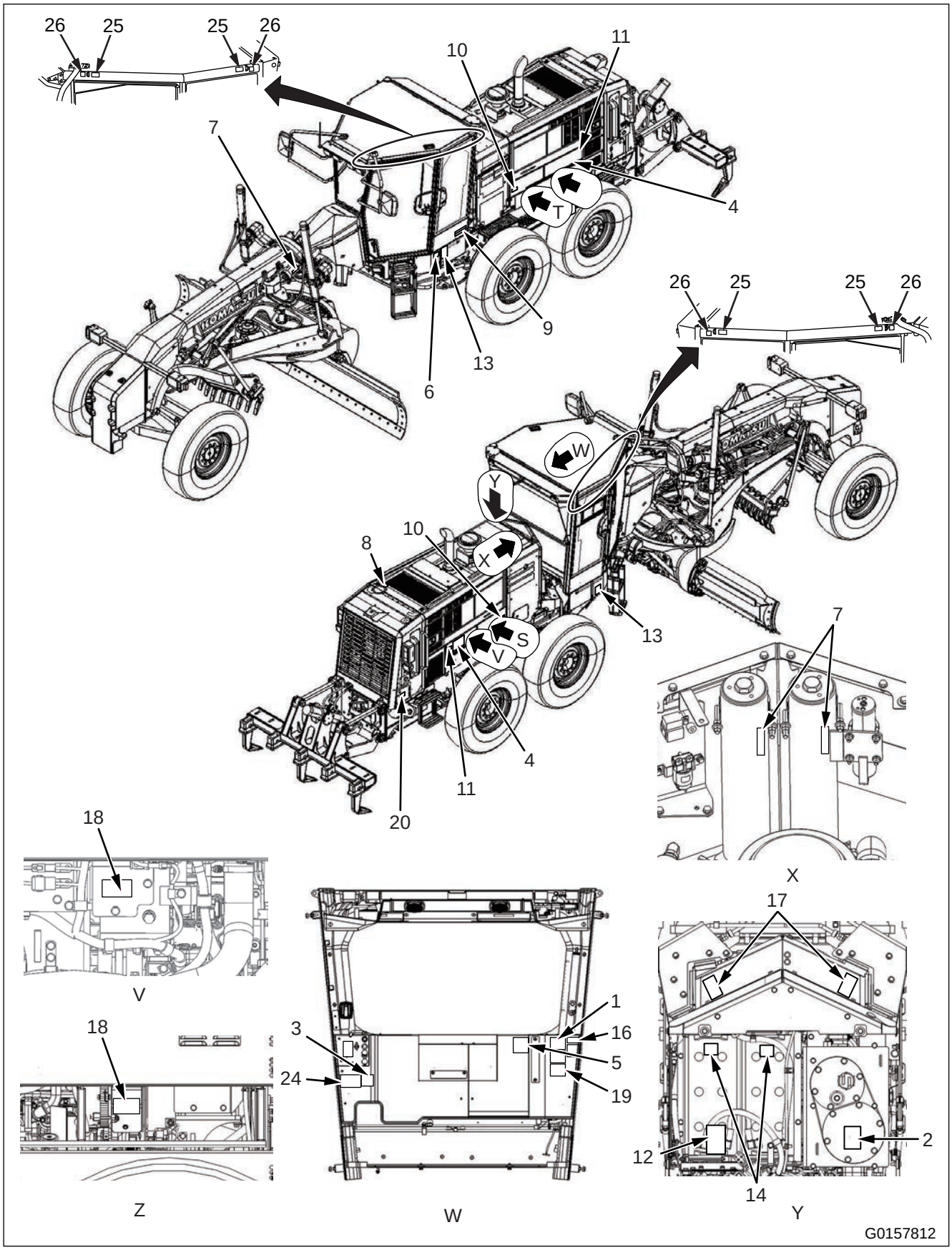
SAFETY LABELS

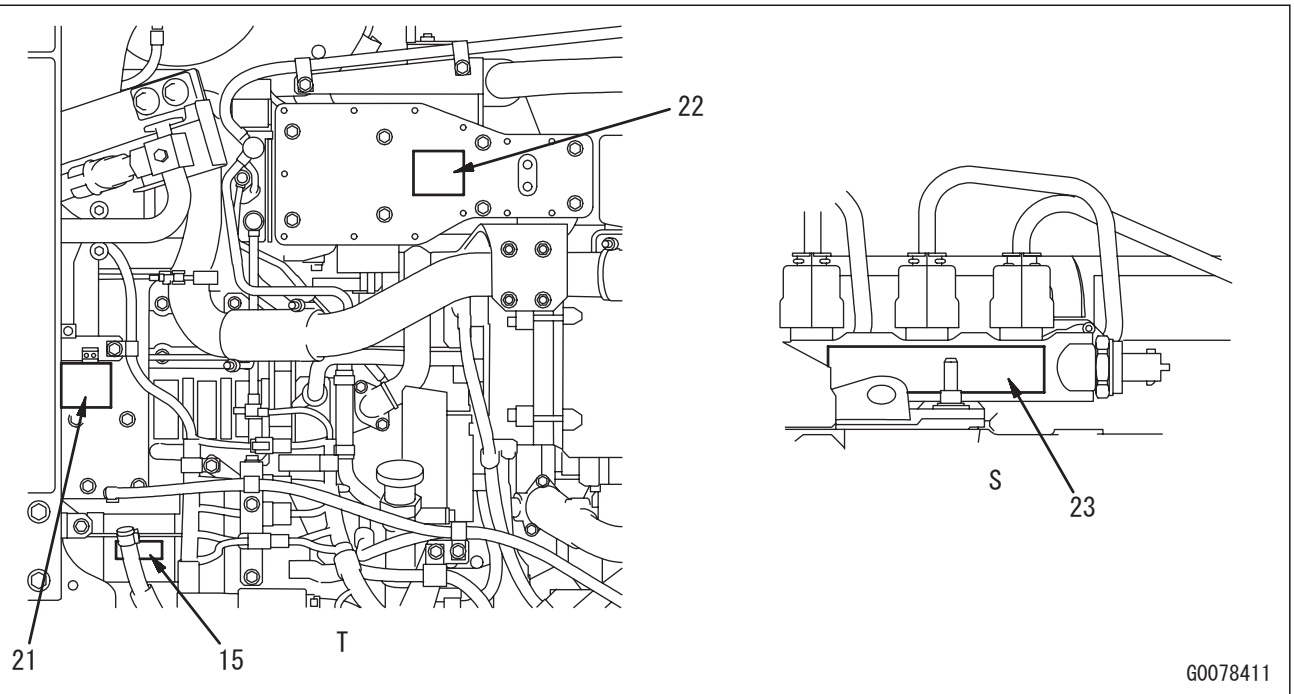
Make sure you fully understand the content and how to avoid the danger shown on the safety labels. Remember where these safety labels are located.

Handle the safety labels used on this machine as follows.

- Always keep the safety labels clean to be read correctly. When you clean the safety labels, do not use the organic solvents or gasoline. These can cause the labels to peel off.
- If the safety label is damaged, or it cannot be found or read, replace it with a new one. For the part numbers for the safety labels, see Operation and Maintenance Manual or the actual label, and place an order to your Komatsu distributor.
- The warning and safety signs are not the only signs on the machine. Read and obey those signs also.

Location of safety labels





Contents of safety labels

1. Caution before operating
   Part number: 09651-03001

WARNING

Improper operation and maintenance can cause serious injury or death.

Read manual and labels before operation and maintenance. Follow instructions and warnings in manual and in labels on machine.

Keep manual in machine cab near operator.
Contact Komatsu distributor for a replacement manual.

09651-03001

2. Caution for high-temperature oil
   Part number: 09653-03001

WARNING

Hot oil hazard.

To prevent hot oil from spurting out :

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

09653-03001

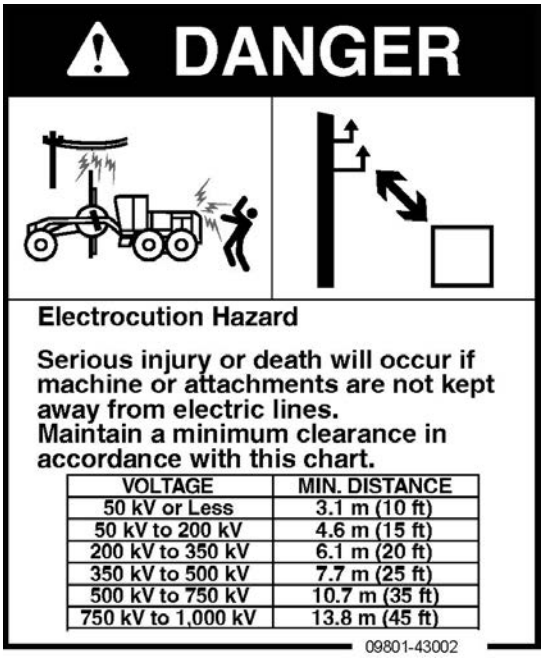
3. Caution when traveling in reverse
   Part number: 09833-33000



4. Caution for nearing machine
   Part number: 09812-13001



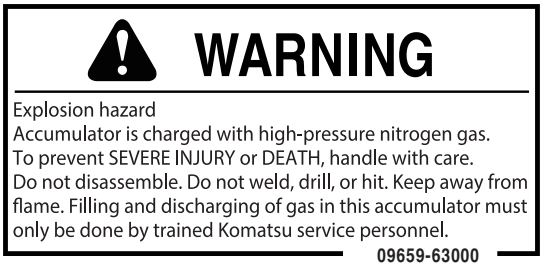
5. Caution for electric cables
   Part number: 09801-43002



6. Articulation lock
   Part number: 09161-33000



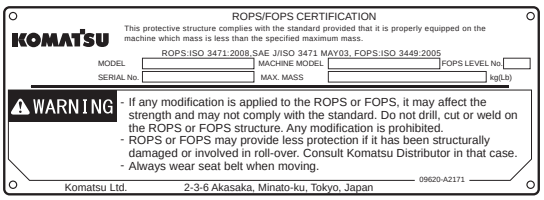
7. Caution for handling accumulator
   Part number: 09659-63000



8. Caution for high-temperature coolant
   Part number: 09668-03001



9. Caution for modification of ROPS/FOPS
   Part number: 09620-A2001, 09620-A2171



10. Do not stand on the tires
    Part number: 23B-53-91120



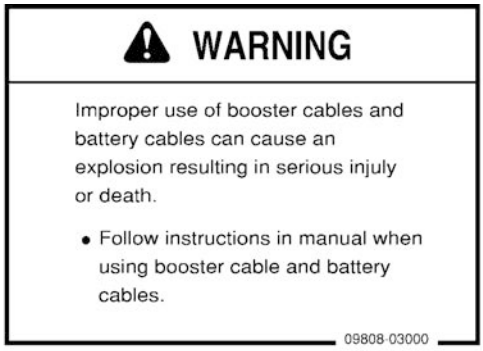
11. Caution for rotating parts when you check and maintenance

    Part number: 09667-03001



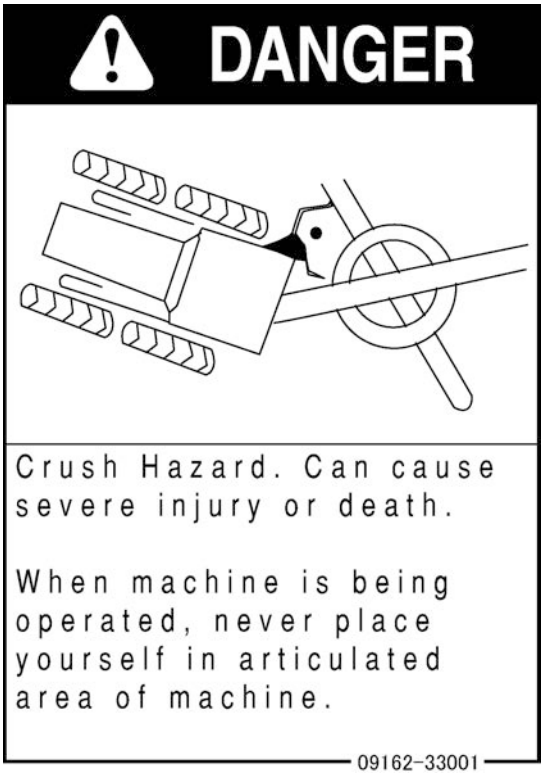
12. Caution for handling cable

    Part number: 09808-03000



13. Prohibition of trespassing

    Part number: 09162-33001



14. Caution for handling battery
    Part number: 09664-30014



15. Prohibition of start by short-circuiting
    Part number: 09842-A0642
    This safety label is attached to the engine starting motor.
    - Start the engine only while sitting on the operator's seat.
    - Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious personal injury or fire.



16. Caution for bank control
    Part number: 09819-03000



17. Caution against falling
    Part number: 09805-13000



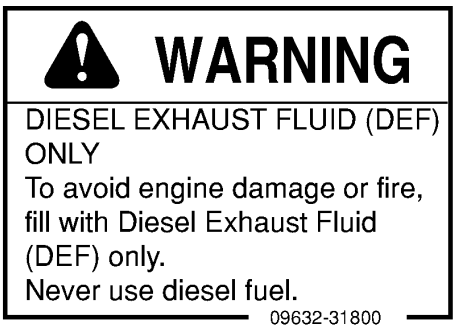
18. Caution against rotating parts
    Part number: 09667-23001



19. Caution for blast site
    (Machine with KOMTRAX)
    Part number: 09845-13000



20. Caution for handling DEF
    Part number: 09632-31800



21. Caution against high temperature turbocharger

    Part number: 09817-A0753

    - Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation.
    - Never touch when hot.



22. Caution against high temperature exhaust pipe

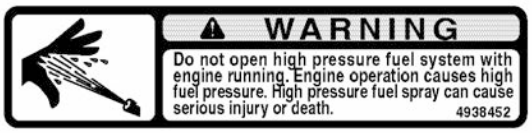
    Part number: 09817-A0753

    - Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation.
    - Never touch when hot.



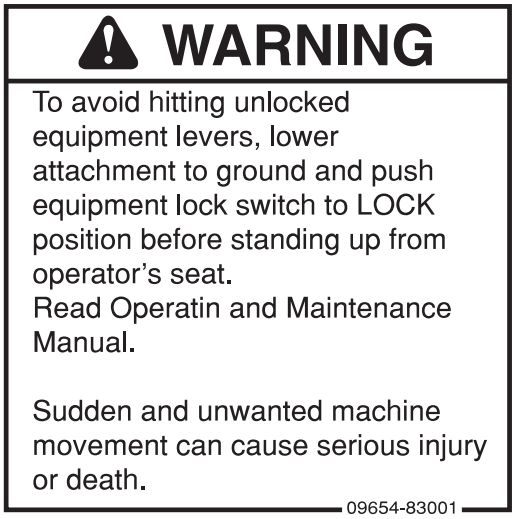
23. Caution for high-pressure common rail

    Part number: 6754-71-1991



24. Caution when leaving operator's seat

    Part number: 09654-83001



25. Anchor point for tie-off

(Machine with anchor point for tie-off)
Part number: 09850-00641
Anchor point for personal fall-arrest equipment.



26. Prohibition of lifting operation

(Machine with anchor point for tie-off)
Part number: 09951-00281
Do not use the anchor point for tie-off which has this safety label to lift all the machine. There is a danger that the machine falls.



GENERAL PRECAUTIONS COMMON TO OPERATION AND MAINTENANCE

Before you do the operation, inspection, or maintenance, read the Operation and Maintenance Manual and the safety labels on the machine.

PRECAUTIONS BEFORE STARTING OPERATION

ENSURE SAFE OPERATION

- Only the trained and authorized persons can operate this machine.
- When you operate the machine and do the inspection and maintenance, obey the safety precautions and procedures written in the Operation and Maintenance Manual.
- Do not operate it in the cases that follow.
  - When you are in bad physical condition
  - When you took the medication which causes drowsiness
  - When you are in the influence of alcohol
  - When your mental condition is not stable
- When you do the work with other workers or allocate a signalman, discuss the work contents in detail and make a decision about the signals to use. Obey the signals which are set when you do the work.

UNDERSTAND THE MACHINE

Before you operate the machine, read the Operation and Maintenance Manual fully. If there is a content that you do not understand in the Operation and Maintenance Manual, consult the safety personnel.

PREPARATIONS FOR SAFE OPERATION

PRECAUTIONS FOR SAFETY-RELATED EQUIPMENT

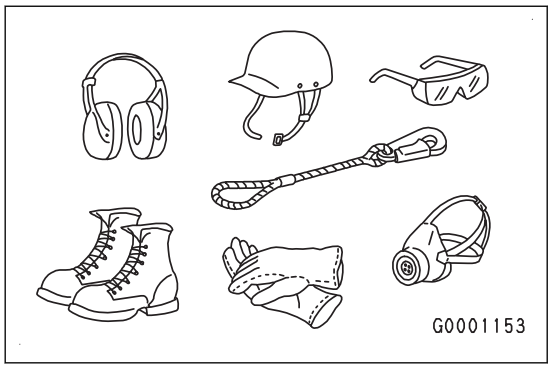
- Make sure that all the equipment like protective guards, covers, cameras, and mirrors are correctly installed. If there is any damaged one, replace it immediately.
- Understand how to use the safety equipment and use it correctly.
- Do not remove the safety equipment. Manage them to keep their correct functions.

INSPECT MACHINE

Before you start the operation, check the machine. If a problem is found, do not operate the machine until the repair is completed.

WEAR WELL-FITTING CLOTHES AND PROTECTIVE EQUIPMENT

- Do not wear loose clothes and accessories. If the protruding portions like the control levers catch them, there is a danger that the machine moves unexpectedly.
- Be sure to wear a hard hat and safety shoes.
  Wear the protective equipment like protective eyeglasses, masks, gloves, ear plugs, and personal fall-arrest equipment by the content of work.
- Tie the long hair not to get involved in the machine.
- Check that all the protective equipment works correctly before you use it.

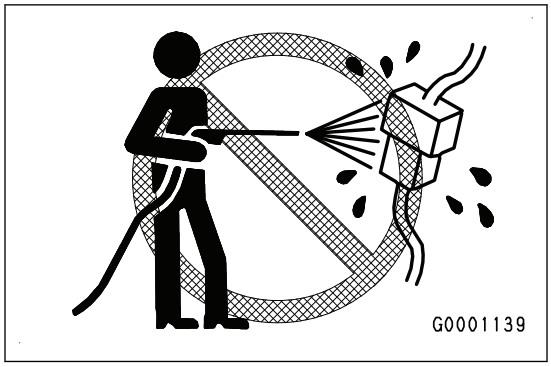


KEEP MACHINE CLEAN

- If mud or oil or grease is stuck to the machine, when you mount or dismount the machine, or when you do the machine inspection and maintenance, there is a possibility that you fall down or fall over.
  Remove the mud or oil or grease fully from the machine.

- If water gets in the electrical system, the electric devices could malfunction or the machine could move unexpectedly. It could cause serious personal injury or death.

  When you clean the machine with water or steam, be careful not to spray water directly onto the electric devices.
- If high-pressure water is sprayed directly onto the cameras, they could have failures, and checks by cameras cannot be done.
  Do not directly spray high-pressure water when you clean the machine.
  Clean the cameras with soft cloth.



- Prepare a scaffold first to provide a safe working platform for the work at heights.
  There is a danger of serious personal injury or death caused by such as falling down.

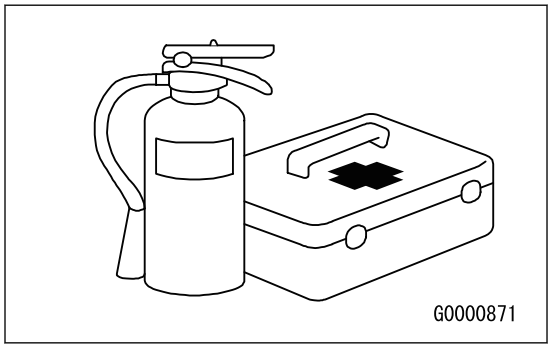
PRECAUTIONS FOR INSIDE OPERATOR'S COMPARTMENT

- Before you enter the operator's compartment, remove the mud or oil or grease from your shoes.
  There is a possibility that you slip by the mud or oil or grease, and incorrect operations could be caused.
- Do not let the tools and parts remain in the operator's compartment.
  There is a possibility that the tools and parts prevent the operation, and the machine moves unexpectedly. It could cause serious personal injury or death.
- Do not install the suction cups on the window glasses. It could act as a lens and it could cause fire.
- Do not use a mobile phone during the machine operation.
  There is a danger of mistakes in the operation and it could cause serious personal injury or death.
- Do not get the dangerous objects such as flammable or explosive materials into the operator's compartment.

PROVIDE FIRE EXTINGUISHER AND FIRST AID KIT

To prevent serious personal injuries or death or fires, obey the items that follow.

- Check the location of fire extinguisher.
  Be sure to know well of the usage method of the fire extinguishers.
  Check the fire extinguisher regularly that it is usable.
- Prepare the first aid kit.
  Check the first aid kit regularly and add to the contents if necessary.



REPORT IMMEDIATELY IF ANY PROBLEM IS FOUND

If you find a problem on the machine during the operation or inspection or maintenance, tell it to the person in charge and act correctly.

Do not operate the machine until the problem is corrected.

ACTIONS IF FIRE OCCURS

- Turn the starting switch to the OFF position and stop the engine.
- Do not jump from the machine. Injury can occur.
  Use the handrails and steps to escape from the machine.
- Do not breathe the combustion gas caused by a fire.
  The combustion gas contains harmful materials which have a bad influence on your body.
- Do not touch the burned remainder after the fire is extinguished.
  There is a possibility that the burned remainder contains harmful compound.
  If you touch the burned remainder, be sure to wear the rubber gloves.

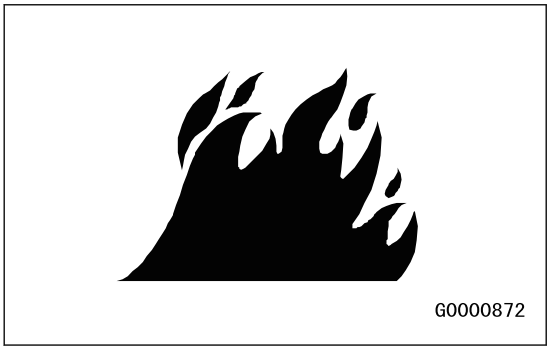
Chloroprene rubber (neoprene rubber) or polyvinyl chloride (when the temperature is sufficiently low) is recommended for the material of the rubber gloves.
If you use the cotton gloves, be sure to wear the rubber gloves below them.

PRECAUTIONS TO PREVENT FIRE

FIRE CAUSED BY FUEL, OIL, COOLANT, OR WINDOW WASHER FLUID

If there is a liquid such as fuel, oil, coolant, and window washer fluid nearby, always obey the items that follow.

- Do not let an open flame be near.
- Do not smoke.
- Before you add fuel to the machine, make sure that the engine is stopped.
- While fuel or oil is added to the machine, stay near the machine.
- Tighten all the fuel and oil caps.
- Do not spill fuel on hot surfaces or electrical devices.
- If fuel or oil is spilled, wipe it up completely.
- Put the greasy rags and other flammable materials into a safe container and store it.
- When you clean the parts, use non-flammable oil. Do not use a flammable liquid such as diesel fuel or gasoline.
- Do not weld the pipes or tubes that contain flammable liquids. Do not cut them with a cutting torch.
- Store oil or fuel in a well-ventilated area. Do not allow the unauthorized persons to enter the area.
- Do not grind or weld.


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FIRE CAUSED BY ACCUMULATED FLAMMABLE OBJECTS

Remove all the flammable materials such as dry leaves or chips or pieces of paper or coal dust, that are accumulated inside the undercover or near the intake or exhaust system or cooling system or battery.

Fires from spreading sparks or burning particles from other fires can be prevented.

FIRE CAUSED BY ELECTRICAL SYSTEM

Short circuits in the electrical system can cause fire. Obey the items that follow.

- Clean the connection of wires in electrical system and install them.
- In the check-before-starting, make sure that the connectors and wiring clamps are not loose or damaged. Repair or replace all the damaged wire.

FIRE FROM PIPINGS

Make sure that all the hose and tube clamps, guards, and cushions are installed tightly.

If they are loose, there is a possibility that the parts are moved by vibration, they rub each other, and damage to the piping is caused. If the piping was damaged, the high pressurized oil will leak and it could cause fire or personal injury.

FIRE CAUSED BY HIGH TEMPERATURE EXHAUST GAS

Komatsu Diesel Particulate Filter (hereafter KDPF) is installed to this machine.

Exhaust gas temperature can increase during the purification (regeneration) of KDPF.

Do not let the flammable materials to come near the exhaust pipe.

If there are flammable materials near the machine, stop the regeneration of KDPF before you start the work.

EXPLOSION CAUSED BY LIGHT

When you check the level of fuel, oil, battery electrolyte, or coolant, use the lighting which does not cause an explosion by vapor.

When you take a power source from the machine body, use the power outlet.

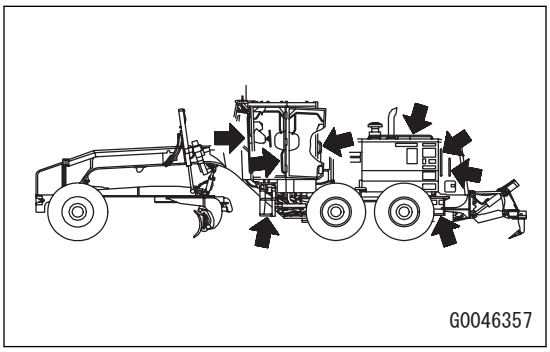
For details, see OPERATION, “POWER SUPPLY OUTLET (3-146)”.

PRECAUTIONS WHEN YOU GET ON OR OFF MACHINE

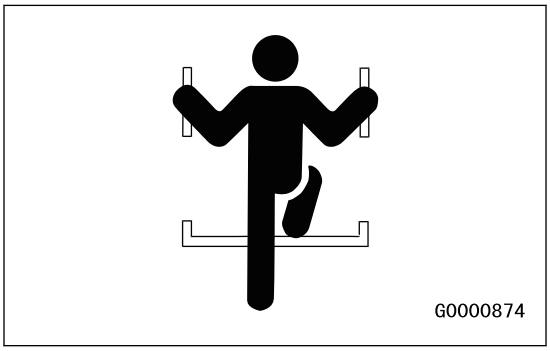
USE HANDRAILS AND STEPS WHEN YOU GET ON OR OFF MACHINE

Obey the items that follow to prevent personal injury caused by falling and such.

- Use the handrails and steps marked by arrows in the figure.



- Keep an eye on the machine. Support yourself at three-point contact with handrails and steps. Three-point contact means to support yourself with the two feet and one hand, or two hands and one foot.
- Before you mount or dismount the machine, check the handrails and steps.
  If there is adhesion of oil or grease or mud, wipe it off not to slip.
  If the bolt of handrails or steps is loose, immediately tighten it.
  If the bolt of handrails or steps is damaged, immediately repair it. Consult your Komatsu distributor for repair.



- Do not hold the control levers when you mount or dismount the machine. When you get on or off the machine, be careful that your body or clothes do not touch the levers.
- You must not stand on the areas where there are no non-slip pads.
- You must not stand on the tires.
- When you hold the tools in your hand, do not mount or dismount the machine.

NO JUMPING ON OR OFF MACHINE

Do not get on the machine or get off from it while it is moving. Serious personal injury or death could be caused.

Do not jump onto the machine or jump down from it.

Even if the machine starts moving while no person is on the machine, do not jump onto the machine to stop it.

NO PEOPLE ON WORK EQUIPMENT OR ATTACHMENTS

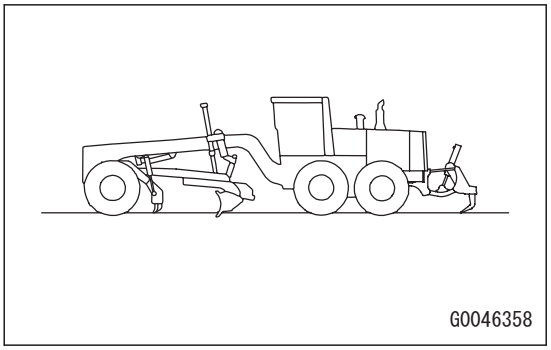
Do not put a person on the work equipment or attachment. The person falls off from there in some cases, and it results in serious personal injury or death.

PRECAUTIONS WHEN YOU STAND UP FROM OPERATOR'S SEAT

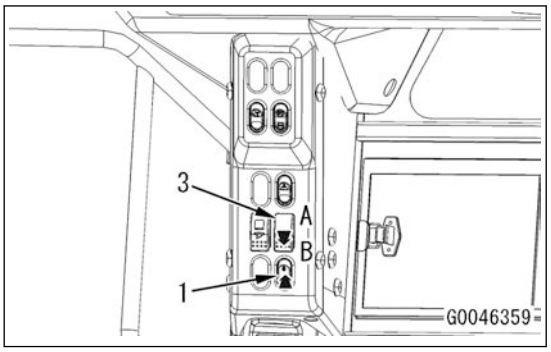
If you touch the devices like control levers by mistake, there is a possibility that the machine suddenly moves and it could cause serious personal injury or death.

Before you stand up from the operator's seat to do the adjustment, etc., do the operations that follow, and then stop the engine.

- Be sure to lower the work equipment to the ground.

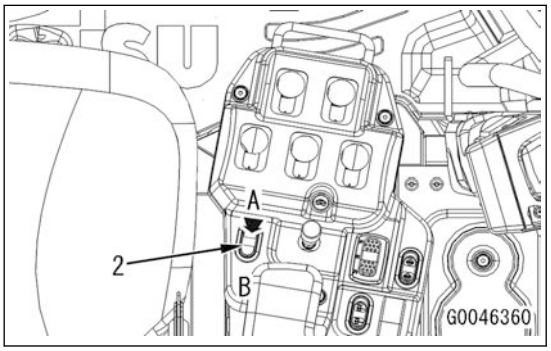


- Push the work equipment lock switch (1) to lock the work equipment.



- Move the parking brake switch (2) to the ON position (A), keep the brake pedal pushed and check that the parking brake pilot lamp is lit. Make sure that the machine is stopped fully even after you release the brake pedal.

  Set the steering lever enable switch (3) to the disable position (B).

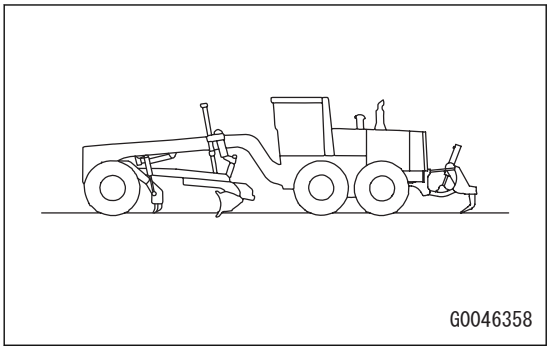


PRECAUTIONS WHEN YOU LEAVE MACHINE

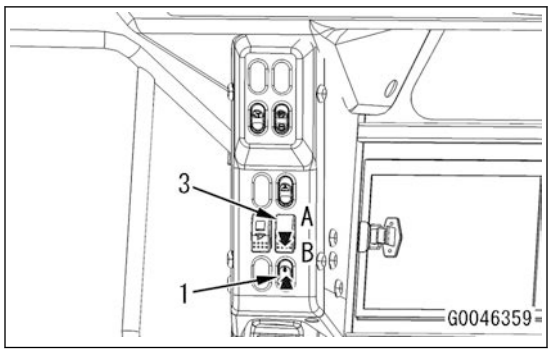
Stop the machine fully. If the actions are not done, there is a possibility that the machine suddenly moves while no person is on the machine, and it could cause serious personal injury or death.

Before you move away from the machine, first do the operations that follow, and then stop the engine.

- Be sure to lower the work equipment to the ground.

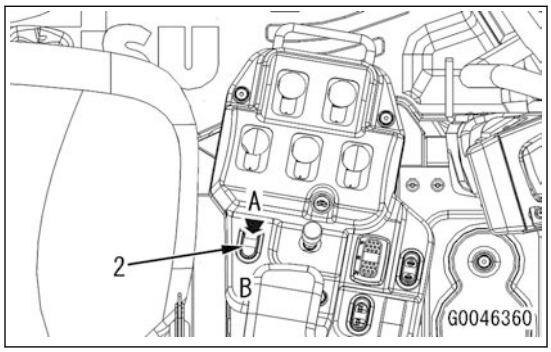


- Push the work equipment lock switch (1) to lock the work equipment.

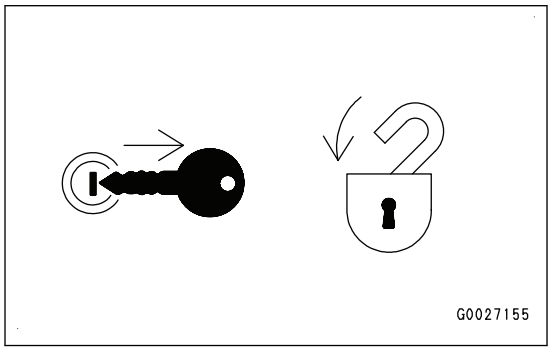


- Move the parking brake switch (2) to the ON position (A), keep the brake pedal pushed and check that the parking brake pilot lamp is lit. Make sure that the machine is stopped fully even after you release the brake pedal.

  Set the steering lever enable switch (3) to the disable position (B).



- Lock all the locks, and keep the keys in the specified area.
- When you get off the machine, keep a space for you to get on or off the machine.
  Pull the work equipment console lever toward rear of the machine, and raise the steering column fully.



EMERGENCY EXIT FROM OPERATOR'S CAB

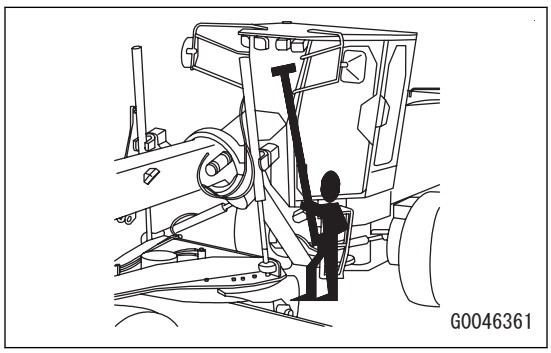
Operator's compartment has the doors on its right and left sides. If one door does not open, escape from the other door.

PRECAUTIONS WHEN YOU CLEAN CAB GLASS

Clean the cab glass to get good visibility during operation.

Clean the glass with a mop from the ground.

When you use the tie-off, see “WALK-AROUND CHECK (3-193)”.

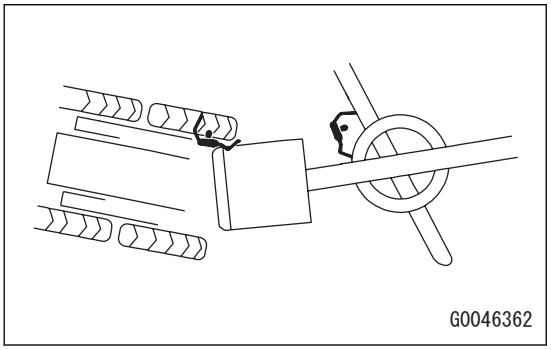


PRECAUTIONS FOR MACHINE AND JOBSITE

DO NOT GET CAUGHT

The clearances around the articulation part or work equipment will change. If something is caught between them, there is a danger that serious personal injury or death occurs.

Do not allow anyone to come near all the rotating or telescopic parts.

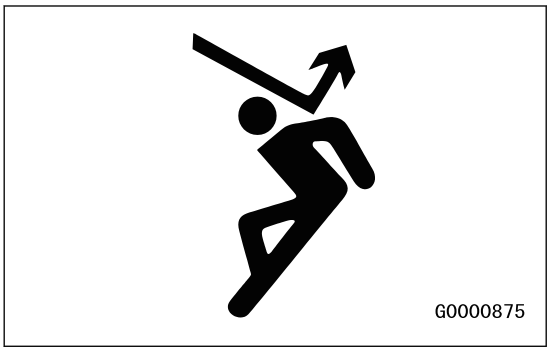


PRECAUTIONS RELATED TO PROTECTIVE STRUCTURES

The operator's cab is provided with a structure to protect the operator (e.g. ROPS, FOPS). This structure absorbs the impact energy and protects the operator.

If the weight exceeds the proof load (shown on the certification plates), the function of the structure to protect the operator cannot be guaranteed.

If the function of the structure to protect the operator is prevented, the strength is decreased, and the efficiency cannot be kept. The operator is not protected and could be injured. Obey the items that follow.



- If you remove the structure to protect the operator, do not operate the machine.
- If the protective structure is welded, or holes are drilled in it, or it is modified, its strength could be lowered. Do not do the modification.
- If the structure to protect the operator is deformed because of tipping over, or by the falling object, be sure to consult your Komatsu distributor.
- Be sure to fasten the seat belt always when you operate the machine.

UNAUTHORIZED MODIFICATION

Komatsu will not be responsible for personal injuries, machine failures, physical loss or damage, or influence on the environment because of modifications made without authorization from Komatsu.

Before the modification, be sure to consult your Komatsu distributor.

PRECAUTIONS RELATED TO ATTACHMENTS AND OPTIONS

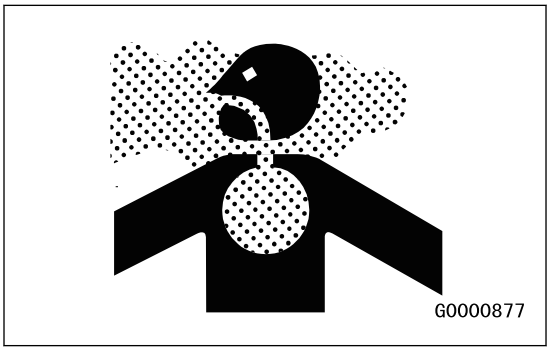
- Komatsu will not be responsible for personal injuries, machine failures, or influence on the environment caused by the use of the attachments and options which are not authorized by Komatsu.
- Installation of attachments and options can cause the safety problem or violation of law. Before that, consult your Komatsu distributor.
- Before the installation, read the instruction manual of the attachment and the information of the attachment in the Operation and Maintenance Manual of the machine.

PRECAUTIONS WHEN YOU OPERATE ENGINE INSIDE BUILDING

In a well-ventilated area, start the engine or operate the machine.

Exhaust gas contains harmful materials which have a bad influence on human body.

In a poor-ventilated area, if you start the engine or if you operate the machine, let the exhaust gas discharge out and let the clean air come in.



PRECAUTIONS FOR OPERATION

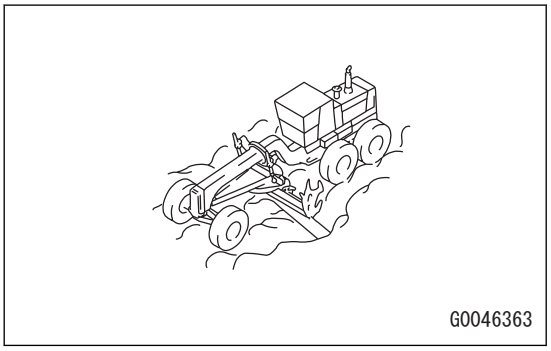
PRECAUTIONS FOR JOBSITE

INVESTIGATE AND CONFIRM JOBSITE CONDITIONS

In the job site, there are many dangers which cause serious personal injury or death.

Before you start the work, check the items that follow to make sure that there is no danger on the job site.

- When you do the work near flammable materials, be careful because they easily cause fire.
- Find out the terrain and ground condition at the job site, and decide the safe way of work.
  Do not do the work on the job site where there is a danger of landslides or falling rocks.
- If water lines, gas lines, or high-voltage electrical lines are buried under the jobsite, contact the management company to identify their locations. Be careful not to damage these buried lines.
- Keep the unauthorized persons away from the jobsite.
- Especially when the work is done on a public road, allocate a signalman or install the fences around the jobsite to protect the pedestrian and vehicles.
- Before the machine travels in shallow water or on soft ground, find out the water depth, speed and status of the current, and shape of the ground.
  Avoid such area that will obstruct the travel.


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- Keep the condition of travel path of the job site well as that there is no obstruction for the travel operations.

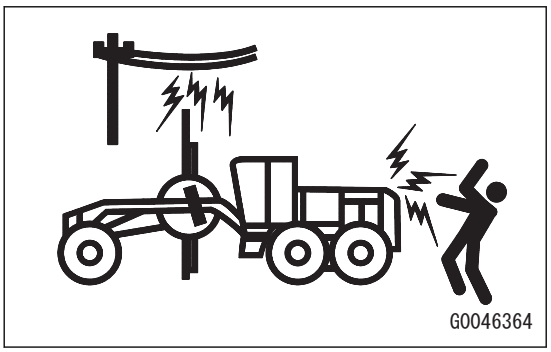
PRECAUTIONS WHEN YOU WORK ON LOOSE GROUND

- Do not drive or operate the machine near the cliffs, road shoulders, and ditches. There is a possibility that the ground is loose.
  If the ground breaks by the vibration or machine weight, there is a danger that the machine falls over or inclines.
  The ground like this will easily break after a heavy rain, blasting work, and earthquake.
- If the machine is operated on the embankment or near the ditches, there is a danger that landslide could occur by vibration or machine weight.
  Before you start the work, make sure that the ground is safe and sufficiently strong against the machine weight.

DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES

Do not operate the machine near the electric cables. There is a danger of serious personal injury or death by an electric shock. In the area where the machine comes near the electric cables, obey the items that follow.

- Tell the electric power company that the construction work will be done near the electric cables and consult the necessary measures.
- There is a danger of an electric shock just if you come near the high-voltage cables.
  Keep the safe distance shown in the table that follows to do the work. Consult the electric power company about the voltage.


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Line voltage	Safe distance
50 kV or less	3.1 m {10 ft} or more
50 kV to 200 kV	4.6 m {15 ft} or more
200 kV to 350 kV	6.1 m {20 ft} or more
350 kV to 500 kV	7.7 m {25 ft} or more

Line voltage	Safe distance
500 kV to 750 kV	10.7 m {35 ft} or more
750 kV to 1000 kV	13.8 m {45 ft} or more

- Wear the rubber sole shoes and rubber gloves. Put a rubber sheet on the operator's seat. Do not let the part of your body which could get an electric shock contacts the machine body.
- Allocate a signalman to keep the machine away from the electric cables.
- When the work is done near the high-voltage cables, do not allow the unauthorized persons to come near the machine.
- If the machine came near or touched the electric cables, to protect the operator from electric shocks, keep the operator seated until the electricity is shut off.
  Also, prohibit other persons to come near the machine.

ENSURE GOOD VISIBILITY

To keep good visibility, mirrors and cameras are installed to this machine. But there are blind spots from the operator's seat.

To prevent serious personal injury or death in the jobsite where the visibility is bad, obey the items that follow.

- If there is an area where the visibility is not sufficient, allocate a signalman.
- When you work in a dark area, illuminate the light. To make the area brighter, add the lighting equipment as necessary.
- If the visibility is bad because of the weather such as mist, snow, rain, or dust, stop the work.
- Before you start the work, clean all the windows, and check that the visibility is clear.
- Before you start the work, check all the mirrors are not dirty, and adjust the angle.
- Before you start the work, check all the cameras are not dirty, and make sure that they can correctly reflect the image.
- If obstacles are reflected on the monitor, be sure to do the visual check.

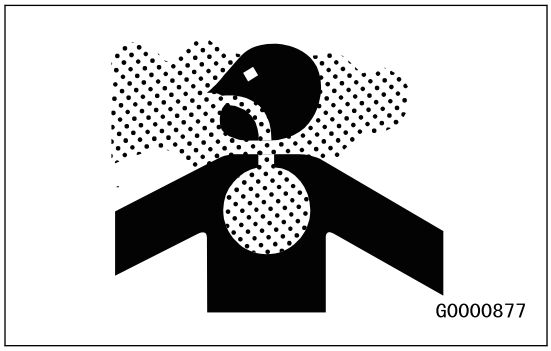
CHECK SIGNS AND SIGNALMAN'S SIGNALS

If signals and signs are not clear, there is a possibility that the machine falls down or falls over and contacts with the structure and persons around the machine. Serious personal injury or death could occur. Obey the items that follow.

- Show the signs to let the operator recognize the road shoulder or soft ground.
- Operator must obey the signs, and the signals from the signalman.
  The signalman who gives signals must be one person.
- Before you start the work, all the personnel must understand the meaning of all the signals and signs.

BEWARE OF ASBESTOS DUST

If you breathed the asbestos particles, a lung cancer could occur. There is a danger of breathing the asbestos particles on the job sites where demolition work is done or the industrial wastes are handled. Obey the items that follow.



- Sprinkle water over the ground not to let the asbestos scatter.
- Do not use the compressed air.
- Be sure to do the work on the windward if the machine is operated at the job site where there is a danger of asbestos dust.
- Workers must wear the dust masks.
- During the work, keep the unauthorized persons away.
- Follow the rules related to the job site and environmental standard.

This machine does not contain asbestos. But there is a danger that some parts other than Komatsu genuine ones could contain it. Komatsu recommends the use of Komatsu genuine parts.

START ENGINE

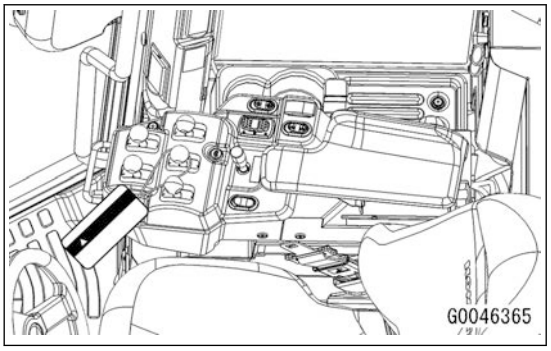
USE WARNING TAGS

“DANGER! Do NOT operate! ”warning tag means that the machine is during the inspection and maintenance.

You must not operate the machine until the warning tag is removed.

If you ignore the warning tag and operate the machine, you could be caught in the machine, and there is a danger of serious personal injury or death.

The person who showed the warning tag must remove it.





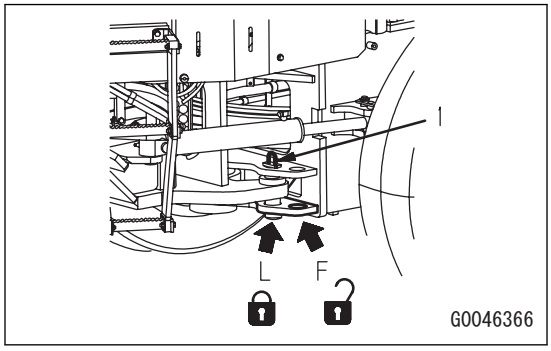
CHECKS AND ADJUSTMENT BEFORE YOU START ENGINE

Before you start the engine, check the items that follow and make sure that there is no problem to operate the machine.

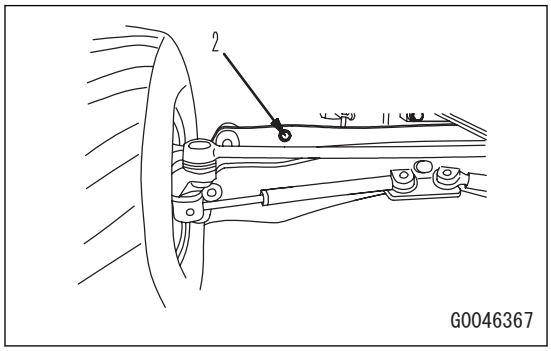
If these checks are not done, a bad influence is given to machine operation. There is a danger that serious personal injury or death is caused.

- Do the walk-around check.
  For details, see OPERATION, “WALK-AROUND CHECK (3-193)”.
- Clean all the windows. Check that the visibility is clear.
- Clean all the lens of lamps. Make sure that they light up normally.
- Do the check-before-starting.
  For details, see OPERATION, “CHECK BEFORE YOU START OPERATION (3-198)”.
- Check the battery terminals for looseness or corrosion.
- Clean all the pedals. Make sure that they operate normally.
- Adjust the operator's seat to a position where you can operate the machine easily.
  Make sure that there is no damage or wear to the seat belt or mounting hardware.
- Make sure that the instruments operate normally.
- Clean and adjust all the mirrors.
  Adjust the mirrors to the position that you can see the rear of the machine easily from the operator's seat.
  For details, see OPERATION, “ADJUST MIRRORS (3-217)”.
- Adjust the cameras to the position that you can see the area around the machine easily from the operator's seat.
  If there is adhesion of snow on the camera, remove the snow. When you do it, you can use a stepladder, and be careful for your safety.
- Make sure that the parking brake switch is at the ON position.
- Make sure that the steering lever enable switch is at the disable position.

- Check that there is no person or obstacle above, below, or in the area around the machine.
- If the machine needs to be articulated, set the articulate lock pin (1) to the FREE position (F).
- Before you drive the machine on a road, make sure that the articulate lock pin (1) is in the LOCK position (L).



- If the leaning stopper (2) is inserted, remove it, and store it in the toolbox.



PRECAUTIONS WHEN YOU START ENGINE

When the engine is started, there is a possibility that the machine starts moving suddenly, and it can cause serious personal injury or death. Obey the items that follow.

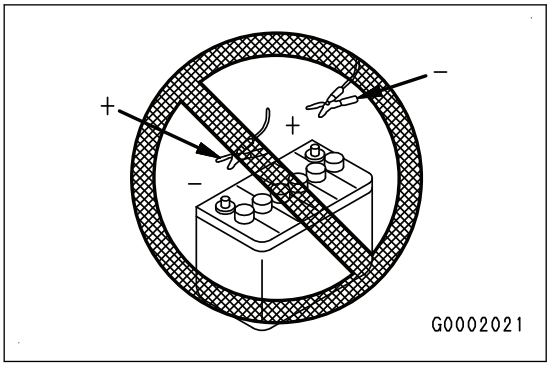
- Be sure to sit on the operator's seat and start the engine.
- Before you start the engine, make a horn sound to give a warning.
- Do not allow anyone other than the operator to ride on the machine.
- Do not start the engine by short-circuiting the engine starting circuit.
  Serious personal injury or death or fire could be caused.
- Check that the alarm buzzer like a backup alarm operates correctly.

IN COLD WEATHER

- Do the warm-up operation fully to let the machine work correctly.
  If the machine is not warmed sufficiently, the reaction of machine to the operation becomes slow, and the machine possibly does a movement that the operator does not intend.
- Before you start the engine, be sure to check that the battery electrolyte is not frozen.
  Before you start the engine by other power supply or by battery charging, check that the battery electrolyte is not frozen or it is not leaked.
  There is a danger that the battery will catch fire and explode.

START ENGINE WITH JUMPER CABLES

If the jumper cables are connected incorrectly, the battery can explode. Obey the items that follow.



- Be sure to wear the protective eyeglasses and rubber gloves.
- Be sure to use a normal machine with the same voltage as the failed machine.
- Do the work by 2 persons. One person is on the operator's seat, and the other person is on the battery side.
- Be careful that the normal machine does not contact with the failed machine.
- Turn the starting switches of the failed machine and the normal machine to the OFF position.
  If the battery disconnect switch is installed to the failed machine, turn it to the OFF position first. Then turn it to the ON position after the cables are connected.
  When the cables are connected, there is a possibility that the machine moves.
- When you connect the cables, connect the positive (+) terminal first.
  When you remove the cables, disconnect the negative (-) terminal (ground side) first.
  Do not let the cable clips contact with other clips or with the machine.
- For the procedure to start the machine by the jumper cables, see OPERATION, “START ENGINE WITH JUMPER CABLES (3-342)”.

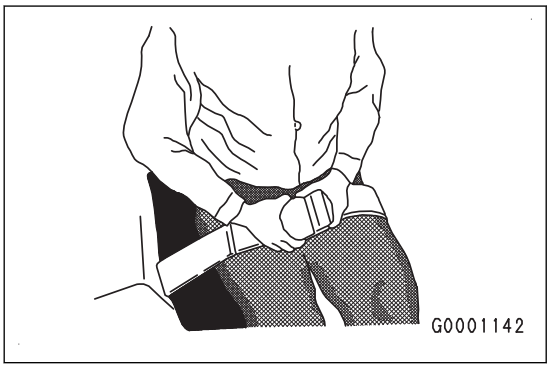
PRECAUTIONS FOR OPERATION

CHECKS BEFORE OPERATION

Before you start the machine, do the checks-before-starting. If it is not done, the machine performance will not be fully used, and serious personal injury or death could be caused.

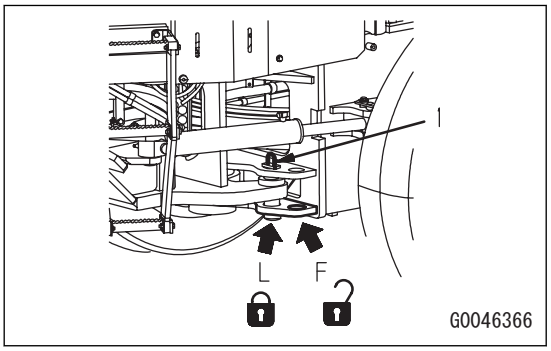
Be careful of around the machine and do the inspection in a large area where has no obstacle.

During the inspection, keep the other persons than the operator away from the machine.



- Be sure to fasten the seat belt.

  In case of such as a sudden braking, serious personal injury or death could be caused.

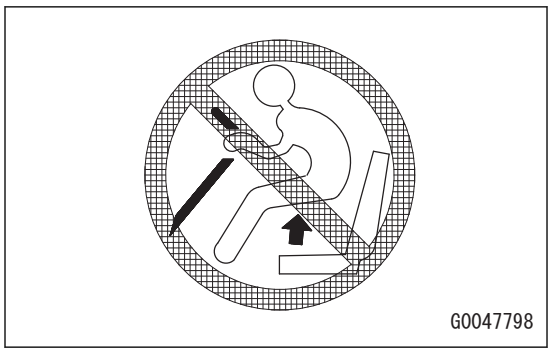


- If the machine needs to be articulated, set the articulate lock pin (1) to the FREE position (F).
- Before you drive the machine on a road, make sure that the articulate lock pin (1) is in the LOCK position (L).
- Make sure that the devices like the work equipment, travel, and brakes are operated correctly.
- Make sure that the machine has no unusual sound, smell and vibration.
- Make sure that the instruments have no problem.
- Make sure that no oil or fuel leaks.

- Sit on the seat correctly.

  If you operate the machine while you half rise from the seat or are not correctly sit on it, the unexpected accident could occur.
  To prevent this, if the operator does not correctly sit on the seat, the leaving operator's seat caution lamp will light up.

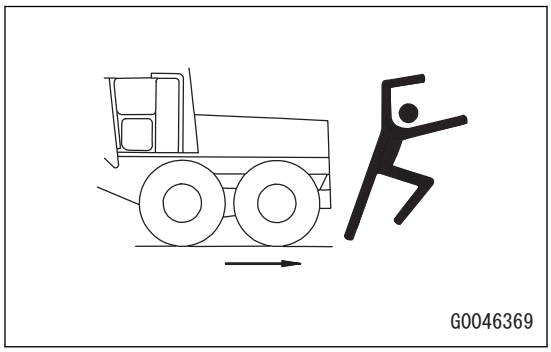
If a problem is found, repair it immediately.



PRECAUTIONS WHEN YOU TRAVEL IN FORWARD OR REVERSE

Obey the items that follow regardless of whether the mirrors and cameras are installed to the machine.

- All the windows and doors on the operator's cab must be locked in the opened or closed state.
  In the jobsite where there is a danger of objects that fly on or enter the operator's cab, close all the windows and doors.
- When you operate the machine, be sure to sit on the operator's seat.
- Before the machine starts traveling, check again that there is no person or obstacle around the machine.
- Before the machine starts traveling, give a warning of horn sound.
- Check that the alarm buzzer like a backup alarm operates correctly.
- If there is a blind spot in the rear of the machine, allocate a signalman.
- When the machine travels downhill through inertia, set the direction of the directional selector switch to the position as the same as the machine travel direction.
  If the directional selector switch is set to the direction opposite to that of the machine travel, there is a danger that the engine stops.



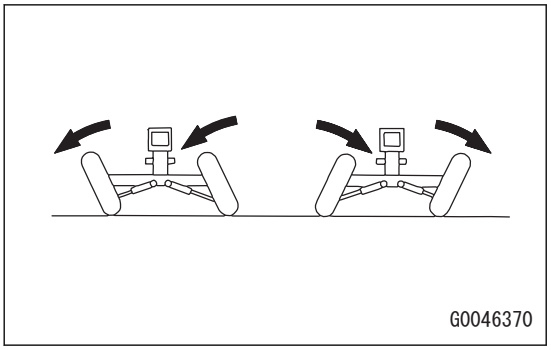
PRECAUTIONS WHEN YOU TRAVEL

There is a danger of serious personal injury or death caused by that the machine falls over while it travels, or someone contacts the machine. Obey the items that follow.

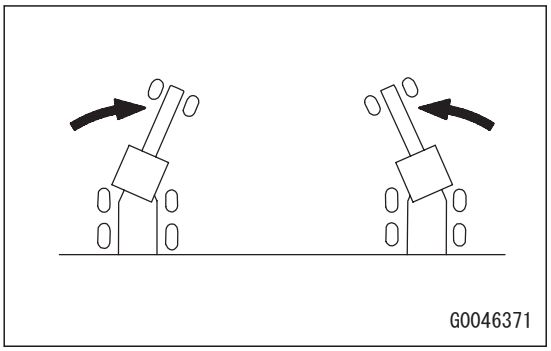
- While the machine travels, you must not turn the starting switch to the OFF position.
  If the engine is stopped while the machine travels, the operation of steering wheel becomes heavier. Mistakes in operation could occur and it could cause serious personal injury or death.
  If the engine stops, push the brake pedal immediately to stop the machine.
- Keep a sufficient distance from persons, constructions, and other machines.
- When the machine travels on a flat ground, keep the work equipment at height of 30 to 50 cm {12 to 20 in} above the ground.
  If that height is not kept between the work equipment and the ground, there is a danger that the work equipment touches the ground and the machine falls over.
  Before it is necessary to operate the work equipment control levers, do it after you stop the travel operation.
- When the machine travels on rough ground, drive the machine at low speed not to let the machine fall over, and avoid sudden direction change.
  If the work equipment touches the ground, the machine could lose the balance, and there is a danger that the machine and the structure around it are damaged.

- Be careful when you do the leaning operation.

  Do not do the leaning operation especially when the machine travels on a road.



- Do the articulation only when the travel speed is 10 km/h {6.2 MPH} or below.
- If you do the articulation at the speed of 10 km/h {6.2 MPH} or more, the machine can fall over.
  You must not do that.
- Before the machine goes over the bridges or the constructions, make sure that they are sufficiently strong to support the weight of the machine.
- When the machine is operated in such areas where the height is limited as in tunnels or buildings or below bridges or below electric wires, operate it slowly and be very careful not to let the machine and work equipment touch anything.



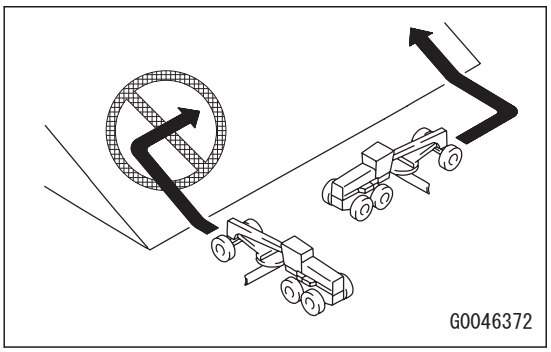
- If you drive the machine at high speed continuously for a long time, the tires will be heated excessively. There is a danger that the internal pressure becomes abnormally high and the tires explode.
  If a tire explodes, it makes a large blast force. It could cause serious personal injury or death.
  If you will drive the machine continuously, consult your Komatsu distributor.
- While you drive the machine or drive it on a downhill slope, do not set the directional selector switch to the NEUTRAL position. Set the direction of the directional selector switch to the position that agrees with the machine travel direction.
  - It is dangerous that the engine brake is disabled.
  - The transmission and other parts of the power train will be damaged, and it could cause serious personal injury or death.

PRECAUTIONS WHEN YOU TRAVEL ON SLOPES

To prevent falling over and sideways slip, obey the items that follow.

- Move the machine straight against to the slope. Do not move the machine diagonally across the slope or parallel to the slope. It is very dangerous.

  Change the machine direction on a level ground. Then move the machine straight against to the slope.
- On a slope, do not steer the machine or do not go across the slope. If you need to change the direction, move the machine to the level ground and find other path.
- Do not do the work at the slope covered with the slippery objects like the steel plates. Even a slight slope is slippery and it is very dangerous.



- Set the travel speed as low as possible on the grasses and fallen leaves. A slight slope is slippery and it is dangerous.
- If the engine stops, immediately push the brake pedal fully, lower the blade, and engage the parking brake to stop the machine.
- While the machine goes down the slope, do not do the gearshift operation or do not set the transmission to the NEUTRAL position.

It is dangerous that the engine brake is disabled. Be sure to shift the gear to the one of the low gear speeds when the machine travels downhill.

- While the machine goes down the slope, drive it slowly at low speed. As necessary, push the brake pedal or use the engine brake.
- When the machine travels on a slope while it is in the articulated state, be sure to let the front wheels face toward the root side. If the front wheels face toward the mountain side, the danger of falling over increases.

Precautions when you operate machine on slopes

- On a steep slope, do not make the machine articulated fully.
  There is a danger that the machine falls over.
- When you do the work on slopes, control the machine speed with both engine brake and foot brake.
  Do not use the RPM set switch.

PRECAUTIONS FOR BRAKE

- Put your foot on the brake pedal when necessary.
  If the machine travels when your foot is on the brake pedal, the brake operates constantly, it heats abnormally, it is disabled, and it can cause personal injuries.
- Do not push the brake pedal many times more than necessary.

PRECAUTIONS WHEN YOU OPERATE MACHINE

- When you operate the machine in such areas where the height is limited, as in tunnels or below bridges or below electric wires, or in barns, be careful not to let the machine touch anything.
- To prevent accidental contacts, operate the machine at a speed that the machine can be operated safely indoors, or in a narrow space, or in a crowded place.
- Make sure that there is no person in the area where the flying objects which are made in the work can reach.

PROHIBITED OPERATIONS

If the machine falls over or down, or the ground at the jobsite breaks, it can cause serious personal injury or death. Obey the items that follow.

- If the work is done at the bottom of a cliff, there is a danger of landslide or falling rocks.
  Do not do the work.
- A cliff and road edge could easily break. There is a danger of falling.
  Do not go near.
- Do not make a sudden start, sudden stop, and sudden turning. There is a danger that the machine falls over.

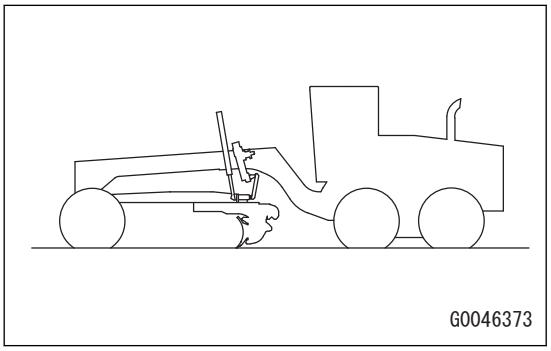
PRECAUTIONS WHEN YOU OPERATE ON SNOW OR FROZEN SURFACES

- If there are snow and frozen ground in the job site, the machine easily slips. Carefully drive the machine and do the work. Do not operate it suddenly.
  Be careful since a slight slope is slippery.
- Frozen ground changes to soft ground as the ambient temperature increases.
  There is a possibility that the machine falls over and you will not be able to escape.
- When the machine travels on the snow road, be sure to put on the tire chains.
  If the machine goes into deep snow, there is a danger that the machine falls over or becomes buried.
  Be careful not to let the machine go off the road shoulder or go into the snowdrift.
- In the snow removal work, the road shoulder and objects located beside the road are buried in the snow and cannot be seen. Be careful because there is a risk of a fall or a collision.
- Do not operate the brakes suddenly on snow-covered slopes.
  Decrease the speed, use the braking force of engine, and apply the brakes (push the brake pedal several times) to stop the machine.

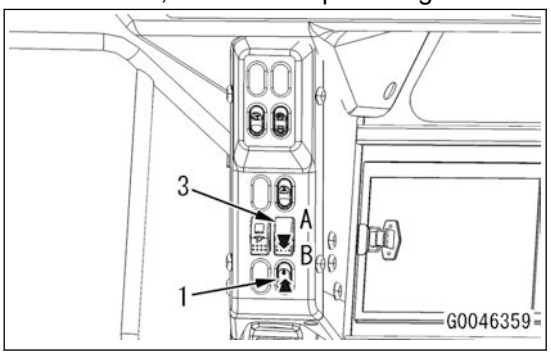
PRECAUTIONS WHEN YOU PARK MACHINE

- Park the machine on a hard and flat ground.

  Select a ground where there is no danger of landslides, falling rocks, or flood.
- Be sure to lower the work equipment to the ground.

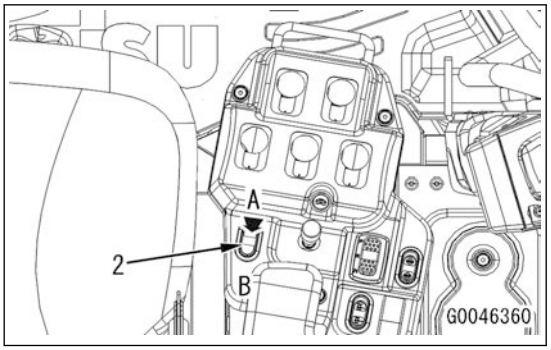


- Before you move away from the machine, first do the operations that follow, and then stop the engine.
  - Push the work equipment lock switch (1) to lock the work equipment.

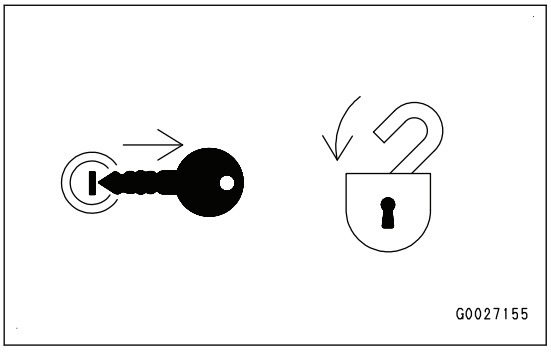


  - Move the parking brake switch (2) to the ON position (A), keep the brake pedal pushed and check that the parking brake pilot lamp is lit. Make sure that the machine is stopped fully even after you release the brake pedal.

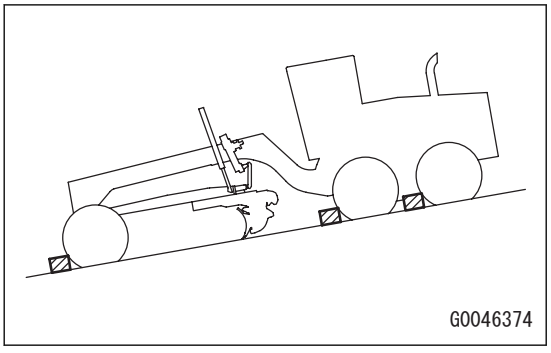
    Set the steering lever enable switch (3) to the disable position (B).



- Lock all the locks, and keep the keys in the specified area.
- When you get off the machine, keep a space for you to get on or off the machine. Pull the work equipment console lever toward rear of the machine, and raise the steering column fully.



- If it is necessary to park the machine on a slope, chock the tires to prevent machine movement.



PRECAUTIONS FOR TRANSPORTATION

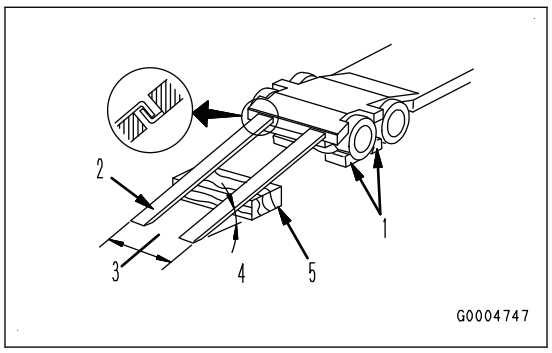
When you transport the machine, there is a risk of serious personal injury or death because of accident during the transportation. Obey the items that follow.

- The dimensions and weight are different by the work equipment that is installed to the machine.
- Make sure that all the constructions on the transportation route are sufficiently strong to support the weight of the machine.
- The disassembly of this machine can be necessary for the transportation by the regulation.
  When you transport the machine, consult your Komatsu distributor.
- Lock the machine with the articulate lock pin not to let the machine be articulated.
- Lock the front axle with the leaning stopper not to let the front tires be leaned.

PRECAUTIONS WHEN YOU LOAD AND UNLOAD

If you handle the machine inappropriately when you load or unload the machine, it is dangerous that the machine can falls over or down. Especially be careful. Obey the items that follow.

- Select a location that is level and firm. Avoid the location that is near the road shoulder and the cliff.
- Be sure to use the ramps which have sufficient length, width, and strength. Set the ramps not to be moved or dropped.
  (1) Chock
  (2) Ramp
  (3) Let the distance between the ramps become the same as the distance between the right and left tires equally from the center of platform.
  (4) Angle of ramp: 15° or below
  (5) Block



- To prevent the machine slip, be sure the surfaces of ground, ramps, and loading platform are free of grease, oil, ice, and water, etc. If any, remove them. Remove mud off from the undercarriage of the machine. Especially on a rainy day, be extremely careful since they are slippery.
- Set the engine speed to low idle, and drive the machine slowly.
- Do not change the direction on the ramps. Get off from the ramps, and then change the direction.
- When the machine is unloaded to an embankment or platform, make sure that it has sufficient width, strength, and grade.
- For the machine with cab, lock the cab door after the machine loading is finished.
- When the handrails and the steps are removed, store them not to lose.
  Install the removed handrails and steps after the machine is transported.

TOWING AND BEING TOWED

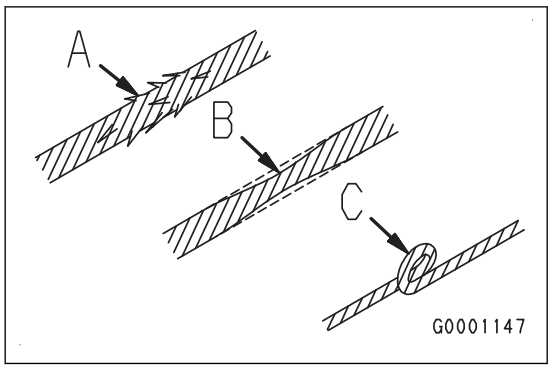
PRECAUTIONS FOR TOWING AND BEING TOWED

If a wrong selection of the towing tool is made or if there is a mistake in procedure, there is a danger that serious personal injury or death is caused. Obey the items that follow.

- Make sure that the wire rope or drawbar used for towing has sufficient strength for the weight of the machine being towed.

- If the strand of wire rope is frayed (A), or the diameter of wire rope is decreased (B), or the wire rope has kinks (C), do not use it.
- When you handle the wire ropes, wear the leather gloves.
- On a slope, do not do the towing of the machine.
- Do not go in between the machines during towing.

For the towing, see OPERATION, “PRECAUTIONS FOR TOWING MACHINE (3-337)”.



PRECAUTIONS FOR MAINTENANCE

PRECAUTIONS BEFORE YOU START INSPECTION AND MAINTENANCE

SHOW WARNING TAG DURING INSPECTION AND MAINTENANCE

During the inspection and maintenance, show “DANGER! Do NOT operate!” warning tag.

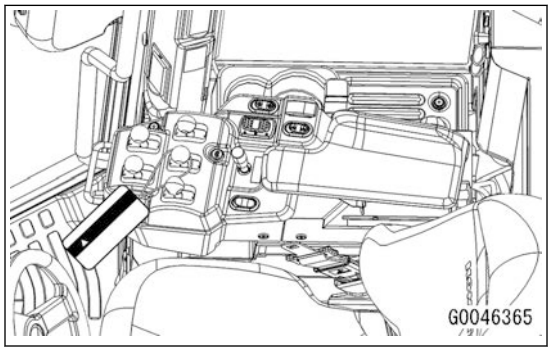
“DANGER! Do NOT operate! ”warning tag means that the machine is during the inspection and maintenance.

Do not ignore the warning tag and do not operate the machine. There is a danger of serious personal injury or death such that you are caught in the machine.

Show the warning tags around the machine as necessary.

The part number of warning tag is “09963-03001”.

Keep the warning tag in the toolbox or in the space where to keep the Operation and Maintenance Manual.





KEEP WORK PLACE CLEAN AND TIDY

For the safety operations, keep the work place clean and tidy.

If the workplace is not organized, there is a danger of personal injury.

- Clear the tools such as hammers which obstruct the work.
- Wipe off the slippery materials such as grease and oil.

SELECT SUITABLE PLACE FOR INSPECTION AND MAINTENANCE

- Park the machine on a hard and flat ground.
- Select a ground where there is no danger of landslides, falling rocks, or flood.

ONLY AUTHORIZED PERSONNEL

Keep unauthorized person away from the jobsite, and allocate an observer as needed.

If the unauthorized persons come near the machine during the maintenance work, serious personal injury or death can occur.

APPOINT LEADER WHEN WORKING WITH OTHERS

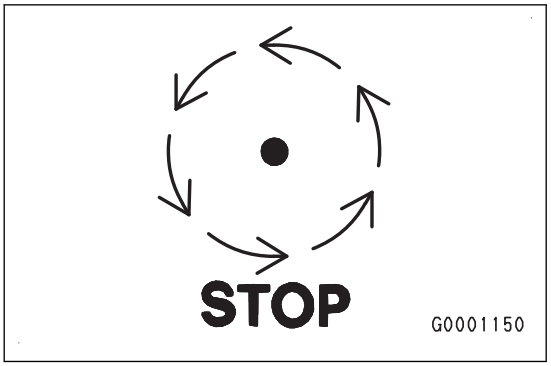
When you do the works that follow, allocate a leader and obey the instructions to prevent serious personal injury or death caused by such accident as the machine catches a person.

- When you repair the machine
- When you remove the work equipment
- When you install the work equipment

STOP ENGINE BEFORE YOU INSPECT OR DO MAINTENANCE

To prevent serious personal injury or death caused by accident like that a person is caught in the machine, or that hot or high-pressure fluid spurts out, obey the items that follow.

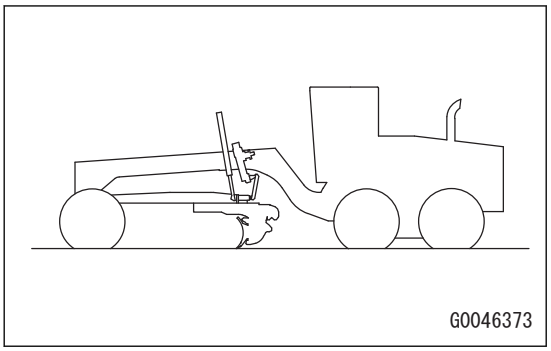
Before inspection and maintenance, be sure to do the items that follow. Stop the engine before you start inspection and maintenance.



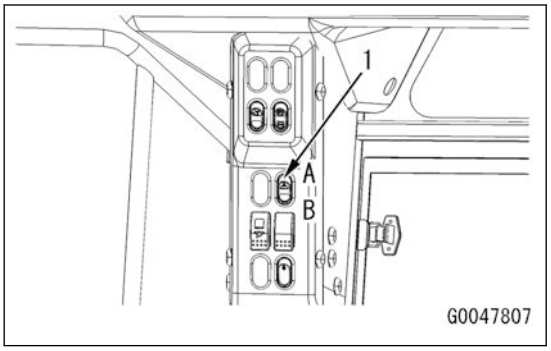
Start the engine and let the machine be in the conditions that follow.

- Park the machine on a hard and flat ground.

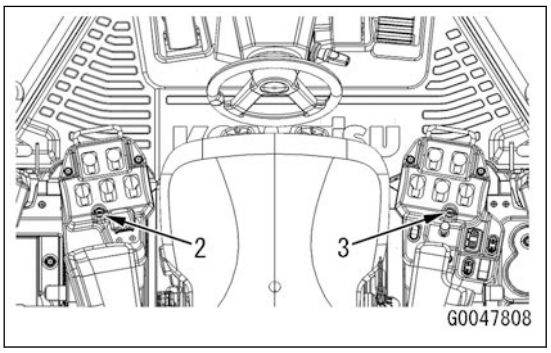
  Be sure to lower the work equipment to the ground.



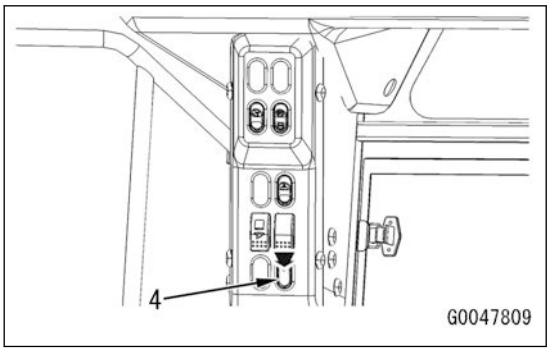
- Set the blade accumulator switch (1) to the ON position (A).



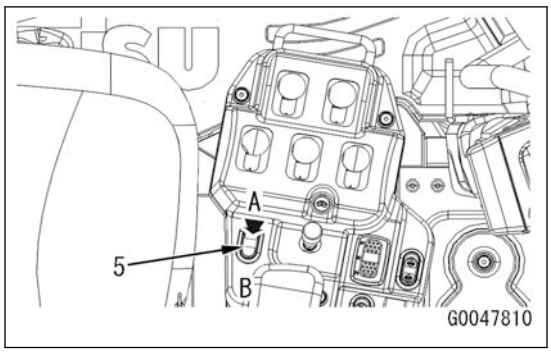
- Turn on the blade float left switch (2) and blade float right switch (3).



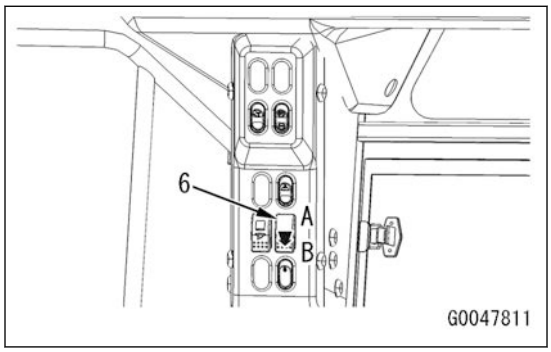
- Push the work equipment lock switch (4) to lock the work equipment.



- Set the parking brake switch (5) to the ON position (A).

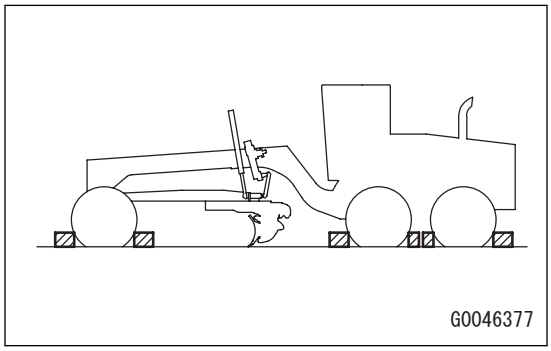


- Set the steering lever enable switch (6) to the disable position (B).

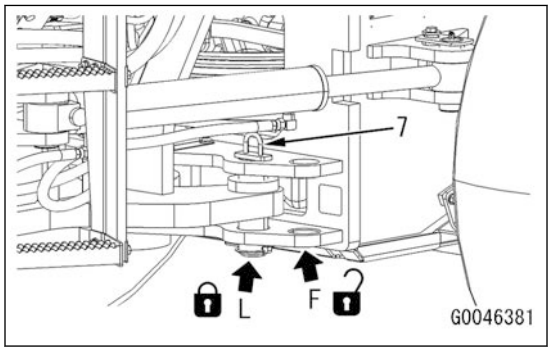


Stop the engine and let the machine be in the conditions that follow.

- Put the chocks in front of and behind the tires not to let the machine move.



- Set the articulate lock pin (7) to the LOCK position (L) not to let the machine be articulated.



- Release the remaining pressure in the hydraulic circuit as follows.

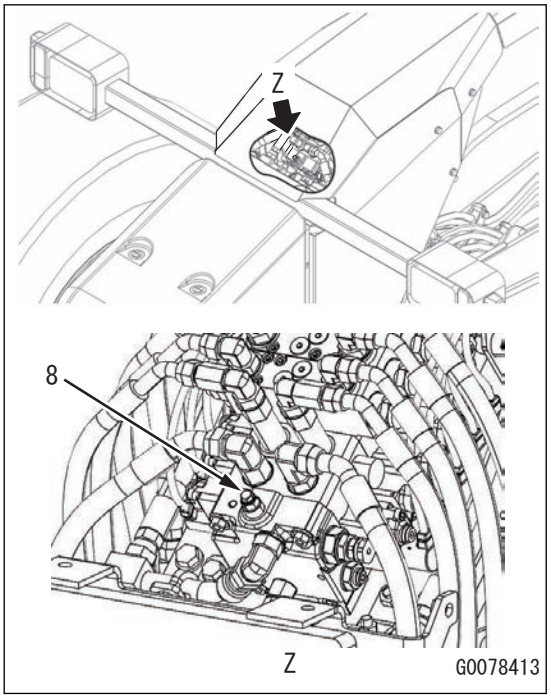
⚠ CAUTION

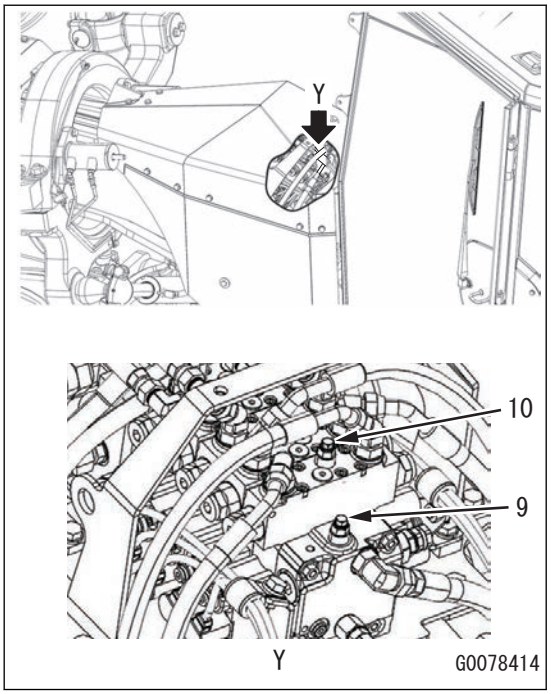
Do not loosen the pressure relief plug assembly until the pressure relief is completed.
The pressure relief plug assembly can jump out.

1. After the engine stops, push the brake pedal approximately 20 times to turn the oil in the accumulator back to the tank.

2. To release the pressure, loosen the pressure relief plug (8) of front control valve and the pressure relief plugs (9) and (10) of rear control valve slowly by 6 to 7 turns.

   Do not loosen or pull it out more than that.
   Width across flats of plug: 10mm {0.4in}

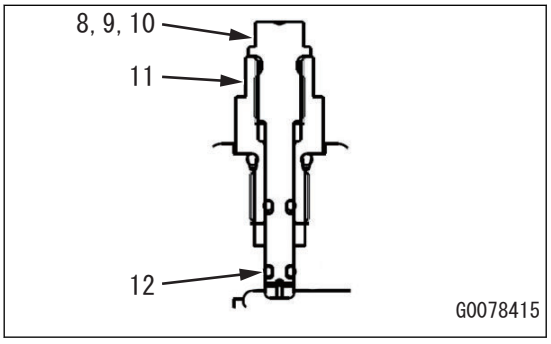




3. After you are sure that the pressure is released, loosen the pressure relief plug assemblies (11) (3 places) to remove.

   Width across flats of plug assembly: 14mm {0.6in}

4. Check that the O-ring (12) at the top is tightly fitted into the O-ring groove.
   If the O-ring (12) comes off from the groove, insert it securely into the groove.



NOTICE

Check the state of O-ring (12) each time you use the pressure relief plugs (8), (9), and (10).
If the O-ring (12) is damaged or deformed, replace it with a new one.

5. Install the pressure relief plug assemblies (11) (3 places), and tighten them to the specified torque.
   Tightening torque: 24.5 to 34.3Nm{2.5 to 3.5kgfm, 18.1 to 25.3lbft}
6. Install the pressure relief plugs (8), (9), and (10) and tighten them to the specified torque..
   Tightening torque: 19.6 to 24.5Nm{2.0 to 2.5kgfm, 14.5 to 18.1lbft}

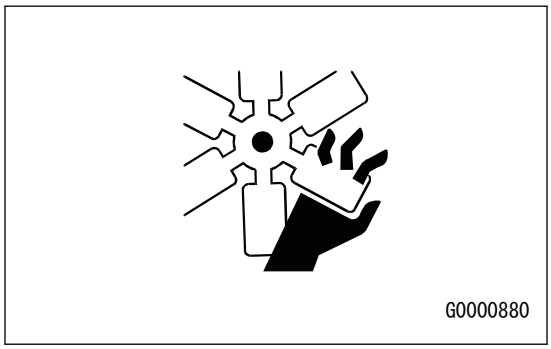
⚠ CAUTION

After the inspection and maintenance, if you feel something abnormal about the work equipment, consult your Komatsu distributor.

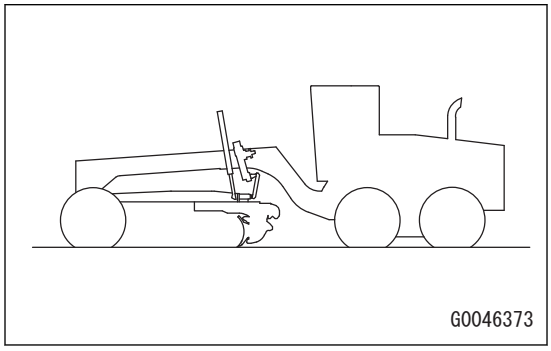
PRECAUTIONS FOR MAINTENANCE WHEN ENGINE IS IN OPERATION

If maintenance is necessary while the engine is in operation, obey the items that follow.

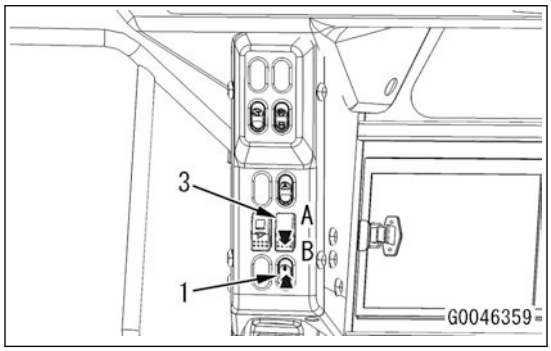
- This operation requires 2 or more workers. One worker must sit on the operator's seat. All workers must keep contact with each other to be able to stop the engine immediately.
- Keep your body or objects away from the rotating fans or belts, etc.
- Do not drop anything into the rotating fans or belts, etc. There is a danger that it hits the rotating parts and springs back.
- Stop the automatic regeneration of aftertreatment devices.
  If the automatic regeneration of aftertreatment devices started during the maintenance, the area around the aftertreatment devices becomes hot.


G0000880

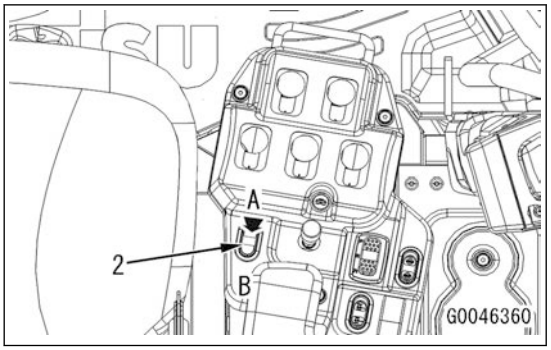
- Let the machine be in the conditions that follow.
  - Be sure to lower the work equipment to the ground.


G0046373

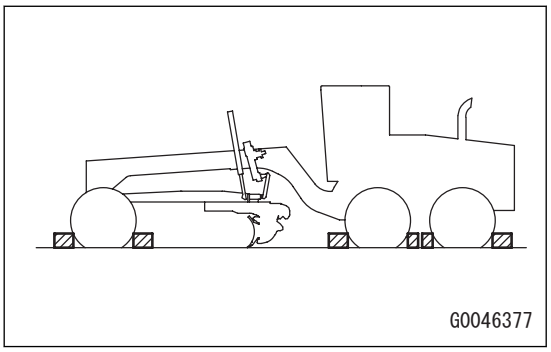
  - Push the work equipment lock switch (1) to lock the work equipment.
  - Set the steering lever enable switch (2) to the disable position (B).



- Set the parking brake switch (3) to the ON position (A).



- Put the chocks in front of and behind the tires not to let the machine move.

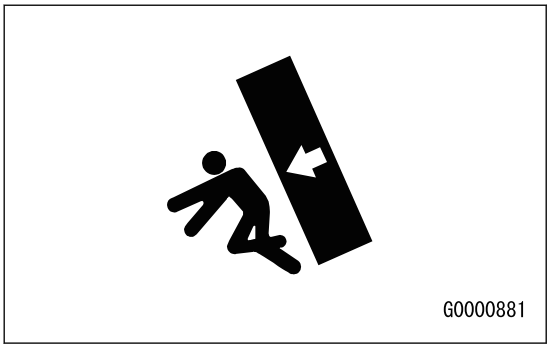


- Do not touch the control levers and steering devices.
  If it is necessary to operate the machine, tell it to all the personnel in the job site first.

PRECAUTIONS WHEN YOU INSTALL, REMOVE, OR STORE ATTACHMENTS

- Allocate a leader before you remove or install the attachments.
- Store the attachments in a stable condition not to fall over.

  Keep the unauthorized persons away from the storage area.



PRECAUTIONS WHEN YOU WORK AT HIGH PLACES

Prepare a scaffold first to provide a safe working platform for the work at heights.

There is a danger of serious personal injury or death caused by such as falling down.

PRECAUTIONS WHEN YOU WORK ON MACHINE

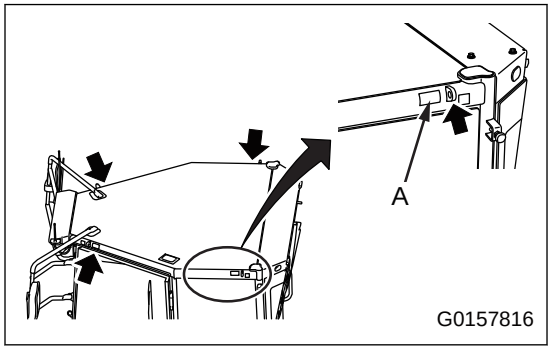
- When you do the maintenance on the machine, obey the items that follow not to fall down from the machine.
  - Always clean the footing.
  - Do not spill oil or grease.
  - Organize the tools.
  - When you walk, be careful of the footing.
  - Remove the mud and grease on your shoes.



- Do not jump from the machine.
  Keep an eye on the machine. Support yourself at three-point contact with handrails and steps.
  Three-point contact means to support yourself with both feet and one hand, or both hands and one foot.

- Do not stand on the areas where there are no non-slip pads.
- To prevent personal injury caused by slipping or falling off the machine, be sure to set the hook of the personal fall-arrest equipment to the anchor point for tie-off before the work.

  Do not set other ones than the hook of the personal fall-arrest equipment to the anchor point for tie-off.
  The anchor point for tie-off on the cab can be used as the lifting point of the cab. When you lift up the cab, consult your Komatsu distributor.



- The safety label (A) as shown in the figure is attached on the anchor point for tie-off.



PRECAUTIONS WHEN YOU WORK UNDER MACHINE OR WORK EQUIPMENT

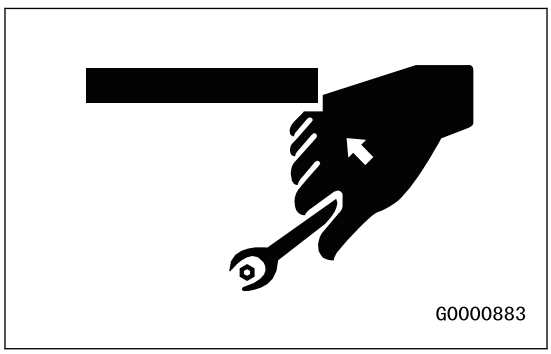
There is a possibility that the machine or work equipment falls down, and it leads to serious personal injury or death. Obey the items that follow.



- Before you go below the work equipment to do the inspection and maintenance, be sure to lower the work equipment to the ground.
- Make sure that the hoists or hydraulic jacks to be used are in good condition and sufficiently strong to handle the weight of the component.
  - Do not use the hydraulic jacks at the parts where the machine is damaged or bent or twisted.
  - If the strand of wire rope is frayed, or the wire rope is twisted, or the diameter of wire rope is decreased, do not use it.
  - Do not use a hook which is bent or damaged.
- Do not use concrete blocks for supports.
  There is a possibility that the concrete blocks break with a light load.

USE PROPER TOOLS

Use the applicable tools for the work correctly.



PRECAUTIONS FOR CHECK AND MAINTENANCE

TURN BATTERY DISCONNECT SWITCH TO OFF POSITION

While the system operating lamp is lit, do not set the battery disconnect switch to the OFF position.

Turn the battery disconnect switch to the OFF position in the cases that follow. If the battery disconnect switch is in the ON position, it can cause an electric shock.

- When you store the machine for a long time (more than 1 month)
- When you repair the electrical system
- When you do the welding
- When you do the battery inspection
- When you replace the fuse

PRECAUTIONS FOR WELDING

Welding must be done by a qualified person at the location which has an applicable equipment.

During the welding, there is a danger of serious personal injury or death such as gas generation, fire, and electric shock.

BATTERY

Before you check the battery, set the battery disconnect switch to the OFF position.

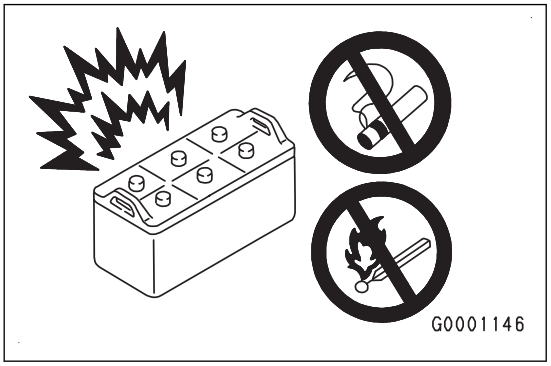
While the system operating lamp is lit, do not set the battery disconnect switch to the OFF position.

RISK FOR BATTERY EXPLOSION

The battery gives the flammable gas.

If there is a mistake when you handle the battery, it can cause serious personal injury, explosion, or fire, so always obey the items that follow.

- If the electrolyte level is below the minimum level line, do not use or charge the battery. There is a danger of explosion.
  Check the battery electrolyte level at intervals. Add the purified water (such as a commercial battery fluid) to the maximum level line.
- Do not use a direct air blow or dry cloth to clean the battery. A wet cloth will prevent fire or explosion from static electricity.
- Do not let an open flame be near the battery.
- Do not smoke near the battery.
- Remove the battery, move it to a well-ventilated area, then remove the battery cap and charge the battery.
  Tighten the battery cap fully after the battery is charged.

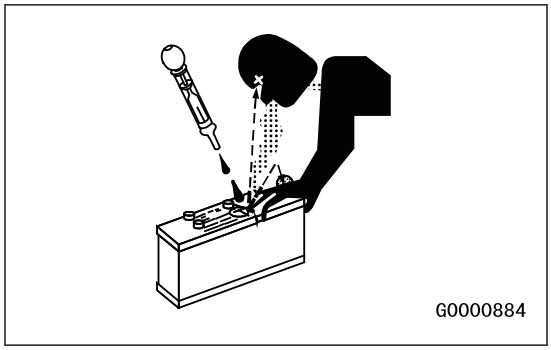


RISK CAUSED BY DILUTE SULFATE

The battery electrolyte contains the dilute sulfuric acid. If there is a mistake in handling, personal injury, explosion, or fire can be caused.

Obey the items that follow.

- When you handle the battery, wear the protective eyeglasses and rubber gloves.
- If the battery electrolyte went into your eyes, immediately flush your eyes by a lot of clean water and consult a doctor.
- If you got the battery electrolyte on your clothes or skin, immediately flush it off with a lot of clean water.



RISK FOR SPARK

Sparks can cause fire. Obey the items that follow.

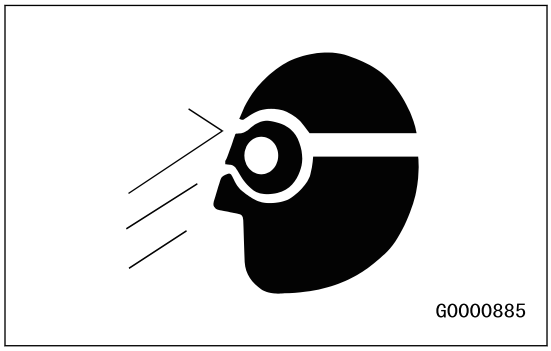
- Do not allow metal object like a tool to contact between both terminals of the battery. Do not put tools near the battery.
- Before you remove the battery terminals, turn the starting switch to the OFF position and check that the system operating lamp is not lit. Then turn the battery disconnect switch to the OFF position.
- When you remove the battery terminals, be sure to disconnect the negative (-) terminal (ground side) first. When you install the battery terminals, be sure to connect the positive (+) terminal first.
- Tighten the battery terminals fully.
- Install the battery tightly to the specified position.

PRECAUTIONS WHEN YOU USE HAMMER

When you use a hammer, pins will jump out or metal particles will fly over. There is a danger that serious personal injury or death is caused.

Obey the items that follow.

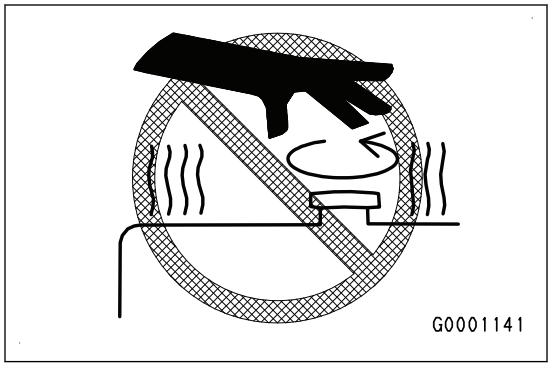
- Wear the protective equipment such as protective eyeglasses and gloves when using a hammer.
- Make sure that there is no person around the machine before you hit or pull the metal parts like pins and teeth. Do not allow anyone to be around the machine.



PRECAUTIONS FOR HIGH-TEMPERATURE COOLANT

Immediately after the engine is stopped, cooling system is very hot and pressure is accumulated, and it can cause a burn injury. Wait for the temperature to go down, and then start the work.

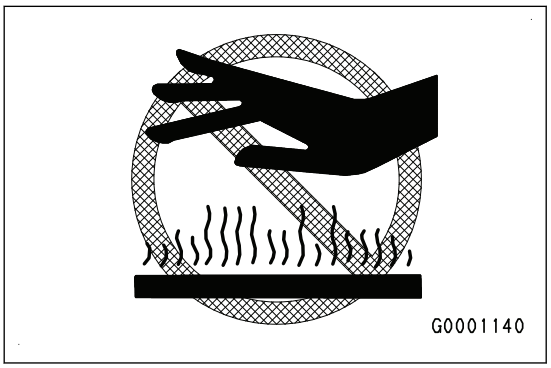
When you remove the cap, there is a possibility that the coolant spurts out. Turn it slowly to release the internal pressure, then remove it.



PRECAUTIONS FOR HIGH-TEMPERATURE OIL

Immediately after the engine is stopped, its oil is very hot, and it can cause a burn injury. Wait for the temperature to go down, and then start the work.

When you remove the parts such as caps and plugs, oil could spurt out. Turn it slowly to release the internal pressure, then remove it.



PRECAUTIONS FOR HIGH-TEMPERATURE PARTS

Immediately after the engine is stopped, the parts are very hot, and they can cause a burn injury. Wait for the temperature to go down, and then start the work.

PRECAUTIONS FOR HIGH-PRESSURE OIL

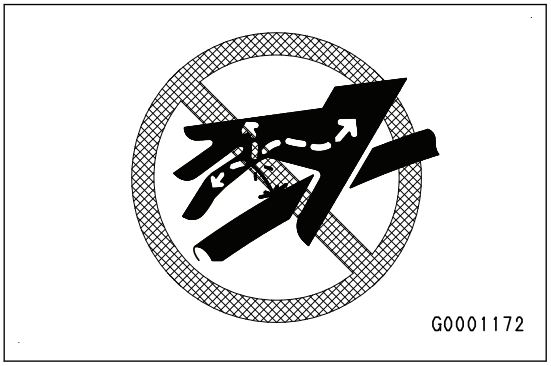
Before you check and replace the piping such as hoses, make sure that the pressure in circuit is released.

The hydraulic system and fuel piping are pressurized. Serious personal injury or death could be caused.

Obey the items that follow.

- Release the pressure before you do the inspection and maintenance.
- When you do the inspection, wear the protective eyeglasses and leather gloves.
- Make sure that the piping such as hoses has no oil leakage or cracks.
- If the pressurized oil which leaks from a small hole hits your skin or eyes, it can cause serious personal injury or death.

  If it hit your skin or eyes, immediately flush it off with a lot of clean water, and consult a doctor.



PRECAUTIONS FOR HIGH-PRESSURE FUEL

The pressure in fuel system becomes very high while engine is in operation. If the inspection and maintenance are done before pressure is released, serious personal injury or death can be caused.

Before the inspection and maintenance of fuel system, stop the engine and wait for 30 seconds or more to decrease the internal pressure.

HANDLE HIGH-PRESSURE HOSES AND PIPING

If the oil or fuel leaks from the high-pressure hoses or pipes, it can cause fire or malfunction.

If the mounting part of hoses or pipes is loose, or leakage is found, stop the work immediately and tighten the loose part with the specified torque.

If damage is found in hoses or pipes, consult your Komatsu distributor.

If problems are found as follows, replace the hose.

- When the hose or hose fitting is damaged
- When the covering is frayed or cut, when the reinforcement of wire becomes bare
- When a part of covering is swelled
- When the movable part is twisted or damaged

- When the covering has foreign materials in it

PRECAUTIONS FOR NOISE

Wear the ear covers or ear plugs if you do the noisy work such as adjustment of engine for a long time.

Ambient noise can cause auditory disturbance.

ACCUMULATOR AND GAS SPRING

The accumulator and gas springs include the high-pressure nitrogen gas. If there is a mistake when you handle them, an explosion can occur, and there is a danger of serious personal injury or death.

Obey the items that follow.

- Do not disassemble.
- Do not let an open flame be near them. Do not throw them in fire.
- Do not do drilling, welding and flame-cutting.
- Do not give shocks to it.
- When you dispose of it, the gas must be released. Consult your Komatsu distributor for the disposal.



PRECAUTIONS FOR COMPRESSED AIR

- If the compressed air is used for cleaning, dirt in the air could scatter and cause serious injury or death.
- When you use the compressed air for cleaning, wear the protective equipment such as protective eyeglasses, dust mask, and gloves.

MAINTENANCE OF AIR CONDITIONER

Do not loosen the parts of the refrigerant system of air conditioner.

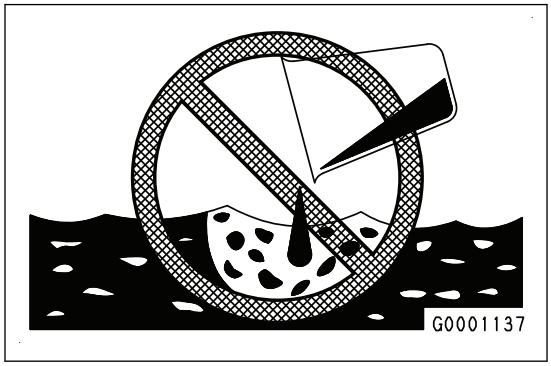
If the refrigerant of air conditioner gets in your eyes, it could cause loss of sight. And if it contacts your skin, it could cause frostbite.

PRECAUTIONS WHEN YOU DISPOSE OF WASTE MATERIALS

To prevent environmental pollution, be careful of the disposal of waste materials.

- Be sure to put the waste fluid into cans or tanks.

  Do not drain it directly onto the ground or pour it into the sewage system, rivers, seas, or lakes.
- When you dispose of the harmful objects such as oil, fuel, coolant, solvent, filters, batteries, and DEF, obey the applicable laws and regulations.
- If rubber or plastics are burned, harmful gas that is harm to persons could be discharged.
  When you dispose of the parts which contain rubber or plastics, obey the applicable laws and regulations.



SELECT WINDOW WASHER FLUID

Use the ethyl alcohol window washer fluid.

Do not use the methyl alcohol window washer fluid. It could damage your eyes.

PERIODIC INSPECTION OF DEFINED LIFE PARTS

- To use the machine safely for a long period, be sure to periodically inspect the defined life parts that have an especially close relation to safety, such as hoses and the seat belt. If an abnormality is found, replace it immediately.

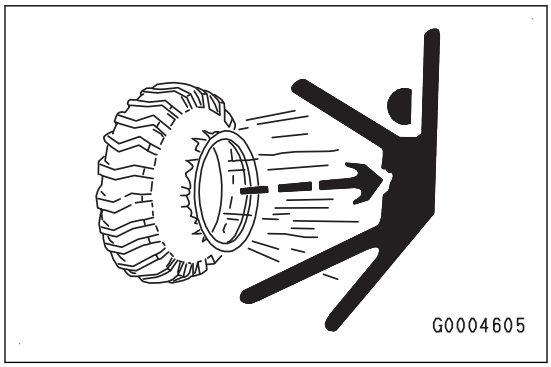
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components can fail and cause serious personal injury or death. It is not easy to judge the remaining life of these components but inspect them as much as possible before work and at the regular maintenance.
- Replace or repair the defined life parts if a defect is found by the check.

PRECAUTIONS FOR TIRE

PRECAUTIONS TO HANDLE TIRES

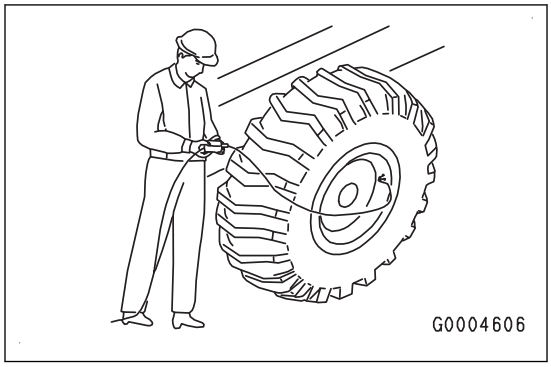
If a mistake occurs in handling, the tires could explode or rims could fly off, and serious personal injury or death could be caused.

For safety, obey the items that follow.



- To do the maintenance, disassembly, repair, and assembly, a special facility and specialized technology are necessary.
  Be sure to consult your Komatsu distributor for the work.
- Use the tires specified by Komatsu and inflate them to the specified tire inflation pressure.
  When you inflate the tires, make sure that there is no person around the machine. Install an air chuck with clip which can be fixed to the air valve, and start the inflation.

  To prevent excessive inflation pressure, measure the pressure from time to time with an air gauge.
  For details, see MAINTENANCE, “CHECK TIRE PRESSURE AND INFLATE TIRE (4-46)”.



- If the tire inflation pressure drops abnormally and if the rim parts do not fit the tire, it shows that a problem occurred.
  Be sure to consult your Komatsu distributor.
- If the rim parts are not fitted correctly when you inflate a tire, there is a possibility that the rim parts flies out.
  Put a fence around the tire for protection. The worker must not stand in front of the rim but must stand on the tread side during the work.
- Do not adjust the tire inflation pressure immediately after the machine traveled at high speed or after it is operated in a heavy load work.
- Do not let an open flame be near tires.
- Before you remove a rim from tire, release the tire inflation pressure first.
- Before you remove the tires from the machine for repairs, remove a part of the valve to release the air from the tire gradually.

PRECAUTIONS WHEN YOU STORE TIRES

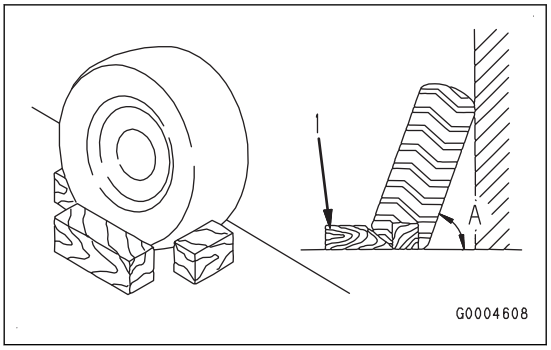
Tires for construction machinery are very heavy and serious personal injury or death could be caused.

For safety, obey the items that follow.

- As a basic rule, store the tires in a warehouse which the unauthorized persons cannot enter.
  If the tires must be stored outside, make sure to set up a fence and put up “No-Entry” signs.

- Stand the tire at the angle (A) of 60 to 70° on a level ground, and chock the tire (1).

  If a person touched the tires, be careful not to let the tires move or fall over.
  Do not put a tire with its side face down. This will deform the tire and cause it to deteriorate.
- If a tire is about to fall over, do not try to stop it. Get out of the way quickly.



PRECAUTIONS FOR DEF

General characteristics and precautions when you handle

The DEF is a colorless transparent 32.5% aqueous urea solution. Urea as main constituent is a material which is used for cosmetics, medical and pharmaceutical products, and fertilizer, etc. The situations that follow require fast action:

- If it gets on your skin, it can cause inflammation. Immediately take the contaminated clothes or shoes off and wash it off with water. In addition, use a soap to wash it off fully.
  If your skin becomes irritated or hurts, immediately consult a doctor for treatment.
- Do not try vomiting if swallowed. If swallowed, fully rinse the mouth with water and consult a doctor for treatment.
- Avoid contact with the eyes. If there is contact, flush with clean water for several minutes and consult a doctor for treatment.
- Wear the protective eyeglasses when exposed to the DEF to protect from solution splashing in your eyes. Wear the rubber gloves when you do the work that handles the DEF to avoid skin contact.

Precautions for adding

Do not put fluid other than DEF into DEF tank. If diesel fuel or gasoline is added into the tank, it can cause a fire. Some fluids or agents added can cause a poisonous gas.

When you open the cap of DEF tank of the machine, the ammonia vapor can escape. Keep your face away from the filler port during opening or refilling.

Precautions for storing

If the temperature of DEF becomes high, a harmful ammonia gas can be caused. Fully seal up its container for storage. Only open the containers in a well-ventilated area.

When you store the DEF, avoid direct sunlight. Always use the original container it came in. Do not change the container of DEF with other one. If the DEF is stored in an iron or aluminum container, poisonous gas can be caused and a chemical reaction can corrode the container.

Precautions for fire hazard and leakage

The DEF is non-flammable; but, in the case of a fire it can cause an ammonia gas.

If the DEF is spilled, immediately wash and clean the area with water. If the spilled DEF is left as it is and the area is not washed and cleaned, it can cause corrosion to the contaminated area and discharge poisonous gas.

Other precautions

When you dispose of the DEF, handle it as an industrial waste. The container for the DEF is also an industrial waste. It must be handled in the same manner.

Do not use an iron or aluminum container for disposal of the DEF, because poisonous gas can be caused and a chemical reaction can corrode the container. When you handle the fluid waste of the DEF, use a container made of resin (PP, PE) or stainless steel.

Do not touch the fluid discharged from urea SCR. This fluid becomes acid by the influence of sulphur in the fuel or built-in oxidation catalyzer. If it gets on your skin, fully wash it off with water.

White powder (crystallized urea) possibly covers the exhaust pipe outlet of aftertreatment devices. When you wipe off the covered materials, discard the crystallized urea and the used cloth as industrial waste.

You must not relocate or modify the exhaust gas aftertreatment devices. The harmful gas can be exhausted and it can cause serious damage to the environment in addition to violation of laws.

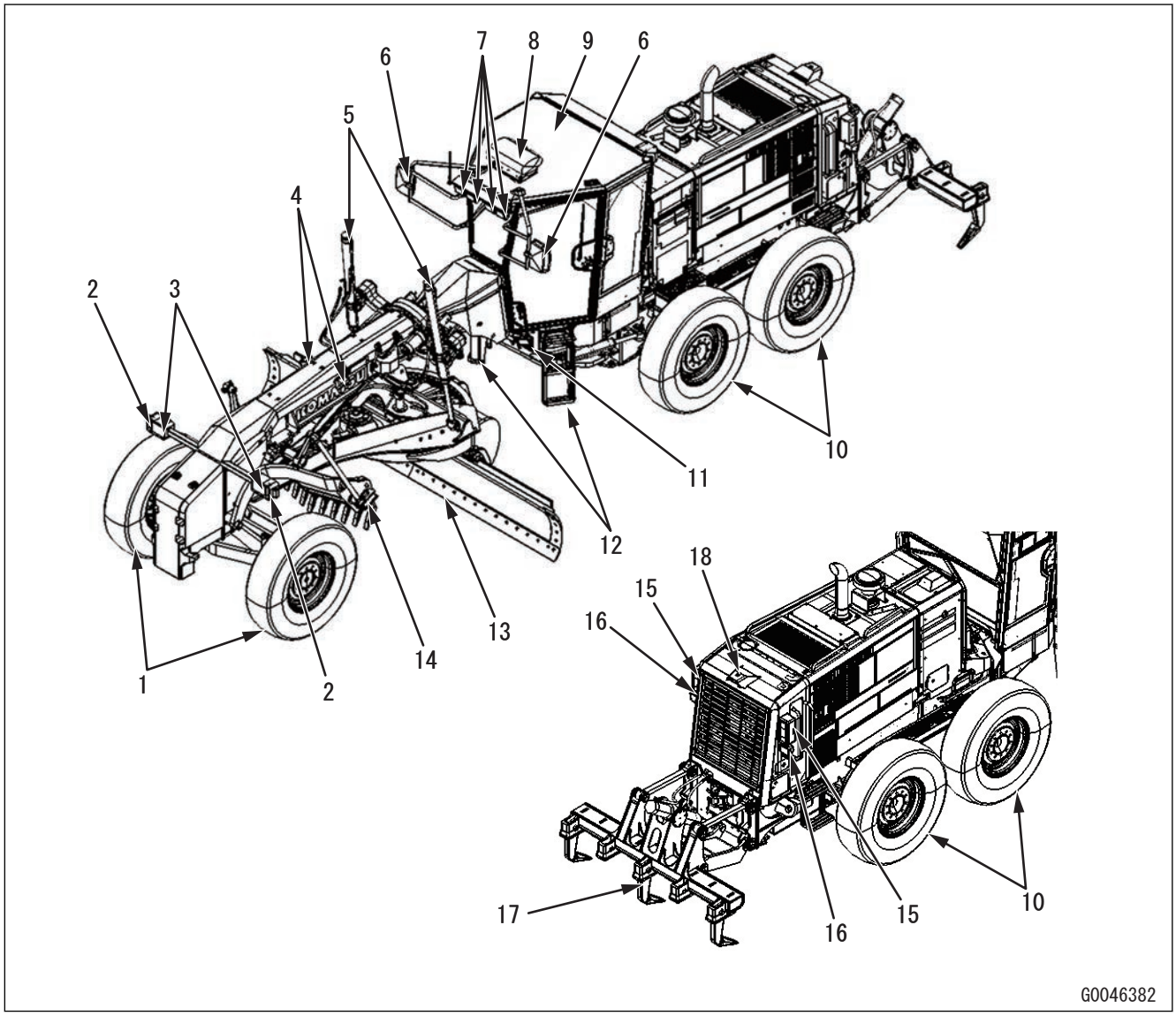
OPERATION

⚠ WARNING

Before you read the OPERATION, read and understand the SAFETY.

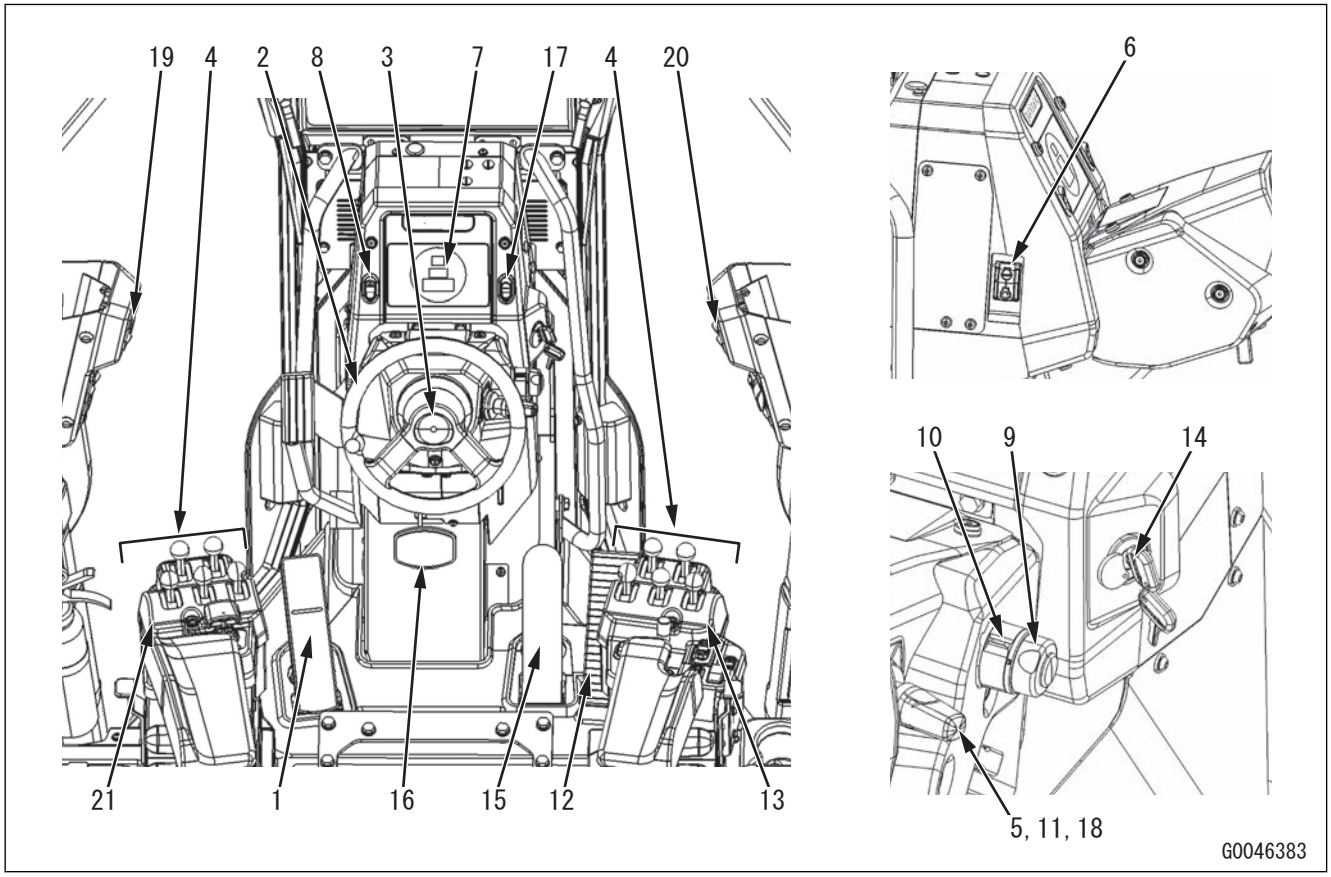
GENERAL VIEW

MACHINE EQUIPMENT NAME



(1) Front wheel
(2) Turn signal lamp
(3) Headlamp
(4) Blade front working lamp
(5) Blade lift cylinder
(6) Rearview mirror
(7) Cab mount working lamp (option)
(8) Revolving lamp (option)
(9) ROPS cab
(10) Rear wheel
(11) Front working lamp
(12) Steps
(13) Blade
(14) Scarifier (option)
(15) Rear combination lamp
(16) Rear working lamp
(17) Ripper
(18) Rearview camera

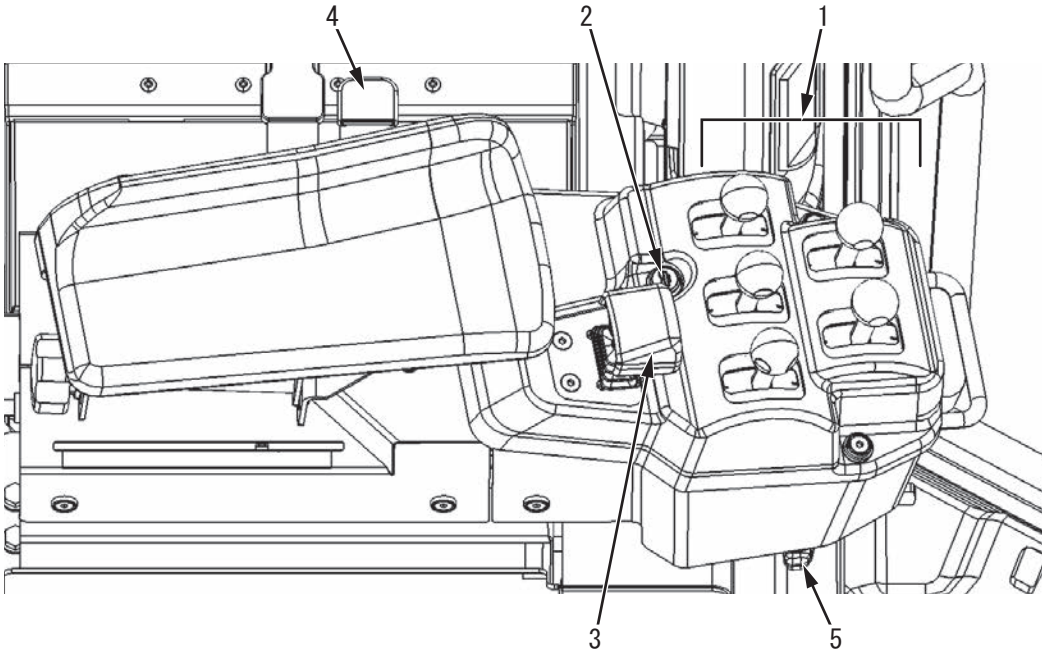
CONTROLS AND GAUGES NAMES



(1) Inching pedal
(2) Steering wheel
(3) Horn switch
(4) Work equipment control lever
(5) Dimmer switch
(6) Engine shutdown secondary switch
(7) Machine monitor
(8) Hazard lamp switch
(9) Front wiper switch
(9) Door wiper switch
(10) Rear wiper switch
(11) Turn signal lever
(12) Accelerator pedal
(13) Right console
(14) Starting switch
(15) Brake pedal
(16) Steering console tilt pedal
(17) Monitor brightness selector switch
(18) Lamp switch
(19) Left switch panel
(20) Right switch panel
(21) Left console

SWITCH PANEL EQUIPMENT NAME

Left console equipment name



(1) Work equipment control lever

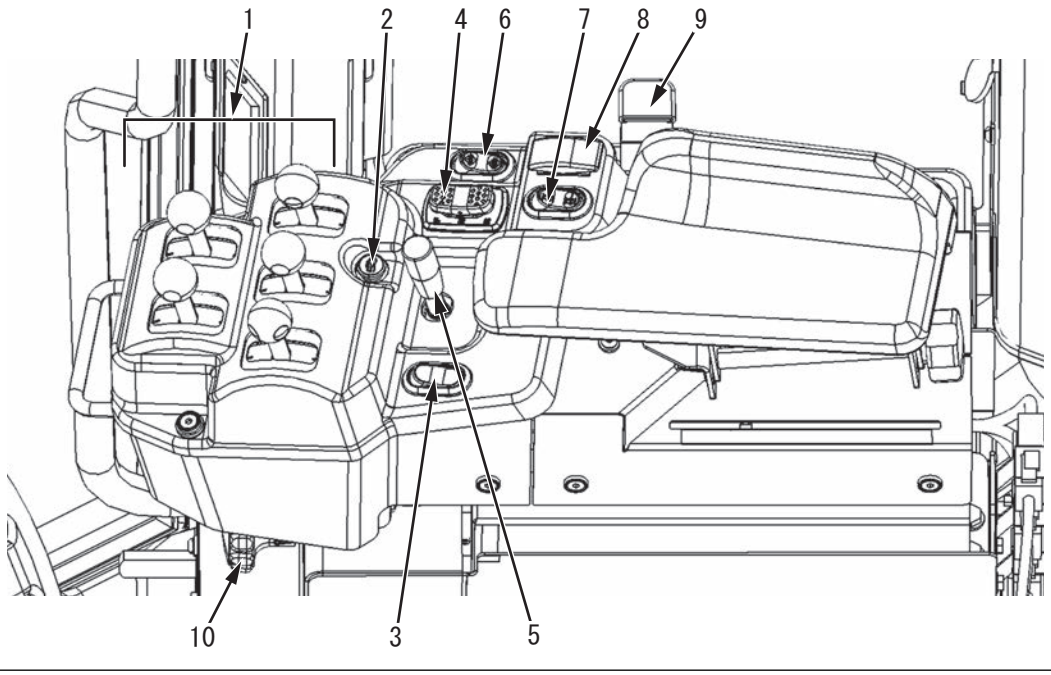
(2) Blade float left switch

(3) Steering control lever

(4) Slide lock release lever (work equipment lever left console)

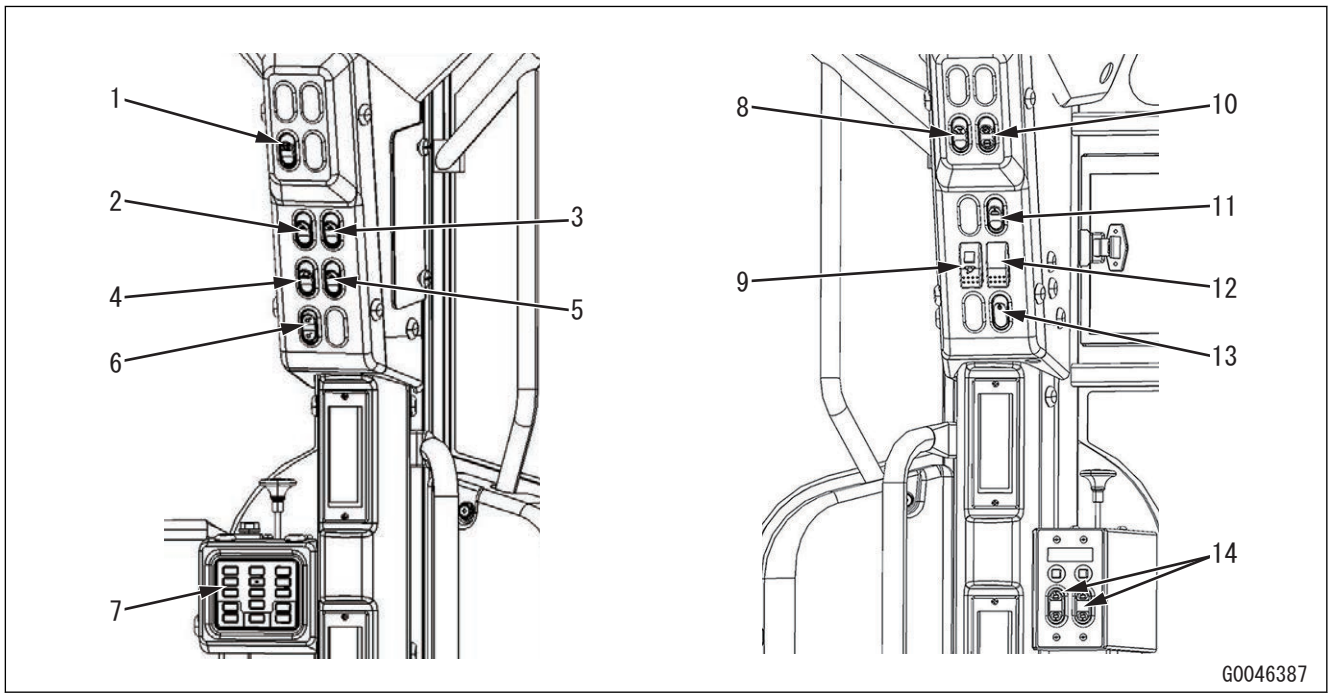
(5) Manual adjustment knob (work equipment lever left console) (option)

Right console equipment name



(1) Work equipment control lever
(2) Blade float right switch
(3) Parking brake switch
(4) Directional selector switch
(5) Gear shift lever
(6) Differential lock switch
(7) RPM set mode selector switch
(8) RPM set switch
(9) Slide lock release lever (work equipment lever right console)
(10) Manual adjustment knob (work equipment lever right console) (option)

Right and left switch panel equipment name



Left switch panel

(1) Rear heated wire glass switch

(2) Yellow revolving lamp switch (option)

(3) Cab mount working lamp switch (option)

(4) Rear working lamp switch

(5) Front working lamp switch

(6) Rearview monitor brightness adjustment switch

(7) Switch panel

Right switch panel

(8) Power mode selector switch

(9) Lifter lock pin switch

(10) Transmission mode selector switch

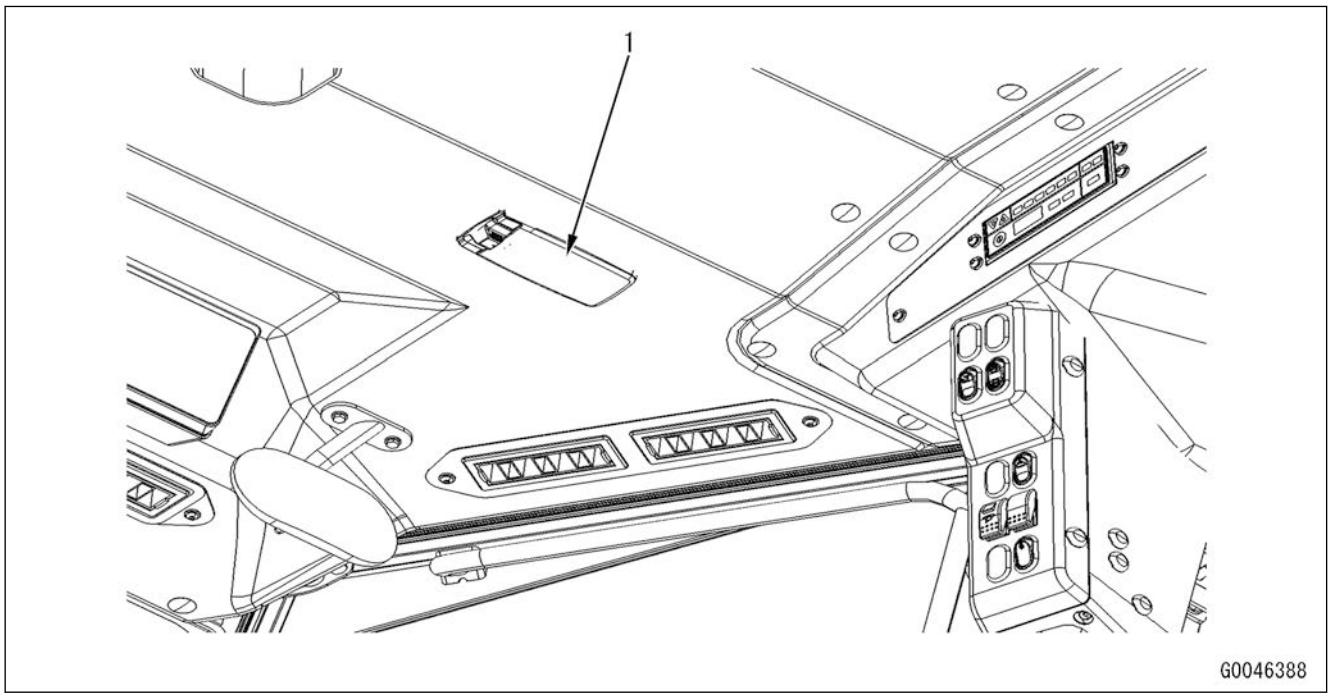
(11) Blade accumulator switch

(12) Steering lever enable switch

(13) Work equipment lock switch

(14) Work equipment lever console electric lifter switch

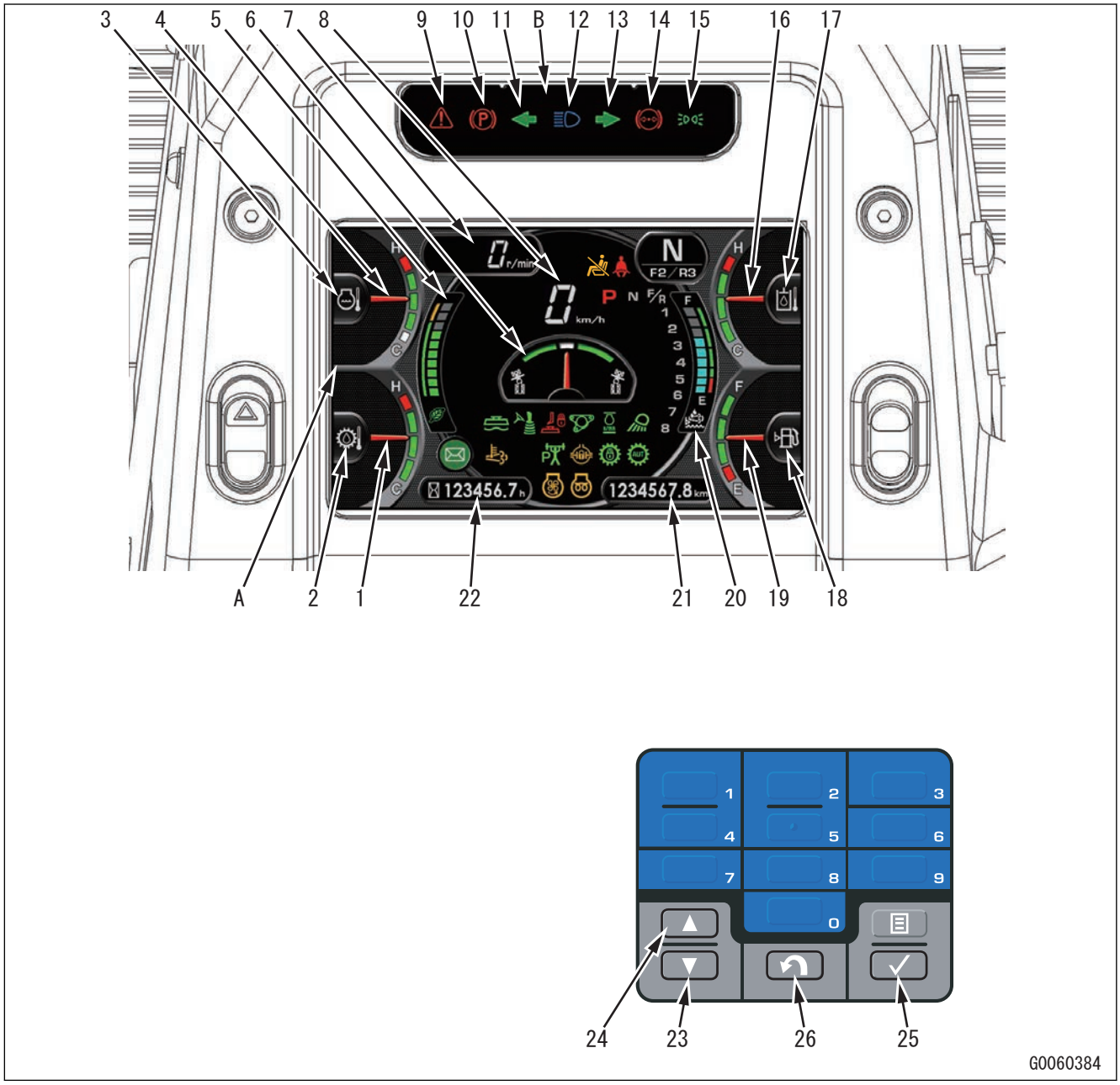
Right upper in cab equipment name



(1) Room lamp switch

MACHINE MONITOR EQUIPMENT NAME

General view



(A) LCD unit
(1) Torque converter oil temperature gauge
(2) Torque converter oil temperature caution lamp
(3) Engine coolant temperature caution lamp
(4) Engine coolant temperature gauge
(5) ECO gauge
(6) Articulate indicator
(7) Engine tachometer
(8) Speedometer
(9) Centralized warning lamp
(10) Parking brake pilot lamp

(B) LED unit
(11) Turn signal pilot lamp (L.H.)
(12) Headlamp (high beam) pilot lamp
(13) Turn signal pilot lamp (R.H.)
(14) Brake oil pressure caution lamp
(15) Clearance lamp pilot lamp
(16) Hydraulic oil temperature caution lamp
(17) Hydraulic oil temperature gauge
(18) Fuel level caution lamp
(19) Fuel gauge
(20) DEF level gauge

(21) R.H. meter (Select one from the fuel consumption gauge, service meter, odometer, or clock.)

(22) L.H. meter (Select one from the service meter, odometer, or clock.)

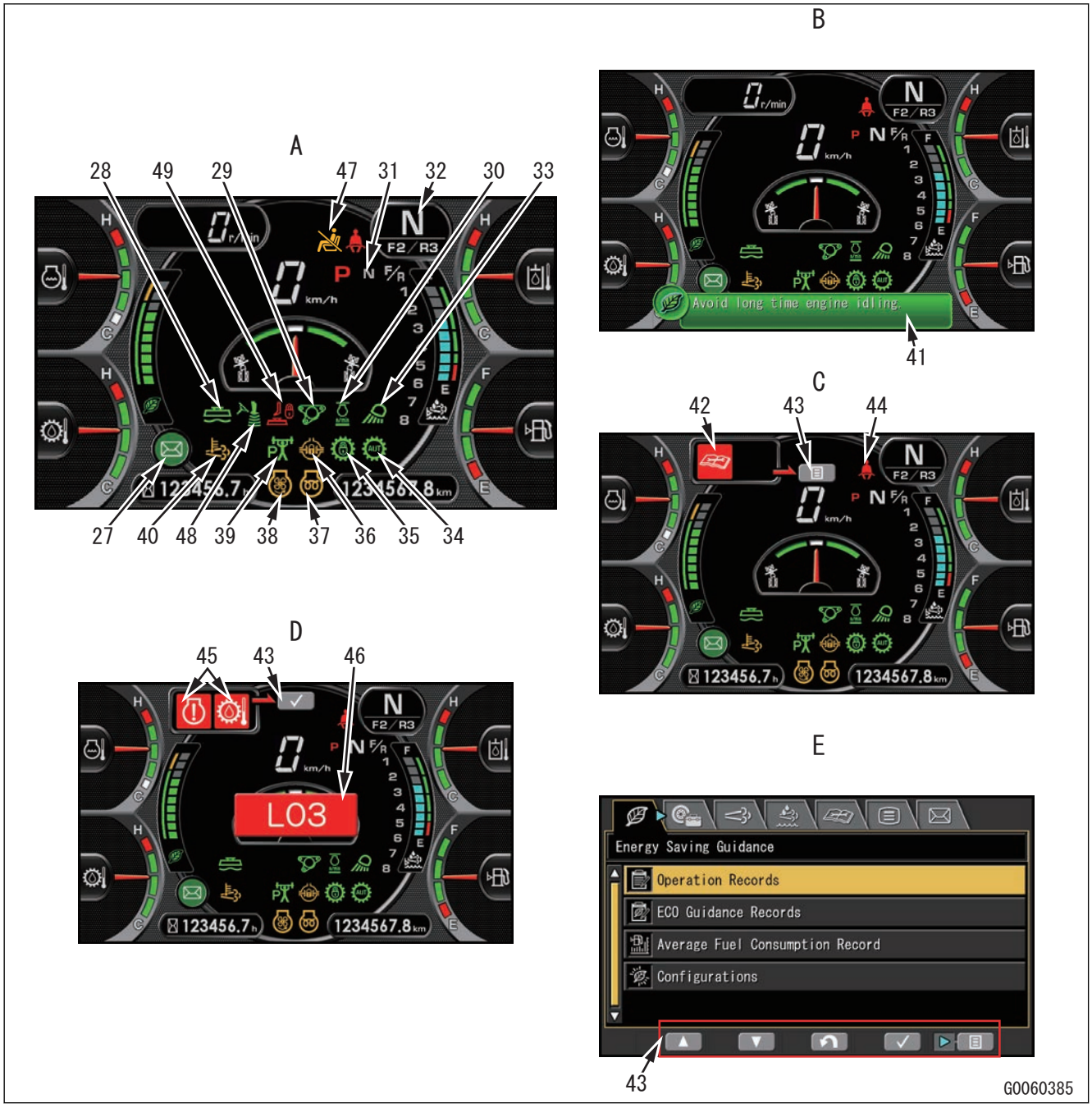
(23) DOWN switch

(24) UP switch

(25) ENTER switch

(26) RETURN switch

Liquid crystal unit display



(A) Standard screen

(B) ECO guidance screen

(C) Maintenance time warning screen

(D) Warning screen

(E) User menu screen

(27) Message display

(28) Blade float pilot lamp

(28) Blade accumulator pilot lamp (R.H., L.H., both R.H. and L.H.)

(29) Lifter lock pin pilot lamp

(30) RPM set pilot lamp

(31) Gear shift lever position display

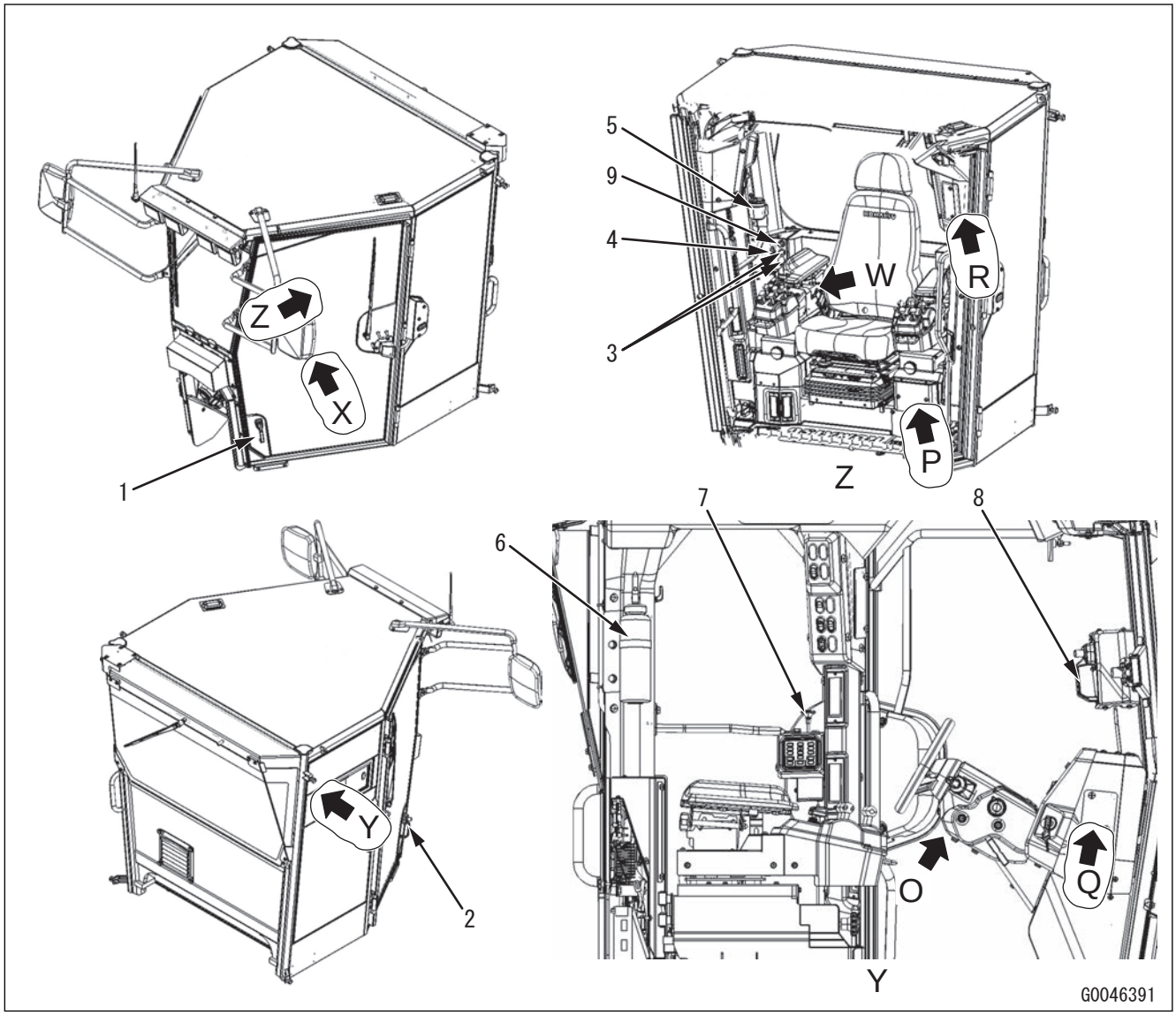
(32) Shift indicator/Gear speed preset indicator

(33) Working lamp pilot lamp
(34) Transmission mode display
(35) Torque converter lockup pilot lamp
(36) Differential lock pilot lamp
(37) Preheating pilot lamp
(38) Fan reverse rotation display
(39) Power mode display
(40) Aftertreatment devices regeneration pilot lamp
(41) ECO guidance
(42) Maintenance time caution lamp
(43) Guidance icon
(44) Seat belt caution lamp
(45) Warning display
(46) Action level display
(47) Leaving operator's seat caution lamp
(48) Steering control lever pilot lamp
(49) Work equipment lock pilot lamp

- At the place (28), 4 types of the pilot lamps are provided.

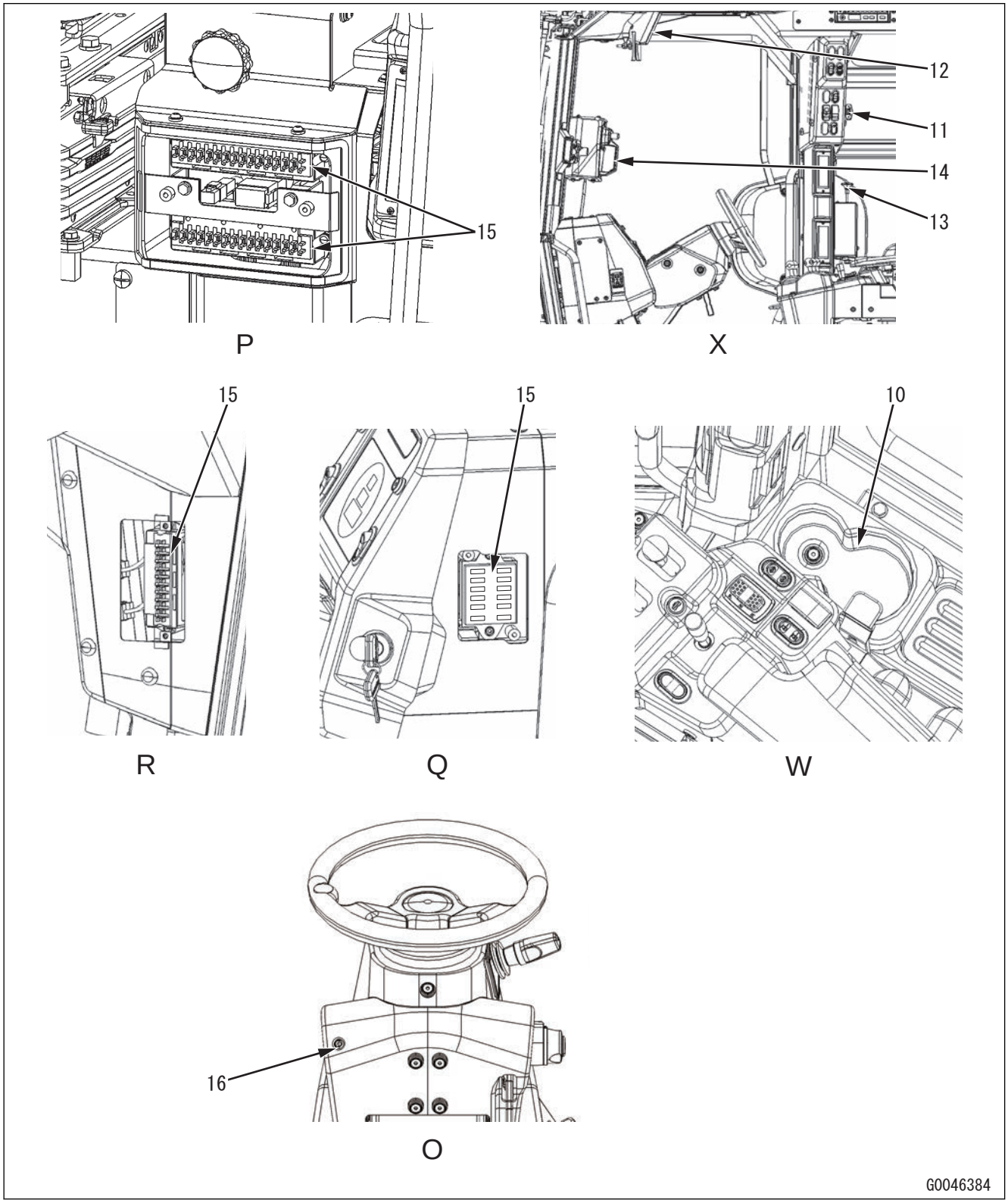
NAMES OF OTHER EQUIPMENT

Inside the cab



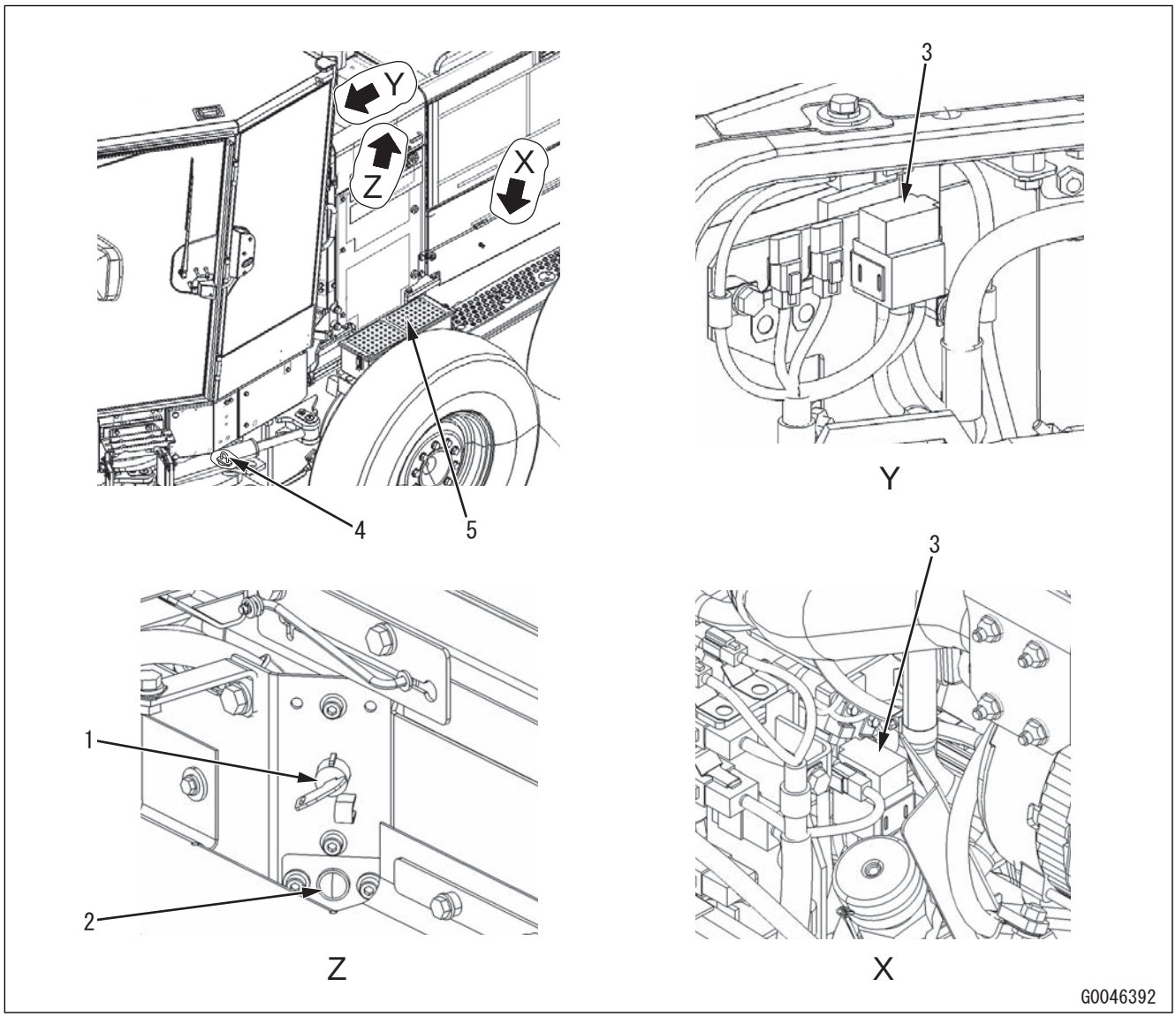
(1) Handle for cab L.H. door
(2) Handle for cab R.H. door
(3) 12V power supply
(4) AUX
(5) Ashtray
(6) Fire extinguisher (option)
(7) Open lock for cab L.H. door
(8) Open handle for cab L.H. door

(9) Cigarette lighter

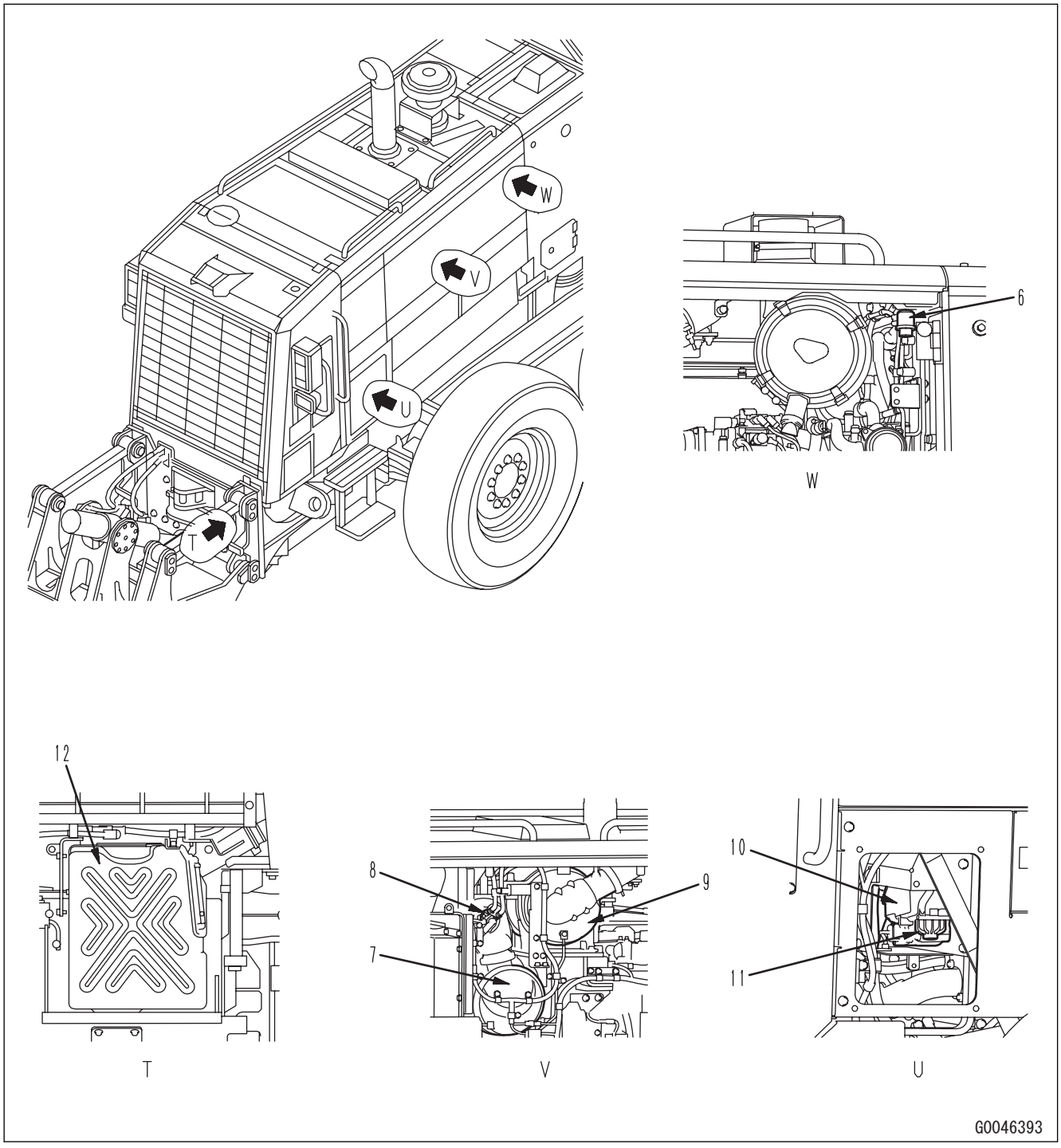


(10) Drink holder
(11) Cab slide sash lock cancel knob
(12) Rearview monitor
(13) Open lock for cab R.H. door
(14) Open handle for cab R.H. door
(15) Fuse
(16) Getting on and off lock confirmation lamp

Outside the cab



(1) Battery disconnect switch
(2) System operating lamp
(3) Slow-blow fuse
(4) Articulation lock pin
(5) Toolbox



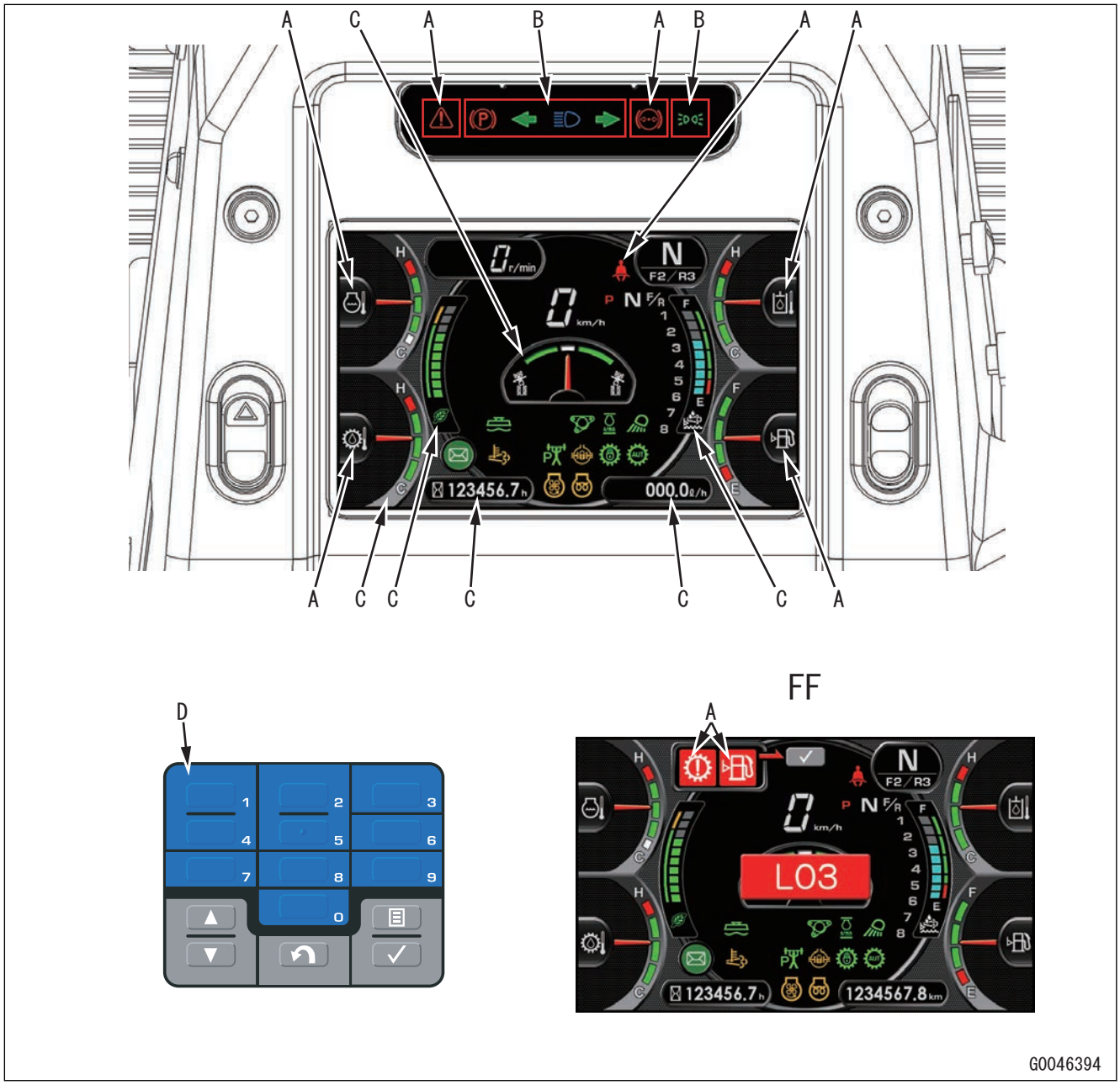
(6) Dust indicator
(7) KDPF
(8) DEF injector
(9) SCR assembly
(10) DEF pump
(11) DEF filter
(12) DEF tank

EXPLANATION OF COMPONENTS

The explanation of devices which is necessary to operate the machine is as follows.

Get thorough understanding of how to operate the device and meaning of what are displayed to make sure that you operate the machine correctly, safely, and comfortably.

MACHINE MONITOR EQUIPMENT



FF: Failure display screen

(A) Warning display

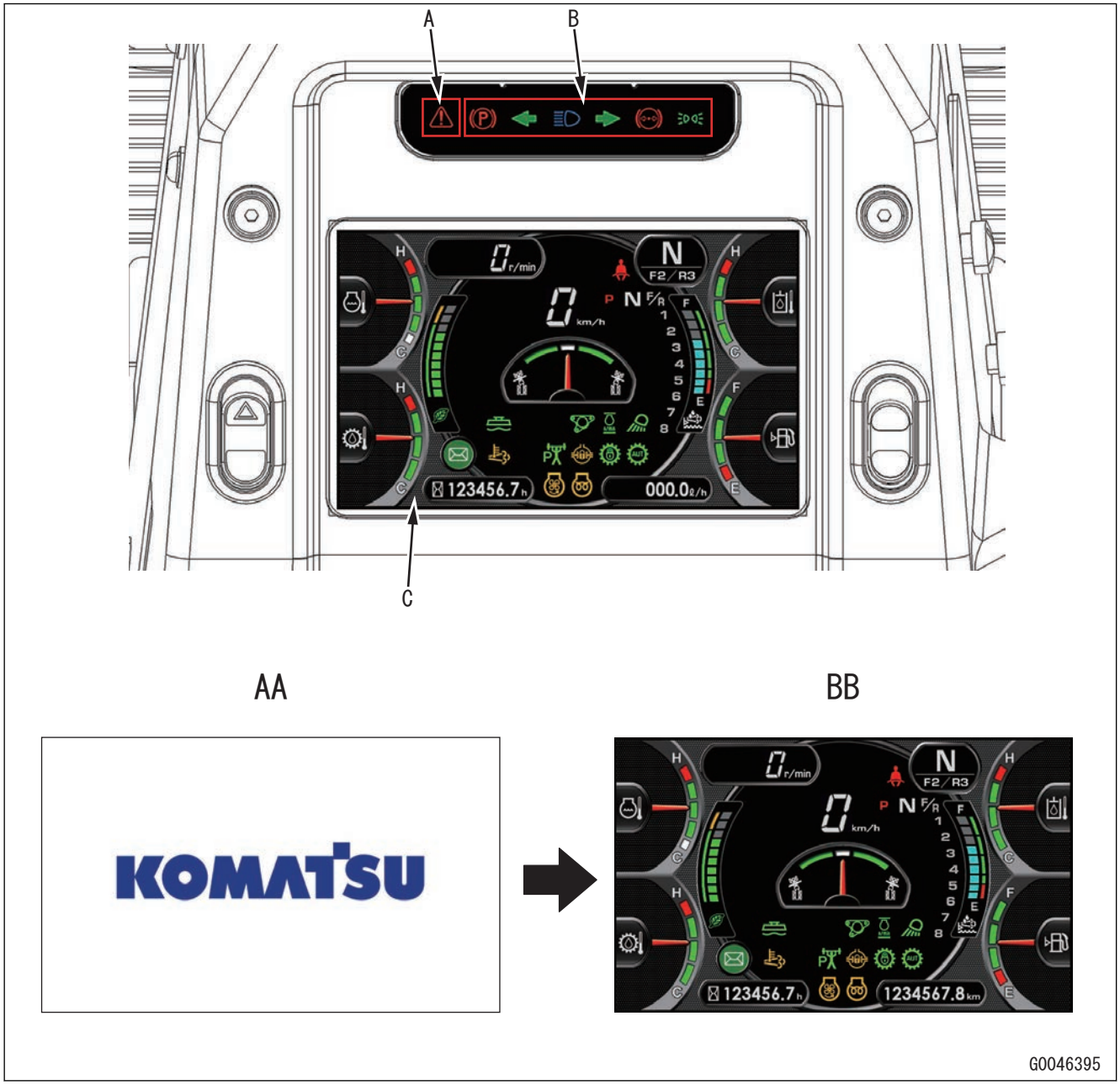
(B) Pilot display

(C) Meter display

(D) Switch panel

BASIC OPERATION OF MACHINE MONITOR

BASIC OPERATION OF MACHINE MONITOR WHEN YOU START ENGINE IN NORMAL SITUATION



When the starting switch is turned to the ON position, the machine monitor is activated and operates as follows.

1. The centralized warning lamp (A) and pilot lamp (B) light up for 2 seconds, and then go off for 1 second.
2. The liquid crystal display (C) shows the start screen AA for 2 seconds, and then changes to the standard screen BB.
3. The alarm buzzer operates for 2 seconds, and goes off when it is normal.

NOTICE

If the display, alarm buzzer, or other device does not operate, the machine monitor can be failed or the electric wiring can have breakage. Consult your Komatsu distributor for repair.

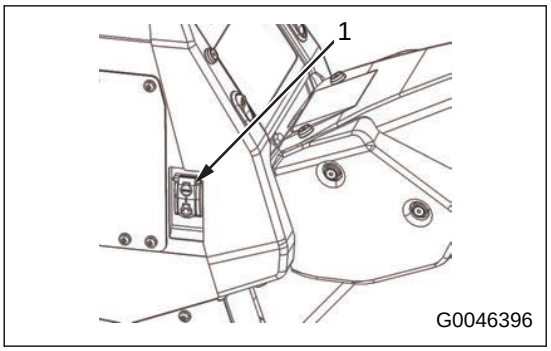
REMARK

When the engine is started, the battery voltage can drops suddenly by the temperature and the battery condition.
In such case, the machine monitor can go off temporarily and start again. It is not a trouble.

BASIC OPERATION OF MACHINE MONITOR WHEN YOU START ENGINE WHILE ENGINE SHUTDOWN SECONDARY SWITCH IS ON

While the additional engine shutdown secondary switch (1) is turned on (engine stopped), even if the starting switch is turned to the ON position, the screen shown in the figure is shown and you cannot start the engine.

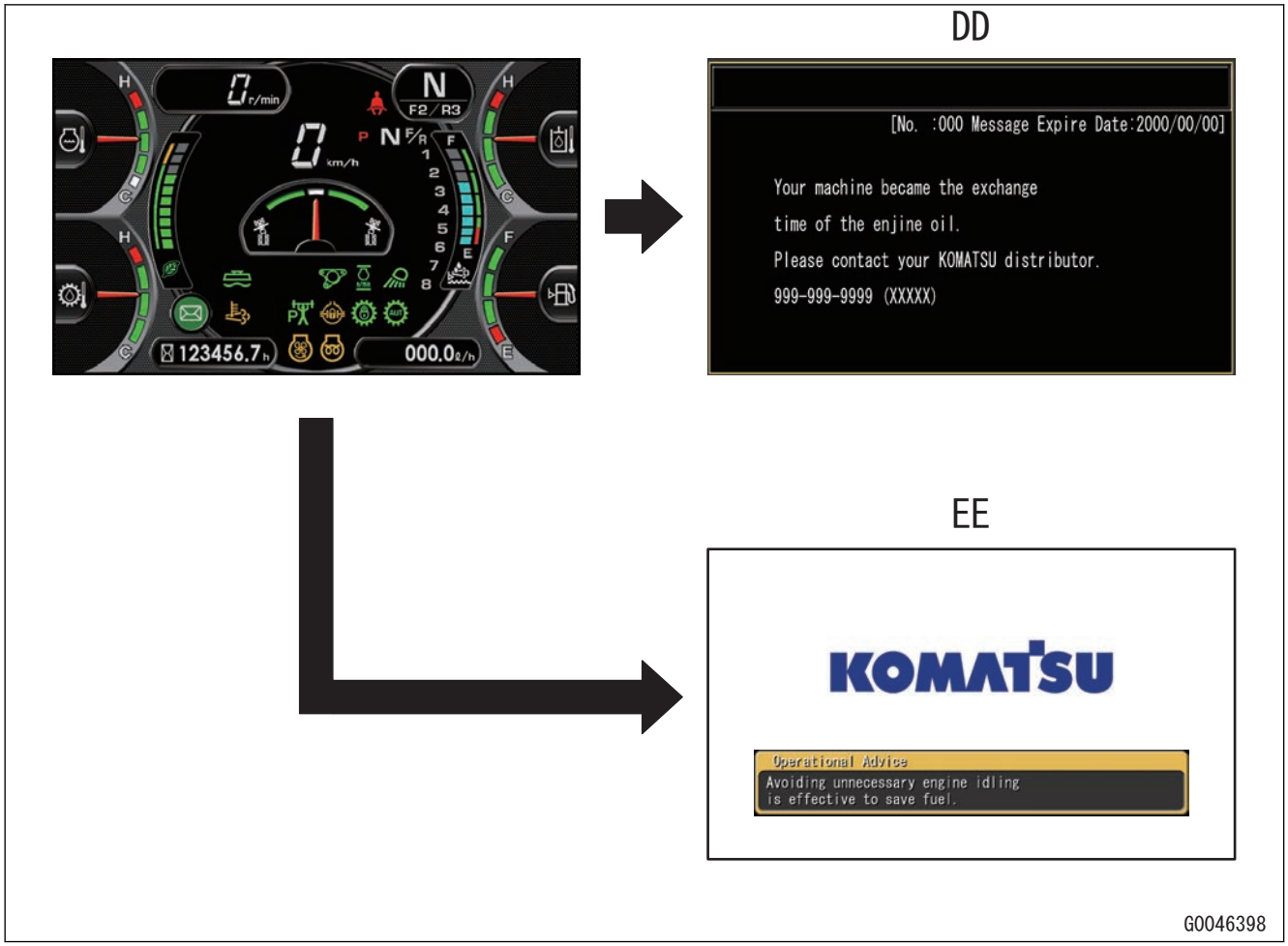
When engine shutdown secondary switch (1) is turned to the OFF position (normal), the machine monitor goes back to the standard screen, and you can start the engine with usual starting switch operation.





G0046397

BASIC OPERATION OF MACHINE MONITOR WHEN YOU STOP ENGINE IN NORMAL SITUATION



When the starting switch is turned to the OFF position, the screen goes off. In cases that follow, the end screen is shown for 5 seconds, and then screen goes off.

End screen when there is a message

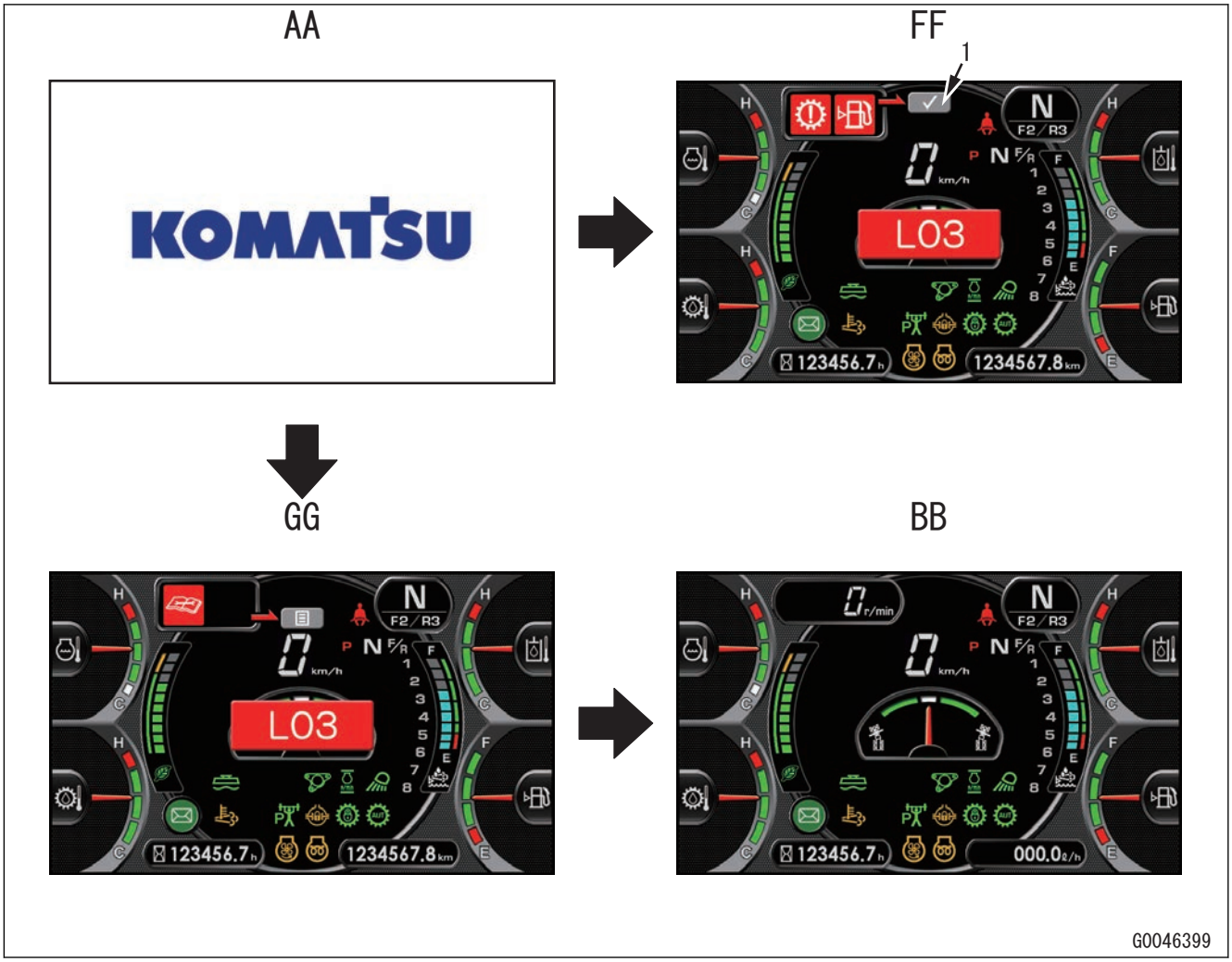
If there is any message from your Komatsu distributor, it is shown on end screen DD for 5 seconds, and then the screen goes off.

In this case, turn the starting switch to the ON position to check the message again, and if the message requests reply, reply to it.

End screen when there is an operational advice

If there is any operational advice, the operational advice is shown on the end screen EE for 5 seconds, and then the screen goes off.

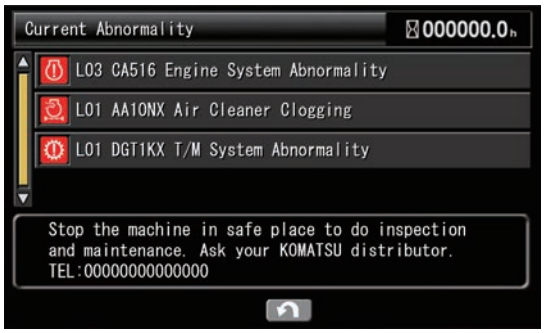
BASIC OPERATION OF MACHINE MONITOR WHEN YOU START ENGINE IN ABNORMAL SITUATION



If there is a problem on the machine when you turn on the machine monitor, the start screen AA is shown for 2 seconds, and the screen changes to the failure display screen FF.

When you push the ENTER switch that is shown on the guidance icon (1), “Current Abnormality” screen HH is shown.

HH



G0046400

If there is an item that the remaining time before maintenance is 30 hours or below when you turn on the machine monitor, the start screen AA is shown for 2 seconds, and the screen changes to the maintenance time warning screen GG.

When the menu switch shown in the guidance icon (2) is pushed, the maintenance menu screen JJ is shown.

The maintenance time warning screen GG is shown for 30 seconds, and then it changes to the standard screen BB.

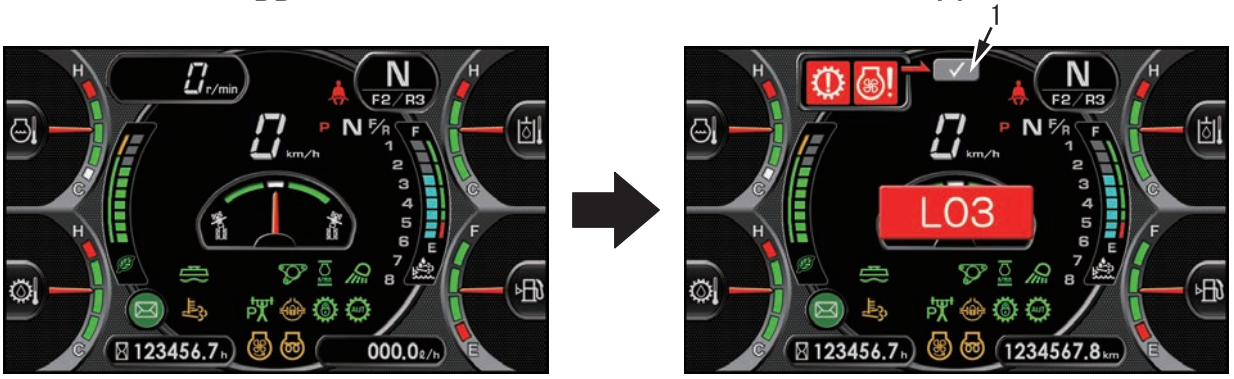
JJ



G0046401

BASIC OPERATION OF MACHINE MONITOR WHEN TROUBLE OCCURS WHILE YOU OPERATE MACHINE

BB FF



G0046402

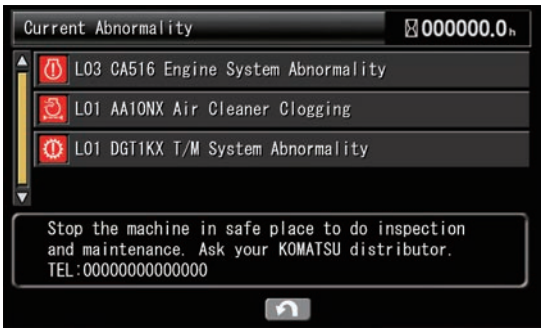
When a problem occurs during the work, the standard screen BB changes to the failure display screen FF.

Push the ENTER switch while the guidance icon (1) is shown, and “Current Abnormality” screen HH is shown.

REMARK

The guidance icon (1) is shown only when the machine is fully stopped.
Even if you push the ENTER switch while the machine is not fully stopped, “Current Abnormality” screen HH is not shown.

HH



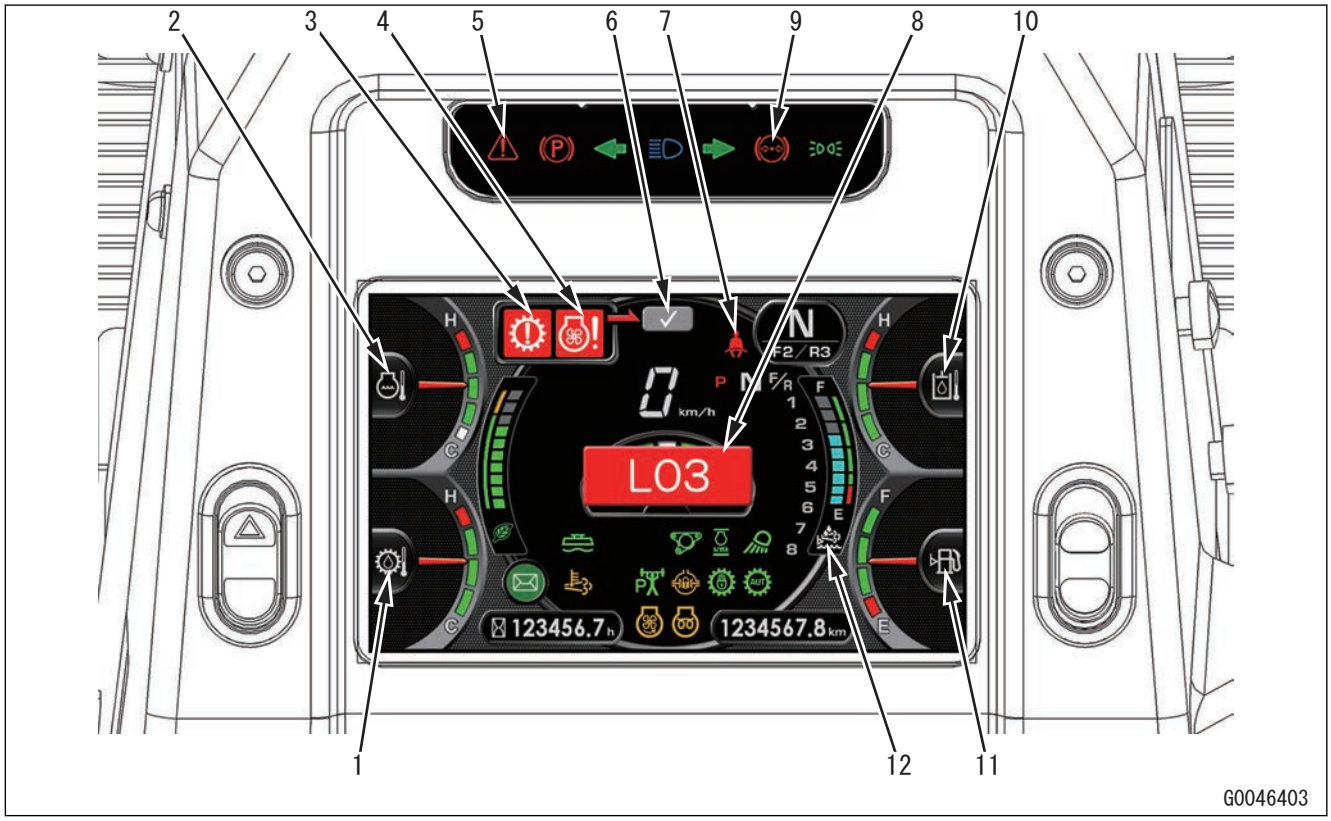
G0046400

WARNING DISPLAY

NOTICE

When one of the action levels from “L01” to “L04” is shown on the machine monitor, there is a problem on the machine.
Do the correct actions in response to the “List of action level displays and required actions”.

- **These cautions do not guarantee the condition of the machine.**
  Do not simply rely on the monitor when you do checks before starting (daily inspection). Always get off the machine and check each item directly.
- **If no action has been taken when the warning caution in red is lit, the machine can be seriously affected. Accordingly, proper actions should be taken immediately.**
- **The engine output or engine speed can be limited and the machine operation speed can become slow, by the contents of the warning.**



(1) Torque converter oil temperature caution lamp
(2) Engine coolant temperature caution lamp
(3) Warning display
(4) Warning display
(5) Centralized warning lamp
(6) Guidance icon
(7) Seat belt caution lamp
(8) Action level
(9) Brake oil pressure caution lamp
(10) Hydraulic oil temperature caution lamp
(11) Fuel level caution lamp
(12) DEF level caution lamp

ACTION LEVEL DISPLAY

The action level display shows the degree of urgency of the problem currently found on the machine by “L01” to “L04”.

The larger the number in the table is, the more dangerous effects the problem can have on the machine if it is left with no action.

When the machine monitor shows an action level, do the applicable actions instructed on “List of action level displays and required actions”.



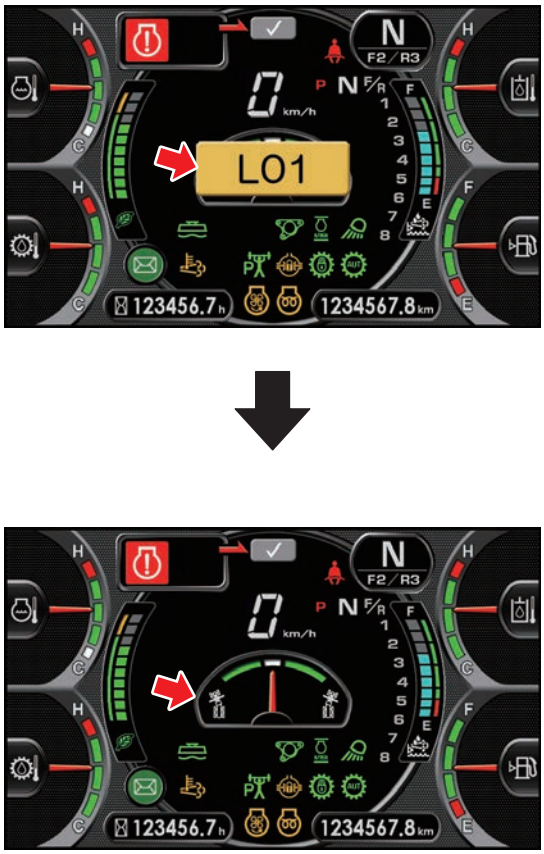
G0046404

List of action level displays and required actions

Degree of urgency	Action level	Centralized warning lamp	Buzzer	Caution lamp	Action
High ↑ | | | | | | ↓ Low	L04	Lights up	Operates continuously	Lights up in red	Stop the machine immediately and consult your Komatsu distributor for inspection and maintenance.
	L03	Lights up	Operates intermittently	Lights up in red	Stop the operation and move the machine to a safe area, then consult your Komatsu distributor for inspection and maintenance.
	L02	Lights up	Operates intermittently	Lights up in red	If there is a display about overrun, decrease the engine speed and the machine travel speed during operation. If there is a display about overheat, stop the machine at a safe area, and run the engine at medium speed with no load. If there is a display related to transmission, decrease the inching pedal operation time. If the condition does not become better, check the failure code and consult your Komatsu distributor for inspection and maintenance.
	L01	Not lit	Does not operate	Lights up in yellow	Some functions can be restricted, but the machine can be operated. When you complete the operation, be sure to do the inspection and maintenance. If necessary, consult your Komatsu distributor for inspection and maintenance.

REMARK

- The action level display “L01” is shown for 2 seconds if a failure is found, and then goes off.
- If multiple problems are found at the same time, the action level with the highest urgency (the highest number) is shown.



G0046405

CAUTION LAMP LIST

NOTICE

- **These caution lamps do not guarantee the condition of the machine.**
  Do not simply rely on the caution lamp for checks-before-starting (start-up inspection). Be sure to move off the machine and check each item directly.
- **If the caution lamp is shown in red, the dangerous effect will be caused to the machine if it is left with no action done.**
  Do the action immediately.
- **Based on the contents of the warning, the engine output or engine speed can be restricted and the machine operation speed can possibly become slow.**

Caution lamp and color

Symbols	Type of caution lamp	Color/Machine state (action level)			
		Red	Yellow	Blue	White
 G0046406	Engine coolant temperature caution lamp	High temperature (L02)	-	-	Normal
 G0046407	Hydraulic oil temperature caution lamp	High temperature (L02)	-	-	Normal
 G0046408	Torque converter oil temperature caution lamp	High temperature (L02)	-	-	-
 G0046409	Differential lock oil temperature caution lamp	High temperature (L02)	-	-	-
 G0046410	Fuel level caution lamp	Low level	-	-	Normal
 G0046411	System caution lamp	Abnormal (L03)	Abnormal (L01)	-	-
 G0046412	Transmission system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 G0046413	Fan control system caution lamp	Abnormal (L03)	Abnormal (L01)	-	-
 G0046414	KDPF system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-

Symbols	Type of caution lamp	Color/Machine state (action level)			
		Red	Yellow	Blue	White
 G0046415	KDPF soot accumulation caution lamp	Abnormal (L03)	Accumulated (L01)	-	-
 G0046416	DEF level caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	Low temperature
 G0046417	DEF system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 G0046418	DEF system high-temperature stop caution lamp	-	Engine is stopped by high temperature (L01)	-	-
 G0046419	Engine system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 G0046420	Engine oil pressure caution lamp	Abnormal (L03)	-	-	-
 G0046421	Charge level caution lamp	Abnormal (L03)	-	-	-
 G0046422	Engine overrun caution lamp	Operation of advance alarm protection	-	-	-
 G0078633	Radiator coolant level caution lamp	Low coolant level (L02)	Low coolant level (L01)	-	-
 G0046423	Air cleaner clogging caution lamp	-	Clogged (L01)	-	-
 G0046424	Maintenance time caution lamp	Due time is over	Notice	-	-
 G0046425	Seatbelt caution lamp	Not fastened	-	-	-

Symbols	Type of caution lamp	Color/Machine state (action level)			
		Red	Yellow	Blue	White
 G0078630	Steering system caution lamp	-	Abnormal (L01)	-	-
 G0078631	Steering oil pressure caution lamp	Low oil pressure (L03)	-	-	-
 G0047793	Steering control lever caution lamp	Abnormal (L03)	-	-	-
 G0047794	Work equipment system caution lamp	Abnormal (L03)	Abnormal (L01)	-	-
 G0047795	Seating switch caution lamp	Abnormal (L03)	Abnormal (L01)	-	-
 G0047796	Leaving operator's seat caution lamp	-	No one on operator's seat	-	-
 G0047797	Differential lock hydraulic caution lamp	-	Low oil pressure	-	-

For the meaning of caution lamps and required actions, see the section of the caution lamps.

CURRENT ABNORMALITY LIST DISPLAY

You can check on the machine monitor that the information on failures that occurred on the machine and the necessary actions for action levels that are shown.

When you push the ENTER switch while the guidance icon is shown, the screen changes to the “CURRENT ABNORMALITY LIST DISPLAY”.

Take appropriate actions in response to the message shown on the monitor.

REMARK

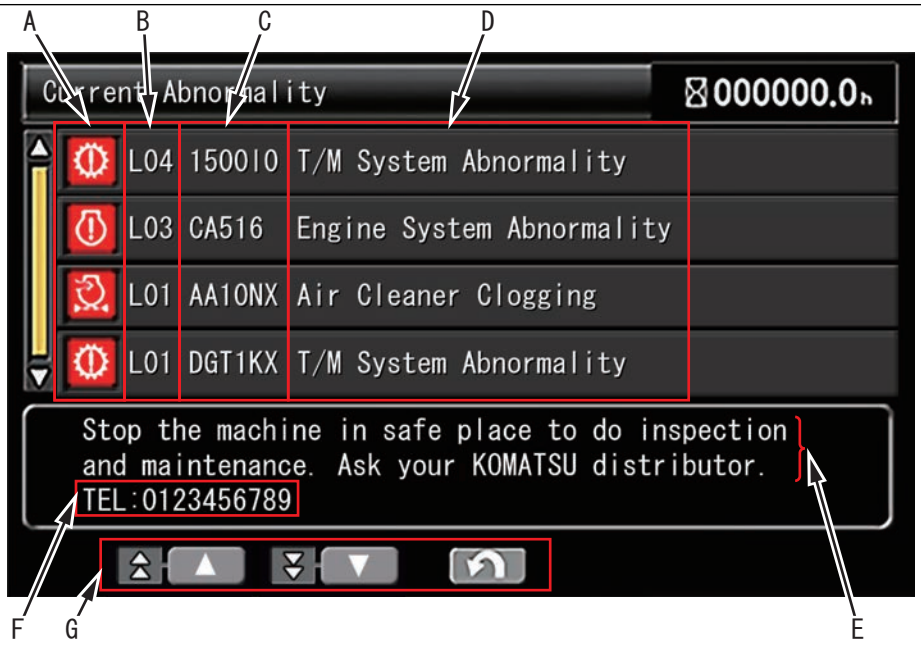
The guidance icon is shown only while the machine is stopped correctly.
When you push the ENTER switch while the machine is not stopped correctly, “CURRENT ABNORMALITY LIST DISPLAY” is not shown.



G0046426



G0046427



G0046433

(A) Caution lamp

(B) Action level

(C) Failure code

Code to show the content of the failure Tell your Komatsu distributor about this.

(D) Failure name

(E) Message

Take appropriate actions in response to the shown message.

(F) Contact telephone number

The telephone number of the contact such as your Komatsu distributor is shown.

If no contact telephone number is registered, no telephone number is shown.

Ask your Komatsu distributor for the telephone number registration if necessary.

(G) Guidance icon

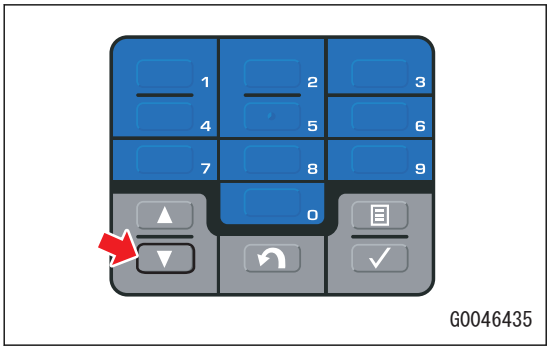
On the "CURRENT ABNORMALITY LIST DISPLAY", you can use the switches that are shown in guidance icon (G). Those switches are as follows.

UP switch: Moves the screen to the previous page. When the screen shows the first page, it moves to the last page.

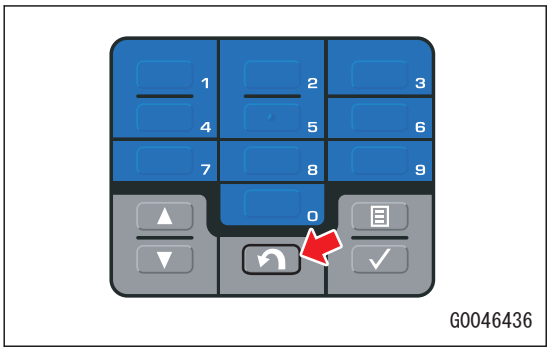


G0046434

DOWN switch: Moves the screen to the next page. When the screen shows the last page, it moves to the first page.



RETURN switch: The screen goes back to the standard screen.



ENGINE COOLANT TEMPERATURE CAUTION LAMP

The engine coolant temperature caution lamp warns the overheat of engine coolant.

If the engine coolant temperature is abnormally high, the caution lamp lights up in red and the action level “L02” is shown.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the machine in a safe area, set the directional selector switch to the NEUTRAL position (N), and run the engine at a medium speed with no load until the caution lamp goes off.



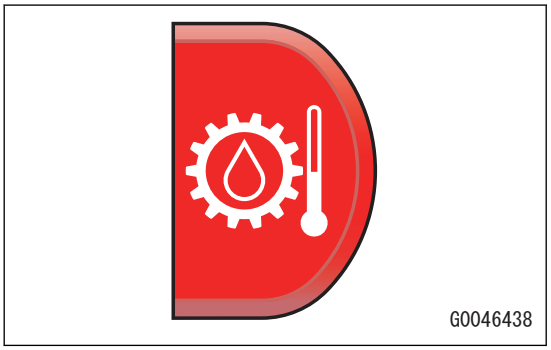
TORQUE CONVERTER OIL TEMPERATURE CAUTION LAMP

The torque converter oil temperature caution lamp gives a warning about overheat of the torque converter oil.

If the torque converter oil temperature is abnormally high, the caution lamp lights up in red and action level “L02” is shown.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the machine in a safe area, set the directional selector switch to the NEUTRAL position (N), and run the engine at a medium speed with no load until the caution lamp goes off.



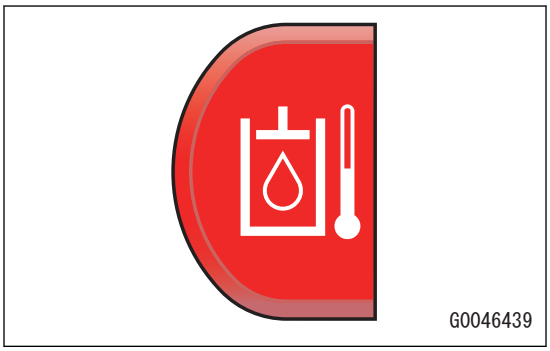
HYDRAULIC OIL TEMPERATURE CAUTION LAMP

The hydraulic oil temperature caution lamp warns about overheating of the hydraulic oil.

If the hydraulic oil temperature is abnormally high, the caution lamp lights up in red, and the action level “L02” is shown.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the machine in a safe place, set the directional selector switch to the NEUTRAL (N) position, and run the engine at a medium speed with no load until the caution lamp goes off.



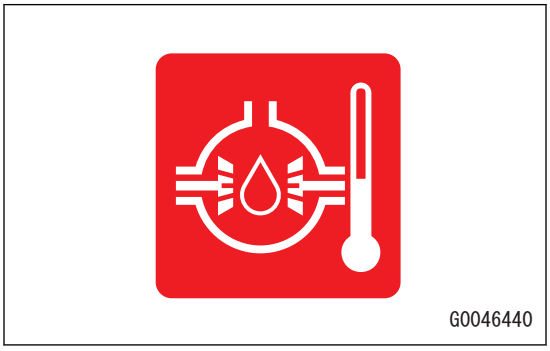
DIFFERENTIAL LOCK OIL TEMPERATURE CAUTION LAMP

The differential lock oil temperature caution lamp gives a warning about overheat of differential lock oil temperature.

If the differential lock oil temperature is abnormally high, the lamp lights up in red and action level “L02” is shown.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the machine in a safe place, set the directional selector switch to the NEUTRAL (N) position, and run the engine at a medium speed with no load until the caution lamp goes off.

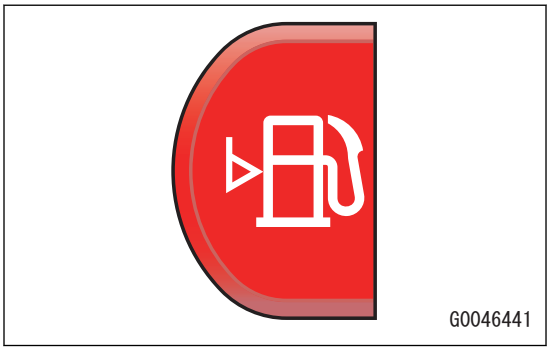


FUEL LEVEL CAUTION LAMP

The fuel level caution lamp warns about the fuel level being low.

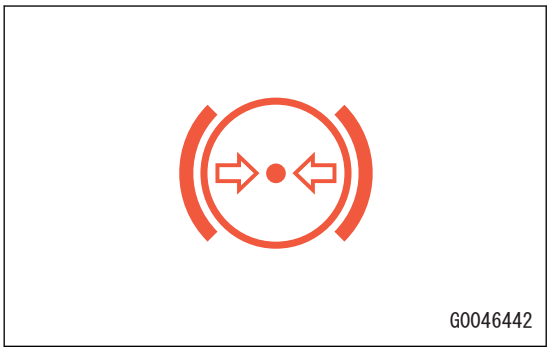
The lamp lights up in red if the fuel level is 100 L or lower.

Add fuel soon.



BRAKE OIL PRESSURE CAUTION LAMP

The brake oil pressure caution lamp warns that the brake oil pressure is below the specified value.



When the action level “L03” is shown

If the brake oil pressure drops below the specified value while the engine is in the operation, the caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for the inspection and maintenance.

When the action level is not shown and the lamp lights up in red

If the brake oil pressure is below the specified value while the engine is stopped, the caution lamp lights up in red.

When you start the engine, the caution lamp is lit in red until the brake oil pressure rises above the specified value.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Wait until the caution lamp goes off, and then start the machine.

SYSTEM CAUTION LAMP

System caution lamp warns about abnormality in the steering system.



When the action level “L03” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for the inspection and maintenance.

When the action level “L01” is shown

The caution lamp lights up in yellow.

Do the inspection and maintenance always after you finish the operation.

Ask your Komatsu distributor for the inspection and maintenance as needed.

DEF LEVEL CAUTION LAMP

The DEF level caution lamp gives a warning that the DEF tank level becomes low.

When the caution lamp lights up in red, immediately add DEF.

In the abnormal condition, the engine power deration will be started to promote the maintenance or repair of the emission control system.


G0046444

When lamp lights up in red

The action level “L04” is shown. DEF tank level is too low. Inducement status is “Final Inducement”. Engine speed is fixed at low idle.

The action level “L04” is shown. DEF tank level is too low. Inducement status is “Severe Inducement”. Engine power is under heavy deration.

The action level “L03” is shown. DEF tank level is low. Inducement status is “Mild Inducement”. Engine power is under deration.

No action level is shown. DEF tank level is low. Inducement status is “Escalated Warning”. Add DEF immediately not to let the warning step go further.

No action level is shown. DEF tank level is low. Inducement status is “Warning”. Add DEF immediately.

When lamp lights up in white

When fluctuation of DEF tank level is large because of freezing or other causes, or when the tank level sensing is not done correctly.

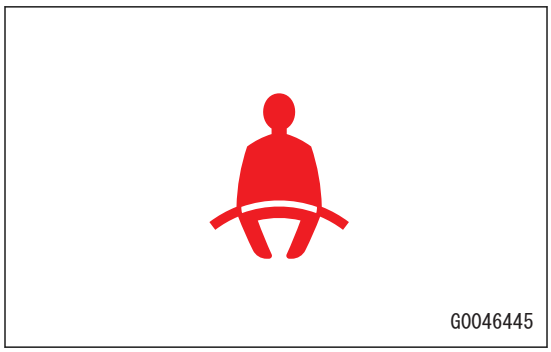
When DEF is added after the engine starting switch is turned to the OFF position.

When the DEF tank level sensor is defective.

SEATBELT CAUTION LAMP

The seat belt caution lamp lights up if the seat belt is not fastened.

Be sure to fasten the seat belt because there can be a risk during the machine travel.

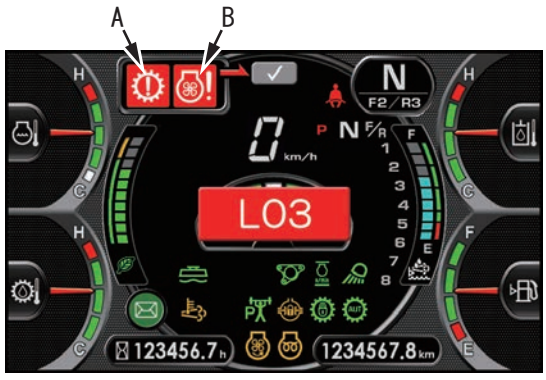

G0046445

WARNING DISPLAY

The caution lamps shown on the warning display section are as follows. Take appropriate measures in response to the specified remedies.

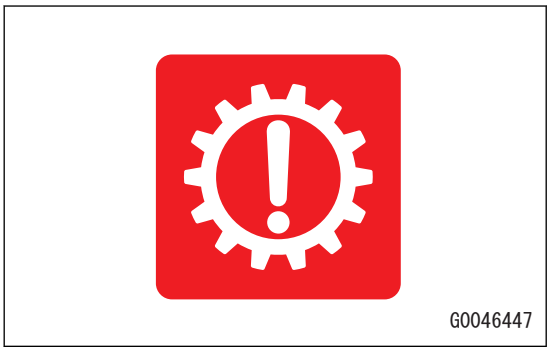
REMARK

- When 1 type of warning is generated, it is shown on the warning display (A).
- When 2 types of warning are generated, they are shown on the warning displays (A) and (B).
- When more than 3 types of warning are generated, they are shown on the warning displays (A) and (B) alternately at intervals of 2 seconds.



G0046446

TRANSMISSION SYSTEM CAUTION LAMP



The transmission system caution lamp warns about abnormality in the transmission system.

When the action level “L04” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds continuously.

Stop the work immediately and ask your Komatsu distributor for inspection and maintenance.

When the action level “L03” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe place. Move the machine, stop the engine, and ask your Komatsu distributor for the inspection and maintenance.

When the action level “L02” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to the safe place, and run the engine with no load at the medium speed.

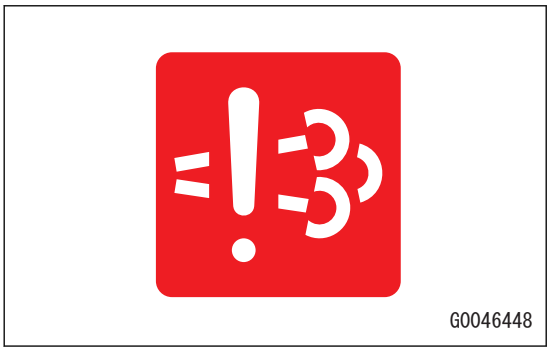
When the action level “L01” is shown

The caution lamp lights up in yellow.

Do the inspection and maintenance always after you finish the operation.

Ask your Komatsu distributor for the inspection and maintenance as needed.

KDPF SYSTEM CAUTION LAMP



The KDPF system caution lamp gives a warning about a problem in the KDPF system.

When the action level “L04” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates continuously.

Stop the machine immediately and consult your Komatsu distributor for inspection and maintenance.

When the action level “L03” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the operation, move the machine to a safe area, and stop the engine, then consult your Komatsu distributor for inspection and maintenance.

When the action level “L01” is shown

The caution lamp lights up in yellow.

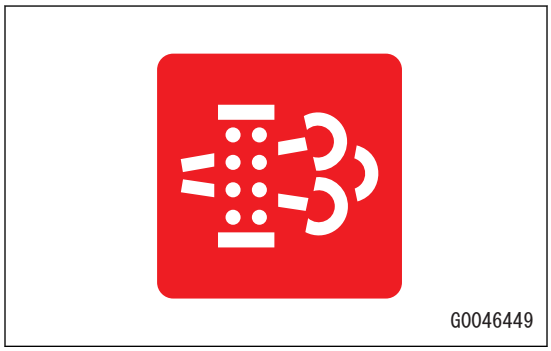
When you complete the operation, be sure to do the inspection and maintenance.

If necessary, consult your Komatsu distributor for inspection and maintenance.

REMARK

If the caution lamp is ignored and the work is continued, the temperature around the aftertreatment devices could become abnormally high.

KDPF SOOT ACCUMULATION CAUTION LAMP



The KDPF soot accumulation caution lamp warns that the soot is accumulated in KDPF or the filtering function of KDPF has lowered abnormally.

When the action level “L03” is shown

The caution lamp lights up in red if much soot is accumulated in KDPF or a system trouble such as lowering of the filtering function of KDPF occurs.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe place, and perform the manual stationary regeneration.

The manual stationary regeneration starts automatically in some cases to protect the KDPF system.

When the action level “L01” is shown

The caution lamp lights up in yellow if much soot is accumulated in KDPF.

After you finish the operation, move the machine to a safe place and perform manual stationary regeneration.

DEF SYSTEM CAUTION LAMP



The DEF system caution lamp warns a problem in the DEF system.

When the caution lamp lights up in yellow or in red, do the necessary actions.

In the abnormal condition, the engine power deration will be started to promote the maintenance or repair of the emission control system.

When lamp lights up in red

With the action level “L04”, Inducement status is “Final Inducement”. The engine speed is fixed at low idle.

With the action level “L04”, Inducement status is “Severe Inducement”. Engine power is under heavy deration.

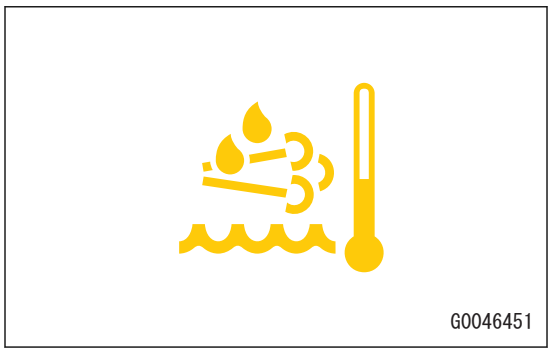
With the action level “L03”, Inducement status is “Mild Inducement”. Engine power is under deration.

When lamp lights up in yellow

With the action level “L01”, Inducement status is “Warning” or “Escalated Warning”.

If no maintenance is done, the machine goes to the next Inducement status.

DEF SYSTEM HIGH TEMPERATURE STOP CAUTION LAMP



The DEF system high-temperature stop caution lamp warns when the times of engine stop in the condition of high degree temperature of DEF system exceeds the defined number of times.

When the caution lamp lights up in yellow or in red, consult your Komatsu distributor for inspection and maintenance as necessary.

When you stop the engine just after the aftertreatment devices regeneration is disabled, run the engine at low idle for approximately 5 minutes, then stop it.

When you disable the aftertreatment devices regeneration during the regeneration of the aftertreatment devices, see “WHILE REGENERATION IS IN PROCESS: STOP REGENERATION (3-169)”.

ENGINE SYSTEM CAUTION LAMP

⚠ WARNING

If you continue the operation even while the caution lamp is lit in red, accumulation and combustion of the soot in KDPF are accelerated. In some cases, the temperature of KDPF and exhaust gas becomes high. Stop the engine immediately.

The engine system caution lamp warns about abnormality in the engine system.


G0046452

When the action level “L04” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds continuously.

Stop the machine immediately and ask your Komatsu distributor for the inspection and maintenance.

When the action level “L03” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for the inspection and maintenance.

When the action level “L01” is shown

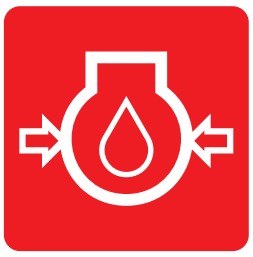
The caution lamp lights up in yellow.

Do the inspection and maintenance always after you finish the operation.

Ask your Komatsu distributor for the inspection and maintenance as needed.

ENGINE OIL PRESSURE CAUTION LAMP

The engine oil pressure caution lamp gives a warning about low engine lubricating oil pressure.


G0046453

If the engine oil pressure decreases to the specified level or lower while the engine is in operation, the caution lamp lights up in red, and the action level “L03” is shown.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the operation, move the machine to a safe area, and stop the engine, then consult your Komatsu distributor for inspection and maintenance.

ENGINE OVERRUN CAUTION LAMP

The engine overrun caution lamp gives a warning that the engine speed is above the allowable range.



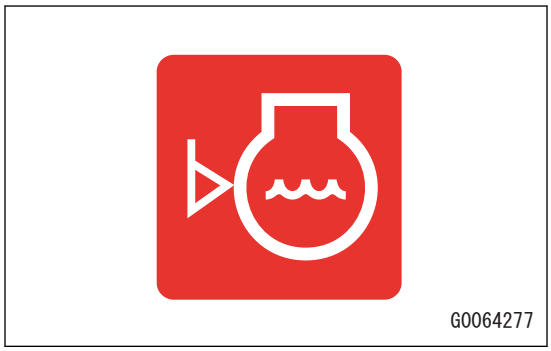
G0046454

When the caution lamp lights up in red, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

If the engine speed increases further, action level “L02” is shown.

Operate the machine with moderate engine speed and travel speed.

RADIATOR COOLANT LEVEL CAUTION LAMP



The radiator coolant level caution lamp gives a warning about the drop of coolant level in the cooling system.

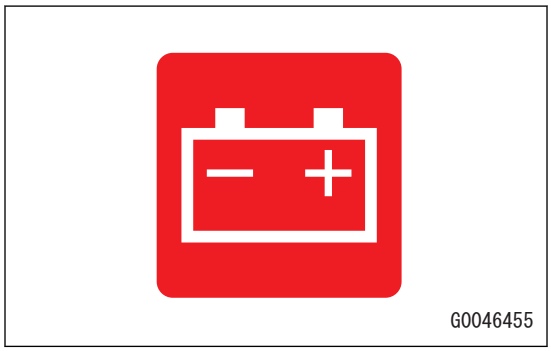
If the caution lamp lights up in yellow and action level “L01” is shown, check the coolant level in the reservoir tank and add coolant.

For details, see OPERATION, “CHECK COOLANT LEVEL, ADD COOLANT (3-200)”.

If the operation is continued while coolant is not added, when the starting switch is turned to the ON position next, the action level “L02” is shown and the caution lamp lights up in red. At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

If it occurs again in a short time, the coolant possibly leaks from the radiator. Consult your Komatsu distributor for inspection and maintenance.

CHARGE LEVEL CAUTION LAMP



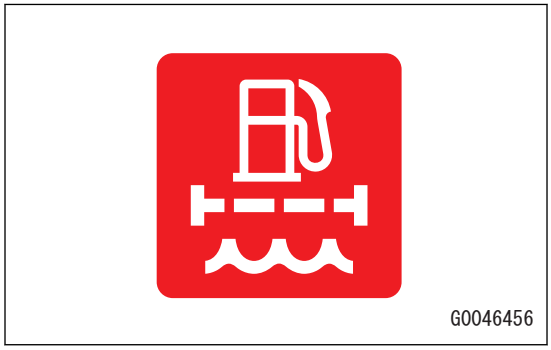
The charge level caution lamp gives a warning about a problem of the charge system while the engine is in operation.

If the battery is not charged correctly while the engine is in operation, the caution lamp lights up in red.

The action level “L03” is shown at the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the engine and check the alternator belt for damage, then consult your Komatsu distributor for inspection and maintenance.

WATER SEPARATOR CAUTION LAMP



The water separator caution lamp warns that water is accumulated in the water separator.

When water is accumulated in the water separator, the lamp lights up in red.

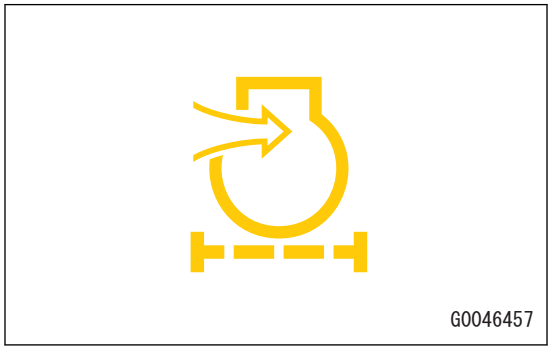
Stop the engine and drain water from the water separator.

For details, see “CHECK WATER SEPARATOR, DRAINING WATER AND SEDIMENT (3-198)”.

REMARK

The water separator forms one unit with the fuel prefilter.
The water separator is installed at the bottom of the fuel prefilter as detachable condition.

AIR CLEANER CLOGGING CAUTION LAMP



Air cleaner clogging warning light warns that the air cleaner is clogged.

If the caution lamp lights up in yellow, and the action level “L01” is shown, stop the engine, then check and clean the air cleaner.

For details, see “CHECK, CLEAN AND REPLACE AIR CLEANER (4-17)”.

FAN CONTROL SYSTEM CAUTION LAMP

The fan control system caution lamp gives a warning about a problem in the fan control system.



When the action level “L03” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the operation, move the machine to a safe area, and stop the engine, then consult your Komatsu distributor for inspection and maintenance.

When the action level “L01” is shown

The caution lamp lights up in yellow.

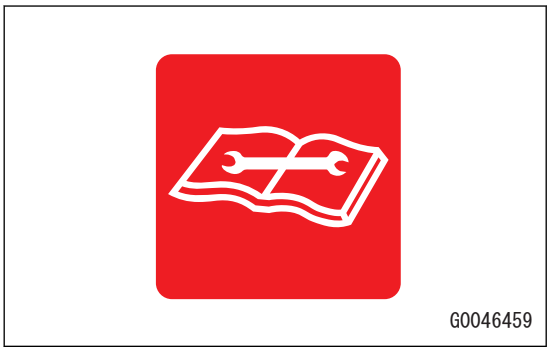
When you complete the operation, be sure to do the inspection and maintenance.

If necessary, consult your Komatsu distributor for inspection and maintenance.

MAINTENANCE TIME CAUTION LAMP

The maintenance time caution lamp shows the notices and alarms for the maintenance time.

It lights up when the starting switch is turned to the ON position, goes off after 30 seconds, and the screen changes to the standard screen.



When lamp lights up in red

The maintenance due time is over.

If no action is done, the machine efficiency will degrade or the service life of the machine will decrease. Do the inspection and maintenance immediately.

When lamp lights up in yellow

The maintenance time is near.

Prepare the necessary parts for the maintenance.

REMARK

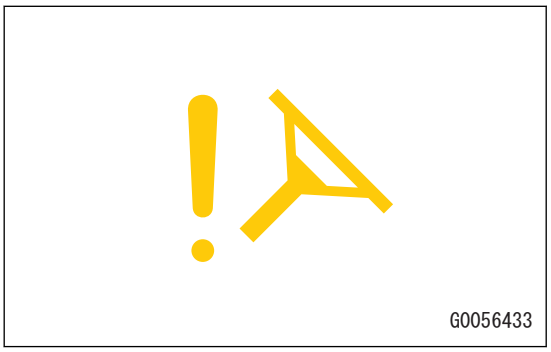
- To check the items that require maintenance, see “Maintenance” menu screen.
- When the menu switch is pushed while the caution lamp is lit on the standard screen, the screen directly changes to “Maintenance” menu screen.
- For the operations on “Maintenance” menu screen, see “MAINTENANCE (3-85)”.
- By default, the maintenance time caution lamp (yellow) is set to light up when the remaining time becomes 30 hours or below. You can change this setting. Consult your Komatsu distributor to change it.

STEERING SYSTEM CAUTION LAMP

The steering system caution lamp gives a warning about a problem in the steering system.

If the caution lamp lights up in yellow and the action level “L01” is shown, be sure to do the inspection and maintenance when you complete the operation.

If necessary, consult your Komatsu distributor for inspection and maintenance.



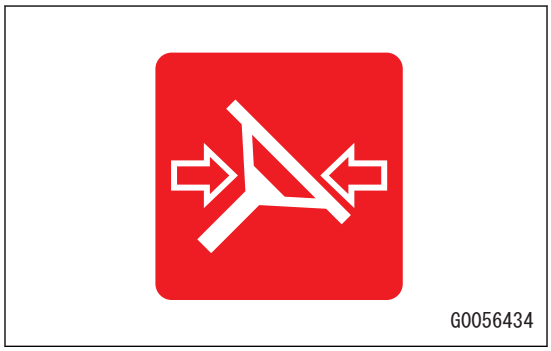
STEERING OIL PRESSURE CAUTION LAMP

The steering oil pressure caution lamp gives a warning that the steering oil pressure is below the specified value.

If the engine oil pressure drops below the specified value while the engine is running, the caution lamp lights up in red and the action level “L03” is shown.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the operation, and move the machine to a safe area. After you moved the machine, stop the engine, then consult your Komatsu distributor for the inspection and maintenance.


G0056434

CENTRALIZED WARNING LAMP

The centralized warning lamp lights up in red when the machine becomes the conditions that follow, and the alarm buzzer operates at the same time.


G0046460

Machine conditions which centralized warning lamp lights up	Other monitor display	
When the action levels of L02 or L03 or L04 is shown on the machine monitor.	 G0046461	
When the engine overrun caution lamp is lit.	 G0046462	
When the brake oil pressure is below the specified value while the engine is in operation.	 G0046463	The brake oil pressure caution lamp lights up.

STEERING CONTROL LEVER CAUTION LAMP

The steering control lever caution lamp gives a warning about a problem in the steering system.

The caution lamp lights up in red, and the action level “L03” is shown.

At the same time the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the operation, and move the machine to a safe area. After the machine is moved, stop the engine, then consult your Komatsu distributor for inspection and maintenance.


G0046464

WORK EQUIPMENT SYSTEM CAUTION LAMP

The work equipment system caution lamp gives a warning about a problem in the work equipment system.

When the action level “L03” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Stop the operation, and move the machine to a safe area. After the machine is moved, stop the engine, then consult your Komatsu distributor for inspection and maintenance.


G0046465

When the action level “L01” is shown

The caution lamp lights up in yellow.

When you complete the operation, be sure to do the inspection and maintenance.

If necessary, consult your Komatsu distributor for inspection and maintenance.

SEATING SWITCH CAUTION LAMP

Seating switch caution lamp gives warning about abnormality of the seating switch system.

When the action level “L03” is shown

The caution lamp lights up in red.

At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the operation, move the machine to a safe area. After you moved the machine, stop the engine, then consult your Komatsu distributor for the inspection and maintenance.


G0046466

When the action level “L01” is shown

The caution lamp lights up in yellow.

Do the inspection and maintenance always after you finish the operation.

Ask your Komatsu distributor for the inspection and maintenance as needed.

LEAVING OPERATOR'S SEAT CAUTION LAMP

The leaving operator's seat caution lamp lights up if the operator is in the posture that there is no weight on the seat surface such as the operator is away from the seat or half rises from the seat.

Sit on the seat correctly to avoid unexpected accidents.



DIFFERENTIAL LOCK HYDRAULIC CAUTION LAMP

⚠ WARNING

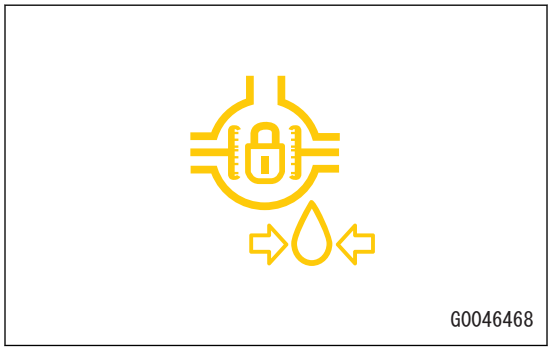
Do not keep traveling if the tire on one side slips with any condition that follows.

- **When the differential lock hydraulic caution lamp is lit**
- **When the differential lock is disabled**

If you use it, the machine can get severely damaged in some cases.

The differential lock hydraulic caution lamp warns that the brake oil pressure is below the specified value when the differential lock is enabled.

If the differential lock oil pressure is lowered, the caution lamp lights up in yellow. At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

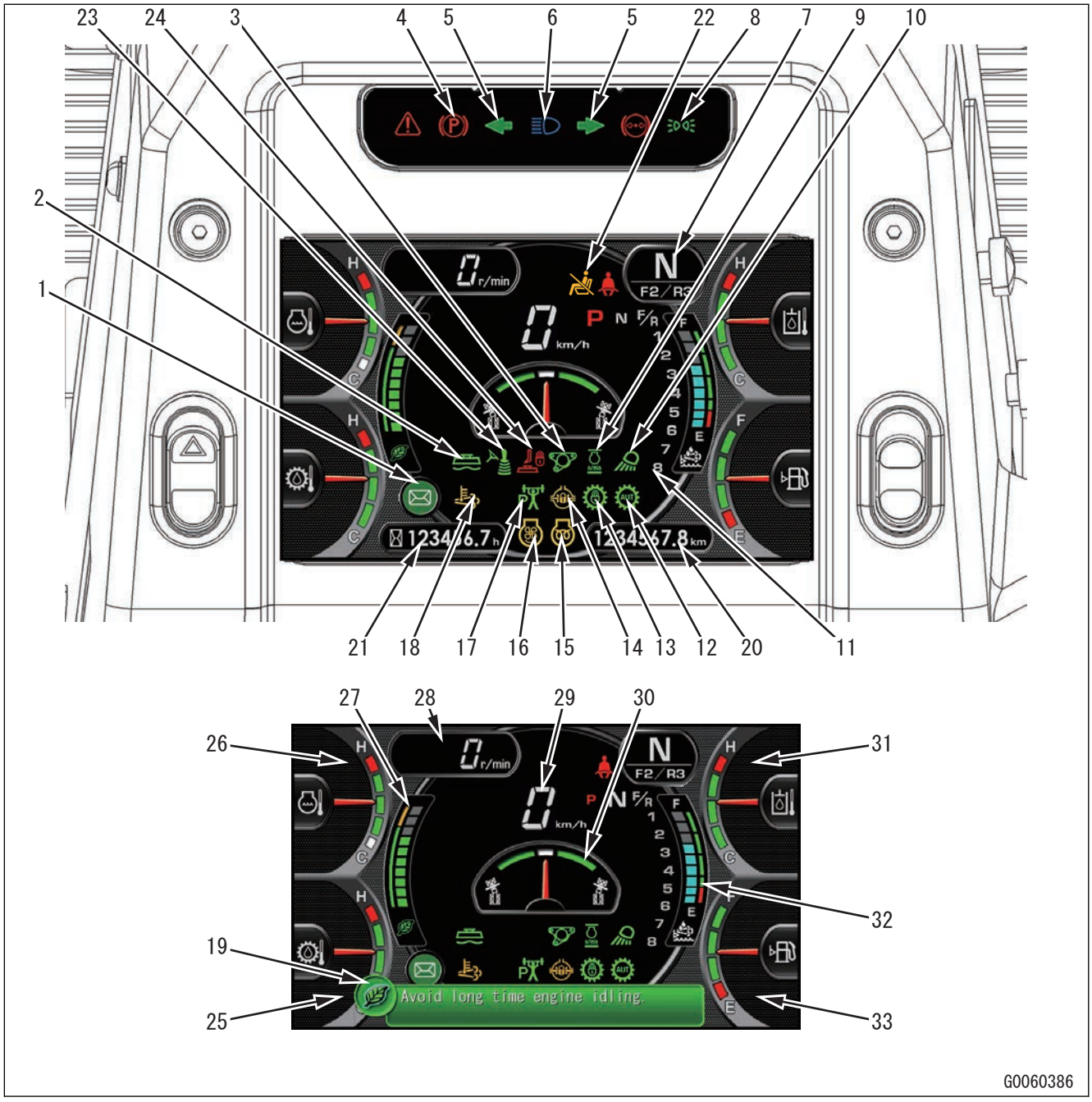


- In cold weather, do not turn the differential lock switch to the ON position unless the automatic warm up operation for the engine is finished.
- If the caution lamp and the alarm buzzer are operated when the differential lock switch is turned to the ON position, take the actions that follows.
  1. Turn the differential lock switch to OFF position.
  2. Wait for approximately 5 minutes.
- If the caution lamp and the alarm buzzer are operated even after you took actions, the differential lock strainer and the filter is likely clogged. See “CLEAN DIFFERENTIAL LOCK FILTER ELEMENT AND STRAINER (4-85)” and clean the element and strainer. If the caution lamp and buzzer are operated even after the cleaning, replace the element and strainer with new ones. If the caution lamp and the buzzer operates even after they were replaced, consult your Komatsu distributor for inspection and maintenance.

REMARK

The final drive case oil is of high viscosity when the temperature is low, and the differential lock oil pressure is easily lowered. See “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)” and select the correct oil.

PILOT DISPLAY AND METER DISPLAY



Pilot display

(1) Message display
(2) Blade float pilot lamp (left, right, right and left)
(2) Blade accumulator pilot lamp
(3) Lifter lock pin pilot lamp
(4) Parking brake pilot lamp
(5) Turn signal pilot lamp
(6) Headlamp (high beam) pilot lamp
(7) Shift indicator/Gear speed preset indicator
(8) Clearance lamp pilot lamp
(9) RPM set pilot lamp
(10) Working lamp pilot lamp
(11) Shift lever position display
(12) Transmission mode display
(13) Torque converter lockup pilot lamp
(14) Differential lock pilot lamp
(15) Preheating pilot lamp
(16) Fan reverse rotation display
(17) Power mode display
(18) Aftertreatment devices regeneration pilot lamp
(19) ECO guidance

(19) DEF low level guidance
(20) R.H. meter
(21) L.H. meter
(22) Leaving operator's seat caution lamp
(23) Steering control lever pilot lamp
(24) Work equipment lock pilot lamp

Meter display

(25) Torque converter oil temperature gauge
(26) Engine coolant temperature gauge
(27) ECO gauge
(28) Engine tachometer
(29) Speedometer
(30) Articulation indicator
(31) Hydraulic oil temperature gauge
(32) DEF level gauge
(33) Fuel gauge

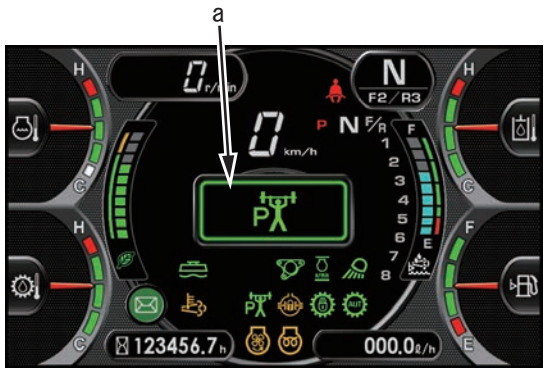
- 4 types of pilot lamps are prepared at the place (2), 2 types at the place (19).

PILOT DISPLAY

The pilot display consists of the pilot lamps to check the actuation of each function.

When the starting switch is turned on and the display items are functioning, the pilot lamps light up.

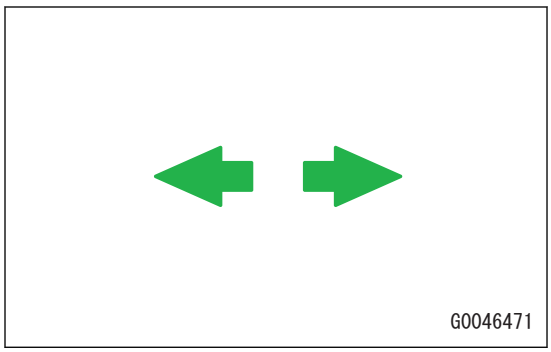
Some pilot lamps is shown by pop-up display (a) when they are selected.



G0046470

TURN SIGNAL PILOT LAMP

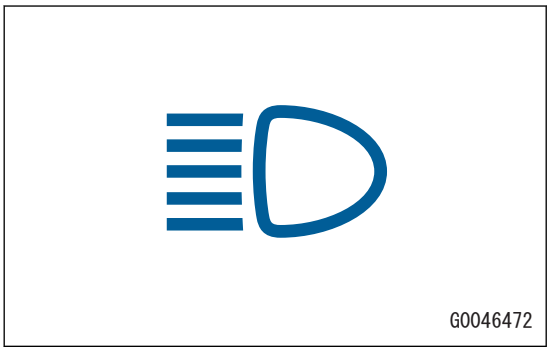
The turn signal pilot lamp flashes in response to the turn signal lamp operation.



G0046471

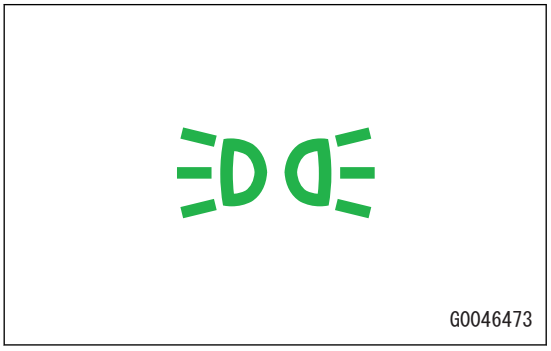
HEADLAMP (HIGH BEAM) PILOT LAMP

The headlamp (high beam) pilot lamp lights up when the headlamp (high beam) is turned on.



CLEARANCE LAMP PILOT LAMP

The clearance lamp pilot lamp lights up when the clearance lamps are turned on.



POWER MODE DISPLAY

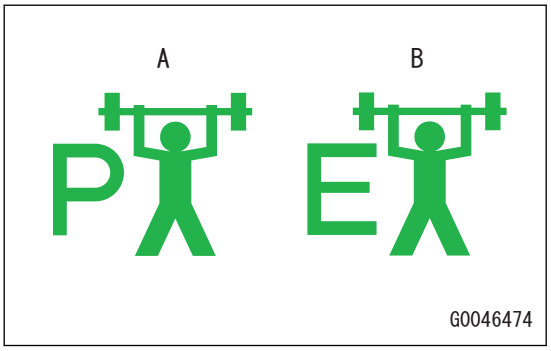
The power mode display shows the set state of the power mode.

One of the lamps lights up in response to the selection by the power mode selector switch.

(A): Power mode

(B): Economy mode

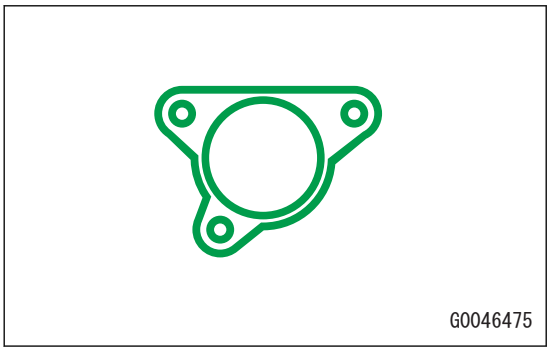
When the mode is shifted, the display pops up.



LIFTER LOCK PIN PILOT LAMP

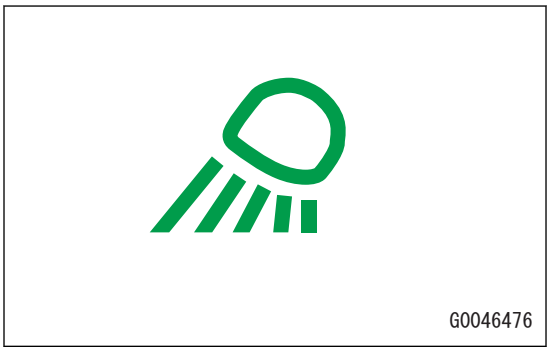
The lifter lock pin pilot lamp lights up when the lifter lock pin is removed.

Use the lifter lock pin switch to operate the lifter lock pin.



WORKING LAMP PILOT LAMP

The working lamp pilot lamp lights up when the working lamps are operated.



BLADE FLOAT DISPLAY

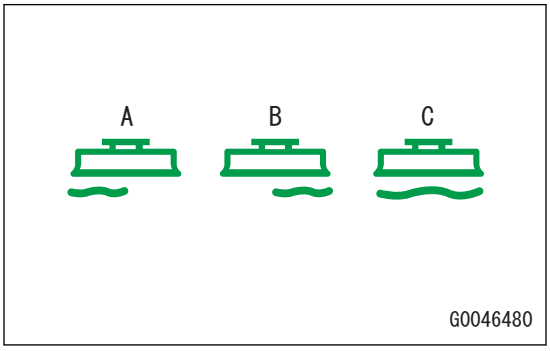
Blade float pilot lamp shows the float setting state of the blade.

The selection of the left and right blade float switches lights up one of the lamps that follow.

(A): L.H. blade float

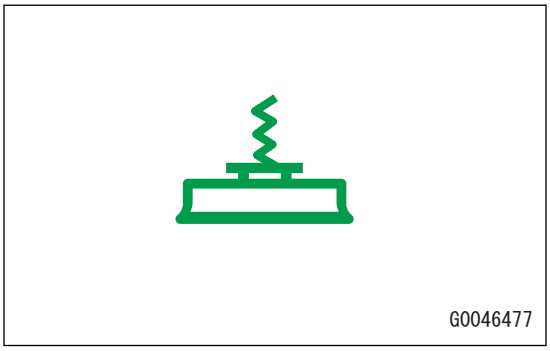
(B): R.H. blade float

(C): Blade float



BLADE ACCUMULATOR PILOT LAMP

Push the blade accumulator switch to the accumulator side and the blade accumulator pilot lamp lights up.



RPM SET PILOT LAMP

When you push the RPM set switch forward (AUTO) or rearward (MANU), the RPM set is operated and the RPM set pilot lamp lights up.

It also lights up when the setting is temporarily canceled by the push of the brake pedal or accelerator pedal after the RPM set is activated.

The pop-up display is shown when the RPM set is activated.



TORQUE CONVERTER LOCKUP PILOT LAMP

The torque converter lockup pilot lamp lights up when the torque converter lockup is in operation and the torque converter is shifted to the direct drive.



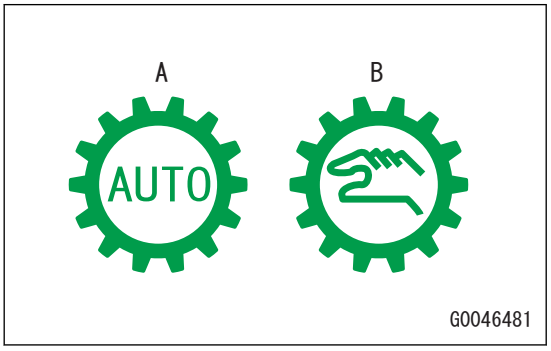
TRANSMISSION MODE DISPLAY

Transmission mode display shows the transmission mode state.

One of the lamps lights up in response to the selection by the transmission mode selector switch.

(A): Torque converter auto mode

(B): Manual mode

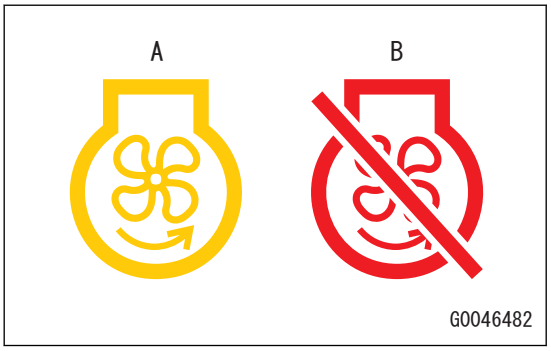


FAN REVERSE ROTATION DISPLAY

The fan reverse rotation display (A) lights up when the radiator fan is rotated reversely in manual reverse rotation mode.

This lamp flashes while the rotation direction is being changed.

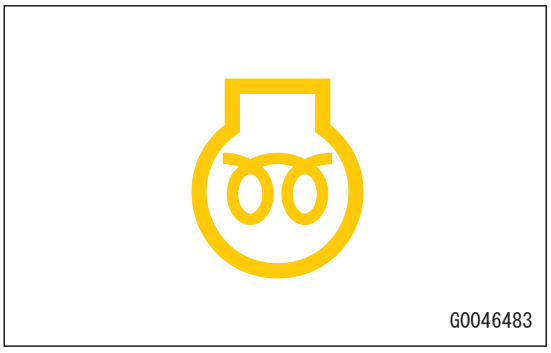
Waiting display (B) for fan switching condition to be satisfied lights up when the fan switching condition is not satisfied.



PREHEATING PILOT LAMP

The preheating pilot lamp is lit when the automatic preheating function of the engine is operated. It goes off when preheating is completed.

This lamp is lit also when the manual preheating is being done. The electrical heater for engine preheating is operated while this lamp is lit.



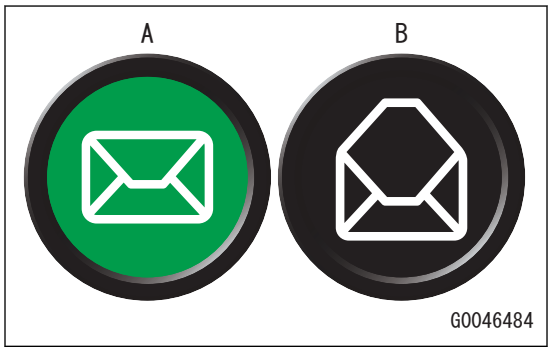
MESSAGE DISPLAY

The message display lights up when there is a message from Komatsu.

(A): There is an unread message.

(B): There is a message which you have read but not yet made reply.

To read the message, see “CHECK MESSAGE (3-107)”.



AFTERTREATMENT DEVICES REGENERATION PILOT LAMP

⚠ CAUTION

- **Exhaust gas temperature may become higher than the previous models during the aftertreatment devices regeneration. Do not go near the exhaust pipe outlet to prevent burn injury. Also, do not bring any combustible material close to the outlet of the exhaust pipe to prevent a fire.**
- **Stop the regeneration when the machine is operated near the combustible materials in order to prevent danger of fire because of highly heated exhaust gas during the aftertreatment devices regeneration.**

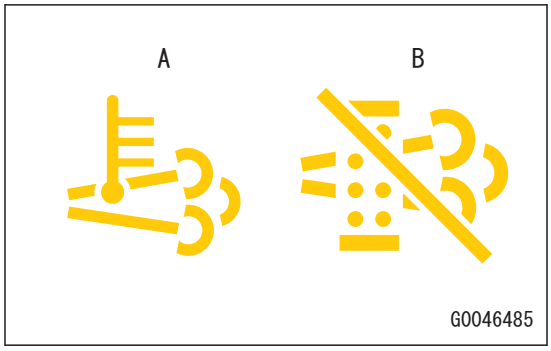
Aftertreatment devices regeneration display shows the regeneration state of the exhaust gas aftertreatment devices.

(A): Lights up during the regeneration of the exhaust gas aftertreatment devices. When the regeneration is completed, the aftertreatment devices regeneration pilot lamp goes off.

(B): Lights up when the regeneration disable is turned on.

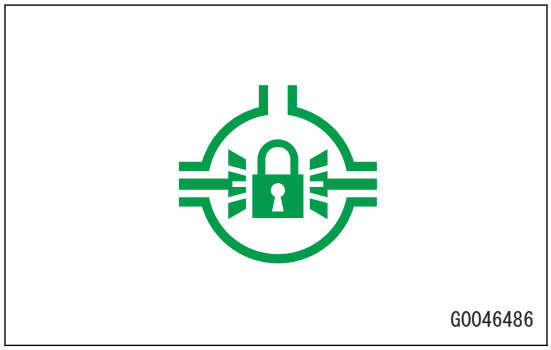
REMARK

- The lighting cycle becomes shorter when the ambient temperature is lower or working load is smaller.
- Even if the aftertreatment devices regeneration is disabled, when the manual stationary regeneration is necessary, the KDPF soot accumulation caution lamp lights up. If the KDPF soot accumulation caution lamp lights up, cancel the regeneration disable setting and do the manual stationary regeneration.



DIFFERENTIAL LOCK PILOT LAMP

Differential lock pilot lamp lights up when the differential lock is in operation.



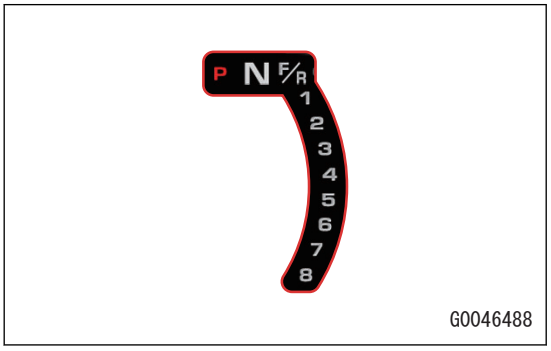
SHIFT INDICATOR

The shift indicator shows the transmission shift range (gear speed).



GEAR SHIFT LEVER POSITION DISPLAY

The gear shift lever position display shows the selected gear shift lever position as an enlarged character for the position.



PARKING BRAKE PILOT LAMP

The parking brake pilot lamp lights up when the parking brake is applied.



STEERING CONTROL LEVER PILOT LAMP

The steering control lever pilot lamp lights up in green when the steering control lever is available.

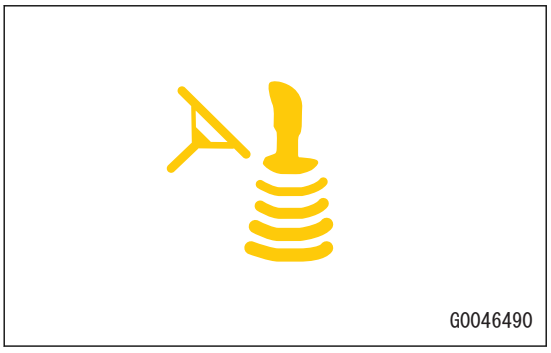
The pop-up display is shown when the steering control lever is available.

When lamp lights up in green

It shows that the steering control lever is available.

When lamp flashes in green

It shows that you must wait until the steering control lever becomes available.



When lamp lights up in yellow

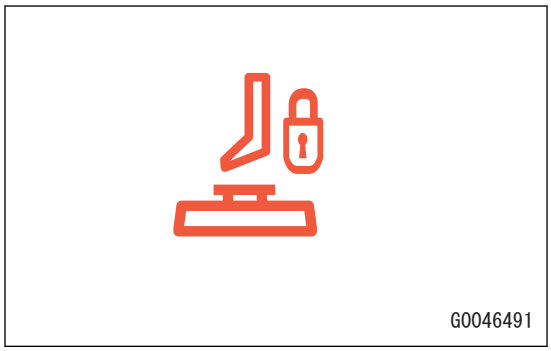
It lights up in yellow if you let the steering lever enable switch be available during the travel. Do not operate the steering lever enable switch during the travel. When the lamp lights up in yellow, the alarm buzzer operates intermittently.

Stop the machine, and disable the steering lever enable switch, then make it effective again.

WORK EQUIPMENT LOCK PILOT LAMP

The work equipment lock pilot lamp lights up when the work equipment is locked.

The work equipment lock pilot lamp pops up on the screen when the work equipment is switched from the unlocked state to the locked state.



ECO GUIDANCE

To support the energy saving operation which reduces the fuel consumption, the ECO guidance is shown when the operation which possibly increases the fuel consumption is done.

The details of the guidance are as follows.

REMARK

Display/non-display of ECO guidance can be changed.

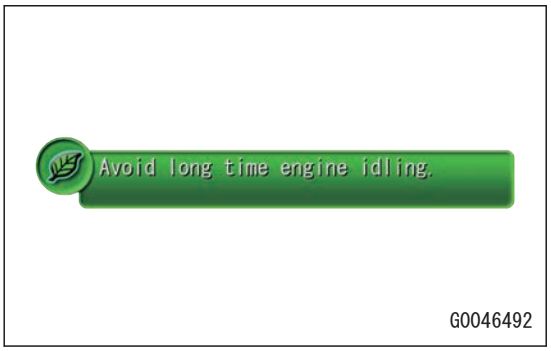
EXCESSIVE IDLING GUIDANCE

If the engine is kept operated at idle for 5 minutes or longer while the directional selector switch is in the NEUTRAL position (N), “Avoid long time engine idling.” is shown on the monitor.

When you wait for the work or stop operation for a short period, stop the engine to decrease fuel consumption.

The excessive idling guidance goes off when you do the operations that follow.

- When you push the accelerator pedal
- When you operate the directional selector switch to other than the NEUTRAL position (N)



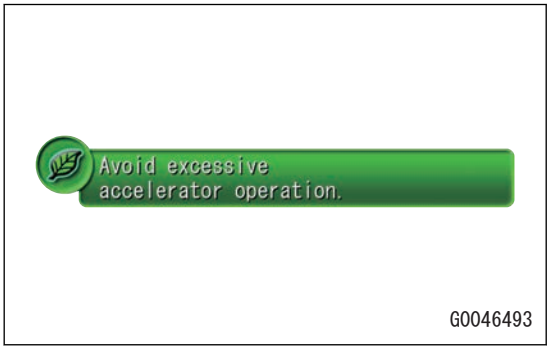
To stop the engine frequently, the setting of the auto idle stop is effective. For the setting of the auto idle stop, see “AUTO IDLE STOP TIMER SETTING (3-81)”.

GUIDANCE OF ACCELERATOR PEDAL DEPRESSING LIMIT IN IDLING

If you push the accelerator pedal too much while the directional selector switch is in the NEUTRAL position (N), “Avoid excessive accelerator operation.” is shown on the monitor.

While you warm up the machine, refrain from unnecessary accelerator operation in order to reduce fuel consumption.

The guidance of accelerator pedal depressing limit goes off automatically after 10 seconds.

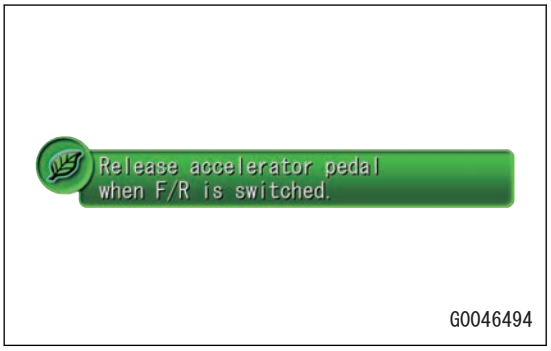


GUIDANCE OF ACCELERATOR PEDAL DEPRESSING LIMIT IN REVERSE

If you push the accelerator pedal too much during directional selection, “Release accelerator pedal when F/R is switched.” is shown on the monitor.

To decrease the fuel consumption during directional selection, do not to operate the accelerator pedal excessively.

The excessive acceleration prevention guidance during the directional selection goes off automatically after 10 seconds.



SHIFT UP RECOMMENDATION GUIDANCE

If the machine continues to travel for 30 seconds or longer, when the selected gear speed is the 1st to 4th, and when the accelerator pedal opening is 80 % or more, and when the travel speed is at more than 3.6 km/h {2.2 MPH} (1st), 5.2 km/h {3.2 MPH} (2nd), 7.4 km/h {4.6 MPH} (3rd), 10.4 km/h {6.5 MPH} (4th), “Fuel consumption improves by releasing accelerator pedal after upshifting.” is shown on the monitor.



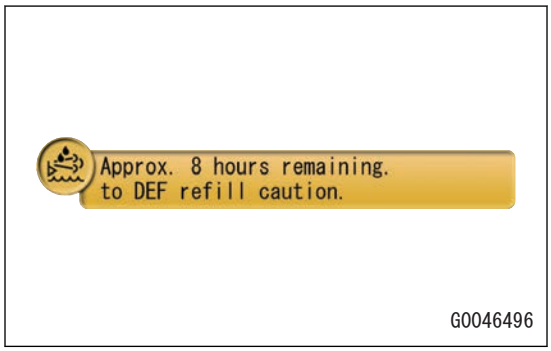
Shift up the gear speed to a correct one to save the fuel consumption.

- The guidance to recommend shifting up goes off automatically after 10 seconds.
- It goes off when the gear speed is shifted up.
- It is not shown in 2 hours from the last display even if the conditions are established.

DEF LOW LEVEL GUIDANCE

If the operable time estimated from the current DEF level and the latest average DEF consumption is shorter than 8 hours, “Approx. 8 hours remaining to DEF refill caution.” is shown.

When the ENTER switch is pushed, or after more than 15 seconds, the low DEF level message goes off.



REMARK

While the monitor shows the DEF level low error or the maintenance warnings, DEF level low guidance will not be shown.

METER DISPLAY

SPEEDOMETER

The speedometer shows the travel speed of the machine.



G0046497

ENGINE TACHOMETER

The engine tachometer shows the engine speed.

If the engine speed exceeds the allowable range during the operation, the engine overrun caution lamp lights up in red. At the same time, the centralized warning lamp lights up and the alarm buzzer operates intermittently.

Operate the machine with moderate engine speed and travel speed.



G0046498

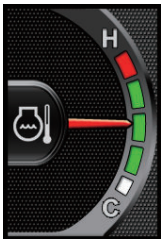
ENGINE COOLANT TEMPERATURE GAUGE

Engine coolant temperature gauge shows the engine coolant temperature.

When the indicator is in the green range during operation, it is normal.

If the indicator is in red range (C), the engine coolant temperature caution lamp lights up in red, and the action level “L02” is shown. At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

The engine output power is then limited automatically.



G0046499

Stop the machine in a safe place, set the directional selector switch to NEUTRAL position (N), and run the engine at a medium speed with no load until the caution lamp goes off.

TORQUE CONVERTER OIL TEMPERATURE GAUGE

The torque converter oil temperature gauge shows the torque converter oil temperature.

When the indicator is in the green range during operation, it is normal.

If the indicator is in the red range, the torque converter oil temperature caution lamp lights up in red, and the action level “L02” is shown. At the same time, the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Park the machine in a safe place, set the directional selector switch to the NEUTRAL position (N), and run the engine at a



G0046500

medium speed with no load until the torque converter oil temperature caution lamp goes off.

HYDRAULIC OIL TEMPERATURE GAUGE

Hydraulic oil temperature gauge shows the hydraulic oil temperature.

When the indicator is in green range during operation, it is normal.

If the indicator is in red range, the hydraulic oil temperature caution lamp lights up in red, and action level “L02” is shown.

Stop the machine in a safe area, set the directional selector switch to the NEUTRAL position (N), and run the engine at a medium speed with no load until the hydraulic oil temperature caution lamp goes off.



G0046501

FUEL GAUGE

Fuel gauge shows the amount of fuel in the fuel tank.

If the indicator is in the red range, the fuel level caution lamp lights up in red. The fuel level is lower than 100 L. Check the fuel level, and add fuel.



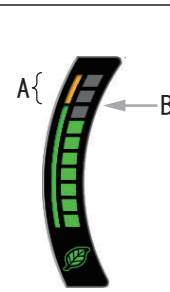
G0046502

ECO GAUGE

ECO gauge indicates the instantaneous fuel consumption (fuel consumption rate at the moment).

The instantaneous fuel consumption varies with how the machine is operated (accelerator operation, travel speed, gear speed, etc.) and the load during travel (load weight, slope, ground condition, etc.).

Higher the value of the gauge is, it indicates higher the fuel consumption is. If the gauge is kept low to the extent that it does not interfere with the work, energy saving operation which suppresses the fuel consumption can be done.



G0046503

REMARK

Even if the gauge is in orange range (A), it is not a machine trouble.
You can change the target fuel consumption (B) shown by ECO gauge as necessary.

L.H. AND R.H. METER DISPLAY

You can select one of the items that follow to be shown on the L.H. meter.

- Service meter
- Odometer (travel distance integrating meter)
- Clock

You can select one of the items that follow to be shown on the R.H. meter.

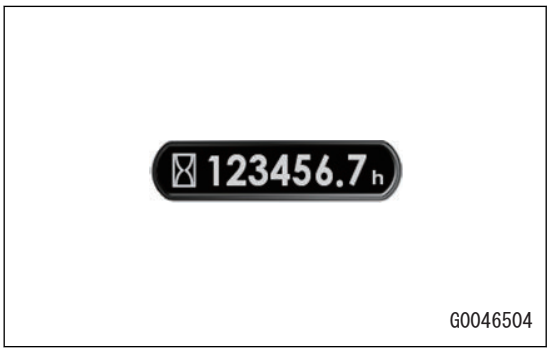
- Fuel consumption gauge
- Service meter
- Odometer (travel distance integrating meter)
- Clock
- Engine tachometer (maintenance time caution lamp/during the warning display operation)

Service meter display

Indicates the integrated operating hours of the machine.

While the engine is running, the service meter advances even if the machine is not being operated.

The service meter advances by 0.1 for 6 engine running minutes and by 1 for 1 engine running hour, regardless of the engine speed.



Odometer (travel distance integrating meter) display

Indicates the total distance that machine has traveled in kilometers.



Clock display

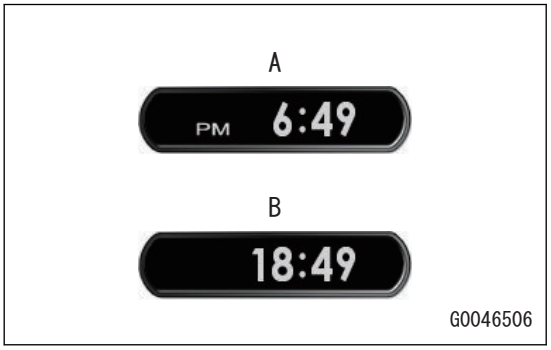
Indicates the current time.

(A): 12-hour display

(B): 24-hour display

REMARK

If the battery is disconnected for a long period for storage etc., the time information will be lost in some cases.



Fuel gauge display

Indicates the average fuel consumption of the machine.

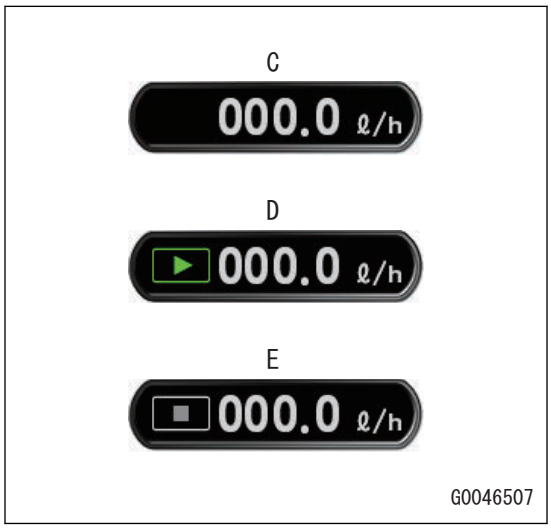
(C): The average fuel consumption of 1 day

(D): Split fuel consumption (when measuring is being done)

(E): Split fuel consumption (when measuring is stopped)

REMARK

You can switch the display on the fuel consumption gauge between the average fuel consumption per day (from 0:00 a.m. of the day to 0:00 a.m. of the next day) and the average fuel consumption during a selected period (split fuel consumption).



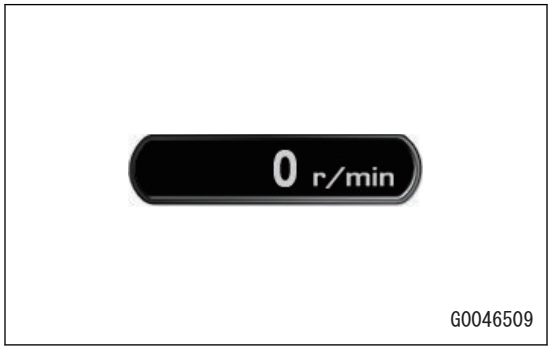
Engine speed display

Indicates the engine speed.

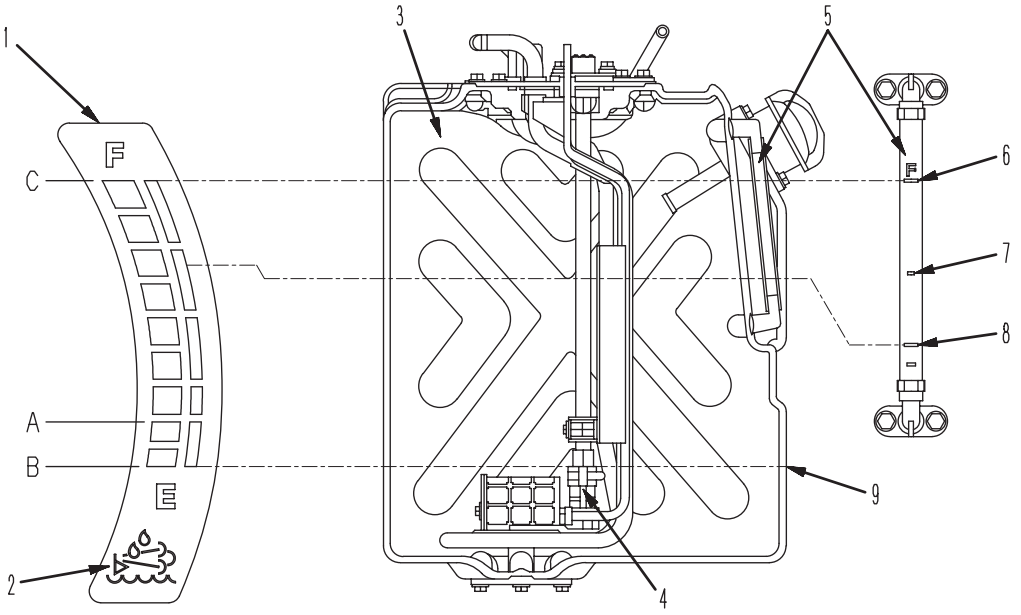
REMARK

The engine speed is shown regardless of the setting but only when the Maintenance time caution lamp and warning display are operated.





DEF LEVEL GAUGE



(1) DEF level gauge

(2) DEF level caution lamp

(3) DEF tank

(4) DEF level sensor

(5) DEF tank sight gauge

(6) DEF level is at the Full position (33 ℓ {8.72 USgal})

(7) DEF level is at the position of 5 ℓ {1.32 USgal} (28 ℓ {7.4 USgal}) below the Full position

(8) DEF level is at the Full position of cold season (23 ℓ {6.08 USgal})

(8) DEF level is at the position of 10 ℓ {2.64 USgal} (23 ℓ {6.08 USgal}) below the Full position

(9) DEF level is at the Empty position (10 ℓ {2.64 USgal})

DEF level gauge shows the remaining level of DEF.

During operations, it is correct if the indicator is in the green range.

During operations, if the indicator is near the red range (A), check and add DEF.

(A) to (B): Shows the red range.

(A) to (C): Shows the green range.

If the indicator is in the red range (A) to (B), the DEF level caution lamp (2) lights up in red.

If the level is lowered further after the lamp is lit in red, the engine output or the engine speed is restricted.

If the remaining DEF level cannot be sensed, the DEF level caution lamp (1) lights up in white.

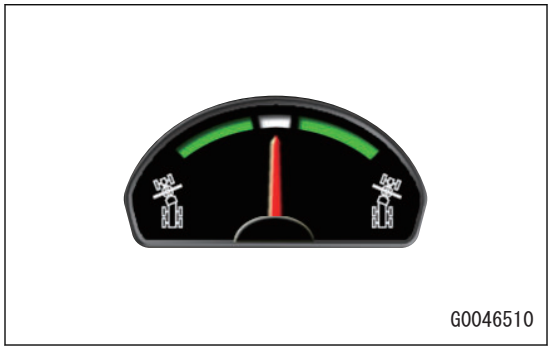
REMARK

- The DEF level caution lamp (2) will light up in white just after you turn the starting switch to the ON position, or during the engine startup operation, this is not a problem.
- In a cold weather, the DEF level caution lamp (2) will light up in white for approximately 1 hour, because the DEF level cannot be sensed, but it is not a problem.
- Even if the DEF level caution lamp (2) does not light up in white, it possibly takes a long time for the DEF level gauge (1) to show the correct level.
  If the states that follow are found, it is not a problem.
  - When you add the DEF while the starting switch is kept in the ON position
  - When you turn the starting switch to the ON position just after you add the DEF (in approximately 30 seconds)

  Add the DEF after you turn the starting switch to the OFF position. Wait for a while, then turn the starting switch to the ON position.

ARTICULATION INDICATOR

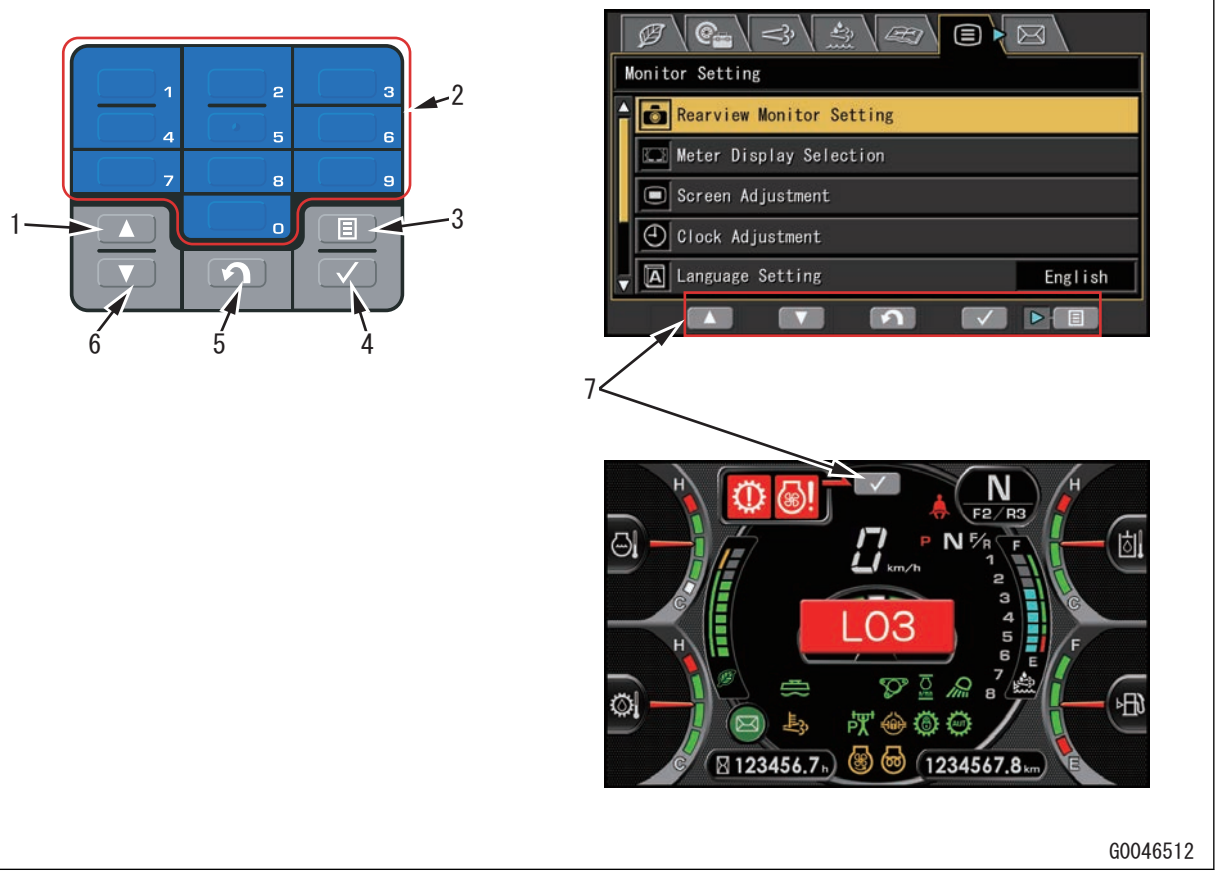
Articulation indicator shows the articulate state of the machine. When the pointer shows the center of the white range, the machine is not articulated (neutral).



SWITCH PANEL

This is used for the operation of the machine monitor or air conditioner.

The function of each switch varies with the screen of the machine monitor.



(1) UP switch
(2) Numeral keypad
(3) Menu switch
(4) ENTER switch
(5) RETURN switch
(6) DOWN switch
(7) Guidance icon

MENU SWITCH

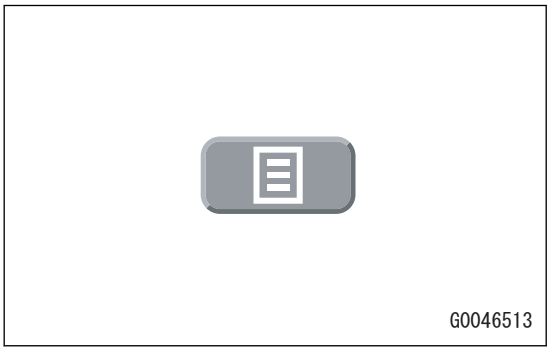
When you push the menu switch on the standard screen, the user menu screen is shown as follows. However, the user menu screen is not shown during traveling.

When normal: Shows the Energy Saving Guidance menu screen.

When the KDPF soot accumulation caution lamp is lit: “After-treatment Devices Regeneration” menu screen is shown.

When the maintenance caution lamp is lit: “Maintenance” menu screen is shown.

When the fan reverse rotation pilot lamp is lit: “Machine Setting and Information” menu screen is shown.



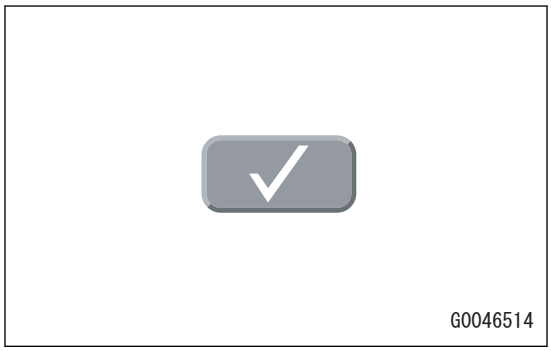
When the message display is lit: User Message menu screen is shown.

When you push the menu switch on the user menu screen, the menu screen changes.

ENTER SWITCH

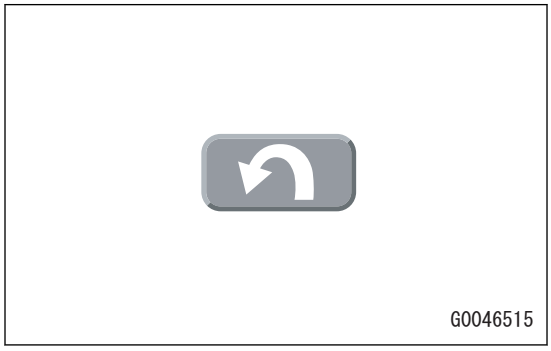
Push the ENTER switch to select or change the menu item on the user menu screen, and go to the next screen.

When the ENTER switch is pushed while a warning is shown in the standard screen, the Current Abnormality screen is shown.



RETURN SWITCH

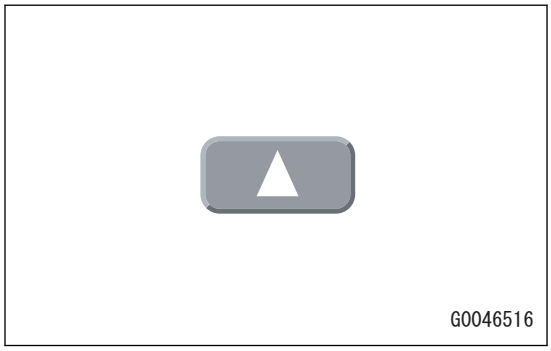
When you push the RETURN switch, it cancels a selection or changes, and the screen goes back to the previous screen or the standard screen.



UP SWITCH

Push the UP switch to move the selection up by one item. When on the first line it moves to the last line.

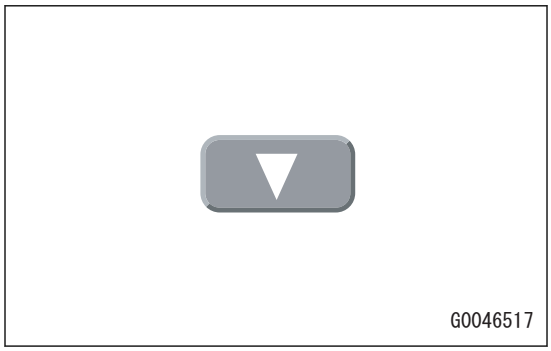
On the value input screen, the value is increased by one.



DOWN SWITCH

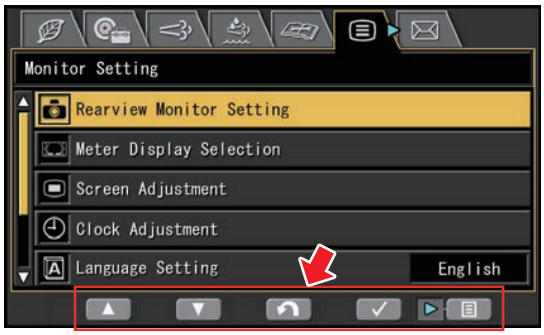
When you push the DOWN switch, it moves the cursor down by one. When the cursor is on the last line, it moves to the first line.

When you input the numeric value, the value is decreased by one.



REMARK

You can check with the guidance icon what switches are available on each screen.
The function of the switch whose mark is not shown with the guidance icon is not available. You cannot push the guidance icons.





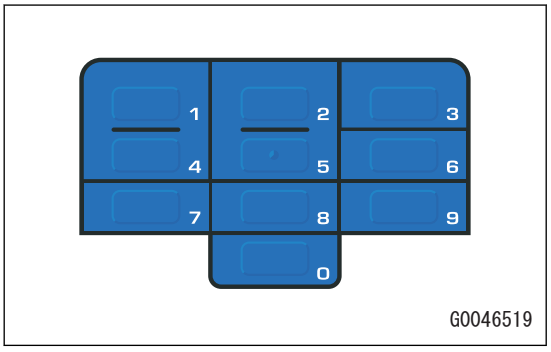
G0046518

NUMERIC KEYPAD

Use the numeric keypad when you input the numeric value such as a password.

Push the key on the switch to enter the numerals 0 to 9 which are shown at the lower right of each switch.

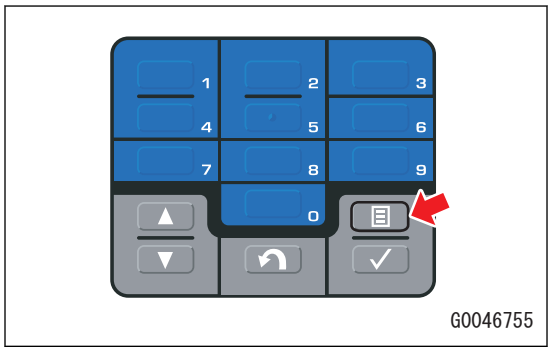
When you push the switch, a sound is heard, and when you release it , the function works.



G0046519

USER MENU

When the menu switch is pushed while the machine is stopped and the standard screen is shown, the user menu is shown and you can use it to set or check the machine settings.



G0046755

The user menu consists of the items that follow. Push the menu switch to change the menu screen.

(A) “Energy Saving Guidance”

(B) “Machine Setting and Information”

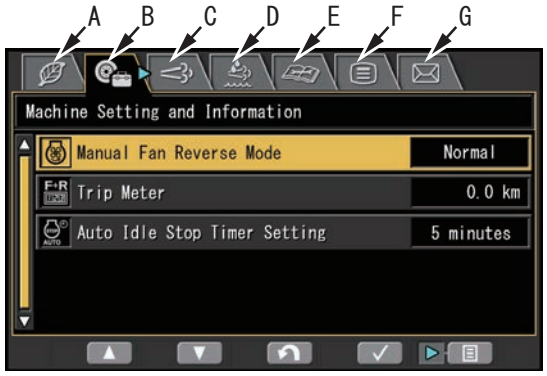
(C) “Aftertreatment Devices Regeneration”

(D) “SCR Information”

(E) “Maintenance”

(F) “Monitor Setting”

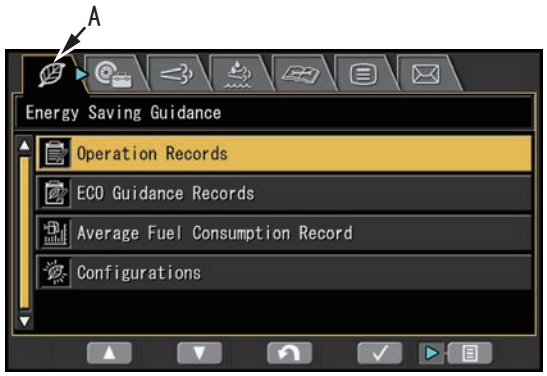
(G) Message Display



G0046521

(A) “Energy Saving Guidance”

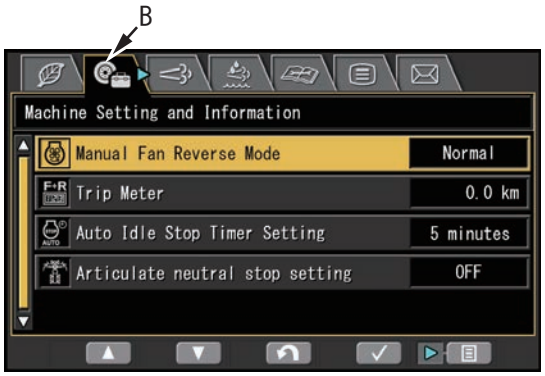
- Check of “Operation Records”
- Check of “ECO Guidance Records”
- Check and reset of “Average Fuel Consumption Record”
- “Configurations”



G0046522

(B) “Machine Setting and Information”

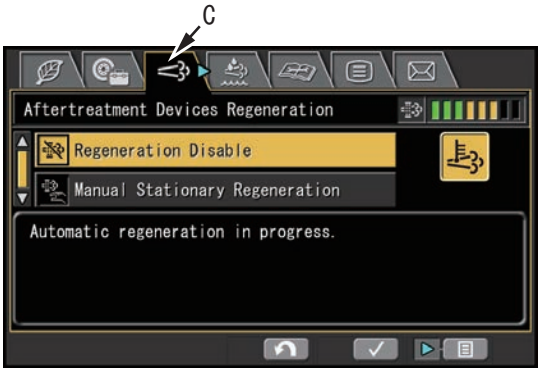
- Setting of “Fan Reverse Mode”
- Display and reset of “Trip Meter”
- “Auto Idle Stop Timer Setting”
- “Articulate neutral stop setting”



G0046523

(C) “Aftertreatment Devices Regeneration”

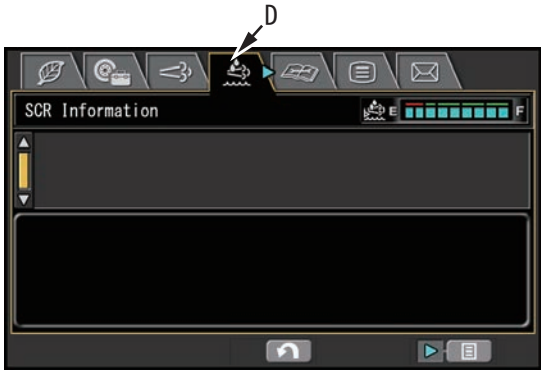
- Setting of “Regeneration Disable”
- Operation of “Manual Stationary Regeneration”



G0088114

(D) “SCR Information”

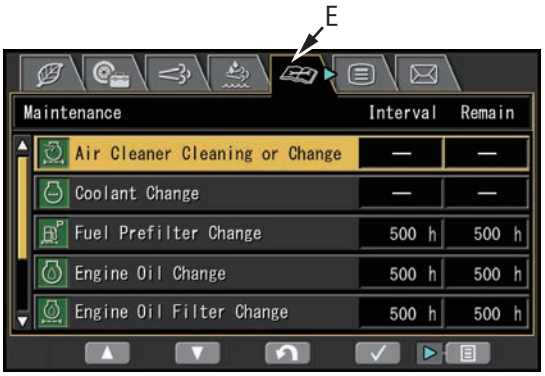
- Check of DEF level
- Information of DEF system



G0046525

(E) “Maintenance”

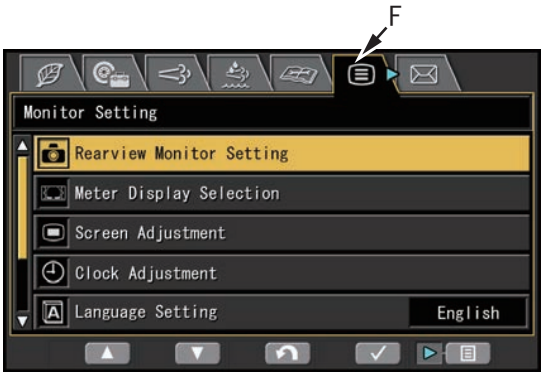
Check and reset of maintenance remaining times



G0046526

(F) “Monitor Setting”

- “Rearview Monitor Setting”
- “Meter Display Selection”
- “Screen Adjustment”
- “Clock Adjustment”
- “Language Setting”



G0046527

(G) Message Display

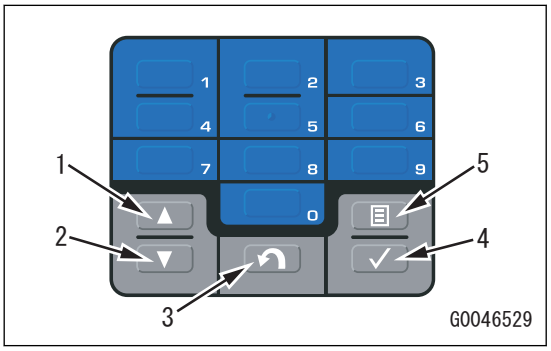
Check of message contents and reply to message



G0046528

Operation on user menu screen

On the user menu screen, you can do the operations with the switches as follows.



(1) UP switch

Moves to the item above.

When on the first item, it moves to the last item.

(2) DOWN switch

Moves to the item below.

When on the last item, moves to the first item.

(3) RETURN switch

Cancels a selection or changes, and goes back to the previous screen or the standard screen.

(4) ENTER switch

Applies your selections or changed contents and goes to the next screen.

(5) Menu switch

Moves to the right menu screen.

When on the right end menu screen, it moves to the left end menu screen.

- If no switch is operated for 30 seconds when the user menu screen is shown, the screen automatically goes back to the previous screen or the standard screen.
- The user menu screen is shown only while the machine stops fully.
- If the machine travels while the user menu screen is shown, the screen automatically goes back to the standard screen.

REMARK

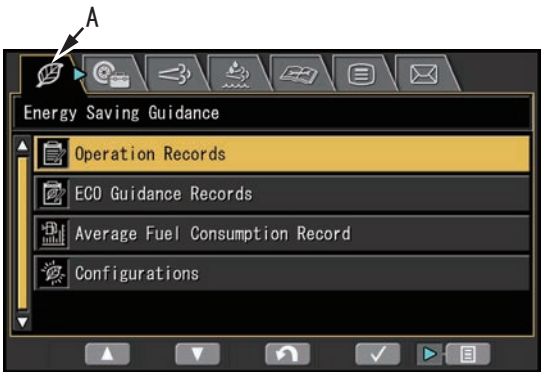
The user menu changed from the standard screen is different by the machine states.
If multiple conditions are occurred at the same time, the priority is given as follows.

1. When the KDPF event occurs, the screen changes to “Aftertreatment Devices Regeneration” menu screen.
2. When the hydraulic drive fan rotates in reverse, the screen changes to “Machine Setting and Information” menu screen.
3. When the maintenance caution occurs, the screen changes to “Maintenance” menu screen.
4. When there is an unread message, the screen changes to the message display screen.
5. In the cases other than 1 to 4, the screen changes to “Energy Saving Guidance” screen.

ECO GUIDANCE

You can use items of the “Energy Saving Guidance” menu (A) to show and set the notification relevant to energy saving.

- “Operation Records”
- “ECO Guidance Records”
- “Average Fuel Consumption Record”
- “Configurations”



G0046522

CHECK OPERATING RECORD

Select “Operation Records” from “Energy Saving Guidance” menu screen, then push the ENTER switch (4).
“Operation Records” screen shows information that follow a daily basis or during the split measurement period.

“Working Hours (Engine On)”

The time during which the engine is in operation

“Average Fuel Consumption”

Average of the fuel consumed while the engine is in operation

“Actual Working Hours”

The time during travel, operation of work equipment, and operation of accelerator pedal

“Ave Fuel Consumption (Actual Working)”

Average of the fuel consumed during actual working hours

“Fuel Consumption”

The quantity of fuel consumed

“Idling Hours”

The time during which the machine stops, and the work equipment and accelerator pedal are not operated

“Economy Mode Ratio”

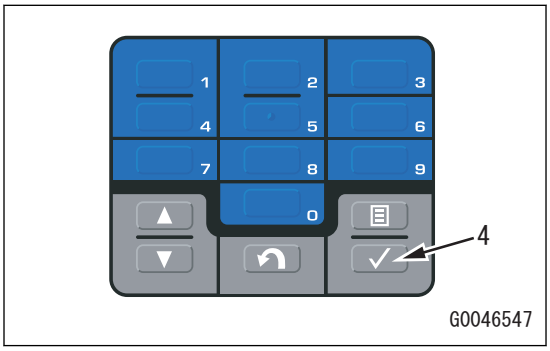
Percentage of E mode operation in the engine operation hours

REMARK

The shown values of Fuel Consumption and Average Fuel Consumption can be different from the actual values by the machine work conditions (fuel, weather, or work contents, or such).



G0046530



G0046547

OPERATING RECORD SCREEN

When “Average Fuel Consumption Display” is set to “1 Day”

“1 Day” is shown on “Operation Records” screen.

On “Operation Records” screen, you can do the operations with the switches as follows.



G0046532

(1) UP switch

Moves to the item above.

When it is on the first line, it moves to the last line.

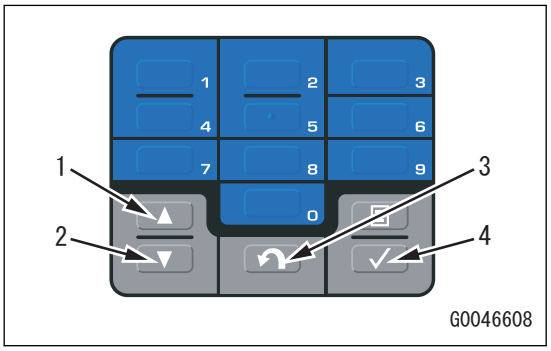
(2) DOWN switch

Moves to the item below.

When it is on the last line, it moves to the first line.

(3) RETURN switch

Goes back to “Energy Saving Guidance” menu screen.



G0046608

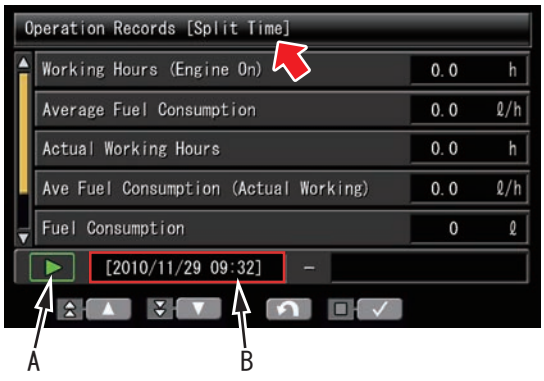
When the split time is measured with the display of “Average Fuel Consumption Display” is set to “Split Time”

“Split Time” is shown on “Operation Records” screen.

(A) Display during measurement

(B) Date and time when measurement is started

On “Operation Records” screen, you can do the operations with the switches as follows.



G0046533

(1) UP switch

Moves to the item above.

When it is on the first line, it moves to the last line.

(2) DOWN switch

Moves to the item below.

When it is on the last line, it moves to the first line.

(3) RETURN switch

Goes back to “Energy Saving Guidance” menu screen.

(4) ENTER switch

The split measurement stops.

When the split time measurement is stopped with the display of “Average Fuel Consumption Display” is set to “Split Time”

NOTICE

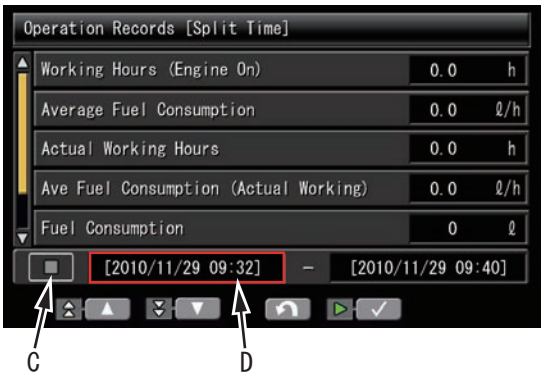
When the measurement is started, the previous split time measurement results (“Average Fuel Consumption Display”, “Operation Records”, and “ECO Guidance Records”) are reset.

“Split Time” is shown on “Operation Records” screen.

(C) Display while measurement is stopped

(D) Date and time when the measurement is started and stopped

On “Operation Records” screen, you can do the operations with the switches as follows.



G0046534

(1) UP switch

Moves to the item above.

When it is on the first line, it moves to the last line.

(2) DOWN switch

Moves to the item below.

When it is on the last line, it moves to the first line.

(3) RETURN switch

Goes back to “Energy Saving Guidance” menu screen.

(4) ENTER switch

The confirmation screen to start the split measurement is shown.

Push the ENTER switch (4) again to start the measurement, or push the RETURN switch (3) to cancel the measurement.



G0046535

CHECK ECO GUIDANCE RECORD

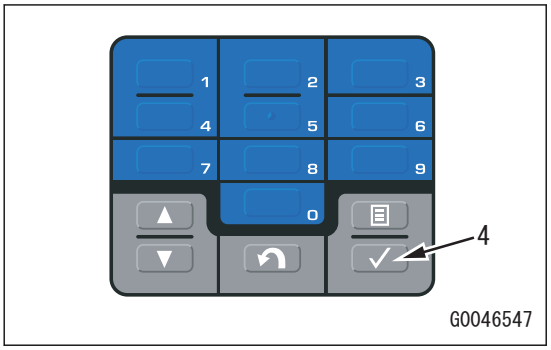
Select the “ECO Guidance Records” on the “Energy Saving Guidance” menu screen, then push the ENTER switch (4).
On the “ECO Guidance Records” screen, the frequency of display of the ECO guidance on a daily basis or during the split measurement period and “Operational Advice” are shown.

REMARK

- In “Operational Advice” section, the advice to the ECO guidance that appeared most frequently is shown.
- The ECO guidance count increases when display conditions are satisfied even if the ECO guidance is not shown.



G0046536



G0046547

ECO GUIDANCE RECORD SCREEN

When “Average Fuel Consumption Display” is set to “1 Day”

“1 Day” is shown on “ECO Guidance Records” screen.

On “ECO Guidance Records” screen, you can do the operations with the switches as follows.

(1) UP switch

Moves to the item above.

When it is on the first line, it moves to the last line.

(2) DOWN switch

Moves to the item below.

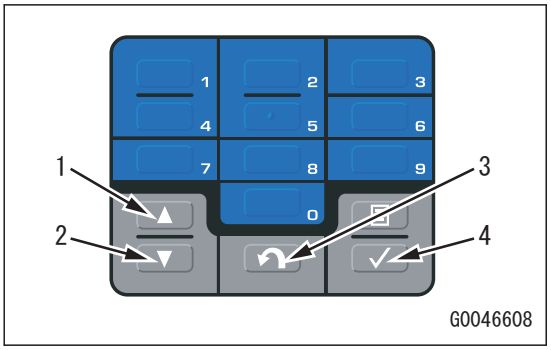
When it is on the last line, it moves to the first line.

(3) RETURN switch

Goes back to “Energy Saving Guidance” menu screen.



G0046537



G0046608

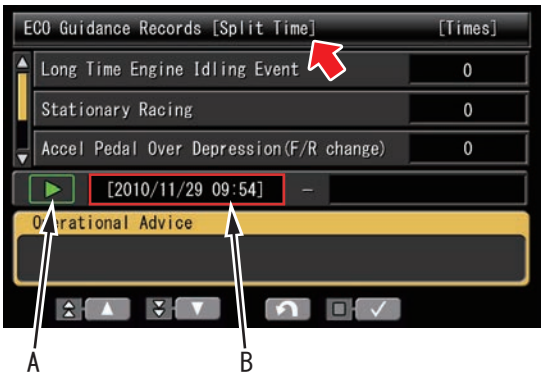
When the split time is measured with the display of “Average Fuel Consumption Display” is set to “Split Time”

“Split Time” is shown on “ECO Guidance Records” screen.

(A) Display during measurement

(B) Date and time when measurement is started

On “ECO Guidance Records” screen, you can do the operations with the switches as follows.



G0046538

(1) UP switch

Moves to the item above.

When it is on the first line, it moves to the last line.

(2) DOWN switch

Moves to the item below.

When it is on the last line, it moves to the first line.

(3) RETURN switch

Goes back to “Energy Saving Guidance” menu screen.

(4) ENTER switch

The split measurement stops.

When the split time measurement is stopped with the display of “Average Fuel Consumption Display” is set to “Split Time”

NOTICE

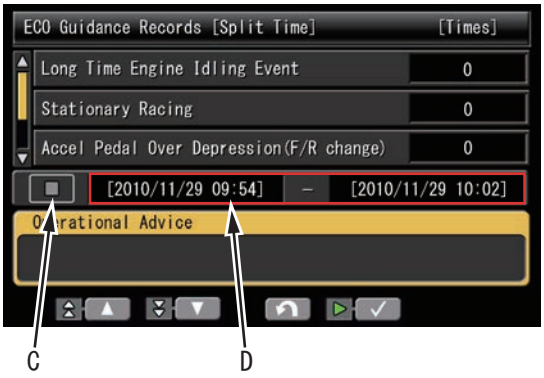
When the measurement is started, the previous split time measurement results (“Average Fuel Consumption Display”, “Operation Records”, and “ECO Guidance Records”) are reset.

“Split Time” is shown on “ECO Guidance Records” screen.

(C) Display while measurement is stopped

(D) Date and time when the measurement is started and stopped

On “ECO Guidance Records” screen, you can do the operations with the switches as follows.



G0046539

(1) UP switch

Moves to the item above.

When it is on the first line, it moves to the last line.

(2) DOWN switch

Moves to the item below.

When it is on the last line, it moves to the first line.

(3) RETURN switch

Goes back to “Energy Saving Guidance” menu screen.

(4) ENTER switch

The confirmation screen to start the split measurement is shown.

Push the ENTER switch (4) again to start the measurement, or push the RETURN switch (3) to cancel the measurement.



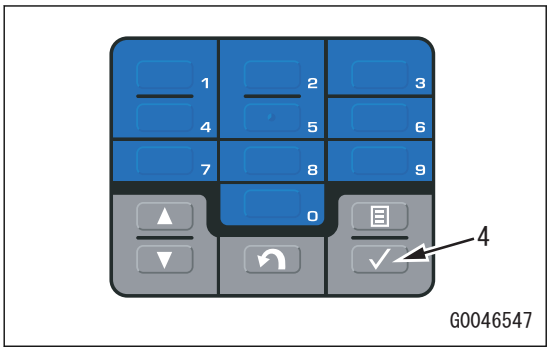
G0046540

CHECK FUEL CONSUMPTION RECORD

Select “Average Fuel Consumption Record” from “Energy Saving Guidance” menu screen, then push the ENTER switch (4). On “Average Fuel Consumption Record” screen, the average fuel consumption is shown in graph display in hourly average on “Last 12 hours” or in daily average on “Last 7 days”.



G0046541



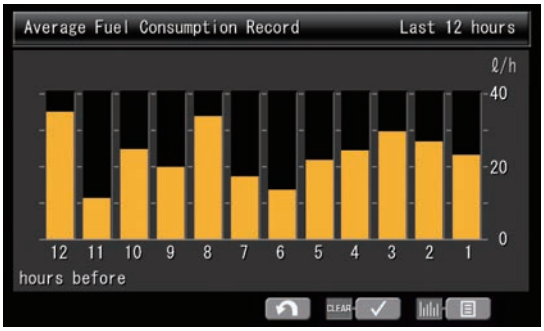
G0046547

REMARK

The shown values of Fuel Consumption and Average Fuel Consumption can be different from the actual values by the machine work conditions (fuel, weather, or work contents, or such).

FUEL CONSUMPTION RECORD SCREEN

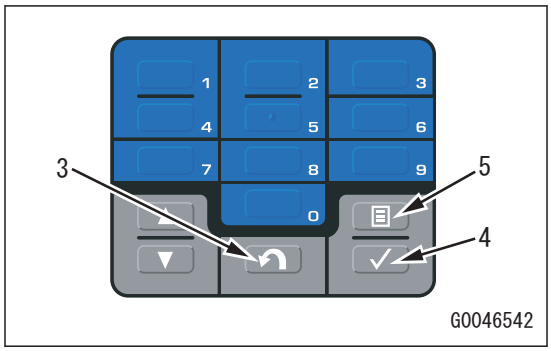
On “Average Fuel Consumption Record” screen, you can do the operations with the switches as follows.



G0046543

(3) RETURN switch

Goes back to “Energy Saving Guidance” menu screen.



G0046542

(4) ENTER switch

The confirmation screen to clear the graph data is shown.

Push the ENTER switch (4) again to delete the graph data, or push the RETURN switch (3) to cancel the operation.

If the ENTER switch (4) is pushed while the graph of “Last 12 hours” is shown, only the data of “Last 12 hours” graph is deleted, and the screen goes back to “Average Fuel Consumption Record” screen.

If the ENTER switch (4) is pushed while the graph of “Last 7 days” is shown, the data of “Last 12 hours” graph and “Last 7 days” graph are deleted, and the screen goes back to “Average Fuel Consumption Record” screen.



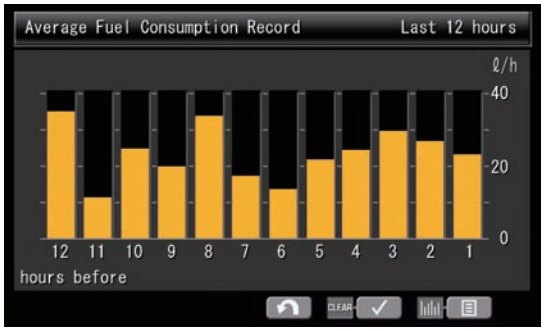
G0046545

(5) Menu switch

It changes the graphical displays of the average fuel consumption.

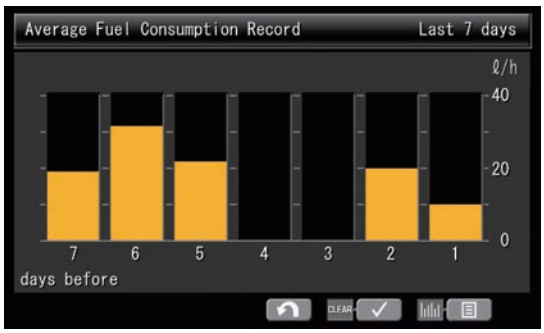
Push the menu switch (5) to change the graph display between hourly average on “Last 12 hours” or daily average on “Last 7 days”.

Display of “Last 12 hours”



G0046543

Display of “Last 7 days”



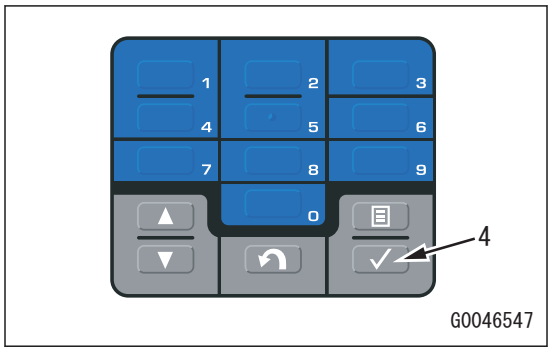
G0046544

DISPLAY SETTING SCREEN

Select the “Configurations” on the Energy Saving Guidance menu screen, then push the ENTER switch (4).

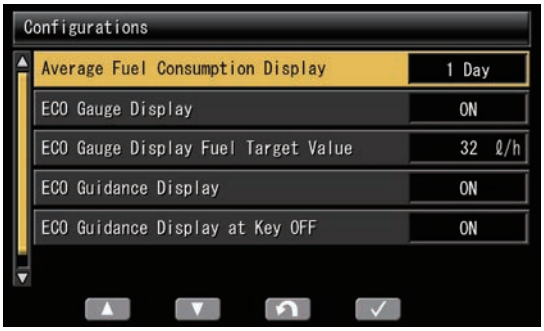


G0046546



G0046547

“Configurations” menu screen is shown.



G0047816

You can set and change the items related to the machine monitor display on the “Configurations” menu screen.

- Setting of the “Average Fuel Consumption Display”
- Switching of the Display/Non-display of “ECO Gauge Display”
- Setting of the “ECO Gauge Display Fuel Target Value”
- Switching the display/non-display of ECO Guidance
- Switching the display/non-display of “ECO Guidance Display at Key OFF”

SET DISPLAY OF FUEL CONSUMPTION GAUGE

You can shift the fuel consumption gauge between 1 day and split time.

The default is “1 Day”.

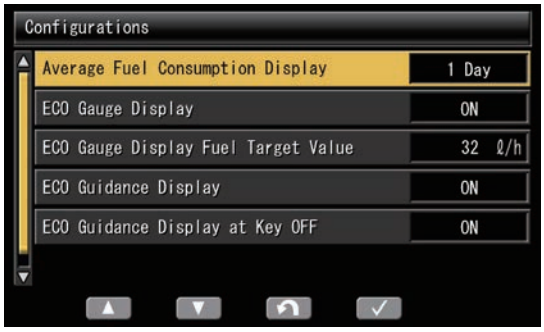
REMARK

Setting of the “1 Day” or the “Split Time” is also applied to the display of the “Operation Records” and the “ECO Guidance Records”.

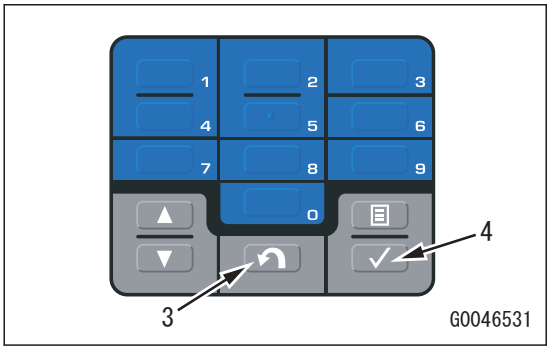


G0046548

1. Select the “Average Fuel Consumption Display” on the “Configurations” menu screen, then push the ENTER switch (4).



G0047816



G0046531

“Average Fuel Consumption Display” screen is shown.

2. Select the “1 Day” or the “Split Time”, then push the ENTER switch (4).

   To cancel it, push the RETURN switch (3).

   - When the “1 Day” is selected, the average fuel consumption in 1 day from 0:00 a.m. of the day to 0:00 a.m. of the next day is shown.
     It will be reset at 0.00 a.m. of the next day.
   - When the “Split Time” is selected, the average fuel consumption during the split measurement period (after the measurement is started until it is finished) is shown.
     When the “Split Time” is selected, split measurement starts automatically.



G0046550

ECO GAUGE SETTING

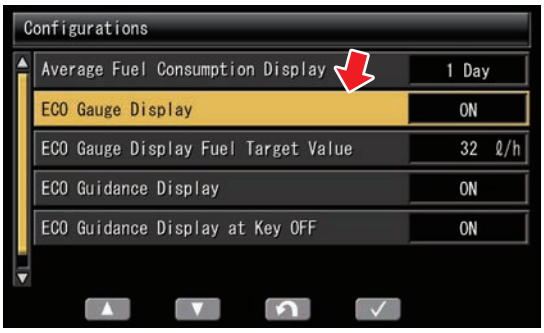
You can shift the ECO gauge to be Display/non-display.

The default is “ON”.

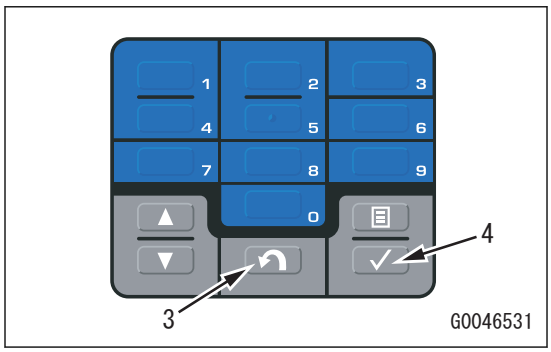


G0046551

1. Select the “ECO Gauge Display” on the “Configurations” menu screen, then push the ENTER switch (4).



G0046552

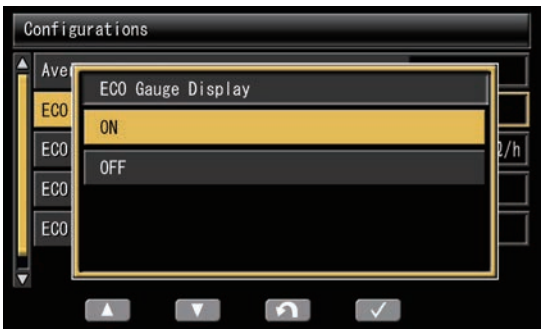


G0046531

“ECO Gauge Display” screen is shown.

2. Select the “ON” or the “OFF”, then push the ENTER switch (4).

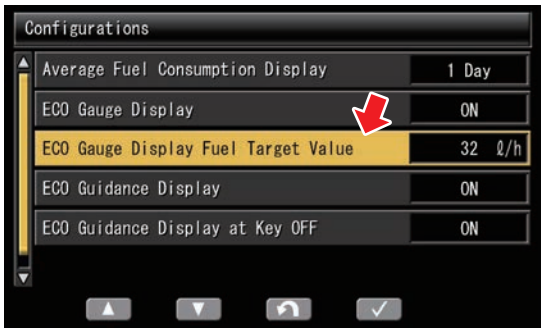
   To cancel it, push the RETURN switch (3).



G0046553

- When the “ON” is selected, ECO gauge is shown.

- When the “OFF” is selected, ECO gauge is not shown. At the same time, the “ECO Gauge Display Fuel Target Value” screen disappears.

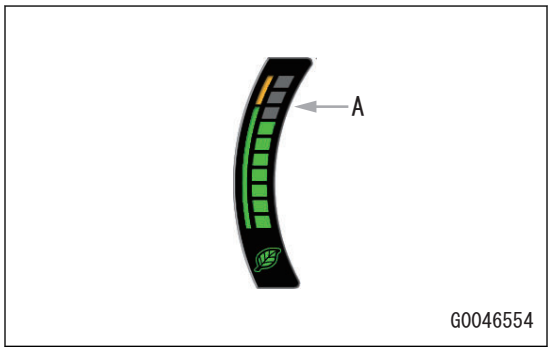


G0046555

SET TARGET FUEL CONSUMPTION VALUE DISPLAYED IN ECO GAUGE

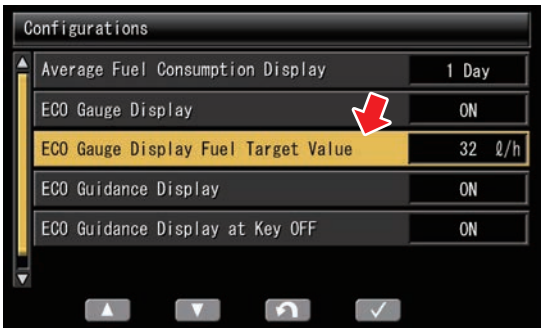
You can change the target fuel consumption value (A) (the upper limit value of the green range).

The default is 32 L/h.

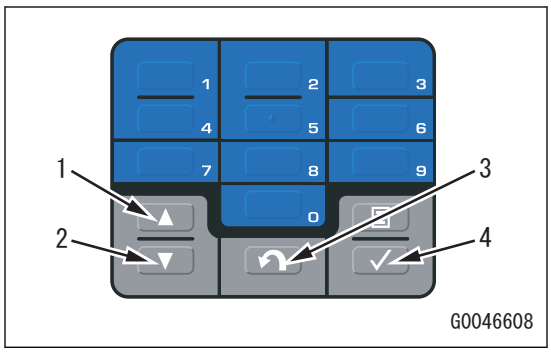


G0046554

1. Select the “ECO Gauge Display Fuel Target Value” on the “Configurations” menu, then push the ENTER switch (4).



G0046555



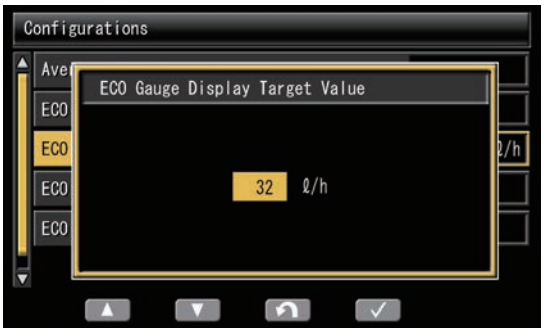
G0046608

“ECO Gauge Display Fuel Target Value” screen is shown.

2. Use the UP switch (1) or DOWN switch (2) to change the value, then push the ENTER switch (4).

   To cancel it, push the RETURN switch (3).

   - If the target fuel value is increased, the fuel consumption value which is shown when the ECO gauge is at the maximum is also increased commensurately.
   - If the target fuel value is decreased, the fuel consumption value which s shown when the ECO gauge is at the maximum is also decreased commensurately.

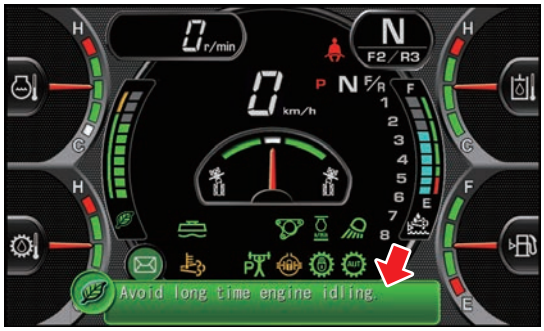


G0046557

ECO GUIDANCE SETTING

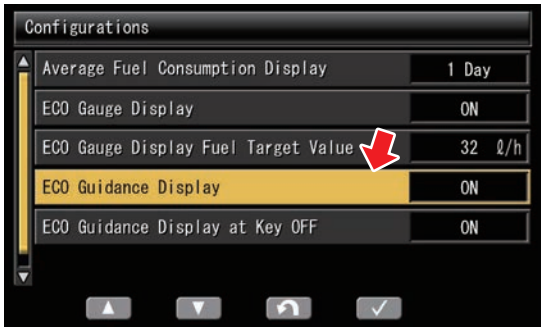
You can shift the ECO guidance to be Display/non-display.

The default is “ON”.

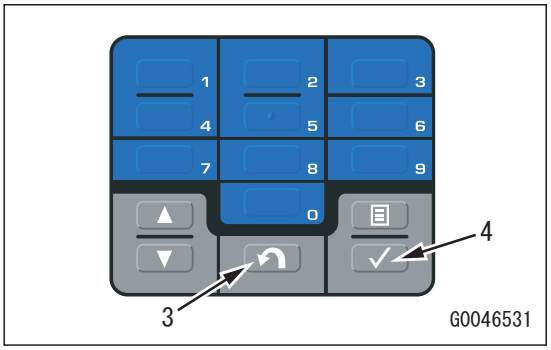


G0046558

1. Select the “ECO Guidance Display” on the “Configurations” menu, then push the ENTER switch (4).



G0046559



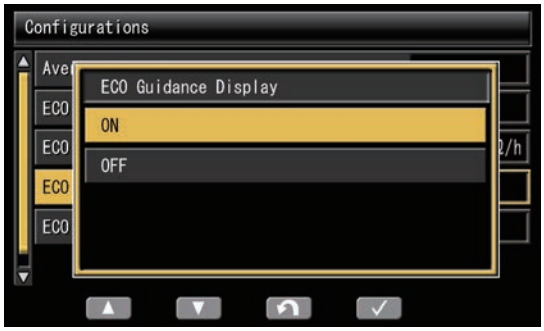
G0046531

“ECO Guidance Display” screen is shown.

2. Select the “ON” or the “OFF”, then push the ENTER switch (4).

   To cancel it, push the RETURN switch (3).

   - When the “ON” is selected, ECO guidance is shown.
   - When the “OFF” is selected, ECO guidance is not shown.
     Items of the “ECO Guidance Display at Key OFF” and the “ECO Guidance Records” are not shown at the same time. “ECO Guidance Records” is not reset.



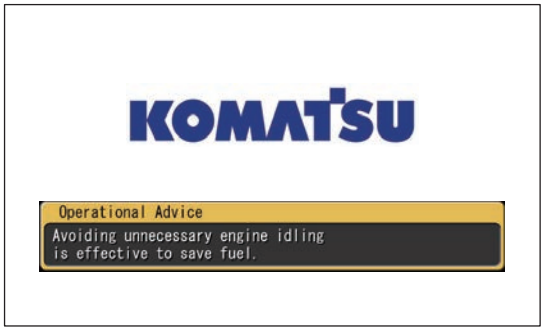
G0046560

GUIDANCE WHEN KEY IS OFF

You can change display/non-display of “Operational Advice” on the end screen.

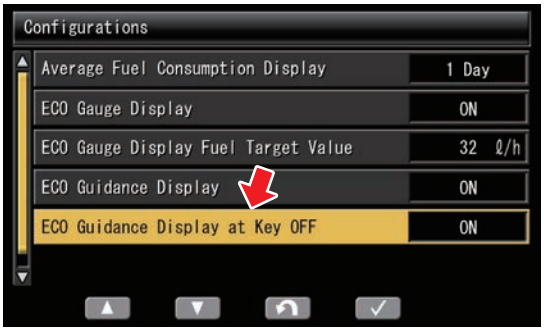
The default is “ON”.

In “Operational Advice” section, the advice to the ECO guidance that was shown most frequently after the starting switch is turned to the ON position is shown.

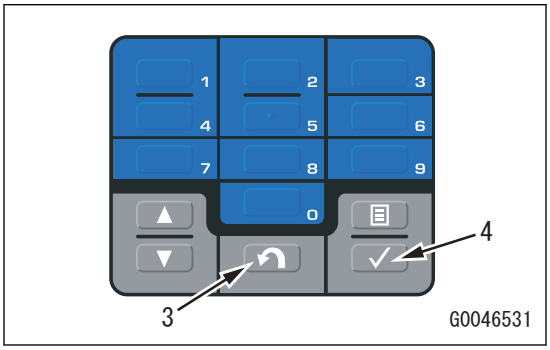


G0046561

1. Select “ECO Guidance Display at Key OFF” from “Configurations” menu screen, then push the ENTER switch (4).



G0046562



G0046531

“ECO Guidance Display at Key OFF” screen is shown.

2. Select “ON” or “OFF”, then push the ENTER switch (4).

   Push the RETURN switch (3) to cancel the operation.

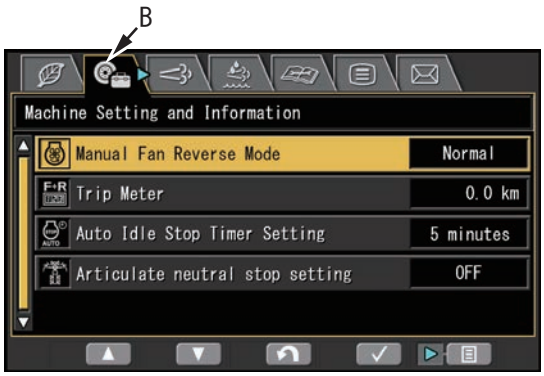
   - When “ON” is selected, the operational advice is shown on the end screen.
   - When “OFF” is selected, the operational advice is not shown on the end screen.



G0046563

MACHINE SETTING AND INFORMATION

You can check or change the settings of machine or information on each item of “Machine Setting and Information” menu (B).



G0046564

REVERSE HYDRAULIC FAN

⚠ CAUTION

When the fan is rotated in reverse direction, be careful not to let dirt fly out and cloth, etc. be caught in the fan.
Dirt could be blown up. Make sure that there is no person around the machine during the fan reverse rotation.
Do not do the fan reverse rotation outdoors if it rains.

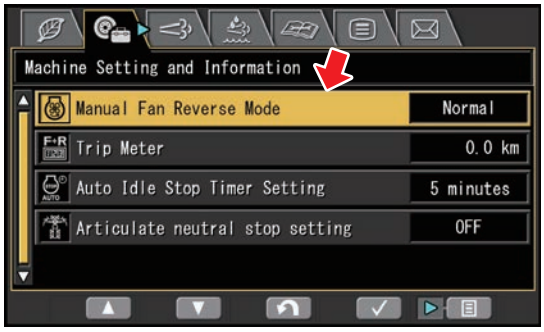
The Fan Reverse Mode can be used to clean dirt or insects by operation of the machine monitor to rotate the fan in reverse.

1. Select “Manual Fan Reverse Mode” from “Machine Setting and Information” menu screen, then push the ENTER switch (4).

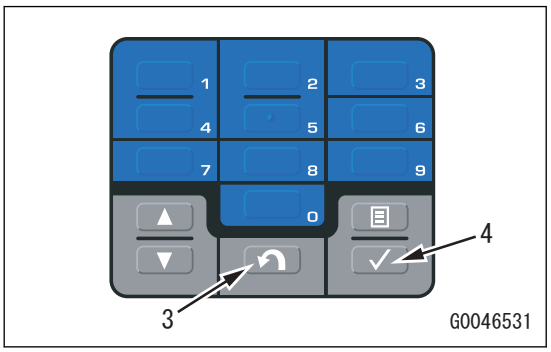
   REMARK

   The fan rotating direction changes from normal to reverse only when all the conditions that follow are satisfied.

   - The manual fan reverse operation is done.
   - The engine coolant temperature is less than 102 °C {215.6 °F}.
   - The hydraulic oil temperature is less than 100 °C {212 °F}.
   - The boost temperature is less than 80 °C {176 °F}.
   - The engine is in operation for 30 seconds or longer after the startup.
   - The directional selector switch is in the NEUTRAL position (N).
   - The parking brake switch is in the ON position.
   - The engine speed is in between Lo and 900 rpm.



G0046565



G0046531

The confirmation screen of “Manual Fan Reverse Mode” is shown.



G0046566

2. Push the ENTER switch (4) on the confirmation screen.

   If you do not rotate the fan in reverse, push the RETURN switch (3).
   The screen in the figure is shown when the conditions are not satisfied.

   The fan rotation direction does not change. In this case, push the RETURN switch (3), and then do the procedure from the start again.

   REMARK

   During the rotating direction change of the fan, the engine speed does not increase to 900 rpm or more even if you push the accelerator pedal.



G0046567

When you push the menu switch on the standard screen during the reverse rotation of the fan, the screen in the figure is shown.

Push the ENTER switch to let the fan rotation direction go back to the normal one.

REMARK

The fan rotating direction changes from reverse to normal when one of the conditions that follow is satisfied.

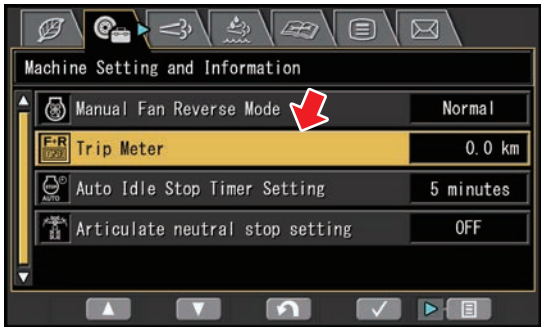
- During the reverse rotation of the fan, the manual fan reverse operation is done again.
- The reverse rotation of the fan was done for 10 minutes.
- The engine is stopped.
- The coolant temperature, hydraulic oil temperature, or torque converter oil temperature overheat (the caution lamp of the oil temperature gauge or coolant temperature gauge on the machine monitor lights up in red, then “L02” is shown) while the fan rotates in reverse.



G0046570

TRIP METER

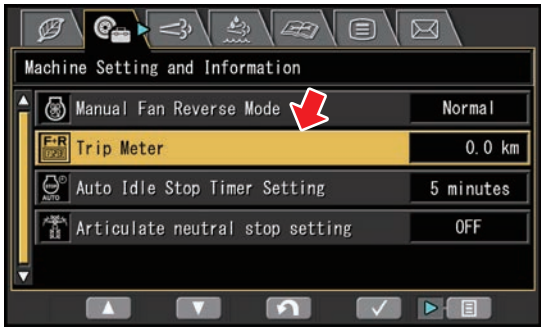
You can check the overall travel distance after the previous reset with “Trip Meter”.



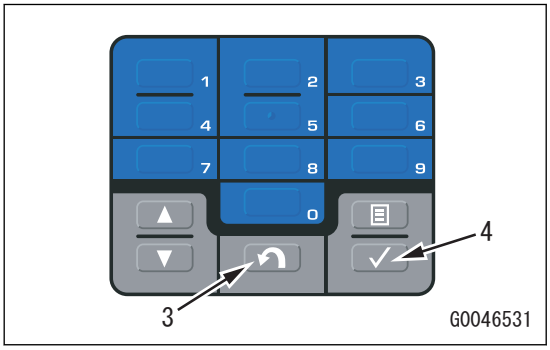
G0046571

Reset “Trip Meter” as follows.

1. Select “Trip Meter” from “Machine Setting and Information” menu screen, then push the ENTER switch (4).



G0046571



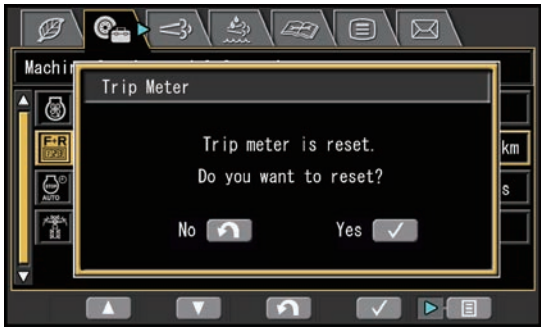
G0046531

“Trip Meter” reset confirmation screen is shown.

2. Push the ENTER switch (4).

   Push the RETURN switch (3) to cancel the operation.

   The overall travel distance is reset, and the screen goes back to “Machine Setting and Information” menu screen.



G0046572

AUTO IDLE STOP TIMER SETTING

The auto idle stop function stops the engine automatically when the engine is operated continuously at idle for a set time.

The auto idle stop operates only when all the conditions that follow are satisfied.

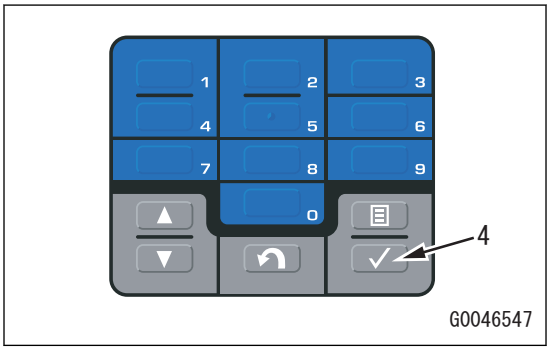
- The accelerator pedal is not pushed.
- The directional selector switch is in the NEUTRAL position (N).
- The parking brake switch is in the ON position.
- The machine is stopped.
- The aftertreatment devices are not in regeneration.
- The engine is not in automatic warm-up operation.

You can change the set time to operate the auto idle stop function on “Auto Idle Stop Timer Setting” screen.

1. Select “Auto Idle Stop Timer Setting” from “Machine Setting and Information” menu screen, then push the ENTER switch (4).



G0046573

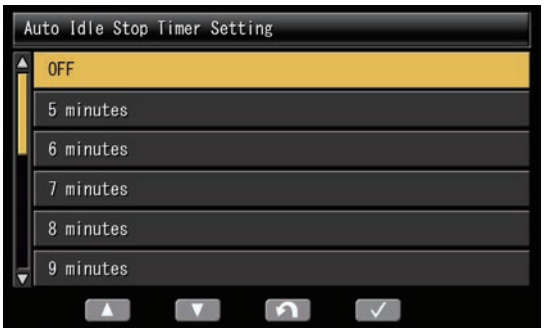


G0046547

“Auto Idle Stop Timer Setting” screen is shown.

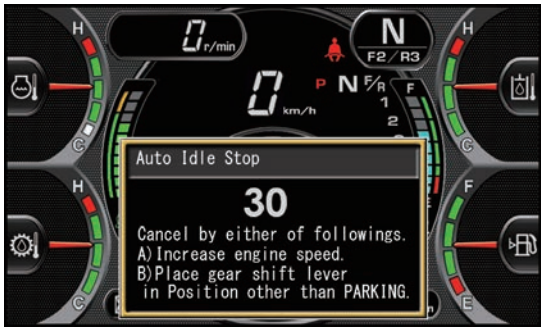
2. Select the operation time on “Auto Idle Stop Timer Setting” screen, then push the ENTER switch (4).

   When you select “OFF”, the auto idle stop function is disabled.



G0046574

3. 30 seconds before the set idling time, the machine monitor goes back to the standard screen and changes to the countdown screen.



G0046575

- If one of the operations that follow is done with the screen instructions, the machine monitor stops countdown and the screen goes back to the standard screen.
  - When the engine speed is increased
  - When the directional selector switch is set to other than the NEUTRAL position (N)
- When the countdown becomes 0 seconds, the engine stops.

  At the same time, the parking brake is applied.
  Turn all switches that there is no need for to the OFF position, so that the battery life does not decrease.



G0046576

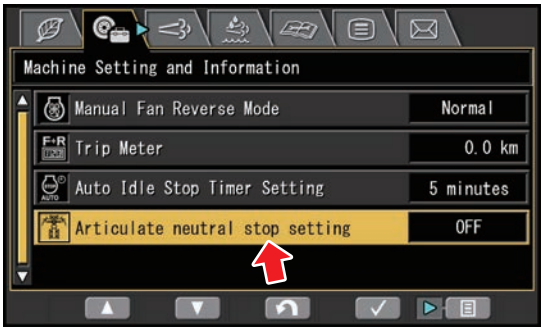
When you start the engine again, turn the starting switch as usual.

When the auto idle stop operates while the parking brake switch is in the OFF position, set the parking brake switch to the ON position. When the parking brake switch is set to the OFF position, the parking brake is released.

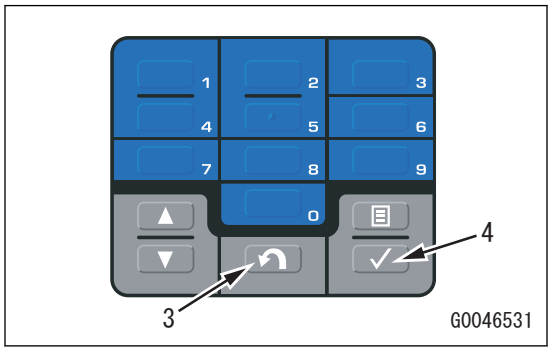
SET ARTICULATE NEUTRAL STOP SETTING

You can set for the articulate operation to be automatically stopped in neutral position.

1. Select the “Articulate neutral stop setting” on the “Machine Setting and Information” menu screen, then push the ENTER switch (4).



G0046577



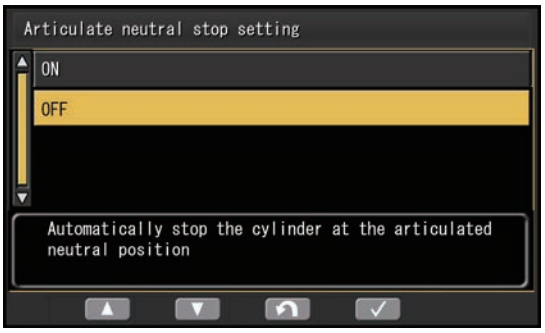
G0046531

“Articulate neutral stop setting” screen is shown.

2. Select the “ON” or the “OFF”, then push the ENTER switch (4).

   To cancel it, push the RETURN switch (3).

   - When the “ON” is selected, articulate stops automatically at neutral position.
   - When the “OFF” is selected, articulate does not stop automatically at neutral position.

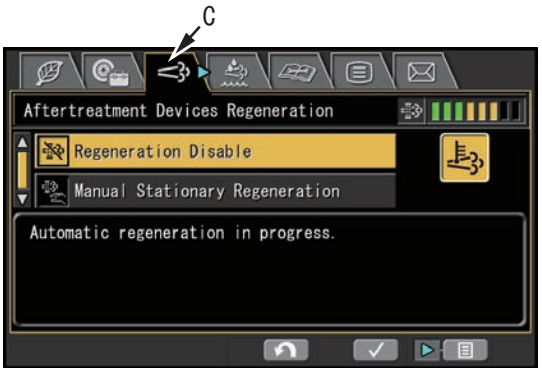


G0046578

AFTERTREATMENT DEVICES REGENERATION

Each item of “Aftertreatment Devices Regeneration” menu (C) is for settings and operations of the aftertreatment devices regeneration.

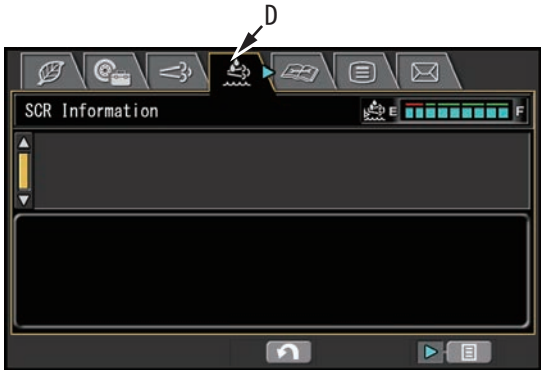
The operation methods and the contents of the display of KDPF regeneration and urea SCR regeneration are common.



G0088114

SCR INFORMATION

Each item of “SCR Information” menu (D) shows the information related to SCR and DEF.

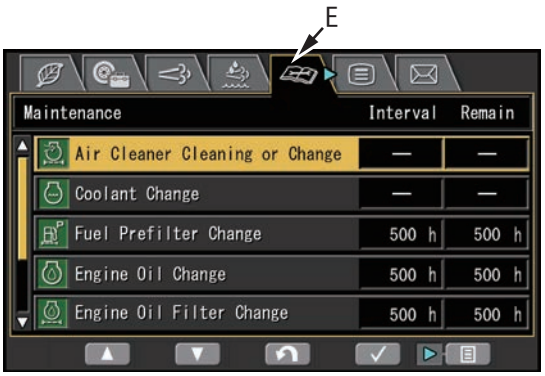


G0046525

MAINTENANCE

You can show or set the notification about maintenance on each item of “Maintenance” menu screen (E).

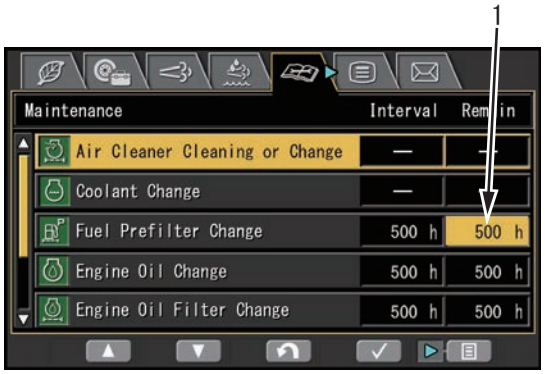
On “Maintenance” menu screen, the maintenance items that follow, the replacement interval, and remaining time to the next maintenance are shown.



G0046526

Maintenance items	Replacement interval (h) (Default)
Air Cleaner Cleaning or Change	-
Coolant Change	-
Fuel Prefilter Change	500
Engine Oil Change	500
Engine Oil Filter Change	500
T/M Oil Filter Change	1000
Fuel Main Filter Change	1000
T/M Oil Change	1000
Axle Oil Change	1000
Hydraulic Oil Filter Change	1000
Hyd Oil Pilot Filter Change	1000
Hydraulic Oil Change	2000
Circle Case Oil Change	2000
Tandem Case Oil Change	2000
KCCV Filter Change	2000
Replace DEF Filter	2000
Replace DEF Tank Breather	2000
KDPF Filter Cleaning	4500
DEF Tank Cleaning	4500

When the remaining time to the next maintenance for an item becomes the maintenance notice time or below, the remaining time display (1) is shown in yellow.



G0046582

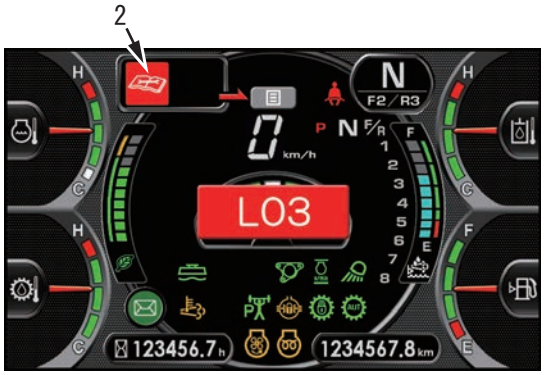
Default maintenance notice time setting is 30 hours.

When the remaining time to the maintenance becomes 0 hours, the remaining time display (1) is shown in red. The time after the replacement interval is shown with the negative symbol.

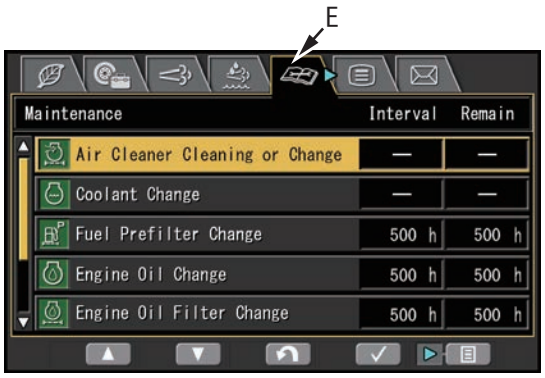
Do the maintenance of the items that are shown in red as fast as possible.

REMARK

The replacement intervals in “Air Cleaner Cleaning or Change” and “Coolant Change” are not set initially.
If you want to change the setting for the maintenance interval and the maintenance notice time, consult your Komatsu distributor.
Push the menu switch while the maintenance time caution lamp (2) is lit on the standard screen and “Maintenance” menu screen (E) is shown automatically.



G0046583



G0046584

RESET REMAINING TIME FOR MAINTENANCE

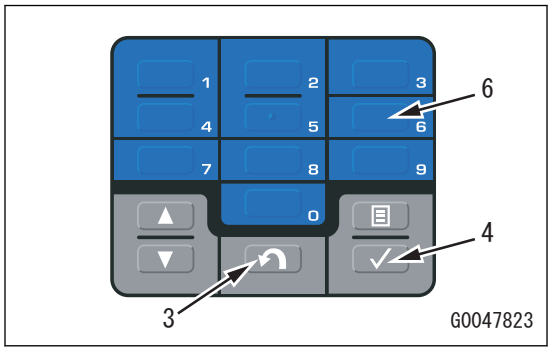
After you have done the checks and maintenance, reset the remaining time for maintenance in response to the procedures that follow.

1. On the “Maintenance” menu screen, select an item to reset the remaining time, then keep pressing the ENTER switch (4) for more than 1.5 seconds.

   If the time you push the ENTER switch (4) is not enough, you can hear the switch operating sound, but the screen does not switch to the “Maintenance Due Time Reset” screen.



G0046585



G0047823

   If you have set the usage limitation password, the password input screen is shown.

2. Input the usage limitation password with the numeric keypad (6), then push the ENTER switch (4).

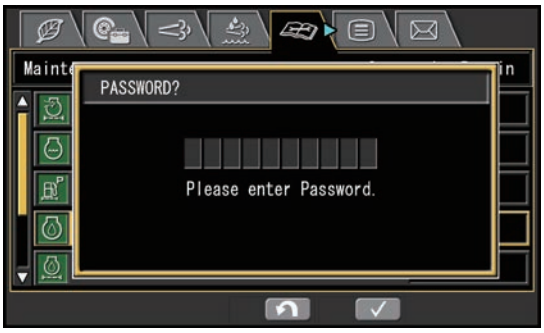
   REMARK

   Ask your Komatsu distributor to set, change, or cancel the password.

   “Maintenance Due Time Reset” screen is shown.

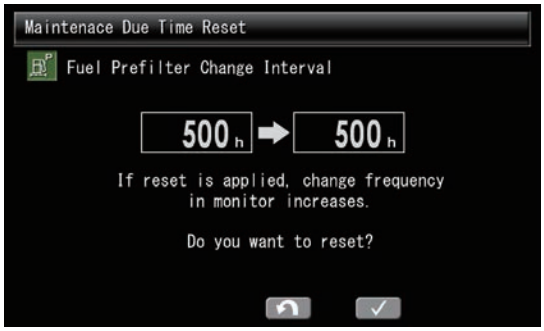
3. On the “Maintenance Due Time Reset” screen, push the ENTER switch (4).

   To cancel it, push the RETURN switch (3).



G0046586

The reconfirmation screen for the “Maintenance Due Time Reset” screen is shown.



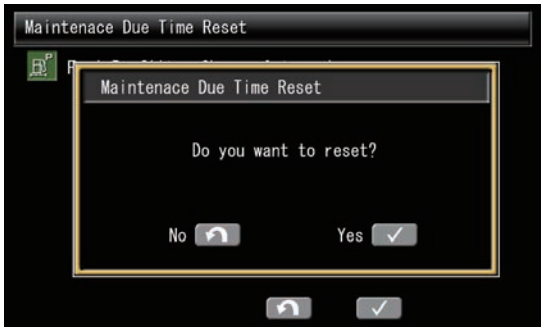
G0046587

4. Push the ENTER switch (4) again.

   To cancel it, push the RETURN switch (3).

   The remaining time is reset, and the screen goes back to the “Maintenance” menu screen.

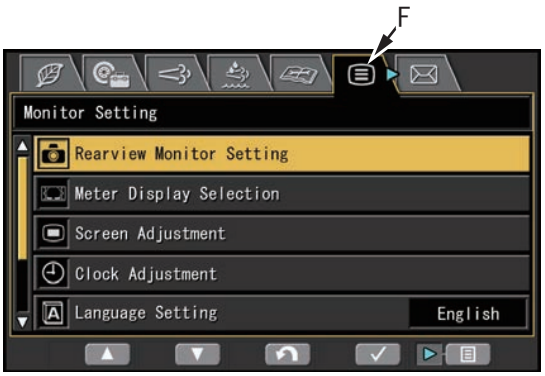
   If the remaining time and the replacement interval are equal, the remaining time cannot be reset.



G0046588

MONITOR SETTING

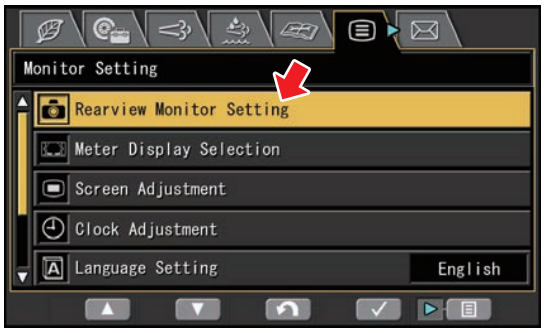
You can set the settings for the machine monitor on each item of “Monitor Setting” menu (F).



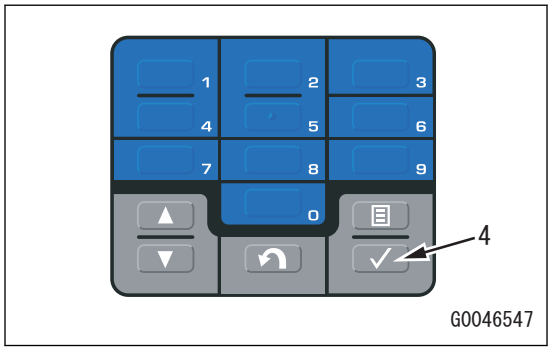
G0046589

REARVIEW MONITOR SETTING DISPLAY

Select “Rearview Monitor Setting” from “Monitor Setting” menu screen, then push the ENTER switch (4).

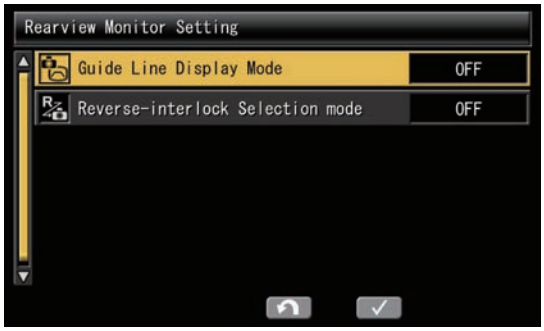


G0046590



G0046547

“Rearview Monitor Setting” menu screen is shown.



G0047760

You can set or change the rearview monitor display settings on each item of “Rearview Monitor Setting” menu screen.

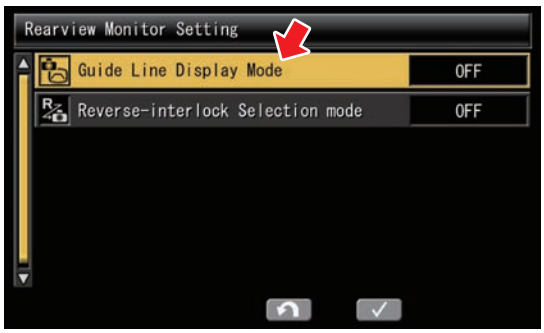
- Display/non-display of reference line
- Set display condition on rearview monitor

REFERENCE LINE SETTING

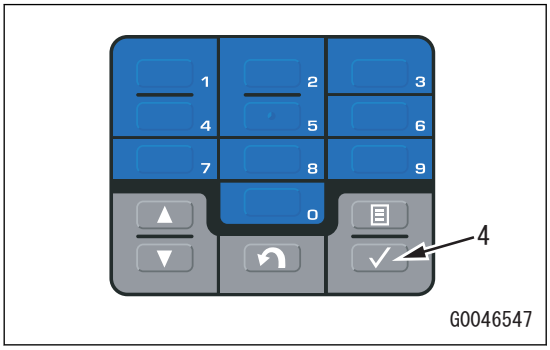
You can shift the reference line on the rearview monitor to be Display/non-display.

The default is “ON”.

1. Select the “Guide Line Display Mode” from the “Rearview Monitor Setting” menu, then push the ENTER switch (4).



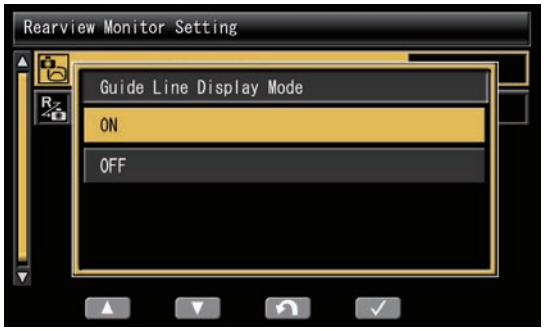
G0046591



G0046547

"Guide Line Display Mode" screen is shown.

2. Select the "ON" or the "OFF", then push the ENTER switch (4).
   - When you select the "ON", the guide line is shown.
   - When you select the "OFF", the guide line is not shown.



G0046592

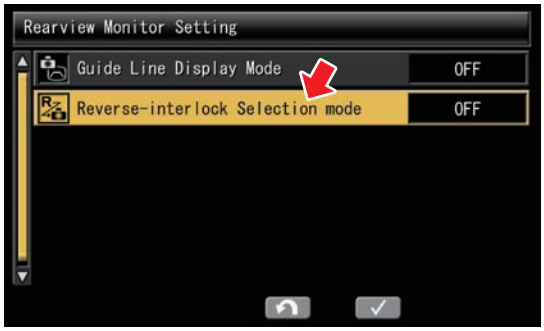
This setting is held even after you turn the starting switch to OFF position.

REARVIEW MONITOR DISPLAY CONDITION SETTING

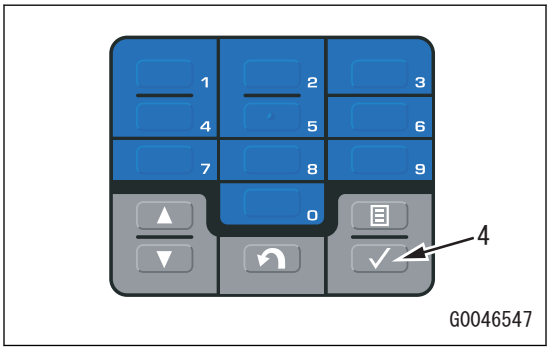
You can change the rearview monitor display.

The default is "OFF".

1. Select the "Reverse-interlock Selection mode" on the "Rearview Monitor Setting" menu screen, then push the ENTER switch (4).



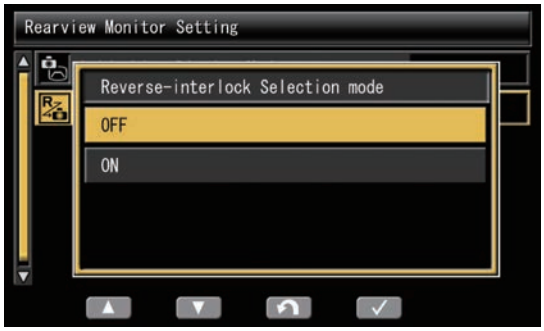
G0046593



G0046547

"Reverse-interlock Selection mode" screen is shown.

2. Select the "ON" or the "OFF", then push the ENTER switch (4).
   - When you select the "OFF", rearview monitor image is always shown.
   - When you select the "ON", rearview monitor image is shown during reverse travel.

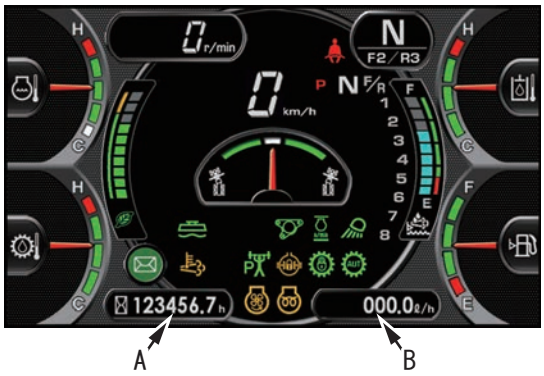


G0046594

This setting is held even after you turn the starting switch to OFF position.

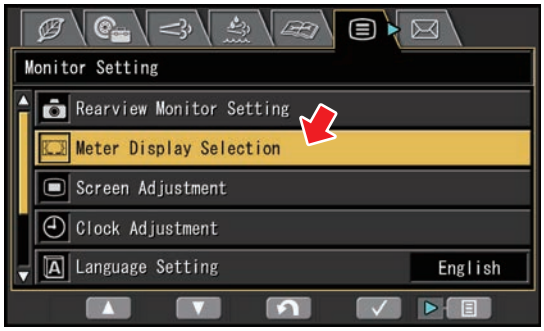
METER DISPLAY SELECTION SCREEN

You can select items to be shown on the L.H. meter display (A) and R.H. meter (B).

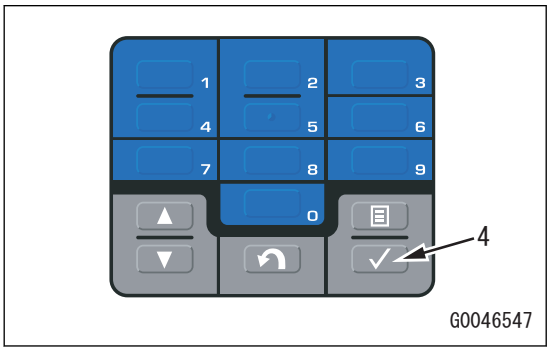


G0046595

Select the "Meter Display Selection" on the "Monitor Setting" menu screen, and push the ENTER switch (4).



G0046596



G0046547

“Meter Display Selection” screen is shown.



G0047756

You can set and change the items related to the meter display on the “Meter Display Selection” menu screen.

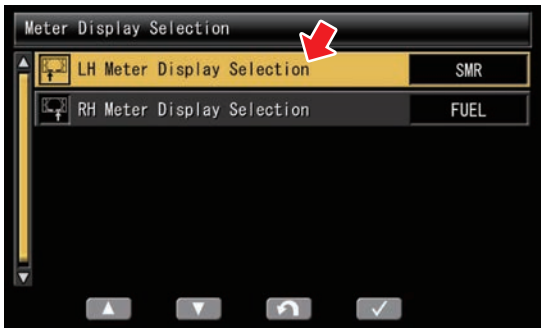
- Select the display for L.H. meter
- Select the display for R.H. meter

L.H. METER DISPLAY SETTING

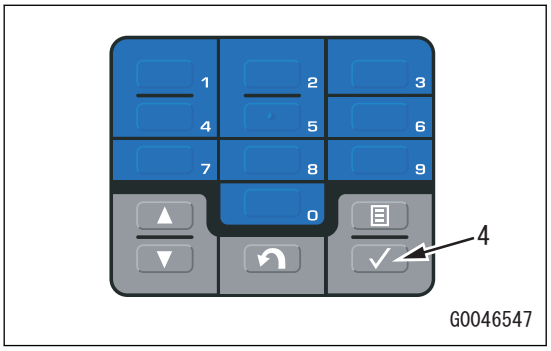
You can select items to be shown on the L.H. meter display.

The default is “SMR: Service Meter”.

1. Select the “LH Meter Display Selection” on the “Meter Display Selection” menu screen, then push the ENTER switch (4).



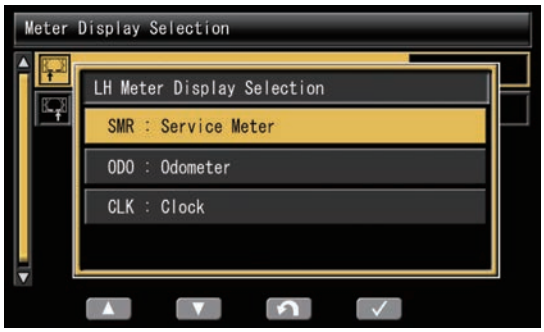
G0046597



G0046547

“LH Meter Display Selection” screen is shown.

2. Select the item to be shown on “LH Meter Display Selection” screen, then push the ENTER switch (4).
   - When the “SMR: Service Meter” is selected, service meter is shown.
   - When the “ODO: Odometer” is selected, odometer (travel distance integrating meter) is shown.
   - When the “CLK: Clock” is selected, clock is shown.



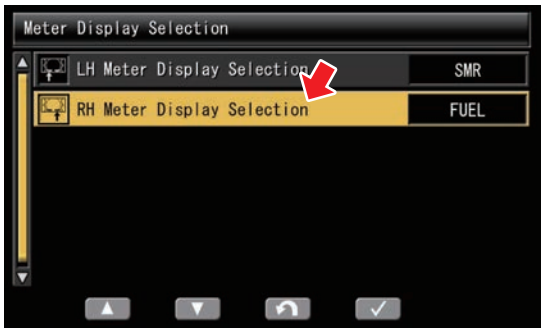
G0046598

R.H. METER DISPLAY SETTING

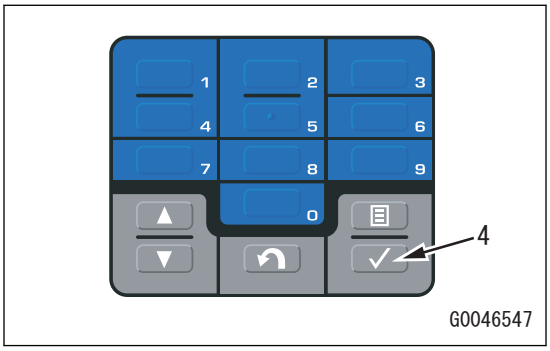
You can select the items to be shown on the R.H. meter display.

The default is “FUEL : Average Fuel Consumption”.

1. Select “RH Meter Display Selection” from “Meter Display Selection” menu screen, then push the ENTER switch (4).



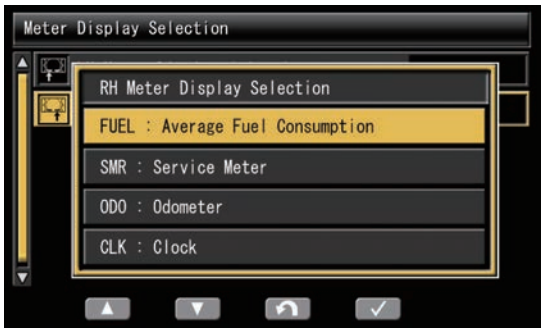
G0046599



G0046547

“RH Meter Display Selection” screen is shown.

2. Select the item to be shown on “RH Meter Display Selection” screen, then push the ENTER switch (4).
   - When “FUEL : Average Fuel Consumption” is selected, the fuel consumption gauge is shown.
   - When “SMR : Service Meter” is selected, the service meter is shown.
   - When “ODO : Odometer” is selected, the odometer is shown.
   - When “CLK : Clock” is selected, the clock is shown.



G0046600

REMARK

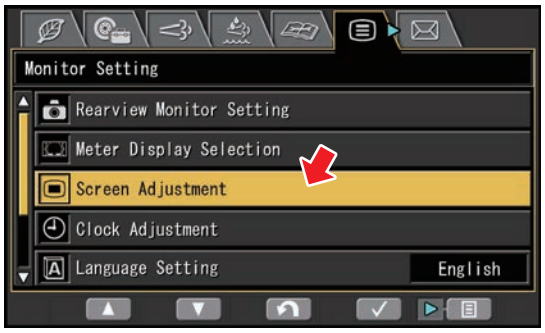
It shows the engine speed regardless of the setting only while the maintenance time caution lamp and warning display are in operation.

SCREEN SETTING

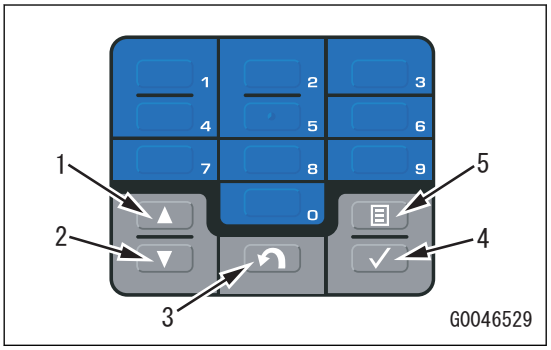
You can adjust the brightness of the machine monitor.

- You can adjust the brightness in the day and night modes individually.
  When the lamp switch is in OFF position, you can adjust the brightness in the day mode by screen adjustment.
  When the lamp switch in ON position, and when the monitor brightness selector switch is set to the night mode, you can adjust the brightness in the night mode.
- The brightness of the night illumination for the switch panel and operation switches is adjusted synchronously with the brightness of the machine monitor.

1. Select the “Screen Adjustment” on the “Monitor Setting” menu screen, then push the ENTER switch (4).



G0046601



“Screen Adjustment” screen is shown.

2. Use the UP switch (1) or the DOWN switch (2) to adjust the brightness, then push the ENTER switch (4).

   To cancel it, push the RETURN switch (3).

   When you push the menu switch (5), the brightness goes back to that of the default setting.



G0046603

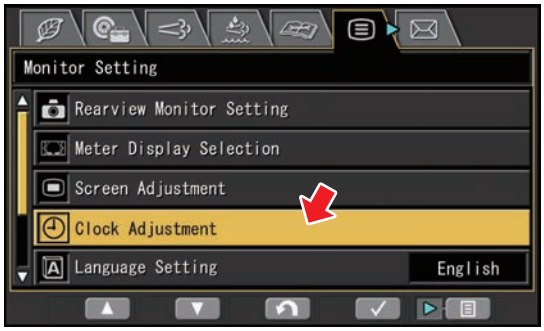
CLOCK SETTING SCREEN

You can change the setting of the clock shown on the standard screen.

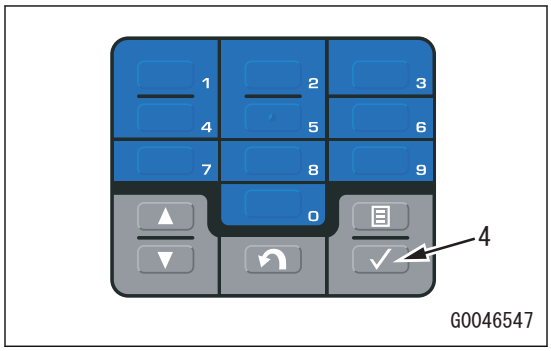
Adjust the “Calendar” and “Time” again since they have been reset after a long-term storage.

When the “GPS Synchronization” is set to the “ON”, they are automatically adjusted.

Select the “Clock Adjustment” on the “Monitor Setting” menu screen, then push the ENTER switch (4).



G0046604



G0046547

“Clock Adjustment” menu screen is shown.



G0047754

You can set and change the clock display with the items on the “Clock Adjustment” menu screen.

- “GPS Synchronization”
- “Calendar”
- “Time”
- “12hour or 24hour Mode”
- “Daylight Saving Time”

GPS SYNCHRONIZATION SETTING

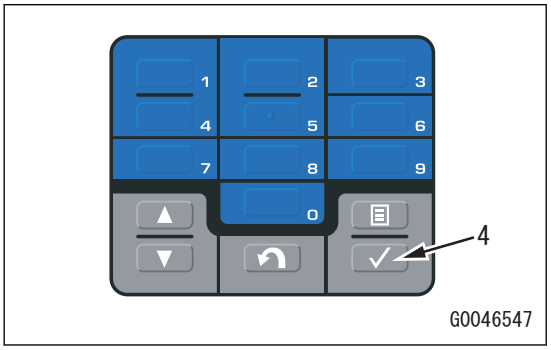
For machines with KOMTRAX, you can set the automatic adjustment of the date and time of machine monitor against the clock of GPS, on “GPS Synchronization” screen.

- The default is “OFF”.
- When the machine is in the environment where the radio waves from GPS cannot be received, such as in a building, the automatic setting function cannot operate.
- When “GPS Synchronization” is set to “ON”, you cannot select the items on “Calendar” and “Time”.

1. Select “GPS Synchronization” from “Clock Adjustment” menu screen, then push the ENTER switch (4).



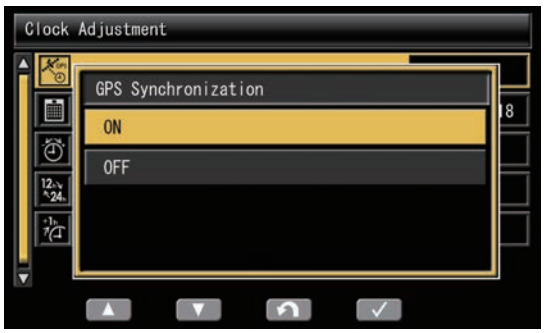
G0046605



G0046547

“GPS Synchronization” screen is shown.

2. Select “ON” or “OFF”, then push the ENTER switch (4).
   - When “ON” is selected, date and time on the machine monitor are automatically adjusted against the clock of GPS.
   - When “OFF” is selected, date and time on the machine monitor do not link to the clock of GPS.



G0046606

This setting is kept even after the starting switch is turned to the OFF position.

DATE SETTING

You can set the date of the machine monitor on the “Calendar” screen.

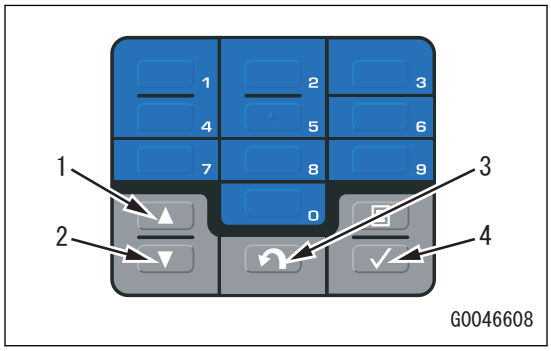
REMARK

While the “GPS Synchronization” is turned on, you cannot select any item of “Time”.

1. Select the “Calendar” on the “Clock Adjustment” menu screen, then push the ENTER switch (4).



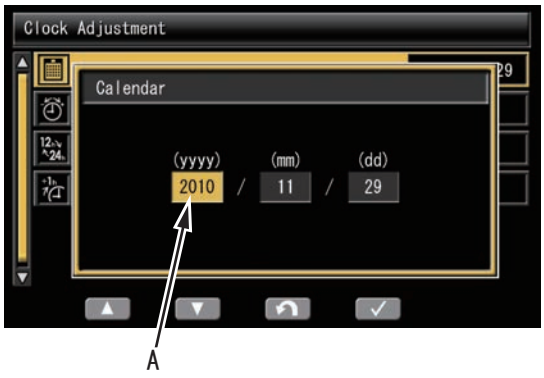
G0046607



G0046608

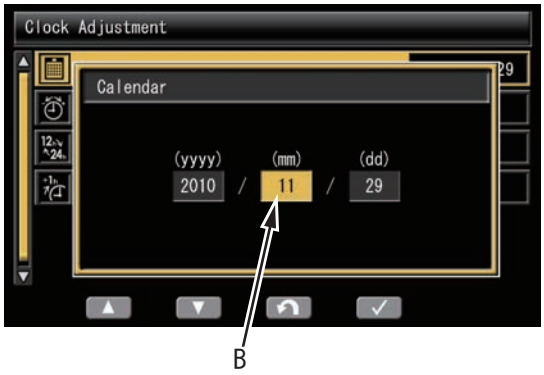
The “Calendar” screen is shown.

2. When the display part (A) is shown in yellow, set the year.
   - When you push the UP switch (1), the number increases by 1.
   - When you push the DOWN switch (2), the number decreases by 1.
   - When you push the RETURN switch (3), it cancels the change, and the screen goes back to the “Clock Adjustment” menu screen.
   - When you push the ENTER switch (4), the screen proceeds to the month setting.
     When there is no need to change the year setting, push the ENTER switch (4).



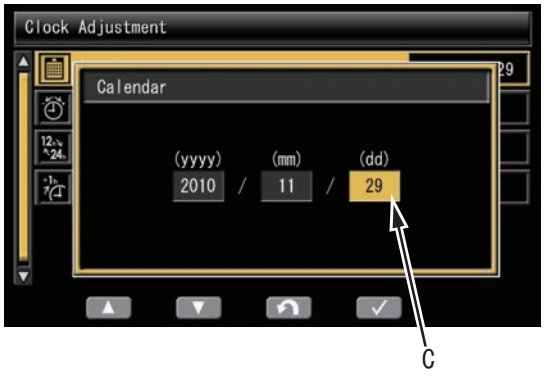
G0046609

3. When the display part (B) is shown in yellow, set the month.
   - When you push the UP switch (1), the number increases by 1.
   - When you push the DOWN switch (2), the number decreases by 1.
   - When you push the RETURN switch (3), it cancels the change, and the screen goes back to the year setting.
   - When you push the ENTER switch (4), the screen moves to the date setting.
     When there is no need to change the month setting, push the ENTER switch (4).



G0046610

4. When the display part (C) is shown in yellow, set the date.
   - When you push the UP switch (1), the number increases by 1.
   - When you push the DOWN switch (2), the number decreases by 1.
   - When you push the RETURN switch (3), it cancels the change, and the screen goes back to the month setting.
   - When you push the ENTER switch (4), it enters the change, and the screen goes back to the “Clock Adjustment” menu screen.
     When there is no need to change the day setting, push the ENTER switch (4).



G0046611

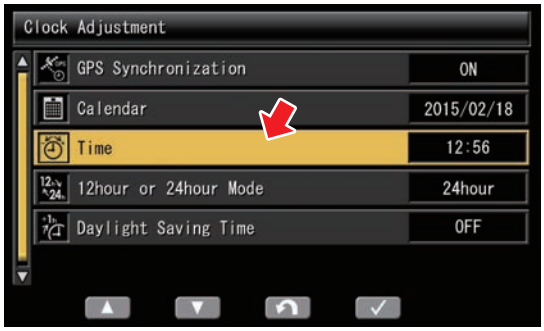
TIME SETTING

You can adjust the time of the machine monitor on “Time” screen.

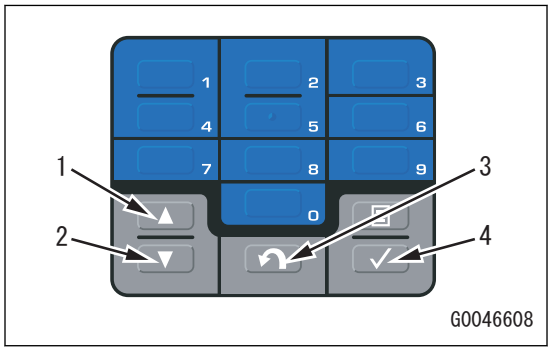
REMARK

While “GPS Synchronization” is enabled, you cannot select the item on “Time”.

1. Select “Time” from “Clock Adjustment” menu screen, then push the ENTER switch (4).

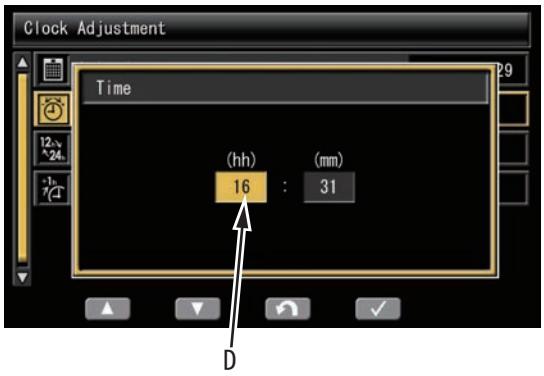


G0046612



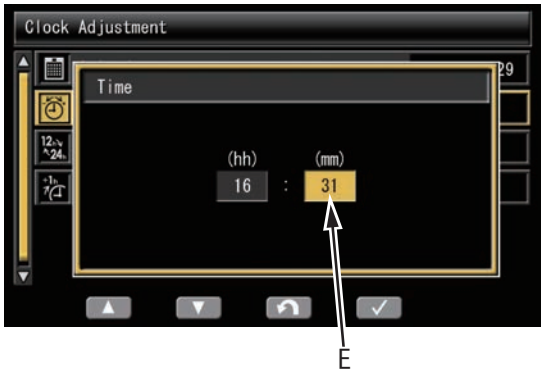
“Time” screen is shown.

2. Set the time while the display part (D) is shown in yellow.
   - Push the UP switch (1) to increase the value by one.
   - Push the DOWN switch (2) to decrease the value by one.
   - Push the RETURN switch (3) to cancel the changes, and the screen goes back to “Clock Adjustment” menu screen.
   - Push the ENTER switch (4) to move to the minute setting.
     When it is not necessary to change the time setting, push the ENTER switch (4).



G0046613

3. Set the minute while the display part (E) is shown in yellow.
   - Push the UP switch (1) to increase the value by one.
   - Push the DOWN switch (2) to decrease the value by one.
   - Push the RETURN switch (3) to cancel the changes, and the screen goes back to the time setting.
   - Push the ENTER switch (4) to apply the changes, and the screen goes back to “Clock Adjustment” menu screen.
     When it is not necessary to change the minute setting, push the ENTER switch (4).



G0046614

12-HOUR AND 24-HOUR DISPLAY MODE SETTING

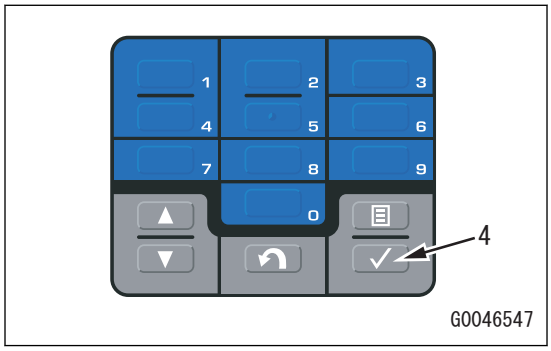
On the “12hour or 24hour Mode” screen, you can set the display mode of clock.

The default is the “24hour”.

1. Select the “12hour or 24hour Mode” on the “Clock Adjustment” menu, then push the ENTER switch (4).



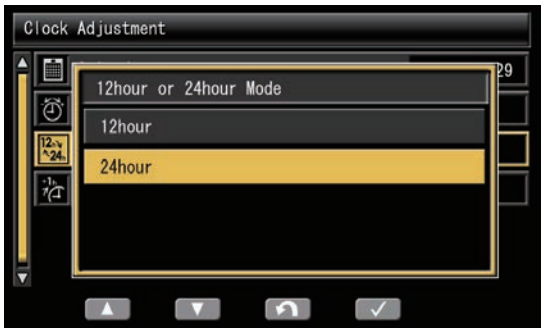
G0046615



G0046547

“12hour or 24hour Mode” screen is shown.

2. Select the “12hour” or “24hour”, then push the ENTER switch (4).
   - When the “12hour” is selected, the clock display is set to 12 hour display (AM, PM).
   - When the “24hour” is selected, the clock display is set to 24 hour display.



G0046616

This setting is held even after you turn the starting switch to OFF position.

DAYLIGHT SAVING TIME (SUMMER TIME) SETTING

On the “Daylight Saving Time” screen, you can advance the clock time by 1 hour.

The default is “OFF”.

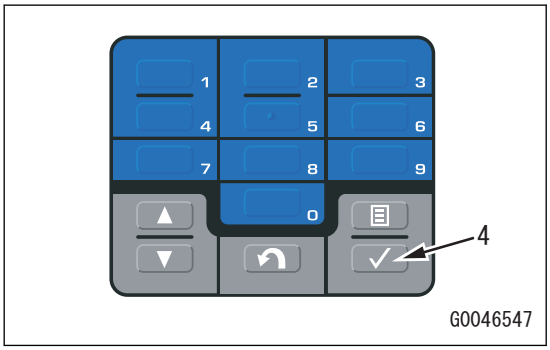
REMARK

Daylight saving time or summer time is the system that we advance the clock time by one hour to take advantage of that the sun rises early in summer.

1. Select the “Daylight Saving Time” on the “Clock Adjustment” menu screen, then push the ENTER switch (4).



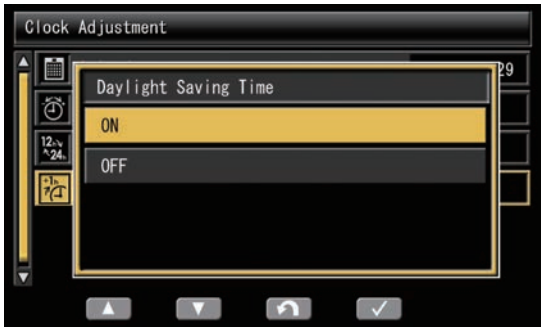
G0046617



G0046547

“Daylight Saving Time” screen is shown.

2. Select the “ON” or the “OFF”, then push the ENTER switch (4).
   - When the “ON” is selected, the clock is shown in the daylight saving time.
     The clock shows the time that is advanced by one hour.
   - When the “OFF” is selected, the clock is shown in the normal time.



G0046618

This setting is held even after you turn the starting switch to OFF position.

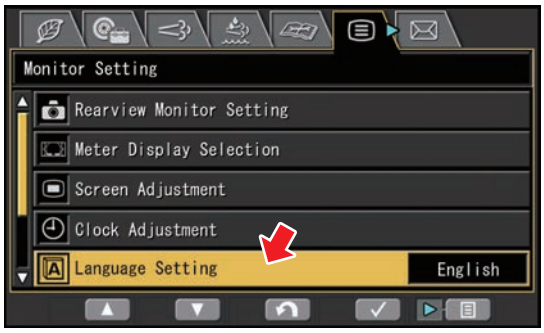
LANGUAGE SETTING ON MACHINE MONITOR

You can change the language setting for the machine monitor.

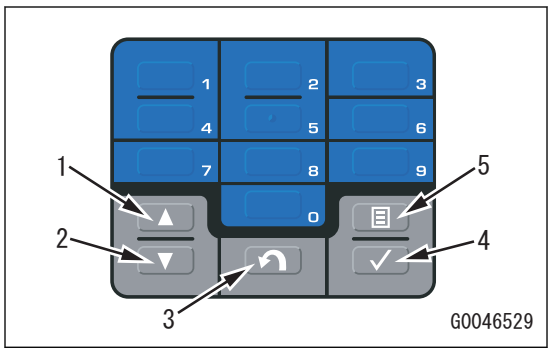
The available languages are as follows.

English, Japanese, French, Spanish, Portuguese, Italian, German, Swedish, Dutch, Danish, Norwegian, Finnish, Icelandic, Czech, Hungarian, Polish, Slovak, Slovene, Romanian, Croatian, Estonian, Latvian, Lithuanian, Bulgarian, Greek, Serbian, Turkish

1. Select the “Language Setting” on the “Monitor Setting” menu screen, then push the ENTER switch (4).



G0046619



The “Language” screen is shown.

2. Select the language you want to use with the UP switch (1) or the DOWN switch (2), and push the ENTER switch (4).

   To cancel it, push the RETURN switch (3).

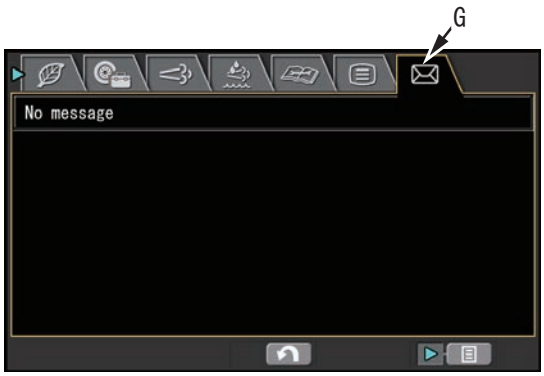


G0046620

This setting is held even after you turn the starting switch to OFF position.

MESSAGE DISPLAY

If the KOMTRAX is installed to the machine, you can see the messages from your Komatsu distributor with the message display menu (G).



G0046621

When there is a message, the message display (1) on the standard screen lights up.

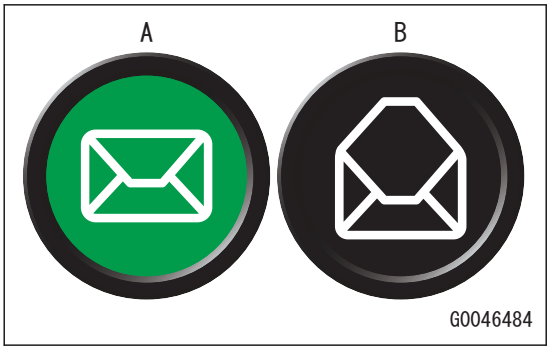


G0046622

(A): There is an unread message.

(B): There is a read message to which no reply is made.

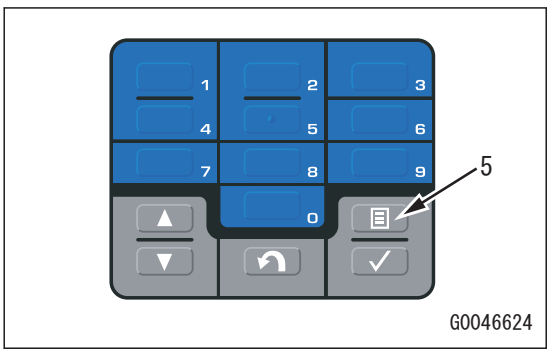
Reply to the message as follows.



G0046484

REMARK

- Push the menu switch (5) while the message display (1) is lit on the standard screen and the message display menu screen (G) is shown automatically.
- If the starting switch is turned to the OFF position when there is an unread message, the message will be shown on the end screen. When the monitor is started next time, the message will change to a read message (lights up in blue).
- The message will be deleted when its expiration date comes or when a new message is received.



G0046624

CHECK MESSAGE

Select the message display screen, and you can read the received message.

(A) Subject of the message

When no message has been received, “No message.” is shown.

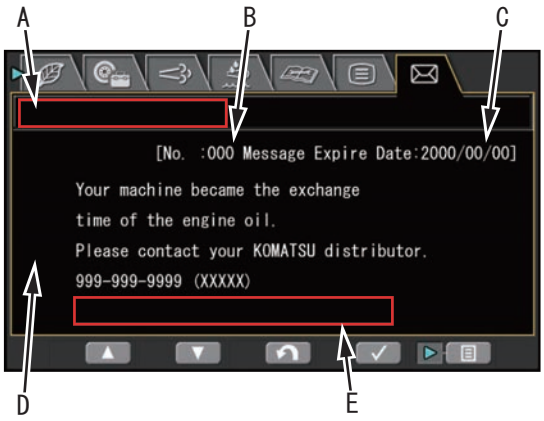
(B) Serial No. of the message

(C) Validity

(D) Text

(E) Reply field

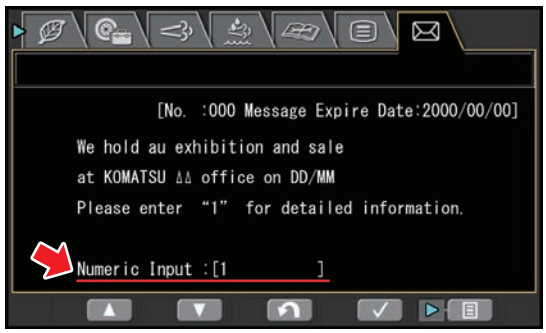
When there is a message which requests reply, “Numeric Input: [ ]” is shown.



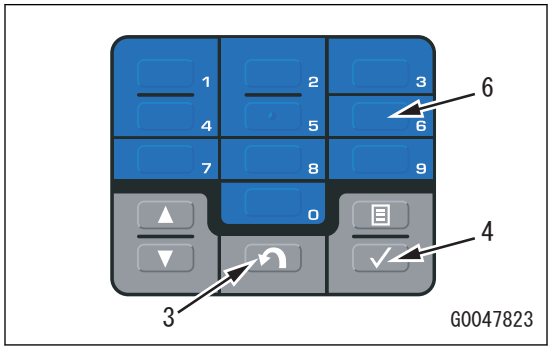
G0058664

REPLY TO MESSAGE

1. When you replay to the message, check the described number of the selected item.
   - If there is a selected item, use the numeric keypad (6) to input the number.
     The numeric keypad (6) corresponds to the numeral shown on the lower right of each switch.
     If you input an incorrect number, push the RETURN switch (3), and you can clear an input a character at a time.
     The input number is shown in “Numeric Input: [ ]” of the reply field.
   - If there is no selected item, push the RETURN switch (3), and the screen goes back to the standard screen.
2. After you input a selected item number, push the ENTER switch (4).



G0046627



G0047823

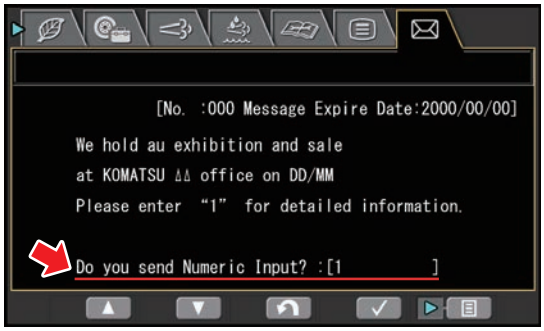
The confirmation screen for the replay is shown.

3. “Do you send Numeric Input? ”When this message is shown, push the ENTER switch (4) again.

   To cancel it, push the RETURN switch (3).

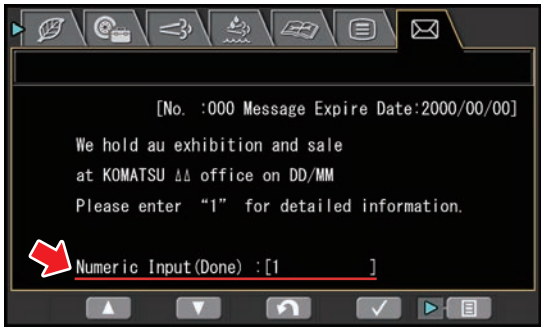
   The input value is cleared.

   The input value is sent out.



G0046628

If the message is replied, “Numeric Input Done.” is shown for it.



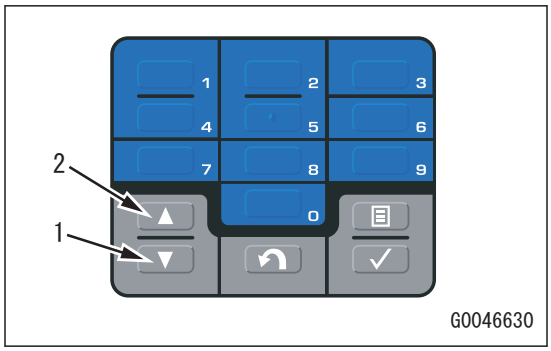
G0046629

OTHER FUNCTIONS OF MACHINE MONITOR

Check the service meter and odometer when the starting switch is at OFF position

You can use the service meter and odometer (travel distance integrating meter) display even when the machine monitor is not started up.

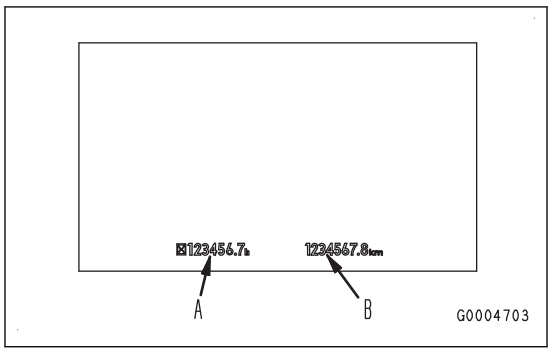
Push the UP switch (2) while you hold down the DOWN switch (1) when the starting switch is in OFF position.



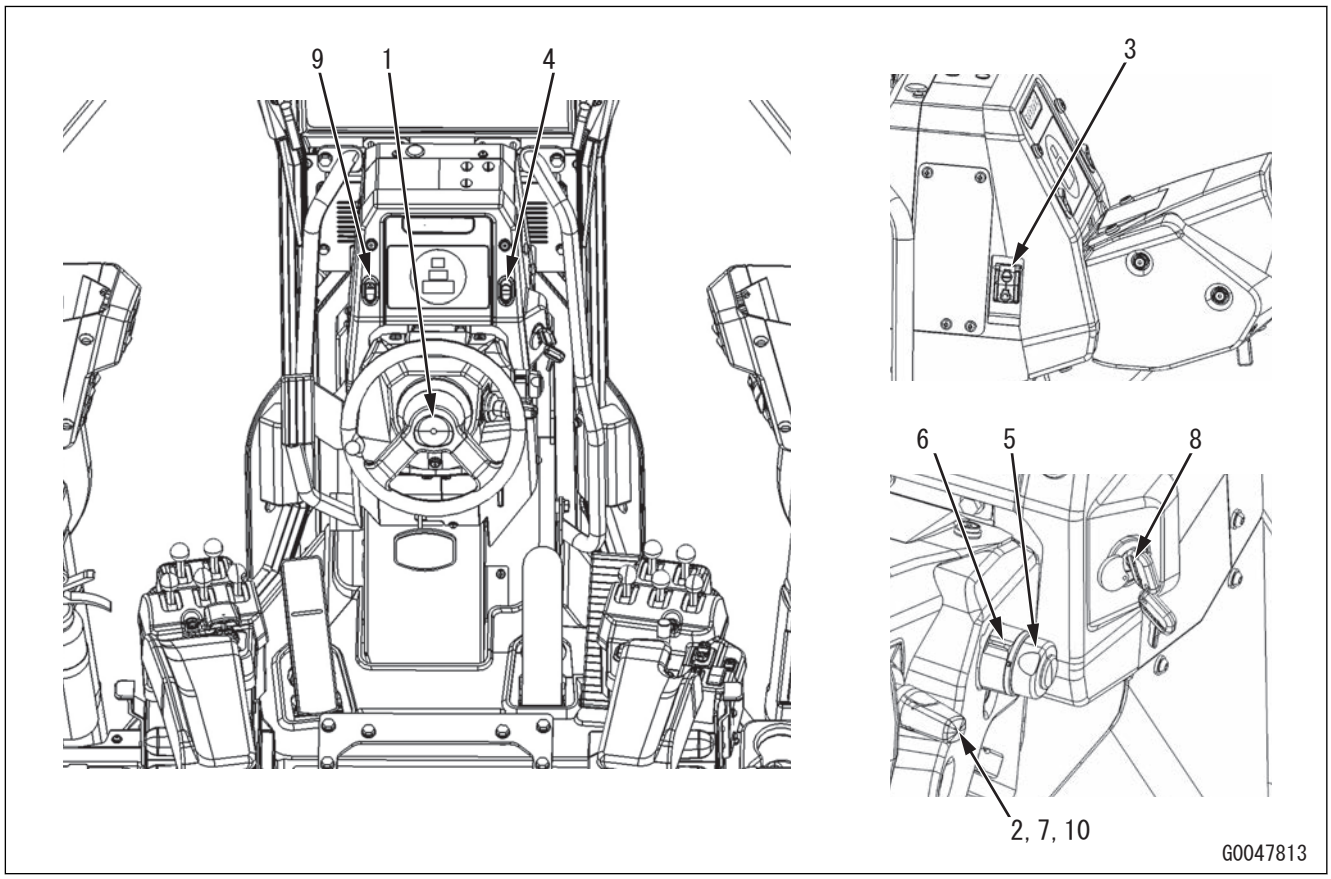
Service meter (A) and odometer (B) are shown while you hold down both switches.

NOTICE

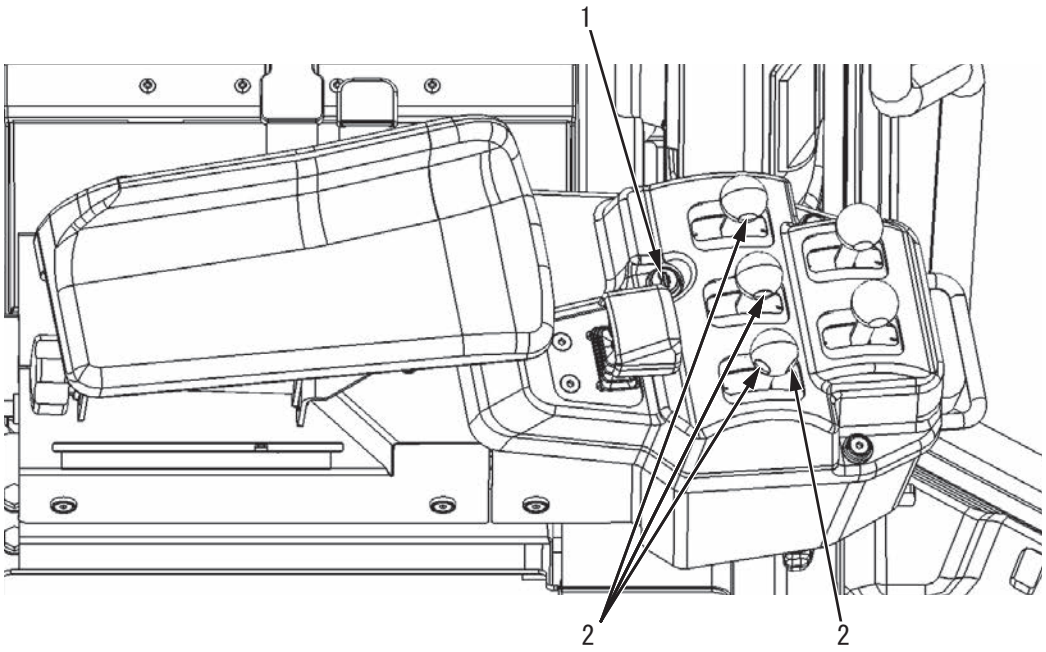
If the camera image CC is shown when you do not operate the above operation, a machine failure is considered. In this case, ask your Komatsu distributor for inspection.



NAMES OF SWITCH PANEL EQUIPMENT



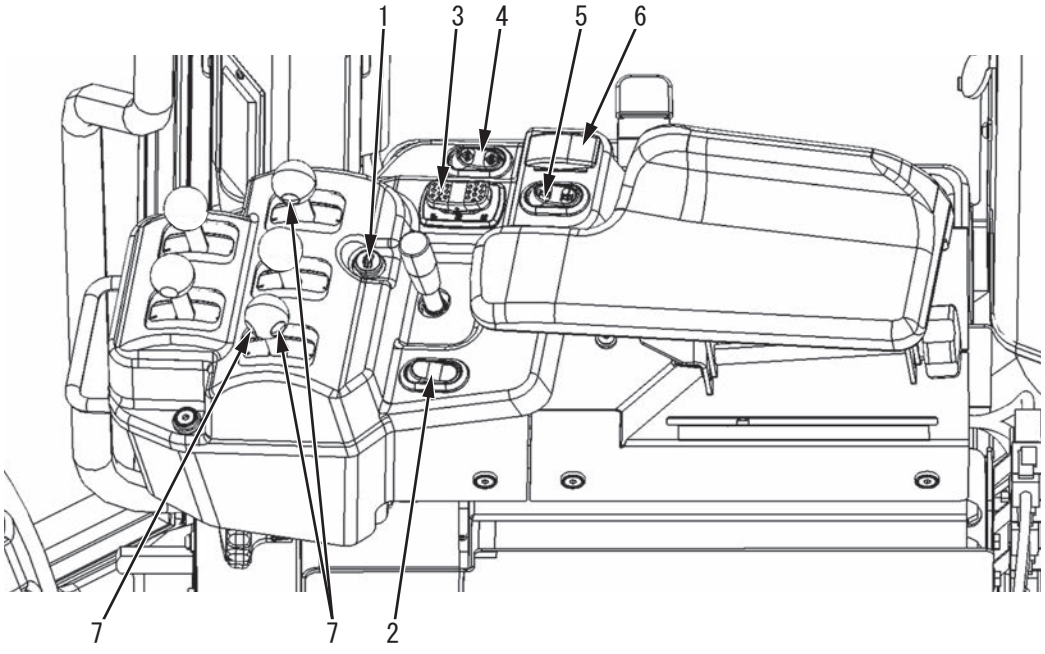
(1) Horn switch
(2) Dimmer switch
(3) Engine shutdown secondary switch
(4) Hazard lamp switch
(5) Front wiper switch
(5) Door wiper switch
(6) Rear wiper switch
(7) Turn signal lever
(8) Starting switch
(9) Monitor brightness selector switch
(10) Lamp switch



Left console

(1) Blade float left switch

(2) Switches for attachments and options



Right console

(1) Blade float right switch

(2) Parking brake switch

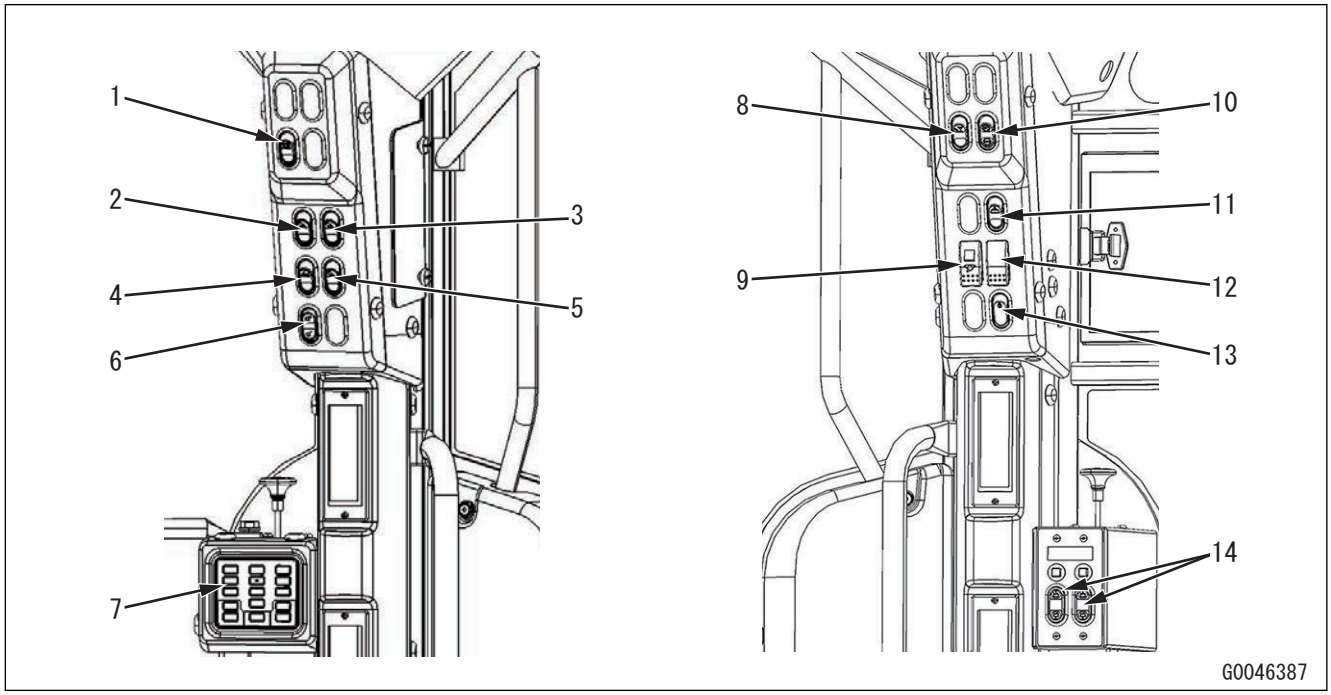
(3) Directional selector switch

(4) Differential lock switch

(5) RPM set mode selector switch

(6) RPM set switch

(7) Switches for attachments and options

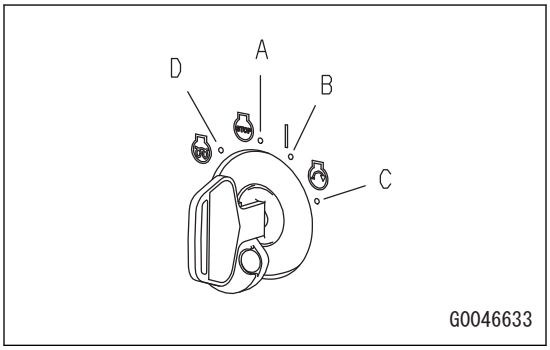


Left switch panel
(1) Rear heated wire glass switch
(2) Yellow revolving lamp switch (option)
(3) Cab mount working lamp switch (option)
(4) Rear working lamp switch
(5) Front working lamp switch
(6) Rearview monitor brightness adjustment switch
(7) Switch panel

Right switch panel
(8) Power mode selector switch
(9) Lifter lock pin switch
(10) Transmission mode selector switch
(11) Blade accumulator switch
(12) Steering lever enable switch
(13) Work equipment lock switch
(14) Work equipment lever console electric lifter switch

STARTING SWITCH

The starting switch is used to start and stop the engine.



(A): OFF position

You can push in or pull out the key of starting switch. The electrical current to the electrical system is cut off, and the engine stops. The parking brake is applied automatically.

(B): ON position

Electric current flows through the charge circuit and lamp circuit. While the engine is in operation, set it in this position.

When the ambient temperature is low at the startup of engine, the preheating pilot lamp lights up automatically and the preheating starts.

The preheating time changes with the ambient temperature at the engine startup.

When the preheating pilot lamp lights up, wait for a while until it goes off, then turn the switch to the START position.

(C): START position

This is the engine start position. During the cranking, keep it at this position. When the engine is started, immediately release the hand from the key. The key goes back to the ON position (B).

(D): Manual preheating position

If it is necessary to extend the engine preheating time longer than the automatic preheating time while you start the engine in cold weather, turn the starting switch to this position.

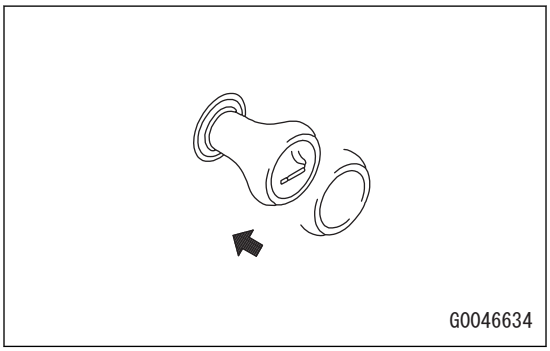
When you release the hand, it goes back to the position (A). Immediately turn it to the position (C) to start the engine.

CIGARETTE LIGHTER

Use the cigarette lighter to light a fire to the cigarettes.

Push in the cigarette lighter, wait for some seconds until it returns to the initial position, then pull it out to use.

If the cigarette lighter is removed, the socket can be used as an 85 W (24 V x 3.5 A) power supply.



NOTICE

This cigarette lighter provides(24V power supply. Do not use this as a power supply for 12 V equipment.

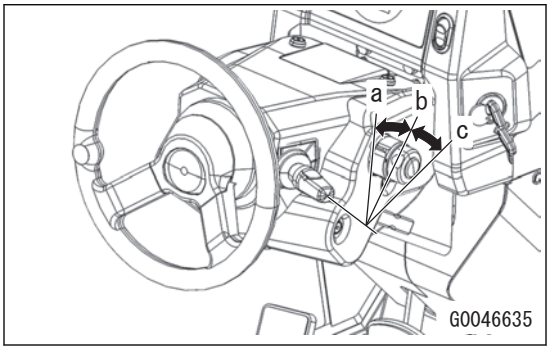
LAMP SWITCH

You can turn on the headlamp, clearance lamp, tail lamp, and machine monitor with the lamp switch.

Position (A): OFF

Position (B): Clearance lamp, tail lamp and machine monitor light up

Position (C): Lamps in (B) and headlamp light up



REMARK

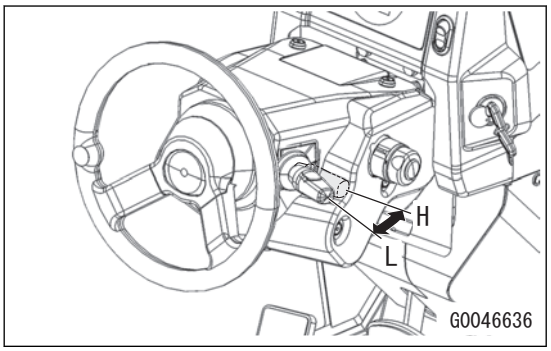
Change of the lamp switch can be operated regardless of the lever position.

DIMMER SWITCH

You can change the high beam or low beam of headlamp with the dimmer switch.

Position (L): Low beam

Position (H): High beam



TURN SIGNAL LEVER

You can operate the turn signal lever to operate the turn signal lamp.

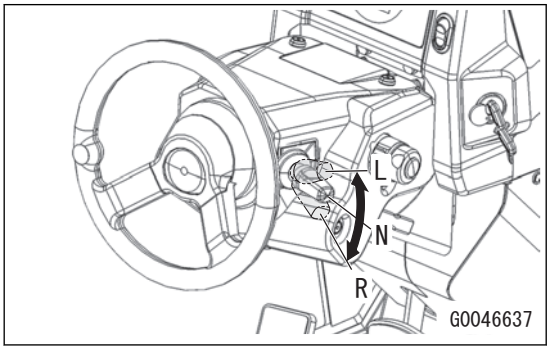
(L) position: The left turn (when the lever is operated forward).

(N) position: OFF

(R) position: The right turn (when the lever is operated to your side).

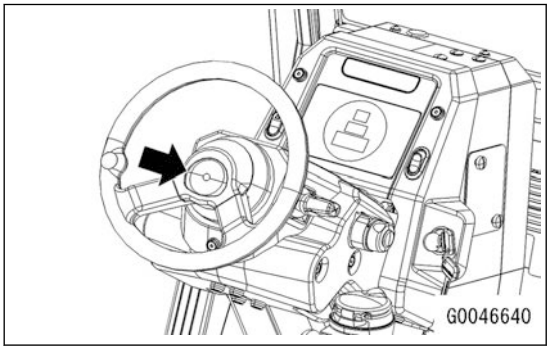
REMARK

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

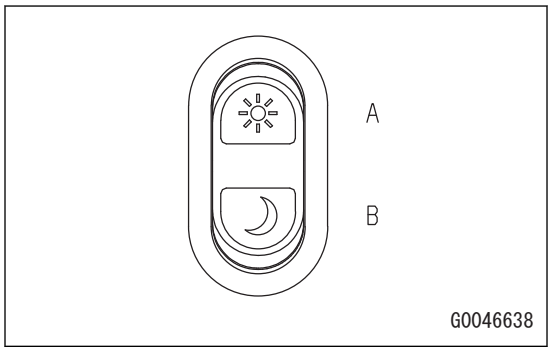


HORN SWITCH

Push the horn switch and the horn operates.



MONITOR BRIGHTNESS SELECTOR SWITCH



You can change the brightness (luminance) of the machine monitor and rearview monitor with the monitor brightness selector switch while the lamp switch is turned on.

In a daytime, when you want to turn on the headlamps for the work, set this switch to the day mode and the monitor screen does not dim.

(A) Day position

The monitor screen becomes the day mode.

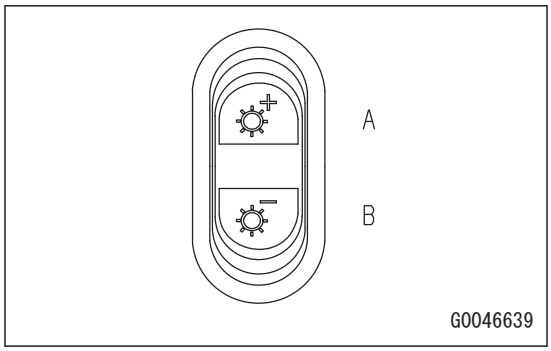
(B) Night position

The monitor screen becomes the night mode.

REMARK

If the lamp switch is in the OFF position, the brightness does not change after switch operation.

REARVIEW MONITOR BRIGHTNESS ADJUSTMENT SWITCH



The rearview monitor brightness adjustment switch is used to adjust the brightness of the rearview monitor.

You can adjust the brightness in the day mode and night mode individually.

(A) position

The rearview monitor becomes brighter.

(B) position

The rearview monitor becomes darker.

PARKING BRAKE SWITCH

⚠ WARNING

When you park the machine or go away from the machine, be sure to apply the parking brake. Be sure to keep the brake pedal pushed until the parking brake pilot lamp lights up on the machine monitor even if the parking brake switch is set to the ON position.

NOTICE

- **Do not apply the brake with the parking brake switch during the travel except in emergency. The parking brake can be damaged and cause a dangerous accident. After the machine is stopped, and then apply the parking brake.**
- **If you are forced to use the parking brake as a secondary brake when you drive the machine with high-speed, ask your Komatsu distributor for the inspection if there is any abnormality in the parking brake.**

The parking brake switch operates the parking brake.

(A) position: ON (activated)

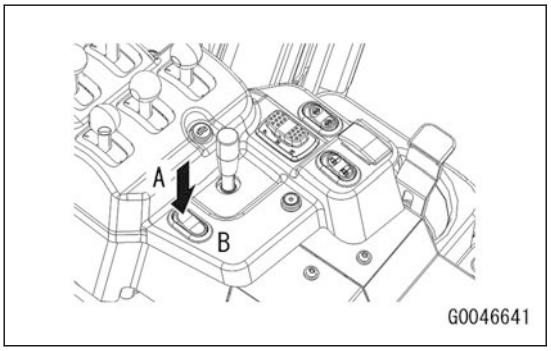
The parking brake is applied. The parking brake pilot lamp on the machine monitor lights up.

(B) position: OFF (released)

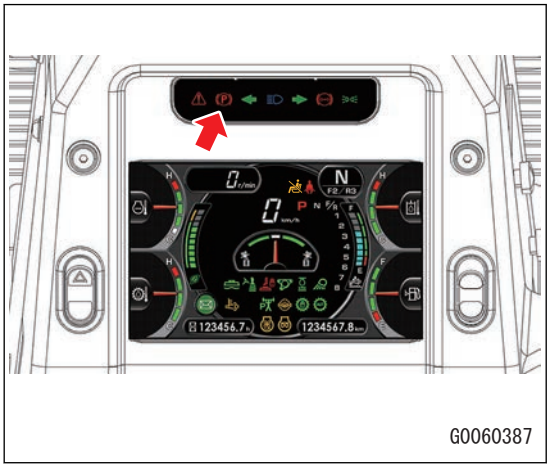
The parking brake is released.

REMARK

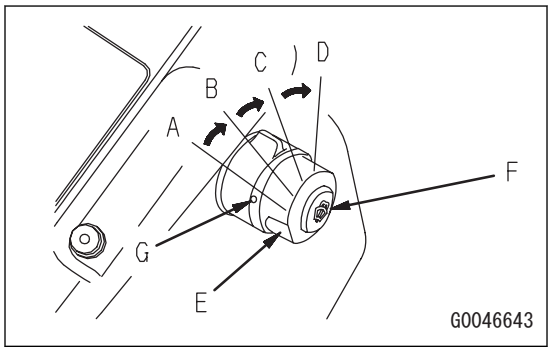
- The machine does not start even if you operate the directional selector switch while the parking brake is applied.
- The centralized warning lamp lights up and the alarm buzzer sounds when you operate the directional selector switch to F(FORWARD) position or R (REVERSE) position while the parking brake is applied.
- To start the engine, set the parking brake switch to ON (activated) position.



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G0060387

FRONT WIPER AND DOOR WIPER SWITCH



When you turn the rotary switch (E) of the front wiper switch, the front wiper and door wiper operate.

When you push the push button (F), washer fluid is sprayed to the front window glass and door glass.

The switch position is shown with the circle (G).

(A) position: (OFF) Stopped.

(B) position: (INT) Front windowshield wiper and door wiper operates intermittently.

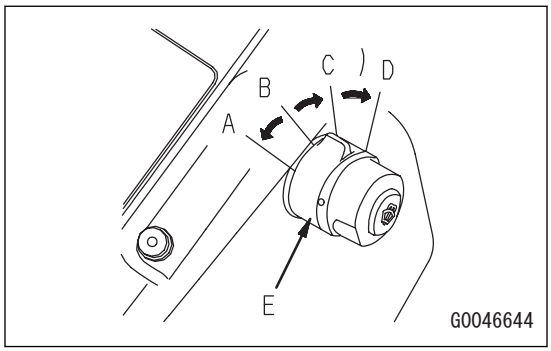
(C) position: The front windowshield wiper and door wiper operate at low speed.

(D) position: The front windowshield wiper operates at high speed.

REMARK

The speed of the front windshield wiper, door wipers on the right and left are not the same. But it is not a problem.

REAR WIPER SWITCH



Turn the lever (E) of rear wiper switch and the rear wiper operates.

Position (A): Washer fluid is sprayed. When you release the hand, it returns to the position (B).

Position (B): (OFF) Wiper stops.

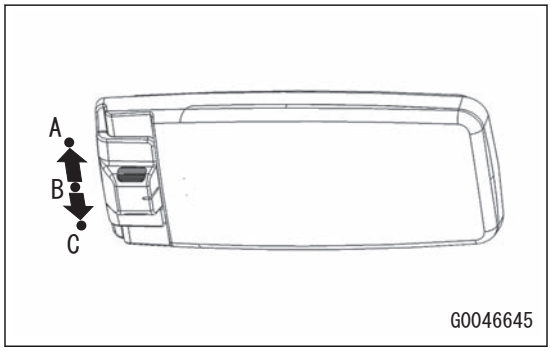
Position (C): Wiper operates. It operates intermittently only when the switch of front wiper and door wiper is at the intermittent position.

Position (D): Washer fluid is sprayed while the wiper is in operation. When you release the hand, it returns to the position (C).

ROOM LAMP SWITCH

NOTICE

If you forget turning off the lamp, it can cause the dead battery. After you use the room lamp, be sure to turn the switch to the OFF position.



The room lamp switch is used to turn on or off the room lamp.

Position (A): OFF(not lit)

Position (B): It lights up when cab door opens.

Position (C): ON (lit)

REMARK

- The room lamp lights up even if the starting switch is in the OFF position. When you go away from the operator's seat, set it to the position (A) or (B).
- When you do the work while the cab door is fully opened, set it to the position (A).

WORKING LAMP SWITCH

⚠ WARNING

Turn off the working lamps when you drive the machine on a public road.

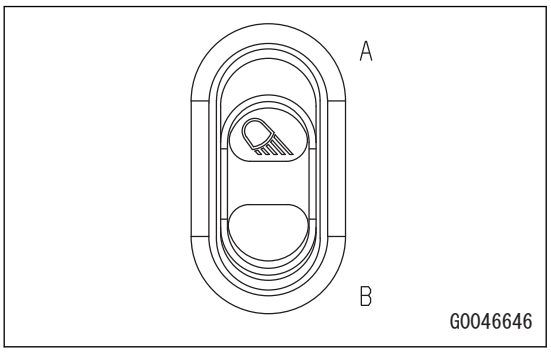
The rear working lamp switch is used to light up the rear working lamps.

(A) position: Working lamp lights up.

(B) position: Working lamp goes off.

REMARK

The rear working lamp lights up only when the front working lamp is lit.
The rear working lamp does not light up even when you turn the rear working lamp switch to the (A) position while the front working lamp is not turned on.



WORKING LAMP SWITCH

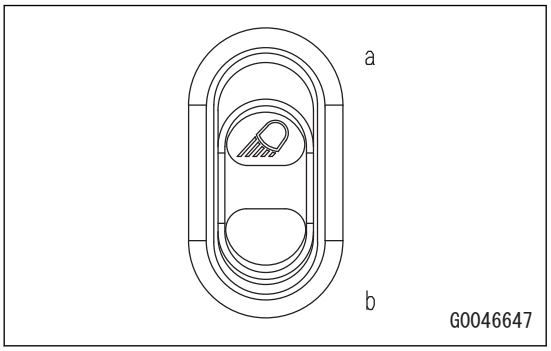
⚠ WARNING

Turn off the working lamps when you drive the machine on a public road.

You can use the front working lamp switch to light up the front working lamp and the blade front working lamp.

(a) position: Working lamp lights up.

(b) position: Working lamp goes off.



BLADE ACCUMULATOR SWITCH

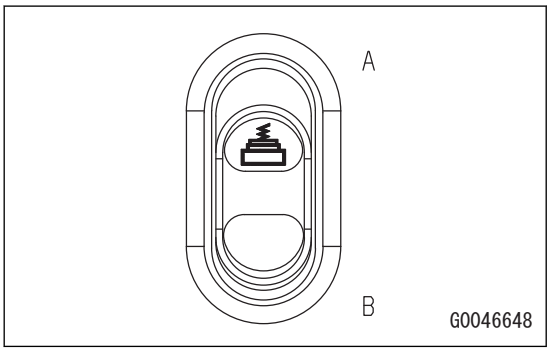
Use the blade accumulator switch to operate the blade accumulator.

Position (A): Blade accumulator operates.

Position (B): Blade accumulator stops.

REMARK

The blade accumulator has an effect to absorb the shocks from the road surface when you do the road maintenance at a rocky jobsite or when you remove the snow from the road.



LIFTER LOCK PIN SWITCH

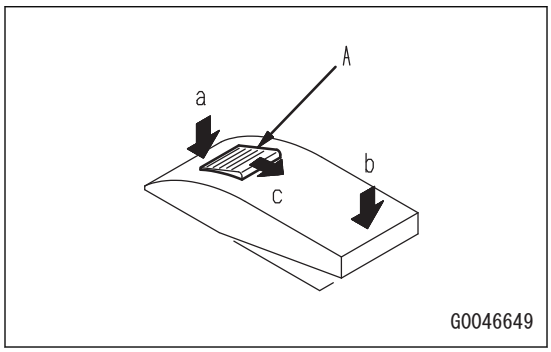
You can pull out and push in the lifter lock pin with the lifter lock pin switch.

Lifter lock pin switch is the switch that is used when you set the blade for the bank cut operation or the groove digging operation.

(a) position: Pulls out the lifter lock pin

(b) position: Push in the lifter lock pin

Push the switch to the (a) position while you pull the lock (A) in the direction of (c).



HAZARD LAMP SWITCH

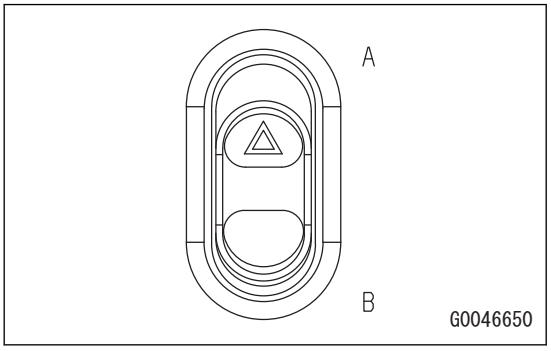
⚠ WARNING

If you use the hazard lamp even when there is no abnormality while you drive the machine, it gives other vehicles wrong information. Do not use this lamp when there is no abnormality.

Use the hazard lamp switch only when you need to park the machine on a road because of a machine failure or in case of emergency.

(A) position: The turn signal lamps and the turn signal pilot lamp flash.

(B) position: OFF (not lit)



POWER MODE SELECTOR SWITCH

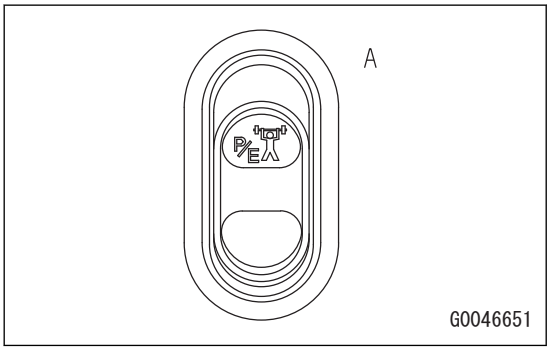
You can use the power mode selector switch to switch the engine output to match the purpose of the operation.

You can switch the modes between E mode (low engine output) and P mode (high engine output) every time you push the power mode selector switch (A).

When the E mode is selected, the pilot lamp E lights up.

When the P mode is selected, the pilot lamp P lights up.

E mode (low engine output): When working on fuel economy, such as flat-level work that does not require maximum output.



P mode (high engine output): When working with a focus on productivity.

REMARK

- In general, select E mode for fuel efficiency.
  In the E mode, the maximum engine rotation is set lower than P-mode. In the meantime, it demonstrates enough power except the hard work such as heavy excavation work, and the fuel efficiency is better. Moreover, the fuel consumption can be suppressed further by lightly stepping on the accelerator pedal.
- You can use P mode for the operation on a slope, operation which requires the large drawbar pull, or for the operation which requires the high speed on a flat ground or uphill.

TRANSMISSION MODE SELECTOR SWITCH

⚠ WARNING

When you change the mode from the torque converter mode to the manual mode, set the directional selector switch t the NEUTRAL position (N), the parking brake switch to the ON position, and the engine to low idle while the machine is stopped.

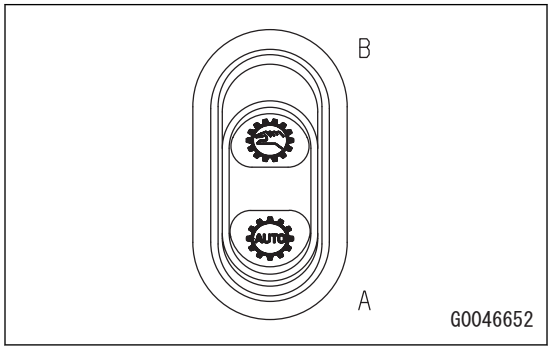
NOTICE

When you do this operation, be careful because excessive load can apply to the lockup clutch and it can lead to the damage to the lockup clutch in some cases.

- **When you stall the torque converter in the torque converter auto mode, do not switch the mode to the manual mode.**
- **If you start the machine while the load applied in manual mode (start with the load applied to the blade), do it with the speed lower than F3.**
- **Before you do directional selections halfway on a slope in the manual mode, make sure to apply the brake to stop the machine even when you are driving the machine at low speed.**
- **Do not make gear shifts halfway on a steep slope in the manual mode.**
  When you drive the machine and go into a slope in the manual mode, you should have selected a gear speed suitable for the slope angle beforehand.

This machine is equipped with the torque flow transmission with lockup clutch.

You can shift the mode between the torque converter auto mode and the manual mode with the transmission shift mode selector switch.



If you select the torque converter auto mode, operation is easy and autoshift is available.

(A) position: Torque converter auto mode (T/C AUTO)

Select the torque converter auto mode if you operate the machine as the torque converter machine with the autoshift function with which the operation is easy.

When the machine is operated high speed with F5 or higher, it can autoshift while it is in lockup state, which results in good fuel efficiency.

You need not operate the inching operation. Only with the brake pedal and accelerator pedal, you can do the optimal work.

Torque converter auto mode is better for the cases that follow.

- If the load varies largely and the engine speed drops largely
- For works with the high speed which is F5 or higher such as snow removal
- For long distance travel
- For works with very slow travel

(B) position: Manual mode (MANU)

Select the manual mode if you operate the machine with same operation feeling as that of the conventional direct power shift (hydro-shift)

T/C AUTO FORWARD

		Position of gear shift lever							
		F1	F2	F3	F4	F5	F6	F7	F8
Gear speed	F1	○							
	F2		○						
	F3			○					
	F4				○	○↑	○↑	○↑	○↑
	F5					◎↓	◎|	◎|	◎|
	F6						◎↓	◎|	◎|
	F7							◎↓	◎|
	F8								◎↓

T/C AUTO REVERSE

		Position of gear shift lever			
		R1	R2	R3	R4
Gear speed	R1	○			
	R2		○	○↑	○↑
	R3			◎↓	◎|
	R4				◎↓

MANUAL FORWARD

		Position of gear shift lever							
		F1	F2	F3	F4	F5	F6	F7	F8
Gear speed	F1	●							
	F2		●						
	F3			●					
	F4				◎				
	F5					●			
	F6						●		
	F7							●	
	F8								●

MANUAL REVERSE

		Position of gear shift lever			
		R1	R2	R3	R4
Gear speed	R1	○			
	R2		○	○↑	○↑
	R3			◎↓	◎|
	R4				◎↓

●:In lock up state (torque converter is not in use)

◎:As the machine speed increases, torque converter state changes to lock up state.

○:In torque converter state

Between↑and↓:Automatic gear shift

REMARK

- The engine does not stop even when you select the manual mode. It is because the torque converter direct cooperation control is installed.
- When the machine is operated at the F1 speed and at low idle of engine while the torque converter auto mode is selected, the travel speed is automatically controlled to approximately 1 km/h {0.6 MPH}, and the machine can easily travel at very slow speed.
- When you select the torque converter auto mode, and select the gear shift lever position between F5 and F8, the machine starts with F4 torque converter, and the gear is shifted automatically between the selected gear speeds as necessary.
- When the machine travels REVERSE (R1 to R4), the gearshift is the same as torque converter auto mode even if you select the manual mode.
- When the machine travels in reverse, if you select the gear shift lever position from R3 or R4, the machine starts with R2 torque converter, and the gear is shifted automatically between the selected gear speeds as necessary.
- Even if you operate the gear shift lever when the machine travels at high speed, the gear shift is not done as long as there is possibility of overrun of the engine. After the machine slows down to a speed at which the engine does not overrun, the gear speed automatically changes to the selected one.

WORK EQUIPMENT LOCK SWITCH

⚠ WARNING

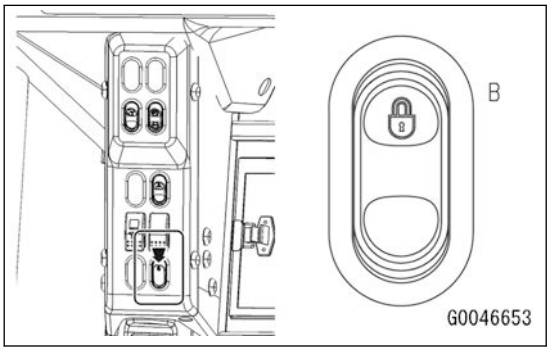
- **When you stand up from the operator's seat, be sure to push the work equipment lock switch to lock the work equipment (pilot lamp lights up). If the work equipment control lever (A) is touched unexpectedly while the work equipment is not locked, it could cause a serious accident.**
- **If the work equipment is not securely locked, it will move, and serious personal injury or death can be caused. Make sure that the pilot lamp is lit.**
- **When you operate the work equipment lock switch, make sure that the work equipment control lever (A) is in the HOLD position.**
- **When you operate the work equipment lock switch, be careful not to touch the work equipment control lever (A).**
- **Make sure that your clothes is not caught by the work equipment control lever (A).**

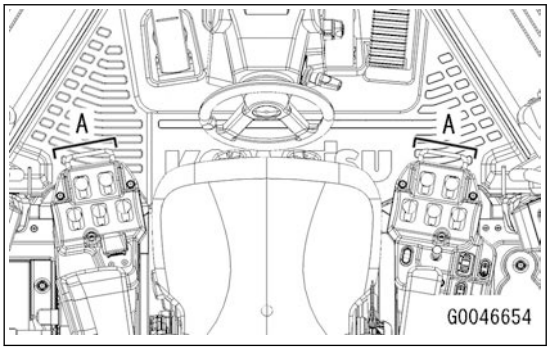
The work equipment lock switch is a device to lock the operation of the work equipment.

Each time you push the position (B) of the switch, you can lock (pilot lamp is lit) or unlock (pilot lamp is not lit) the work equipment.

When you release your hand from the switch, it automatically goes back to its initial position.

Even if you turn the starting switch to the OFF position while the work equipment is unlocked (pilot lamp is not lit), the work equipment is in the locked state (pilot lamp is lit) when you turn the starting switch to the ON position again.





DIFFERENTIAL LOCK SWITCH

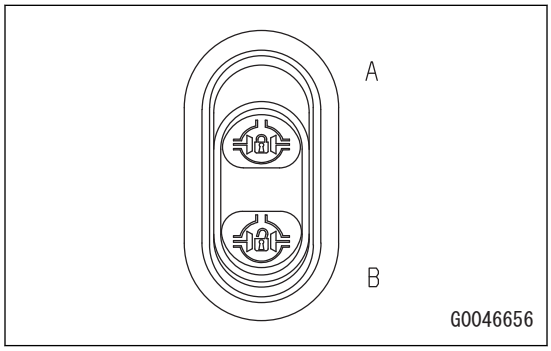
⚠ CAUTION

- **Turn the differential lock switch to the ON position to do the work.**
- **Turn the differential lock switch to the OFF position during traveling.**
- **Do not operate the differential lock switch while you operate the swing operation.**
- **Do not use the differential lock while the machine is traveling at high speed.**
- **Do not operate the differential lock switch while a tire on one side are skidding.**
  In this case, lower the engine speed, check that no tire is skidding, and then operate the differential lock operation.
  If the tire is likely to slip, turn the differential lock switch to the ON position.

The differential lock is operated with the differential lock switch.

(A) position: ON (differential lock is actuated)

(B) position: OFF (differential lock is canceled)



Differential lock is canceled

Normally use this position.

You can drive and turn the machine smoothly, while it prevents damage to road surfaces, and reduces the wear of tires.

Differential lock is actuated

When you do operation in straight travel and the road condition is as follows, use this position.

- The road is wet.
- The road is soft.

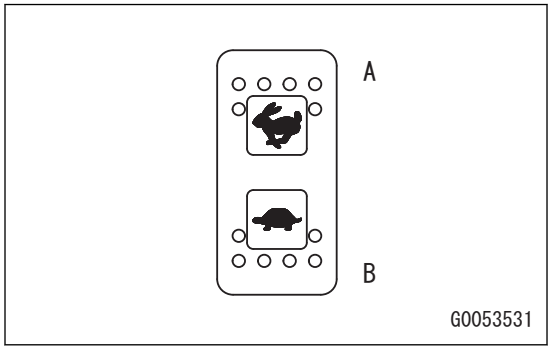
It prevents the slip of the tire on one side because it rotates the tires on the right and left sides with the same speed.

Do not use on a road with a large wear resistance. If you use it, the machine can get severely damaged in some cases.

- The differential lock can enhance the straight travel performance of the machine. It can maximize the drawbar pull force as well.
- Use the differential lock on the road, such as slope, soft ground, or wet.
  It is useful to prevent the slip of the tire on one side.
- Turn the differential lock switch to the OFF position when you operate the swing operation.
  It prevents the wear of the tire. Also, it prevents the road damage caused by a tire.
- Turn the differential lock switch to the OFF position when you operate the swing operation on the road where the wear resistance is large between the tire and the road such as the concrete road.
  It prevents the wear of the tire, and makes the swing operation smoothly done.

RPM SET SWITCH

The RPM set mode switch is used to do the setting and adjustment of the opening of the accelerator pedal.



Position (A) (push forward): SET/ACCEL

After you push the accelerator pedal until you get the necessary engine speed, push the switch forward, the accelerator pedal opening at that time is held, and the RPM set pilot lamp on the machine monitor lights up.

After you set the accelerator pedal opening, each time when you push the switch forward, the number of engine rotation will increase by 100.

As long as the switch is kept pushed forward, the engine rotation increases.

Position (B) (push rearward): RESUME/DECEL

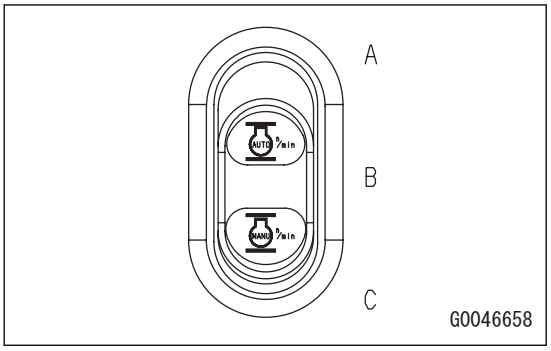
When the accelerator pedal opening is set, each time when you push the switch rearward, the number of engine rotation will decrease by 100.

As long as the switch is kept pushed rearward, the engine rotation decreases.

After you set the accelerator pedal opening in the automatic mode, if you push the switch rearward in temporary cancellation, the accelerator pedal opening recovers to that of before temporary cancellation.

RPM SET MODE SELECTOR SWITCH

The RPM set mode switch is used to turn on or off the RPM set system and to change the RPM set mode.



Position (A)

The automatic mode is selected and the indicator on the (A) side of the switch lights up.

Position (B)

OFF

The RPM set system is turned off and the indicator of the switch goes off.

Position (C)

The manual mode is selected and the indicator on the (C) side of the switch lights up.

REMARK

- The RPM set mode selector switch is used only to turn on or off the RPM set system.
  Use the RPM set switch to set the engine speed.
- If you cancel the RPM set switch or do not use it, turn off the RPM set mode selector switch.
- After the engine is started, it is turned off regardless of the switch position. If the engine is started while the switch is in the position (A) or (C), turn it off, and then push the position (A) or (C) again.

Automatic mode

If the opening of accelerator pedal is set, you can cancel it temporarily with the accelerator operation or brake pedal operation.

In the temporary canceled condition, if you push the RPM set switch rearward (RESUME/DECEL), the opening of the accelerator pedal returns to the state before temporary cancellation.

- After the opening of accelerator pedal is set and the accelerator pedal is fully returned, if the accelerator pedal is pushed further than the set opening, the engine speed will increase and the setting is canceled temporarily.
  The engine speed during the temporary cancellation will follow only the accelerator pedal.
- If you push the brake pedal when the setting of the accelerator pedal opening is done, the setting is canceled temporarily, and the engine speed will follow only the accelerator pedal.

REMARK

- In the temporary canceled state, the RPM set pilot lamp on the machine monitor stays lit.
- In the temporary canceled state, when you push the RPM set switch forward (SET/ACCEL), the accelerator pedal opening at that time is held as a new value.
- In the temporary canceled state, when the engine is stopped, the saved accelerator pedal opening is deleted, and it cannot be recovered even if the switch is pushed rearward (RESUME/DECEL).

Manual mode

The setting of the accelerator pedal opening is held until the RPM set mode selector switch is turned off.

After the opening of accelerator pedal is set, if the accelerator pedal is pushed further than the set opening, the engine speed will increase.

When you return the accelerator pedal, the opening of the accelerator pedal returns to that of the setting.

Even if the brake pedal is pushed, the opening of the accelerator pedal is not canceled.

Mode	Automatic mode	Manual mode
Setting	Push the RPM set switch forward (SET/ACCEL).	
Cancellation	Turn off the RPM set mode selector switch.	
Temporary cancellation	1. Push the accelerator pedal. 2. Push the brake pedal.	-
Recovery from temporary cancellation	Push the RPM set switch rearward (RESUME/DECEL).	-

YELLOW REVOLVING LAMP SWITCH

(option)

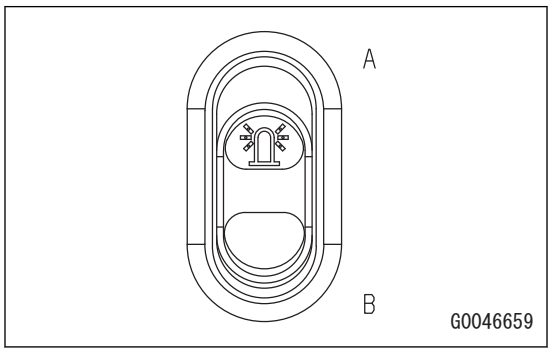
Use the yellow revolving lamp switch to turn on the yellow revolving lamp.

Position (A): Revolving lamp lights up.

Position (B): Revolving lamp goes off.

REMARK

Use the yellow revolving lamp during the work. To use it, obey the instructions of the administrator.



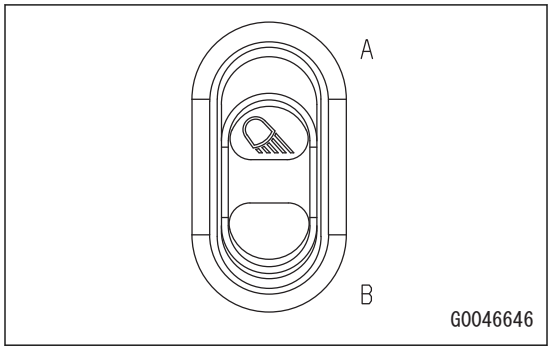
CAB MOUNT WORKING LAMP SWITCH

(option)

You can use the cab mount working lamp switch to light up the cab mount working lamp

(A) position: Working lamp lights up.

(B) position: Working lamp goes off.



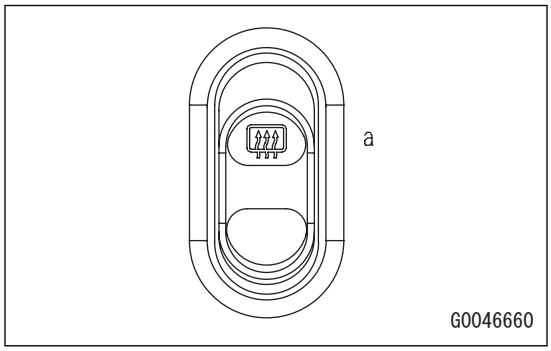
REAR HEATED WIRE GLASS SWITCH

When you push the rear heated wire glass switch, the heating of the rear wire glass is turned on to clear the glass.

After a lapse of 15 minutes of operation from the start, the electricity supply for heating operation of the wire glass automatically stops.

You can switch the operation of the rear heated wire glass between ON (clean the glass) and OFF every time you push the rear heated wire glass switch (a).

If you let go of the switch, it automatically goes back to its original position.



ENGINE SHUTDOWN SECONDARY SWITCH

NOTICE

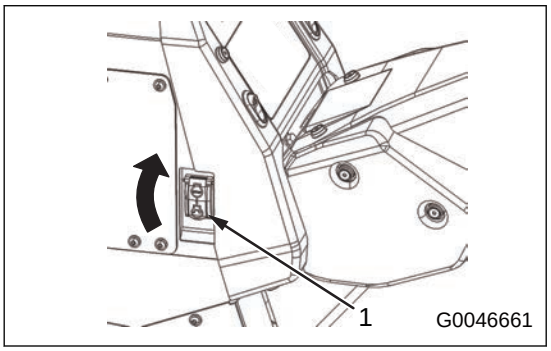
When the engine is not stopped even after you turned the starting switch to the OFF position, use the engine shutdown secondary switch to stop the engine.

- **Use the engine shutdown secondary switch when a problem is found.**
  Repair the defective part immediately.
- **When the machine is in normal condition, if you turn the engine shutdown secondary switch to the STOP ENGINE position by mistake, "Engine Shutdown Secondary SW in Operation" is shown on the machine monitor.**
  When "Engine Shutdown Secondary SW in Operation" is shown on the machine monitor, check that the cover is closed or the switch is in the normal position, and if it is not in the normal position, make it back in the normal position.

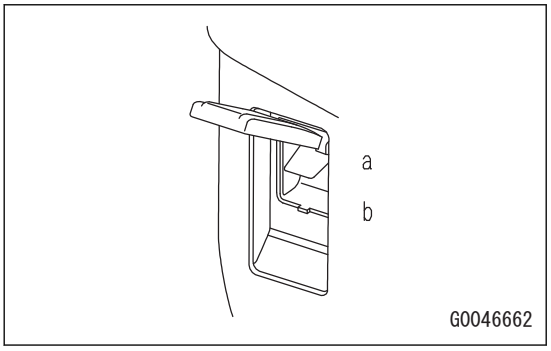
Lower the work equipment to the ground and turn the starting switch to the OFF position.

If the engine does not stop, operate the engine shutdown secondary switch as follows.

1. Raise the cover (1) to open it.
   There is a switch in it.



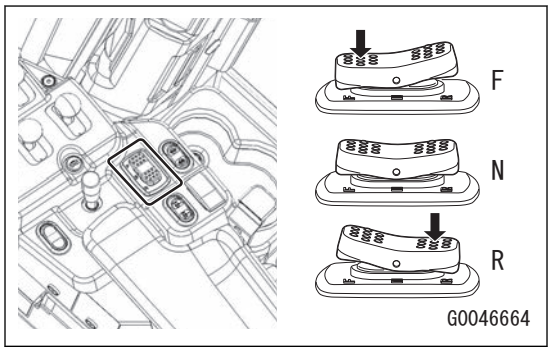
2. Move the switch up and the engine will stop.
   (a) Engine stop: When abnormal (switch is up)
   (b) Normal: When normal (switch is down)
   - When the cover (1) is closed, the engine shutdown secondary switch goes back automatically to NORMAL position (b).
   - When you turn the starting switch is to the ON position if the engine shutdown secondary switch is at the ENGINE STOP position, "Engine Shutdown Secondary SW in Operation" is shown on the machine monitor.
     If this screen is shown, get the engine shutdown secondary switch back to the NORMAL position.





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DIRECTIONAL SELECTOR SWITCH



Directional selector switch is used to select the travel direction of the machine.

Only when the directional selector switch is in the NEUTRAL position (N), you can start the engine.

When it is in other positions, the centralized warning lamp lights up and the alarm buzzer sounds.

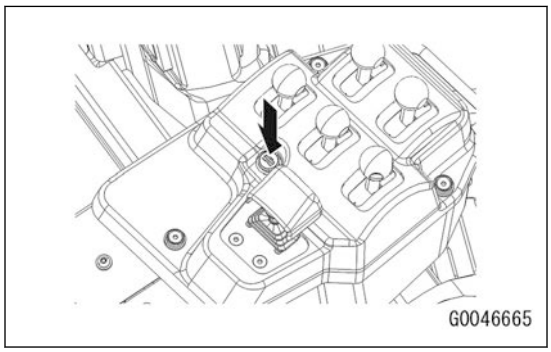
Turn the directional selector switch to the NEUTRAL position (N) first, and start the engine.

(F) position: FORWARD

(N) position: NEUTRAL

(R) position: REVERSE

BLADE FLOAT LEFT SWITCH



With the blade float left switch, you can set the blade to the float position.

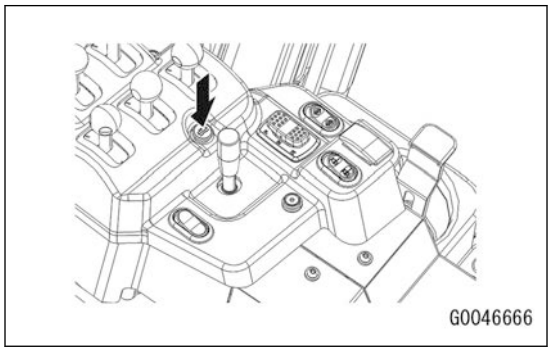
Push the switch to turn it ON or OFF. When the float is operated, the blade float pilot lamp lights up.

It is not operated if the work equipment lock switch is in the ON position. Before you operate the float switch, be sure to turn the work equipment lock switch to the OFF position.

REMARK

- When you operate the left blade lift control lever, the float operation is canceled.
- Since it controls the oil pressure of the blade lift cylinder and let the work equipment go down to the ground only by its own weight, you can use it for the removal work which does not need a high ground pressure of the blade, such as the removal of new snow or surface layer of the road.

BLADE FLOAT RIGHT SWITCH



The blade float right switch is a switch to let the right side of blade be in the float position.

Push the switch to turn it ON or OFF. When the float is operated, the blade float pilot lamp lights up.

It is not operated if the work equipment lock switch is in the ON position. Before you operate the float switch, be sure to turn the work equipment lock switch to the OFF position.

REMARK

- When you operate the right blade lift control lever, the float operation is canceled.
- Since it controls the oil pressure of the blade lift cylinder and let the work equipment go down to the ground only by its own weight, you can use it for the removal work which does not need a high ground pressure of the blade, such as the removal of new snow or surface layer of the road.

STEERING LEVER ENABLE SWITCH

⚠ WARNING

- **When you drive the machine on a public road, be sure to disable the steering control lever.**
- **Before you stand up from the operator's seat, be sure to disable the steering lever enable switch. If you stand up while the steering control lever is effective, you possibly touch the steering control lever by mistake and it can cause serious accident.**
- **If the steering control lever is not disabled securely and it is moved by mistake, it can cause serious personal injury or death. Make sure that the steering control lever pilot lamp is not lit if you do not use the steering control lever.**
- **When you operate the steering lever enable switch, make sure that the steering control lever is at the NEUTRAL position.**
- **When you operate the steering lever enable switch, be careful not to touch the steering control lever.**
- **Make sure that your clothes do not get caught by the steering control lever.**

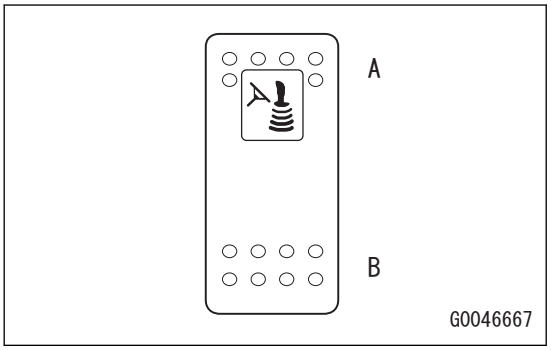
The steering lever enable switch is used to make the operation of the steering control lever effective.

Position (A): ON (steering control lever is effective)

You can steer the machine with the steering control lever.

Position (B): OFF (steering control lever is disabled)

The steering operation by the steering control lever is locked.



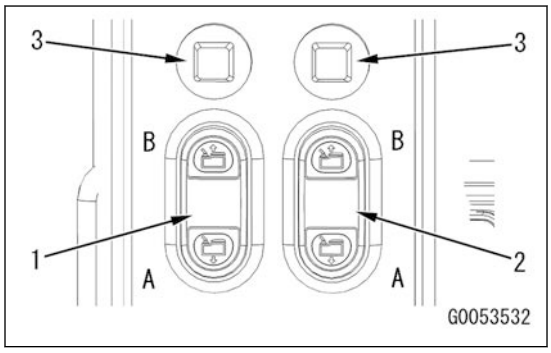
NOTICE

- **Make the steering lever enable switch effective in the conditions that follow.**
  - **The engine is running.**
  - **The machine is stopped.**
  - **The gear shift position is in the NEUTRAL (N).**
- **If you make the steering lever enable switch effective during the travel, the steering control lever pilot lamp lights up in yellow, and the alarm buzzer operates intermittently. Stop the machine immediately, and disable the steering lever enable switch.**

REMARK

- When the steering lever enable switch is effective, the gear speed can only be shifted up to the forward 6th speed and reverse 3rd speed. Disable the steering lever enable switch when the machine travels at high speed.
- If the leaving operator's seat caution lamp is lit, you cannot make the steering lever enable switch effective. Make sure that you sit on the seat correctly, and that the leaving operator's seat caution lamp is not lit, and then make the steering lever enable switch effective.

WORK EQUIPMENT LEVER CONSOLE ELECTRIC LIFTER SWITCH



With the work equipment lever console electric lifter switches (1) and (2), you can adjust the height of the right and left work equipment lever consoles.

Operate the work equipment lever console electric lifter switch (1) and you can adjust the height of the left work equipment lever console. Operate the work equipment lever console electric lifter switch (2) and you can adjust the height of the right work equipment lever console.

(A) Lower the work equipment lever console

While it is pushed, the work equipment lever console lowers.

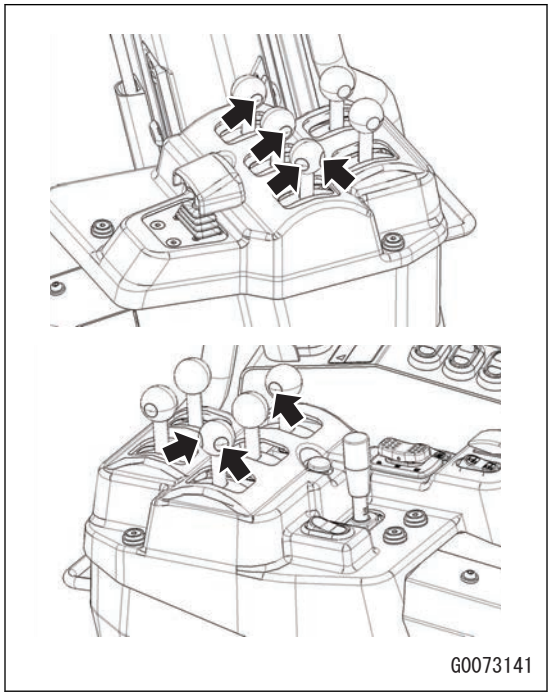
(B) Raise the work equipment lever console

While it is pushed, the work equipment lever console rises.

NOTICE

If the switch is kept pushed even after the console height is adjusted to the highest or lowest position, the motor can overheat.
To protect the motor, if the breaker operates, the breaker switch (3) is pushed out. If you adjust it again, wait for a time, push in the breaker switch (3), and then operate the work equipment lever console electric lifter switch.

SWITCHES FOR ATTACHMENTS AND OPTIONS



The function of each attachment which is installed to the machine is given to each switch for attachments and options.

Switches for attachments and options that are not given with a function do not operate when they are pushed.

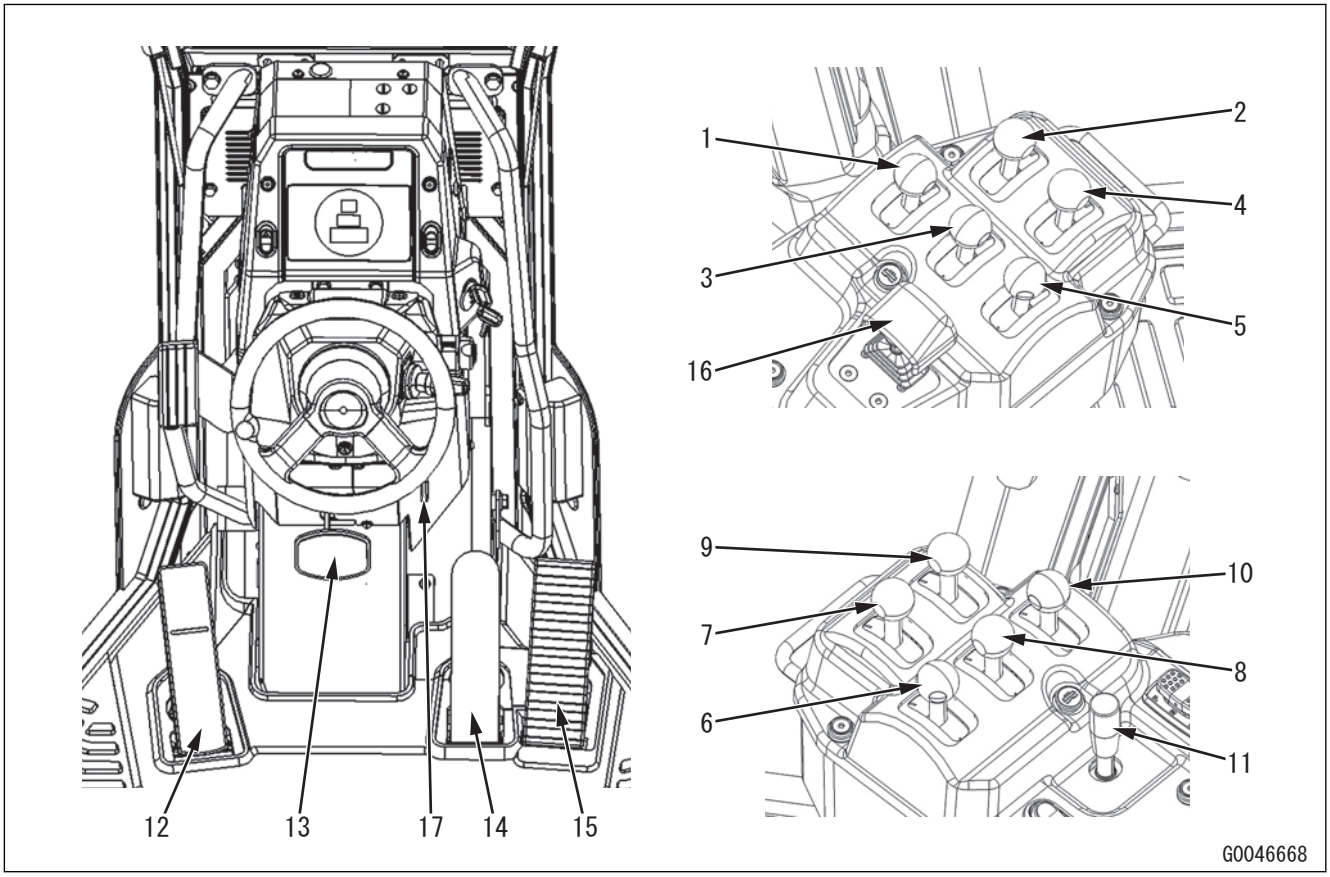
(Machines with ICT devices)

For details, see the ATTACHMENTS AND OPTIONS, “PRECAUTIONS FOR MACHINES WITH ICT DEVICES (6-2)”.

(Machines with cross slope system)

For details, see the ATTACHMENTS AND OPTIONS, “NAMES OF SWITCH PANEL EQUIPMENT OF MACHINE WITH CROSS SLOPE SYSTEM (6-4)”.

CONTROL LEVERS AND PEDALS



(1) L.H. blade lift control lever
(2) Ripper and scarifier control lever
(3) Blade side shift control lever
(4) Power tilt control lever
(5) Blade rotation control lever
(6) Drawbar side shift control lever
(7) Articulate control lever
(8) Leaning control lever
(9) Front attachment control lever (option)
(10) R.H. blade lift control lever
(11) Gear shift lever
(12) Inching pedal
(13) Steering console tilt pedal
(14) Brake pedal
(15) Accelerator pedal
(16) Steering control lever
(17) Steering telescopic lock lever

BRAKE PEDAL

⚠ WARNING

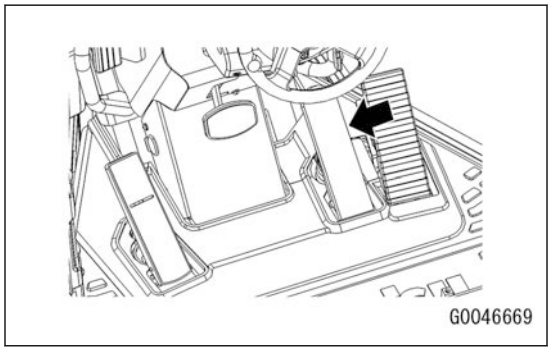
- **Do not push the brake pedal many times more than necessary. If it is used frequently, the brake can be overheated and the brake cannot work. Serious personal injury or death could be caused.**
- **Do not put your foot on the brake pedal unnecessarily.**

NOTICE

To protect the brake disc, try to exercise the operation method that follows.

- **Avoid a continuous brake pedal operation. Push the brake pedal intermittently.**
- **Operate the accelerator pedal and brake pedal gradually. Do not operate the accelerator pedal and brake pedal suddenly.**
- **When the machine travels downhill, use a low gear speed to apply the sufficient engine braking.**

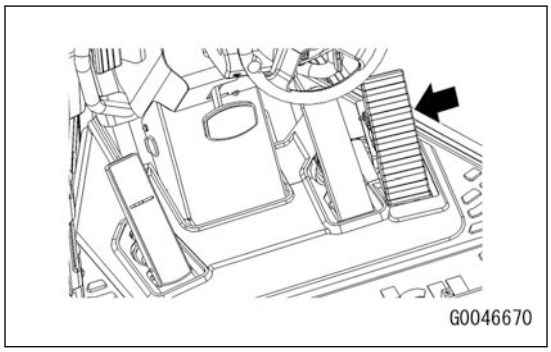
Use the brake pedal to apply the brake.



ACCELERATOR PEDAL

You can use the accelerator pedal to adjust the speed and output of the engine.

It controls the engine steplessly from low idle to high idle.



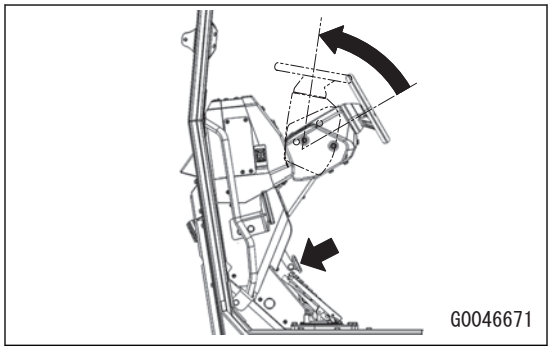
STEERING CONSOLE TILT PEDAL

You can adjust the steering console with the steering console tilt pedal.

Step on the tilt pedal, and adjust the steering console to the desired position, and release the pedal.

REMARK

When you raise the steering console to the highest position, you can easily get on and off the cab.



STEERING TELESCOPIC LOCK LEVER

⚠ WARNING

Stop the machine before adjusting the telescopic lock lever of the steering wheel. If you do this operation (adjustment) while the machine is moving, serious personal injury or death can result.

You can use the steering telescopic lock lever to fix the position of the steering wheel.

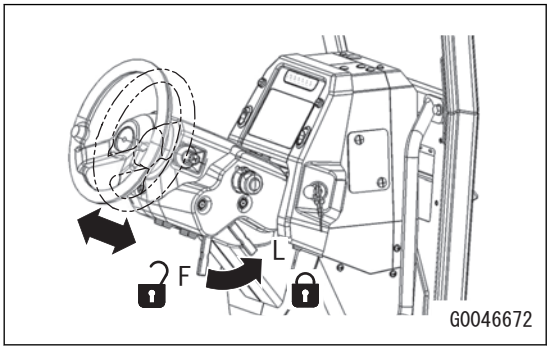
(F) FREE position: The steering wheel can move back and forth.

(L) LOCK position: The steering wheel is fixed in the position.

Push it in, and make sure it does not hit your leg.

NOTICE

Do not continue to operate the steering telescopic lock lever with too much force. In some cases, the lever can be loosened or its angle can be displaced. Ask your Komatsu distributor for inspection in such case.



LH BLADE LIFT CONTROL LEVER

The left blade lift control lever is used to operate the left blade lift cylinder.

Position (A): Lower

The left side of blade lowers.

Position (B): Hold

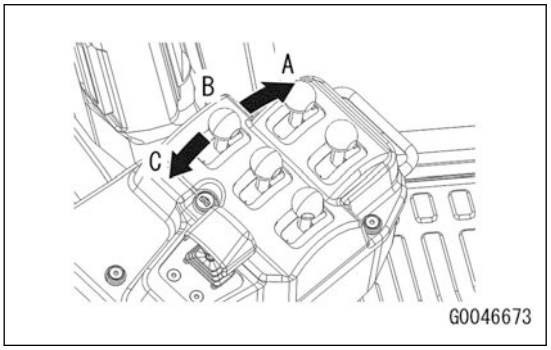
The blade is stopped and kept in that position.

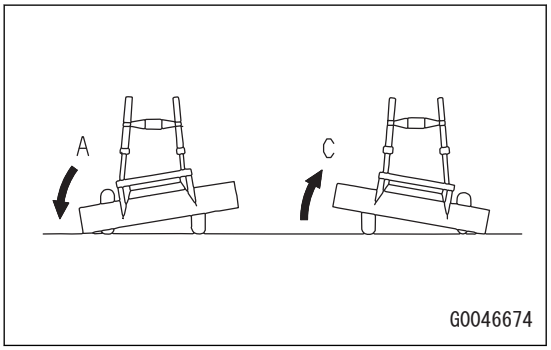
Position (C): Raise

The left side of blade rises.

NOTICE

When you start the engine, be sure to set the lever to the HOLD position (B).





RIPPER AND SCARIFIER CONTROL LEVER

The ripper and scarifier control lever is used to control the ripper or scarifier.

(Machines with ripper)

(A) position: LOWER

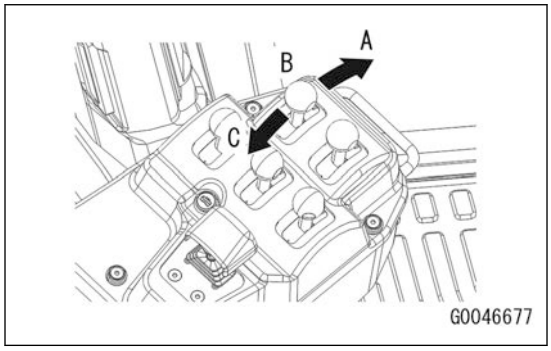
Lowers the ripper.

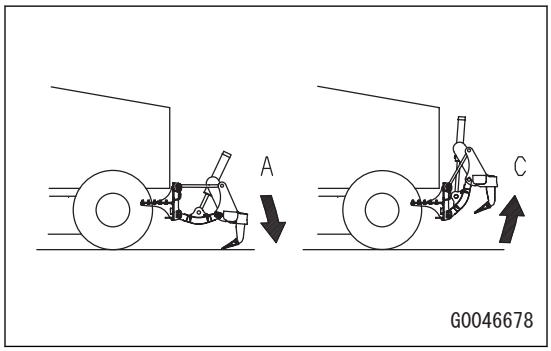
(B) position: HOLD

Ripper is stopped and held in the position.

(C) position: RAISE

Raises the ripper.





(Machine with scarifier)

(A) position: LOWER

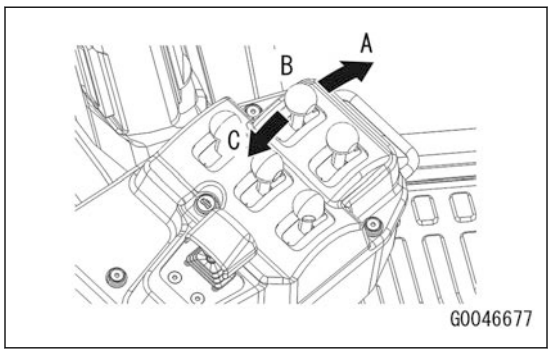
Lowers the scarifier.

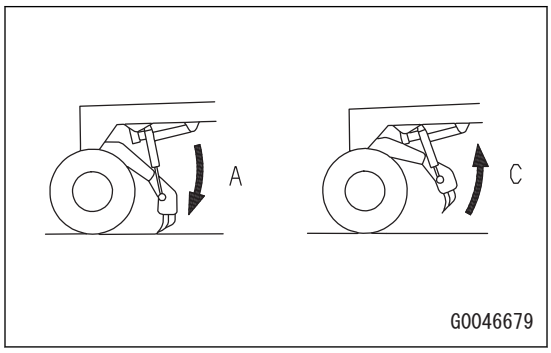
(B) position: HOLD

Scarifier is stopped and held in the position.

(C) position: RAISE

Raises the scarifier.





BLADE SIDE SHIFT CONTROL LEVER

Blade side shift control lever operates the blade to side shift.

(A) position: Shift LEFT

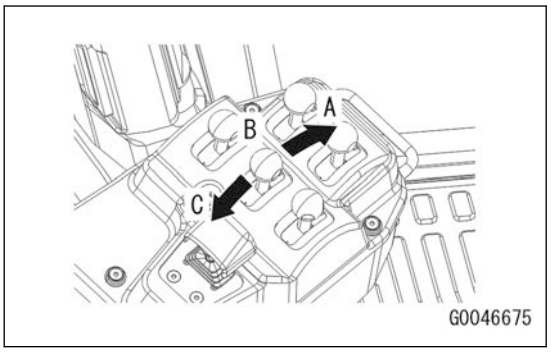
Shifts the blade to the left.

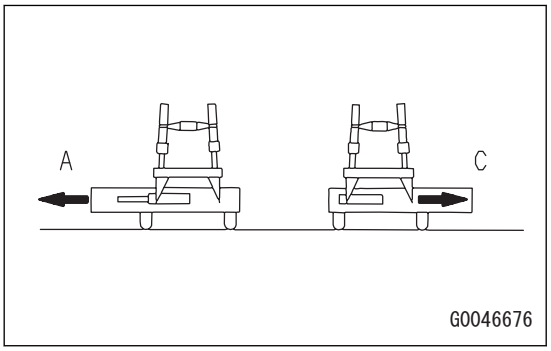
(B) position: HOLD

Blade is stopped and held in the position.

(C) position: Shift RIGHT

Shifts the blade to the right.





POWER TILT OPERATION LEVER

Power tilt operation lever is used to control the blade cutting angle.

Position (A): Large cutting angle

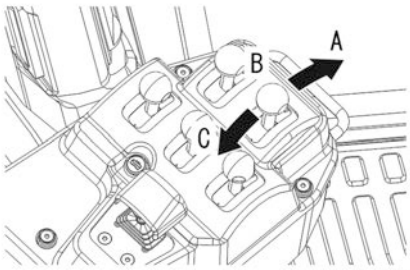
The cutting angle becomes large. It is effective for the hard soil.

Position (B): Hold

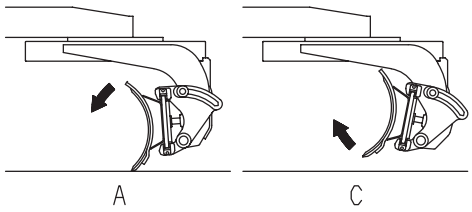
The blade is stopped and kept in that position.

Position (C): Small cutting angle

The cutting angle becomes small. It is effective for the soft soil.



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BLADE ROTATION CONTROL LEVER

NOTICE

To prevent damage to the tires, be careful not to let the blade touch the tires when you turn the blade.

The blade rotation control lever is used to turn the blade.

Position (A): Left turn

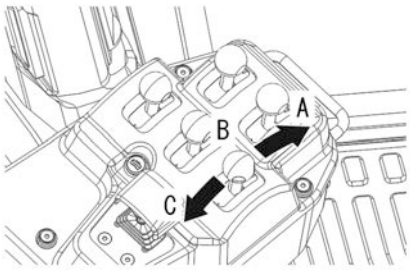
The blade turns to the left.

Position (B): Hold

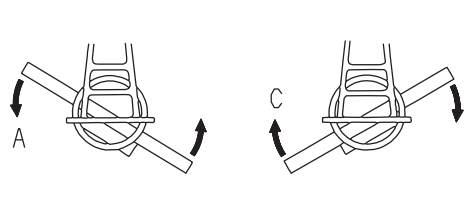
The blade is stopped and kept in that position.

Position (C): Right turn

The blade turns to the right.



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ARTICULATE CONTROL LEVER

⚠ WARNING

Do the operation while the travel speed is 10 km/h {6.2 MPH} or below. If you do the articulation operation while the travel speed is above 10 km/h {6.2 MPH}, or if the travel speed exceeds 10 km/h {6.2 MPH} while the machine is articulated, the machine possibly falls over.

NOTICE

Be careful that the blade does not contact to the tire when you articulate the machine, because it can damage the tire.

The articulate control lever is used to articulate operation.

(A) position: Turn LEFT

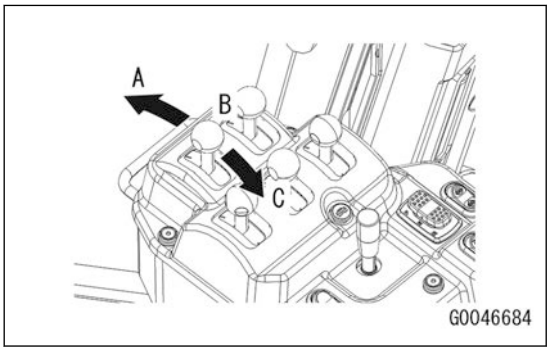
It articulates to the left.

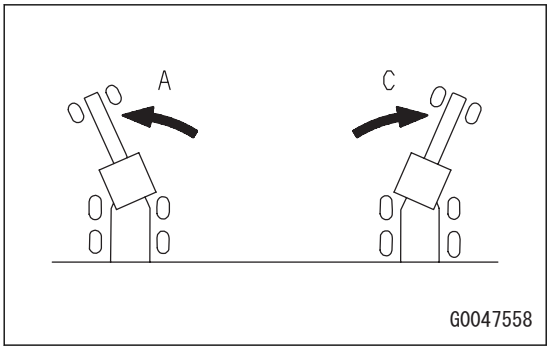
(B) position: HOLD

Keeps the current articulate condition.

(C) position: Turn RIGHT

It articulates to the right.





Articulate neutral stop function

The articulate neutral stop function, which stops the articulation angle automatically at the neutral position when you operate the articulation operation, is provided to this machine.

For the setting of the articulate neutral stop function, see “SET ARTICULATE NEUTRAL STOP SETTING (3-83)”.

If you need to do the articulation operation after the articulation angle is stopped automatically at neutral, move the articulate control lever back to the HOLD position (B), and operate the lever again.

DRAWBAR SIDE SHIFT CONTROL LEVER

The drawbar side shift control lever is used to slide the drawbar.

Position (A): Left shift

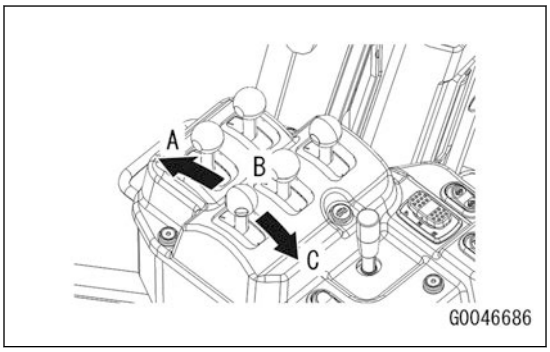
The drawbar is moved to the left.

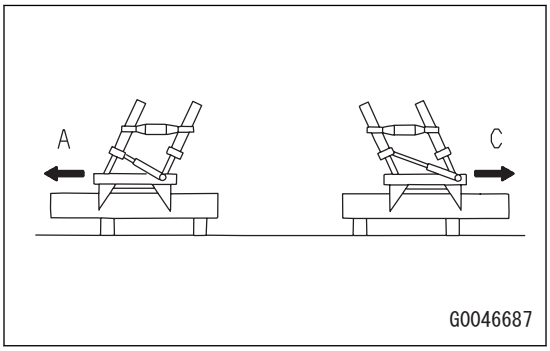
Position (B): Hold

The drawbar is stopped and kept in that position.

Position (C): Right shift

The drawbar is moved to the right.





LEANING CONTROL LEVER

Leaning control lever controls the leaning operation of the front wheel (s).

(A) position: Left leaning

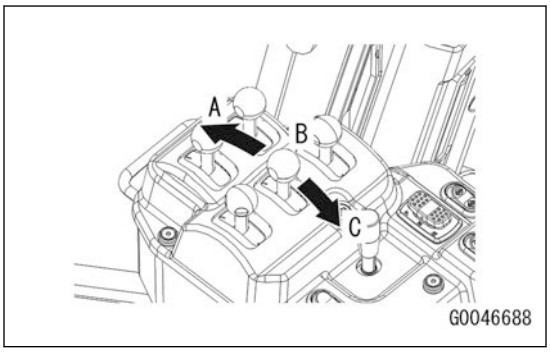
Front wheels lean to the left.

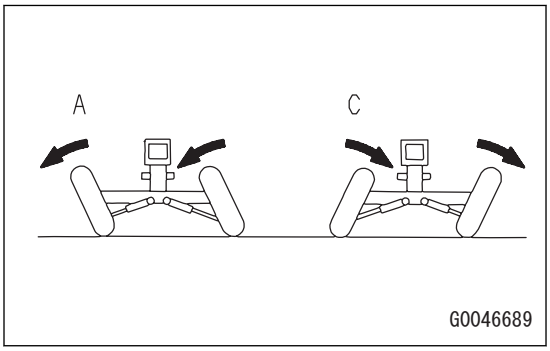
(B) position: HOLD

Keeps the current leaning condition.

(C) position: Right leaning

Front wheels lean to the right.





RH BLADE LIFT CONTROL LEVER

The right blade lift control lever is used to operate the right blade lift cylinder.

Position (A): Lower

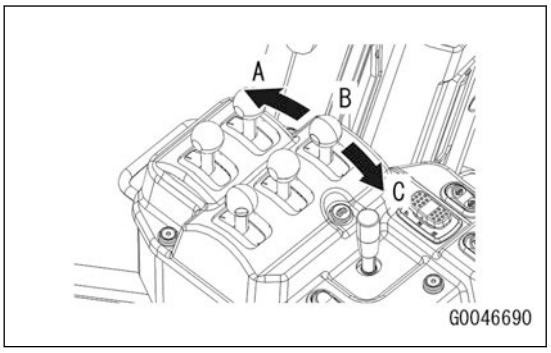
The right side of blade lowers.

Position (B): Hold

The blade is stopped and kept in that position.

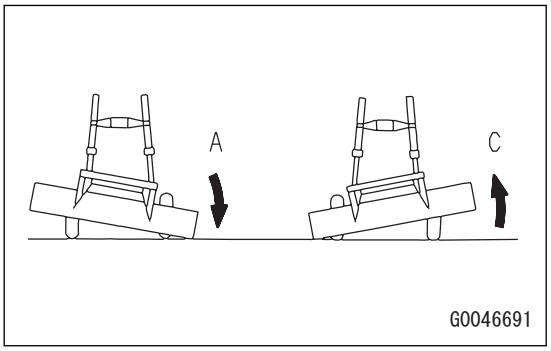
Position (C): Raise

The right side of blade rises.



NOTICE

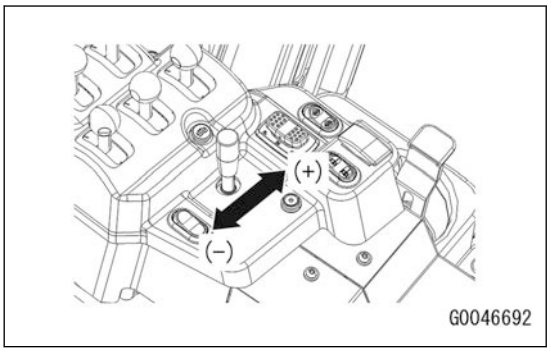
When you start the engine, be sure to set the lever to the HOLD position (B).



GEAR SHIFT LEVER

The gear shift lever is used to change the gear speed of the transmission.

When the directional selector switch is in the FORWARD (F) position or the REVERSE (R) position, you can change the gear speed to one of the 8 forward speeds and one of 4 reverse speeds with the gear shift lever.



(+): Up shift

The gear is shifted up by 1 step each time this lever is tilted.

(-): DOWN shift

The gear is shifted down by 1 step each time this lever is tilted.

REMARK

- The gear shift pattern varies with the position of the transmission mode selector switch.
- When you do the upshift operation at the gear speed other than the F8 and hold it 1 second or more, the gear speed is skipped to F8. The skip shift can be activated only when the torque converter automatic mode is selected.

STEERING CONTROL LEVER

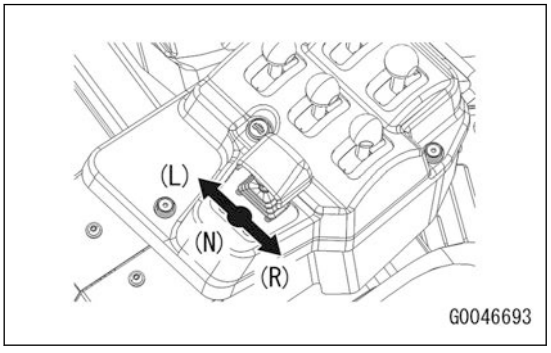
The steering control lever is used to operate the steering at hand.

Tilt the lever toward the direction that you turn when the directional selector switch is in the FORWARD (F) or REVERSE (R) position.

(L): Left turn

(N): Neutral

(R): Right turn



INCHING PEDAL

⚠ WARNING

- **Do not slide the inching clutch to make the machine stopped for a long time on a slope.**
- **Apply the parking brake to stop the machine on a slope.**
- **Do not place your foot on the pedal unless necessary.**

NOTICE

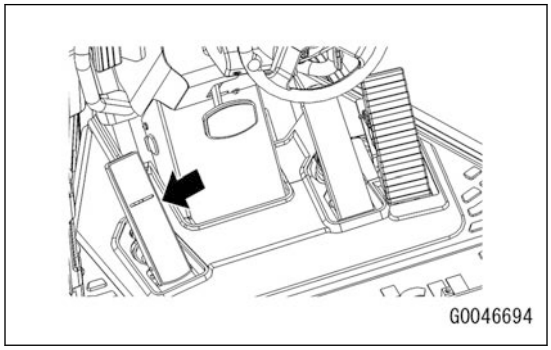
- **When you operate the inching pedal for a long time, the temperature of the clutch rises too high, and it causes seizure and abnormal wear.**
  When the temperature of the clutch rises too high, the transmission system caution lamp and the centralized warning lamp light up, and the alarm buzzer sounds intermittently.
- **Avoid the operations that follow as they possibly cause the transmission system caution lamp to light up.**
  - **To use the inching pedal continuously for a long time. As a guide, you can use the inching pedal for less than 10 seconds.**
  - **To operate the repeating operation of "depress" and "release" of the inching pedal continuously in a short period of time**
  - **To operate the inching pedal operation with a large load applied**
    If the transmission system caution lamp is lit, it shows in some cases that large load is being applied.
    Lower the engine speed, or reduce the load applied to the blade.

The inching pedal intermittently disconnects the power transmitted from the engine.

When you depress the pedal, the power is disconnected.

Use this pedal when you stop, start the machine, or select the direction of the machine.

Use the inching pedal from F1 to F4 speed and R1 and R2 speed, to enable the fine operation of the machine can be operated. It is useful for the work of the light load, such as finishing the road surface.



REMARK

- You need not do the inching pedal operation when you change the gear speed.
  When you change the gear speed, operate the gear shift lever.
- When you do the inching operations, the time it takes for the transmission system caution lamp to light up is not always the same.

FRONT ATTACHMENT CONTROL LEVER

(option)

The front attachment control lever is used to operate the front attachment.

Position (A): Lower

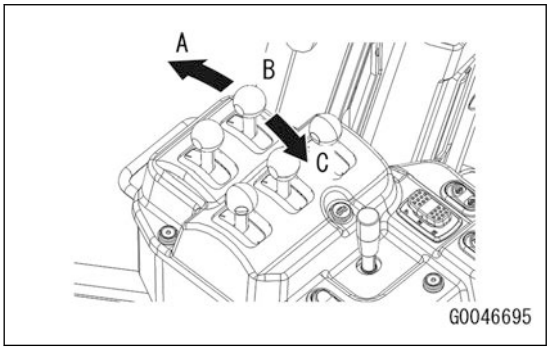
The front blade lowers.

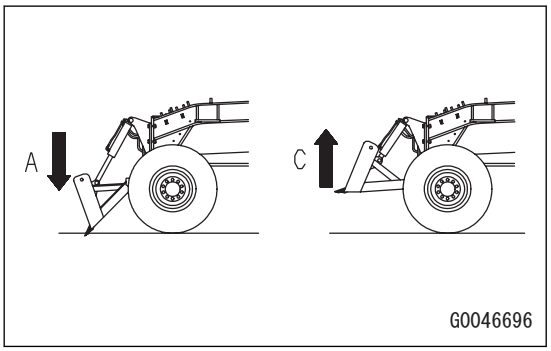
Position (B): Hold

The front blade is stopped and kept in that position.

Position (C): Raise

The front blade rises.



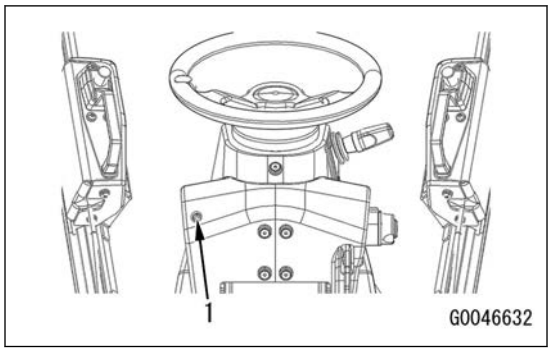


OTHER EQUIPMENT

GETTING ON AND OFF LOCK CONFIRMATION LAMP

If you raise the steering console as a posture for you to get on or off the machine, you cannot check the machine monitor. The lock state for the time of getting on and off machine is shown separately from the indicator of the machine monitor.

The lamp (1) lights up in red when the work equipment lock, parking brake, and disabled steering lever are all operated. If one of them is not operated, it goes off.



NOTICE

The lamp does not light up until all the locks operate. Make sure that each lock switch is effective.

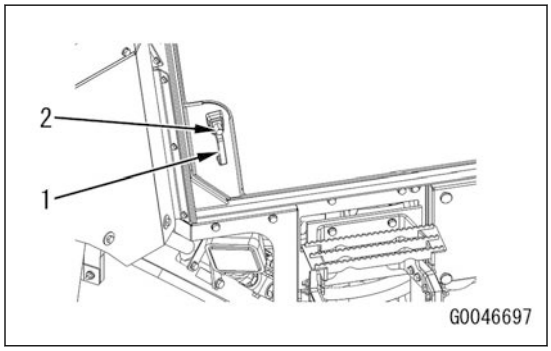
OPEN AND CLOSE CAB DOOR

⚠ CAUTION

- **Check that the cab door is locked regardless of whether it is in the open position or in the closed position.**
- **Place the machine on a flat ground always when you open or close the door.**
  Avoid the slope when you open or close the door, since there is a danger that the operating effort can suddenly change.
  In addition, open or close the door carefully when it is windy around the machine.
- **When you open or close the door, hold both a door handle and a knob.**
- **Be careful not to pinch your hand with the front pillar or the center pillar.**
- **Call out a warning before opening or closing the door when there is anyone inside the cab.**
- **When you lock the door in open state, be sure to lock it from the ground.**

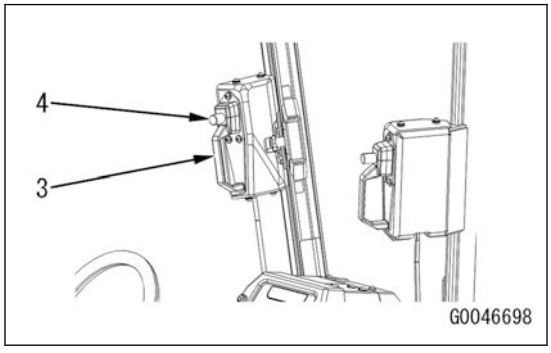
When you open the cab door

- Hold the door handle (1), and push the release button (2) to open the door from the ground.



- Hold door handle (3), and push the release button (4) to open the door from inside the cab.

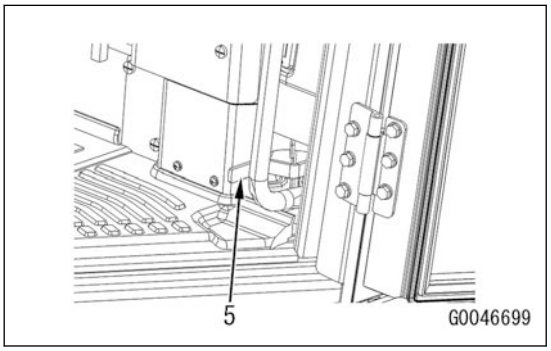
  The door opens by its own weight in some cases. Be careful.



When you close the cab door

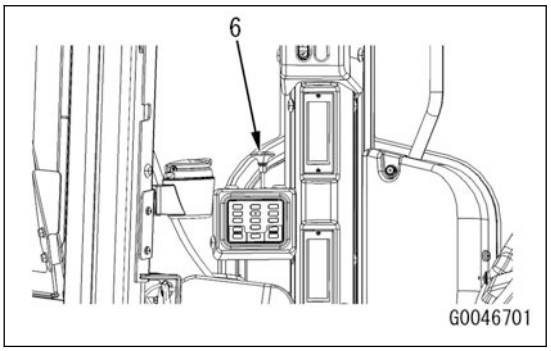
- Push down the release lever (5) to close the door from the ground.

  The lock of the door locked in the open state is released. Because the door starts closing as soon as you release it, hold it by your hand.

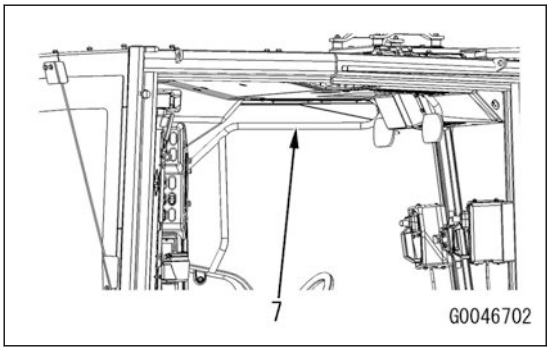


- When you close the door from inside the cab, check that there are no people and obstacles around the machine, and push the release knob (6).

  The lock of the door locked in the open state is released. The door starts closing as soon as you release it.



Hold the handle (7) on the door, pull the door and close it correctly.



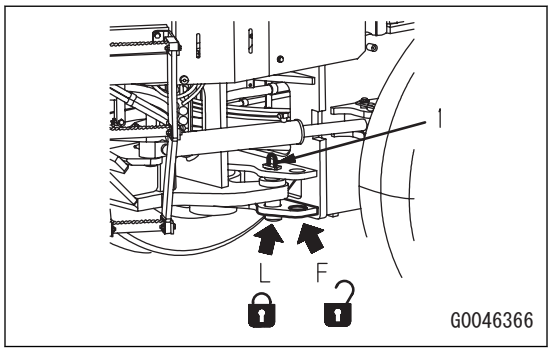
ARTICULATE LOCK PIN

⚠ WARNING

- **Apply the articulate lock pin always when you do maintenance or transport the machine.**
- **Apply the articulate lock pin always when you drive the machine on the public road.**

In the travel on public road, maintenance, or transportation, set the articulate lock pin to the LOCK position (L) to prevent the articulation of machine.

When you do the articulate operation, set the pin (1) in FREE (F) position.

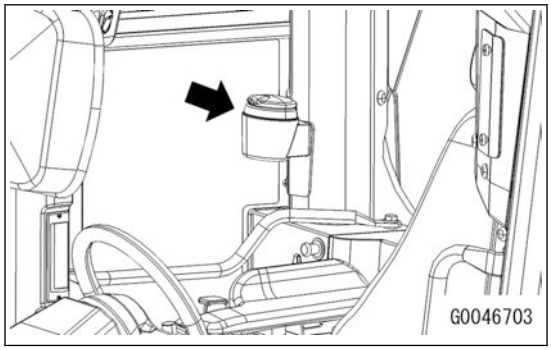


ASHTRAY

It is on the right side of operator's seat.

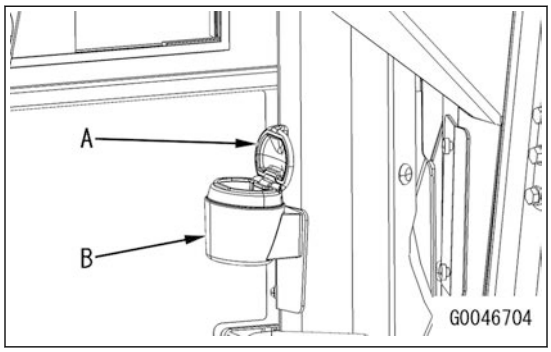
Be sure to extinguish your cigarette before you put it in the ashtray, and close the lid.

Do not use the ashtray during the machine travel.



NOTICE

When you remove the ashtray, if it is stuck in the console cover and difficult to be removed, open the ashtray lid (A), then hold the ashtray body (B) and twist it right and left to remove.
If you hold the ashtray lid (A) and twist it, the ashtray can be damaged.



POWER SUPPLY OUTLET

24 V power supply

NOTICE

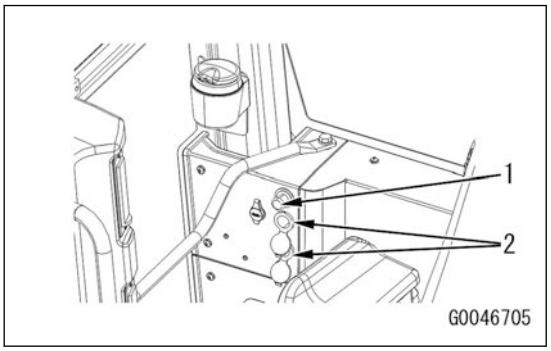
Do not use this as a power supply for 12 V equipment. This will cause failure of the equipment.

When the cigarette lighter (1) is removed, its socket can be used as a 24 V power supply.

The maximum capacity is 85 W (24 V x 3.5 A).

REMARK

Use 24 V power supply while the engine is in operation.



12 V power supply

The accessory socket (2) can be used as a 12 V power supply.

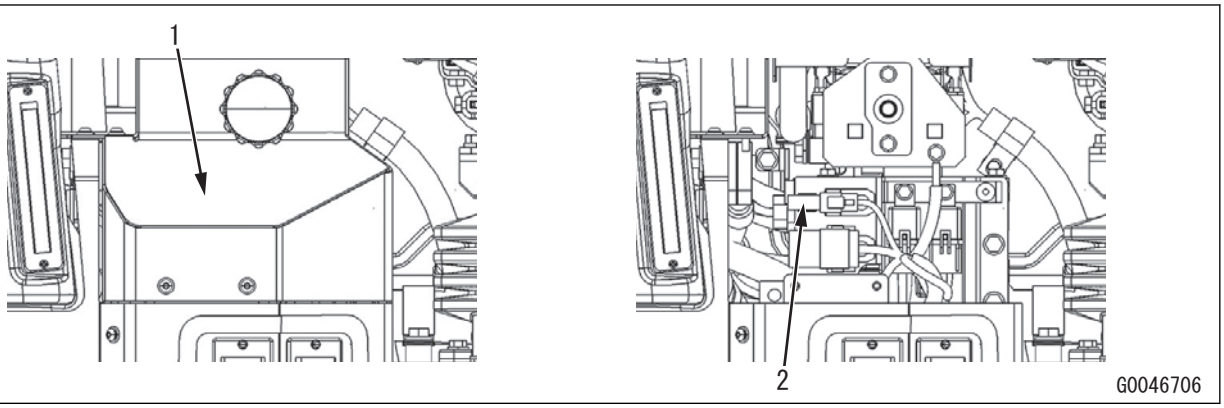
The maximum capacity is 175 W (12 V x 14.5 A).

REMARK

Use 12V power supply while the engine is in operation.

OPTIONAL POWER SUPPLY OUTLET

Remove the cover (1) at the side of the right console, and you can use 24 V power supply through the connector (2).



No.	Connector No.	When key is OFF	When key is ON	When engine is started	Fuse	Fuse capacity
(1)	H1	Power is not supplied.	Power is supplied.	Power is supplied.	Fuse box A-(15)	10 A

FUSE

⚠ WARNING

If the fuses blow out just after the replacement, consult your Komatsu distributor for inspection.

NOTICE

Before you replace the fuses, be sure to turn the starting switch to the OFF position. Check that the system operating lamp is not lit. Then turn the battery disconnect switch to the OFF position.

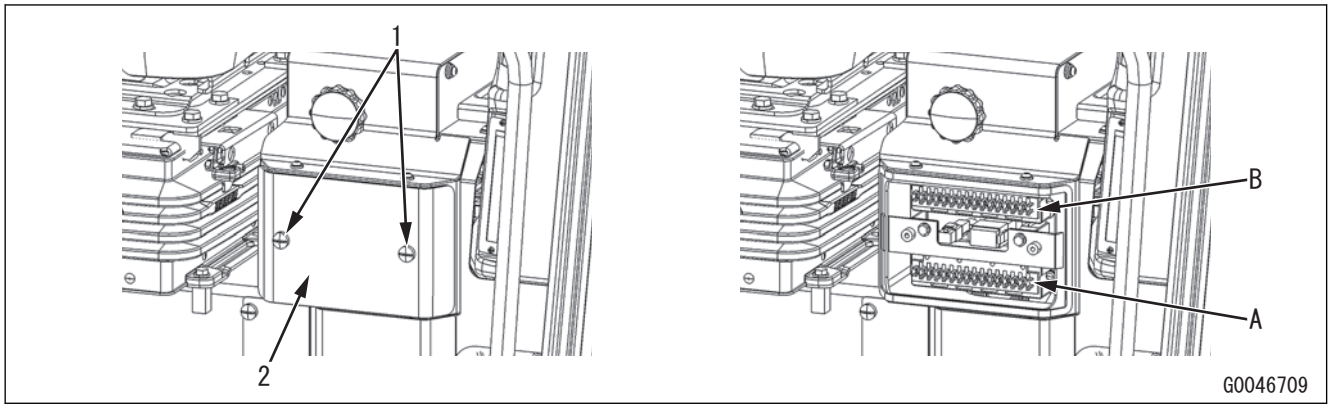
The fuses protect the electrical component and wiring from burning out.

If the fuse is corroded, or looks white powdery, or the fuse is loose in the fuse holder, replace the fuse.

Use a fuse of the same capacity when you replace it.

If the fuses blow out, find the cause and do the actions.

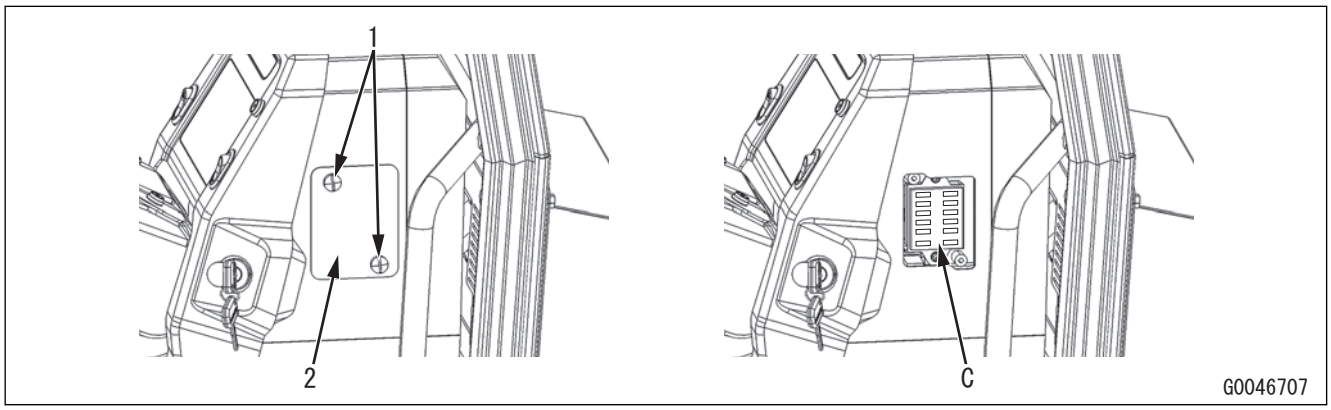
In the left console box



Loosen the knobs (1) (2 places) and remove the cover (2).

The fuse boxes are A and B of inside.

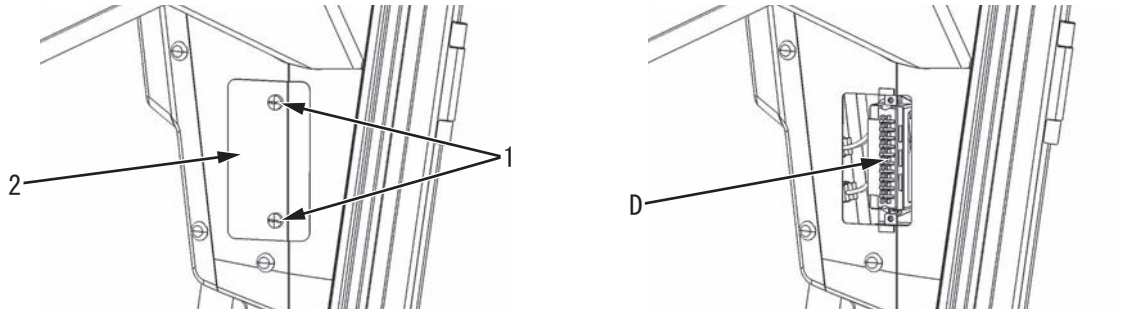
In the front console box



Loosen the knobs (1) (2 places) and remove the cover (2).

The fuse box is C of inside.

In the switch panel



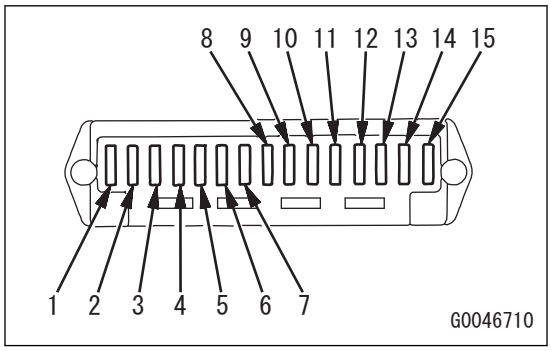
Loosen the knobs (1) (2 places) and remove the cover (2).

The fuse box is D of inside.

Fuse capacity and name of circuit

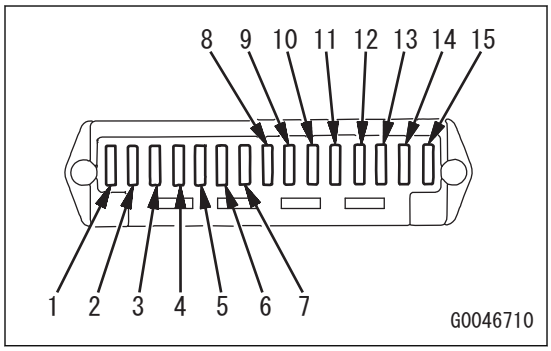
Fuse box A

No.	Fuse capacity	Name of circuit
(1)	10 A	Transmission controller continuous power supply
(2)	30 A	Engine controller continuous power supply
(3)	20 A	Air conditioner blower
(4)	10 A	Room lamp
(5)	20 A	Transmission controller power supply
(6)	10 A	Cigarette lighter
(7)	15 A	Rear working lamp
(8)	20 A	Front working lamp
(9)	20 A	Heater
(10)	10 A	12 V converter
(11)	5 A	Radio
(12)	5 A	Air conditioner compressor
(13)	10 A	Illumination
(14)	15 A	Steering controller
(15)	10 A	Optional connector for user



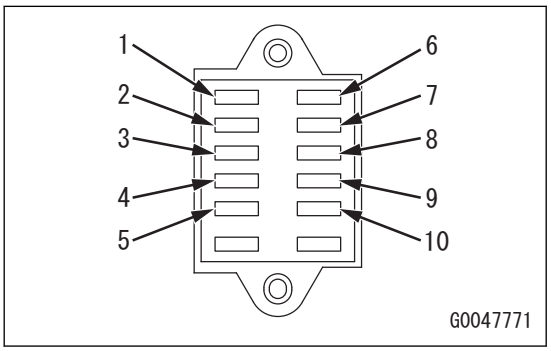
Fuse box B

No.	Fuse capacity	Name of circuit
(1)	20 A	3DMC
(2)	10 A	Smart sensor relay power supply 1
(3)	20 A	DEF hose heater
(4)	20 A	Smart sensor relay power supply 2
(5)	10 A	DEF pump
(6)	10 A	Work equipment controller 1 continuous power supply
(7)	15 A	KOMTRAX continuous power supply
(8)	10 A	KOMTRAX OPT1(continuous power supply)
(9)	10 A	Spare
(10)	20 A	Air conditioner controller
(11)	20 A	Fog lamp
(12)	20 A	Work equipment controller 1 solenoid power supply
(13)	30 A	Spare
(14)	15 A	Spare
(15)	10 A	KOMTRAX OPT2



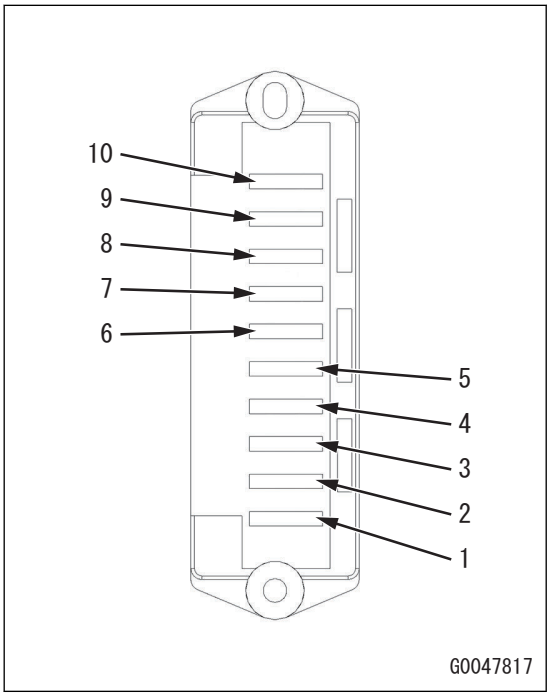
Fuse box C

No.	Fuse capacity	Name of circuit
(1)	15 A	Cab working lamp
(2)	15 A	Cab working lamp
(3)	15 A	Revolving warning lamp
(4)	20 A	Door wiper motor ON
(5)	30 A	Front and rear wiper motor ON
(6)	20 A	Spare
(7)	30 A	Rear heated wire
(8)	30 A	Spare
(9)	30 A	Spare
(10)	20 A	Spare



Fuse box D

No.	Fuse capacity	Name of circuit
(1)	10 A	Monitor controller (continuous power supply)
(2)	15 A	Key switch (B)
(3)	10 A	Turn signal lamp (hazard lamp)
(4)	10 A	Air suspension
(5)	10 A	Spare
(6)	10 A	Turn signal lamp
(7)	15 A	Headlamp
(8)	10 A	Stop lamp and backup lamp
(9)	10 A	Horn
(10)	10 A	Engine controller (ACC)



SLOW-BLOW FUSE

NOTICE

Before you replace the slow-blow fuse, you must turn the starting switch to the OFF position, then turn the battery disconnect switch key to the OFF position.

If the power is not supplied even when the starting switch is turned to the ON position, the slow-blow fuse may be blown. Check the slow-blow fuse and replace it if necessary.

The slow-blow fuses are inside the battery box, and on the side of the engine on the left side of the machine.

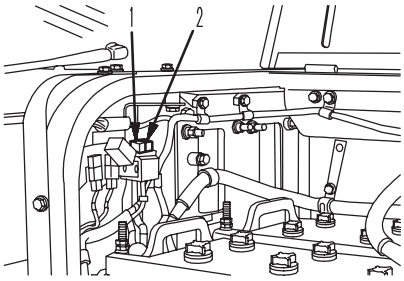
Slow-blow fuse

(1) 120 A: Secondary power supply fuse (standard)

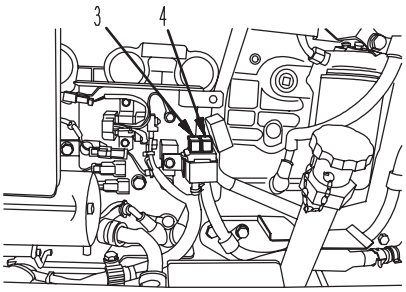
(2) 30 A: Continuous power supply main fuse

(3) 120 A: Heater relay (intake air heater)

(4) 140 A: Alternator main fuse (standard)



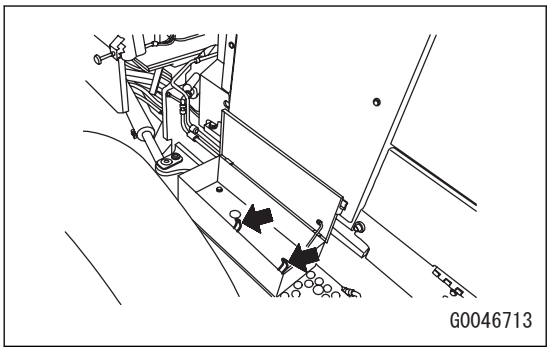
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GREASE PUMP HOLDER

The grease pump is installed to the holder in the toolbox above the tandem on the left side of the machine. After you use it, wipe off the grease from outside of the pump, and install it in position.



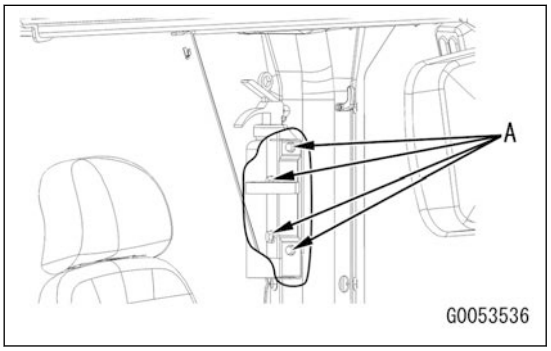
FIRE EXTINGUISHER

(option)

For the installation position of fire extinguisher, we recommend the position shown in the figure. Fix it to the installation position (A).

For the parts necessary for installation, consult your Komatsu distributor.

The instructions are shown on the nameplate attached to the fire extinguisher. Carefully read and understand them for the possibility of fires.



BATTERY DISCONNECT SWITCH

⚠ CAUTION

- **Do not operate the battery disconnect switch while the engine is running.**
  The large current occurred from the alternator can burn the electric parts and it causes a fire in some cases.
  Operate the battery disconnect switch only when the engine is stopped.
- **Be sure to check that the system operating lamp is not lit before you do the inspection and maintenance.**
  The power supply is possibly not cut out for a specified time even if the battery disconnect switch is turned to the OFF position while the system operating lamp is lit.
- **Remove the switch key always when you turn the battery disconnect switch to the OFF position.**
  If other person turns the key to the ON position carelessly, this is very dangerous.

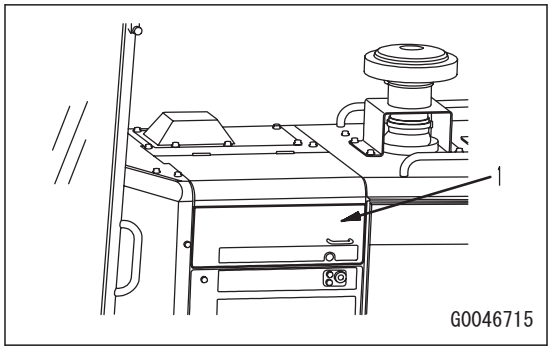
NOTICE

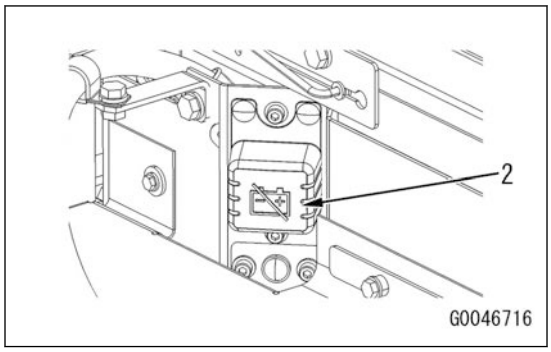
- **Keep the battery disconnect switch in the ON position except the cases that follow.**
  - **When you store the machine for a long time (more than a month)**
  - **When you repair the electrical system**
  - **When you do the electric welding**
  - **When you handle the battery**
  - **When you replace the fuse and slow blow fuse**
- **Do not turn the battery disconnect switch to the OFF position while the system operating lamp is lit. If you turn it to the OFF position while the lamp is lit, the data in the controller can be lost.**
- **If you turn it to the OFF position, all the electrical system is cut out and the functions of KOMTRAX stop. In addition, the time information of the clock can be lost. In this case, see "CLOCK SETTING (3-322)" and "RADIO (3-314)", and set them again.**

The battery disconnect switch is used to cut out the electricity from the battery.

Open the side cover (1) on the left of machine.

Raise the rubber cover (2), and the switch is seen.





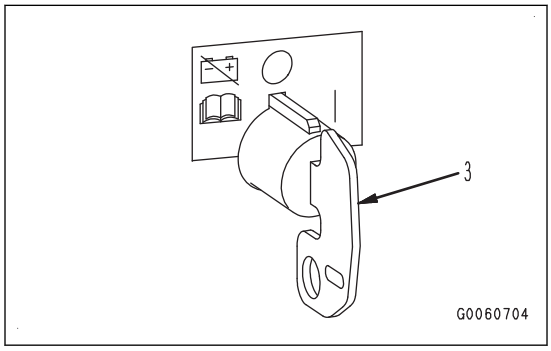
(O): OFF position

It allows you to insert and remove the switch key (3), and cuts out the electric current from the battery.

(I): ON position

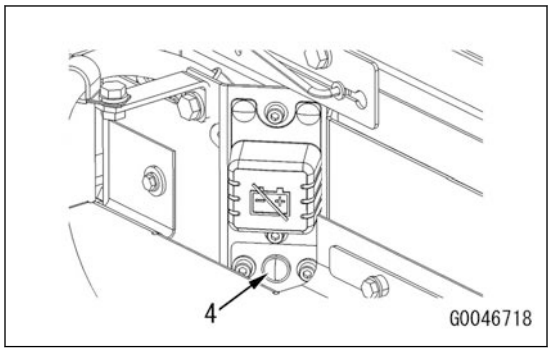
The electric current from the battery flows into the circuit.

Before you start the machine, be sure to set it to this position.



REMARK

- Immediately after the starting switch is turned to the OFF position, each controller saves the data.
  Before you turn the battery disconnect switch to the OFF position, make sure that the system operating lamp (4) below the battery disconnect switch is not lit.
- Immediately after you rotate the fan reversely, power to the fan reverse solenoid is supplied for some time to protect the hydraulic motor even after the starting switch is turned to the OFF position.
  Before you turn the battery disconnect switch to the OFF position, make sure that the fan is stopped fully.



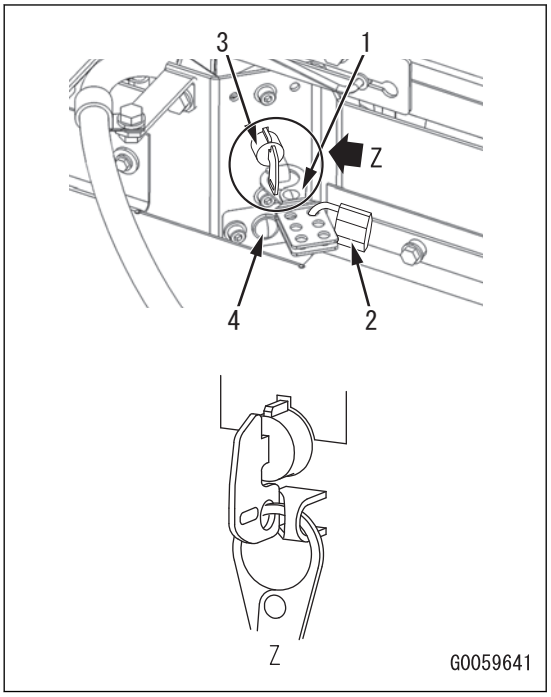
BATTERY DISCONNECT SWITCH

The battery disconnect switch can be locked out with the hasp (1) and padlock (2) at the position where the switch key (3) is in the OFF position.

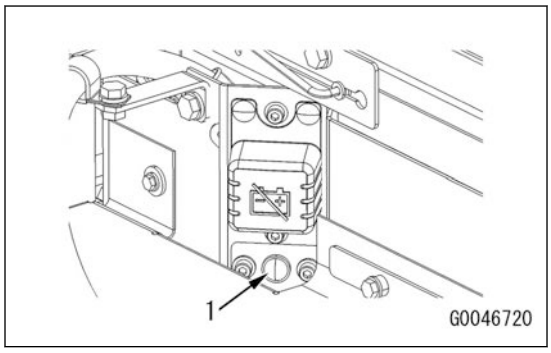
NOTICE

- **Prepare an applicable padlock (2) by yourself.**
- **If the hasp (1) is broken or lost, purchase the same hasp of part number (17A-54–5280) which is attached to the machine, or procure it locally.**
- **Be sure to check the items that follow before the lockout.**

Lock out the battery disconnect switch with the hasp (1) and padlock (2). In the lockout condition, make sure that the switch key (3) does not move to the ON position and the system operating lamp (4) does not light up.



SYSTEM OPERATING LAMP



The system operating lamp shows that the electric power is supplied to the controller installed on the machine.

System operating lamp (1) lights up when the power to the controller is turned on and goes off in 5 to 6 minutes after the power for the machine is turned off.

Check that system operating lamp (1) is not lit before you operate the battery disconnect switch.

NOTICE

If you turn the battery disconnect switch to the OFF position while this lamp is lit, the data in the controller will be lost in some cases.

REMARK

- Even if you turn the starting switch to the OFF position, the controller operates in some cases. The system operating lamp lights up at this time, but it is not a failure.
- After the starting switch has been turned to the OFF position, the system operating lamp stays lit for a long time in some cases.
  In such case, consult your Komatsu distributor.
- While the DEF system devices are operating, the system operating lamp lights up to purge the DEF to the tank.
  Do not turn the battery disconnect switch to the OFF position while the system operating lamp is lit.
- The system operating lamp looks slightly luminous in the dark even when it is not lit. It is because of the minute leakage of the current and this is not an abnormal phenomenon.

BACKUP ALARM

The alarm operates at the same time when the directional selector switch is set to the REVERSE position. This alarm warns people behind the machine that the machine travels reverse.

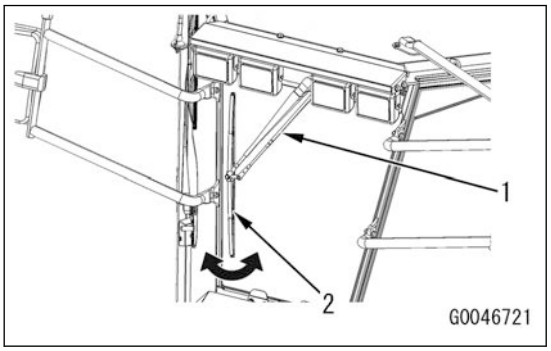
WIPERS

Prevent the damage of the windshield wiper arm bracket

NOTICE

When you tilt forward the windshield wiper arm (1), check beforehand that the windshield wiper blade (2) is not fixed and movable.

When you tilt forward the windshield wiper arm (1) to do wiping and cleaning the cab, the mounting bracket part can get damaged by the abnormal external force caused when the windshield wiper blade (2) is locked to the arm (the blade edge is trapped in the arm).



DUST INDICATOR

Dust indicator

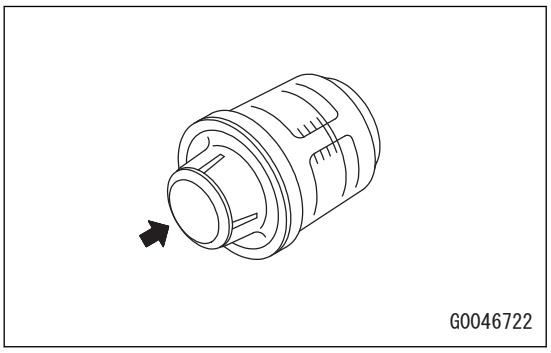
The degree of clogging is shown in 5 stages.

Clean the element when the yellow display board which shows the degree of clogging reaches the red line.

Push the reset button after you finish cleaning, then the yellow display board goes back to the original position.

REMARK

When the air cleaner clogging caution lamp lights up when the clogging is occurred.
After the cleaning, the caution lamp goes off automatically, but the dust indicator needs to be reset.



REARVIEW MONITOR

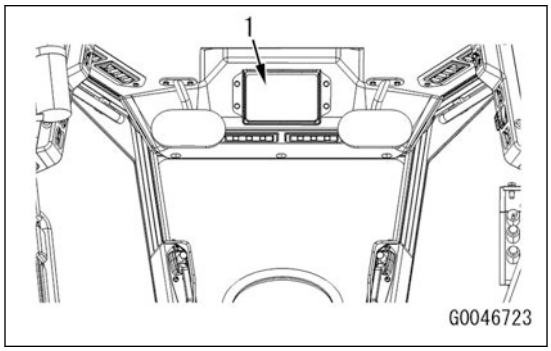
⚠ WARNING

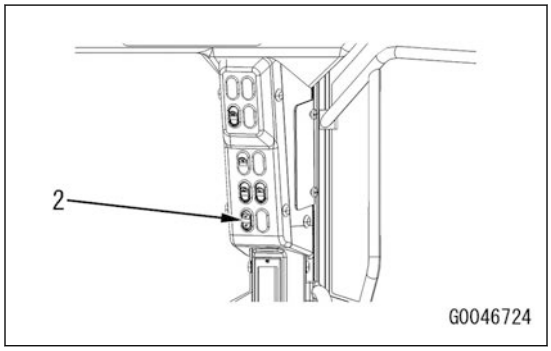
- **Never operate any of the switches during traveling. If you operate any of the switches during traveling, there is a danger that you possibly do a wrong operation, or neglect to watch the travel path ahead for safety, and it causes a serious personal injury or death.**
- **The rearview monitor is a device that assists a visual check to ensure safety in rearward and the area around the machine. There is a limit to the area that is shown on the rearview monitor.**
  Make sure to make a visual check during the reverse travel.
  Never rely solely on the rearview monitor during the reverse travel.
- **An image on the rear view monitor does not show an actual distance. Drive the machine slower during the reverse travel.**
- **The image reflected on the rearview monitor is distorted, and it differs from the actual situation.**
  Use the center of the screen as a guide.

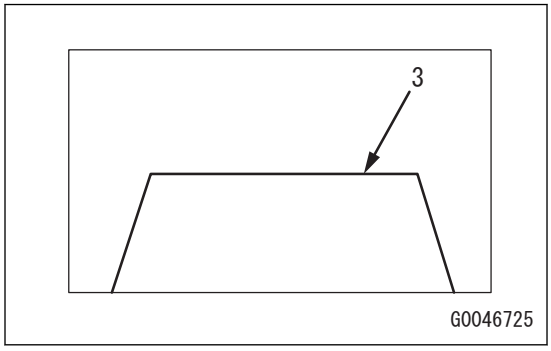
When you operate the rear view monitor (1), you can check the rearward of the machine through the monitor screen.

REMARK

- You cannot see the screen clearly in the dark place at night, but it is not a problem.
  Use the rearview monitor brightness adjustment switch (2) to adjust the brightness of the rear view monitor.
- You can check the approximate width and rear end position of the machine with the reference line (3) on the rearview monitor.
- Reference line (3) does not synchronize with the steering angle. Reference line (3) does not show the actual direction for traveling or travel path.
- Brightness or color of the objects shown on screen changes because of the automatic adjustment function of the camera.







KDPF

⚠ CAUTION

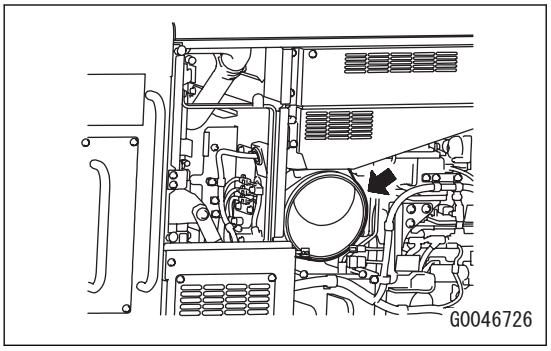
- **In this machine, the exhaust gas temperature during the aftertreatment devices regeneration will be higher than that of the previous models, and the temperature possibly remains high even after the regeneration is finished.**
  Do not come close to the exhaust pipe outlet in order not to get burn injury.
  Also, keep combustible materials away from the exhaust pipe outlet to prevent a fire.
- **When there are thatched houses, dry leaves or pieces of paper near the job site, set the system to the regeneration disable. It is because to prevent the fire hazards caused by highly heated exhaust gas occurred during the aftertreatment devices regeneration.**
- **Do not leave the operator's seat while you do the aftertreatment devices regeneration.**

KDPF is a device to capture soot in the exhaust gas to purify the exhaust gas.

If soot is accumulated to a certain level in the filter, a purification process to burn the soot is done automatically to keep the filtering performance of KDPF high.

This purification process is called the “regeneration”.

If operations which lower the purification function of KDPF continues for long hours, the regeneration is done to protect the KDPF system, regardless of the quantity of the accumulated soot.


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NOTICE

During the KDPF regeneration, aftertreatment devices regeneration display (1) lights up on the machine monitor and the idle speed is set rather high regardless of the accelerator pedal and RPM set switch.
After the automatic regeneration is finished, the aftertreatment devices regeneration display (1) goes off, and the idle speed goes back to the level in response to the RPM set switch.

REMARK

- Even if the aftertreatment devices regeneration display (1) lights up, the you need not stop the machine, and you can carry on the work as long as the KDPF soot accumulation caution lamp (2) does not light up.
- You can check the accumulation amount of soot by soot accumulation level (3) on the “Aftertreatment Devices Regeneration” screen.
  Operate the menu switch on the standard screen to display the “Aftertreatment Devices Regeneration” screen.
- Automatic regeneration against accumulation of soot starts when the soot accumulation level increases “3” or above, and stops a while after the soot accumulation level decreases to “0”.



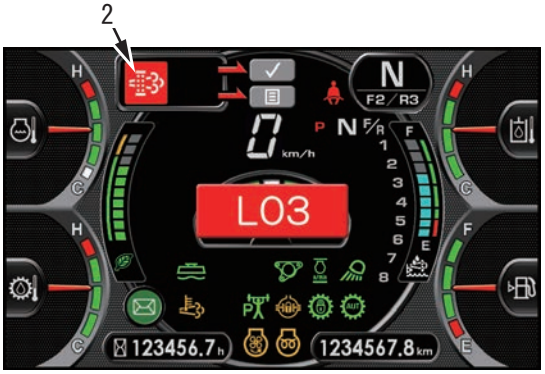
1
G0046727

The KDPF regeneration is done automatically, but the accumulated soot is not be burnt sufficiently in some cases, and the filtering function is not improved under certain operating conditions.

In that case, KDPF soot accumulation caution lamp (2) lights up. If this lamp lights up, stop the machine in a safe place and do the manual stationary regeneration.

There are 2 types of alarm display which require the manual stationary regeneration in response to the level of urgency.

When the directional selector switch is in the NEUTRAL position (N) and the parking brake switch is in the ON position, the manual stationary regeneration is possibly started automatically to protect the KDPF.



G0046728



G0088115

NOTICE

Do not stop engine when the aftertreatment devices regeneration is in operation.
If the KDPF soot accumulation caution lamp (2) is shown, be sure to do the manual stationary regeneration.
When you stop the engine, stop the aftertreatment devices regeneration first. See PROCEDURE FOR SETTING AFTERTREATMENT DEVICES REGENERATION DISABLE, and run the engine at low idle for approximately 5 minutes. Then, stop the engine.
When the action level display “L03” lights up in red, and the KDPF soot accumulation pilot lamp (2) lights up in red, the engine power deration is activated. To restore the engine power, do “PROCEDURE FOR MANUAL STATIONARY REGENERATION”.
When the accumulated soot exceeds the specified level, and if you do not do the “PROCEDURE FOR MANUAL STATIONARY REGENERATION”, the action level “L04” lights up in red. Stop the machine immediately, and ask your Komatsu distributor for the inspection and maintenance.



G0046730

REMARK

- You can check the soot accumulation level (3) with the Aftertreatment Devices Regeneration screen. Push the menu switch on the standard screen to display the Aftertreatment Devices Regeneration screen of the user menu.
- You can check the remaining regeneration time on “Aftertreatment Devices Regeneration” screen. The shown remaining regeneration time is an approximate value and it can be different from the actual regeneration time.
- The soot accumulation quantity decreases in some cases without the regeneration in response to the operating condition. It is because the high-performance catalyst and high-temperature exhaust heat burns the soot in the filter of KDPF.

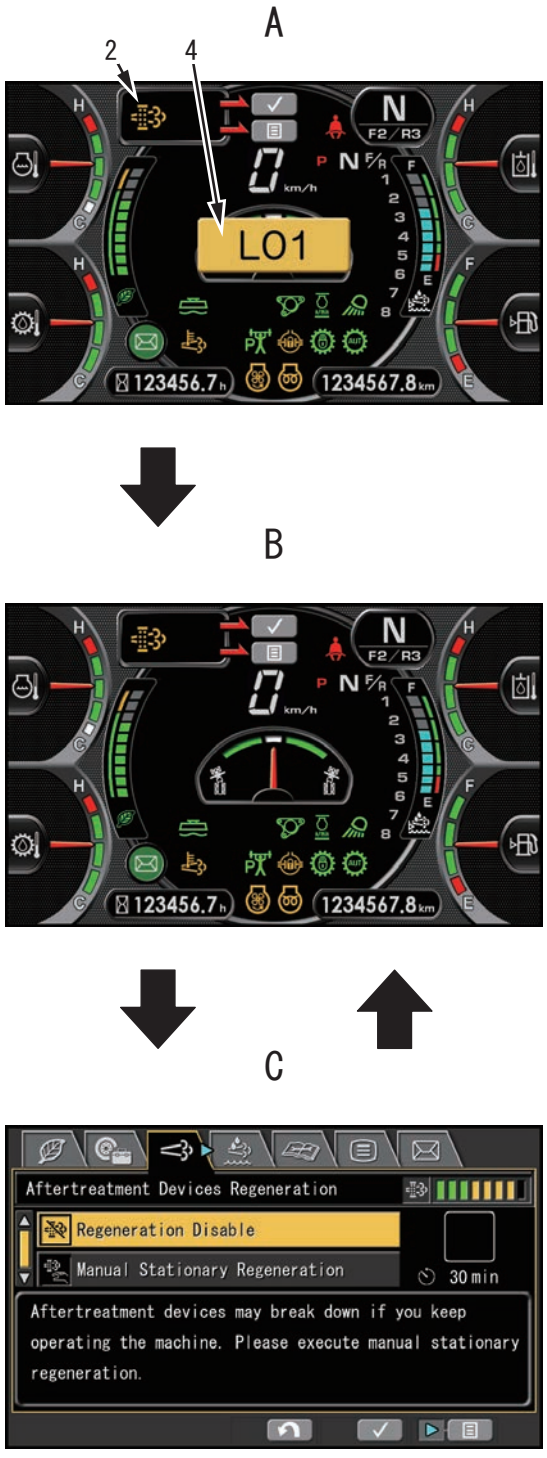


G0088115

- Even when the soot accumulation level is low, the automatic regeneration is done and the manual stationary regeneration is requested to protect the system in some cases.
  If you run the engine at idle continually, the regeneration is done frequently, but this is not a problem.
- Even just after the regeneration is completed, the soot accumulation level does not become “0”. This is caused by the accumulated noncombustible material in the exhaust gas, and this is not a problem.
- Noncombustible matter which the regeneration cannot burn is accumulated in the filter of KDPF. You need to clean the filter or replace it at regular intervals.
- The engine speed or engine sound changes during or after the regeneration. This is caused by the control for better regeneration, and this is not a problem.
- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filtering function.
- White smoke is discharged for a short time just after the engine is started or during the regeneration in the cold season, but this is not a problem.
- Komatsu recommends using Komatsu genuine engine oil for KDPF.
  If the engine oil other than Komatsu genuine oil for KDPF is used, it can shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil reduces the lubrication function, and it will cause a failure of the machine in some cases.
  In addition, the regeneration interval is shortened and the fuel consumption increases in some cases.
- Ash is easy to be accumulated in KDPF when the biofuel is used. Thus, the regeneration of KDPF can possibly become more frequent if the mixing ratio of the biofuel is high.

When the degree of emergency is low

- If the KDPF soot accumulation caution lamp (2) lights up in yellow (action level (4): “L01”), screen (A) is shown first.
- The action level goes out 2 seconds after, and the screen changes to the standard screen (B).
- If the machine is completely stopped, the display switches to the “Aftertreatment Devices Regeneration” screen (C) after 3 seconds only the first time. If, however, the manual stationary regeneration is not done, the display goes back to the standard screen (B) after 30 seconds.
  Then, if the accumulated soot does not decrease, the “Aftertreatment Devices Regeneration” screen (C) is shown for 30 seconds every 2 hours.
- If the KDPF soot accumulation caution lamp (2) lights up in yellow, stop the machine in a safe place after you finish the work, and do the manual stationary regeneration.



G0088116

When the degree of emergency is high

- KDPF soot accumulation caution lamp (2) lights up in red, and “L03” is shown in red on the action level display (4).
- If the machine is stopped completely, the screen changes to the “Aftertreatment Devices Regeneration” screen (E) after 3 seconds.
  Then, the “Aftertreatment Devices Regeneration” screen (E) and the standard screen (D) are automatically shown alternately in response to the machine stop, until the manual stationary regeneration is done.
- If the KDPF soot accumulation caution lamp (2) lights up in red, immediately stop the machine in a safe place, and do the manual stationary regeneration.

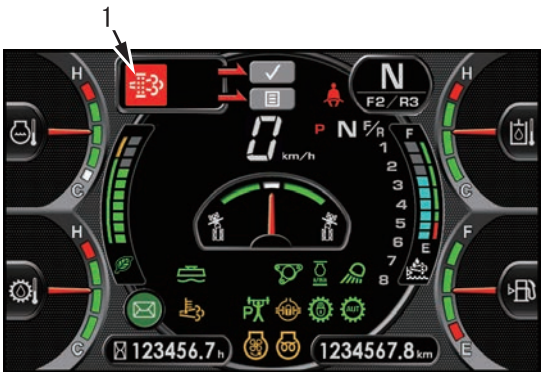


G0088117

MANUAL STATIONARY REGENERATION

⚠ CAUTION

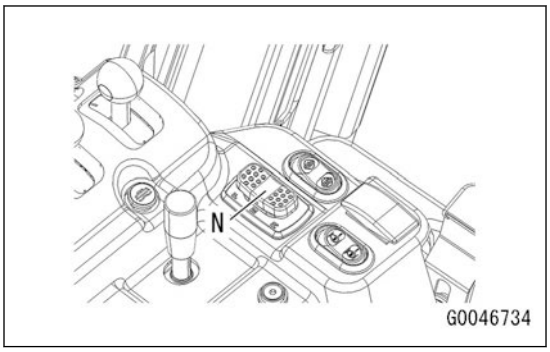
The exhaust gas temperature of this machine can become higher than that of the current models during the aftertreatment devices regeneration. Do not come close to the exhaust pipe outlet and around the aftertreatment devices not to get burn injury. Also, do not bring any combustible material close to the outlet of the exhaust pipe or the aftertreatment devices to prevent a fire.



G0046733

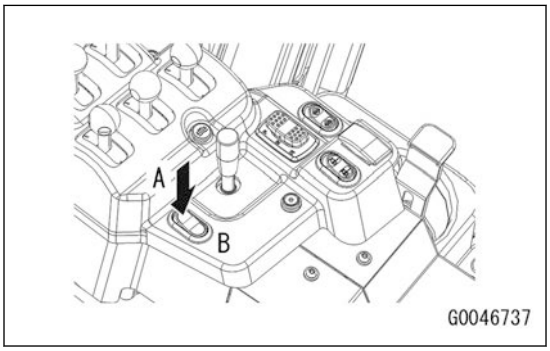
The manual stationary regeneration can be done while KDPF soot accumulation pilot lamp (1) is lit.

1. Move the machine to a safe place and stop it while the engine is running.
2. Check that there is no person or combustible matter around the machine (particularly in the direction of the exhaust gas flow).
3. Release your foot from the accelerator pedal and set the directional lever to the NEUTRAL position (N).



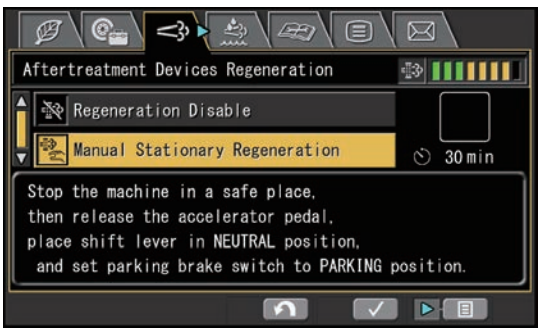
G0046734

4. Set the parking brake switch to the ON position (A) and apply the parking brake.



G0046737

5. Push the menu switch to show the Aftertreatment Devices Regeneration screen.

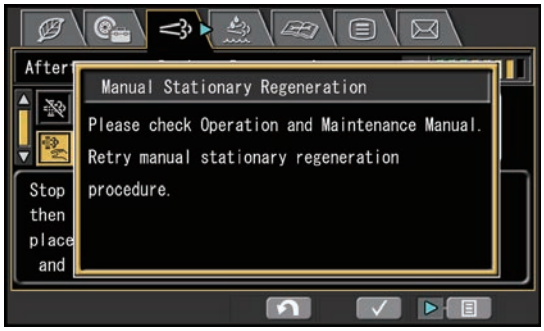


G0088118

6. Select the manual stationary regeneration, check again safety of the area around the machine and make sure that the area is free from irrelevant people or combustible material, then push the ENTER switch.
   If the machine needs to be moved again to secure the safety, move it to a safe place and repeat the procedure from step 1.

REMARK

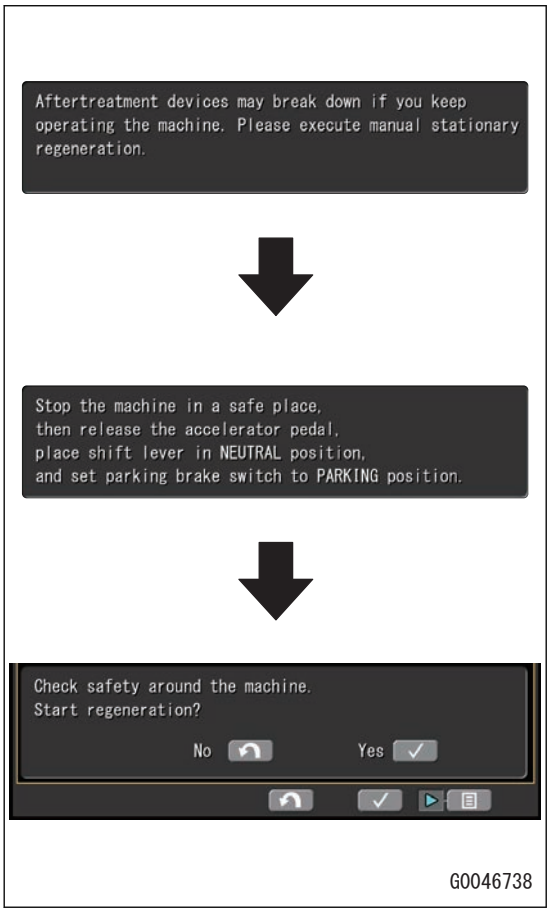
After you push the ENTER switch in step 6, the screen shown in the figure is shown in some cases. This shows that the operations in steps 1 to 3 were not done correctly or there is a failure other than the KDPF soot accumulation abnormality. Check operation of the engine, make sure you are not depressing the accelerator pedal, and check the position of the directional lever and parking brake switch, then repeat the procedure from step 5.
If you cannot do the manual stationary regeneration, go back to the standard screen, push the ENTER switch to check the contents of other failure that is occurring, and take the necessary remedy.



G0046736

REMARK

- The explanation of the manual stationary regeneration is shown in 3 parts on the monitor panel. When you push the ENTER switch, the regeneration is started immediately regardless of which part is shown. When you push the RETURN switch, the display goes back to the standard screen.
- If no monitor switch is operated for 30 seconds, the explanation display of the manual stationary regeneration is not shown and the screen goes back to the standard screen. At this time, to show the explanation of the manual stationary regeneration again, push the ENTER switch on the standard screen, and the Aftertreatment Devices Regeneration screen is shown.



G0046738

7. This screen in the figure is shown during the manual stationary regeneration. It takes more than 30 minutes in some cases to complete the manual stationary regeneration. Do not touch any switch on the screen or accelerator pedal until the regeneration is completed and the standard screen is shown again.



G0088119

REMARK

- You can check the progress of the manual stationary regeneration being done when soot is accumulated by the number of lighting lamps of the soot accumulation level (2). The manual stationary regeneration starts at the soot accumulation level “4” or higher and finishes when all the level lamps go out.
- You can check the remaining regeneration time on “Aftertreatment Devices Regeneration” screen. The shown remaining regeneration time is an approximate value and it can be different from the actual regeneration time.
- The manual stationary regeneration for protection of the system during cold season starts in some cases even when the soot accumulation level is “0” to “3”. In this case, the soot accumulation level does not decrease, but this is not a failure. The progress is not shown on the monitor during this regeneration. It is completed in approximately 10 minutes.
- If you operated the accelerator pedal, gear shift lever, or parking brake switch during the manual stationary regeneration, the regeneration is stopped automatically. Release your foot from the accelerator pedal, turn the directional lever to the NEUTRAL position (N), apply the parking brake, and then repeat the procedure from step 5.
- When the machine needs to be moved during the manual stationary regeneration, stop the regeneration temporarily and move the machine. See the aftertreatment devices regeneration disable and cancel of regeneration disable procedures described as follows.
  When you start the manual stationary regeneration again, secure the safety of the machine and around it, then cancel the regeneration disable.



G0088120

8. After the manual stationary regeneration is completed, the screen automatically goes back to the standard screen.

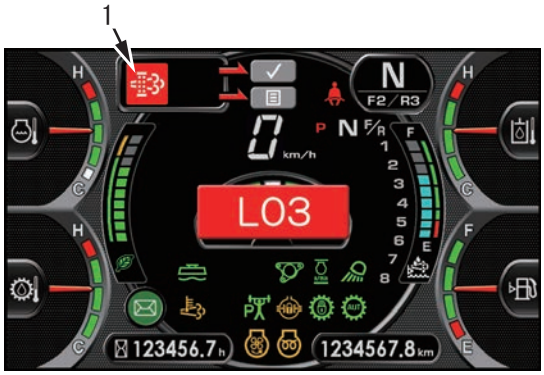
AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING

If there is a possible danger caused by the automatic active regeneration which emits hot exhaust gas, and in such a case as there are flammable materials around the machine, you can set that the aftertreatment devices regeneration will not be automatically done.

You can also disable the regeneration during execution.

NOTICE

If soot is accumulated and the manual stationary regeneration is required even when the regeneration is disabled, the KDPF soot accumulation caution lamp (1) lights up.
If the KDPF soot accumulation caution lamp lights up, move the machine to a safe area and do the manual stationary regeneration.
If you continue the operation without the manual stationary regeneration done, it can cause a failure of the aftertreatment devices or the engine.

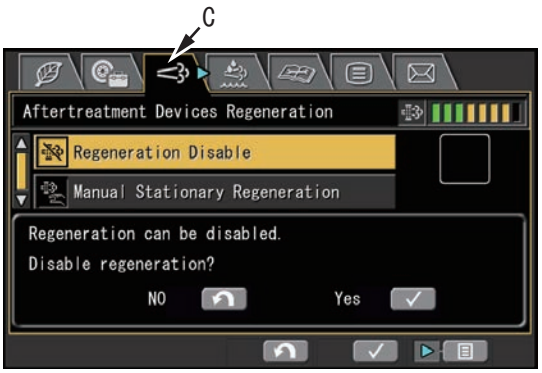


G0046741

WHILE REGENERATION IS NOT IN PROCESS: REGENERATION DISABLE SETTING

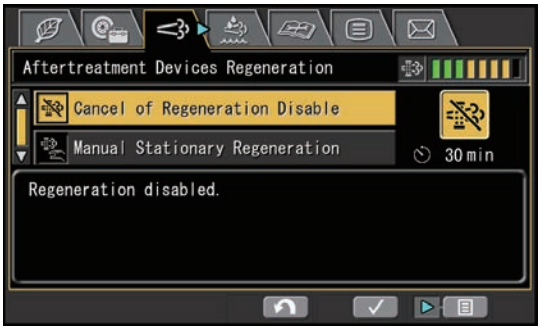
(when the aftertreatment devices regeneration display is not shown on the standard screen)

1. Push the menu switch on the standard screen.
2. Operate the menu switch to select “Aftertreatment Devices Regeneration” menu (C) and show “Aftertreatment Devices Regeneration” screen.



G0088121

3. Select the Regeneration Disable and push the ENTER switch. The regeneration function is disabled and the regeneration is not done.



G0088122

REMARK

- While the regeneration is disabled, the aftertreatment devices regeneration disable pilot lamp (1) is shown with hatch on the standard screen and you can check the state.
- The setting of the regeneration disable is canceled when the starting switch is turned to the OFF position. If it is necessary to keep the automatic regeneration disabled, do the above operation each time you start the engine.
- When the regeneration is done to protect the system, the aftertreatment devices regeneration pilot lamp (2) can light up even if the regeneration disable is set. It is not a problem. During the regeneration to protect the system, the regeneration cannot be disabled.
- In the regeneration to protect the system, the exhaust temperature is lower than that of when the regeneration is done to burn soot, and is almost the same level as the normal exhaust gas temperature.





WHILE REGENERATION IS IN PROCESS: STOP REGENERATION

(when the aftertreatment devices regeneration display is shown on the standard screen)

1. Push the menu switch on the standard screen and “Aftertreatment Devices Regeneration” screen is shown.

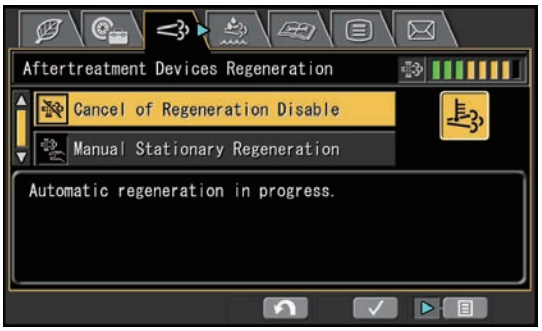


G0046746

2. Select the regeneration disable and push the ENTER switch, then the regeneration is disabled.

REMARK

In the regeneration to protect the system in cold weather, there is a possibility that the regeneration cannot be disabled. It is not a problem.



G0088123

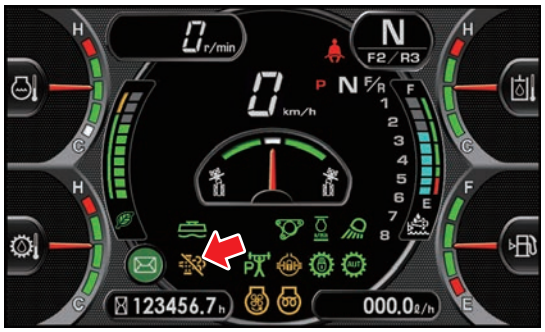
ENABLE AFTERTREATMENT DEVICES REGENERATION

⚠ CAUTION

When you cancel the regeneration disable, move the machine to a safe place, check that there is no person or combustible matter around the machine, and start the operation to cancel the regeneration disable.

1. When you push the menu switch on the standard screen, “Aftertreatment Devices Regeneration” screen is shown.

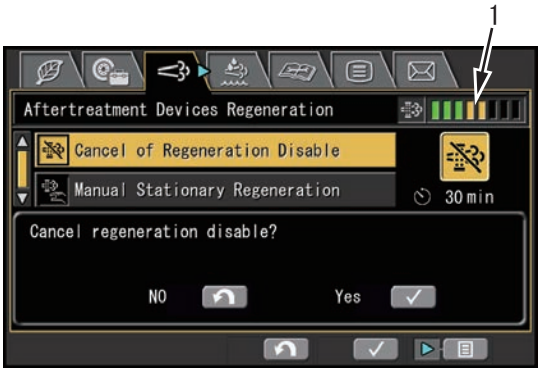
   (If the “Aftertreatment Devices Regeneration” screen is not shown, push the menu switch several times.)



G0046748

2. Select the “Cancel of Regeneration Disable” and push the ENTER switch, and it cancels the regeneration disable.

   If 3 or more soot accumulation gradations (1) light up, the regeneration is started automatically in some cases.



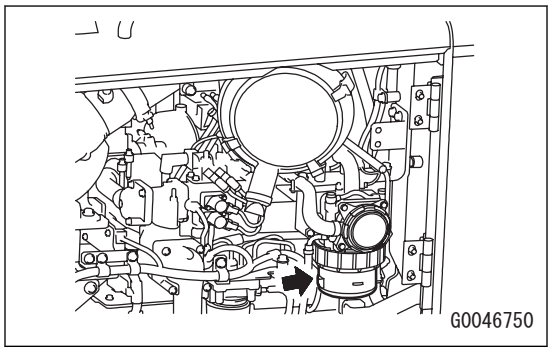
G0088124

REMARK

- When you cancel the regeneration disable, release the accelerator pedal, set the directional selector switch in the NEUTRAL position (N), set the parking brake switch to the “PARKING” position, then cancel the regeneration disable.
- You can cancel the regeneration disable setting when you turn the starting switch to the OFF position to stop the engine.

KCCV

The KCCV is a device to clean the gas released from the engine crankcase and supply it to the engine air intake system.



NOTICE

- **The filter element must be replaced after 2000 hours of operation.**
- **Komatsu recommends the use of Komatsu genuine product for the KCCV filter.**
  The engine sucks oil and foreign material and it causes a failure in the cases that follow.
  - **When the machine travels without KCCV filter element**
  - **When a filter element other than the Komatsu genuine product is used**
- **The filter element cannot be cleaned. The filtration efficiency is degraded and it can cause an engine failure even if it is cleaned.**
  You must not use the element again.

HANDLE UREA SCR SYSTEM WARNING

Urea SCR system is a device which converts poisonous nitrogen oxides (NOx) in the exhaust gas into harmless nitrogen and water. By spraying the DEF into the exhaust gas, it decomposes and hydrolyzes to form ammonia (NH3) and the ammonia selectively reacts with nitrogen oxides for the conversion to nitrogen and water.

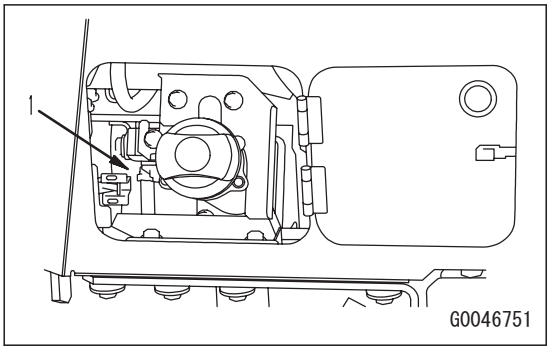
Urea SCR system has functions to monitor the system operation and to save the information of the abnormal state. The information is used for system diagnostics and also for Inducement required by the authorities on engine systems that use Urea SCR systems. The inducement level is shown to the operator in a visual warning and by buzzer sound. The inducement of the engine corrects the inappropriate behavior of the urea SCR system. Warnings in Inducement of the Komatsu Urea SCR System goes step by step from starting visual indications on the machine monitor and alarm sounds to engine power derate to avoid getting into unsafe conditions.

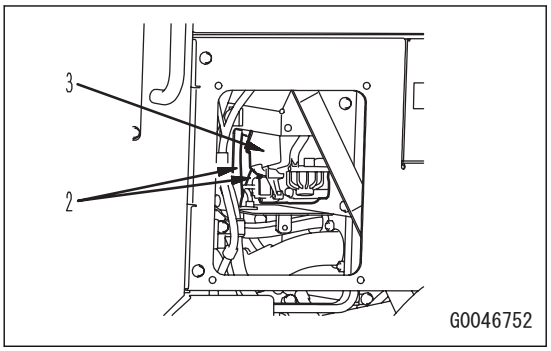
The Komatsu Urea System also monitors recurrences of abnormalities of the system. Inducement in the recurrences is activated when other abnormality occurs within 40 hours after the first abnormality is fixed.

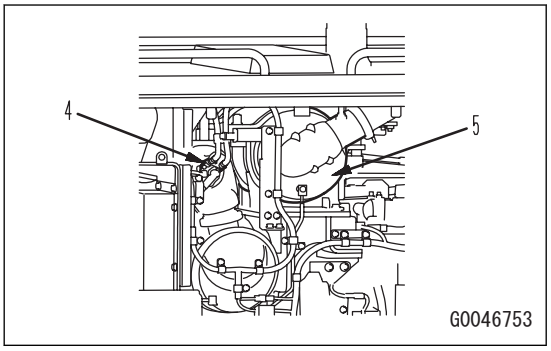
The Komatsu's Urea has two major systems, which are the DEF system and the SCR catalyst assembly.

DEF is supplied from DEF system into the exhaust system. DEF system consist of DEF tank (1), DEF hose (2), DEF pump (3), and DEF injector (4). SCR assembly is shown by (5).

In the event that indications of potential degradation of nitrogen oxides conversion efficiency are sensed, the active regeneration is started to rejuvenate Urea SCR system even if the amount of soot accumulated in the KDPF did not reach to the regeneration thresholds.







⚠ WARNING

Fill ONLY DEF into DEF tank. Foreign material in the DEF system or urea deposits caused by evaporation leads to incorrect operation of the devices.

NOTICE

- **Do not do the work other than replacement of the DEF filter. Do not disassemble and make modification of the devices of the DEF system.**
- **It can cause deterioration of the devices. Paint can cause deterioration of the devices. When you paint the surrounding areas, take care not to get the paint on the injector and the supply pump.**
- **Always use DEF that conforms to the quality standard. If additional additive agents or water are mixed in DEF and that mixture is used, the devices will not function correctly, and conformance to the exhaust gas regulations will be lost. In addition, it will cause failure of the machine. If DEF out of the standard is filled or used by mistake, consult your Komatsu distributor.**

About the operation of Urea SCR system

The Urea SCR System automatically starts operating as soon as the engine is started.

Even after the engine starting switch is turned to the OFF position, the devices are still be in operation for several minutes to purge DEF in the lines, the injector and the supply pump back to the DEF tank. It does not indicate an abnormality. If DEF is returned to the tank, the devices stop.

Do not turn OFF the battery disconnect switch while the devices are in operation. When the devices complete their shutdown procedure, the system operating lamp will go out, and the battery disconnect switch can be disconnected.

About the operation in cold weather

DEF freezes at -11 °C {12.2 °F}.

A heating system to thaw frozen DEF is installed to the Urea SCR system, if it is frozen, for example, during parking and to prevent that DEF freezes during operation.

In case DEF freezes during parking, when the engine starts running the heating system automatically starts providing heat to thaw frozen DEF. The pump and the injector start working only after DEF is thawed. This is a delay in the start of functioning of the pump and the injector.

The heating system is also activated automatically during operation to prevent freezing of DEF when the ambient temperature drops below a certain threshold where DEF in the system possibly freezes. In the event that the ambient temperature drops further than a temperature where the heating system is capable of keeping fluidity of DEF, the DEF system automatically starts purging the remaining DEF back to the tank and stops pumping and injection while heating continues. When the ambient temperature rises above a temperature where DEF system becomes functional, operation starts again automatically.

Short duration of white plume given off from the tail pipe can be seen at and shortly after engine start-up in cold weather, but this is not malfunction.

Inducement strategy when the DEF tank level becomes low

When the amount of DEF in the tank goes low, the Inducement strategy will be activated.

If Inducement starts, add DEF to the DEF tank immediately.

The DEF level caution lamp (1) on the monitor lights up, the alarm sound starts, and the action level is shown, and Inducement strategy is activated. Inducement strategy includes engine output deration, speed limitation, or other warning actions let the operator keep or repair SCR system. The inducement strategy continues in 5 levels, “Warning”, “Escalated Warning”, “Mild inducement”, “Severe Inducement” and “Final Inducement”. The DEF level caution lamp (1) on the machine monitor will light up, alarm sound will start, then action level will be shown on the machine monitor, and engine power will be derated in steps.



In action levels “L03 (Mild Inducement)” and “L04 (Severe Inducement and Final Inducement)”, engine power will be derated. When action level L03 or “L04” is shown, move the machine to a safe area and add DEF.

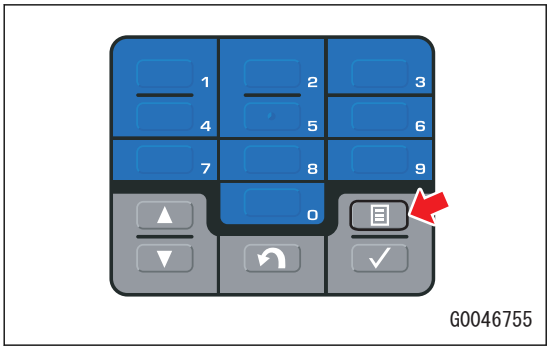
If operation is continued further with no addition of DEF at “Severe Inducement”, engine speed will be fixed at low idle. (“Final Inducement”)

The content of the warning can be checked on the “SCR Information” screen of the user menu.

Do the procedure that follows.

Push the menu switch on the standard screen to show the “SCR Information” screen of the user menu.

3 seconds after the machine is stopped, SCR Information screen is shown.



G0046755

“SCR Information” screen shows the DEF level caution lamp (1), the DEF level gauge (2), information on the Urea SCR System condition (3), and the current status of Inducement (4).

If Inducement starts, stop the machine in a safe area and add DEF.



G0046756

- Warning:

  2 gradations of the DEF level gauge light up in red.
  The DEF level caution lamp (1) lights up in red.
  No alarm sound.
  No action level is shown.
  Push the menu switch to show the “SCR Information” screen.



G0046757

Inducement status (4): 1 “DEF low level warning appears.”

Add DEF to the DEF tank immediately.



G0046758

- Escalated Warning:

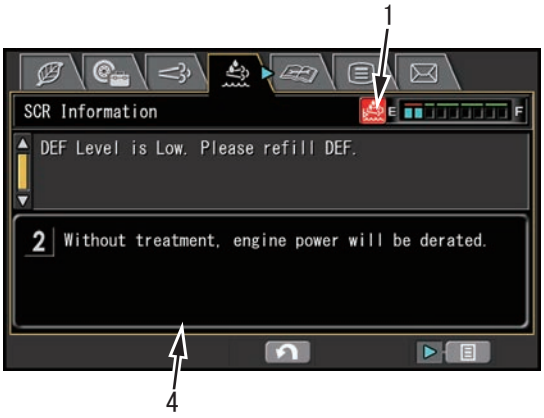
  The alarm buzzer operates in repetition of “Intermittent alarm”.
  2 gradations of the DEF level gauge light up in red.
  The DEF level caution lamp (1) lights up in red.
  No action level is shown.
  Push the menu switch to show the “SCR Information” screen.



G0046757

  Inducement status (4): 2 “Without treatment, engine power will be derated.”

  Add DEF to the DEF tank immediately.



G0046759

- Mild Inducement:

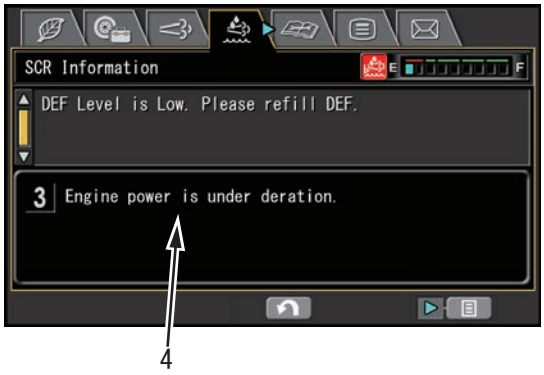
  The alarm buzzer operates in “Intermittent alarm”.
  1 gradations of the DEF level gauge light up in red.
  The DEF level caution lamp (1) lights up in red.
  The action level “L03” is shown in red (5).
  Push the menu switch to show the “SCR Information” screen.



G0046760

Inducement status (4): 3 “Engine power is under deration.”

Add DEF to the DEF tank immediately.



G0046761

- Severe Inducement:

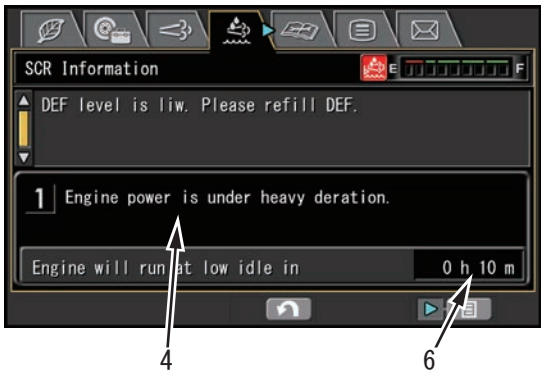
  The alarm buzzer operates in “Continuous alarm”.
  No gradation of the DEF level gauge lights up.
  The DEF level caution lamp (1) lights up in red.
  The action level “L04” is shown in red (5).
  Push the menu switch to show the “SCR Information” screen.
  When all gradations of the DEF level gauge go off, DEF refilling quantity is 26.5 ℓ {7 USgal} to fill up the DEF tank.



G0046762

Inducement status (4): 4 “Engine power is under heavy deration.”

The remaining time (Hours and Minutes) to “Final Inducement” is shown in the column (6) of “SCR Information” screen. If no DEF is added during the “Severe Inducement”, Inducement goes to “Final Inducement” in 1 hour. In “Final Inducement”, engine speed will be fixed at low idle.



G0046763

Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” and relieves back temporarily to the power deration of “Mild Inducement”. The operator can restore engine power through the machine monitor. For the engine power restoration procedure, see the section of Temporary Restoration from Inducement in this manual. In “Severe Inducement”, use the engine power restoration function to move the machine to a safe area and add DEF.

- Final Inducement:

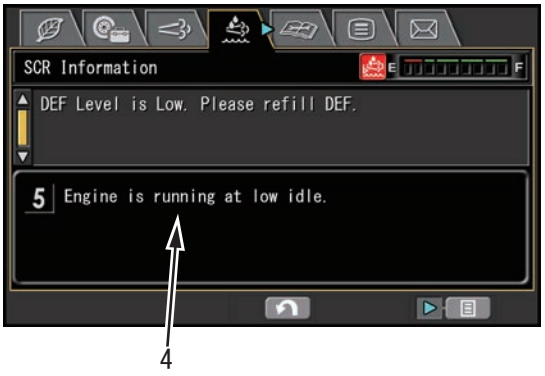
  1 hour after “Severe Inducement” starts, the status goes to “Final Inducement”.
  The alarm buzzer operates in “Continuous alarm”.
  No gradation of the DEF level gauge lights up.
  The DEF level caution lamp (1) lights up in red.
  The action level “L04” is shown in red (5).
  Push the menu switch to show the “SCR Information” screen.



G0046762

Inducement status (4): 5 Engine is running at low idle.

Engine speed is fixed at low idle to disable practical machine operation.
Add DEF to the DEF tank immediately.
In case the system does not come out of Inducement even if DEF is added in the tank, consult your Komatsu distributor.

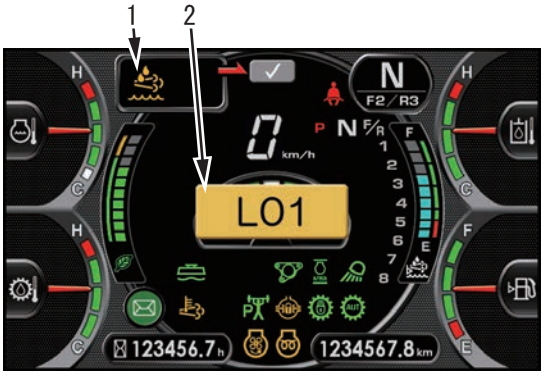


G0046764

Inducement strategy when abnormalities are sensed in the Urea SCR System devices (Except abnormalities in the KDPF system)

If an abnormality is sensed in the DEF quality or in the Urea SCR system, the Inducement strategy is activated.

The inducement strategy continues in 5 levels, “Warning”, “Escalated Warning”, “Mild inducement”, “Severe Inducement” and “Final Inducement”. The Inducement strategy includes visual warning by the DEF system caution lamp on the machine monitor (1), and action level shown on the machine monitor (2), and buzzer sound and stepwise engine power deration that continues to speed limitation to low idle. Engine power deration starts with action level “L03 (Mild Inducement)” and goes to further deration when “L04 (Severe Inducement and Final Inducement)” is shown. When the system goes to “Severe Inducement”, the engine speed is fixed at low idle. When action level “L03” is shown, move the machine to a safe area and consult your Komatsu distributor.



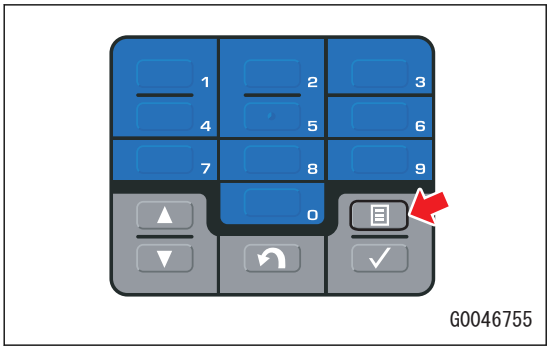
G0046766

The content of the warning can be checked on the “SCR Information” screen of the user menu.

Do the procedure that follows.

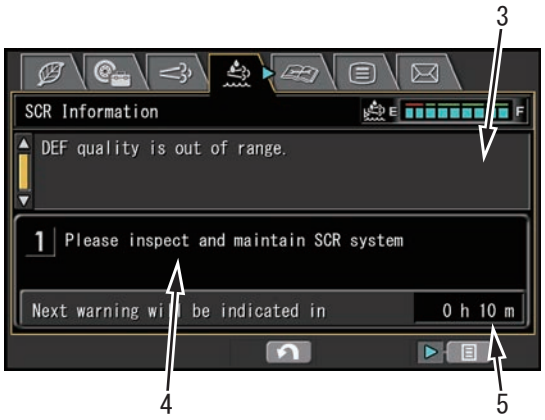
Push the menu switch on the standard screen to show the “SCR Information” screen of the user menu.

3 seconds after the machine is stopped, SCR Information screen is shown.



G0046755

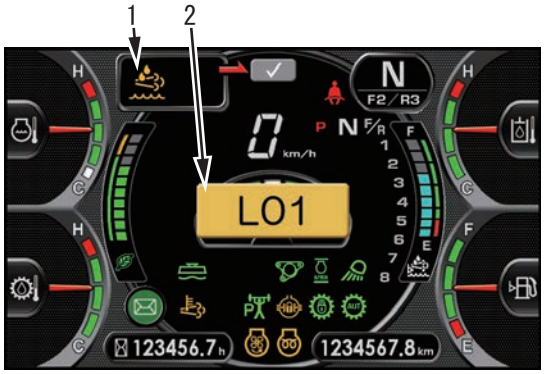
“SCR Information” screen shows remaining time to the next Inducement status in the column (5), and information on the Urea SCR System condition (3), and the current status of Inducement (4).



G0046765

- Warning:

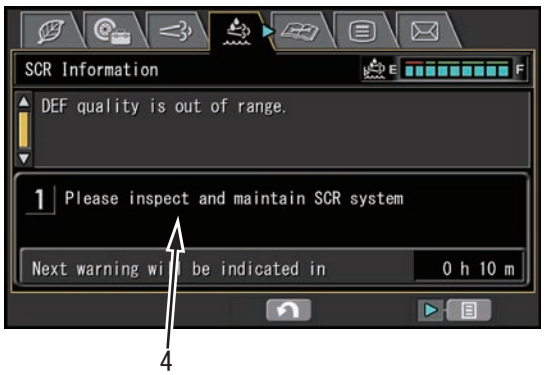
  No alarm sound.
  The DEF system caution lamp (1) lights up in yellow.
  Action level “L01” shows up on the machine monitor (2) for 2 seconds and goes out.
  Push the menu switch to show the “SCR Information” screen.



G0046766

“SCR information” screen message (4): 1 “Please inspect and maintain SCR system.”

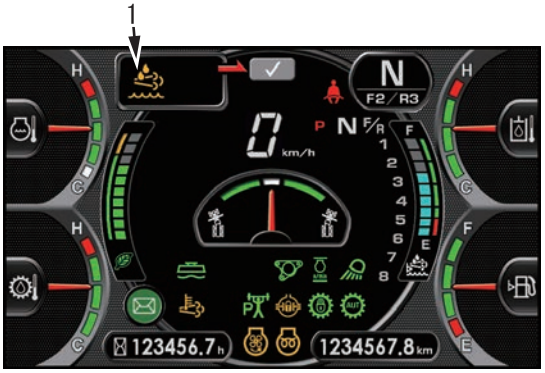
Move the machine to the safe area and consult your Komatsu distributor.
If operation continues for 1 hour after “Warning” started with no actions instructed by the action level table, Inducement goes to “Escalated Warning”.



G0046767

- Escalated Warning:

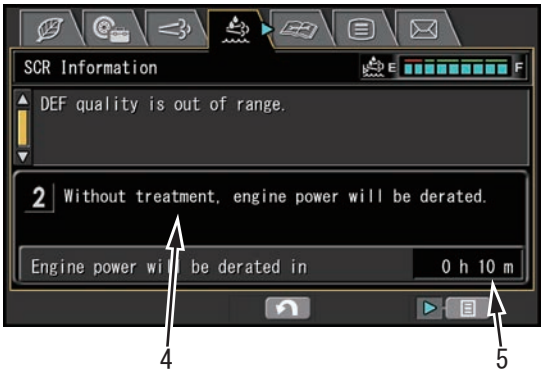
  The alarm buzzer operates in repetition of “Intermittent alarm”.
  The DEF system caution lamp (1) lights up in yellow.
  Push the menu switch to show the “SCR Information” screen.
  If operation continues for 1 hour after “Warning” started with no actions instructed by the action level table, Inducement goes to “Escalated Warning”.



G0046768

  “SCR information” screen message (4): 2 “Without treatment, engine power will be derated.”

  Move the machine to the safe area and consult your Komatsu distributor.
  The duration time of “Escalated Warning” is 1 hour. The remaining time (Minutes) to “Mild Inducement” is shown in the column (5) of “SCR Information” screen.
  In “Mild Inducement”, engine power will be derated.



G0046769

- Mild Inducement:

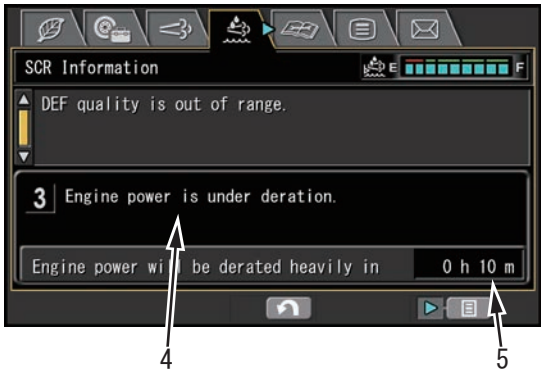
  The alarm buzzer operates in “Intermittent alarm”.
  The DEF system caution lamp (1) lights up in red.
  The action level “L03” is shown in red (2).
  Push the menu switch to show the “SCR Information” screen.



G0046770

"SCR information" screen message (4): 3 "Engine power is under deration."

Because of the reduction of engine power, the machine normal operation will be limited.
Move the machine to the safe area and consult your Komatsu distributor.
The duration time of "Mild Inducement" is 1 hour. The remaining time (Minutes) to "Severe Inducement" is shown in the column (5) of "SCR Information" screen.
In "Severe Inducement", engine power will be derated further.



G0046771

- Severe Inducement:

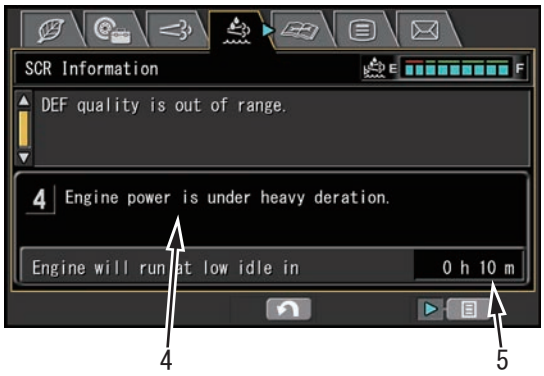
The alarm buzzer operates in "Continuous alarm".
The DEF system caution lamp (1) lights up in red.
The action level "L04" is shown in red (2).
Push the menu switch to show the "SCR Information" screen.



G0046772

"SCR Information" screen message (4): 4 "Engine power is under heavy deration."

Because of the further deration of engine power, the machine operation will be limited further.
Move the machine to the safe area and consult your Komatsu distributor.
The duration time of "Severe Inducement" is 1 hour. The remaining time (Minutes) to "Final Inducement" is shown in the column (5) of "SCR Information" screen.
In "Final Inducement", engine speed will be fixed at low idle.



G0046773

Engine power can be restored temporarily from power derate. If Inducement goes to "Severe Inducement" and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe area and consult your Komatsu distributor. This engine power restoration works only when the Inducement status is "Severe Inducement" and relieves back temporarily to the power deration of "Mild Inducement". The operator can restore engine power through the machine monitor. For the engine power restoration procedure, see the section of Temporary Restoration from Inducement in this manual.

- Final Inducement:

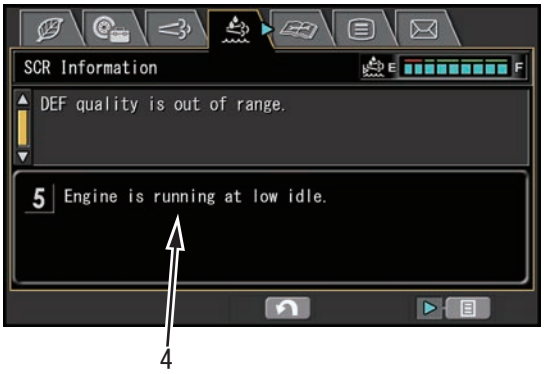
  The alarm buzzer operates in “Continuous alarm”.
  The DEF system caution lamp (1) lights up in red.
  The action level “L04” is shown in red (2).
  Push the menu switch to show the “SCR Information” screen.



G0046772

“SCR Information” screen message (4): 5 “Engine is running at low idle.”

Engine speed is fixed at low idle to disable practical machine operation.
Move the machine to the safe area and consult your Komatsu distributor.

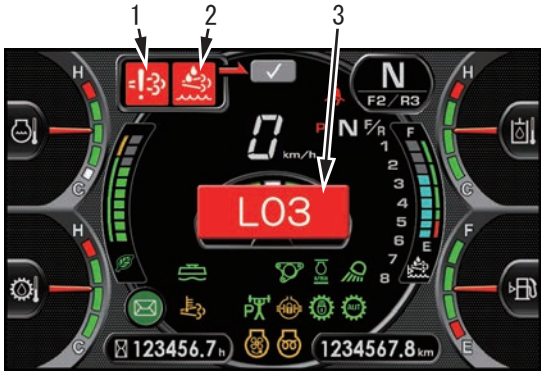


G0046774

Inducement strategy when abnormality is found in the KDPF System by the Urea SCR system

If an abnormality is sensed in the KDPF System through the Urea SCR system, the Inducement strategy is activated.

The inducement strategy continues in 5 levels, “Warning”, “Escalated Warning”, “Mild inducement”, “Severe Inducement” and “Final Inducement”. The Inducement strategy includes visual warning by the KDPF system caution lamp (1), DEF system caution lamp (2), and action level shown on the machine monitor (3), and buzzer sound and stepwise engine power deration that continues to speed limitation to low idle. Engine power deration starts with action level “L03 (Warning, Escalated Warning and Mild Inducement)” and goes to further deration when “L04 (Severe Inducement and Final Inducement)” is shown. When the system goes to “Severe Inducement”, the engine speed is fixed at low idle. When action level “L03” is shown, move the machine to a safe area and consult your Komatsu distributor.



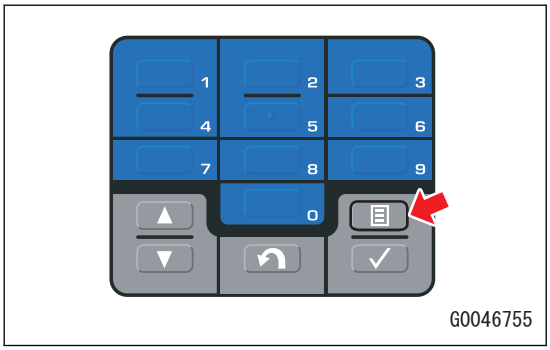
G0046775

The content of the warning can be checked on the “SCR Information” screen of the user menu.

Do the procedure that follows.

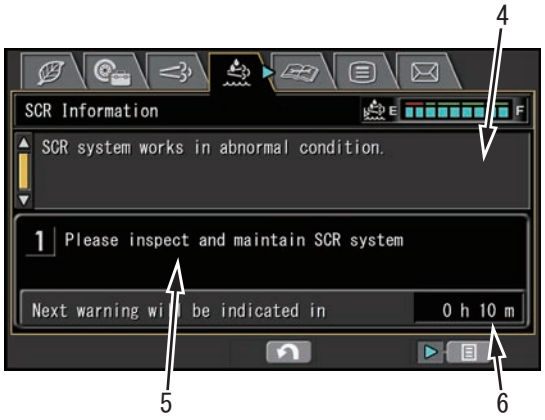
Push the menu switch on the standard screen to show the “SCR Information” screen of the user menu.

3 seconds after the machine is stopped, SCR Information screen is shown.



G0046755

“SCR Information” screen shows remaining time to the next Inducement status in the column (6), and information on the Urea SCR System condition (4), and the current status of Inducement (5).



G0046776

- Warning:

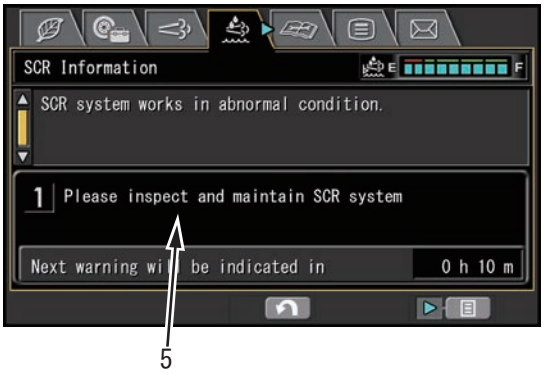
  The alarm buzzer operates in “Intermittent alarm”.
  The KDPF system caution lamp (1) lights up in red.
  The action level “L03” is shown in red (3).
  Push the menu switch to show the “SCR Information” screen.



G0046777

“SCR information” screen message (5): 1 “Please inspect and maintain SCR system.”

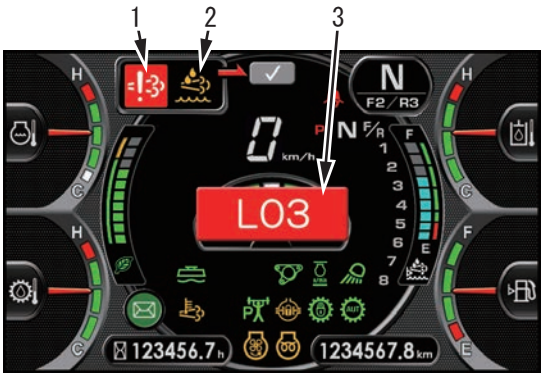
Engine power is derated.
Move the machine to the safe area and consult your Komatsu distributor.
If operation continues for 1 hour after “Warning” started with no actions instructed by the action level table, Inducement goes to “Escalated Warning”.



G0046778

- Escalated Warning:

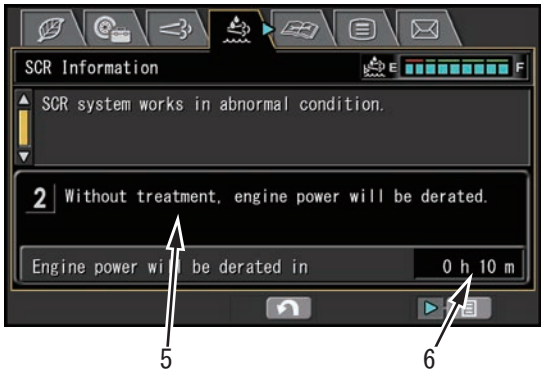
  The alarm buzzer operates in repetition of “Intermittent alarm”.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in yellow.
  The action level “L03” is shown in red (3).
  Push the menu switch to show the “SCR Information” screen.



G0047753

"SCR information" screen message (5): 2 "Without treatment, engine power will be derated."

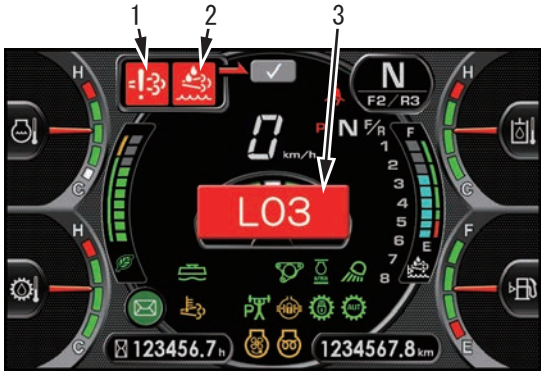
Move the machine to the safe area and consult your Komatsu distributor.
The duration time of "Escalated Warning" is 1 hour. The remaining time (Minutes) to "Mild Inducement" is shown in the column (6) of "SCR Information" screen.
In "Mild Inducement", engine power will be derated.



G0046779

- Mild Inducement:

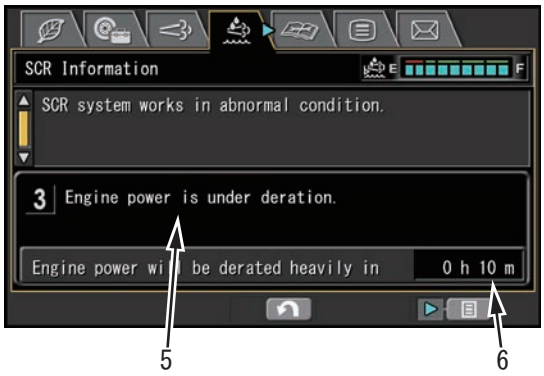
  The alarm buzzer operates in "Intermittent alarm".
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level "L03" is shown in red (3).
  Push the menu switch to show the "SCR Information" screen.



G0046775

"SCR information" screen message (5): 3 "Engine power is under deration."

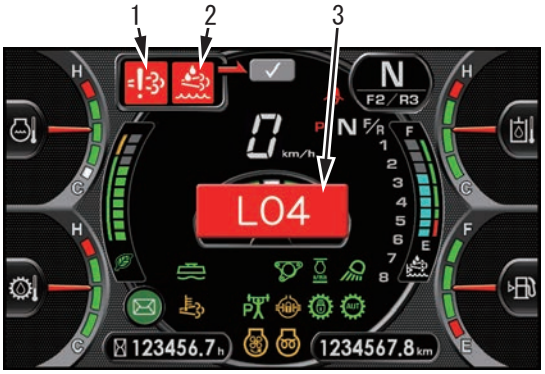
Because of the reduction of engine power, the machine normal operation will be limited.
The duration time of "Mild Inducement" is 1 hour. The remaining time (Minutes) to "Severe Inducement" is shown in the column (6) of "SCR Information" screen.
In "Severe Inducement", engine power will be derated further.
Move the machine to the safe area and consult your Komatsu distributor.



G0046780

- Severe Inducement:

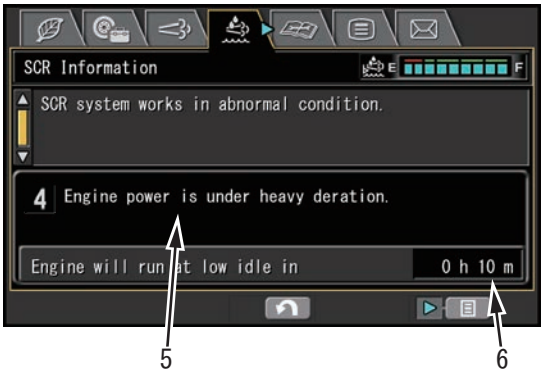
  The alarm buzzer operates in “Continuous alarm”.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level “L04” is shown in red (3).
  Push the menu switch to show the “SCR Information” screen.



G0046781

  “SCR Information” screen message (5): 4 “Engine power is under heavy deration.”

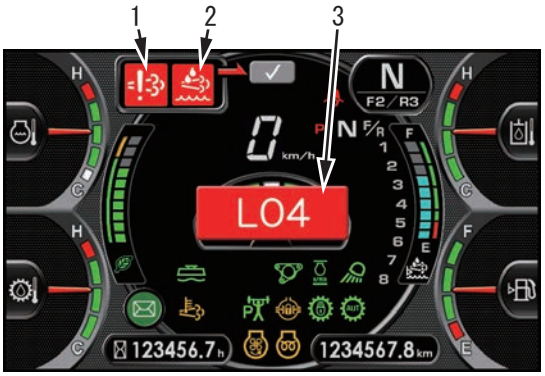
  Because of the further deration of engine power, the machine operation will be limited further.
  The duration time of “Severe Inducement” is 1 hour. The remaining time (Minutes) to “Final Inducement” is shown in the column (6) of “SCR Information” screen.
  In “Final Inducement”, engine speed will be fixed at low idle.
  Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” and relieves back temporarily to the power deration of “Mild Inducement”. The operator can restore engine power through the machine monitor. For the engine power restoration procedure, see the section of Temporary Restoration from Inducement in this manual. If Inducement goes to “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe area and consult your Komatsu distributor.



G0058568

- Final Inducement:

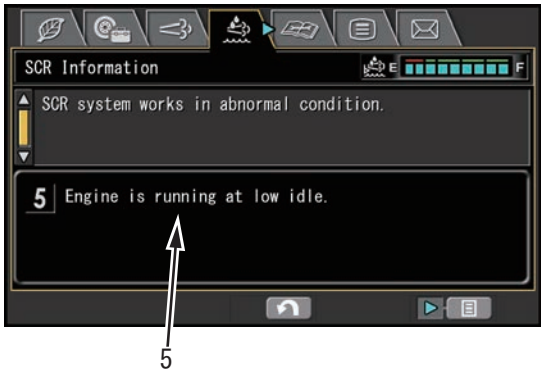
  The alarm buzzer operates in “Continuous alarm”.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level “L04” is shown in red (3).
  Push the menu switch to show the “SCR Information” screen.



G0046781

“SCR Information” screen message (5): 5 “Engine is running at low idle.”

Engine speed is fixed at low idle to disable practical machine operation.
Move the machine to the safe area and consult your Komatsu distributor.



G0046783

Temporary Restoration from Inducement

Temporary Restoration from Inducement is one of the Inducement strategies allowed to be included in Urea SCR systems.

In case the Urea SCR system goes to “Severe Inducement”, engine power is derated heavily. This can cause difficulties of moving the machine to a safe area for adding DEF or troubleshooting and correcting abnormalities of the Urea SCR system. For temporary remedies from these difficulties the operator can restore engine power for a short time to the deration of “Mild Inducement” through the machine monitor. “Temporary Restoration from Inducement” does not regain full engine power.

“Temporary Restoration from Inducement” can be activated only when the Urea SCR system is in “Severe Inducement”. The maximum duration is limited to 30 minutes in each restoration operation, and 3 operations are allowed, but “Temporary Restoration from Inducement” is turned off whenever the system goes to “Final Inducement” even if 30 minutes or 3 operations are not used up.

All the abnormalities of the Urea SCR system need to be corrected to regain other restoration ability.

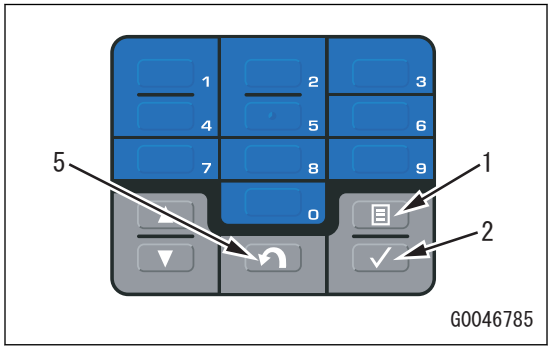
If all the abnormalities of the Urea SCR system are not corrected when the system is in “Severe Inducement”, the system goes to “Final Inducement” in 1 hour after “Severe Inducement” started and engine speed will be fixed to low idle to disable practical machine operation. If the system goes to “Severe Inducement”, use “Temporary Restoration from Inducement” immediately.

Procedure to activate “Temporary Restoration from Inducement”

1. Push the menu switch (1) to show the “SCR Information” screen when the standard screen is on, only when the Urea SCR system is in “Severe Inducement”.



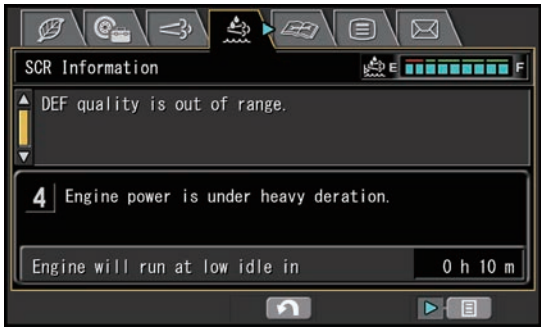
G0058569



G0046785

2. Push the ENTER switch (2) to show the menu windows popping up in the bottom half of the “SCR Information”.

   The menu windows popping up in the bottom half of the “SCR Information” screen change every 15 seconds as shown in the graphics A and B.



G0046786

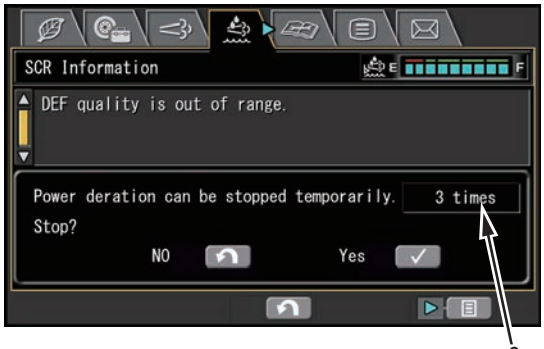
3. Push the ENTER switch (2) while the pop-up menu screen B is shown.

   The “Engine Power Recovery” window will be shown.
   If the ENTER switch (2) is not pushed for 30 seconds, “standard screen” will be displayed, and push the menu switch (1) to start again.
   The remaining number of operations of “Temporary Restoration from inducement” is shown in the column (3) of the pop-up menu window B.

A



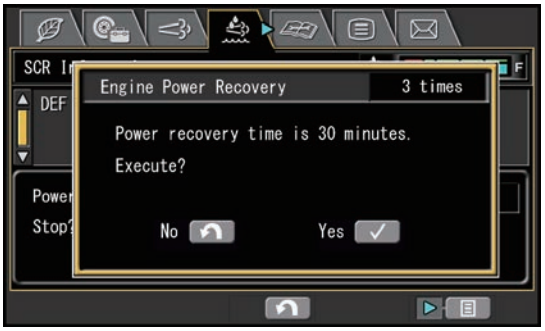
B



G0046787

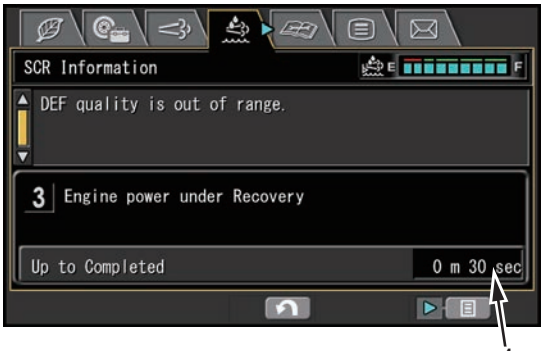
4. Push the ENTER switch (2) while the “Engine Power Recovery” window is shown.

   “Temporary Restoration from Inducement” is activated and engine power deration is relieved to the deration of “Mild Inducement” for the maximum of 30 minutes as long as there is sufficient remaining time to “Final Inducement”.
   Be careful that when Inducement goes to “Final Inducement”, “Temporary Restoration from Inducement” will be turned off.



G0046788

   The remaining time (Minutes/Seconds) of “Temporary Restoration from Inducement” is displayed in the column (2) on the “SCR Information” screen.



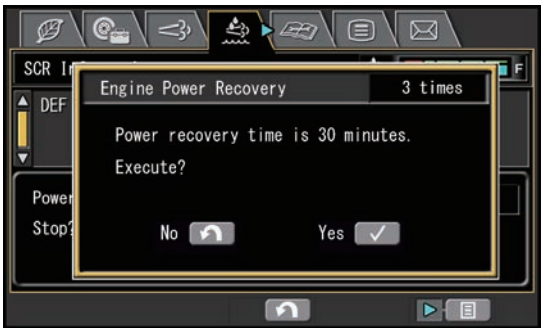
G0046789

If you do NOT activate “Temporary Restoration from Inducement” after the screen goes to the “Engine Power Recovery” window, do the steps explained as follows.

To deactivate “Temporary Restoration from Inducement” function.

1. Push the RETURN switch (5) while the “Engine Power Recovery” window is shown.

   This procedure is split from the procedure 4 in “Temporary Restoration from Inducement”.



G0046788

"SCR Information" screen is shown.



G0046790

2. Move the machine to show the "standard screen".
   "Temporary Restoration from Inducement" is deactivated.



G0058569

Inducement Strategy for abnormalities recurrences within 40 hours

Urea SCR system has functions to monitor the system operation and to save the information of the abnormal state. The stored information is used to monitor recurrences of abnormalities by "Abnormality Recurrence Counter". "Abnormality Recurrence Counter" is required by the U.S. Environmental Protection Agency. The recurrence monitoring continues 40 hours and it monitors the abnormalities that cause Inducement other than the quantity of DEF in the tank.

If other abnormalities are sensed within 40 hours after the previous abnormalities were corrected, regardless of the level of the previous Inducement and whether the new abnormalities are the same as the previous ones or not, it is judged as a recurrence.

If a recurrence occurs, "Severe Inducement" will be activated. If this occurs, use "Temporary Restoration from Inducement" and move the machine to a safe area, and consult your Komatsu distributor.

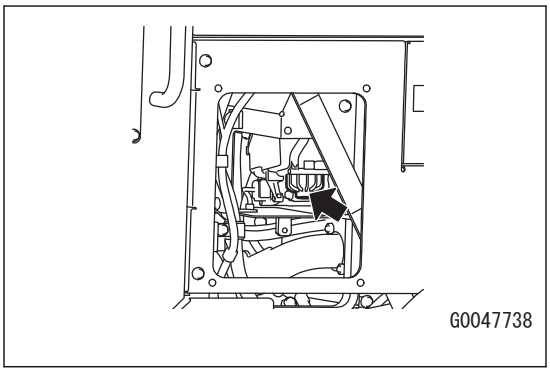
The duration of "Severe Inducement" in the recurrence is limited to 30 minutes. If all the abnormalities are not corrected while Inducement is in "Severe Inducement (30 minutes)", Inducement will go to "Final Inducement", and engine speed will be fixed to low idle to disable practical machine operation.

Although maximum duration of the power restoration is 30 minutes and 3 operations are possible, when Inducement goes to "Final Inducement", "Temporary Restoration from Inducement" will be turned off and its function will be held off till all the abnormalities are corrected.

To activate "Temporary Restoration from Inducement", see the "Temporary Restoration from Inducement" section in this manual.

DEF FILTER

The DEF filter is a filter element to clean the DEF sucked from the DEF tank by the DEF pump, and to supply it to the DEF injector.



NOTICE

- **The DEF filter element needs to be replaced every 2000 hours.**
- **If the machine is operated without the DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials enters the DEF pump and DEF injector in some cases, which will cause a failure of the machine. Never operate the machine without the DEF filter attached. Do not use the filter other than Komatsu genuine parts.**
- **The DEF filter cannot be flushed. If you wash or regenerate of it, it will degrade the performance of the DEF filter and will contaminate the DEF pump and the DEF injector, and it will cause a failure of the machine. Never reuse the DEF filter.**

KOMTRAX

⚠ WARNING

- **You must not disassemble, repair, do modification, or move the communication terminal, antennas, and cables of the wireless communication device. It can cause a failure or fire on the wireless equipment or the machine itself.**
- **Near the blasting jobsite, there is a danger of explosion because of use of the wireless equipment, and serious personal injury or death could be caused.**
  If it is necessary to operate the machine in the range of 12m {39ft 4in} from the remote blasting device, the power supply cable of the wireless communication device must be disconnected.

KOMTRAX is a vehicle management system that remotely manages the machines with the KOMTRAX device by the satellite communication or portable radio communication.

The GPS (Global Positioning System) receiver, and communication system are installed in the vehicle management system.

The machine information such as the machine maintenance, maintenance management, operation situation management, and machine location management is collected from the inner network of the machine. It is used for the machine management by the customer and improvement of our products and service.

Types of information which machines send can be different by machines. About the station set-up for the KOMTRAX communication, consult your Komatsu distributor.

POWER SUPPLY FOR KOMTRAX

- Even when the starting switch key is in OFF position, KOMTRAX system consumes a small amount of electric power.
  It is recommended to start the engine periodically to charge the battery.
- When you use the battery disconnect switch, turn the starting switch to the OFF position, and after you check that the system operating lamp is not lit, set the battery disconnect switch key to the OFF position and pull it out.
  When the battery disconnect switch is turned to the OFF position, it can prevents the consumption of the battery power, but the functions of KOMTRAX stop at the same time.
- If the power supply cable of KOMTRAX system device needs to be disconnected, consult your Komatsu distributor.

MACHINE OPERATIONS AND CONTROLS

CHECKS AND ADJUSTMENT BEFORE YOU START ENGINE

WALK-AROUND CHECK

Before you start the engine, walk around the machine and look at the underside of chassis to check that there is no abnormality like loose bolts and nuts, damage of each part, or leakage of oil, fuel, or coolant. Also check that there is no abnormality in the condition of the work equipment and the hydraulic system . Also check that there is no loose wiring, play, and accumulation of dust in places that reach high temperatures.

⚠ WARNING

Any combustible materials accumulated around the aftertreatment devices, turbocharger, or other high temperature engine parts or the battery, and leakage of fuel or oil will cause the machine to catch fire. Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.

If the machine is tilted, make it in a horizontal state and inspect it.

Do the inspections and cleaning that follow every day before you start the engine for the day's work.

1. Check that there is no abnormality in the work equipment, cylinders, linkage, and hoses for damage, wear, play.

   Check that there is no abnormality in the work equipment, cylinders, linkage, and hoses for damage, wear, play. If any problem is found, repair it.

2. Remove dirt from around the engine and radiator.

   Check for dirt accumulated around the engine and radiator. Also check for flammable material (dry leaves, twigs, etc.) around the aftertreatment devices, turbocharger, or other high temperature engine parts. If dirt or flammable materials are found, remove them.

3. Check the engine and related parts for leakage of water, oil and exhaust gas.

   Check the engine for leakage of oil and exhaust gas, and check the cooling system for coolant leakage. If any problem is found, repair it.

4. Make sure that there is no dirt, especially electrolyte such as snow melting agent or salt on the battery, and no deposits around the battery.

   Do the cleaning around the battery. For how to handle the battery such as cleaning precautions, see “PRECAUTIONS FOR CHECK AND MAINTENANCE (2-38)”, “BATTERY”. Also, do not use a direct air blow or dry cloth to clean the battery. A wet cloth will prevent fire or explosion from static electricity.

5. Check for leakage of fuel line

   Check hoses and tubes for leakage of fuel or damage. If any problem is found, repair it.

6. Check DEF line for leakage.

   Check DEF tank, pump, injector, and hoses and their connections for leakage. If any problem is found, ask your Komatsu distributor for repair.

7. Remove dirt from around the aftertreatment devices.

   Check around the aftertreatment devices if there is dirt and combustible materials (dry leaves, twigs, etc.) accumulated. If any dirt or combustible materials are found, remove them.

8. Check around the aftertreatment devices to see whether there is gas leakage.

   Check the pipe connection of the turbocharger and the aftertreatment devices and connections of the aftertreatment devices for leakage of exhaust gas (and soot deposit).

   If any problem is found, ask your Komatsu distributor for repair.

9. Check KCCV piping for gas leakage and oil leakage.

   Check the 3 pipes which connects the KCCV filter, turbocharger, oil pan, and cylinder head for oozing oil. If any problem is found, ask your Komatsu distributor for repair.

10. Check around SCR for exhaust gas leakage.

Check the piping which connects the KDPF and SCR, and also the SCR connections for exhaust gas leakage (and urea deposit). If any problem is found, ask your Komatsu distributor for repair.

11. Check transmission case, final drive case, tandem case, hydraulic tank, circle rotating device gear case, hoses, and joint for oil leakage.

    Check for oil leakage. If any problem is found, repair the place where the oil is leaking.

12. Check brake line for oil leakage.

    Check hoses and tubes for oil leakage or damage. If any problem is found, repair it.

13. Check tires, wheels, and wheel hub bolts for damage and wear. Check mounting bolts and nuts for looseness

    Check tires for cracks or peeling. Check wheels (side ring, rim base, lock ring) for cracks or wear. If any loose wheel hub bolts or hub nuts are found, retighten them. If any problem is found, repair or replace the part.

    If any valve cap is missing, install a new one.

14. Check the handrails and steps for damages. Check the bolts for looseness.

    If any damage is found, repair it. Tighten any loose bolts.

15. Check the gauges and monitor that there is no problem.

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

    REMARK

    When you clean the stains deposited on the monitor surface such as dusts, use a clean, soft and dry cloth to brush them off.
    For sticky dirt such as oil, remove it with household glass cleaner available on the market (weakly acid to weakly alkaline, which contains no abrasive), and then finish-wipe with a clean, soft, and dry cloth.

16. Check the rear view mirror.

    Check the rearview mirror that there is no problem. If it is damaged, repair it. Clean the surface of the mirror, and adjust the angle to make sure that you can see the rear area from the operator's seat.

17. Check and clean the camera.

    When you clean the camera, wipe off dirt with soft cloth.

    If you stand on an unstable place or you are in an unstable balance when you clean the camera, you could fall and be injured. Put a stepladder or step on the level and firm ground, and clean the camera in a stable balance.

    Check the camera for abnormality. If a problem is found, consult your Komatsu distributor.

18. Check the air cleaner mounting bolts for looseness.

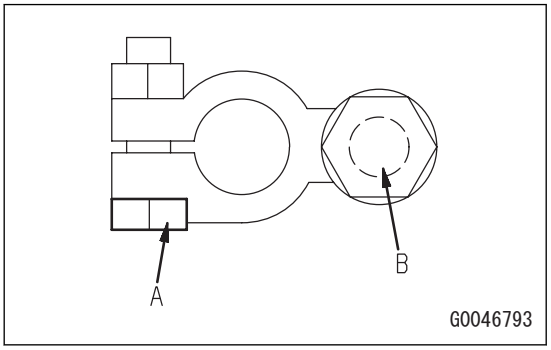
    Check the mounting bolts for looseness. If any loose bolts are found, retighten them.

19. Check the battery terminal for looseness.

    If any loose terminal is found, retighten it.

    Tightening torque for part A: 9.8 to 11.8 Nm {1.0 to 1.2 kgfm, 7.2 to 8.7 lbft}

    Tightening torque for part B: 11.8 to 19.6 Nm {1.2 to 2.0 kgfm, 8.68 to 14.5 lbft}

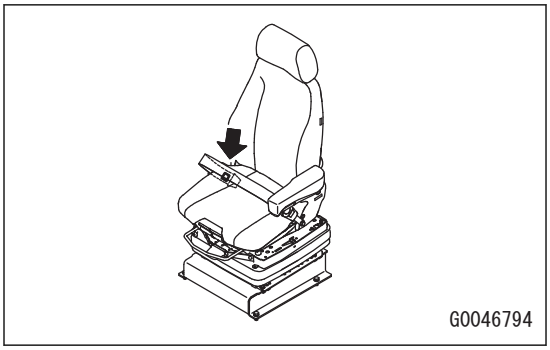


20. Check the seat belt and mounting hardware.

⚠ WARNING

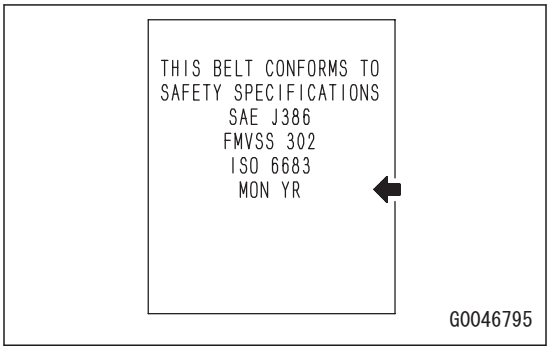
If there is no abnormality in the appearance of the seat belt, replace it at either which comes earlier.

- **5 years after the date of seat belt manufacture.**
- **Every 3 years after the start of actual usage of the seat belt.**


G0046794

REMARK

The date shown on the seat belt is the manufactured date. This date is the start of the 5-year period.
The manufactured date of the seat belt is printed on the label shown by the arrow in the figure.



G0046795

Check the hardware mounting bolts which are installed to the machine for any looseness. Retighten any loose bolt.

Tightening torque: 37.2 to 41.2 Nm {3.8 to 4.2 kgfm , 27.4 to 30.4 lbft}

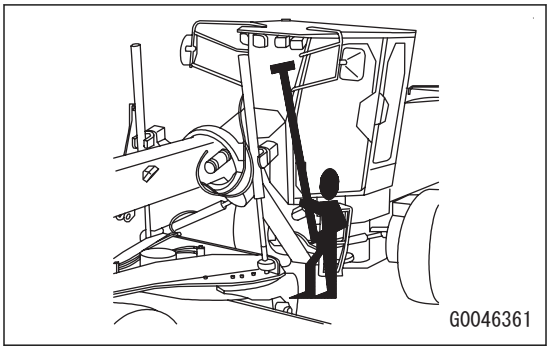
If the seat belt is scratched or frayed, or if any fitting is broken or deformed, replace the seat belt with a new one.

21. Clean the cab windows.

Clean the cab windows to secure visibility during operation.

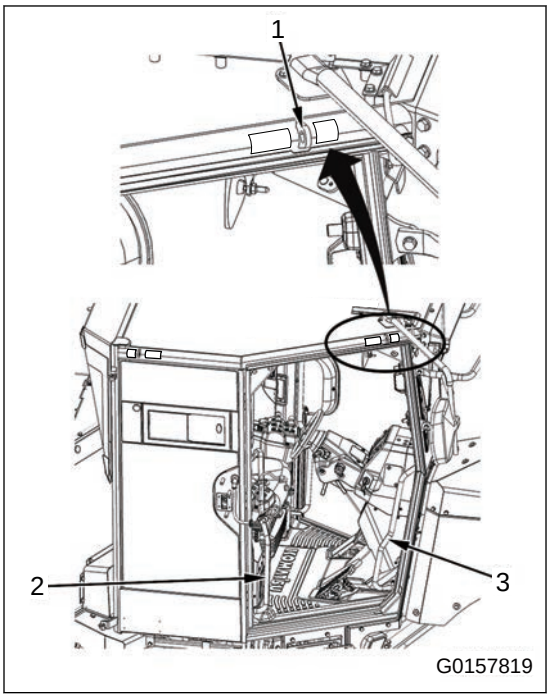
Cleaning from the top of the tire or hood is very dangerous.

Clean it with a mop etc. from the ground.


G0046361

REMARK

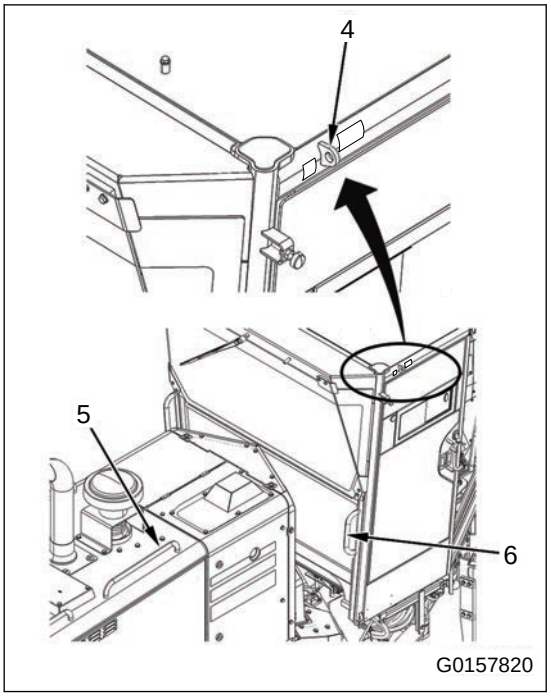
You can use the handrails to clean the cab front window glass from the operator's compartment.
When you clean the cab front window glass, install the personal fall-arrest equipment to the anchor points (1) (2 places on the right and left), and hold the handrails (2) and (3). Support yourself at three-point contact.



G0157819

REMARK

You can use the handrails to clean the cab rear window glass.
When you clean the cab rear window glass, install the personal fall-arrest equipment to the anchor points (4) (2 places on the right and left), and hold the handrails (5) and (6). Support yourself at three-point contact.



22. Check the tire.

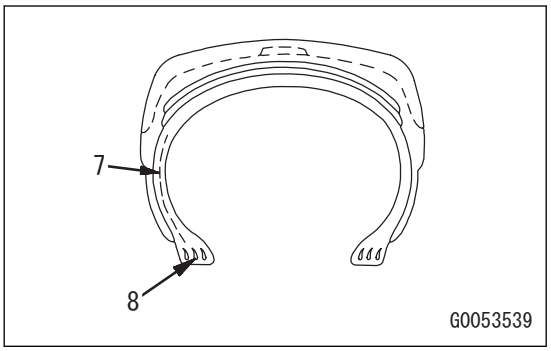
⚠ WARNING

If you use the worn or damaged tires, they can burst in some cases and cause serious injury or death.
Do not use the tires with the condition shown below.
Wear:

- **Tires with the tread groove depth of less than 15 % of that of a new tire**
- **Tires with the abnormal wear such as extremely uneven wear or stepped wear**

Damage:

- **Tires with damage that reached cords (7), or tires with cracks in the rubber**
- **Tires with cut or broken cords (7)**
- **Tires with peeled (separated) surface**
- **Tires with damaged bead (8)**
- **Air leaking tubeless tires or incorrectly repaired tires**
- **Deteriorated tires, deformed tires or the tires which the damage progresses abnormally and do not seem usable**



23. Check the rim.

⚠ WARNING

Check that the rims (wheels) and rings are free from deformation, damage caused by corrosion and cracks.
In particular, check the side rings, lock rings and rim flanges thoroughly.
If any problem is found, replace it.

24. Check the rearview monitor.

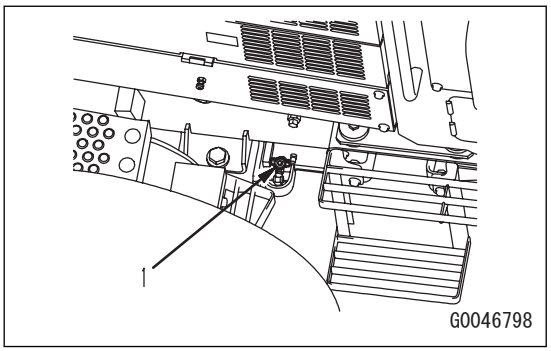
    Check the rearview monitor that there is no problem. If there is a failure, ask your Komatsu distributor for repair.

CHECK BEFORE YOU START OPERATION

Do the inspections that follow and cleaning every day before you start the engine for the day's work.

DRAIN WATER AND SEDIMENT FROM FUEL TANK

1. Put a container to catch the drained fuel below the drain valve (1) of the fuel tank.
2. Open the drain valve (1) of the fuel tank to release the sediment and water which is accumulated in the bottom together with fuel.
3. When only clean fuel flows out, close the drain valve (1).

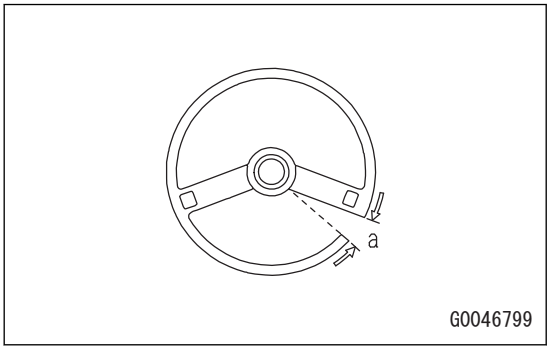


CHECK PLAY OF STEERING WHEEL

Before you measure the play of steering wheel, start the engine.

Measure the play (a) of steering wheel.
The standard value is 20 mm {0.8 in} or below.

When the play is out of the standard or when the steering wheel abnormally swings or is uncontrollable or heavy, consult your Komatsu distributor for repair.



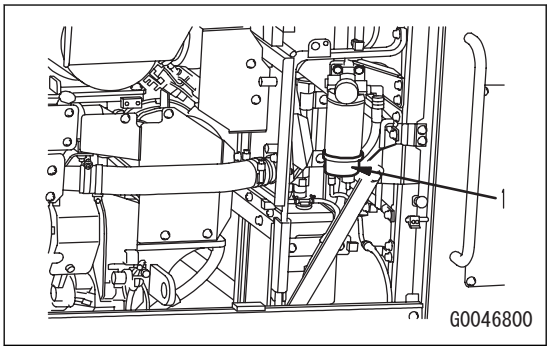
CHECK WATER SEPARATOR, DRAINING WATER AND SEDIMENT

⚠ WARNING

- **Immediately after the engine is stopped, all of parts are very hot. Do not drain water. Do not remove the transparent cup.**
  Wait for all of parts to cool down before you start the work.
- **When the engine runs, high-pressure is generated inside the engine fuel piping. When you drain the water or remove the transparent cup, wait for at least 30 seconds after you stop the engine to let the internal pressure go down before you start the work.**
- **Do not let a fire get close.**

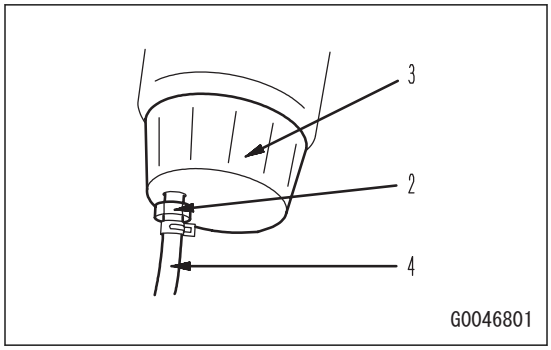
1. Open the side cover at the left rear of the machine.

   Water separator (1) is integrated with the fuel prefilter and located in the lower part.



2. Check that water and sediment are not accumulated.

   Look through the transparent cup (3) to judge the water level and amount of sediment.



   NOTICE

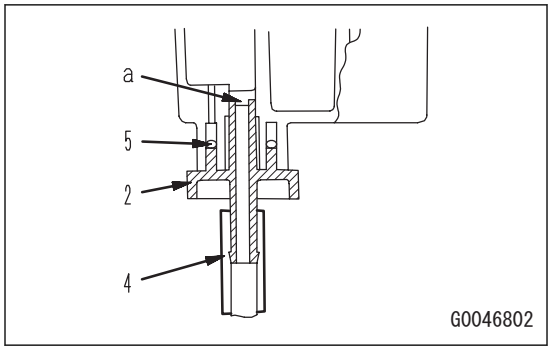
   If the water in transparent cup (3) freezes, wait until the frozen water has melted completely, then follow the procedure to drain the water.

3. Place a container under the drain hose (4) to receive the water.
4. Loosen the plug (2) and drain the water.
5. Immediately after fuel starts being drained from the drain hose (4), tighten the plug (2) to stop draining.

   Tightening torque: 0.2 to 0.45 Nm {0.02 to 0.046 kgfm , 0.14 to 0.33 lbft}

   REMARK

   If the drain plug (2) is hard to turn, apply grease to the O-ring (5) of plug (2) in response to the procedure that follow.



   1) Place a container under drain hose (4) to receive the fuel.
   2) Loosen the plug (2) and drain all the fuel and sediment through the drain hose (4).
   3) Check that nothing comes out from the drain hose (4), then remove the plug (2).
   4) Apply a suitable amount of grease to O-ring (5). At this time, take care that grease will not stick to water drain port (a) and threaded part of the plug.
   5) Tighten the plug (2) by hand until it stops.
   6) Remove the container to receive the fuel.

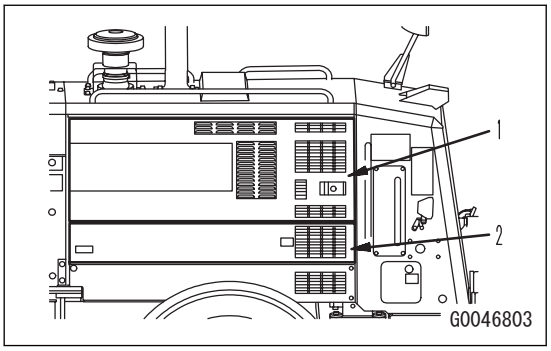
      - If the transparent cup (3) is so dirty that the inside cannot be seen, clean it when you replace the filter.
      - If the plug (2) has been removed during the cleaning work, apply grease to O-ring (5) and tighten with your hand until it stops.

CHECK COOLANT LEVEL, ADD COOLANT

⚠ WARNING

- **Do not open the radiator cap unless it is necessary. Measure the coolant level with the reservoir tank when the engine is cold.**
- **Immediately after the engine is stopped, coolant is very hot. Also, the pressure is accumulated in the radiator. If you remove the cap in this state, it can cause burn injury. Wait for the temperature to go down, and turn the cap slowly to release the pressure.**

1. Open the side covers (1) and (2) at the left rear of the machine.



2. Check the reservoir tank.

   Check that the coolant level is between FULL and LOW marks of the reservoir tank.

3. If it is insufficient, add it to FULL level through the filler port of the reservoir tank.

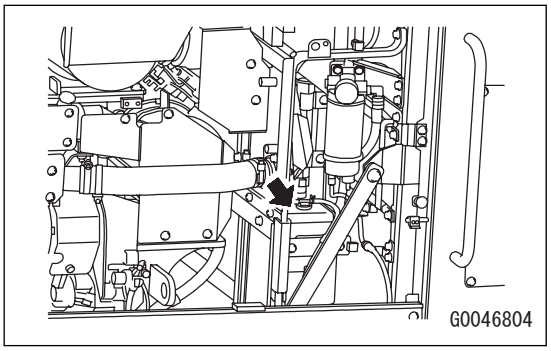
4. After you add it, tighten the cap securely.

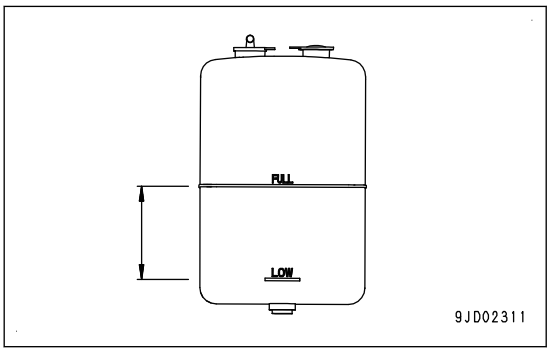
   If the reservoir tank is empty, there can be coolant leakage. If a problem is found after inspection, do the repair immediately.

   If no abnormality is found, check the level of the coolant in the radiator. If it is low, add coolant of the same density in radiator by the coolant density table in “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)”, then add coolant to the reservoir tank.

   If more coolant is added than usual, check for coolant leakage.

   Check that there is no problem such as oil mixed into the coolant.





CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

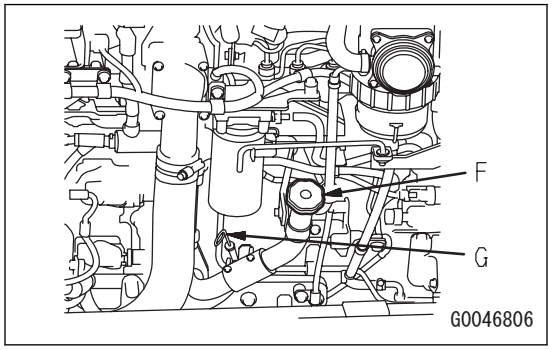
⚠ WARNING

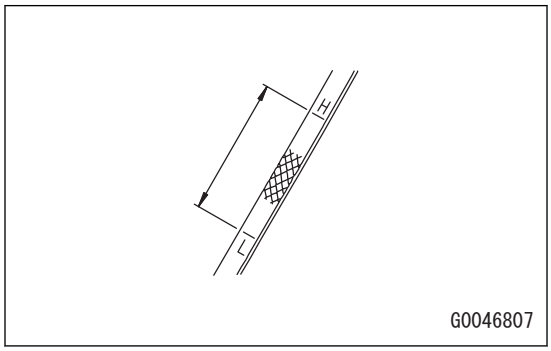
Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

1. Open the side cover at the right rear of the machine.
2. Pull out the dipstick (G) and wipe the oil off with a cloth.
3. Fully put the dipstick (G) into the dipstick pipe again, then pull it out.

   If the oil level is between marks H and L, it is correct.

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

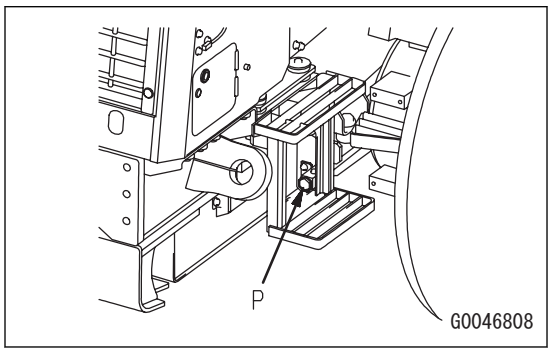




4. If the oil level is higher than H mark, drain the excessive oil through the drain plug (P).
5. Check the oil level again.
6. If it is correct, close the oil filler cap (F) securely.
7. Close the side cover.

REMARK

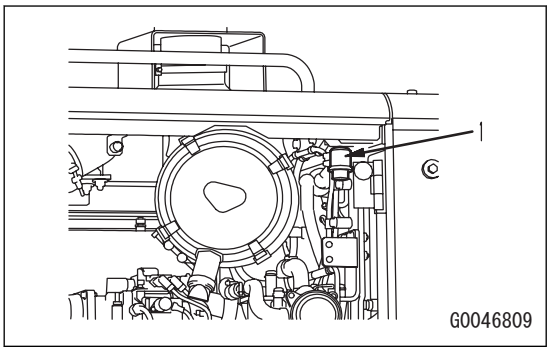
- To check the oil after the engine is started, stop the engine, wait for 15 minutes or more, and check the oil.
- If the machine inclines, make it level before check.
- When the ambient temperature is low, water or emulsified matter can stick to the dipstick or filler cap, etc. or the drained oil can be milky white because of water vapor in the blowby gas. If the coolant level is not decreased, it is not a problem.
- If the coolant level is low, add coolant.

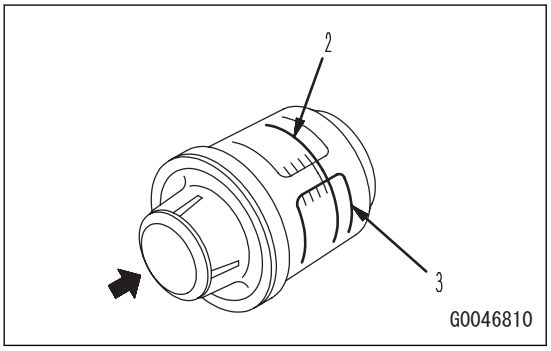


CHECK DUST INDICATOR

1. Open the side cover at the right rear of the machine.
2. Check the position of yellow indicator plate (2) in the transparent part of dust indicator (1).
3. When the yellow indicator plate reaches the red line (3), clean the element.

   For the method to clean the element, see “CHECK, CLEAN AND REPLACE AIR CLEANER (4-17)”.
4. Push the reset button of the dust indicator (1) to change the yellow indicator to its initial position.
5. Close the side cover.





CHECK ELECTRIC WIRING

⚠ CAUTION

- **If your fuse burned out frequently or has traces of the short-circuiting in the electric wiring, ask your Komatsu distributor for immediate inspection and repair of the cause.**
- **Keep the top surface of the battery clean and check the vent hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap with water to clear the vent hole.**

NOTICE

In particular, inspect the wiring of “battery”, “starting motor”, and “alternator” with care.

Check the items that follow.

- Check that the fuses have no defect and their capacity are proper.
- Check that there is no disconnection or trace of short-circuiting in the electric wiring and no damage on the coating.
- Check that there is no loose terminals, and retighten any loose parts if found.
- Check if there is any accumulation of combustible material around the battery, and remove such combustible material if found.

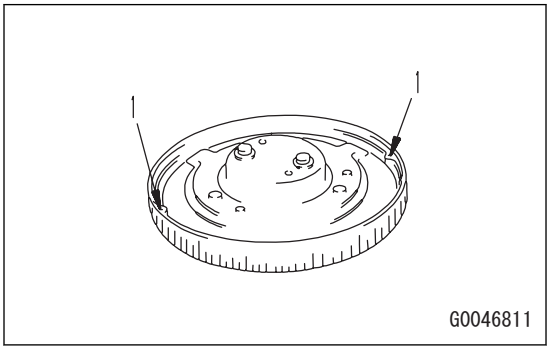
CHECK FUEL LEVEL, ADD FUEL

⚠ WARNING

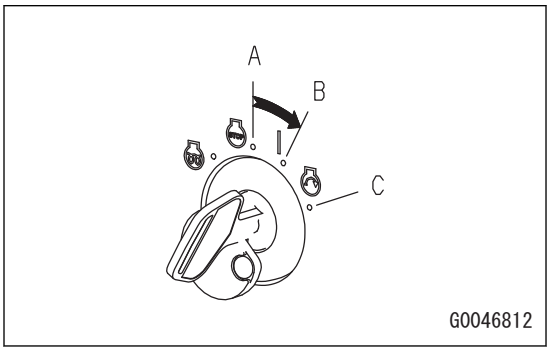
- **When you add fuel, do not spill the fuel. Do not let it overflow. This will cause a fire. Wipe up all the spilled fuel always if it is spilled. If fuel has spilled over soil or sand, remove that soil or sand.**
- **Fuel is highly flammable and dangerous. Do not let a fire get close.**
- **Before you add fuel, stop the engine and do not get on the machine.**
- **Do not leave the machine when you add fuel.**

NOTICE

If the breather hole in the cap is clogged, the pressure inside the tank will go down in some cases, and this causes fuel flow to stop. To prevent this, clean the breather hole from time to time.



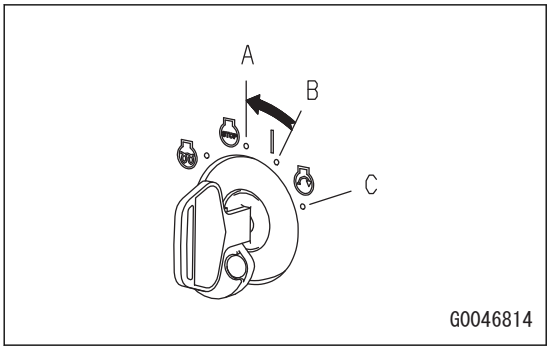
1. Turn the starting switch to the ON position (B).



2. Check the fuel level with fuel gauge (G).



3. After you check, set the starting switch to the OFF position (A).

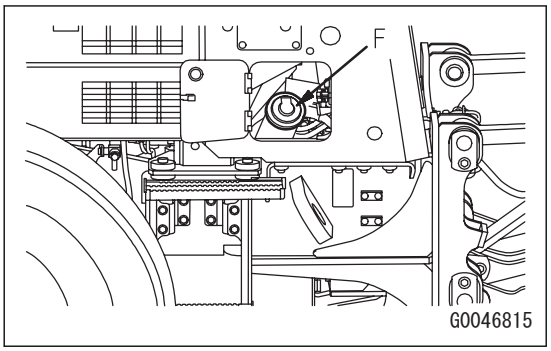


4. After you finish the work, add fuel through oil filler port (F) on the rear left side of the machine to fill the fuel tank fully.

   Once the tank is filled up, do not try to supply additional fuel.

5. After you finish adding the fuel, tighten the cap securely.

   Fuel tank capacity: 390 ℓ {103 USgal}



CHECK DEF LEVEL AND ADDING DEF

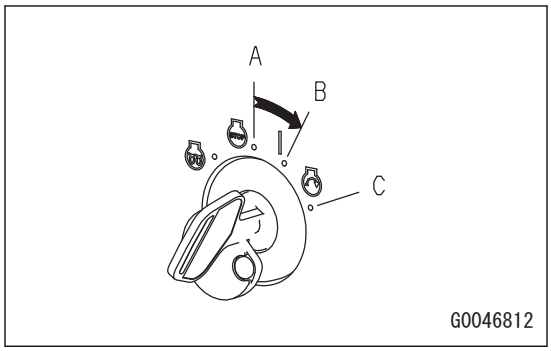
⚠ WARNING

- **Do not put the fluid other than DEF into DEF tank.**
- **When you open the cap of DEF tank of the machine, the ammonia vapor can escape. Keep your face away from the filler port.**
- **Foreign materials in the DEF system or urea deposits caused by precipitation of urea can block the operation of the devices. Before you remove the filler cap, wipe off the dirt from around the filler port. Before you insert the filler nozzle into the filler port, wipe off dirt from it.**
- **If DEF is spilled, immediately wipe and wash the area with water. If spilled DEF is left as it is and the area is not washed and cleaned, it can cause corrosion to the contaminated area and cause poisonous gas.**

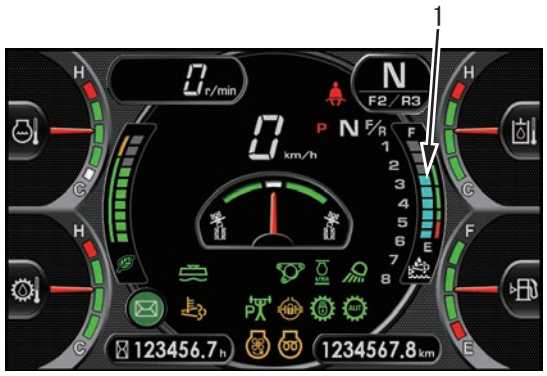
NOTICE

- **Do not add DEF more than the line F of sight gauge (4). DEF possibly leaks through the cap and breather. When the ambient temperature is low and DEF possibly freezes, do not add it more than the line (8) of sight gauge (4).**
  Be careful of the DEF line to be added when you do the operations on a slope or drive the machine on a rough ground. When the remaining DEF level is low, it possibly becomes the warning level if DEF pump sucks air or if DEF level suddenly drops.
- **If DEF is stored in unspecified container, foreign material can mix in it and poisonous gas or corrosive substance can occur by chemical reactions. When you add DEF, do not transfer it to other container.**
- **If you use a funnel when you add DEF, the strainer can break. Do not use a funnel.**
- **When you use a portable DEF refill container, use up DEF each time. If some quantity of DEF is left, remove foreign material, if necessary.**
- **Do not wash the adding nozzle in city water. Minerals can clog the devices.**
- **Do not dilute DEF with water.**
- **If you add fluid other than DEF (diesel fuel, low concentration DEF, etc.) by mistake, the caution lamp lights up and the alarm buzzer operates to warn the abnormality. In this case, consult your Komatsu distributor for draining of the inappropriate fluid and for inspection. DEF injector or DEF pump possibly needs to be replaced.**

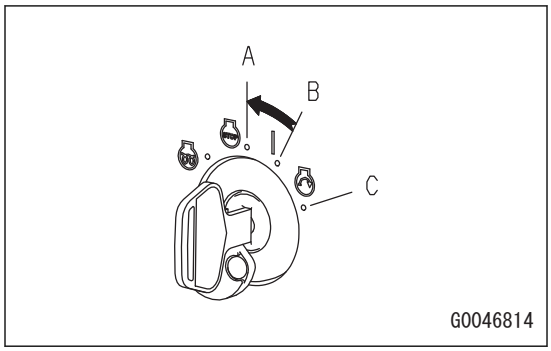
1. Turn the starting switch to the ON position (B).



2. Check the DEF level gauge (1) on the machine monitor.

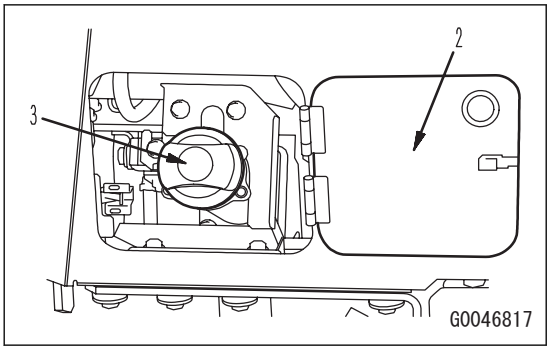


3. After inspection, turn the starting switch to the OFF position (A).



4. Open the cover (2) at the right side of the machine, clean the blue DEF tank cap (3) and the area around it.
5. Turn the filler port cap (3) counterclockwise.

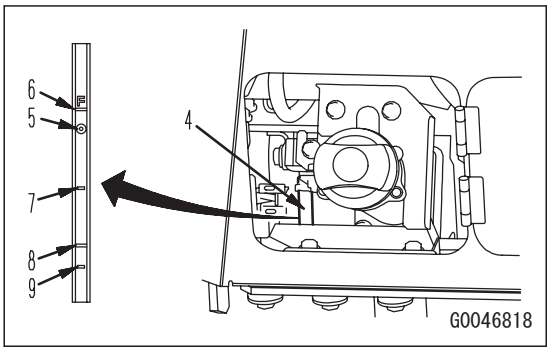
   The fuel filler port cap opens.



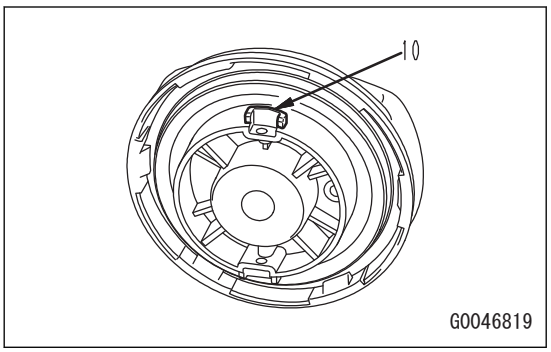
6. While you check by sight gauge (4), add DEF through the filler port until float (5) reaches the line F (6).

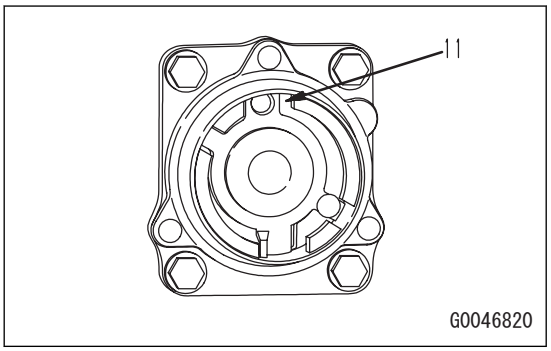
   The line (7) in the sight gauge shows approximately 5 ℓ {1.32 USgal} below the line F, and the line (9) shows approximately 10 ℓ {2.64 USgal} below the line F.

   The line (8) is the maximum adding line when DEF possibly freezes in cold weather.



7. After you add it, align the claw (10) of the cap with the groove (11) of the filler port and turn the cap clockwise by 90 ° to close it securely. .





REMARK

- To add DEF, it is recommended to use a nozzle which has a diameter and a length specified by ISO 22241-4, and which has an auto stop function. When the specified nozzle is used, the magnet installed inside the filler port of the tank cancels the inappropriate fluid addition prevention device, and you can add DEF. This mechanism prevents addition of DEF into the fuel tank, addition of fuel into DEF tank, and spill of DEF from the filler port.
- When you use a nozzle which does not agree with ISO 22241-4, hold it in your hand and add DEF carefully while you check the sight gauge.
- Add DEF in the clearly marked DEF tanks that have the blue cap.

CHECK TIRE PRESSURE

Check the tire inflation pressure before the work in the condition that the tires are cold.

1. Measure the tire inflation pressure with a tire inflation pressure gauge.
2. Adjust the tire inflation pressure to be correct.
   For the correct tire inflation pressure, see the table that follows.

Tire size	Inflation pressure [kPa{kgf/cm^2, PSI}]
17.5R25 (standard specification machine)	300 {3.0, 42.7}
14.00R24 (option)	375 {3.75, 53.3}

NOTICE

If the tires are used when the tire inflation pressure is lower than the above value, it can cause damage on the rim.
Keep the inflation pressure in the range of 0 to +20 kPa {0 to +0.2 kgf/cm^2, 0 to +2.9 PSI} of the correct value.

3. Check the tires and the rims for wear or damage, and check the hub bolts for looseness.

CHECK WINDOW WASHER FLUID SPOUTING OUT

Spray the window washer fluid to see that it is sprayed correctly.

- If it is sprayed incorrectly, clean the washer nozzle hole with a thin wire such as a safety pin.
- If the condition does not become normal, ask your Komatsu distributor to do inspection and repair.

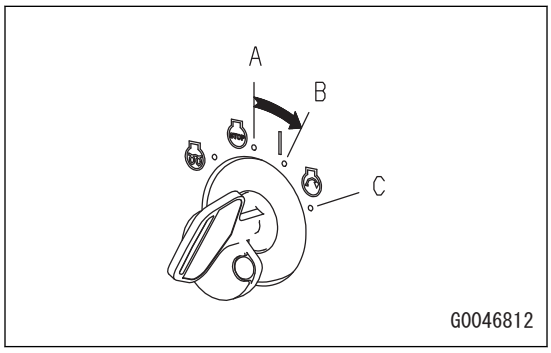
CHECK WIPER FUNCTION

Operate the windshield wiper, and check the operation state and check that it wipes well in “intermittent” operation, “low speed” operation, and “high speed” operation.

- Operate the window washer liquid to wet the glass when you check this.
- If the windshield wiper does not wipe well, you need to clean the glass surface or replace the windshield wiper rubber.
- If the condition does not become normal, ask your Komatsu distributor to do inspection and repair.

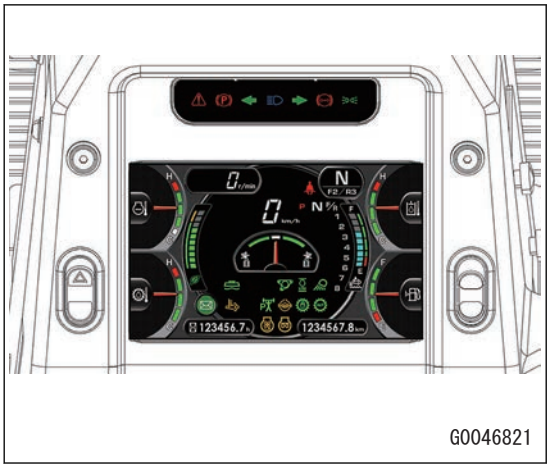
CHECK MACHINE MONITOR

1. Turn the starting switch to the ON position (B).



2. Make sure that all the monitor, gauges, and centralized warning lamp light up for approximately 2 seconds, and the alarm buzzer operates for approximately 2 seconds.

   If it does not light up, the monitor can have a failure or open circuit. Consult your Komatsu distributor for inspection.



CHECK HORN

Check that the horn operates when the horn switch is operated.
If a problem is found, consult your Komatsu distributor for inspection and repair.

CHECK DEFROSTER FUNCTION

- Operate the air conditioner to check that air blows out from the vent to the front window glass correctly.
  If a problem is found, consult your Komatsu distributor for inspection and repair.
- Operate the switch for rear window glass with heated wire to check that the rear window glass becomes warm correctly.
  If a problem is found, consult your Komatsu distributor for inspection and repair.

CHECK LAMPS

Check that the lamps are turned on and off normally, and check them for dirt and damage.

If a problem is found, consult your Komatsu distributor for inspection and repair.

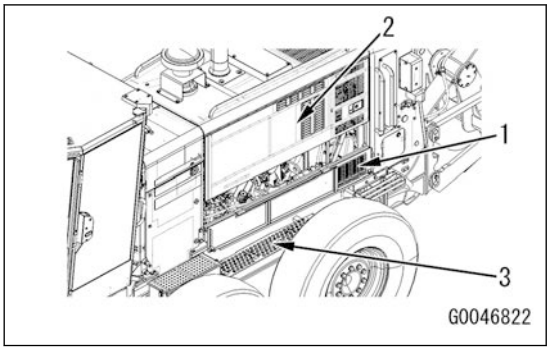
CHECK IF LOWER COVER IS SHUT

⚠ CAUTION

Do not drive or operate the machine with the lower cover open.
Swing of the tandem can damage the lower cover.

- After the inspection or maintenance inside of the engine room, do not close the side panel (2) with the lower cover (1) open.

  (Lower cover is installed on the right and left sides.)
- If you drive or operate the machine with the lower cover (1) open, swing of tandem (3) can damage the lower cover.



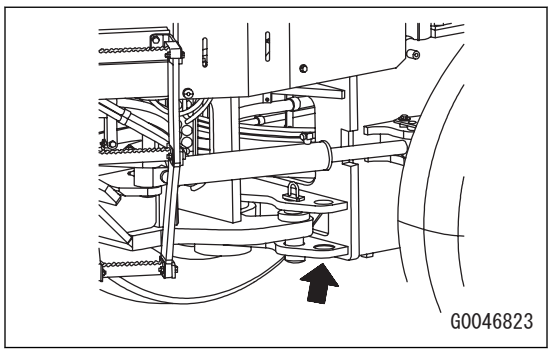
CHECK ARTICULATE LOCK PIN

⚠ WARNING

When you drive the machine on a public road and when you do the maintenance or transportation, keep the articulate lock pin installed to the machine.

When you operate the articulation for the work, do as follows.

1. Remove the articulate lock pin.
2. Store the articulate lock pin in the position shown by arrow.



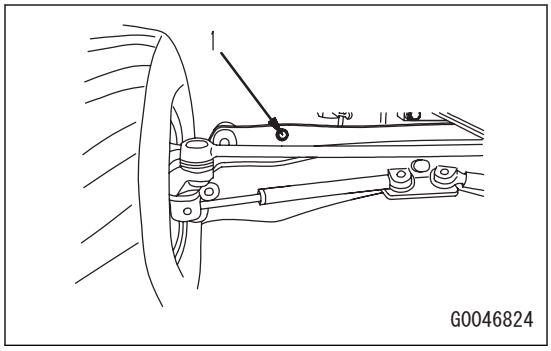
CHECK LEANING STOPPER

⚠ WARNING

If the leaning stopper is being fixed and the machine travels, the machine is possibly damaged.

When the leaning stopper is inserted, remove it.

1. Remove the leaning stopper (1).
2. Store the leaning stopper (1) in the toolbox.



CHECK LOCKS

Check that the locks operate correctly.
(For the locations of the locks, see “LOCK (3-301)”.)

If a problem is found, consult your Komatsu distributor for inspection and repair.

ADJUSTMENT

ADJUST OPERATOR SEAT

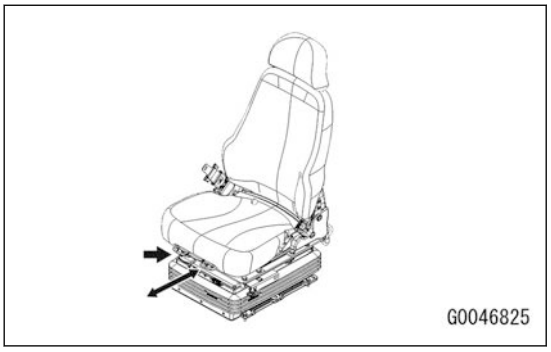
⚠ WARNING

- **Place the machine in a safe place when you adjust the position of the operator's seat.**
- **Adjust it before you start operation or when operators change shift.**
- **Adjust the position of the operator's seat, then you can depress the brake pedal fully with your back against the seat backrest.**

AIR SUSPENSION SEAT

ADJUST SEAT UNIT IN FORE-AND-AFT DIRECTION

Operate the lever up, and set the seat to the desired position, then let go of the lever.
Fore-aft adjustment: 101.6 mm {4 in} (12.7 mm {0.5 in} x 8 stages)



RECLINE SEAT

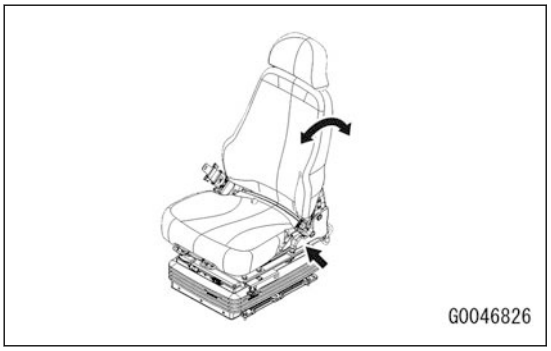
1. Move the lever up to move the backrest forward or rearward.

   Sit with your back against the backrest to adjust the reclining angle. If your back is not on the backrest, it can suddenly go back to the initial position.

   Adjustment degree

   Forward tilt: 21 ° (acceptable if it is 21 ° or more.)

   Rearward tilt: 12 °
2. After adjustment, let go of the lever.

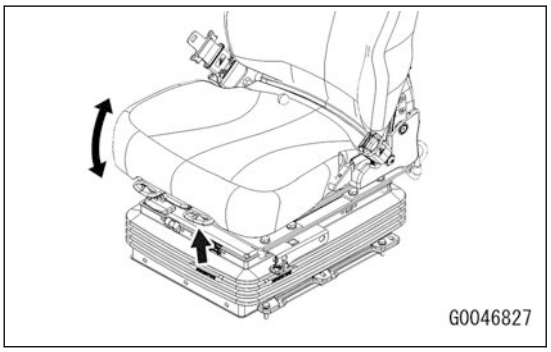


TILT SEAT

Operate the lever up, and move the front of the seat cushion up and down to adjust it to the desired position, then let go of the lever.
Adjustment degree

Forward tilt: 5 °

Rearward tilt: 5 °



ADJUST WEIGHT AND HEIGHT OF SEAT

Turn the engine starting switch to the ON position when you adjust the seat since the air compressor built in the seat is used for this adjustment.

NOTICE

Do not operate the switch continuously for 1 minute or longer. If you do so, it will cause a failure of the air compressor.

The seat height is adjusted pneumatically and in stepless.
Push the switch to adjust the strength and height of the suspension.

(A) RAISE position

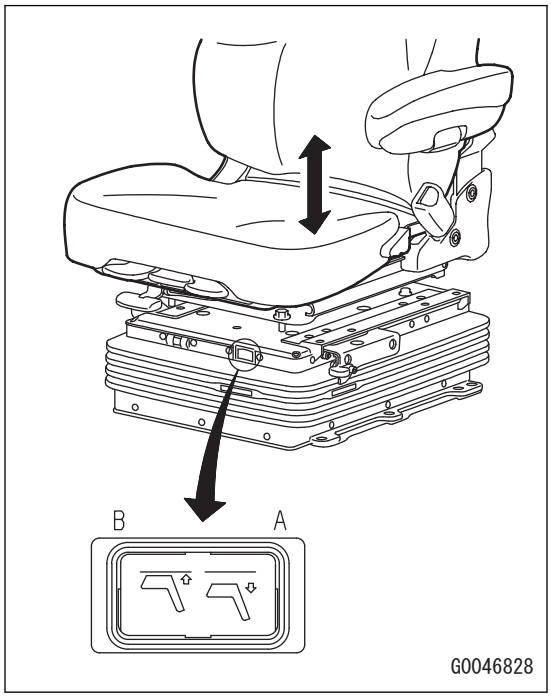
Seat moves up.

(B) LOWER position

Seat moves down.

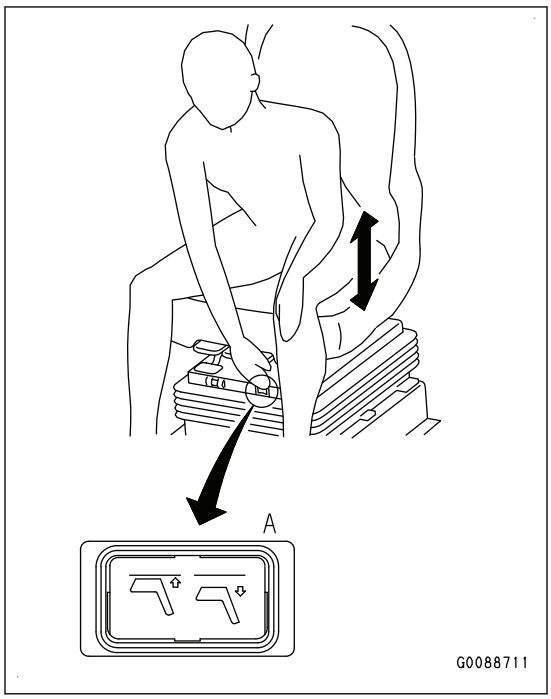
When it is adjusted to the desired position, release the switch.

Adjustment: 152mm {6.0in}



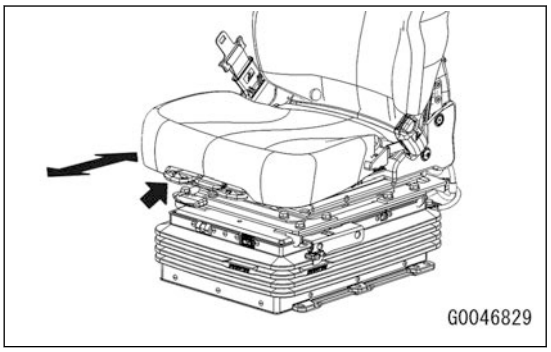
REMARK

Sit on the seat and push the RAISE position (A) of the switch, then move your hip up and down.
Move the suspension up and down by force. Air comes into it more easily and you can adjust it to the desired position faster.



ADJUST SEAT CUSHION IN FORE-AFTER DIRECTION

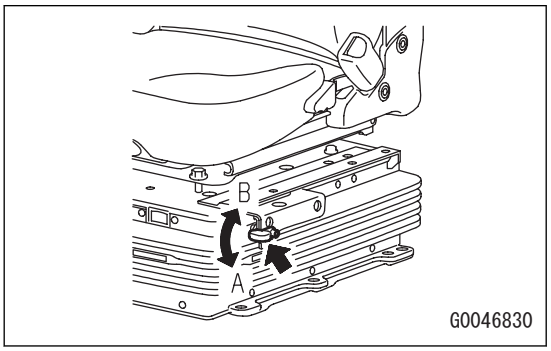
Operate the lever up, and set the seat cushion to the desired position, then let go of the lever.
Fore-aft adjustment: 60 mm {2.4 in}



ADJUST SUSPENSION DAMPER HARDNESS

By operating the knob, the damping force of the suspension damper can be adjusted.

- To increase the damping force, direct the knob downward (A) of the seat.
- To decrease the damping force, direct the knob upward (B) of the seat.



Adjustment amount

1st stage: (c) position

2nd stage: (d) position

3rd stage: (e) position

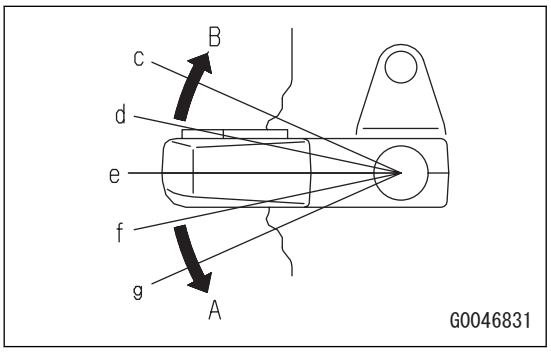
4th stage: (f) position

5th stage: (g) position

REMARK

As for the hardness adjustment of suspension damper, the 3rd stage position (e) is the best position for operator comfort.

We recommend adjusting the knob to the 3rd stage position (e) for usual operation.



1. When you want to decrease the vertical movement of the suspension, adjust the knob to the 4th stage position (f) or 5th stage position (g).

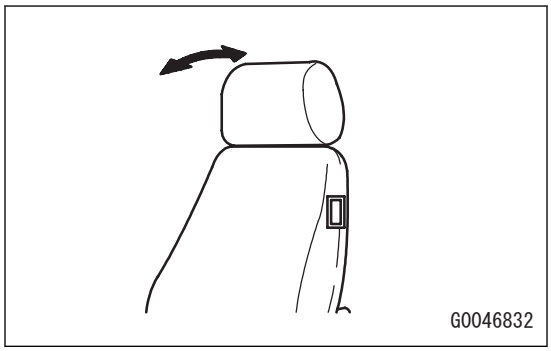
   (The damper becomes harder.)

2. When you want to decrease the shock to the seat, adjust the knob to the 2nd stage position (d) or the 1st stage position (c).

   (The damper becomes softer.)

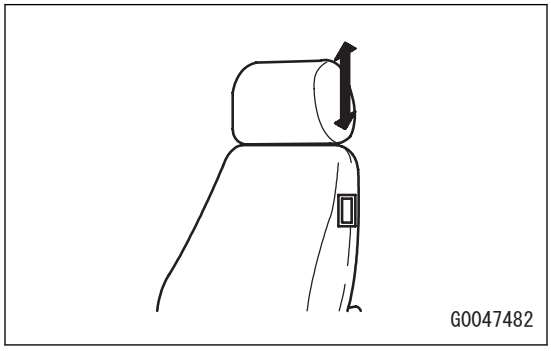
ADJUST HEADREST ANGLE

Turn the headrest back and forth and set it to a desired angle.
Adjustment amount: 30 °



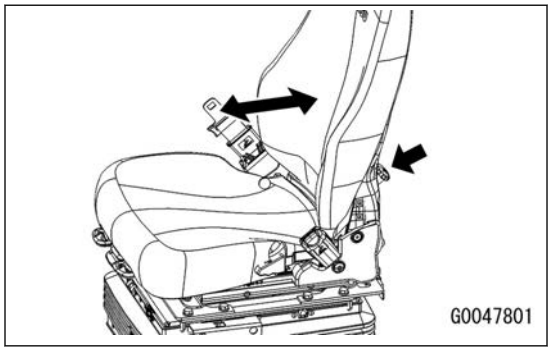
ADJUST HEADREST IN VERTICAL DIRECTION

Move the headrest up or down to the desired height.
Adjustment: 127 mm {5.0 in}



LUMBAR SUPPORT

Turn the knob to the right or left, and adjust the tension to be comfortable to your waist.

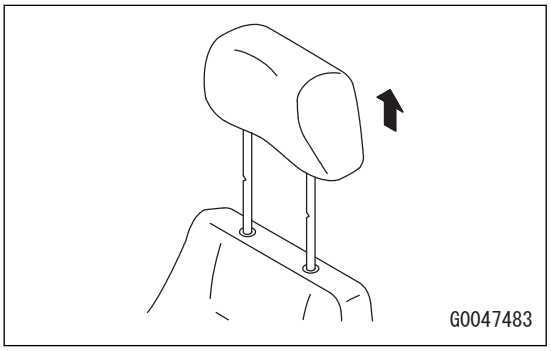


REMOVE AND INSTALL HEADREST

REMOVE HEADREST

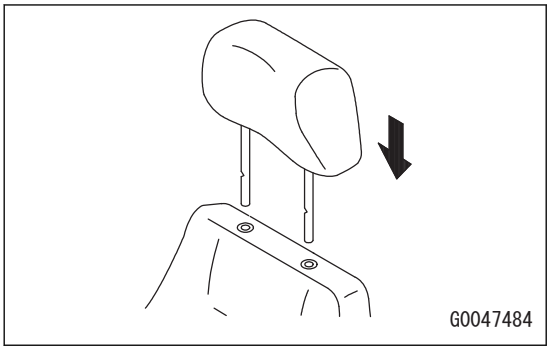
When the headrest is not necessary, remove it as follows.

1. Pull up the headrest to the position where it stops.
2. If you pull up the headrest too fast, it will come off.



INSTALL HEADREST

1. Insert the headrest to the holes on the backrest.
2. Push down the headrest.



ADJUST WORK EQUIPMENT LEVER CONSOLE

⚠ WARNING

When you adjust the lever stand, make sure that the work equipment is locked (the pilot lamp in the switch is lit).
If the work equipment control levers are not locked and they are touched by accident when you start the engine, the work equipment can move unexpectedly, and this may lead to a serious injury or death.

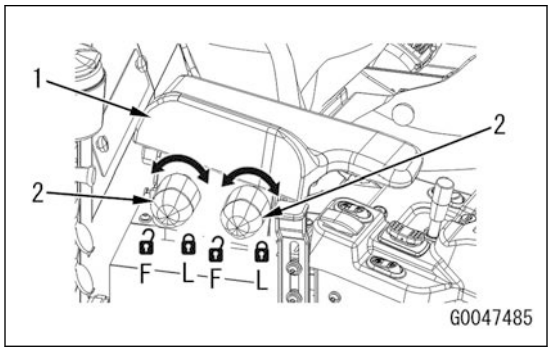
ADJUST ARMREST HEIGHT AND ANGLE

You can adjust the height and angle of armrest (1) by the operation of lock lever (2).
Adjustment of height: 41.5 mm {1.6 in}

Angle adjustment: 17 °

REMARK

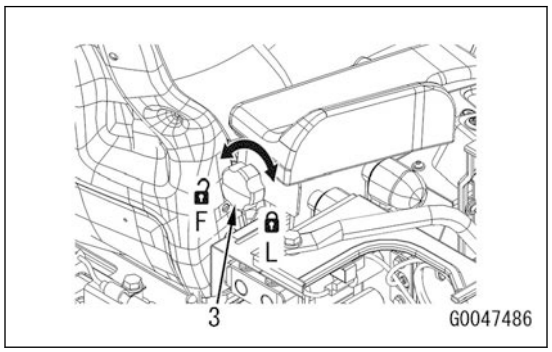
Set the lock lever (2) to the FREE position (F). The lock lever becomes loose.
Hold the armrest at the desired position, and set the lock lever in the LOCK position (L), then the armrest is fixed.



ADJUST ARMREST RIGHT-LEFT POSITION

Set the lock lever (3) to the FREE position (F).
The lock lever is loosened.

While you hold the armrest at the desirable position, set the lock lever to the LOCK position (L), then the armrest is fixed.



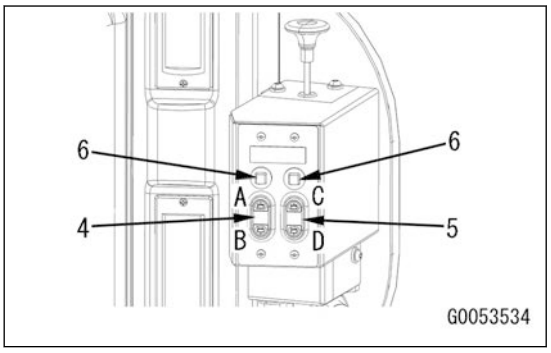
ADJUST HEIGHT OF WORK EQUIPMENT LEVER CONSOLE

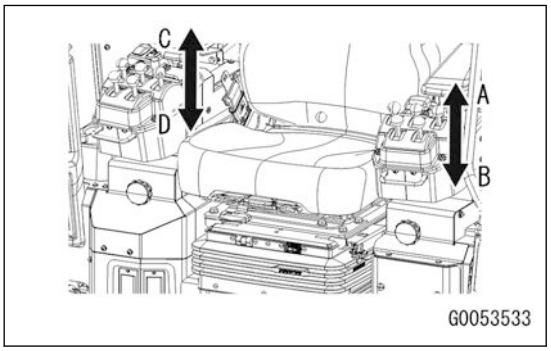
Push the work equipment lever console electric lifter switches (4) and (5), the work equipment lever consoles are raised or lowered.
Positions (A) and (C): It rises when the switch is kept pushed.

Positions (B) and (D): It lowers when the switch is kept pushed.

NOTICE

If the switch is kept pushed even after the height of the work equipment lever console is adjusted to the highest or lowest position, the motor will overheat.
To protect the motor, if the circuit breaker works, wait a while after the breaker switch (6) is raised up, then push down the breaker switch (6) to operate the work equipment lever console lifter switch again.





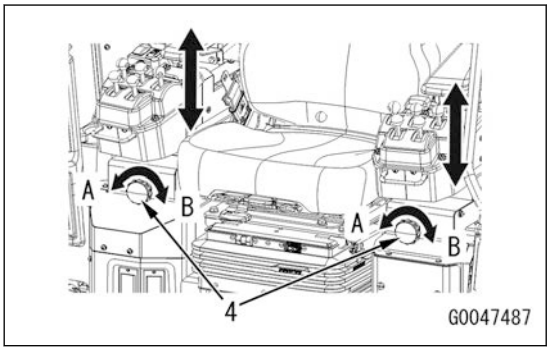
ADJUST HEIGHT OF WORK EQUIPMENT LEVER CONSOLE MANUALLY

(option)

Turn the lever (4) to the direction (A), and the work equipment lever console rises.
Turn the lever (4) to the direction (B), and the work equipment lever console lowers.

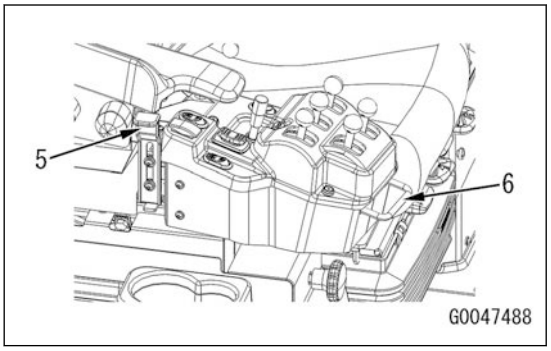
When you let go of the lever (4) after you turned the work equipment lever console to the desired position, the work equipment lever console will be fixed at that position.

Adjustment: 96.4 mm {3.8 in}



ADJUST WORK EQUIPMENT LEVER CONSOLE IN FORE-AND-AFT DIRECTION

Hold the handle (6) while you push the lever (5), move it in fore -and-aft direction, and release it.
Adjustment: 160 mm {6.3 in}



ADJUST MIRRORS

⚠ WARNING

Be sure to adjust the mirrors before the work. If the mirrors are not correctly adjusted, you cannot keep the visibility. There is a danger that you will suffer injury, or a serious personal injury or death is caused.

1. Loosen the mounting screws (1) of mirrors (A) and (B).
2. Adjust the mirrors (A) and (B) for the best visual check position from the operator's seat, and tighten the screws (1) to fix them.

   Make sure that a part of the machine also comes into view at that time.

   View range

   Mirror (A)

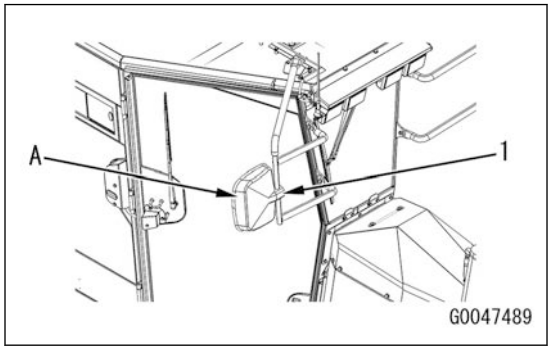
   Hatched area (A): The height of 1.5 m {6 ft 7 in} above the ground must be possible to be seen.

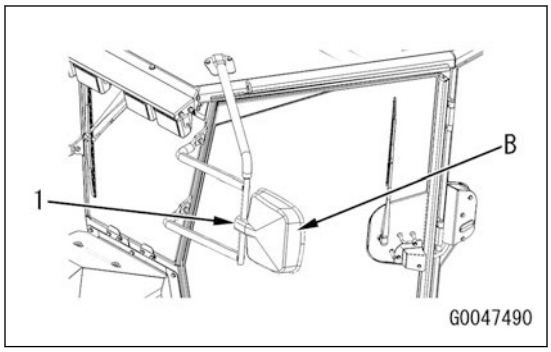
   Mirror (B)

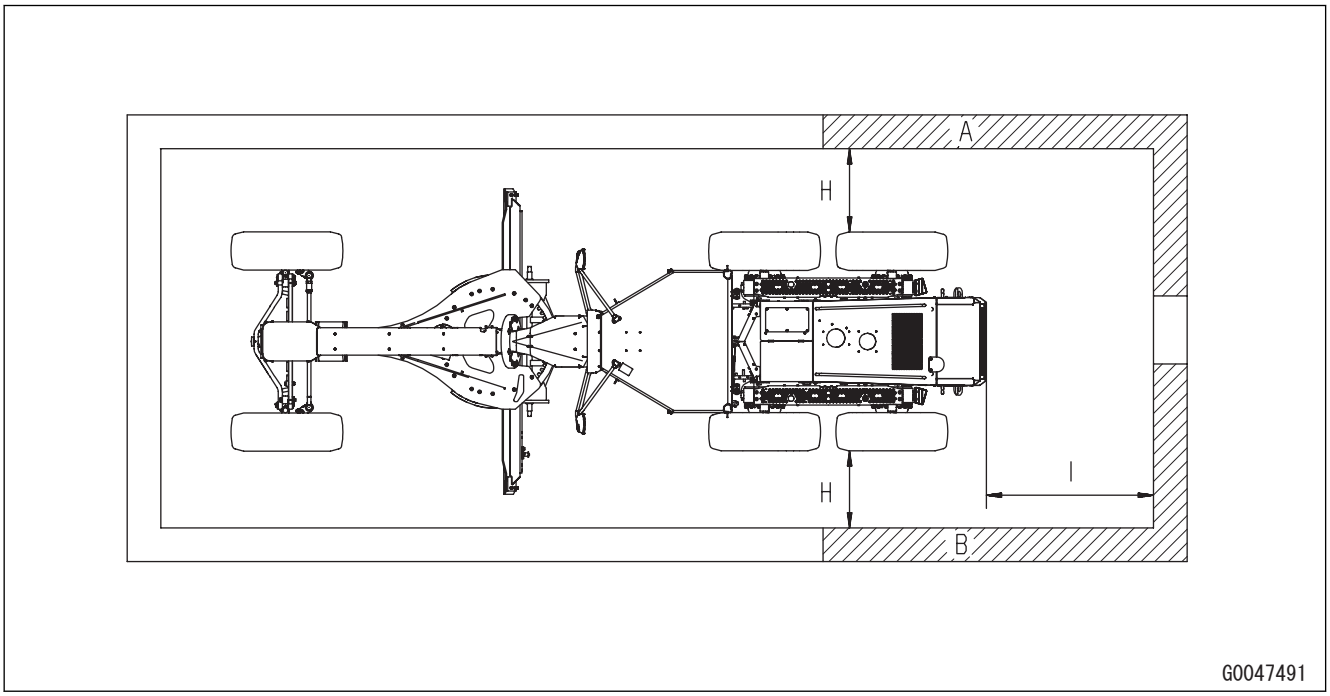
   Hatched area (B): The height of 1.5 m {6 ft 7 in} above the ground must be possible to be seen.

   (H): 1 m {3 ft 3 in}

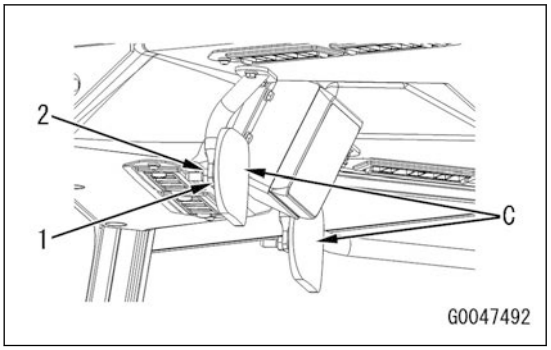
   (I): 2 m {6 ft 7 in}







3. Loosen the mounting screw (1) and nut (2) of mirror (C).
4. Adjust the mirror (C) for the best visual check position from the operator's seat, and tighten the screw (1) and nut (2) to fix them.



View range

Mirror (C)

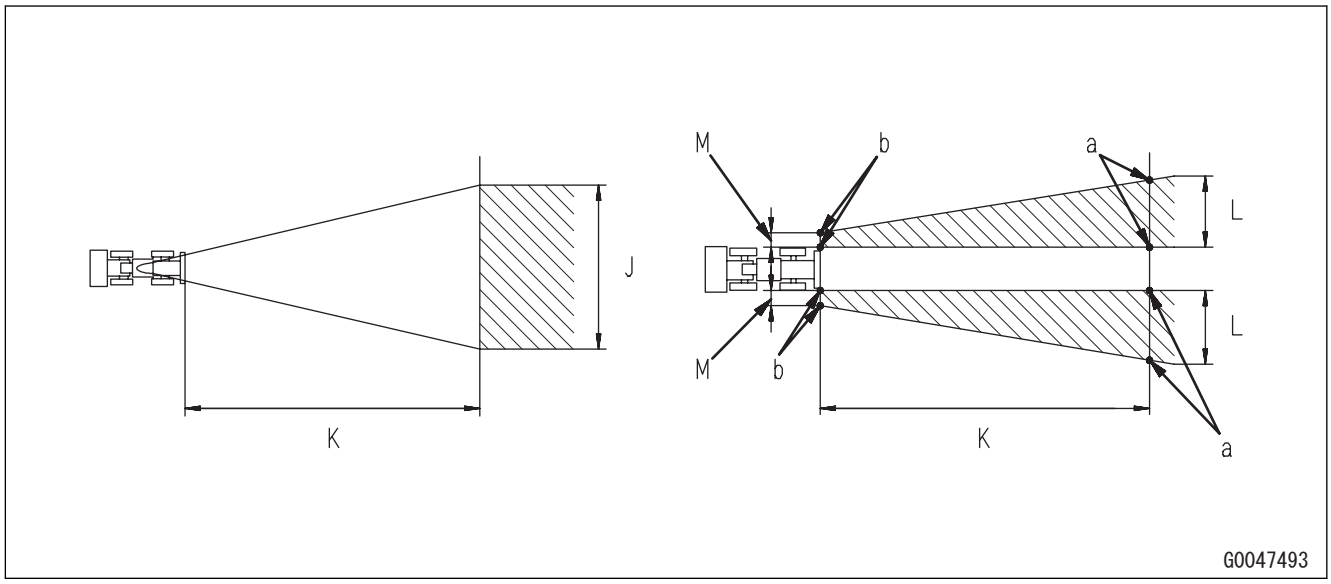
- The ground of the 10 m {32 ft 10 in} wide must be possible to be seen from the position 30 m {98 ft 5 in} at rear.
- The position (a) (ground of 5 m {16 ft 5 in} wide from the position 30 m {98 ft 5 in} rear) must be possible to be seen from the position (b) (of height 1.5 m {4 ft 11 in} and width 0.75 m {2 ft 6 in}) at rear.

(J): 10 m {32 ft 10 in}

(K): 30 m {98 ft 5 in}

(L): 5 m {16 ft 5 in}

(M): 0.75 m {2 ft 6 in}



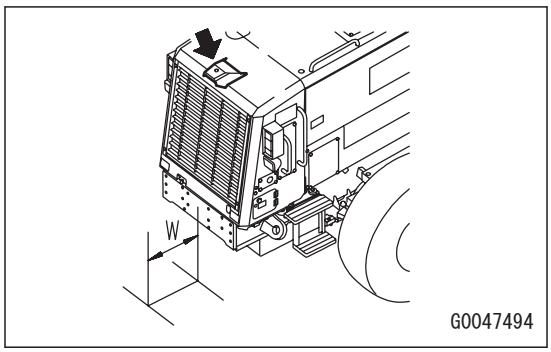
ADJUST REAR VIEW CAMERA

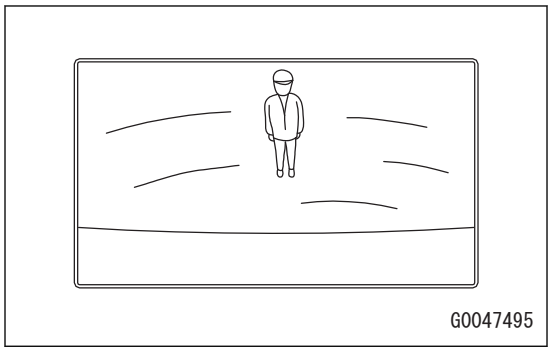
ADJUST REARVIEW CAMERA ANGLE

⚠ WARNING

- **If the rear view shown on the monitor is not aligned correctly, the camera angle must be adjusted. If the camera is not adjusted correctly, you cannot keep a good visibility, and it can cause serious personal injury and death.**
- **If you stand on an unstable place or you are in an unstable balance when you adjust the camera, you could fall and be injured. Put a stepladder or step on the level and firm ground, and adjust the camera in a stable balance.**

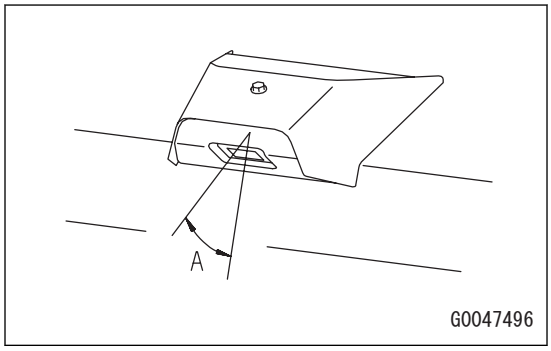
Adjust the angle of the rear view camera to let the person within 1 m {3 ft 3 in} away from the machine's rear part (W) be shown on the monitor at the operator's seat.



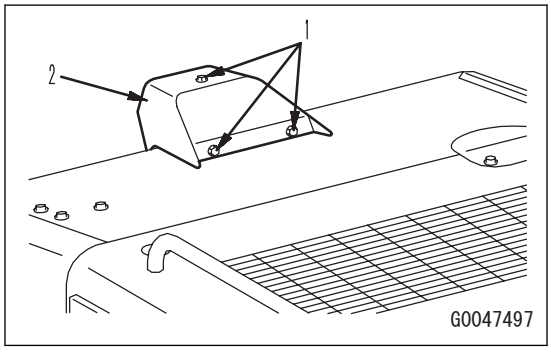


If the image on the monitor is not aligned correctly, adjust the mounting angle (A) of the rearview camera in the procedure that follow.

You can adjust the angle (A) within the range from 35 to 50°.

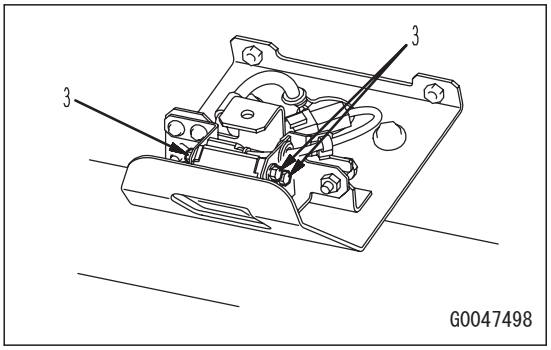


1. Remove the bolts (1) (3 places), and remove the cover (2).

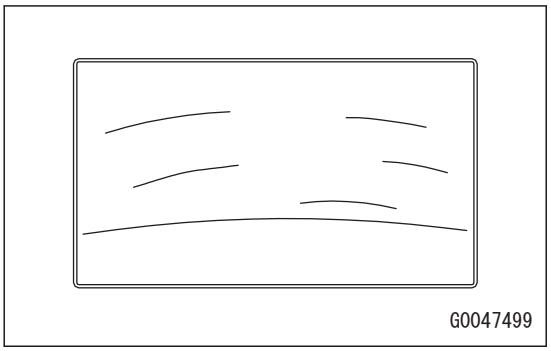


2. Loosen the mounting bolts (3) (3 places), and adjust the angle (A).

   Adjust the angle, then you can see a part of the machine reflected on the monitor screen.
3. After you finish the adjustment, tighten the bolts (3) (3 places).
4. Install the cover (2), and tighten the bolts (1) (3 places).



G0047498

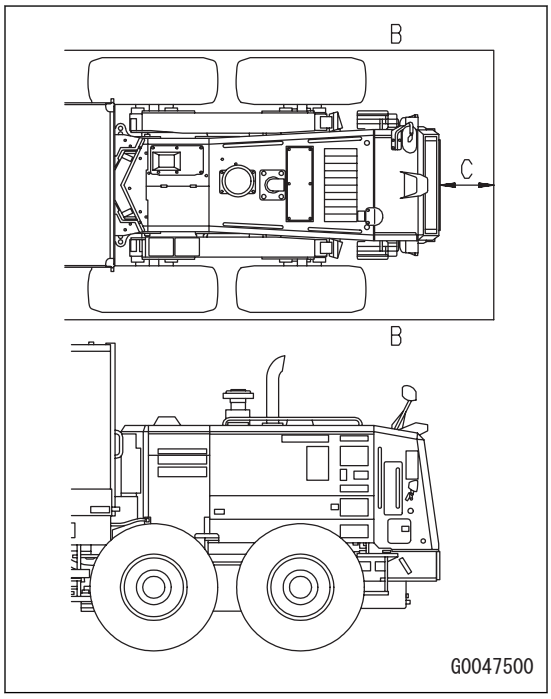

G0047499

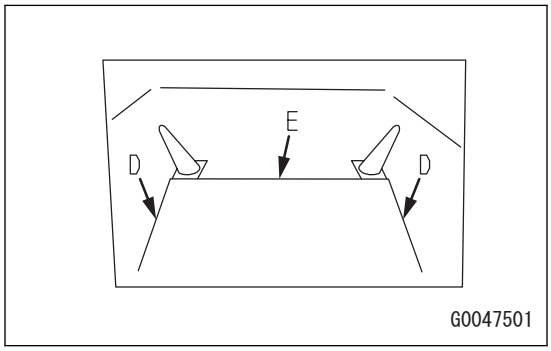
Do the setting of the camera again if the rearview which is reflected on the monitor is not correct even after the angle adjustment. Consult your Komatsu distributor.

CHECK REARVIEW CAMERA REFERENCE LINE

Check that the images on the rearview monitor are normal as shown in the figure. Then make sure that the machine width reference line (D) is aligned to the tire outside width (B), and the horizontal line (E) is aligned to the position (C) that is 1.5 m {4 ft 11 in} away from the rear end of the machine.

When the reference line is abnormal, change its setting to non-display and contact your Komatsu distributor.





ADJUST SEAT BELT

⚠ WARNING

- **Before you fasten the seat belt, check that there is no problem in the belt mounting bracket or belt. If it is worn or damaged, replace it.**
- **Even if no problem can be seen on the appearance of the seat belt, replace it every 3 years from starting usage or 5 years after manufacture that comes first. The date of manufacture of the belt is shown on the back of the belt.**
- **Before you drive the machine, fasten the seat belt.**
- **Be sure to use the seat belt during the operation.**
- **Do not twist the seat belt when you use it.**

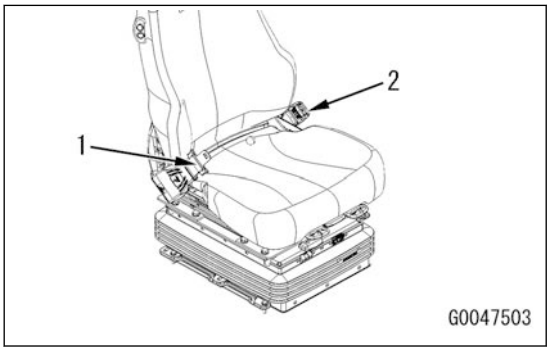
REMARK

The date shown on the seat belt is the production date. This is the start date of the 5-year period from the production. It is not the start of the 3-year period of actual usage.

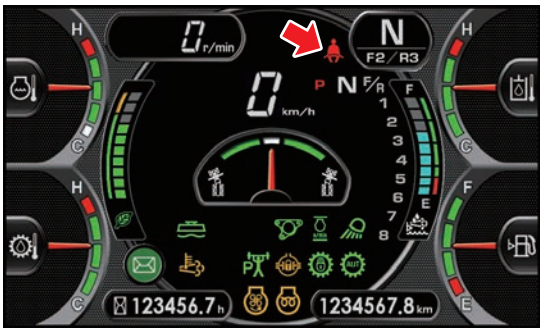
FASTEN AND UNFASTEN SEAT BELT

Wear the seat belt tightly, but not too tight.

1. Sit on the seat, and adjust the seat, and lean back against the seat while you depress the brake pedal fully.
2. Sit on the seat, pull the belt on left side, then insert the tongue (1) into buckle (2) until a “click” sound is heard. Wear the seat belt tightly, but not too tight.



3. Pull the belt to check that it is securely locked.
   - Push the red button on the buckle (2) to unfasten the belt.
   - If the seat belt is not locked, the seat belt caution lamp lights up on the machine monitor.

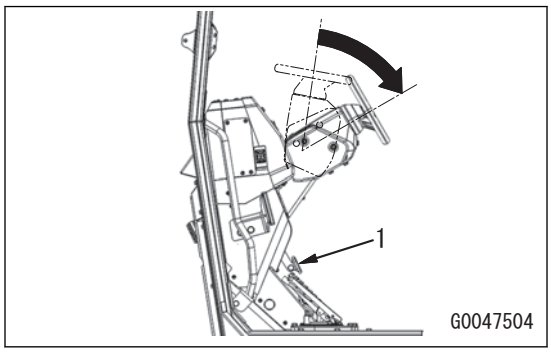


ADJUST STEERING CONSOLE POSITION

⚠ WARNING

While the machine travels, do not adjust it.

1. Push the steering console tilt pedal (1).
   The steering console is tilted toward you.
2. Adjust it to the applicable position in response to the operation posture or the body of the operator.
   The steering wheel and machine monitor also move at the same time.



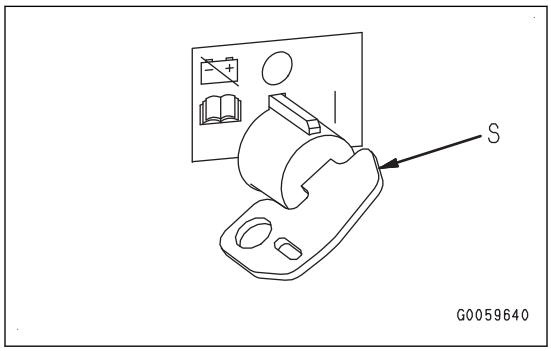
OPERATIONS AND CHECKS BEFORE YOU START ENGINE

⚠ WARNING

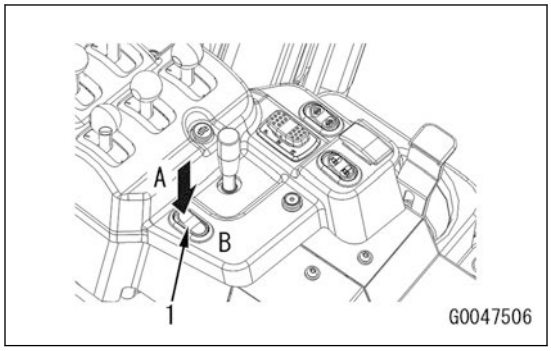
When you start the engine, make sure that the work equipment is securely locked (the pilot lamp in the switch is lit).
At the same time when you start the engine, if you touch the work equipment control lever by mistake, the work equipment will move unexpectedly, and serious personal injury or death can be caused.

Do the operation and check before you start the engine as follows.

1. Check that the battery disconnect switch (S) is in the ON position (I).



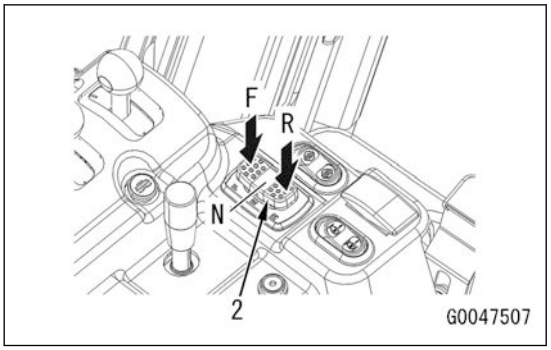
2. Check that the parking brake switch (1) is in the ON position (A).



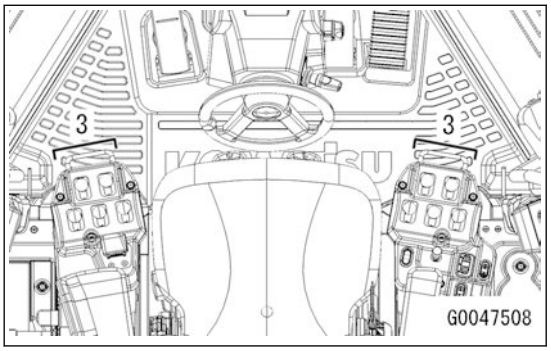
3. Check that the directional selector switch (2) is in the NEUTRAL position (N).

   REMARK

   If the directional selector switch is not in the NEUTRAL position (N), the engine does not start.



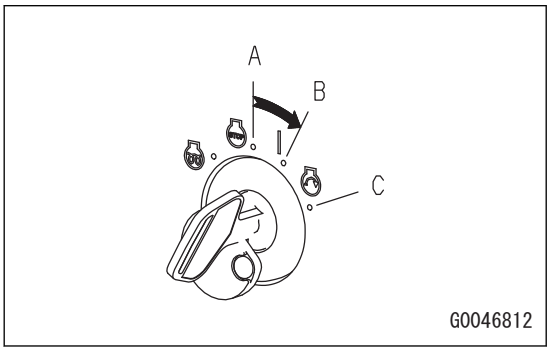
4. Check that the work equipment control lever (3) is in the HOLD position.



5. Insert the key into the starting switch (3), turn it to the ON position (B), and check the operation of the machine monitor system.

   When the starting switch is turned to the ON position before you start the engine, all the monitors, gauges and centralized warning lamp light up for approximately 2 seconds, and the alarm buzzer operates for approximately 2 seconds.

   If the monitor does not light up, there can be a failure or open circuit. Consult your Komatsu distributor for inspection.

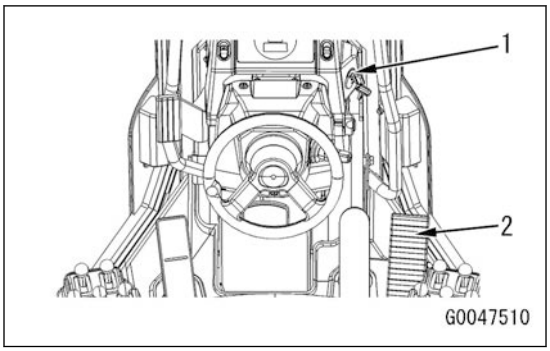


START ENGINE

START ENGINE IN NORMAL WEATHER

⚠ WARNING

- **When you start the engine, be sure to sit on the operator's seat.**
- **Do not start the engine by short-circuiting the engine starting circuit.**
  Serious personal injury or death or fire can be caused.
- **Check that there is no person or obstacle in the area around the machine, and make a horn sound, then start the engine.**
- **The exhaust gas is poisonous.**
  When you start the engine in confined spaces, be careful to have good ventilation.



NOTICE

- **Do not suddenly accelerate the engine before the warm-up operation is completed.**
  Do not operate the starting motor continuously for 20 seconds or more.
- **If the engine does not start, wait for approximately 2 minutes, and then try to start the engine again.**
- **Do not start the engine with the accelerator pedal (2) pushed.**
- **The automatic warm-up function to heat the engine coolant quickly and the turbo protect function to protect the turbocharger are installed to this machine.**
  Sometimes in cold weather, the engine speed does not change for several seconds immediately after the engine is started even if the accelerator pedal (2) is pushed.

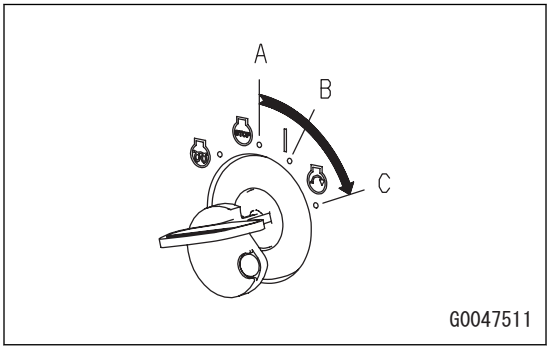
1. Turn the key in the starting switch (1) to the START position (C).

   The starting motor rotates to start the engine.

   Hold the key in the starting switch (1) at the START position (C) to keep the rotation of the starting motor until the engine starts.

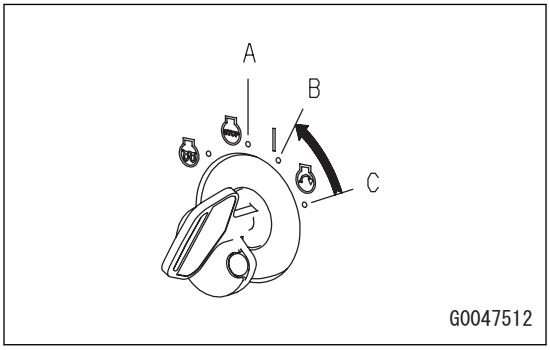
   REMARK

   Even the starting switch (1) is turned to the START position (C), the starting motor does not rotate if the directional selector switch is set to the positions other than the NEUTRAL position (N).



2. After the engine starts, let go of the key in the starting switch (1).

   The key automatically goes back to the ON position (B).



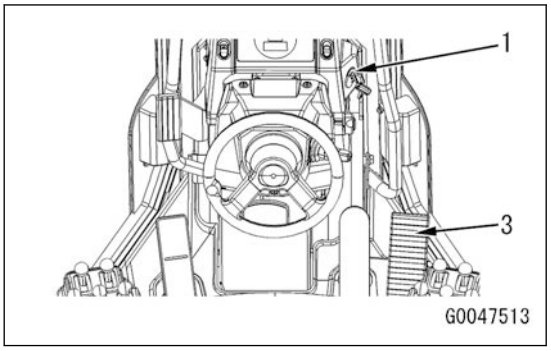
REMARK

- When the engine starts, white smokes can come out from the exhaust pipe. They are fine water particles of moisture or water vapor. It is not a problem.
- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filter function.

START ENGINE IN COLD WEATHER

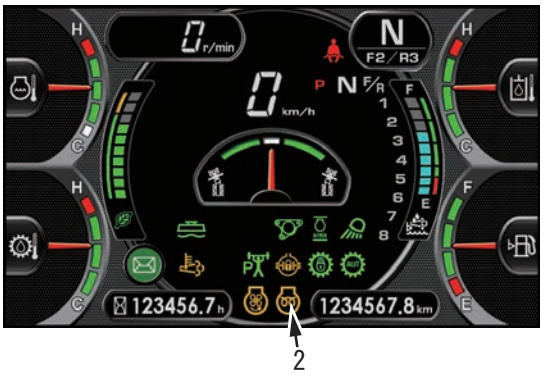
⚠ WARNING

- **When you start the engine, be sure to sit on the operator's seat.**
- **Do not start the engine by short-circuiting the engine starting circuit.**
  Serious personal injury or death or fire can be caused.
- **Check that there is no person or obstacle in the area around the machine, and make a horn sound, then start the engine.**
- **The exhaust gas is poisonous.**
  When you start the engine in confined spaces, be careful to have good ventilation.



NOTICE

- **Do not suddenly accelerate the engine before the warm-up operation is completed.**
  Do not operate the starting motor continuously for 20 seconds or more.
- **If the engine does not start, wait for approximately 2 minutes, and then try to start the engine again.**
- **Do not start the engine with the accelerator pedal (3) pushed.**
- **The automatic warm-up function to heat the engine coolant quickly and the turbo protect function to protect the turbocharger are installed to this machine.**
  Sometimes in cold weather, the engine speed does not change for several seconds immediately after the engine is started even if the accelerator pedal (3) is pushed.



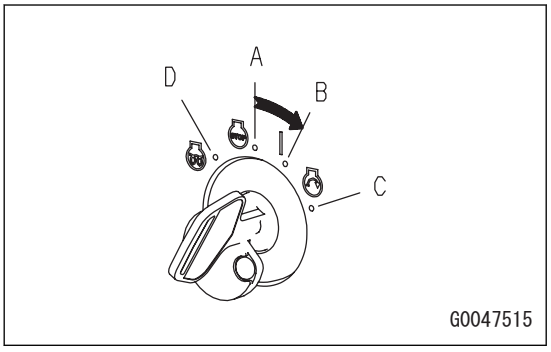
When the engine is started after it is left at temperature of approximately -20 °C {-4 °F} for more than a half day, it takes time to get full combustion.

Operate the starting switch as follows.

1. Turn the key in the starting switch (1) to the ON position (B).

   When the ambient temperature is low, the preheating pilot lamp (2) lights up and the automatic preheating starts. Hold the key in the starting switch (1) at the ON position until the preheating pilot lamp (2) goes off.

   The time that the preheating pilot lamp (2) stays lit changes by the ambient temperature as shown in the table.



Atmospheric temperature (°C {°F})	Lighting time (sec.)
Over -4 {Over 24.8}	0
-4 to -15 {24.8 to 5}	5 to 30
Less than -15 {Less than 5}	30

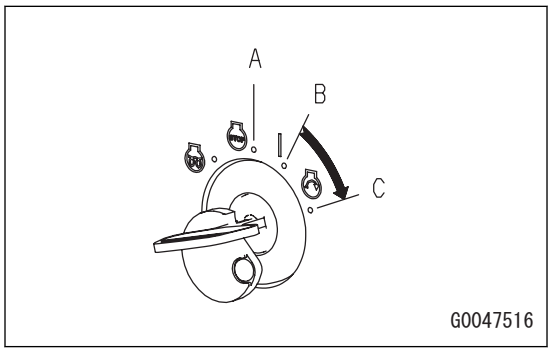
REMARK

Normally, the engine is preheated sufficiently by the automatic preheating. But if you want to extend the preheating time, turn the key in the starting switch (1) to the manual preheating position (D).
Be sure that the preheating time is 30 seconds or below at the longest.

2. When the preheating pilot lamp (2) goes off, turn the key in the starting switch (1) to the START position (C).

   The starting motor rotates to start the engine.

   Hold the key in the starting switch (1) at the START position (C) to keep the rotation of the starting motor until the engine starts.

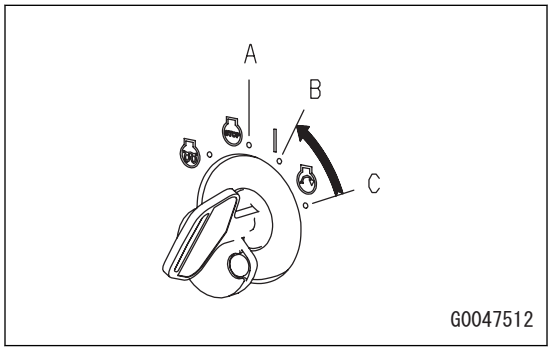


   REMARK

   Even the starting switch (1) is turned to the START position (C), the starting motor does not rotate if the directional selector switch is set to the positions other than the NEUTRAL position (N).

3. After the engine starts, let go of the key in the starting switch (1).

   The key automatically goes back to the ON position (B).



REMARK

- When the engine starts, white smokes can come out from the exhaust pipe. They are fine water particles of moisture or water vapor. It is not a problem.
- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filter function.
- The Urea SCR system has the function to heat and keep the system warm to prevent freezing of DEF.
  If DEF is frozen, the DEF system is heated and thawed automatically after the engine starts. The devices do not operate until DEF is thawed and allowed to supply, but it is not a problem.
  When the ambient temperature decreases to a level where DEF can freeze while the machine is in operation, the DEF system is warmed automatically to prevent freezing. When the ambient temperature decreases to a level where freezing of DEF cannot be prevented, the devices stop operation automatically. It is not a problem.
- If DEF freezes, the thawing operation starts automatically. You must not heat DEF. A harmful ammonia gas can be caused.

TURBOCHARGER PROTECTION FUNCTION

The turbo protect function controls the engine speed at approximately 1000 rpm or below immediately after the engine is started to protect the turbocharger.

When the turbo protect function and automatic warm-up function operate at the same time, the priority is given to the turbo protect function.

- While the turbo protect function is in operation, the increase of engine speed is prevented when the accelerator pedal is pushed.
- When the turbo protect function is canceled, the engine speed changes in response to the pushed level of the accelerator pedal.
- The relationship between the temperature of the engine coolant and the operation time of the turbo protect function is as shown in the table.

Coolant temperature (°C {°F})	Time of turbo protect (sec.)
10 or more {50 or more}	0
10 to -20 {50 to -4}	Changes between 0 and 20

OPERATE AUTOMATIC WARM-UP SYSTEM

When you start the engine if the engine coolant temperature is 20 °C {68 °F} or below, the warm-up operation (engine speed: 1130 rpm) starts automatically. It stops when the engine coolant temperature increases to 30 °C {86 °F} or above. (Engine speed: 825 rpm)

OPERATIONS AND CHECKS AFTER YOU START ENGINE

⚠ WARNING

- **If there are failures such as emergency stop or abnormal operation, turn the key in the starting switch to the OFF position.**
- **If the engine cannot be stopped after you turned the key in the starting switch to the OFF position, use the engine shutdown secondary switch to stop the engine.**
- **If the work equipment is operated without sufficient warm-up operation of the machine, there is a possibility that the work equipment does not respond as intended. Be sure to do the warm-up operation.**
  Especially in cold weather, be sure to do the warm-up operation sufficiently.
- **If the machine is operated without sufficient warm-up operation, the sensors can be damaged because of freezing of the DEF tank.**
- **Keep away from the exhaust pipe while the engine runs or immediately after the engine stops.**
  Do not let the flammable materials come near the exhaust pipe outlet.

CHECK STARTING CONDITION AND UNUSUAL NOISE OF ENGINE

- When the engine is started, check that the engine causes no unusual noise and that it starts up easily and smoothly.
- Check that there is no unusual noise when the engine is at low idle or when the engine speed is increased.

When there is an unusual noise and if that condition continues, the engine can be damaged. Immediately consult your Komatsu distributor for inspection.

CHECK LOW-SPEED RUN AND ACCELERATION OF ENGINE

Check that the engine does not hunt or stop suddenly when the machine is stopped during the normal travel operation.

Check that the engine speed increases smoothly, when the accelerator pedal is pushed.

- Be very careful around the machine to do the inspection in a safe area.
- If the engine performance continues to be very bad in low engine speed and in the acceleration, it can damage the engine, confuse the operator's sense of driving, or lower the braking efficiency. It can lead to an unexpected accident. Immediately consult your Komatsu distributor for inspection.

REMARK

- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas aftertreatment devices.
- White smoke can be released for a short time immediately after the engine is started or during the aftertreatment devices regeneration in cold weather. It is not a problem.

CHECK PARKING BRAKE

Check that the parking brake is applied sufficiently.

If a problem is found in the operation, consult your Komatsu distributor for adjustment.

CHECK BRAKE

Drive the machine forward and reverse slowly on a level ground with no obstacles around, and check the brake performance.

If a problem is found in the operation of the brake, consult your Komatsu distributor for adjustment.

CHECK CLEARANCE BETWEEN BRAKE PEDAL AND FLOOR

Push the brake pedal fully and check that the pedal is not too near the floor. Also check that the feeling when you operate the brake pedal is normal.

If a problem is found, consult your Komatsu distributor for adjustment.

CHECK ABNORMAL POINTS DETECTED UP TO PREVIOUS DAY

Check the part where a problem occurred while the machine was used until the previous day.

If a problem is found, consult your Komatsu distributor for inspection and repair.

OPERATE ENGINE IN BREAK IN PERIOD

NOTICE

This machine was fully adjusted and tested before shipment. But, the operations of the machine in the hard conditions at the start can lower the functions in a short time and decrease the machine service life. Be sure to do the running-in operation of the machine for the initial 100 hours (as shown on the service meter).

Make sure that you fully understand the descriptions in the Operation and Maintenance Manual, and then do the running-in operation. Be careful of the precautions that follow.

- Run the engine at idle for approximately 5 minutes as a warm-up operation after the engine starts.
- Do not operate the machine with heavy loads or at high speed.
- Immediately after the engine starts, do not do the sudden start, sudden acceleration, sudden stop unnecessarily, or sudden change in direction of the machine.

WARM-UP OPERATION

⚠ CAUTION

Operate the blade with the R.H. and L.H. blade lift control lever carefully not to interfere the machine body or objects around.

Do not drive the machine immediately after the engine starts. Do the operations and checks as follows.

NOTICE

Do not suddenly accelerate the engine before the warm-up operation is completed.
Do not run the engine at low idle or high idle continuously for 20 minutes or more.
If it is necessary to run the engine at low idle or high idle, apply a load from time to time or run it at a medium speed.

1. Do not operate the machine until the automatic warm-up operation is completed (engine low idle speed recovers from 1130 rpm to 800 rpm).

Only in cold weather, do the steps 2 to 6 below to warm up the hydraulic oil.

2. After the automatic warm-up operation is completed, set the engine speed to 1500 rpm with the RPM set switch.

   For the method to use, see “RPM SET SWITCH (3-125)”.

3. Push the work equipment lock switch and unlock the work equipment (the work equipment lock pilot lamp goes off). Then do the blade RAISE operation to retract the right and left sides of the blade lift cylinder to the minimum.

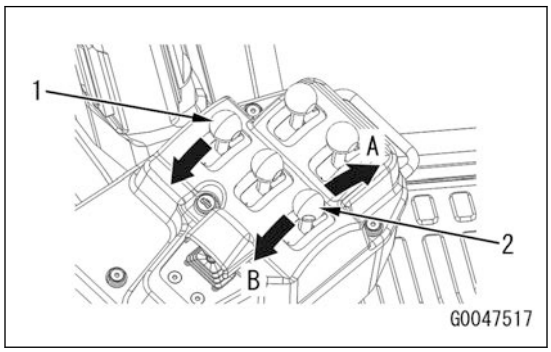
4. While you do the blade RAISE operation with the R.H. or L.H. blade lift control lever (1), operate the blade rotation control lever (2) at the same time to turn the blade to the left (A) or right (B).

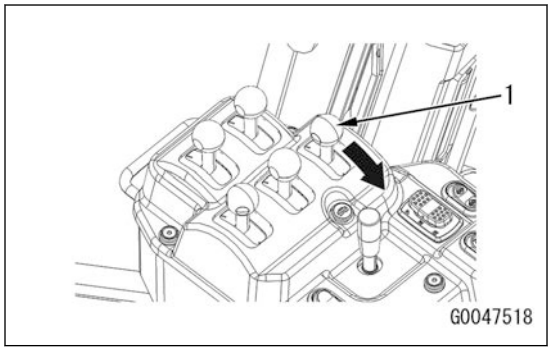
   Continue this operation for 5 minutes.

5. After you do the operation in the step 4 for 5 minutes, set the engine speed to 2200 rpm with the RPM set switch.

6. While you do the blade RAISE operation with the R.H. or L.H. blade lift control lever (1), operate the blade rotation control lever (2) at the same time to turn the blade to the left (A) or right (B).

   Continue this operation for 5 minutes. The warm-up operation in cold weather is completed.





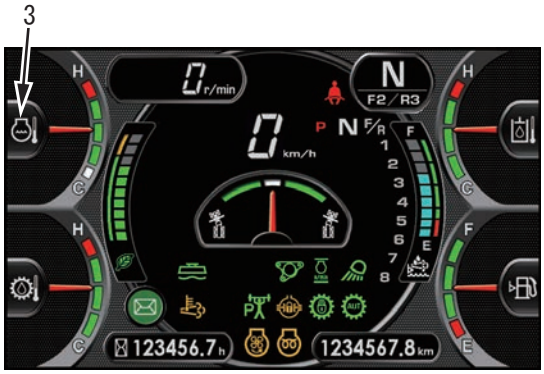
7. After the warm-up operation, make sure that the instruments and caution lamps operate correctly.

   If a problem is found, do the maintenance or repair.

   Run the engine with light load until the indicator of the engine coolant temperature gauge (3) enters the green range.

8. Check for abnormal exhaust gas color, noise, or vibration.

   If a problem is found, consult your Komatsu distributor.



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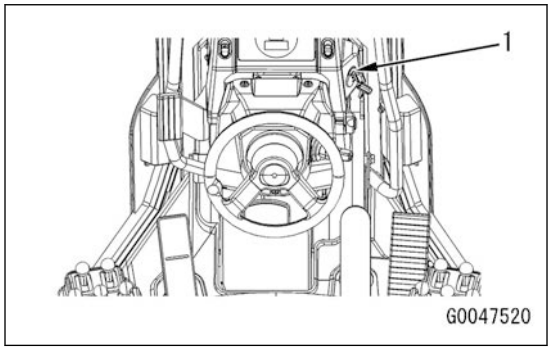
STOP ENGINE

⚠ WARNING

Keep away from the exhaust pipe immediately after the engine stops.

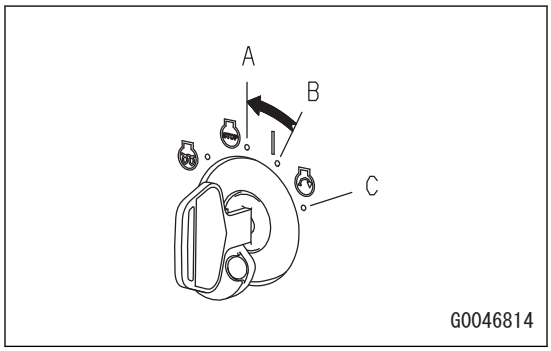
NOTICE

If the engine is suddenly stopped before it cools down, the service life of the engine parts can be decreased. Do not stop the engine suddenly except in emergency.
If the engine is overheated, do not stop it immediately. Run it at medium speed to cool down gradually, and then stop it.
If the engine is stopped during the aftertreatment devices regeneration, the components can be damaged.
Before you stop the engine, stop the aftertreatment devices regeneration and run the engine at low idle for approximately 5 minutes. Then, stop the engine.



Stop the engine as follows.

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



REMARK

After the engine is stopped, DEF in the DEF injector and pump is automatically purged and goes back to the tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.
Thus, the device operates for several minutes even after the starting switch is turned off. It is not a problem.
Do not turn the battery disconnect switch to the OFF position while the devices operate to purge. After the purge operation is completed, the devices stop automatically.

CHECK AFTER YOU STOP ENGINE

1. Walk around the machine to check for oil or coolant leakage, and check the work equipment, outside the machine, and undercarriage. If leakage or problem is found, repair it.
2. Fill up the fuel tank.
3. Remove the flammable materials such as paper from the engine compartment to prevent fire.
4. Remove mud around the undercarriage.

START MACHINE (TRAVEL FORWARD AND REVERSE, GEAR SHIFT) AND STOP MACHINE

TRAVEL POSTURE OF MACHINE

⚠ WARNING

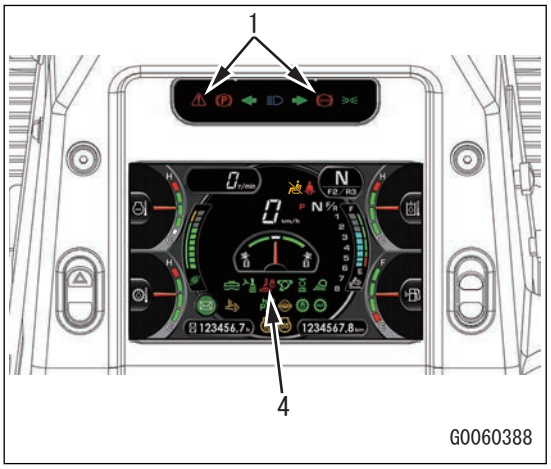
- **When you drive the machine on a public road, be sure to lock the front frame and rear frame with the articulate lock pin.**
- **Before you operate the work equipment control lever, check the distance between the blade and tires.**

NOTICE

Be careful about the clearance between the blade and front tire.
If you let the machine be articulated while the blade is at the propulsion angle, the blade can cut the tire or bend the steps.

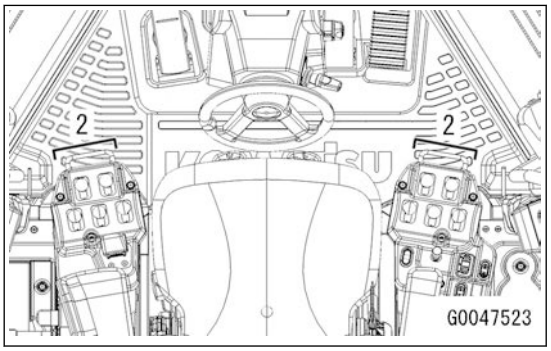
Raise the front end and rear ends of the blade as follows.

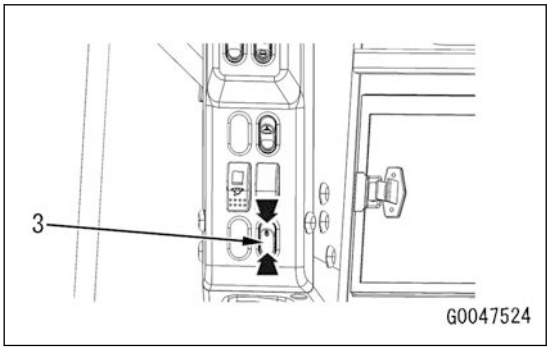
1. Make sure that the caution lamp (1) is not lit.



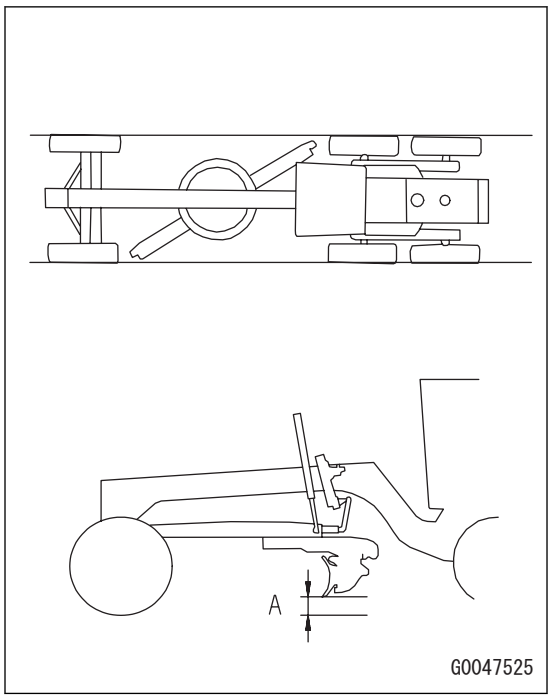
2. Make sure that the work equipment control lever (2) is in the HOLD position.

   Push the work equipment lock switch (3) to unlock the work equipment, and make sure that the work equipment lock pilot lamp (4) is not lit.





3. Raise the blade equally 25 cm {9.8 in} (A) or more with the R.H. and L.H. blade control levers.
4. Push the work equipment lock switch (3) to lock the work equipment, and make sure that the work equipment lock pilot lamp (4) is lit.



MOVE MACHINE

⚠ WARNING

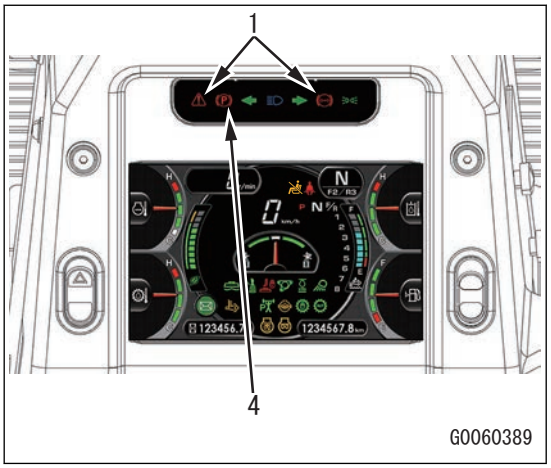
- **Check the safety around the machine, and make a horn sound, then start the machine.**
- **Keep persons away from around the machine.**
- **Clear the obstacles from the travel path.**
- **There is a blind spot behind the machine. When the machine travels in reverse, be especially careful.**
- **While the engine speed is high, do not make a sudden forward/reverse operation.**
- **When the brake oil pressure decreases and the brake oil pressure alarm buzzer operates, run the engine at low idle (with no load) until the brake oil pressure alarm buzzer stops.**
- **Make sure that the seat belt is fastened correctly before you operate the machine.**

⚠ CAUTION

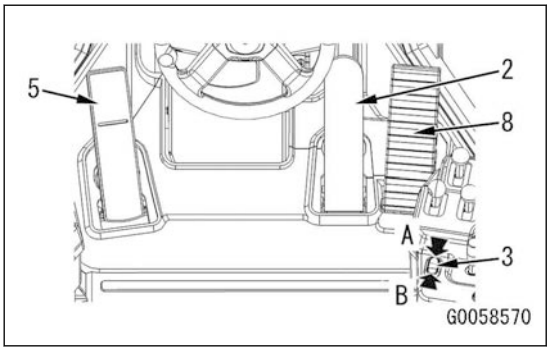
Do not operate the gear shift lever while the inching pedal is operated to release.
Wait for 2 seconds or more after the gear shift lever is operated, then release the inching pedal.

START MACHINE IN MANUAL MODE

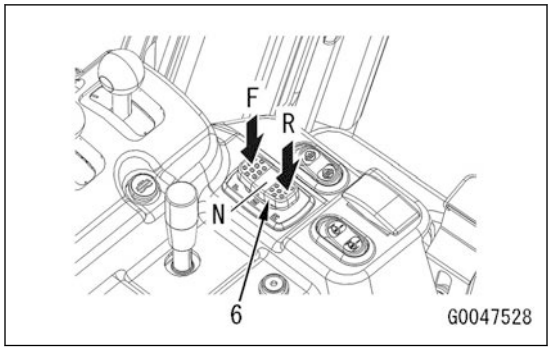
1. Make sure that the caution lamp (1) is not lit.



2. Push the brake pedal (2), and set the parking lock switch (3) to the OFF (cancel) position (B). Make sure that the parking brake pilot lamp (4) is not lit.



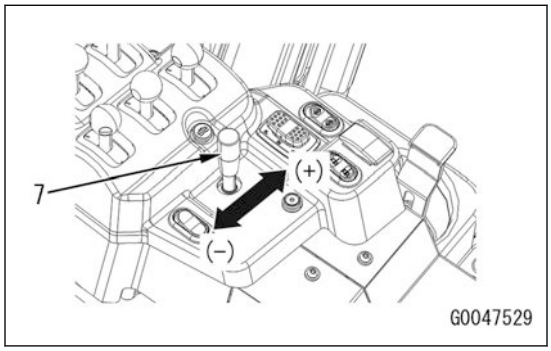
3. Push the inching pedal (5), and set the directional selector switch (6) to the FORWARD position (F) or REVERSE position (R).



4. Operate the gear shift lever (7) to select the 1st or 2nd gear speed.

NOTICE

On a slope, do not start the machine at higher gear speeds (3rd or higher).
Be sure to start the machine at the 1st or 2nd gear speed on a slope.

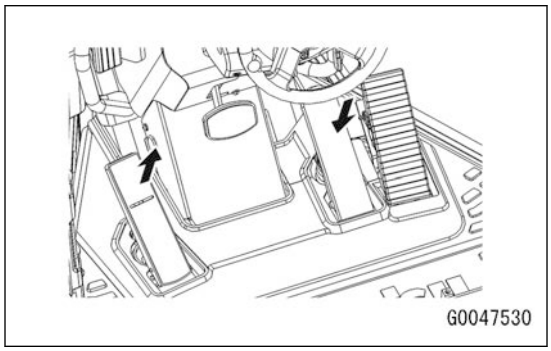


5. Release the inching pedal (3) gradually while the brake pedal (2) is pushed.

   When the inching pedal (3) is released, the transmission starts to transmit the power.

NOTICE

When you start the machine, you must wait for 2 seconds or more between the operations of the step 3 and step 5.



6. When the transmission starts to transmit the power, release the brake pedal (2).
7. Release the inching pedal (5), and push the accelerator pedal (8).

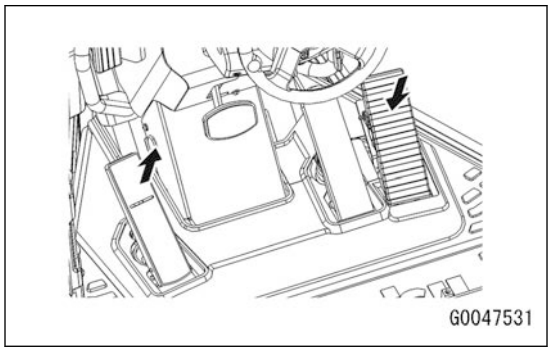
   The machine starts.

NOTICE

If the brake pedal (2) is released on a slope before the transmission starts to transmit the power, the machine can slip down.

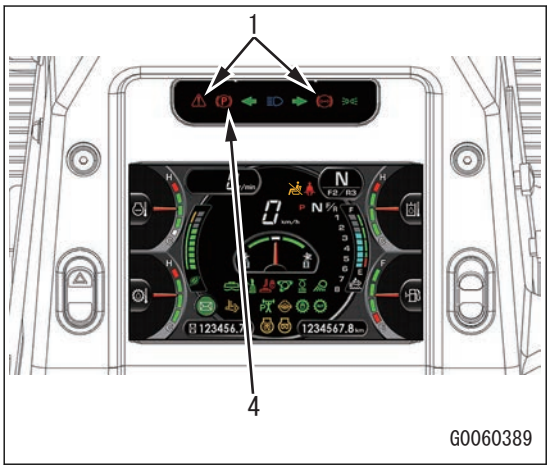
REMARK

If the gear shift lever is set to the reverse R3 or higher position, the automatic gear shift mode is applied even if the manual gear shift mode is selected, and the machine starts at the R2 speed.

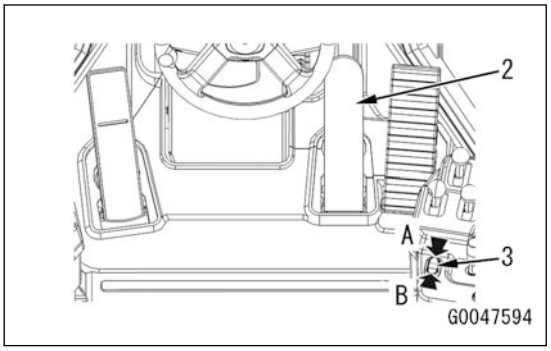


START MACHINE IN TORQUE CONVERTER AUTOMATIC MODE

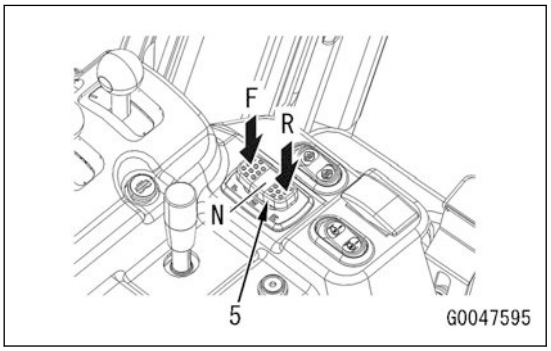
1. Make sure that the caution lamp (1) is not lit.



2. Push the brake pedal (2), and set the parking lock switch (3) to the OFF (cancel) position (B). Make sure that the parking brake pilot lamp (4) is not lit.



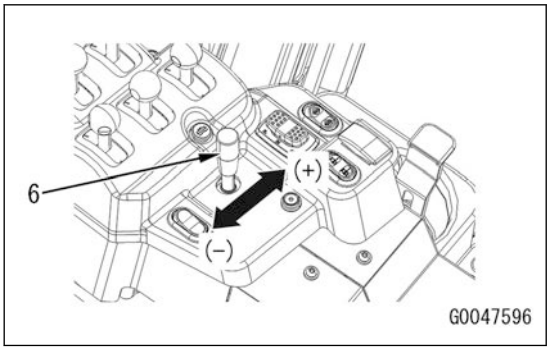
3. Push the brake pedal (2), and set the directional selector switch (5) to the FORWARD position (F) or REVERSE position (R).



4. Operate the gear shift lever (6) to set it to one of the 1st to 8th gear speeds.

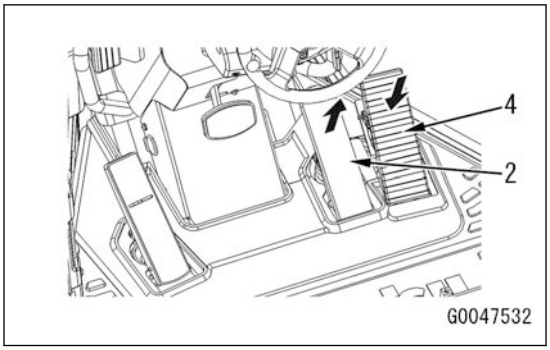
   NOTICE

   - **If the gear shift lever is set to the forward F5 or higher position, the automatic gear shift mode is applied, and the machine starts at the F4 speed.**
   - **If the gear shift lever is set to the reverse R3 or higher position, the automatic gear shift mode is applied, and the machine starts at the R2 speed.**



5. Release the brake pedal (2), and push the accelerator pedal (4).

   The machine starts.



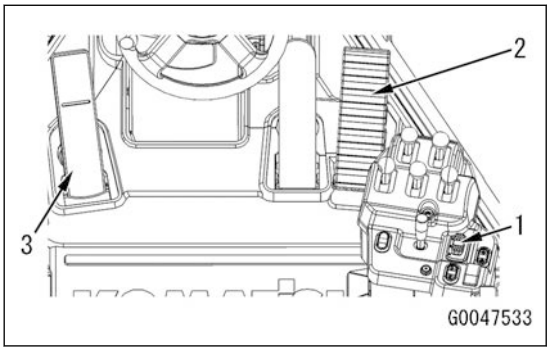
SHIFT GEARS

⚠ WARNING

- **Do not suddenly do the gear shift during the high-speed travel. Push the brake pedal to reduce the speed sufficiently, and shift the gear.**
- **While you drive the machine or drive it on a downhill, do not set the directional selector switch to the NEUTRAL position (N). The sufficient engine brake cannot be applied. It can lead to an unexpected accident. Be sure to shift the gear to the one of the speed when the machine travels.**

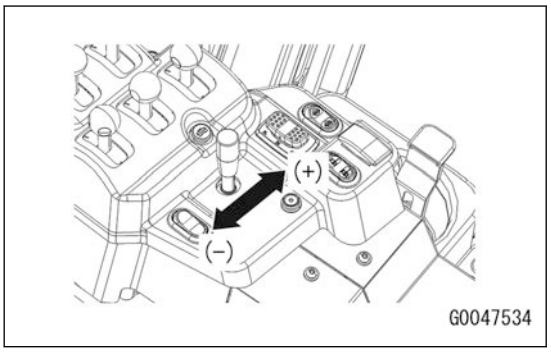
NOTICE

- **When you shift the gear, be sure to shift one gear at a time.**
- **When you set the directional selector switch (1) from the NEUTRAL position (N) to the REVERSE position (R) or FORWARD position (F), release the accelerator pedal (2), and operate the lever while the engine runs at low idle.**
- **Do not push the inching pedal (3) while you shift the gear.**



Upshift (acceleration)

Release the accelerator pedal (2), and operate the gear shift lever to the acceleration side (+).



Downshift (deceleration)

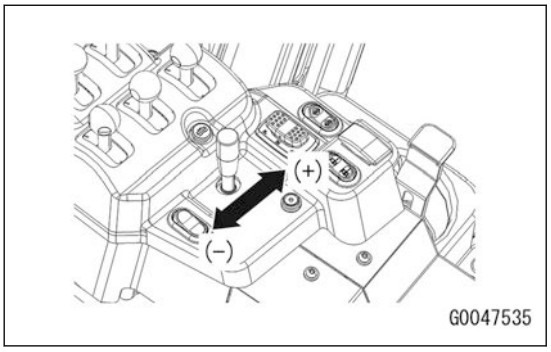
⚠ WARNING

- **When the machine travels downhill, shift the transmission down to apply the sufficient engine brake.**
- **To prevent the engine overrun, the downshift operation is possible only for the limited engine speed. Push the brake pedal to reduce the travel speed, and after the speed reaches in the range that downshifts are possible, do the downshift operation.**

Release the accelerator pedal (2) to reduce the travel speed, and operate the gear shift lever to the deceleration side (-).

REMARK

If the gear is downshifted in 2 steps or more at one time, the engine overrun prevention function can be activated.
If the engine overrun prevention function is activated, it is necessary to wait until the travel speed decreases with brakes or naturally. You cannot shift the gear to the desired speed until the machine slows down to the specified travel speed.

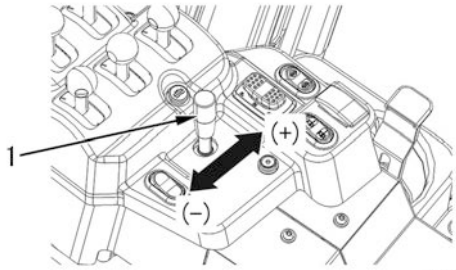


Gear speed	Travel speed that downshift is possible (km/h {MPH})
F2→F1	4.5 {2.8}
F3→F2	6.5 {4.0}
F4→F3	9.0 {5.6}
F5→F4	13.0 {8.1}
F6→F5	20.0 {12.4}
F7→F6	29.0 {18.0}
F8→F7	39.5 {24.5}

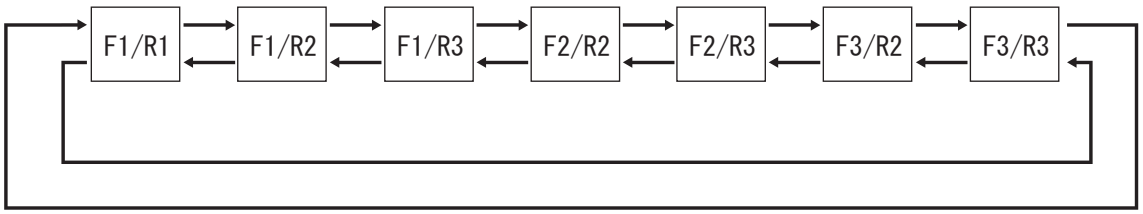
GEAR SPEED PRESET FUNCTION

When the directional selector switch is set to the NEUTRAL position (N) while the machine is stopped, you can set the gear speed to start the machine with the gear shift lever (1).

- When you tilt the gear shift lever (1) to the acceleration side (+) one time, the gear speed changes from the 1st to 2nd, or 2nd to 3rd.
- When you tilt the gear shift lever (1) to the deceleration side (-) one time, the gear speed changes from the 3rd to 2nd, or 2nd to 1st.



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REMARK

The preset function is available only when the directional selector switch is set to the NEUTRAL position (N).

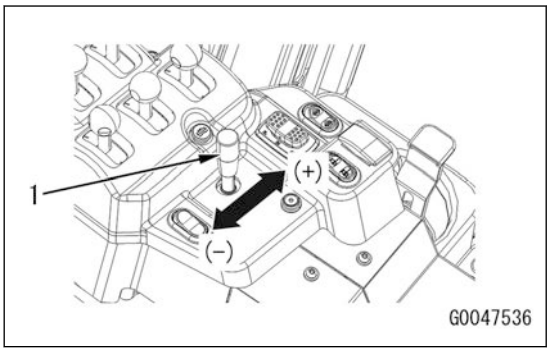
The current gear speed is shown on the preset indicator (2).



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SKIP SHIFT FUNCTION

The gear speed can be skipped up to the 8th from the gear speed between the 1st and 7th when the directional selector switch is set to the FORWARD position (F), and if you hold the gear shift lever (1) to the acceleration side (+) for 1 second or more.



REMARK

- The skip shift function can be activated only when the torque converter automatic mode is selected.
- It is not activated when the steering control lever is effective.

SWITCH BETWEEN FORWARD AND REVERSE

⚠ WARNING

- **Before you change the travel direction, check the safety of the direction to which the machine moves. There is a blind spot behind the machine.**
  When the machine travels in reverse, be especially careful.
- **Do not operate the directional selection while the machine travels at high speed.**

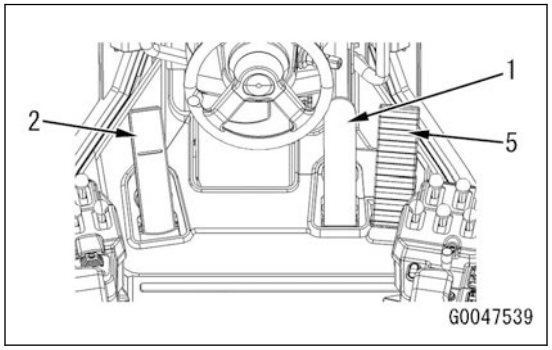
Do the directional selection operation after the machine stops.

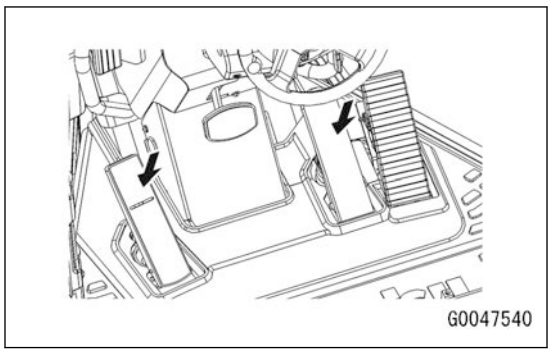
⚠ CAUTION

Do not operate the gear shift lever while the inching pedal is operated to release.
Wait for 2 seconds or more after the gear shift lever is operated, then release the inching pedal.

SWITCH BETWEEN FORWARD AND REVERSE IN MANUAL MODE

1. Push the brake pedal (1) to reduce the travel speed, and then push the inching pedal (2) to stop the machine.

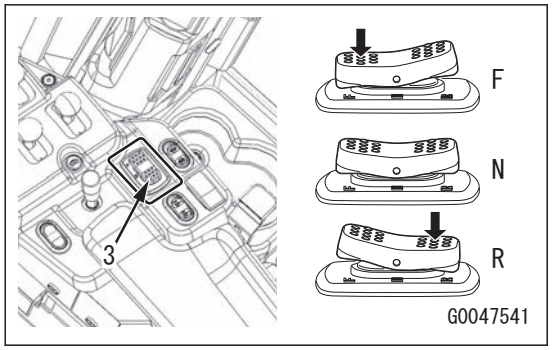


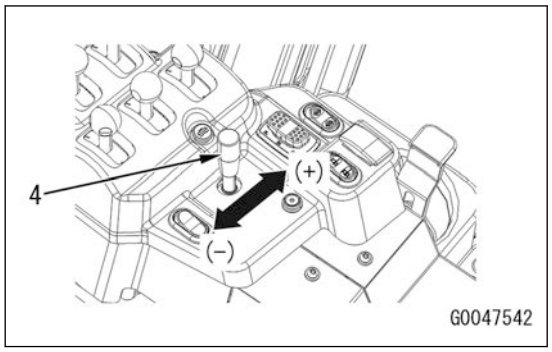


2. Set the directional selector switch (3) to the FORWARD (F) or REVERSE (R) position, and operate the gear shift lever (4) to select the 1st or 2nd gear speed.

   NOTICE

   On a slope, do not start the machine at higher gear speeds (3rd or higher).
   Be sure to start the machine at the 1st or 2nd gear speed on a slope.



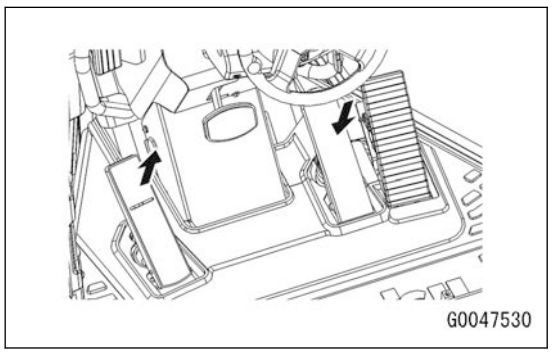


3. Release the inching pedal (2) gradually while the brake pedal (1) is pushed.

   When the inching pedal (2) is released, the transmission starts to transmit the power.

   NOTICE

   When you start the machine, you must wait for 2 seconds or more between the operations of step 2 and step 3.



4. When the transmission starts to transmit the power, release the brake pedal (1).
5. Release the inching pedal (2), and push the accelerator pedal (5).

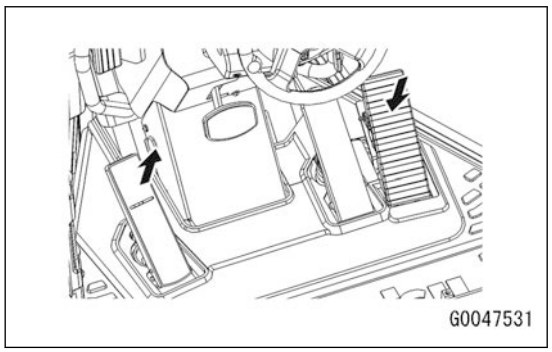
   The machine starts.

   NOTICE

   If the brake pedal (1) is released on a slope before the transmission starts to transmit the power, the machine can slip down.

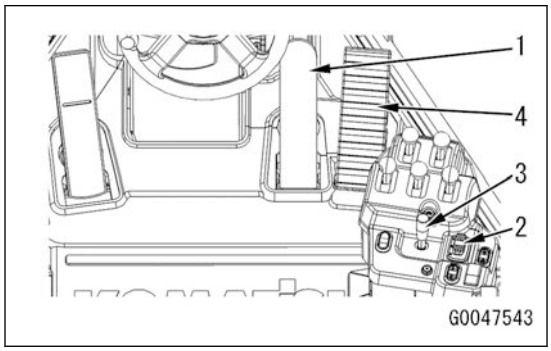
   REMARK

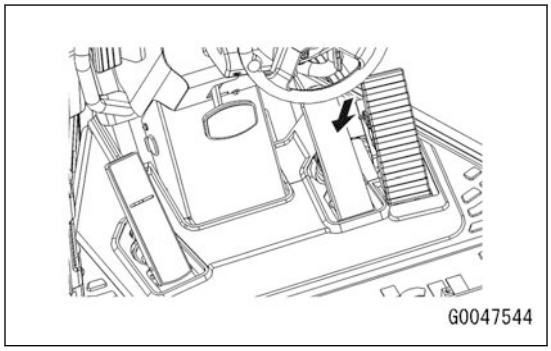
   When the travel direction is changed during the travel, the gear can be downshifted one by one to protect the operator and machine, and then the travel direction changes. It is not a problem.



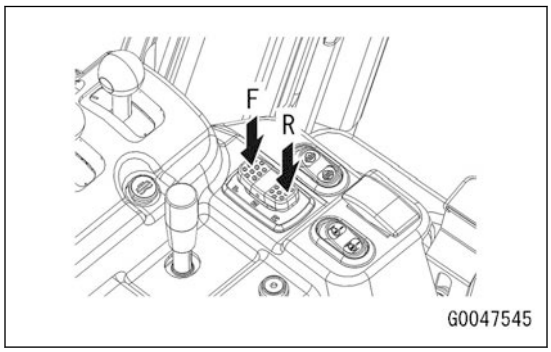
SWITCH BETWEEN FORWARD AND REVERSE IN TORQUE CONVERTER AUTOMATIC MODE

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





2. Set the directional selector switch (2) to the FORWARD (F) or REVERSE (R) position, and operate the gear shift lever (3) to select the 1st or 2nd gear speed.

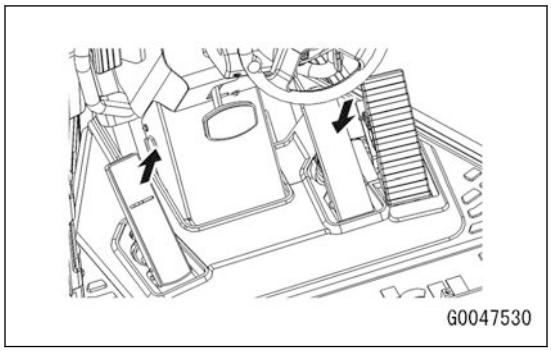


3. Release the brake pedal (1), and push the accelerator pedal (4).

   The machine starts.

   REMARK

   When the travel direction is changed during the travel, the gear can be downshifted one by one to protect the operator and machine, and then the travel direction changes. It is not a problem.



STOP MACHINE

⚠ WARNING

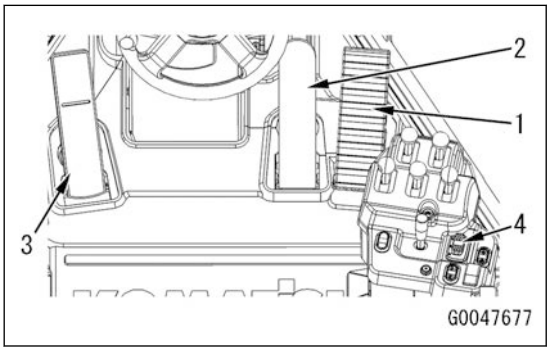
- **Stop the machine gradually. Do not stop suddenly.**
- **If you touch the work equipment control levers or steering control lever by mistake, there is a possibility that the machine or work equipment suddenly moves and it can cause serious accident. Before you stand up from the operator's seat, be sure to push the work equipment lock switch to lock the work equipment and operate the steering lever enable switch to disable the steering control lever.**
- **Be sure to keep the brake pedal pushed until the parking brake pilot lamp lights up on the machine monitor even if the parking brake switch is set to the ON position.**

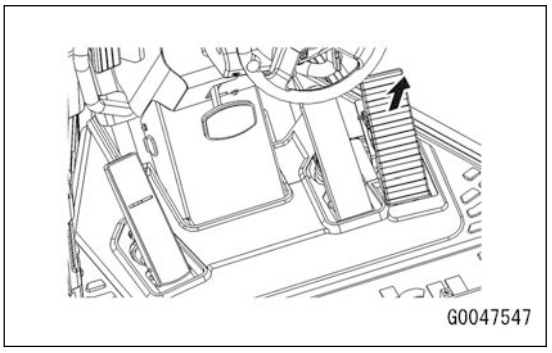
NOTICE

Do not apply the brake with the parking brake switch during the travel except in emergency.
After the machine is stopped, and then apply the brake.

STOP MACHINE IN MANUAL MODE

1. Release the accelerator pedal (1).

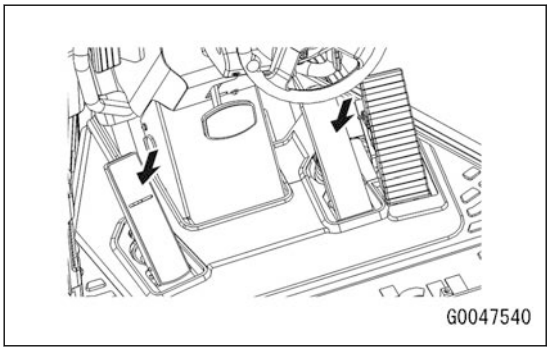




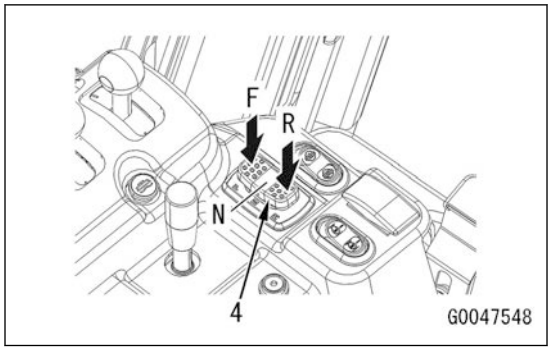
2. Push the brake pedal (2) to reduce the travel speed.
3. Push the inching pedal (3) just before the machine stops.

   REMARK

   As the torque converter direct drive control function is installed to the machine, the engine does not stop if the inching pedal is pushed late, or even if the inching pedal is not pushed.
   But, the lockup is automatically canceled not to stop the engine, and the torque converter mode is selected.
   When the machine starts and the engine speed and travel speed increase, the lockup is set again automatically.

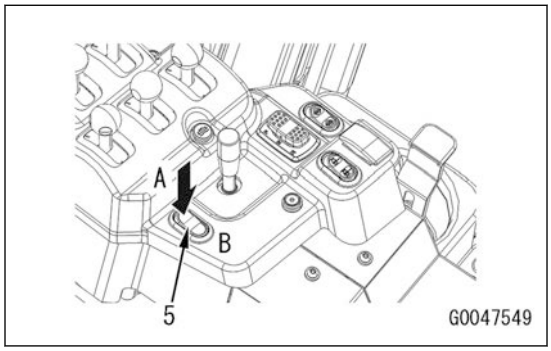


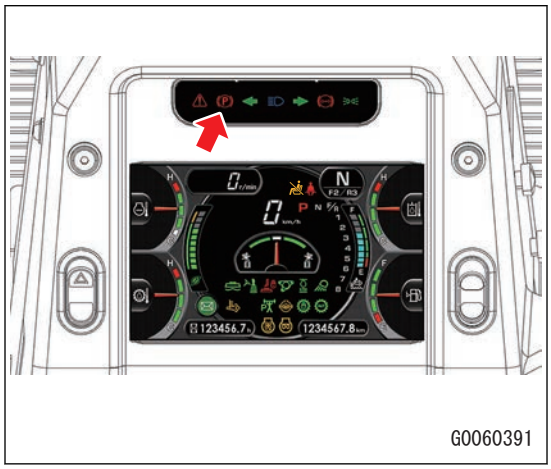
4. Set the directional selector switch (4) to the NEUTRAL position (N).



5. Set the parking brake switch (5) to the ON position (A), and apply the parking brake.

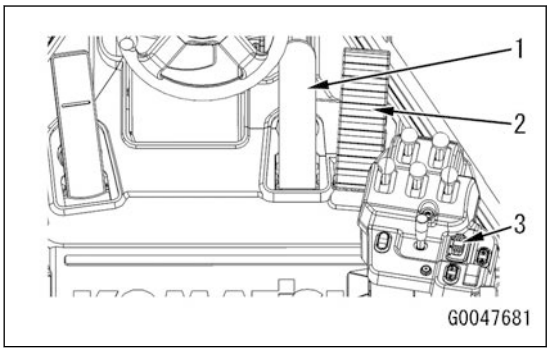
   The parking brake pilot lamp lights up at the same time.

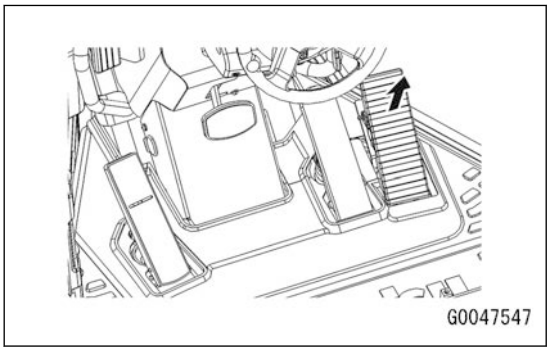




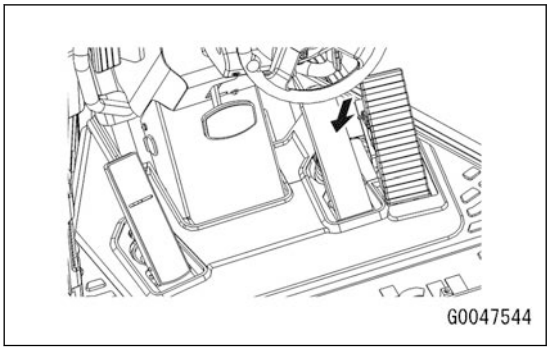
STOP MACHINE IN TORQUE CONVERTER AUTOMATIC MODE

1. Release the accelerator pedal (2).

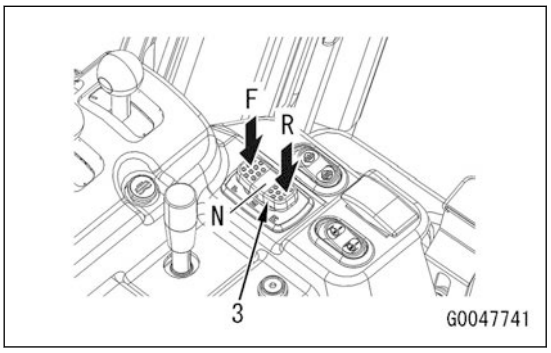




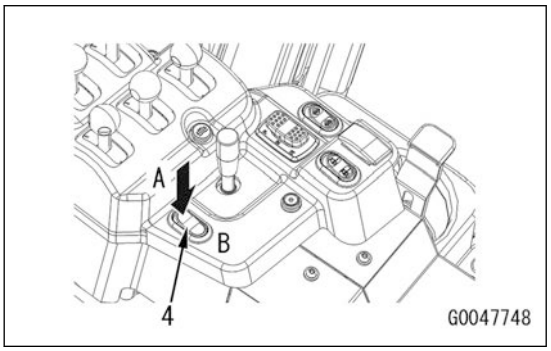
2. Push the brake pedal (1) to stop the machine.



3. Set the directional selector switch (3) to the NEUTRAL position (N).



4. Set the parking brake switch (4) to the ON position (A), and apply the parking brake.



The parking brake pilot lamp lights up.



G0060391

STEER MACHINE

⚠ WARNING

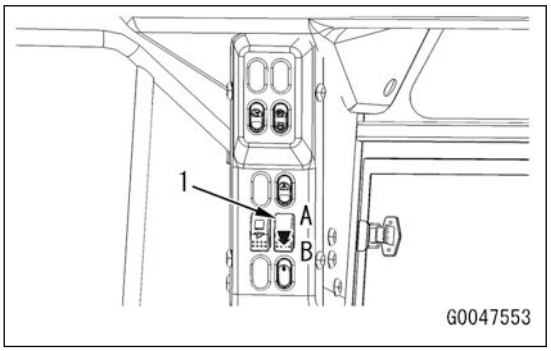
- **Do not steer the machine suddenly at high speed travel or steer it on a steep slope. It is dangerous.**
- **If the engine stops during the travel, the steering operation will become heavy. Do not stop the machine during the travel.**
  You must not stop the engine while the machine travels on a slope. It is very dangerous.
  If the engine stops during the travel, immediately stop the machine in a safe area.

STEER MACHINE WITH STEERING WHEEL

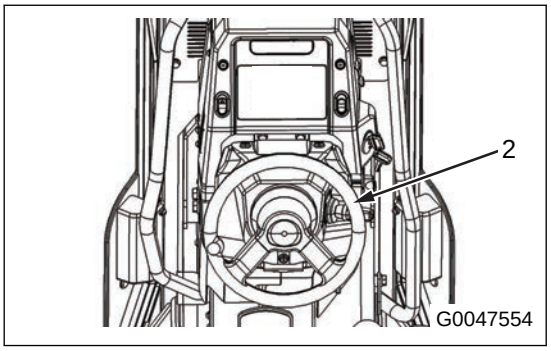
⚠ WARNING

- **When you drive the machine on a public road, be sure to disable the steering control lever.**
- **Before you stand up from the operator's seat, be sure to operate the steering lever enable switch to disable the steering control lever.**
- **If the steering control lever is not disabled securely and it is moved by mistake, it can cause serious personal injury or death. Make sure that the steering control lever pilot lamp is not lit.**
- **When you operate the steering lever enable switch, make sure that the steering control lever is at the NEUTRAL position.**
- **When you operate the steering lever enable switch, be careful not to touch the steering control lever.**

1. In the conditions that follow, set the steering lever enable switch (1) to the disable position (B).
   - The engine is in operation.
   - The machine is stopped.
   - The gear shift position is in the NEUTRAL position (N).



2. The machine turns to the direction that the steering wheel (2) is turned during the travel.

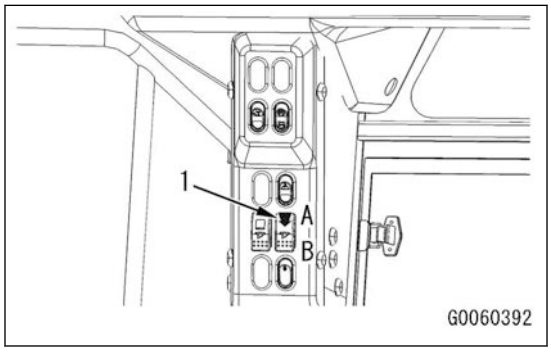


STEER MACHINE WITH STEERING CONTROL LEVER

⚠ WARNING

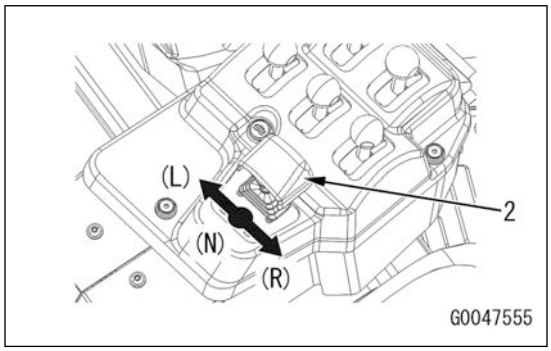
- **When you drive the machine on a public road, be sure to disable the steering control lever.**
- **Before you stand up from the operator's seat, be sure to operate the steering lever enable switch to disable the steering control lever.**
  If you touch the steering control lever by mistake while the steering control lever is not disabled, it can cause serious accident.
- **When you operate the steering lever enable switch, make sure that the steering control lever is at the NEUTRAL position.**
- **When you operate the steering lever enable switch, be careful not to touch the steering control lever.**
- **Make sure that your clothes do not get caught by the steering control lever.**

1. In the conditions that follow, set the steering lever enable switch (1) to the effective position (A).
   - The engine is in operation.
   - The machine is stopped.
   - The gear shift position is in the NEUTRAL position (N).



2. The machine turns to the direction that the steering control lever (2) is tilted during the travel.
   (L): Left turn
   (N): NEUTRAL
   (R): Right turn

   REMARK
   - When the steering lever enable switch is effective, the gear speed can only be shifted up to the forward 6th speed and reverse 3rd speed. Disable the steering lever enable switch when the machine travels at high speed.
   - The steering control lever cannot be activated while the leaving operator's seat caution lamp is lit. Make sure that you sit on the seat correctly, the leaving operator's seat caution lamp is not lit, and then make the steering lever enable switch effective.

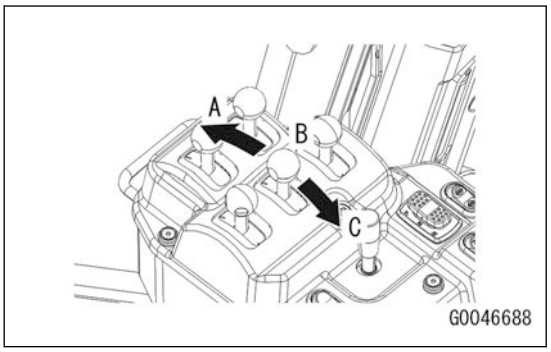


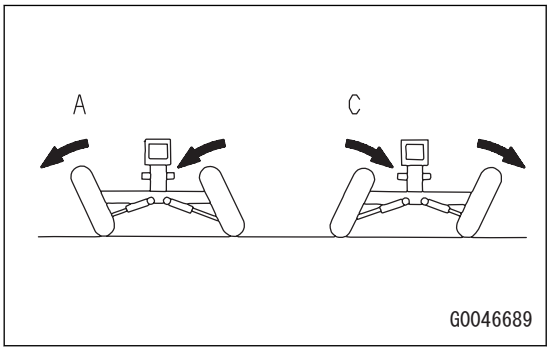
LEAN MACHINE

Operate the leaning control lever.
When the control lever is pushed forward (A), the front wheels lean to the left. When the lever is pulled toward you (C), the front wheels lean to the right.

When you turn the machine during forward travel, if the front wheels are leaned in the turning direction, the turning radius decreases.

When you turn the machine during reverse travel, if the front wheels are leaned in the opposite direction to turn, the turning radius decreases.





ARTICULATE MACHINE

⚠ WARNING

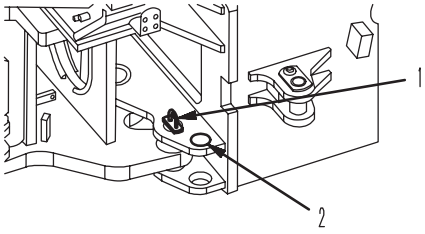
When you drive the machine on a public road, do not remove the lock pin.

NOTICE

To prevent damage to the tires, be careful not to let the blade hit the tires when the machine is articulated.

Remove the lock pin on the left side of the machine to do the articulation operation.

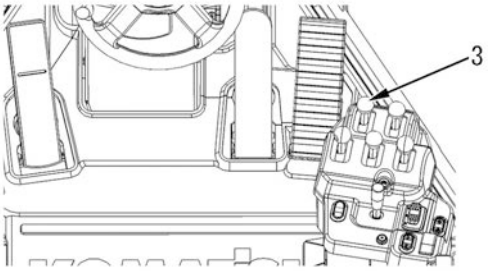
1. Stop the machine.
2. Remove the lock pin (1), and put it to the stowage position (2).



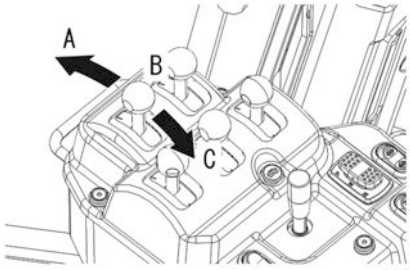
G0047556

3. Operate the articulate control lever (3).

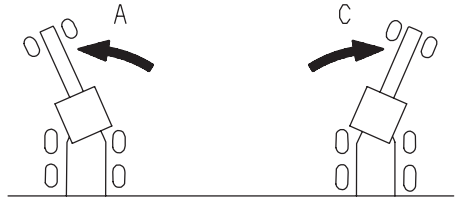
   When the control lever is pushed forward (A), the machine is articulated to the left. When the lever is pulled toward you (C), the machine is articulated to the right.



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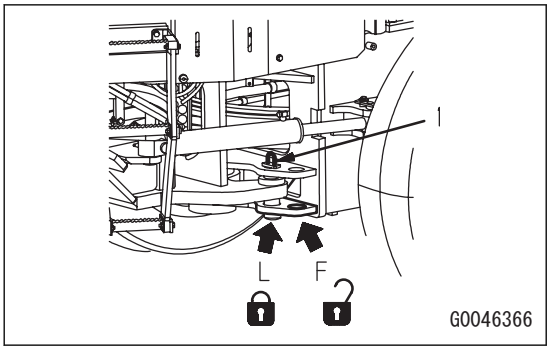


G0046684



G0047558

When the articulation of the machine is not necessary, set the front frame and rear frame straight, align the pin holes, and set the lock pin in the LOCK position (L) to fix the front and rear frames.



SECONDARY STEERING SYSTEM

When the engine or hydraulic pump has a failure during operation, move the machine to a safe area and stop it immediately.

The secondary steering is used as a manual steering when the machine has failures. Do not drive the machine at high speed. If the engine or hydraulic source has a failure, the operating force to turn the steering wheel becomes heavier.

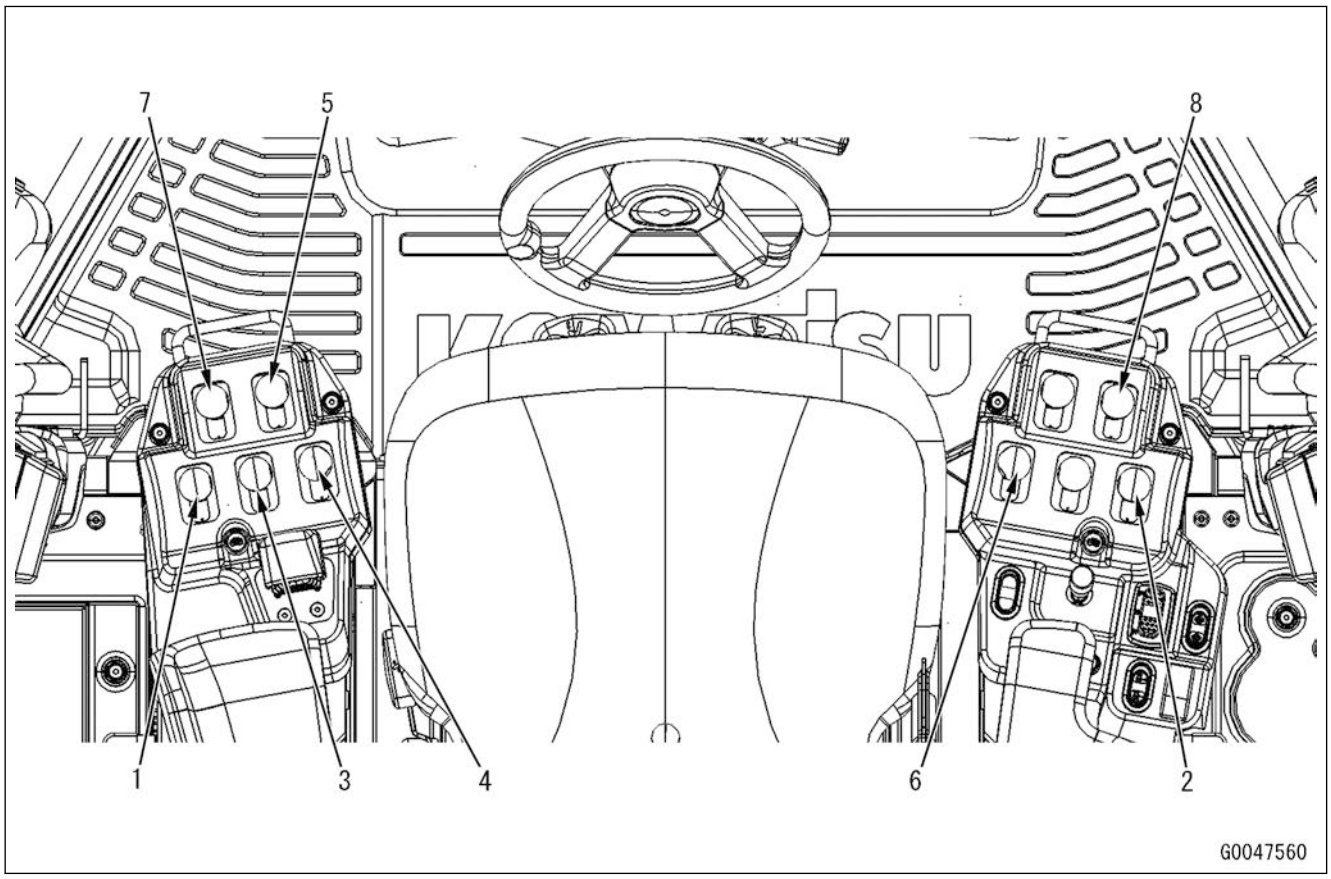
The secondary steering can be used without time limit, but move the machine to a safe area and stop it immediately.

CHECK FUNCTION OF SECONDARY STEERING DEVICES

After the inspection and maintenance, bleed air in the steering circuit, and do the procedure that follows.

1. Start the engine, push down the ground with the blade, and lift up the front wheels off the ground.
2. Turn the starting switch to the OFF position to stop the engine.
3. Turn the steering wheel and make sure that the wheels are steered.
   The steering wheel is heavier than while the engine is running.

OPERATE WORK EQUIPMENT

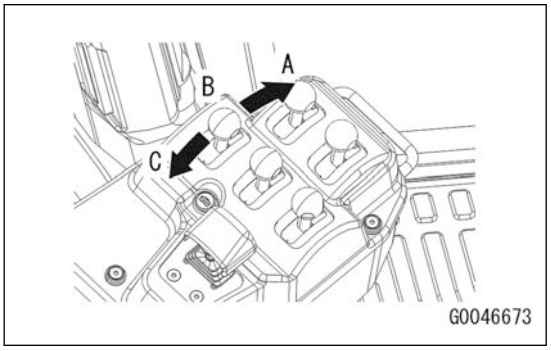


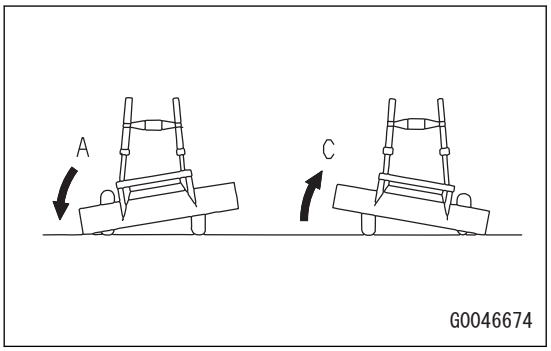
(1) L.H. blade lift control lever
(2) R.H. blade lift control lever
(3) Blade side shift control lever
(4) Blade rotation control lever
(5) Power tilt control lever
(6) Drawbar side shift control lever
(7) Ripper control lever (option), scarifier (option)
(8) Front attachment control lever (option)

OPERATE BLADE

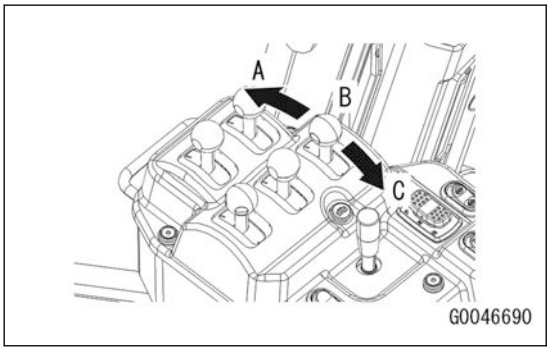
LIFT BLADE

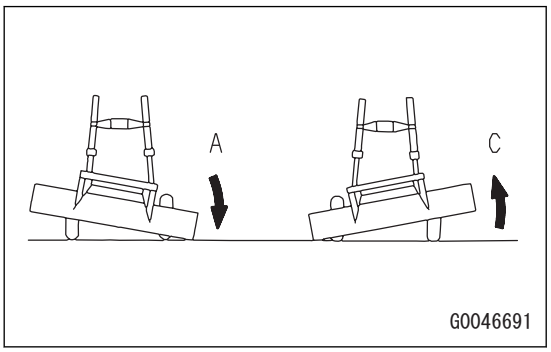
- Operate the L.H. blade lift control lever.
  When you push the control lever forward (A), the left side of the blade lowers. When the lever is pulled toward you (C), the left side of the blade rises.





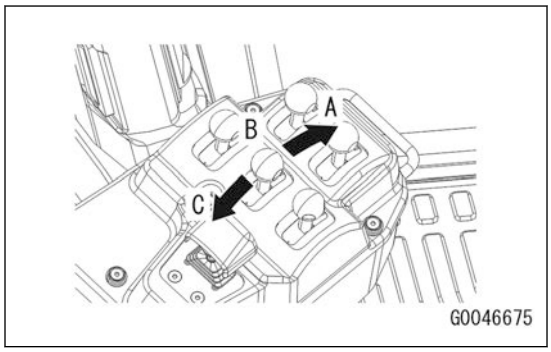
- Operate the R.H. blade lift control lever.
  When you push the control lever forward (A), the right side of the blade lowers. When the lever is pulled toward you (C), the right side of the blade rises.

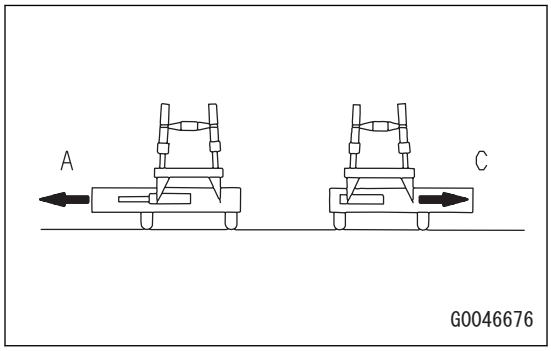




SIDE SHIFT BLADE

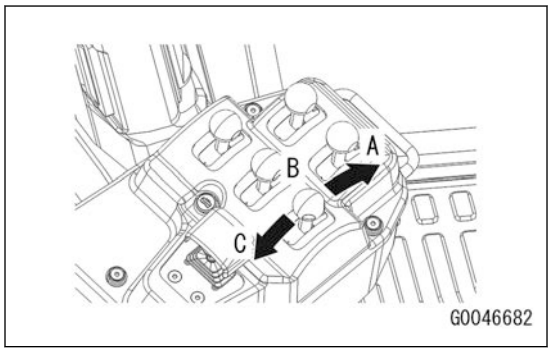
Operate the blade side shift control lever.
When you push the control lever forward (A), the blade side shifts to the left. When the lever is pulled toward you (C), the blade side shifts to the right.

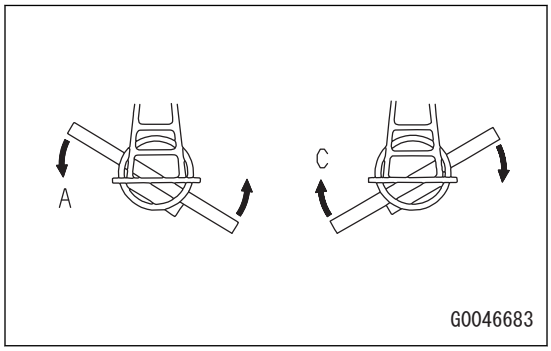




ROTATE BLADE

Operate the blade rotation control lever.
When you push the control lever forward (A), the blade rotates to the left. When the lever is pulled toward you (C), the blade rotates to the right.

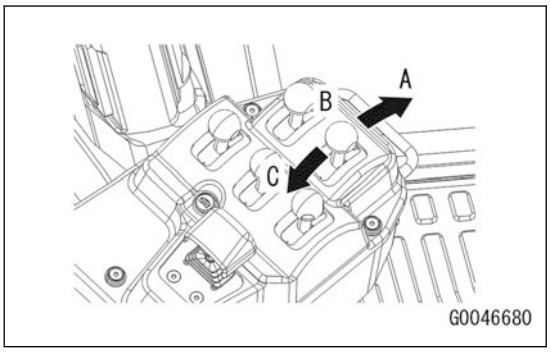


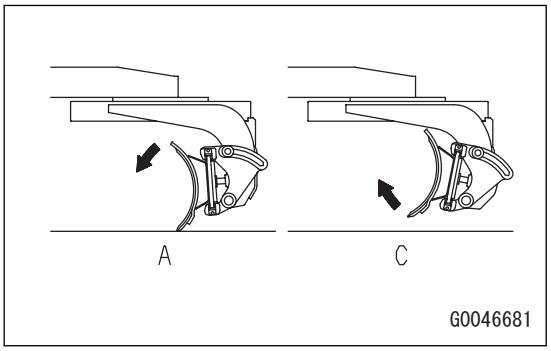


CONTROL BLADE CUTTING ANGLE

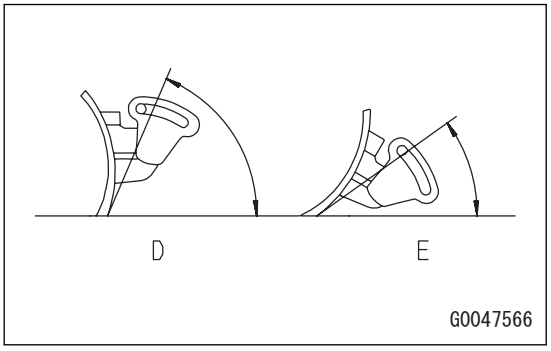
Operate the power tilt control lever.

When you push the control lever forward (A), the cutting angle increases. When the lever is pulled toward you (C), the cutting angle decreases.

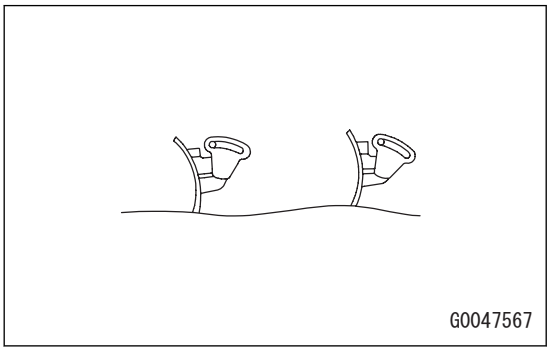




When the soil is hard (D), increase the cutting angle. When the soil is soft (E), decrease the cutting angle.

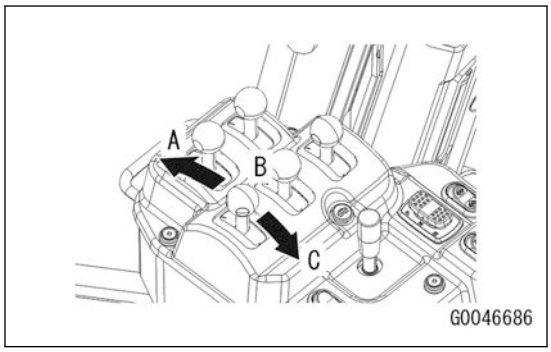


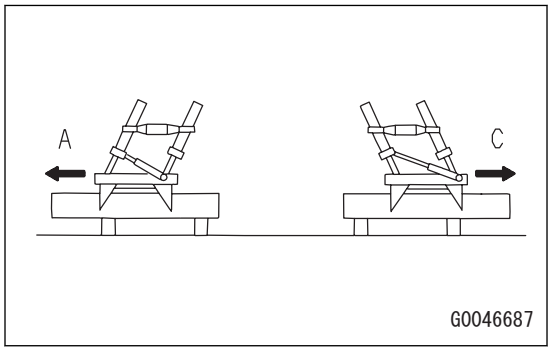
As you can change the distance between the cut surface and blade end, you can finely adjust the height of the cut surface.



SIDE SHIFT DRAWBAR

Operate the drawbar side shift control lever.
When you push the control lever forward (A), the drawbar side shifts to the left. When the lever is pulled toward you (C), the drawbar side shifts to the right.



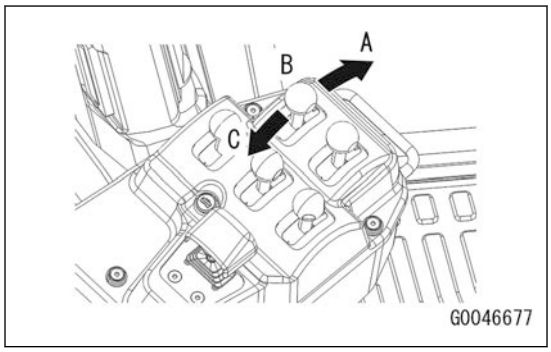


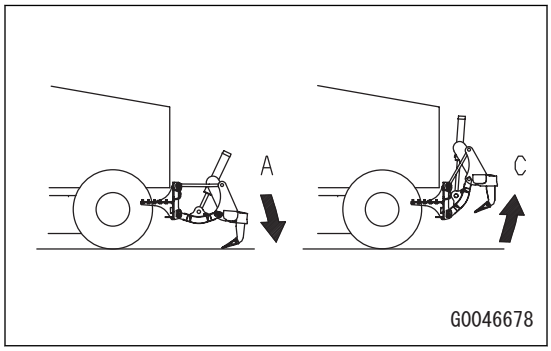
OPERATE RIPPER AND SCARIFIER

(For machines with ripper)

Operate the ripper control lever.

When the control lever is pushed forward (A), the ripper lowers. When the lever is pulled toward you (C), the ripper rises.

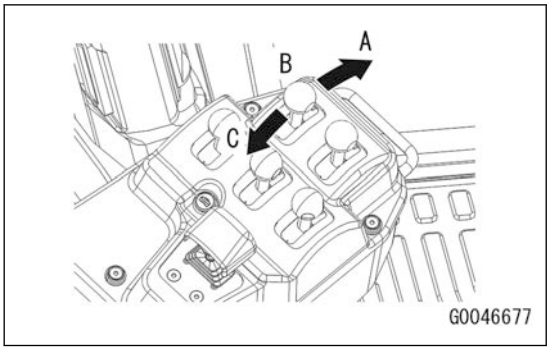


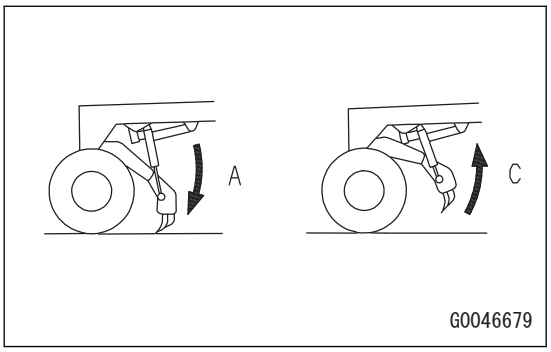


(Machines with scarifier)

Operate the scarifier control lever.

When the control lever is pushed forward (A), the scarifier lowers. When the lever is pulled toward you (C), the scarifier rises.



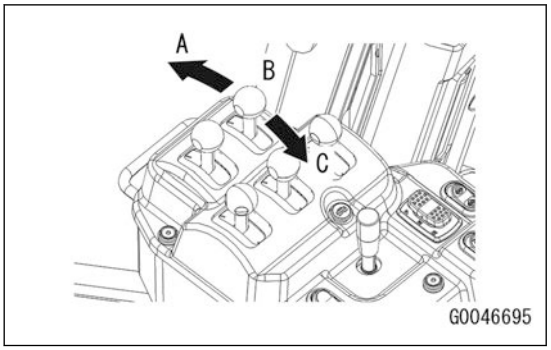


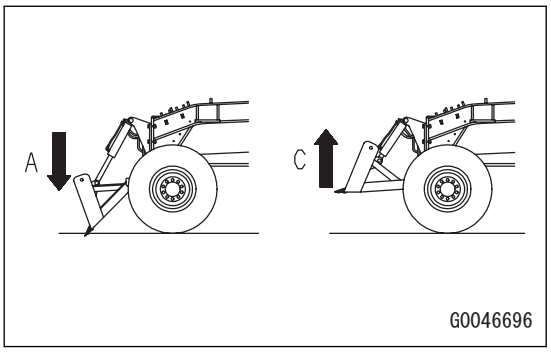
OPERATE FRONT ATTACHMENT

(For machines with front blade)

Operate the front attachment control lever.

When the control lever is pushed forward (A), the front blade lowers. When the lever is pulled toward you (C), the front blade rises.



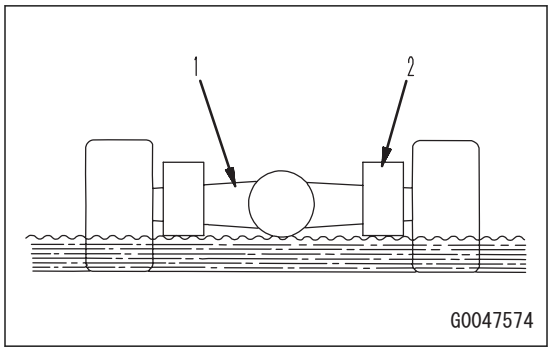


WORK PRECAUTIONS

PERMISSIBLE WATER DEPTH

Do not drive the machine in the water or swampy ground deeper than the allowable water depth (up to the under surface of the axle housing (1) and tandem drive (2)).

When you complete the operation, wash the machine and lubricate the parts that were in the water.



IF BRAKE DOES NOT STOP MACHINE MOVE

If the machine is not stopped when you push the brake pedal, use the parking brake.

NOTICE

If the parking brake was applied as a secondary brake, consult your Komatsu distributor for inspection of the parking brake system.

PRECAUTIONS WHEN TRAVELING ON SLOPES

⚠ WARNING

- **While the machine travels on a slope, do not do the gearshift operation or do not set the transmission to the NEUTRAL position. It is dangerous that the engine brake is disabled. Be sure to shift the gear to the one of the speed.**
- **To prevent overrun, be sure to downshift one gear at a time.**
- **When the machine travels downhill, shift the transmission down to apply the sufficient engine brake.**
- **To prevent the engine overrun, the downshift operation is possible only for the limited engine speed. Push the brake pedal to reduce the travel speed until it is in the range that the downshift operation is possible, and do the downshift operation.**

Gear speed	Travel speed that the downshift operation is possible (km/h {MPH})
F2→F1	4.5 {2.8}
F3→F2	6.5 {4.0}
F4→F3	9.0 {5.6}
F5→F4	13.0 {8.1}
F6→F5	20.0 {12.4}
F7→F6	29.0 {18.0}
F8→F7	39.5 {24.5}

TRAVEL DOWNHILL

When the machine travels downhill, use the same gear speed as it travels uphill, and apply the sufficient engine brake.

If the travel speed is too fast, use the foot brake at the same time.

If you use the foot brake frequently when the machine travels downhill, the brake is possibly overheated and get damages.

REMARK

If there is a danger of the engine overrun, the centralized warning lamp lights up, the alarm operates, and the gear is shifted up to the next speed in some cases. It is not a problem.
When the travel speed decreases, the gear speed automatically goes back to the speed selected by the gear shift lever.

ACTIONS IF ENGINE STOPS

⚠ CAUTION

When the engine stops, the steering booster does not work and the steering wheel becomes heavy. This condition is dangerous. Also, when the brake accumulator oil pressure decreases, the brake efficiency decreases. Be careful.

When the engine stops on a slope, immediately push the brake pedal fully to stop the machine, set the gear shift lever to the NEUTRAL position (N), and then start the engine again.

PRECAUTIONS WHEN YOU OPERATE MACHINE

⚠ CAUTION

The torque converter with lockup clutch is installed to this machine. You can change between the manual mode and torque converter auto mode with the transmission mode selector switch.
The excessive loads apply to the lockup clutch in some operations, and it can cause the damage to the lockup clutch. Obey the precautions that follow.

- **When the torque converter is stalled in the torque converter auto mode, do not change to the manual mode.**
- **When you start the machine in the manual mode with load applied to the blade, start at F2 (forward 2nd) gear speed or below.**
- **When you change the travel direction on a slope in the manual mode, be sure to do it after you stop the machine with the brake even the machine travels at low speed.**
- **Do not shift the gear on a steep slope in the manual mode.**
  Select the gear speed applicable to the slope angle before you enter a slope.

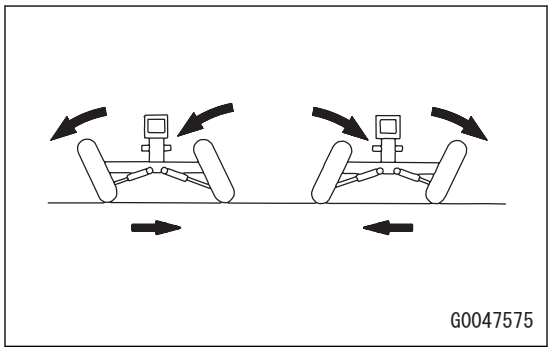
PRECAUTIONS WHEN YOU ARTICULATE MACHINE

If you do articulation of the machine at high travel speed, the machine turns steeply, and falls over in some cases. Do it when the travel speed is 10 km/h {6.2 MPH} or below.

PRECAUTIONS WHEN YOU LEAN MACHINE

You can prevent the side slip of the front wheels with the leaning operation.

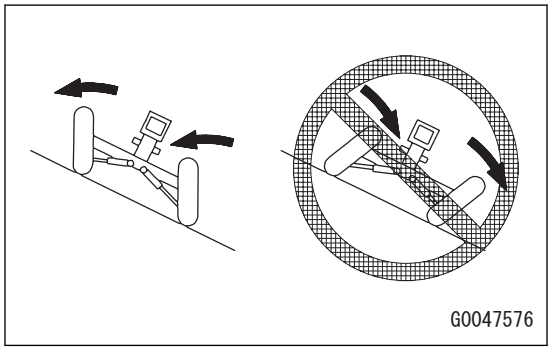
Lean the front wheels in the opposite direction to the front wheels slip.

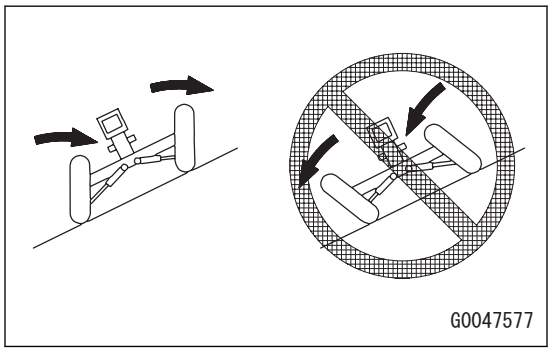


To prevent the side slip during a V-groove digging or ditch finishing, lean the front wheels to the mountain side.

NOTICE

Do not lean the wheels to the lower side of the slope. The machine can move to the unexpected direction, or can be damaged.





PRECAUTIONS WHEN YOU TRAVEL ON ROAD

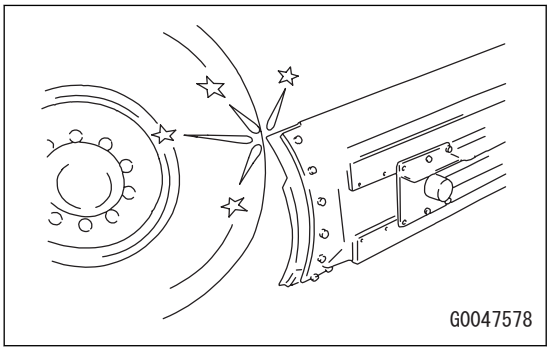
When you transport the machine on the road (at high speed), have a 30-minute break after the machine travels 80 km {49.7 mile} or 2 hours (whichever comes first), have a 1-hour break after the next cycle, and then have a 30-minute break after the next cycle. Continue these cycles.

PRECAUTIONS WHEN YOU OPERATE WORK EQUIPMENT

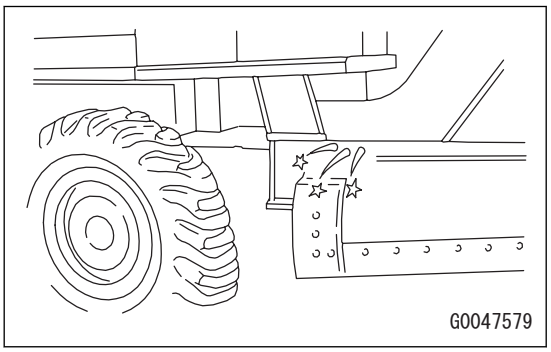
When you operate the work equipment control lever, operate it carefully and do not move the work equipment more than necessary. The work equipment, hydraulic cylinder, or such can hit and damage other things.

When you operate the work equipment, be careful to contact of the parts that follow.

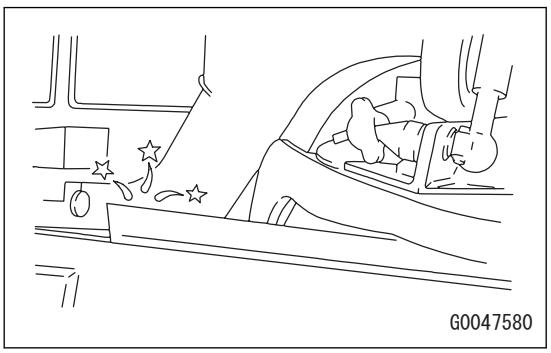
- Blade and front wheels



- Blade and steps



- Blade and frame
- Blade and operator's cab

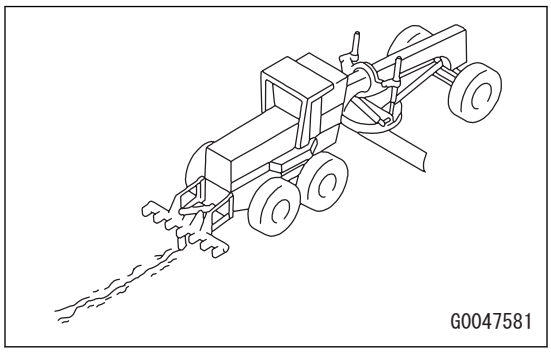


PRECAUTIONS WHEN YOU OPERATE RIPPER

⚠ CAUTION

Operate the ripper while the machine travels straight with the frame set straight.

For heavy-duty condition, use 1 to 3 shanks.

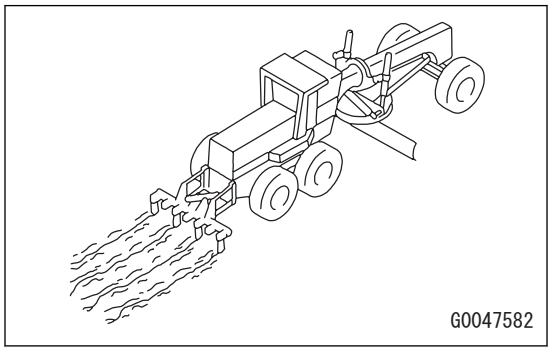


For soft soil condition, you can use 3 to 5 shanks.

Keep the ripper at a depth at where tires do not slip and where the drawbar pull force can be used maximum.

Drive the machine in a straight line at approximately 2 to 4 km/h {1.2 to 2.5 MPH}, and gradually insert the points into the ground.

On a slope, do the ripping operation to the downhill direction to use the weight of the machine.



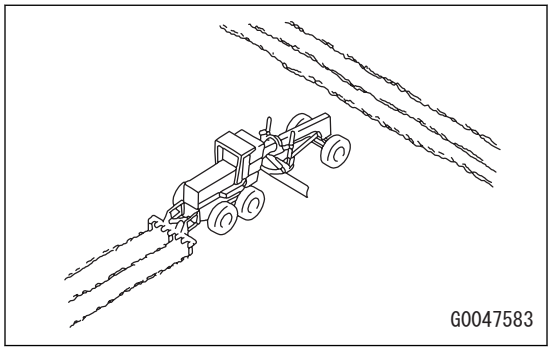
NOTICE

Before you turn the machine, raise the ripper from the ground to prevent damage.

Do the crossover ripper operation only when it is necessary for special purpose.

To break a paved surface, dig the ground below the surface, and then raise the ripper.

Do not dig the concrete while the machine is on a concrete road.



PRECAUTIONS FOR MACHINE WITH FRONT BLADE

⚠ WARNING

The view near the front of the wheels is blocked by the blade if the front blade is installed, and it becomes a blind spot. Be very careful when you operate such a machine.

- **Before the machine starts moving, check again that there is no person or obstacle around the machine.**
- **Before the machine starts moving, make a horn sound to give a warning to persons around the machine.**

- Raise the front blade fully while the machine travels.
- If the machine travels with the front blade lowly set to the ground, the blade easily hits rocks embedded in the ground, and the machine can be damaged.

⚠ CAUTION

No safety device against high load is installed to the front blade.
If a strong shock or an excessive load is applied to the front blade, it will cause damages to the front blade and other parts of the machine in some cases.

When you use the front blade, obey the precautions that follow.

- Use the front blade mainly for spreading work.
- Do not cut hard soil. Do not remove compressed snow or ice. If you do, it will cause damages to the front blade and other parts of the machine in some cases.
- Even during the cut operation of soft soils, do not work with the load tilted to one side.
- Do not turn the machine during the work.
  If it is necessary to turn the machine during the work, raise the front blade and reduce the load, and then steer the machine with the steering wheel.

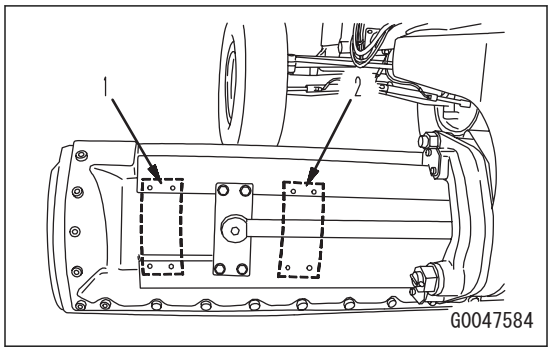
ADJUST WORK EQUIPMENT POSTURE

Move the work equipment to the most applicable position for each operation, and do the efficient operations.

ADJUST BLADE PROTRUSION

You can change the blade protrusion with the control lever during the work. If you want to protrude the blade more, stop the machine and change the installation position of the piston rod of the blade side shift cylinder as follows.

1. Lower the blade to the ground.
2. Loosen the bolts that fix the bracket at the cylinder rod end to the blade.
3. Remove the bolt and lock washer.
4. Retract or expand the cylinder rod.
5. Align the bolt holes of the bracket to other holes on the blade.
   - When you protrude it to the right: Position (1)
   - When you protrude it to the left: Position (2)
   - Standard position: Center
6. Install the lock washers and bolts, and tighten the bolts.



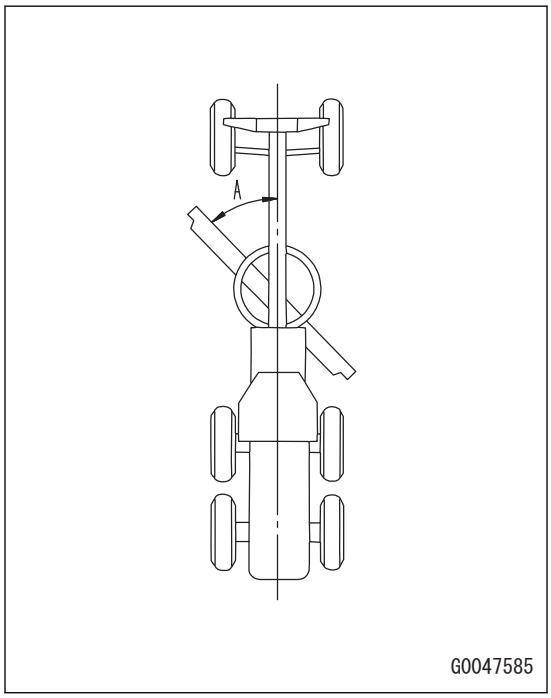
BLADE PROPULSION

The angle between the blade and the center line of the machine is called the blade propulsion angle.

Set it to around 60 ° for general cutting operation. Decrease the angle in the cases that follow.

- When the cutting resistance is high
- When the soil is hard
- When the soil and sand at the front of the blade do not flow smoothly

(A): Blade propulsion angle



ADJUST BLADE CUTTING ANGLE

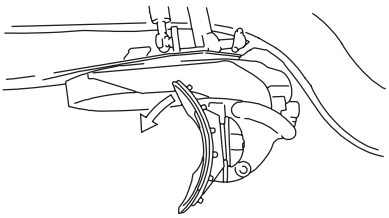
In general, increase the blade cutting angle as the soil is hard, and decrease it as the soil is soft. When you do this, the work efficiency will be improved.

You can change the blade cutting angle freely in the range below, as the power tilt blade is installed.

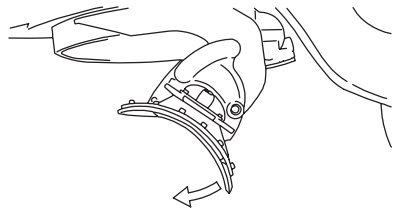
Blade cutting angle

Minimum: 32 °

Maximum: 81 °



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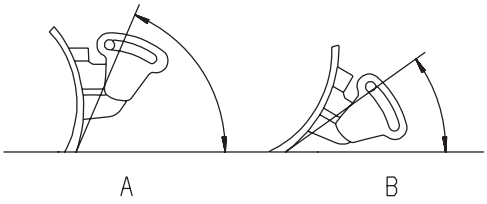


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The power tilt blade has the advantages that follow, in addition to those of the standard blade.

- You can operate the blade with the optimum blade cutting angle with one lever in response to the soil of the work.

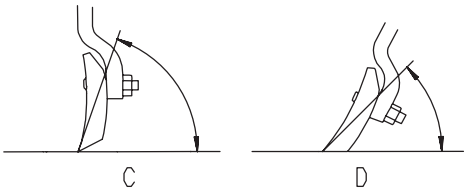
  (A): When soil is hard
  (B): When soil is soft



G0047588

- The cutting edge is always sharp, and you can remove the icy road surface during the snow removal.

  (C): Icy road surface
  (D): Soft snow



G0047589

- When you operate the power tilt blade, the distance between the cut surface and blade end changes. So you can finely adjust the height of the cut surface.
- When you pile up soil, sand, or snow in the low bank posture, you can set the most applicable blade cutting angle. It increases the work efficiency.



G0047567

CHECK BLADE SAFETY DEVICES

The slip clutch is installed to the circle rotation unit to prevent unexpected failure when the excessive shock load is applied to the end of the blade during the work.

If a problem is found in the slip clutch, the failures that follow can occur. Consult your Komatsu distributor for repair and adjustment.

Examples of failure: When the blade rotation control lever is operated, the blade does not rotate.

- The clutch slips and the blade does not rotate while the motor rotates.
  → The clutch can burn easily. It needs to be adjusted.
- The oil pressure is relieved and the blade does not rotate.
  → It is normal. But, when the slip torque is at maximum or too high, damage can occur.

OPERATE MACHINE TO BANK CUTTING POSTURE (RIGHT SIDE)

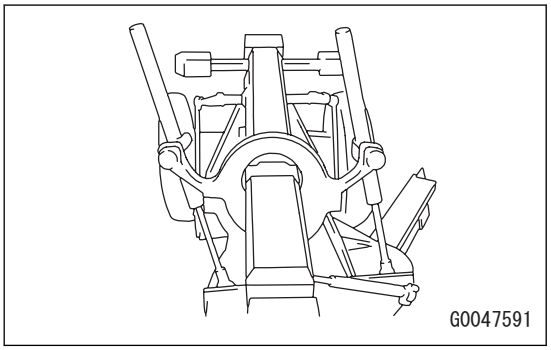
⚠ WARNING

Pull out the lifter lock pin only when the blade is on the ground. The blade can rotate and fall. It is dangerous.

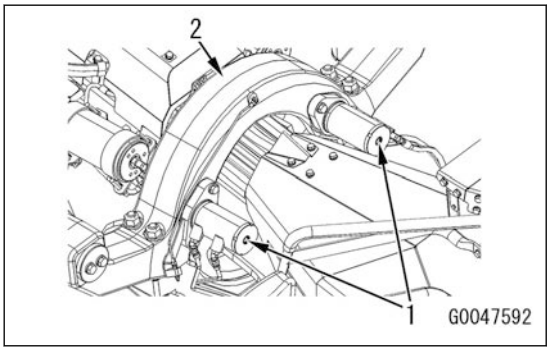
NOTICE

- **When you set the machine in the bank cutting posture, be careful not to hit the blade against the parts of the machine.**
- **Do not turn the lifter further after the lifter lock pin exceeds the hole of the lifter guide. The frame and lifter lock pin case can hit each other to cause damage to the lifter lock pin case.**

1. Fully protrude the blade and drawbar to the right side.
2. Rotate the blade, adjust the blade end to the side of the front right wheel, and lower the blade until it touches the ground lightly.

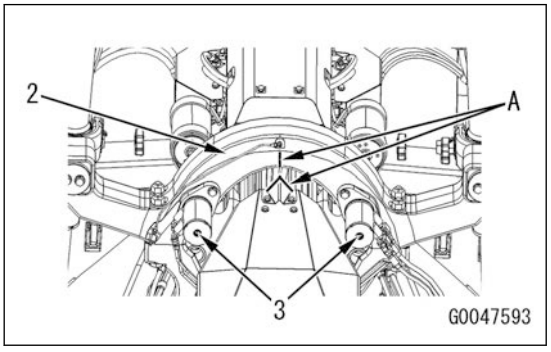


3. Push the lifter lock pin switch to pull out the lock pin (1).
4. When the lock pin (1) cannot be pulled out as interfered with the lifter (2), operate the blade lift cylinder.



5. Make sure that the indicator pin (3) at the rear of the lock pin protrudes sufficiently and the lock pin is pulled out.
6. Expand the R.H. blade lift cylinder and retract the L.H. blade lift cylinder.
7. Turn the lifter (2) counterclockwise.
8. Move the lifter (2) to the desired matchmark (A), and lock it with the lock pin (1).

   Make sure that the indicator pin (3) does not protrude and the lock pin (1) is locked fully.



   NOTICE

   If you turn the lock pin switch while you push it in the lock direction and turn the lifter, the bushing and lifter ring can be damaged.
   Turn the lifter to the specified matchmark, and then lock the lock pin.

9. Retract the R.H. blade lift cylinder and expand the L.H. blade lift cylinder.

   Continue this procedure several times and rotate the blade while you lift it on the right side of the machine. The machine is set in the bank cutting posture.

When you set the machine in the bank cutting posture on the left side, do the same procedure in the reverse order.

REMARK

You can increase the banking performance if you install the piston rod of the blade side shift cylinder to the left position for right banking, or to the right position for left banking.

OPERATE MACHINE TO SHOULDER REACH POSTURE (RIGHT SIDE)

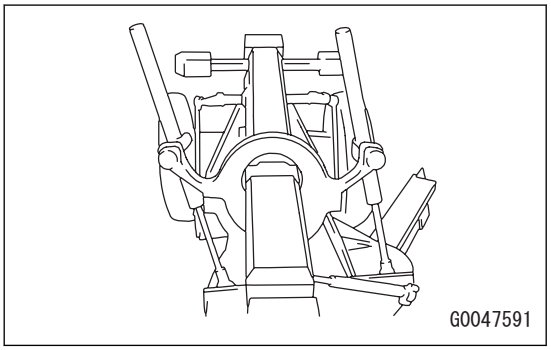
⚠ WARNING

Pull out the lifter lock pin only when the blade is on the ground. The blade can rotate and fall. It is dangerous.

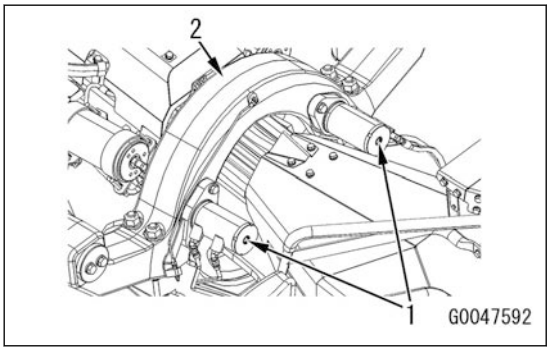
NOTICE

- **When you set the machine in the shoulder reach posture, be careful not to hit the blade against the parts of the machine.**
- **Do not turn the lifter further after the lifter lock pin exceeds the hole of the lifter guide. The frame and lifter lock pin case can hit each other to cause damage to the lifter lock pin case.**

1. Fully protrude the blade and drawbar to the right side.
2. Rotate the blade, adjust the blade end to the side of the front right wheel, and lower the blade until it touches the ground lightly.



3. Push the lifter lock pin switch to pull out the lock pin (1).
4. When the lock pin (1) cannot be pulled out as interfered with the lifter (2), operate the blade lift cylinder.

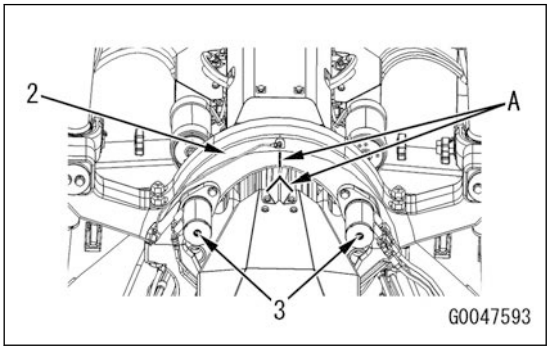


5. Make sure that the indicator pin (3) at the rear of the lock pin protrudes sufficiently and the lock pin is pulled out.
6. Expand the R.H. blade lift cylinder and retract the L.H. blade lift cylinder.
7. Turn the lifter (2) counterclockwise.
8. Move the lifter (2) to the desired matchmark (A), and lock it with the lock pin (1).

   Make sure that the indicator pin (3) does not protrude and the lock pin (1) is locked fully.

   NOTICE

   If you turn the lock pin switch while you push it in the lock direction and turn the lifter, the bushing and lifter ring can be damaged.
   Turn the lifter to the specified matchmark, and then lock the lock pin.

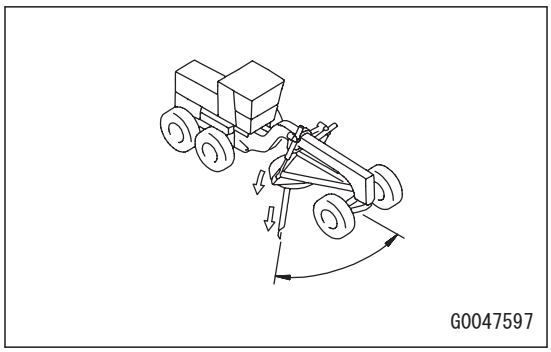


9. Shift the blade sideways as shown in the figure.
   - Shift the blade fully to the right.
   - Shift the drawbar fully to the right.
10. Rotate the blade to the desired position.

    When you set the machine in the shoulder reach posture on the left side, do the same procedure in the reverse order.

    REMARK

    To extend the shoulder reach posture further, change the installation position of the piston rod of the blade side shift cylinder.


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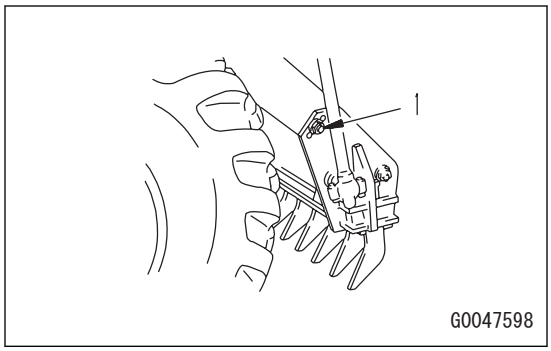
ADJUST SCARIFIER

ADJUST CUTTING ANGLE

Generally, the harder the ground becomes, the greater the cutting angle, the better the work efficiency.

Adjustment

Remove the bolt (1), and change the hole position to the desired position.
You can set the angle to 3 levels of 58 °, 65 °, and 71 °. The standard angle is 65 °.



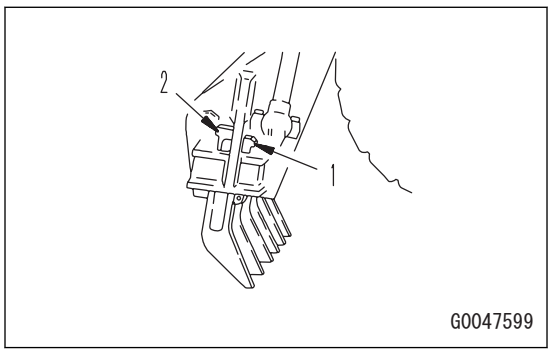
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ADJUST CUTTING DEPTH

You can adjust the cutting depth at the 2 places in response to the work as follows.

Adjustment with tooth

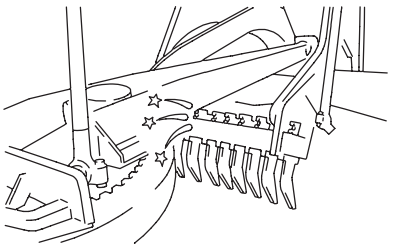
Remove the cotter pin, pull out the wedge (1), and change the notch of the tooth (2).



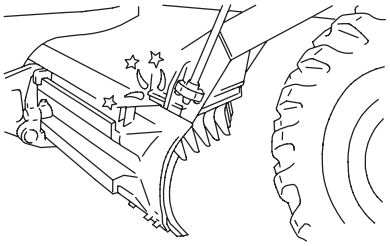
G0047599

PRECAUTIONS WHEN YOU HANDLE AND OPERATE SCARIFIER

- If you lower the blade to lift the machine while the scarifier is raised fully, the scarifier contacts and damages the drawbar. Be careful.
- If you rotate the blade while it is raised off the ground, the scarifier contacts and damages the blade. Be careful.
- If you lower scarifier while the blade is stowed in the machine width, the scarifier contacts and damages the blade top. Be careful.

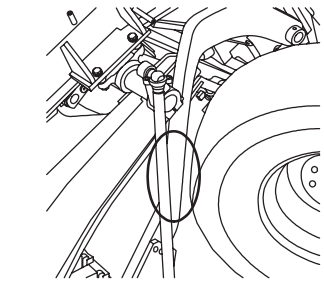


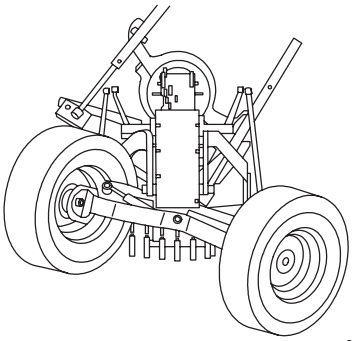
G0047600



G0047601

- In the bank cutting work, the scarifier is lowered to prevent contact between the drawbar and scarifier. Be careful as the scarifier can contact and damage the tires by unevenness in the travel surface.





G0047602

BLADE ACCUMULATOR

FEATURES OF BLADE ACCUMULATOR

Easy snow removal work

- No blade control is required.
- No operator's special skill is required.

Safety and protection

- Reduction of shocks on rocky ground (Protection of operator and machine)
- Protection of buried objects (Blade relief when runs over projected objects)

Increase of steering performance

- Increase of steering performance in operation along curve
- Reduction of sideways slip in operation along curve
- Good steering performance during the leaning operation
- Reduction of sideways slip during the leaning operation

Increase of workability

- Good pushing force of blade
- Good relief of blade

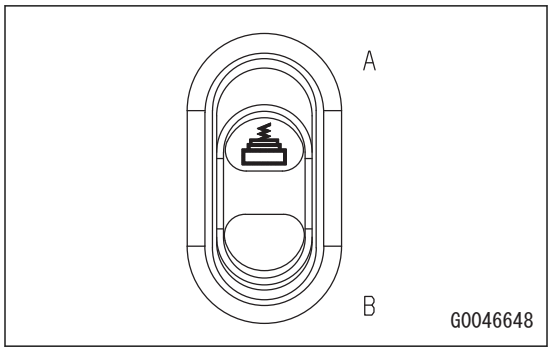
OPERATE BLADE ACCUMULATOR

1. Set the blade accumulator switch to the ON position (A) to activate the accumulator.

   Oil on the bottom side of the R.H. and L.H. blade lift cylinders flow into the accumulator, and a pushing force is applied to the blade.

   REMARK

   To raise or lower the blade accurately, move the R.H. and L.H. blade lift control levers back and forth to release the remaining pressure from the accumulator and hydraulic circuit.



2. Operate the blade lift cylinder to set the desired pushing force.

   When the blade is set to LOWER, the pushing force increases, and when the blade is set to RAISE, the pushing force decreases.

   REMARK

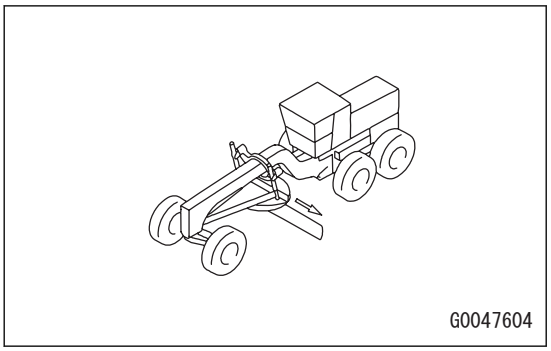
   - When the accumulator is adjusted, it is not necessary to operate the blade lift control lever during the work.
   - If the blade lift cylinder is set to RAISE, the blade does not respond to the concave.

RECOMMENDED APPLICATIONS

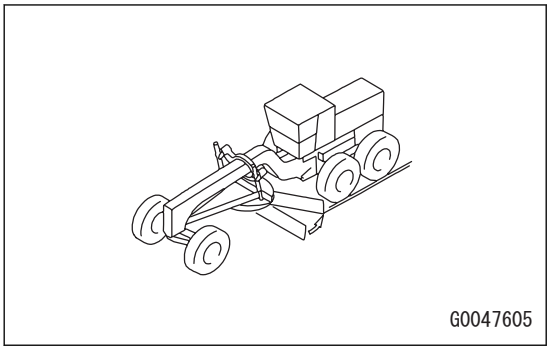
LEVEL GROUND TO RIGHT

1. Shift the drawbar sideways.

   Move the drawbar to the left approximately 200 mm {7.9 in}.

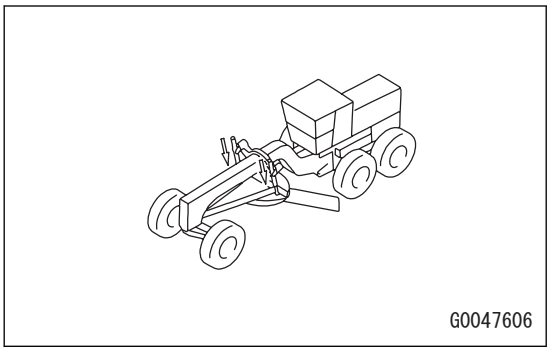


2. Adjust the blade to discharge the soil and sand to outside of the rear left wheels.



3. Set the blade to the desired cutting position.

   Operate the blade lift cylinder to adjust the blade horizontally.



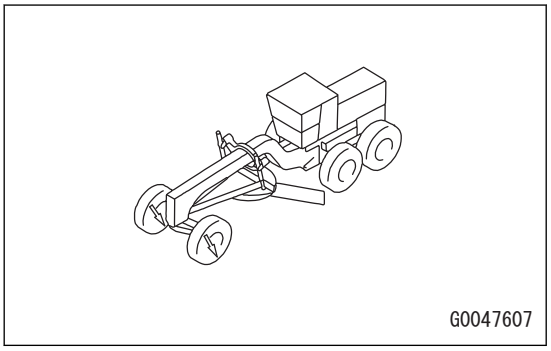
4. Lean the front wheels to the left.

   REMARK

   When the front wheels are leaned to the left, the machine is not pushed to the right by the load applied to the left side of the machine.

5. Rotate the blade to the position best for the soil and sand.

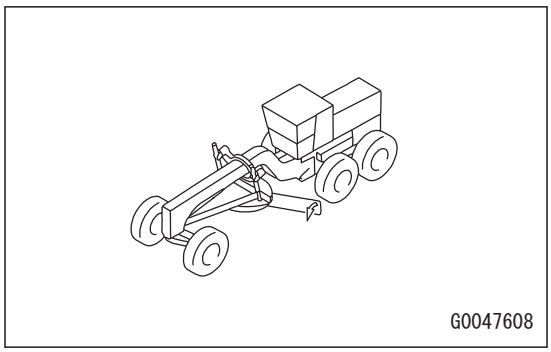
   (Be careful not to step on with the left rear wheel the windrow discharged from the blade.)



6. Use the power tilt operation to operate the top of the blade is positioned forward of the cutting edge, and then start the work.
7. Move the soil and sand sideways to make sure that high loads are not applied to the machine.
8. Spread the finely crushed loose soil and sand until the ground surface becomes level.

REMARK

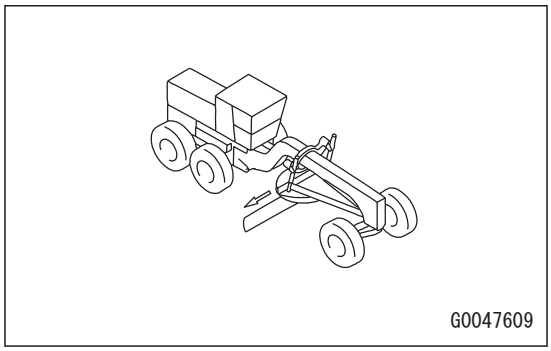
- In general, when you do the blade work on a level ground, set the frame straight.
  When the force caused by high load on the blade is applied to the side of the machine, articulate the frame.
- When the tires slip, rotate the blade further to reduce the cutting width and reduce the load to the machine.
- During the grading work, discharge the soil and sand to outside of the rear wheels. This operation let your steering operation with the rear wheels easier.


G0047608

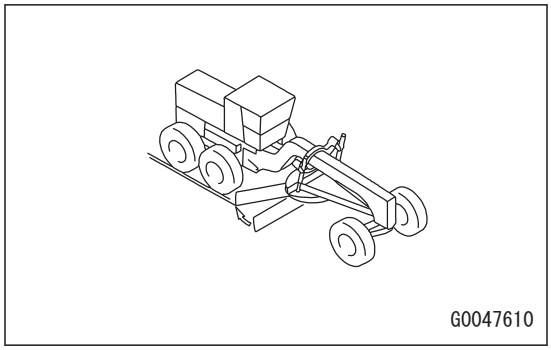
LEVEL GROUND TO LEFT

1. Shift the drawbar sideways.

   Move the drawbar to the left approximately 200 mm {7.9 in}.

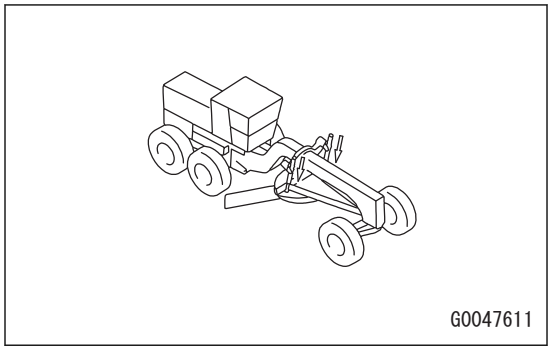

G0047609

2. Adjust the blade in order to let the soil and sand be discharged to outside of the rear right wheels.


G0047610

3. Set the blade to the desired cutting position.

   Operate the blade lift cylinder to adjust the blade horizontally.


G0047611

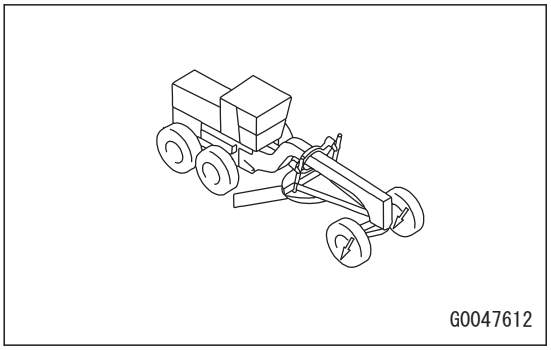
4. Lean the front wheels to the right.

   REMARK

   When the front wheels are leaned to the right, the machine is not pushed to the left by the load applied to the right side of the machine.

5. Rotate the blade to the position best for the soil and sand.

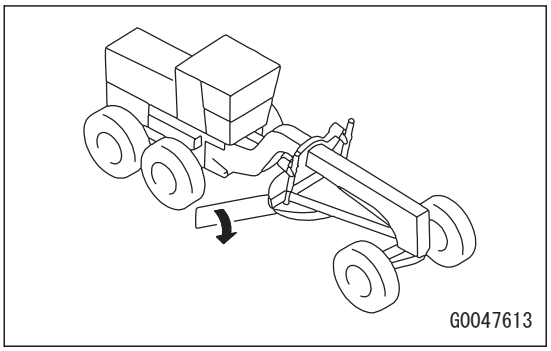
   (Be careful not to step on with the right rear wheel the windrow discharged from the blade.)



6. Use the power tilt operation to operate the top of the blade is positioned forward of the cutting edge, and then start the work.
7. Move the soil and sand sideways to make sure that high loads are not applied to the machine.
8. Spread the finely crushed loose soil and sand until the ground surface becomes level.

   REMARK

   - In general, when you do the blade work on a level ground, set the frame straight.
     When the force caused by high load on the blade is applied to the side of the machine, articulate the frame.
   - When the tires slip, rotate the blade further to reduce the cutting width and reduce the load to the machine.
   - During the grading work, discharge the soil and sand to outside of the rear wheels. This operation let your steering operation with the rear wheels easier.

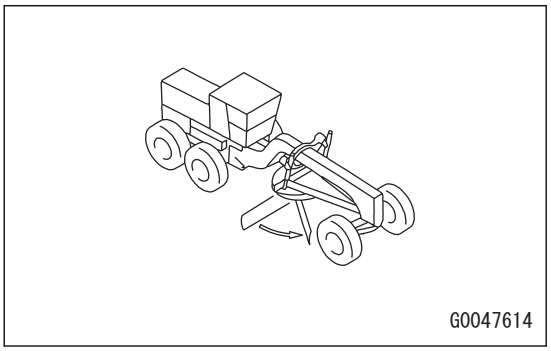


GRADING RIGHT V-DITCHES

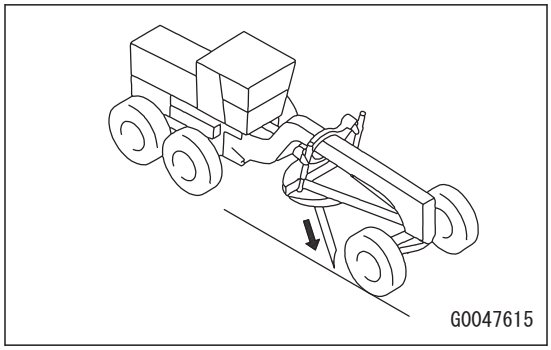
NOTICE

Set the frame straight. If the machine is articulated, the side of the rear wheel is pushed against the back slope, and it damages the side of the tire.
Also, mud is pushed in between the tire and rim, and it can cause air leakage and a flat tire.

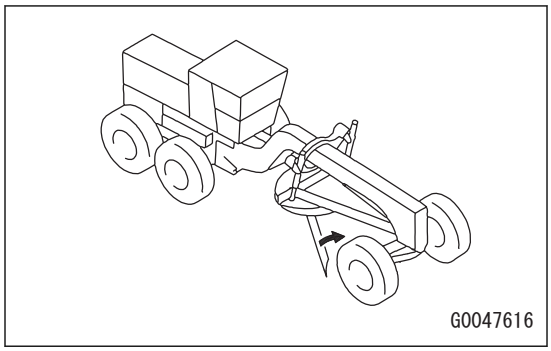
1. Rotate the blade to make an angle in order to let the soil and sand be discharged to inside of the rear left wheels.



2. Adjust the right end of the blade to be aligned with the outside line of the front right wheel.

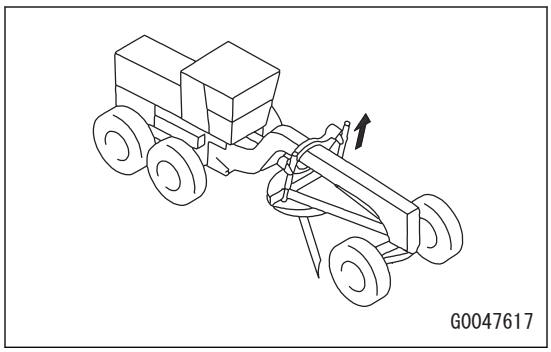


3. Use the power tilt operation to operate the top of the blade is positioned forward of the cutting edge.

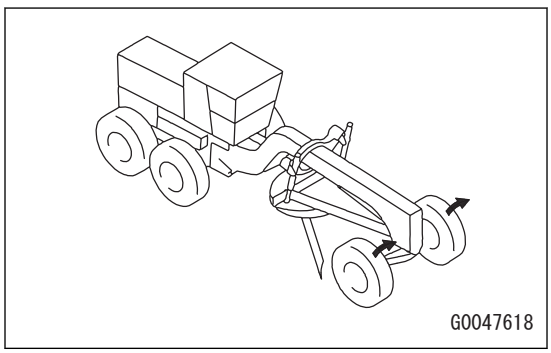


4. Operate the L.H. blade lift cylinder to raise the left end of the blade.

   (The right side of the blade determines the ditch depth. The left side of the blade determines the ditch shape.)



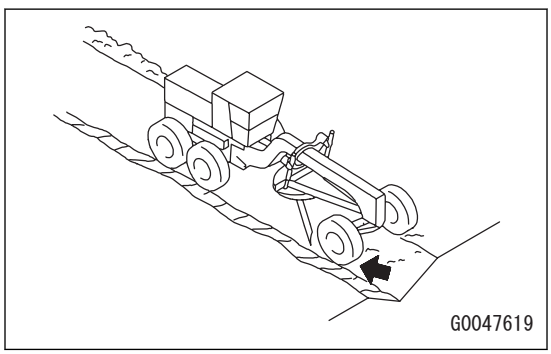
5. Lean the front wheels to the left in order not to let the front wheels rub against the side wall of the ditch.
6. Operate the R.H. blade lift cylinder to adjust the right end of the blade to the cutting depth of 50 to 100 mm {2 to 3.9 in}.
7. Operate the R.H. blade lift cylinder while you travel to adjust the right end of the blade to the desired cutting depth.



8. Set the front right wheel to the bottom of the ditch.

   Do digging to make the ditch of the desired depth.

   - First, cut to a depth of approximately 50 mm {2 in} to decide the ditch line.
   - Set the front and rear wheels to the bottom of the ditch as the machine is not in a stable posture for the work.

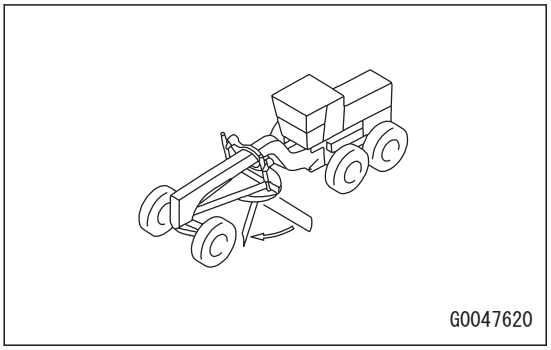


GRADING LEFT V-DITCHES

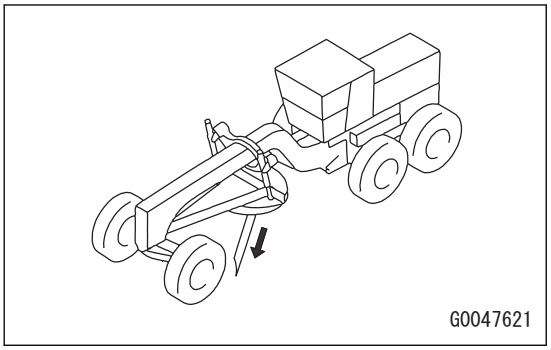
NOTICE

Set the frame straight. If the machine is articulated, the side of the rear wheel is pushed against the back slope, and it damages the side of the tire.
Also, mud is pushed in between the tire and rim, and it can cause air leakage and a flat tire.

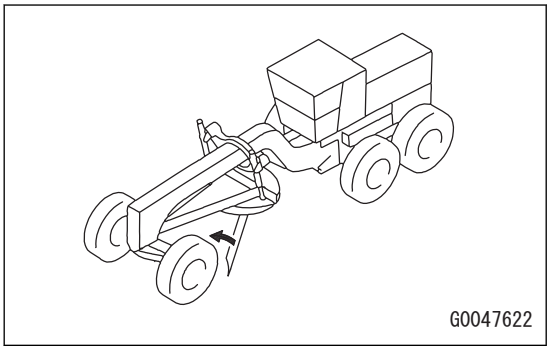
1. Rotate the blade to make an angle in order to let the soil and sand be discharged to inside of the rear right wheels.


G0047620

2. Adjust the left end of the blade to be aligned with the outside line of the front left wheel.

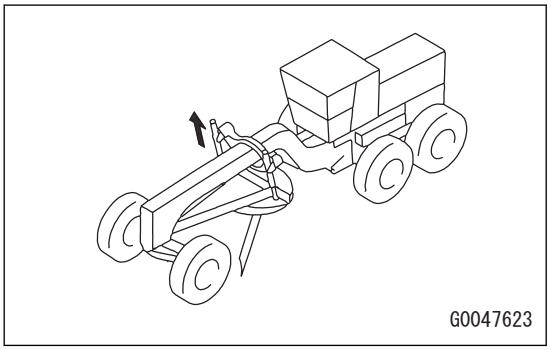

G0047621

3. Use the power tilt operation to operate the top of the blade is positioned forward of the cutting edge.

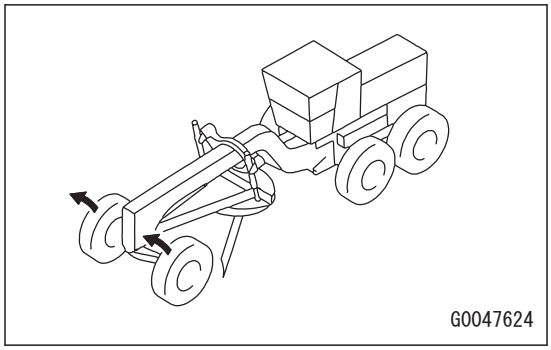

G0047622

4. Operate the R.H. blade lift cylinder to raise the right end of the blade.

   (The left side of the blade determines the ditch depth. The right side of the blade determines the ditch shape.)

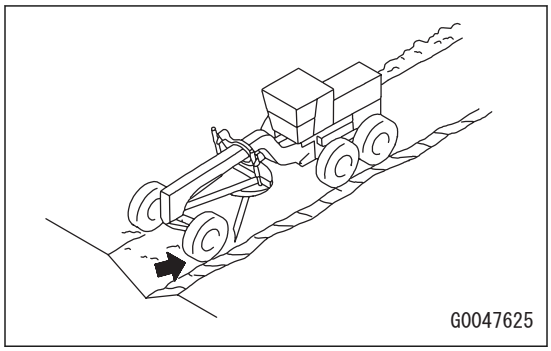

G0047623

5. Lean the front wheels to the right in order not to let the front wheels rub against the side wall of the ditch.
6. Operate the L.H. blade lift cylinder to adjust the left end of the blade to the cutting depth of 50 to 100 mm {2 to 3.9 in}.
7. Operate the L.H. blade lift cylinder while you travel to adjust the left end of the blade to the desired cutting depth.


G0047624

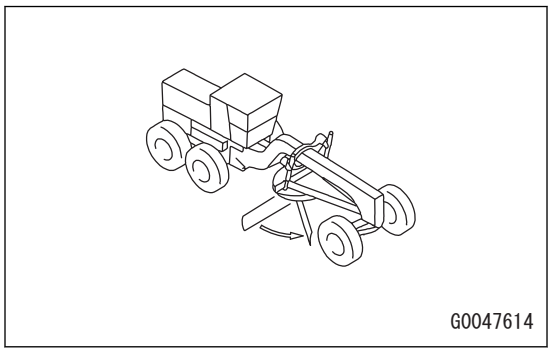
8. Set the front left wheel to the bottom of the ditch.

   Do digging to make the ditch of the desired depth.
   - First, cut to a depth of approximately 50 mm {2 in} to decide the ditch line.
   - Set the front and rear wheels to the bottom of the ditch as the machine is not in a stable posture for the work.


G0047625

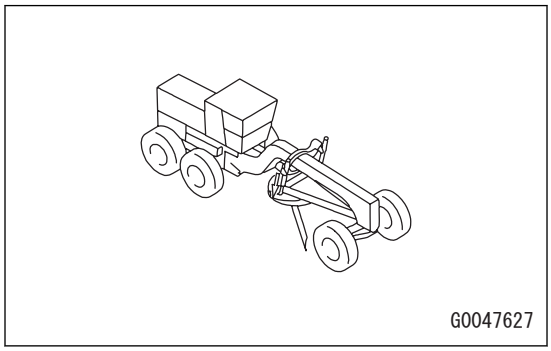
FINISH RIGHT DITCH

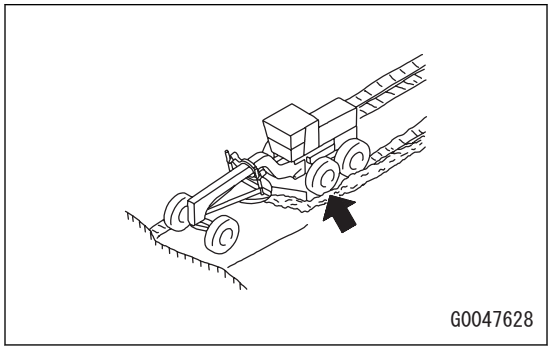
1. Adjust the right side of the blade to the back of the front right wheel.


G0047614

2. Operate the R.H. blade lift cylinder to adjust the blade to the depth of the ditch.

   Be careful not to step on with the left rear wheel the windrow discharged from the blade.
3. Operate the blade lift cylinder and rotate the blade to adjust it.
4. Lean the front wheels to the left a bit.

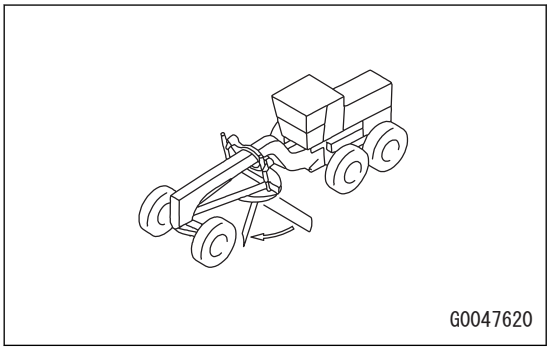

G0047627


G0047628

Different work is required to push out the soil and sand onto the slope and road shoulder. Spread the soil and sand, and do the grader finishing work finally.

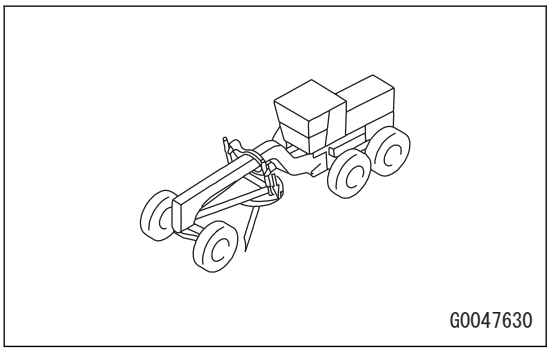
FINISH LEFT DITCH

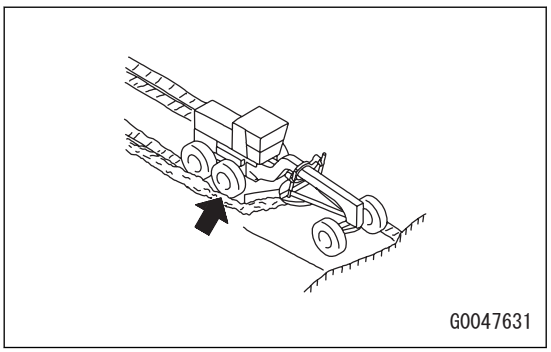
1. Adjust the left side of the blade to the back of the front left wheels.



2. Operate the L.H. blade lift cylinder to adjust the blade to the depth of the ditch.

   Be careful not to step on with the right rear wheel the windrow discharged from the blade.
3. Operate the blade lift cylinder and rotate the blade to adjust it.
4. Lean the front wheels to the right a bit.

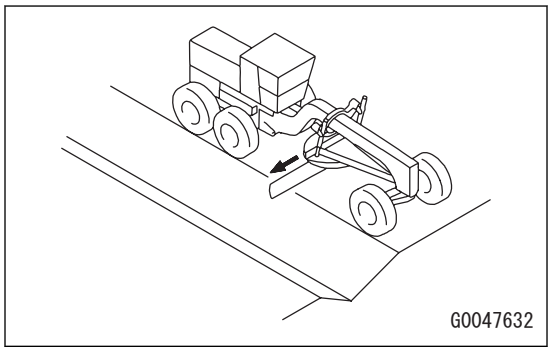




Different work is required to push out the soil and sand onto the slope and road shoulder. Spread the soil and sand, and do the grader finishing work finally.

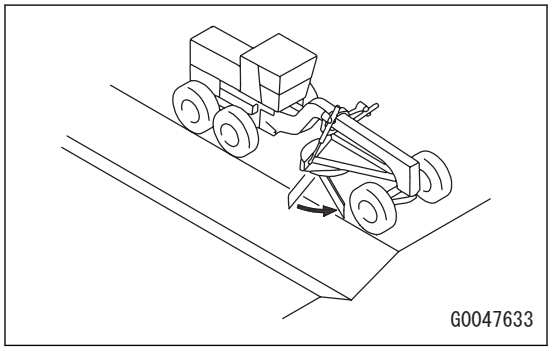
FINISH RIGHT ROAD SHOULDER

1. Operate the drawbar side shift cylinder and move the drawbar to the right end.

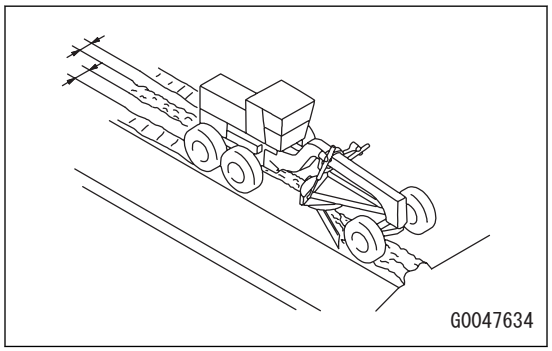


2. Adjust the right side of the blade to be aligned with the outside line of the front right wheel.
3. Adjust the blade in order to let the soil and sand be discharged between the wheels on the right and left sides.

   (The soil and sand move smoothly when the blade propulsion angle is small.)

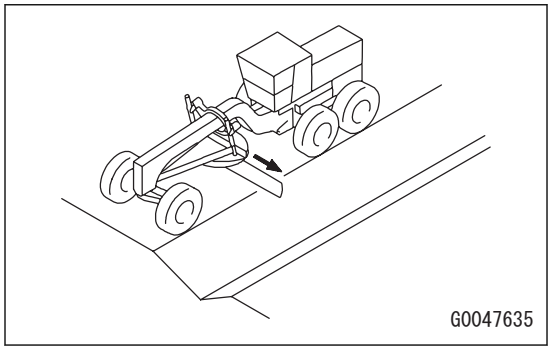


4. Set the center of the machine to the line of the soil and sand discharged by ditching.
5. Operate the R.H. and L.H. blade lift cylinder to set the blade horizontally and to the desired cutting depth.
6. Lean the front wheels to the left a bit.



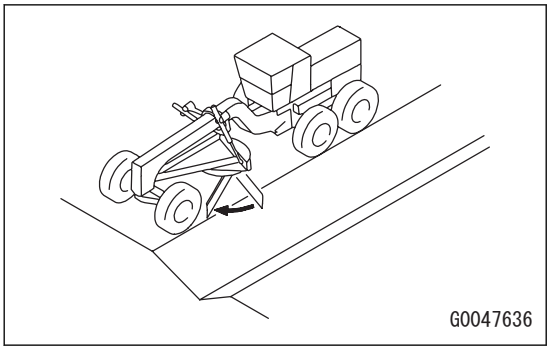
FINISH LEFT ROAD SHOULDER

1. Operate the drawbar side shift cylinder and move the drawbar to the left end.

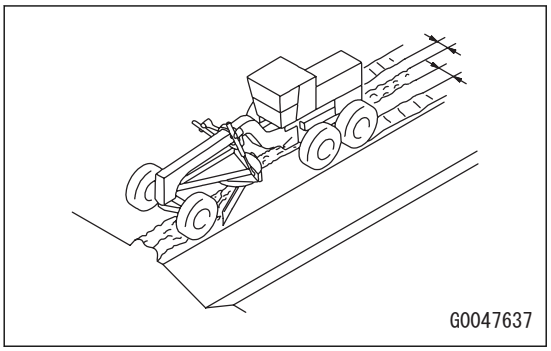


2. Adjust the left side of the blade to be aligned with the outside line of the front left wheel.
3. Adjust the blade in order to let the soil and sand be discharged between the wheels on the right and left sides.

   (The soil and sand move smoothly when the blade propulsion angle is small.)



4. Set the center of the machine to the line of the soil and sand discharged by ditching.
5. Operate the R.H. and L.H. blade lift cylinder to set the blade horizontally and to the desired cutting depth.
6. Lean the front wheels to the right a bit.



MAKE V-DITCH FOR ROAD CONSTRUCTION

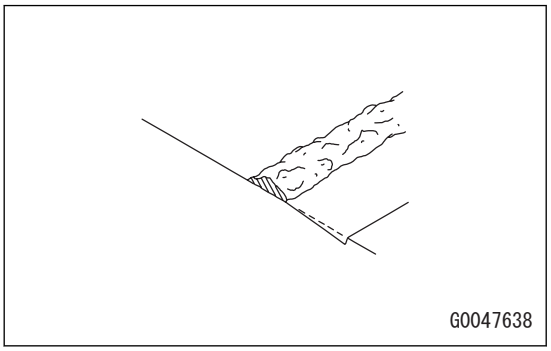
The figure shows the procedure for one side. Do this procedure again for the opposite side of the road.

When you do steps 4 and 7, articulate the frame of the machine.

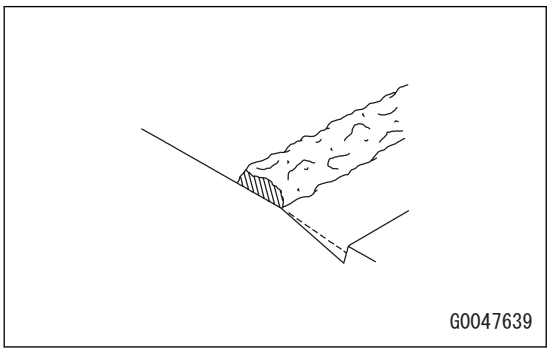
1. Ditch line: Dig lightly.

   Determine the ditch line along the measurement points.

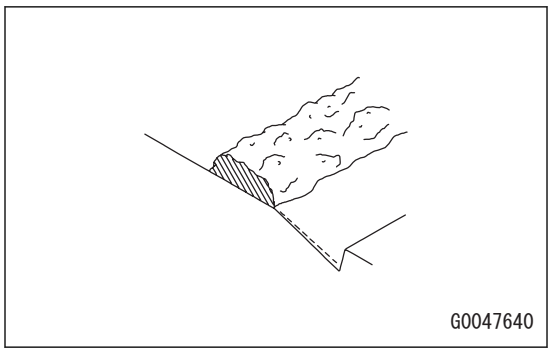
   Depth is approximately 50 mm {2 in}, and speed is approximately 2 km/h {1.2 MPH}.



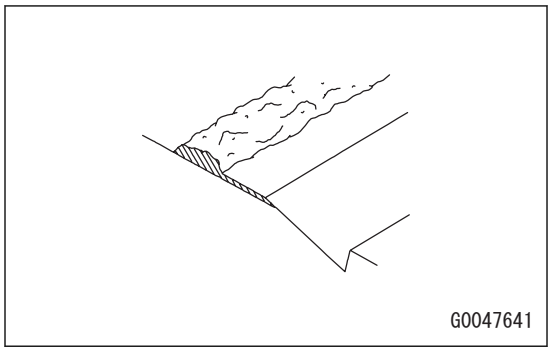
2. 2nd digging: Dig heavily.



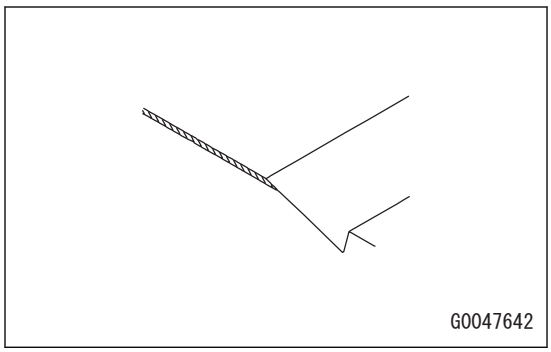
3. 3rd digging: Dig heavily.



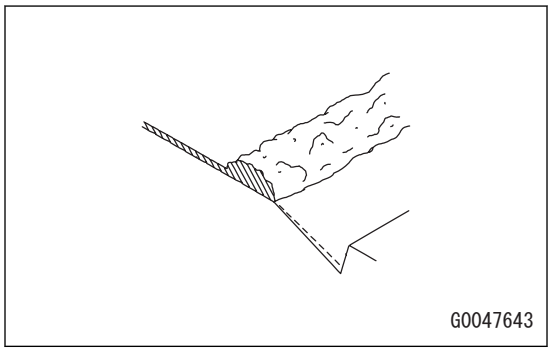
4. Finish the road shoulder.



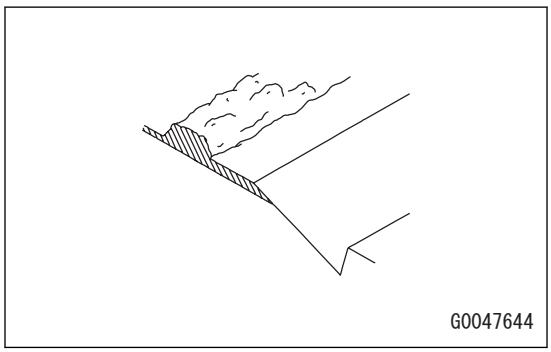
5. Grade the center part.



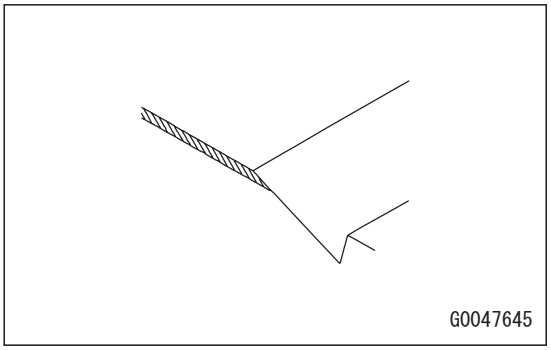
6. 4th digging: Dig heavily.



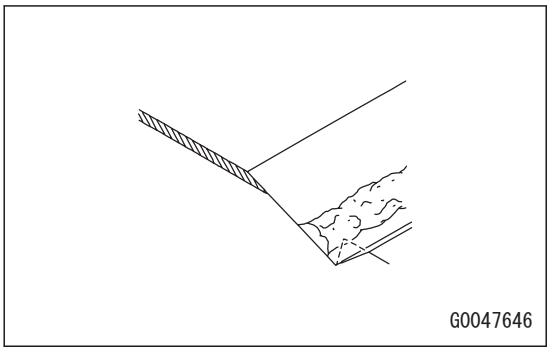
7. Finish the road shoulder.



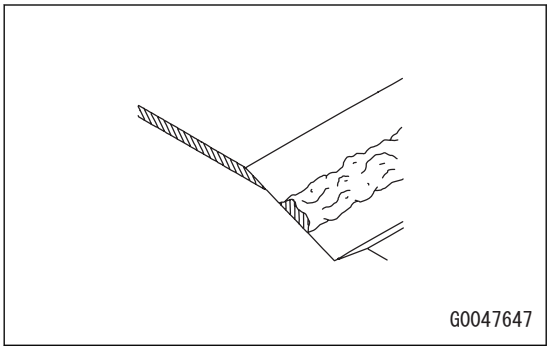
8. Spread the windrow onto the center part.



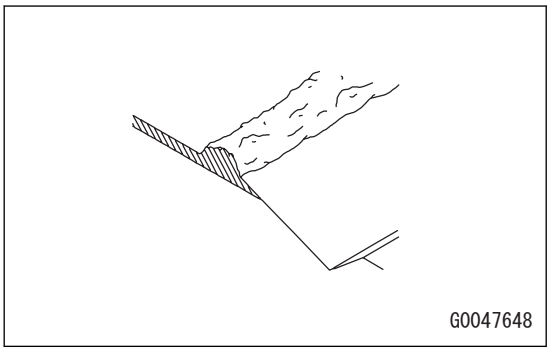
9. Slope and bank
   Set the machine in the bank cutting posture.



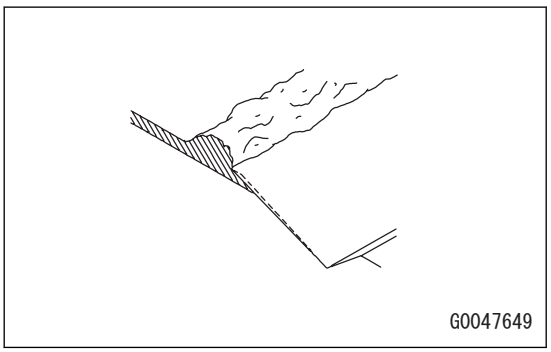
10. Finish the ditch bottom.



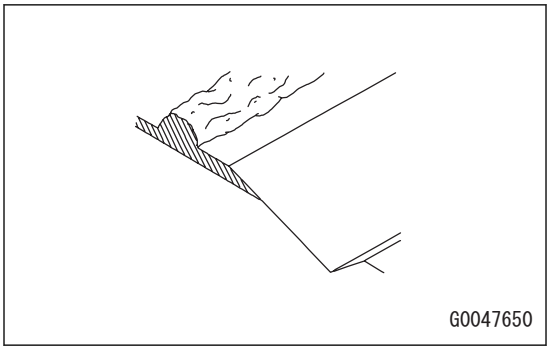
11. Do the final ditching. (Finish and shape inside of slope)



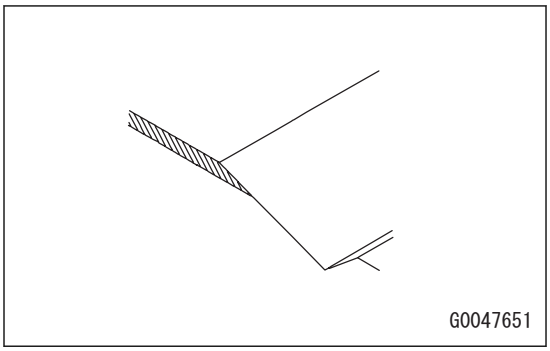
12. Finish the slope finally.



13. Finish the road shoulder.



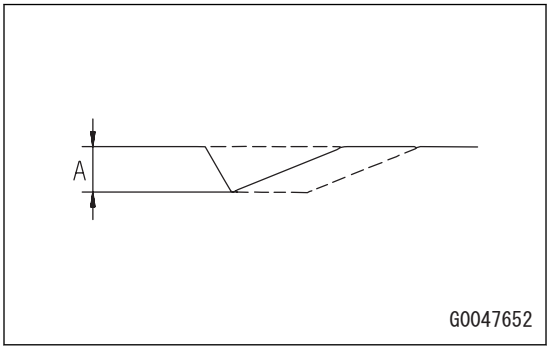
14. Do the grading and finishing.



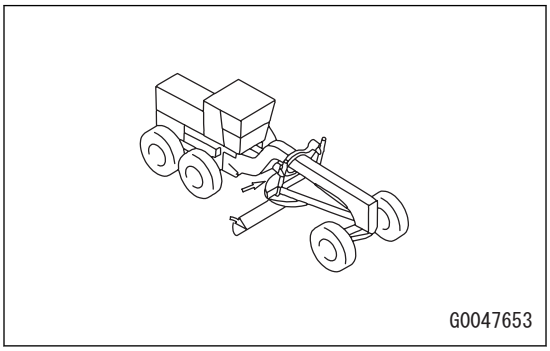
FLAT-BOTTOMED DITCH

If there is no V-ditch, make a V-ditch with the depth (A) of the flat-bottomed ditch.

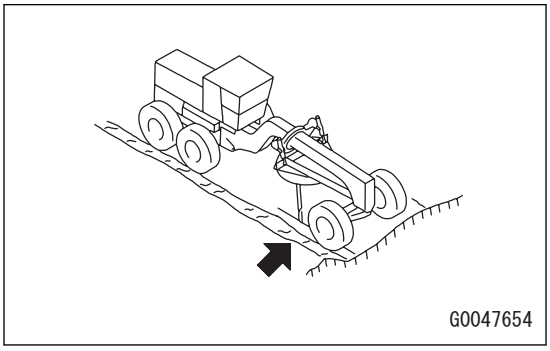
The slope at the road shoulder must be more level than the normal condition.



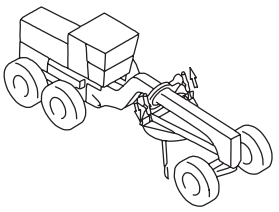
1. Do the power tilt operation to tilt the blade forward.
2. Operate the drawbar side shift cylinder and move the drawbar to the left end of the machine.



3. Put the front right wheel at the bottom of the V-ditch.
4. Adjust the blade in order to let the right side of the blade to be inside the front right wheel and in the width of the flat-bottomed ditch.



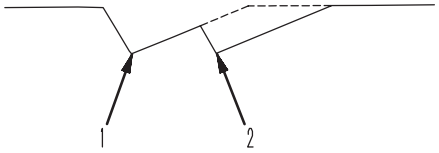
5. Operate the R.H. blade lift cylinder in order to lower the right side of the blade and adjust the cutting depth.
6. Operate the L.H. blade lift cylinder to raise the left side of the blade and adjust the slope of road shoulder to the desired angle.


G0047655

7. Lean the front wheels to the left.

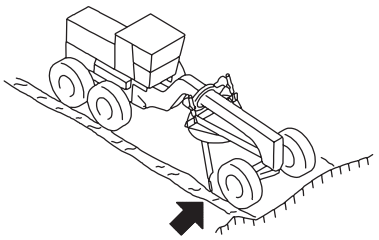
   Dig the 2nd V-ditch (2) to the same depth of the 1st V-ditch (1) or just a bit deeper.
8. Dig the flat bottom.

   Adjust the R.H. blade lift cylinder to the desired depth.
9. Operate the L.H. blade lift cylinder if necessary.

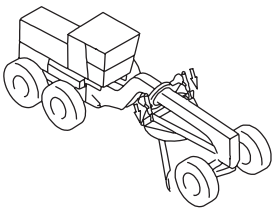


G0047656

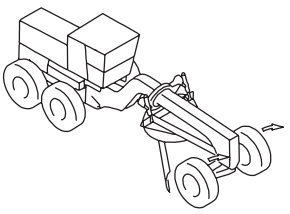
10. Put the front right wheel on the bottom of the first V-ditch, and do the digging.
11. Adjust the right end of the blade to the bottom of the slope.


G0047657

12. Lower the R.H. blade lift cylinder in order to let the blade front end be at the accurate set of the ditch.
13. Lower the L.H. blade lift cylinder to the desired digging depth.


G0047658

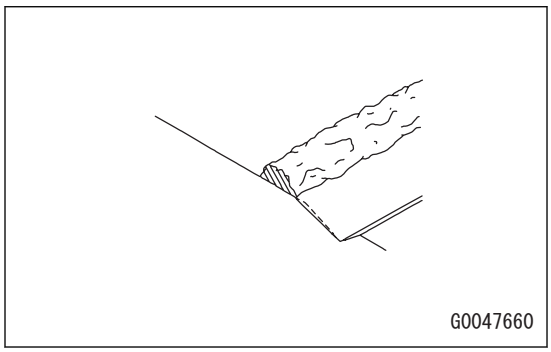
14. Lean the front wheels to the left.
15. Adjust the blade to make an sharp angle, and push up the soil and sand onto the slope of the ditch.
16. Spread the windrow and finish it accurately.


G0047659

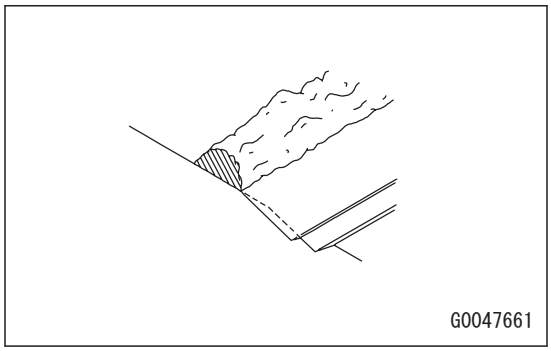
MAKE FLAT-BOTTOMED DITCH FOR ROAD CONSTRUCTION

The figure shows the procedure for one side. Do this procedure again for the opposite side of the road.

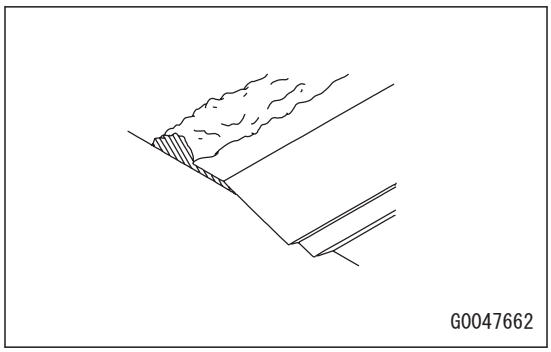
1. Make the inside face of the slope level.



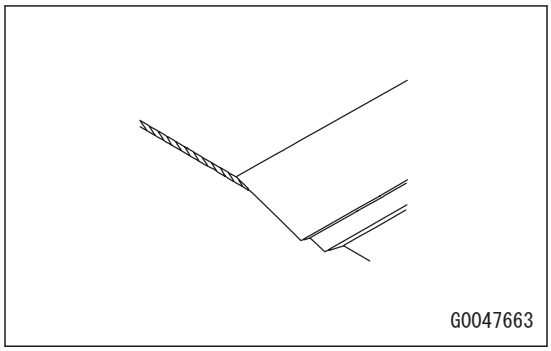
2. Ditch the bottom of the groove and depth by the left ditching method.



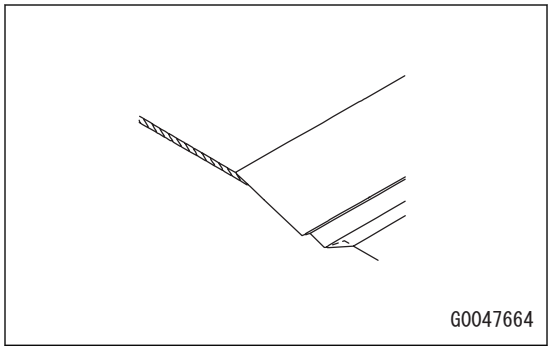
3. Finish the road shoulder.



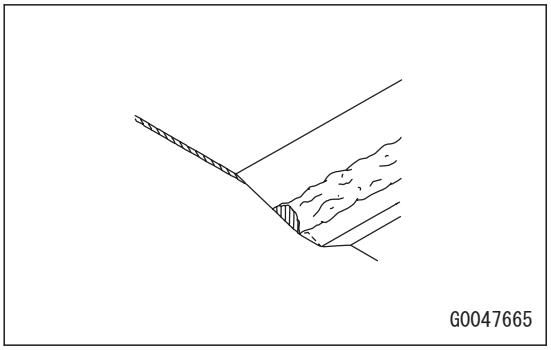
4. Spread the windrow onto the center part.



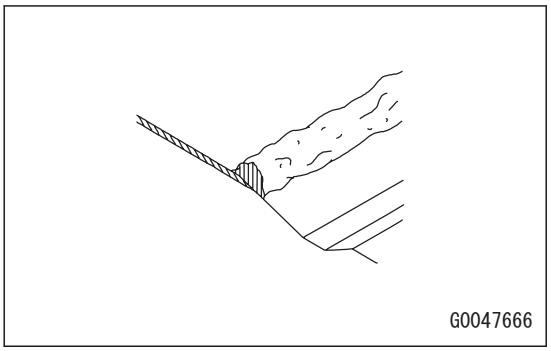
5. Finish the slope on the bank side.



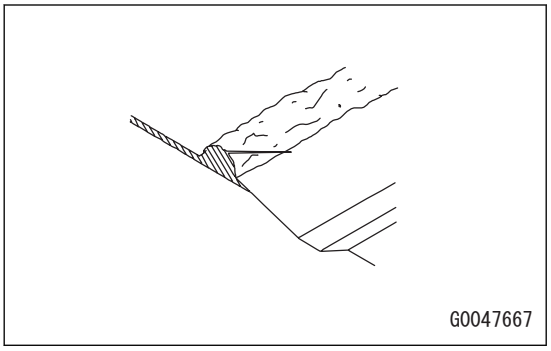
6. Make the ditch bottom level.



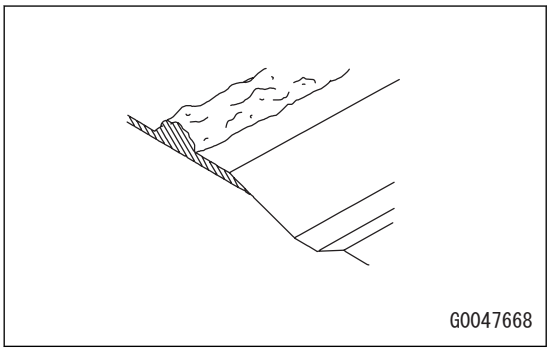
7. Finish the ditch.



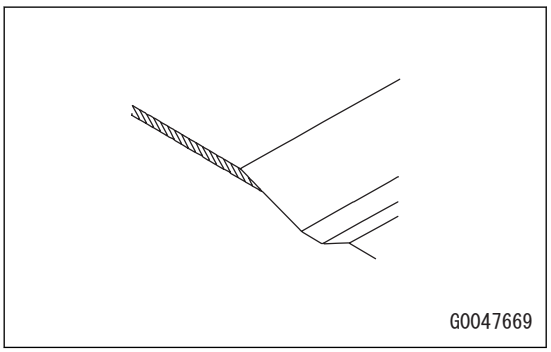
8. Finish the inside slope.



9. Finish the slope finally.



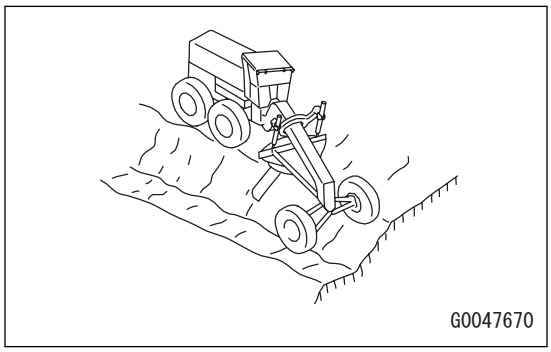
10. Do the grading and finishing.



FINISH WITH GRADER FOR DITCHES WHERE WET ROAD SHOULDER IS LOOSE

Use this method when you want to avoid obstacles for cleaning of an existing ditch such as sagging trees, protruding rocks, or etc.

1. Articulate the machine in order to let the front wheels and blade stay in the ditch. Steer the machine with the front wheels.
2. Keep the rear wheels on the road shoulder. Be careful not to slip on the wet and soft soil and sand in the ditch.



FINISH SLOPE WITH GRADER

⚠ WARNING

- **Understand the machine fully before you operate the machine on a slope where the machine can slip sideways.**
- **Do not articulate the machine fully on a sharp slope.**
- **On a sharp slope, decrease the engine speed and operate the machine at the 1st gear speed.**
- **When you work on a slope, do not use the accelerator to control the machine travel speed.**

BANK CUT ON RIGHT SIDE

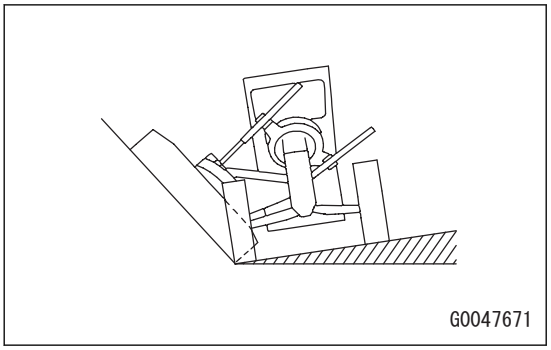
⚠ WARNING

Before you pull out the lifter lock pin, lower the blade to the ground.

The road which is the base of the cutting must be level.

1. When the soil and sand are hard, tilt the road surface just a bit toward the bank.

   Be careful that the machine does not slip sideways from the bank.
2. Set the machine in the bank cutting posture.
3. Extend or retract the R.H. and L.H. blade lift cylinders while you turn the circle to set the machine in the bank slope posture.

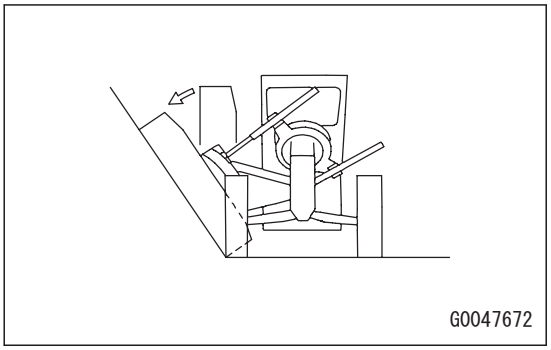


4. Rotate the top of the blade forward toward the high bank position.

   The machine is set in the low bank posture suitable for scraping.

   REMARK

   When the top of the blade is rotated to the rear side, the machine is set in the reverse low bank posture. You can cut the slope and scrape up the soil and sand at the same time in this posture.
   The slope angle must be gradual to scrape up the soil and sand smoothly. Rotate the bottom edge of the blade near to the front wheel. Be careful of interference.

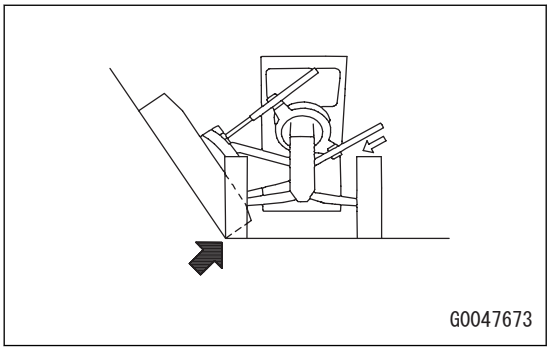


5. Extend the L.H. blade lift cylinder and adjust the front end of the left cutting edge of the blade to be aligned with the outside line of the rear wheel at the base of the slope.

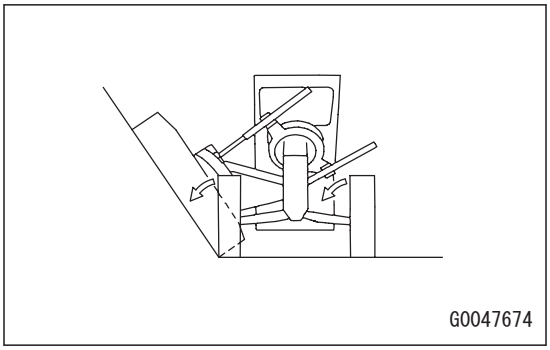
   The rear right wheels must be a V-shape at the base face of the slope.
6. Extend the R.H. blade lift cylinder and adjust the blade to the desired bank slope angle.
7. Do the dozing operation gradually.

   REMARK

   Set the front wheels almost vertically in normal work.



8. For relatively heavy cutting operation, lean the front wheels to the right.

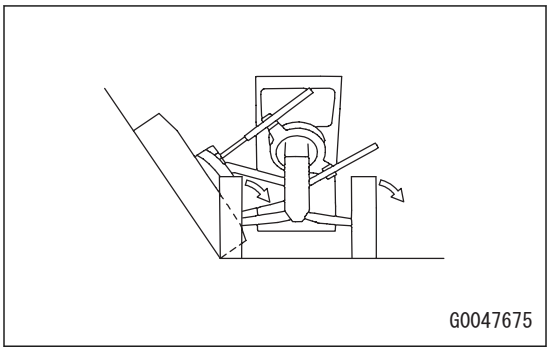


9. For relatively light cutting operation, lean the front wheels to the left.

   Discharge the soil and sand from the slope to the outside of the rear wheels.

   REMARK

   The figure shows the operation for the right side. For the operation for the left side, set the blade opposite to the figure.



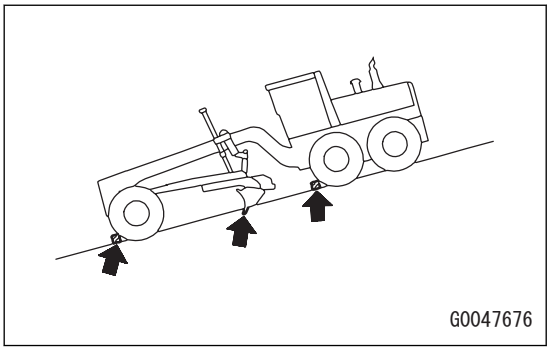
SHOULDER REACH ON RIGHT SIDE

Set the machine in the shoulder reach posture, then start the work.

PARK MACHINE

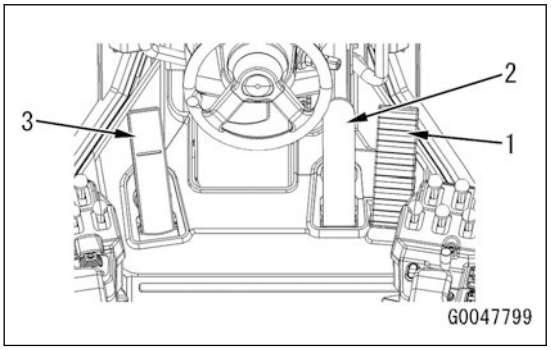
⚠ WARNING

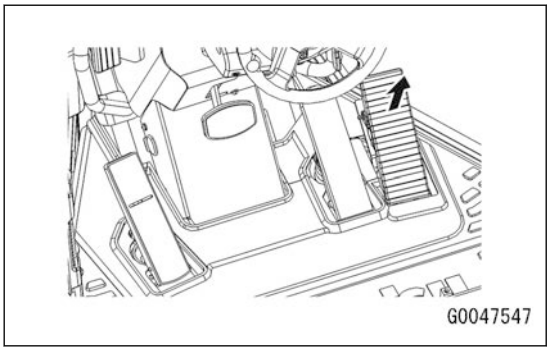
- **Stop the machine gradually. Avoid a sudden stop.**
- **Do not park the machine on a slope.**
  If it is unavoidable to park the machine on a slope, park the machine at a right angle to the slope face, chock the wheels, and then lower the blade to the ground.
- **If you touch the control levers by mistake, there is a possibility that the machine suddenly moves and it could cause serious personal injury or death.**
  Before you stand up from the operator's seat, be sure to let the machine state be as follows.
  - **The work equipment lock switch is in the LOCK position.**
  - **The directional selector switch is in the NEUTRAL position (N).**
  - **When the steering lever enable switch is in the disable position**
  - **The parking brake switch is in the ON position.**
- **There is a danger until the parking brake pilot lamp lights up on the machine monitor even if the parking brake switch is set to the ON position. Keep the brake pedal pushed.**



PARK MACHINE IN MANUAL MODE

1. Release the accelerator pedal (1).



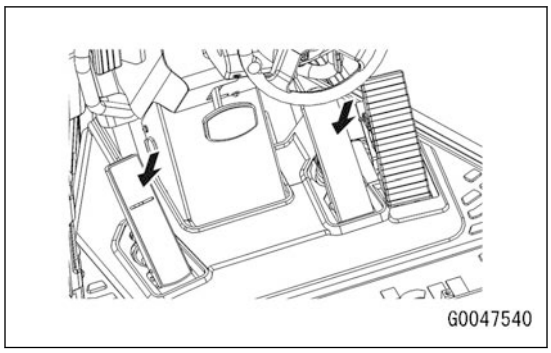


2. Push the brake pedal (2) to reduce the travel speed.
3. Push the inching pedal (3) just before the machine stops.

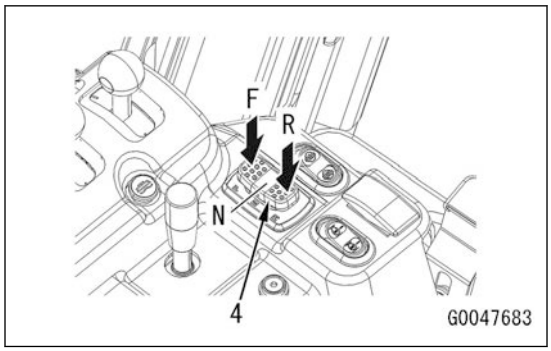
REMARK

The torque converter direct drive control function is installed to the machine.
The engine does not stop if the inching pedal is pushed late, or even if the inching pedal is not pushed.

But, the lockup is automatically cancelled not to stop the engine, and the torque converter mode is selected.
When the machine starts and the engine speed and travel speed increase, the lockup is set again automatically.

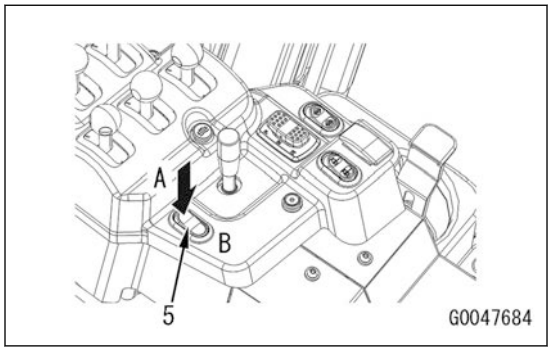


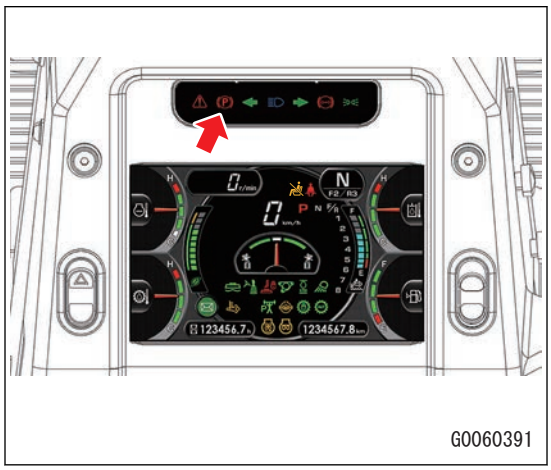
4. Set the directional selector switch (4) to the NEUTRAL position (N).



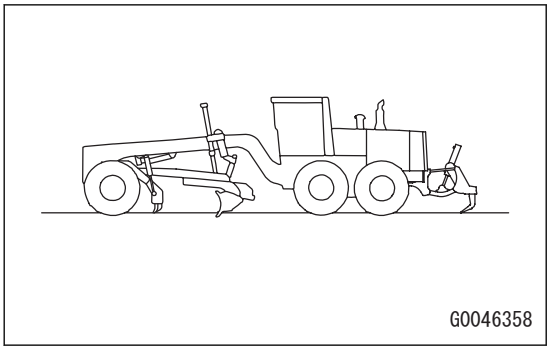
5. Set the parking brake switch (5) to the ON position (A), and apply the parking brake.

   The parking brake pilot lamp lights up at the same time.

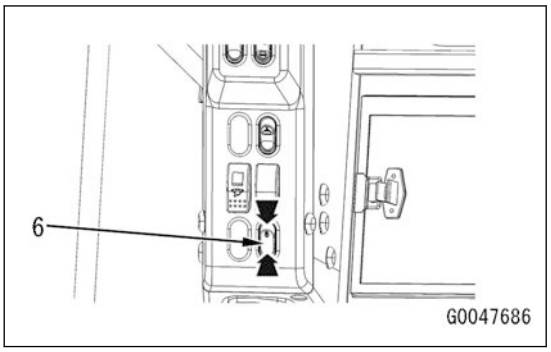




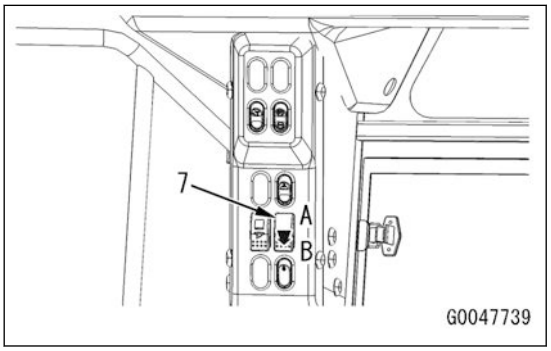
6. Operate the work equipment control lever to lower the blade and ripper (or scarifier) to the ground.



7. Push the work equipment lock switch (6) to lock the work equipment (the pilot lamp lights up).



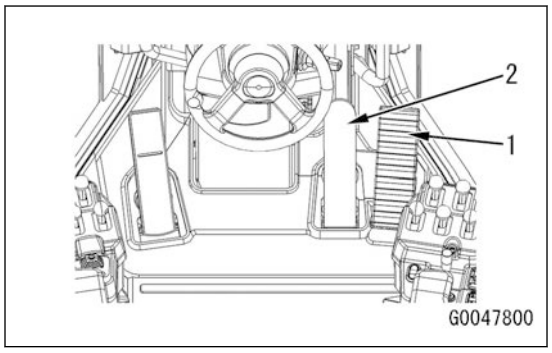
8. Set the steering lever enable switch (7) to the disable position (B).

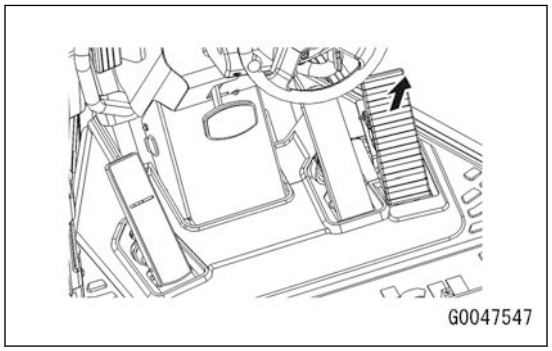


When you get off the machine, keep a space for you to get on or off the machine. Pull the work equipment console lever toward rear of the machine, and raise the steering column fully.

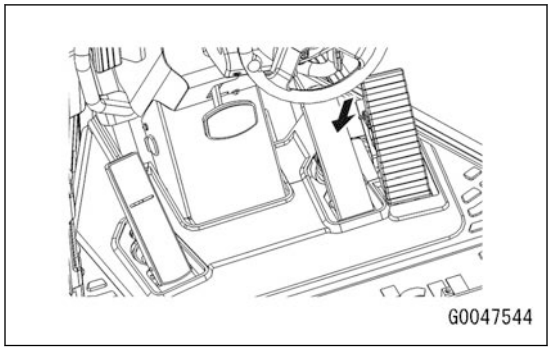
PARK MACHINE IN TORQUE CONVERTER AUTOMATIC MODE

1. Release the accelerator pedal (1).

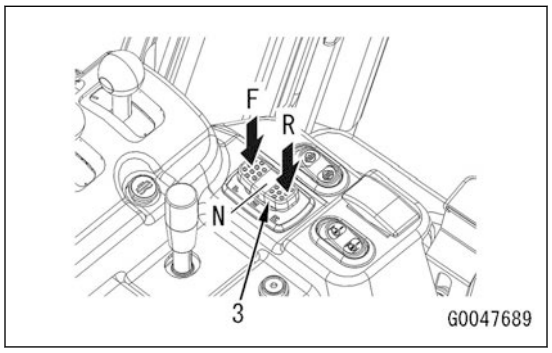




2. Push the brake pedal (2) to stop the machine.

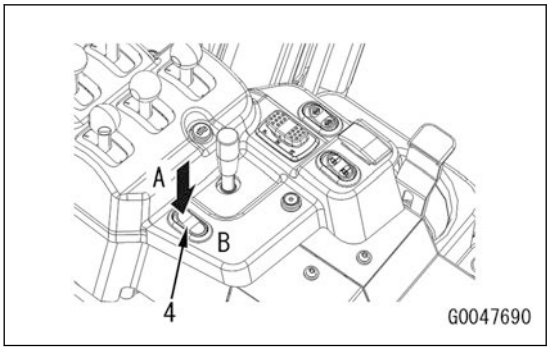


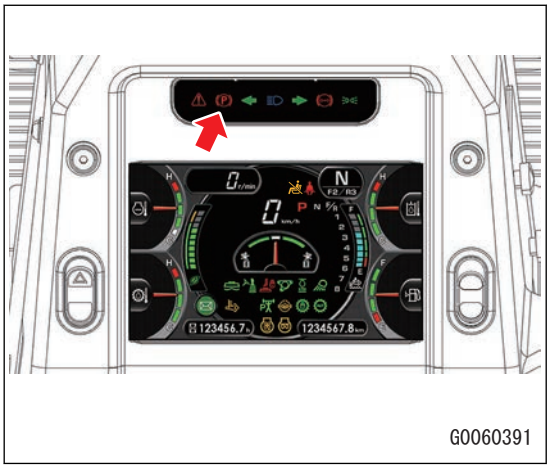
3. Set the directional selector switch (3) to the NEUTRAL position (N).



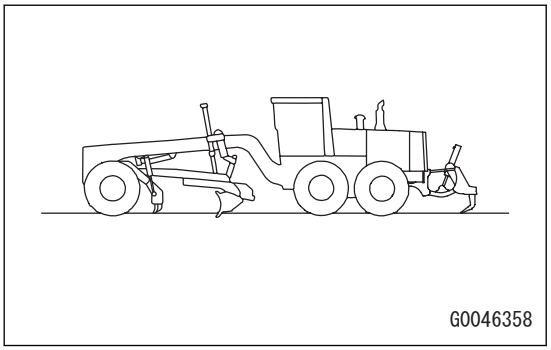
4. Set the parking brake switch (4) to the ON position (A), and apply the parking brake.

   The parking brake pilot lamp lights up at the same time.

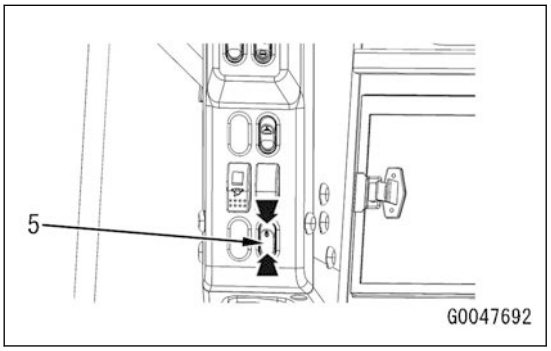




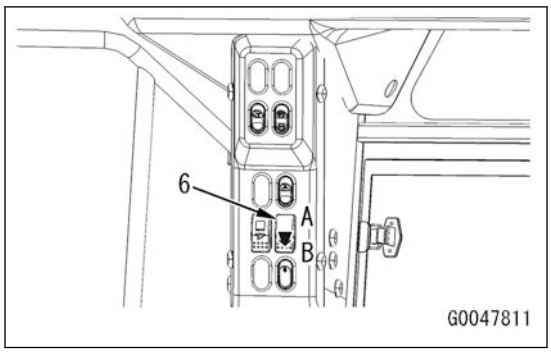
5. Operate the work equipment control lever to lower the blade and ripper (or scarifier) to the ground.



6. Push the work equipment lock switch (5) to lock the work equipment (the pilot lamp lights up).



7. Set the steering lever enable switch (6) to the disable position (B).



When you get off the machine, keep a space for you to get on or off the machine. Pull the work equipment console lever toward rear of the machine, and raise the steering column fully.

CHECK AFTER YOU FINISH WORK

CHECKS BEFORE YOU STOP ENGINE

1. Check the engine coolant temperature, hydraulic oil temperature, torque converter oil temperature, fuel level and DEF level with the machine monitor.
2. If the engine is overheated, do not stop it immediately. Run it at medium speed to cool down gradually, and then stop it.

   If the cooling fan stops when the engine is overheated, stop the engine immediately.

CHECKS AFTER YOU STOP ENGINE

1. Walk around the machine to check for oil or coolant leakage, and check the work equipment, outside the machine, and undercarriage.

   If oil, water leakage or problem is found, repair it.
2. Check the DEF tank, pump, injector, and hose for leakage from the joint parts.

   If a problem is found, consult your Komatsu distributor for repair.
3. Fill up the tank with fuel.
4. Remove the flammable materials such as paper from the engine compartment to prevent fire.
5. Remove mud around the undercarriage.

LOCK

Position to be locked

Be sure to lock the parts that follow.

(1) Cab door (right and left)

(2) Side cover (right and left)

(3) Battery cover

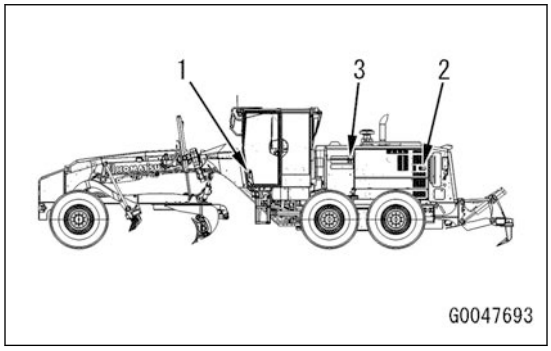
(4) Fuel filler port (left side of machine)

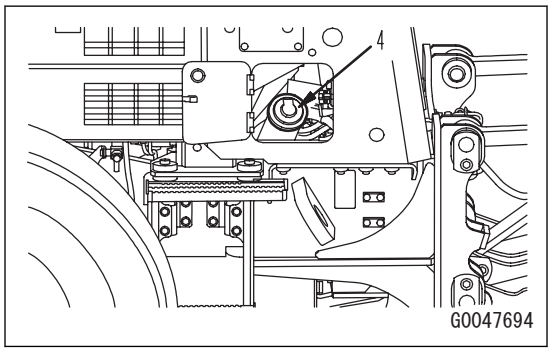
(5) DEF filler port cover (right side of machine)

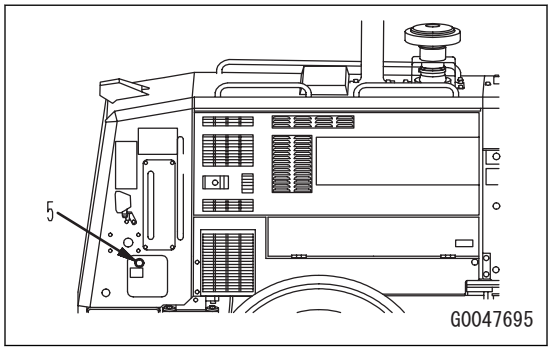
(6) Transmission oil filler port cover (right side of machine)

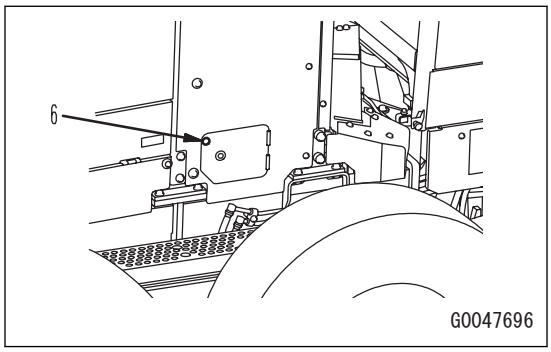
(7) Toolbox

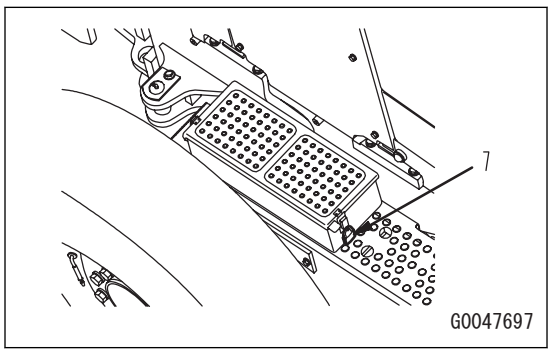
The key of the start switch can also be used as a key of (1) to (6).











OPEN AND CLOSE CAP WITH LOCK

The lock is provided to the fuel tank filler cap.

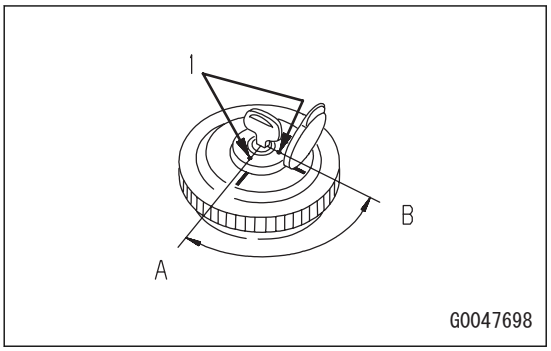
Use the starting switch key to open and close the cap.

OPEN CAP WITH LOCK

1. Insert the key into the key slot.
2. Turn the key clockwise, and align the matching marks (1) of the key groove and the cap to open the cap.

   Position (A): OPEN

   Position (B): CLOSE (LOCK)



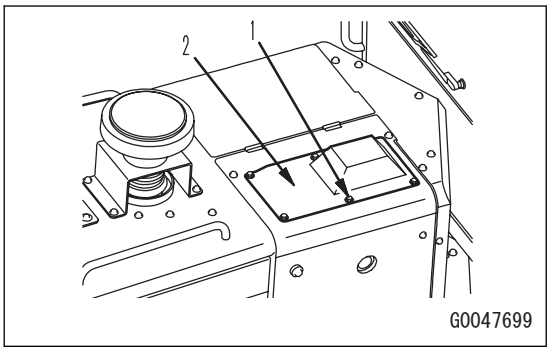
LOCK CAP WITH LOCK

1. Screw in the cap and insert the key into the key slot.
2. Turn the starting switch key to the “LOCK” position (B), and remove it.

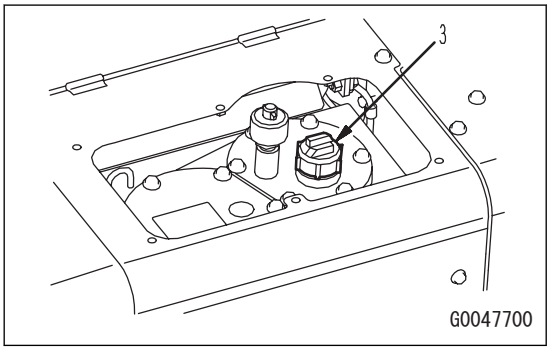
OPEN AND CLOSE HYDRAULIC OIL FILLER PORT CAP

OPEN HYDRAULIC OIL FILLER PORT CAP

1. Remove the bolts (1) (6 pieces) and remove the cover (2).



2. Turn the cap (3) counterclockwise to open it.



LOCK HYDRAULIC OIL FILLER PORT CAP

1. Turn the cap (3) clockwise to close it securely without looseness.
2. Install the cover (2) with the bolt (1).

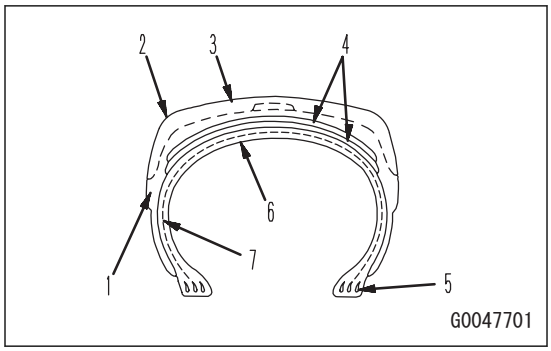
TIRES

PRECAUTIONS WHEN YOU HANDLE TIRES

⚠ CAUTION

If a tire reaches the service limit as shown below, it can be damaged and can cause an accident.
For the safety, replace such a tire with a new one.

- **Service limit for wear**
  - **Tires of which the remaining groove depth (approximately 1/4 of the tread width) reached 15% or below of a new tire**
  - **Tires which have an abnormal wear such as uneven wear or stepped-type wear, or tires of which the cord layer is exposed**
- **Service limit for damage**
  - **Tires which have cracks in the rubber, or tires which damage reached the cord**
  - **Tires of which the cord is cut, or tires which have a dragging**
  - **Tires with peeled (separation) surface**
  - **Tires with damaged bead**
  - **Tubeless tires which have air leakage, or tires which are not repaired correctly**
- **Do not install tires such as urethane tires that are much heavier than the standard tires. The load increases to a level higher than estimated, and the machine can be damaged.**
- **If a tire not specified by Komatsu is used, a displacement can occur between the tire and rim. The operator comfort can also be degraded.**



(1) Side wall
(2) Shoulder
(3) Tread
(4) Breaker or belt (cord layer)
(5) Bead
(6) Inner liner
(7) Cord

When you replace the tires, consult your Komatsu distributor. There is a danger if you jack-up without necessity.

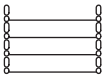
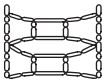
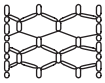
COMBINATION OF SNOW RADIAL TIRE AND CHAIN

NOTICE

If the machine travels on an asphalt road or a concrete road with snow radial tires and chains on them, abnormal vibration can occur because of resonance by the combination of the tire and chain. It will be a cause of crack of the parts and decrease the service life of the machine.
Also, use the rims specified by Komatsu.

Do not apply a combination shown as “Cannot be used” in the table.

Selection and combinations of snow radial tires and chains

		Patterns			
		G lug	Block	Lug	Block
		 G0047705	 G0047706	 G0047707	 G0047708
Tire chains	Ladder type  G0047702	Can be used	Cannot be used	Cannot be used	Cannot be used
	H type  G0047703	Can be used	Can be used	Can be used	Can be used
	Hexagonal pattern type  G0047704	Can be used	Can be used	Can be used	Can be used

AIR CONDITIONER

NOTICE

- **To prevent application of excessive load on the engine or compressor, use the air conditioner only when the engine is running.**
- **Start the engine at low speed always when you do the running-in operation of the air conditioner. Never start the air conditioner while the engine runs at high speed.**
  It will cause a failure of the air conditioner.
- **If water gets into the control panel or sunlight sensor, in some cases, it will cause a failure of the machine. Take care not to splash water on them.**
  Also, do not let the fire get close.
- If there is dust or bad smell in the environment of the machine, use the RECIRC mode.
- If the temperature inside the cab is high when you turn on the air conditioner initially, open the doors and windows to let fresh air in before you use the air conditioner.
- For the air conditioner to show its full performance, take inspection and maintenance periodically. When you add refrigerant or do other maintenance, special tools and instruments are needed. So ask your Komatsu distributor for inspection and maintenance.
- When the air conditioner is not used every day, the film of oil at various parts will be lost. Run the air conditioner with the engine at low speed from time to time and operate cooling or dry heating for several minutes.
- To prevent leakage of the refrigerant from the air conditioner cooling circuit, operate the air conditioner for several minutes 2 or 3 times a month during the off-season. If the refrigerant is left leaked for a long time, rust will occur inside and cause a failure.
- When the temperature inside the cab is low, the air conditioner does not work in some cases. In this case, circulate the recirculation air to warm the inside of the cab. After that, turn the air conditioner switch to the ON position to operate the air conditioner.

Ventilate during cooling

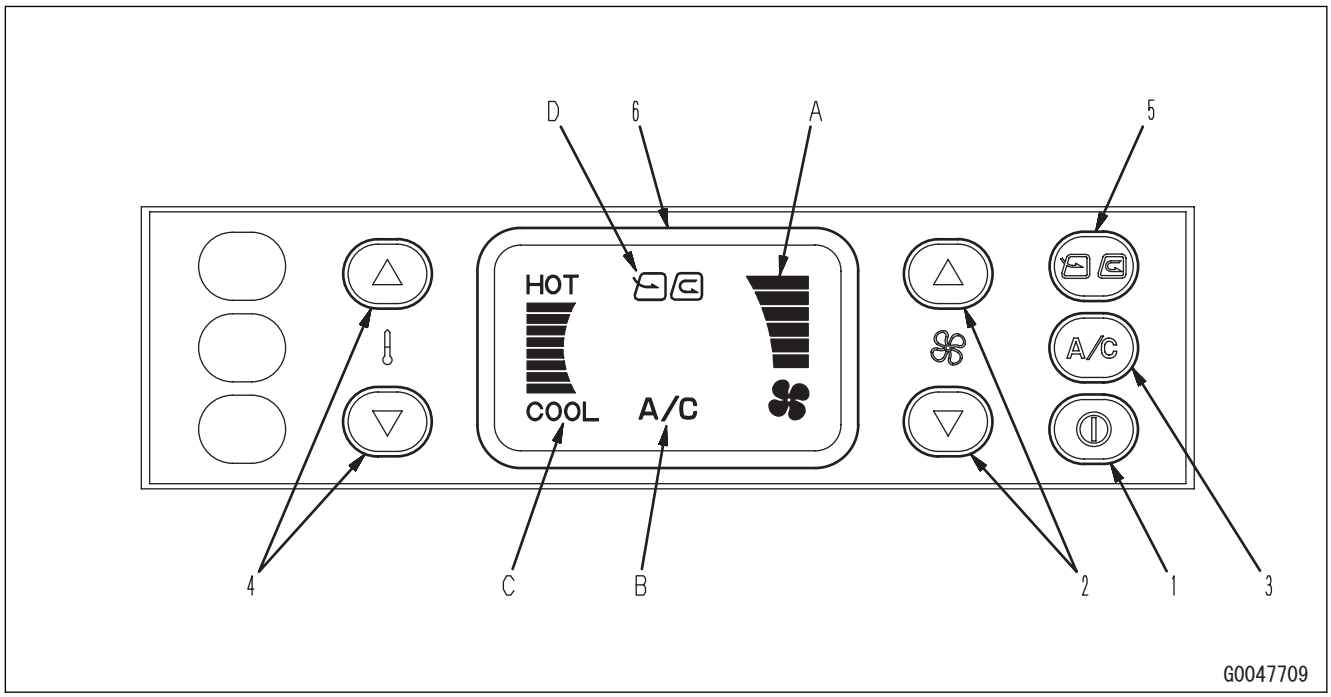
- When you operate the air conditioner for a long time, turn the lever to the FRESH position approximately once an hour for ventilation and cooling operation.
- If you smoke when the air conditioner is operated, the smoke can hurt your eyes. In such case, open the window, and turn the lever to the FRESH position for a while for ventilation and cooling operation to get smoke out.

Be careful not to cool too much

The cooling temperature is optimum for health when you feel moderately cool (5 to 6 °C {9 to 10.8 °F} lower than the ambient temperature) as you go into the cab.

Be mindful to set the appropriate temperature.

AIR CONDITIONER EQUIPMENT



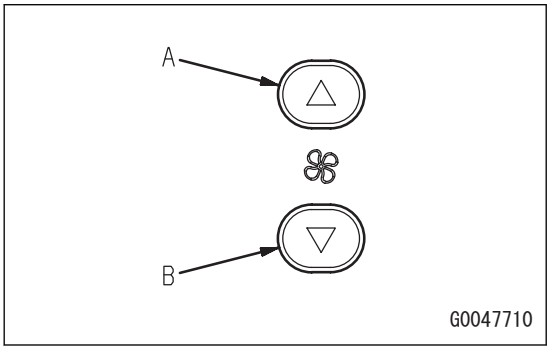
(1) Main power switch
(2) Fan switch
(3) Air conditioner switch
LCD display
(A) Air flow bar
(B) Air conditioner operation symbol
(4) Temperature control switch
(5) FRESH/RECIRC air selector switch
(6) Liquid crystal display (LCD)
(C) Set temperature display
(D) FRESH/RECIRC air selector symbol

FAN SWITCH

Use the fan switch to adjust the air flow from the fan.

You can adjust the air flow to 6 levels.

Push the switch (A) to increase the air flow. Push the switch (B) to decrease the air flow.



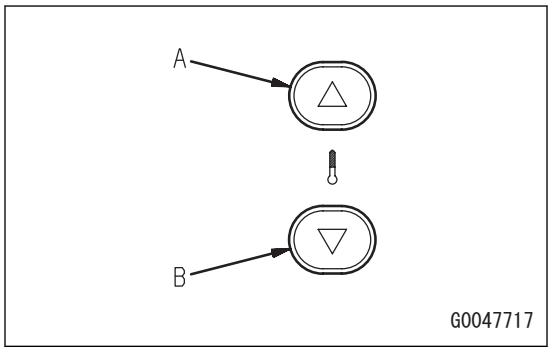
The selected position for the air flow is shown on the LCD.

	Air flow					
	Air flow “low”	Air flow “medium 1”	Air flow “medium 2”	Air flow “medium 3”	Air flow “medium 4”	Air flow “high”
Display on LCD	G0047711	G0047712	G0047713	G0047714	G0047715	G0047716

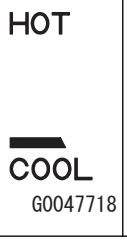
TEMPERATURE CONTROL SWITCH

Temperature control switch is used to adjust the temperature inside the cab.

When the switch (A) is pushed, the output air temperature increases. When the switch (B) is pushed, the output air temperature decreases.



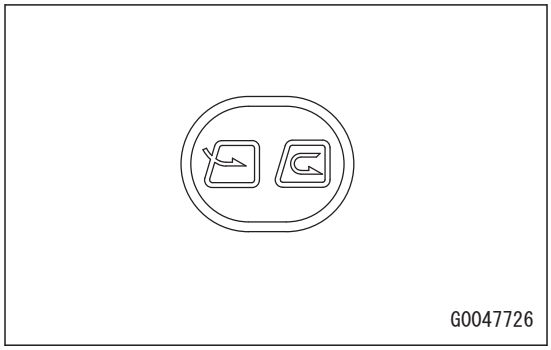
The temperature is shown on the LCD.

	Temperature adjustment setting							
	Maximum cooling	Adjusts the temperature inside the cab to the set temperature.						Maximum heating
Display on LCD	 G0047718	 G0047719	 G0047720	 G0047721	 G0047722	 G0047723	 G0047724	 G0047725

FRESH/RECIRC AIR SELECTOR SWITCH

Use FRESH/RECIRC air selector switch to change the air source between recirculation of the air in the cab and intake of fresh air.

- In the fresh air mode, (A) is lit on the LCD.
- In the recirculation air mode, (B) is lit on the LCD.



RECIRC

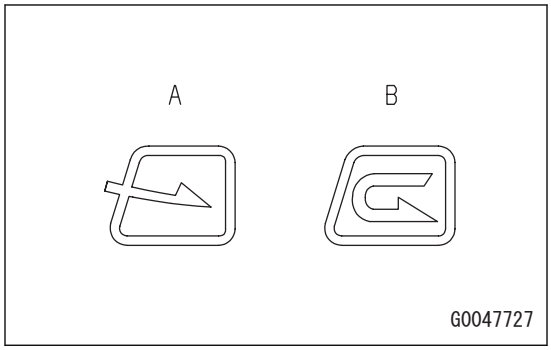
Fresh air is blocked. Only the air in the cab is recirculated.

Use RECIRC when you cool down the cab quickly or when fresh air is contaminated.

FRESH

Fresh air is taken into the cab.

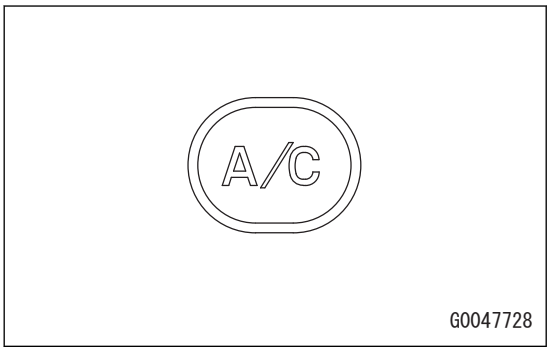
Use FRESH when you introduce the fresh air into the cab or remove fog from cab glass.

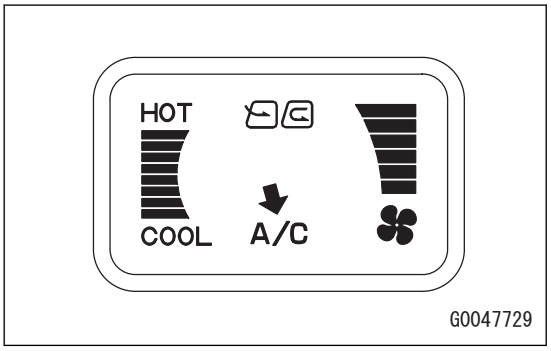


AIR CONDITIONER SWITCH

Use the air conditioner switch to turn on or off the cooling/dry heating function.

- When the air conditioner switch is pushed while the main power switch is turned on, the air conditioner is turned on and the air conditioner operation symbol lights up on the LCD.
- If you push the switch again, it is turned off and the air conditioner operation symbol on the LCD goes off.





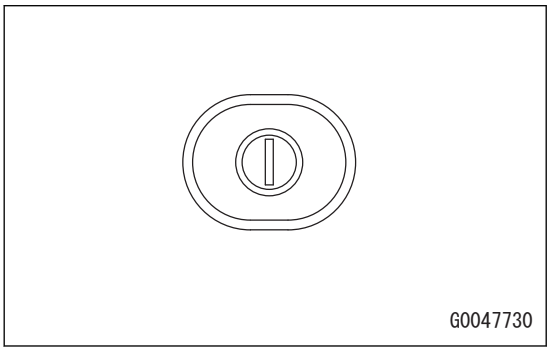
MAIN POWER SWITCH

The main power switch is used to turn on or off the main power for the air conditioner.

When you push the switch, the fan operates.

When you push the switch again, the switch is in the OFF position which stops the fan.

When the switch is turned to the ON position, the fan starts operation with the setting when the switch was turned to the OFF position.

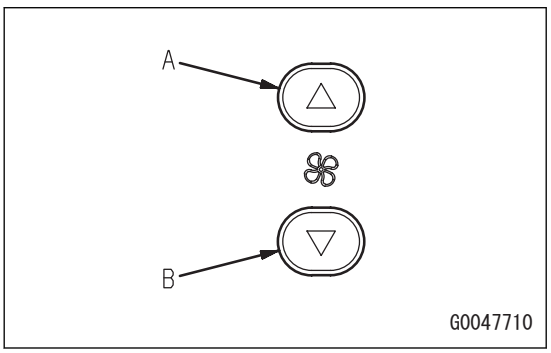


OPERATE AIR CONDITIONER

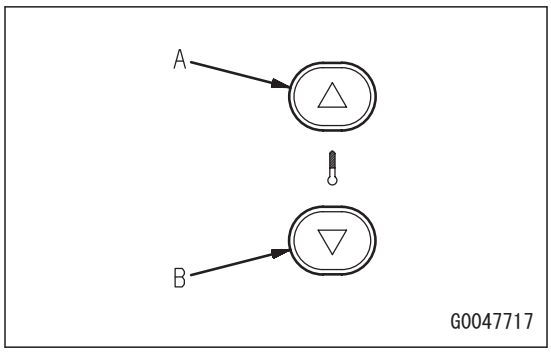
Air conditioning operations include cooling operation, heating operation, dehumidifying heating operation, and mist removal operation. Operate the air conditioner in response to your liking.

USE AIR CONDITIONER

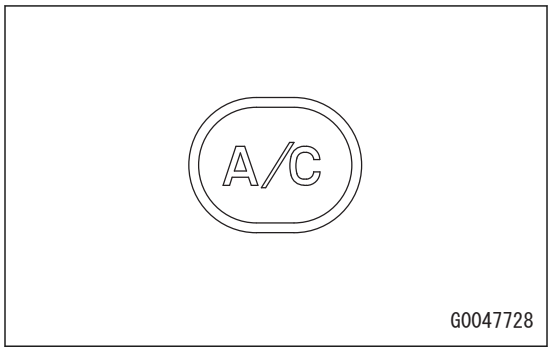
1. Push the fan switch (A), and set the air blow bar on the LCD display to the “High”.



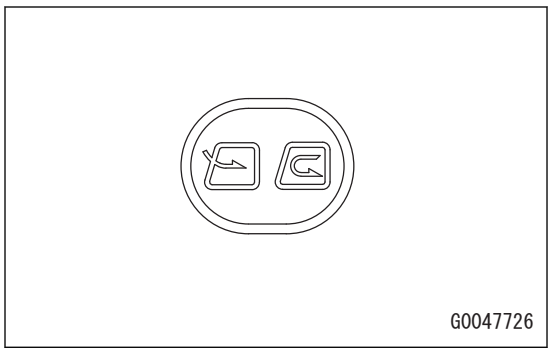
2. Push the temperature adjustment switch (B), and set the temperature setting display on the LCD display to the COOL side.



3. Push the air conditioner switch, and make the air conditioner operation mark light up on the LCD display.



4. Push the FRESH/RECIRC air selector switch, and select recirculation of the air inside the cab (RECIRC).
5. After the temperature in the cab drops, operate the temperature adjustment switch and fan switch to adjust the temperature to a desired level.

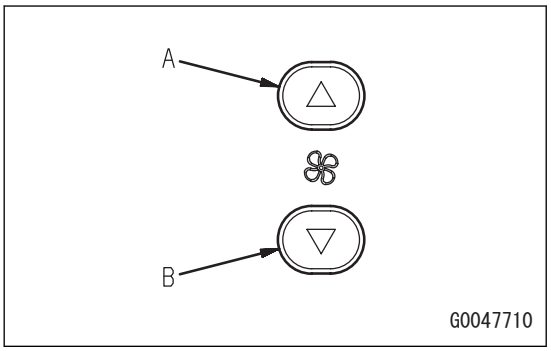


REMARK

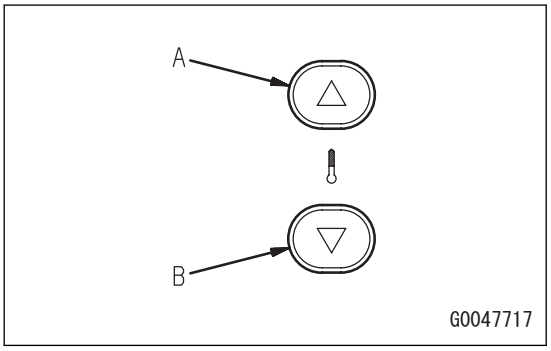
If you operate the air conditioner for a long time with the air flow at “Lo”, the evaporator freezes in some cases, although it is rare when you push the temperature adjustment switch, and set the LCD display to the COOL side.
If cold air does not blow out because the evaporator is freezed, turn the air conditioner switch to the OFF position, set the temperature to HOT, and operate with the air flow at “HI” for a while. Then, turn the air conditioner switch to the ON again.

USE HEATER

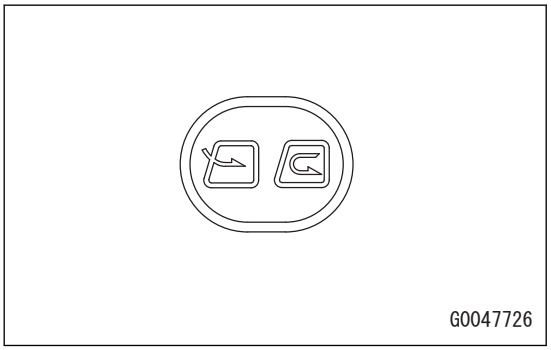
1. Push the fan switch (A), and set the air blow bar on the LCD display to the “High”.



2. Push the temperature adjusting switch (A) to set the temperature shown on the LCD display to HOT.



3. Push the FRESH/RECIRC air selector switch and select the FRESH mode.
4. After the temperature in the cab increases, operate the temperature adjustment switch, fan switch, and FRESH/RECIRC air selector switch to adjust the temperature to a desired level.

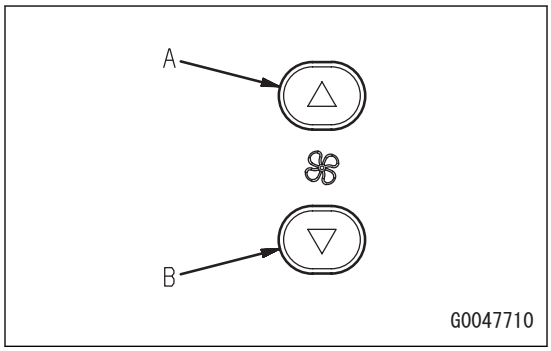


REMARK

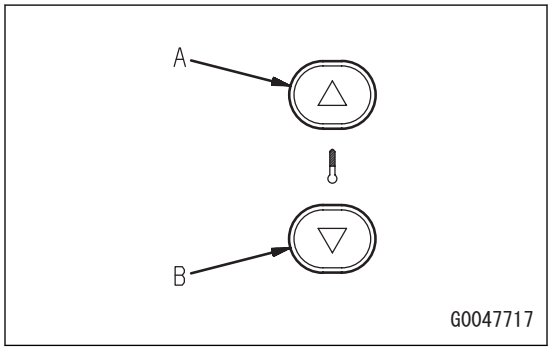
The heating utilizes the heat from the engine cooling water. It is effective only when the cooling water is hot.

USE DEHUMIDIFIER HEATER AND DEMIST

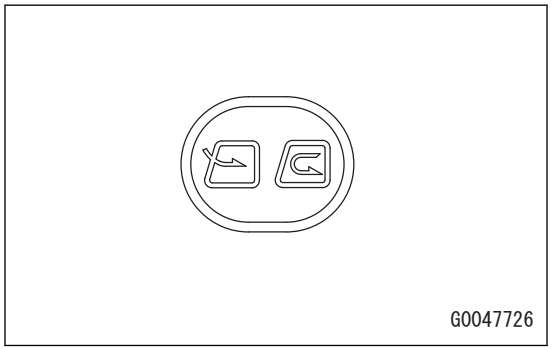
1. Push the fan switch (A) or (B) to adjust the air flow shown on the LCD display.



2. Push the temperature adjusting switch (A) or (B) to adjust the set temperature shown on the LCD display.



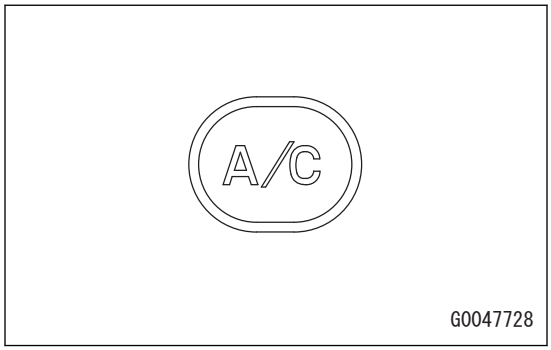
3. Push the FRESH/RECIRC air selector switch and select the FRESH mode.



4. Push the air conditioner switch, and make the air conditioner operation mark light up on the LCD display.

   REMARK

   If the ambient temperature is 0 °C {32 °F} or below, the air conditioner (compressor) cannot work.

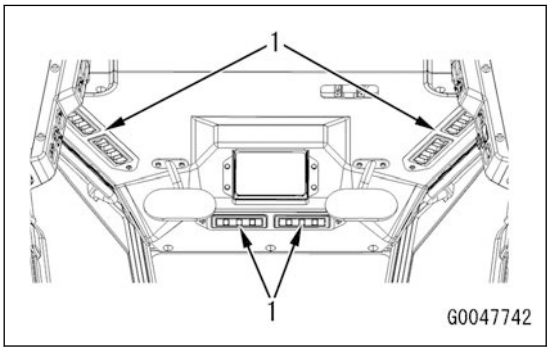


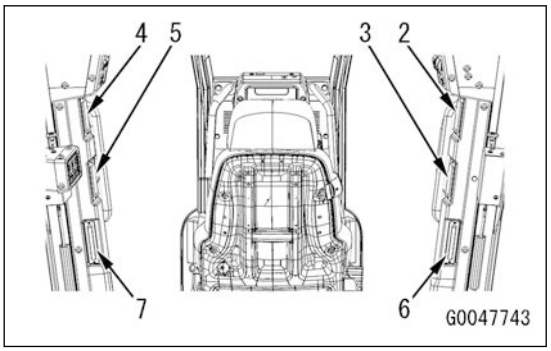
VENT SETTING

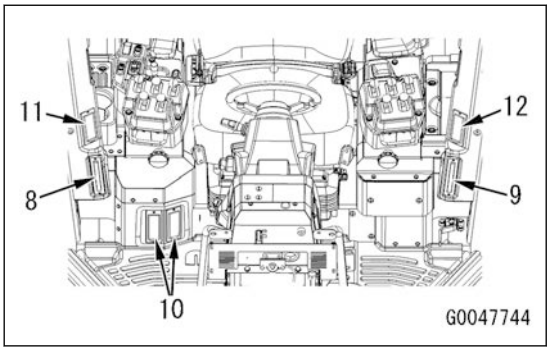
You must set the vent of the air conditioner of the manual air conditioning.

By setting the outlet in response to the application, you can use the air conditioner most efficiently.

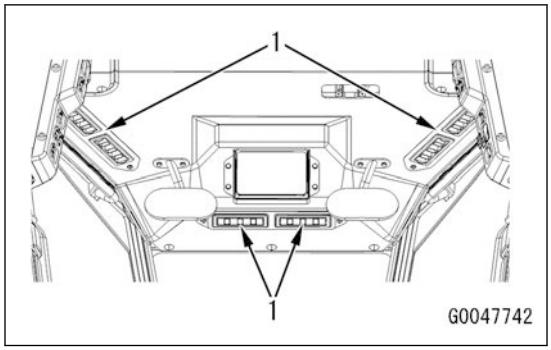
- Setting the vent for heating operation
  1. Open the vents (1) to (12).
  2. Set the vents (11) and (12) downward.

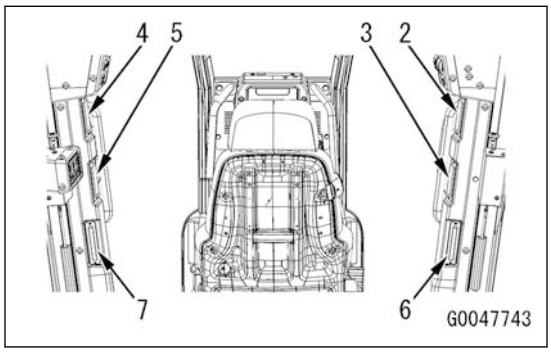


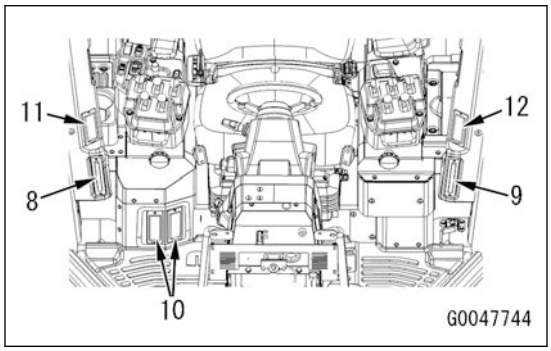




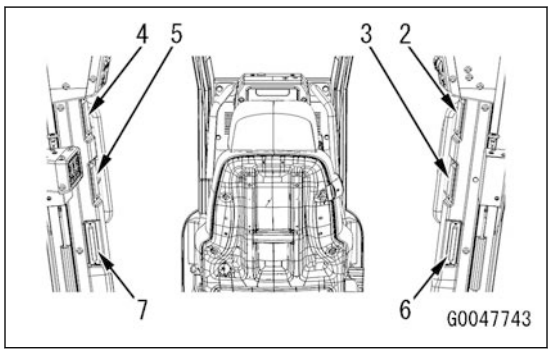
- Setting the vent for defrosting operation
  1. Open the vents (1), and (6) to (9).
  2. Adjust the vents (1), and (6) to (9) to make sure that the air blows onto the window glass.
     If you want to defrost quickly, open the vents (1), (8), and (9) and close other vents.

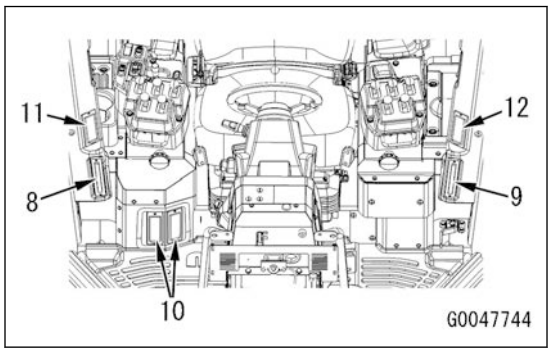






- Setting the vent for cooling operation
  If you want to increase the amount of wind that comes to an operator when using air conditioning, do as follows.
  1. Close the vents (6) to (12).
  2. Adjust the vents (2) to (5) to the optimum direction for operator's comfort.

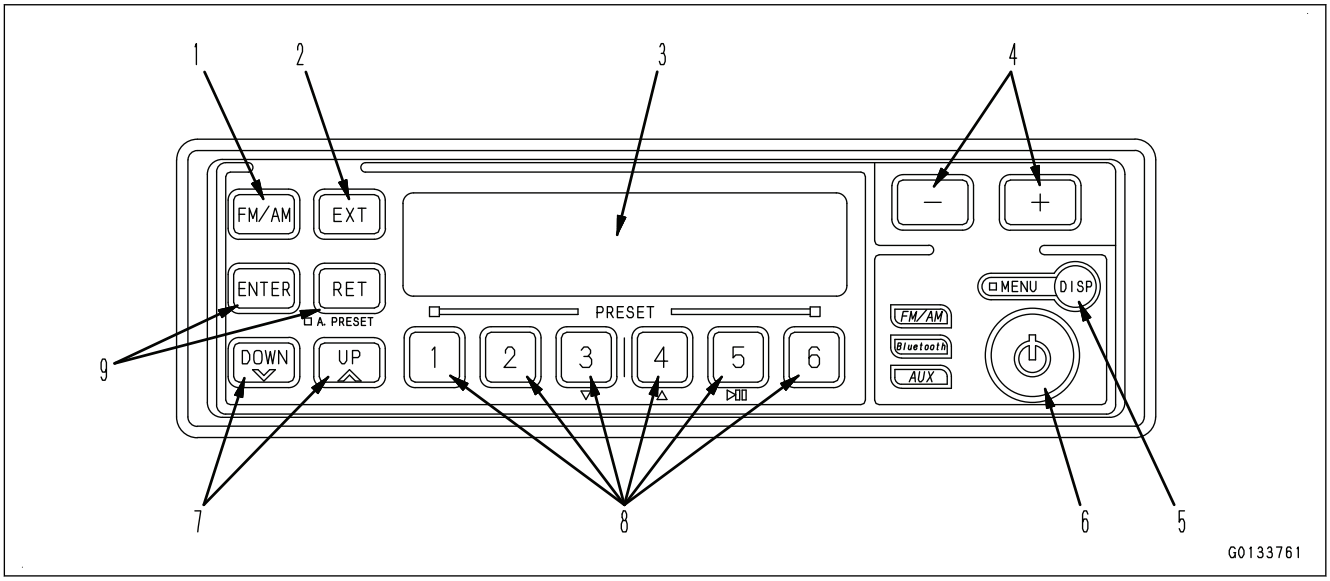




RADIO

- For your safety, adjust the volume to a level where you can hear outside sounds.
- If water goes into the speakers or radio, it can cause a failure. Be sure not to let water touch them.
- Do not wipe the display or switches with solvent such as benzene or thinner. When you clean the display, use clean, dry, and soft cloth. Use a moderate cleaner if necessary.
- When the battery disconnect switch is turned to the OFF position or the power for the machine is turned off for the replacement of the battery, the clock can be initialized. In that case, set the clock again.

RADIO EQUIPMENT



(1) Radio band selector switch
(2) AUX selector switch
(3) Display
(4) Volume control switch
(5) Display selector switch
(6) Power switch
(7) Tuning/time setting switch
(8) Preset/audio switch
(9) Menu switch

RADIO BAND SELECTOR SWITCH

You can select the desired band with the radio band selector switch.

The display changes in the order of FM1, FM2, and AM each time the radio band selector switch is pushed.

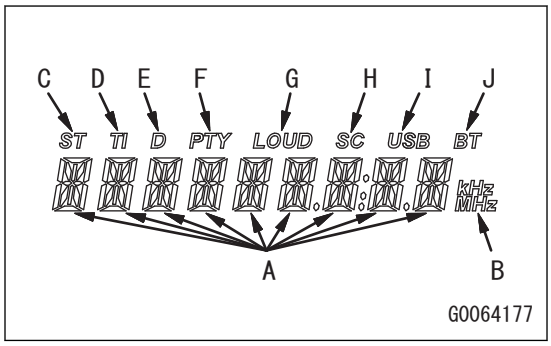
AUX SELECTOR SWITCH

You can select the desired external source with the AUX selector switch.

The display changes in the order of Bluetooth®, AUX each time the AUX selector switch is pushed.

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DISPLAY



You can check the information that follow on the display.

(A) Source name, frequency, and other character/numeric information are shown.

(B) Unit of frequency is shown.

(C) Lights up when a stereo signal is received while FM1 or FM2 is selected.

(D) Not used

(E) Not used

(F) Not used

(G) Lights up when the loudness is set to ON.

(H) Not used

(I) Not used

(J) Lights up when the Bluetooth® connection is active.

VOLUME CONTROL SWITCH

You can adjust the volume with the volume control switch.

The range of the volume is 0 to 32.

Push the (+) switch to increase the volume. Push the (-) switch to decrease the volume.

Hold down the volume control switch to change the volume continuously.

If the volume control switch is not operated for 5 seconds, the screen goes back to the previous screen.

DISPLAY SELECTOR SWITCH

You can change the contents of display with the display selector switch.

The display items changes by the selected source.

When FM1, FM2, or AM is selected

The display changes in the order of the source name, frequency, and clock each time the display selector switch is pushed.

When Bluetooth® connection is selected

The display changes in the order of the Source Name and Clock each time the display selector switch is pushed.

When AUX connection is selected

The display changes in the order of the Source Name and Clock each time the display selector switch is pushed.

POWER SWITCH

Use the power switch to turn on or off the radio.

The radio turns on or off each time the power switch is pushed.

When the radio is turned on, the selected source is shown on the display.

When the radio is turned off, the clock is shown.

TUNING/TIME SETTING SWITCH

Use the tuning/time setting switch to do operations as follows.

- Selection of radio frequency
- Clock setting
- Sound adjustment
- Selection of each setting menu

PRESET/AUDIO SWITCH

When the radio source is selected

You can preset and select the radio station by the preset/audio switch.

It is possible to preset 6 stations each for AM, FM1, and FM2.

If you preset the desired radio stations, you can easily select each station with the switch.

When the external source is selected

You can control the audio device with the preset/audio switch.

MENU SWITCH

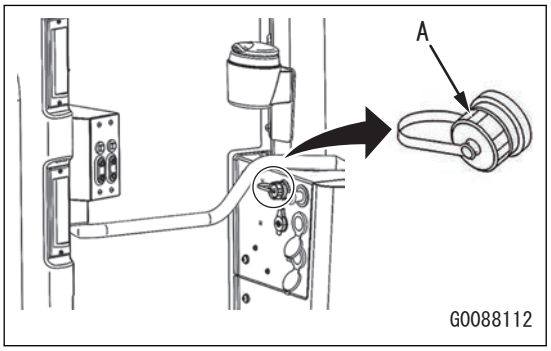
With the menu switch, you can enter each setting and go back to the menu selection.

USB TERMINAL FOR CHARGE

You can use the A-type of USB connector for the charging.

You can charge a smartphone and such with it.

Open the cap (A) at the position shown in the diagram. Connect the device.



Bluetooth®

By the pairing of the Bluetooth® audio player, you can connect the radio and play the music files.

For details, see “PAIRING (3-322)”.

The Bluetooth® profiles below are supported.

- A2DP
- AVRCP

In some versions of the Bluetooth®, connection cannot be done.

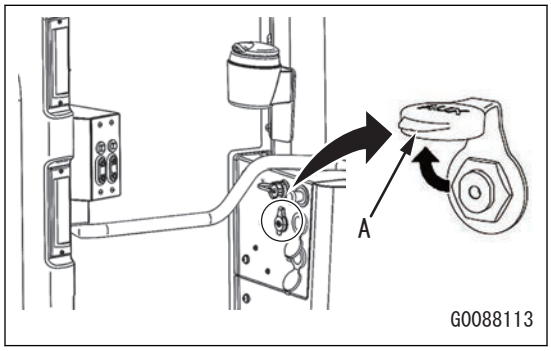
Even if the Bluetooth® profile of the equipment is supported, the Bluetooth® connection cannot be done, or the display and actuation could be different by the characteristics and specifications of the destination equipment.

AUX

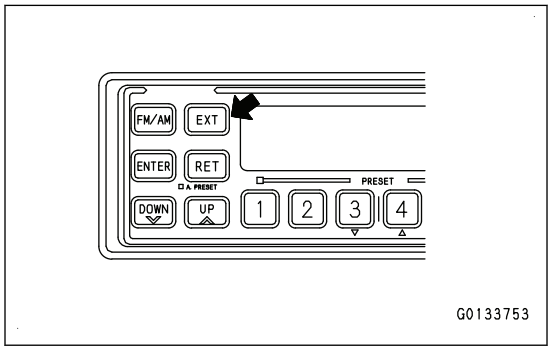
NOTICE

- **You can connect a stereo miniature plug into AUX. Read the instruction manual of the device to connect.**
- **As a power source for the device to connect, use the battery supplied with that device.**
- **It is possible that you hear the noise in the cases that follow.**
  - **If you use an electric power supply installed to the machine**
  - **If you pull out the input plug while AUX is selected**
  - **When the plugs of the equipment to connect is pulled out or pushed in**

Open the cap (A) and connect the external device.



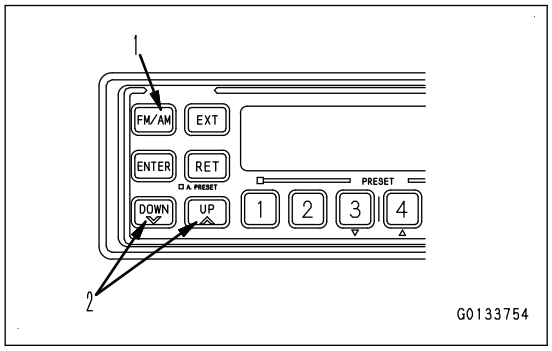
When AUX is selected with the AUX selector switch, you can hear the sound of the external device through the speaker of the machine.



OPERATE RADIO

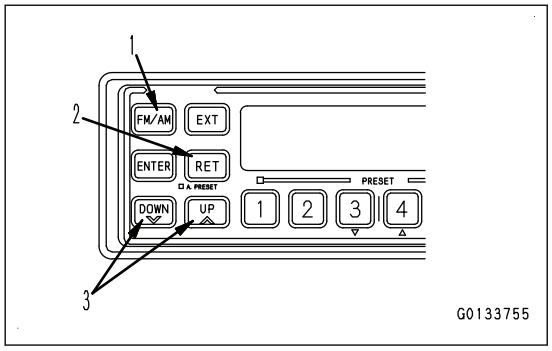
OPERATE RADIO WHEN YOU LISTEN

ADJUST FREQUENCY



1. Push the radio band selector switch (1) and select FM1, FM2, or AM.
2. Push the tuning/time adjustment switch (2) to adjust the frequency.
   - Push the UP switch to increase the frequency.
   - Hold down the UP switch to increase the frequency continuously.
     When the UP switch is released at this state, the tuning stops automatically at the frequency in good reception.
   - Push the DOWN switch to decrease the frequency.
   - Hold down the DOWN switch to decrease the frequency continuously.
     When the DOWN switch is released at this state, the tuning stops automatically at the frequency in good reception.

AUTO PRESET SETTING

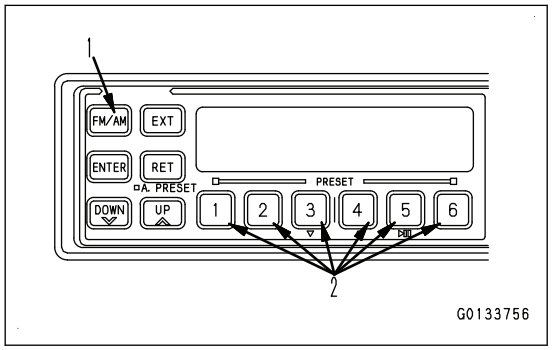


1. Push the radio band selector switch (1) and select FM1, FM2, or AM.
2. Hold down the RET switch (2) on the menu switch.

   Push the tuning/time setting switch (3) to cancel the sensing.

   When a frequency in good reception is sensed, it is automatically registered to preset memories 1 to 6.

LOAD PRESET



1. Push the radio band selector switch (1) and select FM1, FM2, or AM.
2. Push one of the 1 to 6 switches of the preset/audio switch (2).

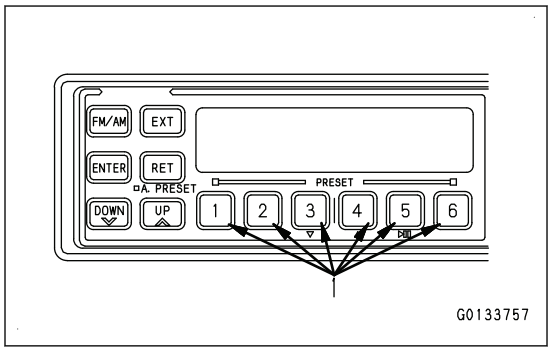
   The frequency registered in the preset number is called up and received.

   The preset number which is received and the frequency are shown on the display.

PRESET STATION

Hold down one of 1 to 6 of the preset/audio switches (1) during radio reception.
The preset number flashes 3 times, then the currently received frequency is shown.

The currently received frequency is registered to the selected preset number.



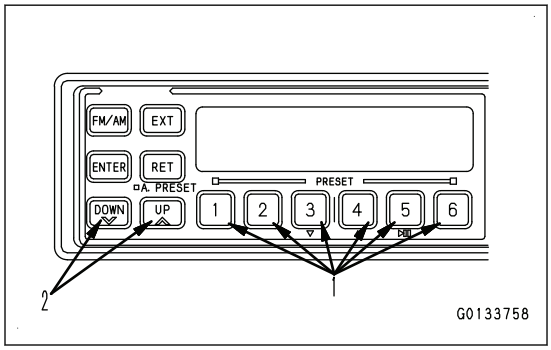
PLAY MUSIC WITH Bluetooth® CONNECTED

The situations that follow can occur by the device to connect or by the version of the Bluetooth®.

- Operation method is different.
- Action is different.
- Music cannot be played.

Do the pairing (Bluetooth® device authentication) to do the Bluetooth® connection.

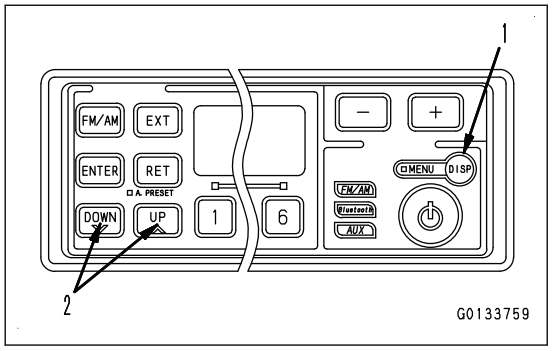
For details, see “PAIRING (3-322)”.



When you do the Bluetooth® connection, operate it as follows.

- Push the 5 of the preset/audio switch (1) to play back or pause.
  The current track is played back or paused.
- Push the tuning/time setting switch (2) to move the track.
  The track moves.
- When you do the operations that follow, operate from the connected playback device.
  - Move folder
  - Change playback mode (Repeat or Random)

RADIO SETTING



1. Hold down the display selector switch (1) to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (2) to select the setting items.

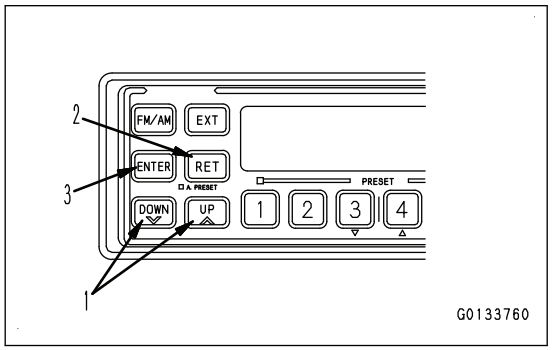
   The setting items are different when the power supply is turned ON or OFF.

   - When the power supply is turned ON, the display changes in the order of Sound Balance adjustment, Treble adjustment, Bass adjustment, Loudness adjustment, Clock adjustment, Pairing (Bluetooth® device authentication), Destination display, and Version display.
   - When the power supply is turned OFF, the display changes in the order of Clock adjustment, and Pairing (Bluetooth® device authentication).

SOUND BALANCE SETTING

You can adjust the ratio of the right and left sound which is outputted from the speaker.

The default value is 0.



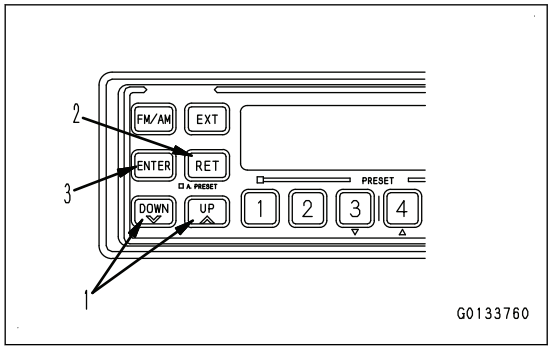
1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select the BALANCE.
3. Push the ENTER (3) on the menu switch while the BALANCE is shown.

   You can adjust the sound balance.
4. Push the tuning/time setting switch (1) to adjust the sound balance.
   - When the UP switch is pushed, the speaker output on the R side increases by 1.
     You can select from R1 to R10.
   - When the DOWN switch is pushed, the speaker output on the L side increases by 1.
     You can select from L1 to L10.
   - Push the RET (2) on the menu switch to go back to the previous step.
5. Push the ENTER (3) on the menu switch to validate the adjusted value.

HIGH REGISTER RANGE (TREBLE) SETTING

You can adjust the sound quality of the treble part which is outputted from the speaker.

The default value is 0.



1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select the TREBLE.
3. Push the ENTER (3) on the menu switch while the TREBLE is shown.

   You can adjust the level of high register range.
4. Push the tuning/time setting switch (1) to adjust the level of high register range.
   - When the UP switch is pushed, the treble level increases by 1.

The maximum value is +10.

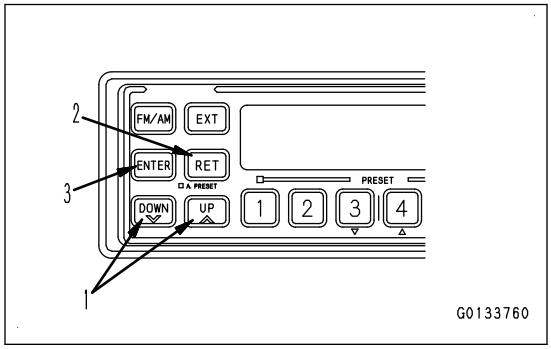
- When the DOWN switch is pushed, the treble level decreases by 1.
  The minimum value is -10.
- Push the RET (2) on the menu switch to go back to the previous step.

5. Push the ENTER (3) on the menu switch to validate the adjusted value.

LOW REGISTER RANGE (BASS) SETTING

You can adjust the sound quality of the bass part which is outputted from the speaker.

The default value is 0.



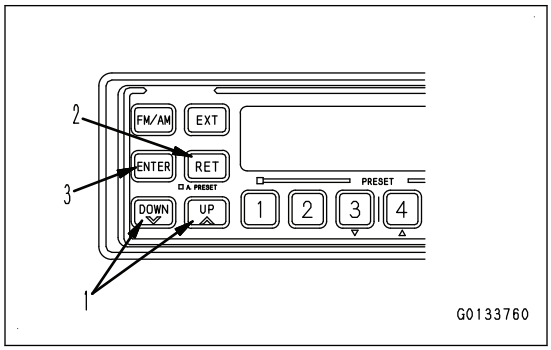
1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select BASS.
3. Push the ENTER (3) on the menu switch while the BASS is shown.

   You can adjust the level of low register range.
4. Push the tuning/time setting switch (1) to adjust the level of low register range.
   - When the UP switch is pushed, the bass level increases by 1.
     The maximum value is +10.
   - When the DOWN switch is pushed, the bass level decreases by 1.
     The minimum value is -10.
   - Push the RET (2) on the menu switch to go back to the previous step.
5. Push the ENTER (3) on the menu switch to validate the adjusted value.

LOUDNESS SETTING

You can increase the low register range and high register range when the sound volume is low.

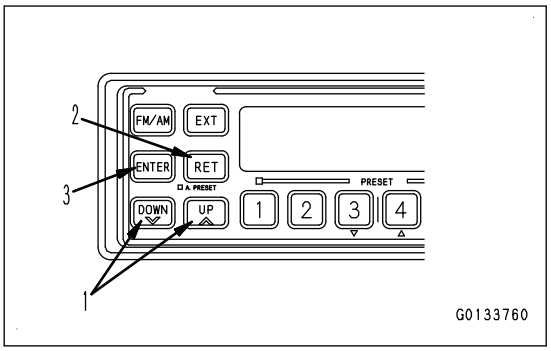
The default value is the OFF.



1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select the LOUDNESS.
3. Push the ENTER (3) on the menu switch while the LOUDNESS is shown.

   The loudness setting is available.
4. Push the tuning/time setting switch (1), and change the ON and OFF of the loudness setting.
   - When the loudness setting is the ON, the low register range and high register range are increased.
   - When the loudness setting is the OFF, the low register range and high register range are not increased.
   - Push the RET (2) on the menu switch to go back to the previous step.
5. Push the ENTER (3) on the menu switch to validate the adjusted value.

CLOCK SETTING



1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select the CLOCK.
3. Push the ENTER (3) on the menu switch while the CLOCK is shown.
4. Select 12-hour mode or 24-hour mode with the tuning/time setting switch (1), and push the RET (3) on the menu switch.

   Push the RET (2) on the menu switch to go back to the previous step.

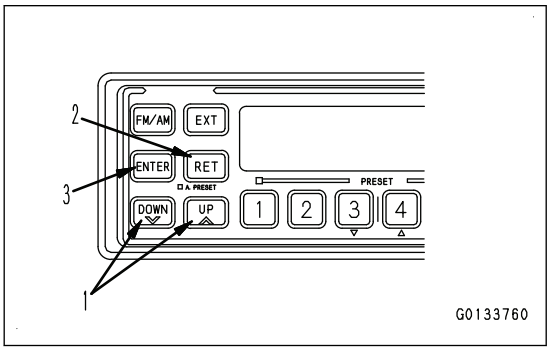
   The clock setting is available.
5. Push the tuning/time setting switch (1) to adjust the hour.
   - When the UP switch is pushed, “HOUR” display increases by 1.
   - When the DOWN switch is pushed, “HOUR” display decreases by 1.
   - Push the RET (2) on the menu switch to go back to the previous step.
6. Push the ENTER (3) on the menu switch.

   You can adjust the minute display.
7. Push the tuning/time setting switch (1) to adjust the minute.
   - When the UP switch is pushed, “MINUTE” display increases by 1.
   - When the DOWN switch is pushed, “MINUTE” display decreases by 1.
   - Push the RET (2) on the menu switch to go back to the previous step.
8. Push the ENTER (3) on the menu switch to validate the time.

PAIRING

It is an authentication of the Bluetooth® device which is used on this machine.

The maximum registration of the pairing is 16. From the 17th and after, the oldest information is overwritten by the newest one. If the information was overwritten and you cannot connect it, do the pairing again.



1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select the PAIRING.
3. Push the ENTER (3) on the menu switch while the PAIRING is shown.

   The PUSH ENT is shown.
4. Push the ENTER (3) on the menu switch.

   The WAIT is shown.

   When the preparation is finished, the pass key (4 digits) and the serial number of the Bluetooth® on radio side is shown alternately.
5. Do the pairing on the side of the device to connect, in this state.

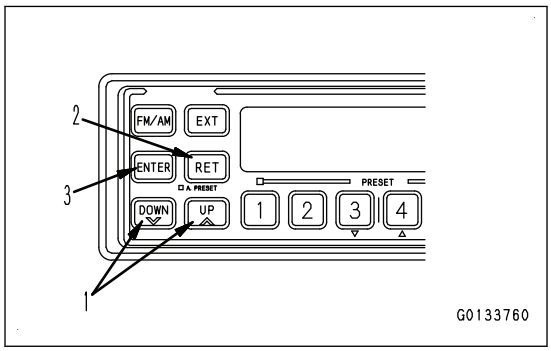
   For the operation, obey the instruction manual of the device to connect.

   In some cases, a pass key can be required by the device to be connected. At that time, input the pass key which is shown on the radio.
   - When the pairing is done successfully, the PAIR OK is shown.
   - When the pairing is failed, the PAIR NG is shown.
   - If there is no response for 180 seconds, the TIMEOUT is shown.

6. Push the RET (2) on the menu switch and go back to the menu screen.
   If the PAIR NG or TIMEOUT is shown, do the procedure from the start again.

CHECK PRESET REGION OF RADIO

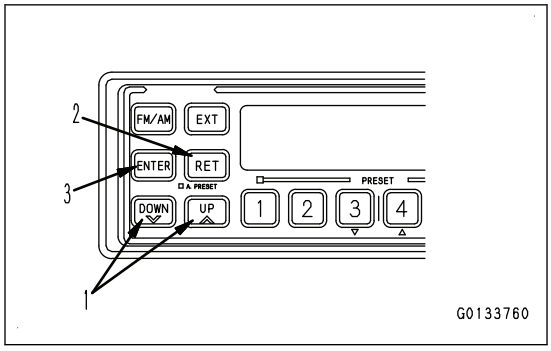
You can check the region of the radio frequency band.



1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select the REGION.
3. Push the ENTER (3) on the menu switch while the REGION is shown.
   The set value of the region is shown.
   The main regions are as follows.
   - JP: For Japan
   - AE: For Europe, Asia, Oceania
   - SA: For North America, Central and South America
4. Push the RET (2) on the menu switch and go back to the menu screen.

CHECK VERSION OF RADIO

You can check the version of radio.



1. Hold down the display selector switch to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (1) and select the VERSION.
3. Push the ENTER (3) on the menu switch while the VERSION is shown.
   The version is shown.
4. Push the RET (2) on the menu switch and go back to the menu screen.

TRANSPORTATION

SELECT TRANSPORTATION METHOD

When you transport the machine, select the transportation method in reference to the machine weight and dimensions.

“SPECIFICATIONS” (weight and dimensions) is different by the type of tire and bucket.

PRECAUTIONS WHEN YOU TRANSPORT MACHINE

LOAD AND UNLOAD A TRAILER

⚠ WARNING

- **When you load or unload the machine on the trailer, lower the engine speed, set the speed to the 1st, and operate slowly.**
- **Select a flat and firm ground to load or unload the machine.**
  Maintain a safe distance from the road shoulder.
- **Use ramps with ample width, length, thickness, and strength and install them correctly with a maximum slope of 15 °.**
  When you use piled soil for the platform, compact the piled soil fully to prevent the collapse of the slope face.
- **Remove mud, etc. from the undercarriage of the machine for the machine not to slip sideways on the ramps.**
  In addition, remove water, snow, ice, grease, oil, etc. from the ramps.
- **Never change the steering direction on the ramps. There is danger that the machine tips over.**
  If necessary, drive off the ramps or back on to the trailer and correct the direction.
- **The center of gravity of the machine shifts suddenly at the joint between the ramps and the trailer, and the machine becomes unbalanced, and it is dangerous. Drive the machine slowly.**

When you load or unload the machine, be sure to use ramps or platform, and follow the procedure shown below.

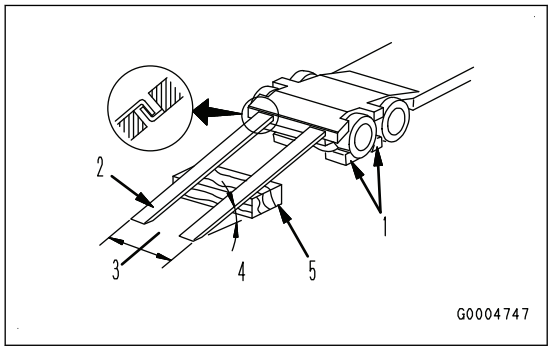
PROCEDURES FOR LOADING MACHINE

Do the loading of machine on a flat and hard ground.

Keep a sufficient distance from the road shoulder.

1. Apply the brake of trailer securely.
2. Set chocks (1) in front of and behind the tires to fix the trailer.
3. Put the right and left ramps (2) parallel and to be at the equal distance from the center (3) of platform, and fix the installation angle (4) at maximum of 15 °.

   If the ramps bend largely by the weight of the machine, put the wooden blocks (5) below the ramps to prevent bending.
4. Set the travel direction toward the ramps and drive slowly to load the machine.
5. Load the machine correctly in the specified position on the trailer.



REMARK

- You can load and unload the machine easily if you rotate the blade from the travel posture position to the maximum lifting position.
- For the easy loading, if the ripper tooth is an obstacle for the loading, remove it or install it to let it face upper inside.

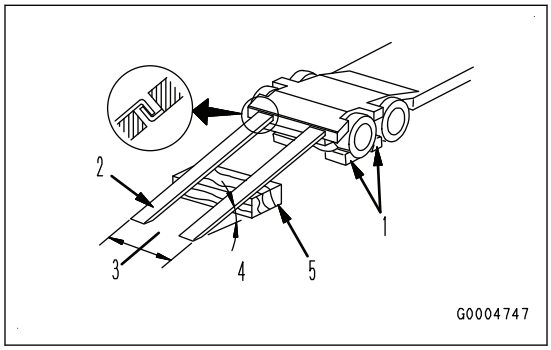
PROCEDURES FOR UNLOADING MACHINE

Do the unloading of machine on a flat and hard ground.

Keep a sufficient distance from the road shoulder.

1. Apply the brake of trailer securely.
2. Set chocks (1) in front of and behind the tires to fix the trailer.
3. Put the right and left ramps (2) parallel and to be at the equal distance from the center (3) of platform, and fix the installation angle (4) at maximum of 15 °.

   If the ramps bend largely by the weight of the machine, put the wooden blocks (5) below the ramps to prevent bending.



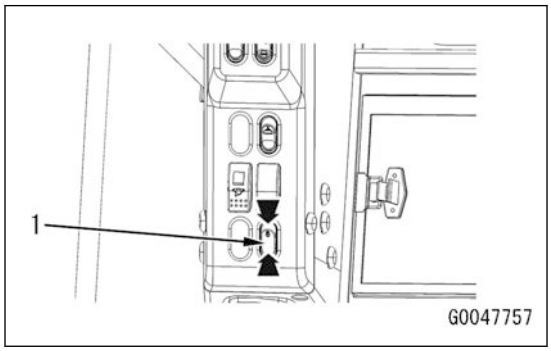
4. Remove the chains or wire ropes which fixed the machine.
5. Start the engine.

   In a cold weather, be sure to do the warm-up operation fully.
6. Check that the work equipment control lever is in the HOLD position.
7. Set the travel direction toward the ramps and drive slowly to unload the machine.

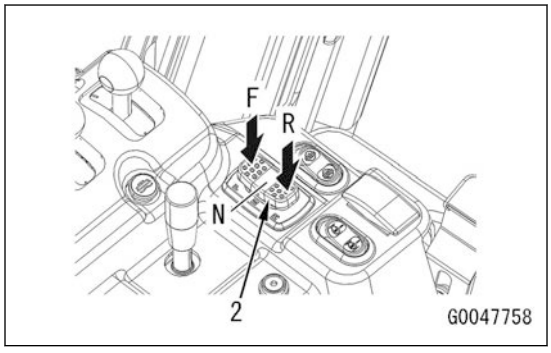
SECURE MACHINE

After you load the machine in the specified position, secure the machine as follows.

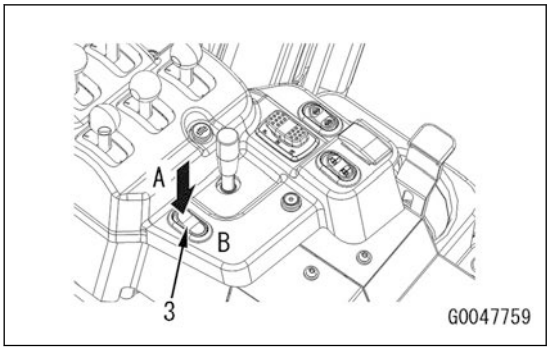
1. Lower the work equipment gently.
2. Push the work equipment lock switch (1) to lock the work equipment (the pilot lamp lights up).



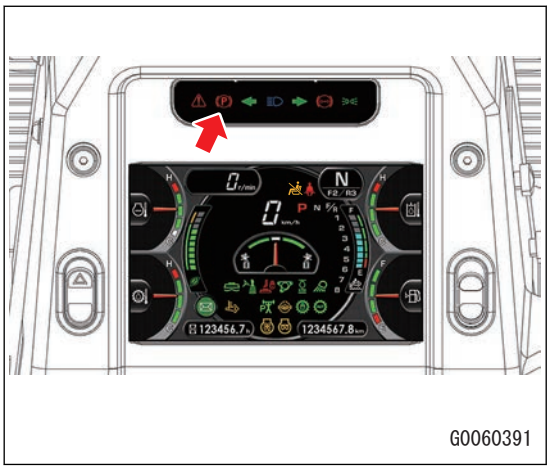
3. Set the directional selector switch (2) to the NEUTRAL position (N).



4. Set the parking brake switch (3) to the ON position (A), and apply the parking brake.



The parking brake pilot lamp is lit.



5. Turn the starting switch key to the OFF position, and stop the engine.
6. Remove the starting switch key.
7. Lock the front frame and rear frame with articulation lock pin.
8. Put wooden blocks on the front and rear sides of the tires, to make sure that the machine does not move during transportation, and secure the machine with chains or wire ropes of suitable strength.

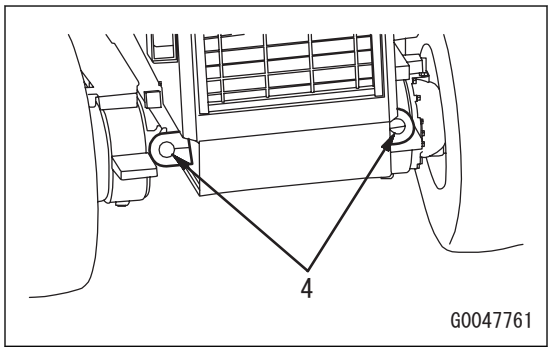
   In particular, fix it securely to make sure that it does not slip sideways.

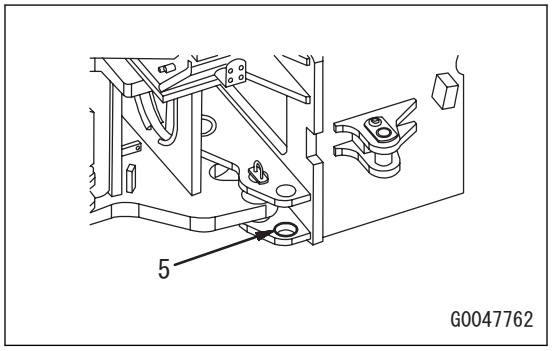
   NOTICE

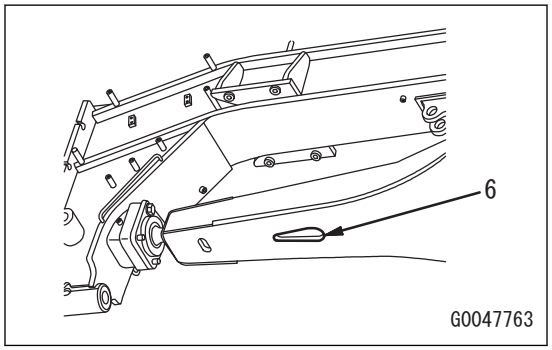
   Always retract the antenna, etc.
   Reassemble the mirrors to make sure that they are within the width of the machine.

REMARK

You can use the lifting hook (4), hole on the frame under the operator's cab(5), and drawbar hole (6) as positions to fix the machine.







LIFT MACHINE

⚠ WARNING

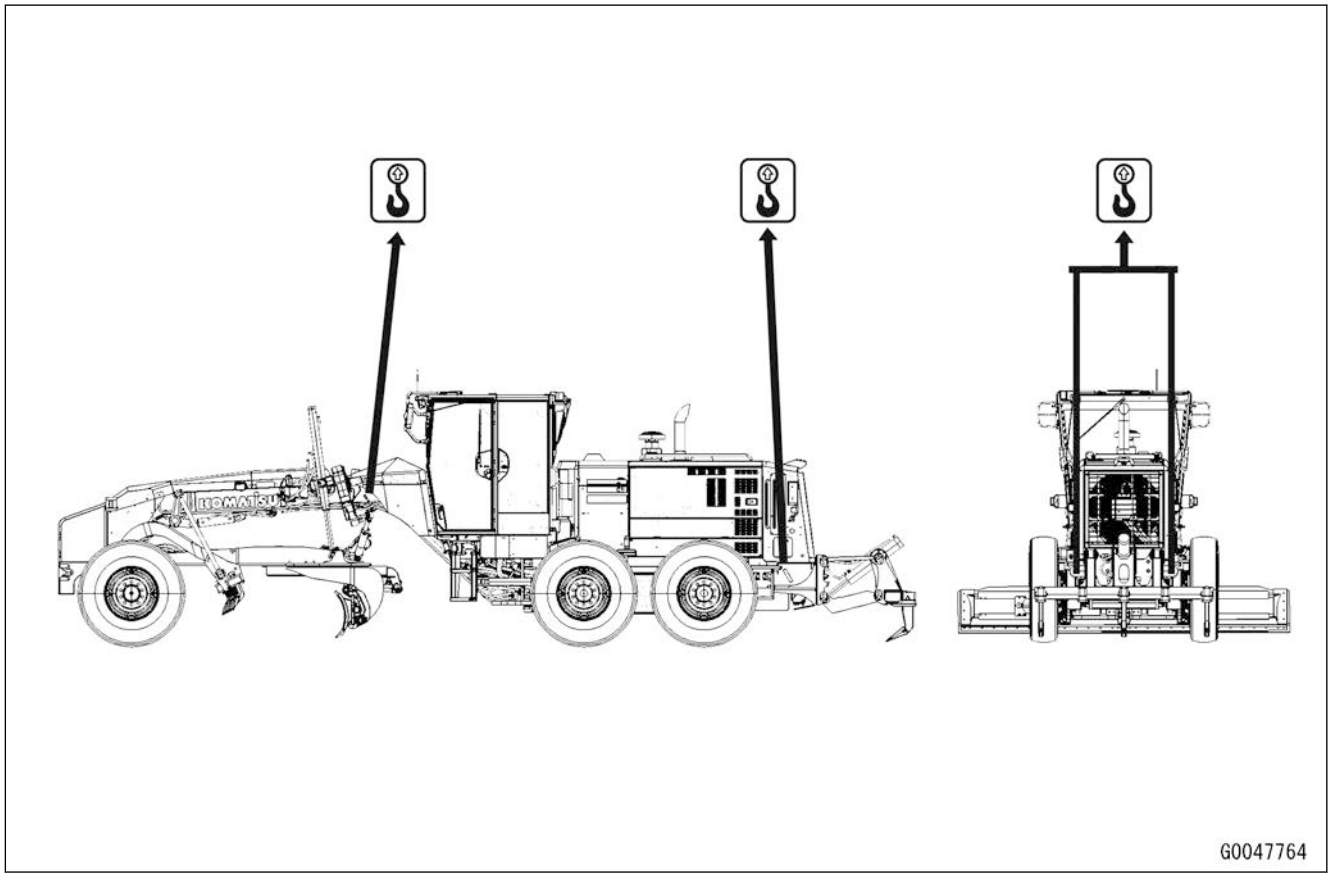
- **The person who does lifting operation with a crane must be a qualified crane operator.**
- **Do not do the lifting work while the worker has got on the machine.**
- **For the lifting work, use a wire rope that has ample strength for the weight of the machine.**
- **For the lifting work, keep the machine horizontal.**
- **For the lifting work, do as follows to make sure that the machine does not move unexpectedly.**
  Lock the work equipment.
  Set the directional selector switch to the NEUTRAL position (N). Set the parking brake to the ON position.
  Lock the front frame and rear frame with the articulation lock pin.
- **Never enter the area under a lifted machine or around it.**
- **There is a danger that the machine loses its balance.**
  Use the procedure below to set the machine in the proper posture and use the sling when lifting the machine.

NOTICE

This lifting method applies to the standard specification machine.
The lifting method varies with the attachments and options installed.
For the procedure for machines other than the standard specification machine, consult your Komatsu distributor.

LIFT MACHINE

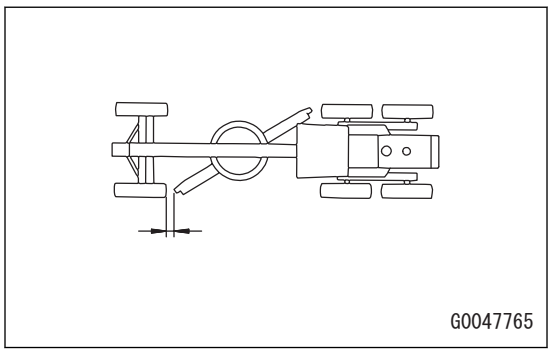
Lifting position



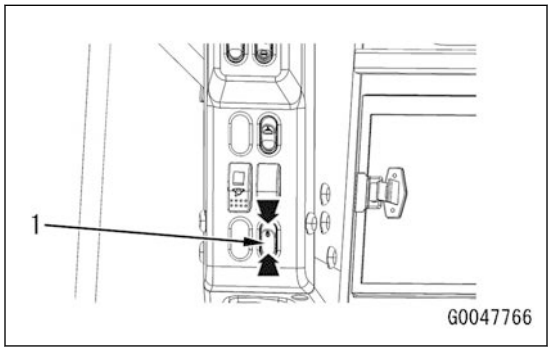
Lifting work is allowed for only machines with lift marks.

Before the lifting work, stop the machine on a level ground and do as follows.

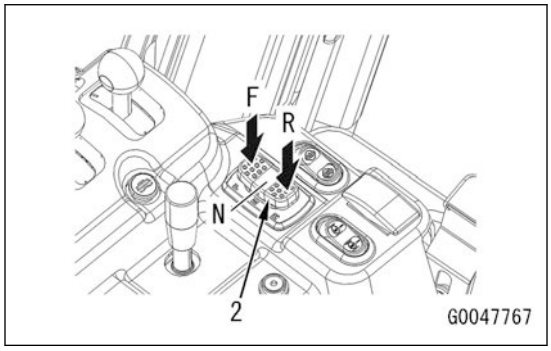
1. Start the engine.
2. Set the machine horizontally and set the work equipment in the travel posture.
3. Check that the work equipment control lever is in the HOLD position.



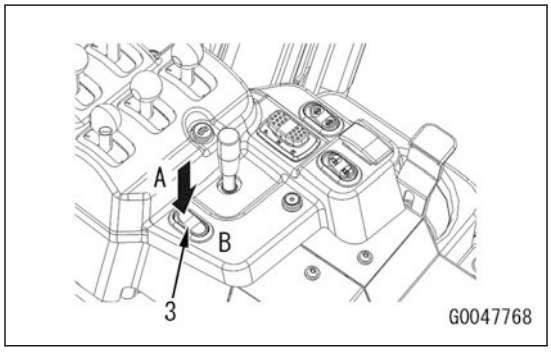
4. Push the work equipment lock switch (1) to lock the work equipment (pilot lamp is lit).



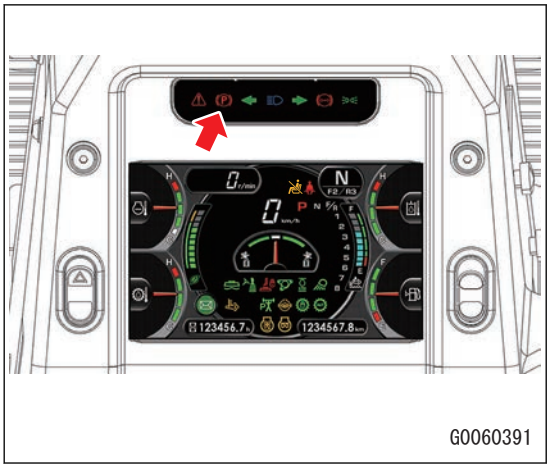
5. Set the directional selector switch (2) to the NEUTRAL position (N).



6. Set the parking brake switch (3) to the ON position (A), and apply the parking brake.



The parking brake pilot lamp is lit.



7. Stop the engine.

   Check the safety around the operator's seat, and lock the front frame and rear frame with the articulation lock pin not to let them be articulated.

8. Use the lifting tools such as the wire rope and sling in response to the machine weight as shown in the figure of the lifting position. Extend the wire rope and hook it to the lifting position.

   NOTICE

   - **At sharp edges or pinched parts of the wire ropes, use the protective equipment such as protectors not to let the ropes break.**
   - **When you use a spreader beam, select the one with sufficient width to prevent contact with the machine.**

9. Just before you lift up the machine, put the lifting tools, and lift the machine 100 to 200 mm {3.9 to 7.9 in} off the ground first. Check that the wire ropes are not loose and the machine is level, then lift it up slowly.

COLD WEATHER OPERATION

COLD WEATHER OPERATION INFORMATION

The lower the temperature, the harder the engine starts and the cooling water freezes. Follow the instructions that follow.

FUEL AND LUBRICANTS

Change the fuel and oil with ones of low viscosity.

For the specified viscosity, see “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)”.

COOLANT

⚠ WARNING

- **The coolant is poisonous. Be careful not to let it get in your eyes or on your skin. If it gets on you, immediately wash the part by a lot of clean water and consult a doctor.**
- **Consult your Komatsu distributor or a qualified company for the disposal of the cooling water which contains the coolant that is discharged during the replacement of the coolant or repair of the radiator. The coolant is poisonous. Do not put it into drainage ditches or drain it onto the ground surface.**

NOTICE

Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC).

Non-Amine Engine Coolant (AF-NAC) is mixed with pure water, so it is not flammable.

For the density of Non-Amine Engine Coolant (AF-NAC), see “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)”.

DEF

NOTICE

- **DEF freezes at -11 °C {12.2 °F}.**
  If DEF in the DEF tank freezes, it can expand to break the devices in the tank. It can cause a bad influence on the parts inside the tank. Add DEF to the specified capacity for cold weather (below the level of when DEF can freeze).
- **In cold weather, keep the DEF or the machine installed with the DEF in the indoors where the temperature is at -11 °C {12.2 °F} or higher not to let the DEF in the tank freeze.**
  If DEF or the machine with DEF system is stored at the outside temperature lower than -11 °C {12.2 °F}, DEF in the tank possibly freezes. Consult your Komatsu distributor to drain DEF, and keep it in the condition free from freezing.

BATTERY

⚠ WARNING

- **Battery discharges the flammable gas. There is a danger of explosion. Do not let an open flame be near.**
- **Battery electrolyte is dangerous object. Be careful not to let it get in your eyes or on your skin. If it gets on you, immediately wash the part by a lot of water and consult a doctor immediately.**
- **Battery electrolyte peels off the painting. If it gets on the machine, immediately wash it off with water.**
- **When the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. Explosion can occur.**
- **The battery electrolyte is poisonous. Do not pour it into drainage ditches or drain it onto the ground surface.**

When the ambient temperature drops, the capacity of the battery will also drop. If the battery charging rate is low, the battery electrolyte possibly freezes. Keep the battery charging rate as near as possible to 100%. Insulate the machine against cold temperature to let the machine be started easily the next morning.

REMARK

Measure the specific gravity of the electrolyte and calculate the battery charge rate from the table that follows.

Fluid temperature (°C {°F}) Battery charge rate (%)	20 °C {68 °F}	0 °C {32 °F}	-10 °C {14 °F}	-20 °C {-4 °F}
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

- When the ambient temperature is low, the capacity of the battery decreases significantly. Cover it or remove it from the machine, and put it in the warm area. Then install it in the next morning.
- If the electrolyte level is low, add purified water in the next morning before the work. To prevent freezing in the nighttime, do not add it after the day's work.

PRECAUTIONS AFTER DAILY WORK COMPLETION IN COLD WEATHER

If the undercarriage, or fouling such as mud or water gets frozen in the night, the machine cannot move in the next morning. To prevent this, observe the precautions that follow.

- Remove all the mud and water from the machine body. In particular, wipe cleanly the hydraulic cylinder rods to prevent damages of the seal caused by mud and water drops on the rod surface, and make sure those do not enter into the seal.
- Park the machine on a firm, dry ground.
  If you cannot find the ground like that, park the machine onto the boards.
  You can prevent the freezing of the undercarriage with the ground, and you can move the machine easily in the next morning.
- Open the drain valve, drain any water collected in the fuel system, and make sure that it does not get frozen.
- Fill up the fuel tank with fuel. This minimizes moisture which is condensed in the tank when the temperature drops.
- Add DEF to the specified level.
  If you add DEF more than the specified level, it expands when it freezes, and it possibly breaks the devices in the tank.
  If the DEF tank level is lower than the level specified for the cold weather, the DEF gets frozen easily, and it possibly damages the parts in the DEF system.
  If the filler cap gets frozen, do not forcibly open it.
- After you do operation in water or mud, remove water from undercarriage to extend undercarriage service life.

IN COLD WEATHER

If engine has run at idle for a long time or machine is traveling at high speed in cold weather, inside of KCCV and KCCV drain piping freezes and they become plugged in some cases.

Avoid such long idling of the engine, and stop the engine. If it is necessary to run the engine at idle, apply a load from time to time.

AFTER COLD WEATHER SEASON

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

Replace the fuel and oil for all devices with the ones of the specified viscosity written in “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)”.

If DEF in the tank is possibly frozen, consult your Komatsu distributor to inspect the inside of the tank. Replacement of the parts in the tank can be necessary.

LONG-TERM STORAGE PRECAUTIONS

PREPARATION FOR LONG-TERM STORAGE

When you store the machine for a long time (more than 1 month), store it as follows.

- Clean all the parts of the machine and store the machine indoors. If it is necessary to store the machine outdoors, select a level ground, and cover the machine with a waterproof sheet.
- Fill up the fuel tank. This prevents dew condensation.
- Lubricate the machine and change the oil before storage.
- Fill up the DEF tank. (in other than cold season)
  Urea deposits caused by evaporation possibly obstruct the operation of the devices.
- Apply grease to the exposed part of the hydraulic cylinder piston rod.
- After you turn the starting switch to the OFF position, check that the system operating lamp is not lit. Then turn the battery disconnect switch key to the OFF position and remove the key. Cover the battery before you store it.
- Lock the work equipment.
- Set the steering lever enable switch to the disable position.
- Release the accelerator pedal, set the directional selector switch to the NEUTRAL position (N) and set the parking brake switch to the ON position.
- Put wooden blocks below the front wheel center and the tandem case, to lift the tires off the ground. Put wooden blocks below the blade to put the blade onto them.
- Lock the front axle with the leaning stopper not to let the front tires be leaned.
- To prevent rust, fill the Non-Amine Engine Coolant (AF-NAC) of a density of 30% or more.

MAINTENANCE DURING LONG-TERM STORAGE

⚠ WARNING

If it is necessary to do the rust prevention operation while the machine is indoors, open the doors and windows of the building to improve ventilation and prevent gas poisoning.

- Do the rust prevention operation and move the machine for a short distance once a month during storage. Then, you can keep the film of oil on lubricated parts. At the same time, charge the battery as well.
- When you operate the work equipment, wipe off all the grease from the hydraulic cylinder piston rods.
- Operate the air conditioner for 3 to 5 minutes once a month. Then, you can keep the film of oil on all parts of the air conditioner compressor. Check the amount of refrigerant gas 2 times a year.

START MACHINE AFTER LONG-TERM STORAGE

NOTICE

Before you use the machine that is stored without monthly rust prevention operation, consult your Komatsu distributor.

Before you use the machine after a long-term storage, do the items that follow.

- Wipe off all the grease from the hydraulic cylinder piston rods.
- Add oil and grease at all the lubrication points.
- When the machine is stored for a long period, moisture in the air will mix with the oil. Check the oil of each part before and after you start the engine. If there is water in the oil, change all the oil.
- Check the engine pulley for rust and make sure that no problem is found on the belt.
  If there are too much rust on the contact surface of the pulley, remove them with wire brush and such.
- Insert the battery disconnect switch key and turn it to the ON position.
- If the machine is stored for a long period while the battery disconnect switch is at the OFF position or the battery terminal is disconnected, it can cause the loss of the clock time information and radio tuning information. In this case, set them again. See “CLOCK SETTING (3-322)” and “RADIO (3-314)” .
- If the machine was not operated for more than 2 months in the storage, do as follows.
  - Before you start the engine, fill up the DEF tank with DEF.
  - Start the engine, and make sure that the SCR system has no problem.
    If SCR system has a problem, warning is given on the monitor screen and by the buzzer sound.
    If SCR system has a problem, stop the engine first and start it again.
    If the problem continues in SCR system even if you start the engine again, consult your Komatsu distributor.
  - If DEF is kept in DEF tank for more than 1 year, drain and replace DEF.
    To dispose of the drained DEF, obey the local regulations and rules about the environment.
    Aged DEF can have smell of ammonia.
    Replace DEF in a well-ventilated area and be careful not to smell its vapor.

TROUBLES AND ACTIONS

ACTIONS WHEN YOU RUN OUT OF FUEL

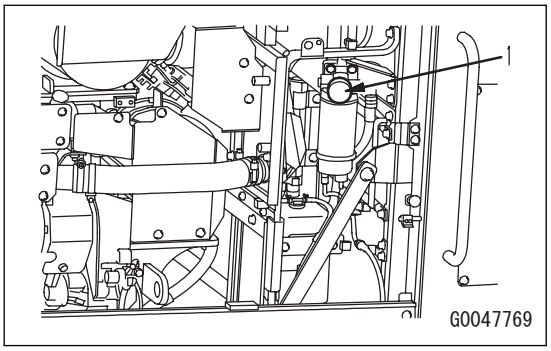
⚠ WARNING

When you start the engine again, check the safety around the engine thoroughly, and then crank the engine.

If you run out of fuel, fill it up with fuel and bleed air from the fuel system, and start the engine again.

BLEED AIR FROM FUEL CIRCUIT

1. Open the side cover at the left of the machine.
2. Loosen and pull out the knob (1) of feed pump, and operate it forward and rearward.
   - You do not need to remove the plug on the side of the fuel prefilter head.
   - Move the knob (1) until it becomes heavy.
3. After the air is bled, push in the knob (1) and tighten it.
4. Close the side cover at the left of the machine.



IF LEANING PIPING IS BROKEN

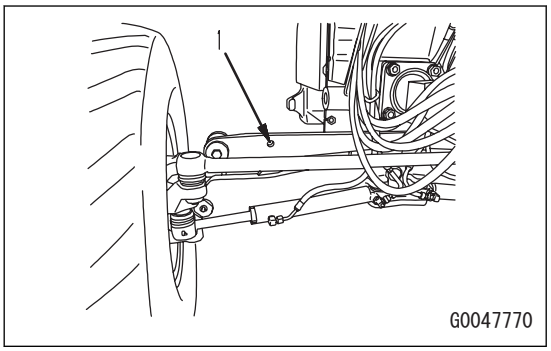
⚠ WARNING

Do not drive the machine if the leaning piping is damaged and the leaning cylinder is not stable or tilted to one side.
It makes the steering unstable which is dangerous, and also it will cause the abnormal wear of the tire.
Immediately arrange for repair and actions.

Contact your Komatsu distributor when the leaning piping is damaged.

USE LEANING STOPPER

Use the bolt in the tool box, and fix the front axle at the hole of the leaning rod hole (1).

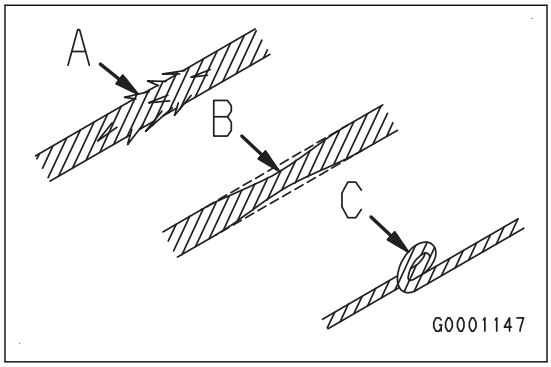


PRECAUTIONS FOR TOWING MACHINE

⚠ WARNING

In the towing and being towed operation, a mistake in the selection of the wire rope or procedures can cause serious personal injury or death.

- **Make sure that the wire rope or drawbar used for towing has a sufficient strength for the weight of the machine being towed.**
- **You must not use a wire rope which has breaks in strands (A), reduced diameter (B), or kinks (C). There is a danger that the rope can break during the towing operation.**
- **Wear the leather gloves always when you handle the wire ropes.**
- **You must not do the towing operation on a slope.**
- **During the towing operation, you must not stand between the towing machine and the towed machine.**
- **Move the machine slowly. Do not put a sudden load to the machine.**
- **Be fully careful that the brakes will not work if there is a failure in the engine or brake system.**
- **When you release the brake, chock the tires to prevent machine movement. If the tires are not chocked, there is a danger that the machine moves suddenly.**



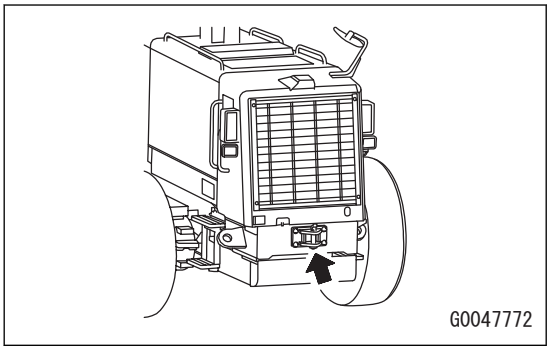
NOTICE

- **Towing is to move the machine to an area where inspection and maintenance are possible, and it must not be done in a long distance.**
  Do not do the long distance towing.
- **For the allowable towing load of this machine, see "SPECIFICATIONS (5-2)".**
- **For towing of a failed machine, consult your Komatsu distributor.**

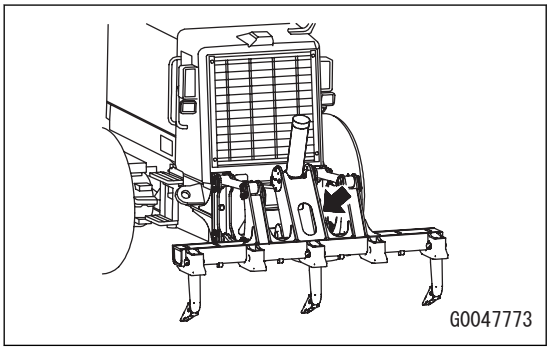
Towing of this machine is not allowed unless it is really necessary, but, if towing is necessary, be careful of the items that follow.

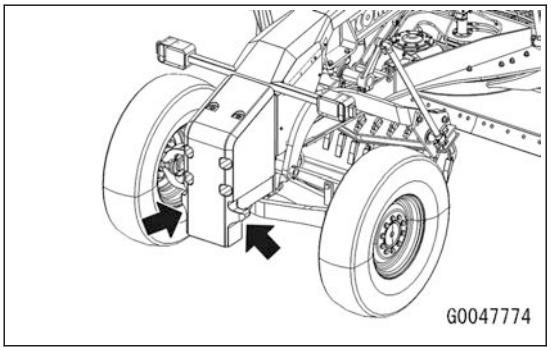
- Tow the failed machine at the low speed of 8 km/h {5 MPH} or below for the distance of within 600 m {1968 ft 6 in}. It is just to move the machine to an area convenient for repair.
  This is only for emergency. If the machine must be moved a long distance, transport it.
- To protect the operator if the towing wire or towing bar breaks, install the protective plates on the towing machine.
- If the steering and mechanical brake of the towed machine cannot be operated, do not allow persons to ride on the machine.
- Before you start towing, make sure that the towing wire and towing bar are in good condition, or they have sufficient strength for the towing.
  The towing wire and towing bar need more than 1.5 times the strength of the weight of the machine being towed, because there is a possibility that the failed machine falls into mud or is towed up the slope.
- Keep the angle of the towing line minimum. Do not let it become 30 ° or more from the straight-travel direction.
- If the machine is moved suddenly, an excessive load is applied to the towing wire or towing bar, and it can break. Move the machine gradually and at a constant speed.

- Usually, use a towing machine of the same class as the machine being towed. Make sure that the towing machine and the machine being towed have sufficient braking power and rim pull to control the machines on slopes or on the towing road.
- When you tow a machine downhill, a larger towing machine is necessary to provide sufficient rim pull and braking power. It can also be necessary to connect other machine to the rear of the machine being towed. By this method, the controllability of the machines can be provided and it can prevent falling over of the machine.
- Requirements for towing cannot be known previously because towing can be done in so many conditions. Towing on level roads will require the minimum rim pull, while towing on slopes or on rough road surfaces will require the maximum rim pull.
- Put the wire rope to the position shown by arrow in the figure.
  (without ripper)



  (with ripper)





TOW THE MACHINE WHOSE ENGINE CAN BE STARTED

- If the power train system and steering wheel can be operated, and the engine is in operation, it is possible to tow the machine out of mud or to move it for a short distance to the edge of the road.
- The operator must be on the machine to be towed and operate the steering wheel in the direction that the machine is towed.

TOW THE MACHINE WHOSE ENGINE CANNOT BE STARTED

When you tow the machine while the engine stops, obey the procedure that follows.

- Do it at the speed of 8 km/h {5 MPH} or below, and within the distance of 600 m {1968 ft 6 in}.
  If the towing will exceed this distance, or if the machine has been failed 1 day or longer, transport it with a trailer.
- The parking brake is applied automatically.
  You need to release the parking brake. When you move it, sufficient safety measures are necessary. Be careful especially on slopes.

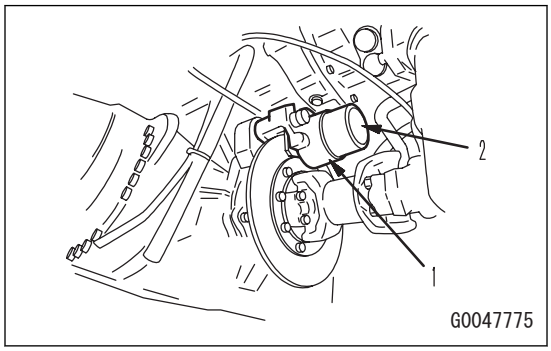
RELEASE PARKING BRAKE

⚠ WARNING

- **When you release the parking brake, stop the machine on a level ground and check that the area around the machine is safe. If it is necessary to release the brake on a slope in an emergency, chock the tires before you start the work.**
- **When you release the parking brake, check that the area around the machine is safe.**

If the engine does not run for some reason, release the parking brake in response to the procedures that follow and tow the machine.

1. Turn and remove the cover plug (2) of the parking brake (1) on the front side of the final drive case.



2. Loosen the lock nut (3) and adjuster bolt (4) in the spring chamber until clearance is made between the disc and pad.

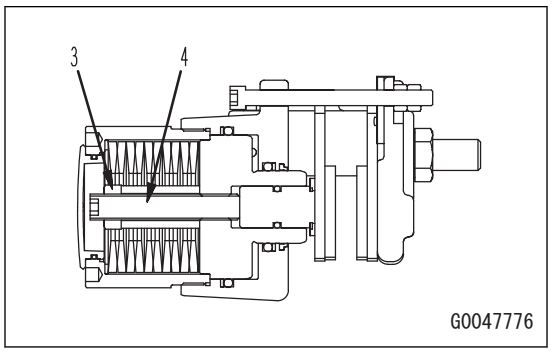
   Lock nut (3): Width across flats, 20.8 mm {0.8 in}

   Adjuster bolt (4): Width across flats of hexagonal hole, 8.1 mm {0.319 in}

3. The parking brake (1) is released.

   REMARK

   After the parking brake is released and the machine is moved, the parking brake needs to be adjusted again. Ask your Komatsu distributor for readjustment.



TRAVEL IN EMERGENCY

The normal gear shift operation is done by electric signals. If there is a failure in the electrical system, and the machine does not move, consult your Komatsu distributor for operation in emergency.

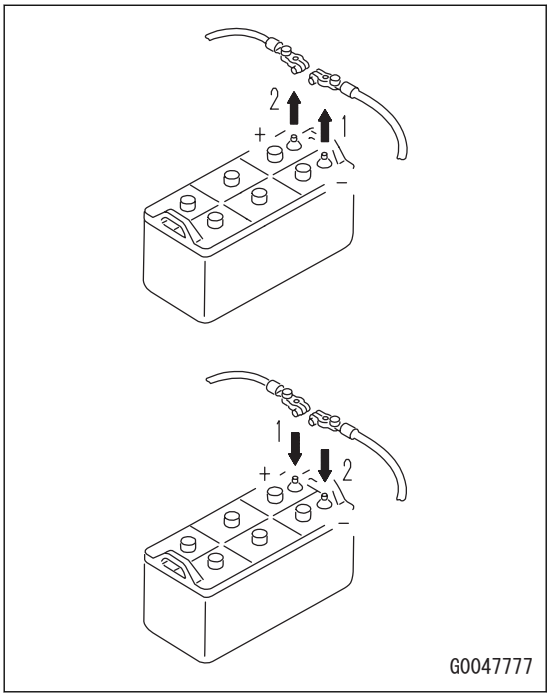
NOTICE

If you do the operation in emergency, consult your Komatsu distributor.

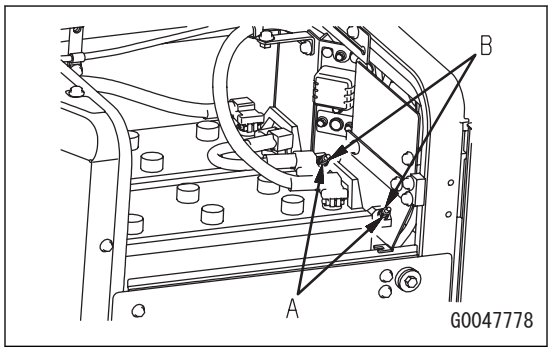
PRECAUTIONS FOR DISCHARGED BATTERY

⚠ WARNING

- **If you charge the battery when the battery is installed on the machine is dangerous. Remove the battery from the machine, and charge the battery.**
- **When you check or handle the battery, stop the engine. Then, turn the starting switch and battery disconnect switch keys to the OFF positions.**
- **Battery generates the hydrogen gas. It causes the explosion in some cases. Do nothing that will cause sparks or fire, such as bringing a lighted cigarette near the battery.**
- **Battery electrolyte is diluted sulphuric acid. It corrodes clothes, skin. If the battery electrolyte gets on your clothes or on your skin, immediately wash it off with a large amount of water.**
  If the battery electrolyte gets in your eyes, immediately wash off the eyes with water, then consult a doctor for a medical treatment.
- **Wear protective equipment such as protective eyeglasses and gloves always when handling the battery.**
- **For removal, start the disconnection of the terminals from the ground side (normally the negative (-) terminal). For installation, start the connection of the terminals from the positive (+) terminal.**
  If a tool touches the positive (+) terminal and the chassis, it is dangerous because it will cause a spark. Be extremely careful.
- **If a terminal is loosened, it is dangerous because it will cause a spark because of defective contact.**
  Install the terminals securely.
- **When you remove and install them, check which is the positive (+) terminal and which is the negative (-) terminal.**
- **For the removal and installation of battery, see "PPRECAUTIONS WHEN YOU REMOVE AND INSTALL BATTERY (3-341)".**



PPRECAUTIONS WHEN YOU REMOVE AND INSTALL BATTERY



1. Start disconnection from the ground side (normally connected to the negative (-) terminal) first.

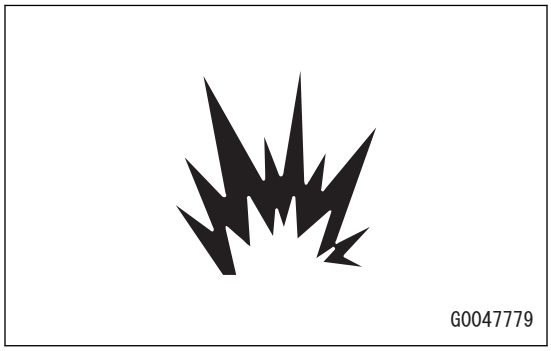
   If any tool touches between the positive (+) terminal and the chassis, sparks are possibly generated, and it is dangerous.
   Loosen the nut of the terminal, and remove the wires from the battery.
2. When you replace the battery, fix the battery body with the battery mounting fixtures.
   Tightening torque
   Nut (A) and (B): 1.77 to 2.16 Nm {0.18 to 0.22 kgfm, 1.3 to 15.9 lbft}
3. When you install the battery, connect the ground side last.
   Install the terminal at the hole to the battery, and tighten the nut.
   Tightening torque: 9.8 to 11.8 Nm {1.0 to 1.2 kgfm, 7.23 to 8.68 lbft}

PRECAUTIONS WHEN YOU CHARGE BATTERY

⚠ WARNING

If the battery is not handled correctly, there is a danger that the battery can explode in some cases when you charge the battery. Always follow the instructions in Operation and Maintenance Manual which comes with the charger, and observe the items that follow.

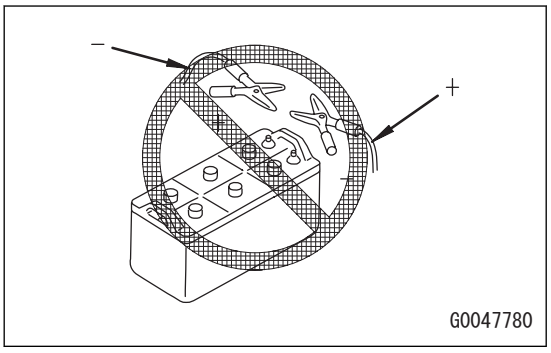
- **Adjust the voltage of the charger to match the voltage of the battery you are to charge. If you set the voltage setting incorrectly, the battery charger overheats in some cases, and it will cause an explosion.**
- **Connect the positive (+) charger clip of the battery charger to the positive (+) terminal of the battery. Then, connect the negative (-) charger clip of the battery charger to the negative (-) terminal of the battery. Be sure to attach the clips securely.**
- **Set the charging current to 1/10 or less of the value of the rated battery capacity. When you use the rapid charger, set it to less than the rated battery capacity.**
  The battery is likely ignited and explodes because of the leakage or lack of battery electrolyte if the charging current becomes excessive.
- **If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. The battery electrolyte is likely ignited and explodes.**
- **Do not use or charge the battery if the battery electrolyte level is below LOWER LEVEL line. It will cause explosion. Always do the periodic inspection of the battery electrolyte level. Add the purified water (such as a commercial battery fluid) to UPPER LEVEL line.**



START ENGINE WITH JUMPER CABLES

⚠ WARNING

- **Do not connect the positive (+) and negative (-) terminals when you connect the cables.**
- **Wear protective eyeglasses and rubber gloves always when you use the jumper cable to start the engine.**
- **Do not get the normal machine into contact with the failed machine.**
  Battery generates the hydrogen gas. It causes the explosion in some cases by the sparks caused near the battery
- **Do not make an incorrect connection of the jumper cable. When the final connection of the cables is done to the engine block of the failed machine, sparks will be generated. So, connect it to a place as far as possible from the battery.**
- **When you disconnect the jumper cable, take care not to get the clips in contact with each other or with the machine.**
- **You must not do a short-circuit the starting motor (jump start) to start the engine.**



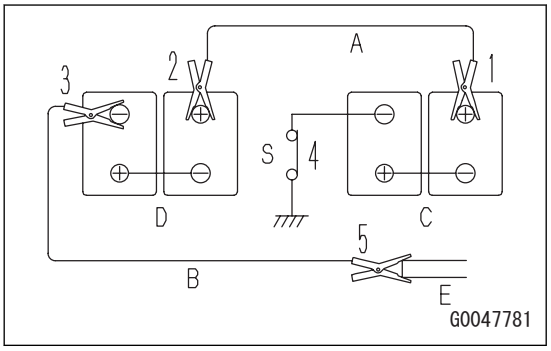
NOTICE

- **The starting system of this machine is 24 V. The 24 V power supply must be installed to the normal machine.**
- **Use jumper cables and clips that match the size of the battery.**
- **The battery of the normal machine must be the same capacity as that of the failed machine.**
- **Check that the cables and clips are free from damages or corrosion.**
- **Connect the clips firmly.**
- **Check that the lock levers and parking brake levers (if installed) of two machines are in the LOCK position.**
- **Check that all levers are in the NEUTRAL position.**
- **To prevent damage of the electric devices of the failed machine, turn the starting switch of the failed machine to the OFF position, turn the battery disconnect switch key to the OFF position, and remove the key before you connect the jumper cables.**

CONNECT JUMPER CABLES

Turn the starting switch and battery disconnect switch (if equipped) of the failed machine to the OFF position. Turn the starting switch of the normally operable machine to the OFF position.

1. Connect the clip of the jumper cable (A) to the positive (+) terminal of the battery (C) on the failed machine.
2. Connect the clip at the other end of jumper cable (A) to the positive (+) terminal of the battery (D) on the normal machine.
3. Connect the clip of the jumper cable (B) to the negative (-) terminal of the battery (D) on the normal machine.
4. Turn the battery disconnect switch (S) of the failed machine to the ON position.



5. Connect the clip at the other end of jumper cable (B) to the engine block (E) of the failed machine.

START ENGINE WITH JUMPER CABLES

⚠ WARNING

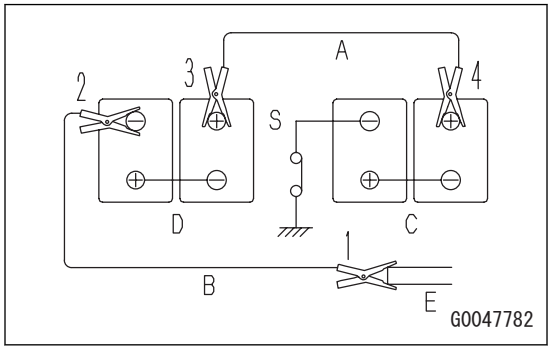
Check that the directional selector switches of the normal machine and failed machine are in the NEUTRAL position (N) and the parking brake switches are in the ON position. Make sure that each work equipment lock switch is in the ON position.

1. Make sure that the clip is securely connected to the battery terminal.
2. Start the engine of the normal machine and operate it at high idle (maximum speed).
3. Turn the starting switch of the failed machine to the START position to start the engine.
   If the engine does not start, wait for 2 minutes or longer and do the procedure again.

DISCONNECT JUMPER CABLES

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

1. Remove the clip of jumper cable (B) from the engine block (E) on the failed machine.
2. Remove the clip of jumper cable (B) from the negative (-) terminal of battery (D) on the normal machine.
3. Remove the clip of jumper cable (A) from the positive (+) terminal of battery (D) on the normal machine.
4. Remove the clip of jumper cable (A) from the positive (+) terminal of battery (C) on the failed machine.

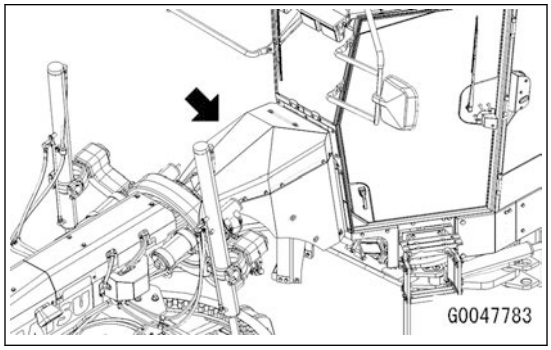


LOWER WORK EQUIPMENT (RELEASING WORK EQUIPMENT HYDRAULIC PRESSURE) WHILE ENGINE IS OFF

⚠ WARNING

Check safety of the area around the machine, and lower the work equipment.

Use the stand, and remove the cover.

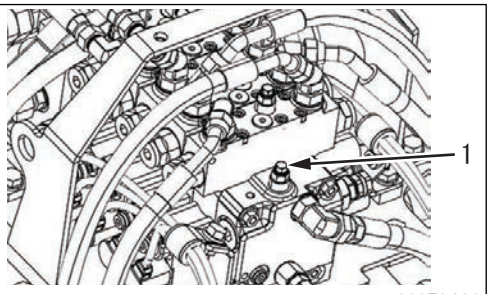


LOWER BLADE

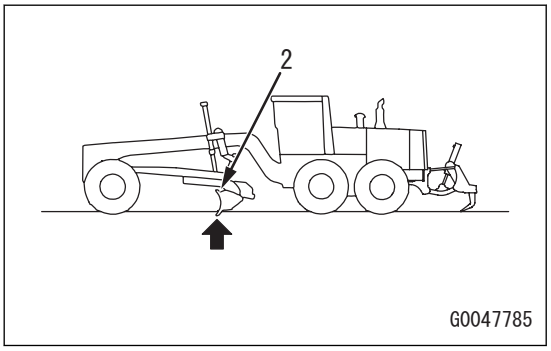
⚠ CAUTION

Do not loosen the pressure relief plug assembly until the pressure relief is completed.
The pressure relief plug assembly can jump out.

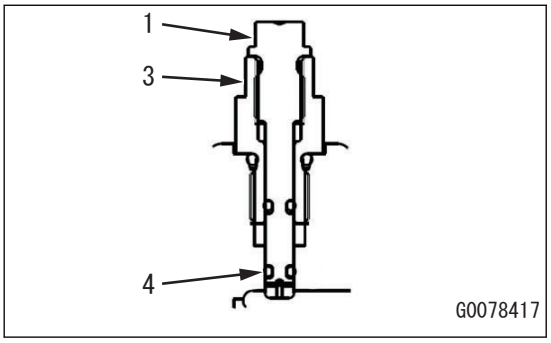
1. Loosen the pressure relief plug (1) of the rear control valve slowly by 6 to 7 turns.
   Do not loosen or pull it out more than that.
   Width across flats of plug: 10mm {0.4in}



2. Lower the blade (2) to the ground.
   Make sure that the blade (2) is lowered to the ground and the pressure relief is completed.



3. Loosen the pressure relief plug assembly (3) to remove it.
   Width across flats of plug assembly: 14mm {0.6in}
4. Check that the O-ring (4) at the top is tightly fitted into the O-ring groove.
   If the O-ring (4) comes off from the groove, insert it securely into the groove.



   NOTICE
   Check the state of O-ring (4) each time you use the pressure relief plug (1).
   If the O-ring (4) is damaged or deformed, replace it with a new one.
5. Install the pressure relief plug assembly (3) and tighten it to the specified torque.
   Tightening torque: 24.5 to 34.3Nm{2.5 to 3.5kgfm, 18.1 to 25.3lbft}
6. Install the pressure relief plug (1) and tighten it to the specified torque.
   Tightening torque: 19.6 to 24.5Nm{2.0 to 2.5kgfm, 14.5 to 18.1lbft}

⚠ CAUTION

After you tighten the pressure relief plug (1), if you feel something abnormal about the hydraulic drift of blade (2), consult your Komatsu distributor.

LOWER RIPPER OR SCARIFIER

(Machine with scarifier or ripper)

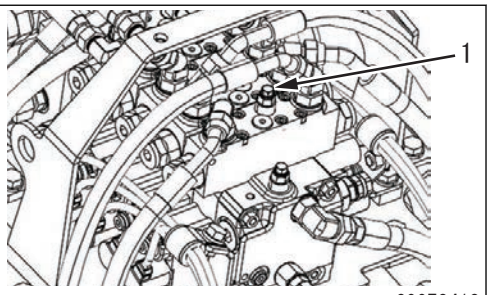
⚠ CAUTION

Do not loosen the pressure relief plug assembly until the pressure relief is completed.
The pressure relief plug assembly can jump out.

1. Loosen the pressure relief plug (1) of the rear control valve slowly by 6 to 7 turns.

   Do not loosen or pull it out more than that.

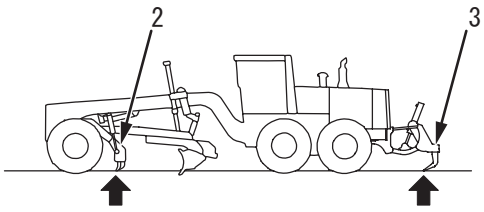
   Width across flats of plug: 10mm {0.4in}



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2. Lower the scarifier (2) or ripper (3) to the ground.

   Make sure that the scarifier (2) or ripper (3) is lowered to the ground and the pressure relief is completed.



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3. Loosen the pressure relief plug assembly (4) to remove it.

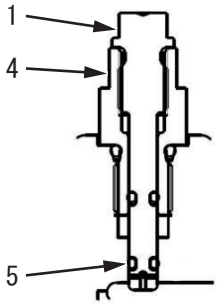
   Width across flats of plug assembly: 14mm {0.6in}

4. Check that the O-ring (5) at the top is tightly fitted into the O-ring groove.

   If the O-ring (5) comes off from the groove, insert it securely into the groove.

   NOTICE

   Check the state of O-ring (5) each time you use the pressure relief plug (1).
   If the O-ring (5) is damaged or deformed, replace it with a new one.



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5. Install the pressure relief plug assembly (4) and tighten it to the specified torque.

   Tightening torque: 24.5 to 34.3Nm{2.5 to 3.5kgfm, 18.1 to 25.3lbft}

6. Install the pressure relief plug (1) and tighten it to the specified torque.

   Tightening torque: 19.6 to 24.5Nm{2.0 to 2.5kgfm, 14.5 to 18.1lbft}

⚠ CAUTION

After you tighten the pressure relief plug (1), if you feel something abnormal about the hydraulic drift of the scarifier (2) or ripper (3), consult your Komatsu distributor.

LOWER FRONT BLADE

(Machines with front blade)

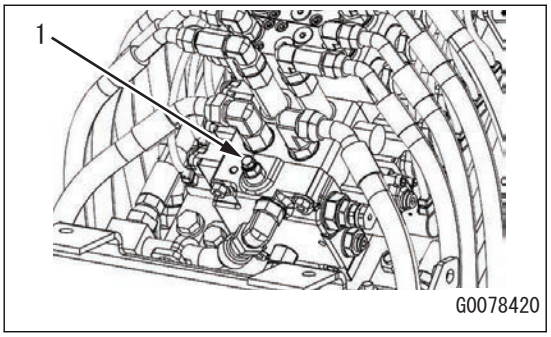
⚠ CAUTION

Do not loosen the pressure relief plug assembly until the pressure relief is completed.
The pressure relief plug assembly can jump out.

1. Loosen the pressure relief plug (1) on the front control valve slowly by 6 to 7 turns.

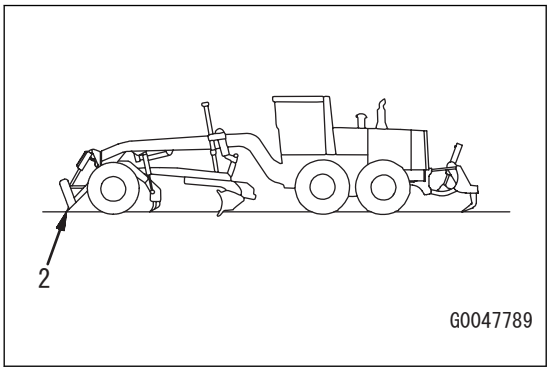
   Do not loosen or pull it out more than that.

   Width across flats of plug: 10mm {0.4in}



2. Lower the front blade (2) to the ground.

   Make sure that the front blade (2) is lowered to the ground and the pressure relief is completed.



3. Loosen the pressure relief plug assembly (3) to remove it.

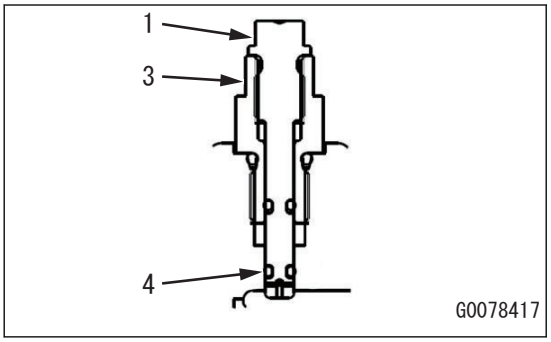
   Width across flats of plug assembly: 14mm {0.6in}

4. Check that the O-ring (4) at the top is tightly fitted into the O-ring groove.

   If the O-ring (4) comes off from the groove, insert it securely into the groove.

   NOTICE

   Check the state of O-ring (4) each time you use the pressure relief plug (1).
   If the O-ring (4) is damaged or deformed, replace it with a new one.



5. Install the pressure relief plug assembly (3) and tighten it to the specified torque.

   Tightening torque: 24.5 to 34.3Nm{2.5 to 3.5kgfm, 18.1 to 25.3lbft}

6. Install the pressure relief plug (1) and tighten it to the specified torque.

   Tightening torque: 19.6 to 24.5Nm{2.0 to 2.5kgfm, 14.5 to 18.1lbft}

⚠ CAUTION

After you tighten the pressure relief plug (1), if you feel something abnormal about the hydraulic drift of front blade (2), consult your Komatsu distributor.

OTHER TROUBLE

TROUBLES AND ACTIONS ON ELECTRICAL SYSTEM

- Contact your Komatsu distributor for the actions indicated with (*) in the corrective action column.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main cause	Remedy
Lamp does not glow brightly even when the engine runs at high speed.	Defective wiring	Check and repair loose terminals, open circuit. (*)
The lamp flickers while engine is running.		
Battery charge circuit caution lamp does not go out even when engine is running.	Monitor is defective.	Replace. (*)
	Alternator is defective.	Replace. (*)
	Alternator belt is loosened and damaged.	Check alternator belt tension and replace.
	Defective wiring	Check, and repair. (*)
	Breakage of slow-blow fuse	Check, and replace. (*)
Unusual noise is generated from the alternator.	Alternator is defective.	Replace. (*)
	Alternator belt is loosened and damaged.	Check alternator belt tension and replace.
Starting motor does not rotate even when you turn the starting switch to the START position.	Defective wiring	Check, and repair. (*)
	Starting motor is defective.	Replace. (*)
	Battery disconnect switch is at the OFF position	Turn it to the ON position.
	Engine shutdown secondary switch is at the “engine stop” position.	Set it to the “normal” position. Put the cover on it.
	Battery charge is insufficient.	Charge the battery.
Pinion of the starting motor repeats engaging and disengaging (rattles).	Battery charge is insufficient.	Charge the battery.
	Starting motor is defective.	Replace. (*)
Starting motor turns engine slowly.	Battery charge is insufficient.	Charge the battery.
	Starting motor is defective.	Replace. (*)
Starting motor disengages before engine starts.	Defective wiring	Check, and repair. (*)
	Battery charge is insufficient.	Charge the battery.
Engine preheating pilot lamp does not go off.	Defective wiring	Check, and repair. (*)
	Monitor is defective.	Replace. (*)
Battery charge circuit caution lamp does not light up when the engine is stopped (starting switch is at the ON position).	Monitor is defective.	Replace. (*)
	Defective wiring	Check, and repair. (*)
Outer surface of the electrical heater is not warm when touched by hand.	Defective wiring	Check, and repair. (*)
	Wire in the electrical intake air heater is broken.	Replace. (*)
	Malfunction of heater relay switch	Replace the heater switch. (*)
Squeaky noise is heard from accelerator pedal	Grease has run out in roller part	Do greasing.

TROUBLES AND ACTIONS ON CHASSIS

- Contact your Komatsu distributor for the actions indicated with (*) in the corrective action column.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main cause	Remedy
Engine runs but the machine does not move.	Parking brake is applied.	Release the parking brake.
	Transmission oil temperature does not increase.	Check, and adjust. (*)
	Oil in the transmission case is insufficient.	Add oil to the specified level. See "EVERY 250 HOURS SERVICE".
	Transmission pump is worn, or scuffing.	Check, and replace. (*)
	Oil leaks from the oil line.	Check, and repair. (*)
	Transmission oil filter element is clogged.	Clean, and replace. See "EVERY 1000 HOURS MAINTENANCE".
	Operation of the transmission and control valve is defective.	Check, and repair. (*)
	Parking brake does not go back correctly.	Check, and repair. (*)
	Transmission control is abnormal.	Check, and repair. (*)
Machine moves slowly, and it lacks power even with engine running at full throttle.	Oil in transmission is insufficient.	Add oil to the specified level. See "EVERY 250 HOURS SERVICE".
	Transmission oil filter cartridge is clogged.	Clean, and replace. See "EVERY 1000 HOURS MAINTENANCE".
	Parking brake does not go back correctly.	Check, and repair. (*)
	Condition of engine is not smooth.	Check, and repair. (*)
The noise from the power train system is larger than usual.	Oil in the transmission and tandem case is insufficient.	Add oil to the specified level. See "EVERY 250 HOURS SERVICE".
Font tires are worn abnormally.	Toe-in adjustment is incorrect.	Adjust. See" EVERY 1000 HOURS MAINTENANCE".
	Inflation pressure is not sufficient.	Check, and adjust.
Front wheels swing during travel.	Adjustment of toe-in is incorrect, tie-rod is loosened.	Adjust. See" EVERY 1000 HOURS MAINTENANCE".
	Tire inflation pressure is not even on left and right.	Adjust inflation pressures evenly.
	Installation of wheel is incorrect.	Install correctly. See "HANDLE TIRES".
	Front wheel bearing mounting nut are loosen.	Adjust. (*)
When you change the gear speed or select the direction, clattering sound is heard.	Ball joint on the front part of the circle drawbar is not adjusted correctly.	Check, and adjust. (*)
Steering wheel is heavy to operate.	Orbitrol is defective.	Adjust. (*)
	Priority valve is not operated correctly.	Check, and repair. (*)
	Hydraulic oil is insufficient.	Add oil to specified level.

Problem	Main cause	Remedy
Braking effect is poor when the brake pedal is depressed.	Lining is worn.	Check, and repair. (*)
	Oil leaks from the brake piping.	Check, and repair. (*)
	Brake valve is defective.	Check, and repair. (*)
	Piston seal part is defective.	Replace. (*)
Brake drags or remains applied.	Vent hole of brake valve is clogged.	Clean it.
Parking brake effect is poor.	Adjustment of the brake is incorrect.	Adjust. (*)
	Oil is sticking to disc surface.	Finish the disc surface with the sandpaper. (*)
	Disc seizure has occurred.	Finish the disc surface with the sandpaper. (*)
Blade often vibrates vertically during work.	There is play in the ball joint of the work equipment.	Adjust shims. See "EVERY 250 HOURS MAINTENANCE".
	Clearance between circle, drawbar, and sliding surface are excessive.	Adjust shim and circle guide. See "EVERY 500 HOURS MAINTENANCE".
	Blade rail guide bushing is worn.	Replace the guide bushing, replace the shim, modify the blade rail.
Blade often vibrates circularly during work.	Clearance in radial direction of circle is large.	Adjust guide position. See "EVERY 500 HOURS MAINTENANCE".
When the work equipment control lever is operated, work equipment moves slowly.	Oil is insufficient.	Add oil to the specified level. See "EVERY 250 HOURS SERVICE".
	Pump adjustment is not done correctly.	Check, and adjust. (*)
Parking brake disc is heated.	Brake pad is in contact with disc.	Adjust the clearance. (*)

TROUBLES AND ACTIONS ON ENGINE RELATED PARTS

- Be sure to consult your Komatsu distributor for the actions shown with (*) in the remedy column.
- If there can be other problem or cause than the ones that follow, consult your Komatsu distributor for repair.

Problem	Main causes	Remedy
After the warm-up operation, when engine speed is increased, engine oil pressure caution lamp lights up.	Oil in oil pan is not sufficient. (air is sucked)	Add oil to specified level. See CHECK BEFORE YOU START OPERATION.
	Oil filter cartridge is clogged.	Replace cartridge. See EVERY 500 HOURS MAINTENANCE.
	Oil leakage because oil pipe and pipe joint are not tightened correctly or they break.	Check, repair. (*)
	Defective monitor	Replace. (*)
	Defective hydraulic switch	Replace. (*)
	Water or fuel is mixed in.	Check, repair. (*)
	Defective hydraulic adjustment valve	Check valve. Replace spring. (*)
Steam spurts out from top of radiator reservoir tank (pressure valve). Pointer of engine coolant temperature gauge is in red range.	Engine coolant is not sufficient, coolant leaks.	Check, add coolant, repair. See WHEN REQUIRED.
	Cooling fan hydraulic circuit has a problem.	Check, repair. (*)
	Accumulation of dirt or scale in cooling system	Change coolant and clean inside cooling system. See WHEN REQUIRED.
	Clogged radiator fins or damaged fin	Clean. See EVERY 500 HOURS MAINTENANCE.
	Defective thermostat	Replace thermostat. (*)
	Loose radiator filler cap (in high altitude operation)	Tighten cap or replace packing.
	Defective coolant temperature sensor	Replace coolant temperature sensor. (*)
	Shroud is damaged or not installed.	Check, repair, install. (*)
	Defective radiator filler cap	Replace. (*)
	Excessive load	Check brake. Check problem in recover of parking brake. (*)
After the warm-up operation, the pointer of engine coolant temperature gauge does not move even if the engine speed is increased.	Defective thermostat	Replace thermostat. (*)
	Defective coolant temperature sensor	Replace coolant temperature sensor. (*)

Problem	Main causes	Remedy
Starting motor turns but the engine does not start.	Fuel is not sufficient.	Add fuel. See CHECK BEFORE YOU START OPERATION.
	Air in fuel system	Repair the part where air is sucked. (*)
	Defective supply pump or nozzle	Replace pump or nozzle. (*)
	Starting motor cannot crank engine smoothly.	See TROUBLES AND ACTIONS ON ELECTRICAL SYSTEM.
	Preheating pilot lamp does not light up.	See TROUBLES AND ACTIONS ON ELECTRICAL SYSTEM.
	Incorrect valve clearance (Compression is not correct.)	Adjust valve clearance. (*)
	Fuel filter is clogged.	Replace filter.
	Battery disconnect switch is at the OFF position.	Set it to the ON position.
	Fuse of engine controller circuit blows.	Check wiring, repair. (*)
	Directional selector switch is in the FORWARD (F) or REVERSE (R) position.	Set directional selector switch to the NEUTRAL position (N).
Exhaust gas color is white or bluish.	Water entry in the aftertreatment devices	Check, repair. (*)
	Damage of aftertreatment devices	Replace aftertreatment devices. (*)
	Too much oil in oil pan	Add oil to specified level. See CHECK BEFORE YOU START OPERATION.
	Inappropriate fuel is used.	Replace it with specified fuel.
Exhaust gas sometimes becomes black.	Damage of aftertreatment devices	Replace aftertreatment devices. (*)
	Air cleaner element is clogged.	Clean or replace. See WHEN REQUIRED.
	Defective injector	Replace injector. (*)
	Defective turbocharger	Check turbocharger, replace. (*)
Combustion makes a breathing sound from time to time.	Defective nozzle	Replace nozzle. (*)
Unusual noise occurs. (Combustion or mechanical noise)	Low grade fuel is used.	Replace it with specified fuel.
	Overheating	See “Pointer of engine coolant temperature gauge is in red range” above.
	Damage inside aftertreatment devices	Replace aftertreatment devices. (*)
	Valve clearance is too much.	Adjust valve clearance. (*)

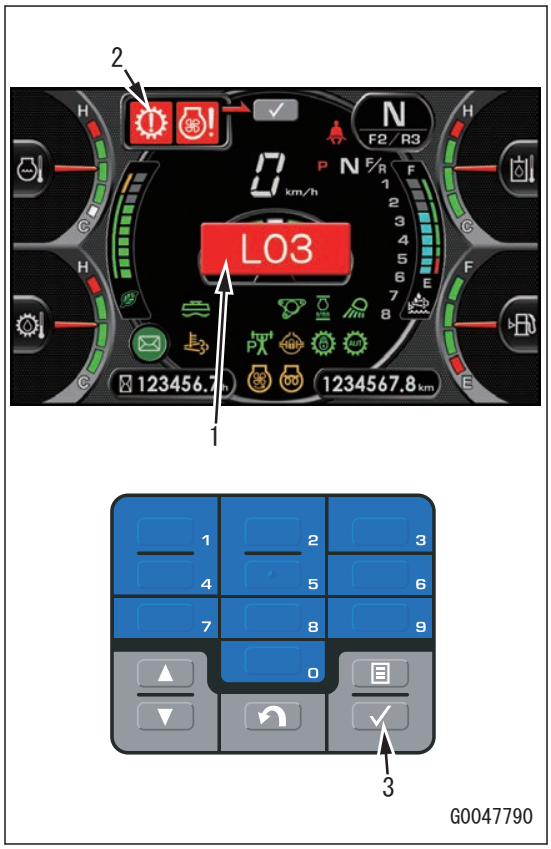
Problem	Main causes	Remedy
Engine does not reach rated speed when loaded.	Malfunction of rotation system	Check, replace. (*)
	Fuel is not sufficient.	Add oil to specified level. See CHECK BEFORE YOU START OPERATION.
	Air in fuel system	Repair the part where air is sucked. (*)
	Defective supply pump or nozzle	Replace pump or nozzle. (*)
	Fuel filter is clogged.	Replace filter.
	Variable output selector signal is not output.	Replace transmission controller. (*)
	Oil level is too high.	Adjust to the correct level.
	Air cleaner is clogged.	Clean, replace.
	Leakage of intake air and exhaust of turbocharger	Check, repair, replace. (*)
	Low grade fuel is used.	Replace it with specified fuel.
	Defective thermostat	Replace thermostat. (*)
DEF level caution lamp lights up.	DEF level is low.	Add DEF.

IF MACHINE MONITOR SHOWS WARNING DISPLAY

When the action level display (1) or caution lamp (2) is shown on the display of the machine monitor, push the switch (3) to display “CURRENT ABNORMALITY” and check the details and remedy.

Take the actions in response to the message shown on the machine monitor, check the failure code, and then ask your Komatsu distributor for repair as necessary.

- If “CA2249” or “CA559” is shown on “CURRENT ABNORMALITY” screen although the machine has not run out of fuel, replace both of the fuel main filter and fuel prefilter immediately.
  If “CA2249” or “CA559” is not cleared even after the replacement, although you are able to operate the machine, immediately ask your Komatsu distributor for inspection.
- When the failure code “CA4166 (SCR Temperature Sensor ECU High Temperature Error)” is shown, increase the engine speed to raise the cooling fan speed to emit the heat inside the engine room.

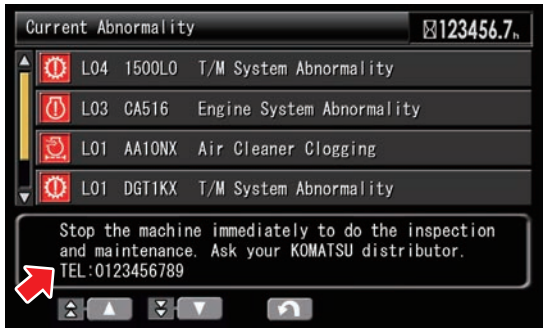


Telephone number for the point of contact if an error occurs

When an error screen is shown on the monitor, push the switch (3) to show “Current Abnormality” screen and telephone number for the point of contact is shown in the message column at the bottom of the screen.

REMARK

If no point of contact telephone number is registered, no telephone number is shown.
Ask your Komatsu distributor for the telephone number registration if necessary.



MAINTENANCE

⚠ WARNING

Before you read this chapter, read and understand the SAFETY.

PRECAUTIONS FOR MAINTENANCE

Do the maintenance items as in the Operation and Maintenance Manual.

Check service meter reading

Check the service meter reading every day to see if the maintenance is necessary.

Komatsu genuine replacement parts

Komatsu recommends the use of Komatsu genuine parts specified in Parts Book for replacement parts.

Komatsu genuine lubricants

Komatsu recommends the use of Komatsu genuine lubricants.

Use a lubricant of the specified viscosity that agrees with the ambient temperature.

Use clean washer fluid

Use the clean window washer fluid.

Be careful to prevent entry of dirt.

Use clean lubricants

Use the clean oil and grease.

Keep the containers clean to prevent entry of dirt.

Check drained oil and used filter

Make sure that no foreign material is found in drained oil and used filters.

If a large quantity of foreign material is found, do the necessary action to prevent damage on the machine.

Precautions to refill oil or fuel

Do not remove a strainer when you add oil or fill with fuel.

Precautions when you add DEF

Do not remove the strainer while you add DEF.

Precautions for welding

- Turn the starting switch to the OFF position. Make sure that the system operating lamp goes off, and then turn the battery disconnect switch to the OFF position.
- Do not continuously apply a voltage 200 V or more.
- Connect the grounding cable within 1 m {3 ft 3 in} of the welding area. If the grounding cable is connected near electric devices or connectors, the device can be damaged.
- Make sure that there are no seals, bearings, or bushings between the grounding cable and welding area. If the welding is done near the flammable materials, sparks can cause a fire.
- Do not connect the grounding cable around a pin or hydraulic cylinder. Sparks can cause damage of the plated parts of the pin or hydraulic cylinder.

Do not drop things inside machine

- When you open the inspection windows or oil filler port of the tank for inspection, be careful not to drop things inside the machine. It can cause damage or failure of the machine. If the thing drops, be sure to remove it.
- Carry only things which are necessary for inspection.

Precautions for aftertreatment devices

During the regeneration or immediately after the regeneration is completed, the parts around the aftertreatment device can be very hot.

After the engine is stopped, the parts around the aftertreatment device can be very hot.

Dusty jobsites

When you work at dusty jobsites, obey the precautions that follow.

- Check the dust indicator frequently to see if the air cleaner is not clogged.
  If it is clogged, clean the air cleaner element immediately.
- Clean the cooling system parts such as radiator fins at a shorter interval than specified.
- Replace the fuel filter at a shorter interval than specified.
- Clean the electrical components to prevent accumulation of dirt. Especially clean the starting motor and alternator to prevent accumulation of dirt.
- When you check oil or filters, and change oil or replace filter, prevent entry of dirt.

Do not mix oil

Do not mix different brand or grade of oil.

If it is necessary to use a different brand or grade of oil, change all the oil and replace the filter at the same time.

Lock inspection covers

Lock the inspection cover with it open.

If the inspection or maintenance is done while the inspection cover is not locked fully, there is a danger that the cover suddenly shuts by the wind and causes personal injury.

Bleed air from hydraulic circuit

When you repair or replace the hydraulic equipment, or disconnect the hydraulic piping, be sure to bleed the air from the circuit.

Precautions to install hydraulic hoses

- When you remove the O-rings or gasket seals, clean the mounting face, and replace them with new ones. Be sure to install new O-rings or gaskets.
- When you install the hoses, do not twist them or bend them too much.
  It can decrease the service life of the hose and cause damage.

Checks after inspection and maintenance

If you do not do the necessary checks after the maintenance, it can cause a failure and personal injury. Obey the items that follow.

- Checks before engine start-up
  - All the maintenance items are completed.
  - No tools or parts are inside the machine.
  - No leakages of water or oil are found.
  - All the nuts and bolts are fully tightened.
- Checks when you start the engine
  - One personnel must always sit on the operator's seat and can contact with other personnel to stop the engine immediately.
  - The machine is in parking state, and the tires are chocked.
- Checks while engine is in operation
  - No leakages of fuel or oil are found while the engine speed increases.
  - The repaired part operates correctly.
  - Make sure that there are no persons near the rotating parts such as fan or belt.
  - Be sure not to fall objects in the rotating parts such as fan or belt.
  - The aftertreatment device regeneration is stopped.
  - Do not touch the control levers.

Select the correct fuel and lubricants that agrees with the ambient temperature

Use a fuel or lubricant that agrees with the ambient temperature.

For details, see REPLACEMENT PARTS, “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)”.

Lock engine side cover

When you close the engine side cover after inspection and maintenance, be sure to lock it with the catch.

If the machine is operated while the engine side cover is not locked, it can cause personal injury.

MAINTENANCE INFORMATION

- Komatsu recommends the use of Komatsu genuine parts for replacement parts, grease, or oil.
- When you change or add oil, do not mix a different brand of oil. If it is necessary to change a different brand of oil, drain all of the old oil as specified, and then add new oil. Be sure to replace the filter at the same time. (It is not a problem to mix the remaining oil in the piping into the new oil if it is not too much.)
- Unless specified differently, when the machine is shipped from the plant, it is filled with the oil and coolant listed in the table below.

Item	Type
Engine oil pan	Engine oil EO15W40-LA (Komatsu genuine)
Final drive case	Power train oil TO30 (Komatsu genuine)
Tandem drive case	
Hydraulic oil system	Power train oil TO10 (Komatsu genuine)
Transmission case	
Circle rotation gear case	Gear oil GO80W90 (Komatsu genuine)
Radiator	Non-Amine Engine Coolant (AF-NAC) (Komatsu genuine) (Density of 30% or more)

OIL, FUEL, AND COOLANT

OIL

- Oil is used in the engine and hydraulic components in heavy-duty conditions (high temperature, high pressure), and deteriorates with use.
  Be sure to use oil that agrees with the grade and the maximum/minimum ambient temperatures as in the Operation and Maintenance Manual.
  Even if the oil is not dirty, be sure to change the oil at the specified interval.
- Oil is like blood in the human body, be very careful when you handle it to prevent entry of foreign material such as water, metal particles, or dirt.
  The majority of failures with the machine are caused by the entry of foreign material.
  Be very careful not to let foreign material get in especially when you store or add oil.
- Do not mix different brand or grade of oil.
- Add the specified quantity of oil.
  Too much or too small quantity of oil can cause failures.
- If oil in the hydraulic component is not clear, there can be water or air mixed in the circuit. Consult your Komatsu distributor.
- When you change oil, be sure to replace the filters at the same time.
- Komatsu recommends that you check the condition of the machine regularly with KOWA (Komatsu Oil Wear Analysis). If you wish to use this service, consult your Komatsu distributor.
- When you use commercially available oil, it can be necessary to reduce the interval for oil change. Komatsu recommends that you use the KOWA to check the properties of the oil in detail.

NOTICE

Komatsu recommends the use of Komatsu genuine engine oil for KDPF. The use of oil other than Komatsu genuine engine oil for KDPF will have bad effects to the engine components such as reduced KDPF filter cleaning interval or reduced lubrication function by deterioration of the engine oil. This can cause failure, decrease of the service life, degradation in performance, or increase of fuel consumption of the machine.

FUEL

- To prevent water formation inside the fuel tank because of condensation caused by the moisture in the air, fill the tank with fuel after the day's work is completed.
- The fuel pump is a precision instrument. If fuel that contains water or dirt is used, it cannot work correctly.
- Be very careful not to let foreign material get in when you store or add fuel.
- Be sure to use the fuel that agrees with the temperature as in the Operation and Maintenance Manual.
  - If the fuel is used at the temperatures lower than the specified temperature (particularly at temperatures below -15 °C {5 °F}), the fuel will solidify.
  - If the fuel is used at temperature higher than the operating temperature, the viscosity will decrease, and it can result in failures such as a drop of output.
- Before you start the engine, or after 10 minutes of refuel, drain the sediment and water from the fuel tank.
- When you run out of fuel or replace the filters, it is necessary to bleed air from the circuit.
- If foreign material is mixed in the fuel tank, clean the tank and fuel system.

NOTICE

Be sure to use the ultra-low sulfur diesel fuel.
To get good fuel consumption properties and exhaust gas properties, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device and emission gas control system (KDPF). The high-pressure fuel injection device requires high precision parts and lubrication. If low viscosity fuel with low lubrication quality is used, its durability can decrease significantly. Also, if fuel with high sulfur content is used, it can deteriorate the engine parts and KDPF catalyzer, and can cause failures, decrease of the service life, and degradation in performance.

BIO-FUEL

The biofuel is a fuel that is formed in a transesterification reaction of vegetable oil, animal fat, and edible oil.

The ASTM D975 diesel fuel can contain 5 % or less of biofuel.

Use the biofuel conforming to ASTM D7467 if its mixing ratio is between 6% to 20%.

The EN590 diesel fuel can contain 7 % or less of biofuel.

When you use 100% biofuel for mixing, it needs to conform to ASTM D6751 or EN14214.

In the United States, purchase the biofuel from the dealer certified by BQ-9000.

In the EU, purchase the biofuel from the member companies of European Biodiesel Board (EBB).

In other countries or regions, purchase the biofuel from the dealer that guarantees the same quality as BQ-9000 or EBB.

NOTICE

When you use biofuel other than the preceding diesel fuel and its mixing ratio is up to 20 %, obey the precautions that follow.

- **It is necessary to consult with the local regulatory authorities of engine exhaust gas regulation whether the biofuel can be used or not.**
- **The fuel can possibly leak because of the deterioration of rubber material of the fuel hose.**
  Replace it with the fuel hose applicable for biofuel. Consult your Komatsu distributor for replacement of the fuel hose.
- **Biofuel cannot be stored for a long time because it is easy to deteriorate and change in quality.**
  Use the fuel in the storage tank or the fuel tank of the machine within 6 months.
  If the deteriorated and altered biofuel is used, it can cause bad effects on the engine parts.
  When you store the machine which uses the diesel fuel mixed with the biofuel for more than 3 months, do the procedure that follows.
  - **Replace it with pure diesel fuel or the new diesel fuel mixed with the biofuel at the lowest possible mixing ratio.**
  - **After you change the fuel, run the engine for a minimum of 30 minutes before you store the machine.**
- **Because the biofuel dissolves the materials sticking to the fuel tank and fuel line, the fuel filter can be clogged with them.**
  When you change the diesel fuel to the biofuel, replace the fuel main filter cartridge and fuel prefilter cartridge with new ones. When you replace the fuel main filter cartridge and fuel prefilter cartridge, make the replacement interval half the normal time until the second replacement after you change the diesel fuel to the biofuel.
- **Because the biofuel absorbs moisture easily, it can possibly cause a growth of microorganism.**
  When the microorganism grows in the biofuel, it can cause corrosion of the fuel system and the clogging of the fuel filter.
  Drain the water from the fuel tank before you start the operation.
  When you complete the operation, fill the fuel tank to reduce the air layer.
- **If the biofuel is used in the conditions of the specific operation, the fuel can possibly get mixed into the engine oil.**
  The fuel level in the engine oil must not exceed 5 %. Deteriorated engine oil can cause adverse effects on the engine parts such as a reduction of lubricating function. It is recommended to take a sample of the oil on a periodic basis.
- **The characteristics of the biofuel change when outside air temperature is low. The fuel filter can be clogged and the fuel inside the fuel tank can be solidified. Store the biofuel in the warm building or in the storage tank.**

Ash is easy to be accumulated in KDPF when the biofuel is used. Thus, the regeneration of KDPF can possibly become more frequent if the mixing ratio of the biofuel is high.

The energy density of the biofuel becomes lower by 7 to 10% with that of the diesel fuel. Fuel consumption and output can possibly be lowered when the mixing ratio is high.

Fuel hose quality can change as time passes due to the influence of material of bio when using BDF that mixing ratio is over 20% and they are likely to wear out or deteriorate.

Strongly recommend to replace Fuel hose every 2 years or every 4000 hours, whichever comes sooner.

PARAFFIN-BASED FUEL

The paraffin-based fuel is generated by natural gas, coal, vegetable oil, and animal and plant fat, and its main constituent is paraffin.

The paraffin-based fuel has almost the same characteristics as the diesel fuel.

Vegetable oil and fat-derived fuel are called renewable diesel (RD) and hydrogenated vegetable oil (HVO).

The fuel synthesized from natural gas is called gas-to-liquid (GTL).

NOTICE

Use the paraffin-based fuel which agrees with EN15940:2016 and ASTM D975.
As long as the fuel agrees with EN15940:2016 and ASTM D975, its mixing ratio can be up to 100%.

The energy density of the paraffin-based fuel becomes lower up to 10% with that of the diesel fuel. Thus, fuel consumption and output can possibly be lowered.

COOLANT

- The coolant has the important function to prevent corrosion and freezing.
  Although the machine is operated in an area where freeze is not an issue, use coolant.
  Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC). Non-Amine Engine Coolant (AF-NAC) has excellent anti-corrosion, antifreeze and cooling properties and can be used continuously for every 3 years or every 6000 hours whichever occurs first in the below listed conditions;
  Conditions to meet every 2 years or 4000 hours to extended coolant life:
  - Must pass coolant test/analysis at 4000 hours, the test interval is a precautionary procedure intended to prevent cooling and engine system damage
  - All maintenance top offs and refills were done with Komatsu approved non-Amine (AF-NAC) coolant

  For more information (e.g. test method) on the Coolant test/Analysis, consult an authorized Komatsu Distributor.
  Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC). If you use other coolant, it can cause dangerous failure such as corrosion of the engine and aluminum parts of the cooling system.
- When you use an antifreeze, be sure to obey the precautions in the Operation and Maintenance Manual.
- The coolant density is different by the ambient temperature.
  Even in areas where freeze is not an issue, use Non-Amine Engine Coolant (AF-NAC) with a density of 30% or more to prevent corrosion of the cooling system.
  Non-Amine Engine Coolant (AF-NAC) is mixed with pure water that does not contain ions or water-hardness components. Do not mix it with water.
- If the engine is overheated, wait for the engine to cool down before you add the coolant.
- If the coolant level is low, it will cause overheating, and will also cause failure with corrosion by entry of air to coolant.

DEF

- If it gets on your skin, it can cause inflammation. Immediately take the contaminated clothes or shoes off and wash it off with water. In addition, use a soap to wash it off fully. If your skin becomes irritated or begins to hurt, immediately consult a doctor for treatment.
- Do not try vomiting if swallowed. If swallowed, fully rinse the mouth with water and consult a doctor for treatment.
- Avoid contact with the eyes. If there is contact, flush with clean water for several minutes and consult a doctor for treatment.
- Wear the protective eyeglasses when exposed to the DEF to protect from solution splashing in your eyes. Wear the rubber gloves when you do the work that handles the DEF to avoid skin contact.
- When opening the cap of DEF tank of the machine, the ammonia vapor may escape. Keep your face away from the filler port during opening or refilling.
- Do not put fluid other than DEF into DEF tank. If diesel fuel or gasoline is added into the tank, it can cause a fire. Some fluids or agents added can cause a poisonous gas.
- The DEF is non-flammable; but, in the case of a fire it can cause an ammonia gas.
- If the DEF is spilled, immediately wash and clean the area with water. If the spilled DEF is left as it is and the area is not washed and cleaned, it can cause corrosion to the contaminated area and discharge poisonous gas.
- When you dispose of the DEF, handle it as an industrial waste. The container for DEF is an industrial waste as well. It must be handled in the same manner.

- Do not use an iron or aluminum container for disposal of the DEF, because poisonous gas can be caused and a chemical reaction can corrode the container. When you handle the fluid waste of the DEF, use a container made of resin (PP, PE) or stainless steel.

NOTICE

If additional additive agents are mixed in DEF, or if water is added to change its concentration, and that mixture is used, the devices will not function correctly, and it will not agree with the exhaust gas regulations. It will cause failure of the machine.

GREASE

- Grease is used to prevent joint seizure or noise.
- The construction machinery is used in heavy-duty conditions. Use the Komatsu recommended grease and be sure to obey the applicable ambient temperature and replacement intervals as in the Operation and Maintenance Manual.
- The grease fittings for overhaul are not included in the periodic maintenance section, so it is not necessary to add grease.
  If the part becomes stiff or creaks after it is used for long time, add grease.
- After lubrication, wipe off the old grease that is pushed out.
  Wipe off grease especially on the rotation parts because sand or dirt is easy to stick and this will promote wear.

KOWA (Komatsu Oil Wear Analysis)

KOWA is a maintenance service to collect oil and analyze it regularly. KOWA finds wear of the machine drive parts or other failures at an early stage to prevent machine failure and downtime.

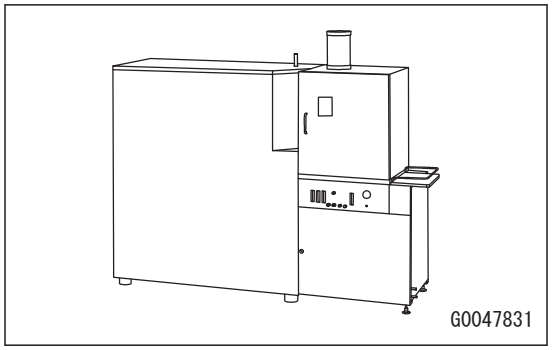
Thanks to long term experience and lots of data collected, we can access your machine's condition accurately to provide correct recommendation.

Komatsu recommends you this service. The oil analysis is done at actual cost only, and the results of the analysis and recommendations are reported promptly.

Analysis items

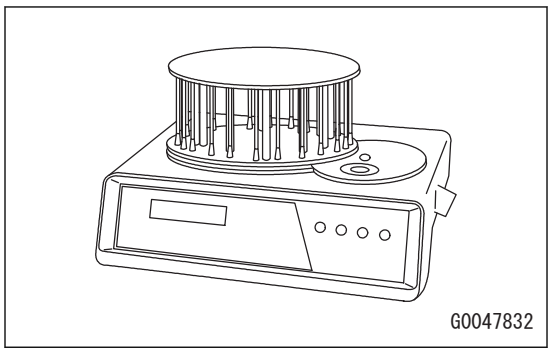
Measurement of metallic powder concentration

The most recent oil ICP (Inductively Coupled Plasma) analyzer is used to measure the concentrations of iron, copper, and other metallic powder in the oil.



Measurement of quantity of iron particles

PQI (Particle Quantifier Index) measuring instrument is used to measure the quantity of iron particles of 5 μm or above and detection of failure at an early stage becomes possible.



Others

KOWA monitors and gives a diagnosis of condition of the machine and components accurately such as entry of moisture, coolant, or fuel in the oil, and also measures kinematic viscosity as necessary.

Oil collection interval

Every 500 hours

Precautions to collect oil

- Mix the oil sufficiently, and then collect the oil.
- Collect the oil at the specified intervals continuously.
- Do not collect oil on rainy or windy days to prevent entry of water or dirt.

For details about KOWA, consult your Komatsu distributor.

STORE OIL AND FUEL

- Keep oil and fuel indoors to prevent entry of foreign material such as water or dirt.
- When you keep a drum can for a long period, put it sideway, and make sure that the filler port of the drum can comes below the liquid surface to prevent entrainment of humidity. If the machine needs to be stored outdoors, cover it with waterproof sheet.
- To prevent change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

STORE DEF

- If DEF becomes high temperature, a harmful ammonia gas can occur. Fully seal up its container for storage. Open containers in a well-ventilated area.
- For storage of DEF, prevent direct sunlight and use the original container. Do not change the container of DEF with other one. If DEF is stored in an iron or aluminum container, toxic gas can occur and a chemical reaction can corrode the container.
- The relationship between the upper limit of storage temperature and the storage period of DEF is shown in the table.

Temperature of storage area	Storage period
10 °C {50 °F} or below	Up to 36 months
25 °C {77 °F} or below	Up to 18 months
30 °C {86 °F} or below	Up to 12 months
35 °C {95 °F} or below	Up to 6 months

*: Do not store DEF in the temperature of 35 °C {95 °F} or above.

FILTER

- The filters are very important safety parts. They prevent entry of impurities into oil, fuel, and air circuits not to cause failure to the important devices. Replace all the filters regularly. For details, see Operation and Maintenance Manual.
  If the machine works in heavy-duty conditions, replace the filters at shorter intervals by the oil and fuel (sulfur content) being used.
- Do not try to clean and use the filter (cartridge type) again.
- After the oil filter is replaced, make sure that no foreign material is found in the used filters.
  If foreign material is found, consult your Komatsu distributor.
- Do not open the packages of spare filters until just before they are to be used.
- Komatsu recommends the use of Komatsu genuine filters.

BATTERY TERMINAL

- Make sure that the battery terminals have no looseness or corrosion.
- If there is looseness, make sure that there is no damage or corrosion, and retighten it.
- For the procedure to retighten and the torques, etc., see“PPRECAUTIONS WHEN YOU REMOVE AND INSTALL BATTERY (3-341)” and “WALK-AROUND CHECK (3-193)”.
- If there is corrosion, fully clean the rust on the battery and battery cable, and replace the battery terminals.
- When you replace the battery terminals, obey the instructions given in “PRECAUTIONS FOR MAINTENANCE (2-31)”.

ELECTRICAL COMPONENTS

⚠ WARNING

- **When the battery disconnect switch key is turned to the OFF position for the maintenance work, be sure to pull out the key and keep it with you. If the key is left in the switch, it can be turned on by mistake and it can cause an electric shock.**
- **Electrical leakage from the electrical components can cause malfunction by wet or damage of the coating. Do not wash inside the operator's compartment with water. Be careful not to let water get into the electrical components when you wash the machine.**

- Wipe off the water drops stuck around connectors before you remove the connectors of the electrical components after you wash the machine or in the rain, and do not let water drops get into the connectors.
- Check and maintenance items include checks for fan belt tension, fan belt damages, and battery fluid level.
- Install the electrical components specified by Komatsu.
- External radio interference can cause malfunction of the control system controller. Accordingly, consult your Komatsu distributor for installation of radio receiver or other wireless equipment to the machine.
- When you work at the seashore, keep the electrical components clean to prevent corrosion.
- When you install the electrical component, connect it to the specified power supply connector.
  Do not connect the optional power supply to the fuse, starting switch, or battery relay, or such.

STANDARD TIGHTENING TORQUE FOR BOLTS AND NUTS

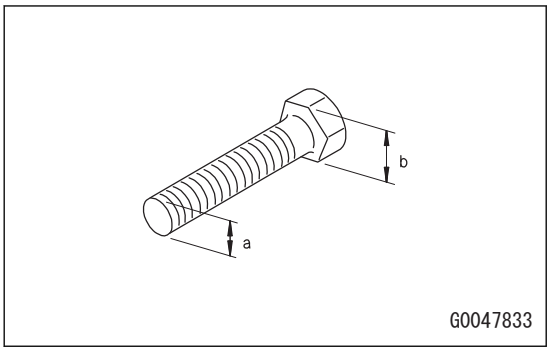
Torque list

⚠ CAUTION

If you tighten the parts by other than the specified tightening torque, the parts will be damaged or loose, and the machine failures or operating problems will be caused.

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

When you replace the bolts or nuts, Komatsu recommends the use of Komatsu genuine part of the same size as before replacement.

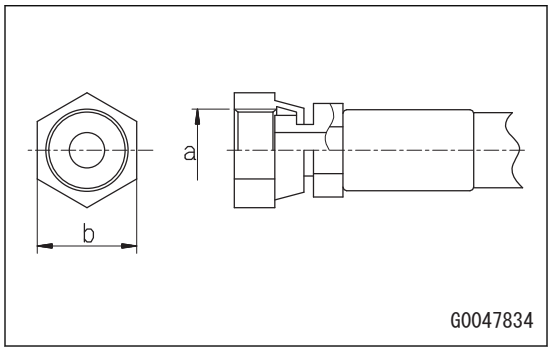


Outside diameter of the thread part “a” (mm {in})	Width across flats “b” (mm {in})	Tightening torque (Nm {kgfm, lbft})	
		Target value	Allowable range
6 {0.236}	10 {0.394}	13.3 {1.35, 9.8}	11.8 to 14.7 {1.2 to 1.5, 8.7 to 10.8}
8 {0.315}	13 {0.512}	31 {3.2, 22.8}	27 to 34 {2.8 to 3.5, 20.3 to 25.3}
10 {0.394}	17 {0.669}	67 {6.8, 48.8}	59 to 74 {6 to 7.5, 43.4 to 54.2}
12 {0.472}	19 {0.748}	111 {11.3, 81.4}	98 to 123 {10 to 12.5, 72.3 to 90.4}
14 {0.551}	22 {0.866}	172 {17.5, 127}	153 to 190 {15.5 to 19.5, 112 to 141}
16 {0.63}	24 {0.945}	260 {26.5, 192}	235 to 285 {23.5 to 29.5, 170 to 213}
18 {0.709}	27 {1.063}	360 {37, 268}	320 to 400 {33 to 41, 239 to 297}
20 {0.787}	30 {1.181}	510 {52.3, 378}	455 to 565 {46.5 to 58, 336 to 420}
22 {0.866}	32 {1.26}	688 {70.3, 508}	610 to 765 {62.5 to 78, 452 to 564}
24 {0.945}	36 {1.471}	883 {90, 651}	785 to 980 {80 to 100, 579 to 753}
27 {1.063}	41 {1.614}	1295 {133, 957}	1150 to 1440 {118 to 147, 853 to 1060}
30 {1.181}	46 {1.811}	1715 {175, 1265}	1520 to 1910 {155 to 195, 1120 to 1410}
33 {1.299}	50 {1.969}	2205 {225, 1630}	1960 to 2450 {200 to 250, 1450 to 1810}
36 {1.417}	55 {2.165}	2745 {280, 2025}	2450 to 3040 {250 to 310, 1810 to 2240}

Outside diameter of the thread part “a” (mm {in})	Width across flats “b” (mm {in})	Tightening torque (Nm {kgfm, lbft})	
		Target value	Allowable range
39 {1.535}	60 {2.362}	3260 {333, 2405}	2890 to 3630 {295 to 370, 2130 to 2680}

Torque list for hoses

Tighten the hoses to the torque shown in the table.



Taper seal

Hose nominal number	Thread size “a” (mm {in})	Width across flats “b” (mm {in})	Tightening torque (Nm {kgfm, lbft})	
			Target value	Allowable range
02	14 {0.6}	19 {0.748}	44 {4.5, 32.5}	34 to 63 {3.5 to 6.5, 25.3 to 47}
03	18 {0.7}	22 {0.866}	78 {8.0, 57.9}	59 to 98 {6.0 to 10.0, 43.4 to 72.3}
04	22 {0.9}	27 {1.063}	103 {10.5, 75.9}	84 to 132 {8.5 to 13.5, 61.5 to 97.6}
05	24 {0.9}	32 {1.26}	157 {16.0, 116}	128 to 186 {13.0 to 19.0, 94 to 137}
06	30 {1.2}	36 {1.417}	216 {22.0, 159}	177 to 245 {18.0 to 25.0, 130 to 181}
10	33 {1.3}	41 {1.6}	216 {22.0, 159}	177 to 245 {18.0 to 25.0, 130 to 181}

Face seal

Hose nominal number	Nominal - Threads per inch “a”	Width across flats “b” (mm {in})	Tightening torque (Nm {kgfm, lbft})	
			Target value	Allowable range
02	$^{9}/_{16}$-18UN	19 {0.748}	44 {4.5, 32.5}	34 to 54 {3.5 to 5.5, 25.3 to 39.8}
03	$^{11}/_{16}$-16UN	22 {0.866}	74 {7.5, 54.2}	54 to 93 {5.5 to 9.5, 39.8 to 68.7}
04	$^{13}/_{16}$-16UN	27 {1.063}	103 {10.5, 75.9}	84 to 132 {8.5 to 13.5, 61.5 to 97.6}
05	1-14UNS	32 {1.26}	157 {16.0, 116}	128 to 186 {13.0 to 19.0, 94 to 137.4}
06	$1^{3}/_{16}$-12UN	36 {1.417}	216 {22.0, 159}	177 to 245 {18.0 to 25.0, 130.2 to 181.8}

MAINTENANCE SCHEDULE

- When you use the engine oil for cold districts, the maintenance intervals of the engine oil and filter cartridge are changed to every 250 hours.
- Consult your Komatsu distributor to change the maintenance interval of the machine monitor.

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MAINTENANCE PROCEDURE

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

Do the maintenance that follow after the first 250 hours only for a new machine.

- Change oil in transmission case and clean strainer
- Change oil in final drive case
- Clean final drive breather
- Change oil in circle rotation gear case
- Replace hydraulic tank oil filter element
- Change oil in tandem case
- Check clearance and play of ball joint in front drawbar

For the maintenance method,, see “EVERY 1000 HOURS MAINTENANCE (4-76)” and “EVERY 2000 HOURS MAINTENANCE (4-91)”.

INITIAL 1000 HOURS MAINTENANCE (ONLY AFTER THE FIRST 1000 HOURS)

Do the maintenance that follow after the first 1000 hours only for a new machine.

- Check and adjust engine valve clearance

For the maintenance method, see “EVERY 2000 HOURS MAINTENANCE (4-91)”.

WHEN REQUIRED

CHECK, CLEAN AND REPLACE AIR CLEANER

⚠ WARNING

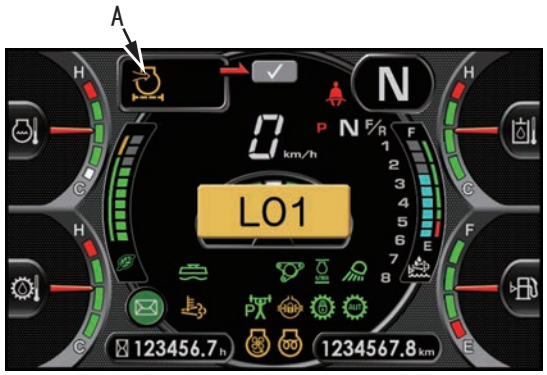
- **When you use the compressed air, there is a danger that personal injury is caused if dirt flies over. Wear the protective equipment such as protective eyeglasses, gloves, and dust mask.**
- **When you remove the outer element, it is dangerous to pull it out by force. Stand on a stable footing, and remove the outer element from the air cleaner body carefully.**

NOTICE

- **Do not clean the element until the air cleaner clogging caution lamp on the machine monitor lights up.**
  If the element is cleaned frequently, the air cleaner cannot show its normal performance and the cleaning effect decreases.
  Also, dirt stuck to the element can fall inside the inner element more frequently.
- **If dirt enters the engine, it can damage the engine. Before you clean or replace the air cleaner, stop the engine.**
  When you clean or replace the air cleaner, be careful not to let dirt on the outer element fall into the inner element. Do not clean or replace the air cleaner in strong winds or in a dusty area.
- **After 6 times of cleaning, or every 1 year, whichever comes first, replace the inner and outer elements with new ones.**

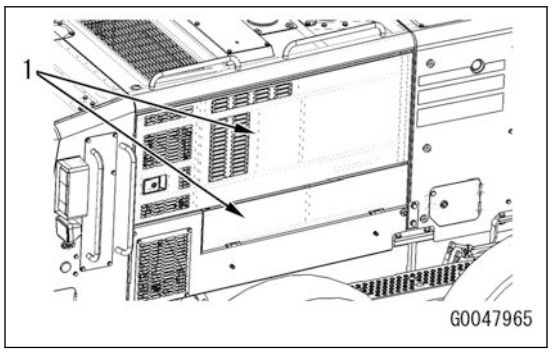
CHECK AIR CLEANER

1. Make sure that the air cleaner clogging caution lamp (A) on the machine monitor is lit.

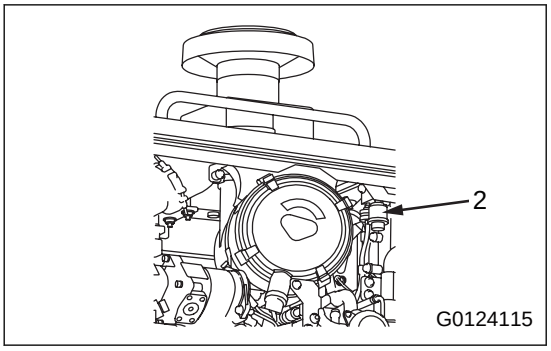


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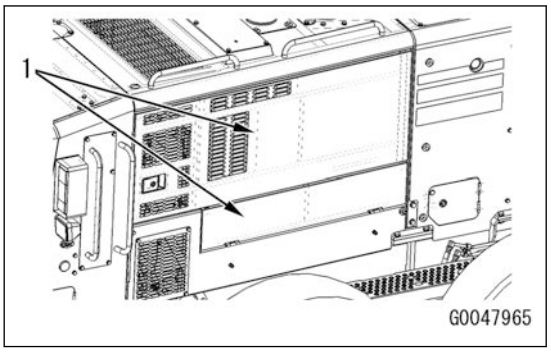
2. Open the side cover (1).



3. When the yellow piston in the dust indicator (2) reaches the red line, clean the air cleaner element.



4. Close the side cover (1).



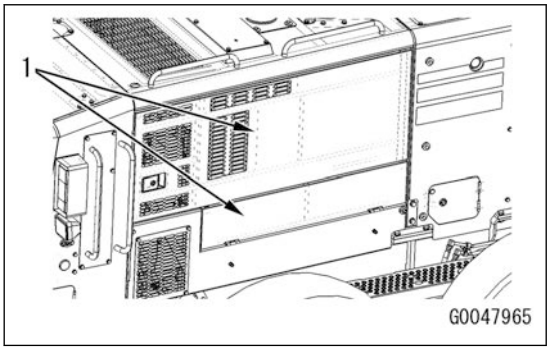
CLEAN AIR CLEANER OUTER ELEMENT

NOTICE

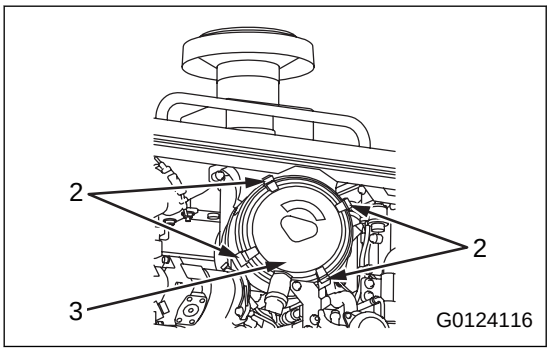
- **Do not remove the inner element. If it is removed, dirt will enter and can cause an engine trouble.**
- **Do not use the tool such as a screwdriver.**
- **When you clean the element, be careful not to hit it against the object. The element can be damaged.**

Clean the air cleaner outer element while the engine is stopped.

1. Open the side cover (1).

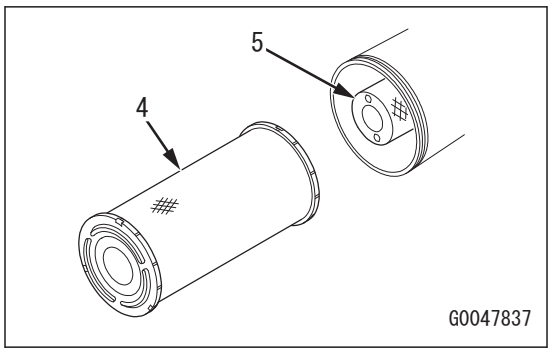


2. Remove the clips (2) (4 pieces), and remove the cover (3).



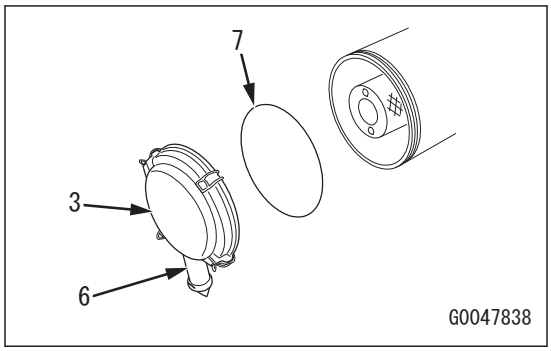
3. Hold the outer element (4), and move it lightly up and down and to the right and left, and pull the element out while you rotate it.
4. Make sure that the inner element (5) does not come out of position or is not at an angle.

   If it is at an angle, push it straight to the bottom with your hand.
5. Put a cloth or tape on the inner element (5) to prevent entry of dirt.



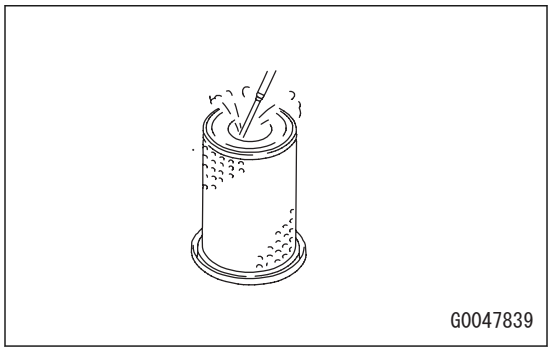
6. Remove dirt inside the cover (3) and air cleaner body.
7. If dirt is accumulated on the vacuator valve (6) installed to the cover (3), replace the vacuator valve.
8. Replace the outer element (4) with a new one in the cases that follow.
   - When the outer element (4) is cleaned more than 6 times
   - When the outer element (4) is used for 1 year

   Replace the inner element (5) also at the same time when you replace the outer element (4).

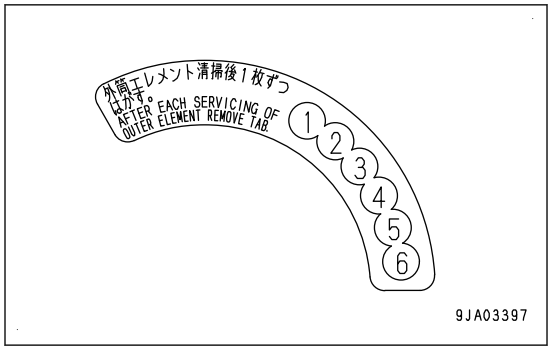


If replacement of the outer element (4) is not necessary, continue the cleaning.

9. Blow dry compressed air (0.2 MPa {2.1 kgf/cm^2, 30 PSI} or below) from the inside of the outer element along the pleats.
10. Blow along the pleats from the outer side, then blow again from the inner side.

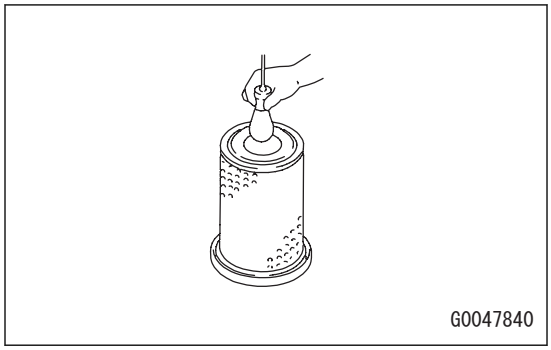


11. Remove a seal each time after you clean the element.

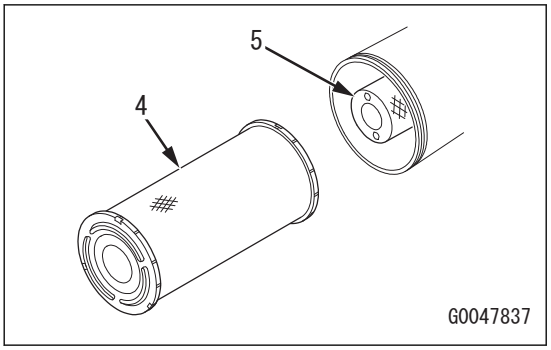


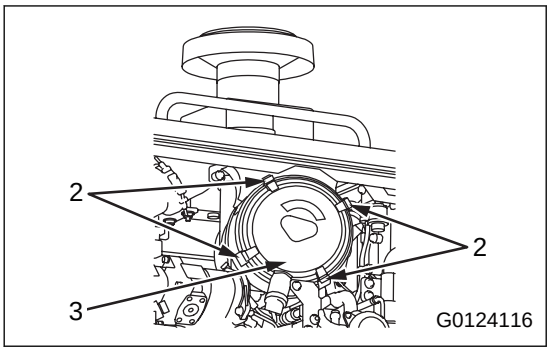
12. After cleaning, illuminate inside of the element with an electric bulb to check.

    If small hole or thin place is found, replace the outer and inner elements with new ones.



13. Remove the cloth or tape attached to the inner element (5).
14. Set the cleaned outer element (4) to the installation position, and fix the cover (3) with the clips (2) (4 pieces).





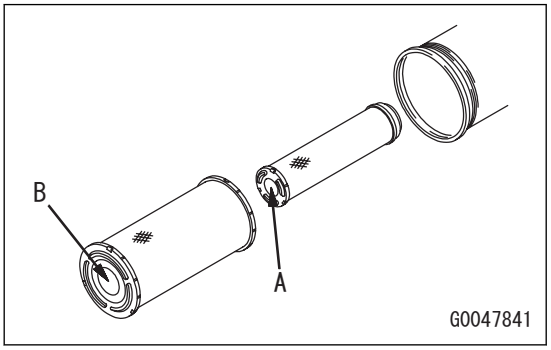
NOTICE

- **Do not use the element with its fold, gasket, or seal damaged.**
- **Do not use the element or O-ring again if they are used for 1 year or more. It can cause a failure.**
- **Wrap the unused element, and keep it in a dry area.**

15. Make sure that there is no dirt and oil stuck on the seal of the cleaned or new element.
    If dirt or oil is stuck, wipe them off.

NOTICE

- **The air cleaner element must be installed in the correct direction.**
  Make the bottoms of the outer element (4) (face where no hole is drilled) (A) and (B) come to the cover (3) side.
  If it is not installed in correct direction, it can cause breakage of the air cleaner element or damage to the engine.
- **If you force to install the cover (3) by the clip (2) as in the status that follow, it can cause damage on the clip or air cleaner.**
  - **If the rubber at the end part is swollen when you insert the element**
  - **If the outer element (4) is not pushed in straight**

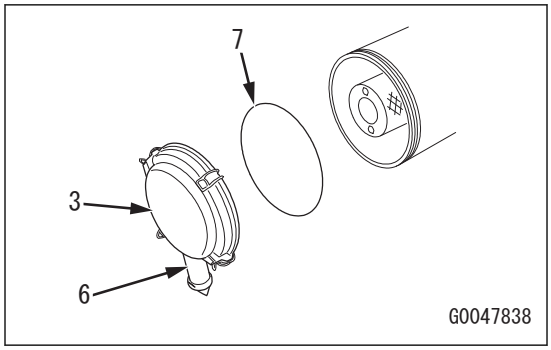


16. Push the outer element (4) in straight with your hand into the air cleaner body.
    Hold the outer element (4), and move it lightly up and down and to the right and left, the outer element can be inserted easily.

17. Install the cover (3) as follows.
    1) Make sure that the O-ring (7) is installed to the cover (3).
    2) Align the cover (3) with the element.

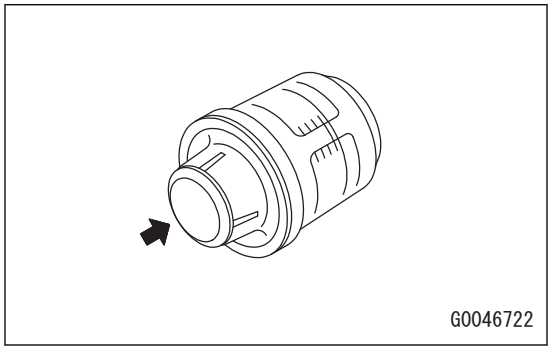
       Be sure to install the cover (3) while the vacuator valve (6) faces to the ground.
    3) Lock the front end of the clip (2) on the protrusion of the air cleaner body.
    4) Make sure that the clearance between the air cleaner body and cover (3) is not too large.

       If the clearance is too large, remove the cover (3), and then install it again.

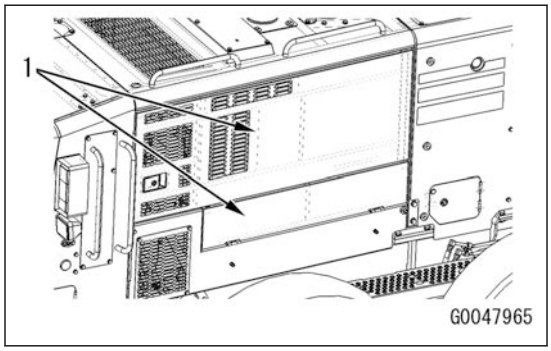


18. Push the button of the dust indicator to return the yellow piston to its initial position.
19. Check the air cleaner clogging caution lamp on the machine monitor.

    Replace the inner and outer elements with new ones for the cases that follow.
    - When the air cleaner clogging caution lamp lights up immediately after cleaning
    - When the yellow piston reaches the red line immediately after cleaning



20. Close the side cover (1).

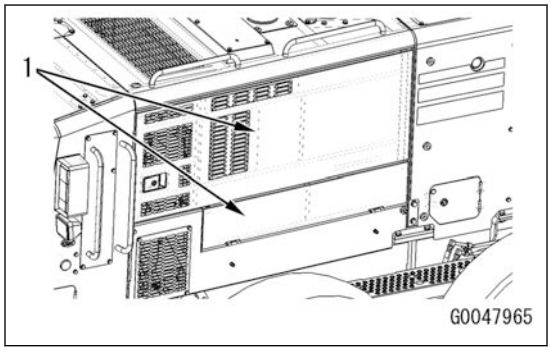


REPLACE AIR CLEANER ELEMENT

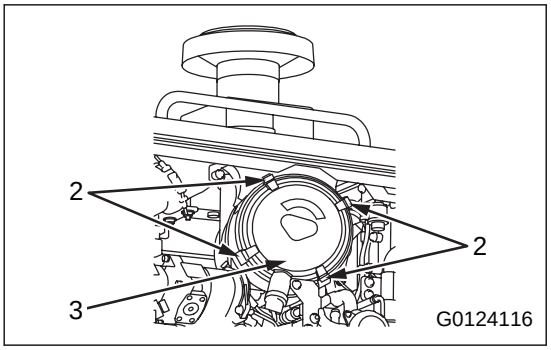
NOTICE

- **Do not clean and use the inner element again.**
  When you replace the outer element, replace the inner element with new one at the same time.
- **If the outer element and cover are installed while the inner element is not installed correctly, the outer element can be damaged.**
- **Do not use improper parts. The seal parts do not have sufficient precision, and it will cause entry of dirt, and thus damage to the engine.**

1. Open the side cover (1).

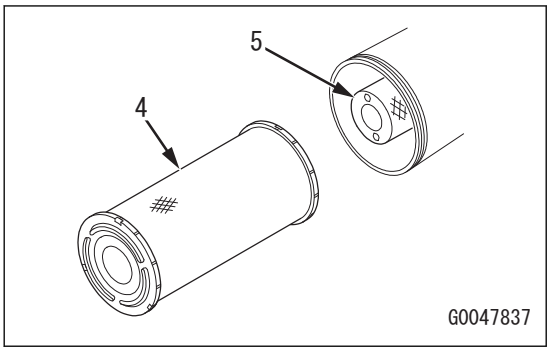


2. Remove the clips (2) (4 pieces), and remove the cover (3).



3. Hold the outer element (4), and move it lightly up and down and to the right and left, and pull the element out while you rotate it.

   Do not remove the inner element.



4. Remove dirt inside the cover (3) and air cleaner body.

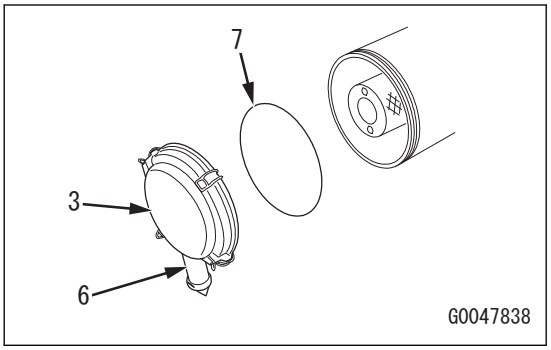
   NOTICE

   When you clean the cover (3), do not remove the vacuator valve (6).

5. Remove the inner element (5), and then quickly install the new inner element.

   Insert the inner element (5) securely not to move.

6. Push the new outer element (4) in straight with your hand into the air cleaner body.



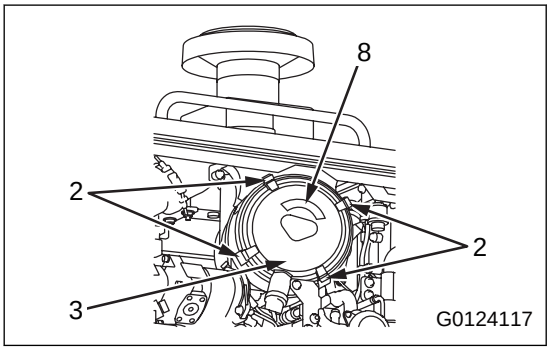
   Hold the outer element (4), and move it lightly up and down and to the right and left, the outer element can be inserted easily.

7. Install the cover (3) as follows.
   1) Make sure that the O-ring (7) is installed to the cover (3).
   2) Align the cover (3) with the element.

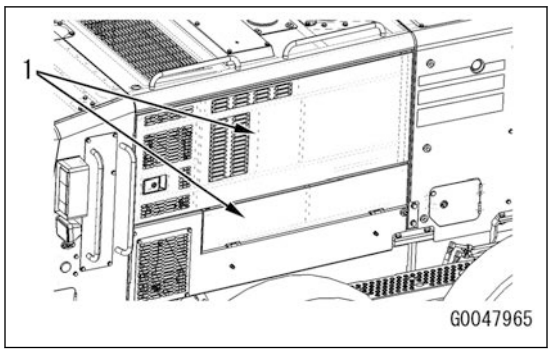
      Be sure to install the cover (3) while the vacuator valve (6) faces to the ground.
   3) Lock the front end of the clips (2) (4 pieces) on the protrusion of the air cleaner body.
   4) When the cover (3) is installed, make sure that the clearance between the air cleaner body and cover (3) is not too large.

      If the clearance is too large, remove the cover (3), and then install it again.

8. Replace the seal (8) on the cover (3) with a new one.

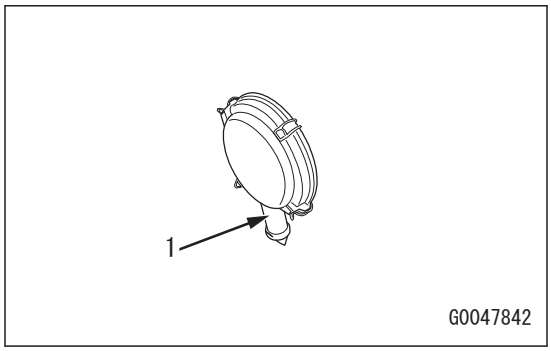


9. Close the side cover (1).



CHECK AND REPLACE VACUATOR VALVE

Check the vacuator valve (1) for damage and deformation of its rubber part.
If the vacuator is damaged or its rubber part is deformed, replace it with a new one.



CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Immediately after the engine is stopped, the cooling system is very hot and can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When you remove the cap of coolant filler port, there is a possibility that the coolant spurts out. Turn it slowly to release the internal pressure, then remove it.**
- **Check that the conditions that follow are satisfied to prevent the machine movement, and then stand up or go away from the operator's seat.**
  - **The work equipment is locked (the work equipment lock pilot lamp lights up).**
  - **Each control lever is in the NEUTRAL position.**
  - **Make sure that the steering lever enable switch is at the disable position.**
  - **The parking brake switch is in the ON position.**
- **The coolant is poisonous. When you open the drain plug, be careful not to get coolant on you. If coolant gets into your eyes, immediately wash your eyes by a lot of clean water and consult a doctor.**
- **Consult your Komatsu distributor or a qualified company for disposal of the discharged coolant. The coolant is poisonous. Do not put it into drainage ditches or drain it onto the ground surface.**

NOTICE

If the air in the cooling system is not fully bled, it can cause damage of EGR cooler and it can cause dangerous failure such as seizure inside of the engine.

- **Be sure to check the coolant level, add coolant, and bleed air immediately after the coolant change.**
- **After coolant is changed, the coolant level of reservoir tank can decrease largely as time goes by. Especially, if the coolant level in the reservoir tank drops, or before you start the operation at the next day of the coolant change, be sure to check the coolant level and add coolant before you start the work. See OPERATION, "CHECK COOLANT LEVEL, ADD COOLANT (3-200)".**
- Stop the machine on a solid and level ground, and clean inside the cooling system or change coolant. Clean inside the cooling system and change coolant as in the table that follows.

Coolant	Interval for cleaning inside of cooling system and changing coolant
Non-Amine Engine Coolant (AF-NAC)	Every 3 years or 6000 hours (See below for condition), whichever comes sooner

- The coolant has the function to prevent corrosion and freeze.
  Although the machine is operated in an area where freeze is not an issue, use coolant.
  Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC). Non-Amine Engine Coolant (AF-NAC) has excellent anti-corrosion, antifreeze and cooling properties and can be used continuously for every 3 years or every 6000 hours whichever occurs first in the below listed conditions (If other coolant than Komatsu approved non-Amine (AF-NAC) is used for refill or top off, the change interval is every 2 years or every 4000 hours whichever occurs first).
  Conditions to meet every 2 years or 4000 hours to extended coolant life:
  - Must pass "coolant test/analysis" at 4000 hours, the test interval is a precautionary procedure intended to prevent cooling and engine system damage
  - All maintenance top offs and refills were done with Komatsu approved non-Amine (AF-NAC) coolant

  Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC). If you use coolant that is not recommended, it can cause dangerous failure such as the corrosion of the cooling system or engine.
  To prevent corrosion of the cooling system, use the Non-Amine Engine Coolant (AF-NAC) of a density of 30% to 64%.
- The supplied Non-Amine Engine Coolant (AF-NAC) is mixed with pure water.
  It is mixed with pure water, so it is not flammable.

- The coolant density is different by the ambient temperature. Find the lowest temperature in the past and select the correct density for the coolant as in the “Coolant density table” that follows.

Coolant density table

Min. atmospheric temperature	°C {°F}	-10 {14} or more	-15 {5}	-20 {-4}	-25 {-13}	-30 {-22}	-35 {-31}	-40 {-40}	-45 {-49}	-50 {-58}
Density (%)		30	36	41	46	50	54	58	61	64

When you select the density for the coolant, set it for a temperature 10 °C {18 °F} lower than the actual lowest temperature in the jobsite.

The coolant density is different by the ambient temperature, but it must be 30% or more.

Check the density with a coolant tester.

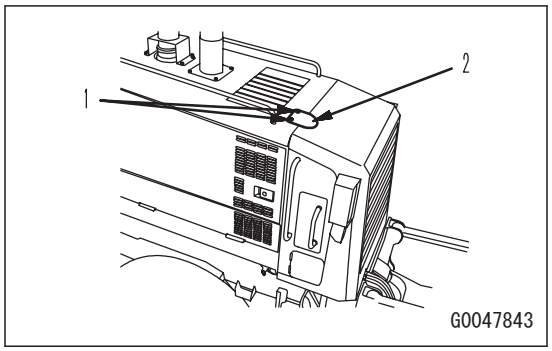
CLEAN INSIDE OF COOLING SYSTEM

Check the density with a coolant tester.

Items to be prepared

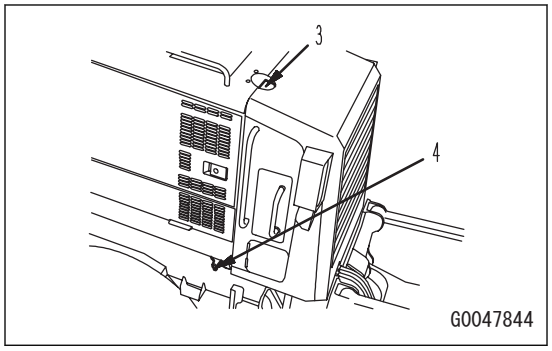
- A container whose capacity is sufficient to catch the coolant of specified capacity
- A hose to add coolant

1. Stop the engine.
2. Remove the bolts (1) (2 pieces) and remove the cover (2).



3. Make sure that the radiator cap (3) is sufficiently cool to touch by bare hands.
4. Turn the radiator cap (3) slowly until it touches the stopper and release the pressure.
5. Turn the radiator cap (3) until it touches the stopper while it is pushed, then remove it.
6. Prepare a container to catch coolant.
7. Open the drain valve (4) and drain coolant.
8. After you drain coolant, close the drain valve (4) and add tap water.

   Add water until it fills the radiator.



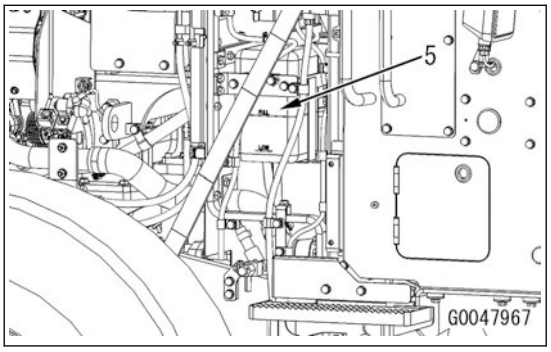
9. Start the engine.

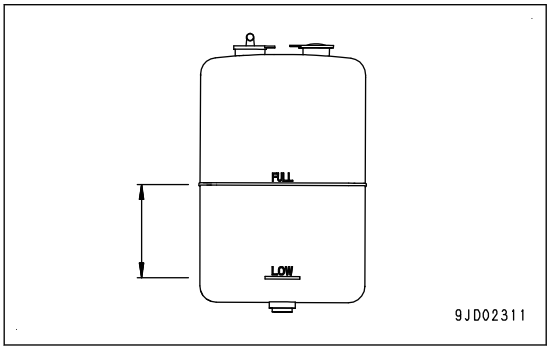
   Do the warm-up operation sufficiently at low idle.

   Run the engine at high idle, and increase the water temperature to 90 °C {194 °F} or more, and run the engine approximately for 10 minutes.
10. Stop the engine.
11. Open the drain valve (4) and drain tap water.
12. Close the drain valve (4).
13. Fill it with coolant through the filler port up to the port.

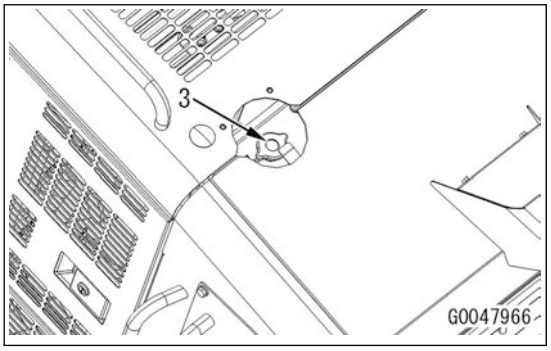
For the density of Non-Amine Engine Coolant (AF-NAC), see “Coolant density table”.

14. Bleed air from the coolant.
    At this time, keep the radiator cap (3) removed.
    1) Run the engine at low idle for 5 minutes.
    2) Run the engine at high idle for 5 minutes.
15. Open the side cover.
16. Drain coolant from the reservoir tank (5).
17. Clean inside the reservoir tank.
18. Add coolant up to the middle between the FULL and LOW.
19. Stop the engine.
20. After approximately 3 minutes, add coolant up to the filler port.
21. Close the side cover.

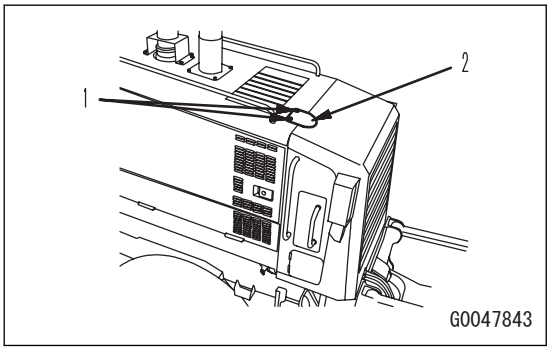




22. Tighten the radiator cap (3).



23. Install the cover (2) with the bolts (1) (2 pieces).



DRAIN WATER IN FUEL PREFILTER

⚠ WARNING

- **Do not drain water or remove the element cup immediately after the engine is stopped. The parts are very hot. Wait for all of parts to cool down before you start the work.**
- **While the engine runs, the high-pressure occurs in the engine fuel piping system. When you drain water or remove the element cup, wait for 30 seconds or more after the engine stops to let the internal pressure go down.**
- **Do not let an open flame be near.**

Items to be prepared

Container to catch water

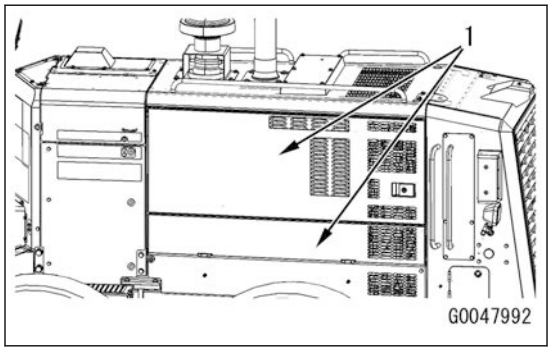
When water is accumulated in the cup at the bottom of the fuel prefilter, the water separator caution lamp on the machine monitor lights up in red.

When the lamp lights up, drain water from the fuel prefilter as follows.



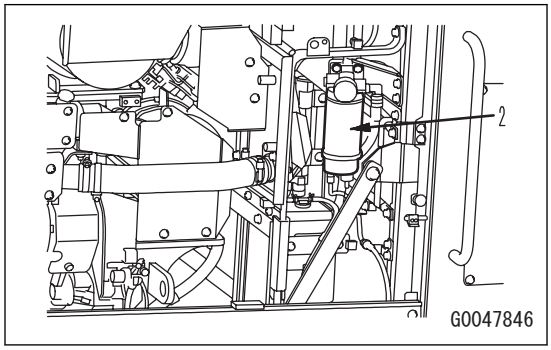
G0048019

1. Open the side cover (1).



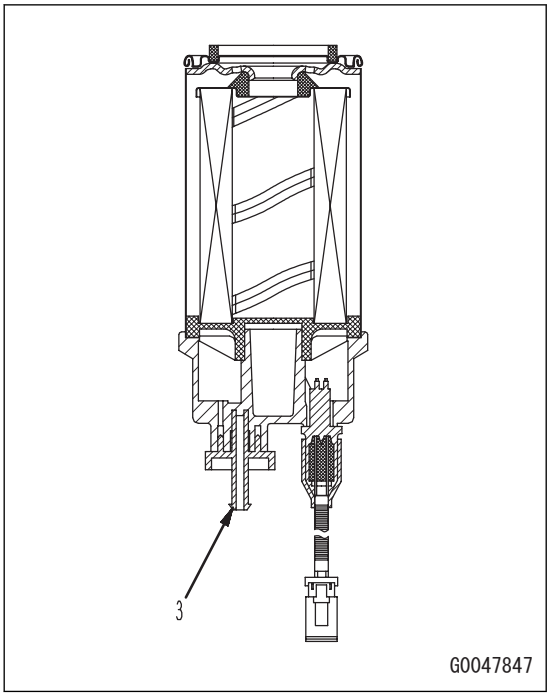
G0047992

2. Put a container to catch water below the drain hose of the fuel prefilter (2).

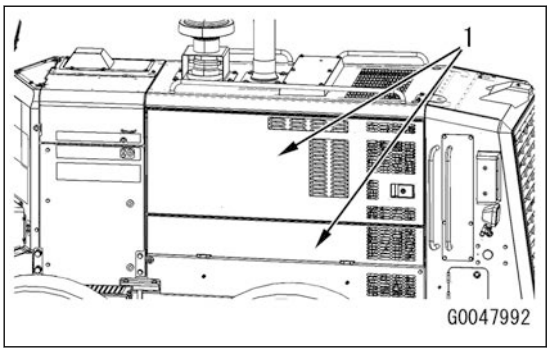


G0047846

3. Loosen the drain plug (3) at the bottom of the fuel prefilter, and drain water.



4. Close the side cover (1).



CLEAN AIR CONDITIONER CONDENSER

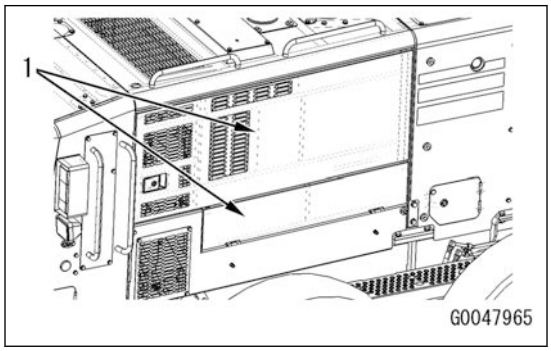
⚠ WARNING

- **The condenser is heated and it is dangerous. Do not use a steam cleaner for cleaning.**
- **If the compressed air, high-pressure water, or steam hits your body directly or if dirt flies over, there is a danger that personal injury is caused. Wear the protective equipment such as protective eye-glasses and dust mask.**

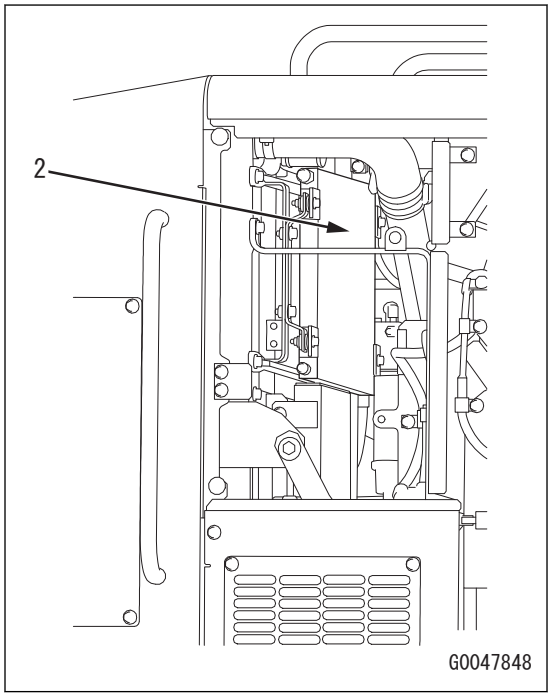
If mud or dirt is stuck to the condenser, clean them with water.

If water pressure is too high, the fin can be deformed. When you clean it with pressurized water, keep sufficient distance.

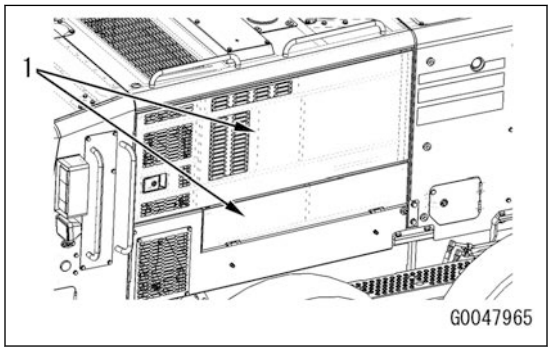
1. Open the side cover (1).



2. Clean the condenser (2) with water from the top.



3. Close the side cover (1).



CLEAN RADIATOR FIN AND COOLER FIN

⚠ WARNING

- **Stop the engine fully before you clean the fin.**
- **If the compressed air, high-pressure water, or steam hits your body directly or if dirt flies over, there is a danger that personal injury is caused. Wear the protective equipment such as protective eyeglasses and dust mask.**

Do this work if mud or dirt is stuck to the radiator.

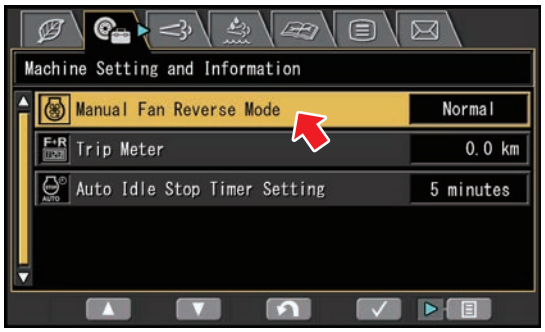
CLEAN FINS BY REVERSE ROTATION OF COOLING FAN

NOTICE

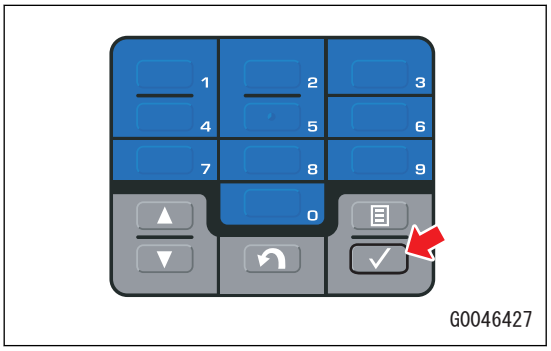
When the fan is rotated in reverse direction, be careful that dirt will not fly out or cloth or such will not be caught in the fan.
As dirt blows up, make sure that there is no person around the machine.

On the jobsite where the dirt sticks easily to the radiator or cooler, rotate the fan in reverse. This will blow off dirt, and can extend the cleaning interval.

For the method of reverse rotation of the fan, see “REVERSE HYDRAULIC FAN (3-78)”.



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REVERSE FAN

NOTICE

- **Do not do the work while the fan rotates in reverse.**
- **Before you operate the reverse rotation of the fan, set the engine speed to low idle.**

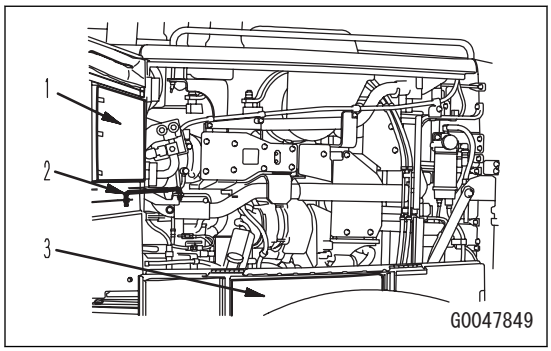
For the reverse rotation of the fan, see “REVERSE HYDRAULIC FAN (3-78)”.

1. Open the side covers (1) at the right and left of the machine, and lock them with the lock bars (2).
2. Open the covers (3) at the right and left of the machine.
3. After the reverse rotation of the fan is started, set the engine speed to high idle.

   Select the time to run the engine at high idle as follows in response to the condition of clogging.

   Normal clogging: 1 to 2 minutes

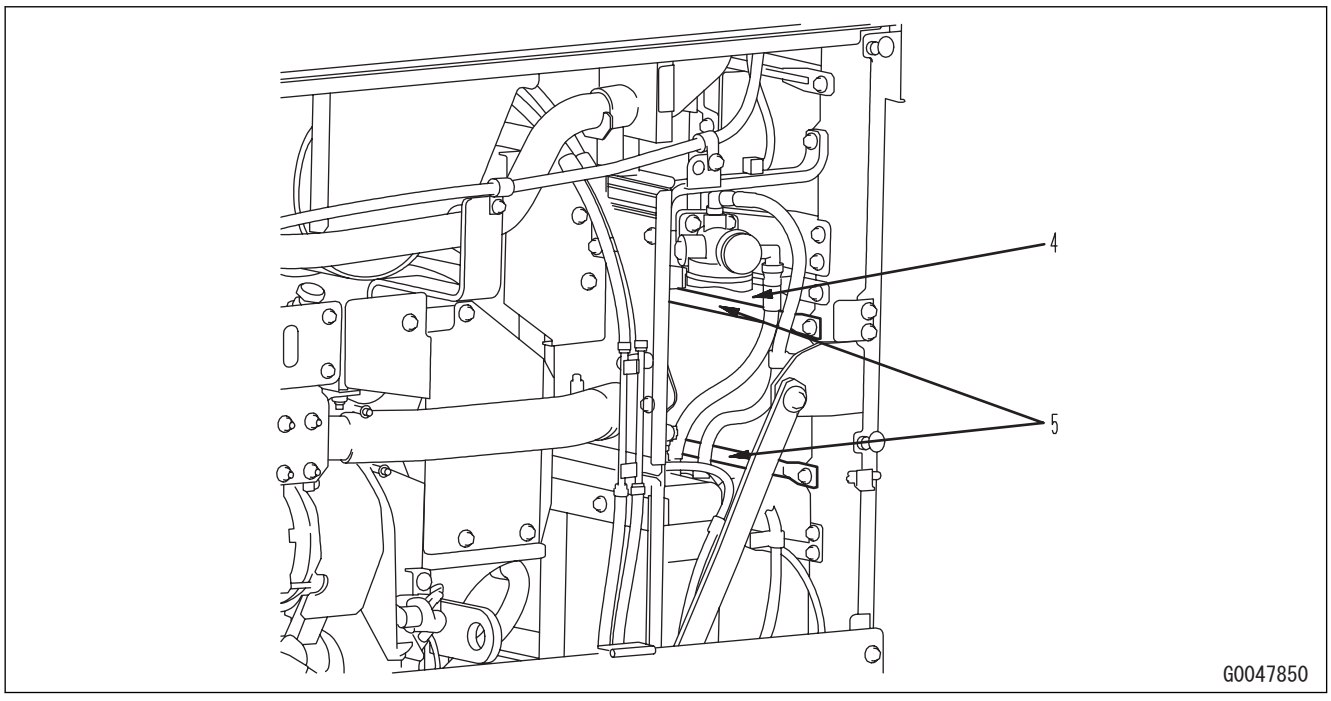
   Excessive clogging: 2 to 3 minutes
4. Clean the fin.



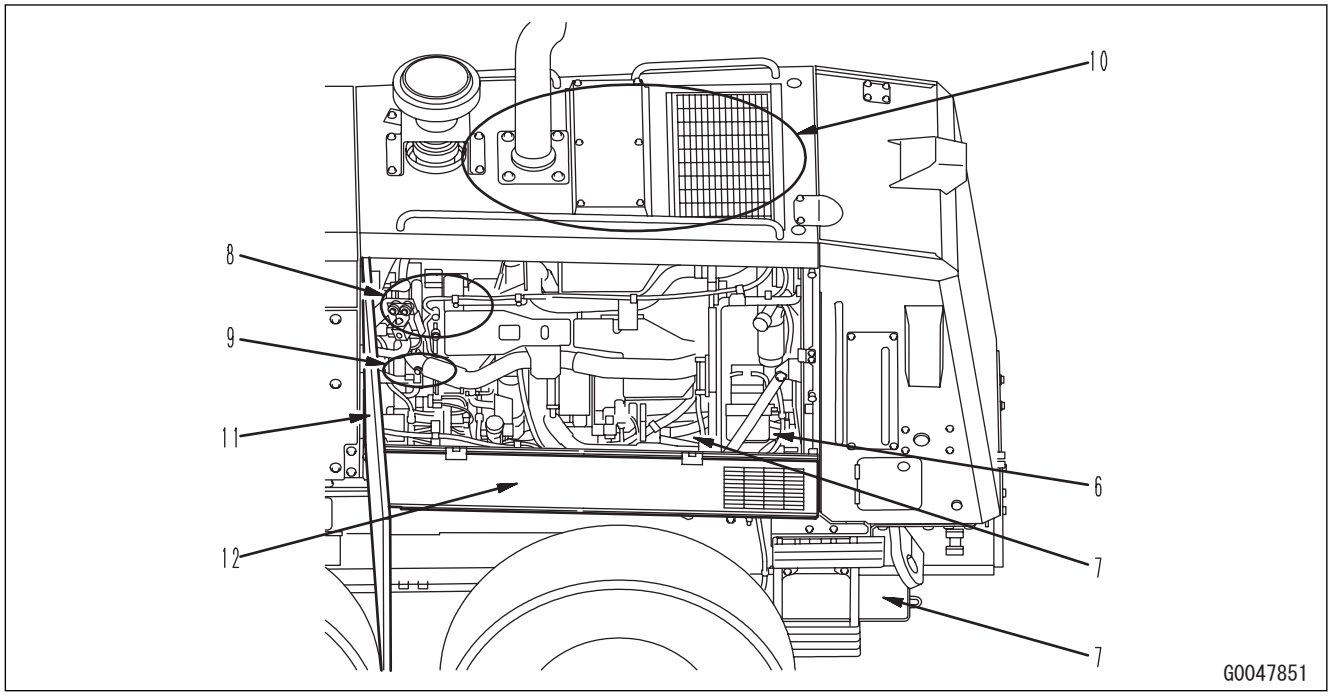
NOTICE

Mud and dirt cannot be removed fully by only reverse rotation of the cooling fan in some cases.
If the cooling fan is returned to the normal rotation in this condition, mud and dirt can be sucked onto the fins again.
After cooling fan reverse rotation, stop the engine, and remove the remaining mud and dirt with compressed air or a broom.
Also, make sure that there is no flammable material at the high-temperature parts of the engine.

Main parts to be checked



(4) Center of fin (5) Around bracket



(6) Bottom of cooling room
(7) Bottom of engine room
(8) Around turbocharger
(9) Around exhaust manifold
(10) Top of engine hood

5. After cleaning, set the engine speed to low idle and set the rotation of the fan to normal.
6. Close the side covers (11) and covers (12) at the right and left of the machine.
7. Clean dirt that flew out.

CLEAN FINS WITH COMPRESSED AIR

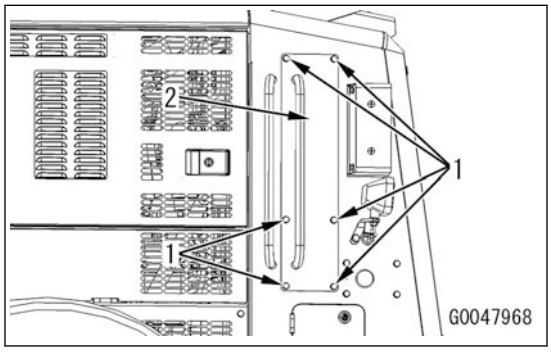
⚠ WARNING

- **If the compressed air, high-pressure water, or steam hits your body directly or if dirt flies over, there is a danger that personal injury is caused.**
  Wear the protective equipment such as protective eyeglasses and dust mask.
- **Set the maximum pressure of compressed air for cleaning to 0.2 Mpa {2.1 kgf/cm^2, 30 PSI} or below.**
  Stop the engine fully before you clean the fin.

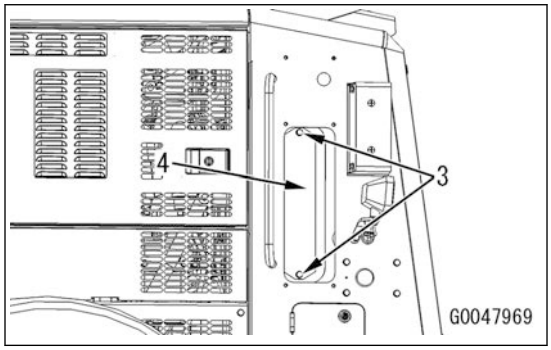
NOTICE

When you use the compressed air, keep a sufficient distance from the fin. The cleaning by compressed air at a short distance can cause damage to the fin.
Damage on the fins can cause water leakage and overheating. In a dusty jobsite, check the fins every day, regardless of the maintenance interval.

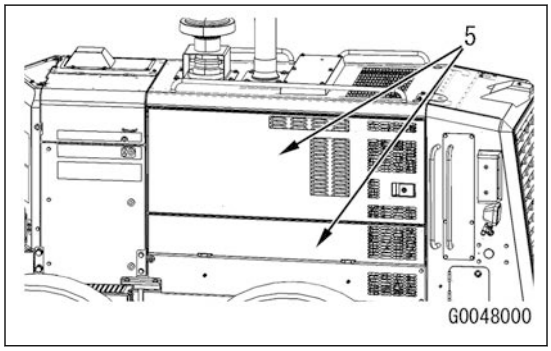
1. Remove the bolts (1) (6 pieces) on the side face of the engine hood, and remove the cover (2).



2. Remove the bolts (3) (2 pieces) and remove the cover (4).
3. Make sure the radiator fin, oil cooler fin, aftercooler fin, and condenser fin are not clogged with mud or dirt.

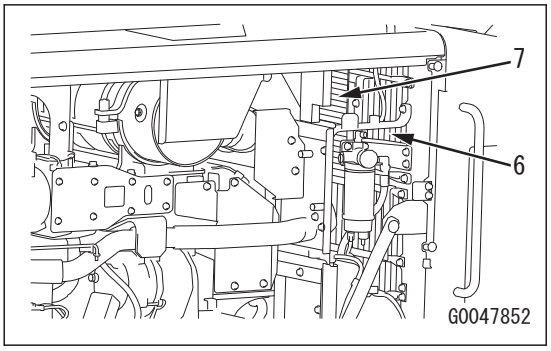


4. Open the side cover (5).

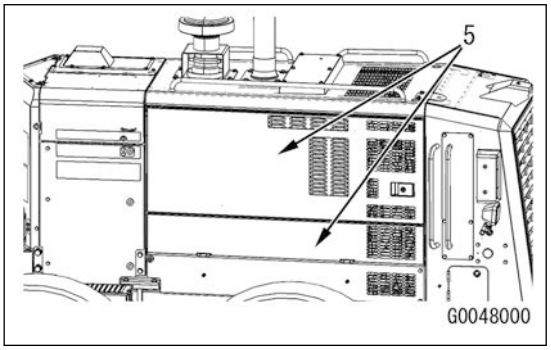


5. Insert the steam nozzle through the clearance between the radiator, oil cooler, aftercooler (6), and air conditioner condenser (7) to clean.

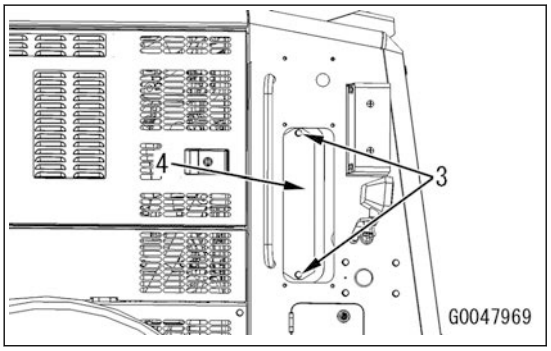
   Steam or water can be used as an alternative for compressed air. When you use the powerful steam cleaning equipment (high-pressure machine wash), keep a sufficient distance to the heat exchange equipment (radiator). If powerful steam cleaning (high-pressure machine wash) is done at a short distance, the internal fins can be deformed, and it can cause clogging and damage of the equipment.



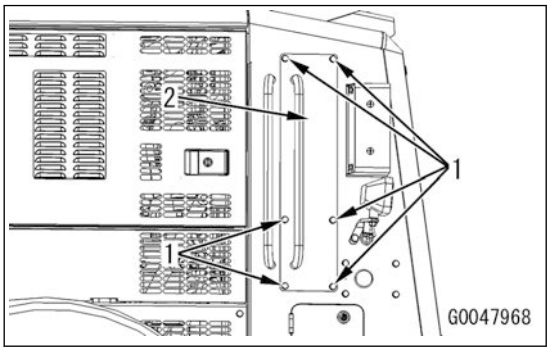
6. If there is a damage or deterioration on the rubber hose, replace it with a new one.
7. Make sure that the hose clamp is not loose.
8. Close the side cover (5).



9. Install the cover (4) with the bolts (3) (2 pieces).
   Be sure to tighten the bolts to the specified torque.



10. Install the cover (2) with the bolts (1) (6 pieces).
    Be sure to tighten the bolts to the specified torque.



REPLACE CUTTING EDGE, INVERT AND REPLACE END BIT

⚠ WARNING

Do not raise the blade more than necessary. When you put a block, be careful not to put a part of your body under the blade.

Replace the cutting edge before the wear reaches the edge of the blade.

Replace the cutting edge and side edge if they are worn to become 10 mm {0.4 in} or less from the blade base.

If the wear extends to the mounting surface, repair the mounting surface, then replace it.

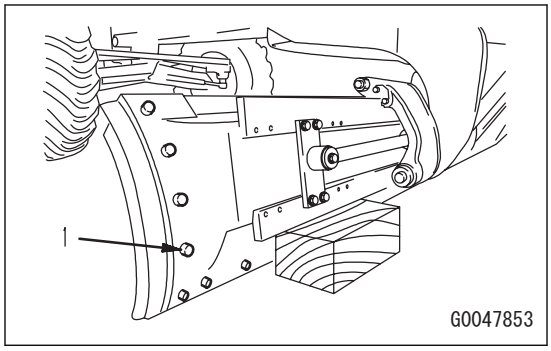
Items to be prepared

Block

1. Raise the blade to the applicable height.
2. Put the block below the blade guide rail.
3. Remove the bolt and nut (1), then remove the cutting edge and end bit.
4. Clean the mounting face of the cutting edge.
5. Install the new cutting edge to the blade.
6. If the outside of the side edge is worn, reverse its right and left or replace it, then install it.

   Tightening torque of mounting nut:

   260±34.3 Nm {26.5±3.5 kgfm, 192±25.3 lbft}
7. Retighten the nut (1) after several hours operation.

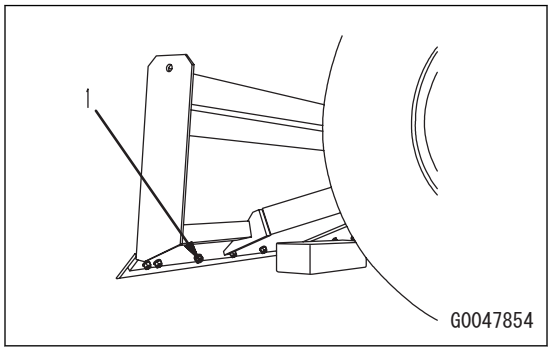


Replace front blade cutting edge

(option)

Replace it with the same procedure for the cutting edge of the main blade.

Put a block under the front blade support as the front blade does not have a blade guide rail.



CHECK BLADE GUIDE WEAR AMOUNT

⚠ WARNING

- **Set the directional selector switch to the NEUTRAL position (N), set the parking brake switch to the ON position, and lock the front and rear frames with the articulate lock pins.**
  Set the steering lever enable switch to the disable position.
- **Set the work equipment in a stable condition, stop the engine, and lock the work equipment.**
- **Do not raise the blade more than necessary. When you put a block, be careful not to put a part of your body under the blade.**

1. Raise the blade to the applicable height.
2. Put the block below the cutting edge.

   The recommended height of the block is 200 to 300 mm {7.9 to 11.8 in}.
3. Push the work equipment lock switch to lock the work equipment.
4. Set the directional selector switch to the NEUTRAL position (N), and set the parking brake switch to the ON position to apply the parking brake.
5. Stop the engine.
6. Check the window part (2) and outside part of the rail guide holding plate (1).
7. Check the plate thicknesses (a) and (b) of the rail guide (3).

   There are 5 rail guides. Check all the 5 pieces.
8. If one of the plate thickness (a) or (b) becomes below the allowable wear limit value, replace the rail guide (3).

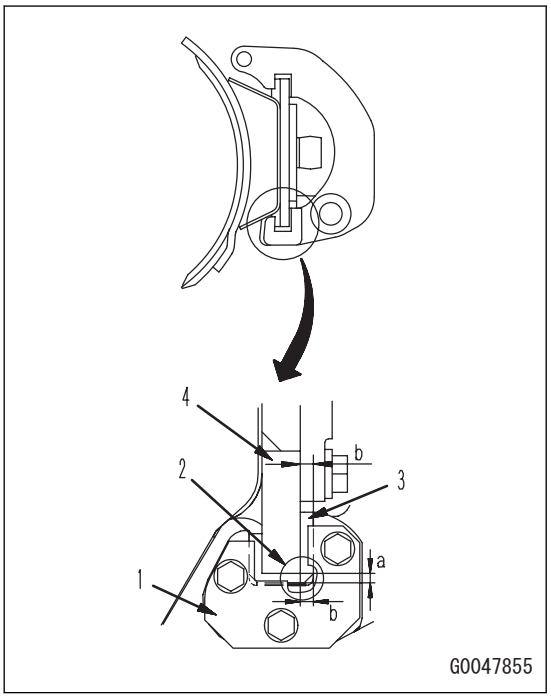
   Replacement of the rail guide (3) prevents interference between the rail (4) and rail guide holding plate (1).

   Allowable wear limit value (plate thickness of a new part: 8 mm {0.315 in})
   - Upper side and lower side of the rail (plate thickness (a)): 5 mm {0.197 in} or more
   - Back side of the rail (plate thickness (b)): 4 mm {0.157 in} or more

   Consult your Komatsu distributor for replacement of the rail guide.

   REMARK

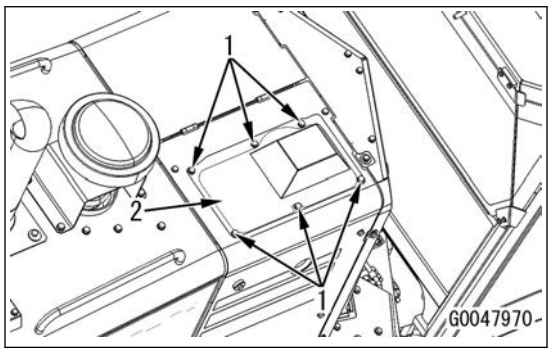
   The center rail guide out of the 5 guides cannot be checked because of the rear side cover of the blade. Consult your Komatsu distributor for the inspection of wear when the other 4 rail guides are replaced.



CLEAN HYDRAULIC TANK BREATHER

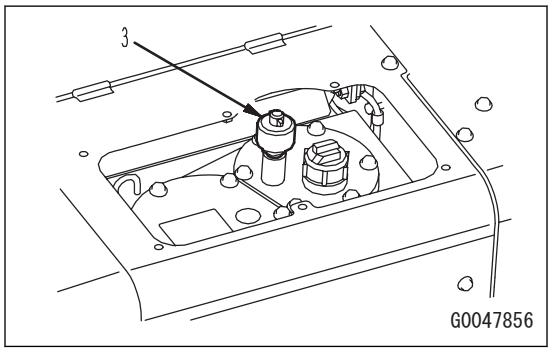
Clean the hydraulic tank breather when it is dirty at the check and maintenance.

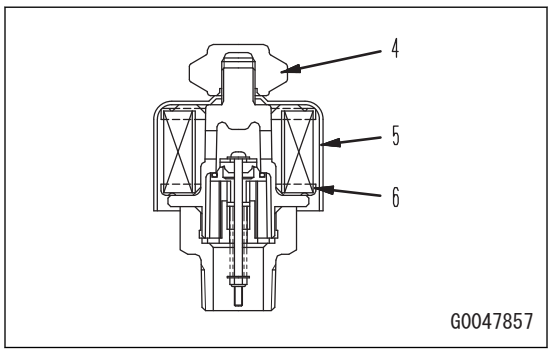
1. Remove the bolts (1) (6 pieces) on the top surface of the exterior and remove the cover (2).



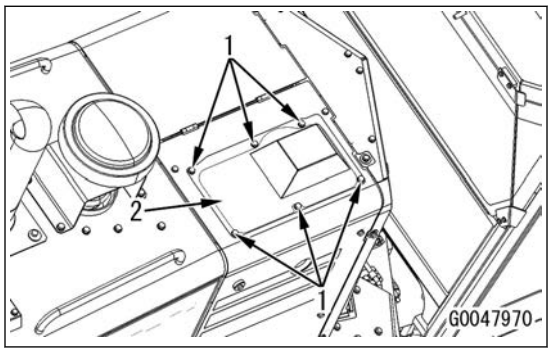
2. Remove the nut (4) of breather assembly (3) on the top surface of the hydraulic tank, then remove the cover (5).
3. Remove dirt from the breather element (6), then wash it in clean diesel fuel or flushing oil.
4. Install the cover (5) and nut (4).

   Tightening torque: 10 to 14 Nm {1.0 to 1.4 kgfm, 7.23 to 10.1 lbft}





5. Install the cover (2) with the bolts (1) (6 pieces).



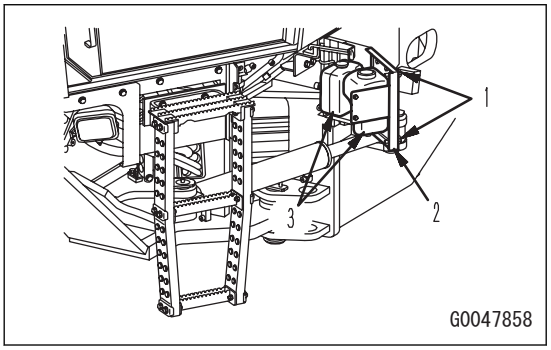
CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

If air mixes in window washer fluid, do the procedure that follows.

1. Remove the screws (1) (2 pieces), and open the cover (2).
2. Check the fluid level in the window washer tanks (3) (2 places).
3. If the fluid level is low, add window washer fluid for automobile.

   Be careful to prevent entry of dirt when you add it.

   The mixing proportion is different by the ambient temperature. Mix the washer fluid with water as follows.

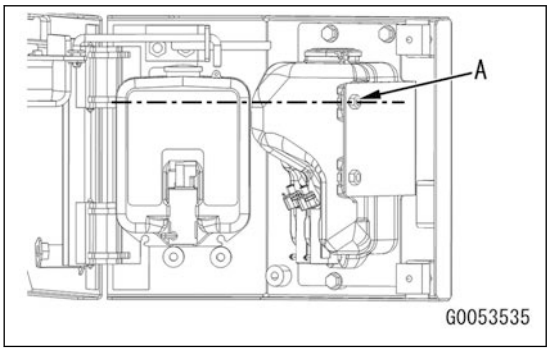


4. Regard the axis of tank mounting bolt (A) as a limit and be careful that it does not exceed the limit.

   If the washer fluid is added too much, it can leak from the filler port when the machine travels on slope.

   REMARK

   There is an air bleeding hole on the cap of window washer tank to prevent breakage caused by negative pressure in the tank when window washer is operated.
   The washer fluid possibly leaks from the air bleeding hole by its volume or the vibration of the machine, but it is not a failure.



Mixture ratio of pure washer fluid and water

Area, season	Mixing proportion	Freezing temperature
Normal	Washer fluid 1/3 : water 2/3	-10 °C {14 °F}
Winter in cold district	Washer fluid 1/2 : water 1/2	-20 °C {-4 °F}
Winter in very cold district	Pure washer fluid	-30 °C {-22 °F}

There are 2 types of fluid: -10 °C {14 °F} (for general use) and -30 °C {-22 °F} (for cold district).

Select by area or season.

CHECK INCHING PEDAL

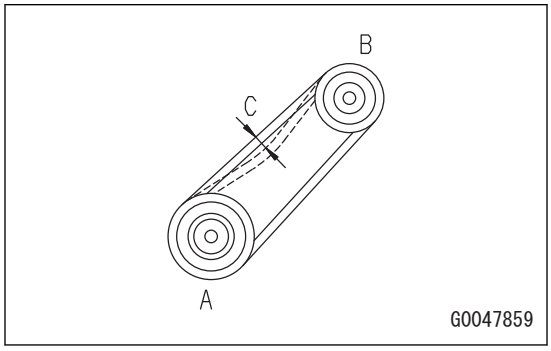
If the phenomena that follow occurs, consult your Komatsu distributor for inspection and adjustment.

- The machine does not stop when the inching pedal is pushed.
- The machine does not move when the inching pedal is released.
- The machine power is low when the inching pedal is released.

CHECK AND MAINTENANCE AIR CONDITIONER

CHECK AIR CONDITIONER COMPRESSOR BELT TENSION

If the driving belt is loose, air cannot be cooled sufficiently.



1. Push the middle point between the drive pulley (A) and compressor pulley (B) with a finger (approximately 98.1 N {10.0 kgf}). Adjust the belt to make the deflection (C) is 19 to 20.5 mm {0.7 to 0.8 in} (15.5 to 17 mm {0.6 to 0.7 in} if it is a new belt).

   When the belt is new, it will stretch in the initial period of use. Be sure to make an adjustment in 2 or 3 days after the replacement.

2. Check each pulley for breakage and check the V-groove and V-belts for wear.

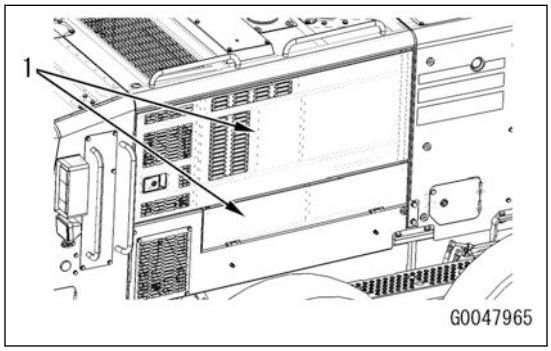
   Especially, check carefully that the V-belt does not touch the V-groove bottom.

ADJUST AIR CONDITIONER COMPRESSOR BELT TENSION

NOTICE

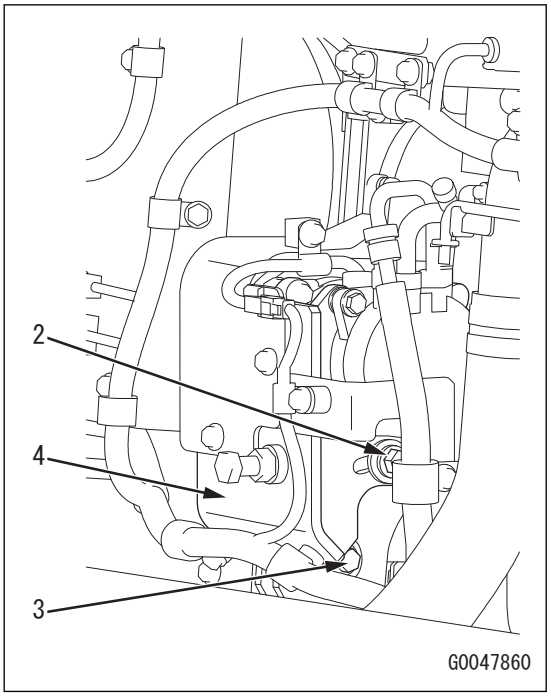
- **Check each pulley for breakage and check the V-groove and V-belts for wear. Especially, check carefully that the V-belt does not touch the V-groove bottom.**
- **In the cases that follow, replace the belt.**
  - **If the belt is stretched and there is no allowance for adjustment**
  - **If the belt has a damage or crack, and slipping sound or unusual noise occurs**
- **When you replace the V-belt, do the adjustment again after 1 hour of operation.**
- **When you adjust the V-belt, use a wrench. Do not push the compressor directly with a bar.**

1. Open the side cover (1).



2. Loosen the bolts (2) and (3).

   The bracket (4) can move when the bolts (2) and (3) are loosened. The bracket (4) uses the bolt (3) as a support point to move.



3. Loosen the nut (5), and tighten the bolt (6).

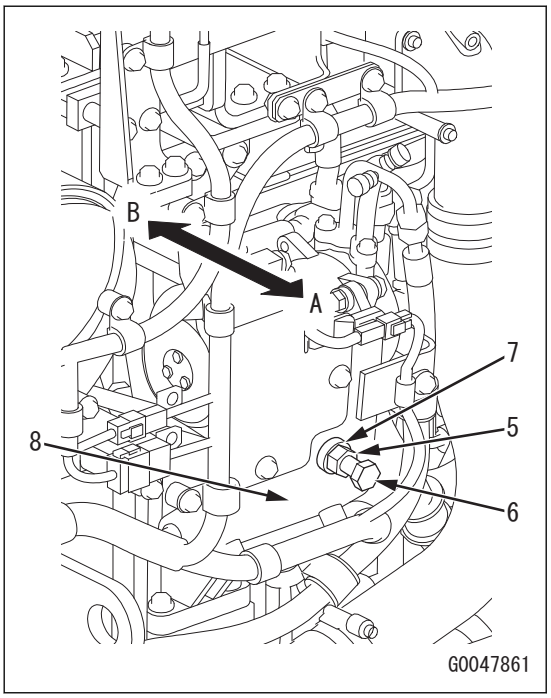
   The compressor (8) moves in direction (A), and the compressor belt is tensed.

4. Adjust the compressor belt tension correctly.

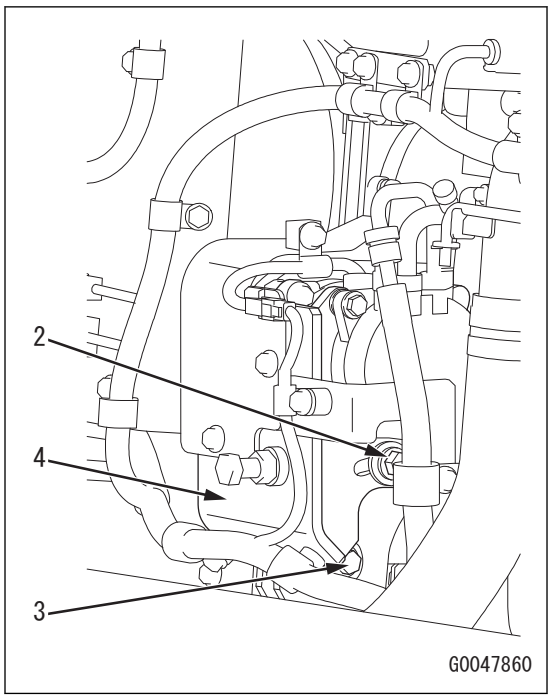
5. Tighten the nut (5) until it touches the boss (7).

   Tighten the nut (5) again in direction (B) to make it not loosened.

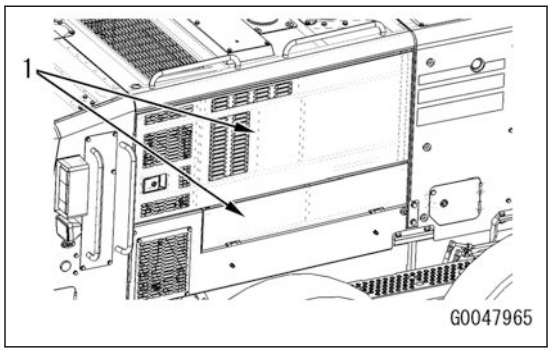
   Tightening torque: 245 to 309 Nm {25.0 to 31.5 kgfm, 181 to 228 lbft}



6. Tighten the bolts (2) and (3), and fix the bracket (4).
   Tightening torque: 98.1 to 123 Nm {10 to 12.5 kgfm, 72.3 to 90.4 lbft}



7. Close the side cover (1).



CHECK REFRIGERANT LEVEL FOR AIR CONDITIONER (GAS)

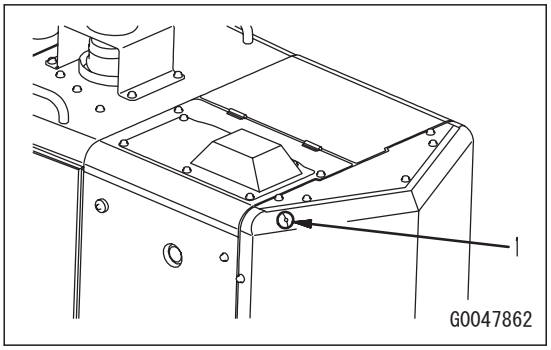
⚠ WARNING

If the refrigerant used in the air conditioner gets into your eyes or is splashed on your hands, it can cause loss of sight or frostbite. You must not touch the refrigerant. Do not loosen the parts of the refrigerant circuit.
Do not let an open flame be near.

If the refrigerant level is not sufficient, the performance of the air conditioner decreases.

1. Let the machine to the conditions that follow to check the refrigerant gas.
   1) Start the engine and set the engine speed to the maximum.
   2) Push the fan switch and set the air flow of the air conditioner to the maximum.
   3) Push the air conditioner switch to turn the air conditioner ON.
   4) Push the temperature control switch to set the temperature to the lowest.
   5) Push the FRESH/RECIRC air selector switch and set the mode to FRESH.
   6) Fully open the doors and windows.

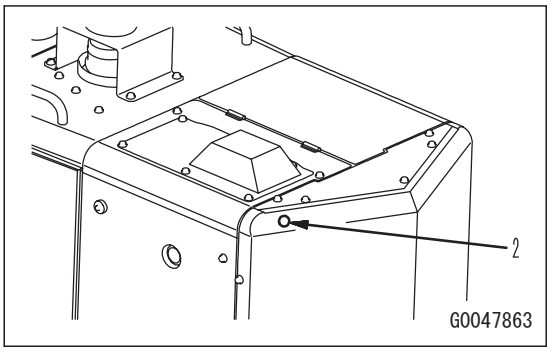
2. Remove the cap (1) at the rear of the cab.



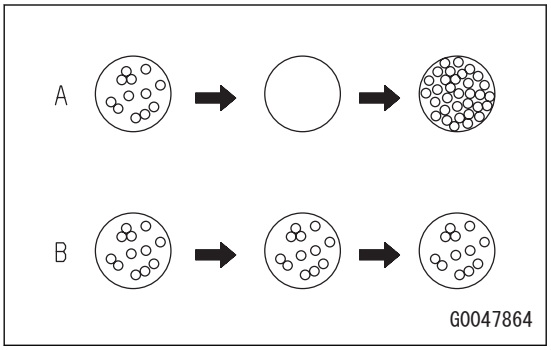
Check the condition of the refrigerant gas (Hydrofluorocarbons HFC-134a) through the sight glass (2) at the refrigerant hose fitting.

(A) A small number of bubbles are seen and it becomes milky white, and then changes the color to pale milky white.

(B) Bubbles are seen continuously.

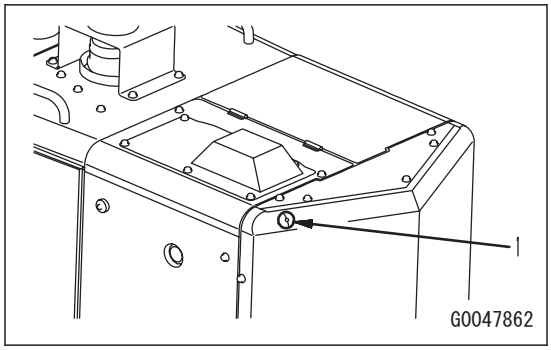


- For the case of (A), the refrigerant level is correct.
- For the case of (B), the refrigerant level is low. Consult your Komatsu distributor to add the refrigerant gas. If the air conditioner is operated with low refrigerant level, it can cause damage to the compressor.



Condition of sight glass	State of refrigerant flow
 G0047865	Bubbles are seen: Gaseous and liquid refrigerants are mixed.
 G0047866	No bubble: All refrigerant becomes liquid and transparent.
 G0047867	Milky white: Oil and refrigerant are separated and their mixture is milky white.

3. Install the cap (1) at the rear of the cab.



CLEAN AIR CONDITIONER AIR FILTERS

If the recirculation air filter and the fresh air filter are clogged, the cooling or heating capacity will decrease, so clean them.

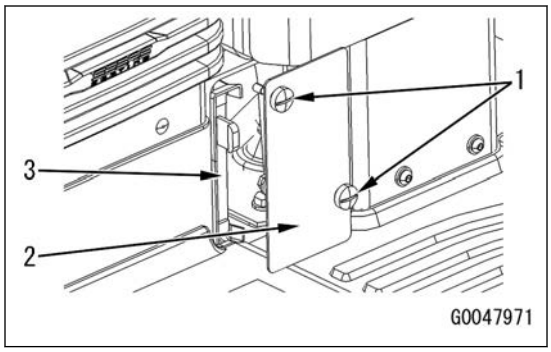
NOTICE

If the clogging of the filter cannot be removed by compressed air or cleaning with water, or every 1 year, replace the filter with a new one.

1. Remove the screws (1) (2 pieces), and remove the cover (2) at the bottom of the operator's seat.
2. Pull out the recirculation air filter (3) and clean it with low-pressure compressed air.

   In the cases that follow, clean the filter with water and neutral detergent.
   - If oil sticks to the filter
   - If the filter gets dirty heavily

   After you clean it with water, dry it sufficiently before use it.
3. Install the recirculation air filter (3).
4. Install the cover (2) with the screws (1) (2 pieces).



5. Remove the cover (4) at the rear of the cab.

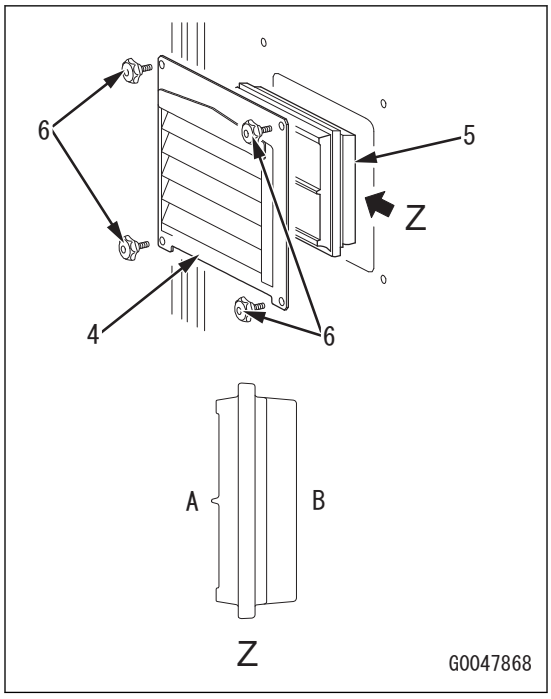
   The screws (6) (2 places) of upper side do not come off from the cover since the stopper is installed.

   The screws (6) (2 places) of lower side do not need to be removed. When you only loosen them, you can pull out and remove the cover.
6. Remove the fresh air filter (5).
7. Clean dirt stuck to the fresh air filter (5) with low-pressure compressed air.
8. Install the fresh air filter (5).

   The fresh air filter must be installed in the correct direction. As shown in the figure, put the thicker end (B) toward inside.

   (A): Outside of cab

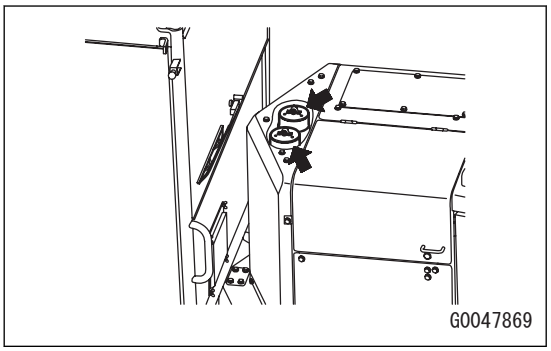
   (B): Inside of cab
9. Install the cover (4) at the rear of the cab with the screws (6) (4 pieces).



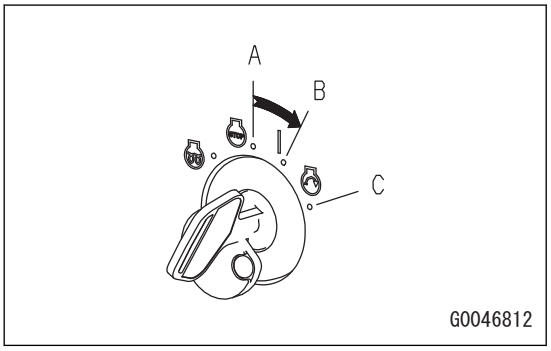
CHECK FUNCTION OF BRAKE ACCUMULATOR

1. Push the brake pedal.
2. Set the directional selector switch to the NEUTRAL position (N), and set the parking brake switch to the ON position.

   The parking brake is applied.
3. Keep the engine at high idle for 30 seconds, then stop the engine.



4. Turn the starting switch to the ON position (B).
5. Push and release the brake pedal continuously.
   - If the brake oil pressure caution lamp does not light up when the brake pedal is pushed 10 times or more, it is normal.
   - If the brake oil pressure caution lamp lights up when the brake pedal is pushed below 10 times, the gas pressure in the accumulator can be low. Consult your Komatsu distributor for inspection.
6. After inspection, turn the starting switch to the OFF position (A).



CHECK FUNCTION OF BLADE ACCUMULATOR

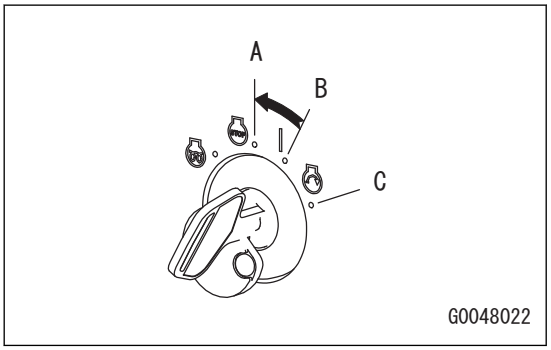
1. Set the blade accumulator switch to the ON position.

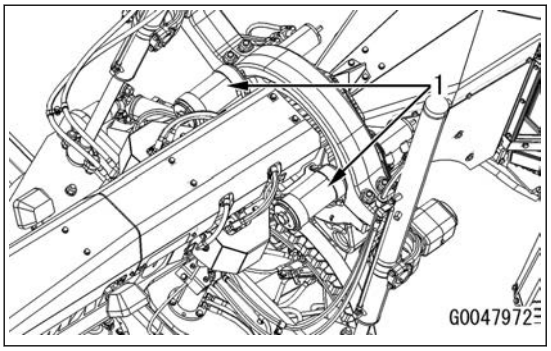
   The hydraulic spring effect of the accumulator (1) reduces the vertical movement on the blade.

   This is effective for road surface maintenance on the rocky jobsite or for removal of compressed snow.
2. Compare the vertical vibration transmitted from the blade when the blade accumulator switch is set to the ON position and when it is set to the OFF position.

   If there is no change in the vertical vibration, the accumulator gas pressure is possibly low.

   Consult your Komatsu distributor for inspection.



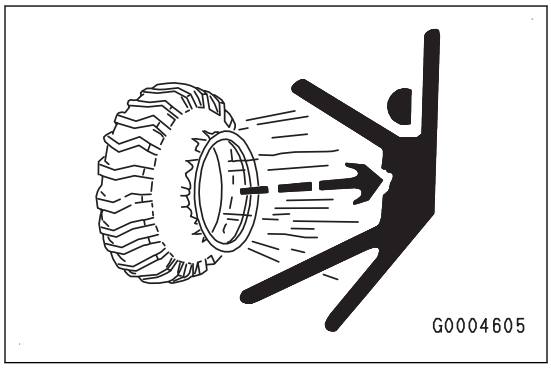


SELECT AND CHECK TIRES

⚠ WARNING

To prevent the machine movement during the work, make sure that the machine is in the conditions that follow before you start the work.

- **If the tires or rims are handled incorrectly, there is a danger that the tires explode or the rims fly off and personal injury or death can be caused.**
- **Special equipment and knowledge are needed for the maintenance, disassembly, repair, and installation of tires and rims. Consult your Komatsu distributor.**
- **Do not let an open flame be near.**



SELECT TIRES

⚠ WARNING

Select the tires by the use conditions of machine and the weight of the attachments on the machine. Use only the tires specified by Komatsu, and obey the specified tire inflation pressure.

Select the tires by the weight of the attachments on the machine.

Use the tires shown in the table that follows.

NOTICE

Consult your Komatsu distributor for selection of tires.

- **Do not install tires such as urethane tires that are much heavier than the standard tires. The load increases to a level higher than estimated, and the machine can be damaged.**
- **If a tire not specified by Komatsu is used, rim displacement can occur between the tire and rim. The operator comfort can also be degraded.**

	Tire size	Remarks
Standard	17.5R25	-
Option	14.00R24	-

CHECK TIRE PRESSURE AND INFLATE TIRE

⚠ WARNING

- **When you inflate the tires, keep the persons away from around the machine. Use an air chuck with clip which can be fixed to the air valve.**
- **Measure the tire inflation pressure from time to time. Be careful not to inflate the tires too much.**
- **If the rims are not assembled correctly, there is a possibility that they fly off. Fence around the tires. Do not stand in front of a tire during the work.**
- **If the tire inflation pressure decreases abnormally and rim parts do not fit the tires, there is a possibility that the tires are defective. Consult your Komatsu distributor for repair.**
- **Obey the specified inflation pressure.**
- **Immediately after the machine traveled at high speed or did a heavy duty work, do not adjust the tire inflation pressure.**

1. Measure the tire inflation pressure with a tire inflation pressure gauge.

   Check the tire inflation pressure while the tires are cold.

   The correct tire inflation pressure is as shown in the table.

	Tire size	Standard tire inflation pressure
Standard	17.5R25	300 kPa {3.0 kgf/cm^2, 42.7 PSI}
Option	14.00R24	375 kPa {3.75 kgf/cm^2, 53.3 PSI}

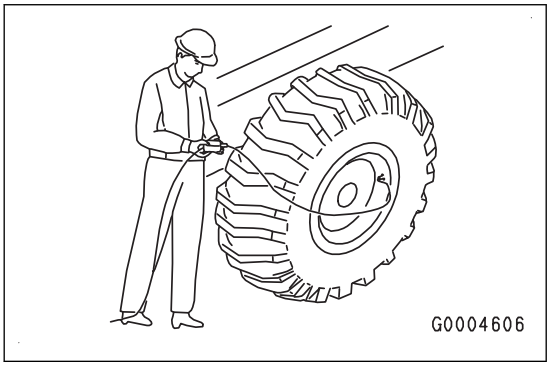
   NOTICE

   If the tire inflation pressure is below the value in the table, the rim can be damaged.
   Keep the tire inflation pressure in range of 0 to +20 kPa {0 to +0.2 kgf/cm^2, 0 to +2.9 PSI} of the value in the table.

2. If the tire inflation pressure is out of the range, adjust it correctly.

   When you inflate a tire, use an air chuck which can be set to the air valve of the tire as shown in the figure.

   Do not stand in front of the rim but stand on the tread side to inflate a tire.



CHECK ELECTRICAL INTAKE AIR HEATER

Check it before you start the engine in cold weather (every 1 year).

Consult your Komatsu distributor for inspection of the electrical intake airheater.

CHECK BEFORE YOU START OPERATION

For the items that follow, see OPERATION, “CHECK BEFORE YOU START OPERATION (3-198)”.

- Drain water and sediment from fuel tank
- Check play of steering wheel
- Check water separator, drain water and sediment
- Check coolant level, add coolant
- Check oil level in engine oil pan, add oil
- Check dust indicator
- Check electric wiring
- Check fuel level, add fuel
- Check DEF level, add DEF
- Check tire inflation pressure
- Check window washer fluid spraying condition
- Check windshield wiper operating condition
- Check machine monitor
- Check horn
- Check defroster function
- Check lamps
- Check open/close state of lower cover
- Check articulate lock pin
- Check leaning stopper
- Check locks

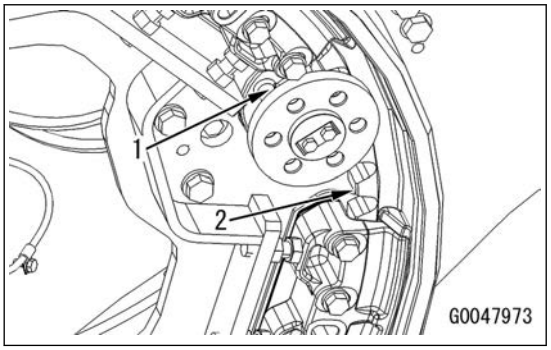
EVERY 50 HOURS MAINTENANCE

LUBRICATION

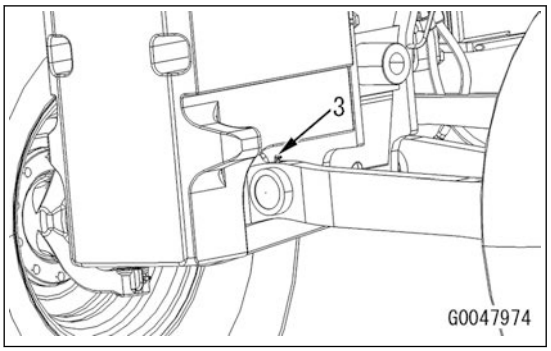
⚠ WARNING

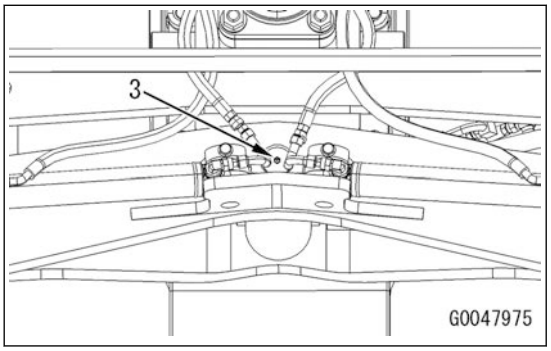
- **Set the work equipment lock switch to the LOCK position, set the directional selector switch to the NEUTRAL position (N), set the parking brake switch to the ON position, and lock the front and rear frames with the articulate lock pins.**
- **Lower the work equipment to the ground, then stop the engine.**
- **Add grease on a level area.**

1. Apply grease to the positions shown by arrows.
   Upper sliding surface of circle (1), inside sliding surface of circle (1), tooth surface of circle gear (2)

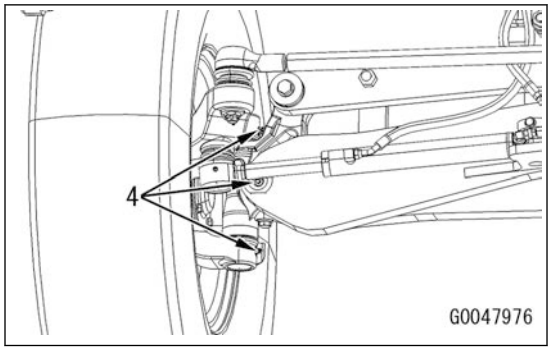


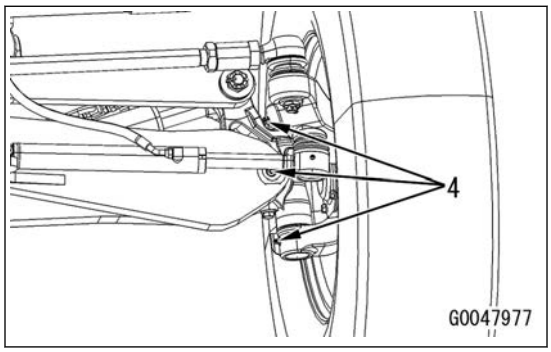
2. Lubricate the grease fittings shown by arrows with a grease pump.
   (3) Front axle center pin (2 places)



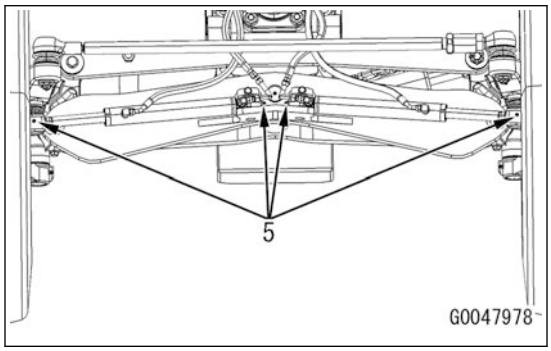


(4) Steering linkage (6 places)

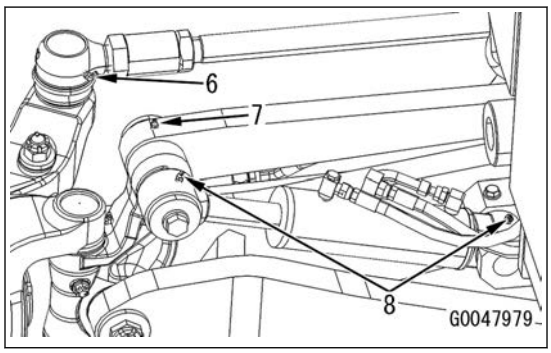




(5) Steering cylinder pin (4 places)



(6) Tie-rod (right and left)
(7) Leaning rod end (right and left)
(8) Leaning cylinder pin (2 places)



3. Visually check that the lubrication is done correctly.
4. After lubrication, wipe off the old grease that is pushed out.

EVERY 250 HOURS MAINTENANCE

Maintenance for every 50 hours must be done at the same time.

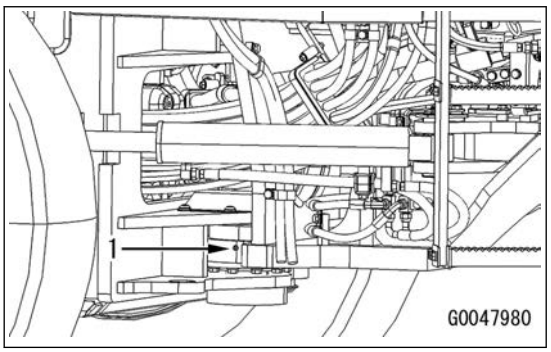
LUBRICATION

⚠ WARNING

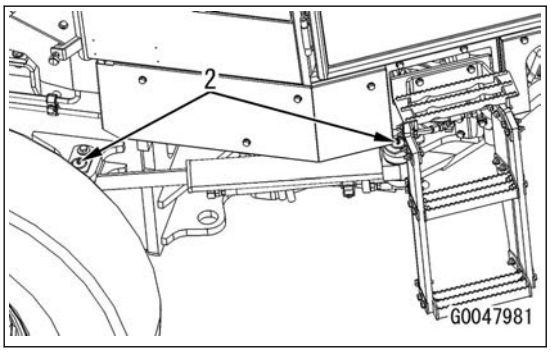
- **Set the work equipment lock switch to the LOCK position.**
- **Set the directional selector switch to the NEUTRAL (N) position.**
- **Set the steering lever enable switch to the disable position.**
- **Set the parking brake switch to the ON position.**
- **Lock the front and rear frames with the articulate lock pin.**
- **Lower the work equipment to the ground, then stop the engine.**
- **Add grease on a level area.**

1. Lubricate the grease fittings shown by arrows with a grease pump.

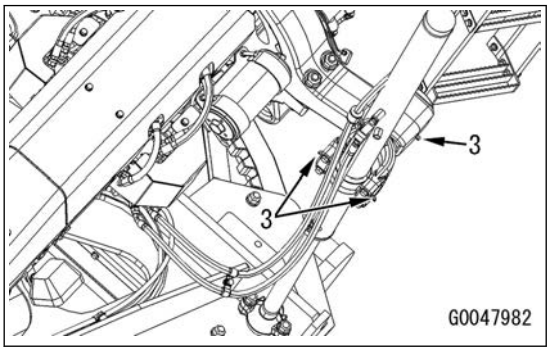
(1) Articulate pin (right and left)



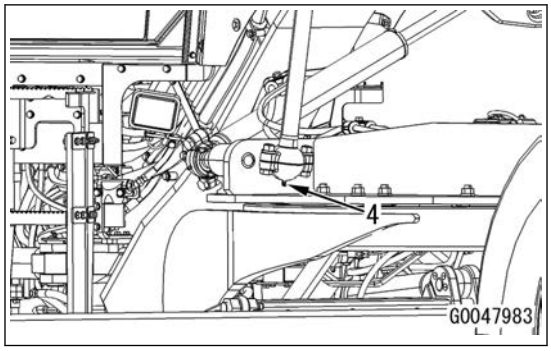
(2) Articulate cylinder pin (2 places each of right and left)



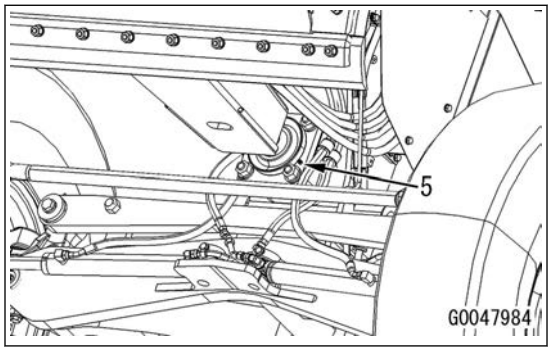
(3) Blade lift cylinder yoke (3 places each of right and left)



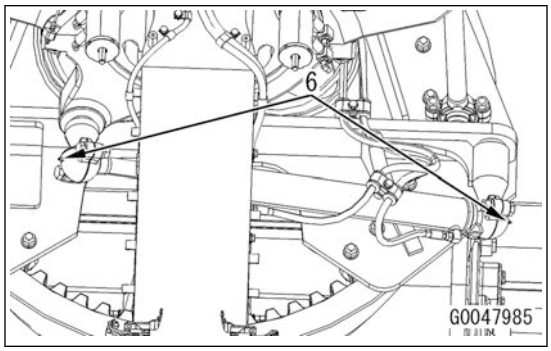
(4) Blade lift cylinder ball joint (right and left)



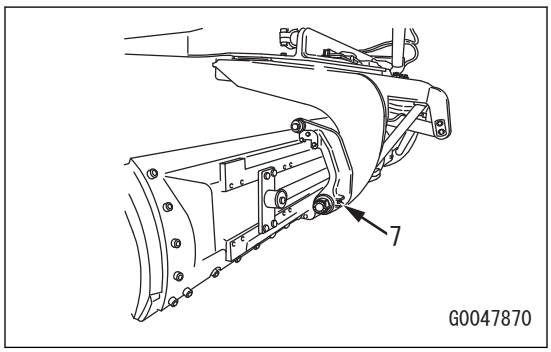
(5) Drawbar ball joint



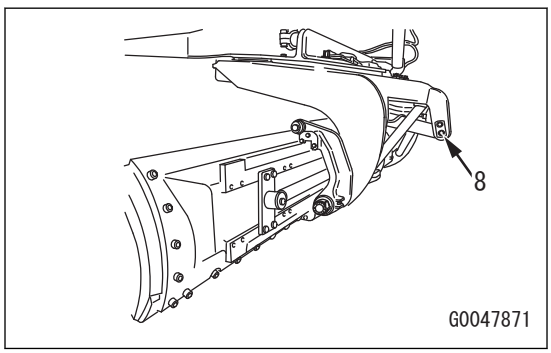
(6) Drawbar side shift cylinder ball joint (2 places)



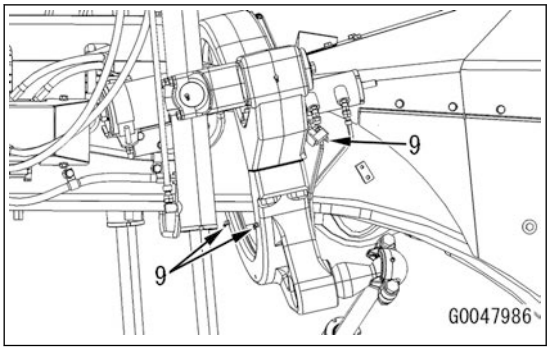
(7) Adjuster bracket (right and left)



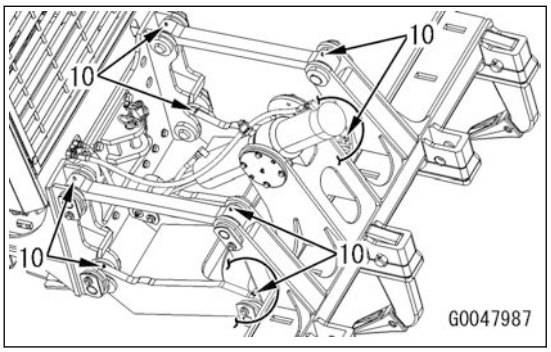
(8) Power tilt cylinder pin (right and left)



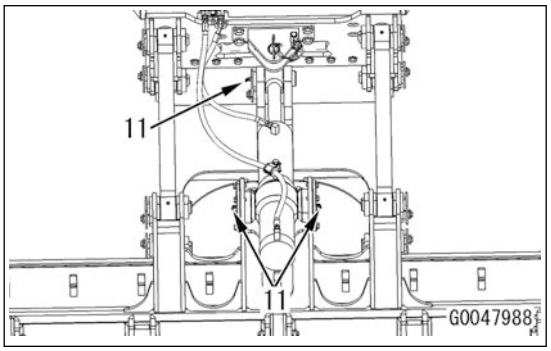
(9) Lifter bracket (3 places)



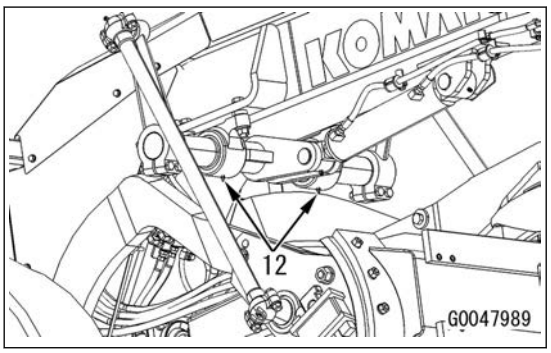
(10) Ripper linkage pin (8 places)
(For machines with ripper)



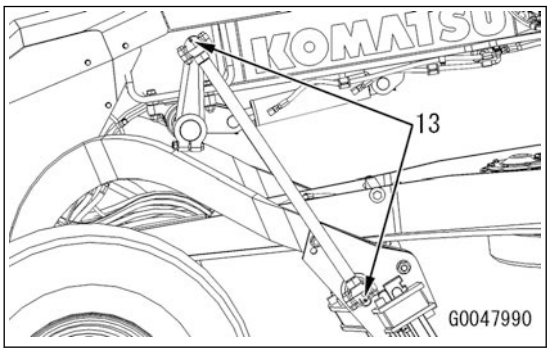
(11) Ripper cylinder pin (3 places)
(For machines with ripper)



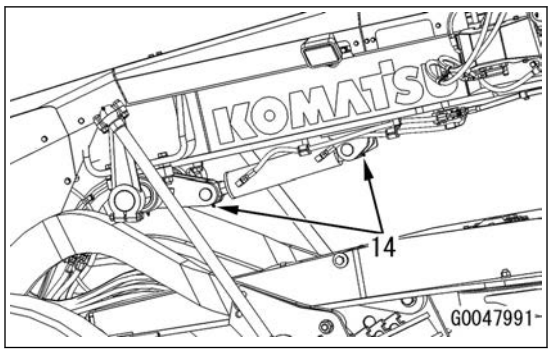
(12) Scarifier shaft (2 places)
(For machines with scarifier)



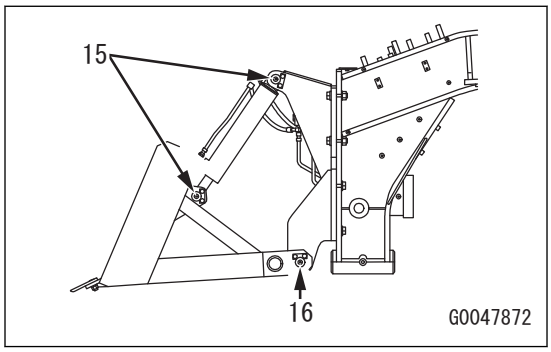
(13) Scarifier ball joint (2 places each of right and left)
(For machines with scarifier)



(14) Scarifier cylinder pin (2 places)
(For machines with scarifier)



(15) Front blade pin (2 places)
(16) Front blade pin (1 place each of right and left)
(For machines with front blade)



2. Visually check that the lubrication is done correctly.
3. After lubrication, wipe off the old grease that is pushed out.

CHECK OIL LEVEL IN TRANSMISSION CASE, ADD OIL

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **Let the machine be in the conditions that follow before inspection.**
  - **The work equipment lock switch is in the LOCK position.**
  - **The directional selector switch is in the NEUTRAL position (N).**
  - **When the steering lever enable switch is in the disable position**
  - **The parking brake switch is in the ON position.**

Check the oil level in the transmission case in the cases that follow.
- If bleeding of oil is found on the transmission case
- If oil is mixed with coolant

Items to be prepared

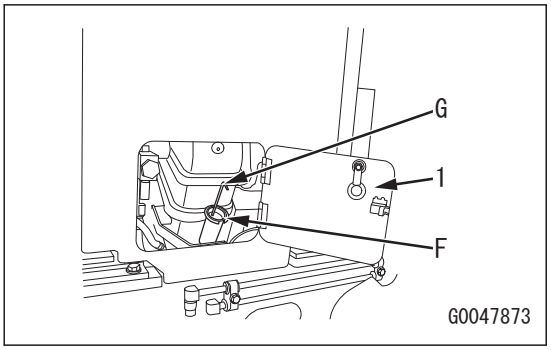
Oil container

1. Stop the engine.

   NOTICE

   Wait for 12 hours or more after the engine is stopped, and check the oil level. Oil level cannot be checked correctly if there is a remaining oil in each part.

2. Open the cover (1) at the right of the machine.
3. Remove the cap of the oil filler port (F).
4. Pull out the dipstick (G) and wipe the oil off with a cloth.



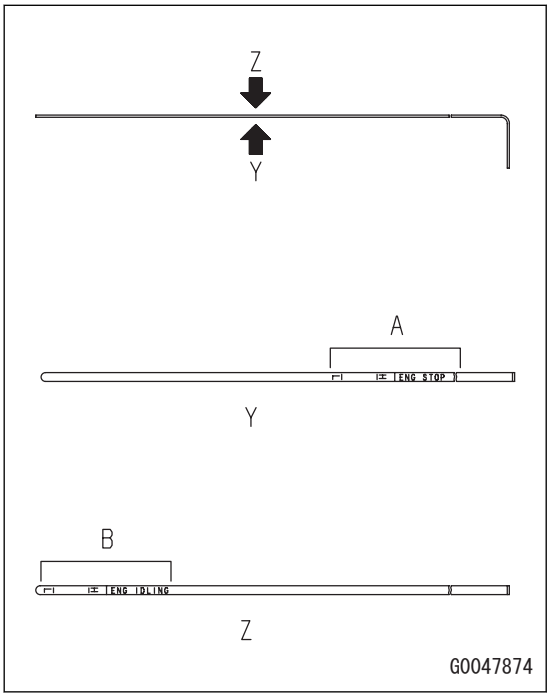
5. Fully put the dipstick (G) into the dipstick pipe, then pull it out.

   If the oil level is between marks H and L of the dipstick (G), it is correct.

   REMARK

   The oil levels that follow are stamped on each side of the dipstick (G).
   - (A) Engine stop state (ENG STOP)
   - (B) Engine idling state (ENG IDOLING)

   Use the mark of the (A) engine stop state (ENG STOP).
6. If the oil level is below L mark, add oil through the oil filler port (F).

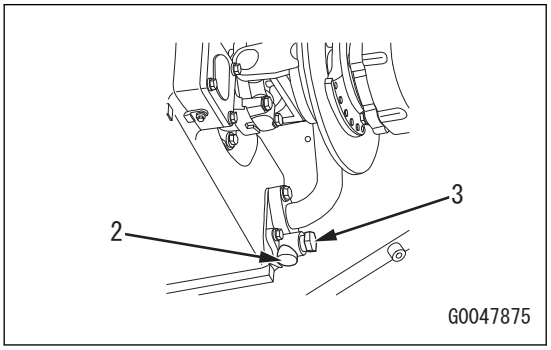


7. If the oil level is above H mark, remove the drain plug (2), and loosen the drain plug (3) to drain excessive oil.

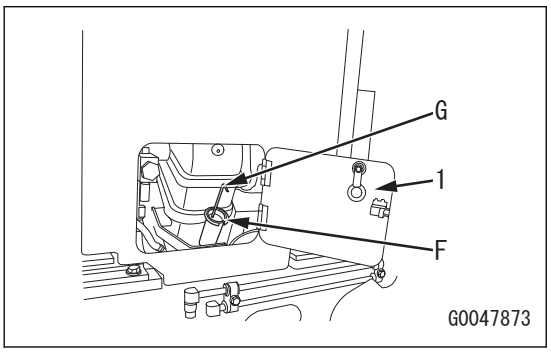
   Tightening torque

   Drain plug (2): 58.8 to 78.5 Nm {6 to 8 kgfm, 43.4 to 57.9 lbft}

   Drain plug (3): 49 to 78.5 Nm {5 to 8 kgfm, 36.2 to 57.9 lbft}
8. Check the oil level again.



9. If the oil is at the correct level, insert the dipstick (G) into the dipstick pipe.
10. Tighten the cap of the oil filler port (F) securely.
11. Close the cover (1).

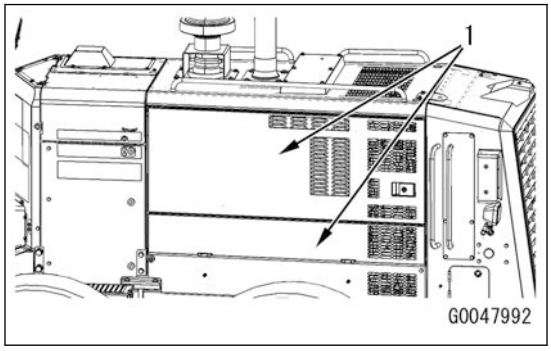


CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

⚠ WARNING

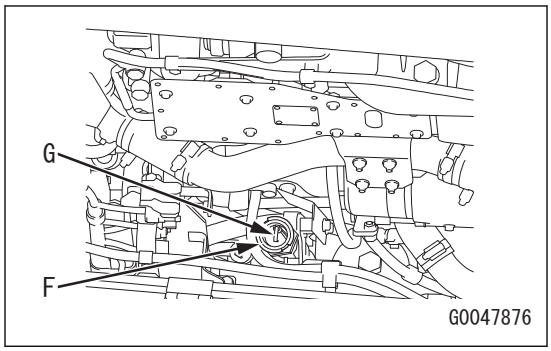
Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

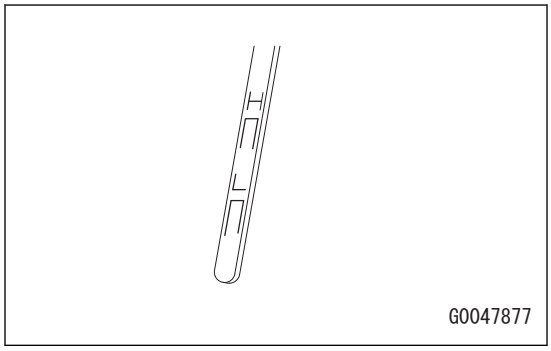
1. Stop the engine and leave it as it is for 5 minutes or more.
2. Open the side cover (1).



3. Remove the oil filler cap (F).
4. Pull out the dipstick (G) and wipe the oil off with a cloth.
5. Fully put the dipstick (G) into the dipstick pipe, then pull it out.

   If the oil level is between marks H and L of the dipstick (G), it is correct.
6. If the oil level is below L mark, add oil through the oil filler port (F).

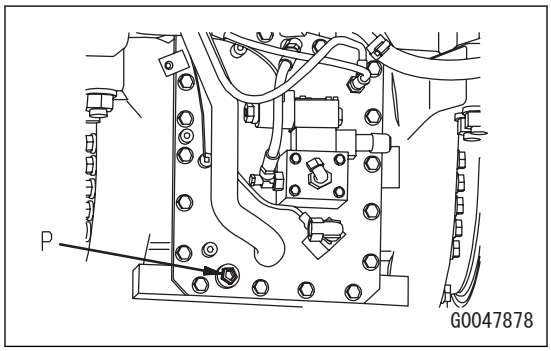




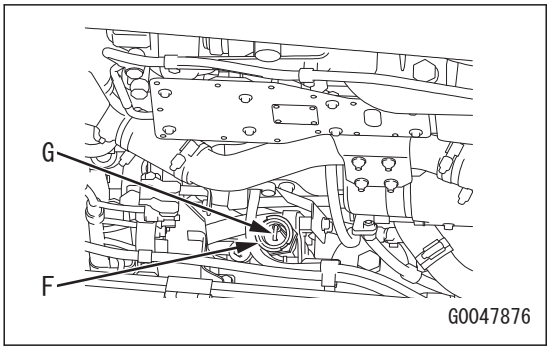
7. If the oil level is higher than H mark, drain the excessive oil from the drain plug (P).

   Tightening torque

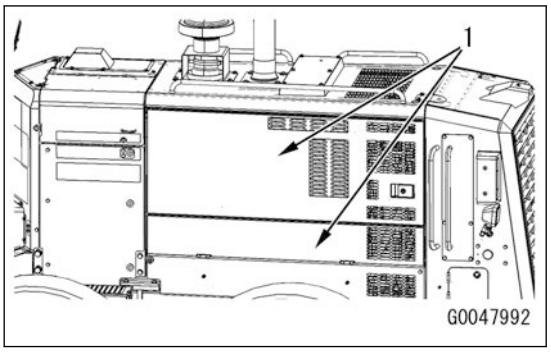
   Drain plug (P): 58.8 to 78.4 Nm {6 to 7.99 kgfm, 43.4 to 57.8 lbft}
8. Check the oil level again.



9. If the oil is at the correct level, insert the dipstick (G) into the dipstick pipe.
10. Close the oil filler cap (F) correctly.



11. Close the side cover (1).



CHECK OIL LEVEL IN TANDEM CASE, ADD OIL

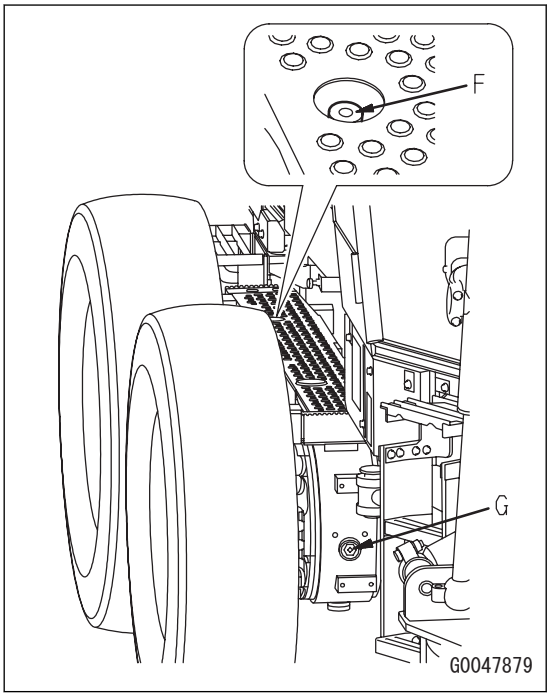
⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

1. Stop the engine and leave it as it is for 5 minutes or more.
2. Remove the plug (G).
3. Check the oil level.

   If the oil level is near the lower edge of the plug hole, the oil level is correct.
4. If the oil level is low, add oil through the oil filler port (F).
5. If the oil level is correct, install the plug (G).

   Tightening torque: 59.0 to 78.0 Nm {6.02 to 7.95 kgfm, 43.5 to 57.5 lbft}



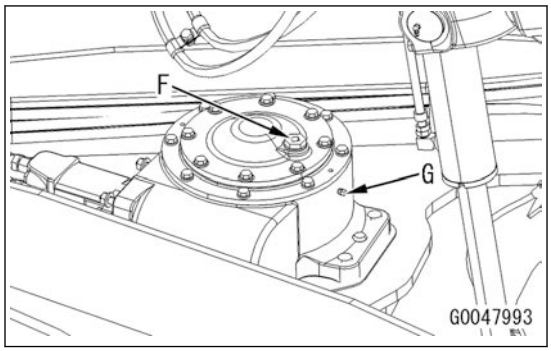
CHECK OIL LEVEL IN CIRCLE ROTATION GEAR CASE, ADD OIL

⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

1. Stop the engine and leave it as it is for 5 minutes or more.
2. Remove the plug (G).

   If the oil leaks slowly, the oil level is correct.
3. If the oil level is low, add oil through the oil filler port (F).
4. If the oil level is correct, install the plug (G).



NOTICE

If the oil level is too high, the internal pressure of the case increases and the oil can leak when the oil temperature in the circle rotation gear case increases.

REMARK

Even if worn dirt mixes in oil, you can use it as it is with no problem.

CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When you remove the oil filler cap, there is a possibility that oil spurts out. Slowly turn the oil filler cap to release the internal pressure, then remove it carefully.**

NOTICE

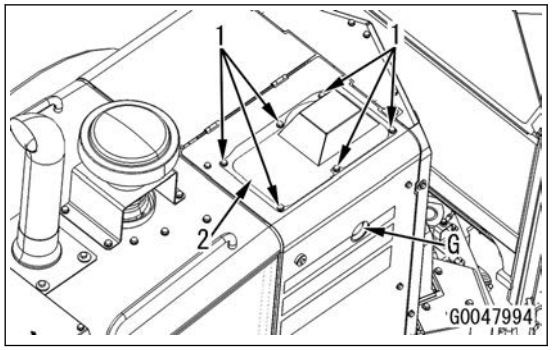
If the oil is added to above the gauge window, drain excessive oil through the drain plug. Stop the engine, wait until hydraulic oil cools down, then start the check. The hydraulic circuit can get damaged, or oil can spurt out.

1. Set the machine in the posture for oil level check.
   - Return the front wheels to the vertical position and set them in the straight travel posture.
   - Set the front frame and rear frame straight (set the articulate angle to 0°), and install the articulate lock pin.
   - Return the blade side shift to the center of the machine, set the blade at a right angle to the machine, and make it touch the ground lightly.
   - Set the blade accumulator switch to the ON position, and raise the blade fully to drain oil from the accumulator. Then, set the blade accumulator switch to the OFF position, and lower the blade to the ground.
2. Start the engine and run it at low idle.

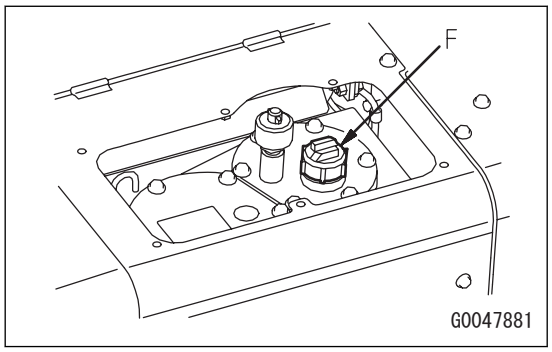
3. Check the oil level with the sight gauge (G).

   If the oil level is in the window of the gauge (G), it is correct.

4. If the oil level is below the window of the gauge (G), remove the bolts (1) (6 pieces), and remove the cover (2).



5. Add oil through the oil filler port (F).

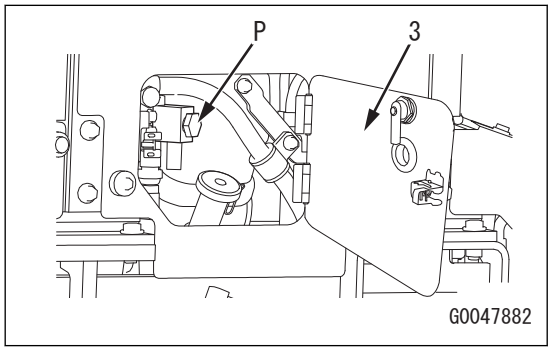


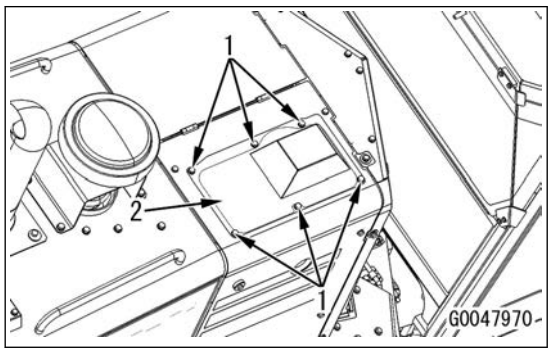
6. If the oil level is higher than the window (G) of the gauge, open the cover (3) on the right of the machine, and loosen the drain plug (P) to drain excessive oil.

   REMARK

   Use the attached hose to prevent the splash of oil.

7. Check the oil level again.
8. If the oil level is correct, tighten the cap of the oil filler port (F) securely.
9. Remove the hose.
10. Close the cover (3).
11. Install the cover (2) with the bolts (1) (4 pieces).





CHECK BATTERY ELECTROLYTE LEVEL

Check it before you start the machine.

Check the battery electrolyte level as in the guidelines for a minimum of one time in a month.

⚠ WARNING

- **Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. The inside of battery can deteriorate and the battery life becomes short. Also, it can cause an explosion.**
- **Do not let an open flame be near.**
  Battery can discharge flammable gas and cause an explosion.
- **Do not use a direct air blow or dry cloth to clean the battery.**
  A wet cloth will prevent fire or explosion from static electricity.
- **Battery electrolyte is dangerous object. If it gets in your eyes or on your skin, flush it off with a lot of water, and consult a doctor.**

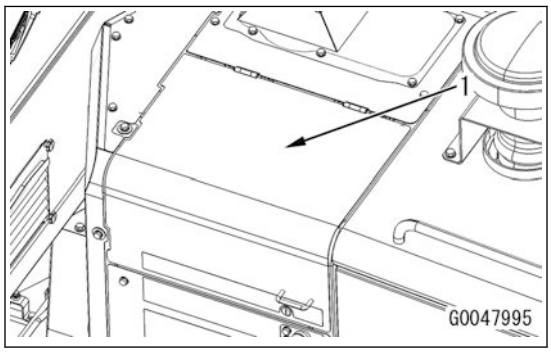
NOTICE

- **Do not add battery electrolyte more than UPPER LEVEL line.**
- **Battery electrolyte can leak and cause damage to the paint surface or corrosion to the parts.**
- **If there is a risk that battery electrolyte can freeze, add the battery electrolyte before you start the work on the next day.**

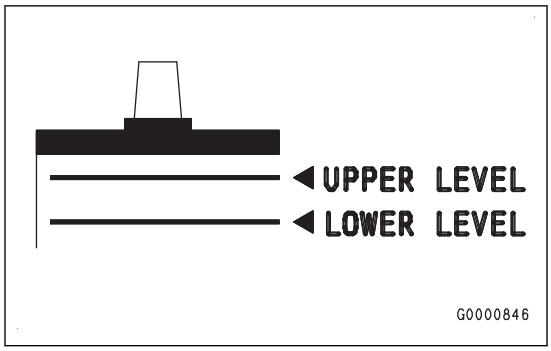
CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

When you check the electrolyte level from the side of the battery, check as follows.

1. Open the cover (1) at the left of the machine.



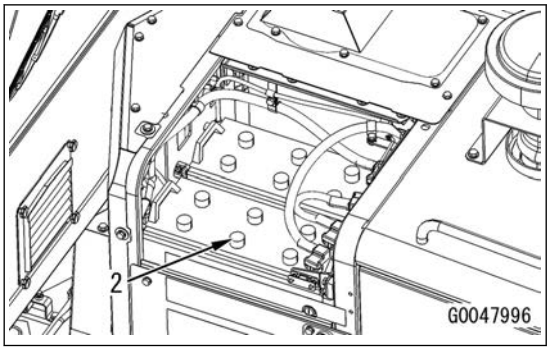
2. Clean the area around the electrolyte level lines with a wet cloth.
3. Make sure that the electrolyte level is between UPPER LEVEL (U.L.) line and LOWER LEVEL (L.L.) line.
4. If the electrolyte level is below the center between UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.), remove the cap (2) immediately.
5. Add purified water (such as a commercial battery fluid) up to UPPER LEVEL (U.L.).



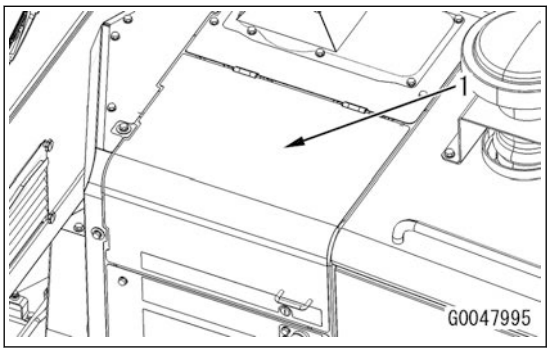
REMARK

If purified water is added to above UPPER LEVEL (U.L.) line, remove the fluid with a syringe to lower the level to UPPER LEVEL (U.L.) line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large quantity of water. If necessary, consult your Komatsu distributor or a battery manufacturer.

6. Tighten the cap (2) securely.



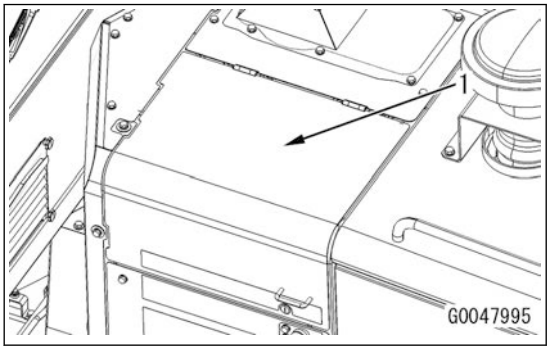
7. Close the covers (1) at the left of the machine.



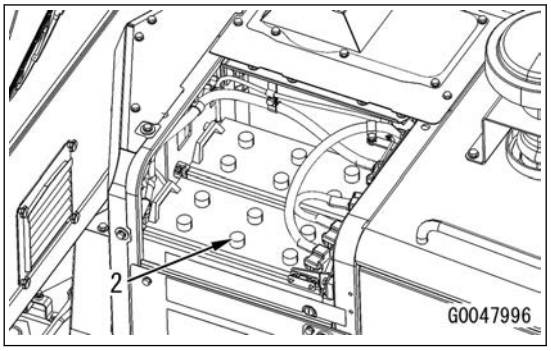
CHECK ELECTROLYTE LEVEL WHEN IT IS IMPOSSIBLE TO CHECK FROM SIDE OF BATTERY

When you cannot check the electrolyte level from the side of the battery, or there is no UPPER LEVEL line on the side of the battery, check as follows.

1. Open the cover (1) at the left of the machine.



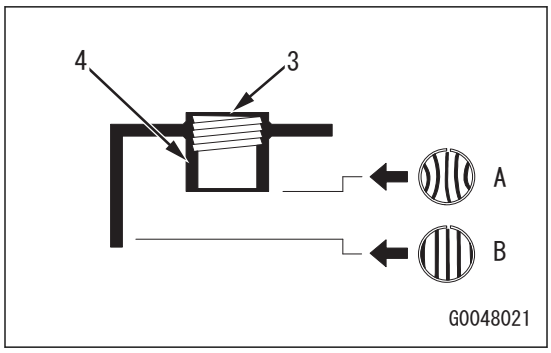
2. Remove the cap (2) at the top of the battery, and check the electrolyte level through the electrolyte filler port (3).

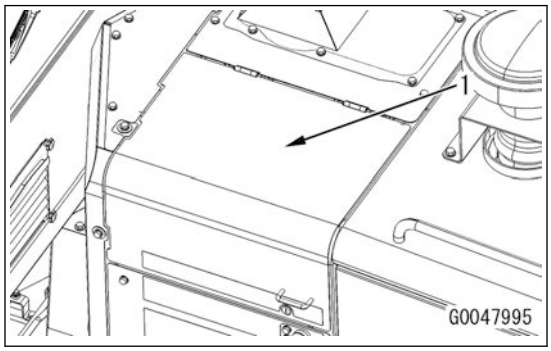


3. If the electrolyte level is below the sleeve (4), add purified water (such as a commercial battery fluid) up to the bottom of the sleeve (UPPER LEVEL line).
   - (A) Correct level: The electrolyte level reaches the bottom of the sleeve, so the surface tension causes the surface to bulge and the pole plate does not look straight.
   - (B) Low level: The electrolyte level does not reach the bottom of the sleeve, so the pole plate looks straight and not bent.

   REMARK

   If it is added to a level above the bottom end of the sleeve, use a syringe to remove it. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large quantity of water. If necessary, consult your Komatsu distributor or a battery manufacturer.
4. Tighten the cap (2) securely.
5. Close the cover (1).

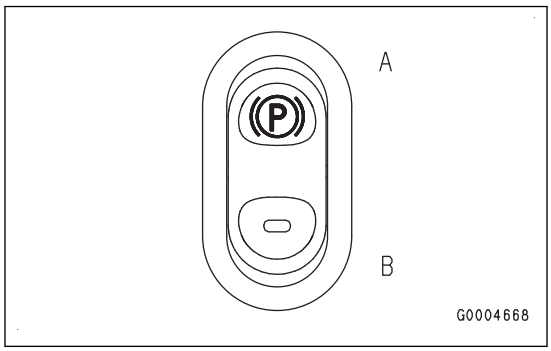




CHECK PARKING BRAKE

1. On a dry slope (downhill), set the parking brake switch from the OFF position (B) to the ON position (A).
2. Check that the machine is stopped and held at the current position.

   If a problem is found, consult your Komatsu distributor for adjustment.



CHECK AND ADJUST CLEARANCE IN BALL JOINT

Check and adjust all the ball joints of the work equipment link.

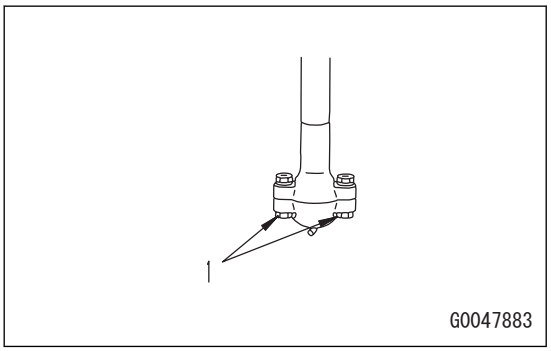
Check the clearance in the ball joint. If the clearance in axial direction is 1 mm {0.039 in} or more, adjust it according to the following procedure.

Items to be prepared

- Feeler gauge
- Shim (2 types: Thickness of 0.5 mm {0.02 in}, 0.2 mm {0.008 in})

1. Remove all the shims of the ball joint.
2. Tighten the cap with the bolts (1) (2 pieces) to make the clearances on the right and left sides are the same.
3. Measure the clearance with a feeler gauge.
4. Insert one more shim (0.2 mm {0.008 in}) in addition to the number required for the measured dimension to fill the clearance fully.

   Thickness of 1 shim is 0.2 mm {0.008 in} and 0.5 mm {0.02 in}.
5. Tighten the cap.



CHECK LOOSENESS OF WHEEL HUB BOLTS, RETIGHTEN BOLTS

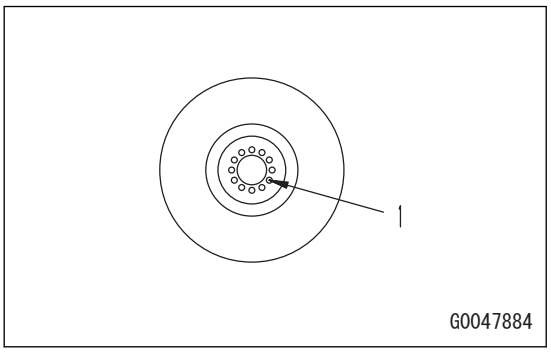
Damage or looseness of the wheel hub bolt (1) can cause wear of the tire, and it can cause personal injury.

1. Check the wheel hub bolts (1) for looseness.

   Be sure to turn the bolts in the direction of tightening.

   If a loose part is found, retighten the wheel hub bolt (1).

   Tightening torque: 610 to765 Nm {62.5 to 78.0 kgfm , 452 to 564 lbft}
2. If the wheel hub bolt (1) of a wheel is broken, replace all the wheel hub bolts (1) for that wheel.



CHECK WHEEL RIM, LOCK RING, AND SIDE RING FOR CORROSION AND WEAR

If the wheel rim, lock ring, or side ring is corroded significantly, consult your Komatsu distributor or a tire manufacturer for inspection.

EVERY 500 HOURS MAINTENANCE

Maintenance for every 50 hours and 250 hours must be done at the same time.

CHANGE OIL IN ENGINE OIL PAN AND ENGINE OIL FILTER CARTRIDGE

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When the oil filler cap is removed, oil can spurt out. Turn it slowly to release the internal pressure, then remove it.**

REMARK

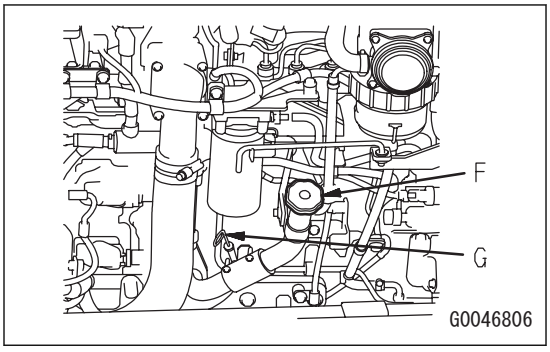
When the ambient temperature is low, water or emulsified thing can stick to the dipstick or oil filler cap. The drained oil can be milky white, but it is not a problem if the coolant level is normal.
The emulsified thing cannot be removed fully after oil change. But it is not a problem.

Refill capacity: 23 ℓ {6.08 USgal}

Items to be prepared

- Container to catch oil
- Filter wrench

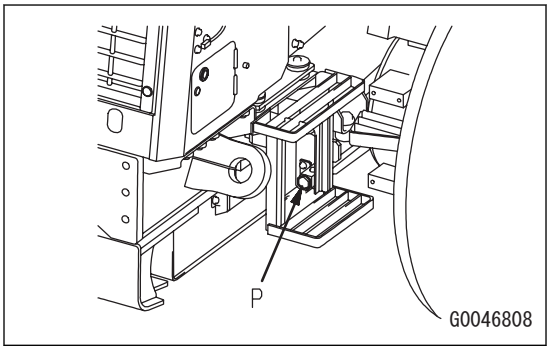
1. Open the side cover at the right of the machine.
2. Open the engine oil filler port (F).



3. Put a container to catch oil below the drain plug (P).
4. Loosen the drain plug (P) and drain oil.

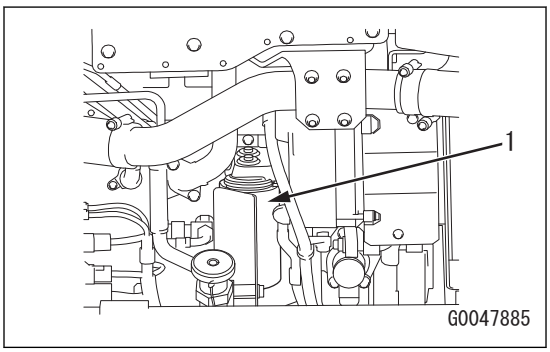
   Check the drained oil. If it contains much metal powder or foreign material, consult your Komatsu distributor.
5. Open the side cover at the left of the machine.
6. Tighten the drain plug (P).

   Tightening torque: 118 to 162 Nm {12 to 16.5 kgfm, 86.8 to 119 lbft}



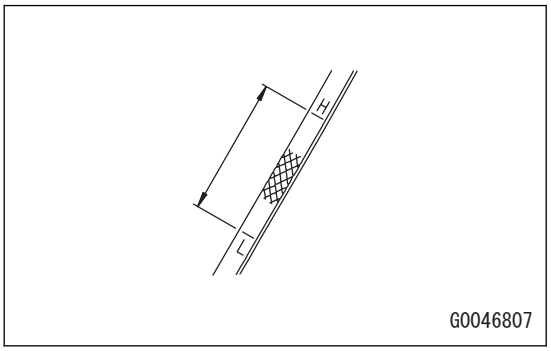
7. Turn the filter cartridge (1) counterclockwise with the filter wrench, and remove it.

   Wait for approximately 10 minutes before removal. A large quantity of oil can come out immediately after the engine stops.
8. Clean the filter head.
9. Fill the new filter cartridge with clean engine oil.
10. Apply engine oil or grease to the seal and thread of the new filter cartridge, and install it.



11. When you install the cartridge, tighten it until the seal surface touches the filter head, and then tighten it 3/4 to 1 turn.
12. After replacement, add oil through the oil filler port (F) up to the mark on the dipstick (G).
13. Make sure that the engine oil level is in the specified level.
    1) Run the engine at low idle for a while and then stop it.

       Wait for 15 minutes or more after the engine starts, and check oil.
    2) Pull out the dipstick (G) and wipe the oil off with a cloth.
    3) Fully insert the dipstick (G) again, then pull it out.
    4) If the oil level is between marks H and L, it is correct.
14. Close the side covers at the right and left of the machine.



REPLACE FUEL PREFILTER CARTRIDGE

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When the engine is in operation, the pressure in the engine fuel system becomes high.**
  After the engine is stopped, wait for 30 seconds or more to decrease the internal pressure.
- **Do not let an open flame be near.**

NOTICE

- **Komatsu recommends the use of Komatsu genuine fuel filter cartridge. It uses a special filter that has high filtration efficiency.**
- **The common rail fuel injection system consists of more accurate parts than those in the conventional injection pump and nozzles.**
  If a cartridge other than a Komatsu genuine filter cartridge is used, dirt or foreign material can be mixed and cause failure to the injection system.
  Do not use an equivalent product.
- **During inspection and maintenance of the fuel system, be very careful to prevent entry of foreign material. If there is dirt in the fuel system, flush it with fuel.**

Items to be prepared

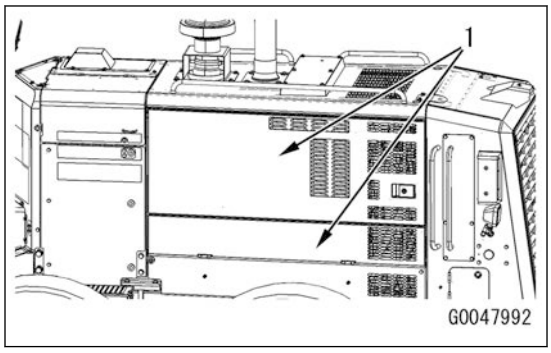
- Container to catch the fuel
- Filter wrench

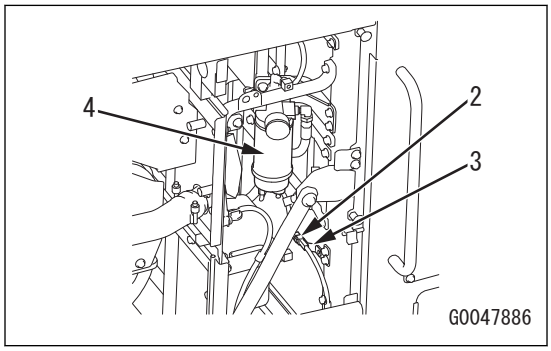
When you replace the fuel main filter cartridge (every 1000 hours), replace the fuel prefilter cartridge first.

1. Open the side cover (1).

   The fuel prefilter, which is one unit with the water separator, is installed at the rear of the engine.
2. Disconnect the connector (2), and remove the clamp (3).

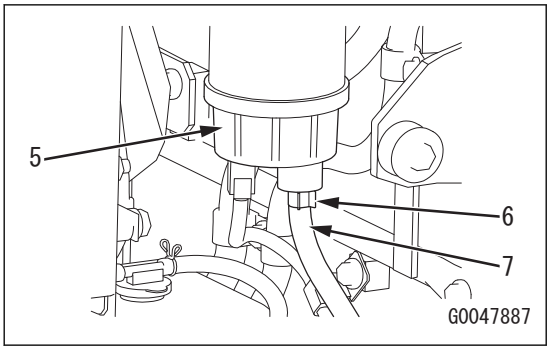
   Put a plastic bag or tape to protect the terminal of the removed connector.
3. Put a container to catch fuel below the filter cartridge (4).





4. Disconnect the hose (7) that connects to the drain plug (6).
5. Turn the filter cartridge (4) counterclockwise with the filter wrench, and remove it.
6. Turn the water separator cup (5) that is installed at the bottom of the removed cartridge counterclockwise to remove it.

   This cup is used again. If it is damaged, replace it with a new one.



7. Install the cup (5), currently removed in step 6, to the bottom of the new fuel prefilter cartridge.

   At this time, be sure to replace the seal ring with a new one.

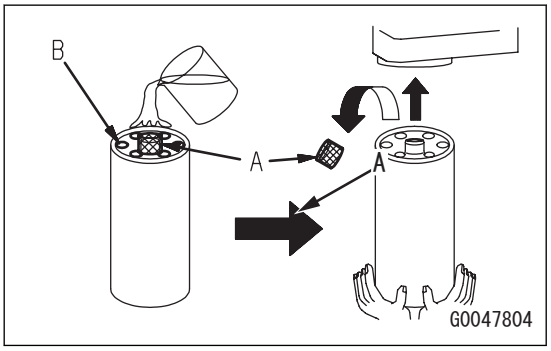
   Tightening torque of cup: 10 Nm {1.0 kgfm, 7.23 lbft}

   When you replace the seal ring, apply clean fuel to the surface of the new ring before you install it.
8. Make sure that the drain valve (6) in the lower part of the cup of the filter cartridge (5) is tightened fully.

   Tightening torque: 0.2 to 0.45 Nm {0.02 to 0.46 kgfm, 0.14 to 0.33 lbft}
9. Clean the filter head.
10. Fill the filter cartridge with clean fuel through the small holes (B) (8 places) in the new filter cartridge.

NOTICE

Fill the filter cartridge with fuel with the cap (A) fitted. The cap (A) is used to prevent entry of dirt into the filter cartridge.

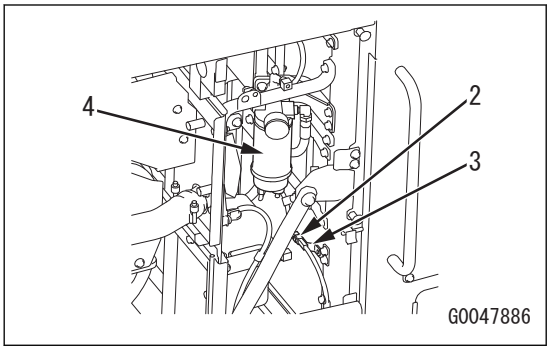


11. Apply thin layer of oil to the packing surface of the filter cartridge.
12. Remove the filter cartridge cap (A), and install it to the filter head.
13. Tighten it until its packing surface touches the filter head, then tighten it 1/2 to 3/4 turn to install it.

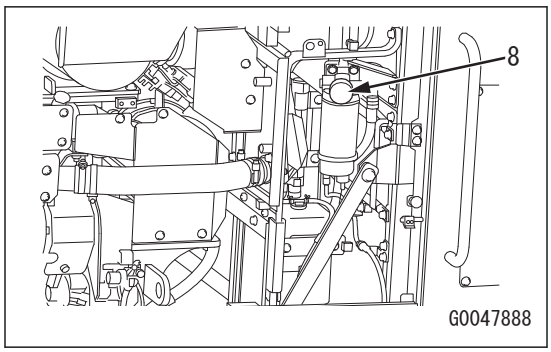
REMARK

Be sure to obey the tightening angle of the filter cartridge. If it is tightened too much, the packing can be damaged and this will cause the leakage of fuel. If it is not tightened sufficiently, fuel will leak through the gap at packing.
When you tighten it with a filter wrench, be very careful not to dent or damage to the filter.

14. Connect the connector (2), and install the clamp (3).
15. Connect the hose (7).



16. Bleed air as follows.
    1) Fill the fuel tank with fuel.
    2) Loosen and pull out the feed pump knob (8), and operate it back and forth.
        - It is not necessary to remove the plug on the side of the fuel prefilter head.
        - Move the knob (8) until the movement becomes heavier.
    3) After air bleeding is completed, push the knob (8) in and tighten it.



17. Close the side cover (1).
18. Start the engine and run it at low idle for 10 minutes.
19. Check the filter seal surface and the mounting face of the water separator for fuel leakage.

    If there is fuel leakage, check the filter cartridge.

    If fuel leakage continues, do steps 1 to 6 to remove the filter cartridge.

    Check the packing surface. If damage or foreign material is found, do the procedure as follows.
    1) Replace the filter cartridge with a new one.
    2) Do steps 7 to 18 again.

CHECK AND ADJUST CLEARANCE IN CIRCLE GUIDE

⚠ WARNING

- **If there is no clearance between the circle gear tooth top (or tooth bottom) and pinion gear tooth bottom (or tooth top) of the circle rotation after the maintenance, replace the guide.**
- **Do not raise the blade higher than necessary for check and adjustment.**

NOTICE

If the condition is as follows after the adjustment, replace the circle guide or wear plate.
Conditions for circle guide replacement

- **When the clearance (R) between the circle gear tooth top and guide shoe becomes zero**
- **When the clearance between the circle gear tooth top (or tooth bottom) and pinion gear tooth bottom (or tooth top) of the circle rotation becomes zero**

Conditions for wear plate replacement

- **When the clearance (S) between the circle gear top face and pinion gear of the circle rotation becomes zero**
- **When the plate thickness (T) of the sliding part of circle gear of the wear plate becomes 4 mm {0.157 in} or below**
- **When small cracks are found on the surface of the wear plate**

Items to be prepared

- Feeler gauge
- Shim (2 types: Thickness of 1 mm {0.039 in}, 0.5 mm {0.02 in})

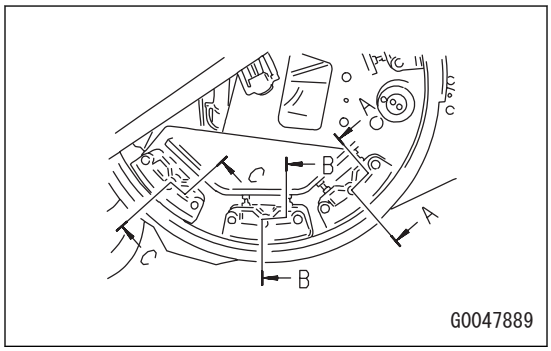
CHECK CLEARANCE IN CIRCLE GUIDE

1. Keep the blade raised and use a feeler gauge to measure the clearance (P) between the top face of the circle and the bottom face of the drawbar as shown in the figure.

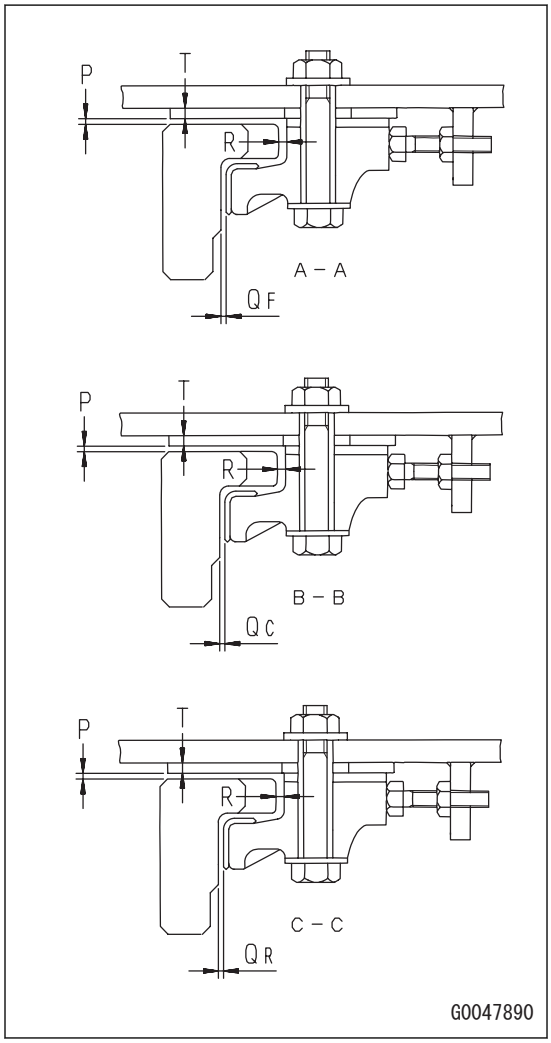
   The standard clearance is 1.5±0.5 mm {0.059±0.02 in}.

2. While force is applied at the rear and keep the blade raised, use a feeler gauge to measure the clearance QF (front), QC (center), and QR (rear) between the circle and circle guide as shown in the figure.

   The standard clearance of QF, QC, QR is QF=0 mm {0 in}, QC=0.7 mm {0.028 in}, QR=1.5 mm {0.059 in}, or QF=QR=1 mm {0.039 in}.



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ADJUST CLEARANCE IN CIRCLE GUIDE

The installed wear plates are made of thermoplastic resin or copper alloy.

Check the wear plate that is installed, and then adjust it. See the pages for the adjustment.

ADJUST WEAR PLATE MADE OF THERMOPLASTIC RESIN

ADJUST VERTICAL POSITION OF THERMOPLASTIC WEAR PLATE

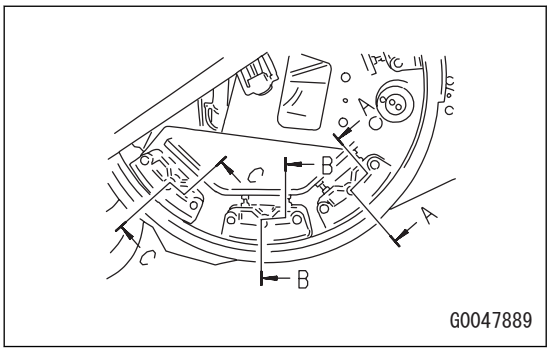
1. Raise the blade off the ground.
2. Remove the bolts (1), (5), and (9), and remove the guide shoes (2), (6), and (10), and adjust the clearance (P) with number of the shims (18).

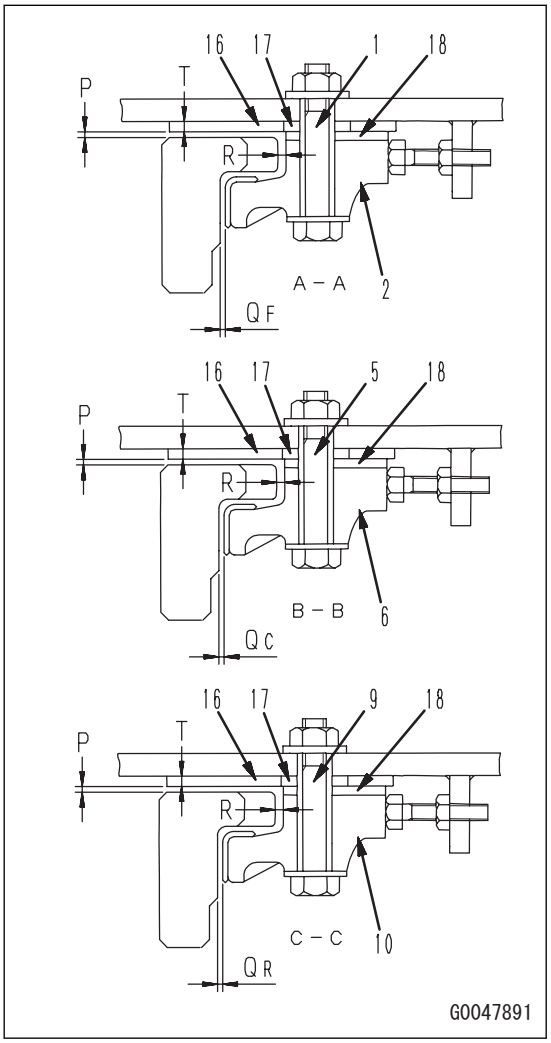
   There are 2 types of the thickness of shims (18), 1 mm {0.039 in}, 0.5 mm {0.02 in}.

   Adjust the guide shoes one by one.

   Before you install the guide shoes (2), (6), and (10), make sure that the collar (17) is fitted to the wear plate (16).

   If the collar (17) comes off from the wear plate (16) easily, apply grease on the outside perimeter of the collar (17) not to come off.





ADJUST FORE-AND-AFT POSITION OF THERMOPLASTIC WEAR PLATE

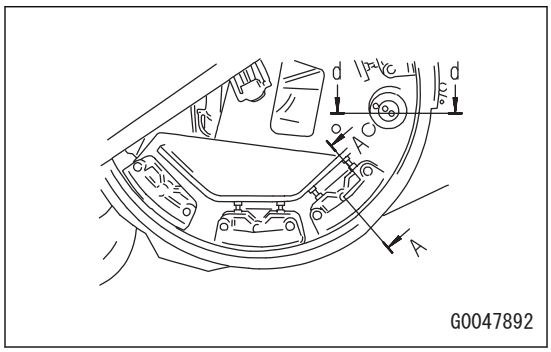
1. Lower the blade until it touches the ground lightly.
2. Loosen the bolt (1) and lock nut (4), and loosen the bolt (3).
3. Push open the guide shoe (2).

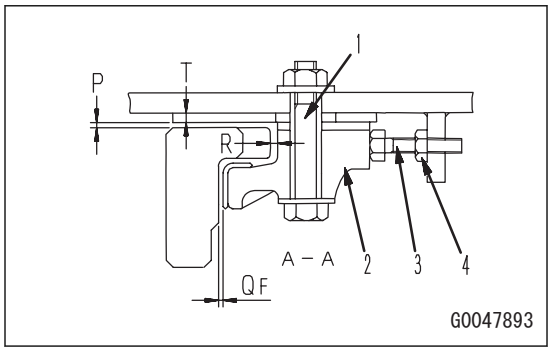
   Set it as QF=0 mm {0 in}.

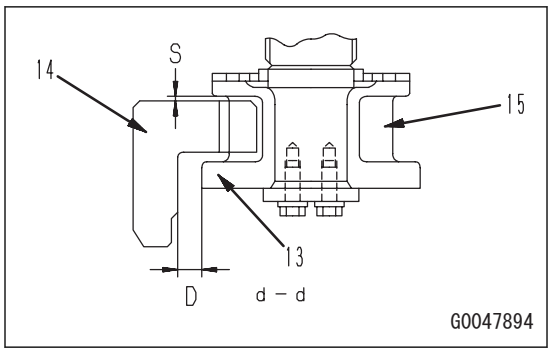
   Push open the right and left bolts equally.
4. Adjust the circle (14) back and forth.

   Adjust it so that the clearance (D) between the lower flange (13) of the circle rotation and internal rocking surface of the circle becomes 20 to 22 mm {0.8 to 0.9 in}.

   (15): Pinion gear
5. With QF=0 mm {0 in} state, tighten the lock nut (4), and tighten the bolt (1).







ADJUST RIGHT AND LEFT POSITION OF THERMOPLASTIC WEAR PLATE

1. Lower the blade until it touches the ground lightly.
2. Loosen the bolt (9) and lock nut (12), and loosen the bolt (11).
3. Push open the guide shoe (10).

   Set it as QR=0 mm {0 in}.

   Push open the right and left bolts equally.
4. Loosen the bolt (5) and lock nut (8), and loosen the bolt (7).
5. Push open the guide shoe (6).

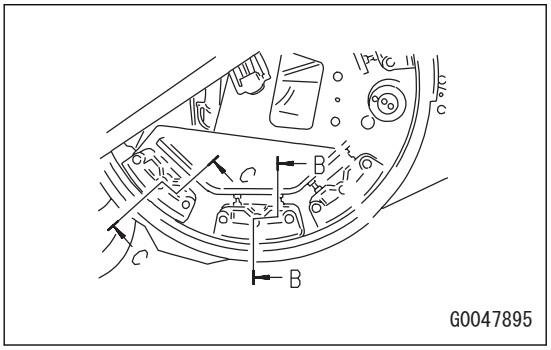
   Set it as QC=0 mm {0 in}.

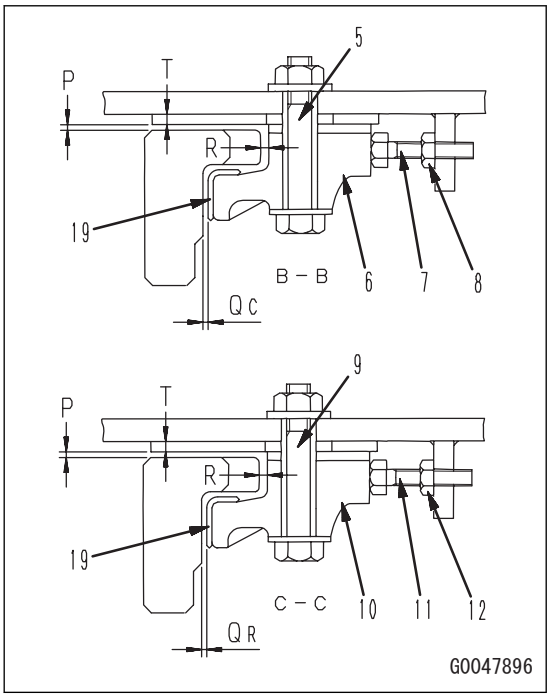
   Push open the right and left bolts equally.
6. With QR=0 mm {0 in} state, turn back the bolt (11) by a half turn, and tighten the lock nut (12).
7. Return the guide shoe (10) until it touches the bolt (11), and tighten the bolt (9).

   The standard clearance between the circle gear tooth tip and pinion gear tooth bottom of the rotation is 1.5 to 3.0 mm {0.059 to 0.018 in}.
8. With QC=0 mm {0 in} state, return the bolt (7) by 1/4 turn, and tighten the lock nut (8).
9. Return the guide shoe (6) until it touches the bolt (7), and tighten the bolt (5).

   Make sure that the circle rotates even at 90 ° high bank on the right and left sides.

   (19): Circle guide





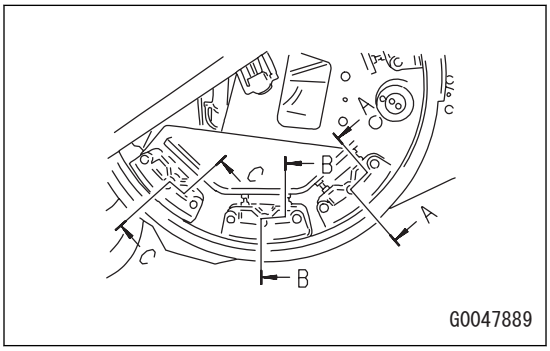
ADJUST WEAR PLATE MADE OF COPPER ALLOY

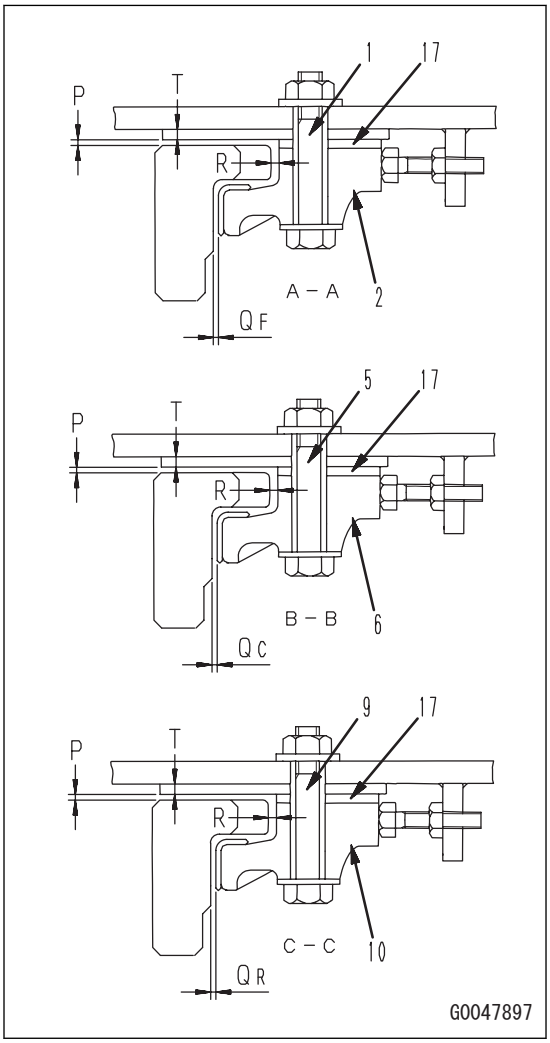
ADJUST VERTICAL POSITION OF COPPER ALLOY WEAR PLATE

1. Raise the blade off the ground.
2. Remove the bolts (1), (5), and (9), and remove the guide shoes (2), (6), and (10), and adjust the clearance (P) with number of the shims (17).

   There are 2 types of the thickness of shims (17), 1 mm {0.039 in}, 0.5 mm {0.02 in}.

   Adjust the guide shoes one by one.





ADJUST FORE-AND-AFT POSITION OF COPPER ALLOY WEAR PLATE

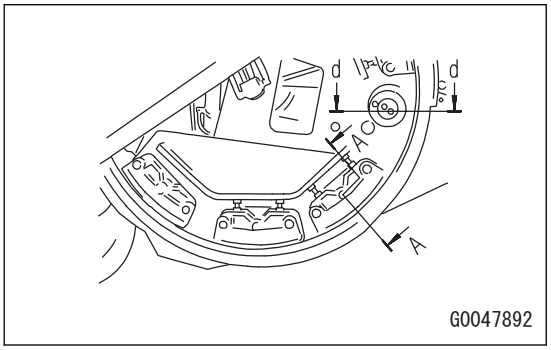
1. Lower the blade until it touches the ground lightly.
2. Loosen the bolt (1) and lock nut (4), and loosen the bolt (3).
3. Push open the guide shoe (2).

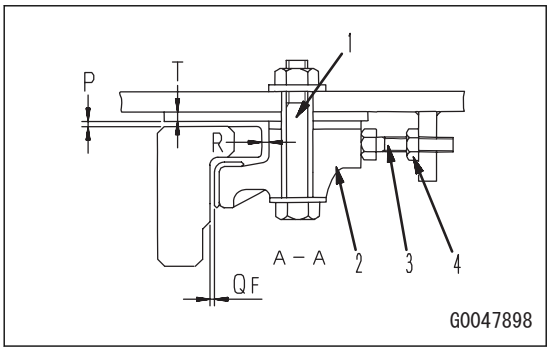
   Set it as QF=0 mm {0 in}.

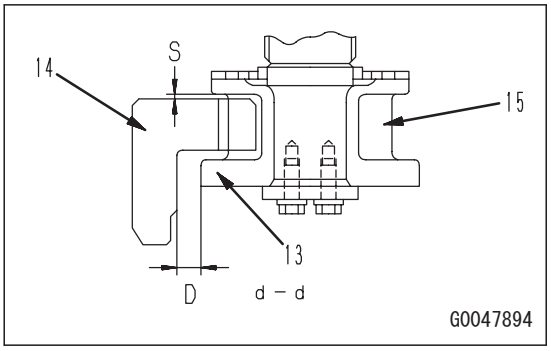
   Push open the right and left bolts equally.
4. Adjust the circle (14) back and forth.

   Adjust it so that the clearance (D) between the lower flange (13) of the circle rotation and internal rocking surface of the circle becomes 20 to 22 mm {0.8 to 0.9 in}.

   (15): Pinion gear
5. With QF=0 mm {0 in} state, tighten the lock nut (4), and tighten the bolt (1).







ADJUST RIGHT AND LEFT POSITION OF COPPER ALLOY WEAR PLATE

1. Lower the blade until it touches the ground lightly.
2. Loosen the bolt (9) and lock nut (12), and loosen the bolt (11).
3. Push open the guide shoe (10).

   Set it as QR=0 mm {0 in}.

   Push open the right and left bolts equally.
4. Loosen the bolt (5) and lock nut (8), and loosen the bolt (7).
5. Push open the guide shoe (6).

   Set it as QR=0 mm {0 in}.

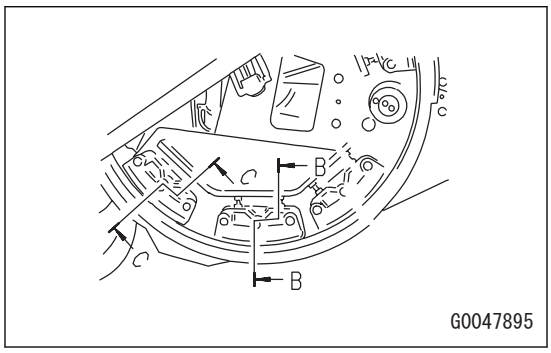
   Push open the right and left bolts equally.
6. With QR=0 mm {0 in} state, turn back the bolt (11) by a half turn, and tighten the lock nut (12).
7. Return the guide shoe (10) until it touches the bolt (11), and tighten the bolt (9).

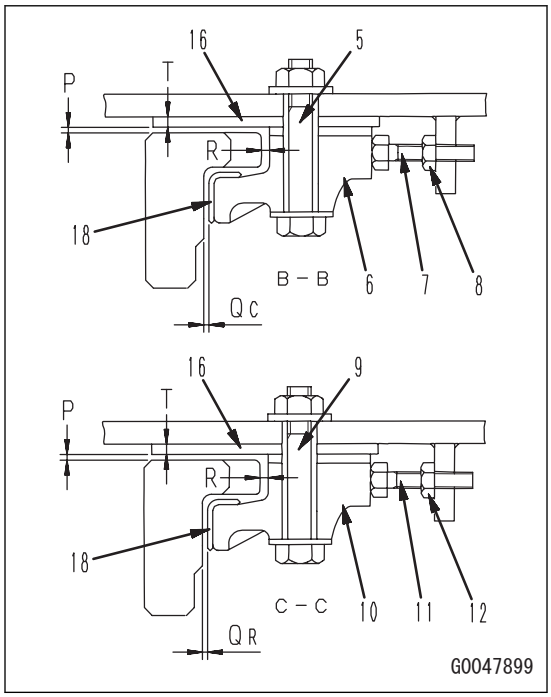
   The standard clearance between the circle gear tooth tip and pinion gear tooth bottom of the rotation is 1.5 to 3.0 mm {0.059 to 0.118 in}.
8. With QC=0 mm {0 in} state, return the bolt (7) by 1/4 turn, and tighten the lock nut (8).
9. Return the guide shoe (6) until it touches the bolt (7), and tighten the bolt (5).

   Make sure that the circle rotates even at 90 ° high bank on the right and left sides.

   (16): Wear plate

   (18): Circle guide





EVERY 1000 HOURS MAINTENANCE

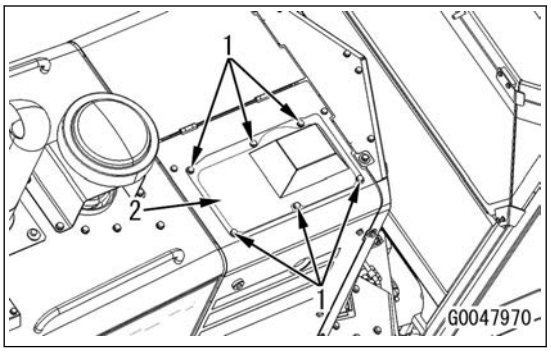
Maintenance for every 50 hours, 250 hours, and 500 hours must be done at the same time.

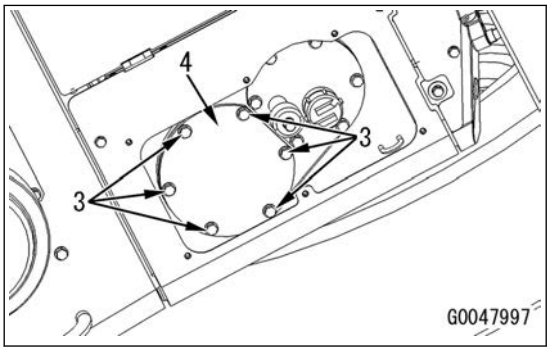
REPLACE HYDRAULIC OIL FILTER ELEMENT

⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.
When you remove the oil filler cap, there is a possibility that oil spurts out. Slowly turn the oil filler cap to release the internal pressure, then remove it carefully.

1. Remove the bolts (1) (6 pieces) and remove the cover (2).
2. Remove the bolts (3) (6 pieces), and remove the cover (4).
3. Take out the element, and clean the removed parts and filter case.
4. Install a new breather element.
5. Install the cover (4) with the bolts (3) (6 pieces).
6. Install the cover (2) with the bolts (1) (6 pieces).





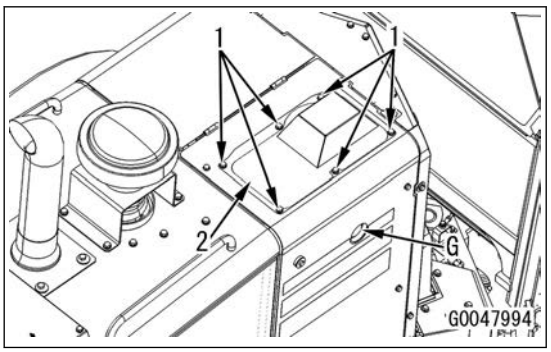
7. Bleed air as follows.

   NOTICE

   If the operations that follow are done while no warm-up operation was done, air that entered inside the cylinder can cause damage to the piston packing.

   - **Run the engine at high speed.**
   - **Operate the cylinder to the stroke end.**

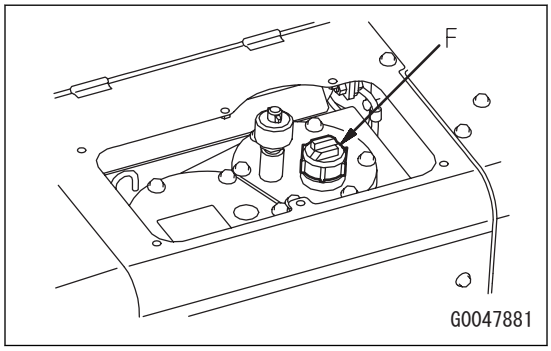
   1) Start the engine.
   2) Run the engine at low idle for 5 minutes.
   3) Operate each cylinder to approximately 100 mm {3.9 in} before the stroke end 4 to 5 times.
      - Blade lift
      - Blade side shift
      - Power tilt
      - Steering
      - Articulate
      - Drawbar side shift
      - Leaning
      - Ripper



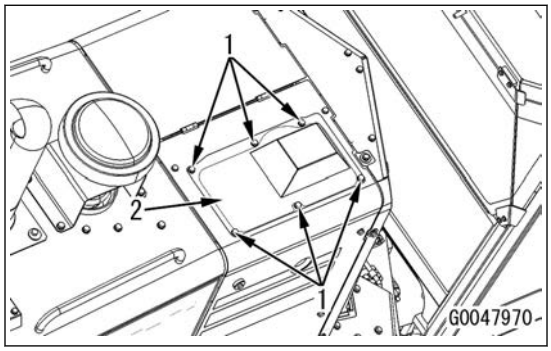
- Scarifier
- Front blade

Be careful not to operate the cylinder to the stroke end.

4) Operate each cylinder to the stroke end 3 to 4 times.
   - Blade lift
   - Blade side shift
   - Power tilt
   - Steering
   - Articulate
   - Drawbar side shift
   - Leaning
   - Ripper
   - Scarifier
   - Front blade
5) Check the hydraulic oil level.
   Check the oil level with the sight gauge (G).
   If the oil level is in the window of the gauge (G), it is correct.
6) If the oil level is below the window of the gauge (G), remove the bolts (1) (6 pieces), and remove the cover (2).
7) Add oil through the oil filler port (F).



8. Install the cover (2) with the bolts (1) (6 pieces).



REPLACE FUEL MAIN FILTER CARTRIDGE

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When the engine is in operation, the pressure in the engine fuel system becomes high. After the engine is stopped, wait for 30 seconds or more to decrease the internal pressure.**
- **Do not let an open flame be near.**

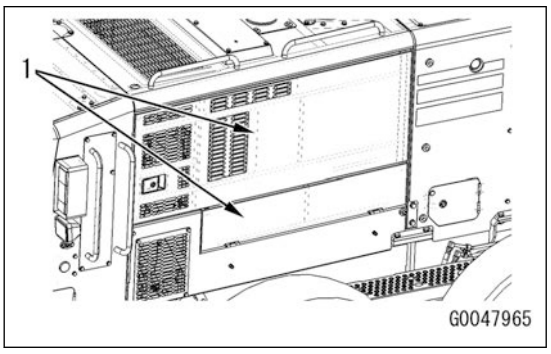
NOTICE

- **Komatsu recommends the use of Komatsu genuine fuel filter cartridge. It uses a special filter that has high filtration efficiency.**
- **The common rail fuel injection system consists of more accurate parts than those in the conventional injection pump and nozzles. If a cartridge other than a Komatsu genuine filter cartridge is used, dirt or foreign material can be mixed and cause failure to the injection system. Do not use an equivalent product.**
- **During inspection and maintenance of the fuel system, be very careful to prevent entry of foreign material. If there is dirt in the fuel system, flush it with fuel.**
- **If you remove the filter cartridge, the fuel will spill from the filter head. To prevent fuel to flow out, do not let the machine with the filter cartridge removed.**

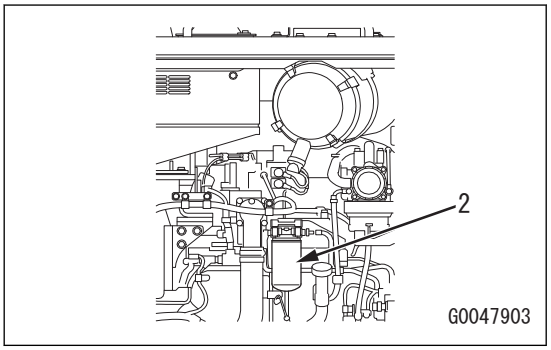
Items to be prepared

- Container to catch the fuel
- Filter wrench

1. Open the side cover (1).



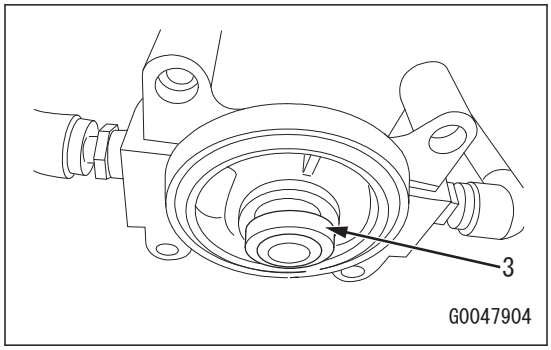
2. Put a container to catch fuel below the filter cartridge (2).
3. Turn the filter cartridge (2) counterclockwise with the filter wrench, and remove it.



4. Clean the filter head.
5. Replace the inner seal (3) with a new one.
6. Apply thin layer of oil to the packing surface of the new filter cartridge.

   NOTICE

   - **Do not fill the new filter cartridge with fuel.**
   - **Remove the cap (B) at center, and install the filter cartridge.**



7. Tighten it with the filter wrench until its packing surface touches the filter head, then tighten it 3/4 turn.

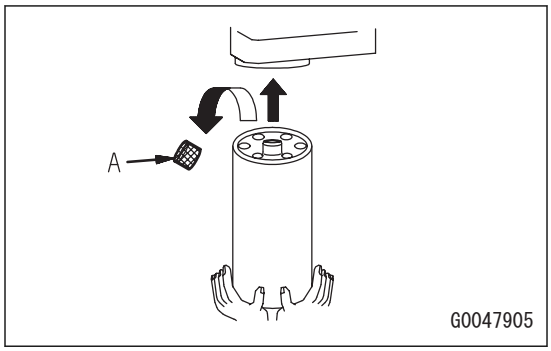
   REMARK

   Be sure to obey the tightening angle.

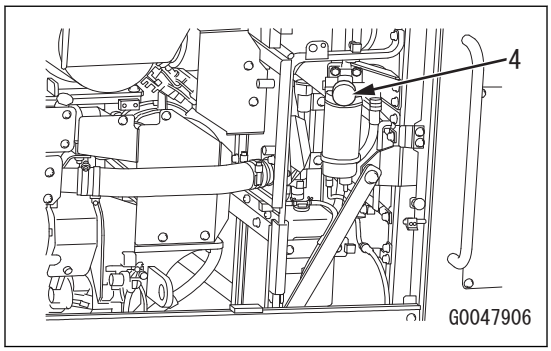
   - If the filter cartridge is tightened too much, it can cause damage on the packing and fuel leakage.
   - If the filter cartridge is not tightened fully, fuel leakage from the packing will occur.

   REMARK

   Be sure not to damage the filter cartridge.



8. After replacement of the fuel main filter cartridge is completed, bleed air as follows.
   1) Fill the fuel tank with fuel.
   2) Open the side cover at the left of the machine.
   3) Loosen and pull out the feed pump knob (4), and operate it back and forth.
      - It is not necessary to remove the plug on the side of the fuel prefilter head.
      - Move the knob (4) until the movement becomes heavier.



   4) After air bleeding is completed, push the knob (4) in and tighten it.
9. Start the engine and check the filter seal surface for fuel leakage.

   If there is fuel leakage, check the tightening condition of the filter cartridge.

   If there is fuel leakage, remove the filter cartridge in steps 1 to 3. If damage or pinched foreign material on the packing surface is found, replace it with a new cartridge, and do steps 4 to 9.
10. Close the side covers at the right and left of the machine.

CHANGE OIL IN TRANSMISSION CASE AND CLEAN TRANSMISSION CASE STRAINER

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When the oil filler cap is removed, oil can spurt out. Turn it slowly to release the internal pressure, then remove it.**

Refill capacity: 45 ℓ {11.9 USgal}

Items to be prepared

Container to catch oil

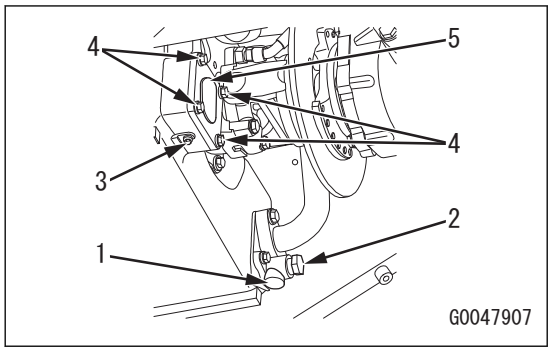
1. Put a container to catch oil below the transmission case.
2. Remove the drain plug (1) and drain oil.

   Loosen the drain plug (2) slowly not to let the oil spurt out.
3. After oil is drained, tighten the drain plug (2) and install the drain plug (1).

   Tightening torque

   Drain plug (1): 59 to 78.5 Nm {6.0 to 8.0 kgfm, 43.4 to 57.9 lbft}

   Drain plug (2): 49 to 78.5 Nm {5.0 to 8.0 kgfm, 36.2 to 57.9 lbft}

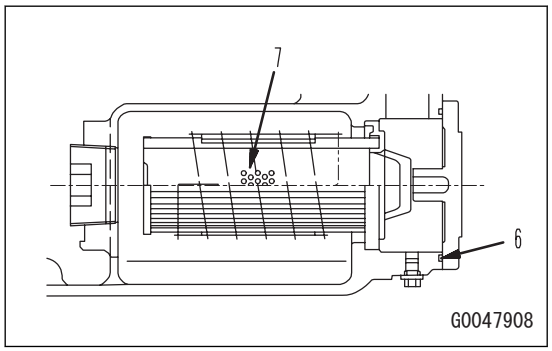


4. Remove the drain plug (3) and drain oil.
5. After oil is drained, install the drain plug (3).

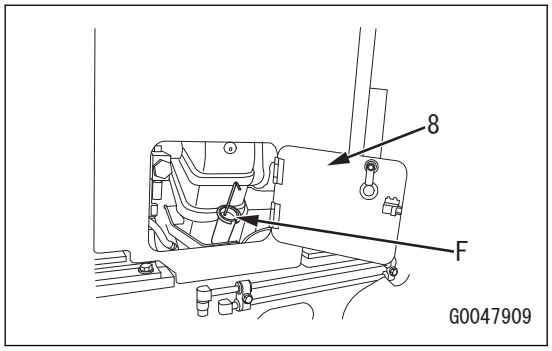
   Tightening torque

   Drain plug (3): 9.8 to 12.7 Nm {1.0 to 1.3 kgfm, 7.23 to 9.4 lbft}
6. Remove the bolts (4) (4 pieces) and remove the cover (5).
7. Remove the strainer (7).
8. Remove dirt from the strainer (7), then wash it in clean diesel fuel or flushing oil.

   If the strainer is damaged, replace it with a new one.
9. After you clean it, install the strainer (7) to the case.
10. Replace the O-ring (6) of the cover (5) with a new one.
11. Install the cover (5) with the bolts (4) (4 pieces).



12. Open the cover (8).
13. Add the specified quantity of oil through the oil filler port (F).
14. After the oil is added, see “CHECK OIL LEVEL IN TRANSMISSION CASE, ADD OIL (4-53)” and make sure that the oil is at the specified level.
15. Check the transmission case for oil leakage.



REPLACE TRANSMISSION OIL FILTER CARTRIDGE

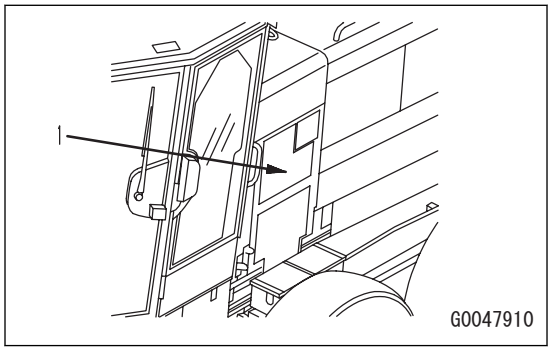
⚠ WARNING

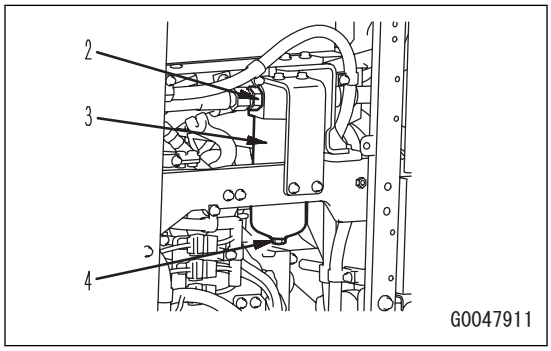
Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

Items to be prepared

- Container to catch oil
- Filter wrench
- Wrench (Width across flats: 24 mm {0.9 in})

1. Open the cover (1) at the left of the machine.
2. Put a container to catch oil below the transmission filter.
3. Remove the plug (2) of the transmission filter.
4. Drain oil. After oil is drained, tighten the plug.
5. Turn the transmission filter cartridge (3) counterclockwise with the nut (4), and remove it.
6. Clean the filter head, apply transmission oil to the seal surface and thread part of the new filter cartridge, then install it.
7. When you install it, tighten it until the seal surface touches the filter head, and then tighten it 2/5 turns with the filter wrench.
8. Make sure that the oil level is in the specified level. For details, see “CHECK OIL LEVEL IN TRANSMISSION CASE, ADD OIL”.
9. Check the transmission oil filter for oil leakage.
10. Close the cover (1).



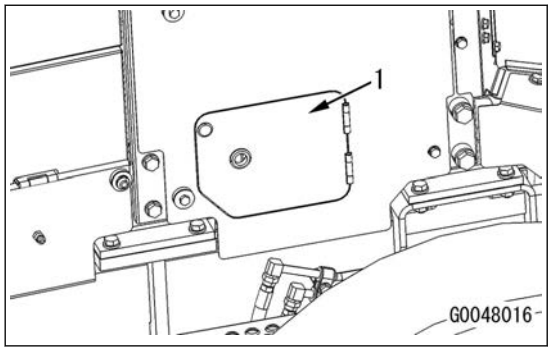


CLEAN TRANSMISSION BREATHER

⚠ WARNING

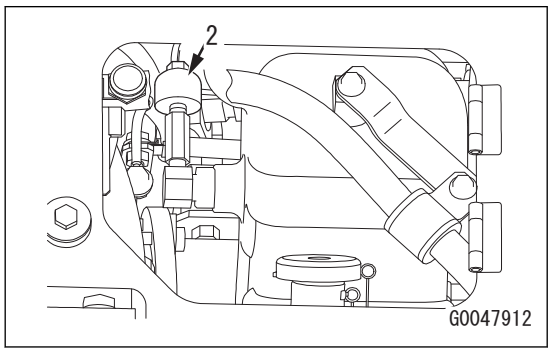
Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

1. Stop the engine.
2. Open the cover (1) at the right rear of the machine.



3. Remove mud and dirt around the breather, remove the breather (2), then wash it in detergent liquid.

   While you remove the breather (2), prevent entry of dirt through the mounting location.
4. Install the breather (2).
5. Close the cover (1).



CHANGE OIL IN FINAL DRIVE CASE

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When the oil filler cap is removed, oil can spurt out. Turn it slowly to release the internal pressure, then remove it.**

Refill capacity: 16 ℓ {4.23 USgal}

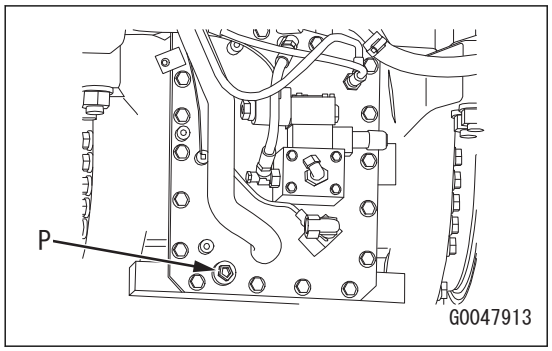
Items to be prepared

Container to catch oil

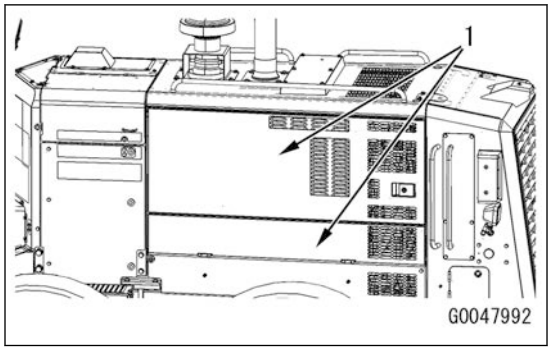
1. Stop the engine and keep it as it is for 5 minutes or more.
2. Put a container to catch oil below the final drive case.
3. Remove the drain plug (P) and drain oil.

   Loosen the drain plug (P), and then remove it slowly not to let the oil spurt out.
4. After oil is drained, install the drain plug (P).

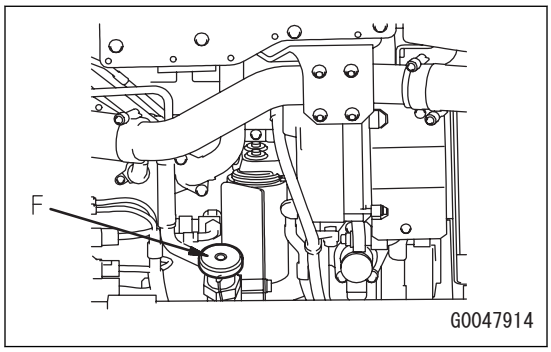
   Tightening torque: 58.8 to 78.4 Nm {6 to 7.99 kgfm, 43.4 to 57.8 lbft}



5. Open the side cover (1).

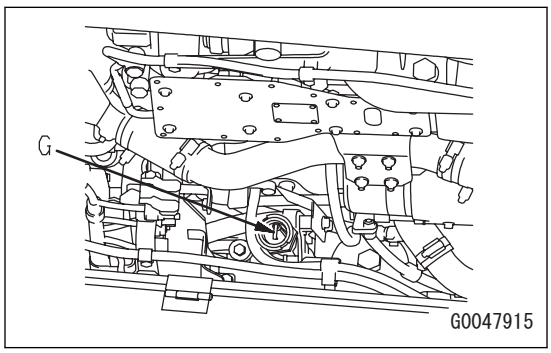


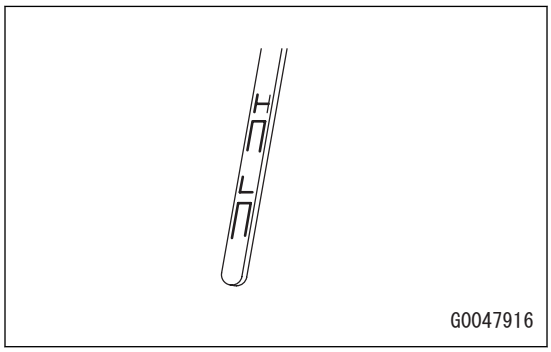
6. Add the specified quantity of oil through the oil filler port (F).



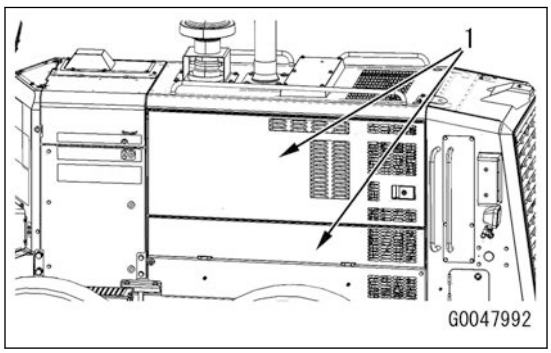
7. Pull out the dipstick (G) and wipe the oil off with a cloth.
8. Fully put the dipstick (G) into the dipstick pipe, then pull it out.

   If the oil level is between marks H and L of the dipstick (G), it is correct.
9. Check the final drive case for oil leakage.





10. Close the side cover (1).

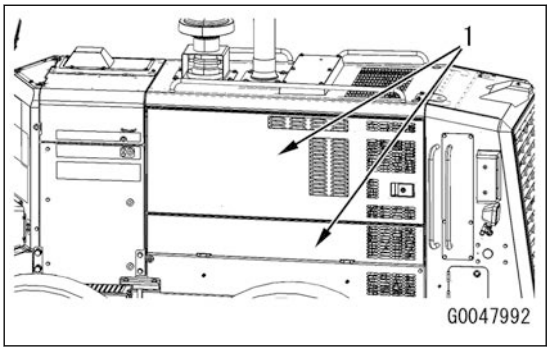


CLEAN FINAL DRIVE BREATHER

⚠ WARNING

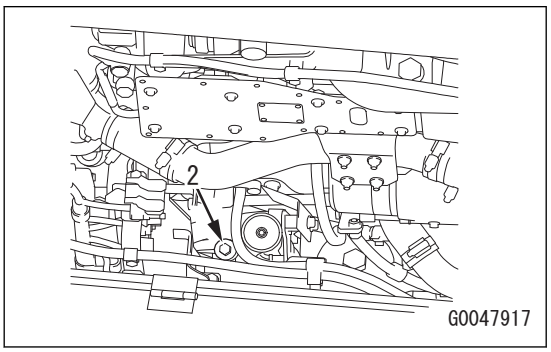
Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

1. Stop the engine.
2. Open the side cover (1).



3. Remove mud and dirt around the breather, remove the breather (2), then wash it in detergent liquid.

   While you remove the breather (2), prevent entry of dirt through the mounting location.
4. Install the breather (2).
5. Close the side cover (1).

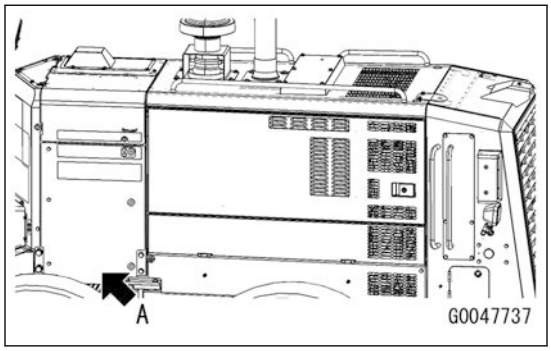


CLEAN DIFFERENTIAL LOCK FILTER ELEMENT AND STRAINER

⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

1. Stop the engine.
2. Remove the side cover (A) at the left of the machine.

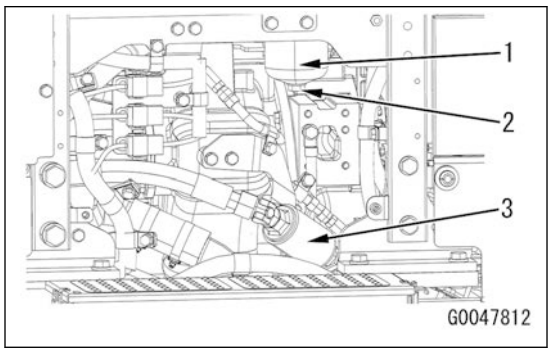


3. Remove mud and dirt around the filter and strainer.
4. Turn the filter case bottom (2) to remove the filter case (1), and remove the element.

   Filter case bottom (2) (width across flats: 24 mm {0.9 in})
5. Remove the cap (3), and remove the strainer.

   Cap (3) (width across flats: 36 mm {1.4 in})
6. Remove dirt from the element and strainer, then wash them in clean diesel fuel or flushing oil.

   If the element or strainer is damaged, replace it with a new one.



7. Install the strainer, and install the cap (3).

   Tightening torque: 274.4 to 367.5 Nm {28.0 to 37.5 kgfm, 203 to 271 lbft}
8. Replace the O-ring with a new one, and install the element and case (1).

   Tightening torque: 25 to 35 Nm {2.45 to 3.43 kgfm, 17.7 to 24.8 lbft}
9. Install the side cover (A) at the left of the machine.

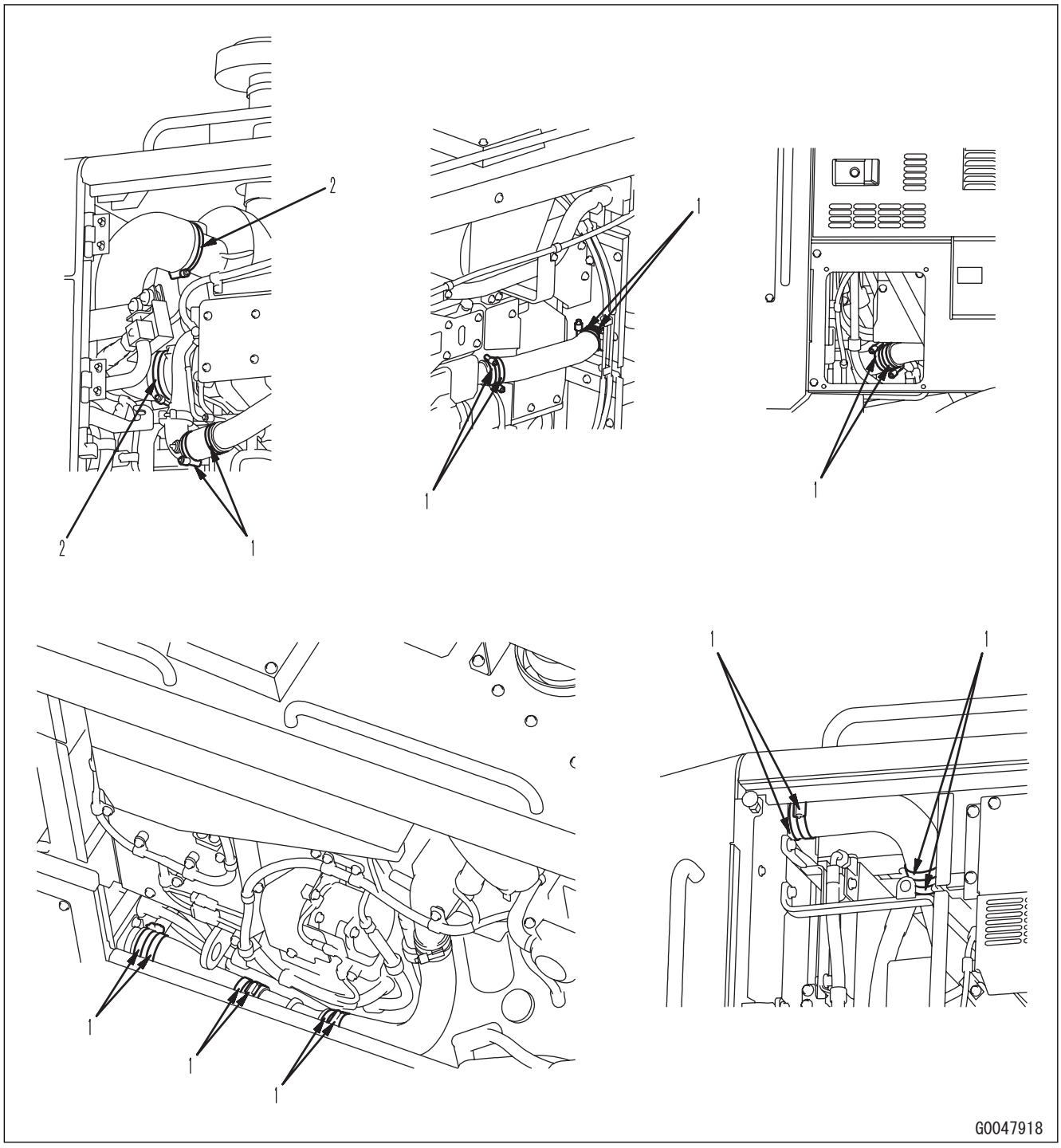
CHECK ALL TIGHTENING POINTS OF ENGINE INTAKE PIPE CLAMPS

Check the clamps (1) (18 pieces) and (2) (2 pieces) for looseness between the air cleaner and turbocharger, between the turbocharger and aftercooler, and between the aftercooler and engine.
Retighten the clamp if it is loose.

Tightening torque

Clamp (1): 10.0 to 11.0 Nm {1.02 to 1.12 kgfm, 7.38 to 8.1 lbft}

Clamp (2): 8.3 to 9.3 Nm {0.85 to 0.95 kgfm, 6.15 to 6.87 lbft}



CHECK ALTERNATOR BELT TENSION, CHECK AND REPLACE AUTO-TENSIONER

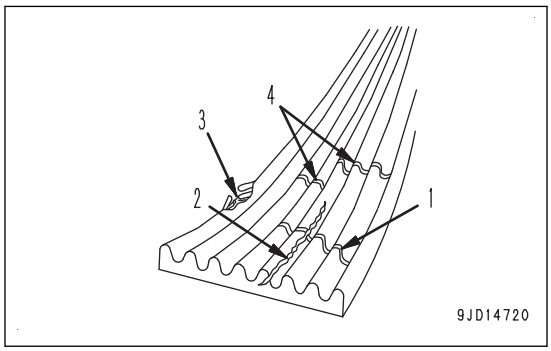
The alternator belt tension is automatically adjusted by auto-tensioner (belt tensioner). Normally, no belt tension adjustment is required. But, if there is a problem of the tension of alternator belt, you need to check the fan belt and auto-tensioner.

Special tools are required for the inspection and replacement of auto-tensioner.

Consult your Komatsu distributor.

If alternator drive belt shows the conditions that follow, it must be replaced. Consult your Komatsu distributor for replacement.

- If there is a vertical flaw (2) that is across a horizontal flaw (1).
- If there is a tear (3) on a part of the belt.
- You do not need to replace the belt when it has only horizontal flaw (4).

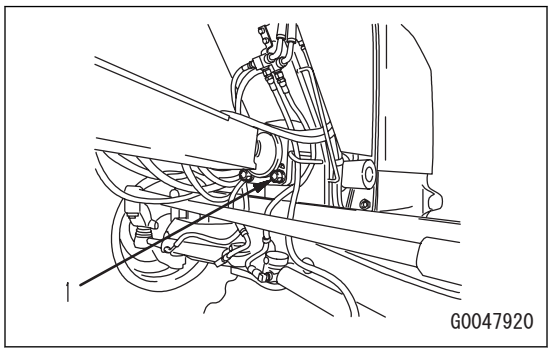


CHECK CLEARANCE AND PLAY OF BALL JOINT IN FRONT DRAWBAR

1. Turn the nut (1) of the ball joint mounting part at the front of the drawbar in the tightening direction. If it is loose, retighten it.
2. Check the clearance of the ball joint.

   If the forward and backward clearance is 2 mm {0.079 in} or more, remove the shim until the clearance is 0.5 to 2 mm {0.02 to 0.079 in}.

   If you tighten it without clearance, the ball joint can break.



CHECK AND ADJUST TOE-IN

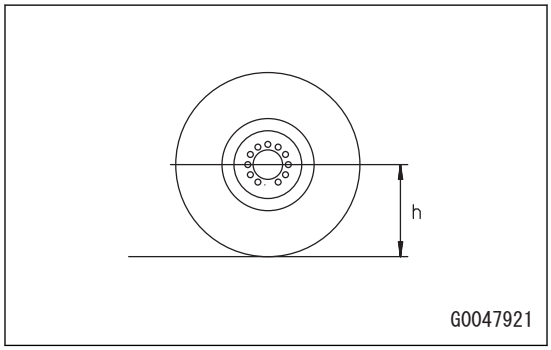
CHECK TOE-IN

Adjust the toe-in with the side slip tester to let the sideways slip of the tire become zero.

If the side slip tester is not available, do as follows.

1. Set the steering and leaning to the center position, and park the machine on a level ground.

   When you park the machine, be sure to move it forward several meters, and then stop it.
2. Measure the height (h) of the center of the axle from the ground.

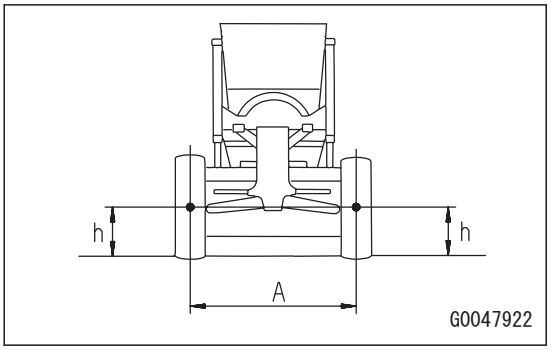


3. Make a mark of the dimension measured in the step 2 at the center of the tire width.

   Make the marks on the right and left tires in the same procedure.

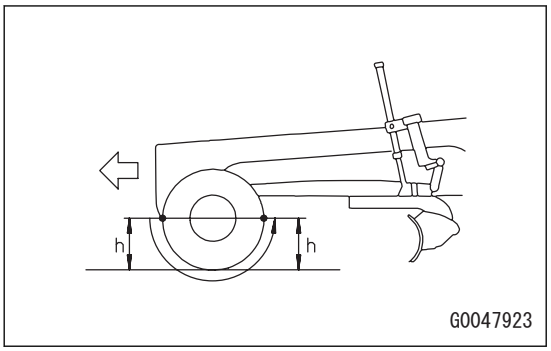
4. Measure the dimension between the marks on the right and left tires.

   Set this dimension as (A).



5. Move the machine forward slowly, and let the marks on the tires move to the rear faces.
6. When each mark comes to the height of the center of axle from the ground, stop the machine.

   Be sure to do this while you move the machine forward.

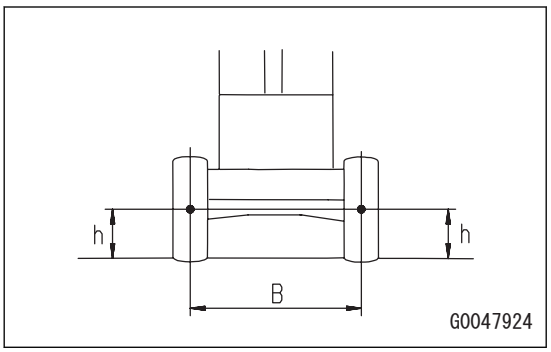


7. Measure the dimension between the marks on the right and left tires.

   Set this dimension as (B).

   The standard toe-in (B-A) is -5±1 mm {-0.197±0.039 in}. At this time, the side slip is zero.

   If it is out of this range, do the adjustment as follows.



ADJUST TOE-IN

NOTICE

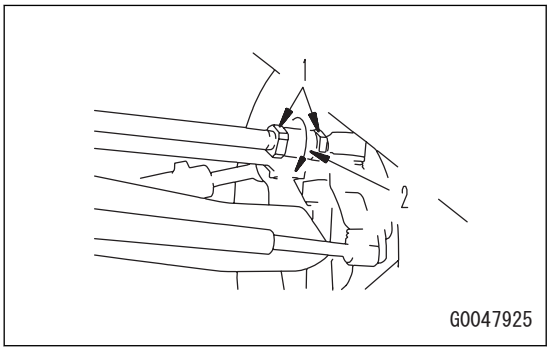
When you adjust the toe-in, set the front axle horizontally and set the leaning to zero.

1. Loosen the tightening nut (1), set the spanner on the square part (2) of the tie-rod, and turn the right and left tie-rods to adjust.

   When the tie-rod is turned in the direction of the arrow in the figure, the toe-in increases, and when it is turned in the opposite direction, the toe-in decreases.

   Each tie-rod increases by 6 mm {0.236 in} in length as it is turned by 1/3 turn in the expanded direction.

2. After adjustment, tighten the tightening nut (1).



CHECK AND ADJUST PLAY OF FRONT WHEEL BEARING

Consult your Komatsu distributor for inspection of the bearing play and adjustment.

REPLACE HYDRAULIC OIL PILOT FILTER ELEMENT

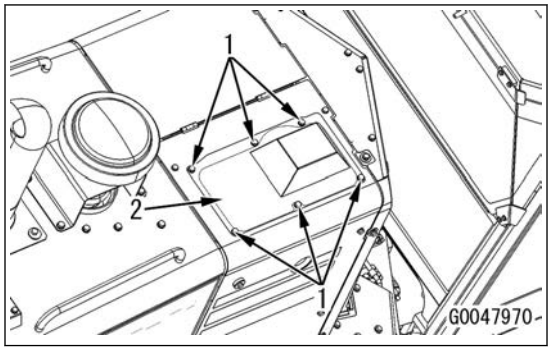
⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

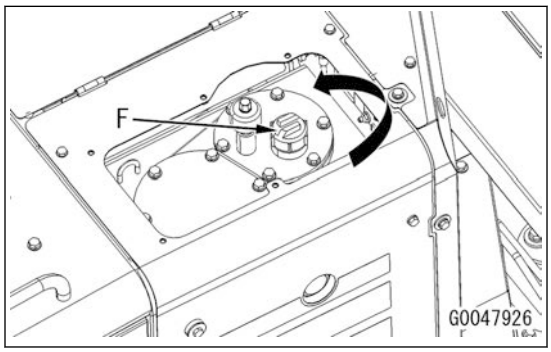
Items to be prepared

Container to catch oil

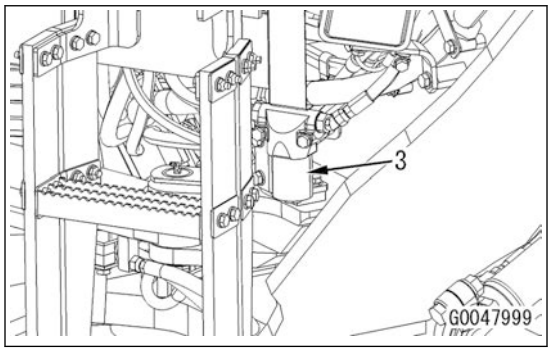
1. Remove the bolts (1) (6 pieces) and remove the cover (2).



2. Loosen the oil filler cap (F) on the top of the hydraulic tank slowly to release the internal pressure.



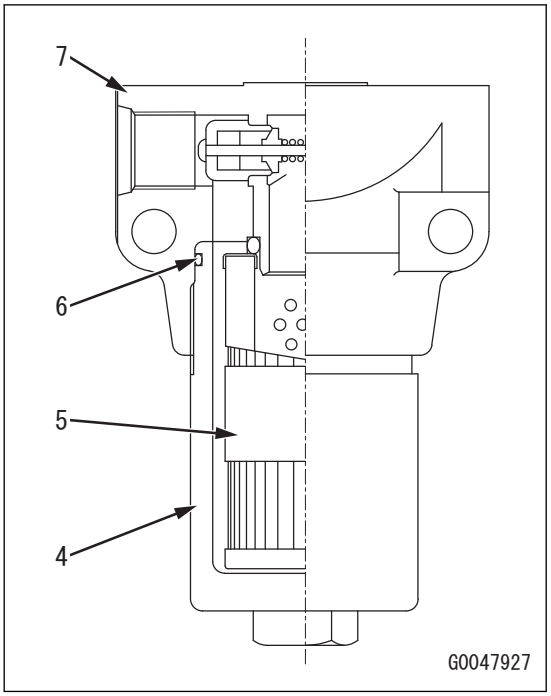
3. Put a container to catch oil below the filter element (3).

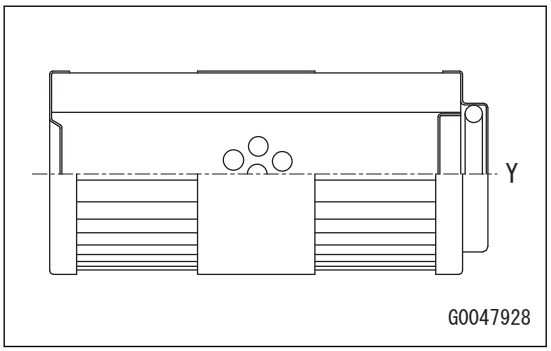


4. Make sure that the hydraulic oil temperature goes down, turn the filter case (4) counterclockwise to remove it, and then remove the element (5).
5. Clean the removed parts, and install the new element (5).

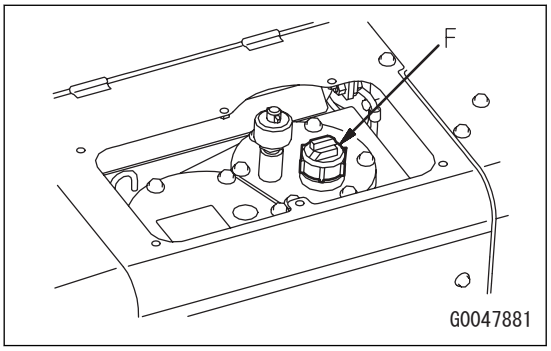
   The element (5) must be installed in the correct direction. Insert the hole in the element (5) to the protrusion inside the filter head (7). Set the element (5) with the holed Y-side up.
6. Install the new O-ring (6), and install the filter case (4).

   Tightening torque: 25 to 35 Nm {2.6 to 3.6 kgfm, 18.8 to 26 lbft}

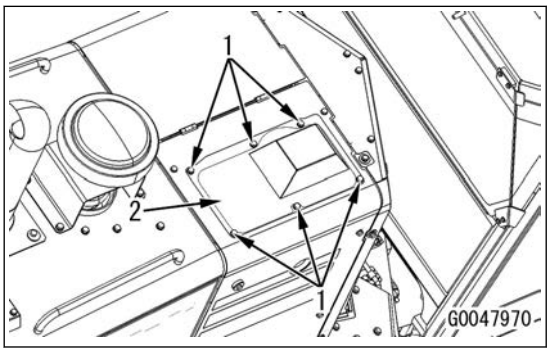




7. Close the cap (F) securely.



8. Install the cover (2) with the bolts (1) (6 pieces).



EVERY 2000 HOURS MAINTENANCE

Maintenance for every 50 hours, 250 hours, 500 hours, and 1000 hours must be done at the same time.

CHANGE OIL IN HYDRAULIC TANK, CLEAN STRAINER

⚠ WARNING

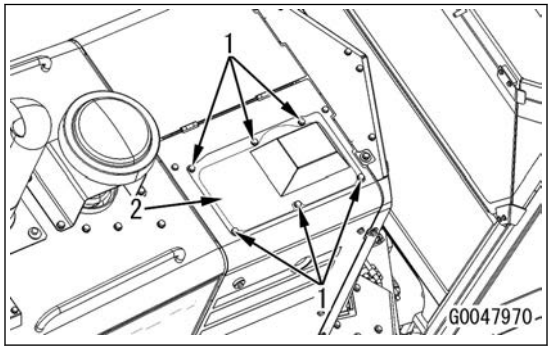
- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When the oil filler cap is removed, oil can spurt out. Turn it slowly to release the internal pressure, then remove it.**

Refill capacity: 69 ℓ {18.2 USgal}

Items to be prepared

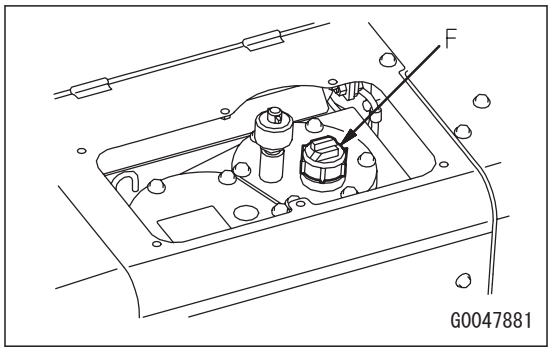
Container to catch oil

1. Set the machine in the posture for oil level check.
   - Return the front wheels to the vertical position and set them in the straight travel posture.
   - Set the front frame and rear frame straight (set the articulate angle to 0 °), and install the articulation lock pin.
   - Return the blade side shift to the center of the machine, set the blade at a right angle to the machine, and make it touch the ground lightly.
2. Remove the bolts (1) (6 pieces) and remove the cover (2).



3. Loosen the cap of the oil filler port (F) slowly, and fully release air in the hydraulic tank.
4. After the engine stops, push the brake pedal approximately 20 times to return the oil in the accumulator to the tank.
5. Stop the engine while the blade accumulator switch is set to the ON position.
6. Operate the right and left blade lift control levers continuously until the blade does not move.

   The pressure inside the accumulator is released.

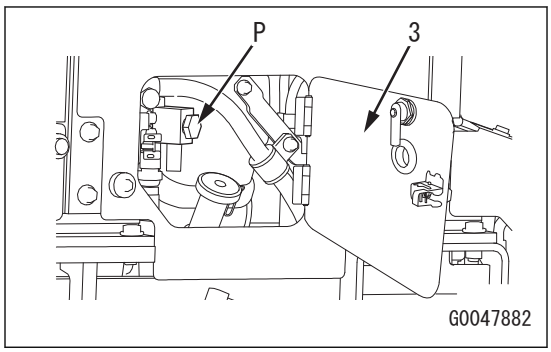


7. Open the cover (3).
8. Put a container to catch oil below the drain plug (P).
9. Remove the drain plug (P) and drain oil.

   Loosen the drain plug (P), and then remove it slowly not to let the oil spurt out.

   REMARK

   Use the attached hose to prevent the splash of oil.



10. After oil is drained, remove the bolts (4) (6 pieces) and remove the cover (5).

    The cover (5) can jump out by force of the gas spring (6). Remove the bolt (4) while you push and hold the cover (5) down.

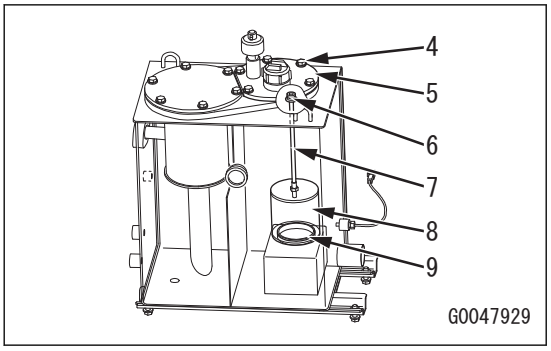
11. Pull up the top of the rod (7), and remove the spring (6) and strainer (8).
12. Remove dirt from the strainer (8), then wash it in flushing oil.

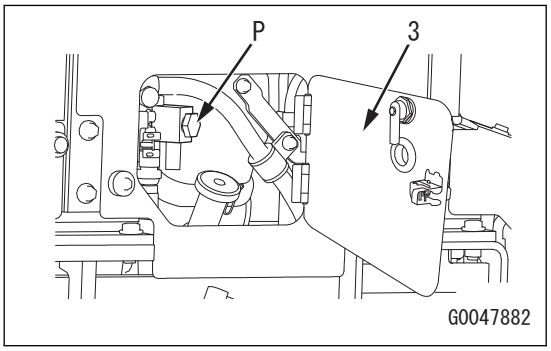
    If the strainer (8) is damaged, replace it with a new one.

13. Insert the strainer (8) into the protrusion part (9) of the tank.
14. Push the spring (6) with the protrusion part at the bottom of the cover (5) to install it.
15. Install the cover (5) with the bolts (4) (6 pieces).
16. Tighten the drain plug (P).

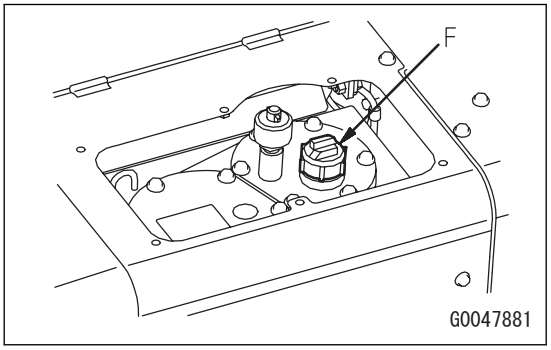
    Tightening torque: 118 to 162 Nm {12 to 16.5 kgfm, 86.8 to 119.0 lbft}

17. Close the cover (3).





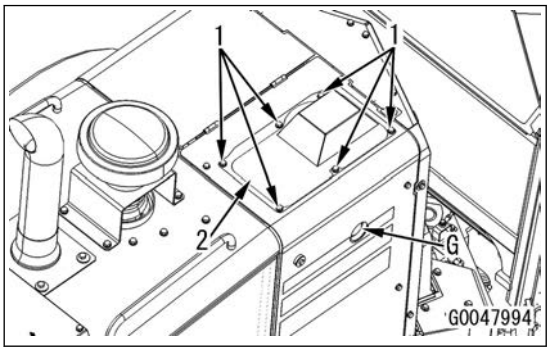
18. Add the specified quantity of oil through the oil filler port (F).
19. Start the engine and run it at low idle.



20. Check the oil level with the sight gauge (G).

    If the oil level is in the window of the gauge (G), it is correct.

21. Install the cap of the oil filler port (F).
22. If the oil level is correct, tighten the cap of the oil filler port (F) securely, and remove the hose.
23. Install the cover (2) with the bolts (1) (6 pieces).



CHANGE OIL IN CIRCLE ROTATION GEAR CASE

⚠ WARNING

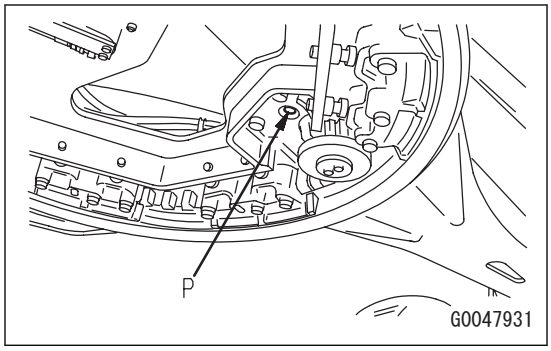
- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When the oil filler cap is removed, oil could spurt out. Turn it slowly to release the internal pressure, then remove it.**

Refill capacity: 7 ℓ {1.85 USgal}

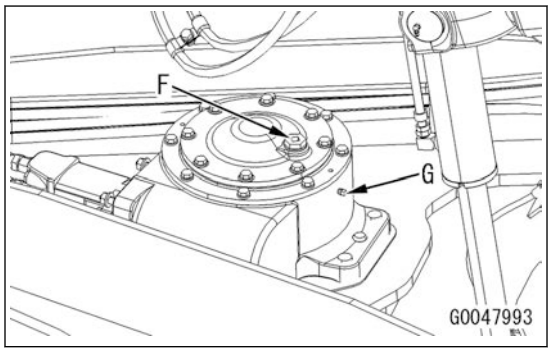
Items to be prepared

Container to catch oil

1. Stop the engine and keep it as it is for 5 minutes or more.
2. Put a container to catch oil below the drain plug (P).
3. Remove the drain plug (P) and drain oil.
4. After oil is drained, clean the drain plug (P), and install it.



5. Remove the plug of the oil filler port (F), and add specified quantity of oil.
6. Remove the plug (G).
   If oil leaks slowly, the oil level is correct.
7. If the oil level is correct, install the plug (G).
8. Install the plug of the oil filler port (F).



CHANGE OIL IN TANDEM CASE

⚠ WARNING

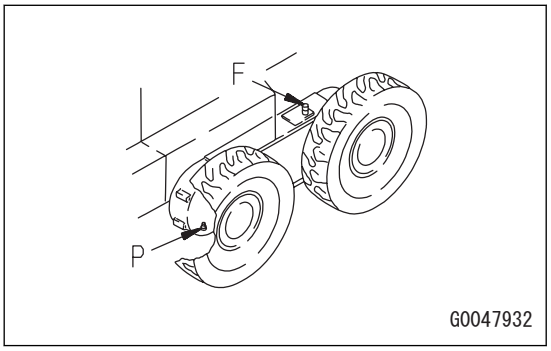
Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

Refill capacity: 57 ℓ {15.1 USgal} each of right and left

Items to be prepared

Container to catch oil

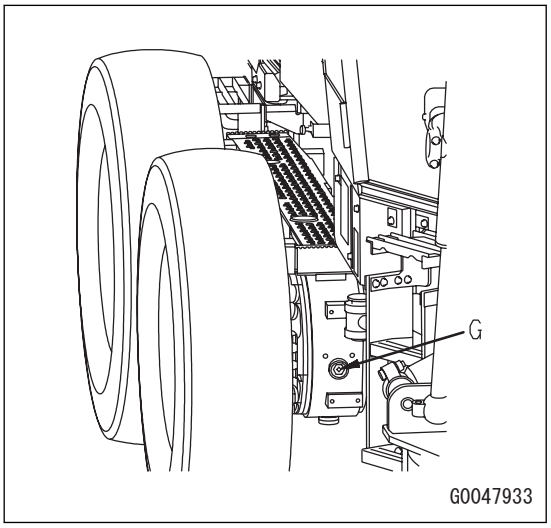
1. Stop the engine and keep it as it is for 5 minutes or more.
2. Put a container to catch oil below the drain plug (P).
3. Remove the drain plug (P) and drain oil.
4. After oil is drained, clean the drain plug (P), and install it.
5. Add specified quantity of oil through the oil filler port (F).



6. Remove the plug (G).
7. Check the oil level.

   If the oil level is near the lower edge of the plug hole, the oil level is correct.
8. If the oil level is correct, install the plug (G).

   Tightening torque: 59.0 to 78.0 Nm {6.02 to 7.95 kgfm, 43.5 to 57.5 lbft}



CHECK DISC BRAKE

⚠ WARNING

When the brake is applied, do not look into the inspection plug hole. A small quantity of oil can come out from the plug hole.

PERIODICAL REPLACEMENT OF DISC BRAKE

Inspection: Every 12 months or 2000 hours

Disassembly: When the disc reaches the wear limit or if a problem is found in the brake system, judge whether the disassembly or maintenance is necessary.

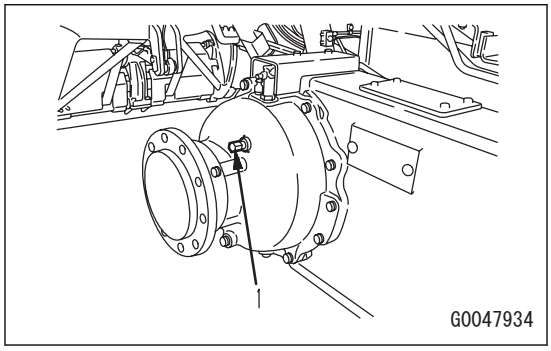
CHECK BRAKE DISC WEAR

⚠ WARNING

If the disc wear quantity comes near the wear limit, do the inspection frequently, regardless of the maintenance interval.

Inspection of wear on the brake disc must be done for 4 places, on the right and left sides of the front and rear axles. Do the inspection in the same procedure.

1. Remove the cap (1) of the wear indicator.
2. Push the brake pedal and keep the brake applied.



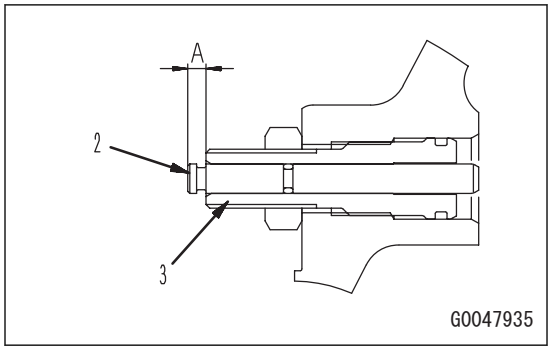
3. Fully push in the pin (2) of the wear indicator while you push the brake pedal.

   When the groove (B) of the pin (2) gets inside the end surface (C) of the guide (3), the disc reaches the wear limit.

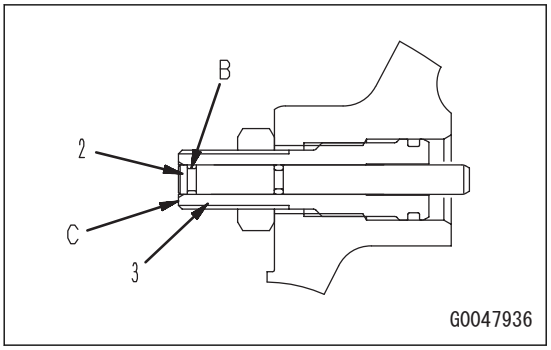
   Consult your Komatsu distributor for inspection and replacement in such case.

   When new

   (A):1.5 mm {0.059 in}



Wear limit

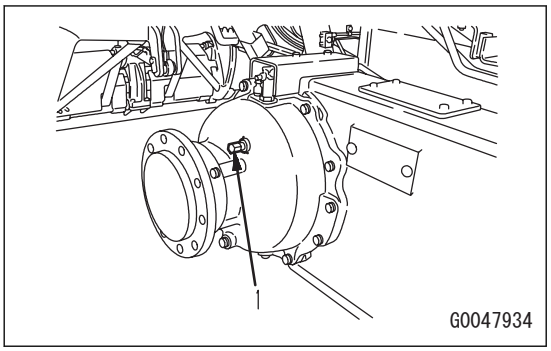


4. Install the cap (1).

   Tightening torque: 29.4 to 39.2 Nm {3.0 to 4.0 kgfm, 21.7 to 28.7 lbft}

   REMARK

   This operation requires 2 workers. One worker pushes in the pin (2) while the other pushes and holds the brake pedal.



CHECK ACCUMULATOR GAS PRESSURE

Contact your Komatsu distributor to have the gas pressure checked.

CHANGE GREASE IN FRONT WHEEL BEARING

Consult your Komatsu distributor for inspection and adjustment.

CHECK ALTERNATOR

The brush can be worn or the grease cannot be sufficient on the bearing.

Consult your Komatsu distributor for the inspection and repair.
If you start the engine frequently, consult for inspection every 1000 hours.

CHECK AND ADJUST ENGINE VALVE CLEARANCE

Special tools are necessary to check and adjust the engine valve clearance.
Consult your Komatsu distributor for inspection and adjustment.

CHECK VIBRATION DAMPER

Check the outside surface of the rubber for crack or peeling.
If a crack or peeling is found, consult your Komatsu distributor for replacement.

REPLACE KCCV FILTER ELEMENT

⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work. Be sure to stop the engine before you start the replacement work.

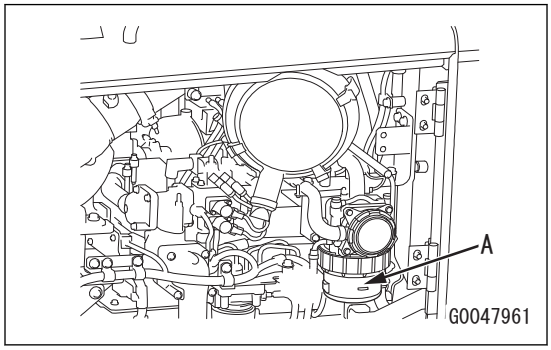
NOTICE

- **Komatsu recommends the use of Komatsu genuine parts for replacement parts.**
- **Be sure not to start the engine when there is no element in the system. It can degrade the engine performance, or cause a failure of the engine.**
- **The element must not be cleaned and used again. It can degrade the engine performance, or cause a failure of the engine.**
- **Replace the element in the correct procedure.**
  If it is not assembled correctly during element replacement, it can cause leakage of oil or blowby gas.

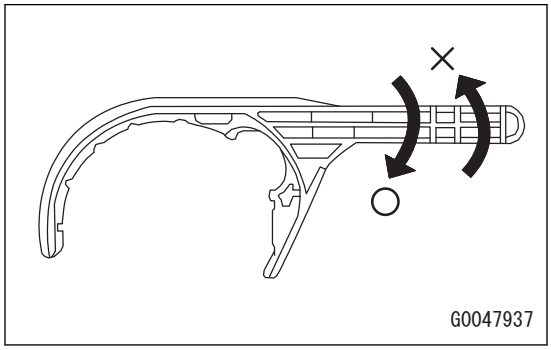
Items to be prepared

- Container to catch oil
- Special wrench for KCCV

The KCCV ventilator is located in the position of (A).



For the use of the special wrench, see the figure.



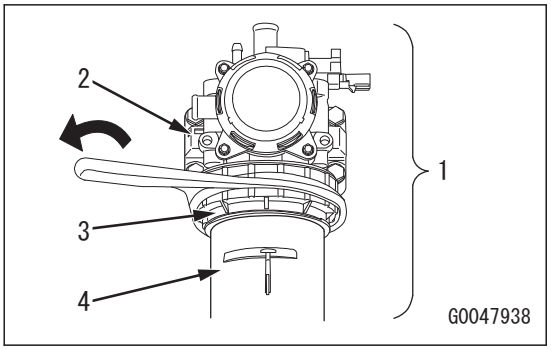
1. Loosen the ring (3) with the special wrench.
2. After the ring (3) is removed, remove the case (4) from the body (1), and remove the element (5).

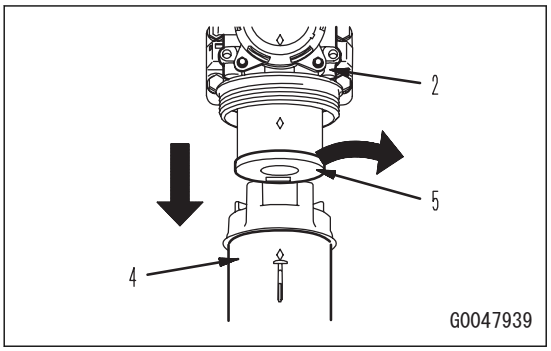
   Oil can be accumulated in the case and element. When you replace the element, be careful not to spill the oil.

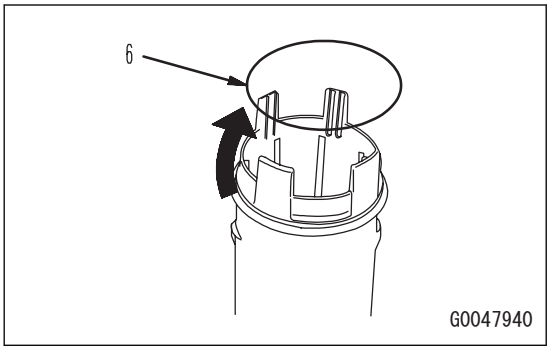
   REMARK

   When the ambient temperature is low, water or emulsified thing can stick inside the KCCV. If the coolant level is not decreased, it is not a problem.
3. Remove the O-ring (6) that is installed to the case (4).
4. Replace the O-ring with a new one, apply thin layer of oil to it, and install it.

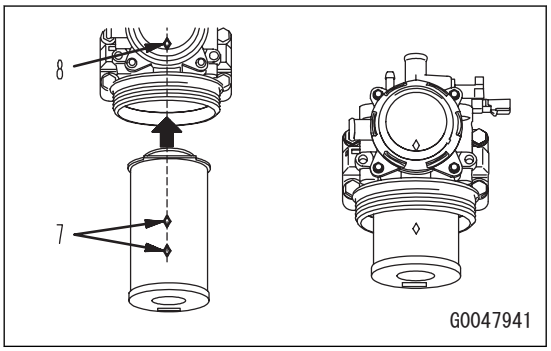
   New O-rings are included with the service kit.



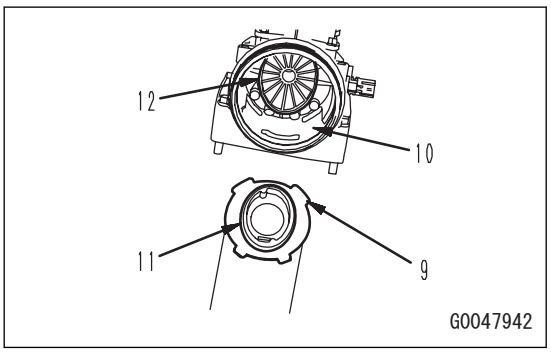




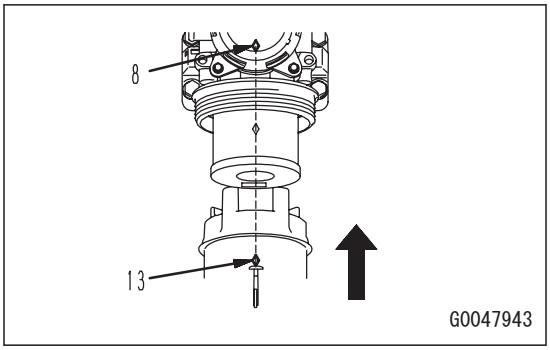
5. Align the ◇ marks (7) of the new element with the ◇ mark (8) of the body label, insert the element securely into the end of the body.



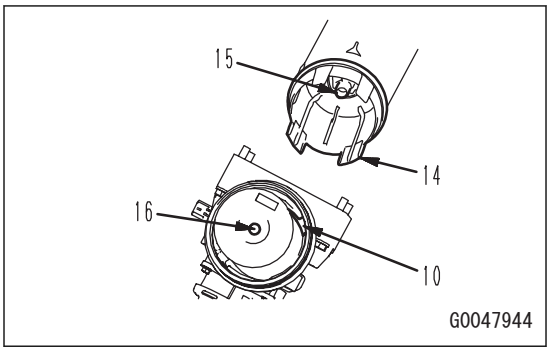
   The element can be installed only when its claws (9) are correctly inserted in grooves (10) of the filter body. Bases (11) and (12) are oval. Be careful to let them match with each other.



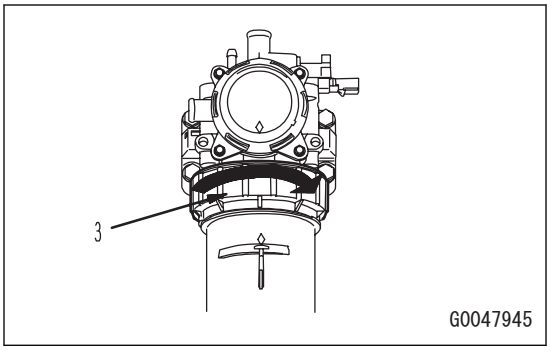
6. Align the ◇ mark (13) on the case with the ◇ mark (8) of the body label, and install it to the body.



The case can be installed only when its claws (14) are correctly inserted in grooves (10) of the filter body. Make sure that the protrusion (15) in the case aligns to the rubber lip (16) of the element.



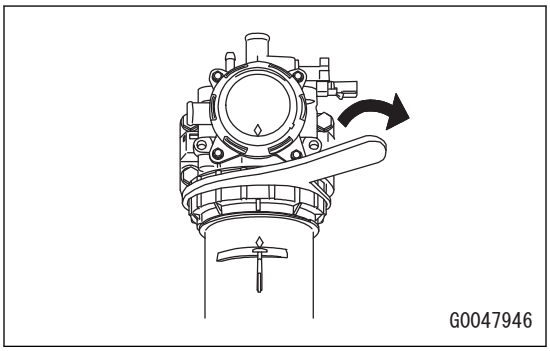
7. Put the ring (3) to the thread of the body and tighten it by hand until it stops.



8. Retighten the ring (3) 1/15 to 2/15 turns (1 to 2 ridges of the ring) with the special KCCV wrench.

   If the engine is started while the ring (3) is not tightened fully, leakage of oil or blowby gas can occur.

   Make sure that there are no leakages, cracks, or loose clamps on the KCCV hose. Replace the part if necessary.



REPLACE DEF FILTER

⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

NOTICE

- **Komatsu recommends the use of Komatsu genuine parts for replacement parts.**
- **If the machine is operated while the DEF filter is not installed, or while a filter other than Komatsu genuine part is installed, entry of foreign material to the DEF pump and DEF injector can occur, and it will cause failure of the machine. You must not operate the machine to which the DEF filter is not installed, or must not use a filter other than Komatsu genuine part.**
- **The DEF filter cannot be washed. Cleaning or regeneration of the filter will degrade the performance of filter, and will cause the breakage of the DEF tank. You must not use the element again.**
- **If the DEF tank filler cannot be assembled correctly, it can cause leakage of DEF. Replace the DEF filter in the correct procedure.**
- **DEF freezes at -11 °C {12.2 °F}. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around the DEF pump is higher than -11 °C {12.2 °F} in the condition that the DEF will not freeze.**

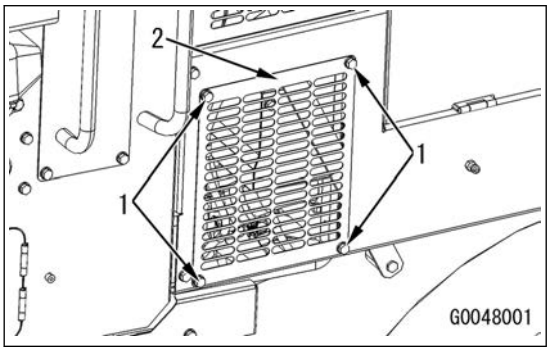
After the engine is stopped, the DEF system devices automatically purge DEF in the DEF injector and DEF pump, and let it go back to the DEF tank to prevent malfunction of the devices caused by freezing of the DEF or deposition of urea.

The DEF system devices keep in operation for several minutes after the engine stops. Before you replace the filter, clean around the DEF pump after the devices stop.

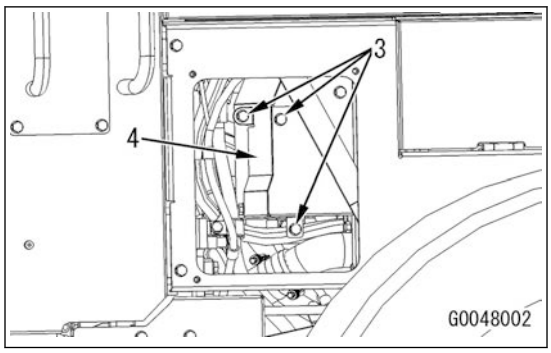
Items to be prepared

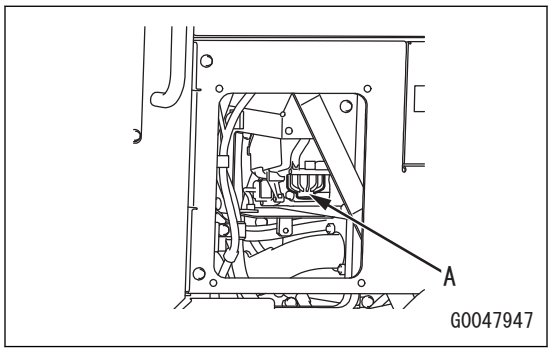
- DEF filter removal tool
- Torque wrench

1. Remove the bolts (1) (4 pieces) and remove the cover (2).

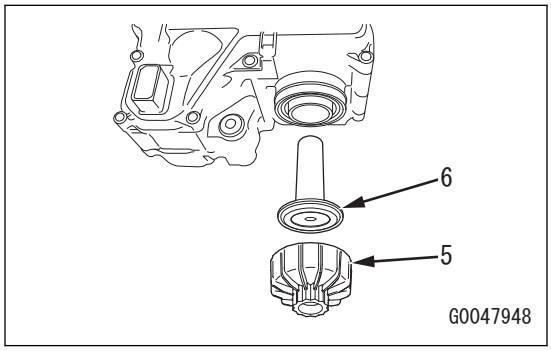


2. Remove the bolts (3) (3 pieces) and remove the cover (4).
   The DEF filter is located in the position of (A).

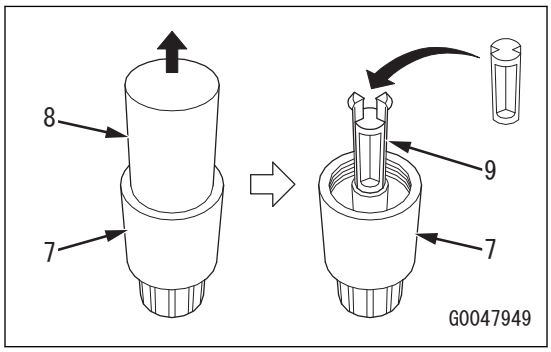




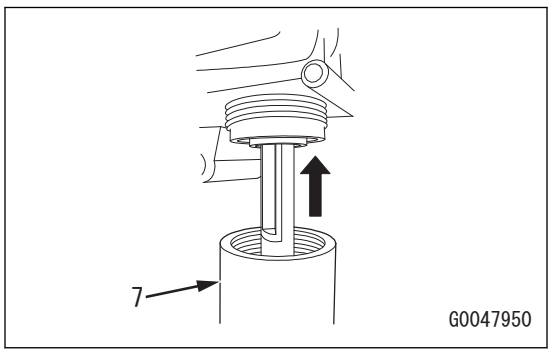
3. Remove the filter cap (5) at the lower part of the DEF pump, and remove the element (6).



4. Turn the cap (8) of the filter removal tool (7), and remove it.
5. Check the installed state of the spacer (9).

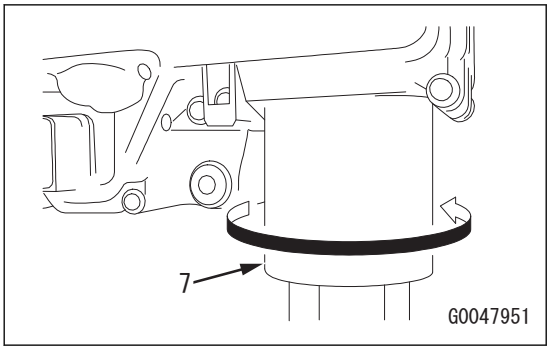


6. Insert the filter removal tool (7) into the lower part of the DEF pump and screw in by hand.



7. Make sure that the filter removal tool (7) is fully inserted to the end.

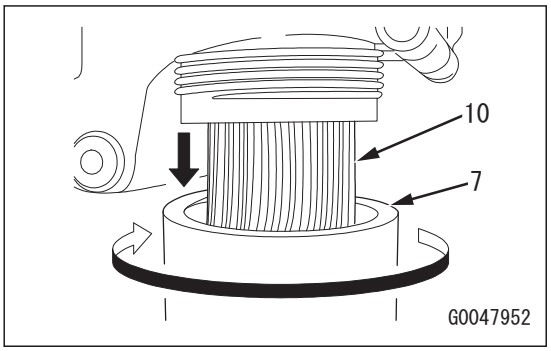
   Insert the filter removal tool (7) to the end where you cannot thrust it in further.



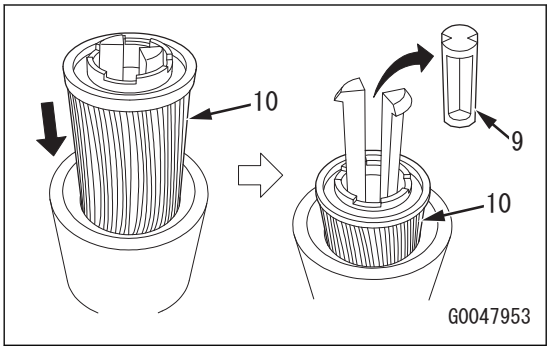
8. Turn the filter removal tool (7) in reverse, and remove the filter (10).

   The filter (10) is removed and you can take it out together with the filter removal tool (7).

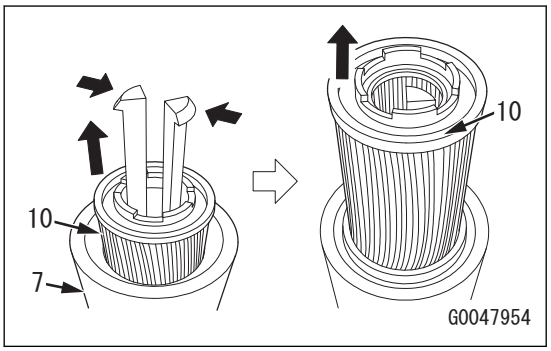
   If the filter (10) cannot be removed from the DEF pump, hold the filter removal tool (7), and then pull it down to remove it.



9. Slide down the filter (10), and remove the spacer (9) from the filter removal tool (7).



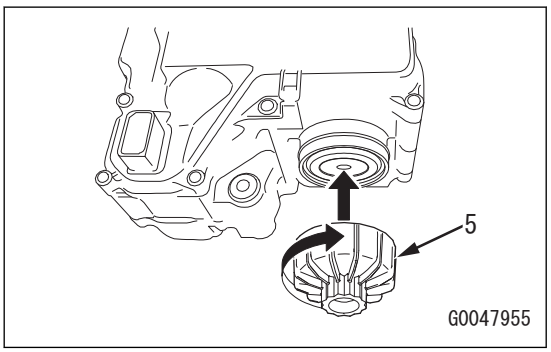
10. Pull the filter (10) up and remove it while you push in the top of the filter removal tool (7).
11. Put the removed spacer (9) back to the filter removal tool (7), and keep them.
12. Insert a new filter and a new element into the lower part of the DEF pump, and lightly tighten them by hand.



13. Tighten the filter cap (5).

    Tightening torque: 20 to 25 Nm {2.0 to 2.5 kgfm, 14.5 to 18.1 lbft}

14. Install the covers (4) and (2).



REPLACE DEF TANK BREATHER ELEMENT

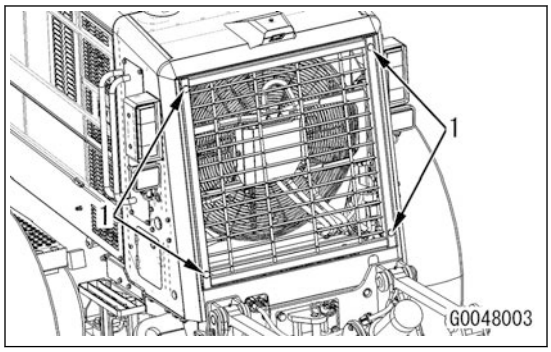
⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

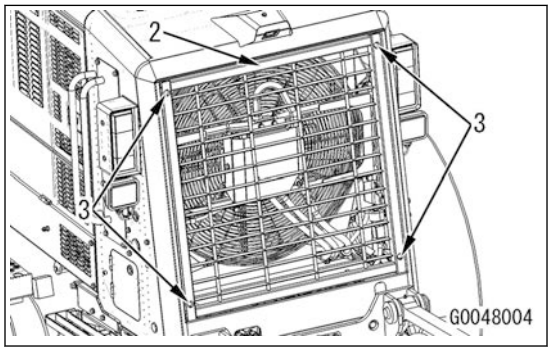
NOTICE

- **Komatsu recommends the use of Komatsu genuine parts for replacement parts.**
- **If the machine is operated while the DEF tank breather element is not installed, or while an element other than Komatsu genuine part is installed, entry of foreign material to the DEF pump and DEF injector can occur, and it will cause failure of the machine. You must not operate the machine to which the DEF tank breather element is not installed, or must not use an element other than Komatsu genuine part.**
- **The DEF tank breather element cannot be cleaned. Cleaning or regeneration of the element will degrade the performance of element, and will cause the breakage of the DEF tank. You must not use the element again.**
- **Be sure to stop the engine and clean around the DEF tank before you start the replacement work.**
- **After the engine is stopped, the DEF system devices automatically purge DEF in the DEF injector and DEF pump, and let it go back to the DEF tank to prevent malfunction of the devices caused by freezing of the DEF or deposition of urea.**
  Replace the element after the DEF system devices stops operation. The devices keep in operation for several minutes after the engine stops.
- **If the DEF tank breather element cannot be assembled correctly, it can cause leakage of DEF. Replace the element in the correct procedure.**

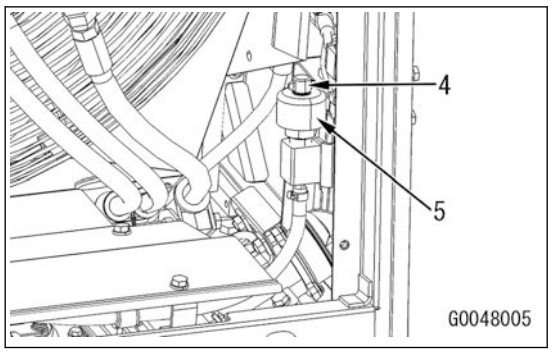
1. Remove the caps (1) (4 pieces).

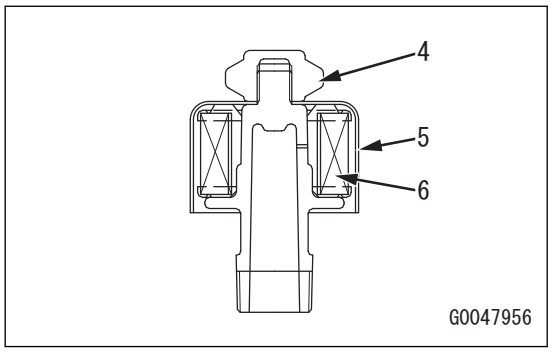


2. Remove the bolts (3) (4 pieces), and remove the radiator grille (2).

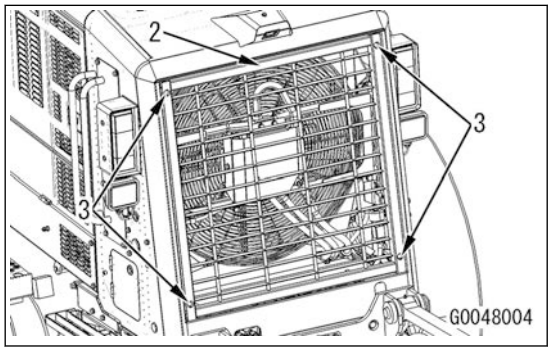


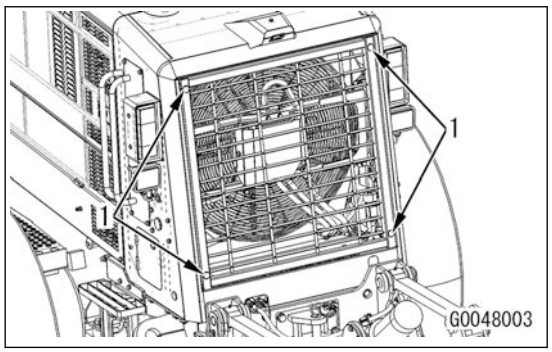
3. Remove the nut (4) of the breather assembly on the top of the DEF tank, and remove the cover (5).
4. Replace the breather (6) with a new one.
5. Install the cover (5) and nut (4).





6. Install the radiator grille (2) with the bolts (3) (4 pieces), and install the caps (1) (4 pieces).





EVERY 4000 HOURS MAINTENANCE

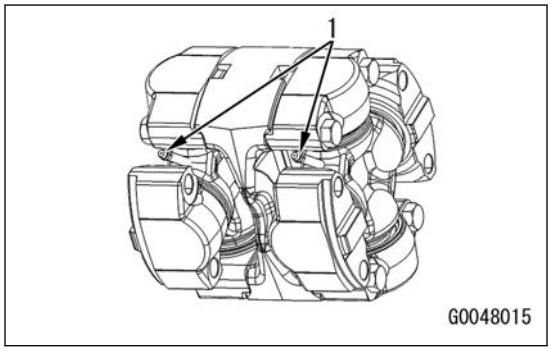
Maintenance for every 50 hours, 250 hours, 500 hours, 1000 hours, and 2000 hours must be done at the same time.

LUBRICATE DRIVE SHAFT

⚠ WARNING

- **Set the work equipment lock switch to the LOCK position.**
- **Set the directional selector switch to the NEUTRAL position (N).**
- **Set the steering lever enable switch to the disable position.**
- **Set the parking brake switch to the ON position.**
- **Lock the front and rear frames with the articulate lock pin.**
- **Lower the work equipment to the ground, then stop the engine.**
- **Do the lubrication on a level ground.**

1. Lubricate the grease fitting (1) with a grease pump.
   Drive shaft (2 places)
2. Visually check that the lubrication is done correctly.
3. After lubrication, wipe off the old grease that is pushed out.



CHECK WATER PUMP

Check the water pump for play, oil leakage, water leakage, and clogging of weep hole.
If a problem is found, consult your Komatsu distributor for inspection, disassembly repair, or replacement.

CHECK STARTING MOTOR

If you start the engine frequently, consult for inspection every 1000 hours.
Consult your Komatsu distributor for the inspection and repair.

CHECK OPERATION OF AIR CONDITIONER COMPRESSOR

Check the two items that follow.

1) When you turn ON or OFF the air conditioner switch, are the air conditioner compressor and the magnetic clutch also turned ON or OFF?
2) Does an unusual noise occur on the magnetic clutch or the air conditioner compressor body?

   If a problem is found, consult your Komatsu distributor for the disassembly repair or replacement.

CHECK FAN PULLEY

Check the pulley for clearance, grease leakage, water leakage, and clogging of weep hole.
If a problem is found, consult your Komatsu distributor for the disassembly repair or replacement.

CHECK FOR LOOSENESS OF ENGINE HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER

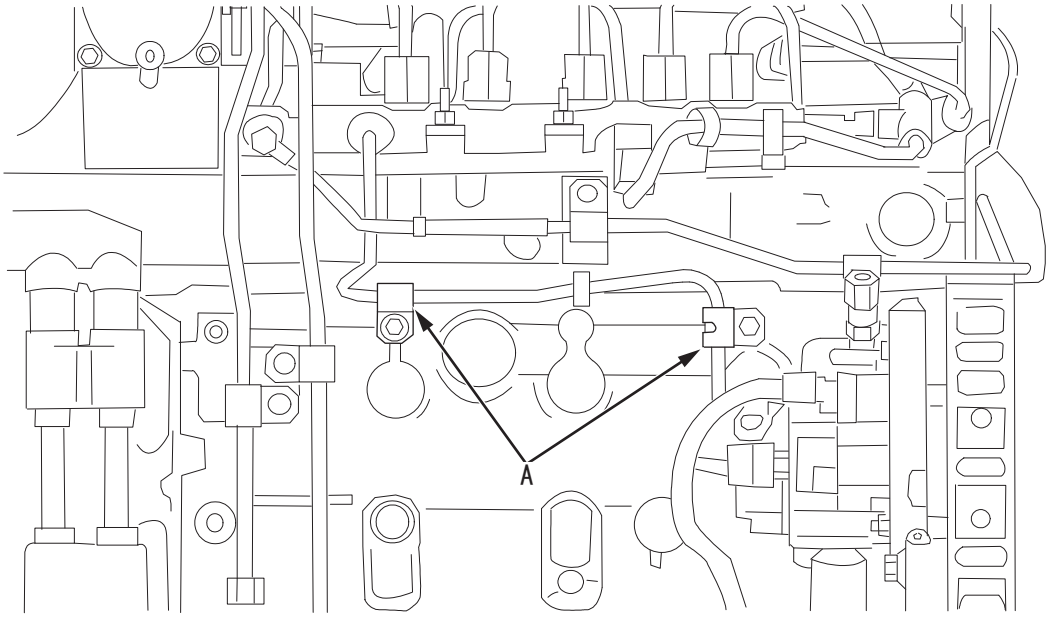
NOTICE

If you run the engine continuously in the conditions that follow, it can cause damage by the wear or vibration of the contact part of the high-pressure pipe.

- **The bolt is loose.**
- **The rubber becomes hard.**
- **A part such as bolt or rubber falls off.**

Make sure that the high-pressure piping clamps are installed correctly.

Visually check that the bolts are not loose, and check with a finger that the rubber is not hard for the clamps (A) (2 pieces).



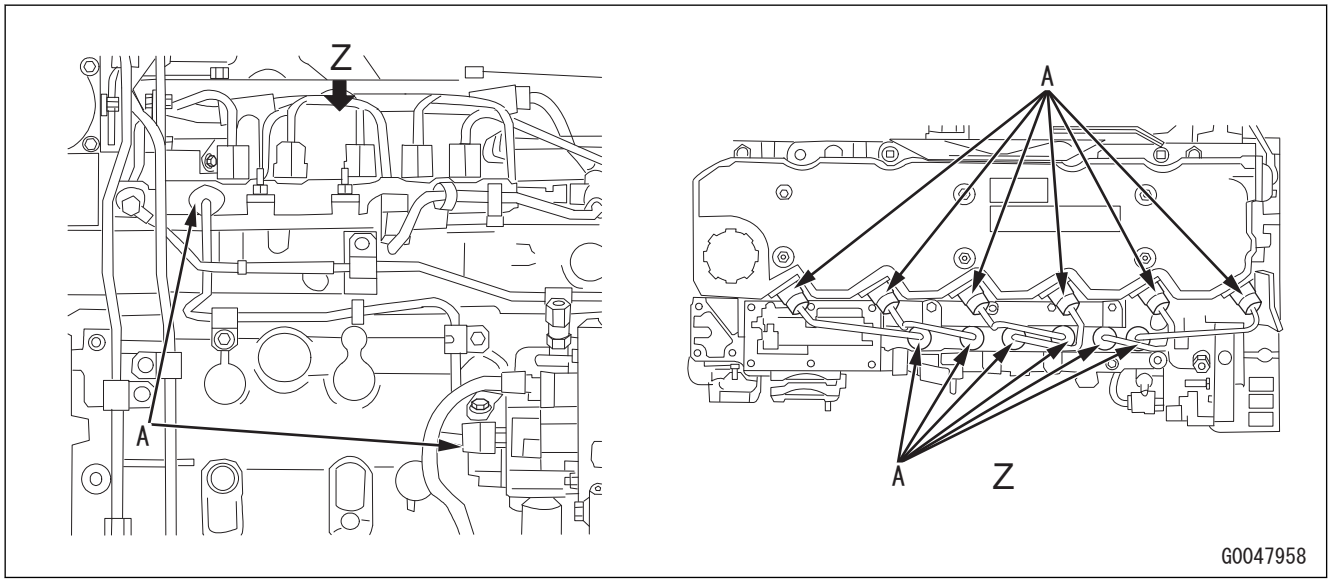
Replacement of the clamp must be made as an assembly.

If a problem is found, consult your Komatsu distributor for replacement.

CHECK FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

The fuel spray prevention caps act not to cause fuel leakage or sprayed out. It prevents fire caused by contact of fuel with high-temperature parts of the engine.

Visually check that the fuel spray prevention caps (A) (14 pieces) are not fallen off. Check with a finger that the rubber is not hard.



If a problem is found, consult your Komatsu distributor for replacement.

EVERY 4500 HOURS MAINTENANCE

Maintenance for every 50 hours, 250 hours, and 500 hours must be done at the same time.

CLEAN KDPF

Consult your Komatsu distributor to clean the inner part of the KDPF.

CLEAN DEF TANK

Consult your Komatsu distributor for cleaning of the DEF tank.

REPLACE DEF TANK FILLER PORT FILTER

⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.

NOTICE

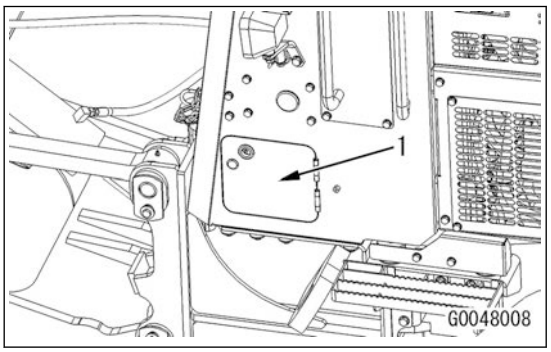
- **If the filter other than Komatsu genuine parts is used, entry of foreign materials to the DEF pump and DEF injector can occur, and it causes failure of the machine. Komatsu recommends the use of Komatsu genuine parts for replacement parts.**
- **The DEF tank filler port filter cannot be washed. Cleaning or regeneration of the filter will degrade the performance of filter, and will cause the breakage of the DEF pump. You must not use the filter again.**
- **If the DEF tank filler port filter cannot be assembled correctly, it can cause leakage of DEF. Replace the DEF tank filler port filter in the correct procedure.**
- **DEF freezes at -11 °C {12.2 °F}. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around the DEF pump is higher than -11 °C {12.2 °F} in the condition that the DEF will not freeze.**
- **Before you start the work, clean around the DEF tank filler port, and be careful not to let dirt get into the tank during the work.**
- **If you cannot add the DEF easily because of the clogging in the DEF tank filler port filter, replace the DEF tank filler port filter even when it does not reach a periodic replacement time.**

Items to be prepared

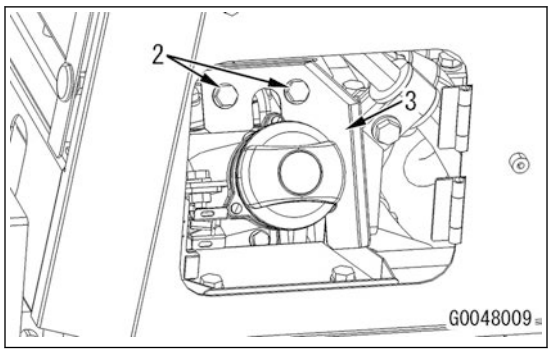
- Distilled water
- Torque wrench

Do not replace the DEF tank filler port filter if the DEF tank is filled with DEF.

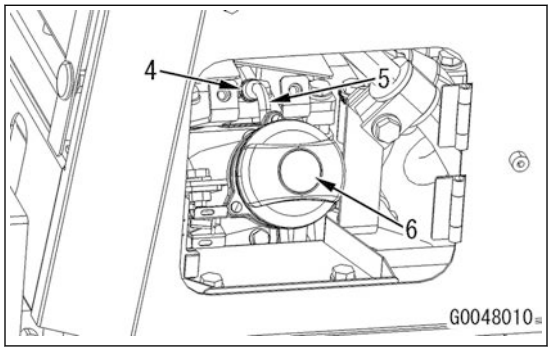
1. Park the machine on a level ground.
2. Check the sight gauge on the DEF tank that the DEF is not full in the DEF tank.
3. Open the cover (1).



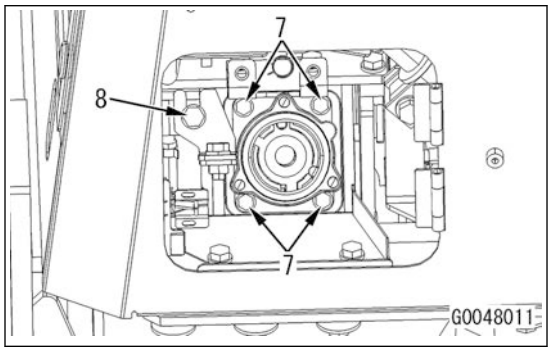
4. Remove the bolts (2) (2 pieces) and remove the cover (3).



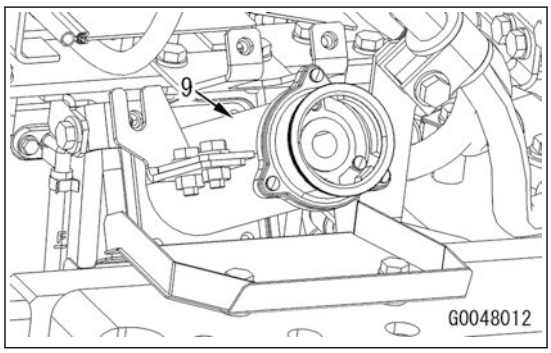
5. Loosen the clip (4), and pull out the hose (5) from the tube.
6. Turn the cap (6) counterclockwise to remove it.



7. Remove the bolts (7) (4 pieces) and bolt (8).



8. Remove the DEF tank filler (9).

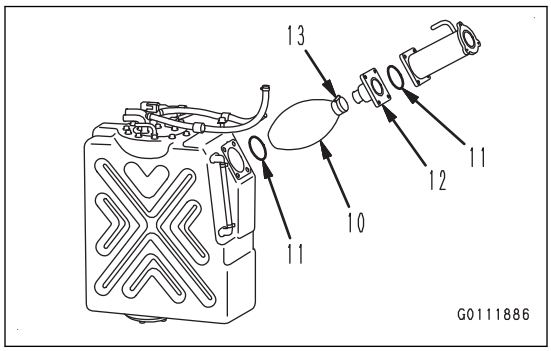


9. Remove the DEF tank filler port filter (10) and DEF tank flange (12) together.

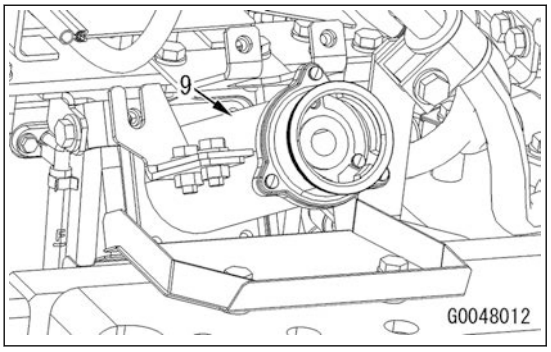
   Do the work carefully since the DEF in the DEF tank filler port filter (10) can spill out.
10. Loosen the band (13) and remove the DEF tank filler port filter (10) from the DEF tank flange (12).
11. Remove the old O-ring (11) and replace it with a new one.

    Apply the distilled water as a lubricant to the new O-ring.
12. Install the new DEF tank filler port filter (10) to the DEF tank flange (12), and tighten the band (13).

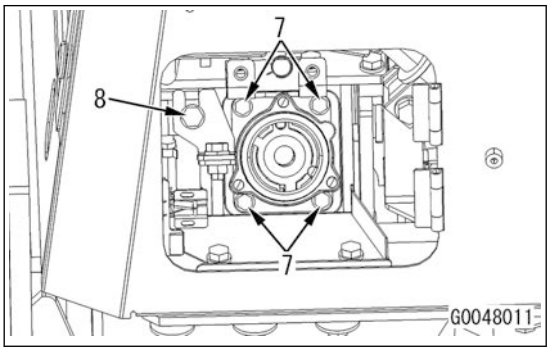
    Tightening torque: 4.4±0.49Nm{0.45±0.05kgfm, 3.25±0.36lbft}



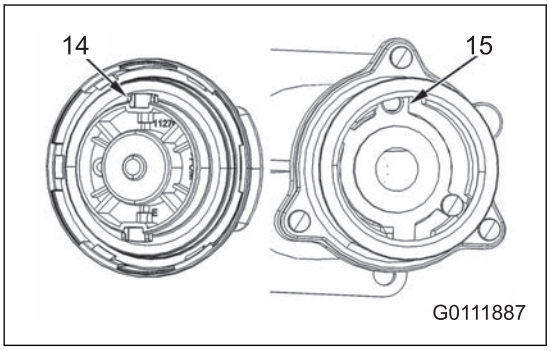
13. Install the DEF tank filler port filter (10) and DEF tank flange (12) together.
    At this time, be careful of the installation direction of the DEF tank flange (12).
14. Install the DEF tank filler (9).

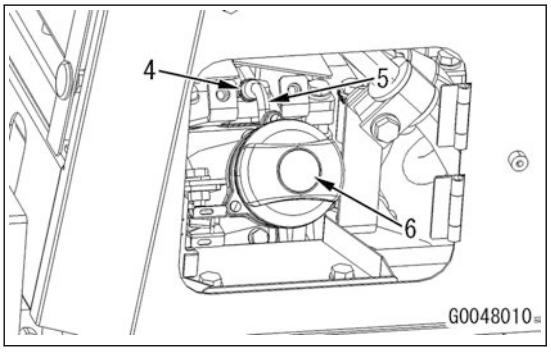


15. Install the bolts (7) (4 pieces).
    Tightening torque: 9.5 to 10.5Nm {0.97 to 1.07kgfm, 7.02 to 7.74lbft}
16. Install the bolt (8).
    Tightening torque: 59 to 74Nm {6 to 7.5kgfm, 43.4 to 54.2lbft}

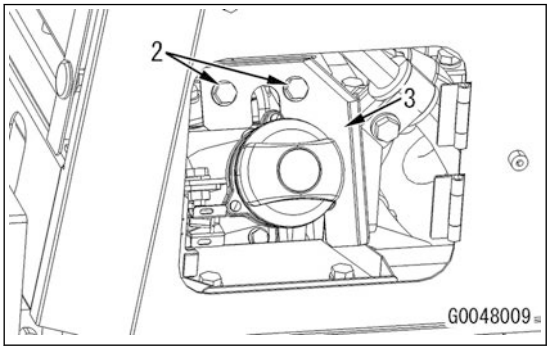


17. Align the claw (14) of the cap (6) with the groove (15) of the filler port.
    Turn the cap (6) clockwise by 90 ° to close it securely.
18. Insert the hose (5) to the tube, and tighten it with the clip (4).

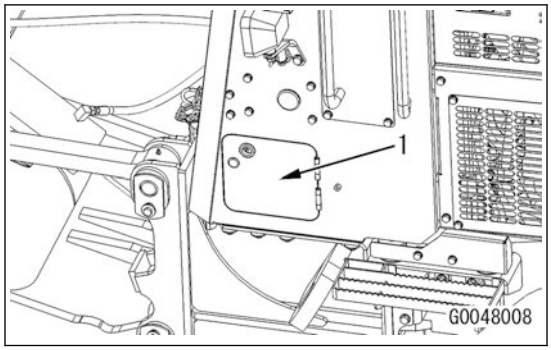




19. Install the cover (3) with the bolts (2) (2 pieces).
    Tightening torque: 59 to 74Nm {6 to 7.5kgfm, 43.4 to 54.2lbft}



20. Close the cover (1).



EVERY 8000 HOURS MAINTENANCE

Maintenance for every 50 hours, 250 hours, 500 hours, 1000 hours, 2000 hours, and 4000 hours must be done at the same time.

REPLACE FUEL SPRAY PREVENTION CAP

Consult your Komatsu distributor for replacement of the fuel spray prevention cap.

EVERY 9000 HOURS MAINTENANCE

Maintenance for every 50 hours, 250 hours, 500 hours, 1000 hours, and 4500 hours must be done at the same time.

REPLACE DEF HOSE

Consult your Komatsu distributor for replacement of the DEF hose.

SPECIFICATIONS

SPECIFICATIONS

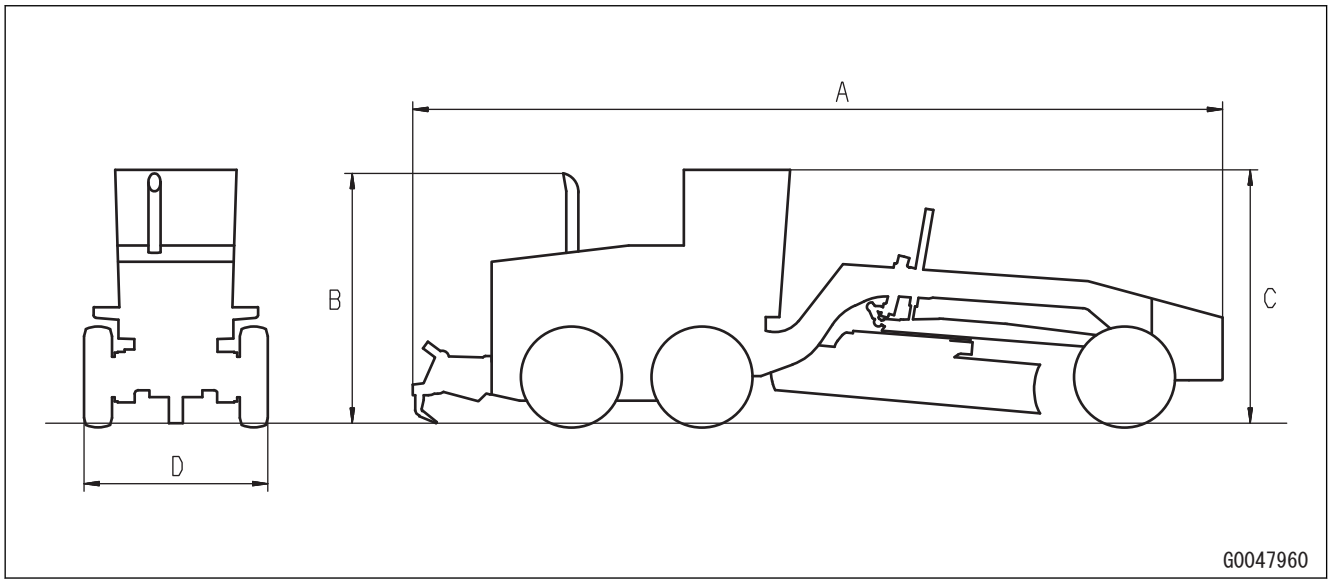
When the pusher weight, ripper, 4.3 m {14 ft 1 in} blade t25, and 17.5R25 tire are installed

	Item		Unit	GD655–7
	Operating weight (including 1 operator (75 kg {165 lb}))		kg {lb}	19480 {42953}
	Weight of pusher weight		kg {lb}	1100 {2426}
	Ripper equipment weight		kg {lb}	1030 {2271}
	Engine model		-	KOMATSU SAA6D107E-3 diesel engine
	Rated horse-power (*1)	SAE J1995 (gross)	kW {HP}/ min^{-1} {rpm}	
		Forward 1st to 3rd, Reverse 1st to 2nd		136{183}/2000{2000}
		Forward 4th to 6th, Reverse 3rd to 4th		152{203}/2000{2000}
		Forward 7th to 8th		165{221}/2100{2100}
		ISO9249/SAE J1349 (net)		
		Forward 1st to 3rd, Reverse 1st to 2nd		134{180}/2000{2000}
		Forward 4th to 6th, Reverse 3rd to 4th		149{200}/2000{2000}
		Forward 7th to 8th		162{217}/2100{2100}
A	Overall length		mm {ft in}	10875 {35' 8"}
B	Height up to exhaust pipe end		mm {ft in}	3030 {9' 11"}
C	Overall height		mm {ft in}	3200 {10' 6"}
D	Overall width		mm {ft in}	2680 {8' 10"}
	Minimum ground clearance		mm {ft in}	350 {1' 2"}
	Minimum turning radius		mm {ft in}	7400 {24' 3"}
	Permissible towing load		kN {kgf}	111.3 {11360}

	Item			Unit	GD655–7
	Travel speed (*2)	Forward	1st	km/h {MPH}	3.8 {2.4}
			2nd	km/h {MPH}	5.5 {3.4}
			3rd	km/h {MPH}	7.7 {4.8}
			4th	km/h {MPH}	11.2 {7.0}
			5th	km/h {MPH}	16.9 {10.5}
			6th	km/h {MPH}	24.5 {15.2}
			7th	km/h {MPH}	33.7 {20.9}
			8th	km/h {MPH}	48.5 {30.1}
		Reverse	1st	km/h {MPH}	5.0 {3.1}
			2nd	km/h {MPH}	10.2 {6.3}
			3rd	km/h {MPH}	22.3 {13.9}
			4th	km/h {MPH}	44.4 {27.6}

*1: Shows the value of P mode and manual mode.

*2: Shows the value of travel speed when engine is at full speed, and the tire load radius 0.61 m {24 in}.



ATTACHMENTS AND OPTIONS

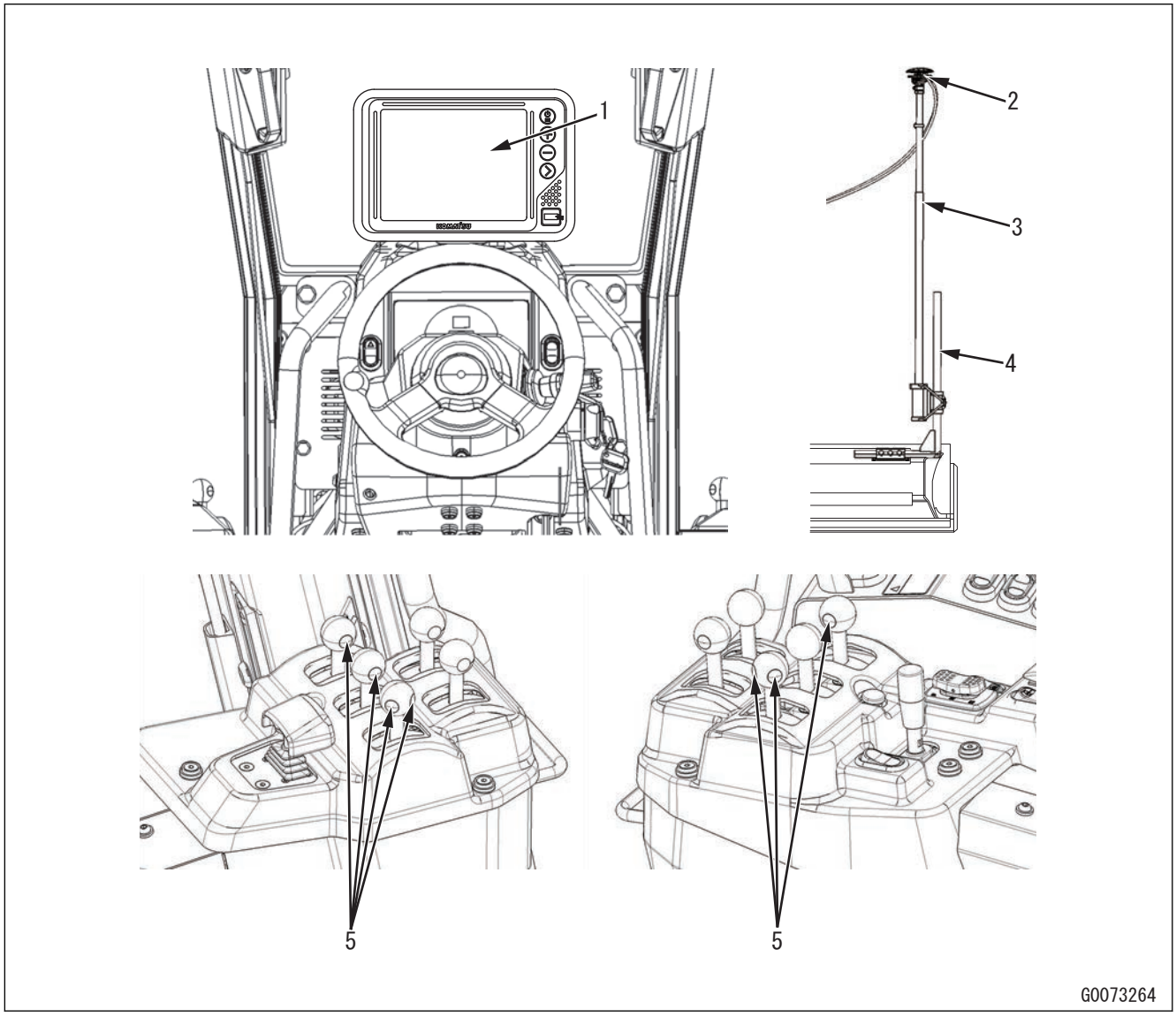
⚠ WARNING

Before you read ATTACHMENTS AND OPTIONS, read and understand SAFETY.

MACHINES WITH ICT DEVICES

PRECAUTIONS FOR MACHINES WITH ICT DEVICES

The special kit manufactured by Topcon can be installed to the machines with ICT devices without additional work.



(1) Control box (control panel)
(2) GNSS antenna
(3) Pole
(4) L bar
(5) ICT devices operation switch

For the operation method of the devices, see the manual of ICT devices supplied by Topcon.

When you use it, obey the precautions that follow.

- Do not install the kit other than the special one manufactured by Topcon.
- Before you drive the machine on a road for the transportation, be sure to remove the control box (control panel) (1), GNSS antenna (2), pole (3), and L bar (4).
  Do not transport the removed parts with the machine. Send them separately.

REMARK

GNSS is an abbreviation for the Global Navigation Satellite System.
It means a generic term of the global positioning satellite (Global satellite navigation system) like GPS.

MACHINE WITH CROSS SLOPE SYSTEM

OVERVIEW OF MACHINE WITH CROSS SLOPE SYSTEM

The cross slope system automatically controls the blade angle to the cross slope set by the operator.

The operator can set one of the right or left blade lift cylinder to the automatic control, and can manually operate the blade lift control lever for the other side to adjust the blade height.

The operator can set the target cross slope with the target cross slope increase/decrease switches on the drawbar side shift control lever, or the slope match activation switch on the blade side shift control lever.

You can freely change the automatically controlled side with the auto/manual switch on the right and left blade lift control levers.

The target cross slopes are recorded in each of the 2 presets. You can change the preset with the preset selection switch on the blade rotation control lever.

You can change the response speed of automatic control from “Cross slope gain adjustment” on the user menu.

Machines with a cross slope system have 2 IMUs and 1 speed sensor.

Machines with a cross slope system also have an interference prevention alarm function that uses these sensors. An alarm sound tells the operator if the drawbar component likely interferes with the front frame component.

Use “Interference prevention alarm of W/E” to set ON/OFF the interference prevention alarm for the work equipment.

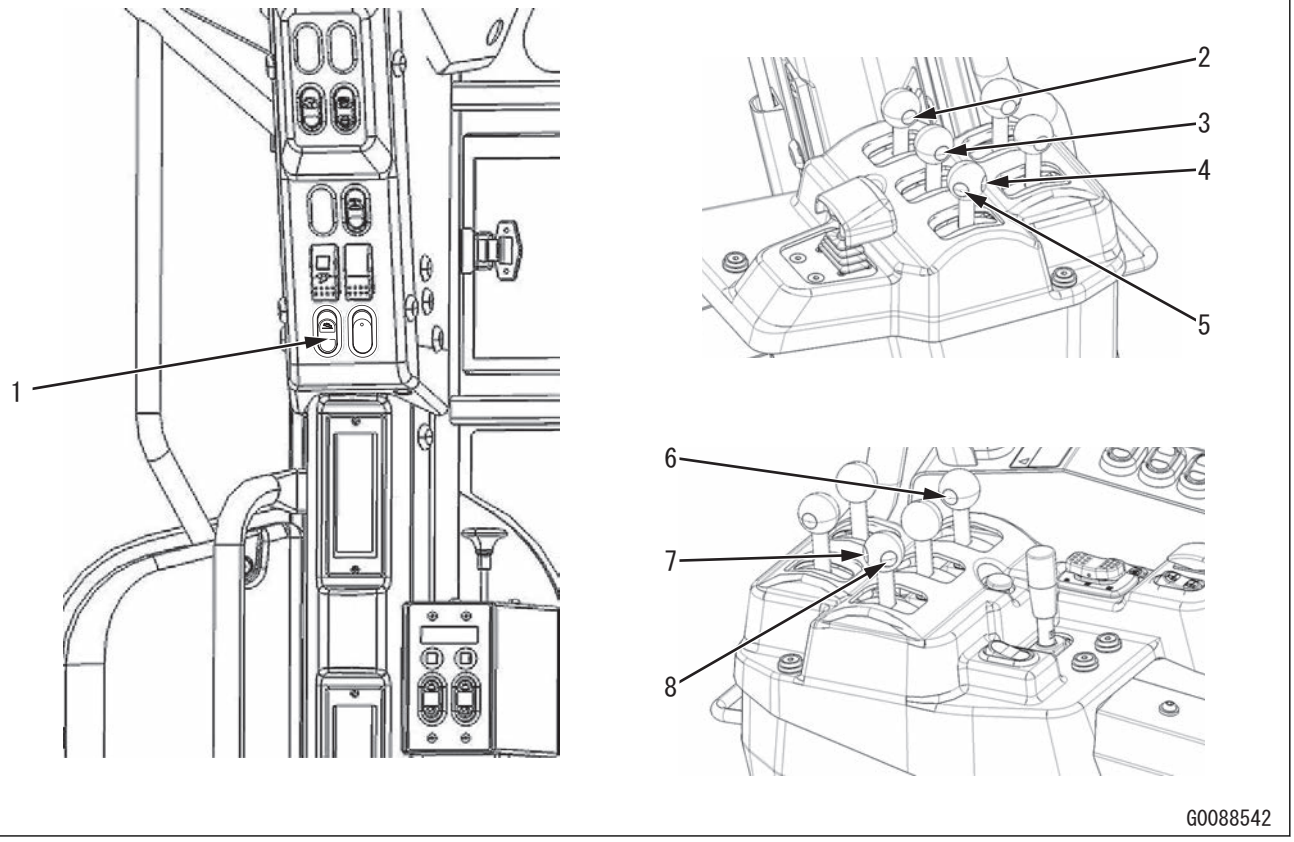
PRECAUTIONS FOR MACHINE WITH CROSS SLOPE SYSTEM

When you use it, obey the precautions that follow.

- When you enable the automatic control, make sure that there are no persons or obstacles around. Operate the machine while you are very careful about the movement of the blade.
- The cross slope function is designed for use when the blade is in a horizontal position.
  If you enable the automatic control while the machine is in an attitude for such as bank cutting, the blade will move largely. Do not use the cross slope function in such an attitude.
- The cross slope function is designed for use when the drawbar is at the center of the machine body.
  If you use it when the drawbar is shifted right or left from the center of the machine body, the movement of the right and left blade lift cylinders can be different.
- The cross slope function is designed for use when the articulation is near 0°.
  If you use it when the machine body is largely articulated, the construction precision can decrease.
- If the blade is raised to the maximum height while automatic control is enabled, the blade lift cylinder on the automatic control side can be hydraulically relieved and cause fuel consumption more than necessary.
  In such a case, hydraulic pressure relief events can be prevented if the automatic control is set OFF.
- The cross slope function cannot be used together with TOPCON intelligent Machine Control systems.
  When you change the machine specification from the cross slope system to the intelligent Machine Control, consult your Komatsu distributor.

COMPONENTS ON MACHINES WITH CROSS SLOPE SYSTEM

NAMES OF SWITCH PANEL EQUIPMENT OF MACHINE WITH CROSS SLOPE SYSTEM



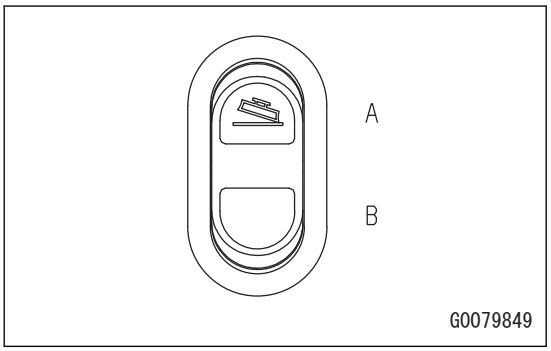
(1) Cross slope enable switch
(2) Auto/manual switch (left side)
(3) Slope match activation switch
(4) Preset 1 selection switch
(5) Preset 2 selection switch
(6) Auto/manual switch (right side)
(7) Target cross slope increase switch
(8) Target cross slope decrease switch

CROSS SLOPE ENABLE SWITCH

Use the cross slope enable switch to set ON/OFF the cross slope function.

Position (A): ON (cross slope function ON)

Position (B): OFF (cross slope function OFF)



AUTO/MANUAL SWITCH (LEFT SIDE)

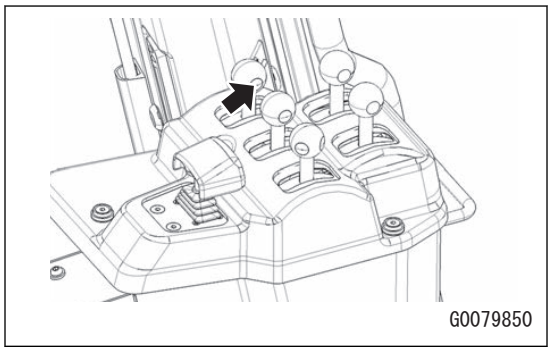
If you release your finger after you hold down the auto/manual switch (left side) for 1 to 2 seconds, you can set ON/OFF the automatic control of the L.H. blade lift cylinder.

The auto/manual switch (left side) is attached to the L.H. blade lift control lever.

If the cross slope enable switch is in the OFF position, the automatic control is not activated even if you operate the auto/manual switch (left side).

REMARK

If the L.H. blade lift control lever is in other than the HOLD position, the automatic control is not activated even if you operate the auto/manual switch (left side).


G0079850

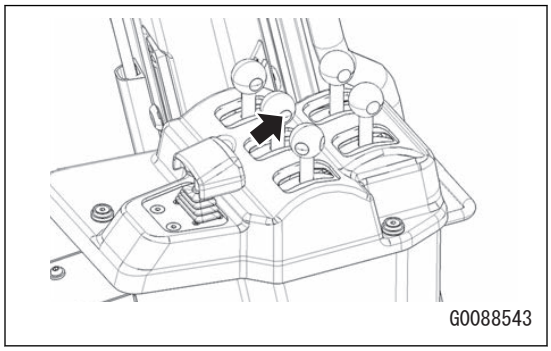
SLOPE MATCH ACTIVATION SWITCH

Set the actual cross slope at the time when you push the slope match activation switch as the target cross slope.

The slope match activation switch is attached to the blade side shift control lever.

REMARK

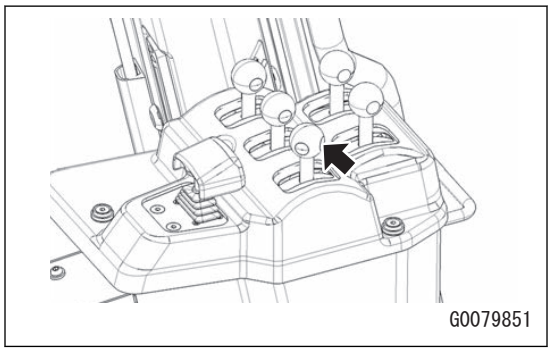
When the blade side shift control lever is not in the HOLD position, the actual cross slope is not set as the target cross slope even if you operate the slope match activation switch.


G0088543

PRESET 1 SELECTION SWITCH

The preset 1 selection switch makes a change to the preset 1.

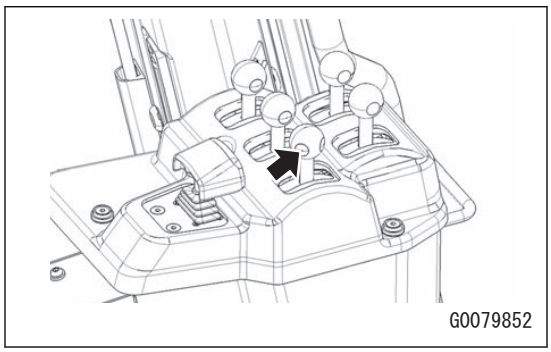
The preset 1 selection switch is attached to the blade rotation control lever.


G0079851

PRESET 2 SELECTION SWITCH

The preset 2 selection switch makes a change to the preset 2.

The preset 2 selection switch is attached to the blade rotation control lever.


G0079852

AUTO/MANUAL SWITCH (RIGHT SIDE)

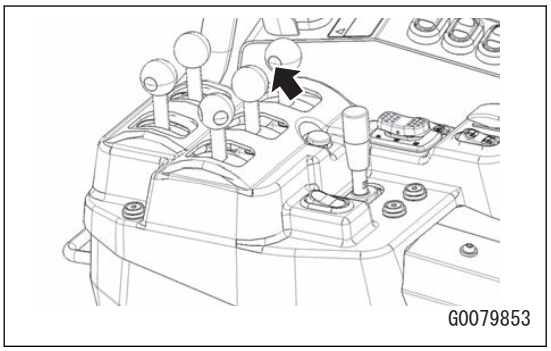
If you release your finger after you hold down the auto/manual switch (right side) for 1 to 2 seconds, you can set ON/OFF the automatic control of the R.H. blade lift cylinder.

The auto/manual switch (right side) is attached to the R.H. blade lift control lever.

If the cross slope enable switch is in the OFF position, the automatic control is not activated even if you operate the auto/manual switch (right side).

REMARK

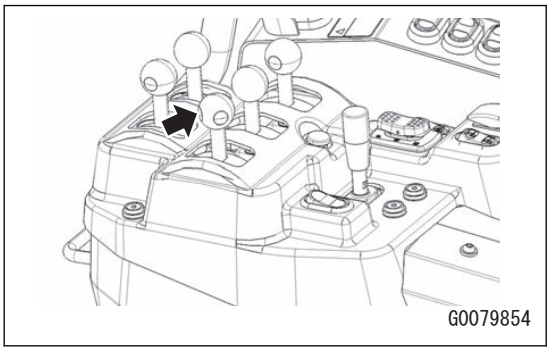
If the R.H. blade lift control lever is in other than the HOLD position, the automatic control is not activated even if you operate the auto/manual switch (right side).



TARGET CROSS SLOPE INCREASE SWITCH

Push the target cross slope increase switch to increase the target cross slope.

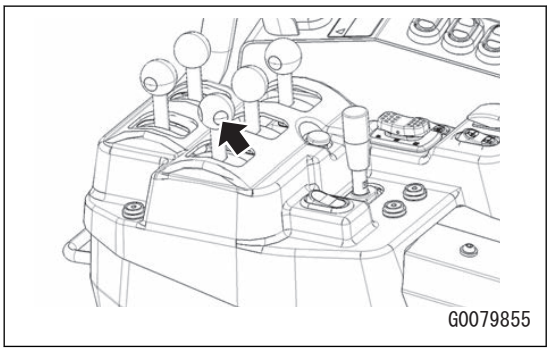
The target cross slope increase switch is attached to the drawbar side shift control lever.



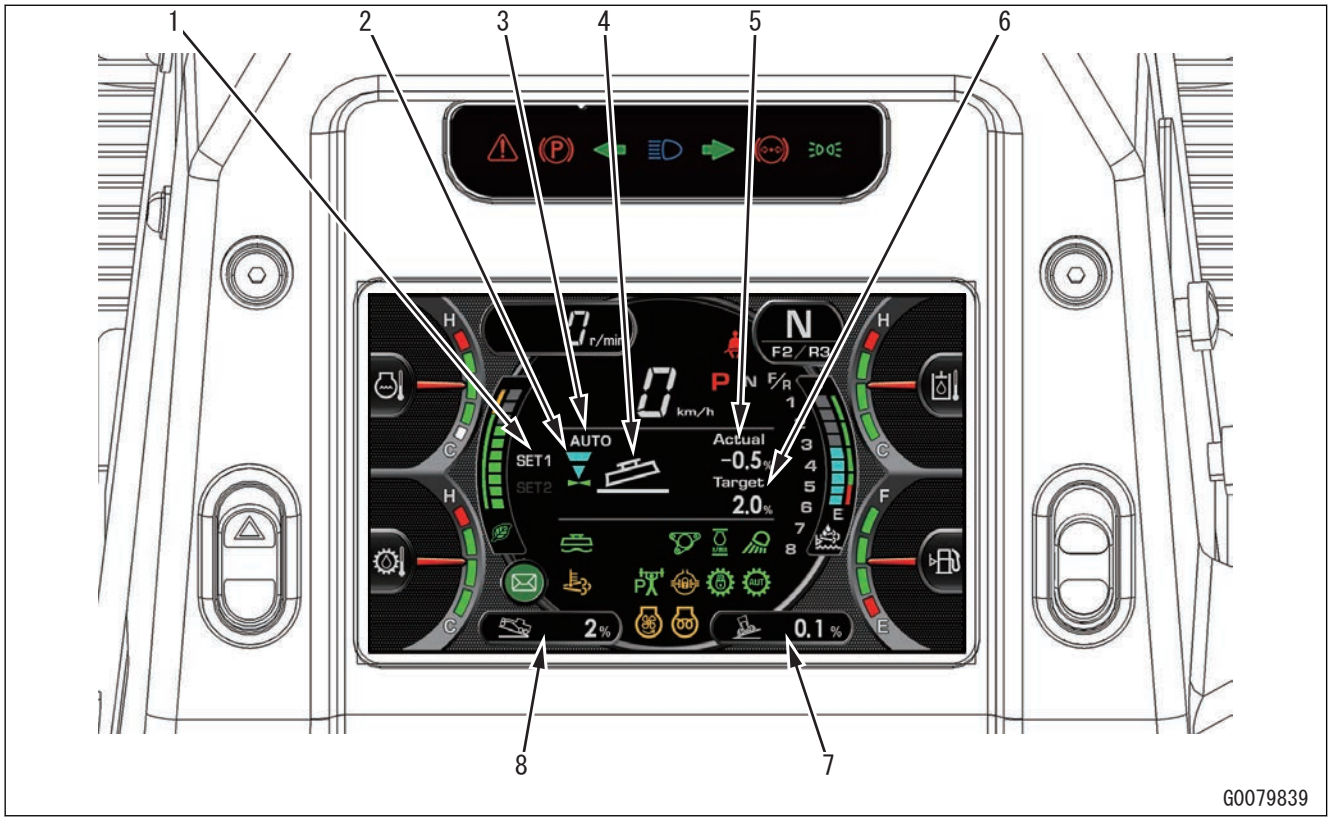
TARGET CROSS SLOPE DECREASE SWITCH

Push the target cross slope decrease switch to decrease the target cross slope.

The target cross slope decrease switch is attached to the drawbar side shift control lever.



PILOT DISPLAY AND METER DISPLAY OF CROSS SLOPE SCREEN



Pilot display

(1) Preset indicator

(2) Actual/target slope difference indicator

(3) Blade lift automatic control indicator

(4) Target slope status display

Meter display

(5) Actual cross slope

(6) Target cross slope

(7) R.H. meter

(8) L.H. meter

PILOT DISPLAY OF CROSS SLOPE SCREEN

PRESET INDICATOR

The preset indicator shows the current preset information.

Push the preset selection switch to change the preset.



ACTUAL/TARGET SLOPE DIFFERENCE INDICATOR

The actual/target slope difference indicator shows the difference between the actual cross slope and the target cross slope, and the direction in which the blade moves.

When the automatic control is activated, the indicator for the automatically controlled side lights up.

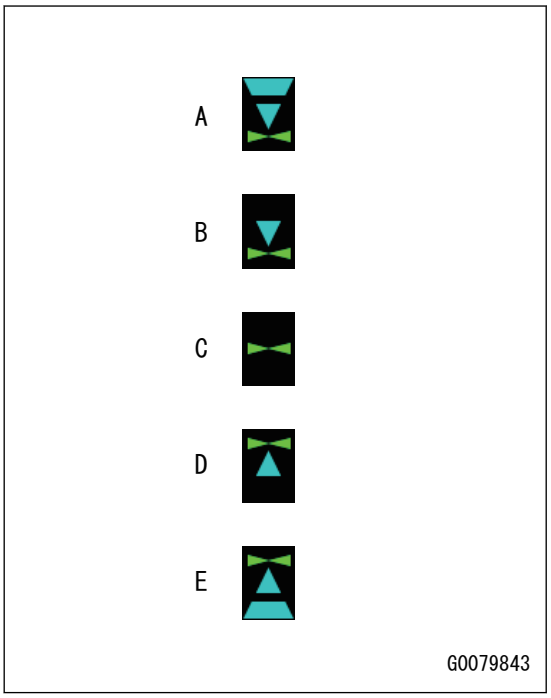
(A): The difference from the target cross slope is very large. The blade lowers.

(B): The difference from the target cross slope is large. The blade lowers.

(C): The difference from the target cross slope is small. The blade is finely adjusted.

(D): The difference from the target cross slope is large. The blade rises.

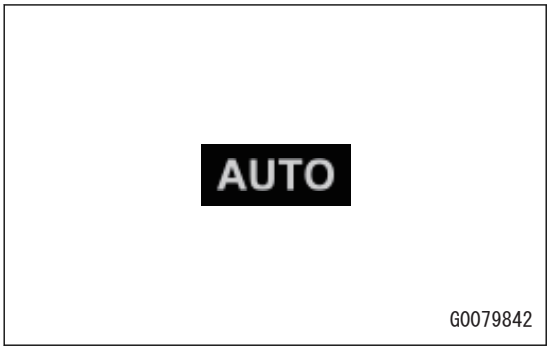
(E): The difference from the target cross slope is very large. The blade rises.



BLADE LIFT AUTOMATIC CONTROL INDICATOR

The blade lift automatic control indicator shows the operation status of automatic control.

When the automatic control is activated, the indicator for the automatically controlled side lights up.



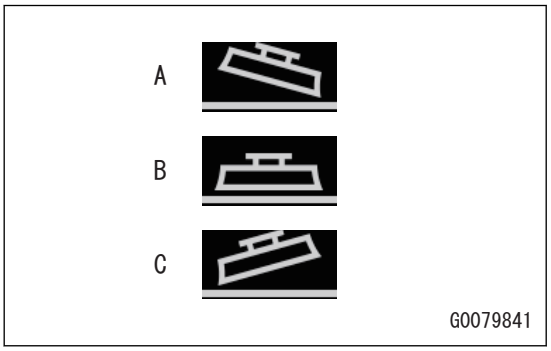
TARGET SLOPE STATUS DISPLAY

The target slope status display shows the status of the target cross slope.

(A): When the target cross slope is negative (from top left to bottom right)

(B): When the target cross slope is neutral (flat) (0.0%)

(C): When the target cross slope is positive (from bottom left to top right)

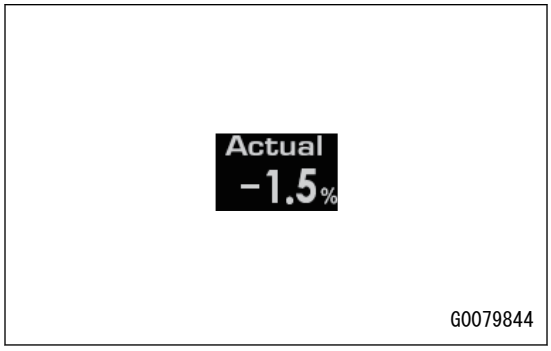


METER DISPLAY OF CROSS SLOPE SCREEN

ACTUAL CROSS SLOPE

The actual cross slope is shown in %.

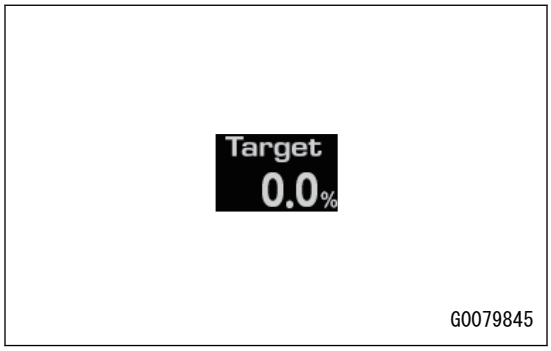
A bottom left to top right slope is shown as a positive slope.



TARGET CROSS SLOPE

The target cross slope is shown in %.

A bottom left to top right slope is shown as a positive slope.



L.H. AND R.H. METER DISPLAY OF MACHINE WITH CROSS SLOPE SYSTEM

On the machine with cross slope system, you can select one of the items that follow to be shown on the L.H. meter.

- Service meter
- Odometer (travel distance integrating meter)
- Clock
- Machine body pitch angle
- Machine body roll angle

For how to select a display, see “L.H. METER DISPLAY SETTING (3-94)”.

On the machine with cross slope system, you can select one of the items that follow to be shown on the R.H. meter.

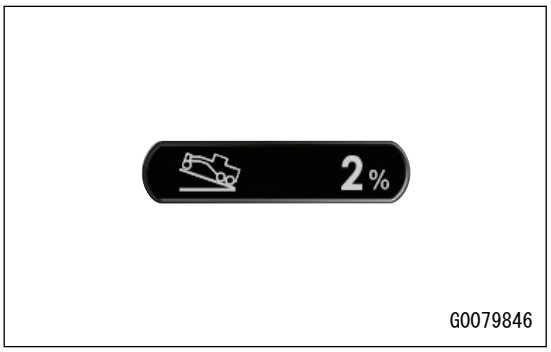
- Fuel consumption gauge
- Service meter
- Odometer (travel distance integrating meter)
- Clock
- Engine tachometer (when maintenance time caution lamp/warning display are in operation)
- Machine body pitch angle
- Machine body roll angle

For how to select a display, see “R.H. METER DISPLAY SETTING (3-95)”.

Machine body pitch angle display

The forward and reverse inclination of the machine is shown in %.

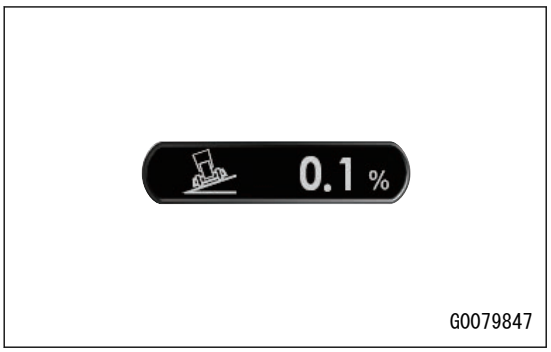
The elevation angles are shown as positive.



Machine body roll angle display

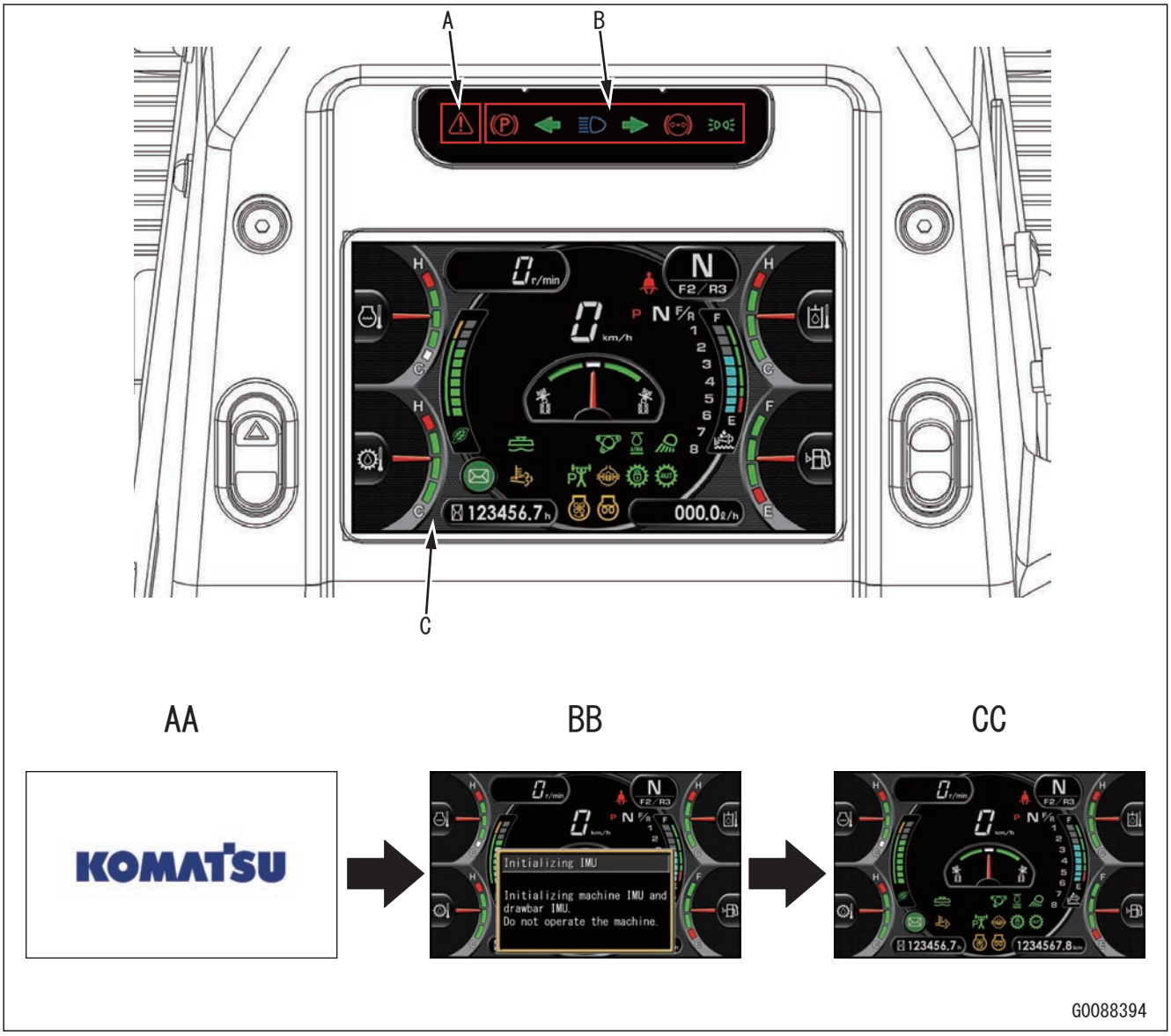
The right and left inclination of the machine is shown in %.

A bottom left to top right slope is shown as a positive slope.



BASIC OPERATION OF MACHINE MONITOR OF MACHINE WITH CROSS SLOPE SYSTEM

BASIC OPERATION OF MACHINE MONITOR WHEN YOU START ENGINE IN NORMAL SITUATION



When you turn the starting switch to the ON position, the machine monitor is activated and operates as follows.

1. The centralized warning lamp (A) and pilot lamp (B) light up for 2 seconds, and then go off for 1 second.
2. The liquid crystal display (C) shows the start screen AA for 2 seconds, the IMU initialization message screen BB, and then changes to the standard screen CC.
3. The alarm buzzer operates for 2 seconds, and goes off when it is normal.

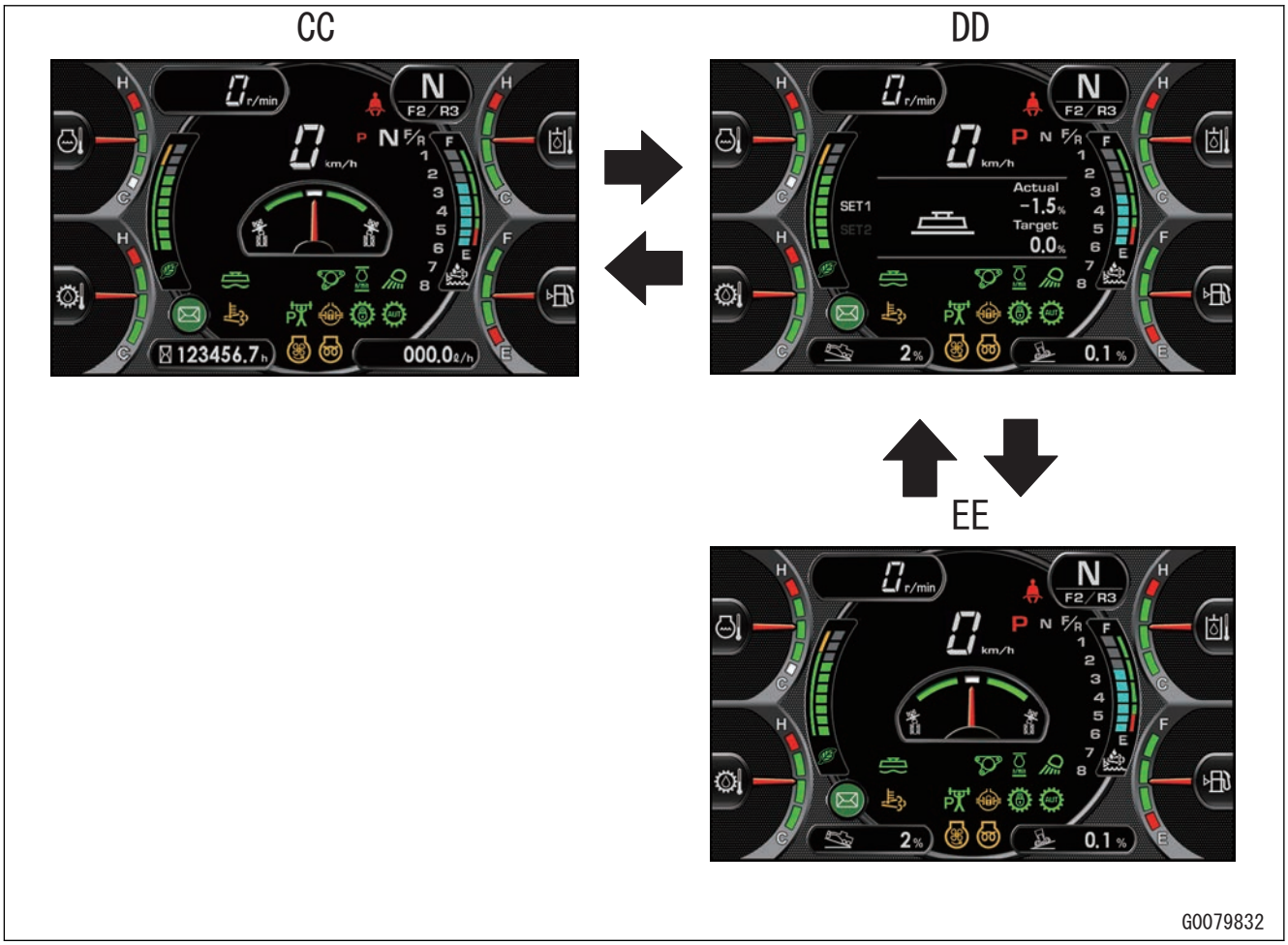
NOTICE

If the displays, alarm buzzer, or other devices do not operate, the machine monitor can be failed or the electric wiring can have breakage. Consult your Komatsu distributor for repair.

REMARK

- When the engine is started, the battery voltage can drop suddenly by the temperature and the battery condition.
  In such case, the machine monitor can go off temporarily and start again. It is not a trouble.
- On machines with the cross slope system, the IMU is adjusted at machine startup. The IMU initialization message screen BB is shown at that time.
  While this message is shown, the operator must not operate the machine unless in an emergency.

BASIC OPERATION OF MACHINE MONITOR WHEN YOU USE CROSS SLOPE SYSTEM

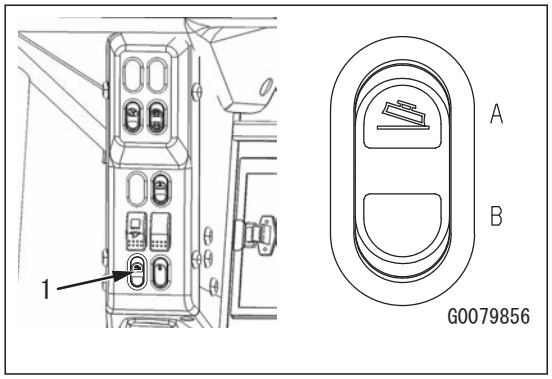


When the cross slope enable switch (1) is set to the ON position (A), the machine monitor screen changes from the standard screen CC to the cross slope screen DD.

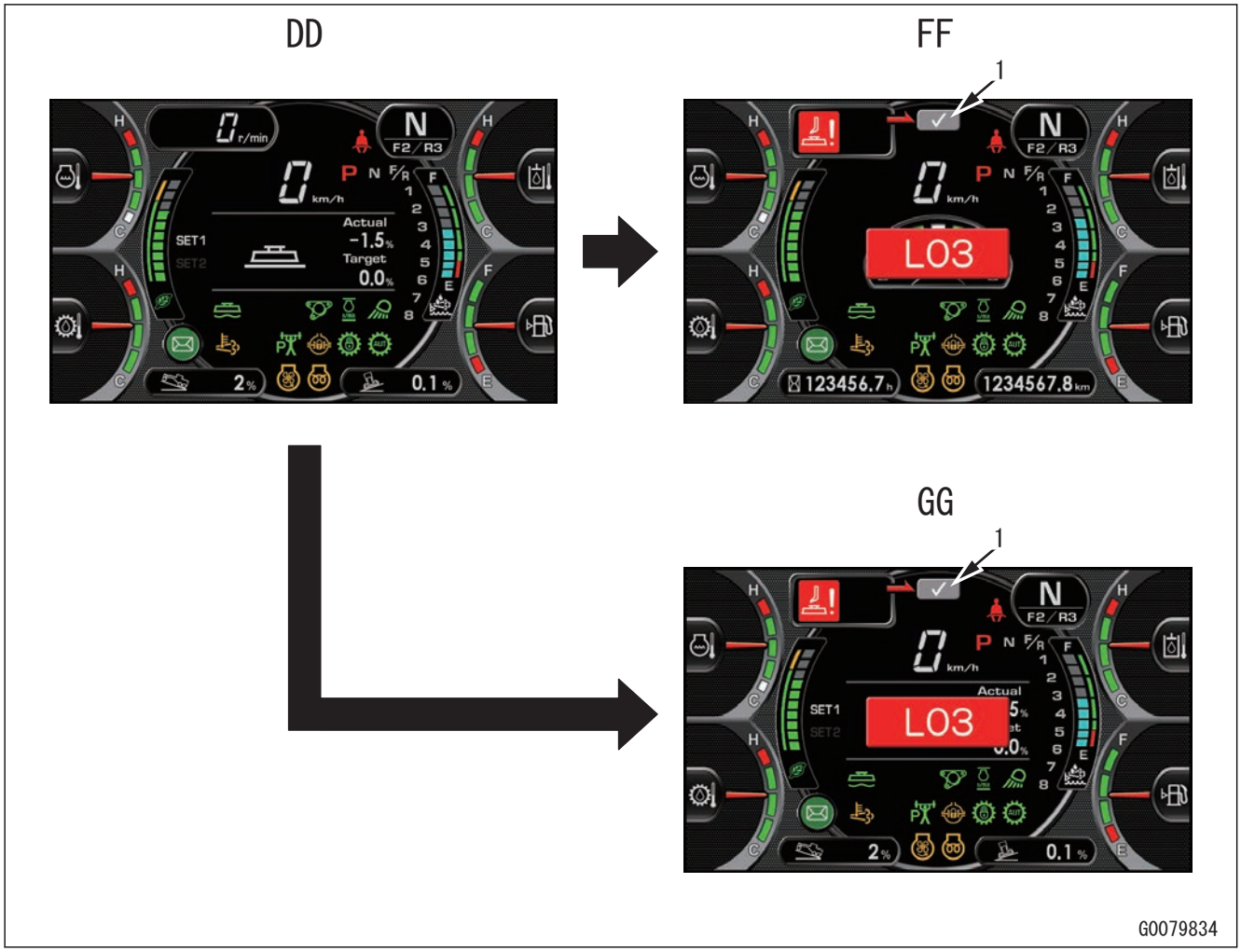
When the cross slope enable switch (1) is set to the OFF position (B), the machine monitor screen changes from the cross slope screen DD to the standard screen CC.

REMARK

When the articulate control lever is operated while the cross slope screen DD is shown, the cross slope screen DD changes to the cross slope screen EE. Automatic control continues during the changeover.
If the articulate control lever is not operated for a specified period of time, the cross slope screen EE goes back to the cross slope screen DD.



BASIC OPERATION OF MACHINE MONITOR WHEN TROUBLE OCCURS WHILE YOU USE CROSS SLOPE SYSTEM



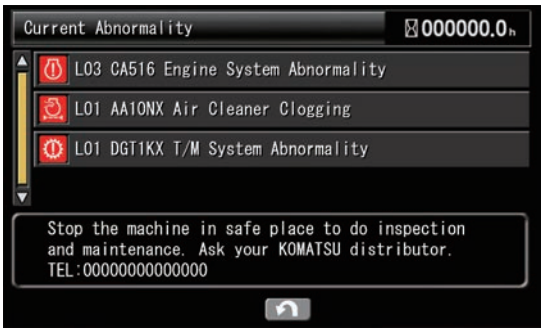
If a problem occurs in one of the sensors for cross slope or the blade lift cylinder while you use the cross slope function, the cross slope screen DD changes to the failure display screen FF. Automatic control is canceled.

If a problem occurs in other than the sensors for cross slope or the blade lift cylinder while you use the cross slope function, the cross slope screen DD changes to the failure display screen GG. The automatic control continues.

When you push the ENTER switch that is shown with the guidance icon (1), “Current Abnormality” screen HH is shown.

For “Current Abnormality” screen and the remedies, see “CURRENT ABNORMALITY LIST DISPLAY (3-26)”.

HH



G0046400

CAUTION LAMPS OF MACHINE WITH CROSS SLOPE SYSTEM

CAUTION LAMP LIST

NOTICE

- **These caution lamps do not guarantee the condition of the machine.**
  Do not simply rely on the caution lamps for checks-before-starting (start-up inspection). Be sure to get off the machine and check each item directly.
- **Based on the contents of the caution, the engine output or engine speed can be restricted and the machine operation speed can possibly become slow.**

Caution lamp and color

Symbol	Type of caution lamp	Color/machine state (action level)			
		Red	Yellow	Blue	White
 G0079835	IMU error caution lamp	-	Abnormal	-	-
 G0079836	Work equipment interference prevention caution lamp	-	Give a caution	-	-

IMU ERROR CAUTION LAMP

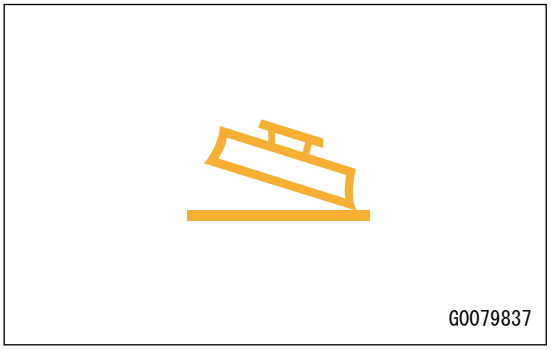
The IMU error caution lamp gives a warning about abnormality of IMU operation.

The caution lamp lights up in yellow.

The IMU has not been started normally.

Stop the work. Move the machine to a safe place. Stop the engine. Turn the starting switch to the ON position again.

If this caution lamp does not go off even after you operate the starting switch, consult your Komatsu distributor for inspection and maintenance.


G0079837

REMARK

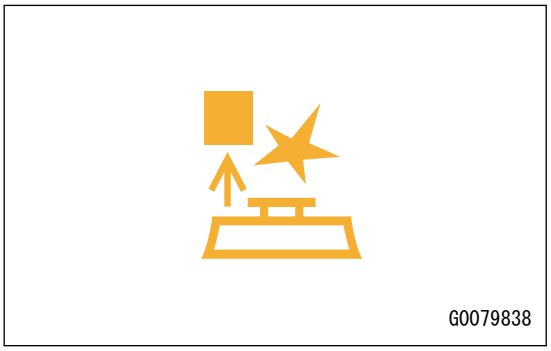
If the IMU initialization message is shown when you start the machine, the operator must not operate the machine unless in an emergency.

WORK EQUIPMENT INTERFERENCE PREVENTION CAUTION LAMP

The work equipment interference prevention caution lamp gives a warning to the operator when the drawbar component is likely to interfere with the front frame component.

The caution lamp lights up in yellow. The alarm buzzer operates intermittently.

After you check the drawbar position and around it, the operator must correctly do the operation, such as to stop the work equipment control lever.


G0079838

REMARK

- While the work equipment is locked (the work equipment lock pilot lamp is lit), the work equipment interference prevention alarm stops.
- You can set ON/OFF the work equipment interference prevention alarm.
  The default is OFF.
  To change the setting, see “SET INTERFERENCE PREVENTION ALARM OF WORK EQUIPMENT (6-26)”.
  If you set the work equipment interference prevention function to OFF, check the drawbar position and around it, and operate the machine carefully.

USE CROSS SLOPE SYSTEM

⚠ CAUTION

- **When you set the automatic control to ON, make sure that there are no persons or structures around. Be very careful about the movement of the blade and operate the machine.**
- **The cross slope function is designed for use when the blade is in a horizontal position. If you set the automatic control to ON while the machine is in an attitude for such as bank cutting, the blade will largely incline. Do not use the cross slope function in such an attitude.**
- **When you do not use the cross slope function, set the cross slope enable switch to the OFF position. Make sure that the function is OFF.**

This section is the explanation of how to operate the cross slope function.

For other procedures, see the OPERATION part in the Operation and Maintenance Manual.

The functions of the cross slope that follows are explained.

- How to set the automatic control
- How to cancel the automatic control
- How to change the preset
- How to set the target cross slope
- How to change the blade lift automatic control

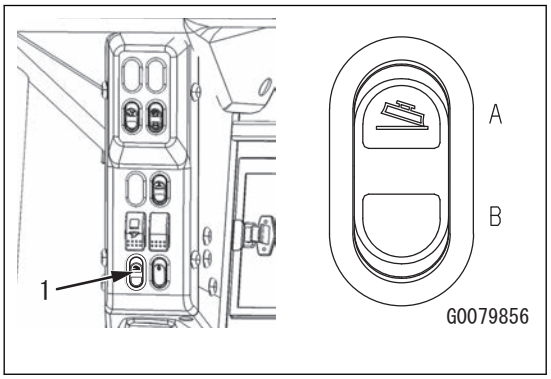
SET AUTOMATIC CONTROL

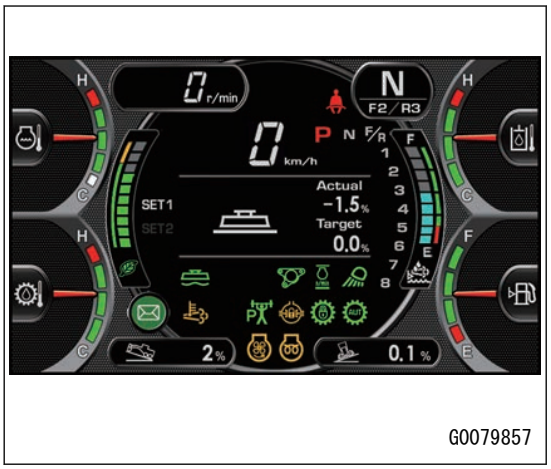
1. Set the cross slope enable switch (1) to the ON position (A).

   The cross slope screen is shown on the machine monitor.
2. Set the preset freely.

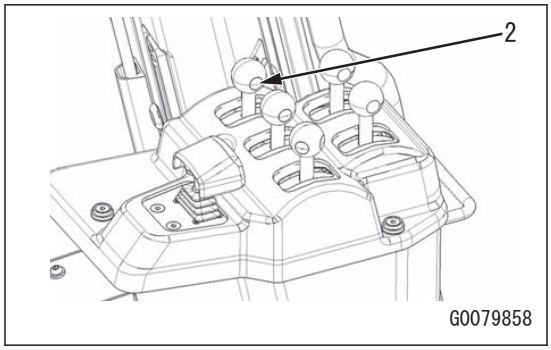
   For the operation method, see “CHANGE PRESET (6-19)”.
3. Set the target cross slope.

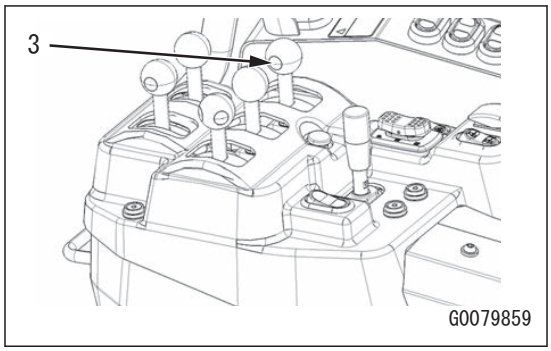
   For the operation method, see “SET TARGET CROSS SLOPE (6-20)”.



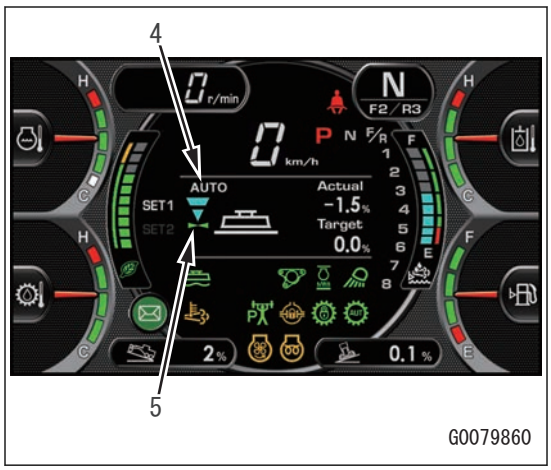


4. Hold down the auto/manual switch (left side) (2) or auto/manual switch (right side) (3) for 1 to 2 seconds, then release your finger.





Automatic control is set to ON. The blade lift automatic control indicator (4) and actual/target slope difference indicator (5) are shown on the monitor screen.



REMARK

When you set the automatic control to ON, make sure that the work equipment lock is released and the blade FLOAT function is OFF.
If one of these functions is active, the automatic control cannot be enabled.
Also, if the blade lift control lever on the side which the automatic control is to be enabled is in other than the HOLD position, the automatic control cannot be enabled.

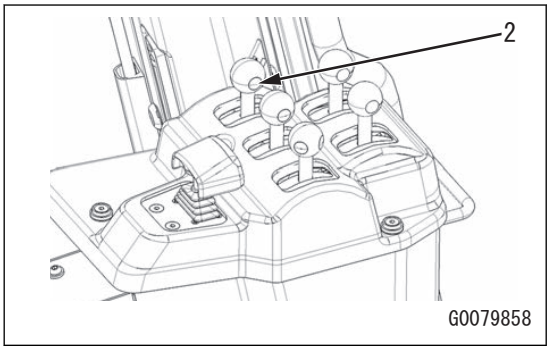
5. Operate the blade lift control lever on the manual control side to adjust the blade height.

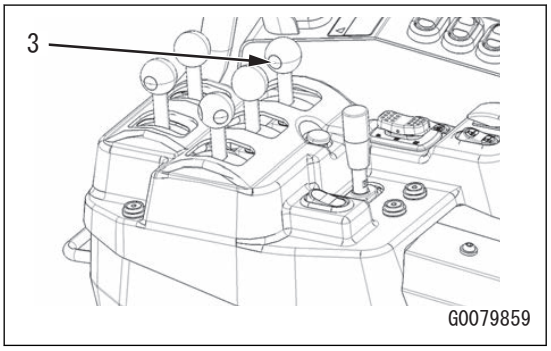
REMARK

- When you operate the blade lift control lever on the automatic control side, automatic control is released, and manual operation will have priority.
- The cross slope function is designed for use when the drawbar is at the center of the machine.
  If the drawbar is used when it is shifted right or left from the center of the machine, the movement of the right and left blade lift cylinders can be different.
- The cross slope function is designed for use when the articulation is near 0°.
  If it is used when the machine is largely articulated, the construction precision can decrease.
- If the blade is raised to the maximum height while automatic control is enabled, the blade lift cylinder on the automatic control side can be hydraulically relieved and cause fuel consumption more than necessary.
  In such a case, oil pressure relief events can be prevented if automatic control is disabled.

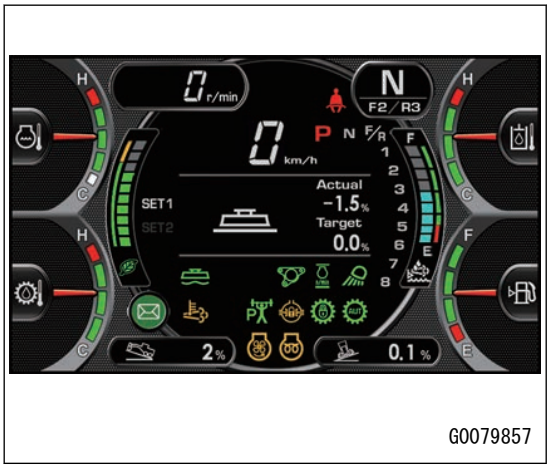
CANCEL AUTOMATIC CONTROL

Hold down the auto/manual switch (left side) (2) or auto/manual switch (right side) (3) on the side which the automatic control is enabled for 1 to 2 seconds, then release your finger.





The automatic control is disabled. The blade lift automatic control indicator and the actual/target slope difference indicator go off.



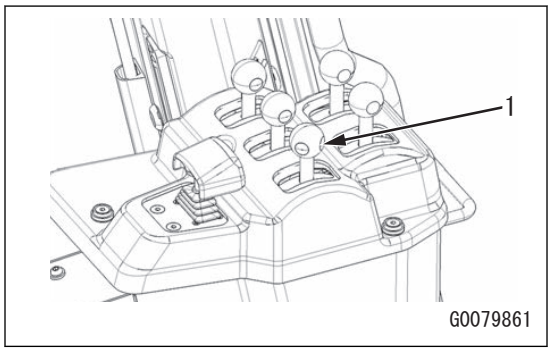
CHANGE PRESET

The target cross slopes are recorded in each of the presets of “SET1” and “SET2”.

You can change the preset on the cross slope screen when automatic control is OFF.

Change the preset and you can set a different target cross slope while the first set target slope is recorded.

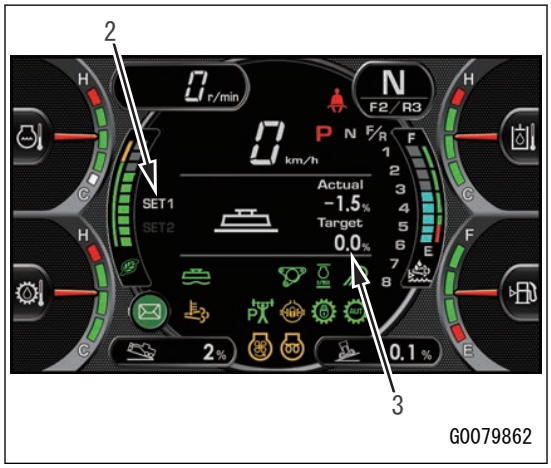
1. Push the preset 1 selection switch (1).



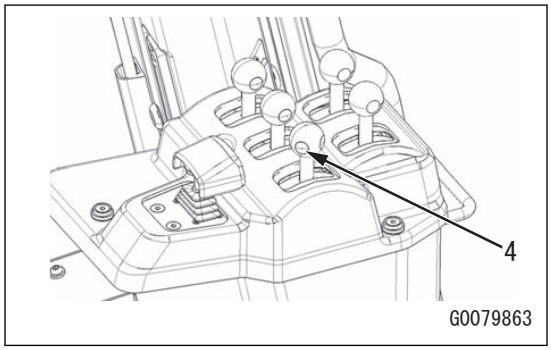
The preset indicator (2) on the machine monitor changes to “SET1”.

At the same time, the target cross slope (3) changes to the value recorded in the specified preset.

If the preset shown is “SET1”, the preset indicator (2) and the display of target cross slope (3) will not change.



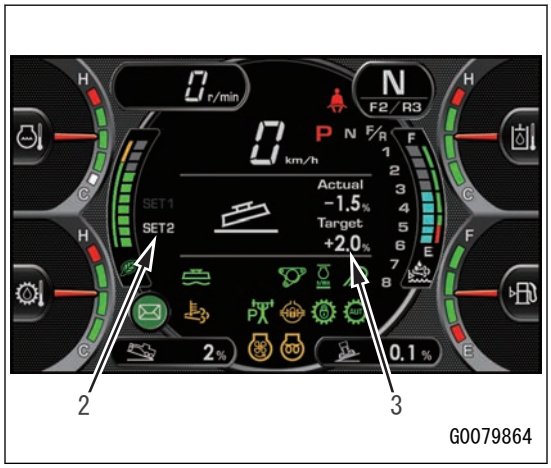
2. Push the preset 2 selection switch (4).



The preset indicator (2) on the machine monitor changes to “SET2”.

At the same time, the target cross slope (3) changes to the value recorded in the specified preset.

If the preset shown is “SET2”, the preset indicator (2) and the display of target cross slope (3) will not change.

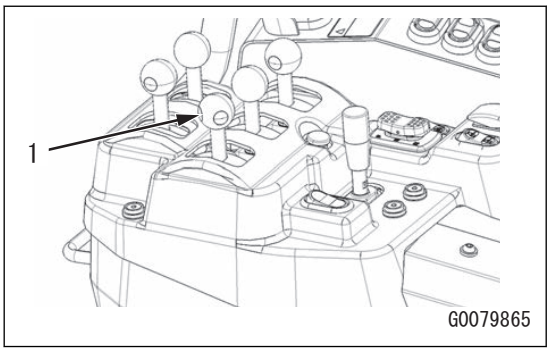


SET TARGET CROSS SLOPE

There are 2 procedures to set the target cross slope.

SET BY TARGET CROSS SLOPE INCREASE AND DECREASE SWITCH

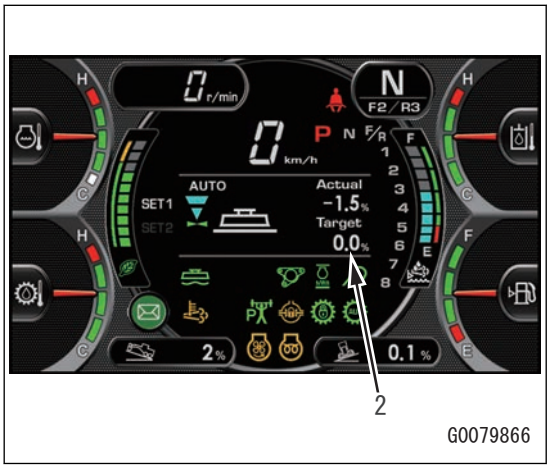
1. While the cross slope screen is shown, push the target cross slope increase switch (1).



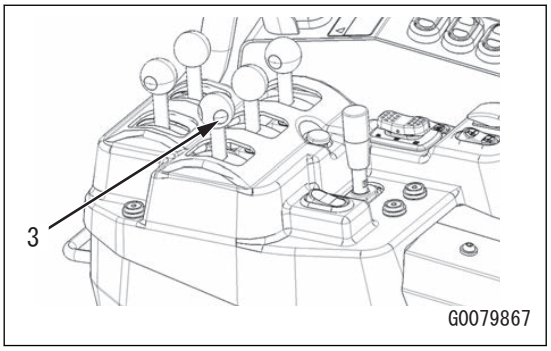
The target cross slope (2) increases by 0.1%.

REMARK

If you hold down the target cross slope increase switch (1) when the blade lift automatic control indicator is not shown on the cross slope screen, the target cross slope (2) increases by 1.0%.



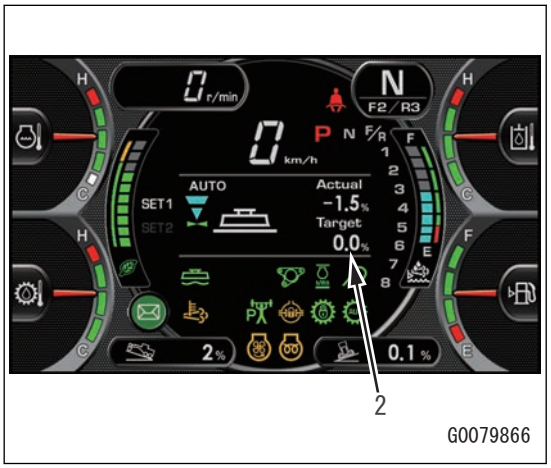
2. While the cross slope screen is shown, push the target cross slope decrease switch (3).



The target cross slope (2) decreases by 0.1%.

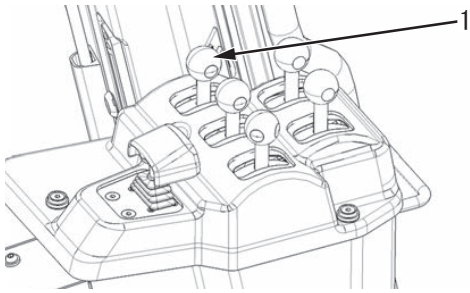
REMARK

If you hold down the target cross slope decrease switch (3) when the blade lift automatic control indicator is not shown on the cross slope screen, the target cross slope (2) decreases by 1.0%.

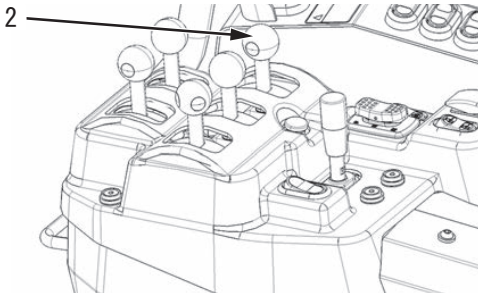


SET BY SLOPE MATCH ACTIVATION SWITCH

1. Operate the L.H. blade lift control lever (1) or R.H. blade lift control lever (2) while the cross slope screen is shown, and move the blade.

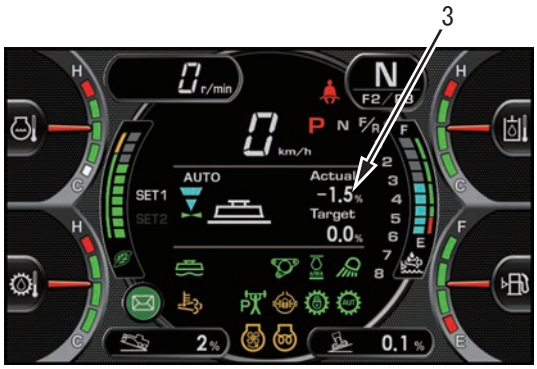


G0088544



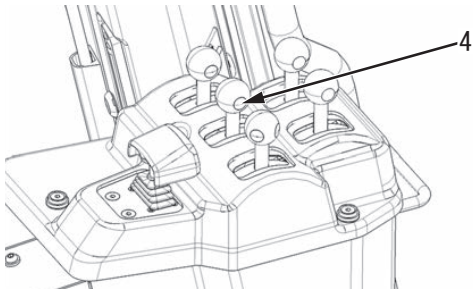
G0088545

Set the actual cross slope (3) to the desired slope.



G0088546

2. Push the slope match activation switch (4).

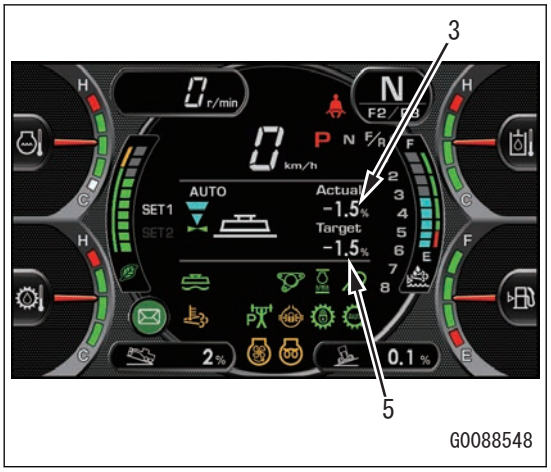


G0088547

The actual cross slope (3) at the time when you push the slope match activation switch (4) is set as the target cross slope (5).

REMARK

If the blade side shift control lever is in other than the HOLD position, the actual cross slope is not set as the target cross slope even if you push the slope match activation switch.

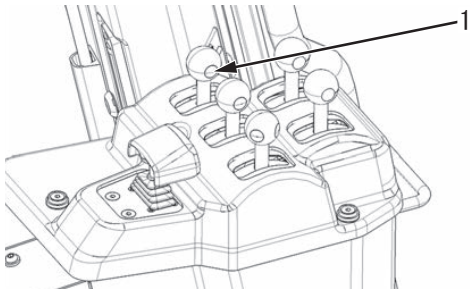


REMARK

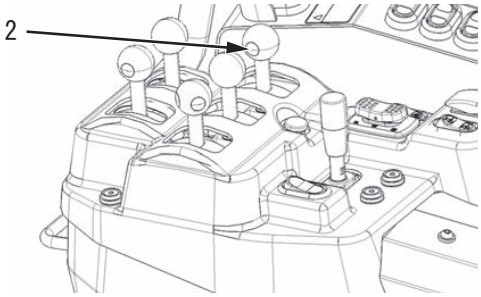
When you repair the unpaved road without the planned drawings, it is not easy to set the target cross slope with the target cross slope increase/decrease switches.
In that case, lower the blade to the ground and use the slope match activation switch, and you can set the cross slope of actual road surface to the target cross slope easily.

CHANGE BLADE LIFT AUTOMATIC CONTROL

Hold down the auto/manual switch (left side) (1) or auto/manual switch (right side) (2) on the manual control side for 1 to 2 seconds, then release your finger.

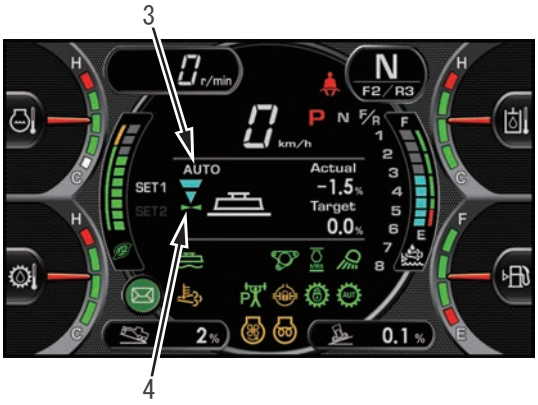


G0079868



G0079869

The automatic control side changes between right and left. The blade lift automatic control indicator (3) and the actual/target slope difference indicator (4) are shown on the side which is specified.



G0079870

REMARK

- If the blade lift control lever on the side which the automatic control is to be enabled is in other than the HOLD position, the automatic control cannot be enabled.
- When you push the auto/manual switch on the side in automatic control, the blade lift automatic control indicator (3) and the actual/target slope difference indicator (4) go off and automatic control is canceled.
  To start the automatic control again, push the auto/manual switch on the side you want to start automatic control.

FUNCTION RELATED TO CROSS SLOPE ON MACHINE MONITOR

This is explanation of the functions related to cross slope in the functions of the machine monitor.

For other machine monitor functions and procedures, see the OPERATION part in the Operation and Maintenance Manual.

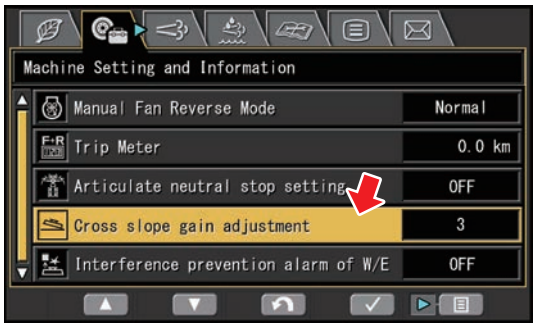
ADJUST CROSS SLOPE GAIN

The cross slope gain is the setting of the response speed while the blade is automatically controlled.

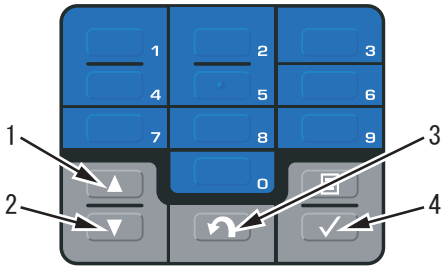
If the response speed of LIFT RAISE/LOWER during the blade automatic control is too fast or too slow, the ground can become waved after the leveling work.

If this occurs, you can adjust the gain of the blade lift cylinder from the user menu screen of the machine monitor.

1. Select “Cross slope gain adjustment” on “Machine Setting and Information” menu screen, then push the ENTER switch (4).



G0090938



G0046608

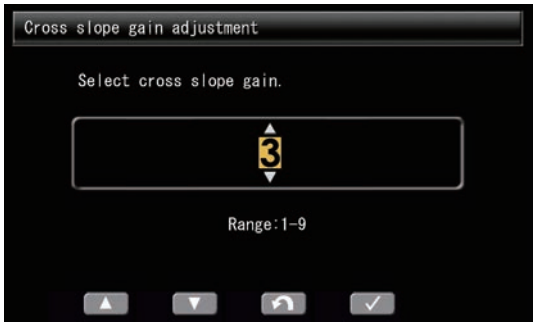
“Cross slope gain adjustment” screen is shown.

2. Operate the UP switch (1) or DOWN switch (2) to change the cross slope gain.

   To set the cross slope gain to the specified value, push the ENTER switch (4).

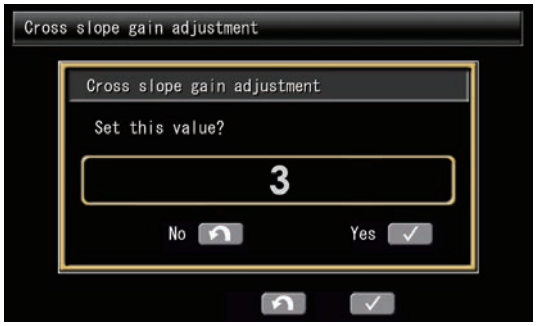
   REMARK

   The default is “3”.
   You can change the set value within the range of “1 to 9”.



G0090939

3. Check if the specified cross slope gain is set. Push the ENTER switch (4) to set or the RETURN switch (3) not to set.



G0090940



G0090941

NOTICE

If the cross slope gain is largely changed, the blade can move unexpectedly. Change the cross slope gain gradually while you check the actual movement of the blade.

- **A larger cross slope gain value makes the response speed of the blade lift cylinder on the automatic control side faster.**
  A smaller cross slope gain value makes the response speed of the blade lift cylinder on the automatic control side slower.
- **If the leveled ground waves in a short cycle, decrease the cross slope gain to get the better result.**
  If the leveled ground waves in a long cycle, increase the cross slope gain to get the better result.
- **To do the leveling work while the machine travels at high speed, we recommend you to increase the cross slope gain.**

SET INTERFERENCE PREVENTION ALARM OF WORK EQUIPMENT

⚠ CAUTION

If the work equipment system caution lamp or the IMU error caution lamp is lit, there can be a problem in the IMU.
If there is a problem in the IMU, the interference prevention alarm for the work equipment will not be activated.

The interference prevention alarm for the work equipment is an operator assistance function which gives an alarm if a danger of interference between drawbar components and front frame components is predicted.

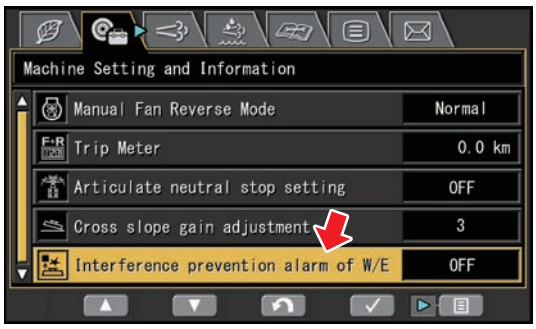
This function assists the operator to make decisions and reduce damage to the machine caused by interference.

If the interference prevention alarm for the work equipment is activated, the operator must check the drawbar position and the area around it, and then do the correct operation such as to stop the work equipment control lever.

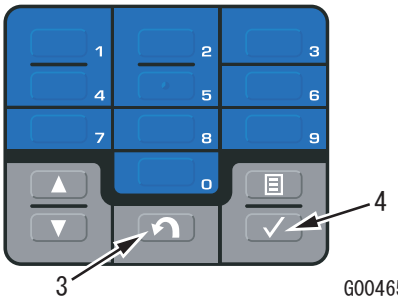
NOTICE

The purpose of this function is to tell the operator about the situation with an alarm.
This is not an automatic stop function. It does not operate to make interference prevention operation by the operator not necessary.
Do not only rely on this function for operation.
If you rely on this function, an unexpected accident can occur.

1. Select “Interference prevention alarm of W/E” on “Machine Setting and Information” menu screen, then push the ENTER switch (4).

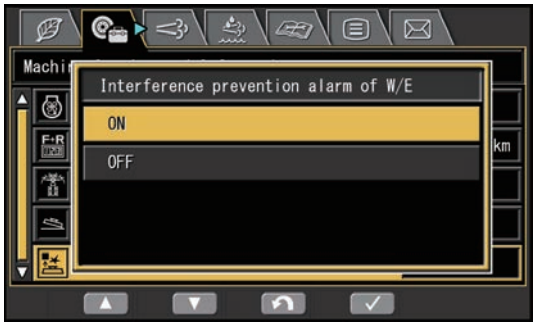


G0090942



G0046531

2. Select “ON” or “OFF”, then push the ENTER switch (4).
   The default is “OFF”.
   Push the RETURN switch (3) to cancel the operation.
   - If you set it to “ON”, the interference prevention alarm for the work equipment is enabled.
   - If you set it to “OFF”, the interference prevention alarm for the work equipment is disabled.



G0090943

REPLACEMENT PARTS

DEFINED LIFE PARTS

- For using the machine safely for a long period, always perform periodic inspection of the defined life parts that have a particularly close relation to safety, such as hoses and the seat belt.
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious personal injury or death. Check if there is any abnormality in wear or deterioration on them before work and at the regular maintenance.
- Replace immediately the hose if any defect is found by checking. If any of the hose clamps show deterioration like deformation or cracking, replace the clamps at the same time as the hoses.
- Tighten all loose hoses and replace defective hoses, as required. When replacing hoses, always replace O-rings, gaskets, and other such parts at the same time.

DEFINED LIFE PARTS LIST

<table>
<tr><th>No</th><th colspan="2">Target Parts</th><th>Inspection /Replacement interval</th></tr>
<tr><td>1</td><td>Fuel system</td><td>Fuel hose</td><td>Every 2 years or every 4000 hours, whichever comes sooner.</td></tr>
<tr><td>2</td><td>Steering system</td><td>High pressure circuit hose</td><td rowspan="6">Replace if any of the damages were found when the daily check or periodical maintenance.</td></tr>
<tr><td>3</td><td>Brake system</td><td>Brake oil pressure hose</td></tr>
<tr><td>4</td><td>Torque converter and transmission system</td><td>Transmission circuit hose</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Work equipment hydraulic system</td><td>Pump delivery hose</td></tr>
<tr><td>Main pump LS hose</td></tr>
<tr><td>6</td><td>Leaning system</td><td>Leaning circuit hose</td></tr>
<tr><td>7</td><td>Others</td><td>Seat belt</td><td>Every 3 years from start of usage or 5 years after manufacturing of seat belt, whichever comes sooner.</td></tr>
</table>

CONSUMABLE PARTS

- Replace the consumable parts such as the filter element or air cleaner element at the time of periodic maintenance or before they reach the wear limit.
  Replace the consumable parts to keep correct operations of the machine.
  Komatsu recommends the use of Komatsu genuine parts for replacement parts.
- The part number can change because of quality improvement.
  Tell your Komatsu distributor the machine serial number to check the latest part number.

CONSUMABLE PARTS LIST

Parts in parentheses are to be replaced at the same time.

Item		Part number	Part name	Q'ty	Replacement interval
Engine oil filter		6736-51-5142	Cartridge	1	Every 500 hours
Fuel prefilter		600-319-3610	Cartridge	1	
Fuel main filter		600-319-3750	Cartridge	1	Every 1000 hours
Transmission oil filter		714-07-28713	Cartridge	1	
Hydraulic oil filter		423-60-45461	Element	1	
		(07000-15195)	(O-ring)	(1)	
Hydraulic tank breather		421-60-35170	Element	1	
Differential lock filter, strainer		195-15-75560	Element	1	
		(234-60-62230)	(O-ring)	(1)	
		23H-60-14690	Strainer	1	
Hydraulic oil pilot filter		20Y-62-51691	Element	1	
KCCV filter		600-331-2900	Element	1	Every 2000 hours
DEF filter		6540-71-2320	Filter kit	1	
DEF tank breather		421-60-35170	Element	1	
DEF tank filler port filter		56D-02-57690	Filter	1	Every 4500 hours
		(07000-G2075)	(O-ring)	(2)	
Air conditioner filter	Fresh air	17M-911-3530	Filter	1	Every 1 year
	Recirculation air	23B-07-74170	Filter	1	
Air cleaner		600-185-4100	Element assembly	1	-
3.7m blade t22 With side edge		23B-70-31310 or 232-70-12143	Edge	2	
		23B-70-31660 or 23B-70-31271	Side edge	2	
		(232-70-12550)	(Bolt)	(34)	
		(232-70-12480)	(Nut)	(34)	
		(01643-31645)	(Washer)	(34)	
		232-70-31340	End bit (option)	2	
		(232-70-12560)	(Bolt)	(10)	

Item	Part number	Part name	Q'ty	Replacement interval
4.3m blade t25 With side edge	23B-70-31460 or 232-70-12193	Edge	2	-
	23B-70-31660 or 23B-70-31271	Side edge	2	
	(232-70-12590)	(Bolt)	(38)	
	(232-70-12480)	(Nut)	(38)	
	(01643-31645)	(Washer)	(38)	
	232-70-31340	End bit (option)	2	
	(232-70-12490)	(Bolt)	(10)	
3.7m blade t19 Without side edge	232-70-12143	Edge	2	
	232-70-52190	End bit	2	
	(232-70-12450)	(Bolt)	(28)	
	(232-70-12460)	(Bolt)	(4)	
	(232-70-12480)	(Nut)	(32)	
	(01643-31645)	(Washer)	(32)	
4.3m blade t19 Without side edge	232-70-12143	Edge	2	
	232-70-52190	End bit	2	
	(232-70-12450)	(Bolt)	(32)	
	(232-70-12460)	(Bolt)	(4)	
	(232-70-12480)	(Nut)	(36)	
	(01643-31645)	(Washer)	(36)	
Blade	23B-70-31331	Guide bushing	6	
	23B-735-3320	Guide bushing	2	
Circle	23B-70-71920	Wear plate	6	
	23B-70-51560	Circle guide	6	
Scarifier	232-71-51320	Tooth	11	
Ripper	234-785-1121	Tooth	3	
	(113-78-21170)	(Pin)	(3)	
Front blade	233-971-5120	Edge	2	
	(232-70-12450)	(Bolt)	(14)	
	(232-70-12480)	(Nut)	(14)	
	(01643-31645)	(Washer)	(14)	

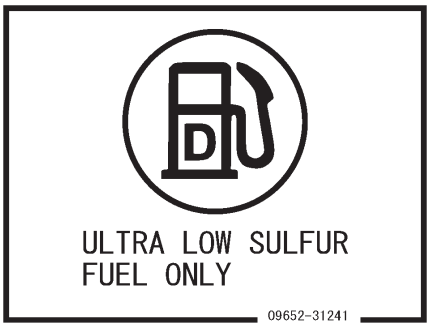
RECOMMENDED FUEL, COOLANT, AND LUBRICANT

NOTICE

- **Komatsu genuine oils are conditioned to keep the reliability and durability of Komatsu construction equipment and components.**
  Obey the instructions of the Operation and Maintenance Manual to use the machine correctly for a long period.
- **Failure to obey the instructions can result in decreased service life or too much wear of the engine, power train, cooling system, and/or other components.**
- **Locally available additive agent is not recommended to use.**
- **Komatsu recommends you to use Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it can decrease cleaning interval of KDPF filters. Deteriorated engine oil can lower the lubrication function. The machine can have decreased machine life, lower performance, or bad fuel consumption.**
- **Use correct fuels, oils, and lubricants for the ambient temperature.**
- **To operate the machine when the temperature is less than -20 °C {-4 °F}, auxiliary devices are necessary. Consult your Komatsu distributor.**

NOTICE

Be sure to use the ultra low-sulfur diesel fuel.



To get good fuel consumption characteristics and exhaust gas characteristics, an electronically controlled high-pressure fuel injection device and emission gas control system (KDPF) are used. The high-pressure fuel injection device requires high precision parts and good lubrication. The use of low viscosity fuel can decrease its durability. The use of fuel with high sulfur content can decrease the service life of the engine or KDPF, or cause the damage to the machine or degradation in performance.
Do not use additive agents that contain metal component.
The metal component in the additive agent will not be burned during the regeneration of the KDPF filter. The use of additive agents can cause an abnormality in the exhaust gas aftertreatment devices.

The ASTM D975 diesel fuel can contain 5 % or less of biofuel.

The EN590 diesel fuel can contain 7 % or less of biofuel.

NOTICE

When you use biofuel other than the preceding diesel fuel and its mixing ratio is up to 20 %, obey the precautions that follow.

- **It is necessary to consult with the local regulatory authorities of engine exhaust gas regulation whether the biofuel can be used or not.**
- **The fuel can possibly leak because of the deterioration of rubber material of the fuel hose. Replace it with the fuel hose applicable for biofuel. Consult your Komatsu distributor for replacement of the fuel hose.**
- **Biofuel cannot be stored for a long time because it is easy to deteriorate and change in quality. Use the fuel in the storage tank or the fuel tank of the machine within 6 months. If the deteriorated and altered biofuel is used, it can cause bad effects on the engine parts. When you store the machine which uses the diesel fuel mixed with the biofuel for more than 3 months, do the procedure that follows.**
  - **Replace it with pure diesel fuel or the new diesel fuel mixed with the biofuel at the lowest possible mixing ratio.**
  - **After you change the fuel, run the engine for a minimum of 30 minutes before you store the machine.**
- **Because the biofuel dissolves the materials stuck to the fuel tank and fuel line, the fuel filter can be clogged with them. When you change the diesel fuel to the biofuel, replace the fuel main filter cartridge and fuel prefilter cartridge with new ones. When you replace the fuel main filter cartridge and fuel prefilter cartridge, make the replacement interval half the normal time until the second replacement after you change the diesel fuel to the biofuel.**
- **Because the biofuel absorbs moisture easily, it can possibly cause a growth of microorganism. When the microorganism grows in the biofuel, it can cause corrosion of the fuel system and the clogging of the fuel filter. Drain the water from the fuel tank before you start the operation. When you complete the operation, fill the fuel tank to reduce the air layer.**
- **If the biofuel is used in the conditions of the specific operation, the fuel can possibly get mixed into the engine oil. The fuel level in the engine oil must not exceed 5 %. Deteriorated engine oil can cause unwanted effects on the engine parts such as a reduction of lubricating function. It is recommended to take a sample of the oil on a periodic basis.**
- **The characteristics of the biofuel change when outside air temperature is low. The fuel filter can be clogged and the fuel inside the fuel tank can solidify. Store the biofuel in the warm building or in the storage tank.**

NOTICE

Use the paraffin-based fuel which agrees with EN15940:2016 and ASTM D975.
As long as the fuel agrees with EN15940:2016 and ASTM D975, its mixing ratio can be up to 100 %.

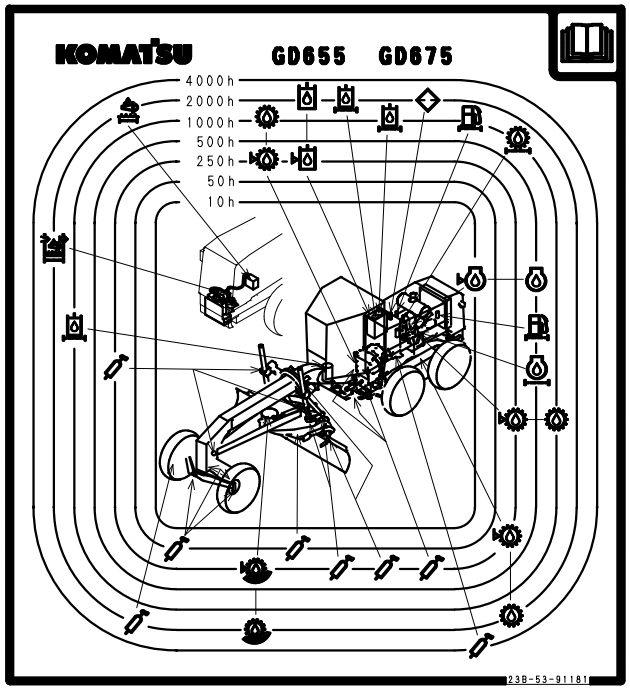
NOTICE

Use DEF as the aqueous urea solution for SCR system.
The DEF is a colorless transparent 32.5 % aqueous urea solution.
The quality of DEF is provided in ISO22241-1. Always use DEF that agrees with this quality standard.
In North America, use the DEF (Diesel Exhaust Fluid) which is certified by API (American Petroleum Institute). The certified DEF has the API DEF Certification Mark. Look for the mark when you purchase the DEF.

API Diesel Exhaust Fluid Certification Mark is the trade mark of API (American Petroleum Institute).

LUBRICATION CHART

- The lubrication chart uses the symbols to show the lubrication points and types of lubricant by each lubrication interval.
- Although the same symbol is used in the lubrication chart, the recommended genuine oil can be different by the lubrication points and the ambient temperature. Obey REPLACEMENT PARTS, .“USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)”.
- For details of lubrication, see CHECK AND MAINTENANCE, “MAINTENANCE SCHEDULE (4-14)”.



The symbols used in the lubrication chart are explained as follows.

Symbols	Meaning of symbols	Symbols	Meaning of symbols
	Read the Operation and Maintenance Manual.		Supply grease
	Change engine oil		Check oil level in engine oil pan
	Change hydraulic oil		Check hydraulic oil level
	Change power train oil		Check power train oil level
	Replace engine oil filter		Replace hydraulic oil filter

Symbols	Meaning of symbols	Symbols	Meaning of symbols
	Replace fuel filter		Replace DEF filter
	Replace DEF tank breather element		Replace power train oil filter
	Change oil in circle rotation gear case		Check oil level in circle rotation gear case
	Replace KCCV filter breather element		

USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

Reservoir	Fluid type	Recommended Komatsu Fluids	Ambient temperature °C {°F}	
			Min.	Max.
Engine oil pan	Engine oil for KDPF used in cold terrain (Oil change interval 250 hours) (Note 1)	EOS0W40-LA (KES)	-30 {-22}	40 {104}
	Engine oil for KDPF (Oil change interval 500 hours)	EO10W30-LA (KES)	-20 {-4}	40 {104}
		EO15W40-LA (KES)	-15 {5}	50 {122}
Transmission case	Power train oil	TO10 (KES)	-30 {-22}	50 {122}
Hydraulic system	Power train oil	TO10 (KES)	-20 {-4}	50 {122}
Final drive case	Power train oil	TO30 (KES)	-30 {-22}	50 {122}
Tandem drive case	Power train oil			
Circle reverse gear case	Gear oil	GO80W90 (KES)	-20 {-4}	50 {122}
Grease fitting Work equipment	Hyper grease (Note 2)	G2-TE (KES)	-20 {-4}	50 {122}
	Lithium EP grease	G2-LI (KES)	-20 {-4}	50 {122}
Cooling system	Non-amine engine coolant AF-NAC (Note 3)	AF-NAC (KES)	-30 {-22}	50 {122}
Fuel tank	Diesel fuel	ASTM D975 No.1-D S15	-30 {-22}	20 {68}
		ASTM D975 No.2-D S15	0 {32}	50 {122}
DEF tank	DEF (Note 4)	DEF	-30 {-22}	50 {122}

KES

Abbreviation for Komatsu Engineering Standard

ASTM

Abbreviation for American Society of Testing and Material

Reservoir	Specified capacity	Refill capacity
	ℓ {US gal}	ℓ {US gal}
Engine oil pan	26 {6.87}	23 {6.08}
Transmission case	60 {15.90}	45 {11.90}
Hydraulic system	141 {37.30}	69 {18.2}
Final drive case (each)	16 {4.23}	16 {4.23}
Tandem drive case (each)	57 {15.10}	57 {15.10}
Circle reverse gear case	7 {1.85}	7 {1.85}
Cooling system	32 {8.45}	30 {7.93}
Fuel tank	390 {103.00}	-
DEF tank	36 {9.51}	-

REMARK

Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.

Note 1: KDPF engine oil for cold district is deteriorated easily than that for normal area (replace every 500 hours), so replace oil and filter cartridge every 250 hours. To change the maintenance time of machine monitor, consult your Komatsu distributor to do the work.

Note 2: Hyper grease (G2-TE) has a high performance. When it is necessary to improve the lubricating ability of the grease to prevent squeak of pins and bushings, the use of G2-TE is recommended.

Note 3: Non-Amine Engine Coolant (AF-NAC)

1. The coolant has the important function to prevent corrosion in addition to prevent freezing.
   Even in the areas where freezing is not an issue, the use of coolant is essential.
   Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC). If you use other coolant, it can cause serious problems in the cooling system, including the engine.
   Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC). Non-Amine Engine Coolant (AF-NAC) has excellent anti-corrosion, antifreeze and cooling properties and can be used continuously for every 3 years or every 6000 hours whichever occurs first in the below listed conditions (If other coolant than Komatsu approved non-Amine (AF-NAC) is used for refill or top off, the change interval is every 2 years or every 4000 hours whichever occurs first).
   Conditions to meet every 2 years or 4000 hours to extended coolant life:
   - Must pass coolant test/analysis at 4000 hours, the test interval is a precautionary procedure intended to prevent cooling and engine system damage
   - All maintenance top offs and refills were done with Komatsu approved non-Amine (AF-NAC) coolant

   For more information (e.g. test method) on the Coolant test/Analysis, consult an authorized Komatsu Distributor.
   Non-Amine Engine Coolant (AF-NAC) is strongly recommended wherever available.
2. For the density of Non-Amine Engine Coolant (AF-NAC), see “Coolant density table”.
   Non-Amine Engine Coolant (AF-NAC) is supplied already diluted. In this case, fill up the tank with pre-diluted fluid. (Do not dilute the Non-Amine Engine Coolant with ordinary water.)

Coolant density table

Min. atmospheric temperature	°C {°F}	-10 {14} or more	-15 {5}	-20 {-4}	-25 {-13}	-30 {-22}	-35 {-31}	-40 {-40}	-45 {-49}	-50 {-58}
Density (%)		30	36	41	46	50	54	58	61	64

Note 4: The DEF freezes at -11 °C {12.2 °F}. If thawing is necessary, the DEF system is automatically heated to thaw DEF after the engine is started.

RECOMMENDED BRANDS AND QUALITIES OTHER THAN KOMATSU GENUINE OILS

For locally available oil other than Komatsu genuine oil, consult your Komatsu distributor.

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