

Operation & Maintenance Manual

WA380-8

WHEEL LOADER

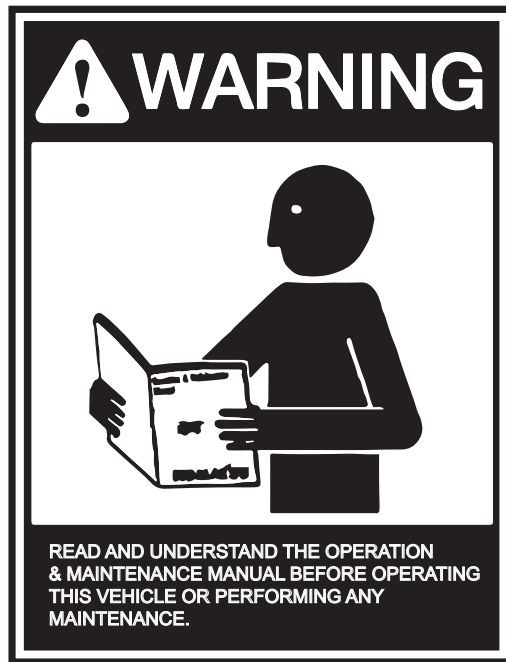
SERIAL NUMBERS WA380-8 A74001 and up

ENGINE 6D107E-3

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

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



WARNING

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

 **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 engine 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 to the State of California to cause cancer and birth defects or other reproductive harm.


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

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.

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READ THIS MANUAL

This manual gives details of the operation and methods of inspection and maintenance for this machine that must be observed in order to use the machine safely. Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines.

Read, understand and follow all precautions and warnings in this manual and on the machine before performing operation and maintenance. Failure to do so may result in serious injury or death.

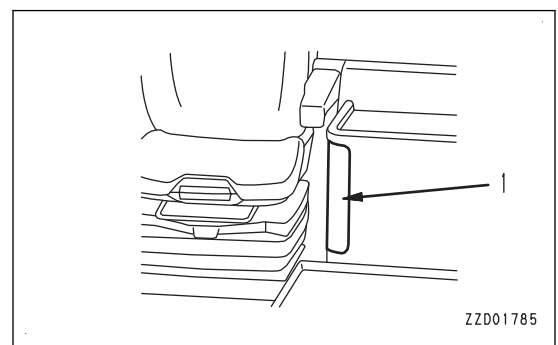
Komatsu cannot predict every circumstance that might involve a potential hazard when the machine is used. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions.

If you perform any operation, inspection, or maintenance under conditions that are not described in this manual, understand that it is your responsibility to take the necessary precautions to ensure safety. In no event should you or others engage in the prohibited uses or actions described in this manual. It is dangerous to perform improper operation and maintenance of the machine. It may cause serious injury or death.

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

Always keep this Operation and Maintenance Manual in the indicated location so that all relevant personnel can read it at any time.

Keep it in the storage door (1) beside the shoes box on the left side of the operator's seat.



If this manual is lost or damaged, contact Komatsu or your Komatsu distributor and tell them about the machine model name and the serial No. immediately to arrange for its replacement.

For details regarding the machine model name and the serial No., see the machine serial No. plate. In order to arrange the proper Operation and Maintenance Manual, you will need to provide the machine model name and the serial No.

This manual uses the International System of Units (SI) for units of measurement. For reference, units that have been used in the past are given in { }.

The explanations, values, and illustrations in this manual have been prepared based on the latest information available as of the date of its publication. Continuing improvements in the design of this machine may lead to additional changes that are not reflected in this manual. If there is any question or suggestion, consult your Komatsu distributor.

The numbers in the illustrations correspond to the numbers in () in the text. (Example: 1 → (1))


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


SAFETY INFORMATION


To enable you to use the machine safely, and to prevent personal injury to operators, service personnel or bystanders, the precautions and warnings included in this manual and the safety signs attached to the machine must always be observed.

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

The “Safety Alert Symbol” identifies important safety messages on machines, in manuals, and elsewhere. When you see this symbol, be alert to the risk of personal injury or death. Follow the instructions in the safety message.

 **DANGER** This signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING** This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION** This signal word indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

The following signal words are used to alert you to information that must be followed to avoid damage to the machine.

NOTICE If precautions described are not observed, the machine may be damaged or the service life may be reduced.

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

INTRODUCTION

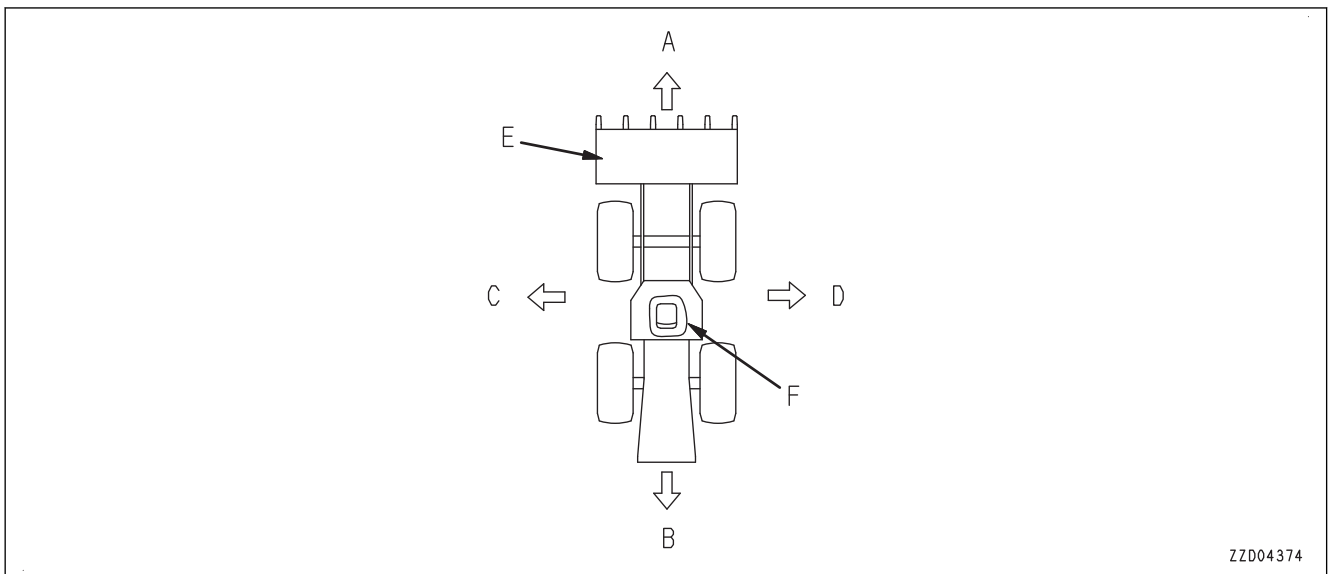
MAIN USE OF MACHINE

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

- Digging work
- Leveling work
- Dozing work
- Loading work

For details of the work procedure, see "RECOMMENDED APPLICATIONS".

DIRECTIONS OF MACHINE



(A) Front

(B) Rear

(C) Left

(D) Right

(E) Bucket

(F) Operator's seat

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

VISIBILITY FROM OPERATOR'S SEAT

This machine complies with the visibility standard (ISO5006).

This machine maintains a proximity visibility of a height of 1.5 m {4 ft 11 in} at a point 1 m {3 ft 3 in} away from the outside surface of the machine, and a visibility for a radius of 12 m {39 ft 4 in}.

Protective structures

This machine is equipped with a structure to protect the operator (ROPS) conforming to ISO3471.

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 captures soot in the exhaust gas to clean the exhaust gas. If soot is accumulated to a level in the filter, a purification step to burn the soot is done automatically to keep the filtering performance of KDPF high.
- Komatsu's 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 have 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 in 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 standards are based on ISO 22241-1. 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).



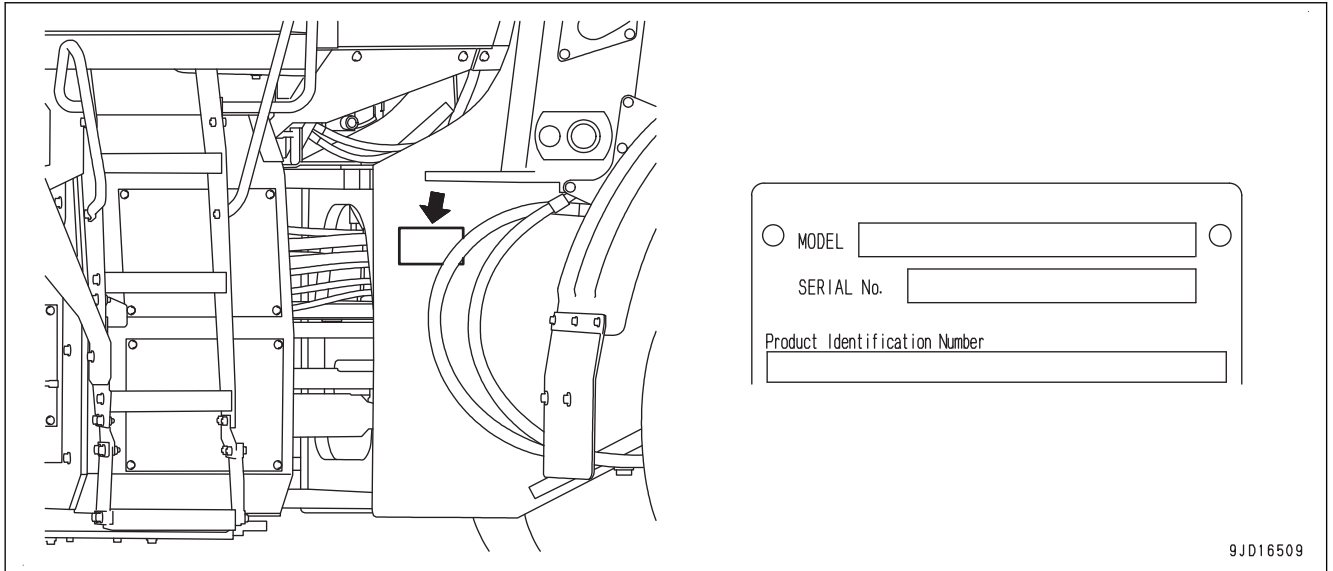
PRODUCT INFORMATION

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

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

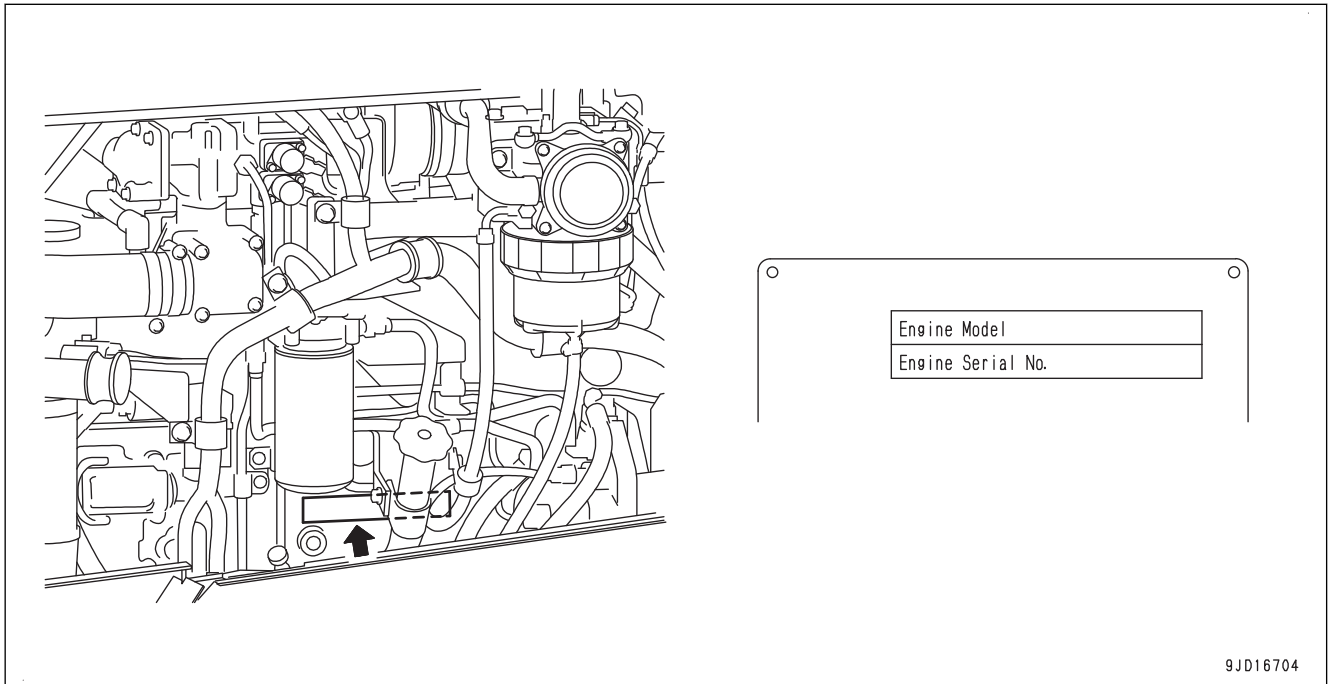
This is located at the center of the front frame on the right side of the machine.

The design of the nameplate differs according to the district.



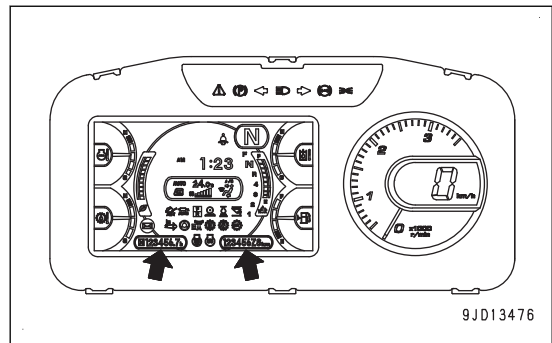
LOCATION OF ENGINE NUMBER PLATE

This is located at the right top of the engine rear part on the right side of the machine.



SERVICE METER LOCATION

It is at the center bottom of the machine monitor.



YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR

Machine serial No.	
Engine serial No.	
Product identification number (PIN)	
Distributor name	
Address	
Phone/Fax	
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
AJSS	Advanced Joystick Steering System	AJSS is a function that allows operators to drive the machine forward and reverse, operate steering, and shift the gear by use of the joystick. The right or left tilt of the joystick links the steering angle of the machine body.
API	American Petroleum Institute	API is the abbreviation for American Petroleum Institute.
BOC	Bolt-On Cutting edge	BOC is a cutting edge that is attached with bolts to the bucket.
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.
HST	HydroStatic Transmission	HST is a device that is composed of the hydraulic pump and motor, and that controls the forward and reverse travel of the machine and the shift of speed range without gears.
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.
KTCS	KOMATSU Traction Control System	KTCS is a function that prevents tire slip to keep the driving force.
PCS	Proportional Control Switch	PCS is a device that provides fine control of the work equipment.
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.

Abbreviation	Actual word spelled out	Explanation
SCR	Selective Catalytic Reduction	SCR is a device that purifies nitrogen oxides (NOx) in exhaust gas from the engine.

SAFETY

WARNING

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

SAFETY LABELS

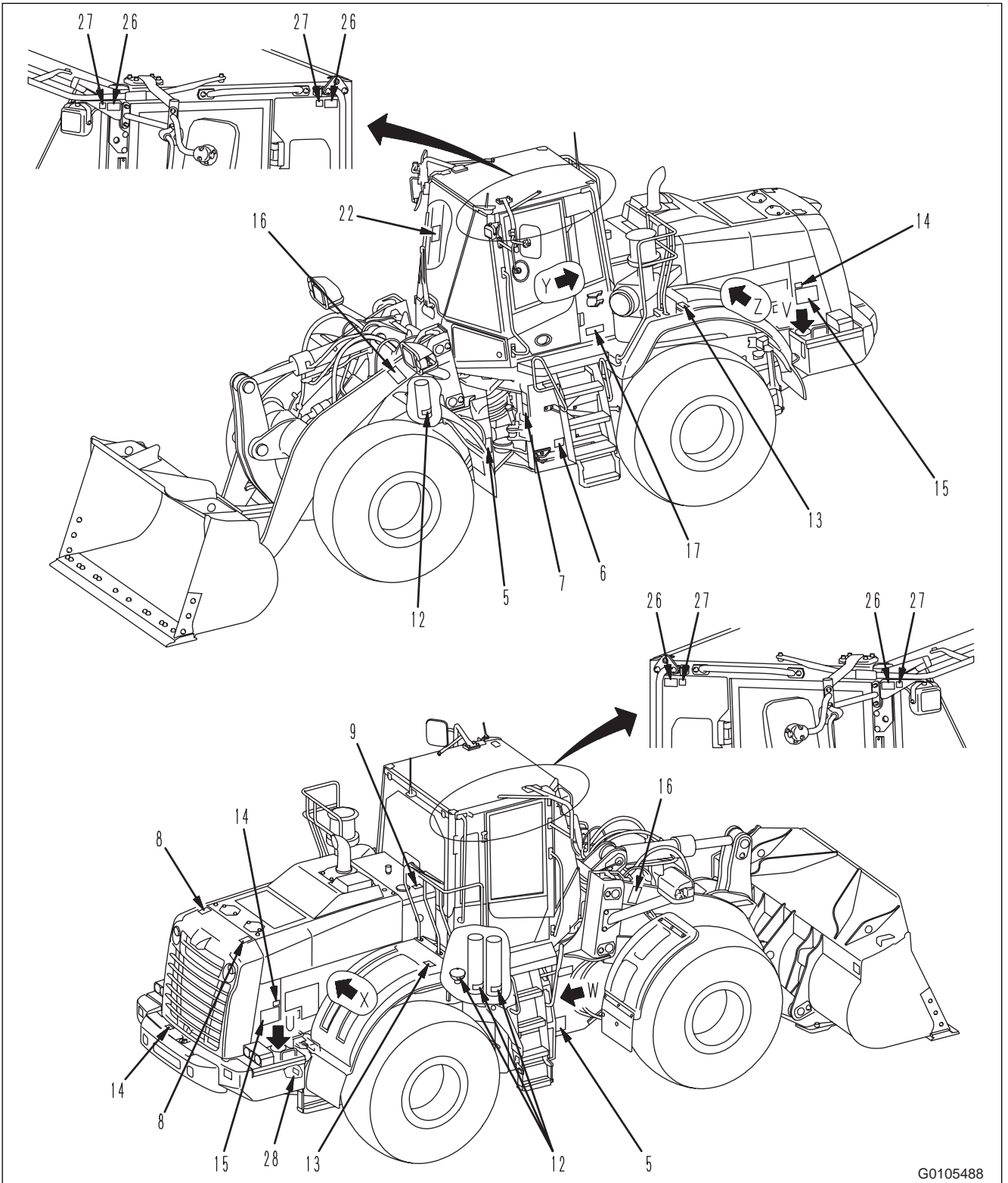
WARNING

Be sure that you fully understand the correct position, content and how to avoid a danger shown in the safety labels.

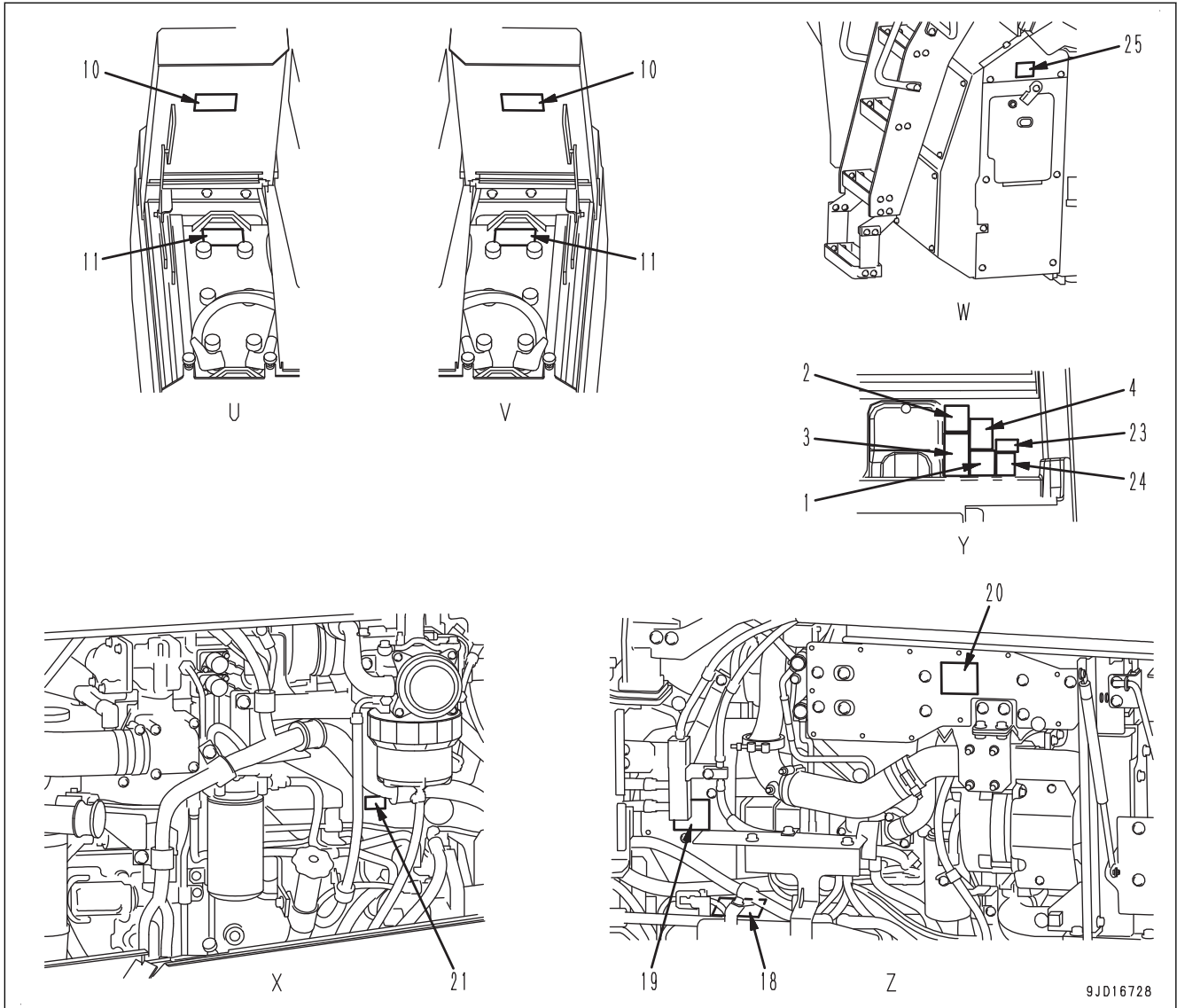
Handle the warning signs and safety labels used on this machine as follows.

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

LOCATION OF SAFETY LABELS



G0105488



- (1) Caution before operating
- (2) Caution when leaving operator's seat
- (3) Caution when traveling in reverse
- (4) Caution for electric cables
- (5) Prohibition of trespassing
- (6) Caution for frame lock bar
- (7) Caution for emergency release of parking brake
- (8) Caution for high-temperature coolant
- (9) Caution for high temperature oil and hydraulic oil
- (10) Caution for handling battery cable
- (11) Caution for handling battery
- (12) Caution for explosion
- (13) Prohibition of getting on or off fender
- (14) Caution while engine is running
- (15) Caution for nearing machine
- (16) Prohibition of entering beneath work equipment

- (17) Caution for modification of ROPS/FOPS
- (18) Prohibition of start by short-circuiting
- (19) Caution for high-temperature turbocharger
- (20) Caution for hot exhaust pipe
- (21) Caution for high-pressure common rail
- (22) Emergency escape
- (23) Caution for blast site
(Machines equipped with KOMTRAX)
- (24) Caution when traveling in reverse
(Machine with rearview camera)
- (25) Caution for handling DEF
- (26) Anchor point for tie-off
(Machine with anchor point for tie-off)
- (27) Prohibition of lifting operation
(Machine with anchor point for tie-off)
- (28) Notice for battery disconnect

CONTENTS OF SAFETY LABELS


Caution before operating

"09651-03001"

 WARNING
<p>Improper operation and maintenance can cause serious injury or death.</p> <p>Read manual and labels before operation and maintenance. Follow instructions and warnings in manual and in labels on machine.</p> <p>Keep manual in machine cab near operator. Contact Komatsu distributor for a replacement manual.</p> <p style="text-align: right;"><small>09651-03001</small></p>

Caution when leaving the operator's seat

"09654-83001"

 WARNING
<p>To avoid hitting unlocked equipment levers, lower attachment to ground and push equipment lock switch to LOCK position before standing up from operator's seat. Read Operatin and Maintenance Manual.</p> <p>Sudden and unwanted machine movement can cause serious injury or death.</p> <p style="text-align: right;"><small>09654-83001</small></p>

Caution when traveling in reverse

“09802-33000”

⚠ WARNING



To prevent SEVERE INJURY or DEATH, do the following before moving machine or its attachments:

- Honk horn to alert people nearby.
- Be sure no one is on or near machine.
- Use spotter if view is obstructed.


Follow above even if machine equipped with back-up alarm and mirrors.

09802-33000

Caution for electric cables

“09801-63002”

⚠ DANGER



Electrocution Hazard

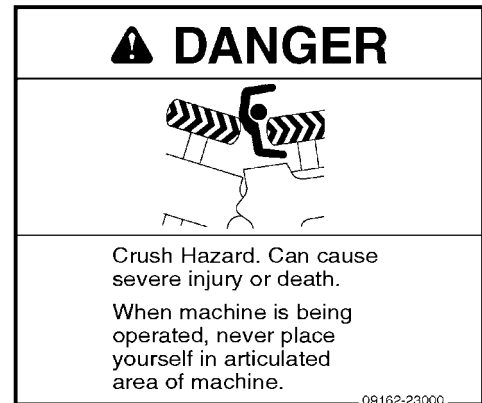
Serious injury or death will occur if machine or attachments are not kept away from electric lines. Maintain a minimum clearance in accordance with this chart.

VOLTAGE	MIN. DISTANCE
50 kV or Less	3.1 m (10 ft)
50 kV to 200 kV	4.6 m (15 ft)
200 kV to 350 kV	6.1 m (20 ft)
350 kV to 500 kV	7.7 m (25 ft)
500 kV to 750 kV	10.7 m (35 ft)
750 kV to 1,000 kV	13.8 m (45 ft)

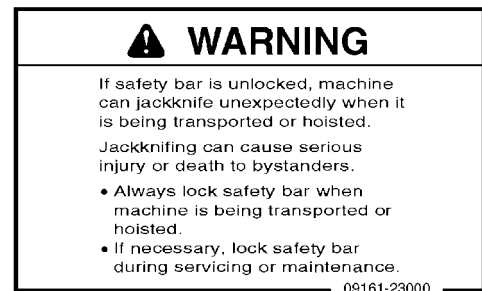
09801-63002

Prohibition of trespassing

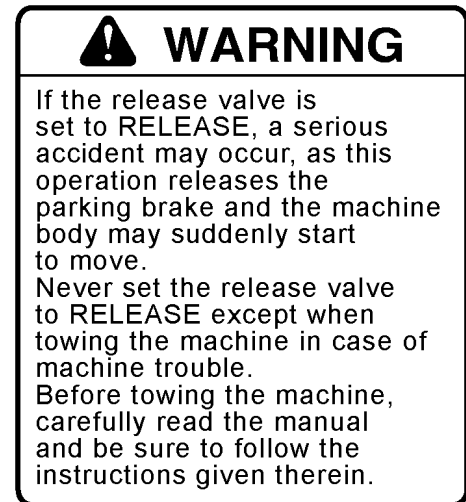
"09162-23000"

**Caution for frame lock bar**

"09161-23000"

**Caution for emergency release of parking brake**

"423-93-41311"

**Caution for high-temperature coolant**

"09668-03001"



Caution for high temperature oil and hydraulic oil

“09653-03001”

WARNING

Hot oil hazard.

To prevent hot oil from spurting out:

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

09653-03001

Caution for handling battery cable

“09808-03000”

WARNING

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

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

09808-03000

Caution for handling battery

“09664-30014”

DANGER

DANGER: Lead Acid Battery, Contains Lead, Sulfuric Acid and Lead Compounds.
WARNING: Risk of explosion, burn or fire. Do not disassemble.
High Voltage: Risk of shock, do not touch uninsulated terminals or connectors.

KEEP OUT OF REACH OF CHILDREN. KEEP VENT CAPS TIGHT AND LEVEL.
 Open flames or sparks could cause battery to explode. May form explosive air/gas mixture during charging. Store and use in well-ventilated area. Extremely flammable gas (hydrogen), Explosion, Fire, Blast or Projectile hazard. Do not handle or charge until all safety precautions/instructions have been read and understood. Wear protective gloves, protective clothing, eye protection and face protection when handling. If SWALLOWED, INHALED, or IN EYE: immediately call a POISON CENTER or consult doctor/physician. If on CLOTHES or SKIN: wash immediately with water.

Komatsu America Corp. 1701 Golf Rd. Rolling Meadows, IL 60008. (731) 635 6321
09664-30014

Caution for explosion

“09659-53000”

WARNING

Explosion hazard

- Keep away from flame
- Do not weld or drill

09659-53000

Prohibition of getting on or off fender

“09805-03000”

CAUTION

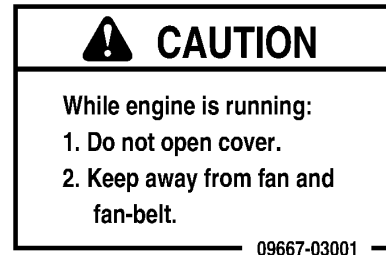
NEVER be on this fender.

09805-03000

2-8

Caution while engine is running

“09667-03001”



Caution for nearing machine

“09812-13000”



Prohibition of entering beneath work equipment

“09807-C0883”



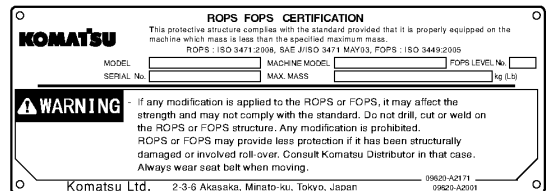
Sign indicates a crush hazard from falling off of working device.

Keep away when the working device is raised.

Caution for modification of ROPS/FOPS

“09620-A2001”

“09620-A2171”



Prohibition of start by short-circuiting

"09842-A0481"



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

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

Caution for high-temperature turbocharger

"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.

Caution for hot exhaust pipe

“09817-A0753”

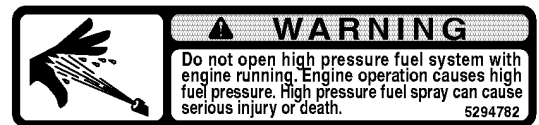


Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation.

Never touch when hot.

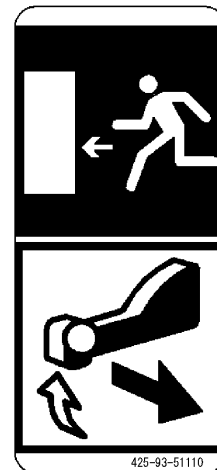
Caution for high-pressure common rail

“6754-71-1992”



Emergency escape

“425-93-51110”



Caution for blast site

(Machines equipped with KOMTRAX)


“09845-13000”

 WARNING
EXPLOSION HAZARD
Unintentional detonation may be caused by an active radio transmitter in blast zone.
To prevent SEVERE INJURY or DEATH, keep machine a safe distance away from a blast zone and a detonator or disconnect the wireless monitoring system in accordance with instructions in the Operation and Maintenance Manual.
09845-13000

Caution when traveling in reverse


(Machine with rearview camera)

“09833-33000”

 WARNING
When backing up, rear of machine is displayed on monitor. Before moving, look back and at mirror and monitor to confirm that no one is rear of machine. Failure to do so can result in serious injury or death.
09833-33000

Caution for handling DEF

“09632-31800”

 WARNING
DIESEL EXHAUST FLUID (DEF) ONLY
To avoid engine damage or fire, fill with Diesel Exhaust Fluid (DEF) only. Never use diesel fuel.
09632-31800

Anchor point for tie-off

"09850-00641"

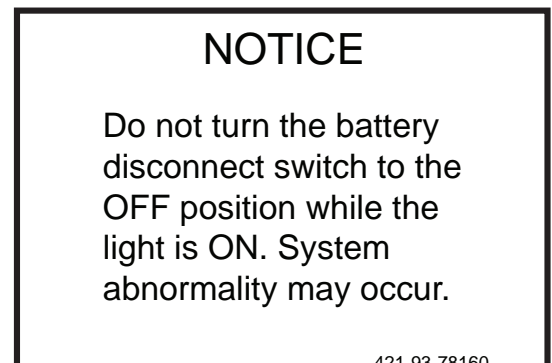
- Anchor point for safety strap

**Prohibition of lifting operation**

"09951-00281"

**Notice for battery disconnect**

"421-93-68160"



GENERAL PRECAUTIONS COMMON TO OPERATION AND MAINTENANCE

Mistakes in operation, inspection, or maintenance may result in serious personal injury or death. Before performing operation, inspection, or maintenance, always read this manual and the safety labels on the machine carefully and obey the warnings.

PRECAUTIONS BEFORE STARTING OPERATION

ENSURE SAFE OPERATION

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

UNDERSTAND THE MACHINE

Before operating the machine, read this manual thoroughly. If there is any place in this manual that you do not understand, ask the person in charge of safety for explanation.

PREPARATIONS FOR SAFE OPERATION

PRECAUTIONS FOR SAFETY-RELATED EQUIPMENT

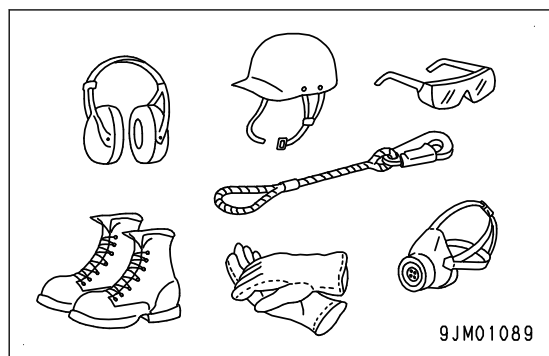
- Be sure that all guards, covers, cameras, and mirrors are in their proper position. Repair them immediately if they are damaged.
- Understand the using method of the safety related devices and use them properly.
- Never remove any safety related devices. Always keep them in good operating condition.

INSPECT MACHINE

Check the machine before starting operations. If any abnormality is found, do not operate the machine until repairs of the problem location have been completed.

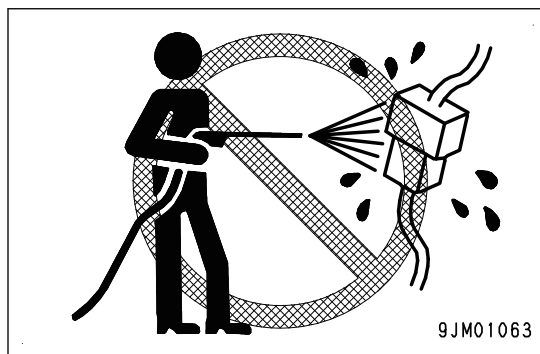
WEAR WELL-FITTING CLOTHES AND PROTECTIVE EQUIPMENT

- Do not wear loose clothes or any accessories. If any of these catch the control levers or protruding parts, it may cause the machine to move unexpectedly, it is extremely dangerous.
- Always wear a hard hat and safety shoes. Wear protective eyeglasses, mask, gloves, ear plugs, and safety belt as appropriate for the work function.
- Long hair hanging out from the hard hat is dangerous that it may get caught up in the machine. Tie the hair up and be careful not to be caught.
- Check that all personal protective items function properly before using them.



KEEP MACHINE CLEAN

- If you get on or off the machine or perform inspection and maintenance on the machine with mud or oil, you may slip and fall, and it is dangerous. Wipe off any mud or oil from the machine. Always keep the machine clean.
- If water gets into the electrical system, electric devices will cause malfunctions, and the machine will cause error. If the machine cause error, it may move unexpectedly and cause serious personal injury or death. When washing the machine with water or steam, do not allow the water or steam to come into direct contact with electrical components.
- If high-pressure water is sprayed directly onto camera, it may cause failure. Do not allow the high-pressure water to get into camera directly. When cleaning the camera, wipe off any dirt with soft cloth.
- When cleaning camera, if you stand on an unstable place, or take an unstable posture, you may fall and be injured. Put proper stepladder or step on the level and firm ground, and clean the camera in secure posture.



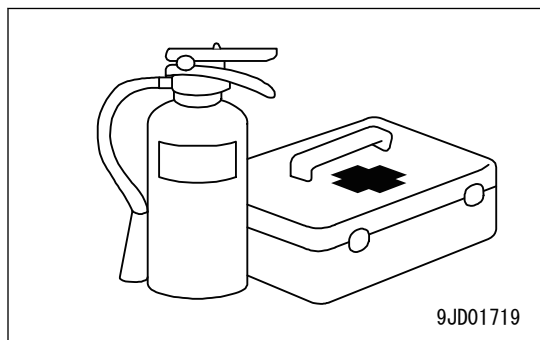
PRECAUTIONS FOR INSIDE OPERATOR'S COMPARTMENT

- When entering the operator's compartment, always remove all mud and oil from the soles of your shoes. If you operate the pedal with mud or oil affixed to your shoes, your foot may slip and this may cause a serious accident.
- Do not leave tools or machine parts lying around inside the operator's compartment. If tools or parts get into the control devices, it may obstruct operation and cause the machine to move unexpectedly, resulting in serious personal injury or death.
- Do not stick suction pads to the window glass. Suction pads act as a lens and may cause fire.
- Do not use a cellular phone when driving or operating the machine. This may lead to mistakes in operation, and may cause serious personal injury or death.
- Never bring any dangerous objects such as flammable or explosive items into the operator's compartment.

PROVIDE FIRE EXTINGUISHER AND FIRST AID KIT

Observe the following precautions to prepare for action if any serious personal injury or death or fire should occur.

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



IF ANY PROBLEM IS FOUND

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

PRECAUTIONS TO PREVENT FIRE

ACTIONS IF FIRE OCCURS

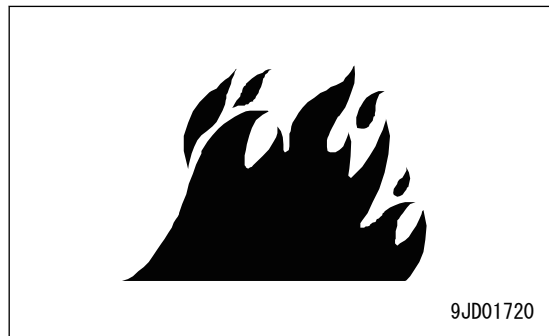
- Turn the starting switch to OFF position, and stop the engine.
- Use the handrails and steps to escape from the machine.
- Do not jump off the machine. There is the danger of falling and it may cause personal injury.
- The fume generated by a fire contains harmful materials which have a bad influence on your body when they are inhaled.
Do not breathe the fumes.
- After a fire, harmful compounds may be left. If it touches your skin, it may have a bad influence on your body.
Be sure to wear rubber gloves when handle the materials left after the fire.
The material of the gloves, which is recommended is polychloroprene (Neoprene) or polyvinyl chloride (in the lower temperature environment).
When wearing cotton work gloves, wear rubber gloves under them.

PREVENT FIRE

Fire caused by fuel, oil, coolant, or window washer fluid

Do not bring any open flame close to flammable substances such as fuel, oil, coolant, or window washer fluid. There is a danger that they may catch fire. Always observe the following.

- Do not smoke or use any open flame near fuel or other flammable substances.
- Shut down the engine before adding fuel.
- Do not leave the machine when adding fuel or oil.
- Tighten all the fuel and oil caps securely.
- Be careful not to spill fuel on overheated surfaces or on parts of the electrical system.
- After adding fuel or oil, wipe up any spilled fuel or oil.
- Put greasy rags and other combustible materials into a safe container to maintain safety at the workplace.
- When washing parts with oil, use a non-flammable oil. Do not use diesel fuel or gasoline. There is danger that they may catch fire.
- Do not weld or use a cutting torch to cut any pipes or tubes that contain combustible liquids.
- Determine well-ventilated areas for storing oil and fuel.
Keep the oil and fuel in the specified place and do not allow unauthorized persons to enter.
- When performing grinding or welding work on the machine, move any flammable materials to a safe place before starting.



Fire caused by accumulation of combustible material

- Remove any dry leaves, chips, pieces of paper, coal dust, or any other combustible materials accumulated or affixed around the engine exhaust manifold, muffler, or battery, or inside the undercovers.
- To prevent fires from spreading sparks or burning particles from other fires, remove any combustible materials such as dry leaves, chips, pieces of paper, coal dust, or any other combustible materials accumulated around the cooling system (radiator, oil cooler) or inside the undercover.

Fire coming from electric wiring

Short circuits in the electrical system can cause fire. Always observe the following.

- Keep all the electric wiring connections clean and securely tightened.
- Check the wiring every day for looseness or damage. Reconnect any loose connectors or refasten wiring clamps. Repair or replace any damaged wiring.

Fire caused from piping

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

If they are loose, they may vibrate during operation and rub against other parts. There is danger that this may lead to damage to the hoses and cause high-pressure oil to spurt out, leading to fire and serious personal injury.

Fire around the machine due to highly heated exhaust gas

This machine is equipped with Komatsu Diesel Particulate Filter (hereafter KDPF).

KDPF is a device to purify the soot in the exhaust gas. Exhaust gas temperature may increase during the purification process (regeneration). Do not bring any combustible material close to the outlet of the exhaust pipe.

When there are thatched houses, dry leaves or pieces of paper near the job site, set the system to the regeneration disable to prevent fire hazards due to highly heated exhaust gas during the aftertreatment devices regeneration. For setting, see "HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)".

Explosion caused by lighting equipment

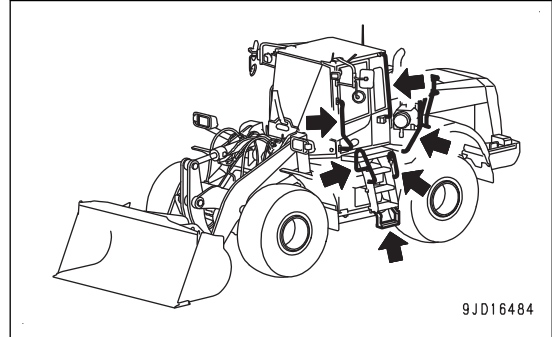
- When checking fuel, oil, battery electrolyte, or coolant, always use lighting with anti-explosion specifications.
- When taking the electrical power for the lighting equipment from the machine, see "POWER SUPPLY OUTLET (3-132)".

PRECAUTIONS WHEN GETTING ON OR OFF MACHINE

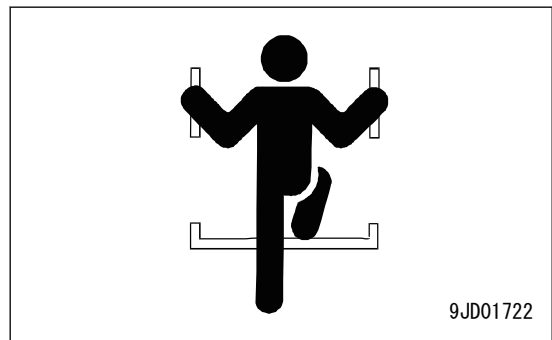
USE HANDRAILS AND STEPS WHEN GETTING ON OR OFF MACHINE

To prevent personal injury caused by slipping or falling off the machine, always observe the following.

- Use the handrails and steps marked by arrows in the figure When getting on and off the machine.



- Always face the machine and maintain at least three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps to ensure that you support yourself.



- Before getting on and off the machine, check the handrails and steps if there is any oil, grease, or mud on them. Wipe it off immediately not to slip if any. In addition, tighten any loose bolt of the handrails and steps. If the handrails and steps are damaged or deformed, they need to be repaired immediately. Ask your Komatsu distributor to perform this work.
- Do not grip the control levers when getting on or off the machine. When getting on or off the machine, take care that your body or clothes do not touch the control levers.
- Never climb on the engine hood or covers where there are no non-slip pads.
- Do not try to get on a tire from the step in the rear side of the machine or the step beside the cab.
- Do not get on or off the machine with tools in your hand.

NO JUMPING ON OR OFF MACHINE

Getting on or off the moving machine can cause serious personal injury or death. Always observe the following.

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

NO PEOPLE ON ATTACHMENTS

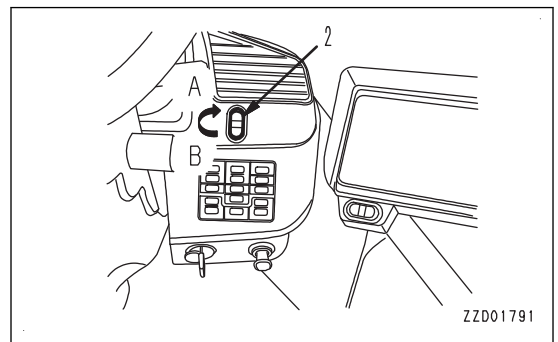
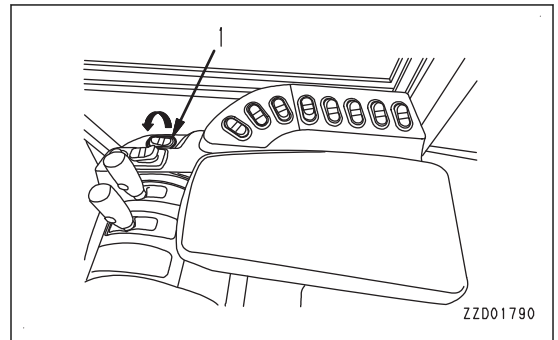
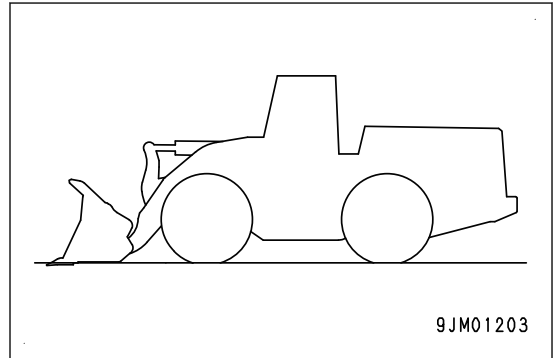
Never let anyone ride on the work equipment or other attachments. There is a hazard of falling and suffering serious personal injury or death.

PRECAUTIONS WHEN STANDING UP FROM OPERATOR'S SEAT

Before standing up from operator's seat to adjust it, be sure to lower the work equipment to the ground.

Press the work equipment lock switch (1) to lock the work equipment (the pilot lamp lights up). Move the parking brake switch (2) to ON (actuate) position (A) with brake pedal depressed, check that the machine is stopped completely, and stop the engine.

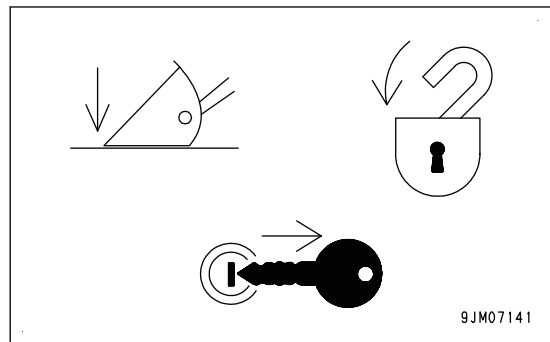
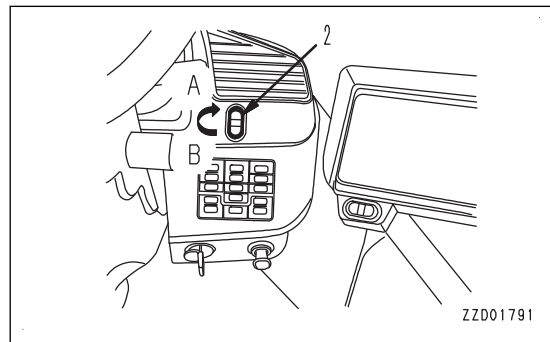
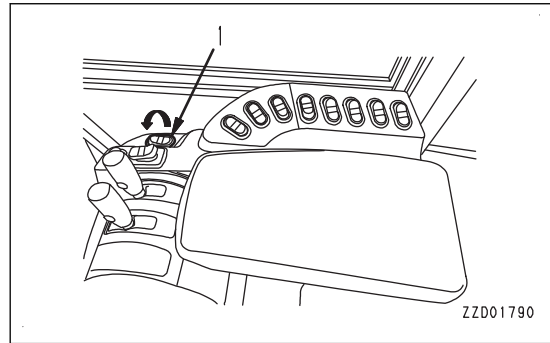
If the control levers are touched by mistake, there is danger that the machine may suddenly move and cause serious personal injury or death.



PRECAUTIONS WHEN LEAVING MACHINE

If the proper procedures are not taken when parking the machine, the machine may suddenly move off by itself, and this may lead to serious personal injury or death. Always observe the following.

- Before leaving the machine, set the machine to the straight travel condition, then be sure to lower the work equipment to the ground. Press the work equipment lock switch (1) to lock the work equipment (the pilot lamp lights up). Move the parking brake switch (2) to ON (actuate) position (A) with brake pedal depressed, check that the machine is stopped completely, and stop the engine.
- If the operator's seat is positioned forward, your body or clothes will easily touch the levers. Shift it backward to keep enough space, and then get off the machine.
- Lock all the places and always take the key with you and keep it in the specified place.



EMERGENCY EXIT FROM OPERATOR'S CAB

Machines equipped with a cab have a door on the left side and a door for an alternate exit on the right side. If the door on the left side does not open, use the right side alternate exit door.

PRECAUTIONS FOR CLEANING CAB GLASS

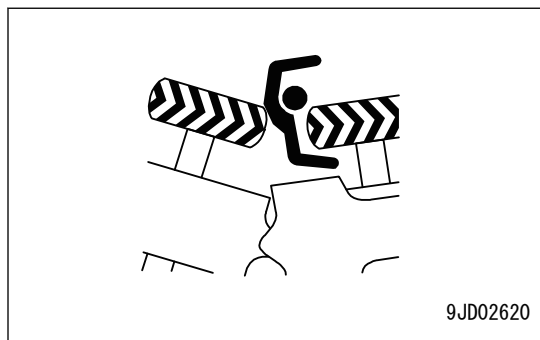
Clean the cab glass to keep visibility during operation.

Make sure to clean the glass with a mop from the ground.

For details of the cleaning procedure, see “”.

DO NOT GET CAUGHT

- If the clearance at the articulating portion changes and you get caught in it, you will suffer serious personal injury or death. Do not allow anyone to come inside the articulation range.
- The clearance in the area around the work equipment changes according to the movement of the link. If you are caught, this may lead to serious personal injury or death. Do not allow anyone near any of the rotating or telescopic parts.



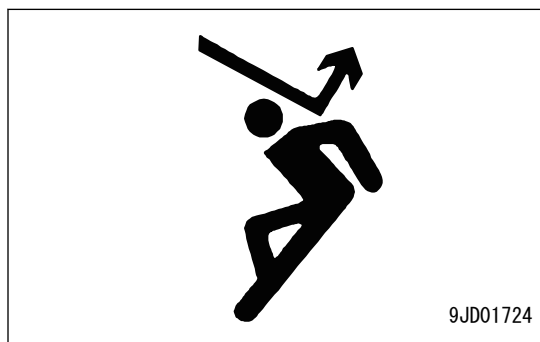
PRECAUTIONS RELATED TO PROTECTIVE STRUCTURES

The operator's compartment is equipped with a structure (such as ROPS, FOPS) to protect the operator by absorbing the impact energy.

As for the machine equipped with ROPS, if the machine weight (mass) exceeds the certified value (shown on ROLL-OVER PROTECTIVE STRUCTURE (ROPS) CERTIFICATION plate), ROPS will not be able to fulfill its function. Do not increase machine weight beyond the certified value by modifying the machine or by installing attachments to the machine.

Also, if the function of the protective equipment is impeded, the protective equipment will not be able to protect the operator, and the operator may suffer injury. Always observe the following.

- If the machine is equipped with a protective structure, do not remove the protective structure and perform operations without it.
- If the protective structure is welded, or holes are drilled in it, or it is modified in any other way, its strength may drop. Any modification is prohibited.
- If the protective structure is damaged or deformed by falling objects or by rolling over, its strength will be reduced and it will not be able to fulfill its function properly. In such cases, always consult your Komatsu distributor.
- Even if the protective structure is installed, always fasten your seat belt properly when operating the machine. If you do not fasten your seatbelt properly, it cannot display its effect. Always fasten your seat belt while operating the machine.



UNAUTHORIZED MODIFICATION

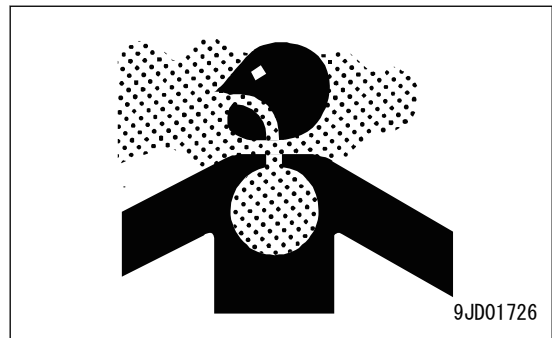
- Komatsu will not be responsible for any personal injuries, product failures, physical loss or damage, or influence on the environment resulting from modifications made without authorization from Komatsu.
- Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor.

PRECAUTIONS RELATED TO ATTACHMENTS AND OPTIONS

- Any personal injuries, product failures, physical loss or damage, or influence on the environment resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.
- When installing optional parts or attachments, contact your Komatsu distributor for advice to any potential problems or safety and legal requirements.
- When installing and using optional attachments, always read the instruction manual for the attachment, and the general information related to attachments in this manual.

PRECAUTIONS WHEN RUNNING ENGINE INSIDE BUILDING

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



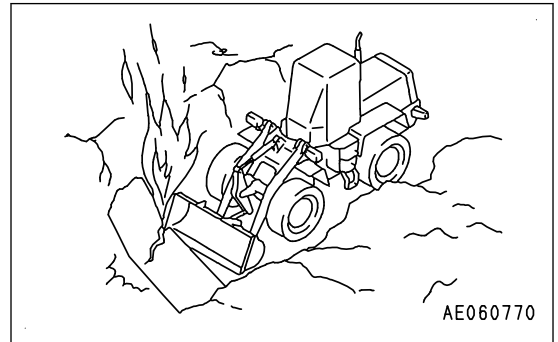
PRECAUTIONS FOR OPERATION

PRECAUTIONS FOR JOBSITE

INVESTIGATE AND CONFIRM JOBSITE CONDITIONS

On the jobsite, there are various hidden dangers that may lead to serious personal injury or death. Before starting operations, always check the following to confirm that there is no danger on the jobsite.

- Always be careful when performing operations near materials such as thatched roofs, dry leaves or dry grass, because they are easily combustible and may cause fire.
- Check the terrain and condition of the ground at the jobsite, and determine the safest method of operation. Do not operate in a dangerous area where landslides or rockfall may occur.
- If water lines, gas lines, or high-voltage electrical lines may be buried under the jobsite, contact the management company to identify their locations, and be careful not to damage any of these lines.
- Take necessary measures to prohibit other personnel from coming close to the machine during operation.
- In particular, if you need to operate on a road, protect pedestrian and cars by designating a person for jobsite traffic duty or by installing fences around the jobsite.
- When traveling or operating in shallow water or on soft ground, check the water depth, speed of the current, condition of bedrock, and shape of the ground beforehand. Always avoid any place that will obstruct travel.
- Maintain the travel path on the jobsite so that there is no obstruction to travel operations.



PRECAUTIONS WHEN WORKING ON LOOSE GROUND

- Avoid driving or operating the machine near the edge of cliffs, road edges, and deep ditches. The ground may be weak in such areas. If the ground should collapse under the weight or vibration of the machine, there is a hazard that the machine may fall or tip over. Remember that the soil is weak in these areas, after heavy rain or blasting or after earthquakes.
- When working on embankments or near excavated ditches, there is a hazard that the weight and vibration of the machine will cause the soil to collapse. Before starting operations, take steps to ensure that the ground is safe and to prevent the machine from rolling over or falling.

DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES

Do not travel or operate the machine near electric cables. There is a hazard of electric shock, which may cause serious personal injury or death. On jobsites where the machine may go close to electric cables, always observe the following.

- Before starting work near electric cables, inform the local power company of the work to be performed, and ask them to take the necessary action.
- Even going close to high-voltage cables can cause electric shock. Always maintain a safe distance (see the table) between the machine and the electric cable. Check with the local power company about the voltage of cables and safe operating procedure before starting operations.

VOLTAGE	MIN. DISTANCE
50 kV or Less	3.1 m {10 ft}
50 kV to 200 kV	4.6 m {15 ft}
200 kV to 350 kV	6.1 m {20 ft}
350 kV to 500 kV	7.7 m {25 ft}
500 kV to 750 kV	10.7 m {35 ft}
750 kV to 1000 kV	13.8 m {45 ft}



- To prepare for any possible emergencies, wear rubber shoes and gloves. Lay a rubber sheet on the operator's seat, and be careful not to touch the chassis with any exposed part of your body.
- Use a signalman to give warning if the machine approaches too close to the electric cables.
- When performing operations near high voltage cables, prohibit anyone other than related persons to come close to the machine during operation.
- If the machine should come too close or touch the electric cable, to prevent electric shock, the operator should not leave the operator's compartment until it has been confirmed that the electricity has been shut off. Also, prohibit any other persons to come close to the machine.

ENSURE GOOD VISIBILITY

Although this machine is equipped with mirrors and cameras to ensure good visibility, there are places that cannot be seen from the operator's seat. Be careful when performing operation.

When traveling or performing operations in places with poor visibility, it is dangerous and may cause serious personal injury or death because it is difficult to check for obstacles and condition of the jobsite. When traveling or performing operations in places with poor visibility, always observe the following.

- Allocate a signalman for jobsite duty if there are areas where the visibility is poor.
- Only one signalman should give signals.
- When working in dark places, turn on the working lamp and headlamps installed to the machine, and set up additional lighting equipment in the work area if necessary.
- Stop operations if the visibility is poor because of mist, snow, rain, or dust.
- When checking the mirrors installed to the machine, remove all dirt and adjust the angle of the mirror before starting the work to ensure good visibility.
- When cleaning the camera, wipe off any dirt with soft cloth. Make sure that a clear view is displayed on the monitor.
When cleaning camera, if you stand on an unstable place, or take an unstable posture, you may fall and be injured. Put proper stepladder or step on the level and firm ground, and clean the camera in secure posture.
- The rear view monitor is provided to secure the rear side visibility. If, however, an obstacle is detected on the monitor, you must confirm it with your eyes.

CHECK SIGNS AND SIGNALMAN'S SIGNALS

If signals and labels are not clear, serious personal injury can result from downward slip, overturn or accidental contact with nearby people or obstacles. Always observe the following.

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

BEWARE OF ASBESTOS DUST

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

- Spray water to keep down the dust.
- Do not use compressed air.
- If there is danger that there may be asbestos dust in the air, always operate the machine from an upwind position, and make sure that all workers operate on the upwind side.
- All workers should use anti-dust masks.
- Prohibit other personnel from coming close to the machine during operation.
- Always observe the regulations for jobsite and environmental standards.

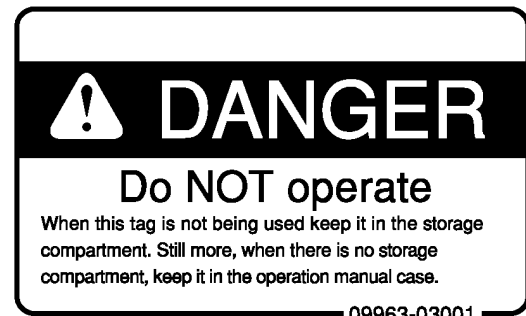
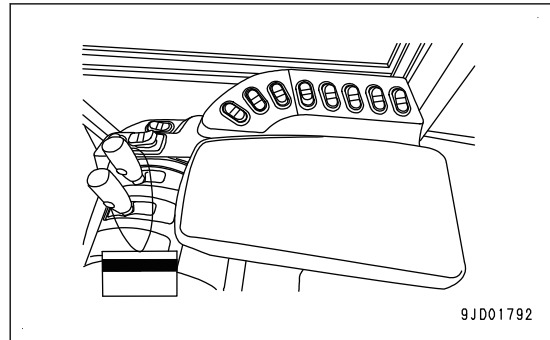


This machine does not contain asbestos, but any part which is not the genuine part, it has risk of containing asbestos. Always use Komatsu genuine parts.

START ENGINE

USE WARNING TAGS

If there is a “DANGER! Do NOT operate!” warning tag displayed, it means that someone is performing inspection and maintenance of the machine. If the warning tag is ignored and the machine is operated, the person performing inspection or maintenance may be caught in the rotating parts or moving parts. It is dangerous and may cause serious personal injury or death. Do not start the engine or touch the levers.

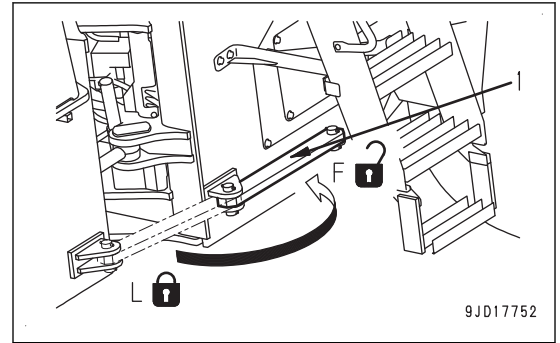


CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE

Perform the following checks before starting the engine at the beginning of the day's work to ensure that there is no problem with the operation of the machine. If these checks are not performed properly, problems may occur with the operation of the machine, and there is a danger which may lead to serious personal injury or death.

- Remove all dirt from the surface of the window glass to ensure a good view.
- Perform the walk-around check securely according to “”.
- Remove all dirt from the surface of the lens of the headlamps, working lamps, and combination lamps, and check that they light up correctly.
- Check the coolant level, fuel level, DEF level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Check that there is no mud or dust accumulated around the movable parts of the accelerator pedal or brake pedal, and check that the pedals work properly.
- Adjust the operator's seat to a position for easier operation. Check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the mirror, and check that the control levers are all at NEUTRAL position.
- Adjust the mirrors to have a good rear view from the operator's seat. For the adjustment, see “METHOD FOR ADJUSTING MIRRORS (3-191)”.
- Check that there are no persons or obstacles above, below, or in the area around the machine.
- Check that the parking brake switch is at ON (operation) position.

- Check that frame lock bar (1) is fixed securely at FREE position (F).
- Adjust the angle of each camera so that the surrounding area can be seen clearly from the operator's seat. For details of the adjustment, see "METHOD FOR ADJUSTING REAR VIEW CAMERA ANGLE (3-193)".
- If snowfalls adhered to a camera, eliminate them with securing your safety by using a stepladder.



PRECAUTIONS WHEN STARTING ENGINE

The machine may suddenly move off and this may lead to serious personal injury or death. Always observe the following.

- Start the engine only while sitting down in the operator's seat.
- When starting the engine, sound the horn as a warning.
- Prohibit other personnel to get on the machine.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. This may cause fire, serious personal injury or death.
- Check that the backup alarm (alarm buzzer when machine travels in reverse) works properly.

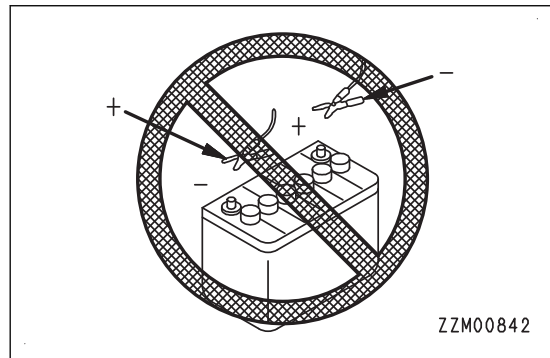
IN COLD WEATHER

- If the warm-up operation is not performed thoroughly, and the work equipment is operated, the reaction of the work equipment to the operation of the control levers and pedals will be slow and the movement of it may not be what the operator intended. Be sure to perform the warm-up operation. Particularly in a cold weather, be sure the warming-up operation is completed.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery and cause the battery to explode. Before charging or starting the engine with a different power source, melt the battery electrolyte and check that there is no leakage of electrolyte before starting.

START ENGINE WITH JUMPER CABLES

If any mistake is made in the method of connecting the jumper cables, it may cause the battery to explode, so always observe the following.

- Always wear protective eyeglasses and rubber gloves when starting the engine by using the jumper cables.
- When connecting a normal machine to a failed machine with the jumper cables, always use the normal machine with the same battery voltage as the failed machine.
- When starting the engine with the jumper cables, perform the starting operation with 2 workers (one worker sitting in the operator's seat and the other working with the battery).
- When starting from another machine, be careful that the normal machine does not contact with the failed machine.
- When connecting the jumper cables, turn the starting switch to OFF position for both the failed machine and the normal machine. If the failed machine has a battery disconnect switch, turn it to OFF position, and turn it ON again after connecting the cables. For details of operation of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-139)". It is dangerous that the machine may move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the jumper cables. Disconnect the negative (-) cable (ground side) first when removing them.
- When disconnecting the jumper cables, take care not to bring the clips in contact with each other or with the machine.
- For the starting procedure with the jumper cables, see OPERATION, "START ENGINE WITH JUMPER CABLES (3-281)".



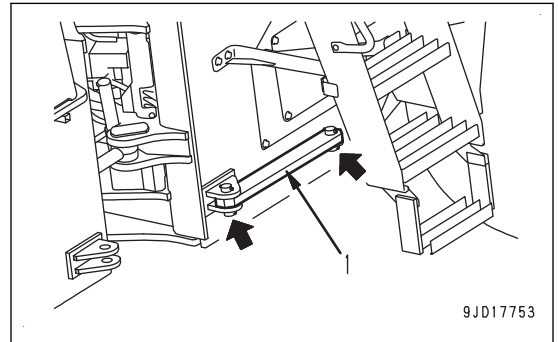
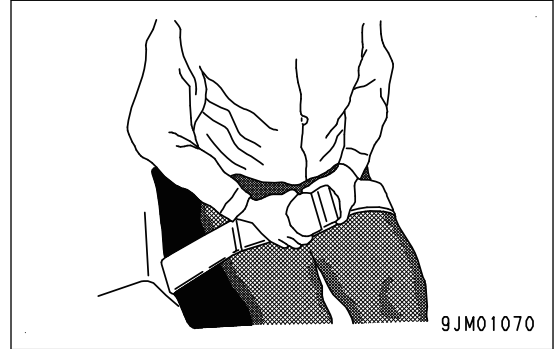
PRECAUTIONS FOR OPERATION

CHECKS BEFORE OPERATION

If the checks before starting are not performed properly, the machine will be unable to display its full performance. It is dangerous and may cause serious personal injury or death.

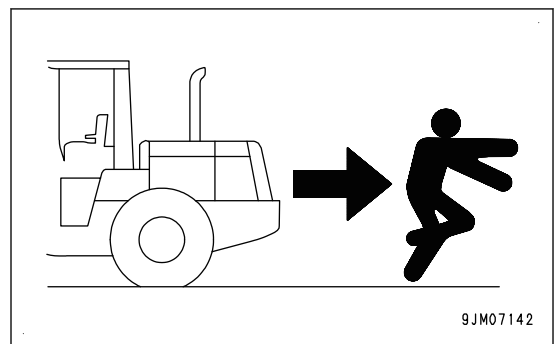
When performing the checks, move the machine to a wide area with no obstructions, and pay careful attention to the surroundings. Prohibit anyone other than the operator from coming close to the machine during operation.

- Fasten the seatbelt. When the brakes are applied suddenly, the operator may be thrown out of the operator's seat. It is dangerous and may cause personal injury.
- Check the operating condition of the machine, work equipment, and travel and brake systems.
- Check for any problem in the sound, vibration, heat and smell of the machine, or abnormalities of instruments. Also check that there is no leakage of oil or fuel.
- If any problem is found, repair it immediately.
- Before starting to travel or operations, check that frame lock bar (1) is fixed securely at FREE position.



PRECAUTIONS WHEN TRAVELING IN FORWARD OR REVERSE

- Always lock all the doors and windows of the operator's compartment in position regardless of whether it is open or closed.
- Prohibit other personnel to get on the machine.
- If there are any persons in the area around the machine, there is danger that they may be hit or caught by the machine, and this may lead to serious personal injury or death. Always observe the following before traveling.
 - Always operate the machine only when seated on the operator's seat.
 - Before starting to move, check again that there is no people or obstacle in the surrounding area.
 - Before moving, sound the horn to warn people in the surrounding area.
 - Check that the backup alarm (alarm buzzer when machine travels in reverse) works properly.
 - If there is an area in the rear of the machine which cannot be seen, allocate a conductor.



Always be sure to perform the above precautions even when the machine is equipped with mirrors and cameras.

When traveling downhill through inertia, set the direction of the directional lever or directional selector switch (if equipped) to the position that matches the machine traveling direction. If the directional lever or directional selector switch (if equipped) is set to the direction opposite to that of the machine travel, engine stall can result and it is very dangerous.

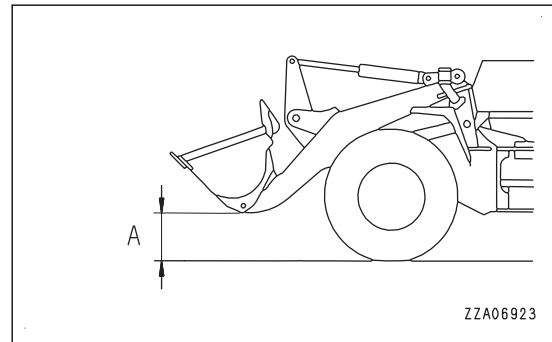
PRECAUTIONS WHEN TRAVELING

Serious personal injury or death can result from tipping over of the traveling machine or its accidental contact. Always observe the following.

- Never turn the key in the starting switch to OFF position when the machine is traveling. If the engine stops when the machine is traveling, the steering wheel becomes heavy to operate, and this will cause a wrong operation of the steering wheel and may lead to serious personal injury or death. If the engine stops, depress the brake pedal immediately to stop the machine.
- When driving the machine or performing operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When traveling on a level ground, keep the work equipment at height (A) of approximately 40 to 50 cm {16 to 20 in} above the ground. If that height is not maintained between the work equipment and the ground, the work equipment may get stuck in the ground and the machine may tip over.

When you are forced to operate the work equipment control lever, do it after stopping the travel once.

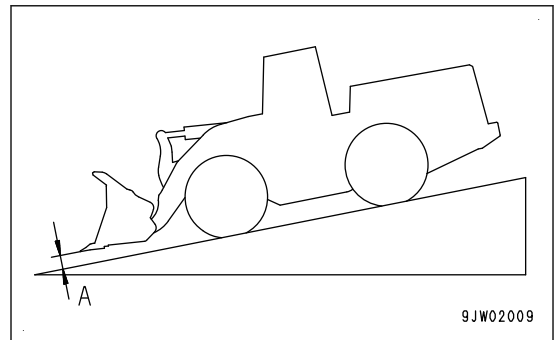
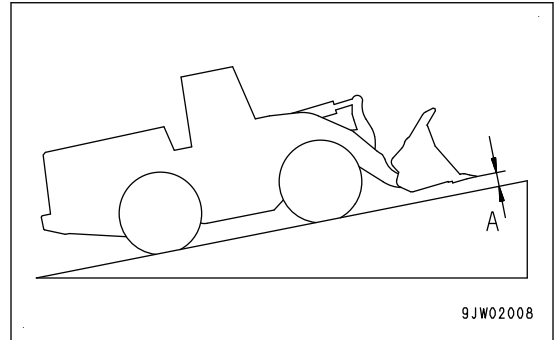
- Try to avoid traveling over obstacles. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. The machine tips over easily to the right or left. Do not drive it over obstacles which make the machine tilt largely to the right or left.
- When driving the machine on the rough ground, drive it at low speed and do not operate the steering suddenly. There is a danger that the machine may tip over. The work equipment may hit the ground, and the machine may lose its balance, or it may damage the machine or structures in the area.
- When using the machine, to prevent serious personal injury or death caused by the work equipment or by the machine tipping over due to overloading, do not use the machine beyond the permitted performance of the machine such as the maximum permitted load for the structure of the machine.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the machine body or work equipment hit anything.
- If you drive the machine at high speed continuously for a long time, the tires will overheat and the internal pressure will become abnormally high. This may cause the tires to burst. If a tire bursts, it produces a large destructive force, and this may cause serious injury or death.
- Directional lever or directional selector switch (if equipped) must not be set to NEUTRAL position (N) while traveling or traveling downhill. Set the direction of directional lever or directional selector switch (if equipped) in the traveling direction of the machine.
 - It is dangerous that the engine brake is disabled and the steering wheel becomes heavier.
 - The transmission and other parts of the power train may be damaged, and it may cause serious personal injury or death.



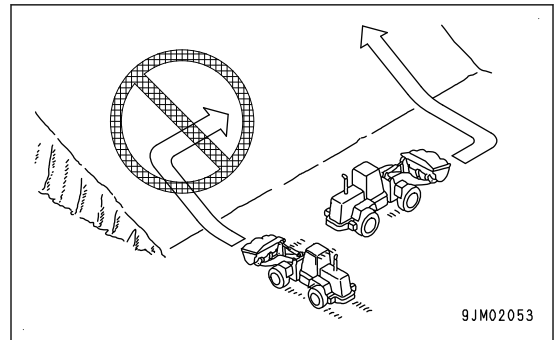
PRECAUTIONS WHEN TRAVELING ON SLOPES

To prevent the machine from tipping over or slipping to the side, always observe the following.

- Keep the work equipment at height (A) of approximately 20 to 30 cm {8 to 12 in} above the ground. In case of emergency, lower the work equipment to the ground immediately to help stopping the machine.



- Always drive the machine straight up or down a slope. Driving the machine at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or drive across slopes. Always go down to a flat place to change the position of the machine, then drive it on to the slope again.
- Drive the machine at low speed on the grass or fallen leaves. Even with slight slopes, there is a hazard that the machine may slip.
- If the engine should stop on a slope, depress the brake pedal immediately, lower the bucket and apply the parking brake to stop the machine.
- When traveling downhill, never shift gear or place the transmission at neutral. Engine brake does not work and dangerous. The direction of directional lever or directional selector switch (if equipped) must be set in the traveling direction of the machine.
- When driving the machine downhill, drive it slowly at low speed. Depress the brake pedal or use the engine brake as necessary.
- When the bucket is loaded, direct the bucket toward the hill top both in uphill and downhill travel. When driving the machine with the bucket directing downhill, it is liable to tip over and is dangerous.

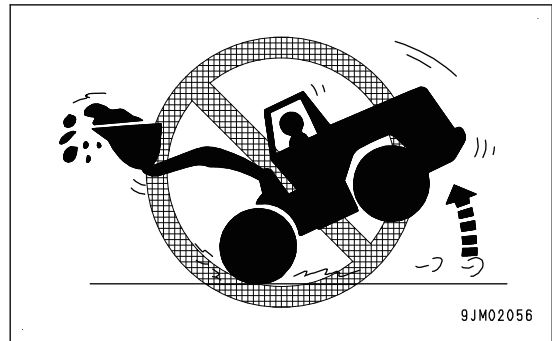


METHOD OF USING BRAKES

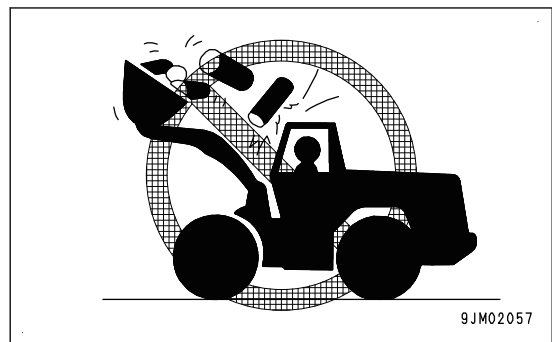
- Do not put your foot on the brake pedal unnecessarily. If the machine travels with your foot on the brake pedal, the brake operates constantly and heats abnormally, and is disabled and that can cause an accident.
- Do not depress the brake pedal repeatedly more than necessity.
- Set to the lockup and use the engine brake.
- When traveling downhill, use the engine brake while turning the transmission cut-off switch to OFF position.

PRECAUTIONS WHEN OPERATING MACHINE

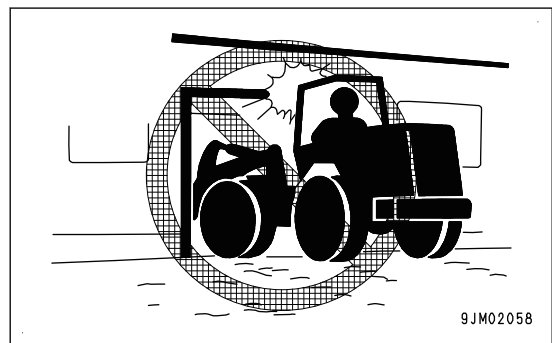
- When using the machine, to prevent serious personal injury or death caused by the work equipment or by the machine tipping over due to overloading, do not use the machine beyond the permitted performance of the machine such as the maximum permitted load for the structure of the machine.
- If the engine cannot be started again after it has stopped, turn the starting switch key to ON position, and immediately operate the work equipment control levers to lower the work equipment to the ground. (The accumulator is capable of working only for a limited time after the engine is stopped.)
- Be careful not to approach too close to the edge of cliffs. When making embankments or landfills, or when dropping soil over a cliff, dump one pile, then use the next pile of soil to push the first pile.
- The load suddenly becomes lighter when the soil is pushed over a cliff or when the machine reaches the top of a slope. When this happens, there is danger that the travel speed will suddenly increase, so be sure to reduce the speed.
- When the bucket is fully loaded, do not start, turn, or stop the machine suddenly. There is danger that the machine may tip over.



- When handling unstable loads such as round and cylindrical materials, and stacked plates, they may drop onto the operator's compartment if the work equipment is raised high, and cause serious personal injury or death.
- When handling unstable loads, be careful not to raise the work equipment too high or tilt the bucket backward too much.
- If the work equipment is suddenly lowered or stopped, the reaction may cause the machine to tip over. Particularly when carrying a load, be sure to operate the work equipment carefully.



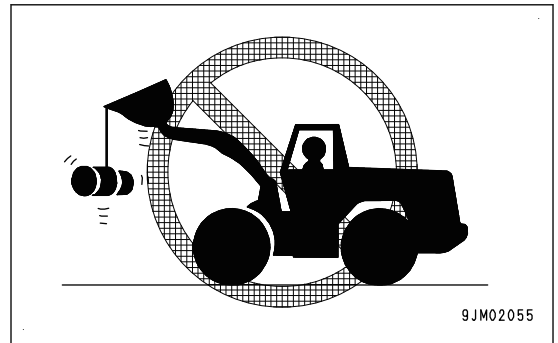
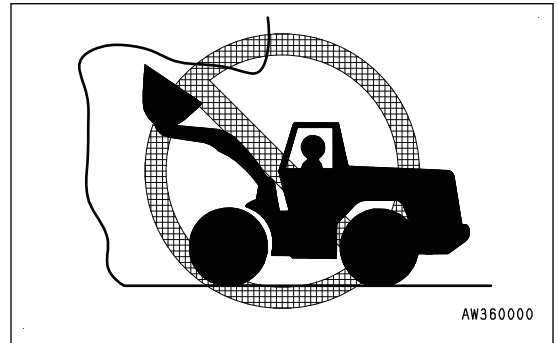
- When performing the operation in tunnels, under bridges, under electric wires, or other places where the height is limited, be extremely careful not to let the work equipment etc. hit anything.
- To prevent accidents caused by hitting other objects, always operate the machine at a speed which is safe for operation, particularly in confined spaces, indoors, and in places where there are other machines.



PROHIBITED OPERATIONS

If the machine tips over or falls, or the ground at the working point collapses, it may lead to serious personal injury or death. Always observe the following.

- Do not dig the work face under an overhangs. There is a danger that the work face will collapse.
- When digging, never thrust the bucket into a load at an angle. This will bring an excessive load on the machine and will reduce the machine life.
- Wall surface digging by using of driving force is dangerous. An excessive load will be brought on the machine and this will cause damage to the machine. Never try such practice.
- Never perform digging operations on a downhill slope. An excessive load will be brought on the machine and this will damage the machine.
- Do not use the bucket or boom for crane operations. There is a danger that the machine may tip over and the load may fall.
- Do not pass the bucket over the heads of other workers or over the operator's seat of dump trucks or other hauling equipment. There is a danger that the load may spill or the bucket may hit the dump truck and cause serious personal injury or death.



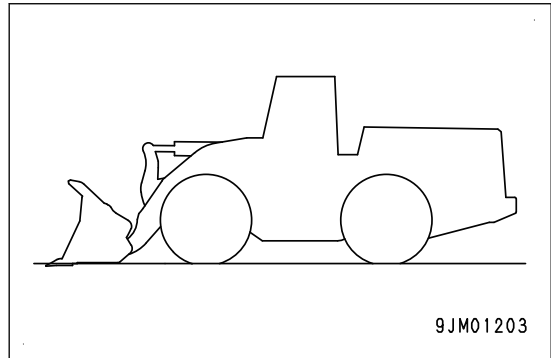
PRECAUTIONS WHEN OPERATING ON SNOW OR FROZEN SURFACES

- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not perform abrupt lever operation. Machine may slip even on a slight slope. Be particularly careful when working on slopes.
- Frozen road becomes soft when the temperature rises, and the machine may tip over or be not able to escape. Be particularly careful when working on frozen road.
- When traveling on snow-covered roads, always fit tire chains.
- It is dangerous that the machine enters deep snow. The machine may tip over or become buried in the snow. Be careful not to go off the road or to get trapped in a drift of snow.
- When performing snow removal, the road and objects placed beside the road are buried in the snow and cannot be seen. Be careful.
- When traveling on snow-covered slopes, never apply the foot brake suddenly. Reduce the speed and use the engine brake while applying the foot brake intermittently (depress the brake intermittently several times). If necessary, lower the work equipment to the ground to stop the machine.

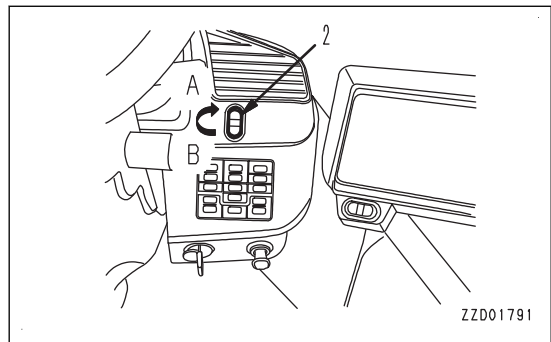
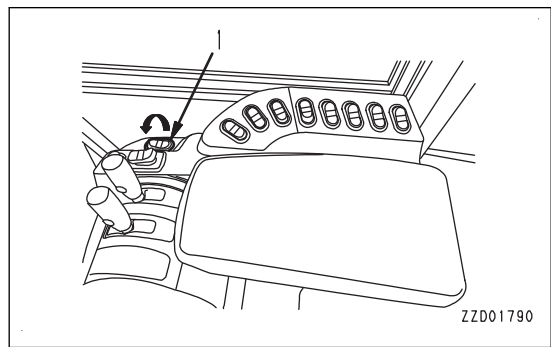
PRECAUTIONS WHEN PARKING MACHINE

Unexpected move of the parked machine can cause serious personal injury or death. Always observe the following.

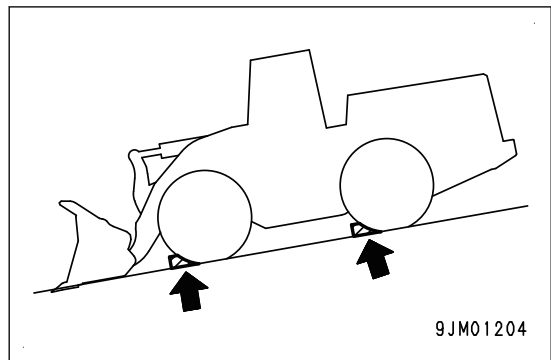
- Park the machine on a firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.
- Set the machine to the straight travel condition, then lower the work equipment to the ground.



- When leaving the machine, lock the work equipment by pressing the work equipment lock switch (1) (pilot lamp lights up). Move the parking brake switch (2) to ON (actuate) position (A) with brake pedal depressed, check that the machine is stopped completely, and stop the engine.
- If the operator's seat is positioned forward, your body or clothes will easily touch the levers. Shift it backward to keep enough space, and then get off the machine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from operating the machine. Always remove the key, take it with you, and keep it in the specified place.



- If it is necessary to park the machine on a slope, set blocks under the tires to prevent the machine from moving.



PRECAUTIONS FOR TRANSPORTATION

When the machine is transported on a trailer, serious personal injury or death may result because of the accident during transportation. Always observe the following.

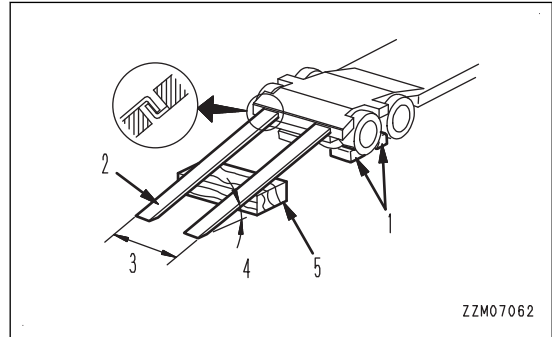
- Always check the machine dimensions carefully. Depending on the work equipment installed, the machine weight, transportation height, and overall length differ.
- Check beforehand that all bridges and other structures on the transportation route are strong enough to withstand the combined weight of the transporter and the machine being transported.
- This machine needs to be divided into components for transportation depending on the regulation. When transporting the machine, consult your Komatsu distributor.
- Lock the frame with the frame lock bar to prevent the machine from articulating.
- Fit chains to the front frame and the rear frame to hold the machine securely in position.

PRECAUTIONS WHEN LOADING AND UNLOADING

If handling is improper when loading or unloading the machine, it is dangerous that the machine may tip over or fall. It requires particular attention. Always observe the following.

- Perform loading and unloading on a firm, level ground only. Avoid road edge or place near the cliff.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.

- (1) Chocks
- (2) Ramp
- (3) Width of ramps: Same width as tires
- (4) Angle of ramp: Max. 15 °
- (5) Block



- Be sure the ramp surface and the platform of trailer are clean and free of grease, oil, ice, water and other loose materials. If any, remove them. Remove dirt around the undercarriage of the machine. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Run the engine at low idle and drive the machine slowly at low speed.
- Never correct your steering on the ramps. If necessary, drive off the ramps onto the ground, correct the direction, then enter the ramps again.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- For machines equipped with a cab, always lock the door after loading the machine. To prevent the door from opening during transportation.
- When it is necessary to remove handrails and steps, take care not to lose removed handrails and steps. Install the removed handrails and steps securely.

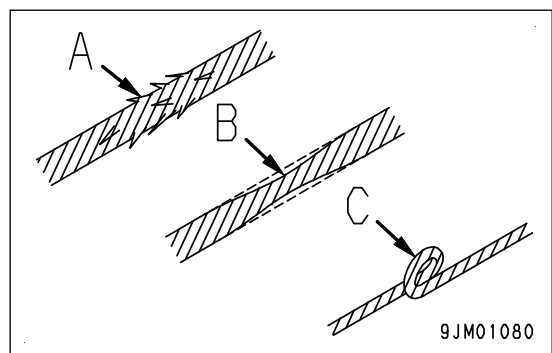
TOWING AND BEING TOWED

PRECAUTIONS FOR TOWING AND BEING TOWED

Always use the correct towing equipment and towing method. Any mistake in the selection of the wire rope or drawbar or the method of towing a disabled machine and being towed may lead to serious personal injury or death.

For towing, see "PRECAUTIONS FOR TOWING MACHINE (3-274)".

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



PRECAUTIONS FOR MAINTENANCE

PRECAUTIONS BEFORE STARTING INSPECTION AND MAINTENANCE

DISPLAY WARNING TAG DURING INSPECTION AND MAINTENANCE

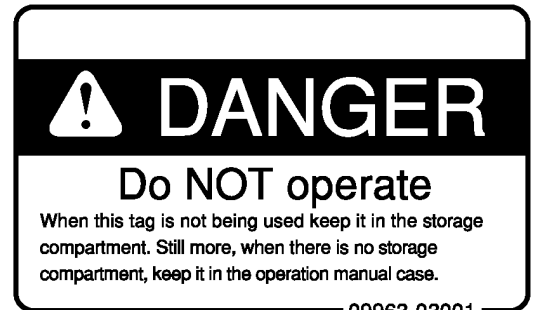
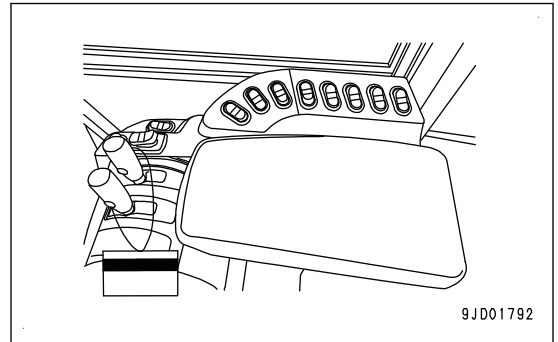
During inspection and maintenance, always display the “DANGER! Do NOT operate!” warning tag.

If there is a “DANGER! Do NOT operate!” warning tag displayed, it means that someone is performing inspection and maintenance of the machine. If the warning tag is ignored and the machine is operated, the person performing inspection or maintenance may be caught in the rotating parts or moving parts. It is dangerous and may cause serious personal injury or death. Do not start the engine or touch the levers.

If necessary, put up signs around the machine as well.

Warning tag part No. 09963-03001

When not using this warning tag, keep it in the toolbox. If there is no toolbox, keep it in the pocket for Operation and Maintenance Manual



KEEP WORK PLACE CLEAN AND TIDY

Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to perform operations safely.

If the work place is not kept clean and tidy, there is the danger that you will trip, slip, or fall over and injure yourself.

SELECT SUITABLE PLACE FOR INSPECTION AND MAINTENANCE

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

ONLY AUTHORIZED PERSONNEL

As long as maintenance of the machine is continued, do not allow unauthorized person to come near the work-place. They might get unexpected personal injury from, for instance, touching machine. Do not allow anyone except the workers concerned to enter the workplace. If necessary, employ a guard.

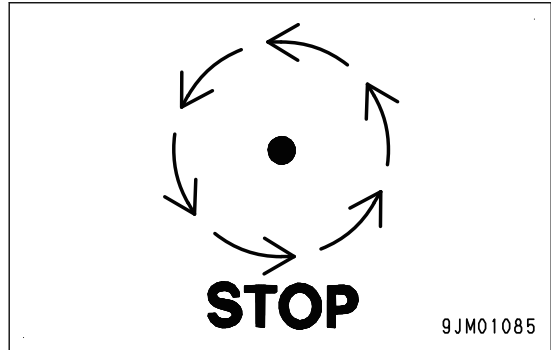
APPOINT LEADER WHEN WORKING WITH OTHERS

When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his/hers instructions during the operation in order to prevent personal injuries caused by being caught or pinched.

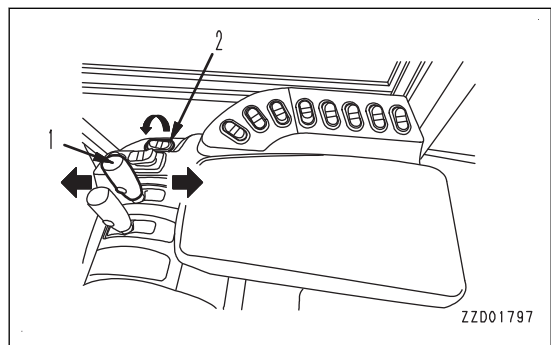
STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

If you are caught or pinched between the work equipment during operation, or exposed to high-temperature or high-pressure liquids, it is dangerous and may cause serious personal injury or death. Always observe the following.

- Lower the work equipment to the ground and stop the engine before performing any inspection and maintenance.

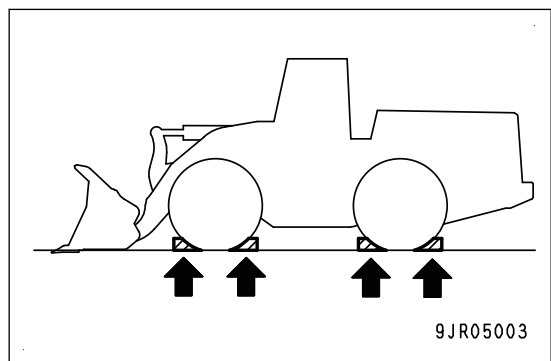
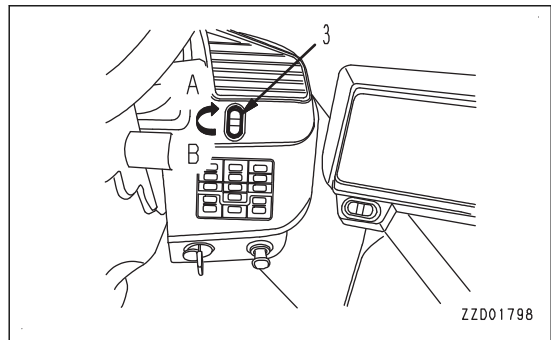


- Stop the engine (work equipment is lowered to the ground), and turn the starting switch to ON position. Press work equipment lock switch (2) to release the work equipment lock (the pilot lamp goes off), then operate work equipment control lever (1) to RAISE and LOWER position fully 2 to 3 times to release the remaining pressure in the hydraulic circuit. Then lock the work equipment (the pilot lamp lights up) by pressing work equipment lock switch (2).

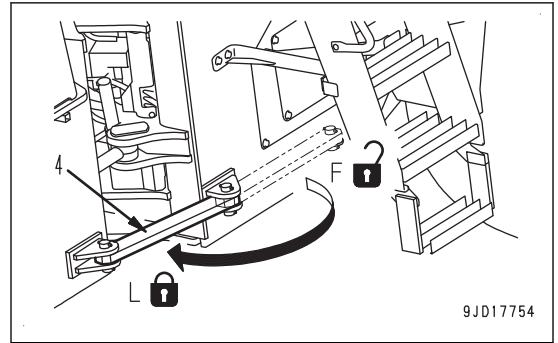


After releasing the remaining pressure in the hydraulic circuit, turn the starting switch to OFF position.

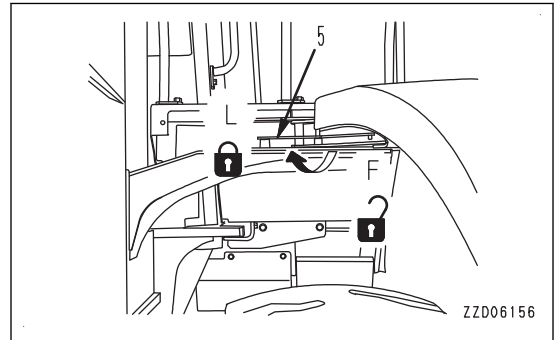
- Set parking brake switch (3) to ON (operation) position (A) to apply the parking brake, then put blocks in front of and behind the tires to prevent the machine from moving.



- Set frame lock lever (4) to LOCK position (L) to lock the front and rear frame.



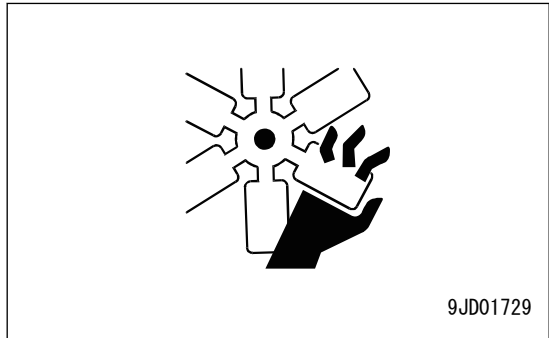
- After opening the rear full-length fender, set lock lever (5) to LOCK position (L).



TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

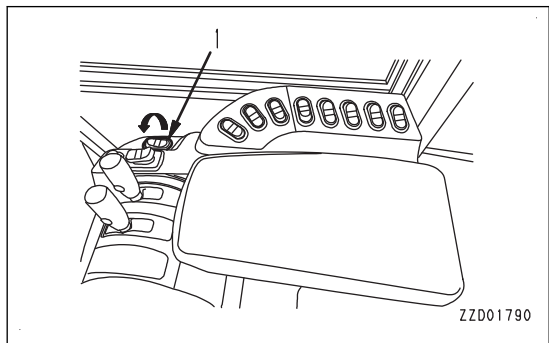
To prevent accident, do not perform maintenance with the engine running. When it is necessary to perform the maintenance with the engine running, always observe the following.

- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- Rotating parts such as the fan, fan belt are dangerous that they may easily catch a body part or an object someone wears. Be careful not to come close to the rotating part.
- Never drop or insert tools or other objects into the fan, fan belt, or other rotating parts. They may contact the rotating parts and break, and be scattered. It is dangerous.
- If the automatic active regeneration of KDPF starts during maintenance work, surroundings of KDPF become high temperature.

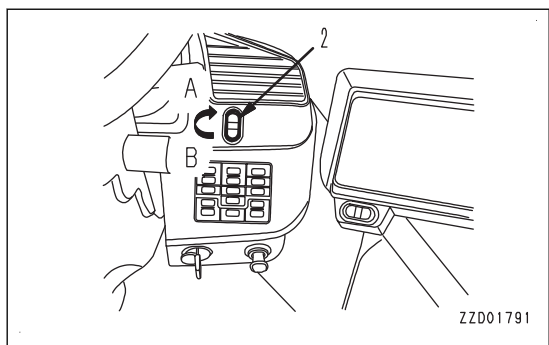


When performing maintenance work, perform Aftertreatment Devices Regeneration Disable according to “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)”.

- Lower the work equipment to the ground and press work equipment lock switch (1) to lock the work equipment (pilot lamp lights up) and prevent it from moving.



- Set parking brake switch (2) to ON (operation) position (A) to apply the parking brake, then put blocks in front of and behind the tires to prevent the machine from moving.
- Do not touch the control levers or steering system. If it is necessary to operate the control lever or steering system, always give a signal to your fellow workers and have them take refuge to a safe place.

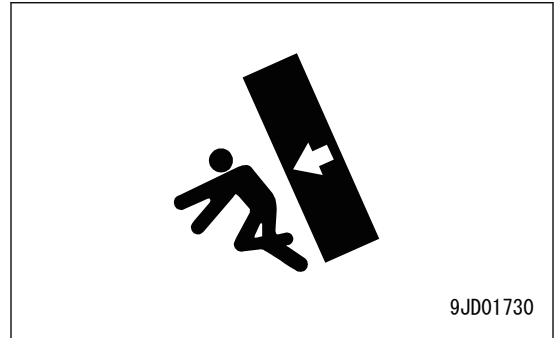


TURN OFF ECSS SWITCH BEFORE PERFORMING INSPECTION AND MAINTENANCE

Before starting the inspection and maintenance, lower the bucket to the ground and turn the ECSS switch to OFF position, then stop the engine. Never turn the ECSS switch to ON position during the inspection or maintenance.

PRECAUTIONS WHEN INSTALLING, REMOVING, OR STORING ATTACHMENTS

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



PRECAUTIONS FOR WORKING AT HIGH PLACES

When working at high places, use a step ladder or other stand to ensure that the work can be performed safely. There is a danger falling from high place that can lead to serious personal injury or death.

PRECAUTIONS WHEN WORKING UNDER MACHINE OR WORK EQUIPMENT

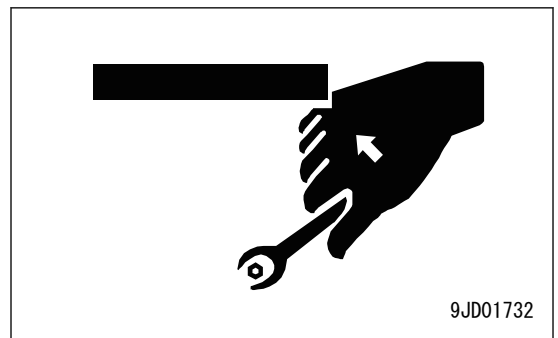
Machine or work equipment may fall, and it is dangerous that serious personal injury or death may occur. Always observe the following.

- Do not perform inspection and maintenance under the work equipment which is not lowered to the ground. Always lower the work equipment to the ground when performing inspection and maintenance.
- Make sure the hoists or hydraulic jacks you use are in good repair and strong enough to handle the weight of the component. Never use hydraulic jacks at places where the machine is damaged, bent, or twisted. Never use if the strand of wire rope is frayed, twisted or pinched. Never use bent or distorted hooks.
- Never use concrete blocks for supports. Concrete blocks may break under even light loads.



USE PROPER TOOLS

Use the tools suited to the task and use them correctly. Using damaged, deformed, or low quality tools, or making improper use of the tools may cause serious personal injury or death.



PRECAUTIONS FOR CHECK AND MAINTENANCE

TURN BATTERY DISCONNECT SWITCH TO OFF POSITION

In the following cases, turn the starting switch to OFF position and check that the system operating lamp is off. Then set the battery disconnect switch to OFF position and remove the switch key.

If you check and handle battery without turning battery disconnect switch to OFF position, serious personal injury or death by such as an electric shock may occur.

- When storing the machine for a long time (more than 1 month)
- When repairing the electrical system
- When performing electric welding
- When handling the battery
- When replacing the fuse, etc.

PRECAUTIONS FOR WELDING

Welding operations must always be performed by a qualified welder and in a place equipped with proper equipment. There is a hazard of gas, fire, or electric shock when performing welding, so never allow any unqualified person to perform welding.

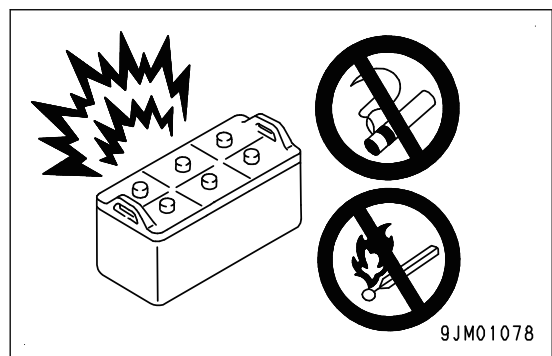
HANDLE BATTERY

Before inspecting or handling the battery, turn the key in the starting switch to OFF position and check that the system operating lamp is off. Then set the battery disconnect switch to OFF position and remove the switch key.

Danger of battery exploding

When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire, so always observe the following.

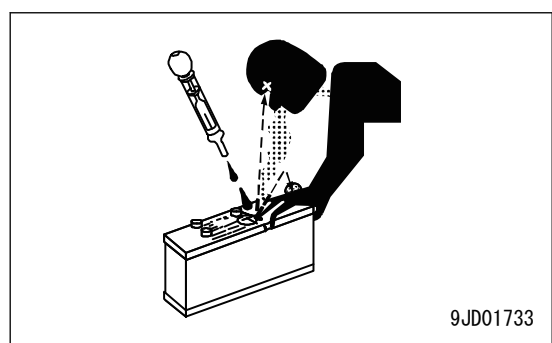
- Do not use or charge the battery if the battery electrolyte is below LOWER LEVEL mark. This may cause an explosion. Always perform periodic inspection of the battery electrolyte level, and add purified water (such as a commercial battery fluid) to UPPER LEVEL mark.
- Do not use a dry wipe to clean the battery. A wet wipe will prevent fire or explosion from static electricity.
- Do not smoke or bring any open flame close to the battery.
- Hydrogen gas is generated when the battery is being charged, so remove the battery from the machine, take it to a well-ventilated place, remove the battery caps, then perform the charging.
- After charging, tighten the battery caps securely.



Danger from dilute sulphuric acid

When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire. Always observe the following.

- When handling the battery, always wear protective eye-glasses and rubber gloves.
- If battery electrolyte gets into your eyes, immediately wash your eyes with large amounts of fresh water. After that, get medical attention immediately.



- If battery electrolyte gets on your clothes or skin, wash it off immediately with large amounts of water.

Danger of sparks

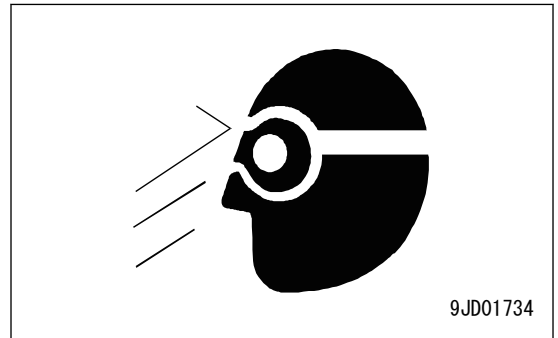
Sparks may be generated and they can cause a fire. Always observe the following.

- Do not let tools or other metal objects make any contact between the battery cables. Do not leave tools lying around near the battery.
- When removing the battery cables, turn the starting switch to OFF position and, after checking that the system operating lamp goes out, set the battery disconnect switch key to OFF position and pull it out. When removing the battery cables, remove the ground cable (negative (-) cable) first. When installing, connect the positive (+) cable first, then connect the ground.
- Tighten the battery cable terminals securely.
- Secure the battery firmly in the specified position.

PRECAUTIONS WHEN USING HAMMER

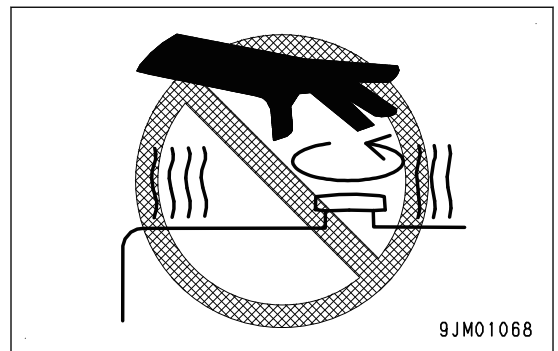
When using a hammer, pins may come out or metal particles may be scattered. It is dangerous and may cause serious personal injury or death. Always observe the following.

- When hitting pins or bucket teeth, broken pieces may be scattered, and it may cause personal injury to the people in the surrounding area. Always check that there is no one in the surrounding area.
- If hard metal parts such as pins, bucket teeth, cutting edges, or bearings are hit with a hammer, pieces might be scattered, and it may cause serious personal injury or death. Always wear protective eyeglasses and gloves.
- If the pin is hit with strong force, it may come out, and injure people in the surrounding area. Do not allow anyone to enter the surrounding area.



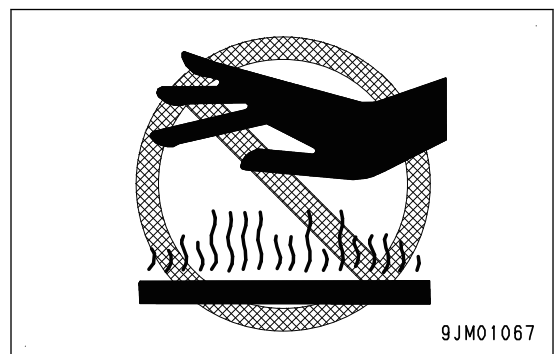
PRECAUTIONS FOR HIGH-TEMPERATURE COOLANT

To prevent burns from boiling water or steam spurting out when checking or draining the coolant, wait for the coolant to cool down to a temperature where the radiator cap can be touched by hand. Then loosen the cap slowly to release the pressure inside the radiator, and remove the cap.



PRECAUTIONS FOR HIGH-TEMPERATURE OIL

To prevent burns from hot oil spurting out or from touching high-temperature parts when checking or draining the oil, wait for the oil to cool down to a temperature where the cap or plug can be touched by hand. Then, loosen the cap or plug slowly to release the internal pressure and remove the cap or plug.



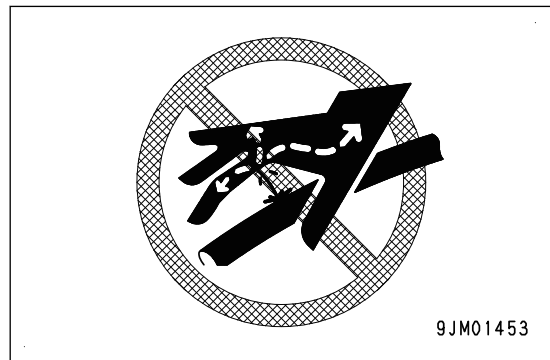
PRECAUTIONS FOR HIGH-TEMPERATURE PARTS

To prevent burns from touching high-temperature parts, when checking or performing maintenance after stopping engine, check the parts have been cooled down to touch with bare hand before checking or maintenance.

PRECAUTIONS FOR HIGH-PRESSURE OIL

The hydraulic system is always under internal pressure. In addition, the fuel piping is also under internal pressure when the engine is running and immediately after the engine is stopped. When performing inspection or replacement of the piping or hoses, check that the internal pressure in the circuit has been released. If this is not done, serious personal injury or death may occur. Always observe the following.

- Do not perform inspection or replacement work with the circuit under pressure. Release the pressure. For details, see "STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE (2-38)".
- If there is any leakage from the piping or hoses, the surrounding area may be wet, so check for cracks in the piping and hoses and for swelling in the hoses. When performing inspection, wear protective equipment such as protective eyeglasses and leather gloves.
- High-pressure oil leaking from small holes is dangerous that may penetrate your skin and cause loss of sight if it contacts your skin or eyes directly. If a jet of high-pressure oil hit your skin or eyes, and suffer injury, wash the place with clean water, and consult a doctor immediately for medical attention.
- The oil pressure in the ECSS circuit is stored by the accumulator. Do not remove the ECSS piping and parts. If it is necessary to remove them, ask your Komatsu distributor to perform the removal work.



PRECAUTIONS FOR HIGH-PRESSURE FUEL

While the engine is running, high-pressure is generated in the engine fuel piping. If you try to disassemble the piping before the internal pressure is released, serious personal injury or death can result. When performing inspection or maintenance of the fuel piping system, stop the engine and wait for at least 30 seconds to allow the internal pressure to go down before starting the work.

HANDLE HIGH-PRESSURE HOSES AND PIPING

If oil or fuel leaks from high-pressure hoses or piping, it may cause fire or defective operation. It is dangerous and may cause serious personal injury or death. If the hose or piping mounts are loose or oil or fuel is found to be leaking from the mount, stop operations and tighten to the specified torque.

If any damaged or deformed hoses or piping are found, consult your Komatsu distributor.

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

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

PRECAUTIONS FOR NOISE

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

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

HANDLE ACCUMULATOR AND GAS SPRING

This machine is equipped with an accumulator. For a while after the engine has been stopped, if the work equipment control lever is operated in LOWER direction while the starting switch key is at ON position, the work equipment goes down with its own weight.

After stopping the engine, turn the work equipment lock switch to LOCK position and the parking brake switch to ON (operation) position.

The accumulator and gas spring are charged with high-pressure nitrogen gas. If the accumulator is handled mistakenly, it may cause an explosion. It is dangerous and may cause serious personal injury or death. Always observe the following.

- Do not disassemble.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it, weld it, nor use a cutting torch.
- Do not hit or roll the accumulator, or subject it to any impact.
- When disposing of the accumulator, the gas must be released. Ask your Komatsu distributor to perform this work.



PRECAUTIONS FOR COMPRESSED AIR

- When performing cleaning with compressed air, there is a hazard of serious personal injury or death caused by flying dust or particles.
- When using compressed air to clean the filter element or radiator, wear protective eyeglasses, anti-dust mask, gloves, and other protective equipment.

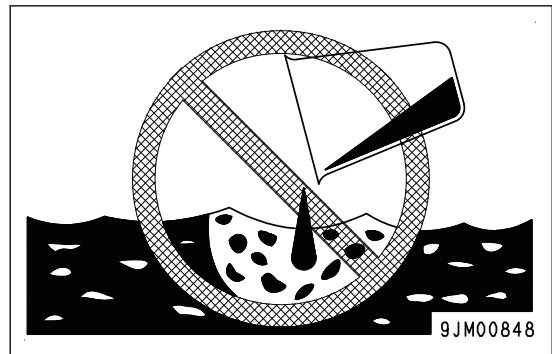
MAINTENANCE OF AIR CONDITIONER

If air conditioner refrigerant gets into your eyes, it may cause loss of sight; if it contacts your skin, it may cause frostbite. Never loosen any parts of the cooling circuit.

PRECAUTIONS FOR DISPOSING OF WASTE MATERIALS

To prevent pollution, pay full attention to the way to dispose of waste materials.

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



Avoid exposure to burning rubber or plastics which produce a toxic gas that is harmful to people.

- When disposing of parts made of rubber or plastics (hoses, cables, and harnesses), always comply with the local regulations for disposing industrial waste products.

METHOD FOR SELECTING WINDOW WASHER FLUID

Use an ethyl alcohol base washer liquid.

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

PERIODIC REPLACEMENT OF DEFINED LIFE PARTS

- For using the machine safely for a long period, always perform periodic replacement of the defined life parts that have a particularly close relation to safety, such as hoses and the seat belt.
Replacement of the defined life parts: See "PERIODIC REPLACEMENT OF DEFINED LIFE PARTS".
- 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. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair the defined life parts if any defect is found, even when they have not reached the specified replacement time.

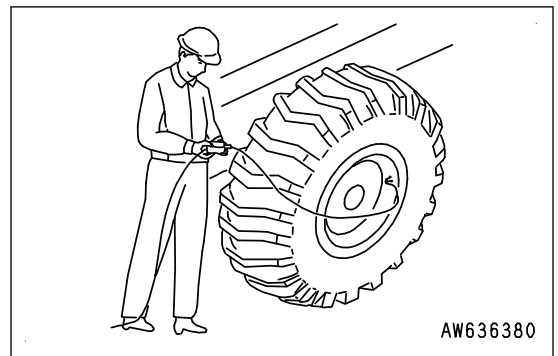
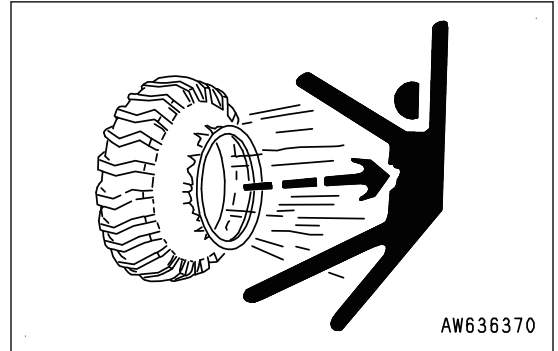
TIRES

HANDLE TIRES

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

To ensure safety, always observe the following.

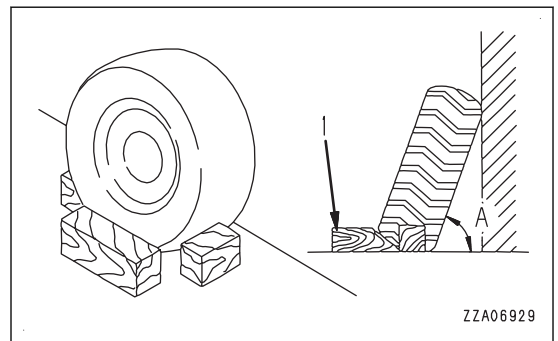
- Maintenance, disassembly, repair, and assembly of the tires and rims requires special equipment and special technology, so always ask your Komatsu distributor to perform these operations.
- Use only specified tires and inflate them to the specified pressure.
Appropriate inflation pressure: See "TIRE PRESSURE (3-246)".
- When pumping up the tires, check that no other person is standing near the tire, and install an air chuck with a clip that can be secured to the air valve.
To prevent the tire inflation pressure from becoming too high, measure the pressure from time to time with an air gauge while pumping up the tire.
- If the tire inflation pressure goes down abnormally or the rim parts do not fit the tire, there is a problem with the tire or rim parts. Always contact your Komatsu distributor for repairs.
- If the rim parts are not fitted properly when the tire is being pumped up, there is a danger that the rim parts may fly off, so set up a protective fence around the tire, and do not stand directly in front of the rim. Stand beside the tread when pumping up the tire.
- Do not adjust the tire inflation pressure immediately after traveling at high speed or operating under heavy load.
- Never perform welding or light a fire near the tire.
- Always release the inflation pressure from a tire prior to removing rim from tire.
- Before removing the tire from the machine for repairs, remove the valve partially to release the air from the tire gradually, then remove the tire.



PRECAUTIONS FOR STORING TIRES

Tires for construction equipment are extremely heavy, it may lead to serious personal injury or death. To maintain safety, always observe the following.

- As a basic rule, store the tires in a warehouse which unauthorized persons cannot enter.
If the tires must be stored outside, always erect a fence and put up "No Entry" signs.
- Stand the tire at the angle of 60 to 70° (A) on a level ground, and block it securely (1) so that it cannot tip over or fall over if any person should touch it. Do not lay the tire on its side. This will deform the tire and cause it to deteriorate.
- If the tire should fall over, do not attempt to stop it. Get out of the way quickly.



PRECAUTIONS FOR DEF

GENERAL CHARACTER AND PRECAUTIONS FOR HANDLING

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 following situations require immediate action:

- If it gets on your skin, it may 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 thoroughly. If your skin becomes irritated or begins to hurt, immediately consult a doctor for treatment.
- Do not induce vomiting if swallowed. If swallowed, thoroughly rinse 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 protective eyeglasses when exposed to DEF to protect from solution splashing in your eyes. Wear rubber gloves when you perform work handling 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 create and emit a toxic gas.

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.

PRECAUTIONS FOR STORING

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

When storing DEF, avoid direct sunlight. Always use the original container it came in. Do not exchange the container of DEF with another one. If DEF is stored in an iron or aluminum container, toxic gas may develop and a chemical reaction may corrode the container.

PRECAUTIONS FOR FIRE HAZARD AND LEAKAGE

DEF is non-flammable; however, in the case of a fire it may generate an ammonia gas.

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

OTHER PRECAUTIONS

When disposing of DEF, treat it as an industrial waste. The container for DEF is an industrial waste as well. It should be treated in the same way.

Never use an iron or aluminum container when disposing DEF, because toxic gas may develop and a chemical reaction may corrode the container. Use a container made of resin (PP, PE) or stainless steel when handling the fluid waste of DEF.

Do not touch any 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, thoroughly wash it off with water.

White powder (crystallized urea) may cover 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.

Never relocate or modify the exhaust gas aftertreatment devices. The harmful gas may be exhausted and it can cause serious damage to the environment as well as violation of laws.

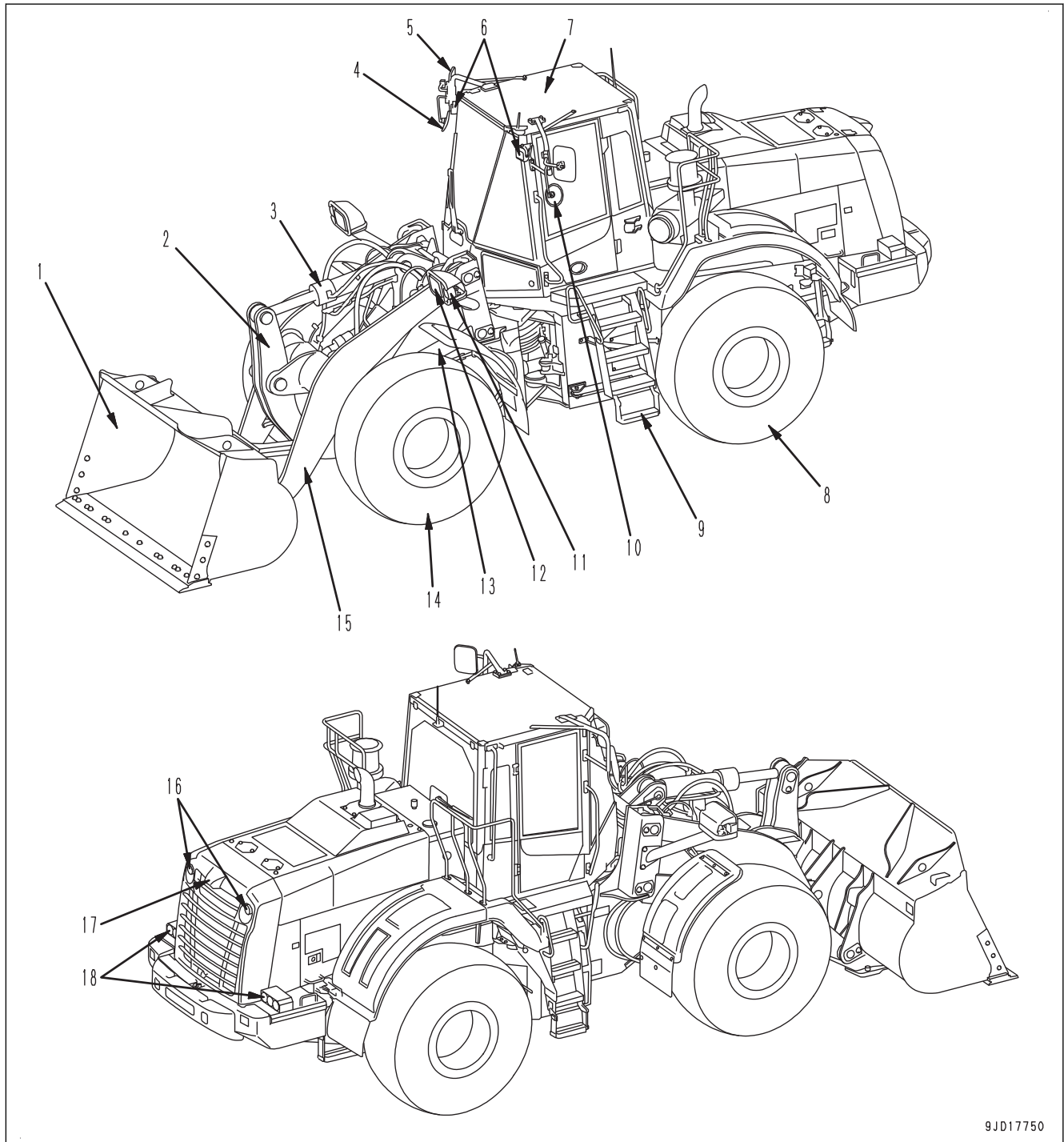
OPERATION

WARNING

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

GENERAL VIEW

MACHINE EQUIPMENT NAME



9JD17750

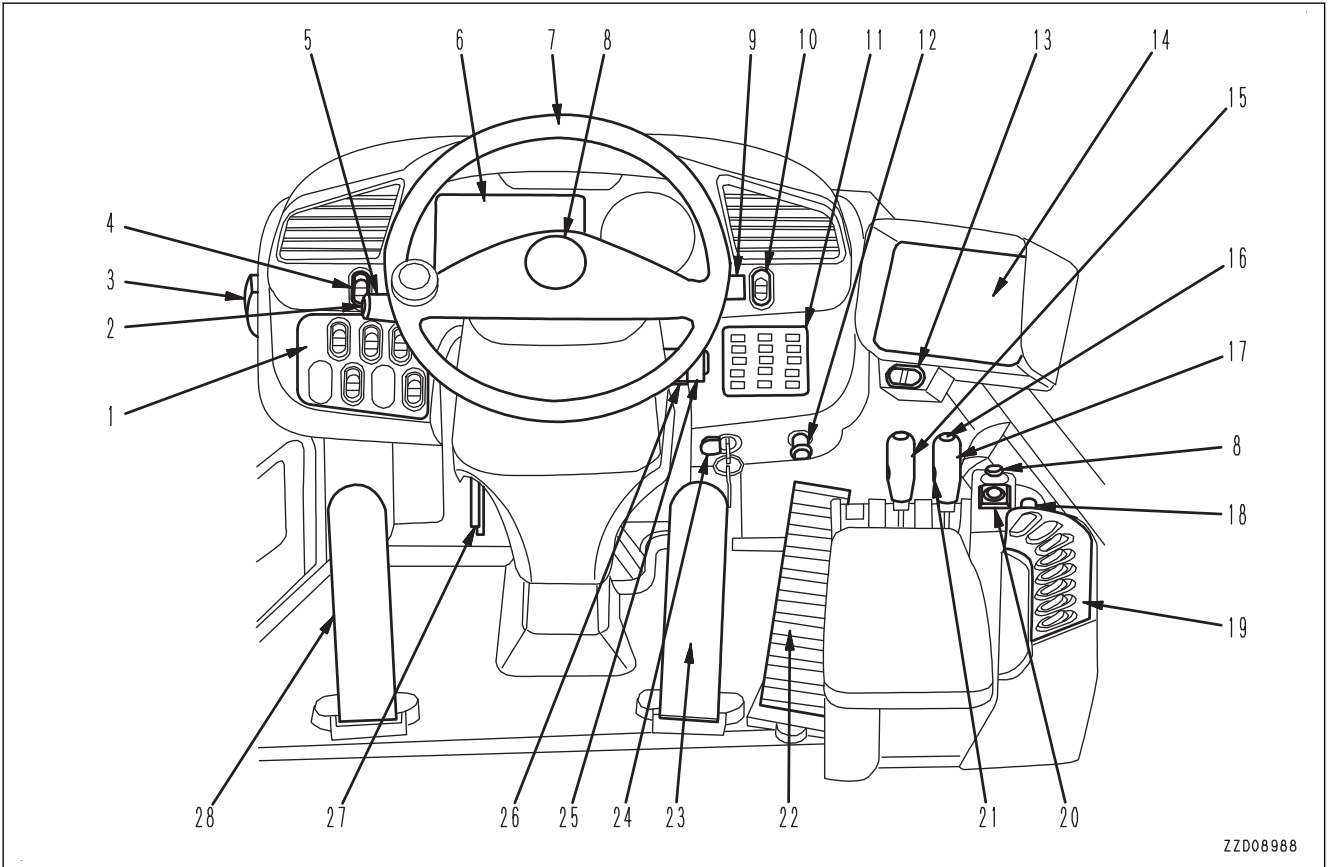
- (1) Bucket
- (2) Bell crank
- (3) Bucket cylinder
- (4) R.H. side under-mirror
- (5) Rearview mirror
- (6) Front working lamp
- (7) ROPS cab

- (8) Rear wheel
- (9) Stepladder
- (10) L.H. side under-mirror
- (11) Turn signal lamp
- (12) Headlamp
- (13) Lift cylinder
- (14) Front wheel

- (15) Boom
- (16) Rear working lamp

- (17) Rearview camera
- (18) Rear combination lamp

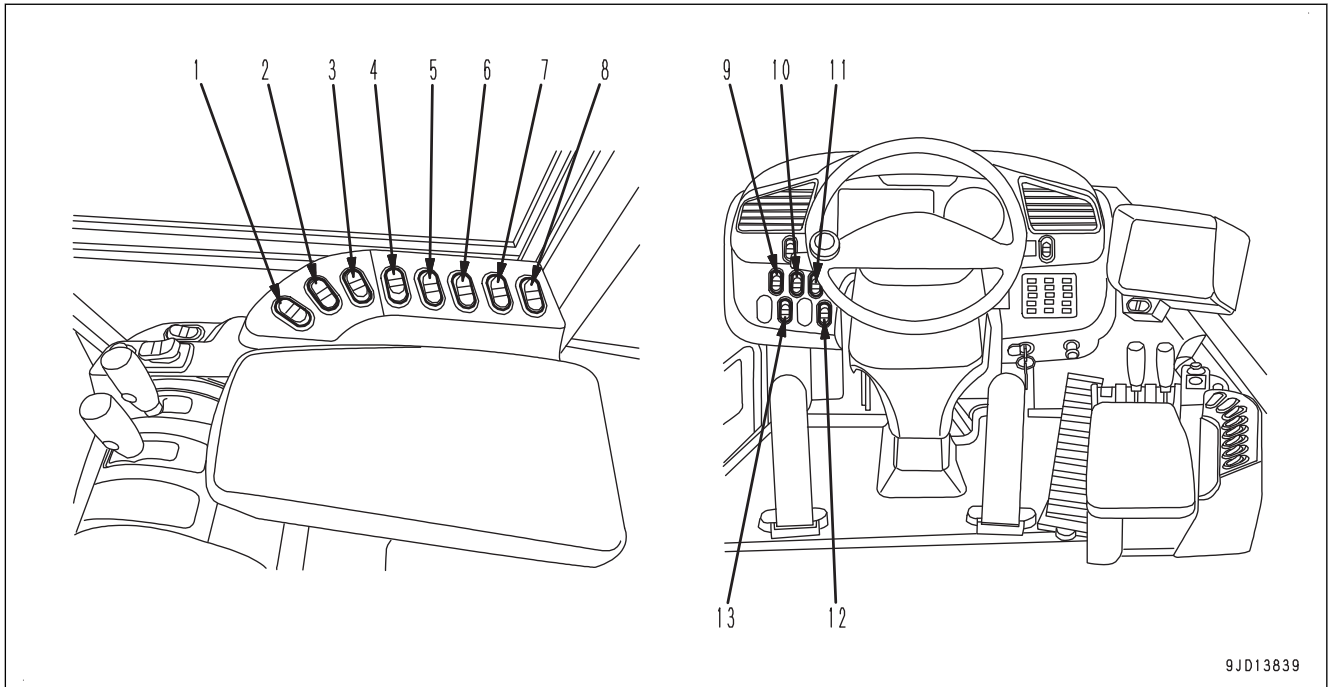
CONTROLS AND GAUGES NAMES



ZZD08988

- | | |
|--|--|
| (1) Front switch panel | (14) Rear view monitor |
| (2) Directional lever | (15) Bucket control lever |
| (3) Engine shutdown secondary switch | (16) Kickdown switch |
| (4) Hazard lamp switch | (17) Boom control lever |
| (5) Gear speed switch | (18) Work equipment lock switch |
| (6) Machine monitor | (19) R.H. switch panel |
| (7) Steering wheel | (20) Directional selector switch (if equipped) |
| (8) Horn switch | (21) Hold switch |
| (9) Lamp switch | (22) Accelerator pedal |
| (9) Turn signal lever | (23) R.H. brake pedal |
| (9) Dimmer switch | (24) Starting switch |
| (10) Parking brake switch | (25) Front wiper switch |
| (11) Monitor switch | (26) Rear wiper switch |
| (12) Cigarette lighter | (27) Steering tilt lock lever |
| (13) Brightness adjustment switch of rear view monitor | (28) L.H. brake pedal |

SWITCH PANEL



R.H. switch panel

- (1) Transmission cut-off switch
- (1) Transmission cut-off set switch
- (2) Power mode selector switch
- (3) Transmission shift mode selector switch
- (4) Torque converter lockup switch

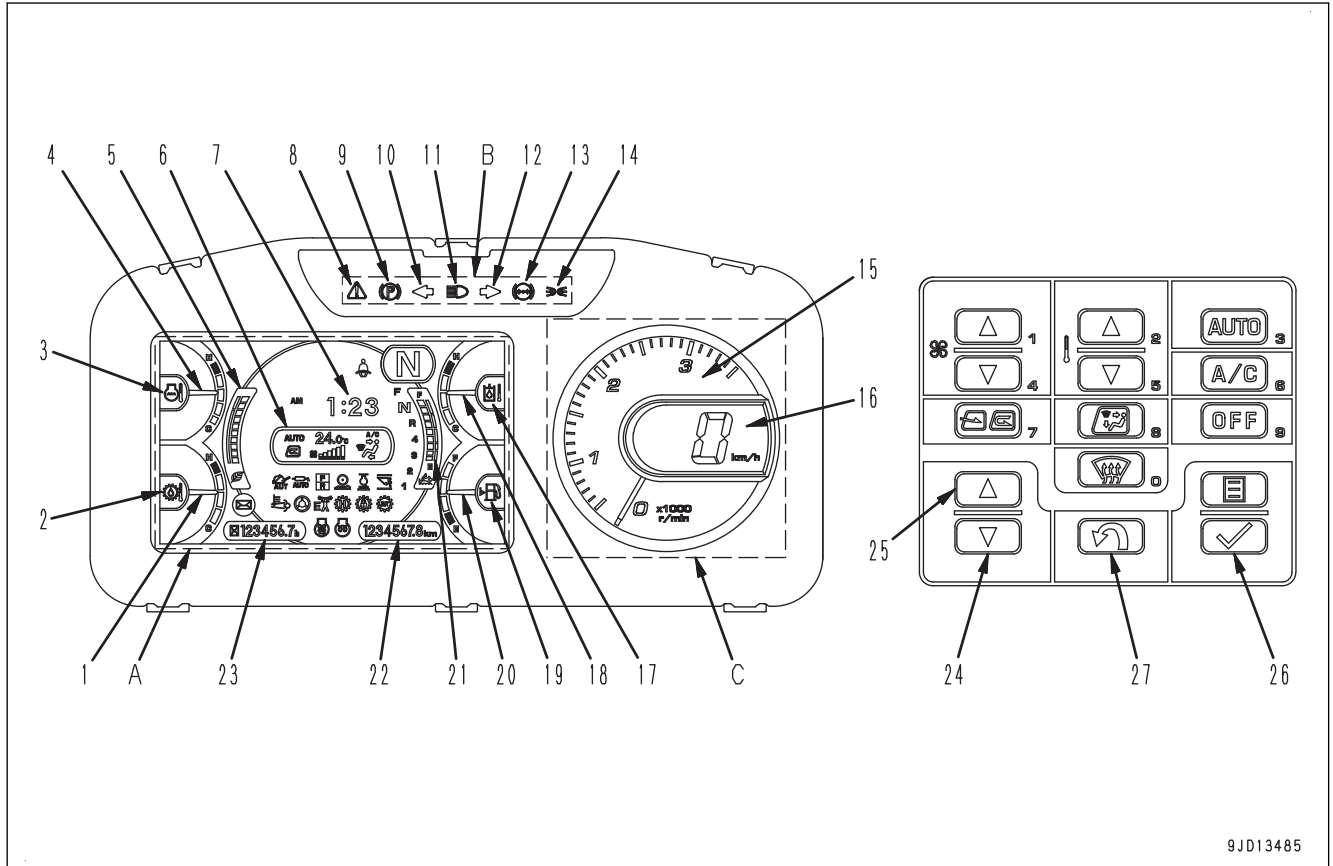
- (5) Directional selector enable switch on R.H. switch panel (if equipped)
- (6) Remote positioner switch
- (7) 2-stage low idle switch (if equipped)
- (8) Secondary steering switch (if equipped)

Front switch panel

- (9) Front working lamp switch
- (10) Rear working lamp switch
- (11) Beacon lamp switch (if equipped)
- (12) Monitor brightness selector switch
- (13) ECSS switch

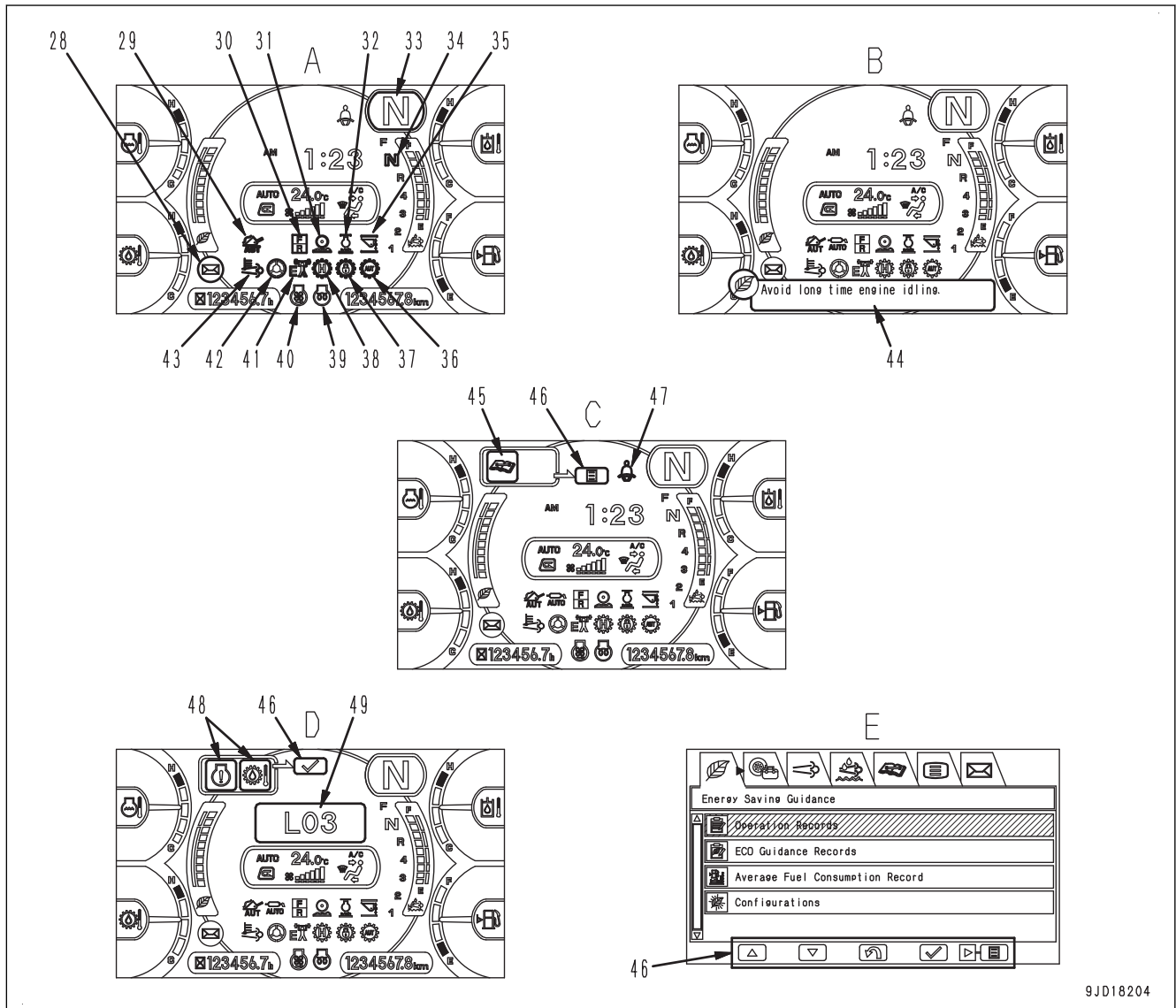
MACHINE MONITOR EQUIPMENT NAME

General view



- | | |
|---|---|
| <ul style="list-style-type: none"> (A) LCD unit (B) LED 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) Air conditioner display (7) Clock (8) Centralized warning lamp (9) Parking brake pilot lamp (10) Turn signal pilot lamp (L.H.) (11) Headlamp (high beam) pilot lamp (12) Turn signal pilot lamp (R.H.) (13) Brake oil pressure caution lamp (14) Clearance lamp pilot lamp (15) Engine tachometer | <ul style="list-style-type: none"> (C) Meter unit (16) Speedometer (17) Hydraulic oil temperature caution lamp (18) Hydraulic oil temperature gauge (19) Fuel level caution lamp (20) Fuel gauge (21) DEF level gauge (22) R.H. meter (Select the fuel consumption gauge, service meter, odometer, or clock.) (23) L.H. meter (Select the service meter, odometer, or clock.) (24) DOWN switch (25) UP switch (26) ENTER switch (27) RETURN switch |
|---|---|

Display of liquid crystal unit



9JD18204

(A) Standard screen

(B) ECO guidance screen

(C) Maintenance time warning screen

(28) Message display

(29) Semi-auto digging pilot lamp

(30) Directional selector pilot lamp (if equipped)

(31) ECSS pilot lamp

(32) 2-stage low idling pilot lamp (if equipped)

(33) Shift indicator

(34) Shift indicator position display

(35) Work equipment lock pilot lamp

(35) Remote positioner display

(36) Automatic shift pilot lamp

(37) Torque converter lockup mode display

(38) Shift hold pilot lamp

* ECSS: Electronically Controlled Suspension System

(D) Warning screen

(E) User menu screen

(39) Preheating pilot lamp

(39) Transmission cut-off pilot lamp

(40) Fan automatic reverse display

(41) Power mode display

(42) Secondary steering pilot lamp

(43) Aftertreatment devices regeneration display

(44) Guidance display

(45) Maintenance time caution lamp

(46) Guidance icon

(47) Seat belt caution lamp

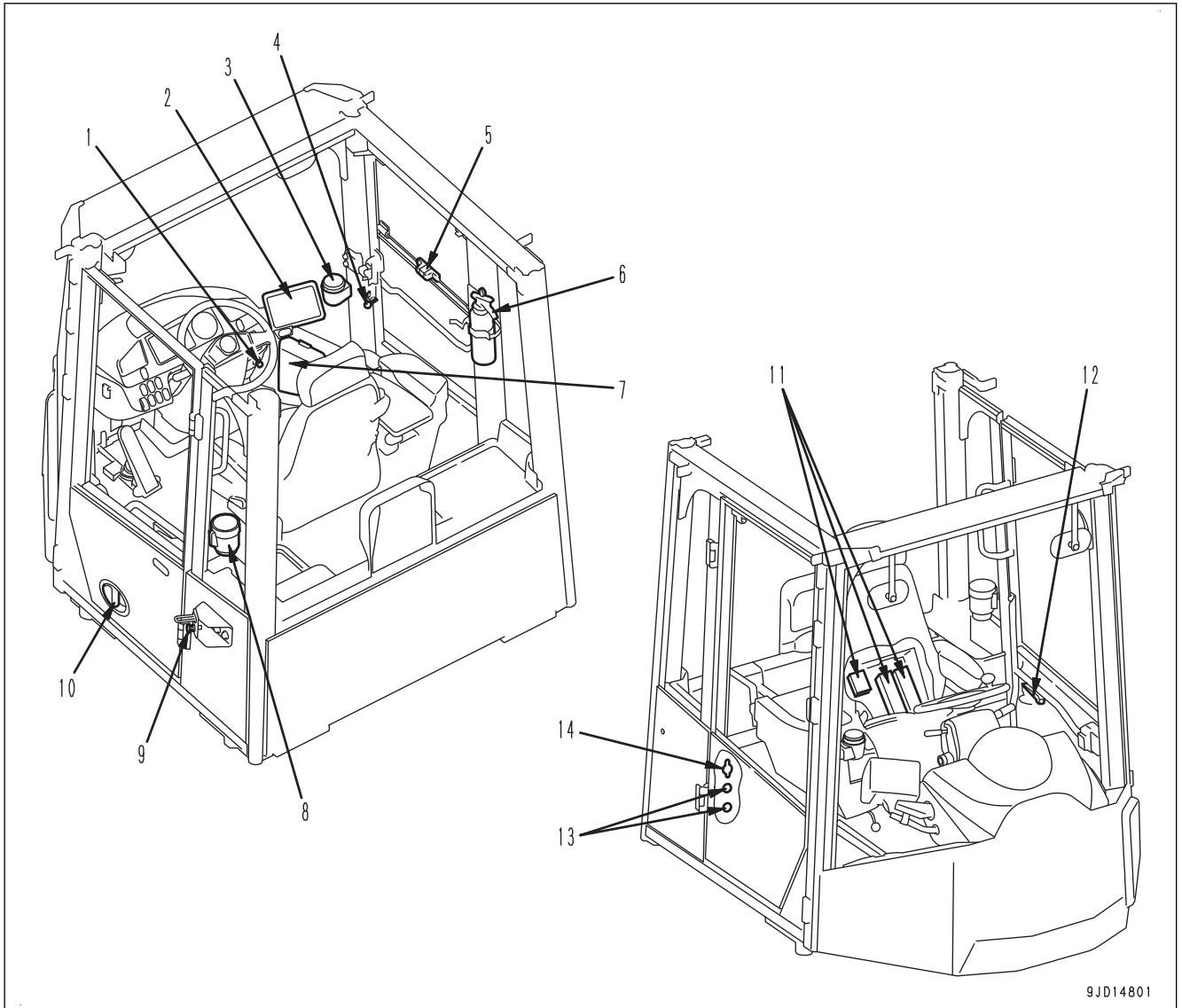
(48) Warning display

(49) Action level display

* At sections (35) and (39), 2 types of pilot lamp are prepared.

OTHER EQUIPMENT NAME

Inside of cab



(1) 24 V power supply

(2) Rearview monitor

(3) Ashtray

(4) Open knob for alternate exit of cab

(5) Unlock knob for slide window of cab

(6) Fire extinguisher (if equipped)

(7) Cool box

(8) Cup holder

(9) Open lock for cab L.H. door

(10) Cab door handle

(11) Fuse

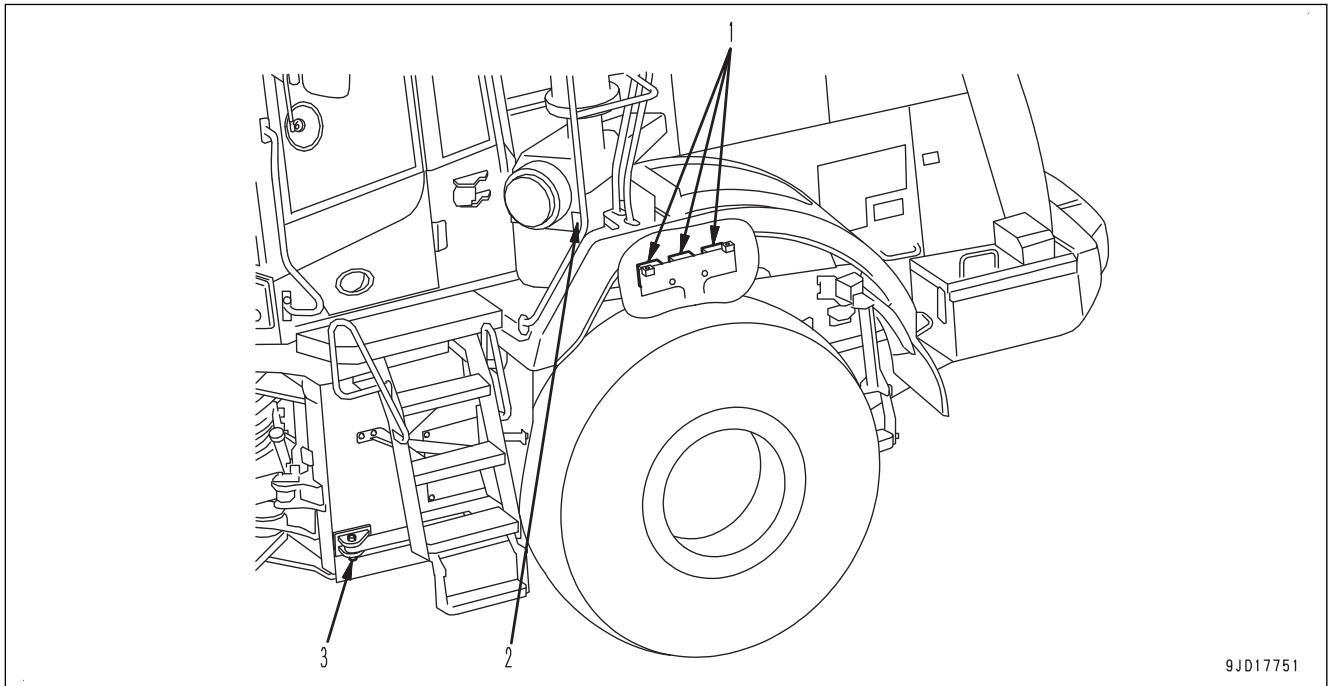
(12) Open handle for cab L.H. door

(13) 12 V power supply

(14) AUX

9JD14801

Outside of cab

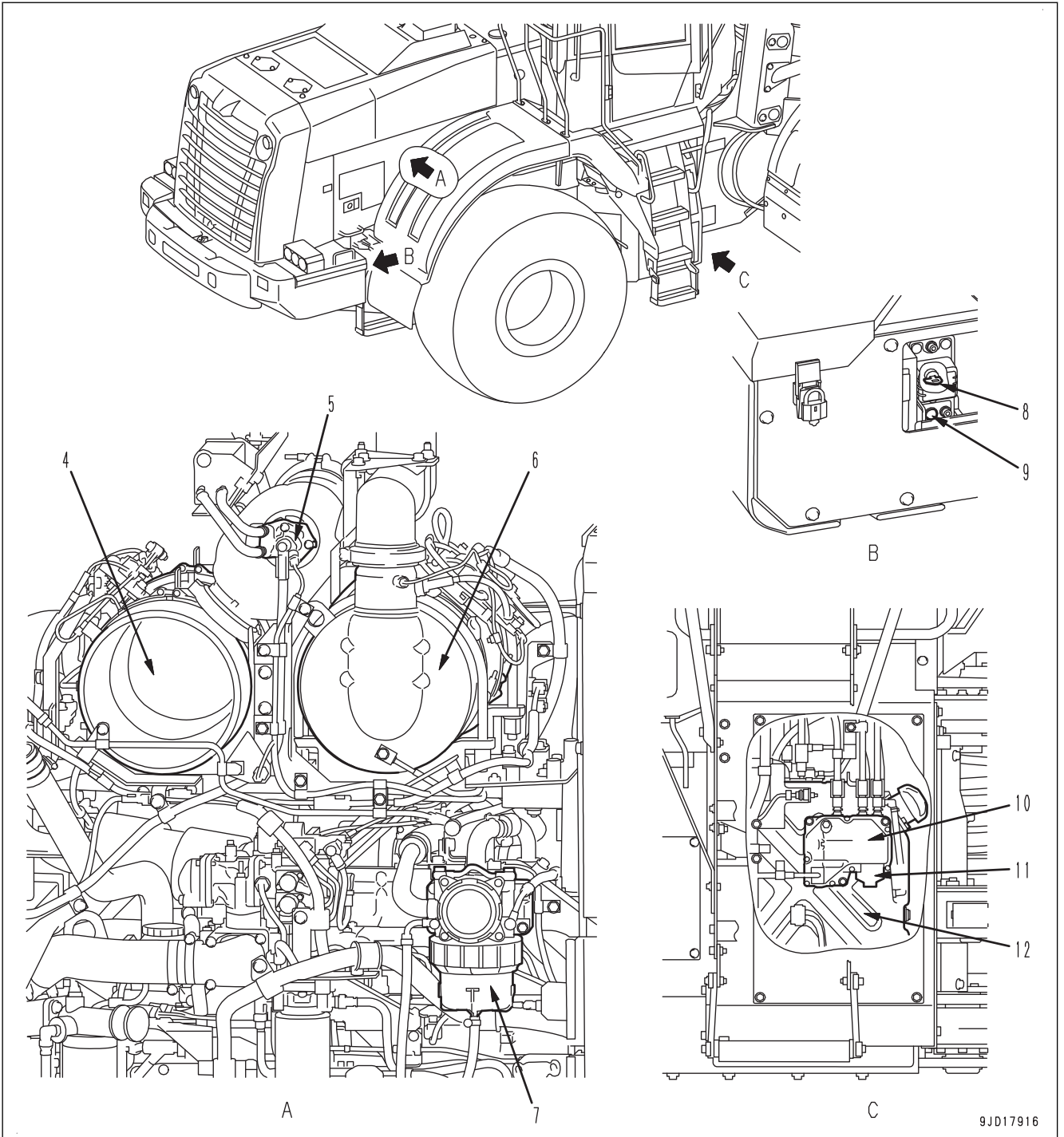


9JD17751

(1) Slow-blow fuse

(2) Dust indicator

(3) Articulation lock pin



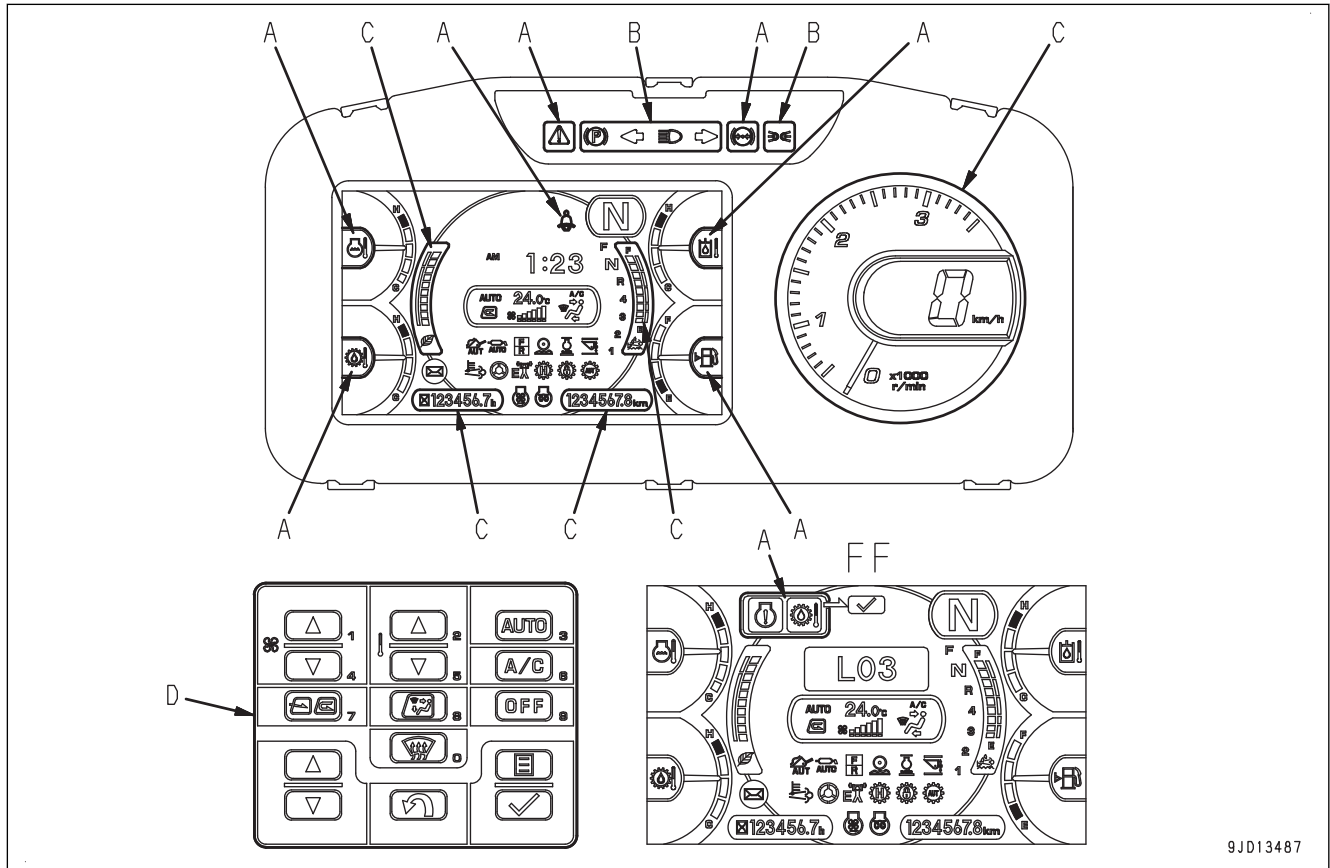
- | | |
|--|---------------------------|
| (4) KDPF | (9) System operating lamp |
| (5) DEF injector | (10) DEF pump |
| (6) SCR assembly | (11) DEF filter |
| (7) Komatsu Closed Crankcase Ventilation (hereafter KCCV) ventilator | (12) DEF tank |
| (8) Battery disconnect switch | |

EXPLANATION OF COMPONENTS

The following is an explanation of devices necessary to operate the machine.

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

EXPLANATION OF MACHINE MONITOR EQUIPMENT



9JD13487

FF: Failure display screen

(A) Warning display

(B) Pilot display

(C) Meter display

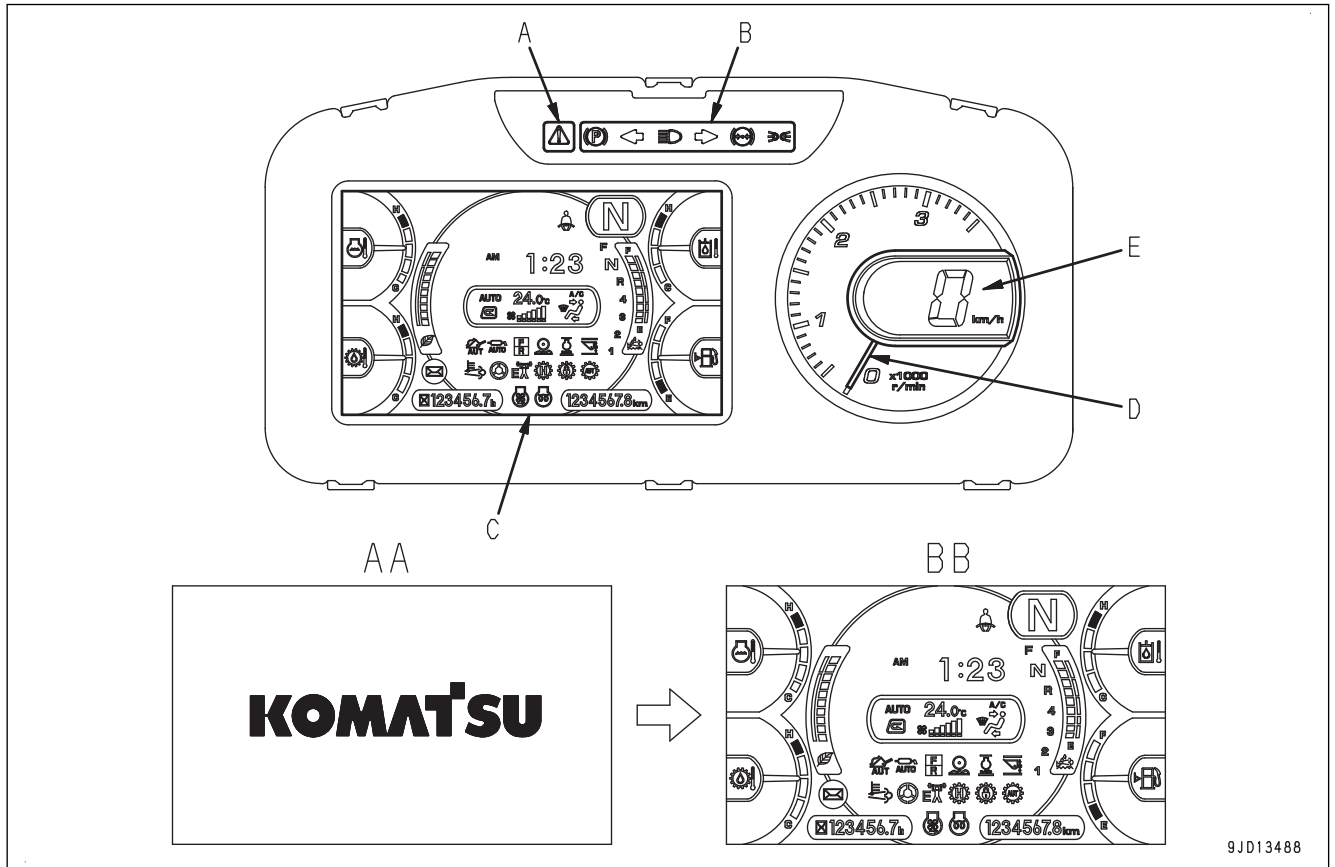
(D) Monitor switch area

REMARK

For the user menu used for setting various items of the machine on the machine monitor, see "USER MENU (3-57)".

BASIC OPERATION OF MACHINE MONITOR

BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE IN NORMAL SITUATION



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

1. Centralized warning lamp (A) and pilot lamp (B) light up for 2 seconds and go out for 1 second.
2. Liquid crystal display (C) displays starting screen AA for 2 seconds, and then changes to standard screen BB.
3. The pointer of engine tachometer (D) swings once.
4. Speedometer (E) displays "88" for 2 seconds.
5. The alarm buzzer sounds for 2 seconds, then stops under the normal condition.

NOTICE

If the lamps, alarm buzzer, etc. do not work, the machine monitor may be failed or the electric wiring may have breakage. In this case, ask your Komatsu distributor for repair.

REMARK

When the engine is started, the battery voltage may suddenly drop depending on the temperature and the battery condition.

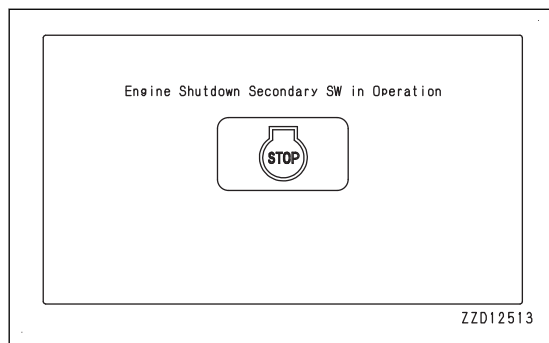
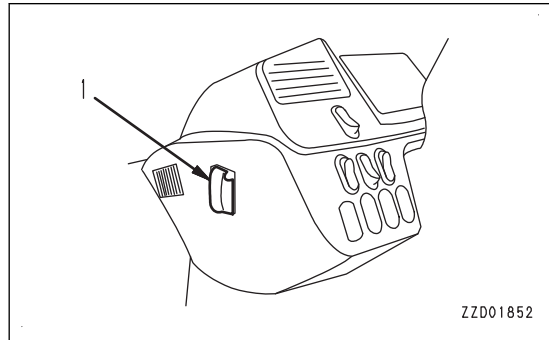
In such case, the machine monitor may go out temporarily or restart, but it is not a trouble.

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

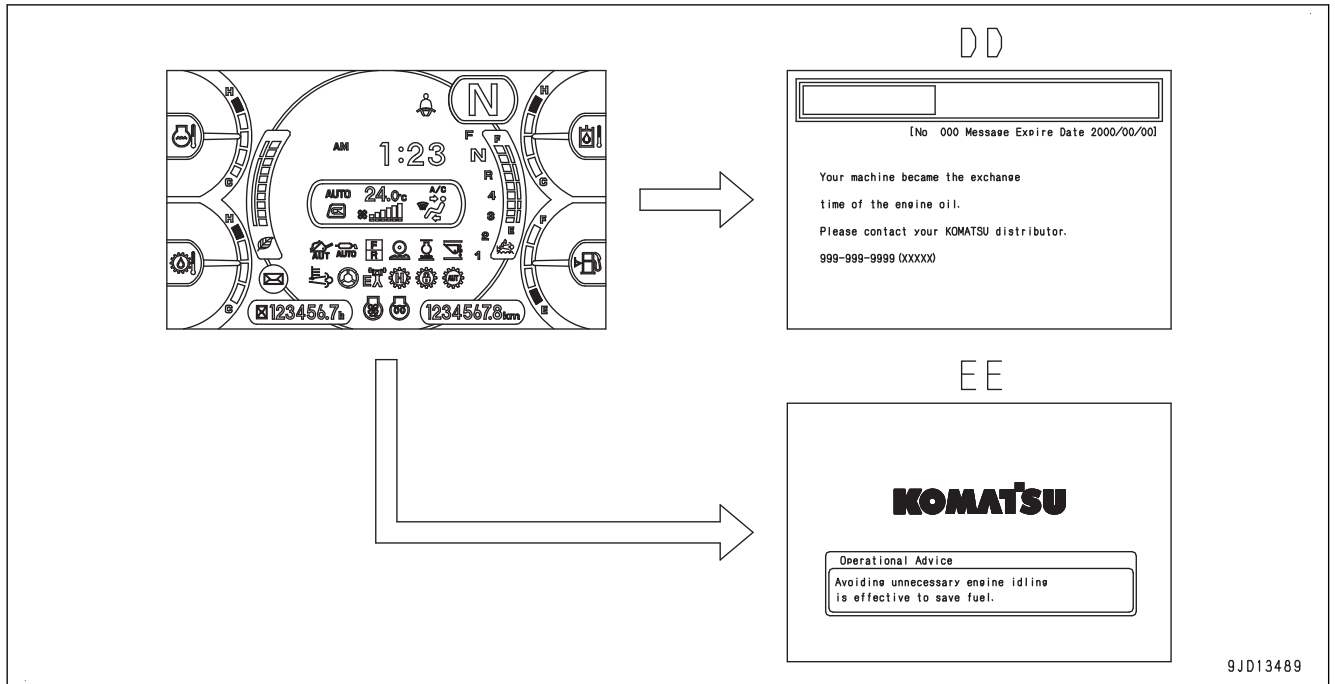
While engine shutdown secondary switch (1) is ON (engine stopped), even if the starting switch is turned to ON position, the screen shown in the figure is displayed and the engine does not start.

When engine shutdown secondary switch (1) is turned OFF (normal), the machine monitor returns to the standard screen, and the engine can be started with usual starting switch operation.

For the function and operating method of engine shutdown secondary switch (1), see "ENGINE SHUTDOWN SECONDARY SWITCH (3-122)".



BASIC OPERATION OF MACHINE MONITOR WHEN STOPPING ENGINE IN NORMAL SITUATION



When starting switch is turned to OFF position, the screen goes out. In the following case, the end screen is displayed for 5 seconds, and then screen goes out.

End screen with message

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

In this case, turn the starting switch to ON position to re-check the message, and if it is the message requesting response, send back your reply.

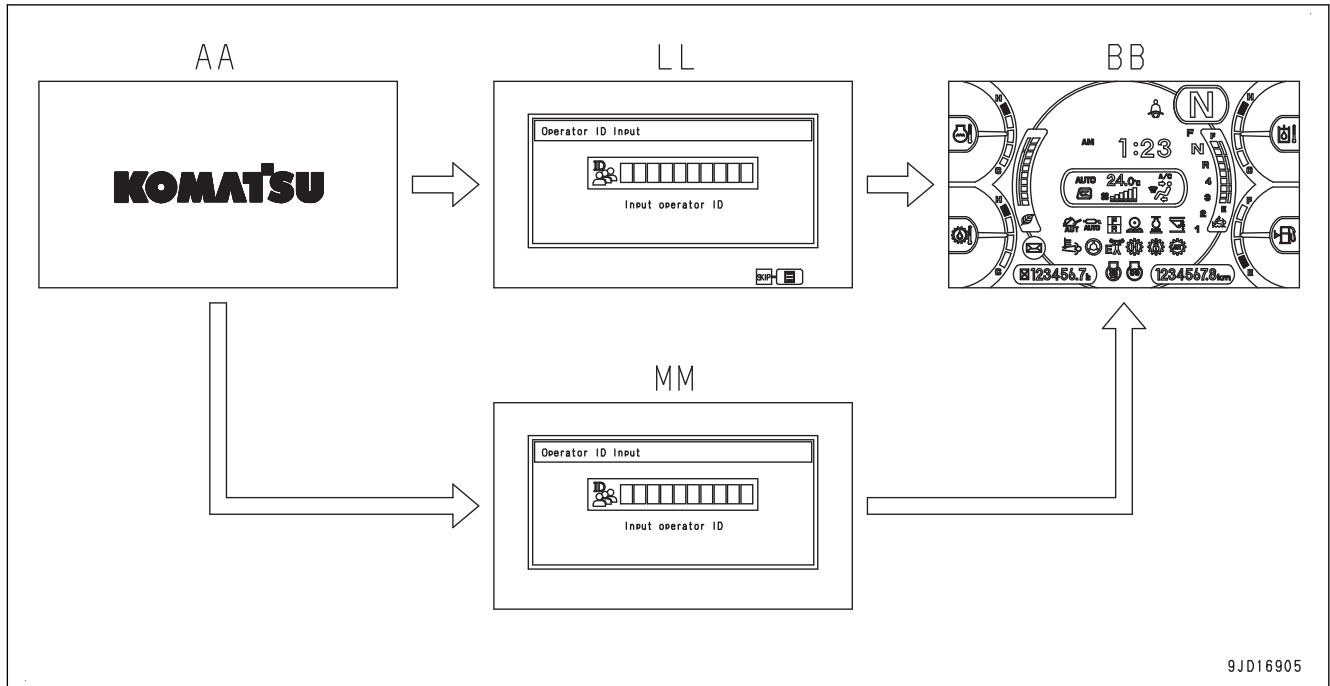
For the method of displaying and replying the messages, see "MESSAGE DISPLAY (3-42)".

End screen with "Operational Advice"

If there is any "Operational Advice", "Operational Advice" is displayed on end screen EE for 5 seconds, and then the screen goes out.

For the "Operational Advice" when ending, see "SWITCH DISPLAY/NON-DISPLAY OF GUIDANCE WHEN KEY IS OFF (3-69)".

BASIC OPERATION OF MACHINE MONITOR WHEN STARTING SWITCH IS ON WHILE OPERATOR ID INPUT IS SET

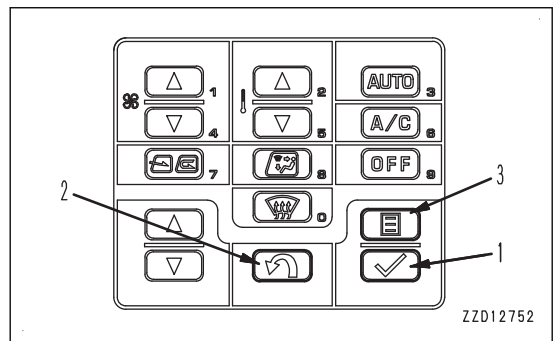


9JD16905

- If inputting ID number for operator identification function (with SKIP) is set, the opening screen AA switches to ID number input screen LL (with SKIP) when the starting switch is turned to ON position.
- If inputting ID number for operator identification function (without SKIP) is set, the opening screen AA switches to ID number input screen MM (without SKIP) when the starting switch is turned to ON position.

- On the ID number input screen LL (with SKIP) or MM (without SKIP), input the already registered ID number, and press ENTER switch (1). The screen changes to the Check Before Starting screen BB. If you input an incorrect ID number, press RETURN switch (2), and clear an input character at a time.

On the ID number input screen LL (with SKIP), press menu switch (3), and the screen changes to the Check Before Starting screen BB without inputting ID number.



ZZD12752

REMARK

- Contact your Komatsu distributor for details of the method of setting, changing, or canceling the operator identification function.
- Depending on the set value of ID holding time, even if inputting ID number for operator identification function is set, the ID number input screen LL (with SKIP) or MM (without SKIP) may not be displayed while the starting switch is turned to ON position.

If inputting incorrect ID number for 3 times continuously, you cannot input ID number for 5 minutes. Wait for more than 5 minutes, try inputting ID number again.

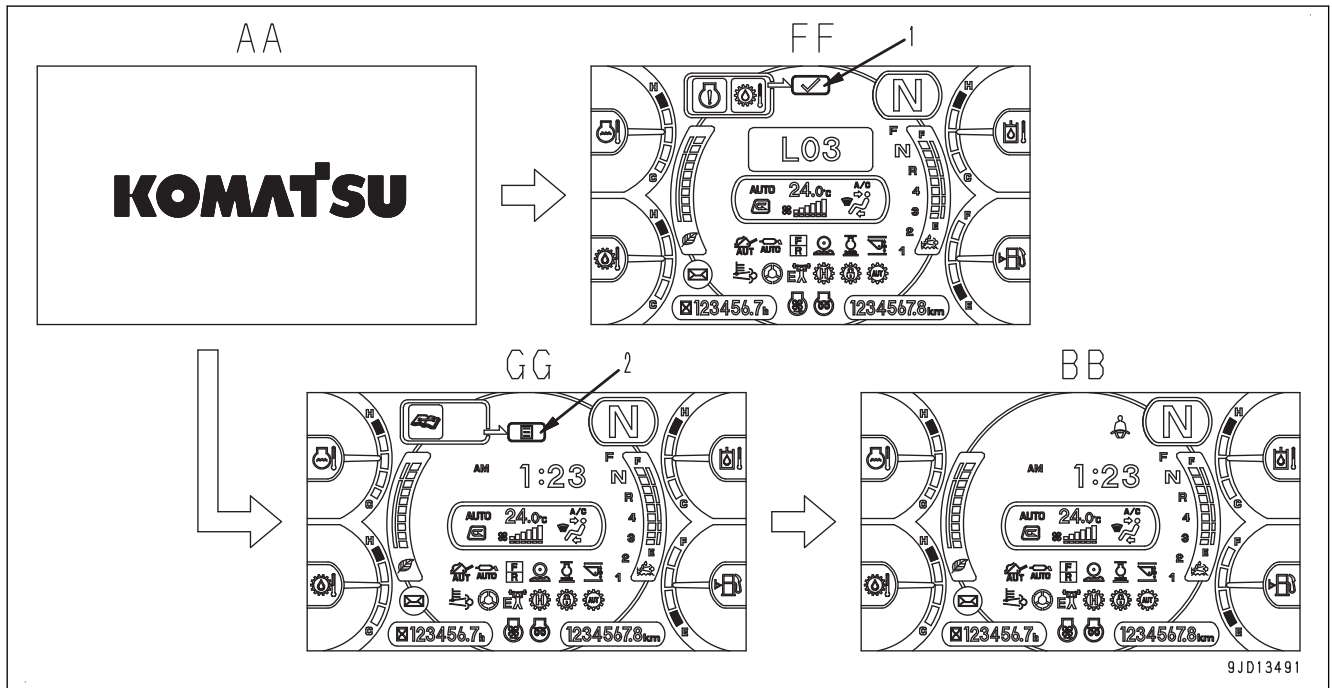
As long as ID number input screen is displayed, the engine cannot be started. If you forget the ID number and cannot start the engine, confirm the person in charge of the machine.

NOTICE

Since the purpose of the operator identification function is neither security enhancement nor a protection against theft, it has no antitheft effect. Be careful not to use it for the purpose of security enhancement.

Komatsu cannot accept any responsibility for any loss or damage resulting from the wrong use of ID or unauthorized use of ID by a third person.

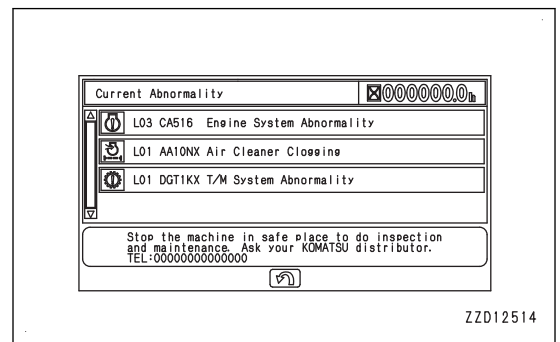
BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE IN ABNORMAL SITUATION



When the machine monitor is started, if the machine has trouble, starting screen AA is displayed for 2 seconds and then it is changed to the failure display screen FF.

When ENTER switch displayed in guidance icon (1) is pressed, the “Current Abnormality” screen is displayed.

For the “Current Abnormality” screen and the remedies, see “CURRENT ABNORMALITY LIST DISPLAY (3-19)”.

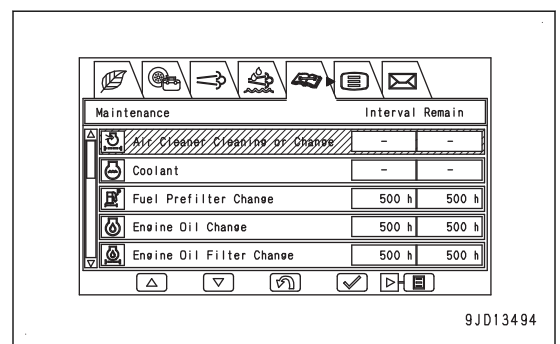


When the machine monitor is started, if the time to the next maintenance of any item is 30 hours or less, starting screen AA is displayed for 2 seconds and then it is changed to maintenance time warning screen GG.

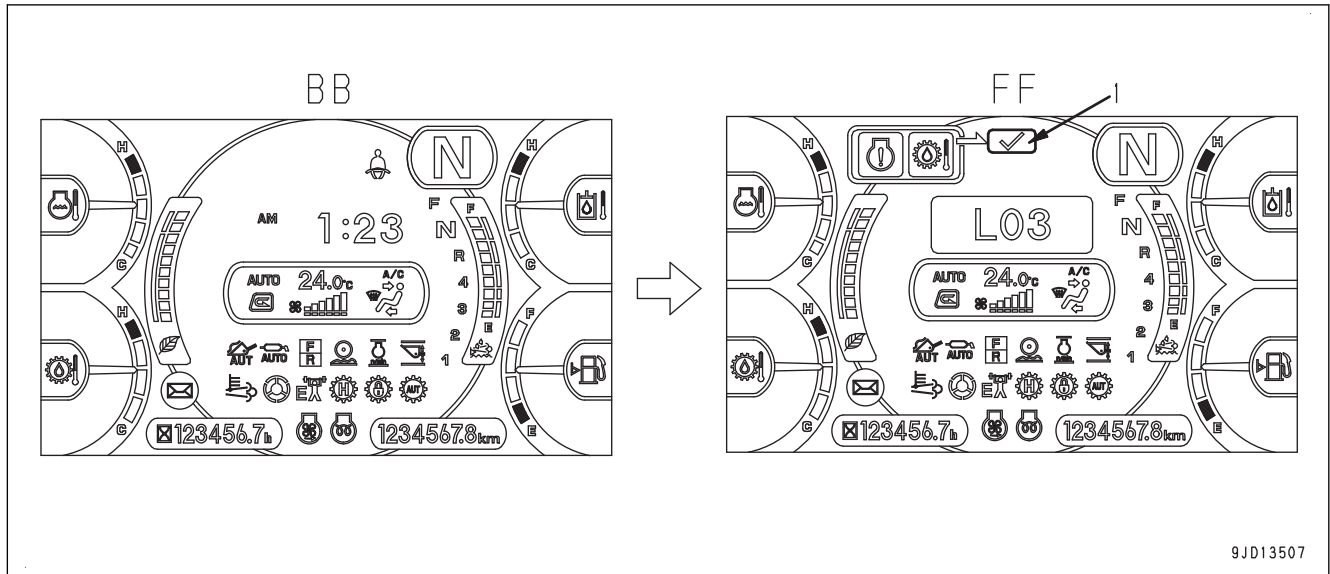
When the menu switch displayed in guidance icon (2) is pressed, the “Maintenance” menu screen is displayed.

For the “Maintenance” menu screen and the remedies, see “MAINTENANCE SCREEN SETTING (3-83)”.

After displaying maintenance time warning screen GG for 30 seconds, the screen returns to the standard screen BB.



BASIC OPERATION OF MACHINE MONITOR WHEN TROUBLE OCCURS WHILE OPERATING MACHINE



If any trouble occurs during operation, the standard screen BB changes to the failure display screen FF.

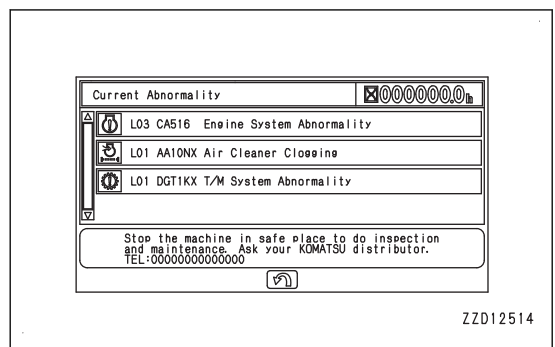
When ENTER switch is pressed while guidance icon (1) is displayed, the "Current Abnormality" screen is displayed.

For the "Current Abnormality" screen and the remedies, see "CURRENT ABNORMALITY LIST DISPLAY (3-19)".

REMARK

Guidance icon (1) is displayed only while the machine is stopped completely.

Even when ENTER switch is pressed while the machine is not stopped completely, the "Current Abnormality" screen is not displayed.



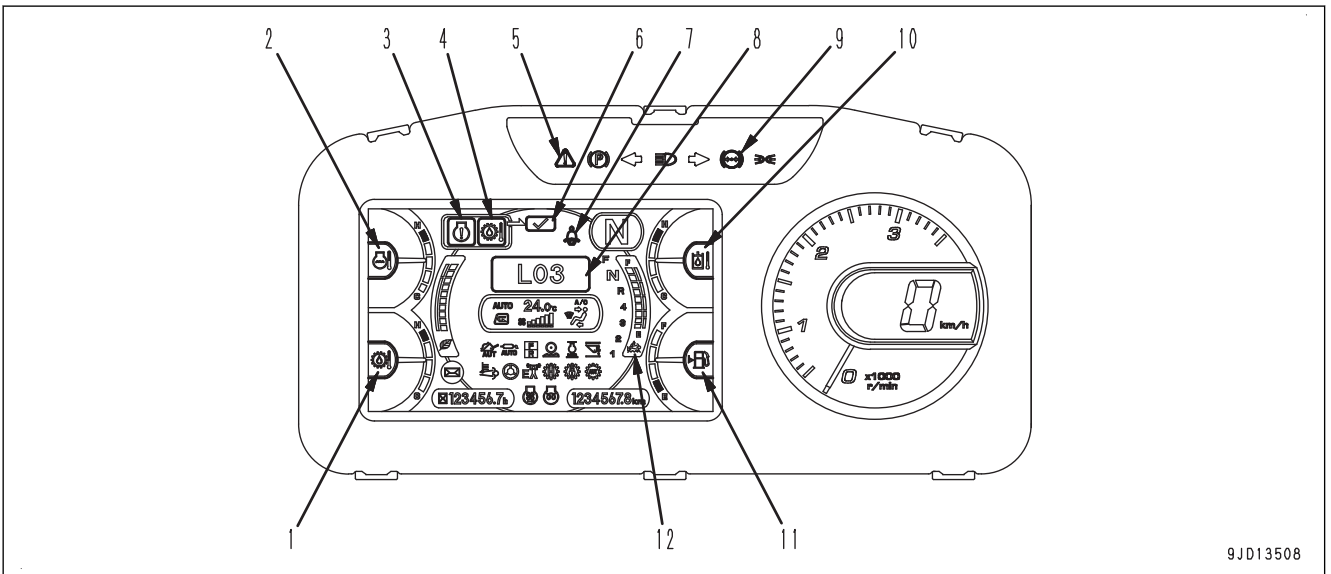
WARNING DISPLAY

NOTICE

Appearance of any of action levels “L01” to “L04” on the machine monitor indicates presence of an abnormality the machine.

Perform the inspection and maintenance according to “ACTION LEVEL DISPLAY (3-18)”.

- These cautions do not guarantee the condition of the machine.
Do not simply rely on the monitor when carrying out checks before starting (daily inspection). Always get off the machine and check each item directly.
- When the warning caution is displayed in red, if no action is taken, the machine can be seriously affected. Accordingly, take proper remedies immediately.
- The engine output or engine speed is limited and the machine operation speed may become slow, depending on the contents of the warning.



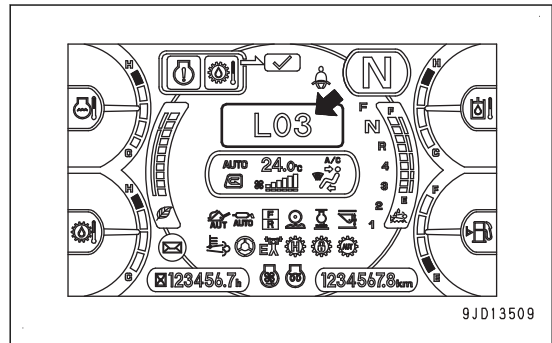
- | | |
|---|---|
| (1) Torque converter oil temperature caution lamp | (7) Seat belt caution lamp |
| (2) Engine coolant temperature caution lamp | (8) Action level |
| (3) Warning display | (9) Brake oil pressure caution lamp |
| (4) Warning display | (10) Hydraulic oil temperature caution lamp |
|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

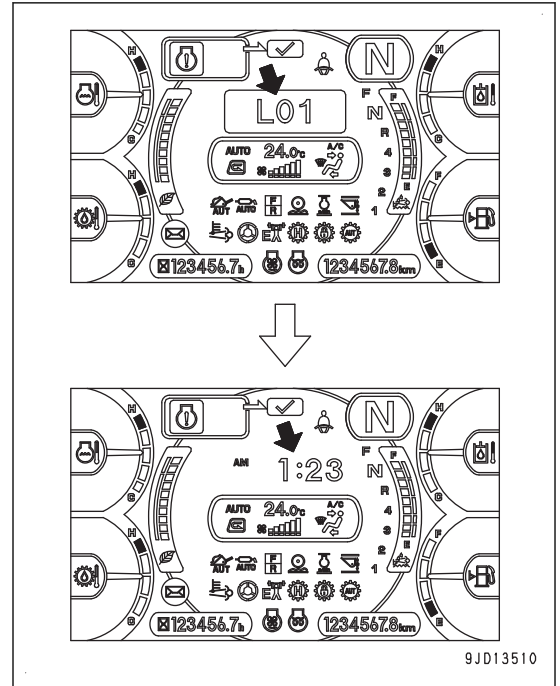


List of action level displays and required actions

De-gree of urgen-cy	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, move the machine to a safe area, and 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 about secondary steering, do not operate the secondary steering for a long time. If there is a display about the radiator coolant level, stop the operation and move the machine to a safe area, then do the inspection and maintenance. 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 finish the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

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.



CURRENT ABNORMALITY LIST DISPLAY

The monitor provides information on failures that occurred on the machine and necessary remedies for action levels that are displayed.

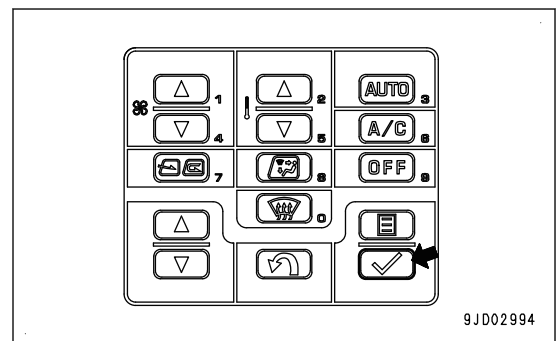
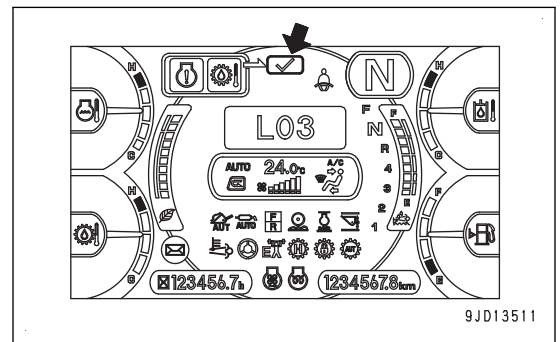
When ENTER switch is pressed while the guidance icon is displayed, the screen changes to the “Current Abnormality” screen.

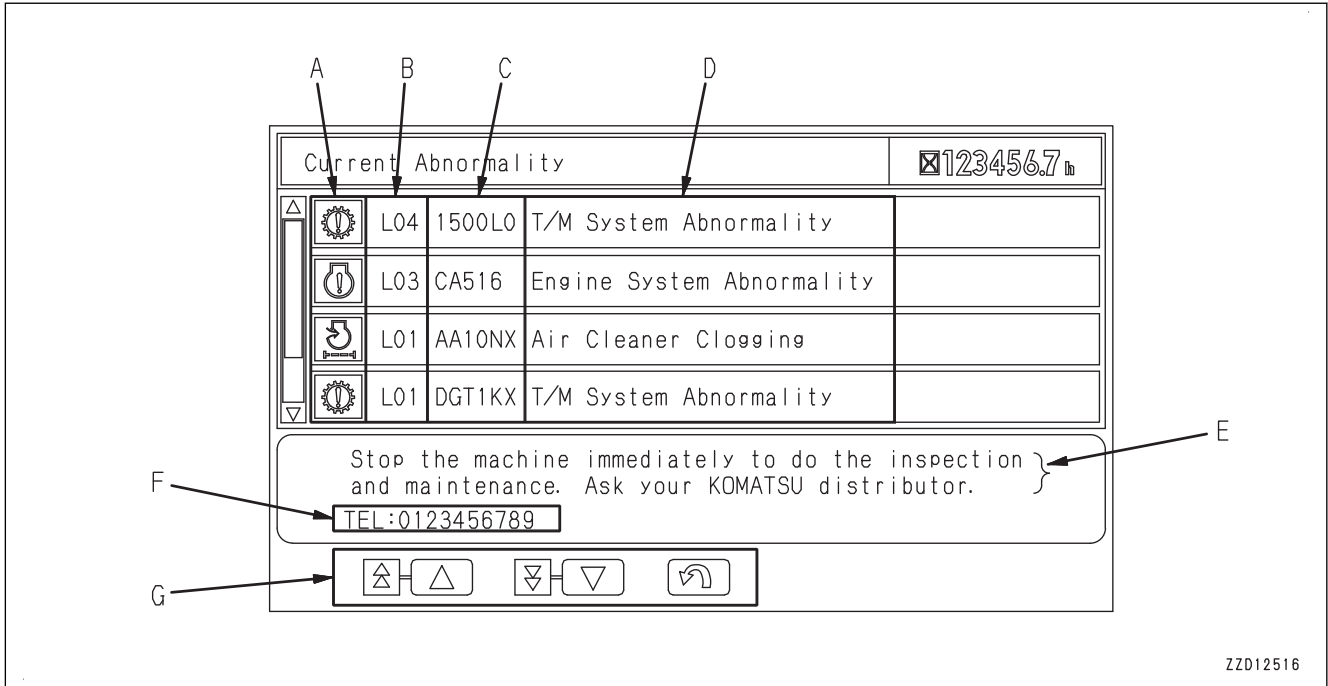
Take appropriate remedies according to the message displayed on the monitor.

REMARK

The guidance icon is displayed only while the machine is stopped completely.

Even when ENTER switch is pressed while the machine is not stopped completely, the “Current Abnormality” screen is not displayed.





(A) Caution lamp

(B) Action level

(C) Failure code

Code to indicate the content of the failure. Notify it when calling your Komatsu distributor.

(D) Failure name

(E) Message

Take appropriate remedies according to the displayed message.

(F) Contact telephone number

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

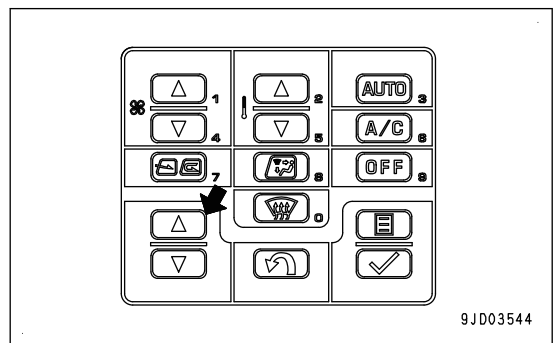
If no point of contact telephone number is registered, no telephone number is displayed.

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

(G) Guidance icon

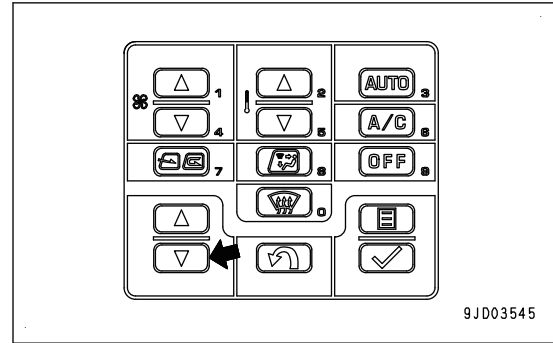
On the "Current Abnormality" list screen, the following switches displayed in guidance icon (G) can be operated.

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

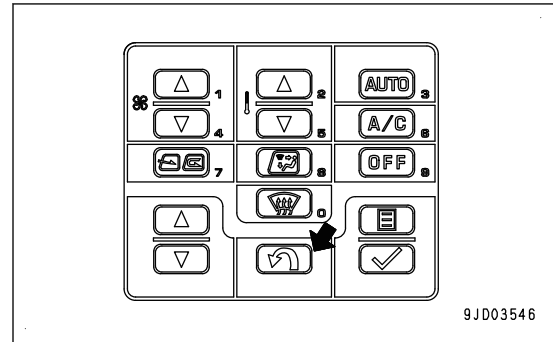


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DOWN switch: Moves to the next page. When on the last page, it moves to the first page.



RETURN switch: Returns to the standard screen.



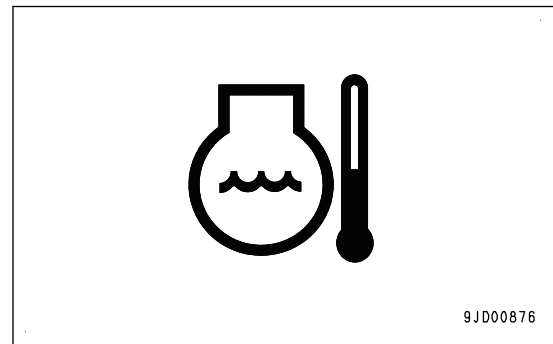
ENGINE COOLANT TEMPERATURE CAUTION LAMP

Engine coolant temperature caution lamp warns about overheating of the engine coolant.

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

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

Place the machine in a safe place, set the directional lever and directional selector switch (if equipped) to NEUTRAL position (N), and run the engine at a medium speed under no load until the caution lamp goes out.



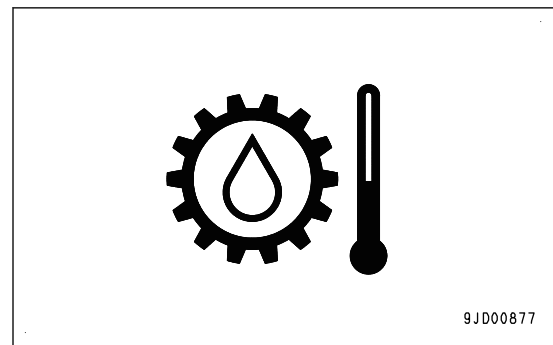
TORQUE CONVERTER OIL TEMPERATURE CAUTION LAMP

The torque converter oil temperature caution lamp warns about overheating 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 displayed.

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

Place the machine in a safe place, set the directional lever and directional selector switch (if equipped) to NEUTRAL position (N), and run the engine at a medium speed under no load until the caution lamp goes out.



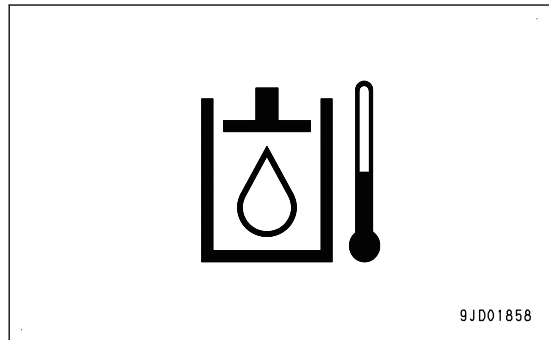
HYDRAULIC OIL TEMPERATURE CAUTION LAMP

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 action level "L02" is displayed.

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

Place the machine in a safe place, set the directional lever and directional selector switch (if equipped) to NEUTRAL position (N), and run the engine at a medium speed under no load until the caution lamp goes out.

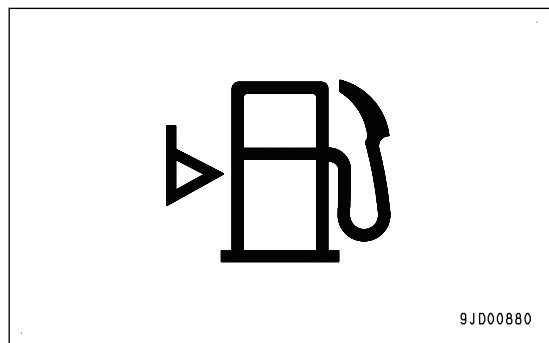


FUEL LEVEL CAUTION LAMP

The fuel level caution lamp warns about low remaining fuel level.

The lamp lights up in red if the fuel level is 28 l {7.4 U.S.Gal} or below.

Add fuel as soon as possible.



BRAKE OIL PRESSURE CAUTION LAMP

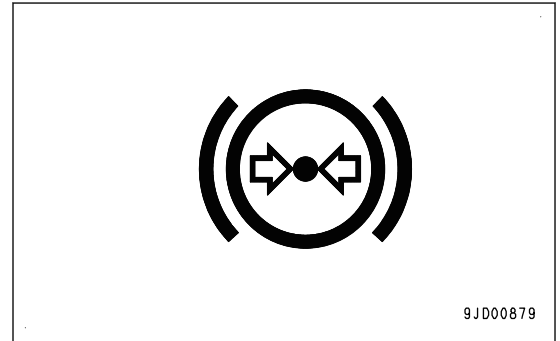
The brake oil pressure caution lamp warns that the brake oil pressure is below the specified value.

When action level “L03” is displayed

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

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

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



When action level is not displayed and 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 the engine is started, the caution lamp lights up in red until the brake oil pressure increases above the specified value.

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

Wait until the caution lamp goes out, and then move the machine.

SYSTEM CAUTION LAMP

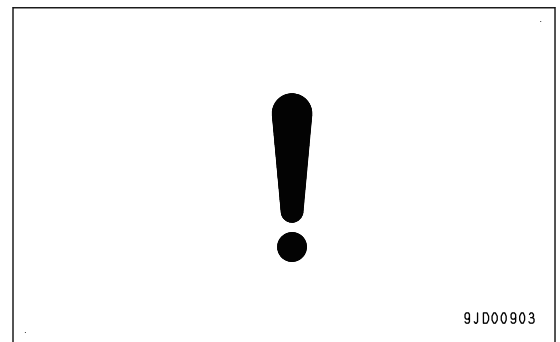
The system caution lamp warns about abnormality in the system.

When action level “L03” is displayed

The caution lamp lights up in red.

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

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



When action level “L01” is displayed

The caution lamp lights up in yellow.

When you finish the operation, always perform the inspection and maintenance.

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

WORK EQUIPMENT SYSTEM CAUTION LAMP

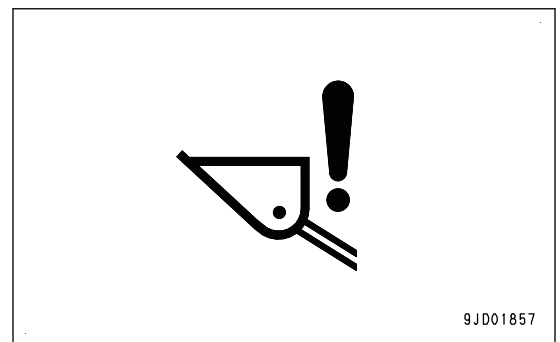
The work equipment system caution lamp warns about abnormality in the work equipment system.

When action level “L03” is displayed

The caution lamp lights up in red.

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

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



When action level “L01” is displayed

The caution lamp lights up in yellow.

When you finish the operation, always perform the inspection and maintenance.

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

BRAKE OIL TEMPERATURE CAUTION LAMP

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

If the machine is operated continuously under severe condition or the brake is used frequently on a long downhill slope, the brake oil temperature increases.

If the caution lamp lights up in yellow, perform the following remedies according to the machine state just before the lamp lights up.

(1) When performing the load-and-carry operation repetitively

- Return the accelerator pedal, refrain from high speed travel, and check whether symptom changes or not.
- Use E mode or turn off the torque converter lockup switch, and apply the brake after the speed has been decreased. After a while, the oil temperature goes down.

(2) When the machine has been traveling downhill in a long slope by using the brake

- Downshift the gear speed and drive the machine at a stable speed.
- Use the engine brake together with the brake. (Using the lockup function together is more effective.)

(3) When performing the operation which needs frequent braking

- If you drive the machine or perform the work while dragging the brake, the oil temperature increases. Adjust the travel speed by accelerator operation.

(4) When the machine travels at high speed in a long distance continuously

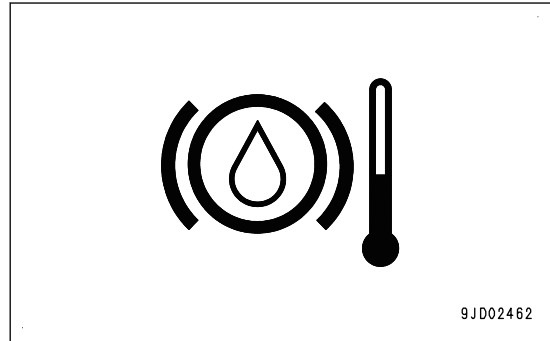
- Return the accelerator pedal, refrain from high speed travel, and check whether symptom changes or not.
- Use E mode or turn OFF the torque converter lockup switch, and apply the brake after the speed has been decreased. After a while, the oil temperature goes down.

(5) When performing the loading work such as V-shape loading continuously for a long time

- Turn ON the transmission cut-off switch and decrease the braking frequency.
- Decrease the travel speed when approaching the dump truck to reduce the load on the brake.
- Depress the brake pedal intermittently not constantly.

After a while the preceding remedies have been taken, the oil temperature decreases and the caution lamp goes out.

If the brake oil temperature caution lamp frequently lights up, record the operation, travel speed, and the state of braking just before the lamp lights up, then consult your Komatsu distributor.



DEF LEVEL CAUTION LAMP

DEF level caution lamp alerts when DEF tank level becomes low.

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

Fault conditions that result in activation of the Inducement strategy for engine derates to prompt to maintain or repair the emission control system.

When Lightning in red,

With Action level "L04", DEF tank level is too low. Inducement status is "Final Inducement". Engine speed is fixed at low idle.

With Action level "L04", DEF tank level is too low. Inducement status is "Severe Inducement". Engine power is under heavy deration.

With Action level "L03", DEF tank level is low. Inducement status is "Mild Inducement". Engine power is under deration.

With No Action level display. DEF tank level is lower. Inducement status is "Escalated Warning". Need to add DEF immediately to avoid advancing to the next Inducement status.

With No Action level display. Warning starts. Inducement status is "Warning". Need to add DEF immediately.

When Lightning in white

When fluctuation of DEF tank level is large, frozen, or not limited to, tank level sensing is not performed correctly.

When DEF is added after engine starting switch turn to OFF.

When DEF tank level sensor is defective.

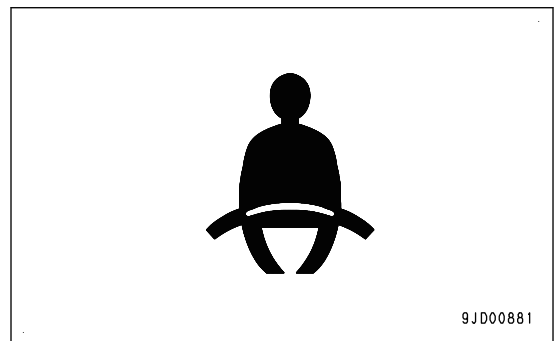
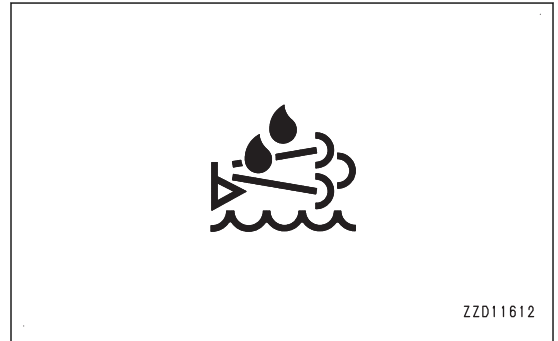
REMARK

For more information about the Inducement strategy, and Inducement status concerning engine power deration, see "HANDLE UREA SCR SYSTEM WARNING (3-153)".

SEATBELT CAUTION LAMP

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

Always fasten the seat belt while traveling because there may be a possible danger.

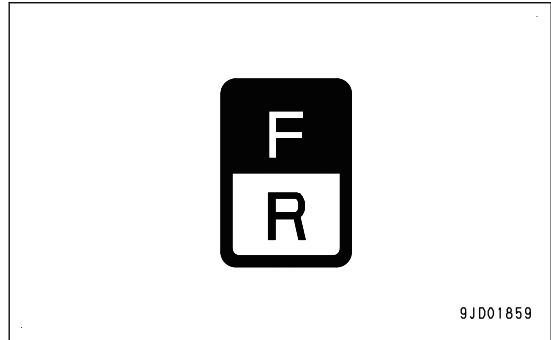


DIRECTIONAL SWITCH CAUTION LAMP

(if equipped)

The directional switch caution lamp warns the operator that there is wrong operation of the directional selector switch or directional lever.

If the caution lamp lights up in red, return the directional selector switch and directional lever to NEUTRAL position (N).

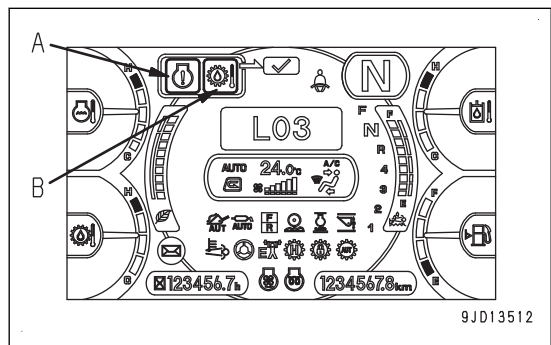


WARNING DISPLAY

The caution lamps displayed on the warning display section are as follows. Take appropriate measures according to the specified remedies.

REMARK

- When 1 type of alarm is generated, it is displayed on caution lamp (A).
- When 2 types of alarm are generated, they are displayed on caution lamps (A) and (B).
- When 3 types of alarm are generated, they are displayed on caution lamps (A) and (B) alternately at intervals of 2 seconds.

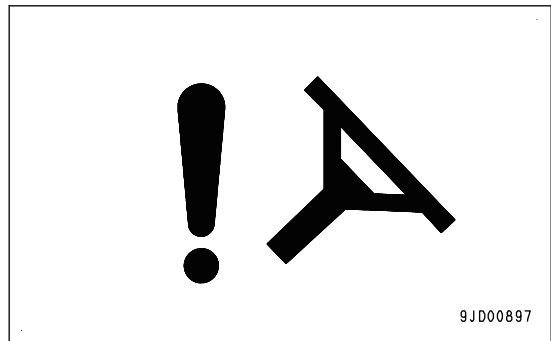


STEERING SYSTEM CAUTION LAMP

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 warns the operator that the steering oil pressure is below the specified value.

When action level "L03" is displayed

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

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

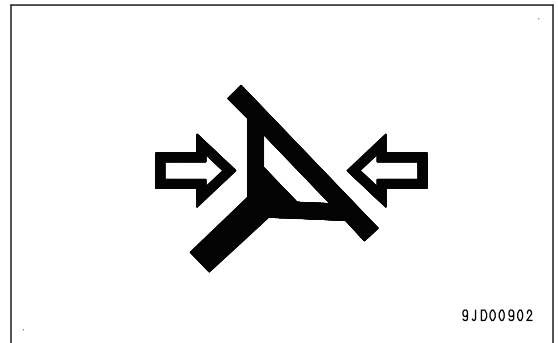
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.

When action level is not displayed and lamp lights up in red

When the engine is started, the caution lamp lights up in red until the steering oil pressure rises above the specified value.

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

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



SECONDARY STEERING SYSTEM CAUTION LAMP

(if equipped)

The secondary steering system caution lamp warns about abnormality in the secondary steering system.

When action level “L03” is displayed

The caution lamp lights up in red.

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

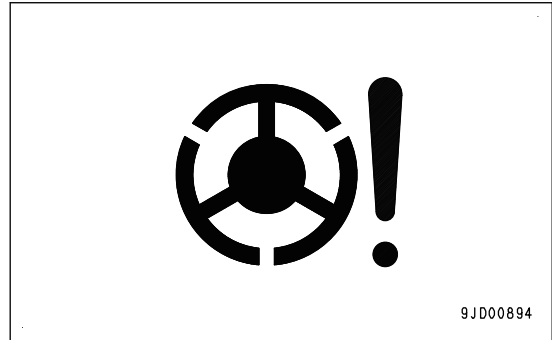
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.

When action level “L01” is displayed

The caution lamp lights up in yellow.

When you finish the operation, always perform the inspection and maintenance.

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



SECONDARY STEERING MOTOR CAUTION LAMP

(if equipped)

The secondary steering motor caution lamp warns that the secondary steering motor has been operating.

When action level “L02” is displayed

The caution lamp lights up in red.

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

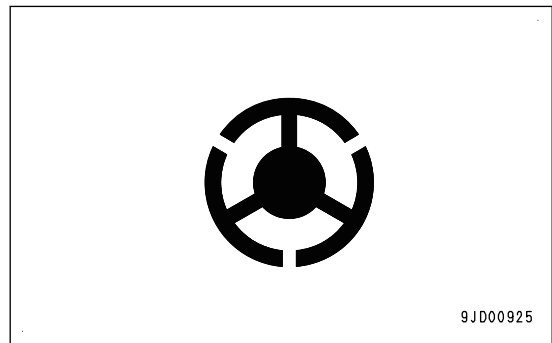
This warns that the secondary steering has been used for a long time.

Do not continue to use the secondary steering for more than 60 seconds.

Action level is not displayed and lamp lights up in red

Secondary steering self-check is being performed.

For details, see “SELF-CHECK FUNCTION FOR SECONDARY STEERING (3-222)”.



TRANSMISSION SYSTEM CAUTION LAMP

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

When action level “L04” is displayed

The caution lamp lights up in red.

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

Immediately stop the machine and ask your Komatsu distributor for inspection and maintenance.

When action level “L03” is displayed

The caution lamp lights up in red.

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

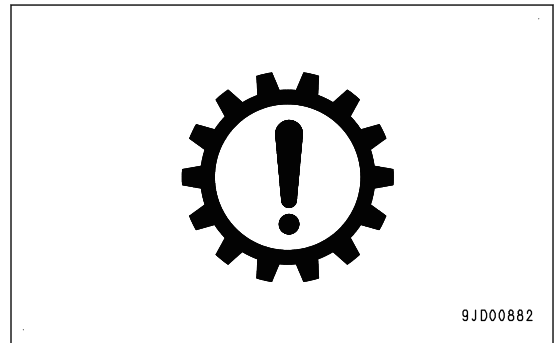
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.

When action level “L01” is displayed

The caution lamp lights up in yellow.

When you finish the operation, always perform the inspection and maintenance.

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



KDPF SYSTEM CAUTION LAMP

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

When action level “L04” is displayed

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 inspection and maintenance.

When action level “L03” is displayed

The caution lamp lights up in red.

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

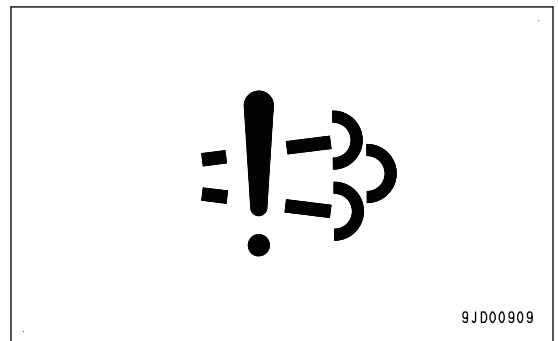
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.

When action level “L01” is displayed

The caution lamp lights up in yellow.

When you finish the operation, always perform the inspection and maintenance.

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



REMARK

If you ignore the caution lamp and continue the work, the peripheral temperature of the aftertreatment devices may increase abnormally.

For the aftertreatment devices, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)”.

KDPF SOOT ACCUMULATION CAUTION LAMP

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

When action level “L03” is displayed

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 alarm buzzer sounds intermittently.

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

The manual stationary regeneration may start automatically to protect the KDPF system.

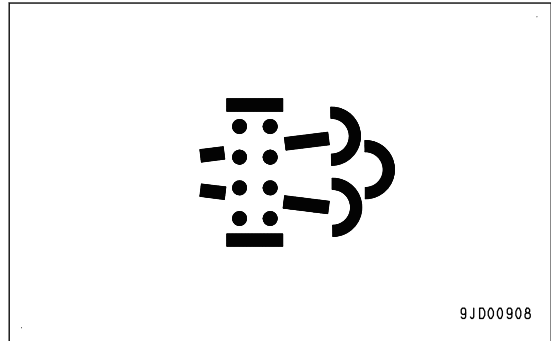
When action level “L01” is displayed

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

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

REMARK

For details of the manual stationary regeneration, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)”.



DEF SYSTEM CAUTION LAMP

DEF system caution lamp alerts when abnormality in the system are detected.

Whenever the caution lamp lights up in yellow or in red, take necessary actions by instructions.

Fault conditions that result in activation of the Inducement strategy for engine derates to prompt to maintain or repair the emission control system.

Lighting in red

With Action level “L04”, Inducement status is “Final Inducement”. Engine speed is fixed at low idle.

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

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

Lighting in yellow

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

When “Escalated Warning”, If no maintenance, advancing to the next Inducement status. Engine power will be derated.

REMARK

For more information about the Inducement strategy, and Inducement status concerning engine power deration, see “HANDLE UREA SCR SYSTEM WARNING (3-153)”.



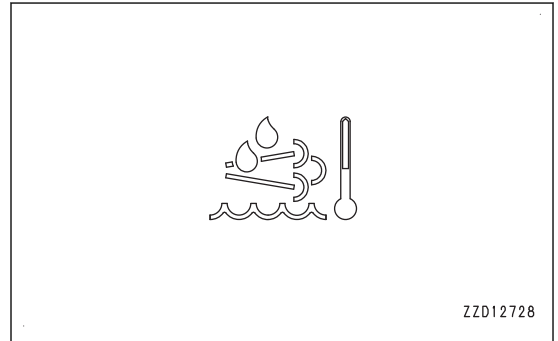
DEF SYSTEM HIGH TEMPERATURE STOP CAUTION LAMP

DEF system high temperature stop caution lamp alerts when the times of engine is shut down under the condition of high degree temperature of DEF system exceeds the defined number of times.

Whenever the caution lamp lights up in yellow, it is necessary to ask your Komatsu distributor to go off this caution lamp.

When stopping the engine, stop it after running it at low idle for approximately 5 minutes. For details, see "METHOD FOR STOPPING ENGINE (3-209)".

When stopping the engine during the aftertreatment devices regeneration, stop the regeneration first according to "PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING (3-149)", then stop the engine after running it at low idle for approximately 5 minutes.



ENGINE SYSTEM CAUTION LAMP

WARNING

If the operation is continued while the caution lamp is lit in red, accumulation and combustion of the soot in KDPF are accelerated, and consequently the temperature of KDPF and exhaust gas can increase high. Stop the engine immediately.

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

When action level "L04" is displayed

The caution lamp lights up in red.

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

Immediately stop the machine and ask your Komatsu distributor for inspection and maintenance.

When action level "L03" is displayed

The caution lamp lights up in red.

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

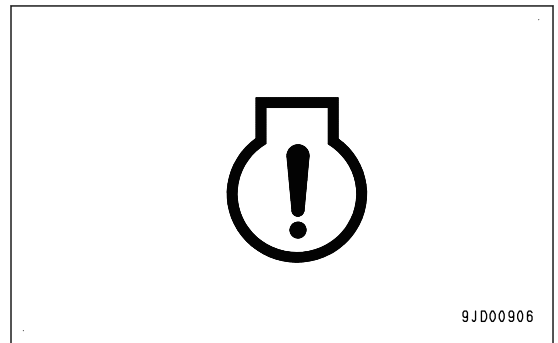
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.

When action level "L01" is displayed

The caution lamp lights up in yellow.

When you finish the operation, always perform the inspection and maintenance.

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



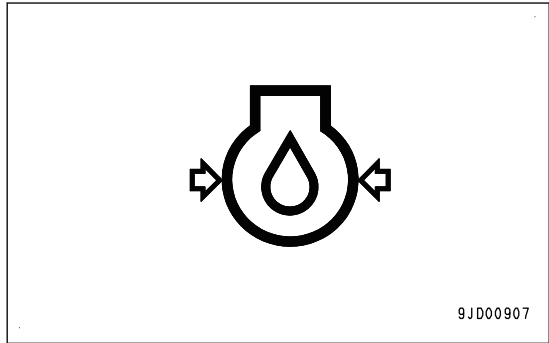
ENGINE OIL PRESSURE CAUTION LAMP

Engine oil pressure caution lamp warns about low engine lubricating oil pressure.

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

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

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



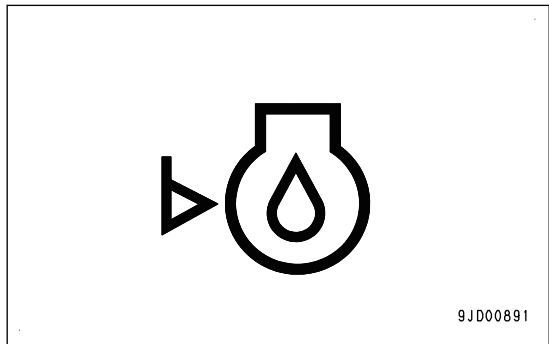
ENGINE OIL LEVEL CAUTION LAMP

Engine oil level caution lamp warns about drop of engine lubricating oil level. It displays only while the engine is stopped.

If the caution lamp lights up in yellow and action level "L01" is displayed, inspect the oil level in the oil pan and add oil.

See "METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL (3-176)".

If it occurs again in a short time, the engine oil may be leaking. Ask your Komatsu distributor for inspection and maintenance.



ENGINE OVERRUN CAUTION LAMP

The engine overrun caution lamp warns the operator that the engine speed is higher than the allowable range.

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

If the engine speed increases more, action level "L02" is displayed.

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 the radiator coolant level.

When the coolant level is continuously low

The caution lamp lights up in red, the alarm buzzer operates intermittently, and the action level "L02" is shown.

Stop the operation, move the machine to a safe area, and check the coolant level in the radiator and add coolant.

Check the coolant level in the reservoir tank of the radiator and add coolant.

See "METHOD FOR CHECKING COOLANT LEVEL, ADDING COOLANT (3-175)".

When the coolant level is low

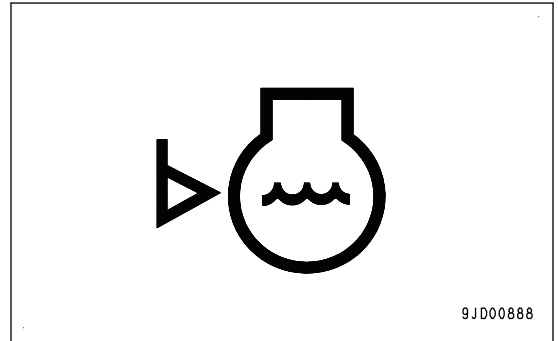
The caution lamp lights up in yellow, and the action level "L01" is shown.

The radiator coolant level is low.

Check the coolant level in the reservoir tank of the radiator and add coolant.

See "METHOD FOR CHECKING COOLANT LEVEL, ADDING COOLANT (3-175)".

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



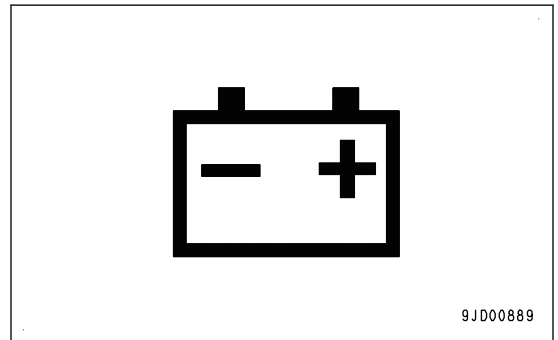
CHARGE LEVEL CAUTION LAMP

Charge level caution lamp warns about abnormality in the charging system while the engine is running.

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

At the same time, action level "L03" is displayed and the centralized warning lamp lights up and the alarm buzzer sounds intermittently.

Stop the engine and check the alternator belt for damage, then ask 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.

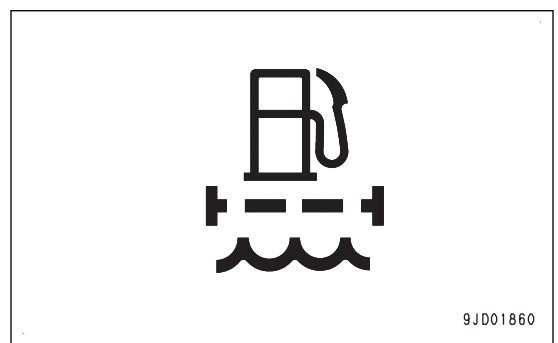
Stop the engine and drain water from the water separator.

For details, see "METHOD FOR CHECKING WATER SEPARATOR, DRAINING WATER AND SEDIMENT (3-173)".

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.

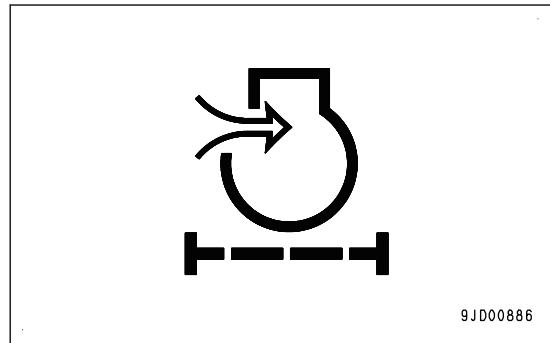


AIR CLEANER CLOGGING CAUTION LAMP

Air cleaner clogging caution lamp warns about clogging of the air cleaner.

If the caution lamp lights up in yellow and action level "L01" is displayed, stop the engine, then inspect and clean the air cleaner.

See "METHOD FOR CHECKING, CLEANING AND REPLACING AIR CLEANER (4-19)".



FAN CONTROL SYSTEM CAUTION LAMP

The fan control system caution lamp warns about abnormality in the fan control system.

When action level "L03" is displayed

The caution lamp lights up in red.

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

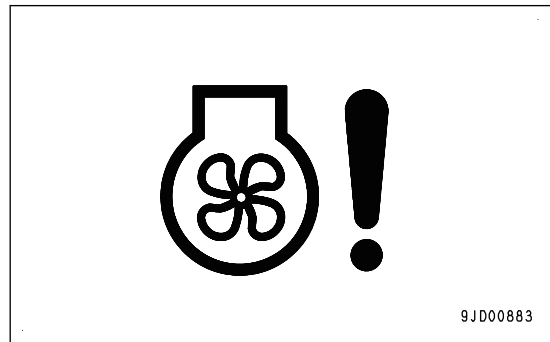
Stop the operation, move the machine to a safe place, stop the engine, then ask your Komatsu distributor for inspection and maintenance.

When action level "L01" is displayed

The caution lamp lights up in yellow.

When you finish the operation, always perform the inspection and maintenance.

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

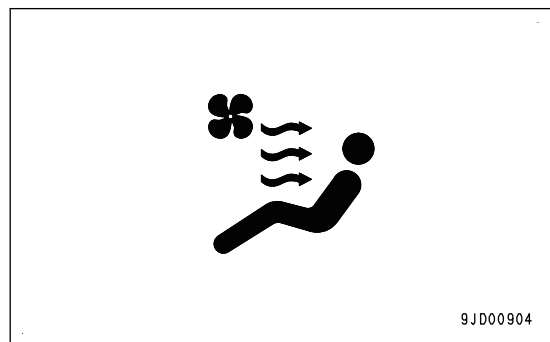


AIR CONDITIONER SYSTEM CAUTION LAMP

Air conditioner system caution lamp warns about abnormality in air conditioner system.

If the caution lamp lights up in yellow and action level "L01" is displayed, always perform inspection and maintenance after the operation is finished.

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



MAINTENANCE TIME CAUTION LAMP

Maintenance time caution lamp displays notices and alarms concerning maintenance time.

This lamp lights up when the starting switch is turned to ON position. It goes out after 30 seconds and the display changes to the standard screen.

When lamp lights up in red

The maintenance due time is over.

If no action is taken, the machine performance will become worse and the machine life will be shortened. Perform necessary maintenance as soon as possible.

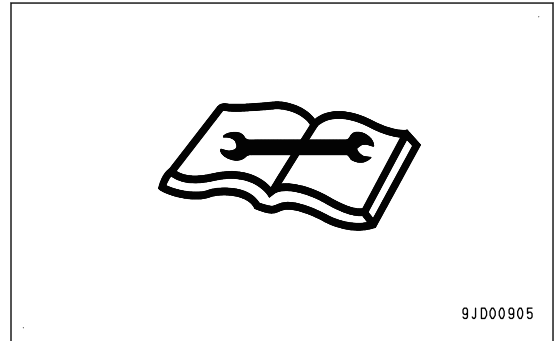
When lamp lights up in yellow

The maintenance due time is approaching.

Prepare necessary parts for the maintenance.

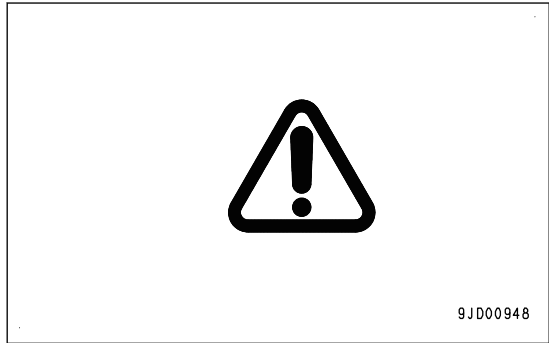
REMARK

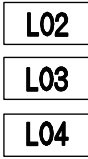




- To check the items that need maintenance, see the "Maintenance" menu screen.
- On the standard screen, when the menu switch is pressed while the caution lamp is lit, the screen changes directly to the "Maintenance" menu screen.
- For operations on the "Maintenance" menu screen, see "MAINTENANCE SCREEN SETTING (3-83)".
- By default, the maintenance time caution lamp (yellow) is set to light up when the remaining time reaches 30 hours. However, you can change this setting. To change the setting, ask your Komatsu distributor.



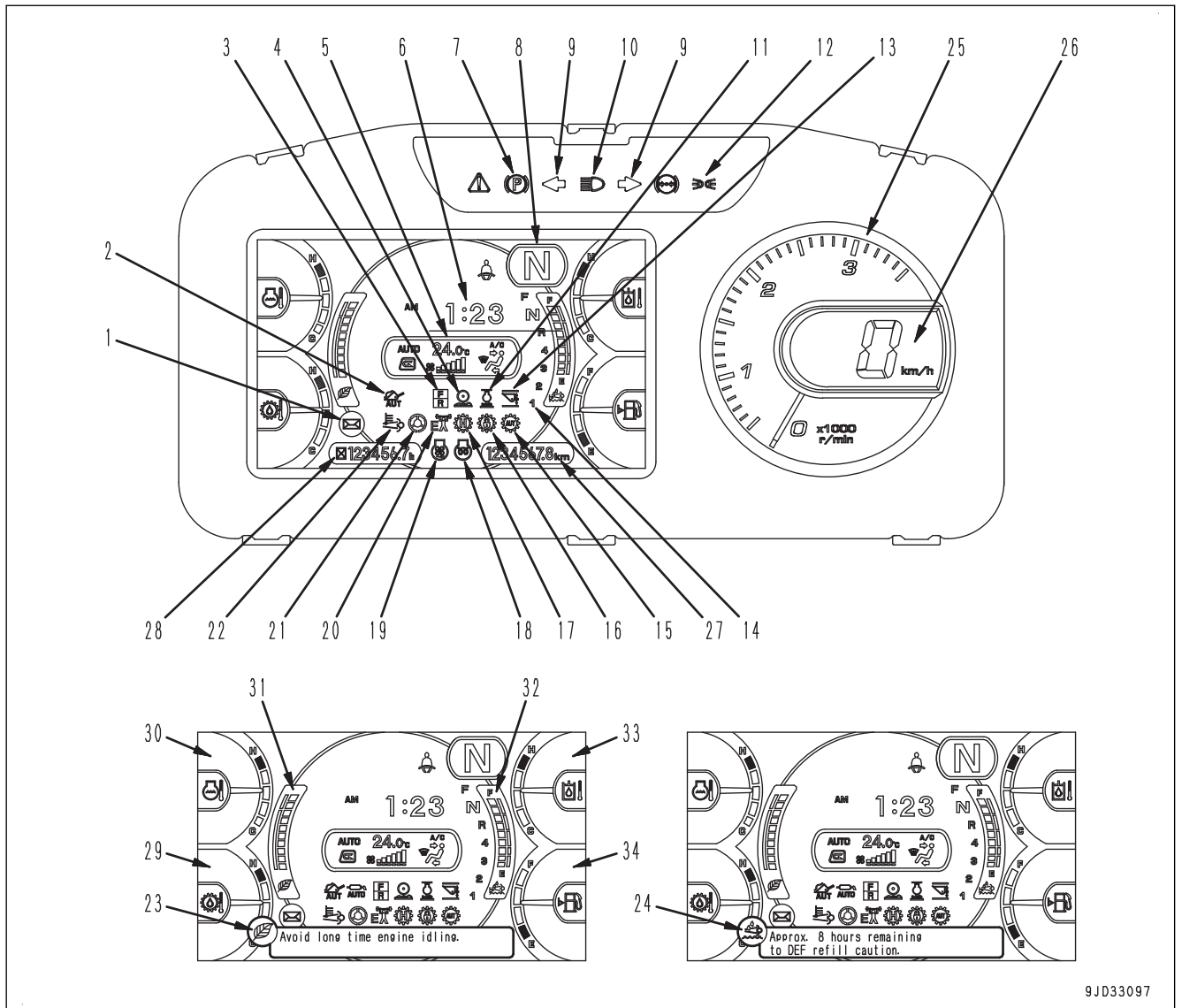
CENTRALIZED WARNING LAMP

The centralized warning lamp lights up in red and at the same time the alarm buzzer sounds intermittently when the machine is in any of the following conditions.



Machine conditions under which centralized warning lamp lights up	Other monitor displays	
When action level L02, L03, or L04 is displayed on the machine monitor.	 <p>9JD03001</p>	
When the engine overrun caution lamp is lit.	 <p>9JD01260</p>	
When the brake oil pressure is below the specified value while the engine is running.	 <p>9JD01255</p>	The brake oil pressure caution lamp lights up.
When starting switch is turned to ON position while the directional lever or directional selector switch (if equipped) is not in NEUTRAL position (N) . When all signals from directional lever or directional selector switch (if equipped) are turned OFF.	 <p>9JD03237</p>	The current gear speed flashes.
When directional lever or directional selector switch (if equipped) is not in NEUTRAL position (N) while the parking brake is applied	-	
When the gear is shifted down or the travel direction is changed while the travel speed is high.	-	
When the directional lever is not in NEUTRAL position (N) while the directional selector switch (if equipped) is effective.	 <p>9JD02645</p>	The directional switch caution lamp flashes.

PILOT DISPLAY AND METER DISPLAY



9JD33097

Pilot display

- | | |
|---|--|
| (1) Message display | (13) Remote positioner display |
| (2) Semi-auto digging pilot lamp | (14) Shift lever position pilot lamp |
| (3) Directional selector pilot lamp (if equipped) | (15) Automatic shift pilot lamp |
| (4) ECSS pilot lamp | (16) Torque converter lockup mode display |
| (5) Air conditioner display | (17) Shift hold pilot lamp |
| (6) Clock | (18) Preheating pilot lamp |
| (7) Parking brake pilot lamp | (18) Transmission cut-off pilot lamp |
| (8) Shift indicator | (19) Fan reverse display |
| (9) Turn signal pilot lamp | (20) Power mode display |
| (10) Headlamp (high beam) pilot lamp | (21) Secondary steering pilot lamp (if equipped) |
| (11) 2-stage low idling pilot lamp (if equipped) | (22) Aftertreatment devices regeneration display |
| (12) Clearance lamp pilot lamp | (23) ECO guidance |
| (13) Work equipment lock pilot lamp | (24) DEF low level guidance |

Meter display

- | | |
|------------------------|------------------|
| (25) Engine tachometer | (26) Speedometer |
|------------------------|------------------|

- (27) R.H. meter
- (28) L.H. meter
- (29) Torque converter oil temperature gauge
- (30) Engine coolant temperature gauge
- (31) ECO gauge
- (32) DEF level gauge
- (33) Hydraulic oil temperature gauge
- (34) Fuel gauge

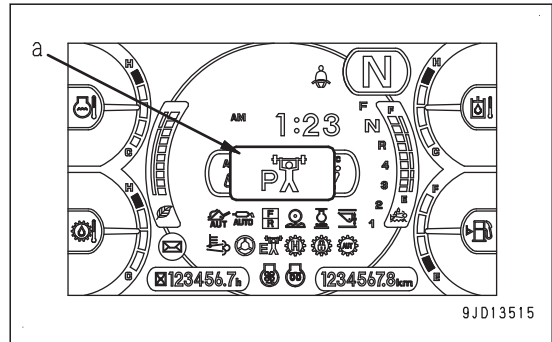
* At sections (13) and (18), 2 types of pilot lamp are prepared.

PILOT DISPLAY

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

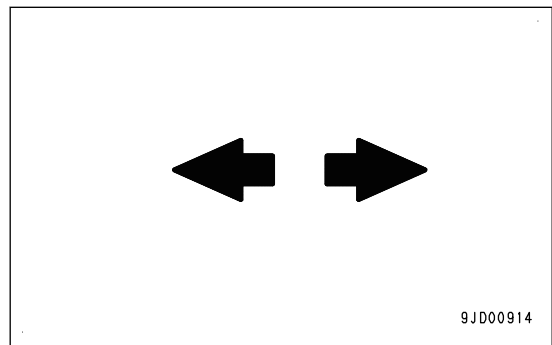
When the starting switch is in ON position, the pilot lamps light up when the display items are functioning.

For some pilot lamps, pop-up (a) is displayed on the screen when the setting is changed.



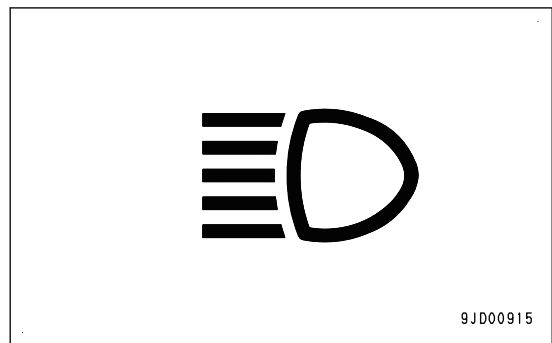
TURN SIGNAL PILOT LAMP

The turn signal pilot lamp flashes synchronously with the turn signal lamp, when it is turned on.



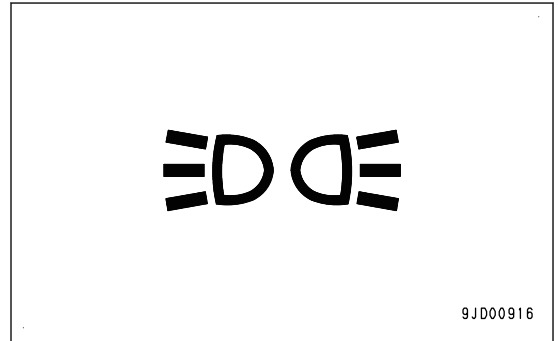
HEADLAMP (HIGH BEAM) PILOT LAMP

The headlamp (high beam) pilot lamp lights up when the headlamps are set to high beam.

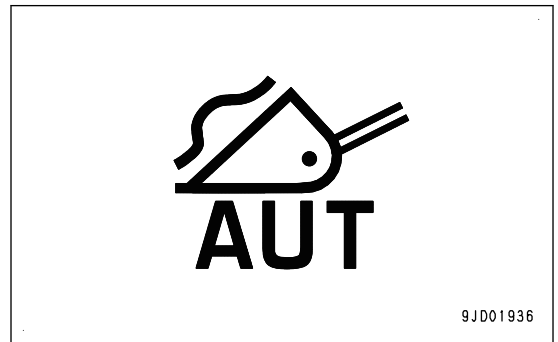


CLEARANCE LAMP PILOT LAMP

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

**SEMI-AUTO DIGGING PILOT LAMP**

The semi-auto digging pilot lamp lights up while the semi auto-digging system is working.

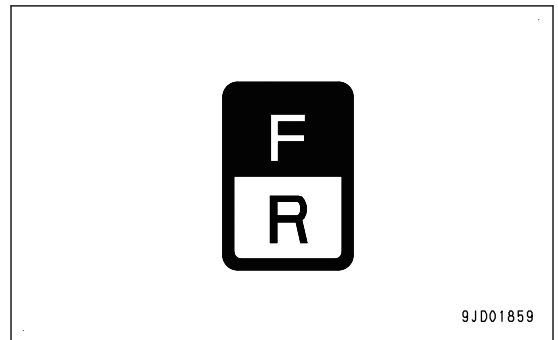
**DIRECTIONAL SELECTOR PILOT LAMP**

(if equipped)

The directional selector pilot lamp lights up in green when the directional selector enable switch on R.H. switch panel is effective.

It lights up in yellow when the directional selector switch is operated wrongly.

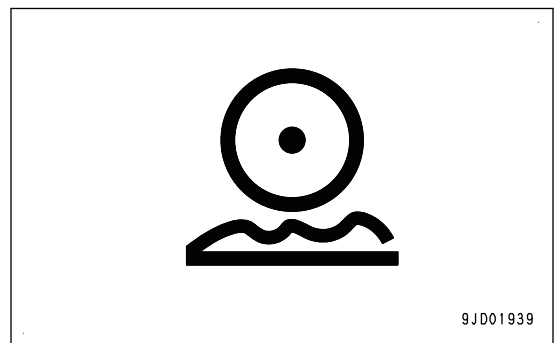
This pops up when the directional selector enable switch on R.H. switch panel is turned on.

**ECSS PILOT LAMP**

The ECSS pilot lamp lights up when ECSS is effective.

When ECSS switch is turned ON, the display pops up.

For detail, see "ECSS SWITCH (3-114)".

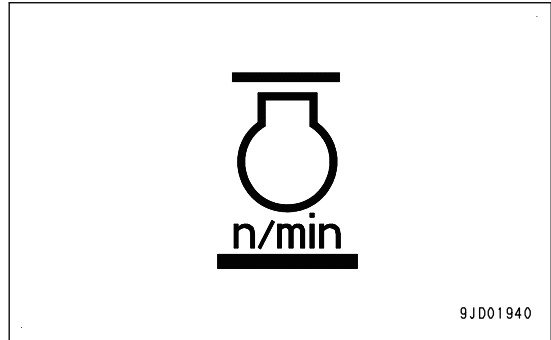


2-STAGE LOW IDLING PILOT LAMP

(if equipped)

The 2-stage low idling pilot lamp lights up when the 2-stage low idle is effective.

If the 2-stage low idle switch is turned ON, the display pops up.

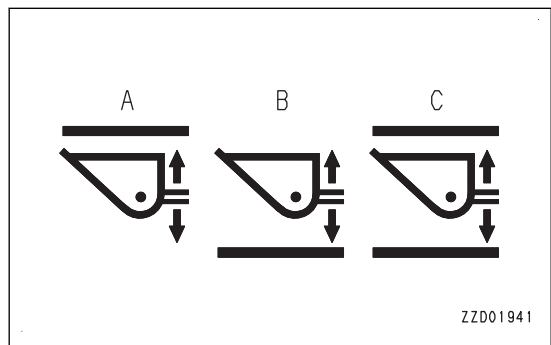


REMOTE POSITIONER DISPLAY

The remote positioner display lights up in green when the remote positioner is effective.

When the remote positioner function is changed from OFF to ON, the display pops up.

- (A): When only RAISE operation is effective
- (B): When only LOWER operation is effective
- (C): When RAISE and LOWER operations are effective



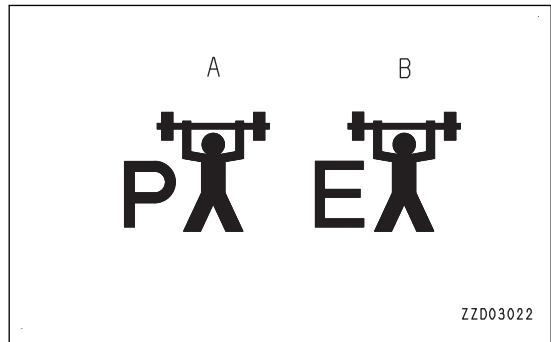
POWER MODE DISPLAY

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

By selecting power mode selector switch, one of the following lamps lights up.

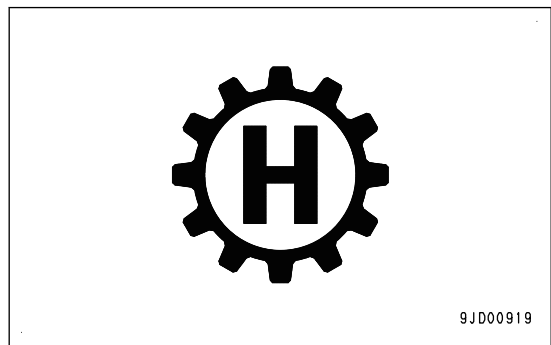
- (A): Power mode
- (B): Economy mode

When the mode is changed, the display pops up.



SHIFT HOLD PILOT LAMP

The shift hold pilot lamp lights up when the shift hold function works.



TORQUE CONVERTER LOCKUP MODE DISPLAY

The torque converter lockup pilot lamp displays the set state of the torque converter lockup mode.

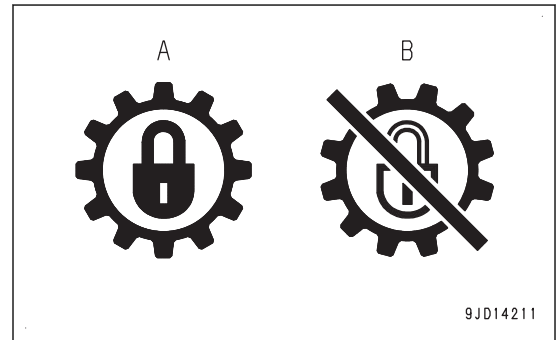
By selecting torque converter lockup mode selector switch, one of the following lamps lights up.

(A): Lockup mode ON

(B): Lockup mode OFF

When the mode is changed, the display pops up.

For selection of the lockup function mode, see "HANDLE TORQUE CONVERTER LOCKUP (3-223)", "LOCKUP FUNCTION SETTING WHEN KEY IS ON (3-81)".

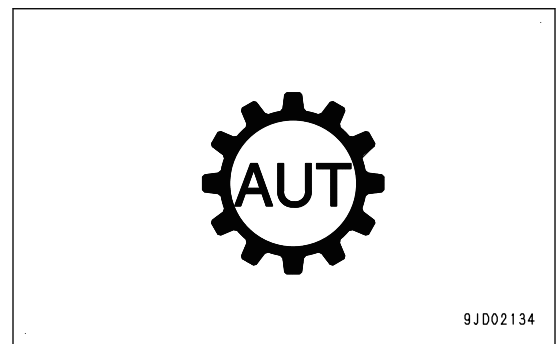


AUTOMATIC SHIFT PILOT LAMP

The automatic shift pilot lamp lights up when the auto-shift function is selected.

Change the shift mode with the transmission shift mode selector switch.

When the shift mode is changed from manual to auto, the display pops up.



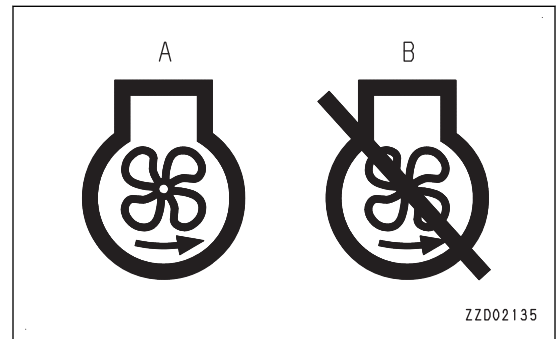
FAN REVERSE ROTATION DISPLAY

When the radiator fan is set in manual or auto reverse rotation mode, if the fan starts to rotate in reverse, fan reverse rotation pilot lamp (A) lights up.

This lamp flashes while the rotation direction is being changed.

If the condition for changing the fan rotation direction is not satisfied, changing condition satisfaction waiting pilot lamp (B) lights up.

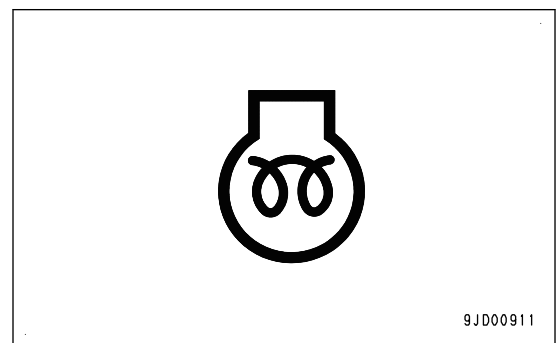
For details of the method of setting the fan reverse mode, see "RADIATOR FAN MANUAL REVERSE MODE (3-70)" and "RADIATOR FAN AUTOMATIC REVERSE MODE (3-72)".



PREHEATING PILOT LAMP

The preheating pilot lamp lights up when the automatic preheating function of the engine is actuated, and goes out when preheating is completed.

The pilot lamp also lights up during manual preheating. The electrical heater for engine preheating is actuated while the pilot lamp is lit.



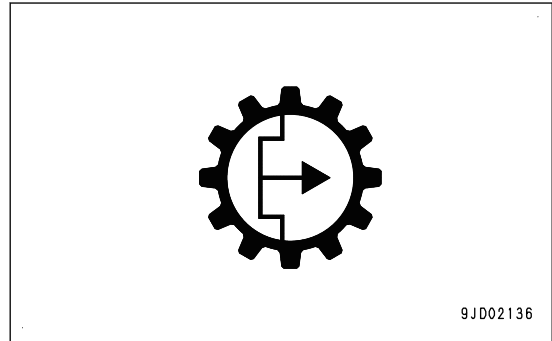
TRANSMISSION CUT-OFF PILOT LAMP

The transmission cut-off pilot lamp lights up when the transmission cut-off function is enabled.

It flashes for 2.5 seconds while resetting is being accepted after the cut-off position is set.

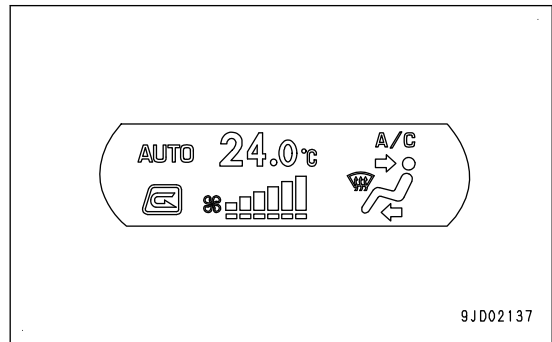
When the transmission cut-off switch is turned ON, the display pops up.

For detail, see "TRANSMISSION CUT-OFF FUNCTION (3-218)".



AIR CONDITIONER DISPLAY

The air conditioner display shows the operating state of the air conditioner.



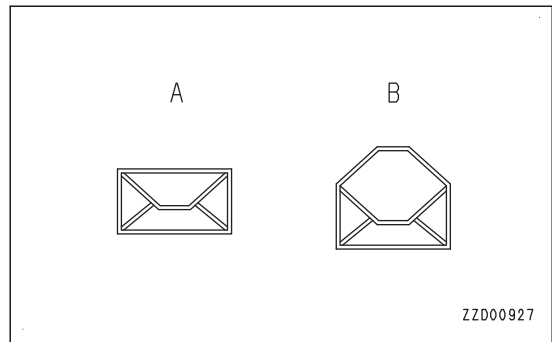
MESSAGE DISPLAY

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

(A): There is unread message

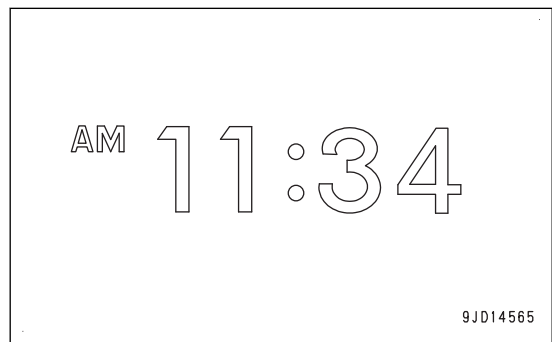
(B): There is any read message to which no reply is made.

To read the message, see "MESSAGE DISPLAY (3-103)".



CLOCK

The clock indicates the current time.



AFTERTREATMENT DEVICES REGENERATION PILOT LAMP

⚠ CAUTION

- Exhaust gas temperature may increase higher than the previous models during the aftertreatment devices regeneration. Stay away from the exhaust pipe outlet to prevent yourself from getting burnt. Also, keep combustible materials away from the exhaust pipe outlet to prevent a fire.
- If there is a thatched roof, dead leaves, paper, or other combustible matter near the machine, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)”.

Aftertreatment devices regeneration display indicates the regeneration state of the aftertreatment devices.

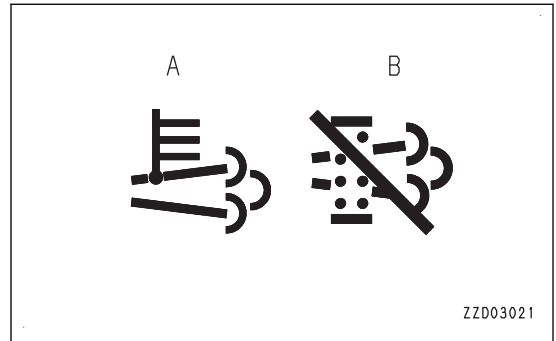
(A): Lights up during regeneration of the aftertreatment devices. It goes out when the regeneration is completed.

(B): Lights up when KDPF is set to regeneration disable.

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, KDPF soot accumulation caution lamp lights up. If KDPF soot accumulation caution lamp lights up, cancel the regeneration disable setting and perform manual stationary regeneration.

For the procedures of cancellation of regeneration disable setting, and setting of manual stationary regeneration, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)”.



SECONDARY STEERING SYSTEM PILOT LAMP

(if equipped)

The secondary steering pilot lamp lights up while the secondary steering is in operation.

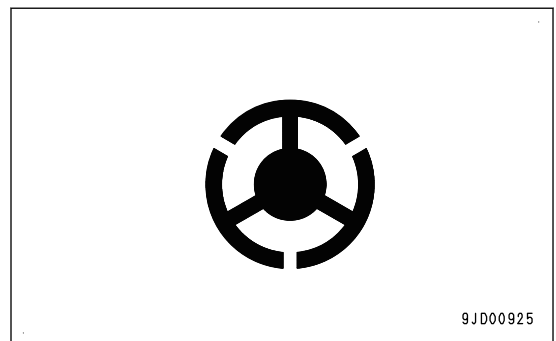
If the engine stops during travel or if the steering hydraulic circuit has a trouble and the machine is traveling at speed of 2 km/h {1.2 MPH} or higher, the secondary steering operates automatically and this lamp lights up.

Move the machine to a safe place, stop the engine, then perform the inspection and maintenance.

If the secondary steering has been operated for 60 seconds continuously, the caution lamp lights up.

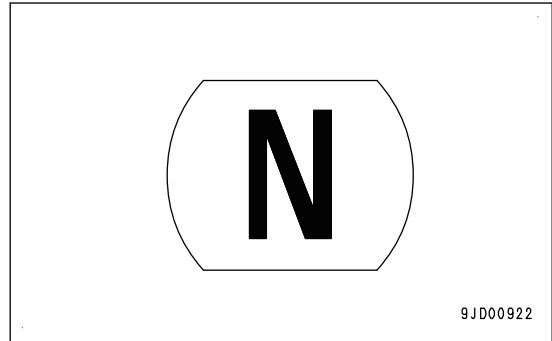
At the same time, action level “L02” is displayed. Move the machine to a safe place, stop the engine, then perform the inspection and maintenance.

The secondary steering self-check function is installed. For detail, see “SELF-CHECK FUNCTION FOR SECONDARY STEERING (3-222)”.



SHIFT INDICATOR

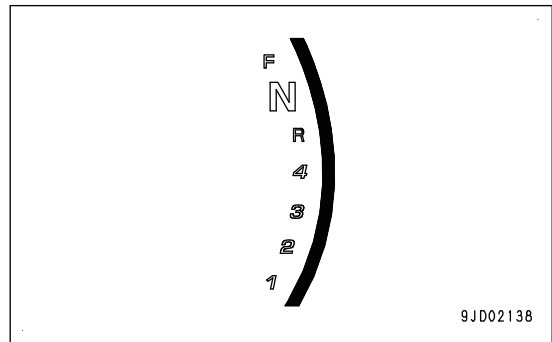
The shift indicator shows the transmission shift range (gear speed).



SHIFT LEVER POSITION DISPLAY

The shift lever position display shows the position of the directional lever or directional selector switch (if equipped) in enlarged letters.

The position of the selected gear speed switch is also displayed in enlarged letters.

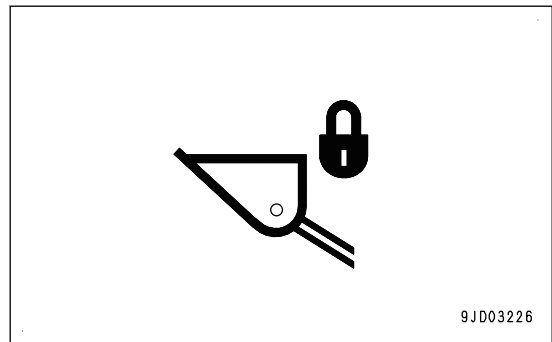


WORK EQUIPMENT LOCK PILOT LAMP

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

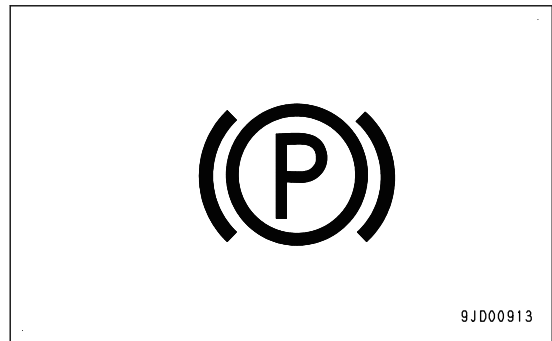
This pops up on the screen when the work equipment is switched from the unlock mode to the lock mode.

For detail, see "WORK EQUIPMENT LOCK SWITCH (3-120)".



PARKING BRAKE PILOT LAMP

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



ECO GUIDANCE

ECO guidance is displayed during the operation that lowers the fuel efficiency, and support energy saving operation for reducing the fuel consumption.

The details of the guidance are as follows.

REMARK

Display/Non-display of ECO guidance can be switched.

For the method of switching the display, see "SWITCH DISPLAY/NON-DISPLAY OF ECO GUIDANCE (3-68)".

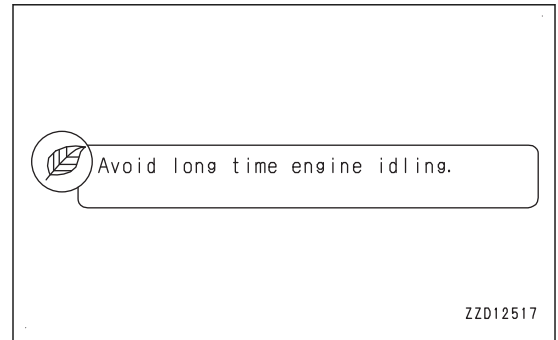
EXCESSIVE IDLING GUIDANCE

If the engine continues running idle for more than 5 minutes, the excessive idling message is displayed on the monitor.

When waiting for work or taking short break, stop the engine to reduce unnecessary fuel consumption.

When the accelerator pedal is depressed or the machine starts traveling or the work equipment is operated, the excessive idling message goes out.

For the auto idle stop function, see "AUTO IDLE STOP TIMER SETTING (3-79)".



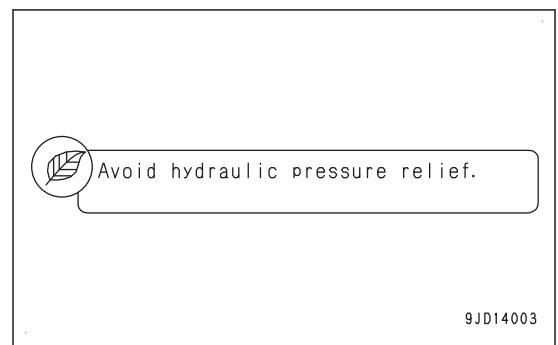
GUIDANCE TO AVOID HYDRAULIC RELIEF

If the hydraulic equipment is relieved for more than 8 seconds during operation, the hydraulic relief deterrence message is displayed on the monitor.

The hydraulic equipment is relieved when an attempt is made to lengthen each cylinder further over the maximum (for example, to move bucket control lever to TILT while the bucket is fully tilted) or reduce it further over the minimum.

Stop unnecessary relief.

The hydraulic relief deterrence message goes out automatically after 10 seconds.

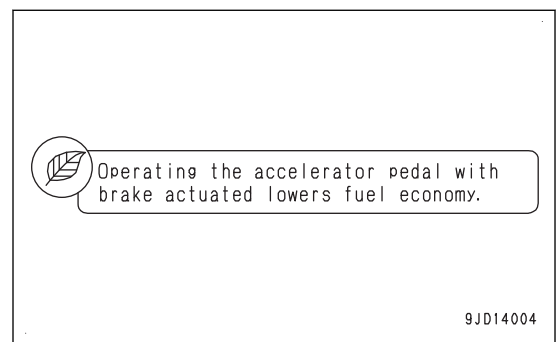


BRAKE DRAGGING PREVENTION GUIDANCE

If the accelerator pedal is depressed for more than 3 seconds while applying the brake during traveling, the brake dragging restriction message is displayed on the monitor.

If the accelerator is operated while the brake is used, fuel consumption is increased.

The brake dragging prevention message goes out automatically after 10 seconds.

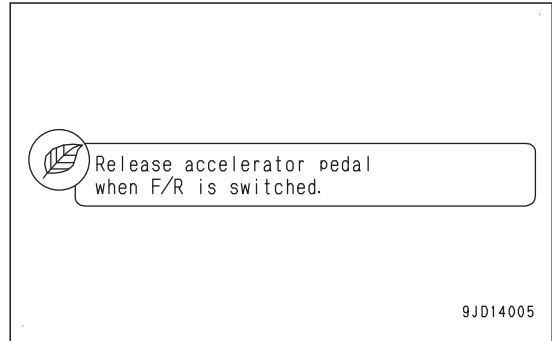


GUIDANCE OF ACCELERATOR PEDAL DEPRESSING LIMIT

If the accelerator pedal is depressed too much when the travel direction is changed, the notification of accelerator pedal depressing limit is displayed on the monitor.

In order to reduce fuel consumption during directional selection, try not to operate the accelerator pedal excessively.

The notification of accelerator pedal depressing limit goes out automatically after 10 seconds.

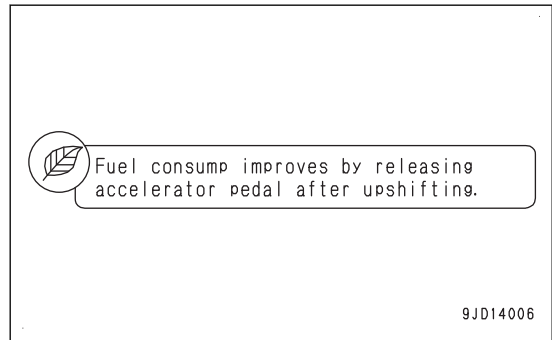


GUIDANCE TO RECOMMEND SHIFTING UP GEAR TO 4TH

If the machine travels at a speed of 20.4 km/h {12.6 MPH} or higher and at accelerator opening of 80 % or more for 30 seconds with the gear speed switch set in the 3rd position, the notification of recommendation to shift up the gear to the 4th is displayed on the monitor.

Reduce the fuel consumption by traveling at lower engine speed.

- The notification of recommendation to shift up the gear to 4th goes out automatically after 10 seconds.
- It goes out by shifting up the gear speed switch to the 4th.
- This notification is not displayed for 2 hours after the previous display, even if the condition for display is satisfied.

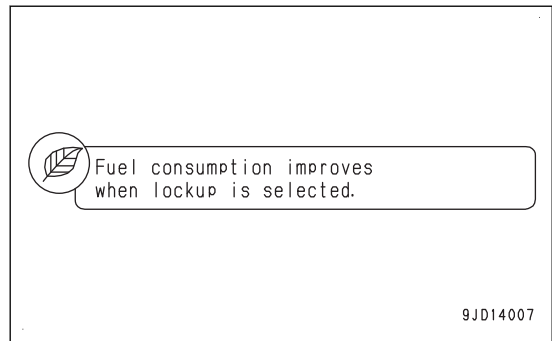


LOCKUP RECOMMENDATION GUIDANCE

If the machine travels at a speed of 11.5 km/h {7.1 MPH} or higher and at accelerator opening of 80 % or more for 20 seconds with the lockup switch OFF, the notification of lockup recommendation is displayed on the monitor.

Reduce the fuel consumption by selecting the direct drive.

- The notification of lockup recommendation goes out automatically after 10 seconds.
- This notification goes out when the lockup switch is turned ON.
- This notification is not displayed for 2 hours after the previous display, even if the condition for display is satisfied.

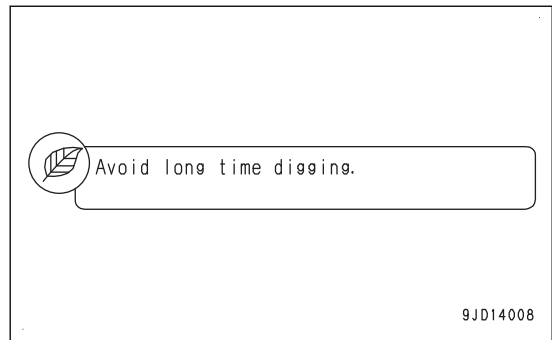


LONG-TIME DIGGING PREVENTION GUIDANCE

If the digging state is continued for 8 seconds, the notification of excessive digging limit is displayed on the monitor.

Avoid long-time digging to reduce the fuel consumption.

The notification of excessive digging limit goes out automatically after 10 seconds.

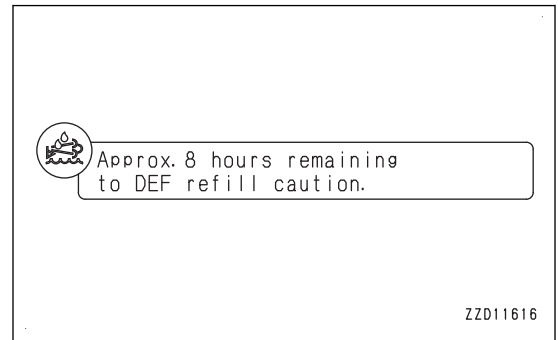


DEF LOW LEVEL GUIDANCE

At 15 seconds after the starting switch is turned to ON position and the standard screen is displayed, if the operable time estimated from current DEF level and the latest average DEF consumption is shorter than 8 hours, DEF Level Low Error guidance is displayed.

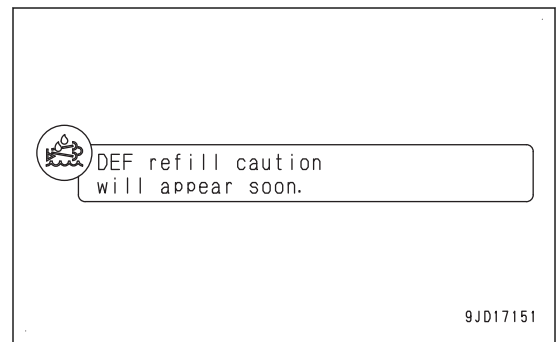
When the time until engine output power limitation starts is 1 to 8 hours

“Approx. * hours remaining to DEF refill caution.” is displayed.



When the time until engine output power limitation starts is less than 1 hour

“DEF refill caution will appear soon.” is displayed.



DEF Level Low Error guidance goes out in more than 15 seconds or when ENTER switch is pressed.

For the remaining amount of DEF, see “DEF LEVEL GAUGE (3-52)”.

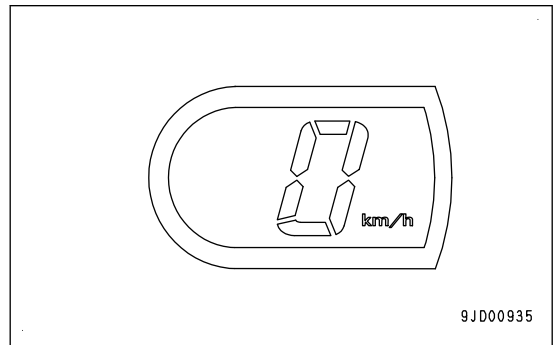
REMARK

While monitor displays DEF level low error or maintenance warnings, DEF level low guidance is not displayed.

METER DISPLAY

SPEEDOMETER

The speedometer indicates the travel speed of the machine.

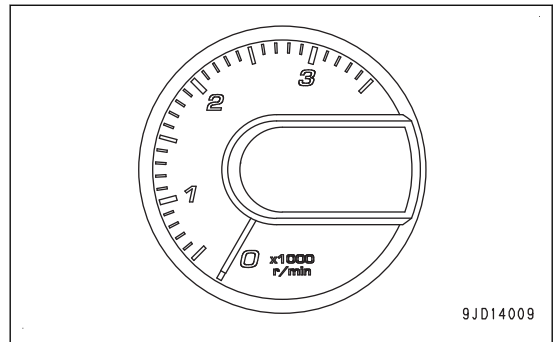


ENGINE TACHOMETER

The engine tachometer indicates the engine speed.

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

Operate the machine with moderate engine speed and travel speed.



ENGINE COOLANT TEMPERATURE GAUGE

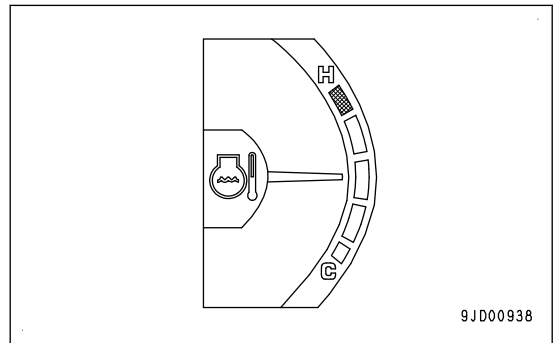
Engine coolant temperature gauge shows the engine coolant temperature.

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

If the indicator is in the red range, the engine coolant temperature caution lamp lights up in red, and action level "L02" is displayed. At the same time, the centralized warning lamp lights up and alarm buzzer sounds intermittently.

The engine output is then limited automatically.

Place the machine in a safe place, set the directional lever and directional selector switch (if equipped) to NEUTRAL position (N), and run the engine at a medium speed with no load until the engine coolant temperature caution lamp goes out.



TORQUE CONVERTER OIL TEMPERATURE GAUGE

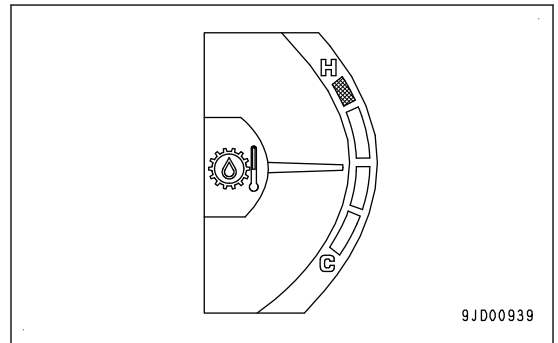
The torque converter oil temperature gauge indicates the torque converter oil temperature.

When the indicator is in the green range during operation, the retarder oil temperature is normal.

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

The engine output power is then limited automatically.

Stop the machine in a safe place, set the directional lever and directional selector switch (if equipped) to NEUTRAL position (N), and run the engine at a medium speed with no load until the torque converter oil temperature caution lamp goes out.



HYDRAULIC OIL TEMPERATURE GAUGE

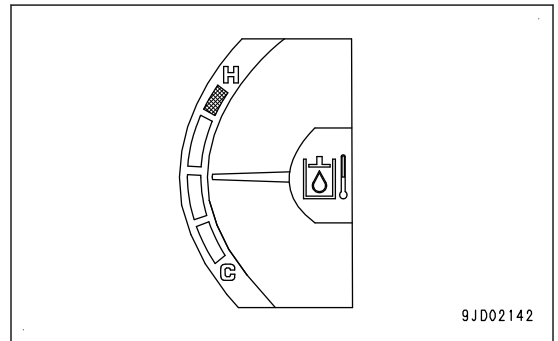
Hydraulic oil temperature gauge shows the hydraulic oil temperature.

When the indicator is in the green range during operation, the retarder oil temperature is normal.

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

At this time, the work equipment speed is limited automatically.

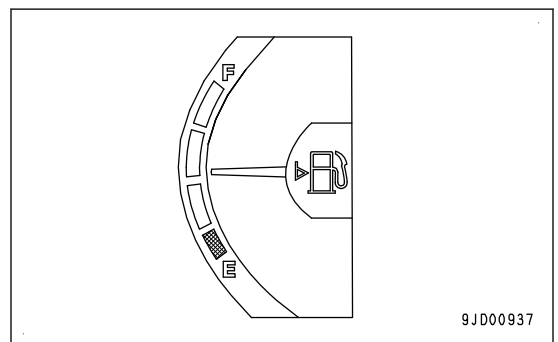
Stop the machine in a safe place, set the directional lever and directional selector switch (if equipped) to NEUTRAL position (N), and run the engine at a medium speed with no load until the hydraulic oil temperature caution lamp goes out.



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 below 28 l {7.4 U.S.Gal}. Check the fuel level, and add fuel.

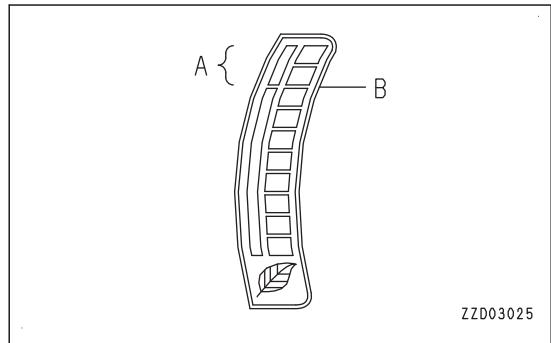


ECO GAUGE

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

The instantaneous fuel consumption varies depending on the operation ways (accelerator operation, travel speed, gear speed, etc.) and the given load during travel (load weight, slope, ground condition, etc.).

As the gauge is higher, the fuel consumption is higher. Reduce the gauge to a point where there is no adverse effect on the operation, leading to energy saving operation to reduce the fuel consumption.



REMARK

Even if the gauge is in orange range (A), it is not a machine trouble.

Target fuel consumption (B) displayed by ECO gauge can be changed as necessary.

For the method of changing the target value, see "SET TARGET FUEL CONSUMPTION VALUE DISPLAYED IN ECO GAUGE (3-67)".

L.H. AND R.H. METER

The L.H. meter indicates either of the following which can be selected.

- Service meter
- Odometer
- Clock

For the method of selecting the display, see "SELECT L.H. METER DISPLAY (3-90)".

The R.H. meter indicates either of the following which can be selected.

- Fuel consumption gauge
- Service meter
- Odometer
- Clock

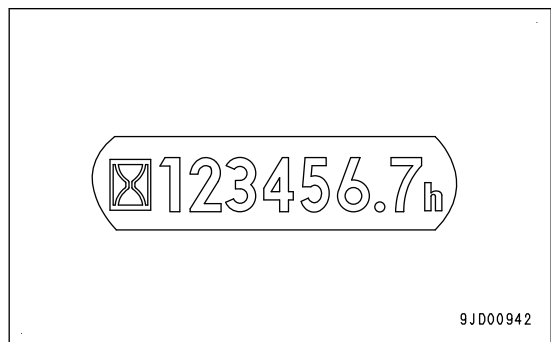
For the method of selecting the display, see "SELECT R.H. METER DISPLAY (3-91)".

Service meter display

Indicates the integrated operating hours of the machine.

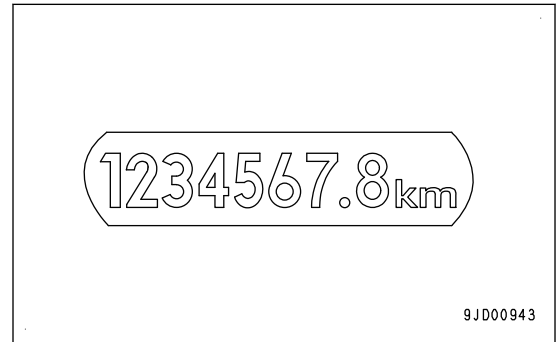
When the engine has run, the service meter advances even if the machine is not being operated.

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 display

Indicates the total distance that machine has traveled in kilometers.



Clock display

Indicates the current time.

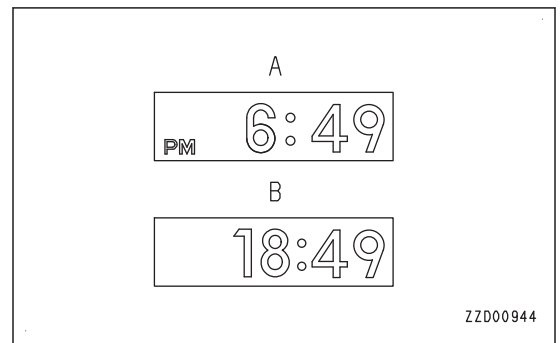
(A): 12-hour display

(B): 24-hour display

REMARK

If the battery is disconnected for a long period for storage etc., the time information may be lost.

For the method of setting and correcting the time and changing the display of the clock, see "CLOCK ADJUSTMENT (3-93)".



Fuel consumption gauge display

Indicates the average fuel consumption of the machine.

(C): Average fuel consumption in a day

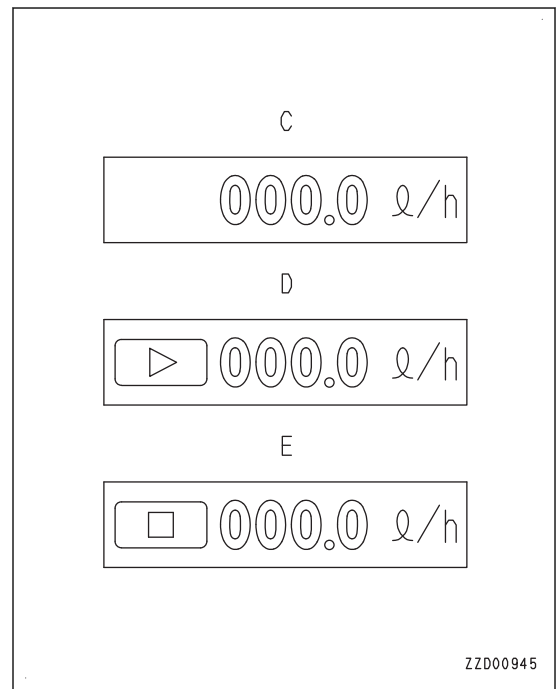
(D): Split fuel consumption (under measuring)

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

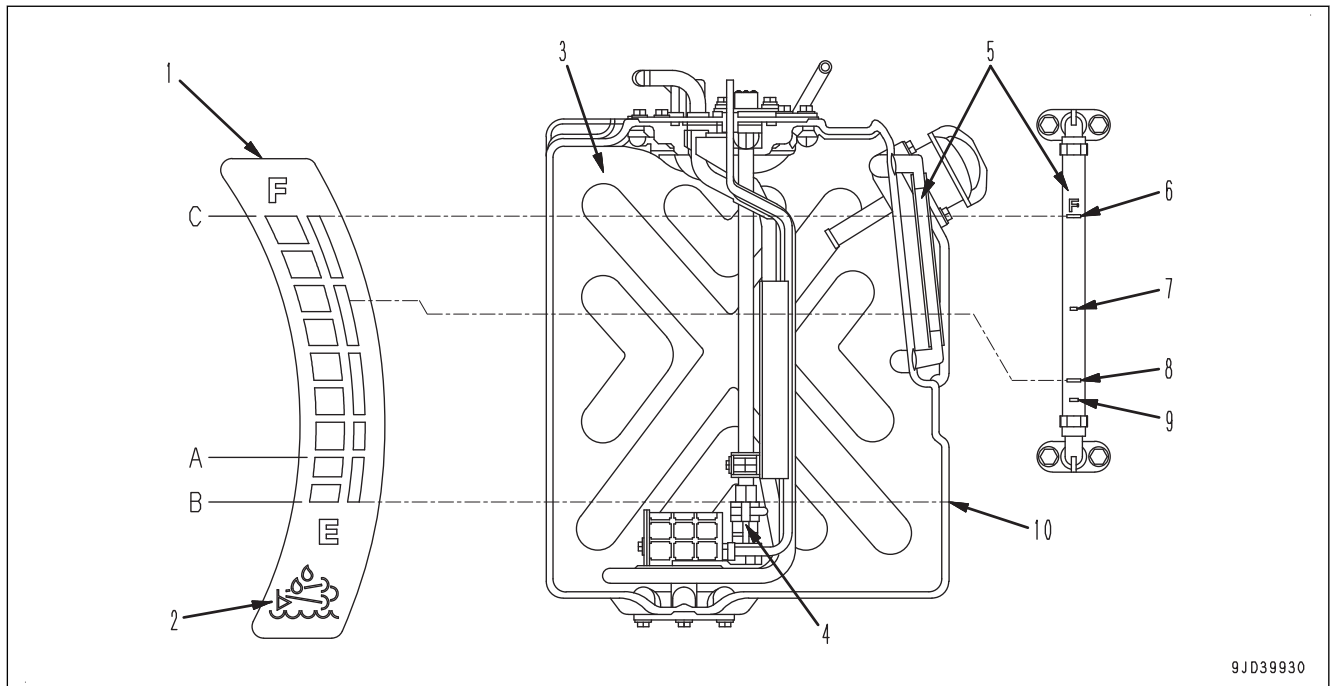
REMARK

Display on the fuel consumption gauge can be switched between the average fuel consumption per day (from 0:00 am of the day to 0:00 am of the next day) and the average fuel consumption during an selected period (split fuel consumption).

For details of the fuel consumption gauge and the method of switching the display, see "SET DISPLAY OF FUEL CONSUMPTION GAUGE (3-65)".



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 (36 ℓ {9.51 USgal})
- (7) DEF level is at the position of 5 ℓ {1.32 USgal} (31 ℓ {8.19 USgal}) below the Full position
- (8) DEF level is at the Full position of cold season (27 ℓ {7.13 USgal})
- (9) DEF level is at the position of 10 ℓ {2.64 USgal} (26 ℓ {6.87 USgal}) below the Full position
- (10) DEF level is at the Empty position (9.5 ℓ {2.51 USgal})

DEF level gauge (1) indicates the remaining level of DEF.

If the indicator is in green range during operations, it is normal.

If the indicator comes close to (A) of red range during operation, check and add DEF.

(A) to (B): Red range

(A) to (C): Green range

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

If DEF level further decreases after the lamp lights up in red, the engine output and engine speed are limited. For detail, see "HANDLE UREA SCR SYSTEM WARNING (3-153)".

When remaining level of DEF cannot be detected, DEF level caution lamp (2) lights up in white.

REMARK

- Immediately after turning the starting switch to ON position and during the engine is running, DEF level caution lamp (2) lights up in white. However, this does not indicate abnormality.
- In cold weather, DEF level cannot be detected and DEF level caution lamp (2) lights up in white for approximately 1 hour. However, this does not indicate abnormality.
- Even if DEF level caution lamp (2) is not lit in white, it may take a long time for DEF level gauge (1) to display the correct position.

Note that the following cases are not abnormal:

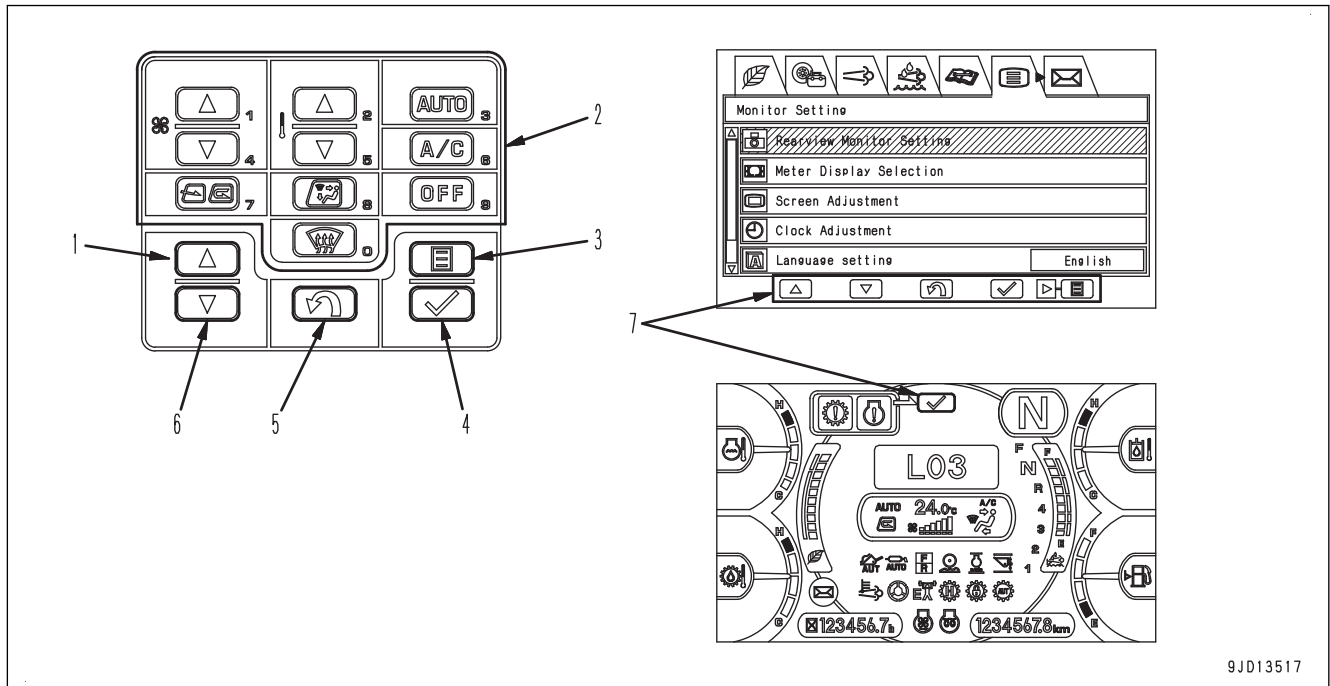
- When DEF is added while the starting switch is kept at ON position.
- When the starting switch is turned to ON position immediately after adding DEF (within approximately 30 seconds).

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

MONITOR SWITCHES

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

The function of each switch varies depending on the screen of the machine monitor.



9JD13517

- (1) UP switch
- (2) Air conditioner switches, numeric keypad
- (3) Menu switch
- (4) ENTER switch
- (5) RETURN switch
- (6) DOWN switch
- (7) Guidance icon

MENU SWITCH

When this switch is pressed on the standard screen, the following user menu screen is displayed. The user menu screen is not displayed during traveling.

For the user menu, see "USER MENU (3-57)".

When normal: Displays the ECO guidance menu screen.

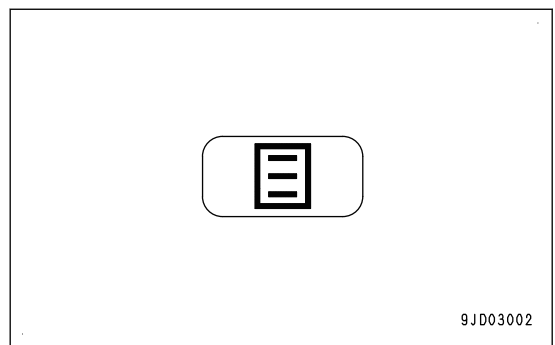
When KDPF soot accumulation caution lamp lights up: Displays the "Aftertreatment Devices Regeneration" menu screen.

When maintenance caution lamp lights up: Displays the "Maintenance" menu screen.

When fan reverse pilot lamp lights up: Displays the "Machine Setting and Information" menu screen.

When message pilot lamp lights up: Displays the Message display menu screen.

When the menu switch is pressed on the user menu screen, the menu screen changes.



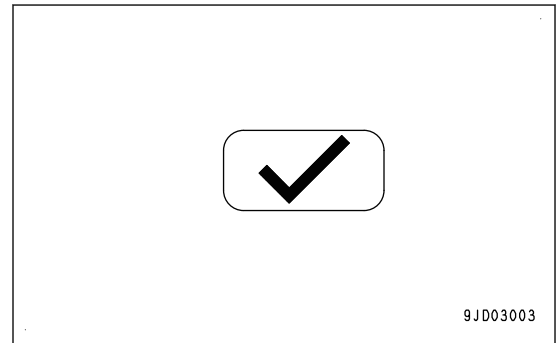
9JD03002

ENTER SWITCH

Pressing ENTER switch on the user menu screen decides any selection and changes, and proceeds to the next screen.

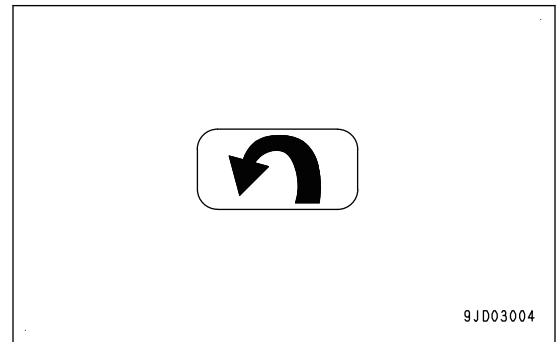
When ENTER switch is pressed on the standard screen with a warning message displayed, the "Current Abnormality" screen is displayed.

For the "Current Abnormality" screen, see "CURRENT ABNORMALITY LIST DISPLAY (3-19)".



RETURN SWITCH

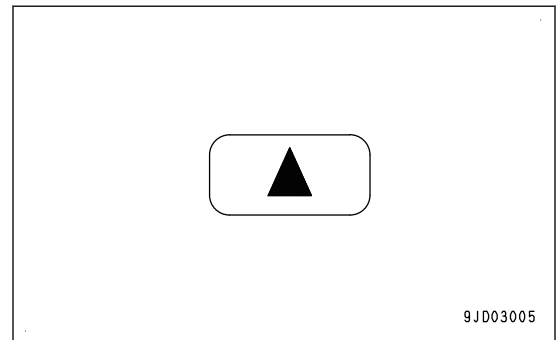
Pressing RETURN switch cancels a selection or changes, and returns the screen to the previous screen or the standard screen.



UP SWITCH

Pressing UP switch moves the cursor up by one item. When on the first line, it moves to the last line.

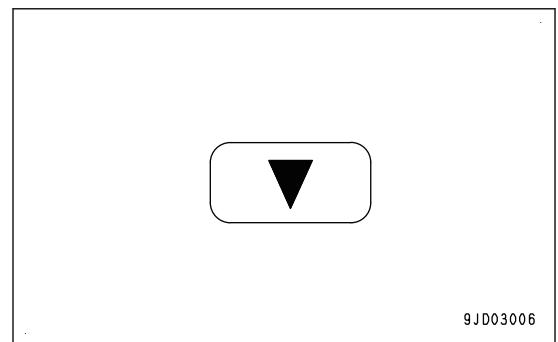
On the value input screen, the value is increased by one.



DOWN SWITCH

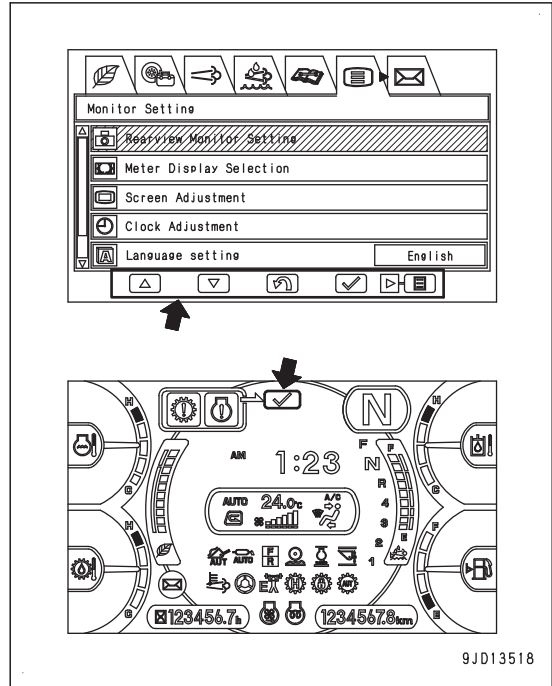
Pressing the DOWN switch moves the cursor down by one item. When on the last line, it moves to the first line.

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



REMARK

The switches effective on each screen can be checked with the guidance icon. This function is not available when you press a switch not marked by the guidance icon or you press the guidance icon itself.



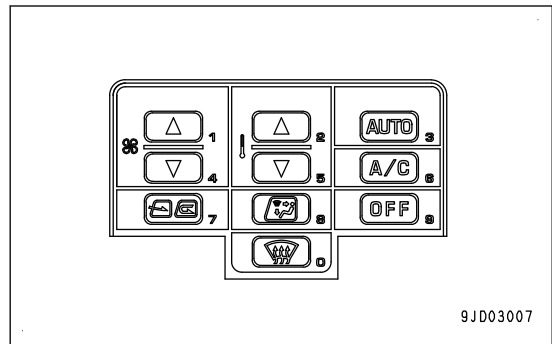
AIR CONDITIONER SWITCH / NUMERIC KEYPAD

The air conditioner switch and the numeric keypad which are used for the operation of the air conditioner consist of 10 switches.

For explanation of each switch, see “HANDLE AIR CONDITIONER (3-248)”.

These switches can be used as a numeric keypad to enter a numeric value such as a password.

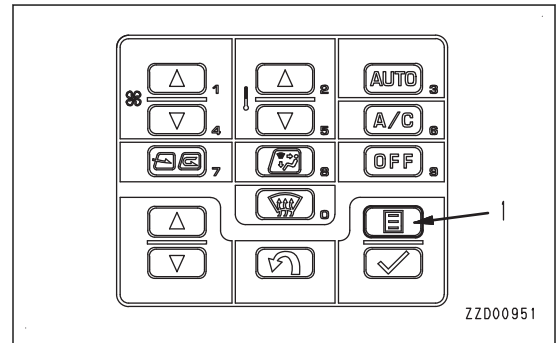
Press a desired switch to enter a numeric value 0 to 9, which is indicated at the lower right of each switch.



- For details of other switch functions, see the explanation for each screen in “USER MENU (3-57)”.
- The confirmation sound is heard when the switch is pressed, but a reaction is taken (the switch function is operated) when the switch is released.

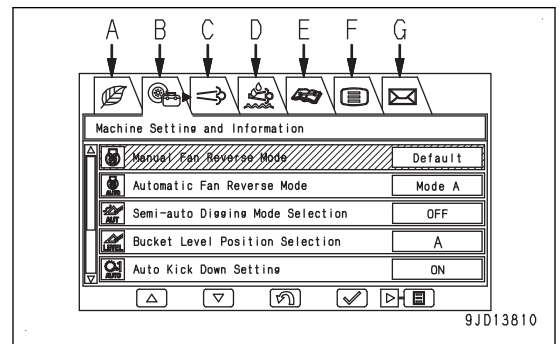
USER MENU

When menu switch (1) is pressed on the standard screen while the machine is stopped, the user menu screen is displayed to enable you to configure and confirm machine settings.



The user menu consists of the following kinds. The menu screen can be changed by pressing the menu switch (1).

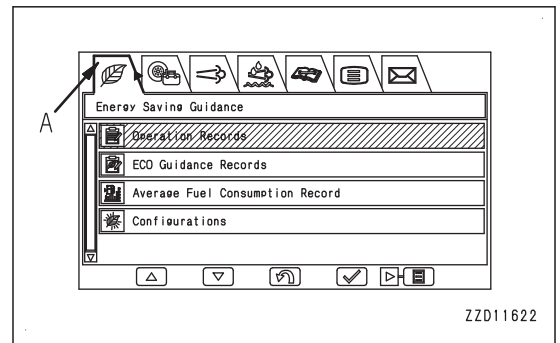
- (A): “Energy Saving Guidance”
- (B): “Machine Setting and Information”
- (C): “Aftertreatment Devices Regeneration”
- (D): “SCR Information”
- (E): “Maintenance”
- (F): “Monitor Setting”
- (G): Message Display



These menus (A) to (G) are for setting and confirming the following items:

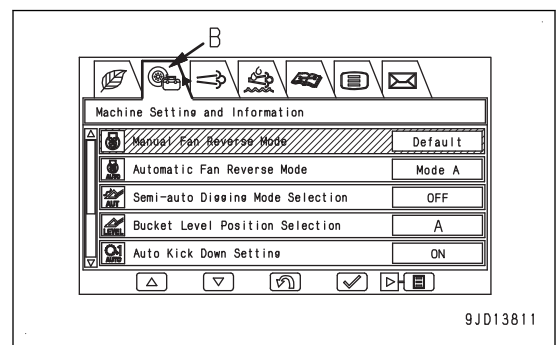
(A) “Energy Saving Guidance”

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



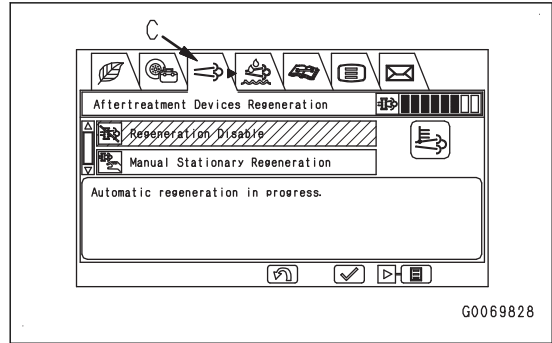
(B) “Machine Setting and Information”

- Setting for “Manual Fan Reverse Mode”
- Setting for “Automatic Fan Reverse Mode”
- “Semi-auto Digging Mode Selection”
- “Bucket Level Position Selection”
- “Auto Kick Down Setting”
- Display and resetting of “Trip Meter”
- “Auto Idle Stop Timer Setting”
- “Lockup Setting with Starting SW ON”



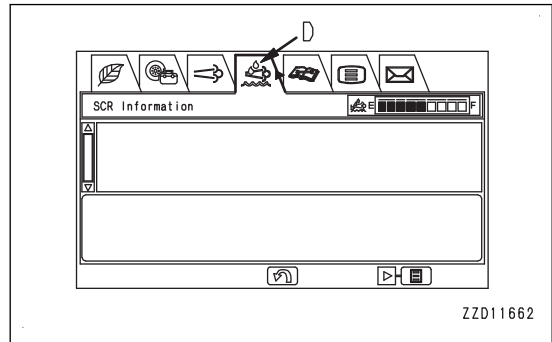
(C) “Aftertreatment Devices Regeneration”

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



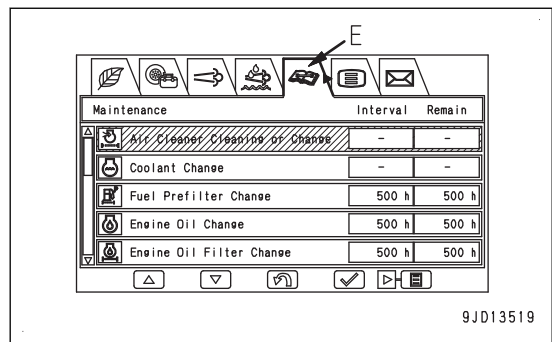
(D) “SCR Information”

- Check of DEF level
- Information on DEF system



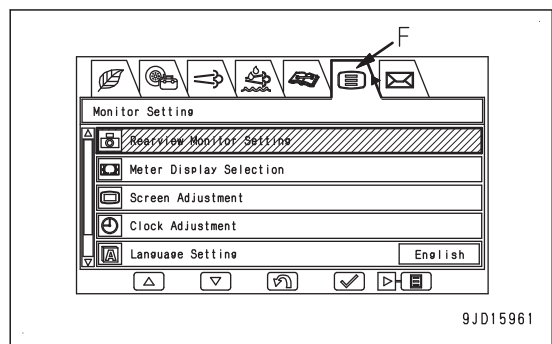
(E) “Maintenance”

- Check and reset of various maintenance remaining times



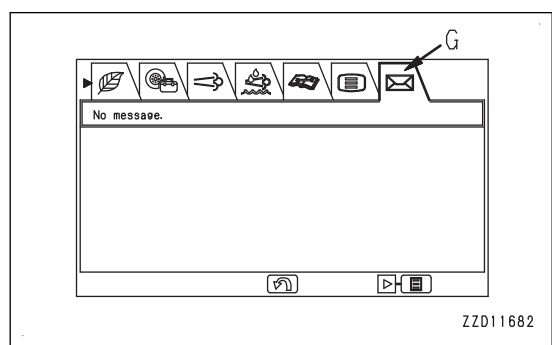
(F) “Monitor Setting”

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



(G) Message Display

- Check of message contents and reply to message



On the user menu screen, it is possible to perform the following operations with the switches.

(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.

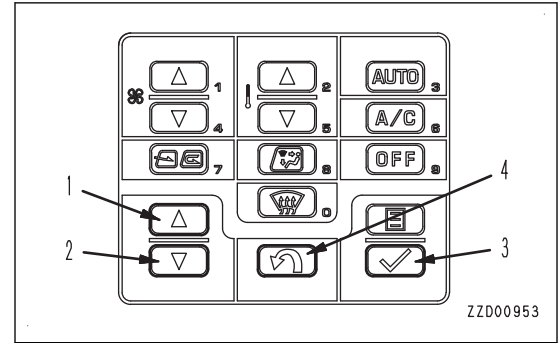
When on the last item, moves to the first item.

(3) ENTER switch

Enters any selection or changes and proceeds to the next screen.

(4) RETURN switch

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



REMARK

- If no switch is operated for 30 seconds on the user menu screen, the screen automatically returns to the previous screen or the standard screen.
- The user menu screen is displayed only while the machine is stopped completely.
- If the machine travels while the user menu screen is displayed, the screen automatically returns to the standard screen.

REMARK

The default tab when the standard screen is changed to the user menu screen varies with the machine condition.

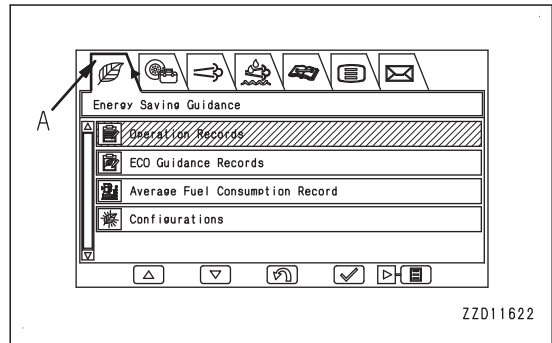
1. SCR event occurs → "SCR Information"
2. KDPF event occurs → "Aftertreatment Devices Regeneration"
3. Hydraulic fan is rotating in reverse → "Machine Setting and Information"
4. Maintenance caution occurs → "Maintenance"
5. Message is not read yet → Message display
6. Other than 1 to 5 → "Energy Saving Guidance"

* If multiple conditions are established simultaneously, the above priority is given.

ENERGY SAVING GUIDANCE

Each item of “Energy Saving Guidance” menu (A) is used for displaying and setting the notification relevant to energy saving.

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

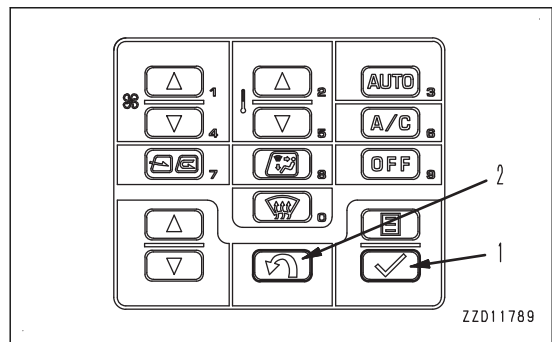
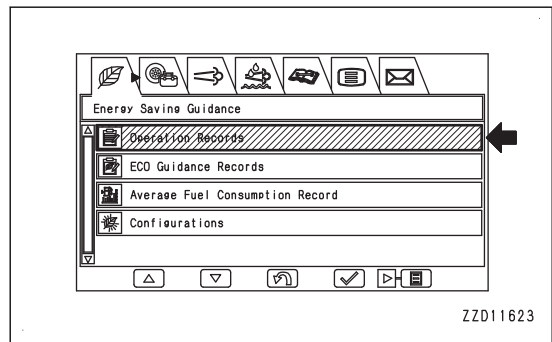


OPERATING RECORD

The “Operation Records” screen displays the following information on a daily basis or during the split measurement period.

- “Working Hours (Engine On)”: The time during which the engine is running
- “Average Fuel Consumption”: Average of the fuel consumed while the engine is running
- “Actual Working Hours”: The time spent for traveling, operation of work equipment and operation of accelerator
- “Ave Fuel Consumption (Actual Working)”: Average of the fuel consumed during actual work
- “Fuel Consumption”: The amount of fuel consumed
- “Idling Hours”: The time during which the machine is stopped, and the work equipment and accelerator are not operated
- “Economy Mode Ratio”: Percentage of E mode operation in the engine-running hours

Select “ECO Guidance Records” from “Energy Saving Guidance” menu screen, then press ENTER switch (1).

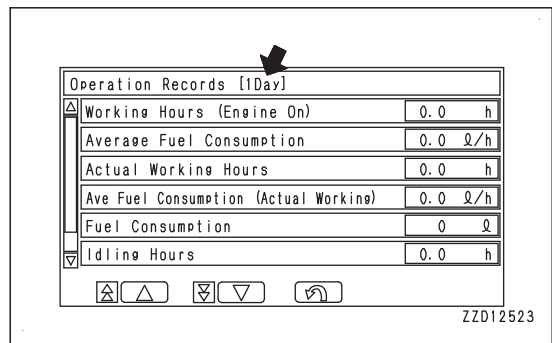


REMARK

For the definition and display change method of “1 Day” and “Split Time”, see “SET DISPLAY OF FUEL CONSUMPTION GAUGE (3-65)”.

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

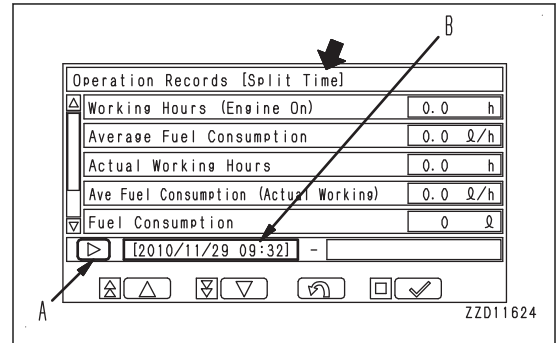
“1 Day” is displayed on the place shown with arrow in the right figure.



When “Average Fuel Consumption Display” is set to “Split Time”, and split time is measured

- (A) Display during measurement
- (B) Date and time when measurement is started

To stop the split measurement, see the guidance icon and press ENTER switch (1).

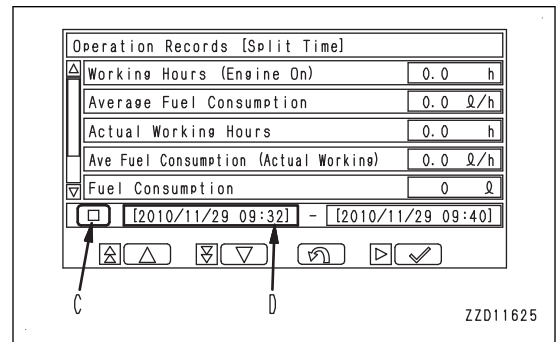


When display of “Average Fuel Consumption Display” is set to “Split Time”, and split time measurement is stopped

- (C) Display while measurement is stopped
- (D) Dates and times when the measurement is started and stopped

To start the split time measurement, see the guidance icon and press ENTER switch (1).

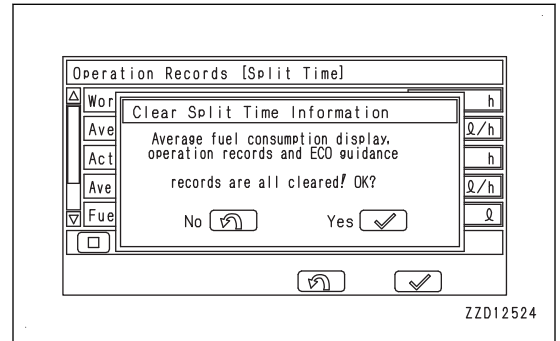
When the measurement is started, the previous split time measurement results (“Average Fuel Consumption Display”, “Operation Records”, and “ECO Guidance Records”) are reset.



When the confirmation screen is displayed, press ENTER switch (1) again to start the split measurement, or press RETURN switch (2) to cancel the start.

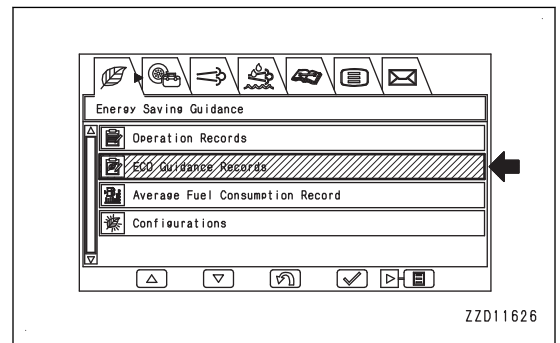
NOTICE

The displayed value of fuel consumption may differ from the actual value due to the operating conditions of the customers (fuel, weather or work contents, etc.).



ECO GUIDANCE RECORD

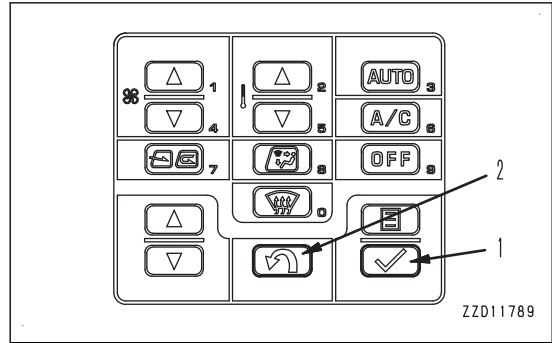
On “ECO Guidance Records” screen, the frequency of display of the ECO guidance on a daily basis or during the split measurement period and “Operational Advice” are displayed.



Select ECO Guidance Records from Energy Saving Guidance menu screen, then press ENTER switch (1).

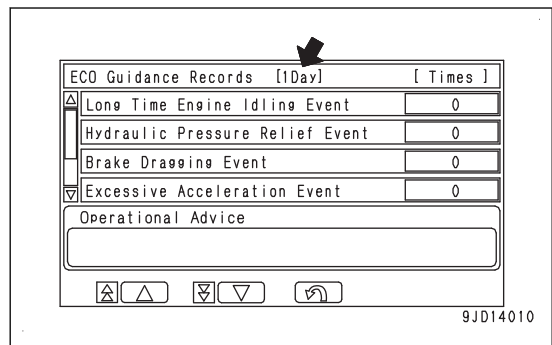
REMARK

- For the definition and display change method of “1 Day” and “Split Time”, see “SET DISPLAY OF FUEL CONSUMPTION GAUGE (3-65)”.
- For the ECO guidance, see “ECO GUIDANCE (3-45)”.
- In the Operational Advice section, the advice to the ECO guidance that appeared most frequently is displayed.
- The ECO guidance count increases when display conditions are satisfied even if the ECO guidance is not displayed.



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

“1 Day” is displayed on the place shown with arrow in the right figure.

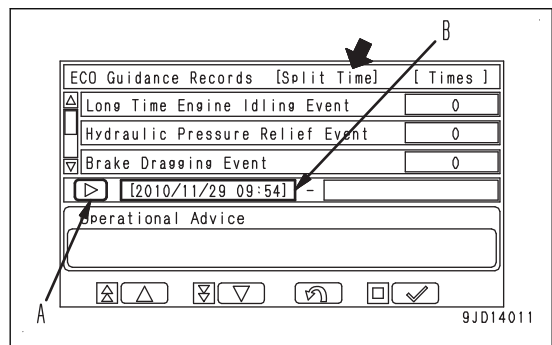


When “Average Fuel Consumption Display” is set to “Split Time”, and split time is measured

(A) Display during measurement

(B) Date and time when measurement is started

To stop the split measurement, see the guidance icon and press ENTER switch (1).



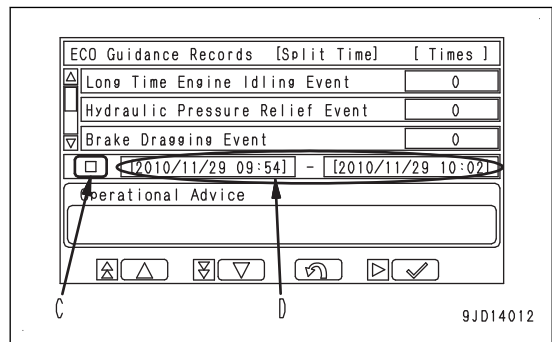
When display of “Average Fuel Consumption Display” is set to “Split Time”, and split time measurement is stopped

(C) Display while measurement is stopped

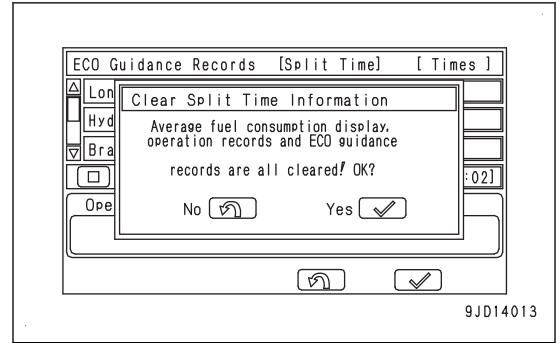
(D) Dates and times when the measurement is started and stopped

To start the split time measurement, see the guidance icon and press ENTER switch (1).

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



When the confirmation screen is displayed, press ENTER switch (1) again to start the split measurement, or press RETURN switch (2) to cancel the start.



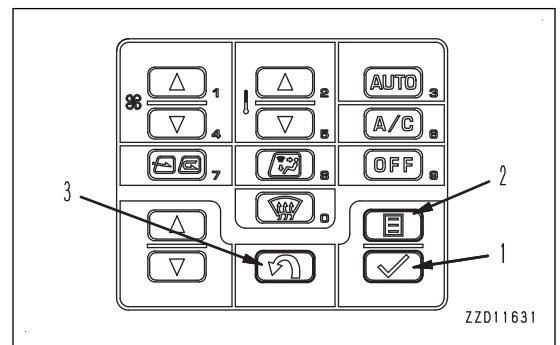
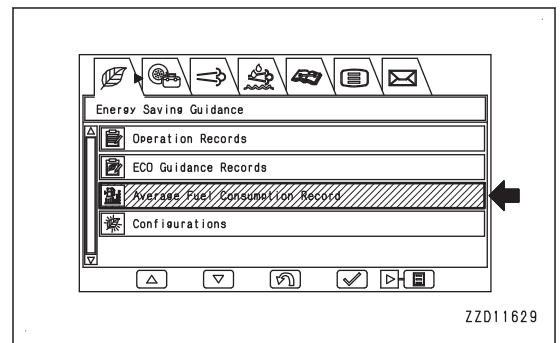
FUEL CONSUMPTION RECORD

The “Average Fuel Consumption Record” screen alternately displays the following graphs.

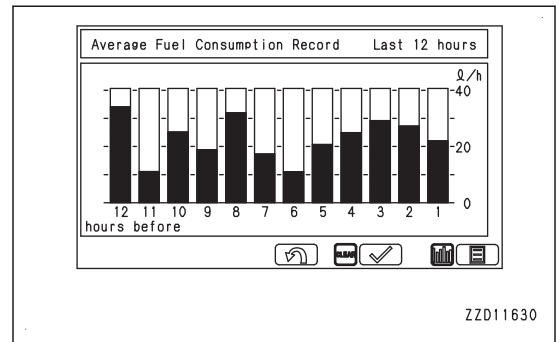
- Average fuel consumption for the “Last 12 hours”
- Average fuel consumption for the “Last 7 days”.

Select “Average Fuel Consumption Record” from the “Energy Saving Guidance” menu screen, then press ENTER switch (1).

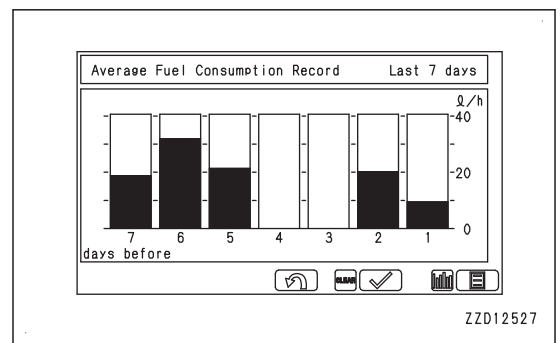
To change a graph, see the guidance icon and press menu switch (2).



- When display of the “Last 12 hours” is selected



- When display of the “Last 7 days” is selected



REMARK

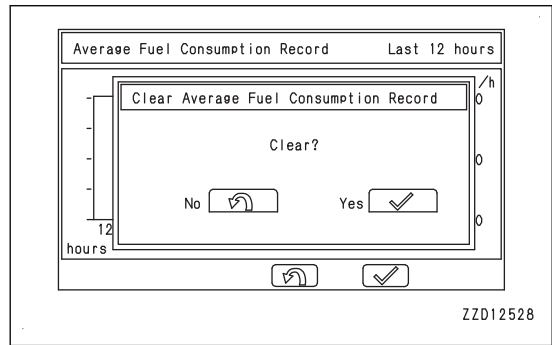
The graph of the "Last 12 hours" is updated every hour of the service meter reading.
The graph of the "Last 7 days" is updated every day.

To clear a graph, see the guidance icon and press ENTER switch (1).

When the confirmation screen is displayed, press ENTER switch (1) again to clear or press RETURN switch (3) to cancel clearing.

REMARK

If clearing is performed while the graph of the "Last 12 hours" is displayed, only the graph of the "Last 12 hours" is cleared.
If clearing is performed while the graph of the "Last 7 days" is displayed, both graphs of the "Last 12 hours" and "Last 7 days" are cleared.

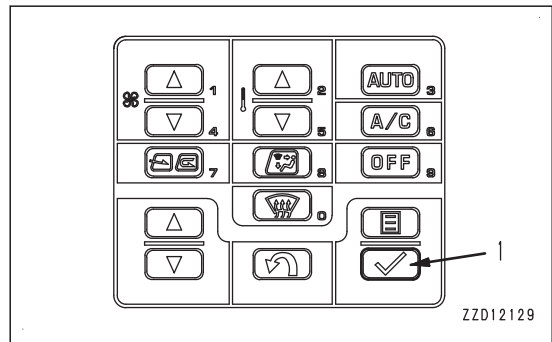
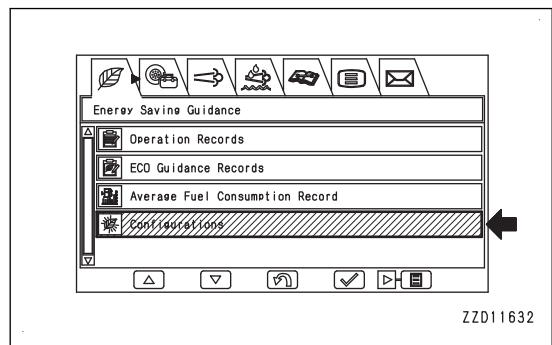


DISPLAY SETTING

On the "Configurations" menu, it is possible to perform following settings.

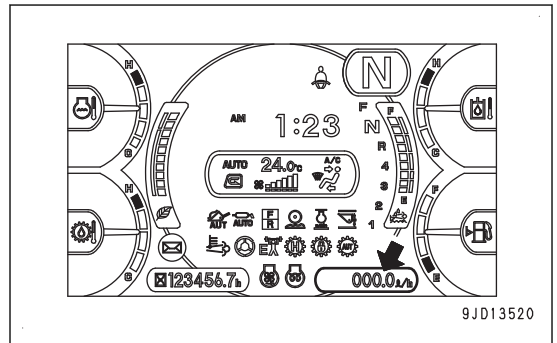
- Setting "Average Fuel Consumption Display"
- Switching ON/OFF of "ECO Gauge Display"
- Setting "ECO Gauge Display Fuel Target Value"
- Switching ON/OFF of ECO guidance
- Switching ON/OFF of "ECO Guidance Display at Key OFF"

Select "Configurations" from "Energy Saving Guidance" menu screen, then press ENTER switch (1).

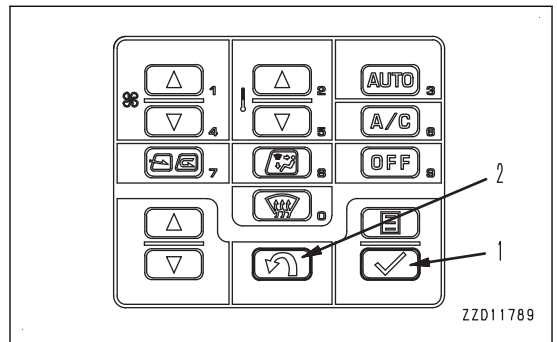
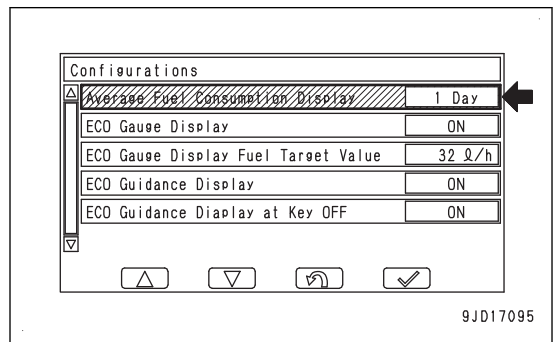


SET DISPLAY OF FUEL CONSUMPTION GAUGE

The display of the fuel consumption gauge can be set to the value on daily basis or during split measurement period.



1. Select "Average Fuel Consumption Display" from "Configurations" menu, then press ENTER switch (1).



2. Select "1 Day" or "Split Time", then press ENTER switch (1).

The default is "1 Day".

To cancel, press RETURN switch (2).

"1 Day"

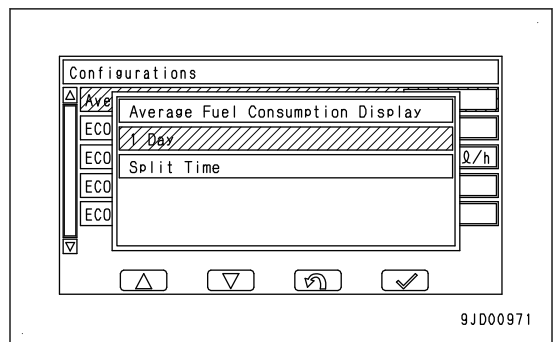
Displays the average fuel consumption in 1 day from 0:00 a.m. of the day to 0:00 a.m. of the next day.

Reset at 0:00 a.m. of the next day.

"Split Time"

Displays the average fuel consumption during the split measurement period (after the measurement is started until it is finished).

Select "Split Time" to start the split measurement automatically.



REMARK

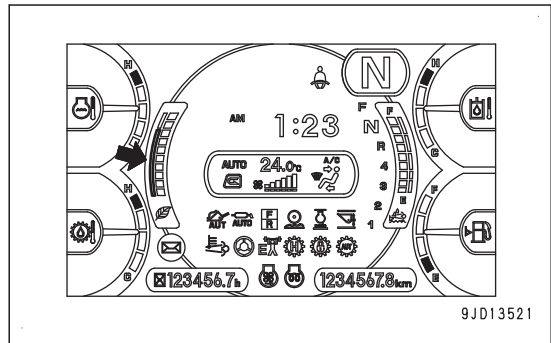
For the display of the average fuel consumption display, see "L.H. AND R.H. METER (3-50)".

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

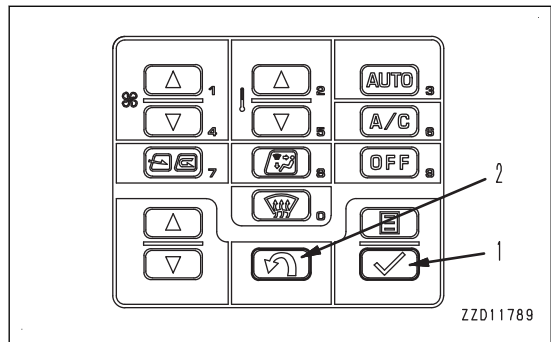
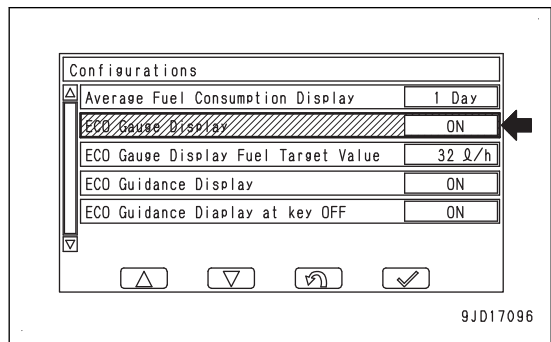
When stopping the split measurement, see "OPERATING RECORD (3-60)" or "ECO GUIDANCE RECORD (3-61)".

SWITCH DISPLAY/NON-DISPLAY OF ECO GAUGE

Display/non-display of ECO gauge can be switched.



1. Select "ECO Gauge Display" from the "Configurations" menu, then press ENTER switch (1).



2. Select "ON" or "OFF", then press ENTER switch (1).

"ON"

Displays the ECO gauge.

"OFF"

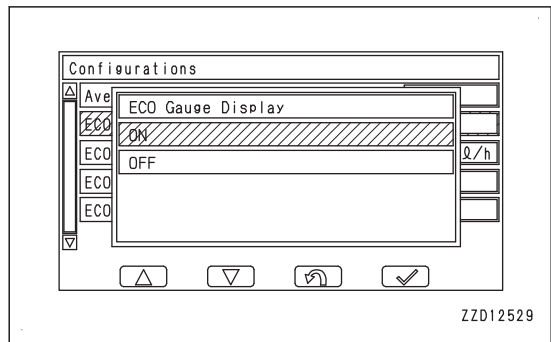
Does not display the ECO gauge.

To cancel, press RETURN switch (2).

The default is "ON".

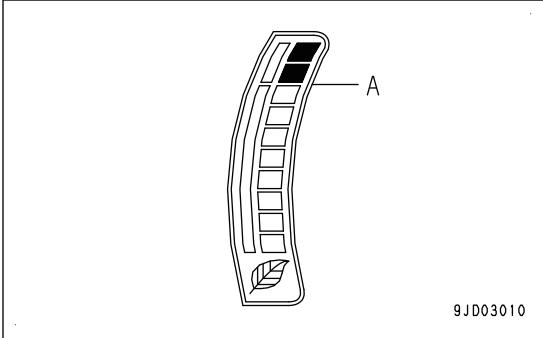
REMARK

For the ECO gauge, see "ECO GAUGE (3-50)".
 If the "ECO Gauge Display" is set to "OFF", the items of "ECO Gauge Display Fuel Target Value" is not displayed.

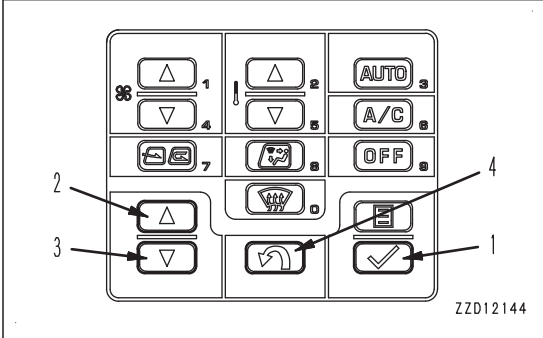
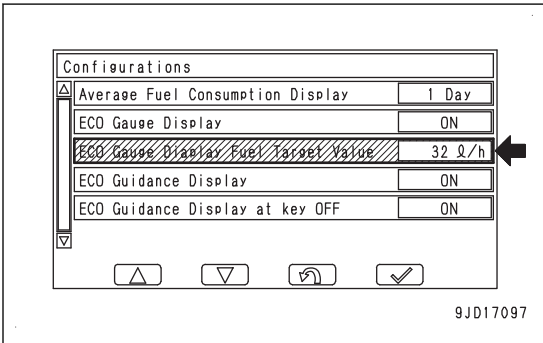


SET TARGET FUEL CONSUMPTION VALUE DISPLAYED IN ECO GAUGE

ECO Gauge Target Value (A) (the upper limit value of the green range) can be changed.



1. Select "ECO Gauge Display Fuel Target Value" from "Configurations" menu, then press ENTER switch (1).



2. Using UP switch (2) or DOWN switch (3) to set the value, and press ENTER switch (1).

(2) UP switch

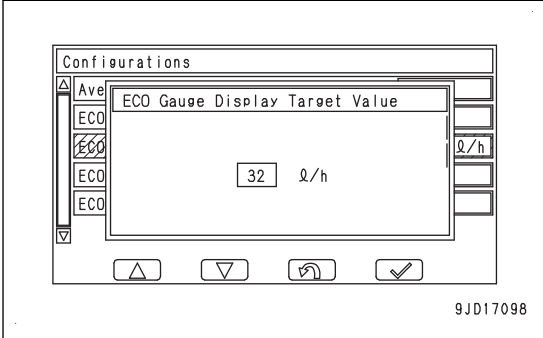
Increases the target fuel consumption value by 1 l/h.

(3) DOWN switch

Decreases the target fuel consumption value by 1 l/h.

To cancel, press RETURN switch (4).

The default is 32 l/h.



REMARK

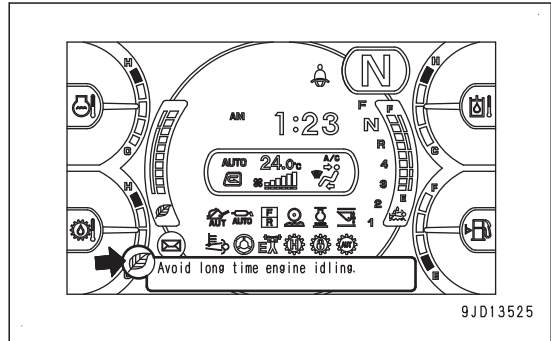
If the target fuel value is increased, the fuel consumption indicated when the ECO gauge is at the maximum is also increased in proportion.

If the target fuel value is decreased, the fuel consumption indicated when the ECO gauge is at the maximum is also decreased in proportion.

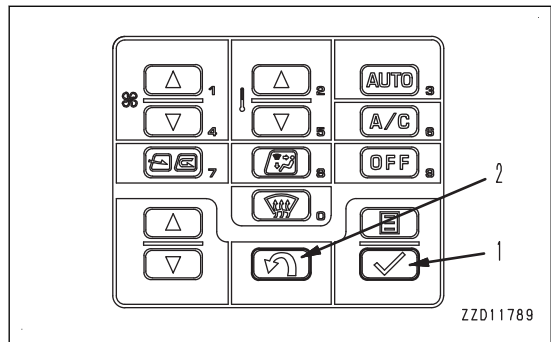
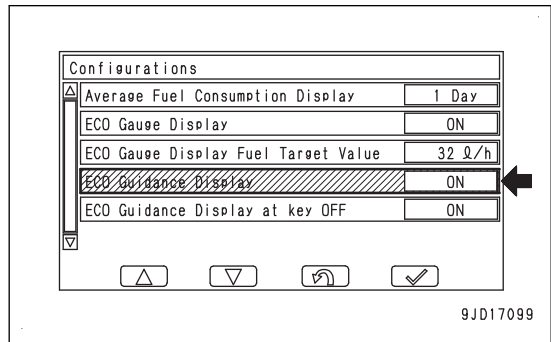
For the ECO gauge, see "ECO GAUGE (3-50)".

SWITCH DISPLAY/NON-DISPLAY OF ECO GUIDANCE

Display/non-display of ECO guidance displayed on the standard screen can be switched.



1. Select "ECO Guidance Display " from "Configurations" menu, then press ENTER switch (1).



2. Select "ON" or "OFF", then press ENTER switch (1).

"ON"

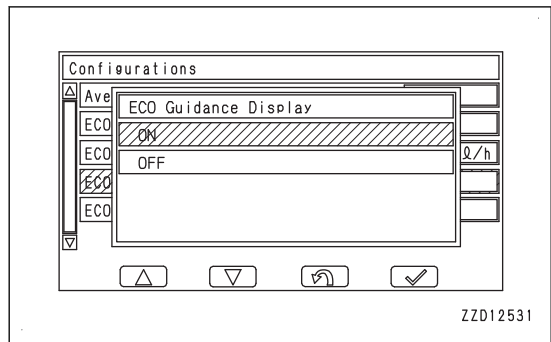
Displays the ECO guidance.

"OFF"

Does not display the ECO guidance.

To cancel, press RETURN switch (2).

The default is "ON".



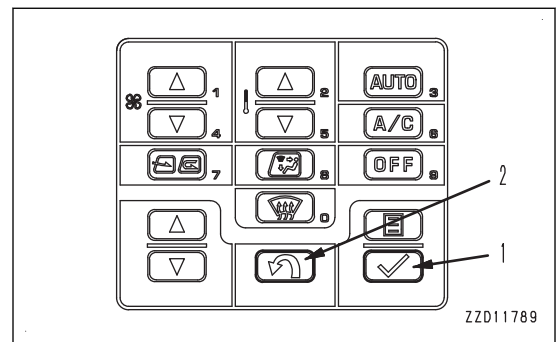
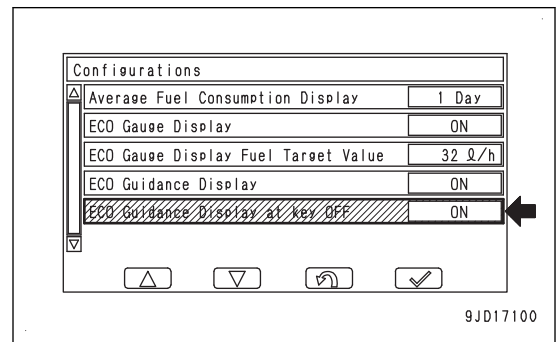
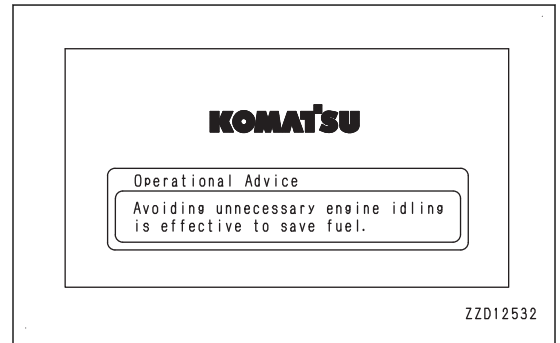
REMARK

- For the ECO guidance, see "ECO GUIDANCE (3-45)".
- If "ECO Guidance Display" is turned "OFF", displays of "ECO Guidance Display at Key OFF" and "ECO Guidance Records" are not displayed. "ECO Guidance Records", however, is not reset.

SWITCH DISPLAY/NON-DISPLAY OF GUIDANCE WHEN KEY IS OFF

Display/non-display of the “Operational Advice” indicated on the end screen when the key is turned to OFF position can be switched.

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



2. Select “ON” or “OFF”, then press ENTER switch (1).

“ON”

Displays the operational advice on the end screen.

“OFF”

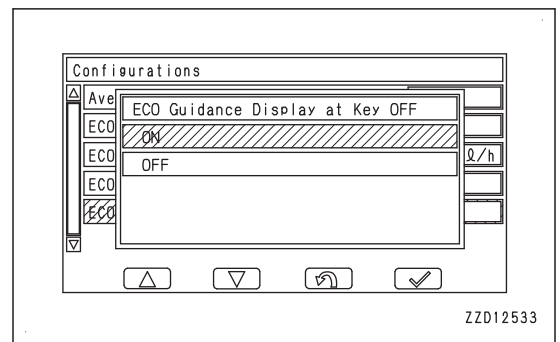
Does not display the operational advice on the end screen.

To cancel, press RETURN switch (2).

The default is “ON”.

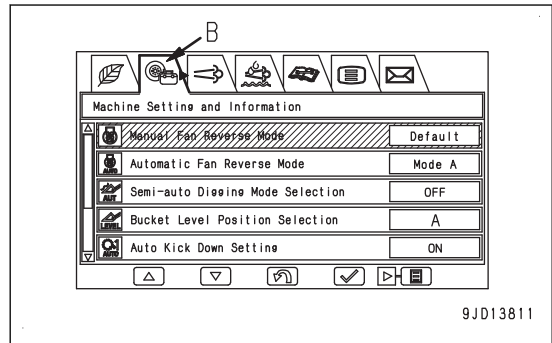
REMARK

In the “Operational Advice” section indicated on the end screen, the advice to the ECO guidance that was displayed most frequently after the starting switch is turned to ON position is indicated. Accordingly, the operational advice indicated on the end screen may be different from the “Operational Advice” indicated on “ECO GUIDANCE RECORD (3-61)”.



MACHINE SETTING AND INFORMATION

In each item of “Machine Setting and Information” menu (B), setting and information of the machine are checked or changed.



RADIATOR FAN MANUAL REVERSE MODE

CAUTION

When rotating the fan in the reverse direction, beware extremely that dirt will not fly out and cloth, etc. will not be wound in the fan. Dust may blow up. During reverse rotation, check that there is no people in the surrounding area.

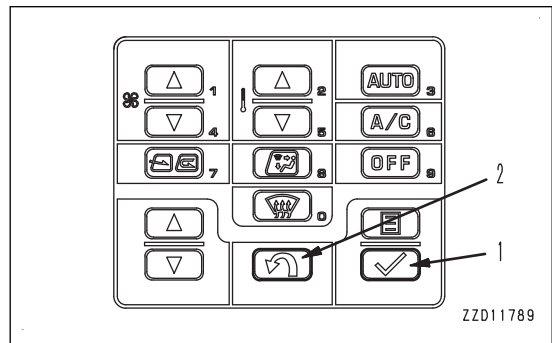
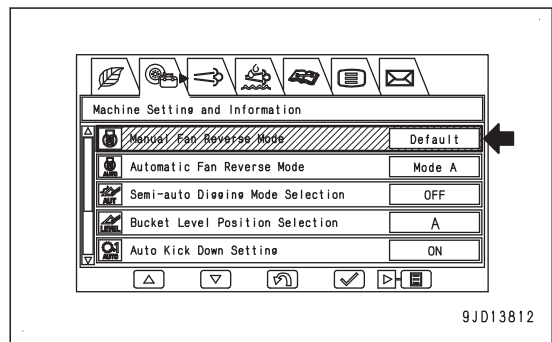
In the manual fan reverse mode, the fan may be rotated in reverse to blow off mud or dirt sticking to the radiator.

1. Set the engine speed to low idle.
2. Select “Manual Fan Reverse Mode” on the “Machine Setting and Information”, and press ENTER switch.

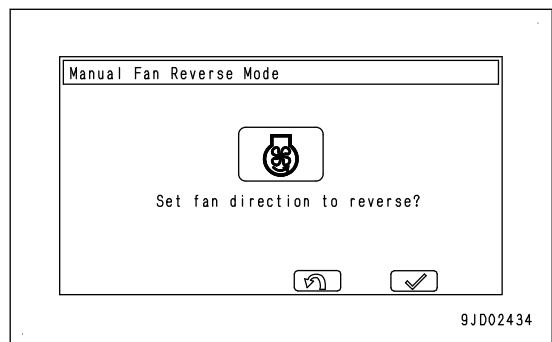
REMARK

The fan rotation switches from the normal direction to the reverse direction only when all of the following conditions are met.

- Perform the manual fan reverse operation.
- The engine coolant temperature is less than 102 °C {215.6 °F}.
- The hydraulic oil temperature is less than 97 °C {206.6 °F}.
- The torque converter oil temperature is less than 120 °C {248 °F}.
- It is 10 seconds or more after the engine was started.



3. Press ENTER switch (1) to rotate the fan in the reverse direction, or press RETURN switch (2) to cancel.



If the fan reverse operation is performed without satisfying the condition for reversing the fan, the screen shown in the figure is displayed, and the fan rotation direction cannot be switched.

In this case, press RETURN switch (2), and then repeat the procedure from the first.

- 4. Fan reverse pilot lamp (3) flashes, then lights up.

If the condition for reversing the fan is not satisfied, changeover condition waiting pilot lamp (4) lights up in red.

- 5. Set the engine speed to high idle and perform cleaning.
- 6. After finishing cleaning, set the engine speed to low idle.

- 7. If the menu switch is pressed on the standard screen, the screen shown in the figure is displayed.

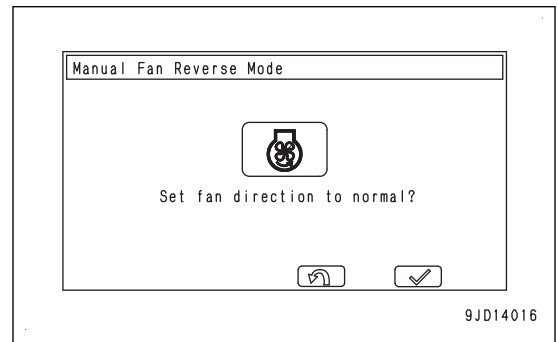
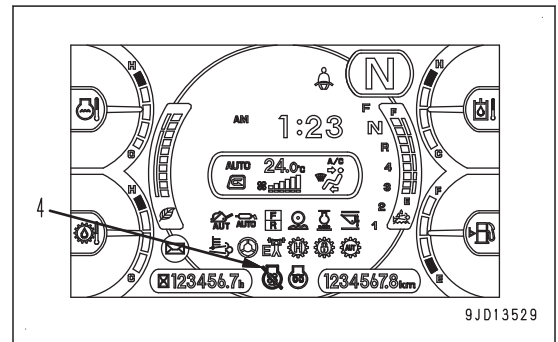
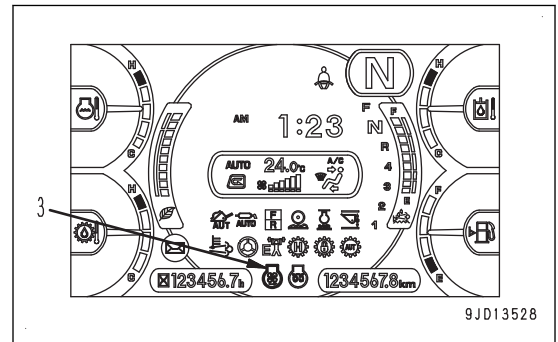
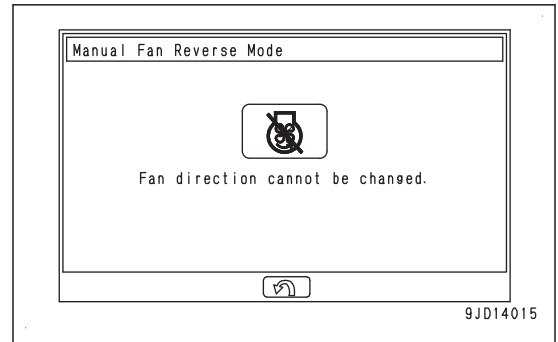
Press ENTER switch to return the fan to the normal rotation mode.

Fan reverse pilot lamp (3) flashes, then goes out.

REMARK

If one of the following conditions is satisfied, the fan rotation returns from reverse direction to normal direction.

- Perform the manual fan reverse operation again while the fan is rotating in reverse.
- 10 minutes elapses after the fan rotation direction is reversed.
- Stop the engine.
- The coolant temperature, hydraulic oil temperature, or torque converter oil temperature overheats (the caution lamp of the oil temperature gauge or coolant temperature gauge on the machine monitor lights up in red, then action level "L02" is displayed) while the fan is rotating in reverse.



RADIATOR FAN AUTOMATIC REVERSE MODE

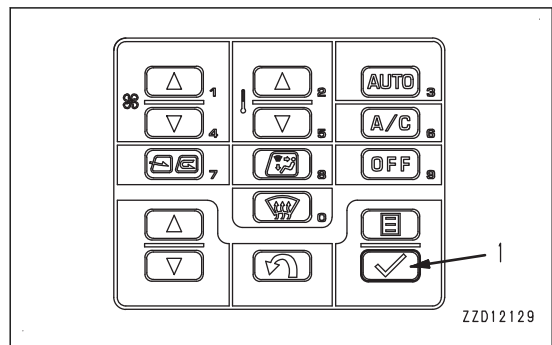
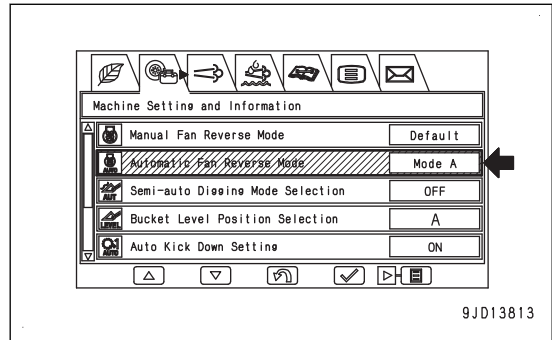
⚠ CAUTION

When rotating the fan in the reverse direction, beware extremely that dirt will not fly out and cloth, etc. will not be wound in the fan.

Dust may be blown up. Check that there is no people in the surrounding area while the fan is rotating in the reverse direction.

In the automatic fan reverse mode, you can configure the setting for automatically rotating the fan in the reverse direction to blow off mud and dirt sticking to the radiator.

1. Select "Automatic Fan Reverse Mode" from "Machine Setting and Information" menu, and press ENTER switch (1).



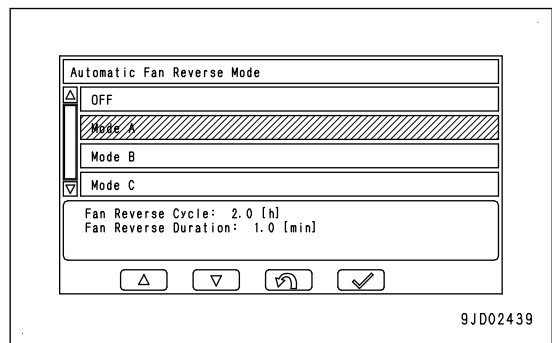
2. Select the duration and cycle of the automatic fan reverse, and press ENTER switch (1).

The following 4 items can be selected.

- "OFF": The fan does not rotate in reverse direction automatically.
- "Mode A": The fan rotates in the reverse direction for 1 minute once for every 2 hours.
- "Mode B": The fan rotates in the reverse direction for 1 minute once for every 1 hour.
- "Mode C": The fan rotates in the reverse direction for 4 minutes once for every 30 minutes.

Initially, "Mode A" is selected.

When you want other than above settings for the duration and cycle of the fan reverse rotation, consult your Komatsu distributor.

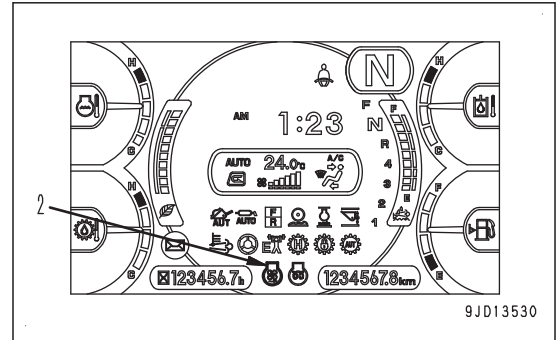


REMARK

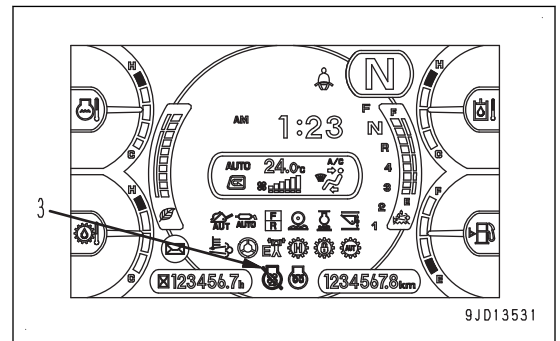
The fan rotation switches from the normal direction to the reverse direction only when all of the following conditions are met.

- Other than “OFF” is set in “Automatic Fan Reverse Mode”.
- The set changeover time for “Automatic Fan Reverse Mode” has elapsed.
- The engine coolant temperature is less than 102 °C {215.6 °F} .
- The hydraulic oil temperature is less than 97 °C {206.6 °F} .
- The torque converter oil temperature is less than 120 °C {248 °F} .
- It is 10 seconds or more after the engine was started.

3. When the set changeover time elapses, fan reverse pilot lamp (2) flashes and lights up.



If the condition for reversing the fan is not satisfied, changeover condition waiting pilot lamp (3) lights up in red.

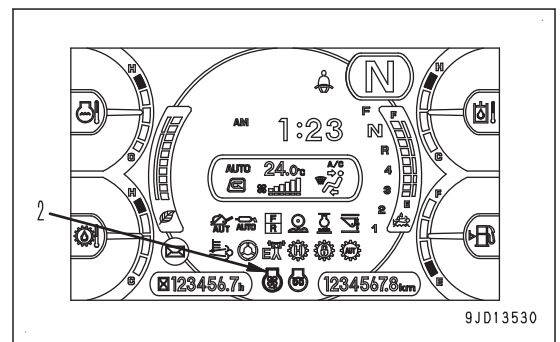


4. The fan returns from the reverse rotation to the normal when the set duration for the reverse rotation elapses. Fan reverse pilot lamp (2) flashes and then goes out.

REMARK

If one of the following conditions is satisfied, the fan rotation returns from reverse direction to normal direction.

- Turn the automatic fan reverse mode OFF.
- The set duration time for the automatic fan reverse mode has elapsed.
- Stop the engine.
- 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 displayed) while the fan is rotating in reverse.



SELECT SEMI-AUTO DIGGING MODE

Semi-auto digging function

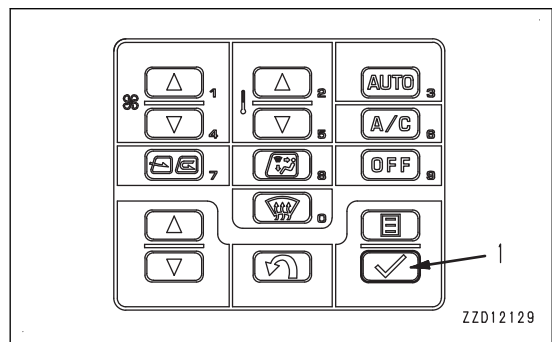
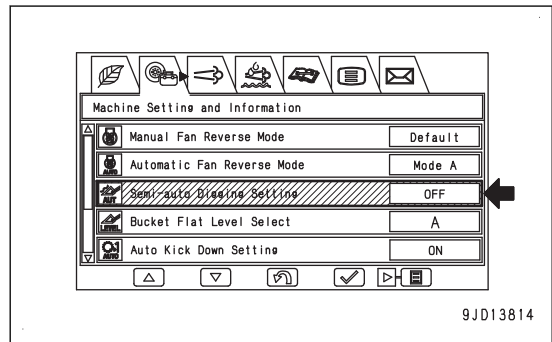
The semi-auto digging system controls automatically the tilting operation of the bucket to facilitate bucket operation and reduce the fatigue of the operator.

When operating, see “DIGGING WORK (3-229)”.

Operation of semi-auto digging system

A suitable digging mode for handled material can be selected according to the following procedure.

1. Select “Semi-auto Digging Mode Selection” on “Machine Setting and Information” menu, and press ENTER switch (1).

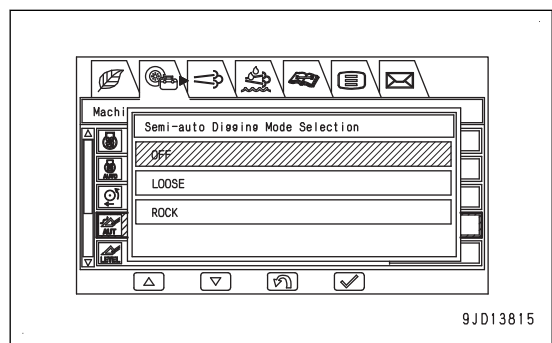


2. Select a suitable digging mode for the handled material, then press ENTER switch.

“OFF”: Semi-auto digging system does not operate.

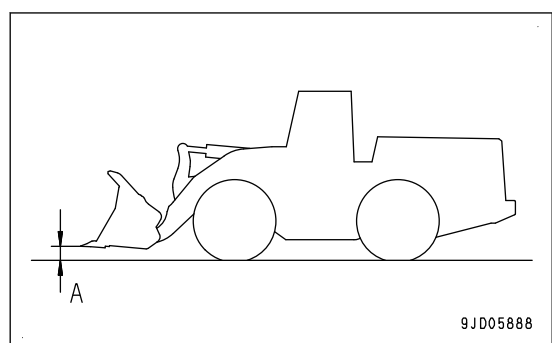
“LOOSE”: Mode suitable for handling gravel and sand.

“ROCK”: Mode suitable for handling quarry and blasted rock.



3. While driving the machine forward, lower cutting edge of the bucket to height (A) of approximately 30 cm {12 in} above the ground.
4. Press the kickdown switch to shift down the gear to the forward 1st.
5. Depress the accelerator pedal to thrust the bucket teeth into the piled soil.
6. Move the boom control lever to RAISE position once, then return it to HOLD position or set the boom control lever to the detent position.

Using this operation as a start signal, the machine starts semi-auto digging approximately 1 second later.



REMARK

- If the travel speed decreases to 1 km/h {0.6 MPH} or below during semi-auto digging, the boom may rise automatically.
- When the gear speed is fixed to 1st in the manual shift mode or when it is shifted down to 1st by the auto-kickdown, if the kickdown switch is pressed, the machine is set in the semi-auto digging mode.

Finishing of semi-auto digging

The semi-auto digging is ended when the following conditions or operations are induced or performed. And at the same time, the automatic tilting operation and automatic boom raising operation are stopped as well.

- When the bucket is tilted fully by the automatic tilting operation.
- When the boom is raised beyond the horizontal position.
- When the directional lever is set in a position other than FORWARD.
- When "OFF" is selected in "Semi-auto Digging Mode Selection".
- When the boom control lever is set to LOWER position.
- When the bucket control lever is set to DUMP position.

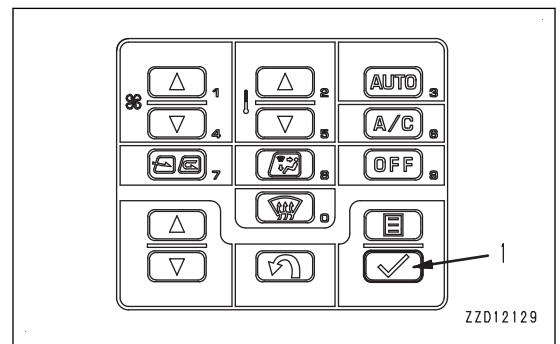
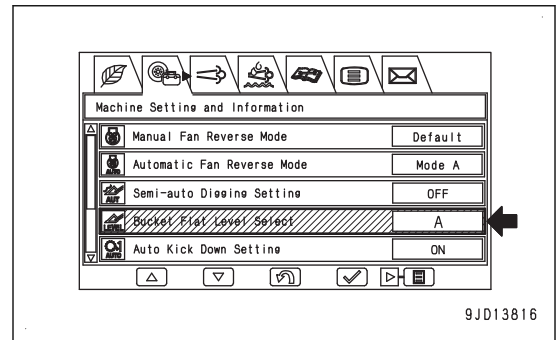
SELECT BUCKET LEVEL POSITION

The bucket cylinder length when the bucket is in the level position depends on the type of the bucket. It is necessary to set the level position according to the installed bucket.

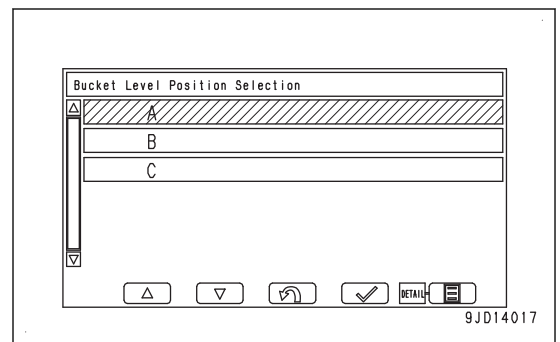
NOTICE

If the level position is not set appropriately, the bucket positioner may not function normally.

1. Select "Bucket Level Position Selection" on "Machine Setting and Information" menu, then press ENTER switch (1).



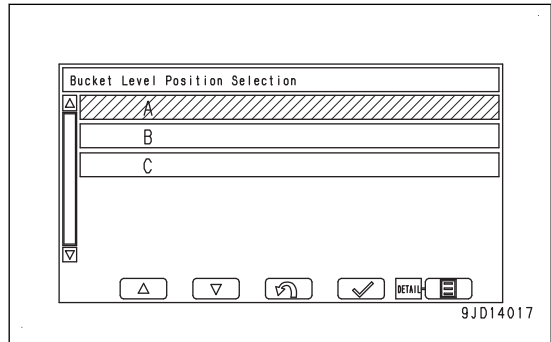
2. "Bucket Level Position Selection" allows the settings for 3 types of bucket A to C.



“Bucket Level Position Adjustment”

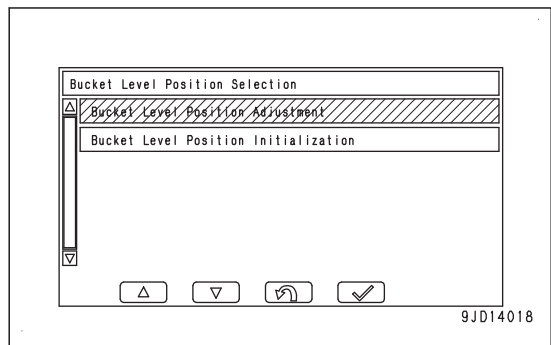
When using a newly delivered machine or installing another bucket to a currently used machine, you must adjust the level position of the bucket.

1. Select a type of bucket whose level position is to be adjusted from the “Bucket Level Position Selection” screen, then press the menu switch.



2. Select the “Bucket Level Position Adjustment”, then press ENTER switch.

The adjustment mode starts.



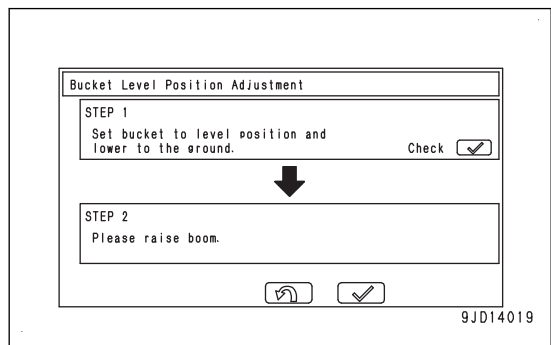
3. According to the screen instructions, set the bucket horizontal, lower the boom to the ground and press ENTER switch.

The screen switches to STEP2.

4. According to the screen instructions, raise the boom to the highest position.

When this operation ends successfully, the bucket level position is adjusted as intended.

5. The screen returns to “Bucket Level Position Selection” screen.

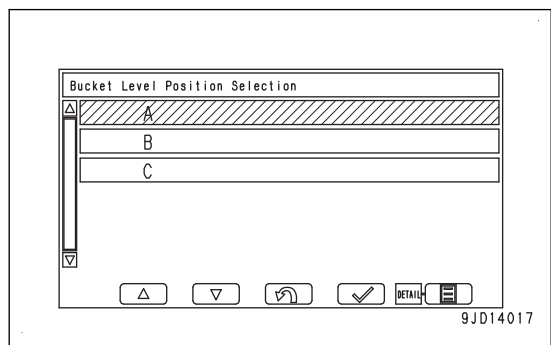


Once the above adjustment is done, if the bucket is installed to the machine, you are requested only to select bucket type A to C without repeating the level position adjustment procedure.

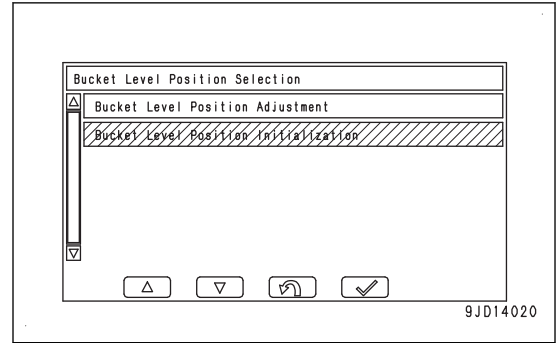
“Bucket Level Position Initialization”

You can return the adjusted bucket level position to the default value.

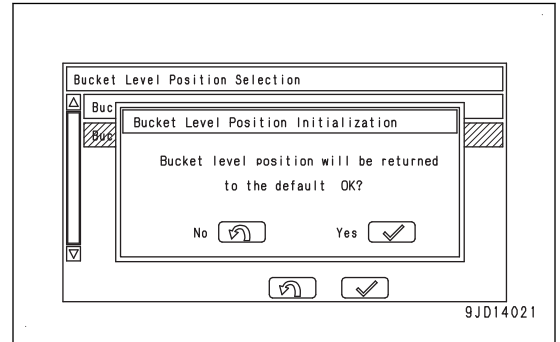
1. Select a type of bucket you want to initialize from the “Bucket Level Position Selection” screen, then press the menu switch.



2. Select the "Bucket Level Position Initialization", then press ENTER switch.
The initialization starts.



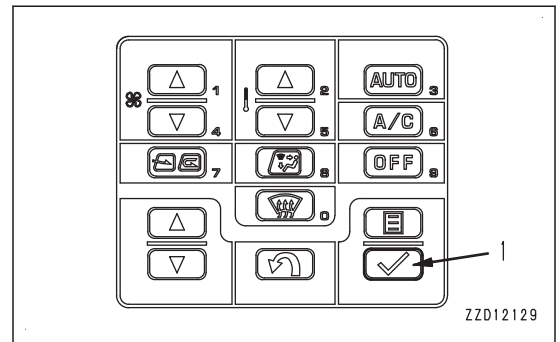
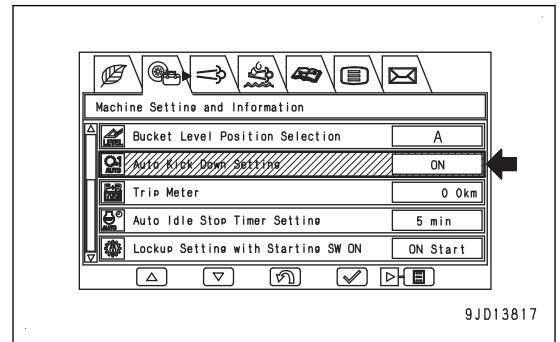
3. Press ENTER switch on the confirmation screen to return the level position of the selected bucket to the default.
When the initialization is not necessary, press RETURN switch.
4. The screen returns to "Bucket Level Position Selection" screen.



AUTO KICK DOWN SETTING

When the shift mode is set to the digging mode automatically, auto-kickdown shifts the gear speed to 1st automatically and eliminates operator's operation.

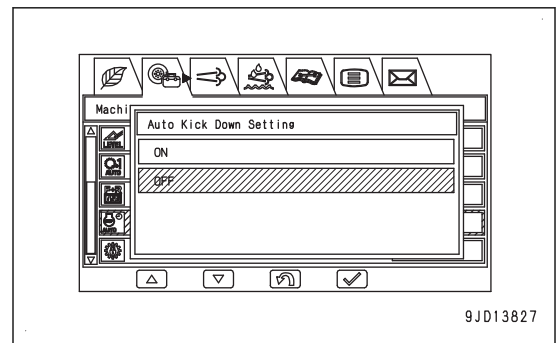
1. Select "Auto Kick Down Setting" on "Machine Setting and Information" menu, then press ENTER switch (1).



2. Select "ON/OFF", then press ENTER switch (1).

REMARK

For the detail of the gear speed, see "GEAR SPEED SWITCH (3-120)".

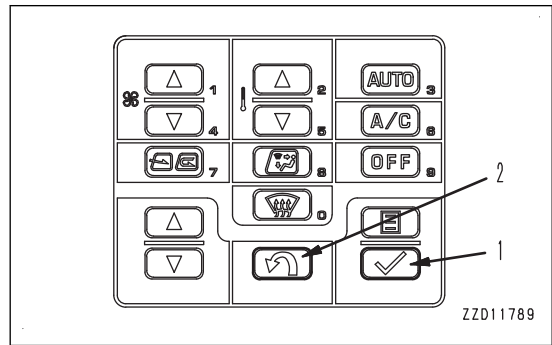
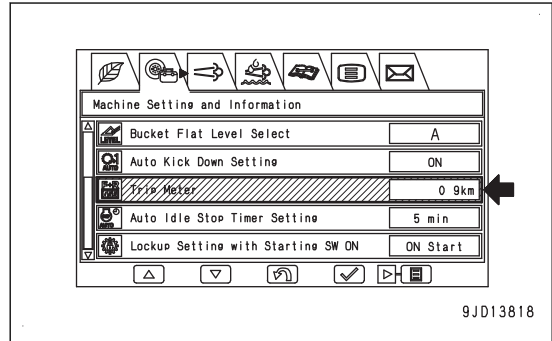


TRIP METER

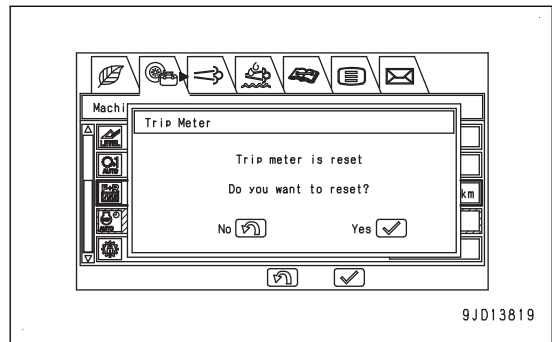
The overall travel distance after the previous resetting can be checked by using the “Trip Meter”.

You can reset the travel distance according to the following procedure.

1. Select “Trip Meter” on “Machine Setting and Information” menu, then press ENTER switch (1).



2. Press ENTER switch (1) to reset or press RETURN switch (2) to cancel resetting.

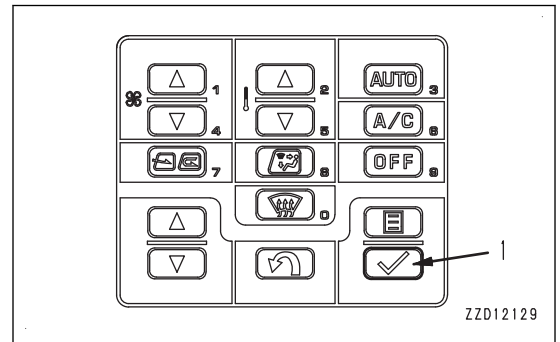
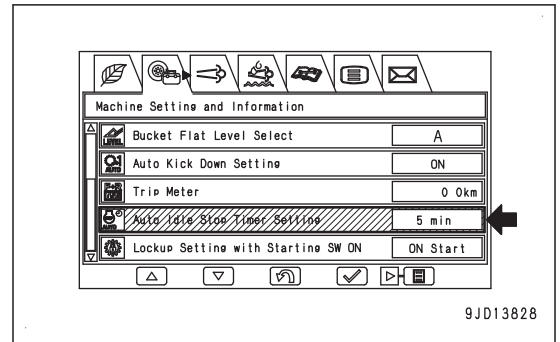


AUTO IDLE STOP TIMER SETTING

Stops the engine automatically when the idle state continued for a predetermined time.

The auto idle stop works only when all of the following conditions are met.

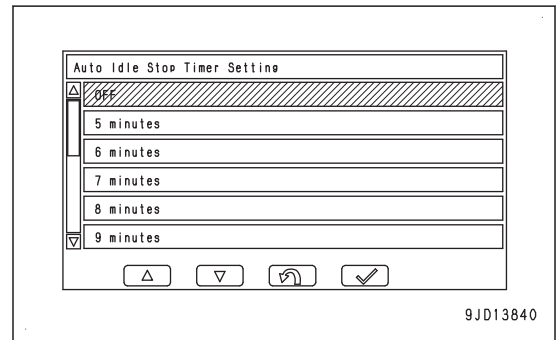
- The engine is running normally.
 - The machine is stopped.
 - The accelerator pedal is not depressed.
 - The transmission is in NEUTRAL (N).
 - The engine is not in warm-up operation.
 - The engine coolant and hydraulic oil are not overheating.
 - Aftertreatment devices are not in regeneration.
 - The parts of DEF system are not in thawing control mode.
1. Select “Auto Idle Stop Timer Setting” on “Machine Setting and Information” menu, and press ENTER switch (1).



2. Select the operating time of the auto idle stop, and press ENTER switch (1).

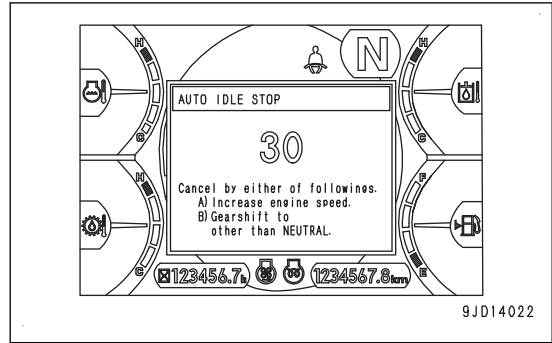
REMARK

Selecting “OFF” disables operation of the auto idle stop.



- 3. If the idle state is continued up to 30 seconds before the current auto idle stop timer setting , the countdown screen is displayed on the standard screen.

If you increase the engine speed or set the gear to any position other than NEUTRAL (N) at this point, the countdown is stopped and the screen returns to the standard screen.



- 4. If the idle state is further continued and the countdown reaches 0 second, the engine stops.

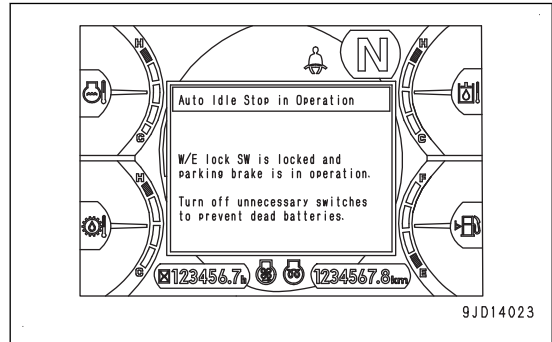
At the same time, the parking brake is applied and the work equipment lock works.

Turn unnecessary switches to OFF position to prevent the battery to run out.

REMARK

When the auto idle stop starts while the parking brake is off, release the parking brake by turning it on once and turning it off again.

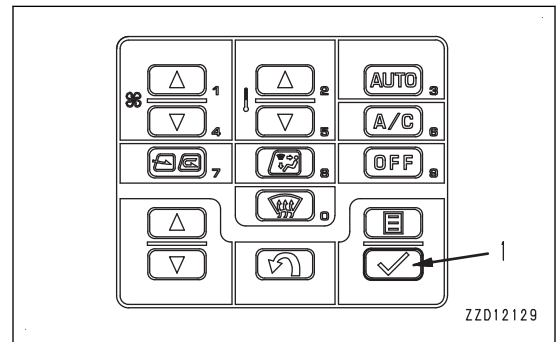
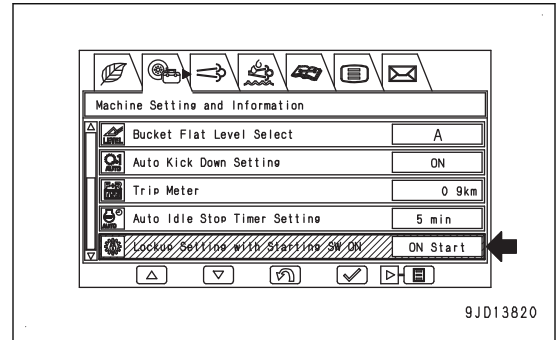
When restarting the engine, turn the starting switch as usual.



LOCKUP FUNCTION SETTING WHEN KEY IS ON

You can set "ON/OFF" state of the torque converter lockup function mode when the starting switch is in ON position.

1. Select "Lockup Setting with Starting SW ON" from "Machine Setting and Information" menu screen, then press ENTER switch (1).

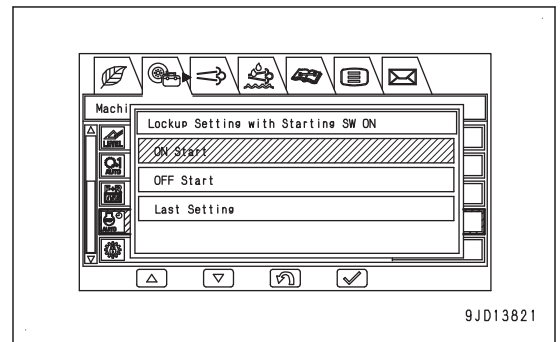


2. Select "Lockup Setting with Starting SW ON" mode, then press ENTER switch (1).

The following 3 items can be selected.

- "ON Start": Lockup function is ON when starting switch is turned to ON position
- "OFF Start": Lockup function is OFF when starting switch is turned to ON position
- "Last Setting": "ON/OFF" state when starting switch is turned to OFF position previous time is selected when starting switch is turned to ON position

The default is "ON Start".

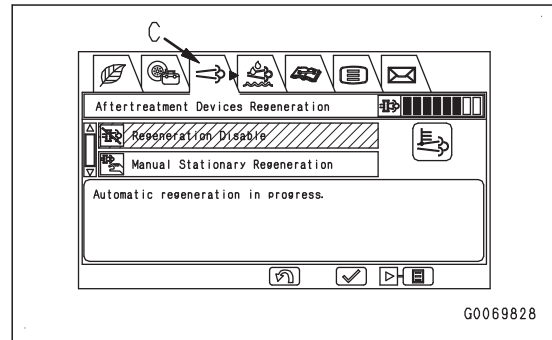


AFTERTREATMENT DEVICES REGENERATION

Each item of “Aftertreatment Devices Regeneration” menu (C) is for settings and operations of the aftertreatment devices regeneration.

For details of the aftertreatment devices regeneration, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)”.

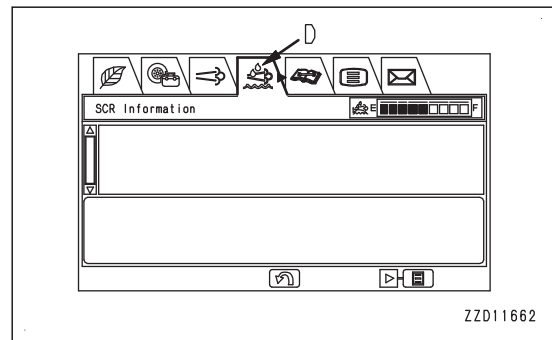
The operation methods and the contents of the display of KDPF regeneration and urea SCR regeneration are common.



SCR INFORMATION

Each item in “SCR Information” menu (D) is for displaying information related to SCR and DEF.

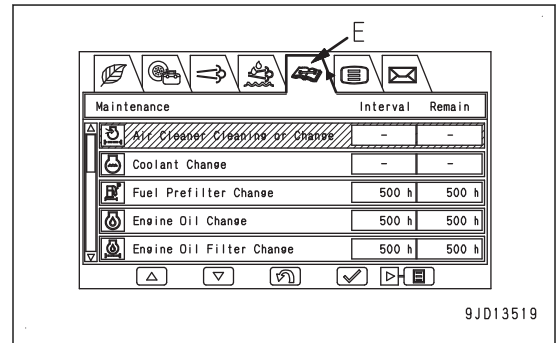
For details of “SCR Information”, see “HANDLE UREA SCR SYSTEM WARNING (3-153)”.



MAINTENANCE SCREEN SETTING

Each item on “Maintenance” menu screen (E) is used for displaying and setting the notification relevant to maintenance.

On the “Maintenance” menu screen, the following maintenance items, their replacement intervals, and their remaining times to the next replacement are displayed.



Maintenance item	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	2000
Hydraulic Oil Change	2000
Hydraulic Oil Filter Change	2000
Hyd Oil Tank Breather Change	2000
KCCV Filter Change	2000
DEF Filter Change	2000
DEF Tank Breather Change	2000
KDPF Filter Cleaning	4500
DEF Tank Washing	4500

When the time remaining to the next “Maintenance” for any item is less than the maintenance notice time (initial setting: 30 hours), the remaining time display (1) is highlighted in yellow.

When the time remaining to the maintenance becomes 0 hours, the Remain (1) is highlighted in red. The time after the replacement interval is indicated with the negative symbol.

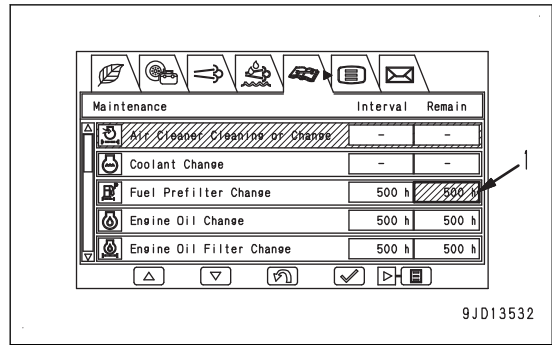
If any item is displayed in red, perform the maintenance for it immediately.

REMARK

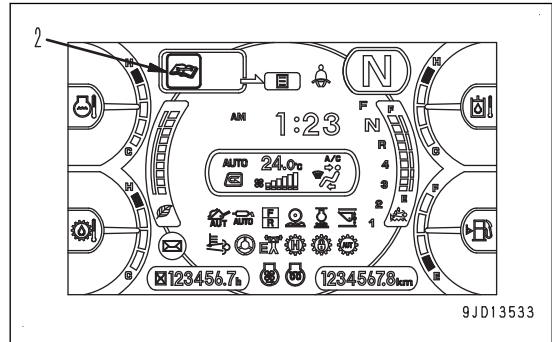
The replacement intervals in “Air Cleaner Cleaning or Change” and “Coolant Change” are not set initially.

If you want to change the setting for the maintenance interval and the maintenance notice time, consult your Komatsu distributor.

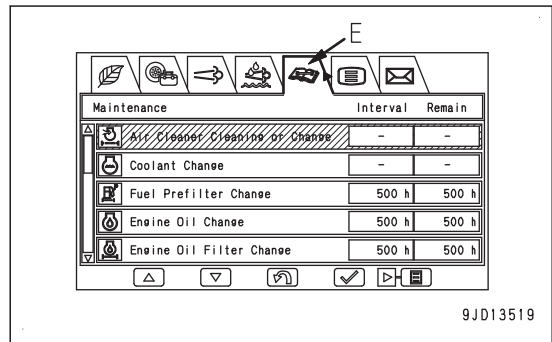
When the maintenance time caution lamp (2) is lit on the standard screen, press the menu switch, and the screen automatically displays the “Maintenance” menu screen (E).



9JD13532



9JD13533



9JD13519

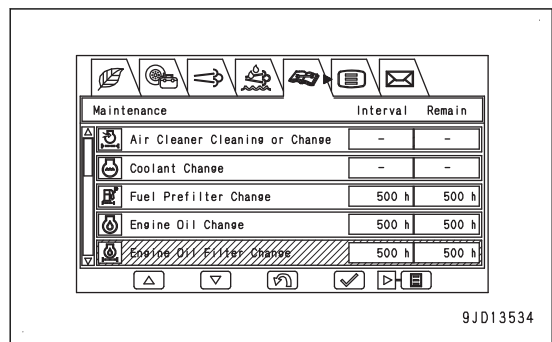
METHOD FOR RESETTING REMAINING TIME FOR MAINTENANCE

After performing maintenance, reset the remaining time for maintenance according to the following procedure.

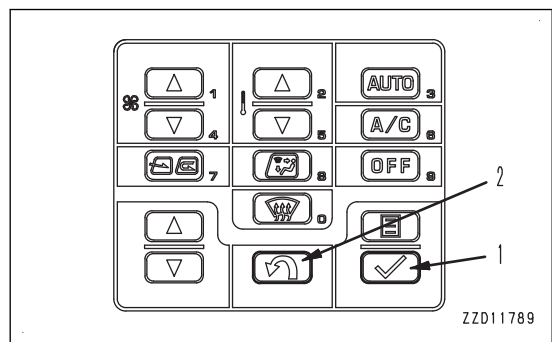
1. On “Maintenance” menu screen, select an item to reset the remaining time, then keep pressing ENTER switch (1) for more than 1.5 seconds.

REMARK

If ENTER switch (1) is not pressed for enough time, the switch operating sound can be heard, but the screen does not switch to the screen for resetting the remaining time for maintenance.



9JD13534



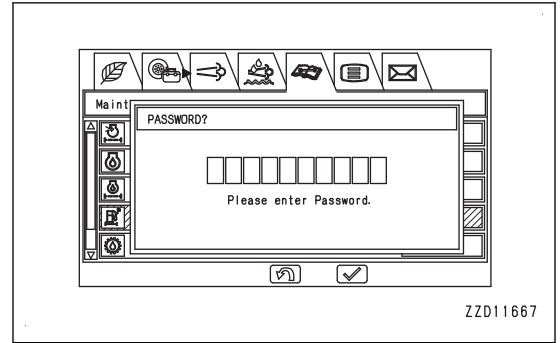
ZZD11789

When a password for restriction of use has been set, the password input screen is displayed.

Input the password for restriction of use by using the numeric keypad, then press ENTER switch (1).

REMARK

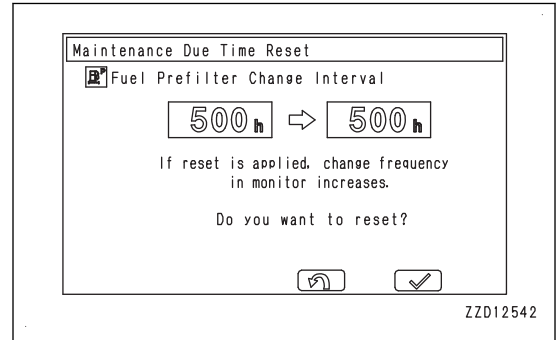
For the setting, changing, or canceling the password, ask your Komatsu distributor.



- The screen changes to Maintenance Due Time Reset screen.

When ENTER switch (1) is pressed, the following reconfirmation screen is displayed.

To cancel, press RETURN switch (2).

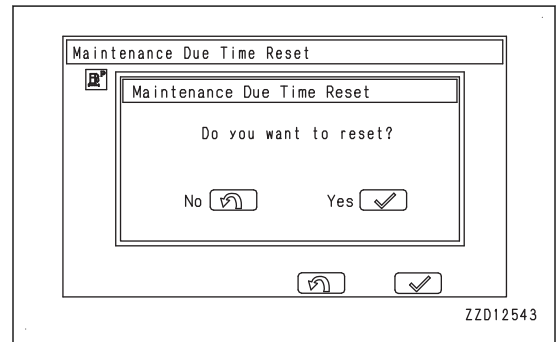


- On the reconfirmation screen shown in the figure, when ENTER switch (1) is pressed again, the remaining time is reset and the screen returns to the "Maintenance" menu screen.

To cancel, press RETURN switch (2).

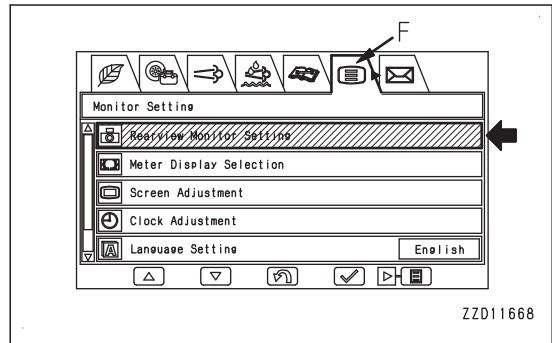
REMARK

If the remaining time and the replacement interval are the same, the remaining time cannot be reset.



MONITOR SETTINGS

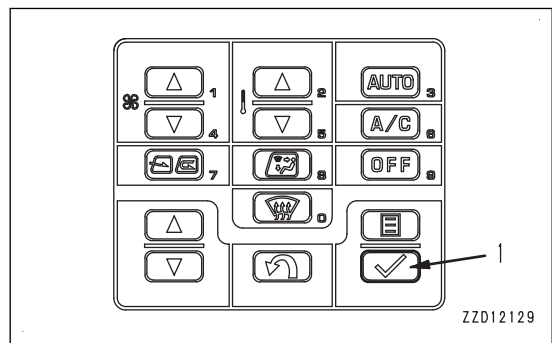
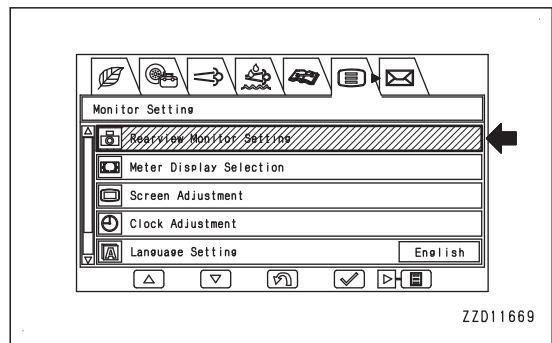
Each item of “Monitor Setting” menu (F) is to make settings for the machine monitor.



REAR VIEW MONITOR SETTING

This is used to set the rearview monitor.

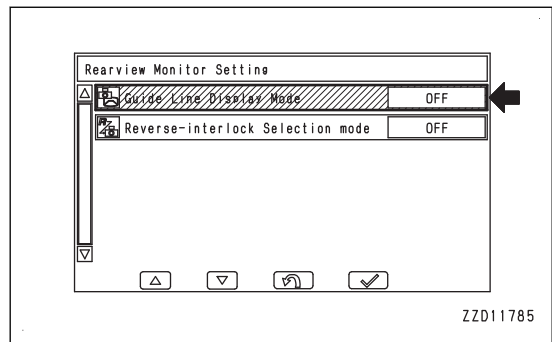
Select “Rearview Monitor Setting” on the “Monitor Setting” menu screen, and press ENTER switch (1).



Reference line display

The is used to change ON/OFF of the reference line on the rearview monitor.

1. Select “Guide Line Display Mode” from the “Rearview Monitor Setting” menu, and press ENTER switch (1).



2. Select "ON" or "OFF", then press ENTER switch (1).

"ON"

Displays the reference line.

"OFF"

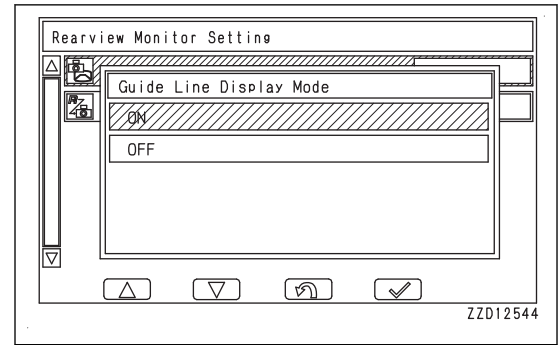
Hides the reference line.

REMARK

For the rearview monitor and the reference line, see "HANDLE REAR VIEW MONITOR (3-142)" and "METHOD FOR ADJUSTING REAR VIEW CAMERA ANGLE (3-193)".

This setting is held even if the starting switch is turned to OFF position.

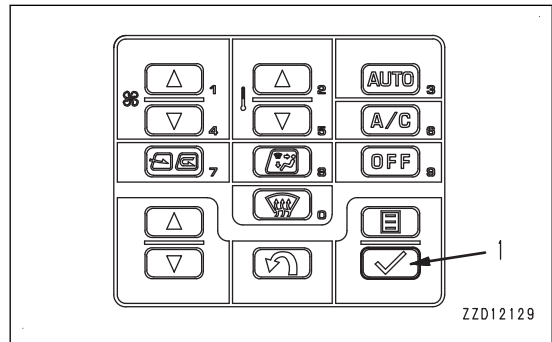
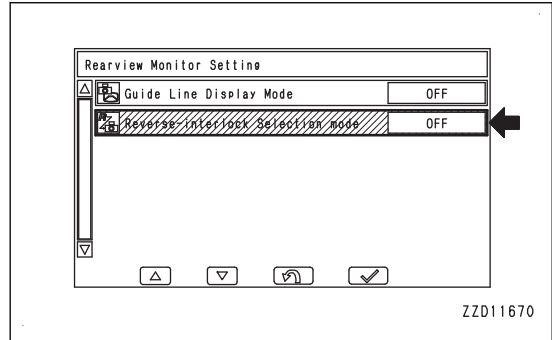
The default is "ON".



REVERSE-INTERLOCK ENABLED MODE

In this mode, display method of rear view monitor can be changed by switching ON/OFF.

1. Select "Reverse-interlock Selection mode" on the "Rear-view Monitor Setting" menu, then press ENTER switch (1).



2. Select "ON" or "OFF", then press ENTER switch (1).

"ON"

Displays images on the rear view monitor only when traveling in reverse.

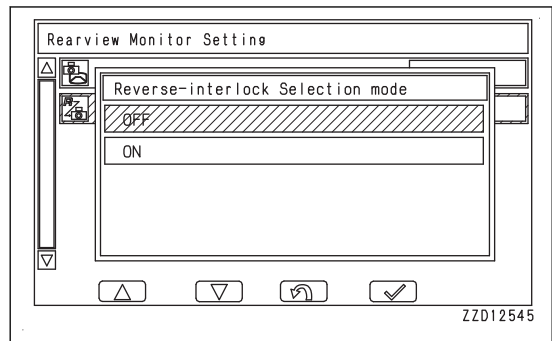
"OFF"

Always displays images on the rear view monitor.

REMARK

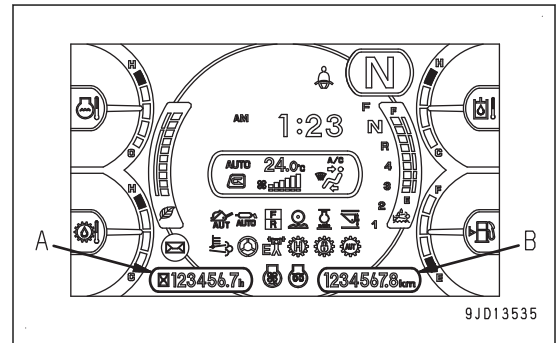
This setting is held even if the starting switch is turned to OFF position.

The default is "ON".

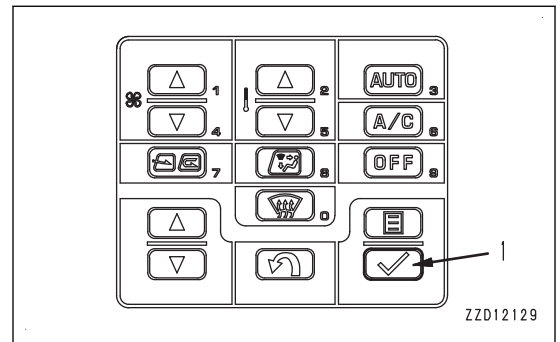
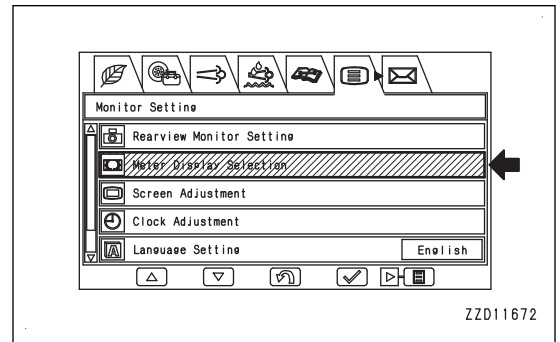


METER DISPLAY SELECTION

This is used for the selection of the items to be displayed on L.H. meter display (A) or R.H. meter display (B).



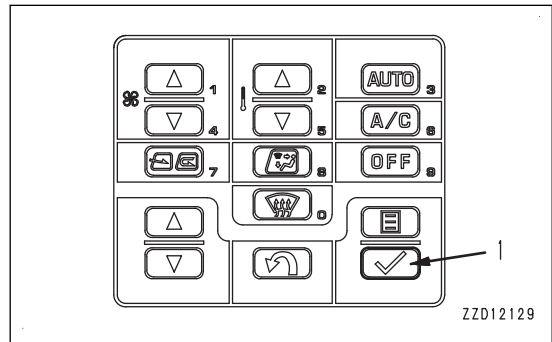
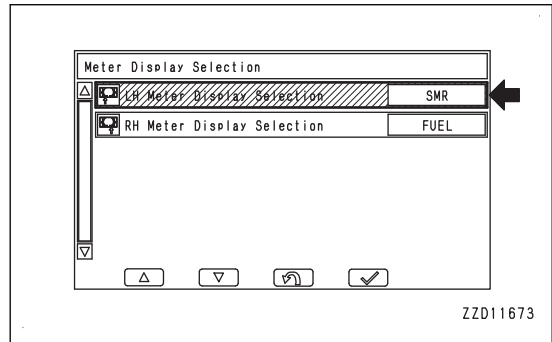
Select "Meter Display Selection" on the "Monitor Setting" menu screen, then press ENTER switch (1).



SELECT L.H. METER DISPLAY

This is used for the selection of the items to be displayed on the L.H. meter display.

1. Select "LH Meter Display Selection" on the "Meter Display Selection" menu, then press ENTER switch (1).



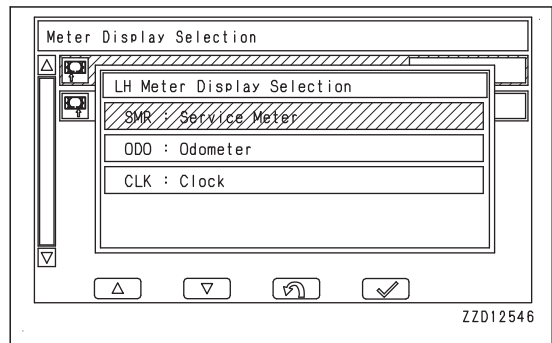
2. Select the items to be displayed, then press ENTER switch (1).

The following 3 items can be selected.

- "SMR: Service Meter"
- "ODO: Odometer"
- "CLK: Clock"

REMARK

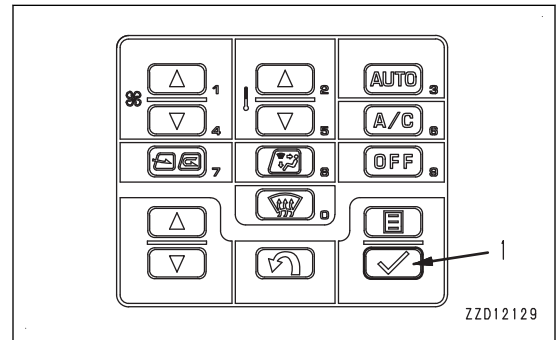
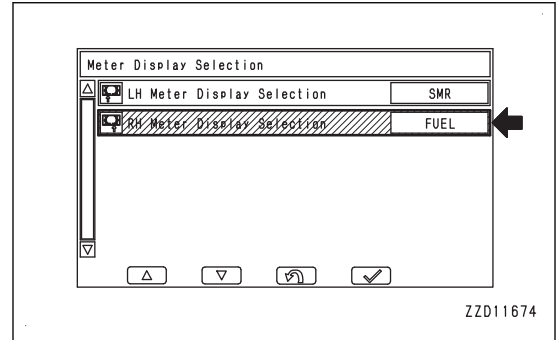
For details of each item, see "L.H. AND R.H. METER (3-50)".
The default of L.H. meter is "SMR: Service Meter".



SELECT R.H. METER DISPLAY

This is used for the selection of the items to be indicated on the R.H. meter display.

1. Select "RH Meter Display Selection" on the "Meter Display Selection" menu, then press ENTER switch (1).



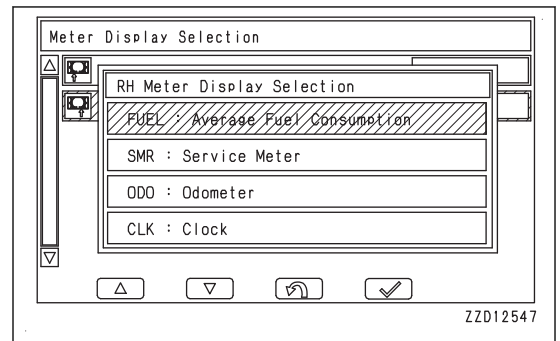
2. Select the items to be displayed, then press ENTER switch (1).

The following 4 items can be selected.

- "FUEL: Average Fuel Consumption"
- "SMR : Service Meter"
- "ODO: Odometer"
- "CLK: Clock"

REMARK

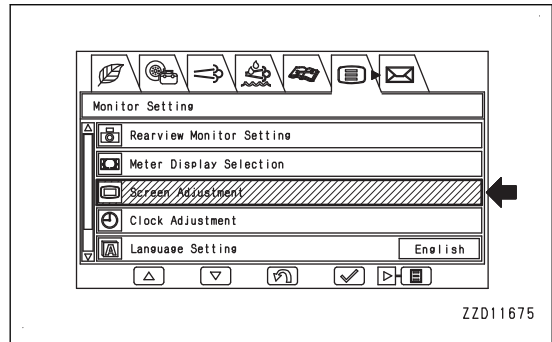
For details of each item, see "L.H. AND R.H. METER (3-50)".
The default of R.H. meter is "FUEL: Average Fuel Consumption"



SCREEN ADJUSTMENT

This function is used for the adjustment of brightness of the machine monitor.

1. Select "Screen Adjustment" on the "Monitor Setting" screen, then press ENTER switch (5).



2. Adjust the brightness by using the switch panel.

The brightness can be adjusted individually in the day and night modes.

(1) Menu switch

Brightness is set to default.

(2) UP switch

Brightness increases. (Moves the indicator to the right by one division.)

(3) DOWN switch

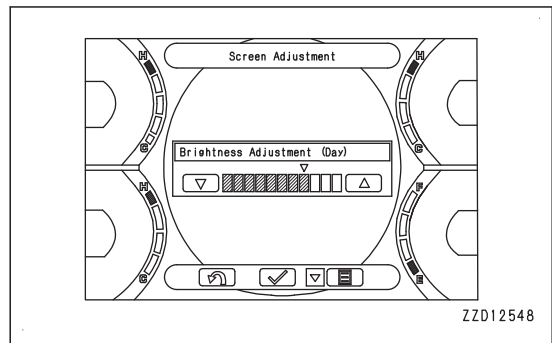
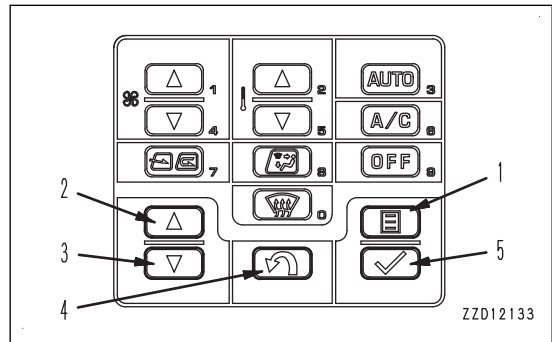
Brightness decreases. (Moves the indicator to the left by one division.)

(4) RETURN switch

Cancels the change and returns to "Monitor Setting" menu.

(5) ENTER switch

Accepts the change and then returns to "Monitor Setting" menu.



REMARK

When the screen is adjusted while the lamp switch is turned off, the brightness in the day mode can be adjusted.
 Turn on the lamp switch, then adjust the screen when the monitor brightness selector switch is set to the night mode, the brightness in the night mode can be adjusted.
 The brightness of night illumination for the switch panel and operation switches are adjusted synchronously with the brightness of the machine monitor.

CLOCK ADJUSTMENT

On the clock adjustment menu, you can change the setting of the clock displayed on the standard screen.

The following items can be changed.

“GPS Synchronization”

“Calendar”

“Time”

“12hour or 24hour Mode”

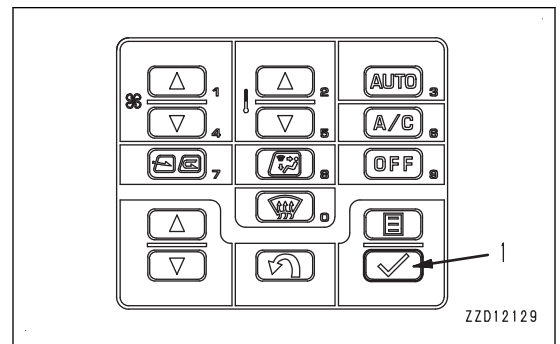
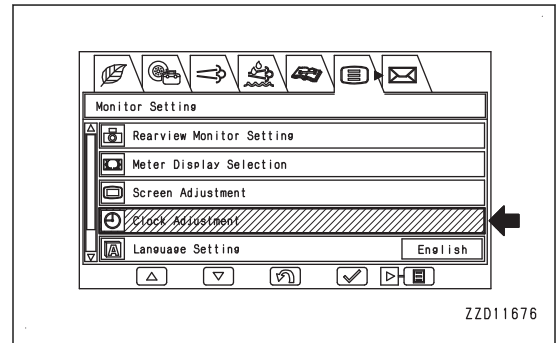
“Daylight Saving Time”

Select “Clock Adjustment” on the “Monitor Setting” menu screen, then press ENTER switch (1).

REMARK

After a long-term storage of the machine, Calendar and Time are reset, so you must readjust them.

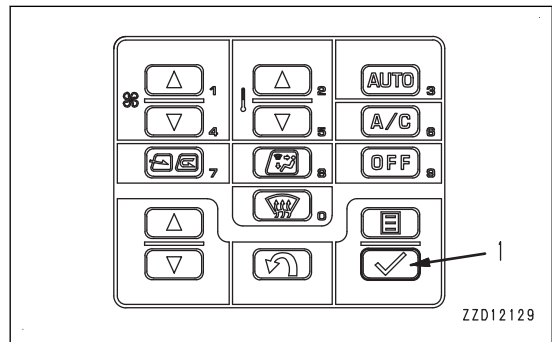
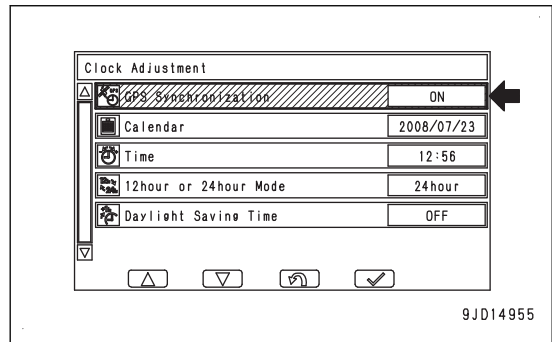
When the “GPS Synchronization” is set to “ON”, the above are automatically readjusted.



GPS SYNCHRONIZATION

On the machines equipped with KOMTRAX, you can configure automatic setting of the machine monitor's date and time in accordance with the GPS's clock.

1. Select "GPS Synchronization" from the "Clock Adjustment" menu, then press ENTER switch (1).



2. Select "ON" or "OFF", then press ENTER switch (1).

"ON"

Sets the date and time automatically.

"OFF"

Does not set the date and time automatically. (Can be set manually.)

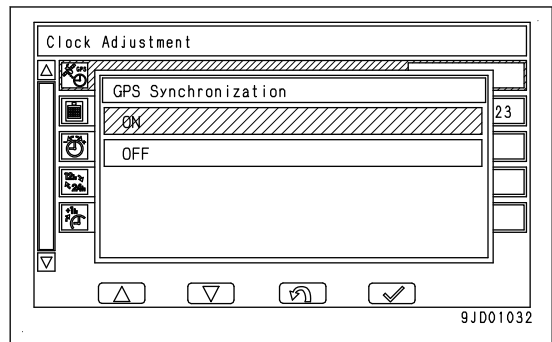
REMARK

This setting is held even if the starting switch is turned to OFF position.

The default is "OFF".

When the machine is in the environment where the radio waves from GPS cannot be received, the automatic setting function might be disable.

Turning the "GPS Synchronization" "ON" disables selecting the "Calendar" and "Time".



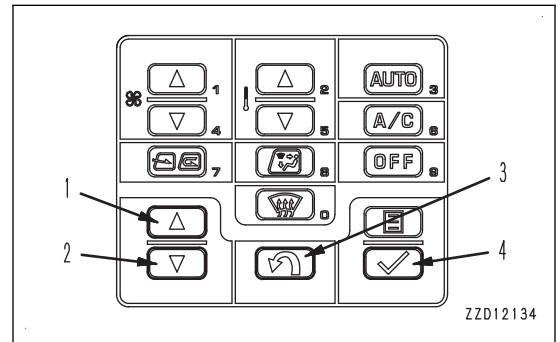
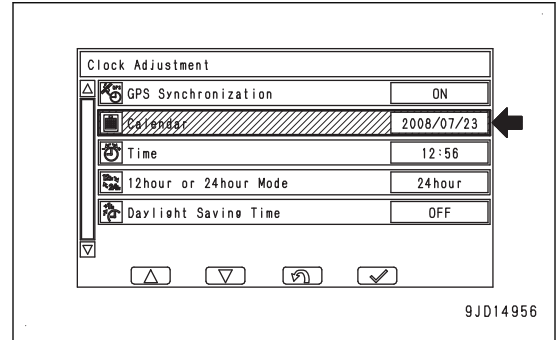
CALENDAR SETTING

Adjust the date of the machine monitor.

1. Select "Calendar" from the "Clock Adjustment" menu, then press ENTER switch (4).

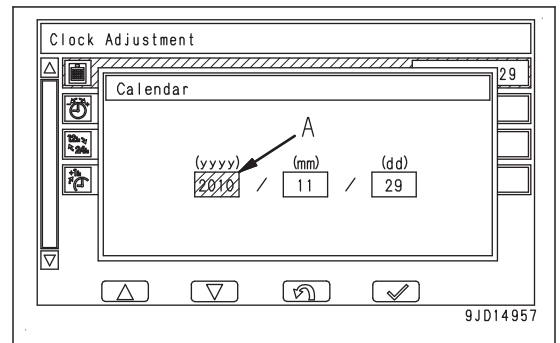
REMARK

As long as "ON" is selected for the "GPS Synchronization", "Calendar" is not selectable.



2. The "Calendar" screen is displayed.

When year display (A) is highlighted in yellow, operate the switches as follows to change year display. When it is not necessary to change the year setting, press ENTER switch (4).



(1) UP switch

Advances calendar one year.

(2) DOWN switch

Puts calendar back one year.

(3) RETURN switch

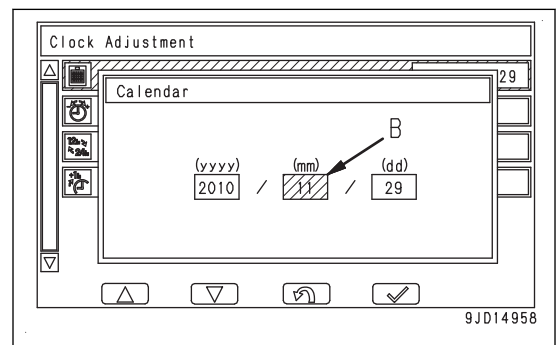
Cancels the change and returns the screen to "Clock Adjustment" menu.

(4) ENTER switch

Proceeds to setting for month.

3. When month display (B) is highlighted in yellow, operate the switches as follows to change month display.

When it is not necessary to change the month setting, press ENTER switch (4).



(1) UP switch

Advances calendar one month.

(2) DOWN switch

Puts calendar back one month.

(3) RETURN switch

Cancels change and returns to setting for year.

(4) ENTER switch

Proceeds to setting for day.

- When day display (C) is highlighted in yellow, operate the switches as follows to change day display.

When it is not necessary to change the day setting, press ENTER switch (4).

(1) UP switch

Advances calendar one day.

(2) DOWN switch

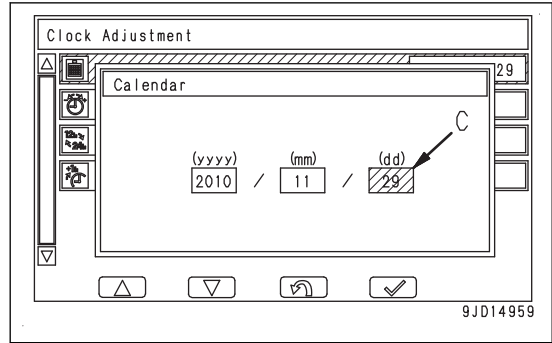
Puts calendar back one day.

(3) RETURN switch

Cancels change and returns to setting for month.

(4) ENTER switch

Accepts change and returns the screen to the “Clock Adjustment” screen.



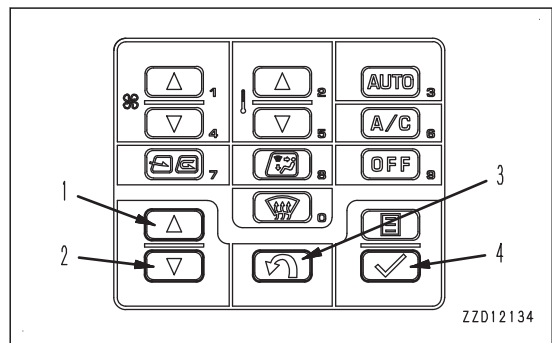
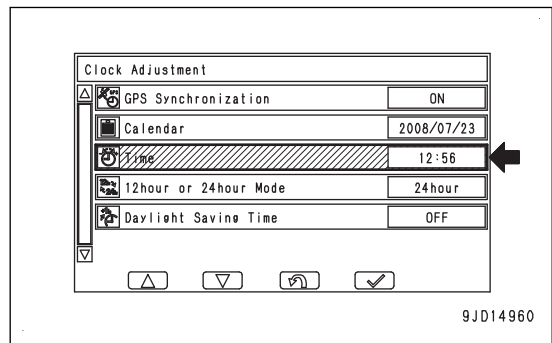
TIME SETTING

Adjust the time of the machine monitor clock.

- Select “Time” from the “Clock Adjustment” menu, and press ENTER switch (4).

REMARK

If “ON” is selected for the setting of “GPS Synchronization”, you cannot select the “Time”.



- The “Time” screen is displayed.

When time display (D) is highlighted in yellow, operate the switches as follows to change time display.

When it is not necessary to change the time setting, press ENTER switch (4).

(1) UP switch

Advances time one hour.

(2) DOWN switch

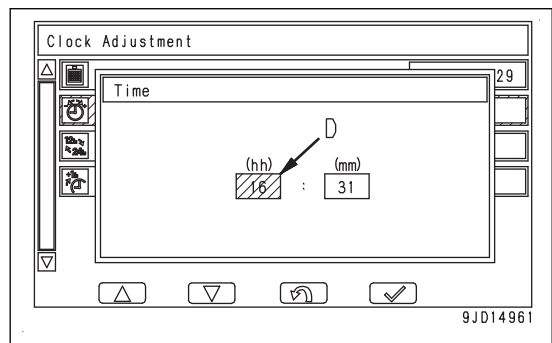
Puts time back one hour.

(3) RETURN switch

Cancels the change and returns the screen to “Clock Adjustment” menu.

(4) ENTER switch

Proceeds to setting for minute.



- When minute display (E) is highlighted in yellow, operate the switches as follows to change minute display.

When it is not necessary to change the minute setting, press ENTER switch (4).

(1) UP switch

Advances time one minute.

(2) DOWN switch

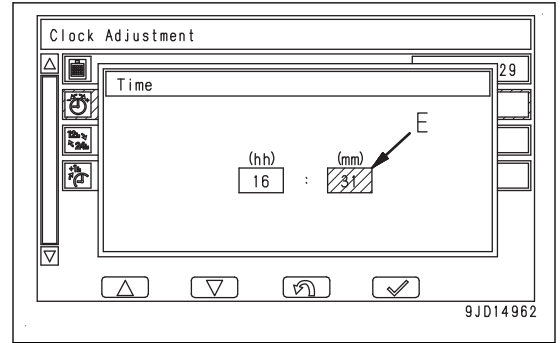
Puts time back one minute.

(3) RETURN switch

Cancels change and returns to the time setting screen.

(4) ENTER switch

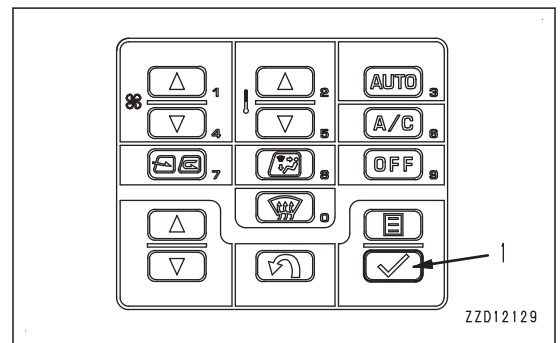
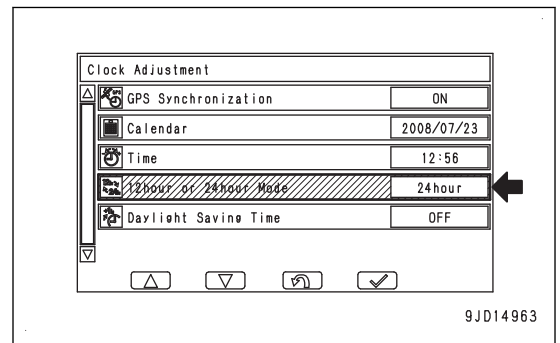
Accepts change and returns the screen to the “Clock Adjustment” screen.



12-HOUR AND 24-HOUR DISPLAY MODE

Choose either a 12-hour display (AM, PM) or a 24-hour display.

- Select “12hour or 24hour Mode” from the “Clock Adjustment” menu, then press ENTER switch (1).



- Select “12hour” or “24hour”, then press ENTER switch (1).

“12hour”

Select 12-hour display (AM, PM).

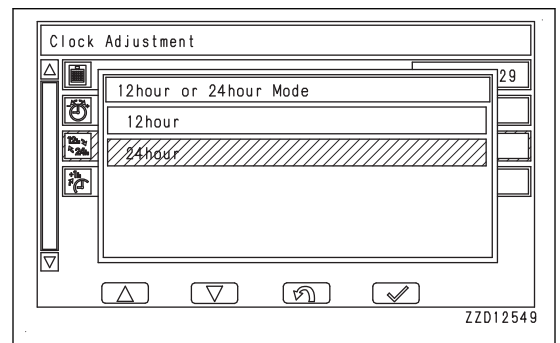
“24hour”

Select 24-hour display.

REMARK

This setting is held even if the starting switch is turned to OFF position.

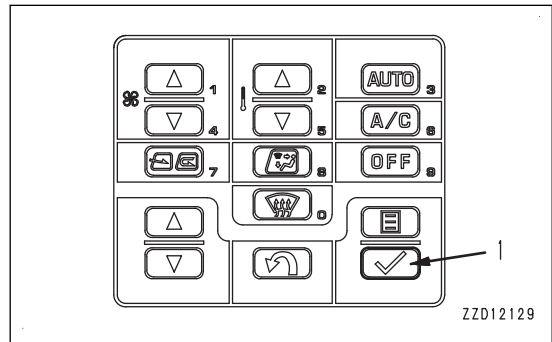
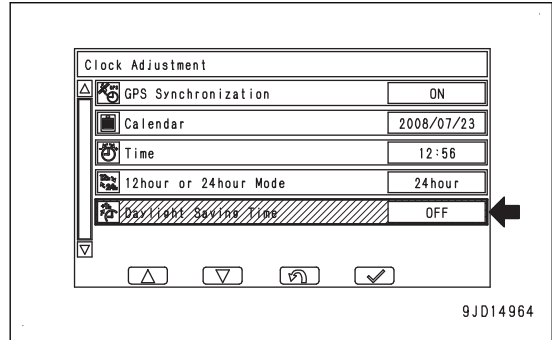
The default is “24hour”.



DAYLIGHT SAVING TIME (SUMMER TIME)

Set the clock display based on the Daylight Saving Time.

1. Select "Daylight Saving Time" from the "Clock Adjustment" menu, then press ENTER switch (1).



2. Select "ON" or "OFF", then press ENTER switch (1).

"ON"

Displays the time 1 hour forward.

"OFF"

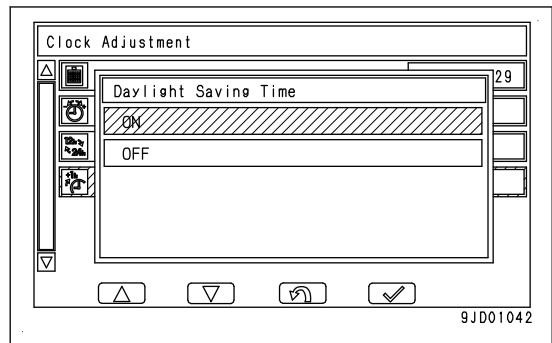
Returns the time to the original.

REMARK

Daylight saving time or summer time means moving the clock forward an hour to take advantage of the fact that the sun rises early in summer in our daily life.

This setting is held even if the starting switch is turned to OFF position.

The default is "OFF".



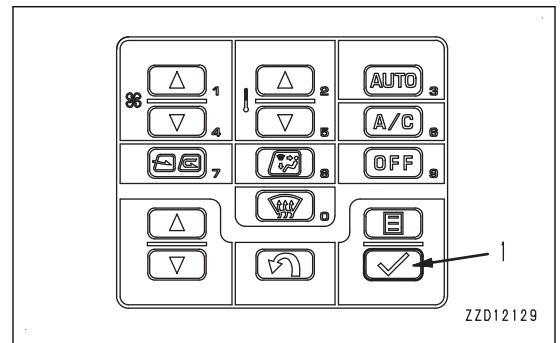
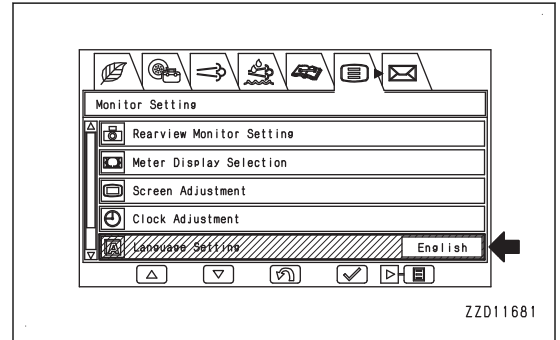
LANGUAGE SETTINGS

The language displayed on the machine monitor can be selected.

The languages that can be selected 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

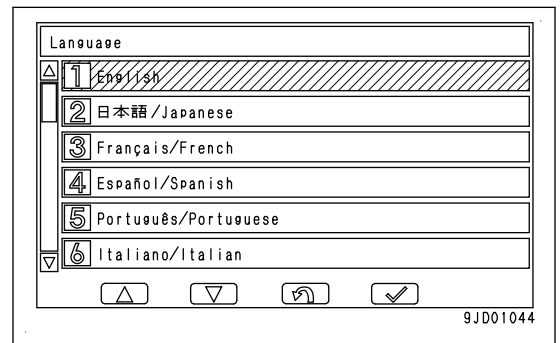
1. Select "Language Setting" on the "Monitor Setting" menu screen, then press ENTER switch (1).



2. Select the language to be displayed, then press ENTER switch (1).

REMARK

This setting is held even if the starting switch is turned to OFF position.



OPERATOR ID

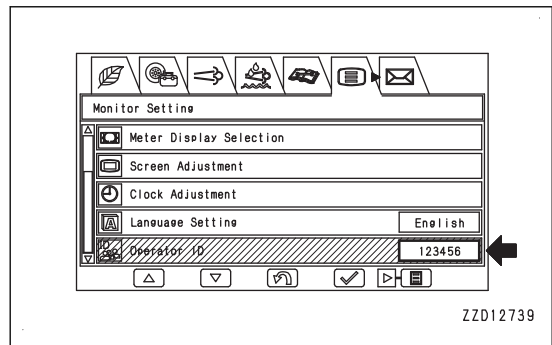
You can check and change the “Operator ID” which is under identification on the “Operator ID” menu.
 The “Operator ID” menu is not displayed when the operator identification function is disabled.

REMARK

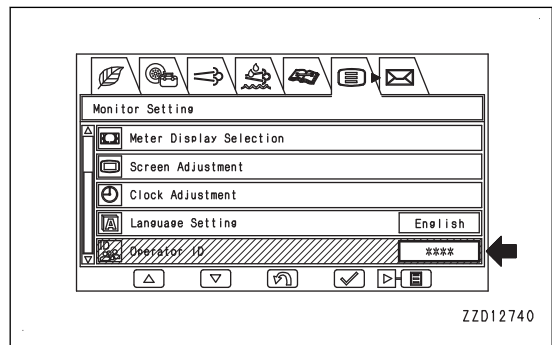
Contact your Komatsu distributor for details of the method of setting, changing, or canceling the operator identification function.

WHEN OPERATOR IDENTIFICATION FUNCTION IS AVAILABLE WITH SKIP

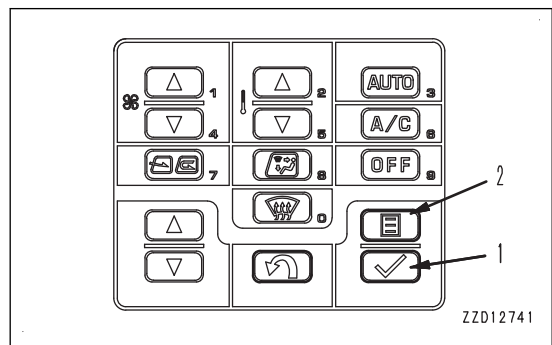
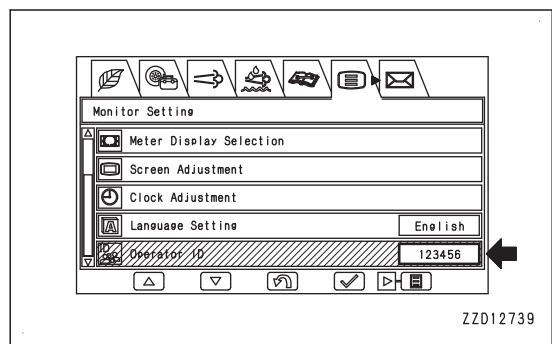
When the starting switch is ON and ID is inputted, the identified ID is displayed in the column of “Operator ID” on the “Monitor Setting” menu screen.



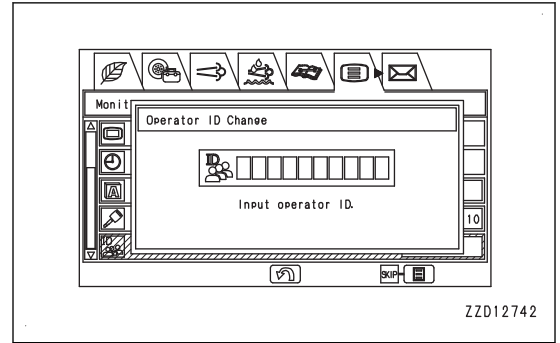
When the starting switch is ON and “SKIP” is selected, “****” is displayed in the column of “Operator ID” on the “Monitor Setting” menu screen.



1. Select “Operator ID” on the “Monitor Setting” menu screen, then ENTER switch (1) for 1 second.



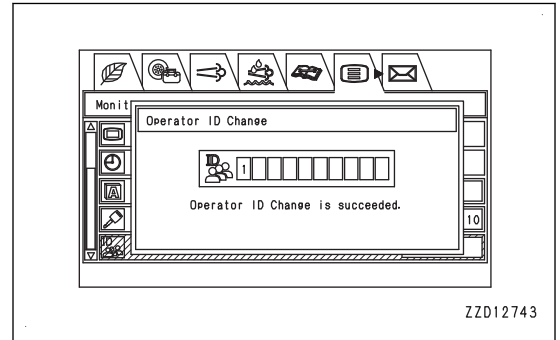
2. The “Operator ID Change” screen is displayed.



- Input the already registered ID on the “Operator ID Change” screen and press ENTER switch (1). Then, the identified ID can be changed.

A message is displayed below and the screen returns to the “Monitor Setting” menu screen.

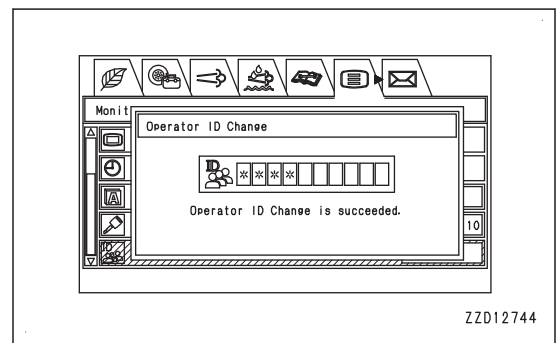
On the “Monitor Setting” menu screen, the inputted ID is displayed in the column of “Operator ID”.



- When you press menu switch (2) on the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.

On the “Monitor Setting” menu screen, as the same way when the starting switch is ON and “SKIP” is selected, “*****” is displayed in the column of “Operator ID”.

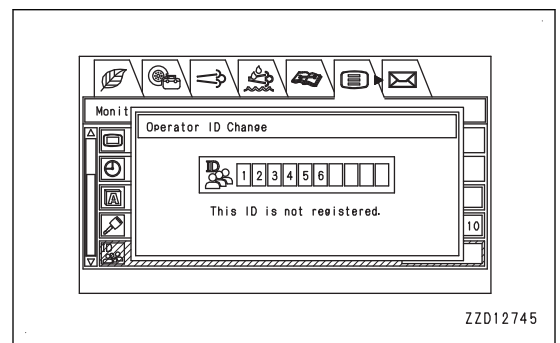
In this case, the operator ID is not identified.



- When you press ENTER switch (1) after inputting the ID which is not registered to the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.

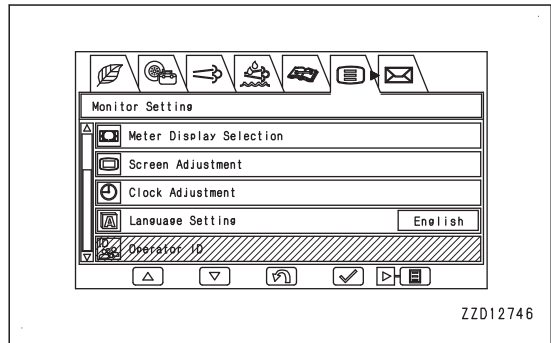
In this case, the identified ID is not changed.

- On the “Operator ID” screen, if no switch is operated for more than 30 seconds, the screen automatically changes to the “Monitor Setting” menu screen. In this case, the identified ID is not changed.

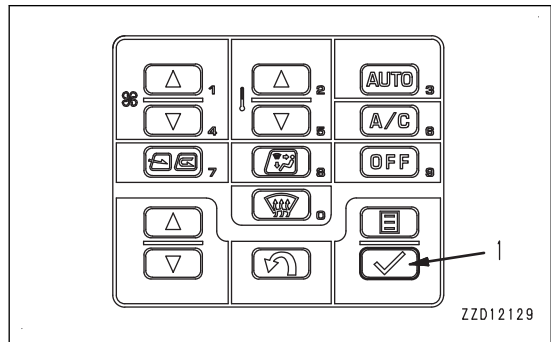


WHEN OPERATOR IDENTIFICATION FUNCTION IS AVAILABLE WITHOUT SKIP

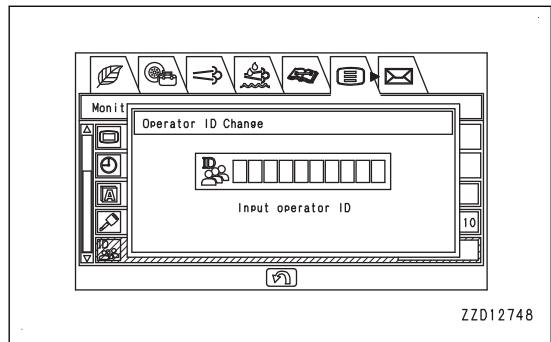
When the operator identification function is available without SKIP, the identified ID number is not displayed in the “Operator ID” column of “Monitor Setting” screen.



1. Select “Operator ID” on the “Monitor Setting” menu screen, then ENTER switch (1) for 1 second.

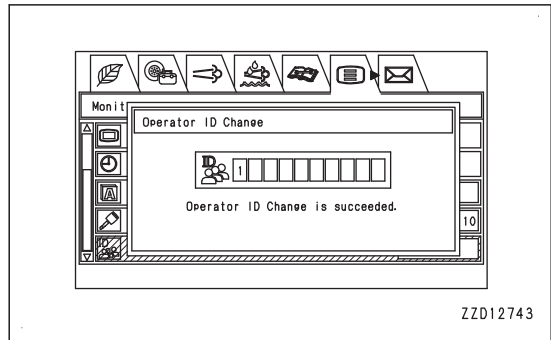


2. The “Operator ID Change” screen is displayed.



- Input the already registered ID on the “Operator ID Change” screen and press ENTER switch (1). Then, the identified ID can be changed.

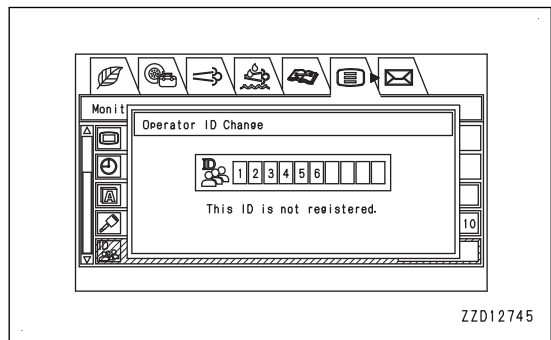
A message is displayed below and the screen returns to the “Monitor Setting” menu screen.



- When you press ENTER switch (1) after inputting the ID which is not registered to the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.

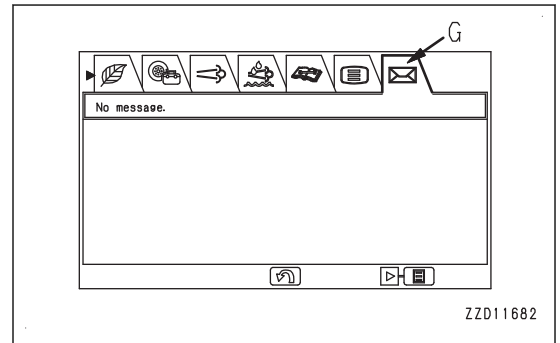
In this case, the identified ID is not changed.

- On the “Operator ID” screen, if no switch is operated for more than 30 seconds, the screen automatically changes to the “Monitor Setting” menu screen.
- In this case, the identified ID is not changed.

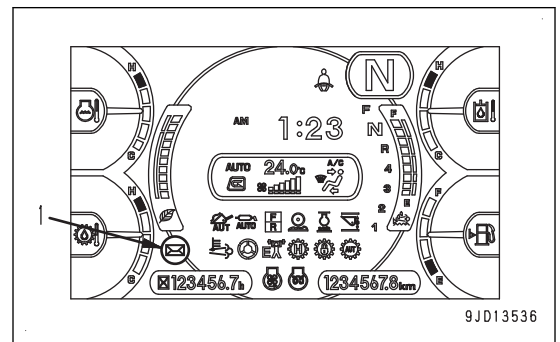


MESSAGE DISPLAY

On machines equipped with KOMTRAX, you can see the messages from your Komatsu distributor on this User Message menu (G).



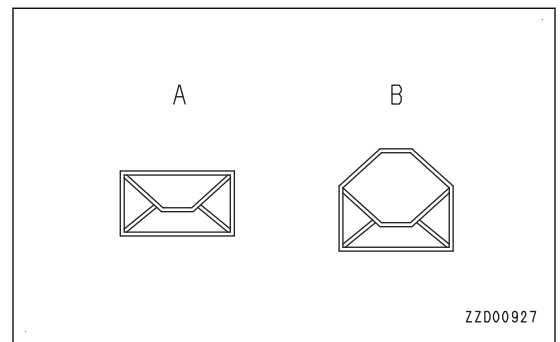
When there is any message, message display (1) of the standard screen lights up.



(A): There is unread message.

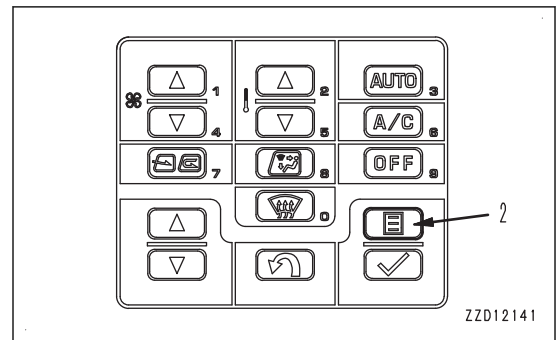
(B): There is any read message to which no reply is made.

Reply to the message in accordance with the replying method mentioned later.



REMARK

- While message display (1) is lit on the standard screen, when menu switch (2) is pressed, User Message menu screen (G) is displayed automatically.
- When the starting switch is turned OFF while there is any unread message, the message is displayed on the end screen, and when the monitor is started next time, the message changes to a read message.
- The message is deleted when it becomes out of date or when a new message reaches.



CHECK MESSAGE

Select message display menu screen (G), and you can read the arrived message.

(A) Subject of message

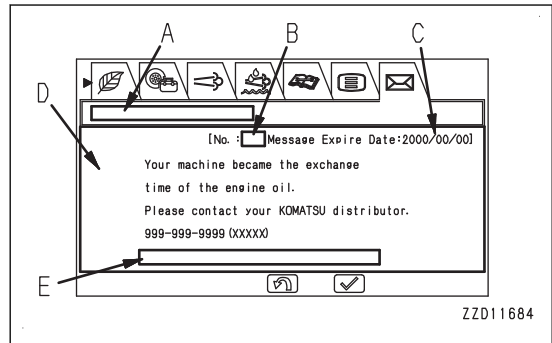
When no message has been received, "No message." is displayed.

(B) Serial No. of message

(C) Validity

(D) Text

(E) Reply field

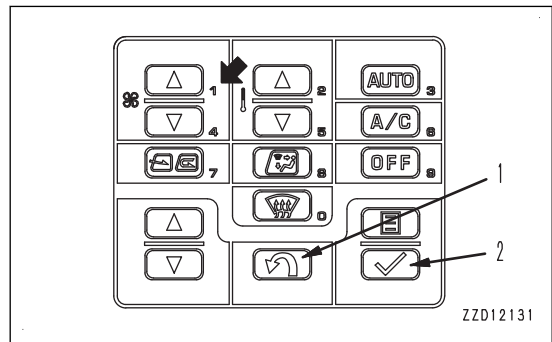


In case of a message requesting for reply, the "Numeric Input: []" is displayed. Make any reply to the message.

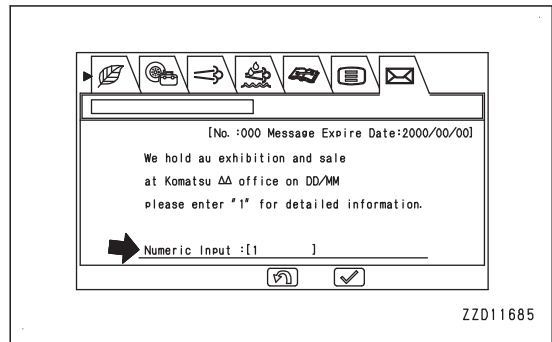
REPLY TO MESSAGE

1. When replying to a message, input the selected item number shown in the text of the message by using the switch panel.

- Each switch of the switch panel corresponds to the number shown on the lower right of the switch.
- The input number is displayed in "Numeric Input: []" of the reply field.
- If you input an incorrect number, press RETURN switch (1), and you can clear an input character at a time.
- If RETURN switch (1) is pressed while no number is entered, the display returns to the standard screen.



2. After inputting a selected item number, press ENTER switch (2).



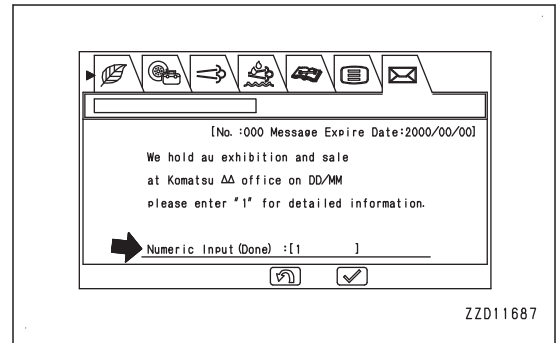
3. "Do you send Numeric Input?" When this message is displayed, press ENTER switch (2) again.

The input value will be sent out.
To cancel, press RETURN switch (1).
The input number is cleared.



REMARK

If the message is replied, "Numeric Input (Done)" is displayed for it.

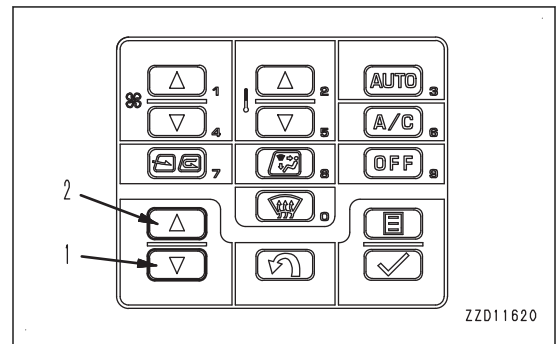


OTHER FUNCTIONS OF MACHINE MONITOR

Confirm the service meter or odometer when the starting switch key is set to OFF position

The service meter and odometer can be displayed even if the machine monitor is not turned ON.

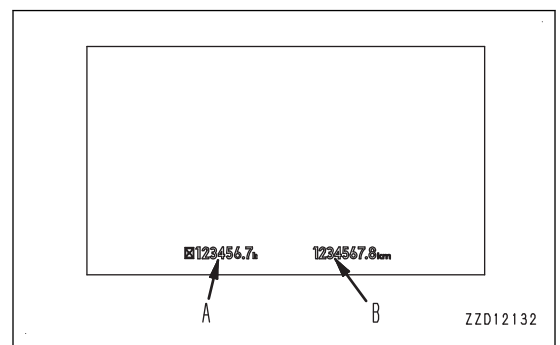
1. Press UP switch (2) while holding down DOWN switch (1) when the starting switch is in OFF position.



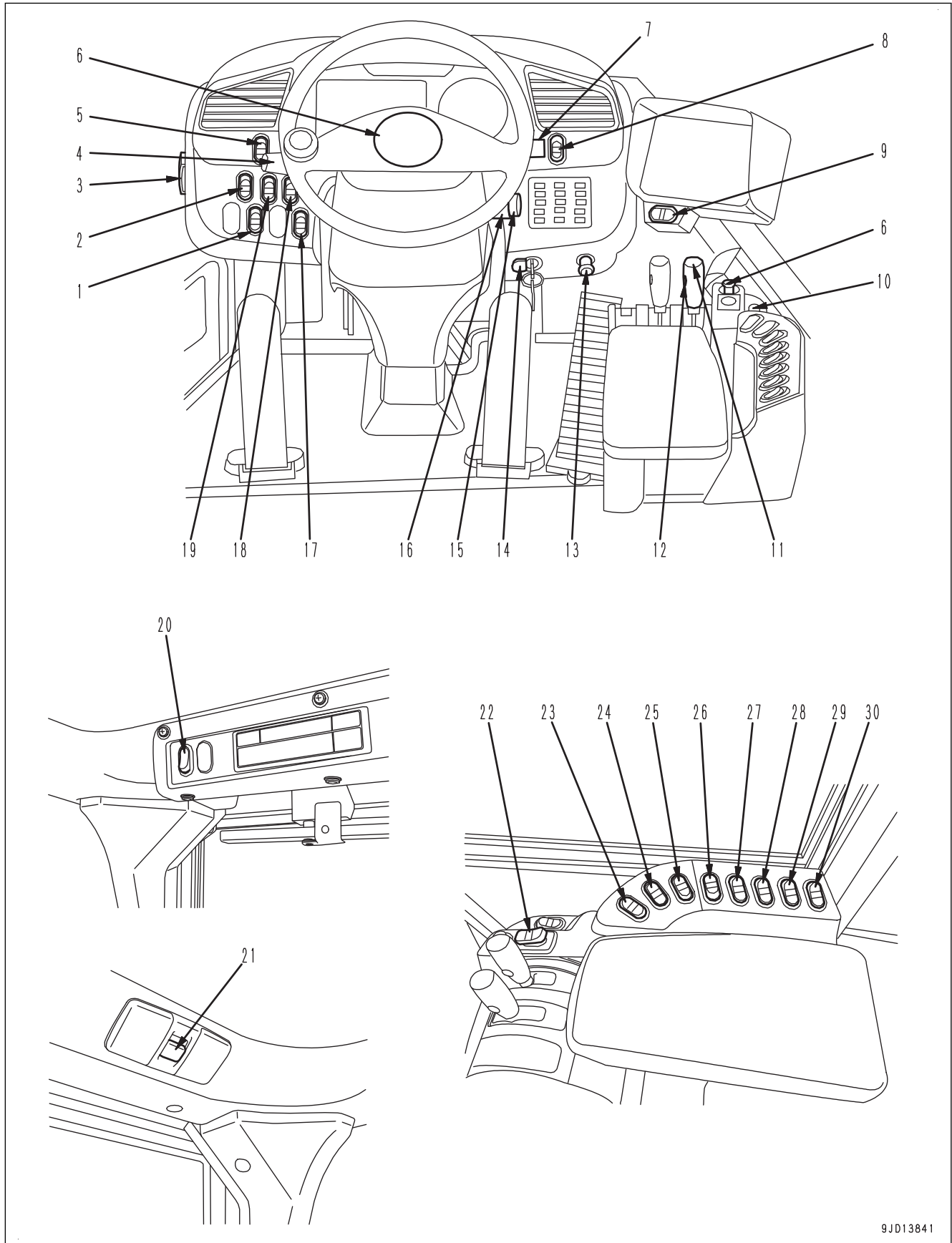
Service meter (A) and odometer (B) are displayed while both switches are held down.

NOTICE

If the monitor screen is displayed during other operations while the starting switch is at OFF position, there is probably a failure in the equipment, so ask your Komatsu distributor for inspection.



SWITCHES



9JD13841

(1) ECSS switch

(2) Front working lamp switch

- | | |
|---|--|
| (3) Engine shutdown secondary switch | (17) Monitor brightness selector switch |
| (4) Gear speed switch | (18) Beacon lamp switch (if equipped) |
| (5) Hazard lamp switch | (19) Rear working lamp switch |
| (6) Horn switch | (20) Rear heated wire glass switch |
| (7) Lamp switch | (21) Room lamp switch |
| (7) Turn signal lever | (22) Directional selector switch (if equipped) |
| (7) Dimmer switch | (23) Transmission cut-off switch |
| (8) Parking brake switch | (23) Transmission cut-off set switch |
| (9) Brightness adjustment switch of rear view monitor | (24) Power mode selector switch |
| (10) Work equipment lock switch | (25) Transmission shift mode selector switch |
| (11) Kickdown switch | (26) Torque converter lockup switch |
| (12) Hold switch | (27) Directional selector enable switch on R.H. switch panel (if equipped) |
| (13) Cigarette lighter | (28) Remote positioner switch |
| (14) Starting switch | (29) 2-stage low idle switch (if equipped) |
| (15) Front wiper switch | (30) Secondary steering switch (if equipped) |
| (16) Rear wiper switch | |

STARTING SWITCH

Starting switch is used to start or stop the engine.

(A): OFF position

The key can be removed from the starting switch, the electrical current to the electrical system is cut, and the engine stops. In addition, the parking brake is applied automatically.

(B): ON position

Electric current flows through the charging and lamp circuits. Keep the switch at this position while the engine is running.

When the ambient temperature is low during engine startup, the engine preheating pilot lamp lights up and engine preheating starts automatically.

This preheating time depends on the ambient temperature during engine startup.

When the engine preheating pilot lamp lights up, wait for a while. When it goes out, then turn the starting key to the START position.

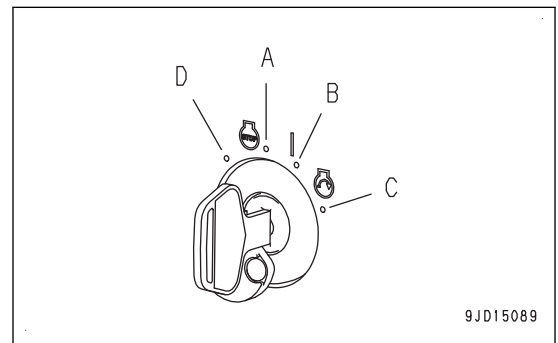
(C): START position

This is the position to start the engine. Hold the key at this position while cranking the engine. Release your hand off the key immediately after the engine has been started. The key returns to ON position (B).

(D): Manual preheat position

In cold weather, you can increase the engine preheating time longer than the automatic preheating time. To increase it, turn the starting switch key to this position.

When you release your hand, the switch returns to position (A). Immediately turn the key to position (C) and start the engine.



9JD15089

CIGARETTE LIGHTER

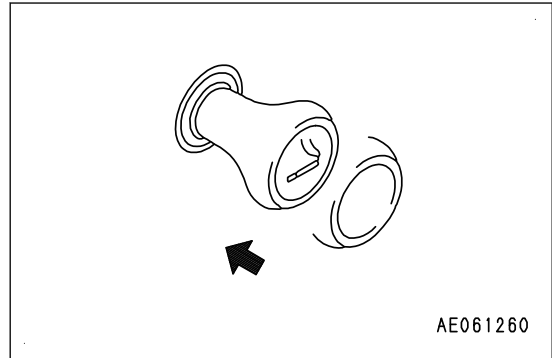
The cigarette lighter is used to light cigarettes.

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

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 is for 24 V. Do not use this as a power supply for 12 V equipment.



LAMP SWITCH

The lamp switch is used to light up the headlamps, clearance lamps, tail lamps, and machine monitor.

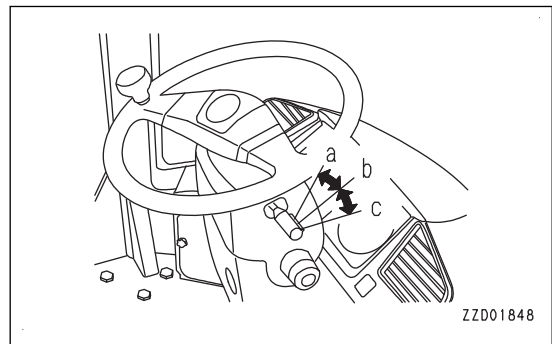
Position (a): OFF

Position (b): Clearance lamps, tail lamps, and machine monitor light up.

Position (c): Headlamps light up together with the lamps lit in position (b).

REMARK

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

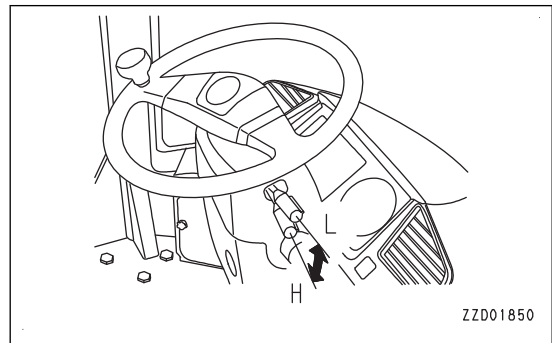


DIMMER SWITCH

The dimmer switch is used to switch the headlights between high and low beams.

Position (L): Low beam

Position (H): High beam



TURN SIGNAL LEVER

The turn signal lever is used to operate the turn signal lamp.

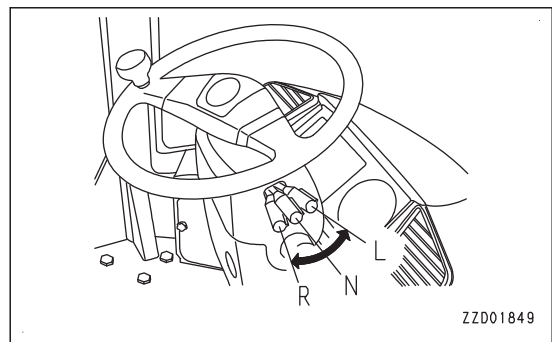
Position (L): The left turn (when the lever is pushed forward).

Position (N): OFF

Position (R): The right turn (when the lever is pulled backward).

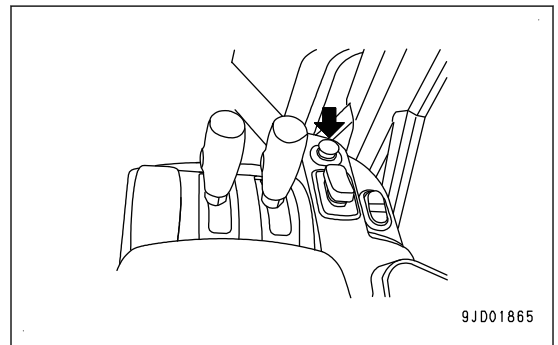
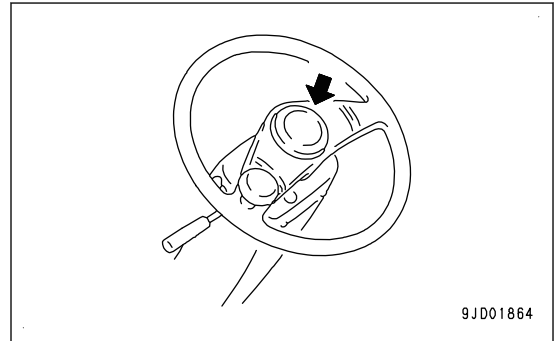
REMARK

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



HORN SWITCH

If you press the horn switch, the horn sounds.



KICKDOWN SWITCH

The kickdown switch is located at the top of the boom control lever.

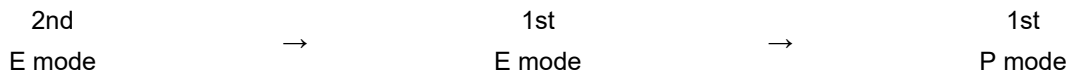
In the manual shift mode, each time the kickdown switch is pressed while the machine is traveling in forward 2nd (F2) , the gear speed is shifted down to forward 1st (F1).

Use this switch to increase the rim pull during scooping.

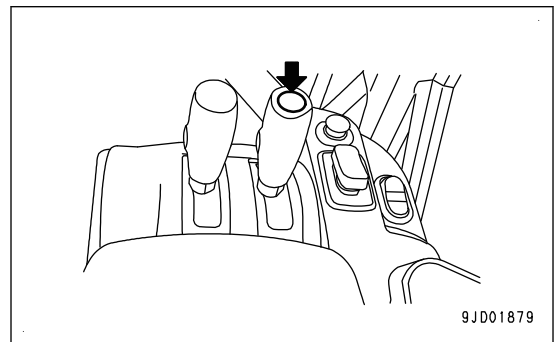
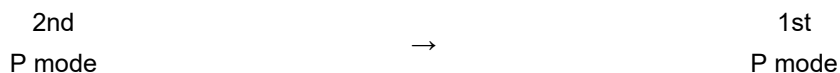
While the shift range is in forward 1st (F1) in E mode, the working mode can be changed to P mode by pressing the kickdown switch.

Use this switch to increase the rim pull further during scooping or for scrape-up work.

In E mode



In P mode



In the auto-shift mode, if the travel speed is 10.5 km/h {6.5 MPH} or slower, the kickdown switch operates and the gear speed can be shifted down to 1st from any gear speed of the forward or reverse travel.

This function facilitates the load-and-carry operation.

When the travel speed is higher than 10.5 km/h {6.5 MPH} , the gear speed is shifted down by one gear speed each time the kickdown switch is pressed in the order F4, F3, and F2.

REMARK

- To cancel the kickdown, operate the directional lever. In the manual shift mode, the kickdown can also be canceled by setting the gear speed switch to a position other than the 2nd.
- When the starting switch is turned to OFF position and then to ON position again while the gear speed is kicked down, the kickdown is canceled.
- Even if the auto-kickdown is enabled, the downshift or the change to P mode with this kickdown switch is enabled.
- In the auto-shift mode, if the travel speed increases after a kickdown, the gear speed is shifted up automatically.
- In the auto-shift mode, when the travel speed is above 14 km/h {8.7 MPH} in 3rd gear speed or above 26 km/h {16.2 MPH} in 4th gear speed, the gear speed is not shifted down to prevent the engine from over-running even if the kickdown switch is pressed.

MONITOR BRIGHTNESS SELECTOR SWITCH

The monitor brightness selector switch is used to select the brightness (luminosity) of the machine monitor and rear view monitor while lamp switch is turned ON.

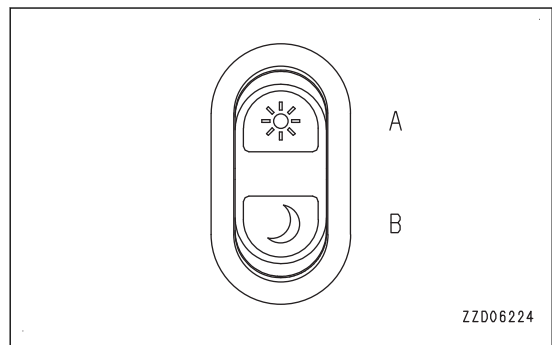
When operating the machine with the headlamp lighting up during the day, if this switch is set to Day mode, monitor screen does not lose the brightness.

(A) Day position

The monitor screen is set to the day mode.

(B) Night position

The monitor screen is set to the night mode.



REMARK

When the lamp switch is turned to OFF position, operating this switch does not change the brightness.

REAR VIEW MONITOR BRIGHTNESS ADJUSTMENT SWITCH

The rear view monitor brightness adjustment switch is used to adjust the brightness of the rearview monitor.

If you release your hand from the switch, it automatically returns to its original position.

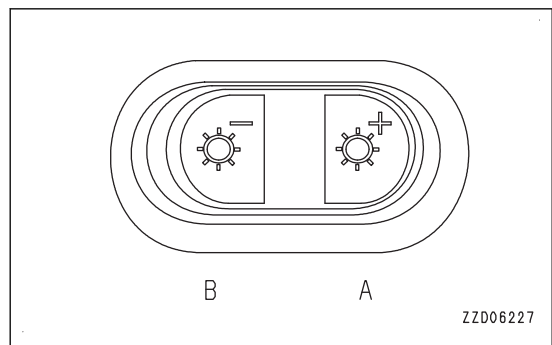
The brightness in the day and night modes can be adjusted individually.

Position (A)

The rearview monitor becomes brighter.

Position (B)

The rearview monitor becomes darker.



PARKING BRAKE SWITCH

WARNING

When parking or leaving the machine, always apply the parking brake. Keep depressing the brake pedal until the parking brake pilot lamp lights up on the machine monitor even when the parking brake switch has been turned ON.

NOTICE

- Do not use the parking brake switch during traveling except for an emergency. The parking brake may be damaged and a serious accident may result. Stop the machine, and then apply the parking brake.
- If the parking brake was used as a secondary brake when the machine was traveling at high speed, ask your Komatsu distributor for inspection of the parking brake system.

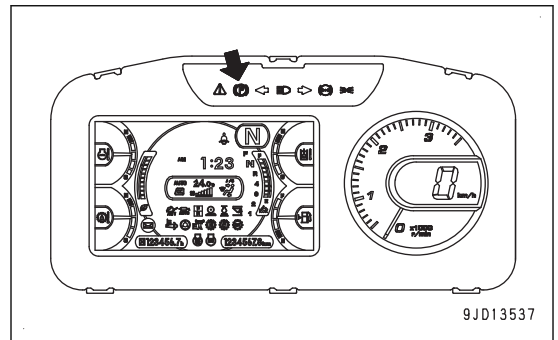
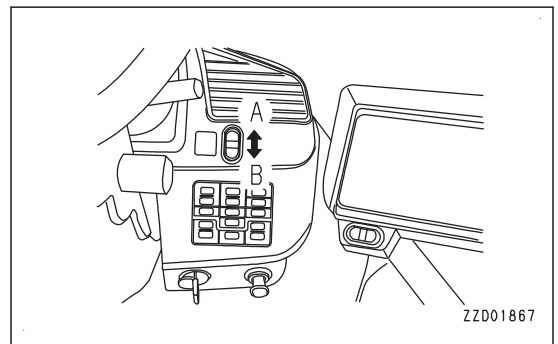
The parking brake switch is used to apply the parking brake.

Position (A): ON (actuated); The parking brake is applied, and the parking brake pilot lamp lights up on the monitor.

Position (B): OFF (released); The parking brake is released.

REMARK

- When the parking brake has been applied, the machine does not move even if the directional lever is operated.
- When the directional lever is shifted to F (forward) or R (reverse) position while the parking brake is applied, the centralized warning lamp lights up and the alarm buzzer sounds.
- Start the engine after turning the parking brake switch to ON position.



HOLD SWITCH

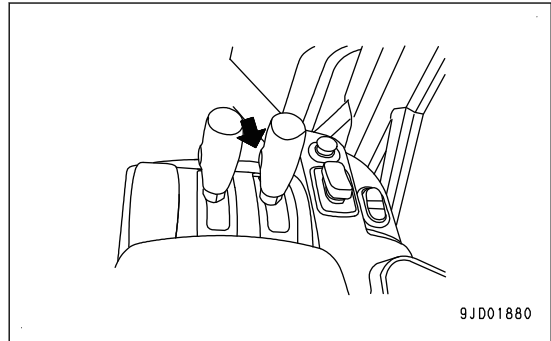
When HOLD switch on the side face of the boom control lever knob is pressed to fix the gear speed in the auto-shift mode, the transmission is fixed to the gear speed indicated on shift indicator (A) of the machine monitor and shift hold pilot lamp (B) lights up.

When this switch is pressed again, the shift hold function is canceled and the pilot lamp goes out.

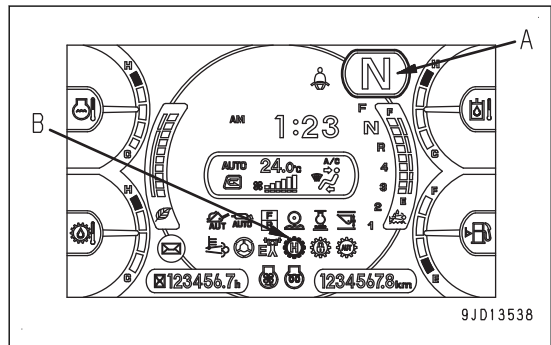
Use this switch to set the gear speed to any position for uphill or downhill travel or grading.

REMARK

The shift hold function can also be canceled by operating the directional lever or gear shift switch, or switching the shift mode to the manual mode with the transmission shift mode selector switch. It can also be canceled by turning the starting switch to OFF position.



9JD01880



9JD13538

FRONT WIPER SWITCH

If rotary switch (E) of the front wiper switch is rotated, the front windshield wiper operates.

If push button (F) is pressed, washer fluid is sprinkled on the front window glass while the push button is held down.

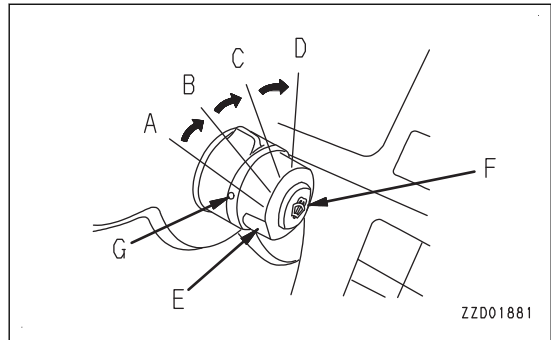
The switch position can be checked by the position of round mark (G).

Position (A): (OFF) Wiper is stopped.

Position (B): (INT) Wiper moves intermittently.

Position (C): Wiper moves at low speed.

Position (D): Wiper moves at high speed.



ZZD01881

REAR WIPER SWITCH

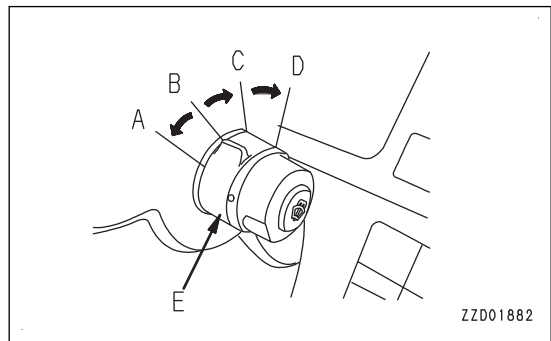
When turning lever (E) of the rear wiper switch, the rear wiper operates.

Position (A): Washer fluid is sprayed out. When you release your hand, it returns to position (B).

Position (B): (OFF) Wiper is stopped.

Position (C): Wiper is actuated.

Position (D): Wiper is actuated and washer fluid is sprayed out. When you release your hand, the switch returns to position (C).



ZZD01882

ROOM LAMP SWITCH

NOTICE

If the room lamp is left to be turned on, the batteries may be exhausted. Always turn the switch to OFF position after using room lamp.

The room lamp switch illuminates the room lamp.

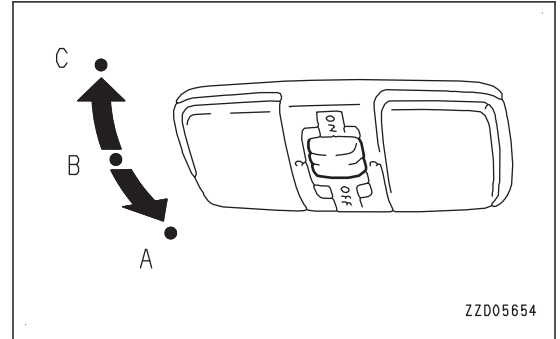
Position (A): OFF (goes out)

Position (B): Lights up when cab door opens.

Position (C): ON (lights up)

REMARK

- The room lamp lights up even when the starting switch is at OFF position. When leaving the operator's seat, set to position (A) or (B).
- When operating the machine with the cab door fully opened, set the switch to position (A).



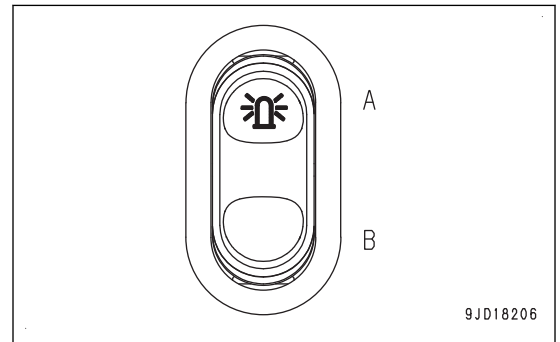
BEACON LAMP SWITCH

(if equipped)

The beacon lamp switch is used to turn on or off the beacon lamp.

Position (A): ON

Position (B): OFF



REAR WORKING LAMP SWITCH

⚠ WARNING

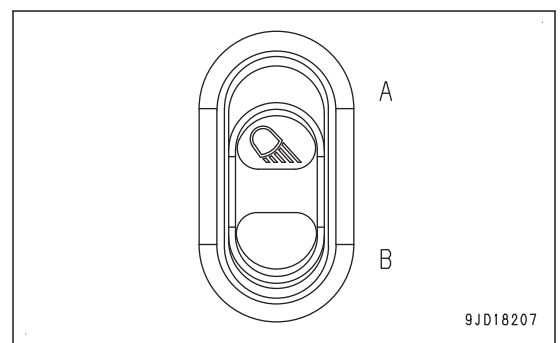
The working lamps must be turned off when the machine is traveling on a public road.

Use the rear working lamp switch to light up the rear working lamps.

Position (A): The working lamps light up.

Position (B): The working lamps go out.

When position (A) is pressed, the pilot lamp lights up, and the working lamps turn ON.



ECSS SWITCH

WARNING

- If the ECSS switch is turned ON during travel or with the work equipment raised, the machine starts moving instantly. Take care.
- If the machine is operated with the ECSS switch ON, the work equipment may start moving at the moment when the ECSS is actuated. Take care.
- Never turn ECSS switch ON during inspection or maintenance. The work equipment will move and it is dangerous.

NOTICE

- Before operating the ECSS switch, be sure to stop the machine and lower the work equipment to the ground.
- When performing inspection or maintenance, lower the work equipment to the ground first, press ECSS switch to OFF position, then start the work.
- Keep ECSS switch turned OFF during leveling work.

ECSS switch is used to turn ECSS ON and OFF.

Position (A): ON

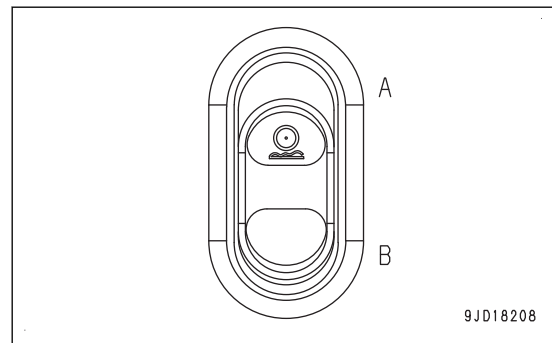
The pilot lamp lights up and ECSS operates.

Position (B): OFF

ECSS does not operate.

REMARK

- The ECSS absorbs the machine vibration during travel with the hydraulic spring effect of the accumulator to attain smooth high speed travel.
- The ECSS does not operate in the 1st gear speed.
- The ECSS does not operate while the boom angle is 25 deg. or larger from the level.
- If the travel speed exceeds 5 km/h {3.1 MPH} while the gear speed is 2nd to 4th, ECSS operates automatically. If the travel speed decreases below 4 km/h {2.5 MPH}, ECSS stops operation automatically.
- When the bucket is empty and the work equipment is positioned at a low height, you may feel the poor damper (ECSS) effect. This is not an abnormality.



FRONT WORKING LAMP SWITCH

⚠ WARNING

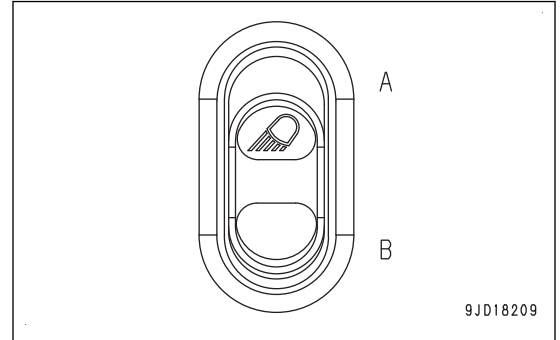
The working lamps must be turned off when the machine is traveling on a public road.

Use the front working lamp switch to light up the front working lamps.

Position (A): The working lamps light up.

Position (B): The working lamps go out.

When position (A) is pressed, the pilot lamp turns ON, and the working lamps turn ON.



HAZARD LAMP SWITCH

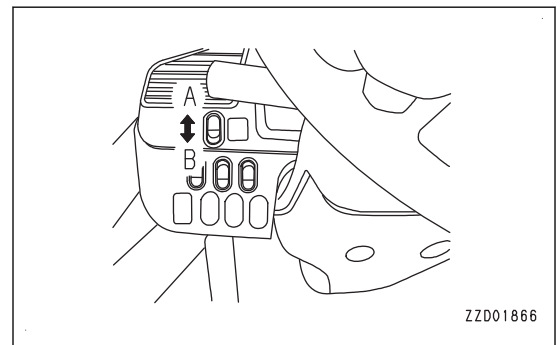
⚠ WARNING

When the machine is traveling normally, do not use this switch as it can mislead another vehicles.

Use the hazard lamp switch when you need to park the machine on a road due to machine failure or during emergency only.

Position (A): The turn signal lamps and the turn signal pilot lamp flash.

Position (B): The lamps go out.



DIRECTIONAL SELECTOR SWITCH

(if equipped)

The directional selector switch is used to set the travel direction to FORWARD, NEUTRAL, and REVERSE.

Position (F): FORWARD

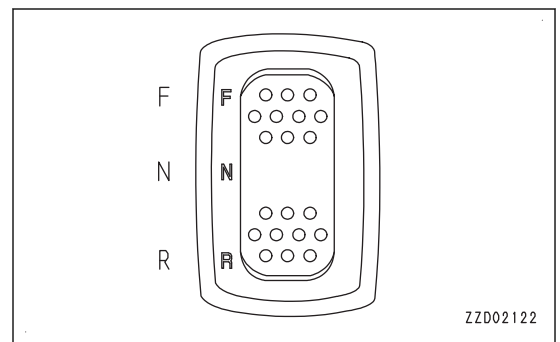
Position (N): NEUTRAL

Position (R): REVERSE

Before using this switch to change the travel direction, set the directional lever to NEUTRAL position and set the directional selector enable switch of R.H. switch panel to "enable" position.

REMARK

Do not maintain the directional selector switch at the intermediate position between positions (F) and (N), or between positions (N) and (R). Such practice sounds the alarm buzzer and sets the transmission in NEUTRAL.



TRANSMISSION CUT-OFF SWITCH

! WARNING

When starting the machine off an uphill, turn the transmission cut-off switch to OFF position, depress the accelerator pedal while depressing brake pedal and then release the brake pedal gradually to allow the machine to start off. This prevents the machine from rolling back.

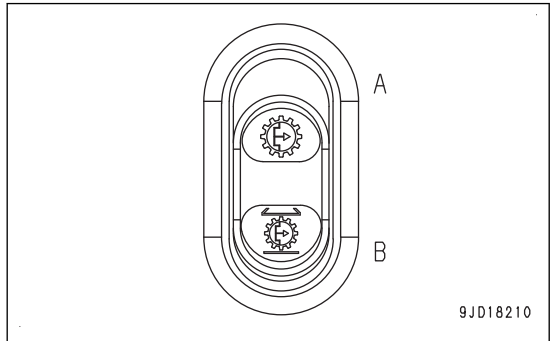
Press position (A) of the transmission cut-off switch to set it ON or OFF.

If you release your hand from the switch, it automatically returns to its original position.

Each time position (A) is pressed, the transmission cut-off function switches between ON and OFF. When this function is turned on, the pilot lamps light up on the monitor and on switch (A) position, and the transmission becomes NEUTRAL at the adjusted brake pedal pressing position.

Normally, keep the switch at ON position.

For details of the cut-off position adjustment procedure, see "METHOD FOR ADJUSTING TRANSMISSION CUT-OFF POSITION (3-219)".



TRANSMISSION CUT-OFF SET SWITCH

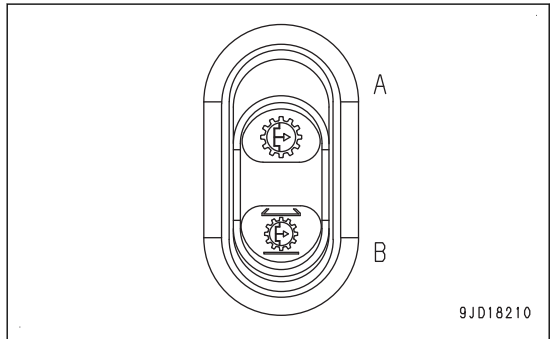
! CAUTION

Apply the parking brake, before starting adjustment of the transmission cut-off position.

Press (B) of the transmission cut-off set switch to adjust the brake pedal pressing position where the transmission is set to NEUTRAL when the transmission cut-off function is turned on.

If you release your hand from the switch, it automatically returns to its original position.

For details of the cut-off position adjustment procedure, see "METHOD FOR ADJUSTING TRANSMISSION CUT-OFF POSITION (3-219)".



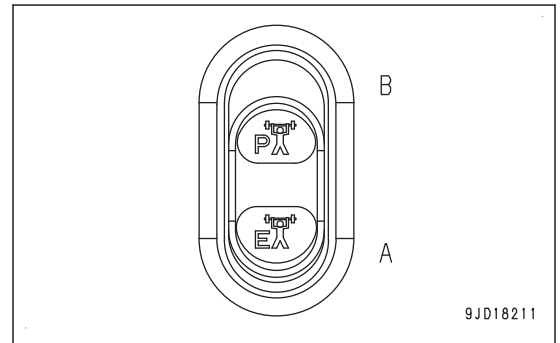
POWER MODE SELECTOR SWITCH

The power mode selector switch is used to select the engine power for the work which the machine will do.

When P mode is selected, P mode pilot lamp lights up, and when E mode is selected, E mode pilot lamp lights up.

Position (A): E mode (the engine power is low). Select this mode for less fuel consumption when the engine high power is not required for operations on the flat ground.

Position (B): P mode (the engine power is high). Select this mode when the priority is given to the productivity.



REMARK

- Usually select E mode to improve the fuel efficiency. Although the engine power is lower than P mode, the engine in E mode can output enough power (except for heavy excavation of the blasted rock, etc.) and improve the fuel efficiency as well. Also, the fuel efficiency can be improved if the accelerator pedal is depressed lightly.
- Use P mode for the blasted rock digging work, for higher speed machine operations, and for traveling at a high speed on a flat or uphill road.

TRANSMISSION SHIFT MODE SELECTOR SWITCH

The transmission shift mode selector switch is used to switch the transmission between the auto shift and manual, and also change the shift point when the auto shift is selected.

When this switch is at (B) or (C) position, the transmission is set in the auto shift mode and the auto shift pilot lamp lights up on the machine monitor. Normally, set it to auto shift mode.

Position (A): The manual shift mode is set and the machine travels at the gear speed displayed on the shift indicator.

Position (B): Travel speed when shifted up is low (level ground, normal travel)

Position (C): Travel speed when shifted up is high (uphill, full throttle travel)

When most of the machine operations is done on a level ground, selecting position (B) allows shifting up the gear at a low engine speed, and it enables to reduce the fuel consumption.

REMARK

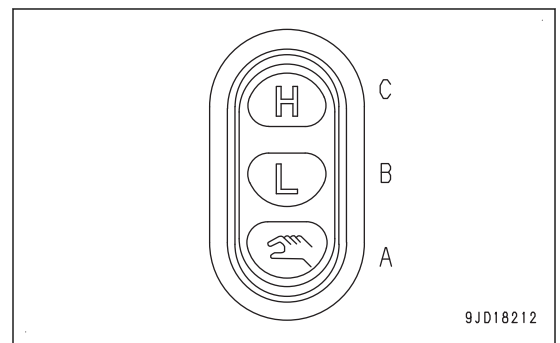
For detail of the manual shift, see "MANUAL SHIFT (3-120)".

For detail of the auto shift, see "AUTOMATIC SHIFT (3-121)".

However, when E mode is selected to reduce the fuel consumption, the shift point remains unchanged whichever you may choose, (B) or (C).

Lamp for the transmission shift mode selector switch lights up when position of (A) or (C) is selected.

Lamp does not light up when position (B) is selected.



TORQUE CONVERTER LOCKUP SWITCH

The torque converter lockup switch is used to turn the torque converter lockup function ON and OFF.

Each time position (A) of the switch is pressed, the function switches between ON and OFF.

If you release your hand from the switch, it automatically returns to its original position.

For setting when the starting key is in ON position, see “LOCK-UP FUNCTION SETTING WHEN KEY IS ON (3-81)”.

ON

The lockup operates according to the travel speed and working condition.

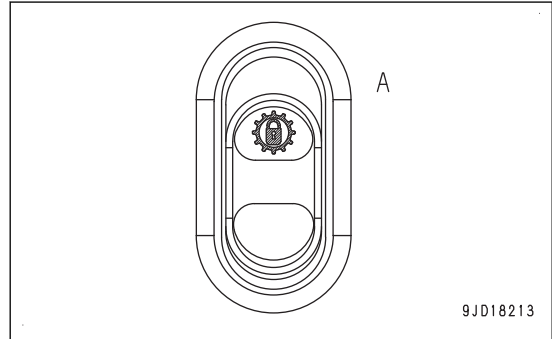
OFF

The lockup function is disabled.

For detail, see “HANDLE TORQUE CONVERTER LOCKUP (3-223)”.

REMARK

Usually, select ON mode to work with less fuel consumption.



DIRECTIONAL SELECTOR ENABLE SWITCH ON R.H. SWITCH PANEL

(if equipped)

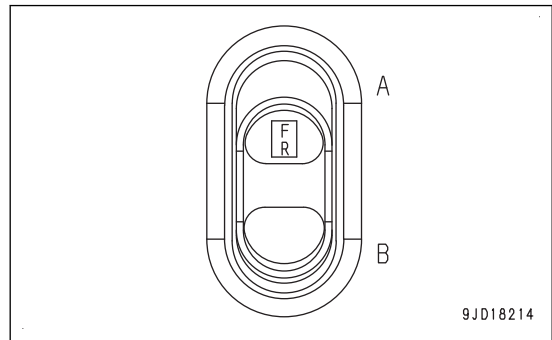
The directional selector enable switch on R.H. switch panel is used to enable the directional selector switch.

The basic operation is as follows.

Position (A): Directional selector switch is enabled.

Position (B): Directional selector switch is disabled.

When setting the directional selector enable switch on R.H. switch panel to position (A), set the directional lever and the directional selector switch to the NEUTRAL position.



REMOTE POSITIONER SWITCH

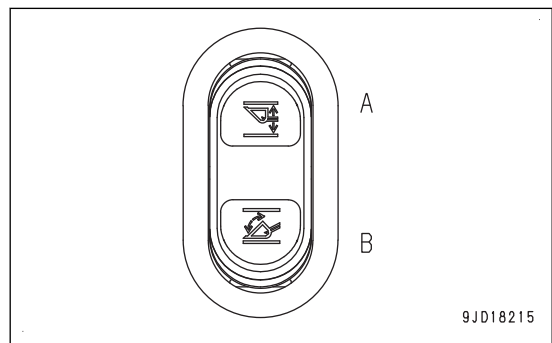
The remote positioner switch is used to freely set the stopping position of the boom and bucket.

If you release your hand from the switch, it automatically returns to its original position.

Position (A): Sets or cancels stopping position of boom

Position (B): Sets or cancels stopping position of bucket

For the setting and canceling method of the remote positioner, see “REMOTE POSITIONER (3-238)”.



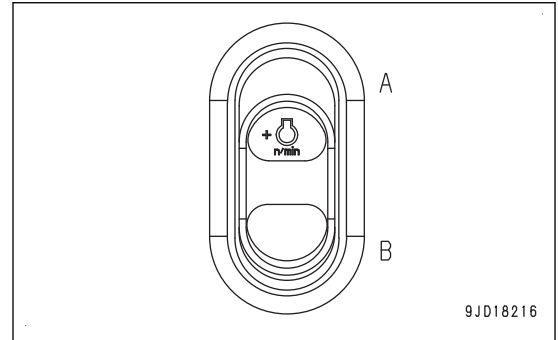
2-STAGE LOW IDLE SWITCH

(if equipped)

If the 2-stage low idle switch is pressed, the engine idle speed increases.

Position (A): ON

Position (B): OFF



SECONDARY STEERING SWITCH

(if equipped)

The secondary steering switch is used to operate the secondary steering manually.

Even when the engine is stopped, pressing this switch allows operating the steering.

Position (A): ON

The pilot lamp in the switch and the secondary steering pilot lamp on the machine monitor light up, and you can operate the steering.

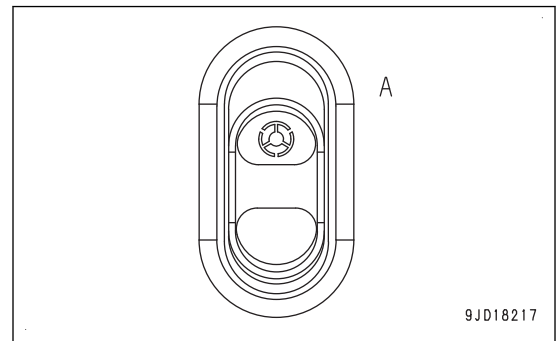
When you release your hand from the switch, it automatically returns to its original position.

Do not actuate the secondary steering except in trouble or checking the function.

The secondary steering is continuously operable up to 60 seconds.

When using the secondary steering, limit the travel speed to 5 km/h {3.1 MPH} or less.

For details, see OPERATION, "HANDLE SECONDARY STEERING SYSTEM (3-221)".

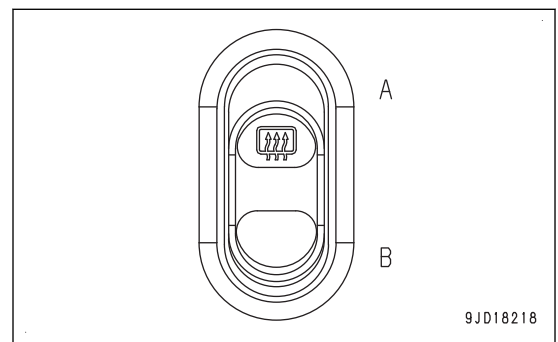


REAR HEATED WIRE GLASS SWITCH

When pressing the switch for rear window glass with heated wire, the rear heated wire glass is turned ON to clear the glass.

Position (A): ON (Clearing the glass)

Position (B): OFF

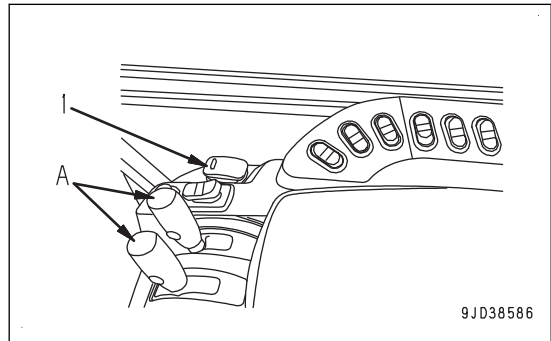


WORK EQUIPMENT LOCK SWITCH

⚠ WARNING

- When leaving the operator's seat, be sure to lock the work equipment by pressing the work equipment lock switch (the pilot lamp lights up). If the work equipment is not locked and the work equipment control lever (A) is touched by mistake, it may lead to serious accident.
- If the work equipment is not securely locked, it can start moving and cause a serious personal injury or death. Check that the pilot lamp is lit.
- Before operating the work equipment lock switch, make sure that work equipment control lever (A) is in HOLD position.
- When operating the work equipment lock switch, be sure not to touch work equipment control lever (A).
- Check that your clothes do not get caught by the work equipment control lever (A).

The work equipment lock switch (1) is a device used to lock the work equipment.

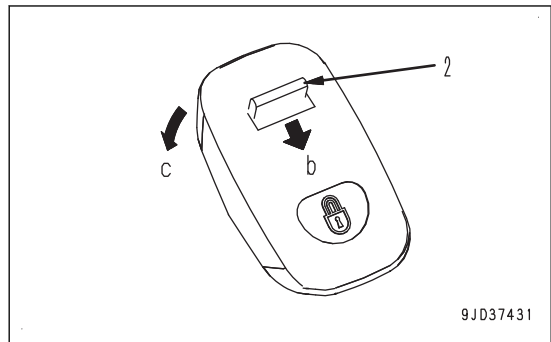


Keep pulling the lock (2) of switch in the direction (b) shown by arrow and push it into the direction (c).

If you release your hand from the switch, it automatically returns to its original position.

The work equipment is locked (the pilot lamp lights up) or unlocked (the pilot lamp goes out) each time you push the switch into the direction (c).

Even if you may turn the starting switch to OFF position with the work equipment unlocked (pilot lamp goes out), the work equipment is locked (pilot lamp lights up) if you turn the starting switch to ON position again.



GEAR SPEED SWITCH

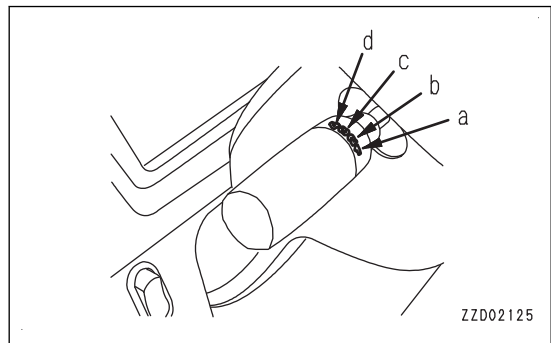
The gear speed switch is used to change the gear speed of the machine.

MANUAL SHIFT

A desired gear speed can be selected from the 4 forward and 4 reverse gear speeds by turning the gear speed switch to that gear speed position.

Use the 1st and 2nd gear speeds for work and the 3rd and 4th for travel.

- Position (a): 1st speed
- Position (b): 2nd speed
- Position (c): 3rd speed
- Position (d): 4th speed



AUTOMATIC SHIFT

The gear switches automatically among 1st to 4th gear speeds in each travel direction, depending on the travel condition.

Position (a): 1st speed

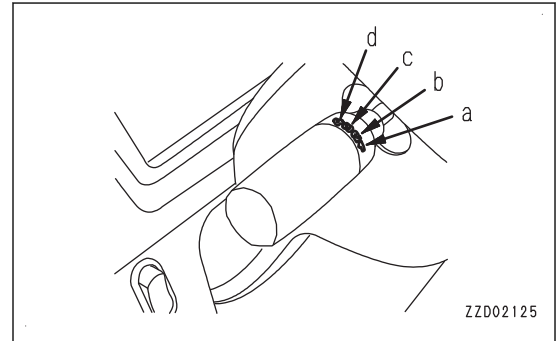
Position (b): 2nd speed

Position (c): 3rd speed

Position (d): 4th speed

The table shows the range of the gear speed that is automatically shift by the gear speed switch position.

Gear speed switch position	Gear speed
2nd	1st ↔ 2nd
3rd	1st ↔ 2nd ↔ 3rd
4th	1st ↔ 2nd ↔ 3rd ↔ 4th



ZZD02125

REMARK

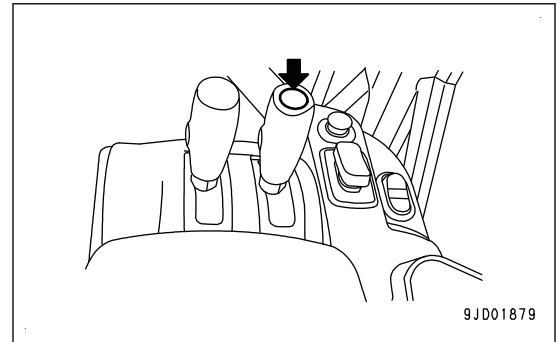
- If the gear speed switch is set to the 1st position, the gear speed is fixed to the 1st speed. The gear speed is not shifted automatically.
- The gear speed is shifted automatically between the set gear speed of the switch and 2nd, depending on the travel speed.
The gear speed is shifted down from the 2nd to the 1st by pressing the kickdown switch of the boom control lever.
- When the auto-shift and auto-kickdown are available, if the travel speed is 10.5 km/h {6.5 MPH} or slower, the kick-down switch operates and the gear speed can be shifted down to 1st from any gear speed of the forward or reverse travel.

This function facilitates the load-and-carry operation.

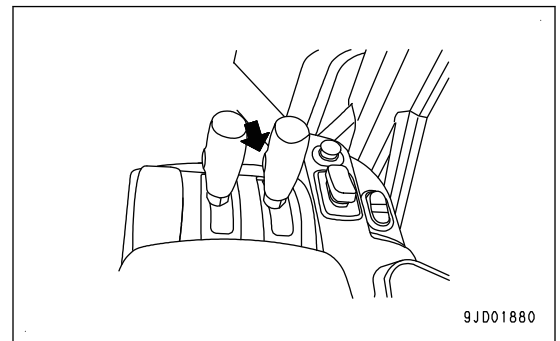
- When the travel speed is higher than 10.5 km/h {6.5 MPH}, the gear speed is lowered by one level each time the kickdown switch is pressed in the order of F4, F3, and F2 while the gear speed switch is in F4, and in the order of F3 and F2 while the gear speed switch is in F3.

To select a gear speed for uphill or downhill travel or grading, use the following procedure.

- When fixing the gear speed
Press HOLD switch on the boom control lever.
The gear speed is fixed to the one indicated on the transmission indicator of the machine monitor.
- When shifting down and up a fixed gear speed
Shift the gear speed with the gear speed switch.



9JD01879



9JD01880

ENGINE SHUTDOWN SECONDARY SWITCH

NOTICE

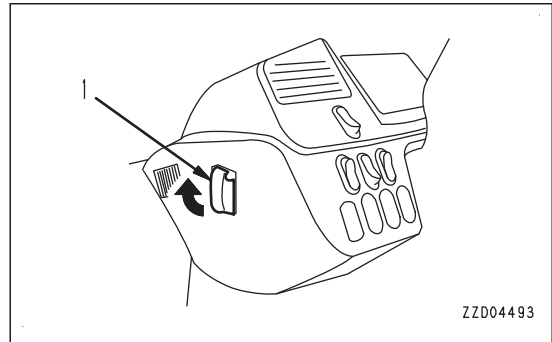
The engine shutdown secondary switch is used to stop the engine when the starting switch is turned to OFF position but the engine does not stop.

- Use the engine shutdown secondary switch only in an emergency.
Contact your Komatsu distributor for repair immediately when there is any abnormality on this switch.
- If the engine shutdown secondary switch is set to STOP ENGINE position by mistake while the machine is operating normally, “Engine Shutdown Secondary SW in Operation” is displayed on the machine monitor.
If “Engine Shutdown Secondary SW in Operation” is displayed on the machine monitor, check that the switch cover is closed and the switch is in NORMAL position. If not, return it to NORMAL position.

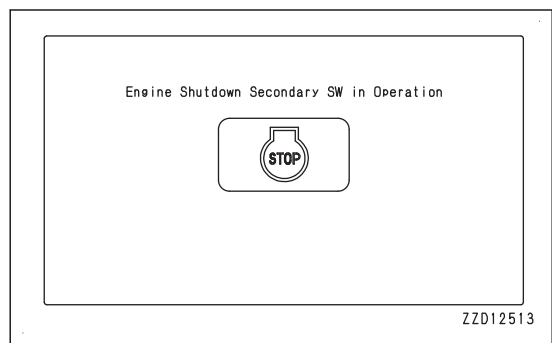
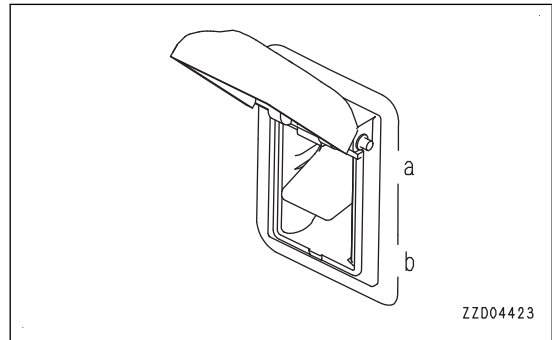
Lower the work equipment to the ground according to Safety, “PRECAUTIONS WHEN STANDING UP FROM OPERATOR'S SEAT (2-19)”, push the work equipment lock switch to lock the work equipment, turn the parking brake switch ON, and turn the starting switch to OFF position.

If the engine does not stop, operate the engine shutdown secondary switch according to the following procedure.

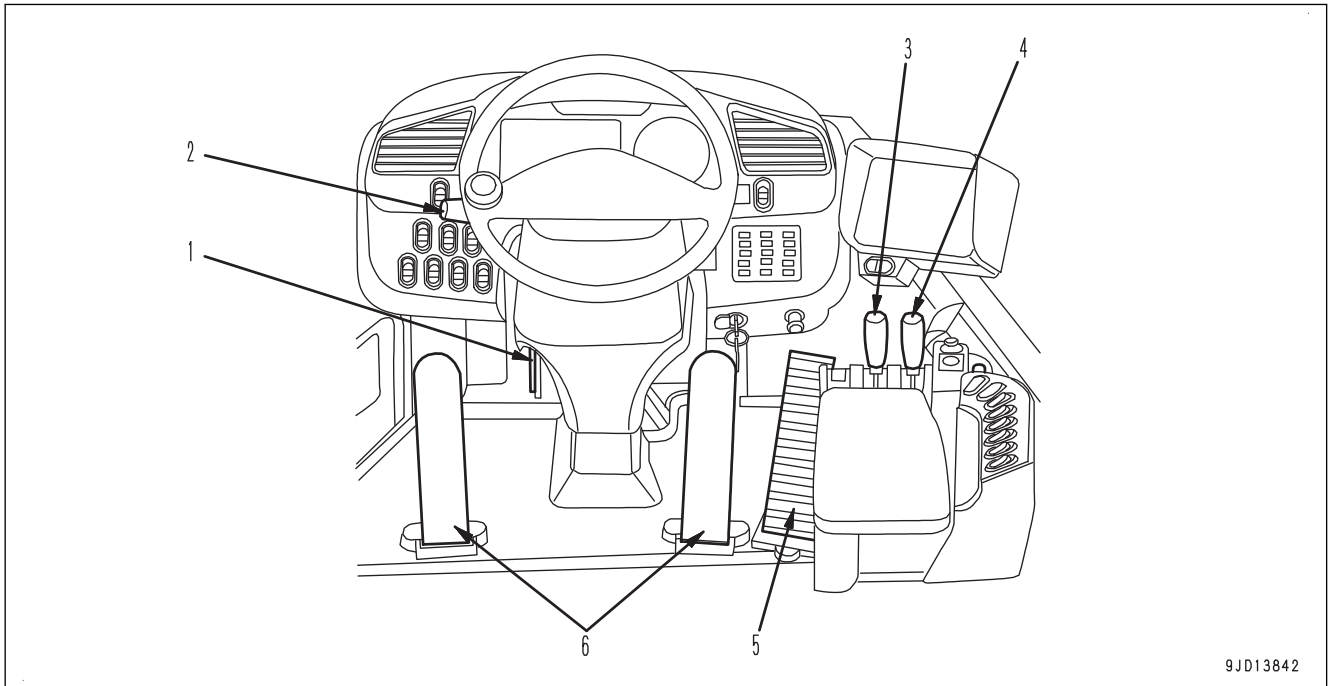
1. Raise cover (1) and open it.
There is a switch under the cover.



2. Pull up the switch, and the engine stops.
 - (a) STOP ENGINE: When abnormal (switch is set up)
 - (b) NORMAL: When normal (switch is set down)
 - When cover (1) is closed, the engine shutdown secondary switch automatically returns to NORMAL position (b).
 - When the starting switch is turned to ON position while the engine shutdown secondary switch is in STOP ENGINE position (a), “Engine Shutdown Secondary SW in Operation” is displayed on the machine monitor.
If this screen is displayed, return the engine shutdown secondary switch to NORMAL position.



CONTROL LEVERS AND PEDALS



9JD13842

(1) Steering tilt lock lever

(2) Directional lever

(3) Bucket control lever

(4) Boom control lever

(5) Accelerator pedal

(6) Brake pedal

DIRECTIONAL LEVER

The directional lever switches the machine travel between the forward and reverse.

The engine does not start if the directional lever is not in NEUTRAL position (N).

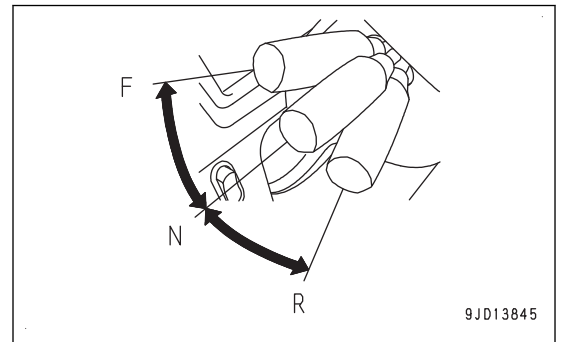
In such case, the centralized warning lamp lights up and the alarm buzzer sounds.

Start the engine after turning the directional lever to NEUTRAL position (N).

Position (F): FORWARD

Position (N): NEUTRAL

Position (R): REVERSE



9JD13845

REMARK

Do not maintain the directional lever at the intermediate position between positions (F) and (N), or between positions (N) and (R).

Although the transmission operates as displayed on the monitor screen, the alarm buzzer sounds.

STEERING TILT LOCK LEVER

WARNING

Stop the machine before adjusting the tilt of the steering wheel. If this operation (adjustment) is performed while the machine is moving, serious personal injury or death can result.

The steering tilt lock lever is used to fix the position of the steering wheel.

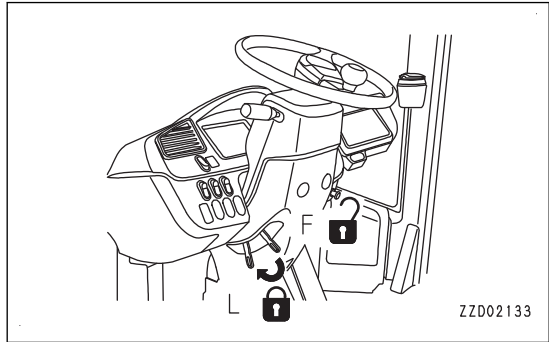
(F) FREE position:

The steering wheel is allowed to move back and forth, and up and down.

(L) LOCK position:

The steering wheel is fixed in the position.

The adjustable range is shown below.



Vertical adjustment	When 0 mm {0 in}	Top to 40 mm {1.6 in}
Tilt adjustment	0 to 129 mm {0 to 5.1 in}	0 to 162 mm {0 to 6.4 in}

NOTICE

Do not operate the steering tilt lock lever repeatedly with an excessive force. The lever can be loosened or its angle can be displaced. In such case, ask your Komatsu distributor for inspection.

BRAKE PEDAL

WARNING

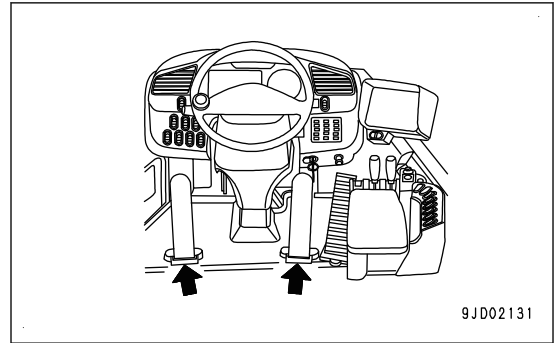
- While traveling downhill, use the engine brake with the transmission cut-off function being shut off. The brake pedals installed on right and left sides of the steering post provide the same function.
- Do not depress the brake pedal repeatedly more than necessity. Excessive use of the brake heats it up, degrading its function and may result in serious personal injury or death.
- Do not put your foot on the brake pedal unnecessarily.

NOTICE

Frequent braking increases the axle oil temperature. As a result, the alarm buzzer may sound and the warning lamp may light up for protection of the brake discs. Observe the following ways of operation to prevent the increase of the axle oil temperature.

- Try to avoid the over travel speed and sudden braking. Before depressing the brake pedal, shift down the gear speed manually with the gear speed switch.
- Try to apply the brake on and off rather than continuously.
- Try gradual acceleration and braking rather than sudden acceleration and braking .
- When traveling downhill, use a low gear speed so that the engine braking works well.
- During loading work on a level ground, use of the cut-off brake is recommended since it cuts off the power train.

The brake pedal is used to apply the brakes.



LEFT AND RIGHT BRAKE PEDALS

These are used to operate the wheel brake.

Use them for the normal braking.

When the transmission cut-off switch is set to ON position, the transmission is put in NEUTRAL in the adjusted position.

When the transmission cut-off switch is set to OFF position, the brake is operated but the transmission is not put in NEUTRAL.

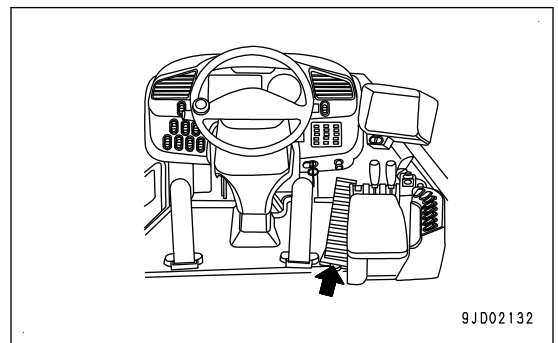
REMARK

When operating the work equipment while accelerating and decelerating the machine by using the brake and accelerator, you should use the brake pedals after turning the transmission cut-off switch to ON position. In this way, you can restrain the brake heating.

ACCELERATOR PEDAL

The accelerator pedal is used to adjust the speed and output of the engine.

It freely controls the engine from low idle to high idle.



BUCKET CONTROL LEVER

NOTICE

Even if the engine is stopped, if the starting switch is at ON position and lock of the work equipment is cancelled (pilot lamp is not lit), the work equipment can be operated.

The bucket control lever is used to operate the bucket.

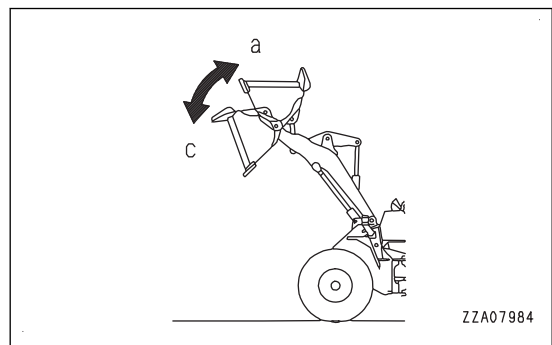
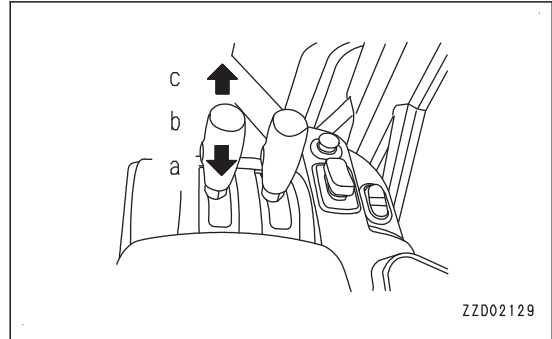
Position (a): TILT

When the bucket control lever is pulled further from the "TILT" position, the lever stops in that position until the bucket reaches the preset position by the bucket positioner, and the lever returns to the "HOLD" position.

Position (b): HOLD

The bucket remains in the position where it was stopped.

Position (c): DUMP



BOOM CONTROL LEVER

The boom control lever is used to control the boom.

NOTICE

Do not use "FLOAT" position when lowering the bucket. Use "FLOAT" when "LEVELING WORK (3-231)".

Position (a): RAISE

If the boom control lever is pulled further from "RAISE" position, the lever stops in that position.

When the remote boom positioner is enabled, the boom stops at the preset position and the lever returns to "HOLD" position at the same time.

When the remote boom positioner is disabled, the boom stops at the highest position and the lever returns to "HOLD" position at the same time.

Position (b): HOLD

The boom remains in the position where it was stopped.

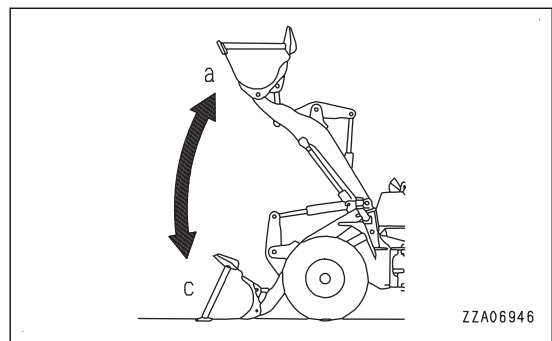
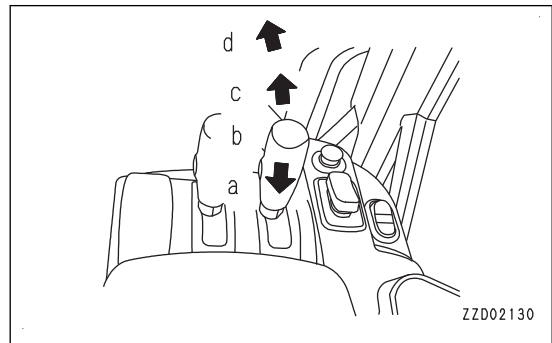
Position (c): LOWER

Position (d): FLOAT

The boom moves freely under external force. If the boom control lever is turned to "FLOAT" position, the lever stops in that position.

When the remote boom positioner is enabled, the boom stops at the preset position and the lever returns to "HOLD" position at the same time.

When the remote positioner is not set, the lever remains in "FLOAT" position and does not return.

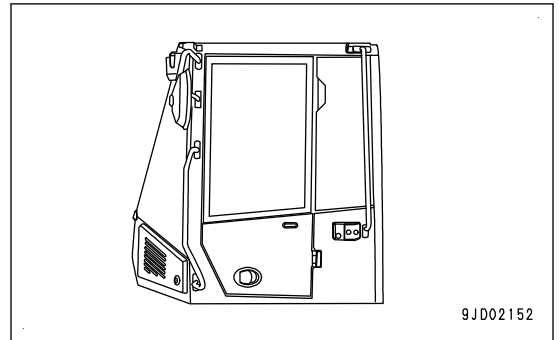


OTHER EQUIPMENT

METHOD FOR OPENING AND CLOSING CAB DOOR

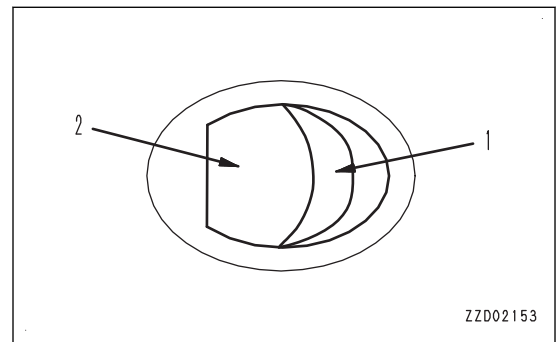
CAUTION

- Always check that the cab door is locked in position, both when it is open and when it is closed.
- Always place the machine on a level ground when opening or closing the door.
Avoid opening or closing the door on a slope, since there is a danger that the operating effort may suddenly change.
- Hold the door handle and knob whenever opening or closing the door.
- Be careful not to get your hands caught between the front pillar or center pillar.
- When there is anyone inside the cab, always call out a warning before opening or closing the door.



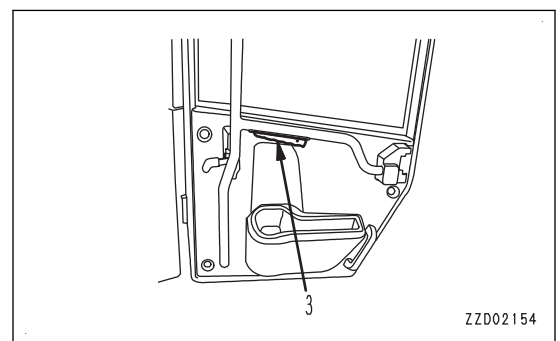
CAB DOOR HANDLE

While the key is not in the lock position, pull right side (1) of the door handle with the right hand, and push left side (2) with the thumb, and the door opens to the full open position,



OPEN HANDLE FOR CAB L.H. DOOR

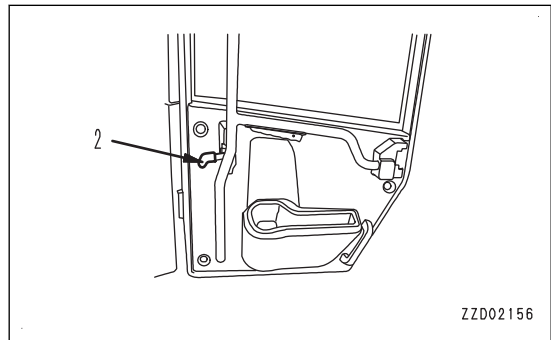
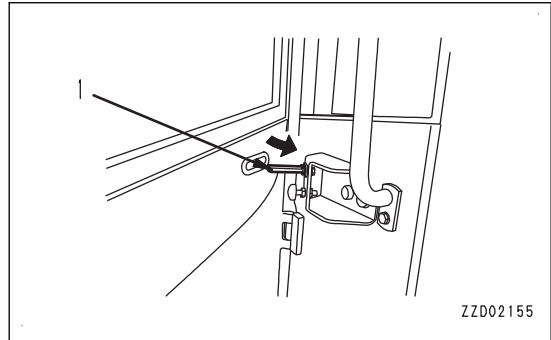
Hold open handle (3), and the door opens to the full open position.



OPEN LOCK FOR CAB L.H. DOOR

Use this to fix the door in position after opening it or when getting on and off the operator's cab.

1. Push the door against catch (1) to lock it in position.
2. When keeping the door open, fix it securely to the catch.
3. When getting on or off the machine, hold the inside hand-rail.
4. When closing the door, push down knob (2) to release the catch.

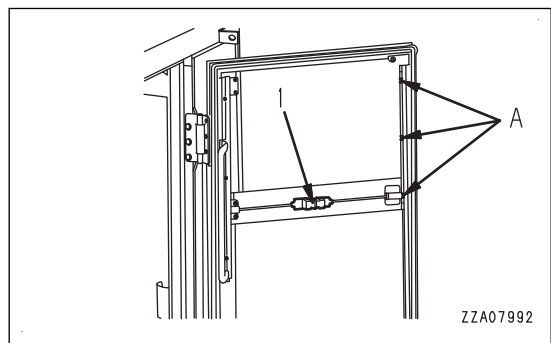


UNLOCK KNOB FOR SLIDE WINDOW OF CAB

Use this to open and close the door window glass up and down.

Grip unlock knob (1) to release the lock, then move it to the lower LOCK position and release it.

There are 3 stages for LOCK position (A).



OPEN KNOB FOR ALTERNATE EXIT OF CAB

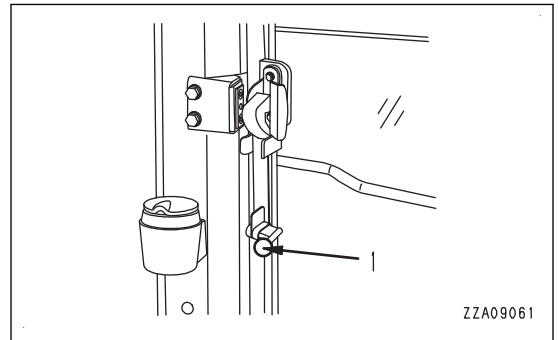
CAUTION

- The door on the right side of the cab is provided as an alternate exit for use when the operator cannot get out through the door on the left side. Do not use this door to get on and off the operator's cab normally.
- Do not operate the machine with the door open full or halfway. The door may suddenly close or open full, and it is very dangerous. Never operate the machine with the door open.
- Always operate the machine while the door is fully closed or locked half open.

Alternate exit door closed fully or locked half open

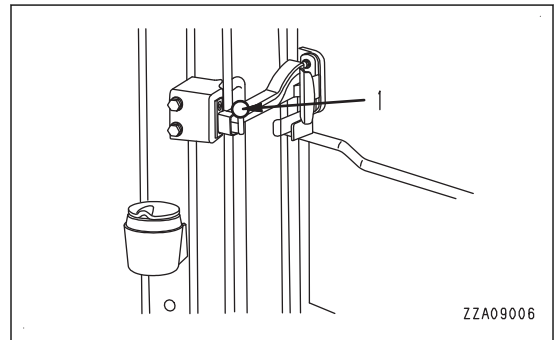
- When door knob (1) is pressed down completely, the door is locked with fully closed state.

When cooling or heating the cab, keep the door locked and fully closed with this function.



- If the door knob (1) is pulled up, the door is locked half open.

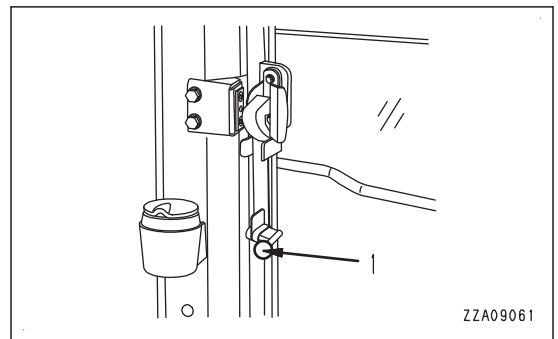
When talking to a person on the right outside of the machine, keep the door locked half open with this function.



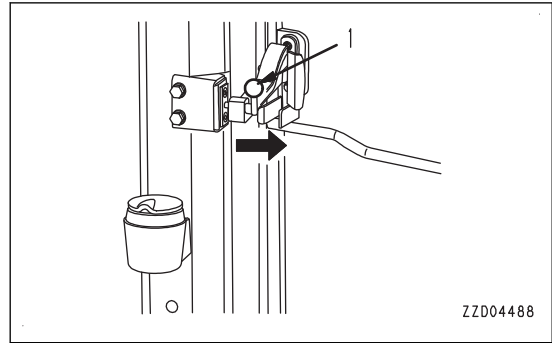
Unlock in emergency

If the door on the left side of the cab does not open or it is dangerous to get off the cab through the left side door, release the alternate exit door knob on the right side to open the right side door fully and get off the cab.

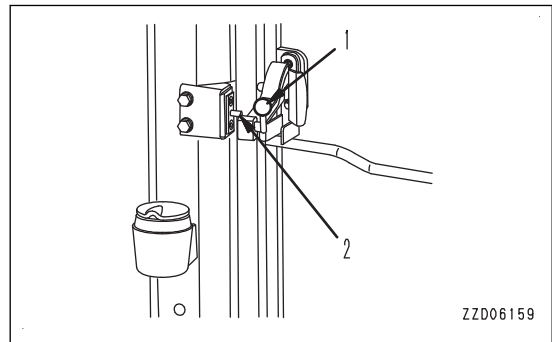
1. Pull up door knob (1).



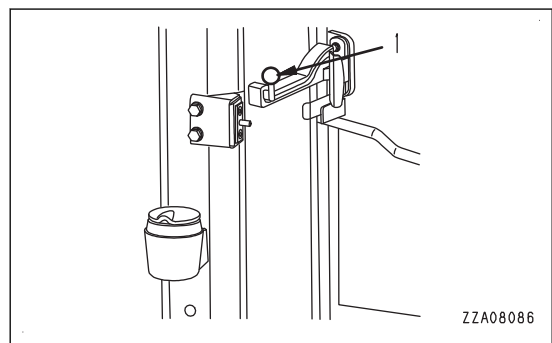
2. Hold door knob (1) and pull it toward the rear of the machine.



3. Remove the guide rail of the door knob from guide pin (2) fixed to the cab and unlock the right side door.



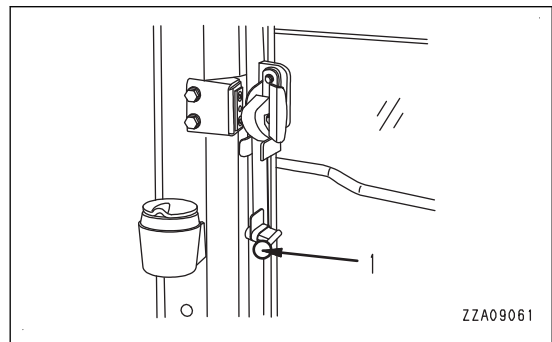
4. Open the right side door wide and go out.



To return the door knob to the locked state, grip door knob (1) and pull it toward the rear of the machine.

Match the guide rail of the door knob with the guide pin on the guide cab side, and push in the door knob toward the front.

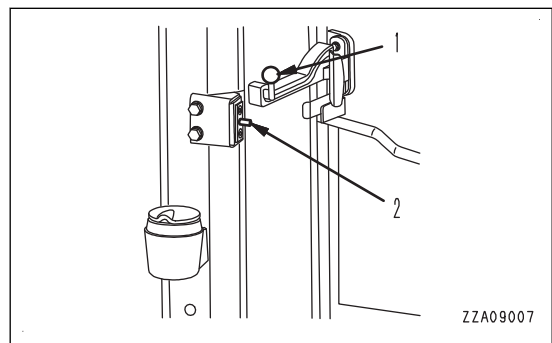
Check that the guide pin is inserted into the guide rail securely, and push in and fix door knob (1) to the lock position.



NOTICE

If the door is closed without holding door knob (1), the plastic part of the door knob hits against guide pin (2) on the cab side and may be broken.

Always close the door while holding door knob (1).



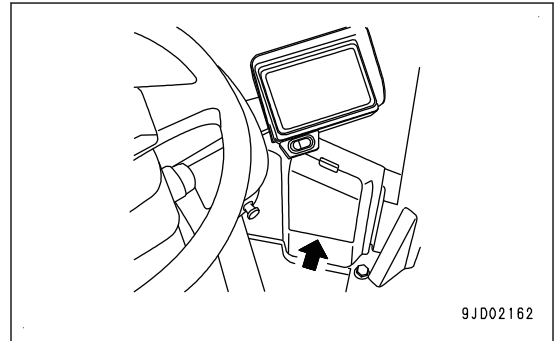
COOL BOX

Drink, hand towel, etc. can be kept cold during the cooling operation.

They can be kept warm during the heating operation.

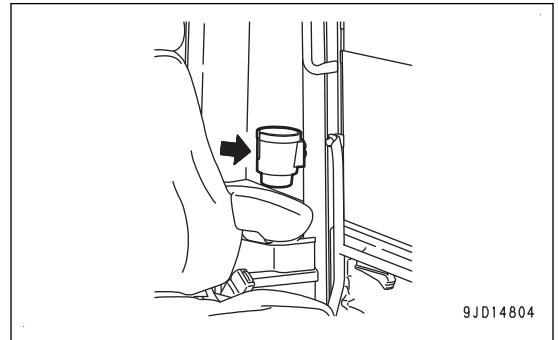
Do not put things which smell or break easily or leak water, etc. in this box.

Do not use this box as a holder for small objects.



CUP HOLDER

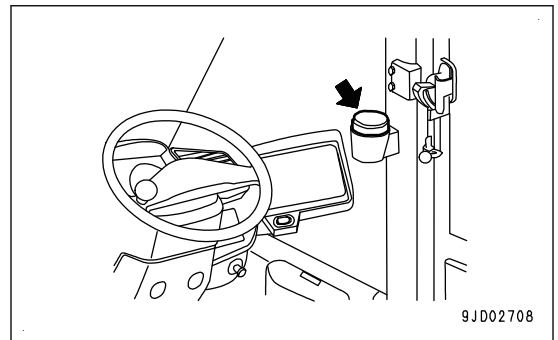
The cup holder is located at the rear left of the operator's seat.



ASHTRAY

This is on the right side of the operator's seat.

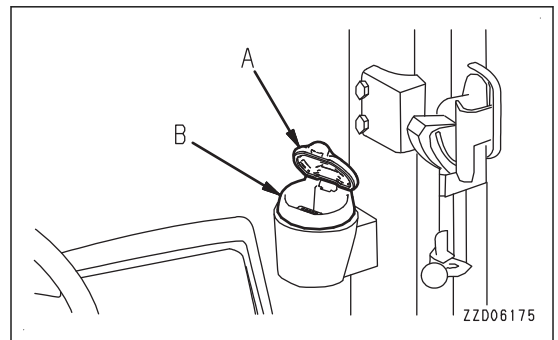
Always extinguish your cigarette before putting it in the ashtray and be sure to close the lid.



NOTICE

While removing the ashtray, if it is stuck in the console cover and hard to be removed, open lid (A) of ashtray, then hold the ashtray body (B) and twist it to remove.

If you hold lid (A) of ashtray and twist it, the ashtray may break.



POWER SUPPLY OUTLET

24 V power supply

NOTICE

Do not use this as a power supply for 12 V equipment.

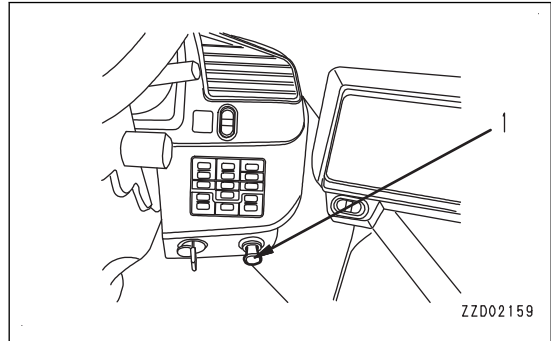
This will cause failure of the equipment.

When cigarette lighter (1) is removed, its socket can be used as a 24 V power supply.

The capacity is 85 W (24 V x 3.5 A).

REMARK

Use 24 V power source while engine is running.



12 V power supply

Power supply take-out (2) can be used as a 12 V power supply.

The capacity is 144 W (12 V x 12 A).

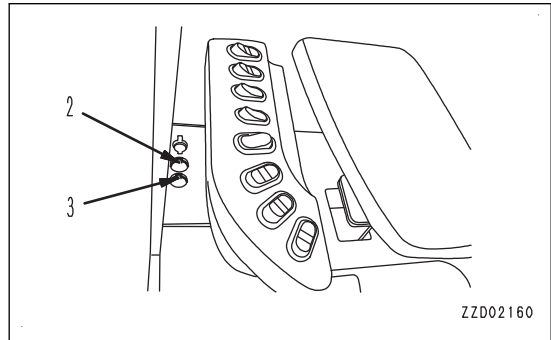
Power supply take-out (3) (if equipped) can be used as a 12 V power supply.

The capacity of 12 V power supply is 144 W (12 V x 12 A).

The total capacity of power take-outs (2) and (3) is 144 W.

REMARK

Use 12 V power source while engine is running.



FUSE

NOTICE

When replacing the fuse, be sure to turn the starting switch to OFF position and, after confirming that the system operating lamp is not lit, set the battery disconnect switch key to OFF position.

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

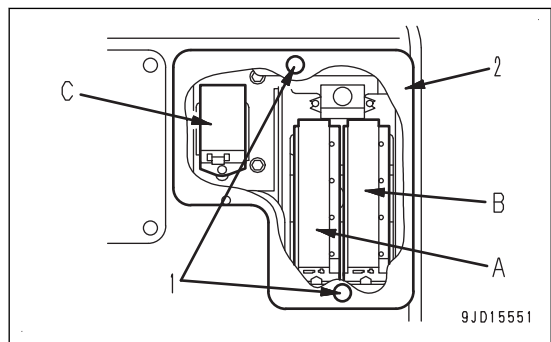
If the fuse becomes corroded, or looks white powdery, or the fuse is loose in the fuse holder, replace the fuse.

Replace the fuse with the one of the same capacity.

Should the fuse is blown, investigate the cause and take necessary actions.

Inside rear console box

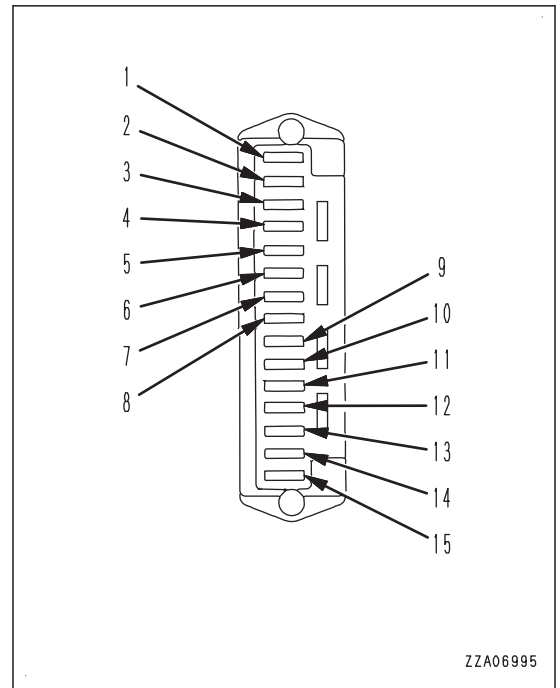
Loosen knobs (1) (2 places), then remove cover (2). Fuse boxes are A, B, and C inside.



Fuse capacities and circuit names

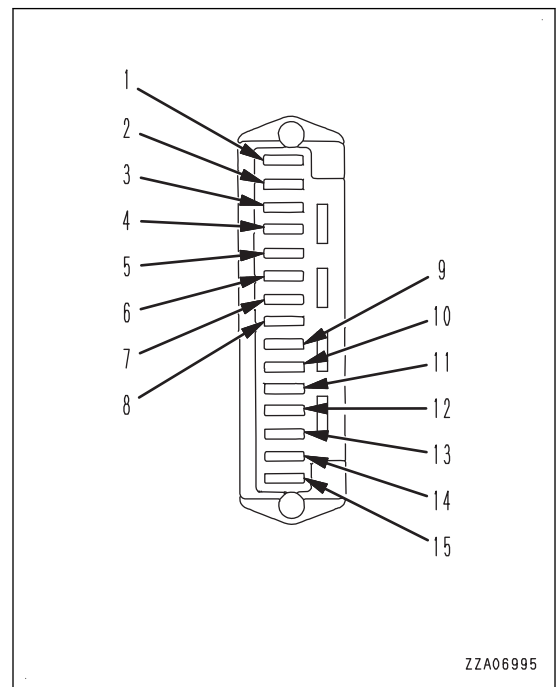
Fuse box A

No.	Fuse capacity	Name of circuit
(1)	20 A	Starting switch
(2)	10 A	Hazard lamp
(3)	10 A	Instrument panel
(4)	10 A	Room lamp
(5)	15 A	Transmission control
(6)	30 A	Engine control
(7)	10 A	Spare
(8)	10 A	Front working lamp
(9)	10 A	Rear working lamp
(10)	30 A	Radio
(11)	10 A	Turn signal lamp
(12)	20 A	Beacon lamp
(13)	20 A	Air suspension seat
(14)	30 A	Rear heated wire glass
(15)	5 A	Engine, control, key switch, accessory



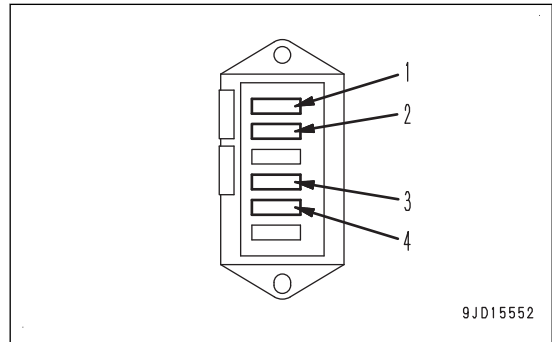
Fuse box B

No.	Fuse capacity	Name of circuit
(1)	15 A	Horn
(2)	20 A	Transmission control
(3)	5 A	Parking brake
(4)	5 A	Secondary steering
(5)	15 A	Work equipment positioner
(6)	10 A	Backup lamp and brake lamp
(7)	30 A	Wiper and washer
(8)	20 A	Air conditioner blower
(9)	5 A	Main compressor
(10)	10 A	Monitor main circuit
(11)	30 A	Main lamp circuit
(12)	10 A	Right clearance lamp
(13)	10 A	Left clearance lamp
(14)	15 A	Right headlamp
(15)	15 A	Left headlamp



Fuse box C

No.	Fuse capacity	Name of circuit
(1)	20 A	Smart sensor
(2)	10 A	Smart sensor
(3)	10 A	DEF heater
(4)	20 A	DEF heater



SLOW-BLOW FUSE

NOTICE

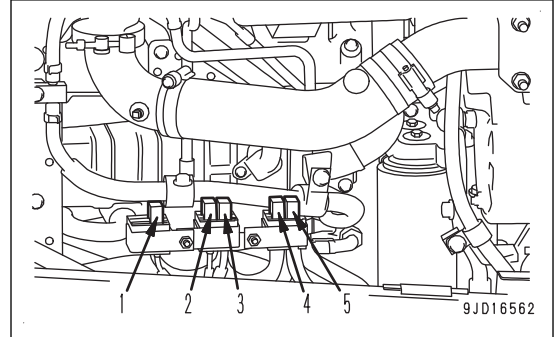
When replacing the slow-blow fuse, be sure to turn the starting switch to OFF position and, after confirming that the system operating lamp is not lit, set the battery disconnect switch key to OFF position.

When the starting switch is turned to ON position, if the power is not supplied, the slow-blow fuse may be broken. Check the slow-blow fuse and replace it if necessary. Check or replace it.

The slow-blow fuse is on the side of the engine on the left side of the machine.

Slow-blow fuse

- (1) 50 A: Continuous power supply
- (2) 80 A: Main power supply 1
- (3) 50 A: Main power supply 2
- (4) 120 A: Charge circuit
- (5) 120 A: Heater relay (ribbon heater)



FRAME LOCK BAR

⚠ WARNING

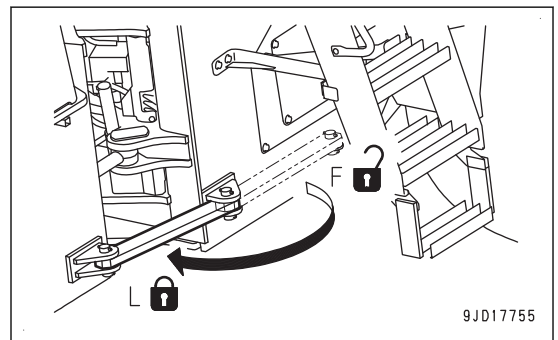
- When performing maintenance or transporting the machine, always set the frame lock bar to LOCK position.
- Always disengage the frame lock bar when traveling. If it is not disengaged, the steering wheel becomes inoperative and this may lead to serious personal injury or death.

This is a device used to lock the front and rear frames to prevent the machine from articulating during maintenance or transporting the machine.

(L) LOCK position:

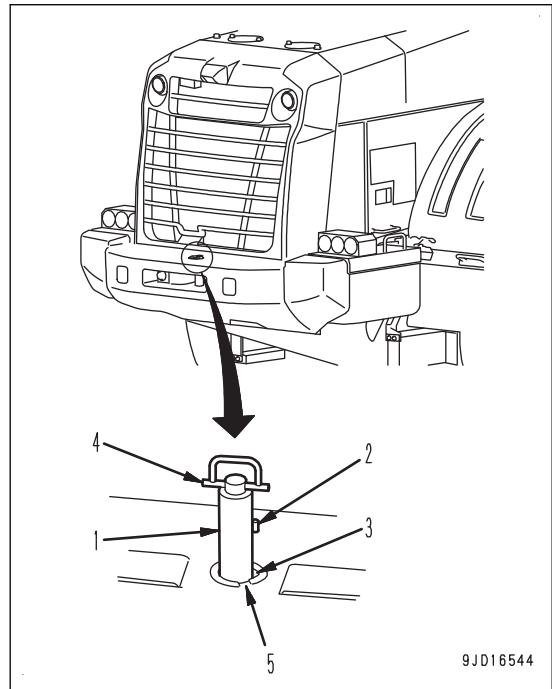
The front and rear frames are locked and the machine does not articulate. Set the bar to this position for inspection and maintenance during maintenance or transporting the machine.

(F) FREE position: Set the bar to this position for normal operation.

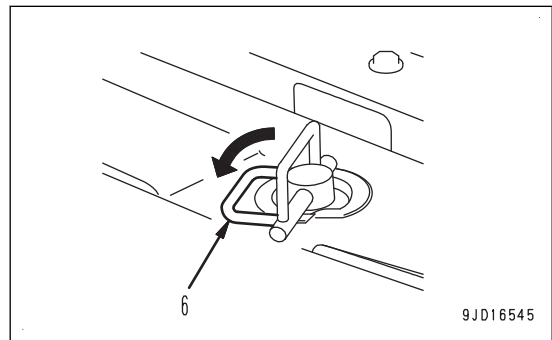


METHOD OF USING TOWING PIN

1. Position protrusion (2) of towing pin (1) with groove (3) of the counterweight, and insert it.
2. Turn towing pin (1) clockwise and set handle bar (4) of towing pin (1) on notch (5).



3. Fold down handle (6) of towing pin (1).
4. When removing it, perform the procedure in the reverse order.

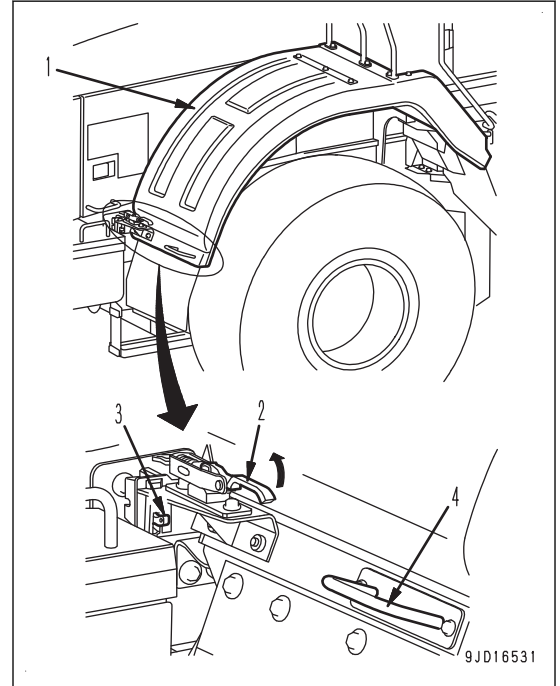


METHOD FOR OPENING AND CLOSING REAR FULL-LENGTH FENDER AND ENGINE SIDE COVER

(Right and left)

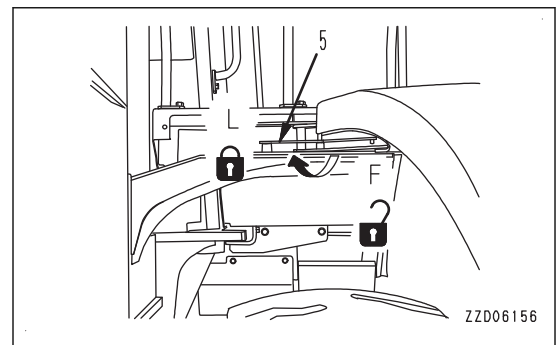
METHOD FOR OPENING REAR FULL-LENGTH FENDER AND ENGINE SIDE COVER

1. Pull up lever (2) of rear full-length fender (1) to unlock.
2. Lower lock pin (3) to unlock.
3. Hold handle (4) and slide rear full-length fender (1) outward.

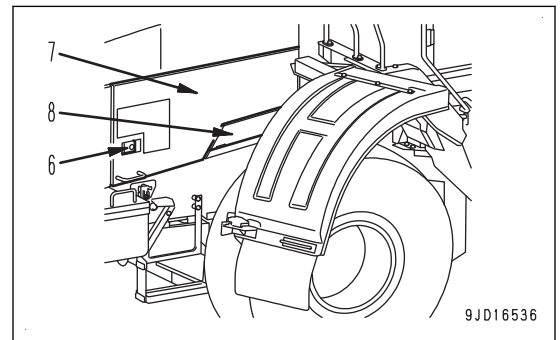


4. Raise lock lever (5) and turn it, then lower the lock lever at LOCK position (L).

Rear full-length fender (1) is locked.

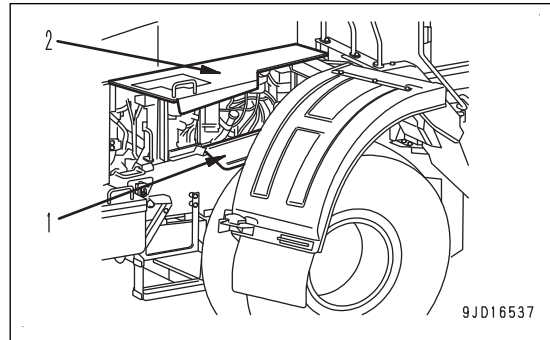


5. Pull door opening lever (6) to unlock.
6. Push up engine side cover (7) to open.
7. Pull cover (8) toward you and open it.

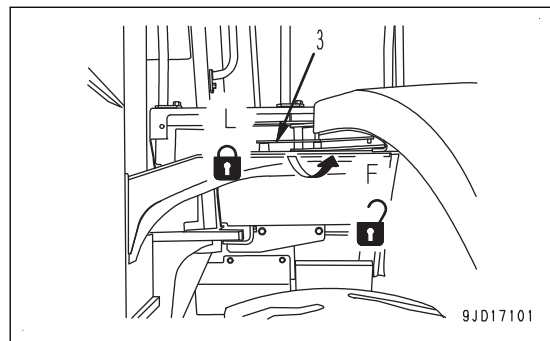


METHOD FOR CLOSING REAR FULL-LENGTH FENDER AND ENGINE SIDE COVER

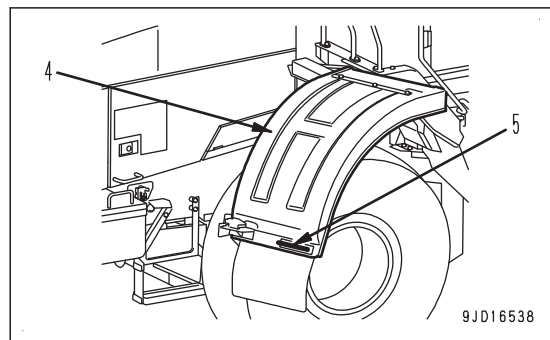
1. Close cover (1).
2. Pull down engine side cover (2).



3. Raise lock lever (3) and turn it, then lower the lock lever at FREE position (F).
Rear full-length fender (4) is unlocked.



4. Hold handle (5) of rear full-length fender (4) and slide it inward, and return the rear full-length fender to its original position.

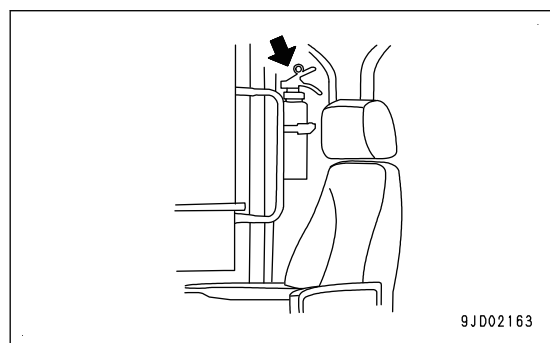


FIRE EXTINGUISHER

(if equipped)

This is installed to the right inside of the operator's cab.

The directions are described on the nameplate affixed to the fire extinguisher. Carefully read and understand them beforehand for emergencies.



BATTERY DISCONNECT SWITCH

CAUTION

- Do not operate the battery disconnect switch while the engine is running. The large current generated by the alternator may burn the electric parts and cause a fire. When operating the battery disconnect switch, always stop the engine.
- If the battery disconnect switch is turned to OFF position, always remove the switch key. If someone turns the key to ON position carelessly, this is extremely dangerous.

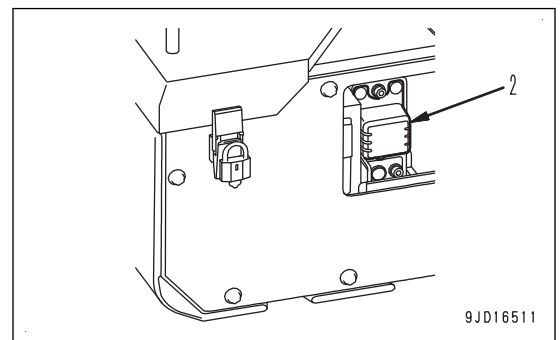
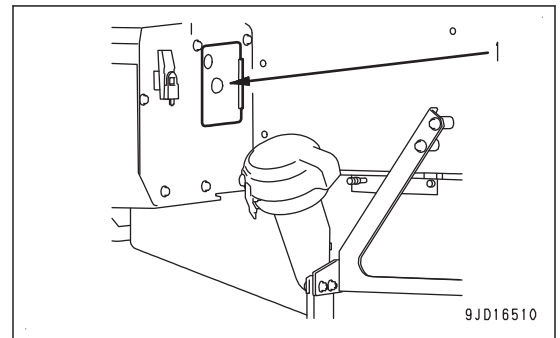
NOTICE

- Keep battery disconnect switch in ON position except the following cases.
 - When the machine is stored for a long time (more than a month)
 - When repairing the electrical system
 - When performing electric welding
 - When handling the battery
 - When replacing the fuse, etc.
- Do not turn battery disconnect switch to OFF position while the system operating lamp is lit. If the battery disconnect switch is turned OFF while this lamp is lit, the data in the controller may be lost.
- If this switch is turned to OFF position, all the electrical system is cut out and the functions of KOM-TRAX stop. In addition, the time setting of the clock may be lost. In this case, set again. For detail, see "CLOCK ADJUSTMENT (3-93)", "HANDLE RADIO (3-258)".

The battery disconnect switch is used to cut out the electricity from the battery.

Open cover (1) at the front side of the battery box on the right side of the machine.

Raise rubber cover (2), and switch (3) is seen.



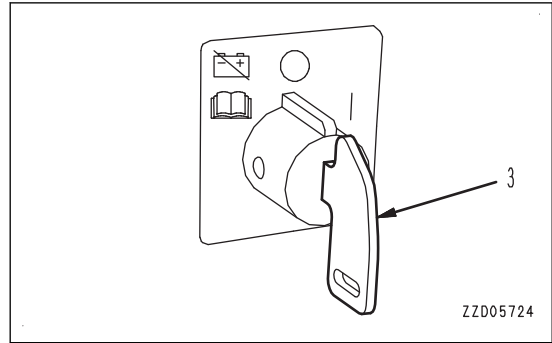
(O): OFF position

It allows moving in and out of switch key (3) and used for cutting off the current from the battery.

(I): ON position

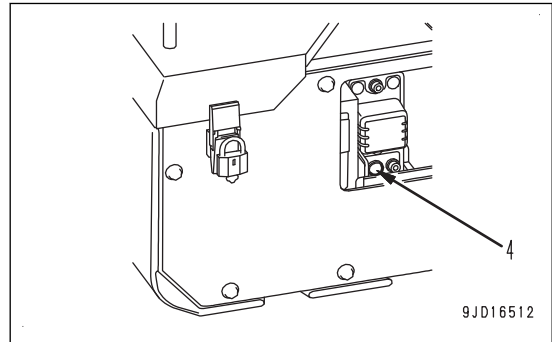
The current from the battery flows into the circuit.

Before starting the machine, be sure to set the switch to this position.



REMARK

- If the battery disconnect switch is turned to OFF position, every electric system of the machine becomes inoperable.
- The memories of the clocks of the radio and monitor are lost. Set them again when using.
- Immediately after the starting switch is turned to OFF position, data is saved on each controller. Before turning the battery disconnect switch to OFF position, make sure that system operating lamp (4) below the battery disconnect switch is off.
- Immediately after the reverse rotation of the fan, power to the fan reverse solenoid is supplied for some time to protect the hydraulic motor even if the starting switch is turned to OFF position. Before turning the battery disconnect switch to OFF position, make sure that the fan is stopped completely.



SYSTEM OPERATING LAMP

The system operating lamp shows that the electric power is supplied to the controller which is installed to 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.

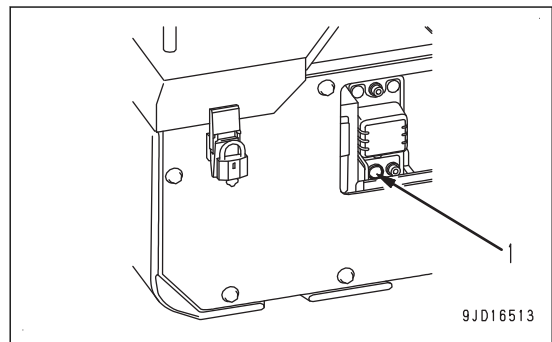
Before you operate the battery disconnect switch, make sure that the system operating lamp (1) is not lit.

NOTICE

If the battery disconnect switch is turned to the OFF position while the system operating lamp is lit, the data in the controller will be lost.

REMARK

- Even if the starting switch is in the OFF position, the controller possibly operates. The system operating lamp lights up at this time, but it is not a problem.
- After the starting switch was turned off, the system operating lamp possibly stays lit for a long time. In such case, consult your Komatsu distributor.
- While the DEF system devices are in operation, 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.

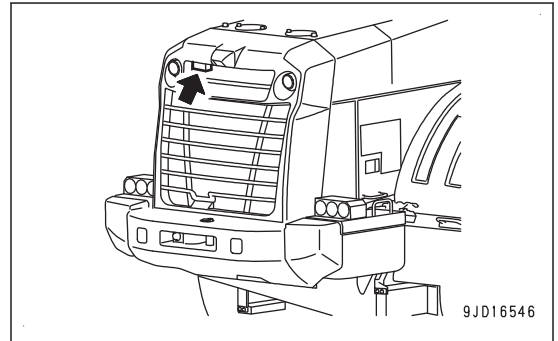


BACKUP ALARM

This alarm sounds as soon as the machine moves in reverse to warn people behind the machine.

When moving the machine in reverse, perform the following procedure.

- Set the directional lever to REVERSE position (R).
- Set the directional selector switch (if equipped) to REVERSE position.
- Set the directional selector switch of the multifunction mono-lever (if equipped) to REVERSE position.



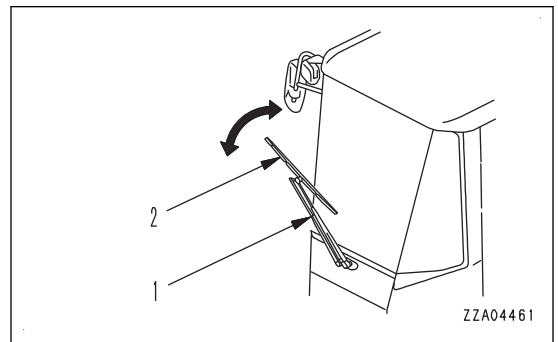
HANDLING FRONT WIPER

Preventing the damage to the wiper arm bracket

NOTICE

When tilting wiper arm (1) forward, make sure that wiper blade (2) moves freely.

When tilting wiper arm (1) forward for cleaning cab glass, etc., make sure that wiper blade (2) is not locked in the arm (the bottom of the blade is not caught in the arm). If locked, an abnormal external force may apply to the bracket when you tilt the wiper arm forward, and the bracket may be damaged.



HANDLE REAR VIEW MONITOR

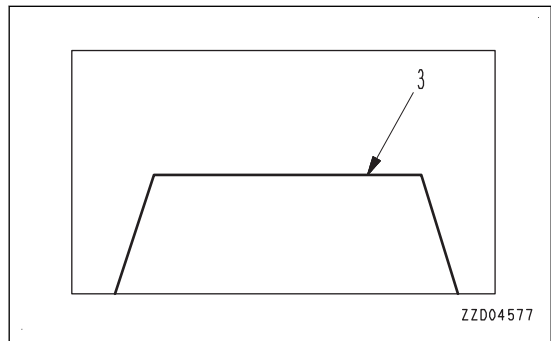
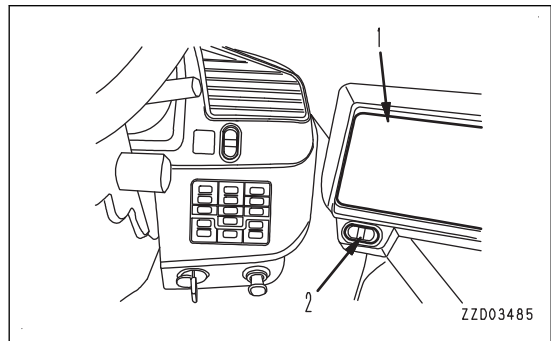
⚠ WARNING

- Never operate any of the switches while traveling. If you do so, there is a danger that you may make an error in the machine operation, or neglect to watch the travel path ahead for safety, and as a result cause a serious personal injury.
- The rear view monitor is an supporting aid for checking obstacles in the rear or surroundings. An image appearing on the monitor is limited.
When backing up the machine, be sure to make a visual check, not relying solely on the monitor. Never rely solely on the monitor when backing up the machine.
- An image on the rear view monitor does not show an actual distance. Drive the machine slowly, when backing it up.
- The distortion different from the actual state appears on an image on the rear view monitor. So, look at the center of the screen as a reference.

When the machine is backed up and rear view monitor (1) is set in operation, a monitor screen enables the operator to check the rear for safety.

REMARK

- The screen may be hard to see in the dark place at night, but it is not a trouble.
The luminance of the rear view monitor can be adjusted with rear view monitor brightness adjustment switch (2). For the adjustment method, see “REAR VIEW MONITOR BRIGHTNESS ADJUSTMENT SWITCH (3-110)”.
- Reference line (3) is used for checking the side and rear of the machine roughly.
For the setting of the rear view monitor, see “REAR VIEW MONITOR SETTING (3-86)”, and for the setting of reference line, see “METHOD FOR ADJUSTING REAR VIEW CAMERA ANGLE (3-193)”.
- Reference line (3) dose not synchronize with steering angle. Reference line (3) does not indicate the actual moving direction or travel path.
- Intensity or color of the objects may change because of the automatic adjustment function of the camera.



HANDLE Komatsu Diesel Particulate Filter (KDPF)

⚠ CAUTION

- Exhaust gas temperature may increase during the aftertreatment devices regeneration and the high temperature may last after the completion of regeneration.
Avoid getting near the exhaust pipe outlet and around the aftertreatment devices to prevent being burnt.
Also, keep combustible materials away from the exhaust pipe outlet and around the aftertreatment devices 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 to prevent fire hazards due to highly heated exhaust gas during the aftertreatment devices regeneration.
For the setting, see “PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING (3-149)”.
- Do not leave the operator's seat during 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 performed automatically to keep the filtering performance of KDPF high.

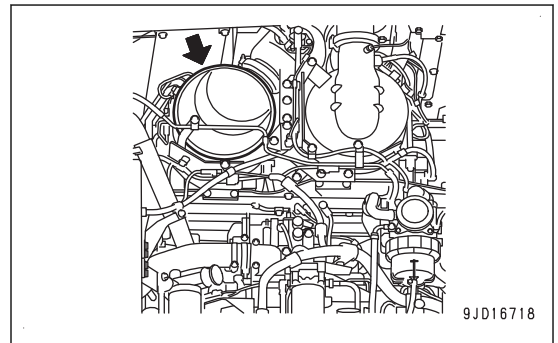
This purification process is called the “regeneration”.

If operations which lower the purification function of KDPF continues for long hours, the regeneration is performed to protect the KDPF system, regardless of the quantity of the accumulated soot.

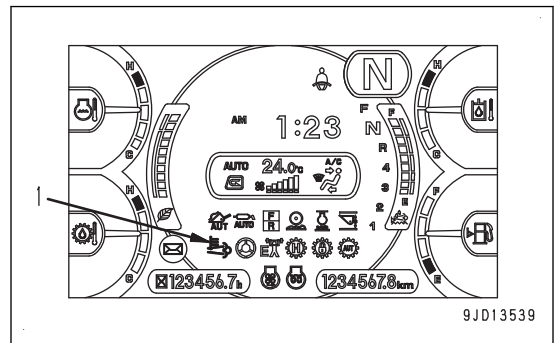
During the KDPF regeneration, aftertreatment devices regeneration pilot lamp (1) lights up on the monitor.

REMARK

- Even if aftertreatment devices regeneration pilot lamp (1) lights up, the machine does not need to be stopped and the work can be continued, unless when the KDPF soot accumulation caution lamp (2) lights up.
- Accumulation amount of soot can be checked 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”.



9JD16718



9JD13539

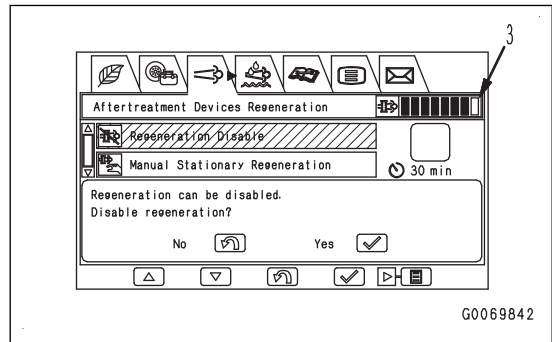
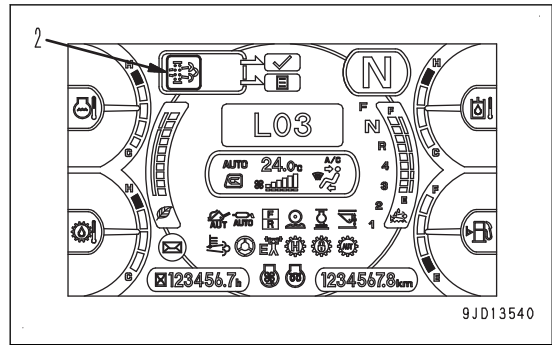
The KDPF regeneration is performed automatically. However, the accumulated soot may not be burnt sufficiently and the filtering function may not be improved under certain operating conditions.

In that case, KDPF soot accumulation caution lamp (2) lights up. If this lamp lights up, stop the machine in a safe place and perform the manual stationary regeneration.

For details of the procedure, see “PROCEDURE FOR MANUAL STATIONARY REGENERATION (3-146)”.

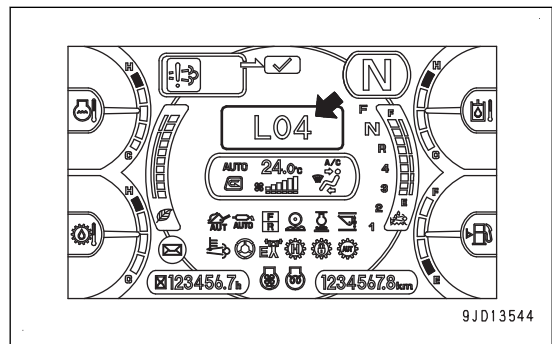
Two types of monitor display require the manual stationary regeneration, depending on the level of urgency.

When the directional lever is turned to NEUTRAL position (N) and the parking brake switch is turned to the “PARKING” position, the manual stationary regeneration may start automatically to protect the KDPF.



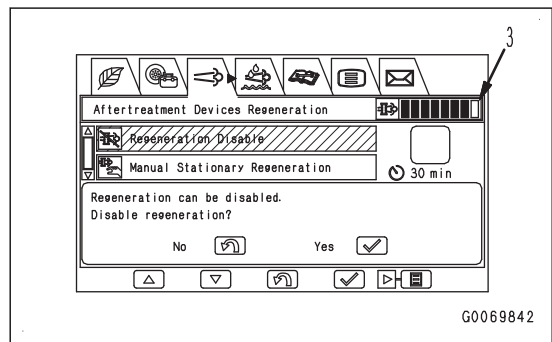
NOTICE

Do not stop engine when the aftertreatment devices regeneration is activated.
When stopping the engine, stop the aftertreatment devices regeneration first according to “PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING (3-149)”, then keep engine running at low idle for approximately 5 minutes, and stop engine.
When the Action level “L03” lights up in red, and the KDPF soot accumulation caution lamp (2) lights up in red, engine power deration is activated. To restore engine power, it is necessary to perform “PROCEDURE FOR MANUAL STATIONARY REGENERATION”.
If soot accumulated in the KDPF exceed the defined level without performing “PROCEDURE FOR MANUAL STATIONARY REGENERATION”, the Action level “L04” lights up in red. Stop the machine immediately and ask your Komatsu distributor.



REMARK

- Soot accumulation level (3) can be checked with the “Aftertreatment Devices Regeneration” screen. Press the menu switch on the standard screen to display “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.
- Since the soot in the filter of KDPF can be burnt by the high-performance catalyst and high-temperature exhaust heat, the soot accumulation quantity may decrease even if the regeneration is not performed, depending on the operating condition.
- Even when the soot accumulation level is low, the automatic regeneration may be performed and the manual stationary regeneration may be requested to protect the system.

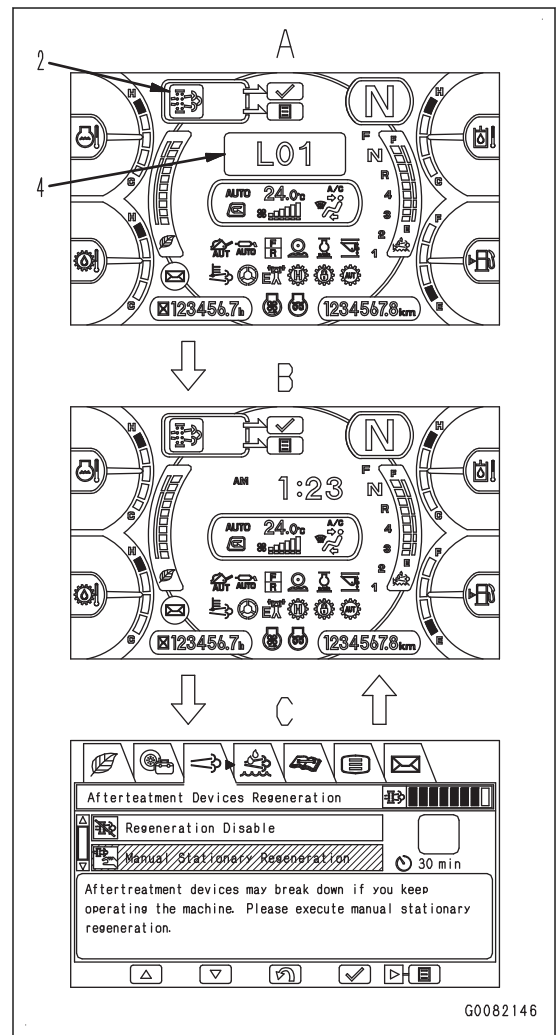


In particular, if engine is kept running with no load, the regeneration frequency may increase, but this is not a failure.

- Even just after the regeneration is completed, the soot accumulation level may not be “0”. This is caused by the accumulated noncombustible material in the exhaust gas and is not a failure.
- Since noncombustible matter which cannot be burnt by the regeneration is accumulated in the filter of KDPF, the filter needs to be cleaned or replaced at regular intervals. For details, see “METHOD FOR CLEANING KDPF (4-90)”.
- The engine speed or engine sound may change during or after the regeneration. This is caused by the control for better regeneration and this is not a failure.
- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filtering function.
- White smoke may be discharged for a short time just after the engine is started or during the regeneration in the cold season, but this is not a failure.
- Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure. In addition, the regeneration interval may be shortened and the fuel consumption may increase. For details of the genuine oil, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.
- 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.

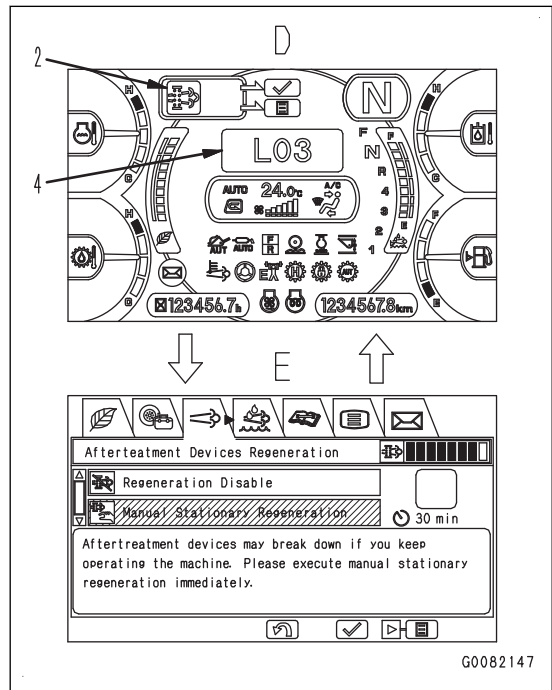
When the degree of emergency is low

- If KDPF soot accumulation caution lamp (2) lights up in yellow (action level (4): “L01”), screen (A) is displayed first.
- The action level goes out 2 seconds after and the screen changes to standard screen (B).
- If the machine is completely stopped, the display switches to “Aftertreatment Devices Regeneration” screen (C) after 3 seconds only the first time. If, however, the manual stationary regeneration is not performed, the display returns to standard screen (B) after 30 seconds. Then, if the accumulated soot does not decrease, the “Aftertreatment Devices Regeneration” screen (C) is displayed for 30 seconds every 2 hours.
- If KDPF soot accumulation caution lamp (2) lights up in yellow, stop the machine in a safe place and perform the manual stationary regeneration.



When the degree of emergency is high

- KDPF soot accumulation caution lamp (2) lights up in red and the action level “L03” lights up in red (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 standard screen (D) are automatically displayed alternately in accordance with machine stop, until the manual stationary regeneration is performed.
- If KDPF soot accumulation caution lamp (2) lights up in red, immediately stop the machine in a safe place and perform the manual stationary regeneration.



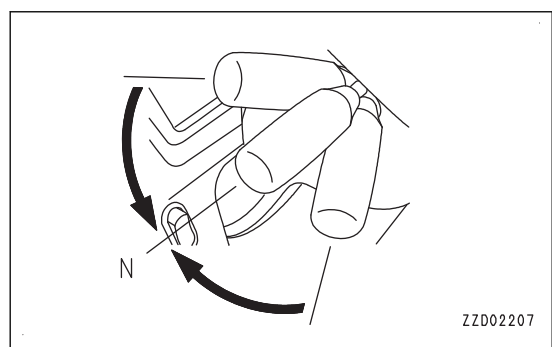
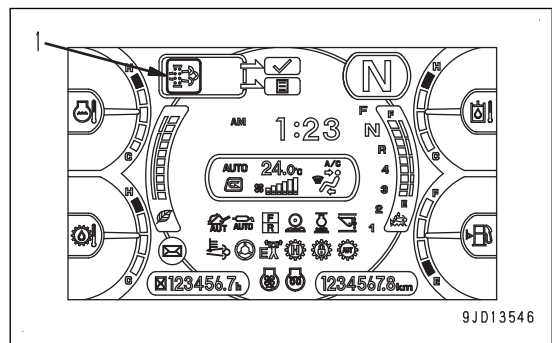
PROCEDURE FOR MANUAL STATIONARY REGENERATION

CAUTION

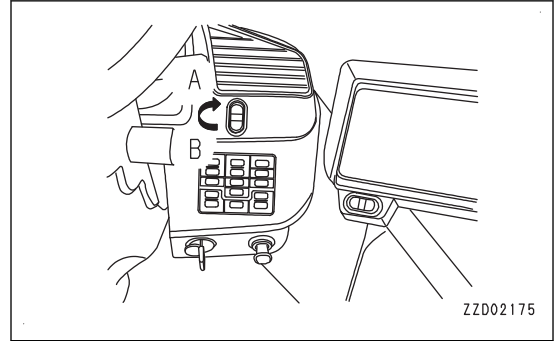
Exhaust gas temperature may increase higher than the previous models during the aftertreatment devices regeneration. Avoid getting near the exhaust pipe outlet and around the aftertreatment devices to prevent being burnt. Also, keep combustible materials away from the exhaust pipe outlet and around the aftertreatment devices to prevent a fire.

The manual stationary regeneration can be performed while KDPF soot accumulation pilot lamp (1) is lit.

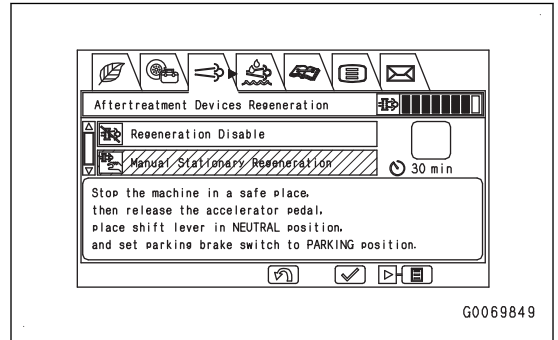
1. Move the machine to a safe place and stop it with engine running.
2. Check that there is no person or combustible matter around the machine (particularly in the direction of the exhaust gas flow).
3. Release your foot from the accelerator pedal and set the directional lever to NEUTRAL position (N).



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



- Press the menu switch to display "Aftertreatment Devices Regeneration" screen.

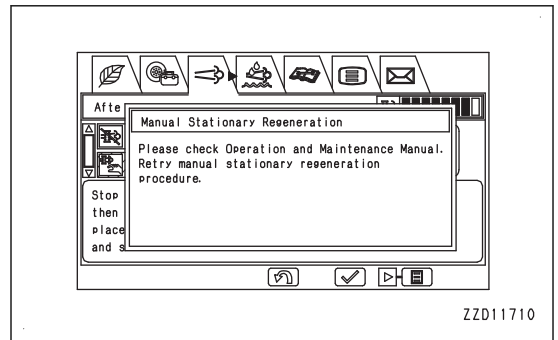


- Select the manual stationary regeneration, check again safety of the surrounding area and make sure the area is free from irrelevant people or combustible material, then press ENTER switch. If the machine needs to be moved again to secure safety, move it to a safe place and repeat the procedure from step 1.

REMARK

After ENTER switch is pressed in step 6, the screen shown in the figure may be displayed. This indicates that the operations in steps 1 to 3 were not performed correctly or there is trouble other than 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.

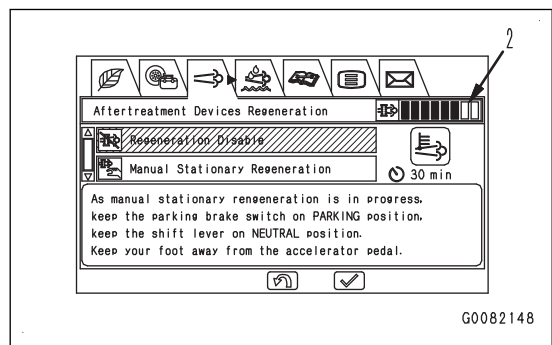
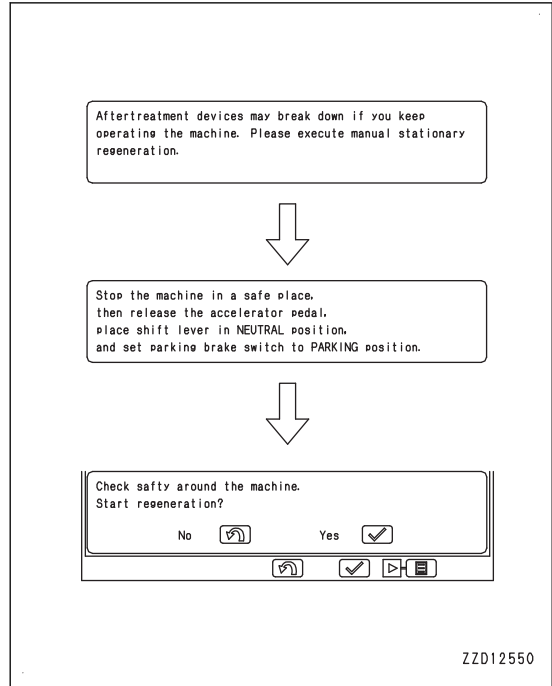
If the manual stationary regeneration still cannot be performed, return to the standard screen, press ENTER switch to check the contents of other occurring troubles, and take the necessary remedy.



REMARK

- The explanation of the manual stationary regeneration is displayed in 3 parts on the monitor panel. When ENTER switch is pressed, the regeneration panel can be started immediately, regardless of which part is displayed. When RETURN switch is pressed, the display returns to the standard screen.
- If no monitor switch is operated for 30 seconds, the explanation display of the manual stationary regeneration is not displayed and the screen returns to the standard screen. At this time, to display the explanation of the manual stationary regeneration again, press ENTER switch on the standard screen to display "Aftertreatment Devices Regeneration" screen.

7. This screen is displayed during the manual stationary regeneration. It may take more than 30 minutes 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 displayed again.



REMARK

- The progress of the manual stationary regeneration performed when soot is accumulated can be checked by the number of lighting lamps of soot accumulation level (2). The manual stationary regeneration starts at 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 may start even when the soot accumulation level is “0” to “3”. In this case, the soot accumulation level may not decrease, but this is not a failure. The progress is not displayed on the monitor during this regeneration. It is completed in approximately 10 minutes.
- If the accelerator pedal or directional lever is operated, or the parking brake is released during the manual stationary regeneration, the regeneration is stopped automatically. Release your foot from the accelerator pedal, turn the directional lever to 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, referring to the aftertreatment devices regeneration disable and cancel of regeneration disable procedures described in the following.
When restarting the manual stationary regeneration, secure the safety of the machine and around it, then cancel the regeneration disable.

8. After the manual stationary regeneration is completed, the screen automatically returns to the standard screen.

PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING

If there is combustible material around the machine and the active regeneration that increases the exhaust temperature must not be performed, the automatic active aftertreatment devices regeneration can be disabled.

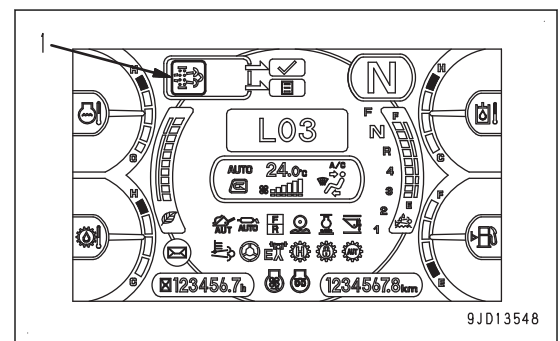
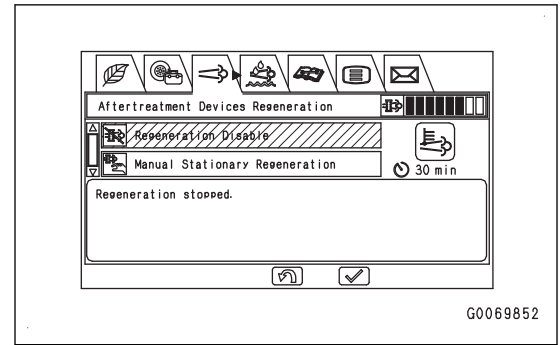
Also, the regeneration in progress can be stopped.

NOTICE

Even if the regeneration is disabled, KDPF soot accumulation caution lamp (1) lights up if soot is accumulated and the manual stationary regeneration is required.

If KDPF soot accumulation caution lamp lights up, move the machine to a safe place and perform manual stationary regeneration.

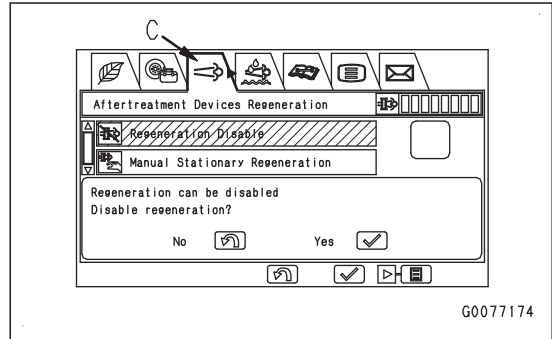
If the operation is continued without performing the manual stationary regeneration, it may cause the failure of KDPF or the engine.



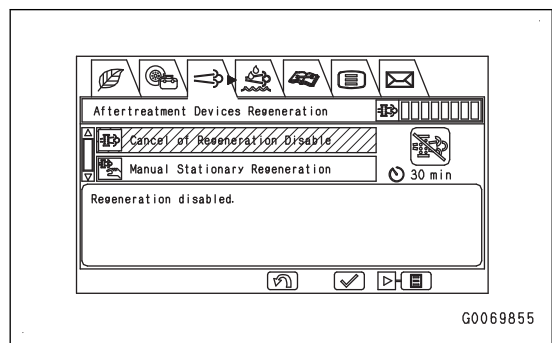
WHILE REGENERATION IS NOT BEING PERFORMED: SETTING FOR REGENERATION DISABLE

(When the aftertreatment devices regeneration is not displayed on the standard screen)

1. Press the menu switch on the standard screen.
2. Operate the menu switch to select "Aftertreatment Devices Regeneration" menu (C) and display "Aftertreatment Devices Regeneration" screen.

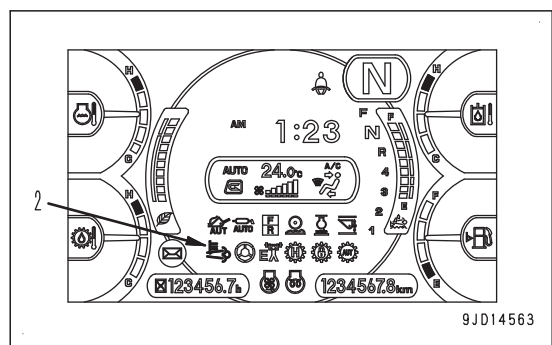
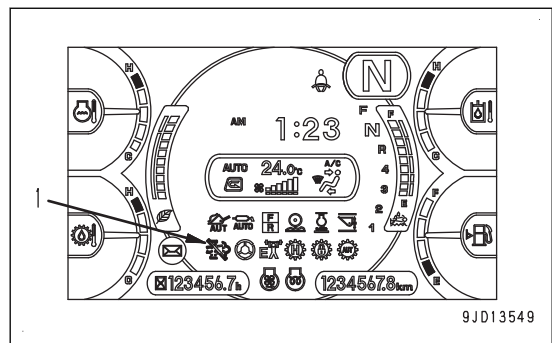


3. Select Regeneration Disable and press ENTER switch. The regeneration function is disabled and the regeneration is not performed.



REMARK

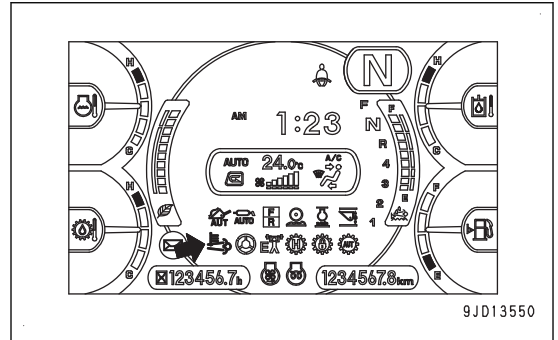
- When the regeneration is disabled, aftertreatment devices regeneration disable pilot lamp (1) is displayed with hatch on the standard screen.
- The setting of the regeneration disable is canceled by turning starting switch to OFF position. When the automatic regeneration needs to be kept disabled, perform the above procedure each time you start the engine.
- During the regeneration to protect the system, even if the regeneration disable is set, aftertreatment devices regeneration pilot lamp (2) may light up, but this does not indicate abnormality. Also, during the regeneration to protect the system, the regeneration disable cannot be operated.
- When the regeneration is performed to protect the system, the exhaust temperature is lower than that of when the regeneration is performed to burn soot, and is almost the same level as the normal exhaust gas temperature.



WHILE REGENERATION IS BEING PERFORMED: STOPPING REGENERATION

(When the aftertreatment devices regeneration display is lit on the standard screen)

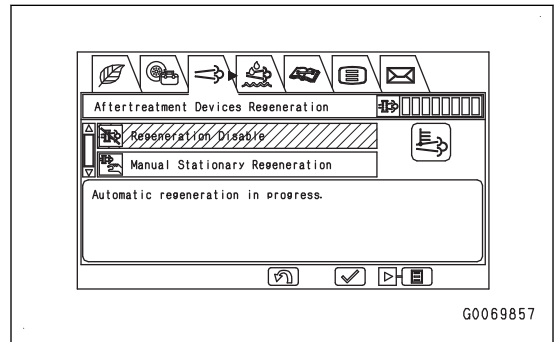
1. When the menu switch is pressed on the standard screen, "Aftertreatment Devices Regeneration" screen is displayed.



2. Press ENTER switch after selecting Regeneration Disable, and then the regeneration stops.

REMARK

The regeneration for protection of the system in cold weather may not be stopped, but this is not a failure.

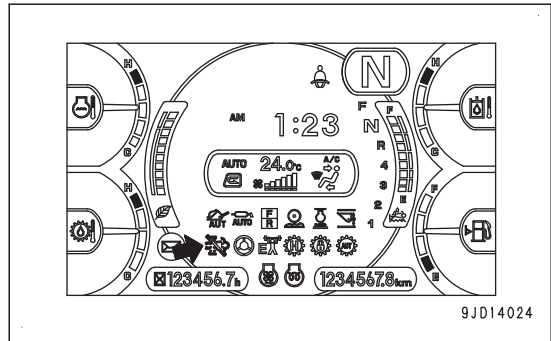


PROCEDURE FOR CANCEL OF AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING

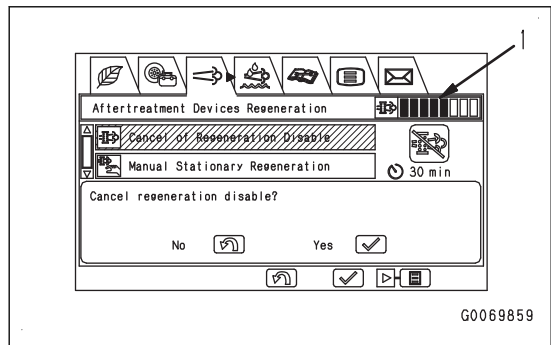
⚠ CAUTION

When canceling the regeneration disable, move the machine to a safe place and check that there is no person or combustible matter around the machine, and start the cancel operation.

- When the menu switch is pressed on the standard screen, "Aftertreatment Devices Regeneration" screen is displayed.
(If "Aftertreatment Devices Regeneration" screen is not displayed, display it by pressing the menu switch several times.)



- Select "Cancel of Regeneration Disable" and press ENTER switch, and the regeneration disable is canceled.
If soot accumulation level (1) lights up 3 or more, the regeneration may be started automatically.



REMARK

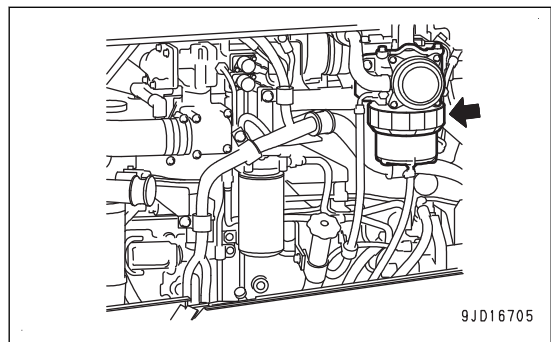
- When canceling the regeneration disable, release the accelerator pedal, set the directional lever in NEUTRAL position (N), set the parking brake switch to "ON" position, then cancel the regeneration disable.
- The regeneration disable setting is also canceled by turning the starting switch to OFF position to stop the engine.

KOMATSU CLOSED CRANKCASE VENTILATION (KCCV)

KCCV is a device to clean the gas discharged from the engine crankcase and return it to the engine air intake system.

NOTICE

- The filter element needs to be replaced every 2000 hours. For details of the replacement procedure, see "METHOD FOR REPLACING KCCV FILTER ELEMENT (4-78)".
- Do not operate the engine without the KCCV filter element or use a filter element other than the Komatsu genuine one.
If this is ignored, the engine sucks oil and foreign material which can cause a trouble.
Always install Komatsu genuine KCCV filter element.
- The filter element cannot be flushed. It is degraded in performance and can cause an engine trouble, even if it is cleaned.
Never reuse the element.



HANDLE UREA SCR SYSTEM WARNING

Urea SCR system is a device which converts toxic nitrogen oxides (NOx) in the exhaust gas into harmless nitrogen and water. By spraying 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.

The Komatsu Urea SCR System continuously monitors its operation conditions and stores information on inappropriate operations including malfunctions. The information is used for system diagnostics and also for Inducement required by the authorities on engine systems that use Urea SCR systems. Inducement is intended for the operator to take prompt actions to maintain and correct inappropriate behaviors of Urea SCR systems by utilizing visible and audible alerts, and engine power derate in addition. Alerts in Inducement of the Komatsu Urea SCR System progresses step by step starting from visual indications on the machine monitor and audible sounds to engine power derate to avoid getting into unsafe conditions.

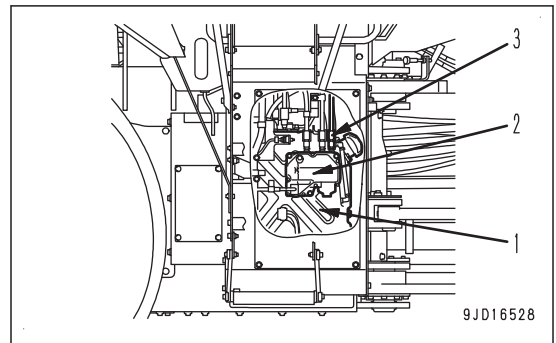
The Komatsu Urea System also monitors recurrences of abnormalities of the system. Inducement in the recurrences is activated when another abnormality occurs within 40 hours after the first abnormality is fixed.

The Komatsu's Urea is composed of two major systems, which are the DEF system and the SCR catalyst Ass'y.

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 Ass'y is indicated by (5).

In the event that indications of potential degradation of nitrogen oxides conversion efficiency are detected, the active regeneration is triggered to rejuvenate Urea SCR system even if the amount of soot accumulated in the KDPF has not reached to the regeneration thresholds.

For details of Aftertreatment Devices Regeneration, see "HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-143)".

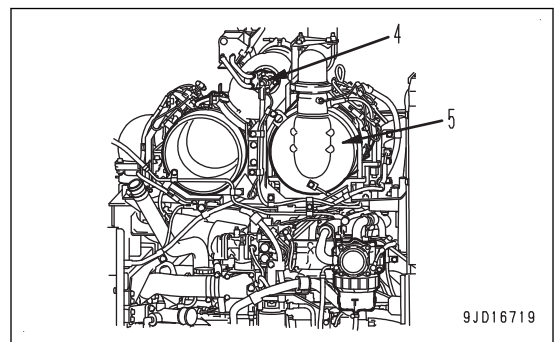


! WARNING

Fill ONLY DEF into DEF tank. Foreign material in the DEF system or urea deposits caused by evaporation may hinder operation of the devices.

NOTICE

- **Do not disassemble any devices of the DEF System other than the filter for change. Do not modify any devices of the DEF System.**
- **Paint may cause deterioration of the devices. When painting the surrounding areas, take care not to get any paint on the injector and the supply pump.**
- **Always use DEF that conforms to the quality standard. If any additional additive agents or water is mixed in DEF and that mixture is used, the devices will not function properly, and conformance to the exhaust gas regulations will be lost. In addition, it may cause failures in the engine system. If DEF out of the standard is filled or used by mistake, contact 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 will still be in operation for several minutes to purge any DEF in the lines, the injector and the supply pump back to the DEF tank. It does not indicate any abnormality. When DEF has been returned to the tank, the devices stop.

Do not turn OFF the battery disconnect switch while the devices are still in operation. When the devices complete their shutdown process, the system operating lamp will go out, and the battery disconnect switch may be disconnected.

About the operation in cold weather

DEF freezes at $-11\text{ }^{\circ}\text{C}$ {12.2 °F}.

Urea SCR system is equipped with a heating system to thaw frozen DEF once it is frozen, for example, during parking and to prevent DEF from freezing during operation.

In case DEF freezes during parking, once the engine starts running the heating system automatically starts providing heat to thaw frozen DEF. The pump and the injector start working only after a proper amount of DEF is thawed. This may be noticed as a delay in the start of functioning of the pump and the injector.

The heating system is also activated automatically during operation to prevent DEF from freezing whenever the ambient temperature drops below a certain threshold where DEF in the system may freeze. In the event that the ambient temperature drops further than a temperature where the heating system is capable of maintaining fluidity of DEF, the DEF system automatically starts purging the remaining DEF back to the tank and stops pumping and injection while heating continues. Once the ambient temperature rises above a temperature where DEF system becomes functional, it resumes operation automatically.

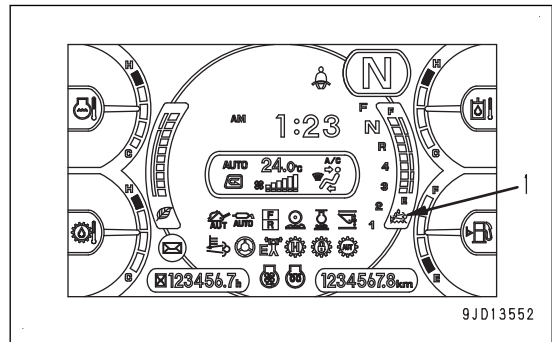
Short duration of white plume given off from the tail pipe may be visible at and shortly after engine start-up in cold weather, but this is not malfunction.

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 audible alert starts, and the Action level is displayed, and Inducement strategy is activated. Inducement strategy includes engine output deration, speed limitation, or other warning actions intend to prompt the operator to maintain or repair SCR system. The Inducement strategy progressed in 5 levels from “Warning”, “Escalated Warning”, “Mild inducement”, “Severe Inducement” and “Final Inducement”. The DEF level caution lamp (1) on the machine monitor will light up, audible alert will start, then Action level will be displayed on the machine monitor, and engine power will be derated in steps.



In Action Level “L03 (Mild Inducement)” and “L04 (Severe Inducement and Final Inducement)” engine power will be derated. When Action Level “L03” or “L04” is displayed, move the machine to a safe place and add DEF.

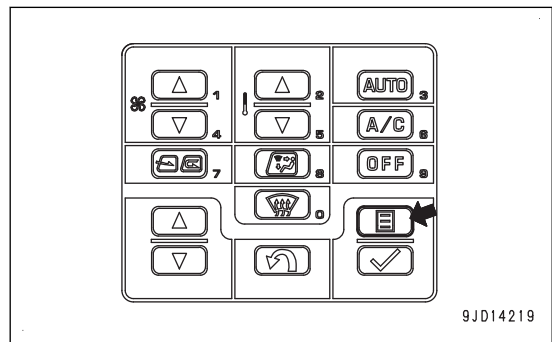
If operation is continued further without adding DEF at Severe Inducement, engine speed will be fixed at low idle. (Final Inducement)

The content of the warning can be checked on the “SCR Information” screen of the user menu.

Perform the following procedure.

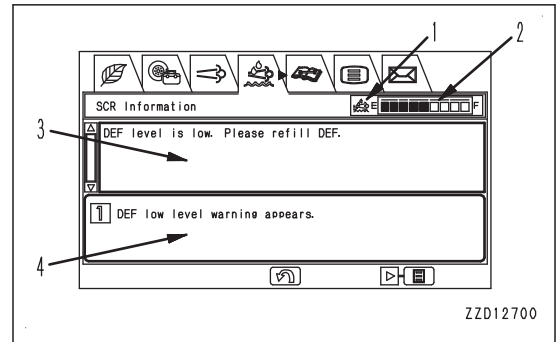
Press the menu switch on the standard screen to display the “SCR Information” screen of the user menu.

After a lapse of 3 seconds to stop the machine, “SCR Information” screen is displayed.

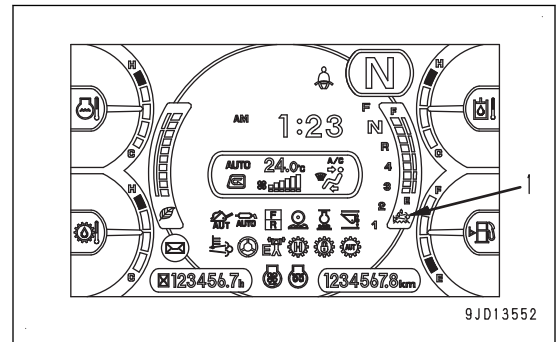


“SCR Information” screen displays the DEF level caution lamp (1), the DEF level gauge (2), information on the Urea SCR System condition (3), and the current status of Inducement (4).

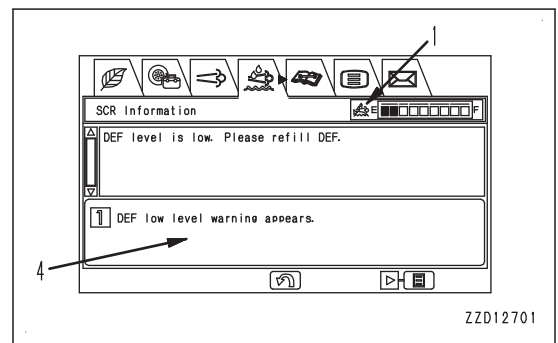
If Inducement starts, stop the machine in a safe place and add DEF.



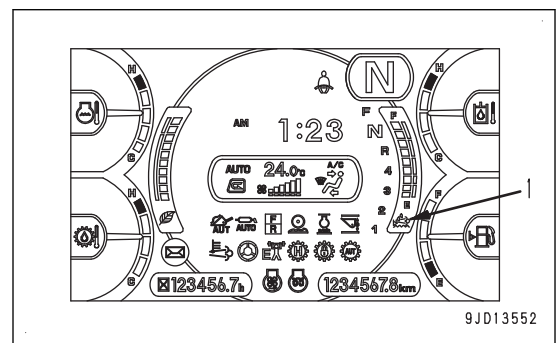
- Warning:
 - 2 gradations of the DEF level gauge light up in the red range.
 - The DEF level caution lamp (1) lights up in red.
 - No audible alert.
 - No Action level is displayed.
 - Press the menu switch to display the “SCR Information” screen.



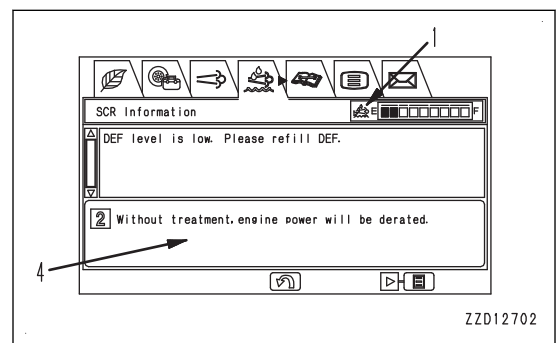
Inducement status (4): 1 “DEF low level warning appears.”
Add DEF to the DEF tank immediately.



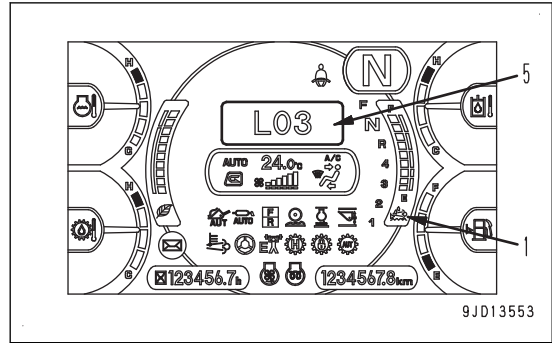
- Escalated Warning:
 - The audible alert sounds in “Intermittent alarm”.
 - 2 gradations of the DEF level gauge light up in the red range.
 - DEF level caution lamp (1) lights up in red.
 - No Action level is displayed.
 - Press the menu switch to display the “SCR Information” screen.



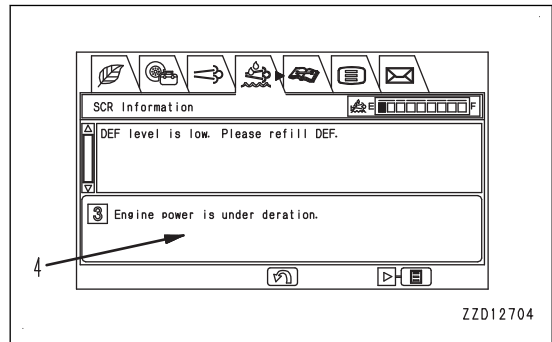
Inducement status (4): 2 “Without treatment, engine power will be derated.”
Add DEF to the DEF tank immediately.



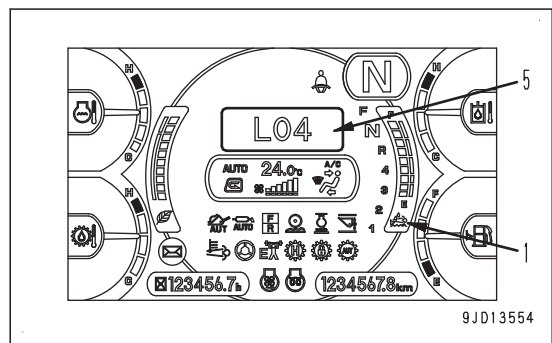
- Mild Inducement:**
 The audible alert sounds in “Intermittent alarm”.
 1 gradation of the DEF level gauge light up in red.
 The DEF level caution lamp (1) lights up in red.
 Action Level “L03” is displayed in red (5).
 Press the menu switch to display the “SCR Information” screen.



Inducement status (4): 3 “Engine power is under deration.”
 Add DEF to the DEF tank immediately.

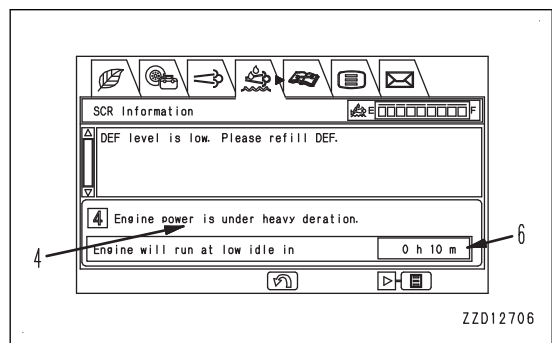


- Severe Inducement:**
 The audible alert sounds in “Continuous alarm”.
 No gradation of the DEF level gauge lights up.
 The DEF level caution lamp (1) lights up in red.
 The Action level “L04” is displayed in red (5).
 Press the menu switch to display the “SCR Information” screen.
 When all gradations of the DEF level gauge go off. DEF re-filling amount is approximately 26.5 l {7 U.S.Gal} to fill up the DEF tank.



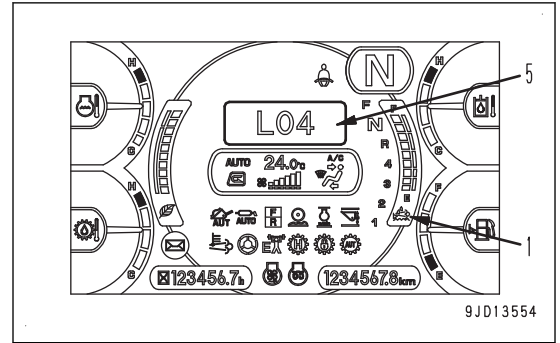
Inducement status (4): 4 “Engine power is under heavy deration.”

The remaining time (Hour and minute) to the Final Inducement is displayed in the column (6) of the “SCR Information” screen. If no DEF is added during the “Severe Inducement”, Inducement advances to “Final Inducement” within 1 hour. At “Final Inducement”, engine speed is fixed at low idle.

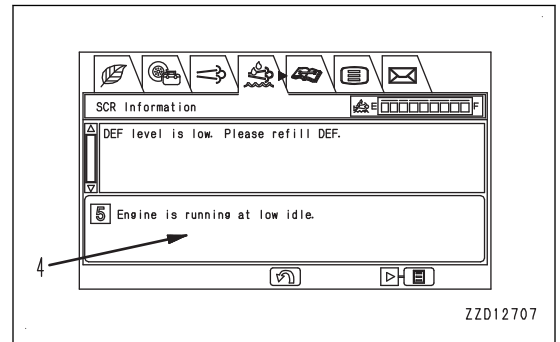


Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” and relieves back temporarily to the power deration of the “Mild Inducement”. The operator can restore engine power through the machine monitor. For the engine power restoration procedure, refer to the section of “Temporary Restoration from Inducement” in this manual. Once in “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe place and add DEF.

- Final Inducement:
 1 hour after "Severe Inducement" starts, advancing to "Final Inducement".
 The audible alert sounds in "Continuous alarm".
 No gradation of the DEF level gauge light up.
 The DEF level caution lamp (1) lights up in red.
 Action level "L04" is displayed in red (5).
 Press the menu switch to display the "SCR Information" screen.



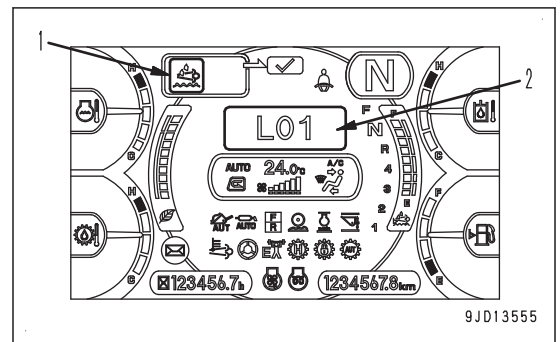
Inducement status (4): 5 "Engine is running at low idle."
 Engine speed is fixed at low idle to disable practical machine operation.
 Add DEF to the DEF tank immediately.
 In case the system does not come out of Inducement even if DEF is added in the tank, contact your Komatsu Distributor.



Inducement strategy when abnormalities are detected in the Urea SCR System devices (Except abnormalities in the KDPF system)

If any abnormality is detected in the DEF quality or in the Urea SCR system, the Inducement strategy is activated.

The inducement strategy progresses in 5 levels, "Warning", "Escalated Warning", "Mild Inducement", "Severe Inducement" and "Final Inducement". The Inducement strategy includes visual alert by the DEF system caution lamp (1), and Action Level displayed on the machine monitor (2), and the audible alert by a buzzer and stepwise engine power deration that advances to speed limitation to low idle. Engine power deration starts with Action Level "L03 (Mild Inducement)" and advances to further deration when "L04 (Severe Inducement and Final Inducement)" is displayed. Once the system advances to "Final Inducement", the engine speed is fixed to low idle. If "L03" is displayed, move the machine to a safe place and contact your Komatsu distributor.

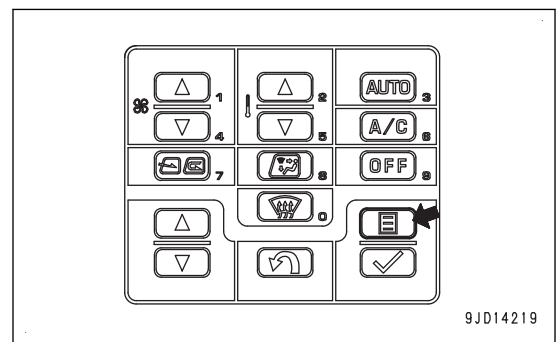


The content of the warning can be checked on the "SCR Information" screen of the user menu.

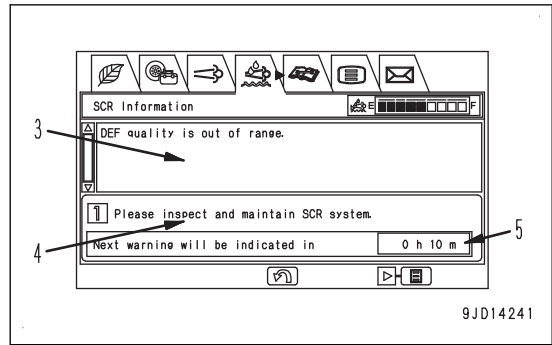
Perform the following procedure.

Press the menu switch on the standard screen to display the "SCR Information" screen of the user menu.

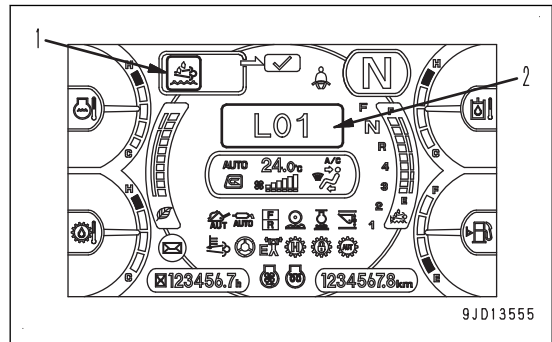
After a lapse of 3 seconds to stop the machine, "SCR Information" screen is displayed.



“SCR Information” screen displays 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).



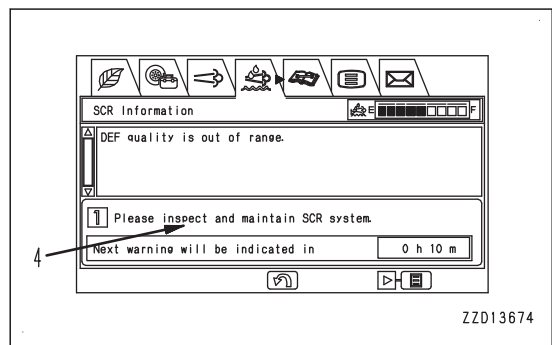
- Warning:
 - No audible alert.
 - The DEF system caution lamp (1) lights up in yellow.
 - Note: Action Level “L01” once shows up in yellow on the machine monitor (2) for two seconds and goes out.
 - Press the menu switch to display the “SCR Information” screen.



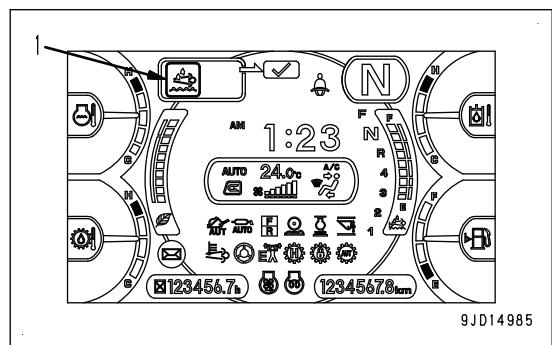
“SCR Information” screen message (4): 1 “Please inspect and maintain SCR system.”

Move the machine to the safe place and contact your Komatsu Distributor.

If operation continues for 1 hour after “Warning” started without taking any actions instructed by the Action Level table, Inducement advances to “Escalated Warning”.



- Escalated Warning:
 - The audible alert sounds in “Intermittent alarm”.
 - The DEF system caution lamp (1) lights up in yellow.
 - If operation continues for 1 hour after “Warning” started without taking any actions instructed by the Action Level table, Inducement advances to “Escalated Warning”.
 - Press the menu switch to display the “SCR Information” screen.

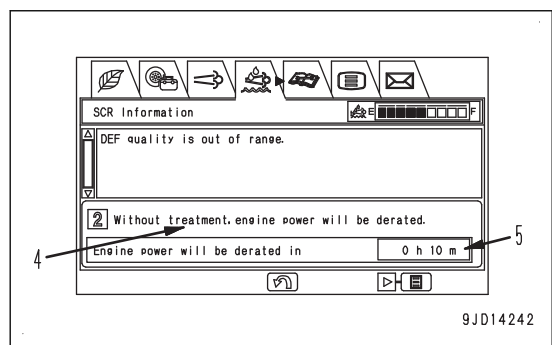


“SCR Information” screen message (4): 2 “Without treatment, engine power will be derated.”

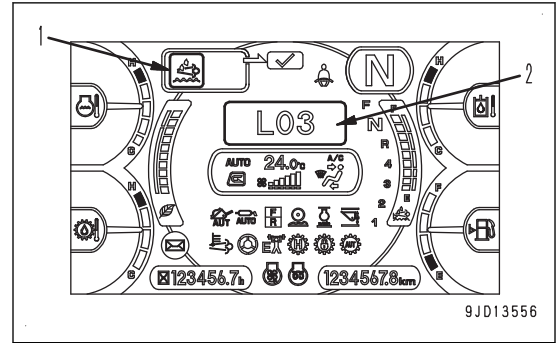
Move the machine to the safe place and contact your Komatsu Distributor.

The duration of “Escalated Warning” is 1 hour. The remaining time (Minutes) to “Mild Inducement” is displayed in the column (5) of the “SCR Information” screen.

In “Mild Inducement”, engine performance will be derated.

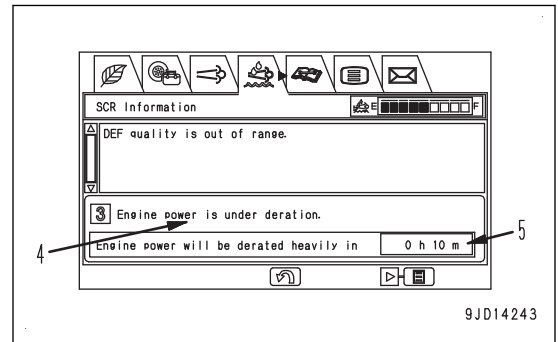


- Mild Inducement:**
 The audible alert sounds in “Intermittent alarm”.
 The DEF system caution lamp (1) lights up in red.
 Action level “L03” lights up in red at action level display (2) and stays on.
 Press the menu switch to display the “SCR Information” screen.

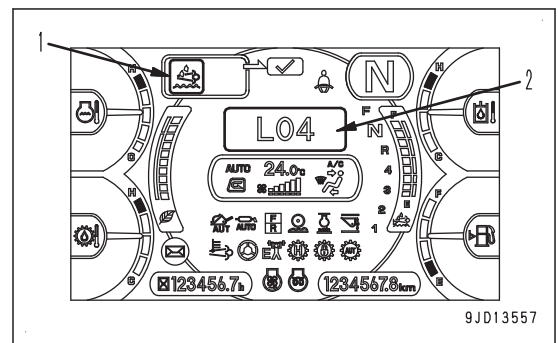


“SCR Information” screen message (4): 3 “Engine power is under deration.”

Due to the engine power deration, capability of the machine will be limited.
 Move the machine to the safe place and contact your Komatsu Distributor.
 The duration of “Mild Inducement” is 1 hour. The remaining time (Minutes) to “Severe Inducement” is displayed in the column (5) of the “SCR Information” screen.
 In “Severe Inducement”, engine power will be derated further.

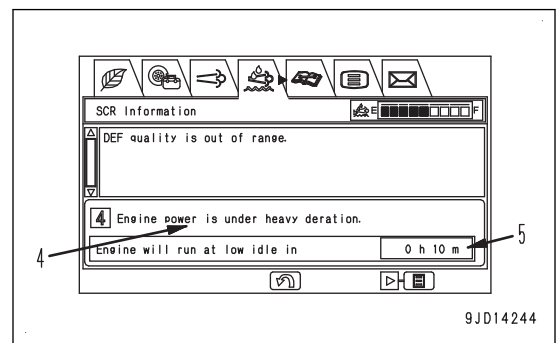


- Severe Inducement:**
 The audible alert sounds in “Continuous alarm”.
 The DEF system caution lamp (1) lights up in red.
 Action level “L04” lights up in red (2).
 Press the menu switch to display the “SCR Information” screen.



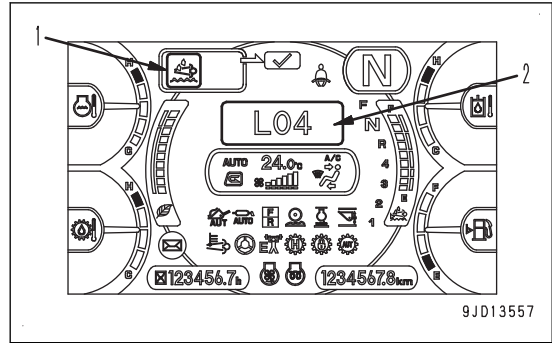
“SCR Information” screen message (4): 4 “Engine power is under heavy deration.”

Due to the further deration of engine power, capability the machine will be limited further.
 Move the machine to the safe place and contact your Komatsu Distributor.
 The duration of “Severe Inducement” is 1 hour. The remaining time (Minutes) to “Final Inducement” is displayed in the column (5) of the “SCR Information” screen.
 In “Final Inducement”, engine speed will be fixed at low idle.



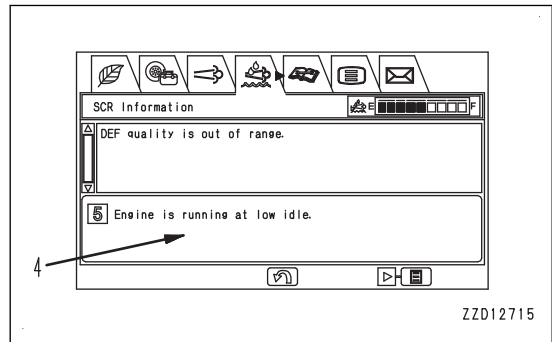
Engine power can be restored temporarily from power derate. If Inducement advances to “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe place and contact your Komatsu distributor. This engine power restoration 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, refer to the section of “Temporary Restoration from Inducement” in this manual.

- Final Inducement:
 The audible alert sounds in "Continuous alarm".
 The DEF system caution lamp (1) lights up in red.
 Action level "L04" lights up in red (2) and stays on.
 Press the menu switch to display the "SCR Information" screen.



"SCR Information" screen message (4): 5 "Engine is running at low idle."

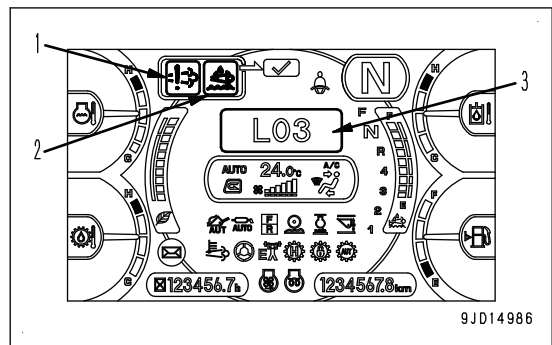
Engine speed is fixed at low idle to disable practical machine operation.
 Move the machine to a safe place and contact your Komatsu Distributor.



Inducement strategy when abnormality is found in the KDPF System by the Urea SCR system

If any abnormality is detected in the KDPF System through the Urea SCR system, the Inducement strategy is activated.

The inducement strategy progresses in 5 levels, "Warning", "Escalated Warning", "Mild Inducement", "Severe Inducement" and "Final Inducement". The Inducement strategy includes visual alert by the KDPF System caution lamp (1), DEF system caution lamp (2), and Action Level displayed on the machine monitor (3), audible alert by a buzzer and stepwise engine power deration that advances to speed limitation to low idle. Engine power deration starts with Action Level "L03 (Warning, Escalated warning, Mild Inducement)" and advances to further deration when "L04 (Severe Inducement and Final Inducement)" is displayed. Once the system advances to "Final Inducement", the engine speed is fixed to low idle. If "L03" is displayed, move the machine to a safe place and contact your Komatsu distributor.

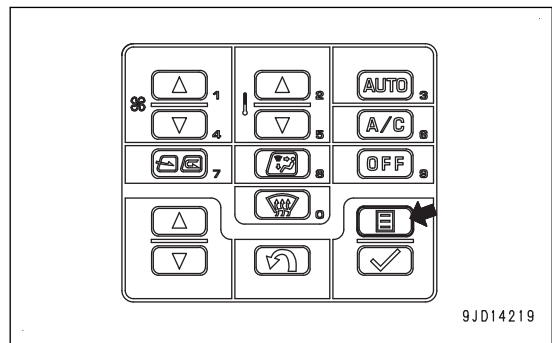


The content of the warning can be checked on the "SCR Information" screen of the user menu.

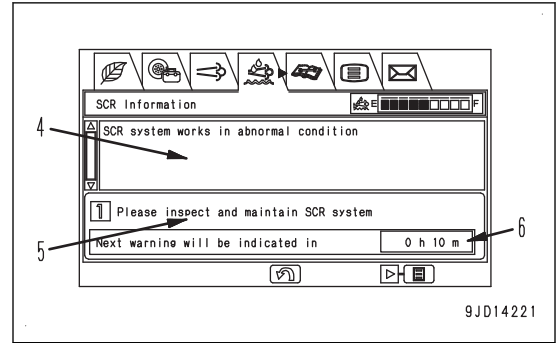
Perform the following procedure.

Press the menu switch on the standard screen to display the "SCR Information" screen of the user menu.

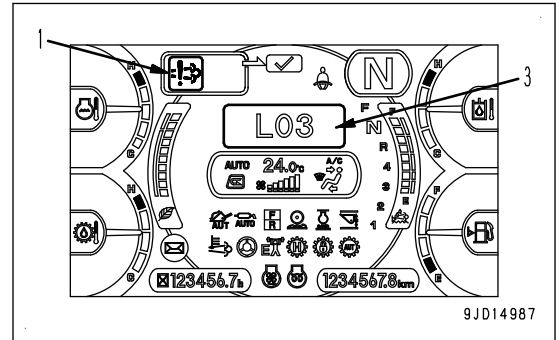
After a lapse of 3 seconds to stop the machine, "SCR Information" screen is displayed.



“SCR Information” screen displays 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).

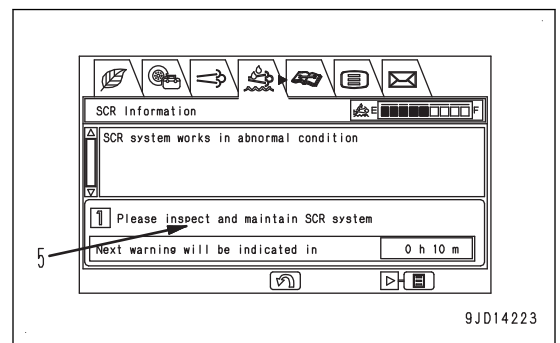


- Warning:
 - The audible alert sounds in “Intermittent alarm”.
 - The KDPF system caution lamp (1) lights up in red.
 - The action level “L03” lights up in red at action level display (3).
 - Press the menu switch to display the “SCR Information” screen.

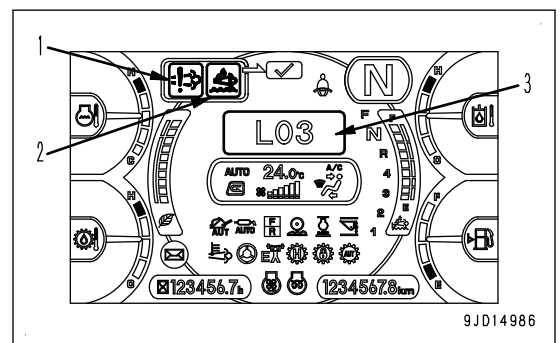


“SCR Information” screen message (5): 1 “Please inspect and maintain SCR system.”

Engine power is derated.
 Move the machine to the safe place and contact your Komatsu Distributor.
 If operation continues for 1 hour after “Warning” started without taking any actions instructed by the Action Level table, Inducement advances to “Escalated Warning”.

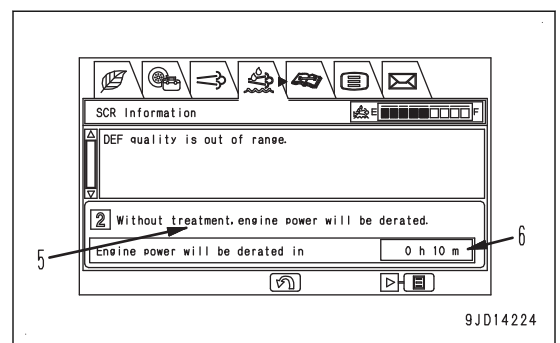


- Escalated Warning:
 - The audible alert sounds in “Intermittent alarm”.
 - The KDPF system caution lamp (1) lights up in red.
 - The DEF system caution lamp (2) lights up in yellow.
 - The action level “L03” lights up in red at action level display (3).
 - Press the menu switch to display the “SCR Information” screen.

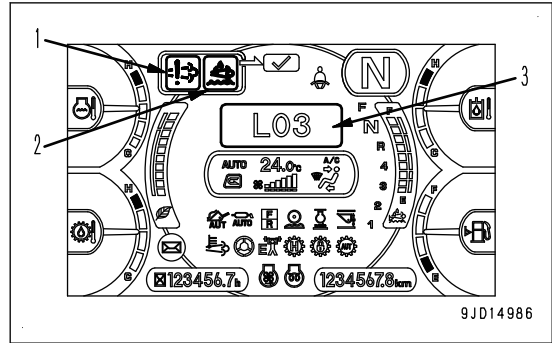


“SCR Information” screen message (5): 2 “Without treatment, engine power will be derated.”

Move the machine to the safe place and contact your Komatsu Distributor.
 The duration time of “Escalated Warning” is 1 hour. The remaining time (Minutes) to “Mild Inducement” is displayed in the column (6) of “SCR Information” screen.
 In “Mild Inducement”, engine performance will be derated.

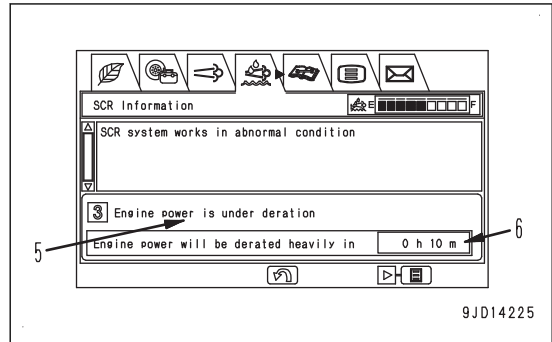


- Mild Inducement:**
 The audible alert sounds in “Intermittent alarm”.
 The KDPF system caution lamp (1) lights up in red.
 DEF system caution lamp (2) lights up in red.
 The action level “L03” lights up in red at action level display (3).
 Press the menu switch to display the “SCR Information” screen.

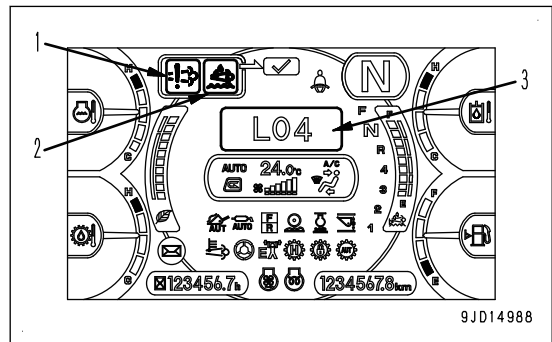


“SCR Information” screen message (5): 3 “Engine power is under deration.”

Due to 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 displayed in the column (6) of “SCR Information” screen.
 In “Severe Inducement”, engine power will be derated further.
 Move the machine to the safe place and contact your Komatsu Distributor.

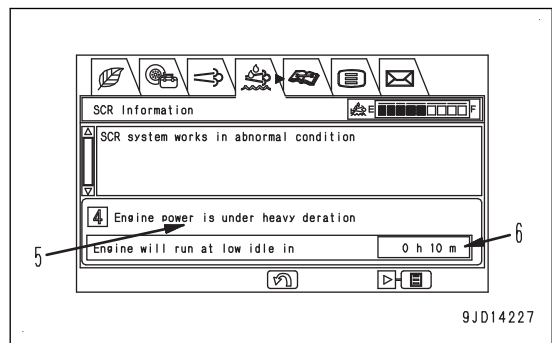


- Severe Inducement:**
 The audible alert sounds in “Continuous alarm”.
 The KDPF system caution lamp (1) lights up in red.
 DEF system caution lamp (2) lights up in red.
 Action level “L04” lights up in red at action level display (3).
 Press the menu switch to display the “SCR Information” screen.



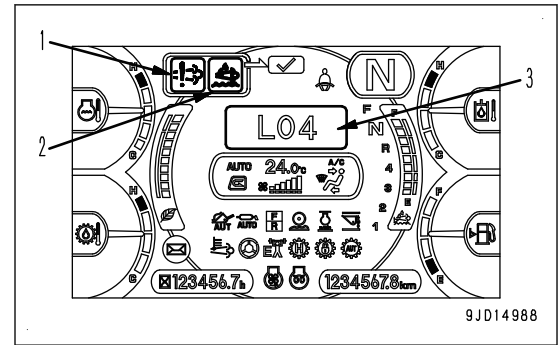
“SCR Information” screen message (5): 4 “Engine power is under heavy deration.”

Due to the further deration of engine power, capability the machine will be limited further.
 The duration time of “Severe Inducement” is 1 hour. The remaining time (Minutes) “Final Inducement” is displayed 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, refer to the section of “Temporary Restoration from Inducement” in this manual. If Inducement advances to “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe place and contact your Komatsu distributor.

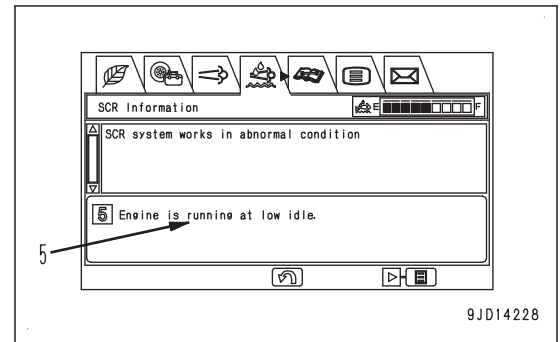
- Final Inducement:
The audible alert sounds in “Continuous alarm”.
The KDPF system caution lamp (1) lights up in red.
The DEF system caution lamp (2) lights up in red.
Action level “L04” lights up in red (3) at action level display.
Press the menu switch to display the “SCR Information” screen.



“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 a safe place and contact your Komatsu Distributor.



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 advances to “Severe Inducement”, engine power is derated heavily. This may cause difficulties of moving the machine to a safe place 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. Note that “Temporary Restoration from Inducement” does not regain full engine power.

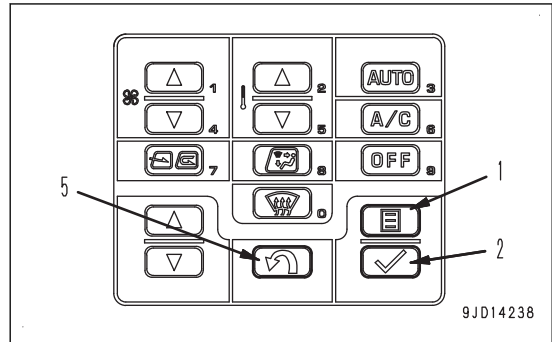
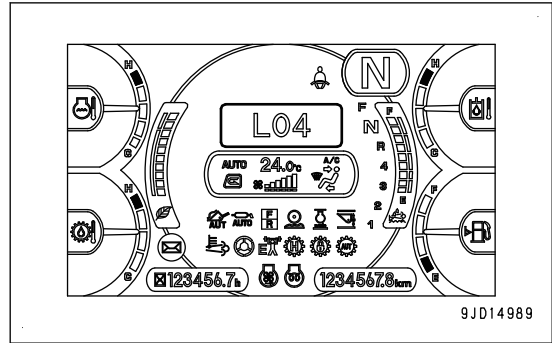
“Temporary Restoration from Inducement” can be activated only when the Urea SCR system is in “Severe Inducement”. The maximum duration is limited to 30 minutes in each restoration operation, and 3 operations are allowed, but “Temporary Restoration from Inducement” is turned off whenever the system advances to “Final Inducement” even if either 30 minutes or 3 operations are not used up.

All the abnormalities of the Urea SCR system need to be corrected to regain another restoration capability.

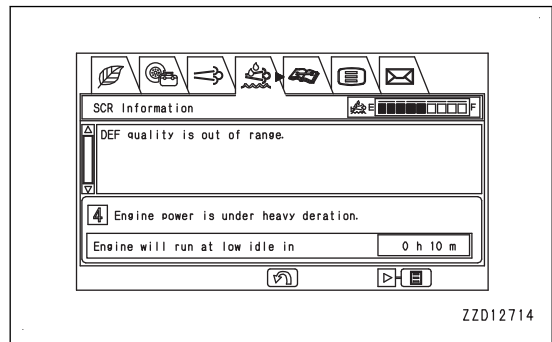
If all the abnormalities of the Urea SCR system are not corrected when the system is in “Severe Inducement”, the system advances to “Final Inducement” in 1 hour after “Severe Inducement” started and engine speed will be fixed to low idle to disable practical machine operation. If the system advances to “Severe Inducement”, utilize “Temporary Restoration from Inducement” immediately.

Procedure to activate “Temporary Restoration from Inducement”.

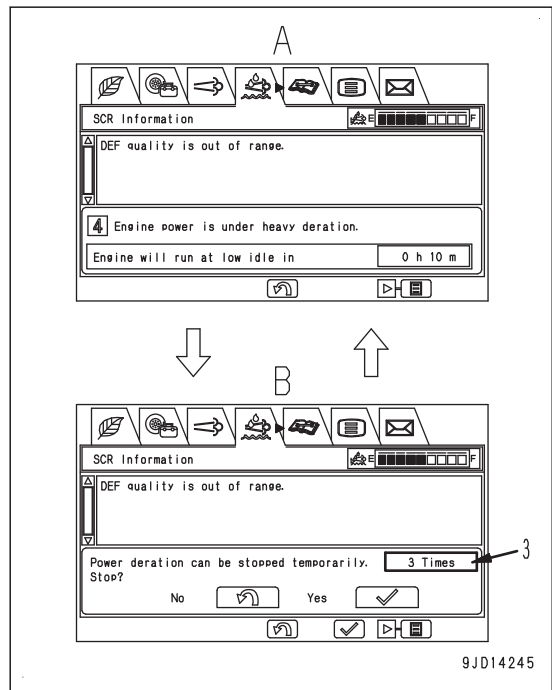
1. Press the menu switch (1) to display the "SCR Information" screen when the Standard screen is on, only when the Urea SCR system is in "Severe Inducement".



2. Press the enter switch (2) to display 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 alternate every 15 seconds as shown in the graphics A and B.



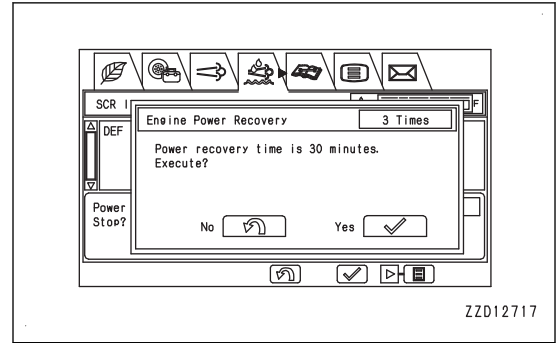
3. Press the enter switch (2) while the pop-up menu screen B is displayed.
The "Engine power Recovery" window will be displayed.
If the enter switch (2) is not pressed for 30 seconds, "Standard Screen" will be displayed, and start again by pressing the menu switch (1).
The remaining number of operations of Temporary Restoration from inducement is displayed in the column (3) of the pop-up menu window B.



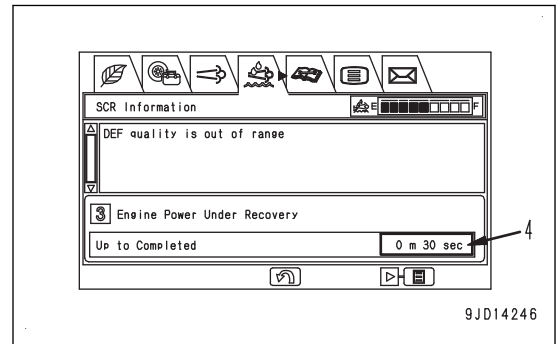
- Press the enter switch (2) while the “Engine power Recovery” window is displayed.

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”. Note that whenever Inducement advances to “Final Inducement” Temporary Restoration from Inducement will be turned off.

The remaining time (minutes/seconds) of “Temporary Restoration from Inducement” is displayed in the column (4) on the “SCR Information” screen.



ZZD12717



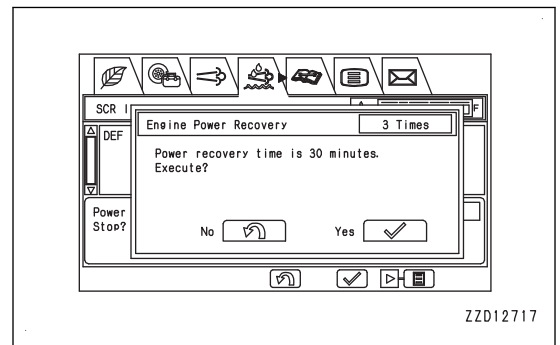
9JD14246

If it is decided NOT to activate “Temporary Restoration from Inducement” after having progressed to the “Engine Power Recovery” window, follow the steps explained in this section.

To deactivate “Temporary Restoration from Inducement” function.

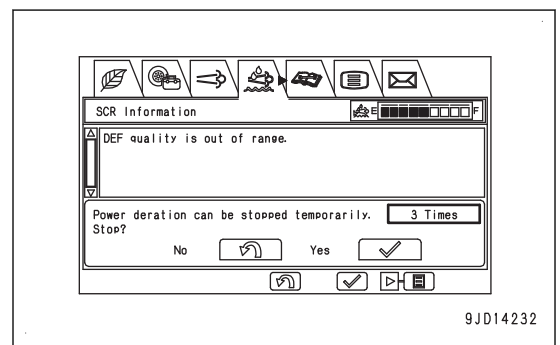
- Press the return switch (5) while the “Engine Power Recovery” window is displayed.

This procedure is split from procedure 4 in “Temporary Restoration from Inducement”.



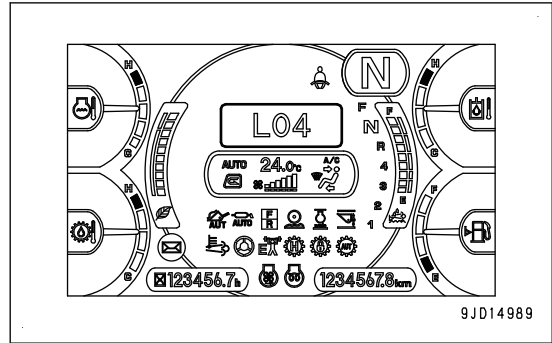
ZZD12717

“SCR Information” screen is displayed.



9JD14232

- 2. Move the machine to display the to display “Standard Screen”.
“Temporary Restoration from Inducement” is deactivated.



Inducement Strategy for abnormalities recurrences within 40 hours

The Urea SCR system continuously monitors its operation conditions and stores information on inappropriate operations including malfunctions. The stored information is utilized to monitor recurrences of abnormalities, “Abnormality Recurrence Counter”. “Abnormality Recurrence Counter” is required by the U.S. Environmental Protection Agency. The recurrence monitoring spans 40 hours and it monitors the abnormalities that trigger Inducement other than the amount of DEF in the tank.

If another abnormality/abnormalities is detected within 40 hours after the previous abnormalities were corrected, regardless of the level of the previous Inducement and whether the new abnormality/abnormalities is 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, utilize “Temporary Restoration from Inducement” and move the machine to a safe place, and contact your Komatsu distributor.

The duration of “Severe Inducement” in the recurrence is limited to 30 minutes. If the abnormalities are not corrected while Inducement is in “Severe Inducement (30 minutes)”, Inducement will advance to “Final Inducement” and engine speed will be fixed to low idle to disable practical machine operation.

Note that although maximum duration of the power restoration is 30 minutes and 3 operations are possible, whenever Inducement advances to “Final Inducement”, “Temporary Restoration from Inducement” will be turned off and its function will be held off till all the abnormalities are corrected.

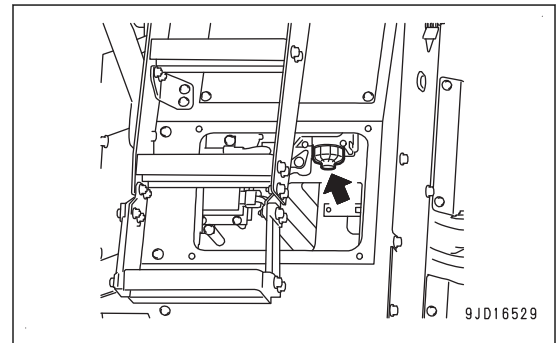
To activate “Temporary Restoration from Inducement”, refer to the “Temporary Restoration from Inducement” section in this manual.

DEF FILTER

DEF filter is an filter element to clean DEF sucked from the DEF tank by DEF pump, and to supply it to DEF injector.

NOTICE

- The DEF filter element needs to be replaced every 2000 hours. For details of the replacement procedure, see “METHOD FOR REPLACING DEF FILTER (4-81)”.
- If the machine is operated without DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials may enter into DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without DEF filter attached, nor use the filter other than Komatsu genuine parts.
- DEF filter cannot be flushed. Flushing or regenerating of it will degrade the performance of DEF filter, and will contaminate DEF pump and DEF injector which will cause the failure of the machine. Never reuse the DEF filter.



KOMTRAX

WARNING

- **Never disassemble, repair, modify, or move the wireless communication terminal, antenna, or cables. This may cause failure or fire on the wireless equipment or the machine itself.**
- **Near the blasting jobsite, there may be a danger of unexpected explosion due to use of the wireless equipment and resulting serious personal injury or death.**
If you have to operate the machine within 12 m {within 39 ft 4 in} from the remote-controlled blasting device, the power supply cable of the wireless communication device must be disconnected in advance.

KOMTRAX is a vehicle management system that remotely manages the machines equipped with the KOMTRAX device by using satellite communication or portable radio communication.

The GPS (Global Positioning System), receiver, and communication system are equipped in the vehicle management system.

The machine information such as the machine maintenance, maintenance management, operating situation management, and machine location management is gathered from the inside network of the machine. It can be useful for you to perform the machine management by yourself. Your Komatsu distributor uses the above machine information for supply of service to the customers, improvement of our products and service, etc.

The type of information which is sent from the machine may vary depending on the machine. For the radio station establishment of KOMTRAX, consult your Komatsu distributor.

POWER SUPPLY FOR KOMTRAX

- Even when the starting switch 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 storing the machine for a long period, see "PRECAUTIONS FOR LONG-TERM STORAGE (3-272)".
- When using the battery disconnect switch, turn the starting switch to OFF position and, after checking that the system operating lamp is not lit, set the battery disconnect switch key to OFF position and pull it out.
When the battery disconnect switch is turned to OFF position, it prevents the battery power from being consumed, but the functions of KOMTRAX stop at the same time.
For operation of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-139)".
- If the power supply cable of KOMTRAX system device has to be disconnected, contact your Komatsu distributor.

MACHINE OPERATIONS AND CONTROLS

CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE

METHOD FOR WALK-AROUND CHECK

Before you start the engine, walk around the machine and look at the underside of chassis for loose bolts and nuts, damage of each part, or leakage of oil, fuel, or coolant. Also check the condition of the work equipment and the hydraulic system. Also check for loose wiring, play, and accumulation of dust in areas that reach high temperature.

WARNING

Flammable materials accumulated around the exhaust pipe, aftertreatment devices, turbocharger, or other high-temperature engine parts or battery, and leakage of fuel or oil will cause the machine to catch fire.

Check fully, and if a problem is found, repair it or consult your Komatsu distributor.

If the machine inclines, make it horizontal before check.

Do the inspections and cleaning every day as follows before you start the engine for the day's work.

1. Check for damage, wear, play in work equipment, cylinders, linkage, and hoses.
Check for cracks, excessive wear, play in work equipment, cylinders, linkage, and hoses. If a problem is found, repair it.
2. Remove dirt from around the engine, battery, and radiator.
Check for dirt accumulated around the engine and radiator. Also check for flammable material (dry leaves, twigs, etc.) around the battery, aftertreatment devices, turbocharger, or other high temperature engine parts. If dirt or flammable materials are found, remove them.
3. Check around the engine for leakage of coolant, oil, and exhaust gas.
Check the engine for leakage of oil and exhaust gas, and check the cooling system for coolant leakage. If a problem is found, repair it.
4. Check the fuel line for leakage.
Check for leakage of fuel or damage to the hoses and tubes. If a problem is found, repair it.
5. Remove dirt and check DEF line for leakage.
Check for dirt accumulated around the DEF tank and clean the blue DEF tank filler cap and around it.
Check the DEF tank, pump, injector, and hoses and their connections for leakage. If a problem is found, consult your Komatsu distributor for repair.
6. Remove dirt from around the aftertreatment devices.
Check for dirt and flammable materials (dry leaves, twigs, etc.) accumulated around the aftertreatment devices. If dirt or flammable materials are found, remove them.
7. Check around the aftertreatment devices for exhaust gas leakage.
Check the pipe connecting the turbocharger to the aftertreatment devices and also connections of the after-treatment devices for leakage of exhaust gas (and deposition of soot).
If a problem is found, consult your Komatsu distributor for repair.
8. Check the KCCV piping for gas leakage and oil leakage.
Check the pipes (3 pieces) between the KCCV filter, turbocharger, oil pan, and cylinder head for ooze of oil. If a problem is found, consult your Komatsu distributor for repair.
9. Check around SCR for exhaust gas leakage.
Check the pipe between the KDPF and SCR and also the SCR connections for leakage of exhaust gas (and urea deposit). If a problem is found, consult your Komatsu distributor for repair.
10. Check the transmission case, axle, hydraulic tank, hoses, and joints for oil leakage.

Check for oil leakage. If a problem is found, repair the part where the oil leaks.

11. Check the brake line for oil leakage.

Check for leakage of oil or damage to the hoses and tubes. If a problem is found, repair the part of oil leakage.

12. Check the tires, wheels, and wheel hub bolts and nuts for damage and wear, and check the wheel hub bolts and nuts for looseness.

Check for cracks or peeling of the tires and for cracks or wear of the wheels (side ring, rim base, lock ring). If loose wheel hub bolts or hub nuts are found, retighten them. If a problem is found, repair or replace the part.

If a valve cap is lost, install a new one.

13. Check the handrails and steps for damages and check the bolts for looseness.

If damage is found, repair it. Tighten loose bolts.

14. Check the gauges and monitor for problem.

Check for problem in the gauges and monitor in the operator's cab. If a problem is found, replace the part. Clean off dirt on the surface.

REMARK

When you clean the dirt on the monitor surface, brush it off with a clean, soft and dry cloth.

For sticky dirt such as oil, remove it with glass cleaner for family use on the market (weakly acid to weakly alkaline, containing no abrasive), and then finish-wipe with a clean, soft, and dry cloth.

15. Check the rearview mirrors.

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 let the area at the rear be seen from the operator's seat.

16. Check the side under-mirror.

Check the side under-mirror that there is no problem. If it is damaged, repair it. Clean the surface of the mirror. Adjust the angle of the R.H. side under-mirror to make sure that you can see the DEF filler port from the operator's seat. Adjust the angle of the L.H. side under-mirror to the same with that of the R.H. side under-mirror.

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.

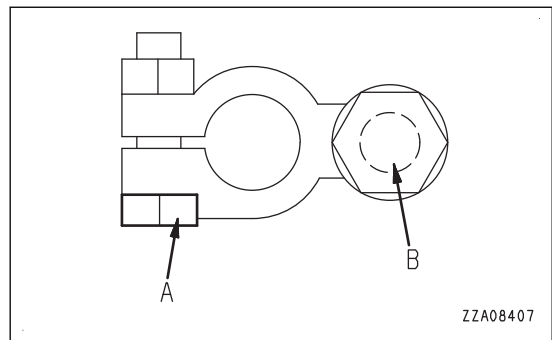
Check the mounting bolts for looseness. If loose bolts are found, retighten them.

19. Check the battery terminals for looseness.

If loose terminal is found, retighten it.

Tightening torque for part A: 5.9 to 9.8 Nm {0.6 to 1.0 kgfm, 4.3 to 7.2 lbft}

Tightening torque for part B: 11.8 to 19.6 Nm {1.2 to 2.0 kgfm, 8.7 to 14.5 lbft}

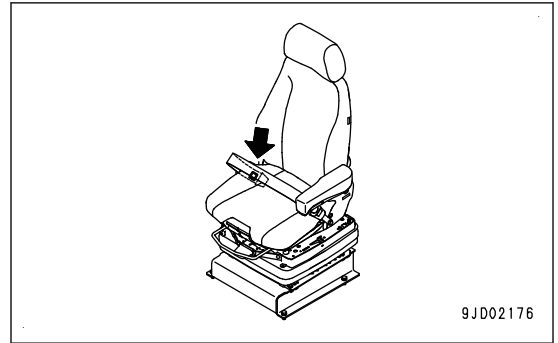


20. Check the seat belt and mounting hardware.

WARNING

Even if no problem can be seen on the appearance of the seat belt, replace it by the schedule that follows whichever date comes first.

5 years after the date of seat belt manufacture, or every 3 years after the start of actual usage.



REMARK

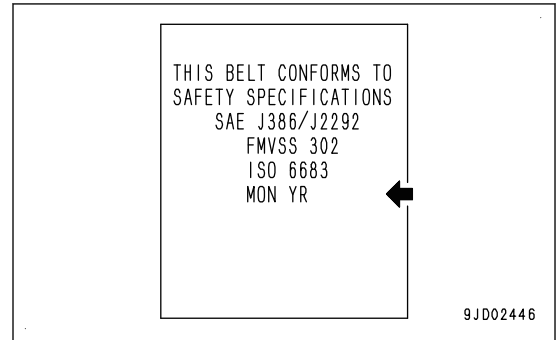
The date shown on the seat belt is the manufactured date. It is the start of the 5-year period.

The manufactured date of the seat belt is printed on the label shown by the arrow in the figure.

Check for loose bolt of the mounting hardware which is installed to the machine. Retighten loose bolts.

Tightening torque: 24.5±4.9 Nm {2.5±0.5 kgfm, 18.1±3.6 lbft}

If the appearance of the seat belt has scratches or frays and if the hardware has damage or deformation, replace the seat belt with a new one.



21. Clean the cab windows.

To have good visibility during operation, clean the cab windows.

Cleaning from the top of the fender or platform is very dangerous.

Clean with a mop etc. from the ground.

REMARK

If the steps for cab front glass cleaning (option) is installed to the machine, you can clean the cab front glass while you use the handrails and the steps for cab front glass cleaning. For details of the cleaning, see "METHOD FOR CLEANING CAB FRONT GLASS (6-12)".

22. Check the tires.

⚠ WARNING

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

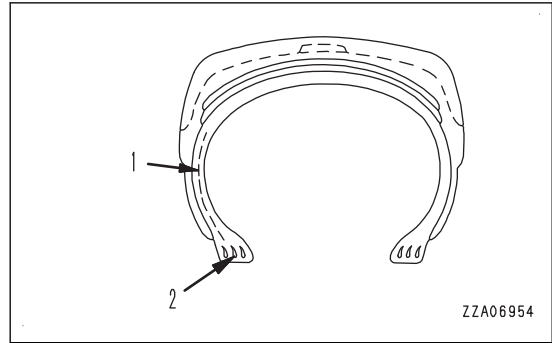
For the safety, do not use the tires that follow.

Wear:

- Tires with the tread groove depth of less than 15 % of that of a new tire
- Tires with the abnormal wear such as uneven wear or stepped-type wear

Damage:

- Tires with damage that reached cords (1), or tires with cracks in the rubber
- Tires with cut or broken cords (1)
- Tires with peeled (separation) surface
- Tires with damaged bead (2)
- Tubeless tires which air leaks, or tires which are not correctly repaired
- Tires which are deteriorated, deformed, abnormally damaged and are not usable



23. Check the wheel rims.

⚠ WARNING

Check that the rims (wheels) and rings are free from deformation, damage caused by corrosion and cracks.

Especially, fully check the side rings, lock rings and rim flanges.

If a problem is found, replace the part.

24. Check the rearview monitor.

Check the rearview monitor for abnormality. If a problem is found, consult your Komatsu distributor for repair.

METHOD FOR CHECKING BEFORE STARTING

Always check the items in this section before starting the engine each day.

METHOD FOR CHECKING WATER SEPARATOR, DRAINING WATER AND SEDIMENT

⚠ WARNING

- Immediately after the engine is stopped, all of parts are still very hot. Avoid draining water or removing the transparent cup.
- Wait for all of parts to cool down before starting the work.
- When the engine has run, high-pressure is generated in the engine fuel piping. When draining the water or removing the transparent cup, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before starting the work.
- Do not bring any open flame close.

1. Open the engine side cover on the right side of the machine.

Water separator (1) is in one piece with the fuel prefilter and located in the lower part.

2. Check for water and sediment.

It is possible to judge the water level and amount of sediment by looking through transparent cup (3).

NOTICE

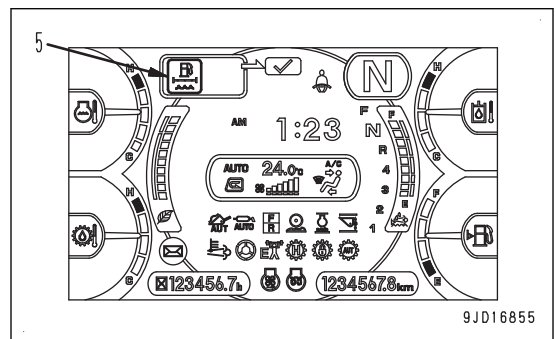
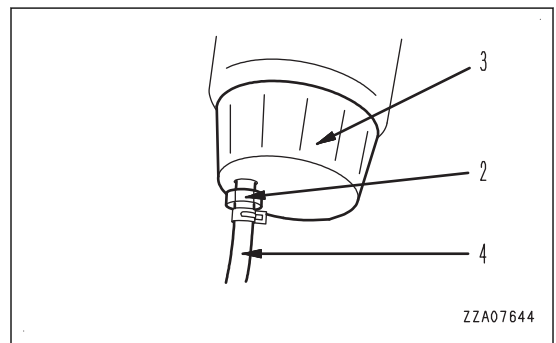
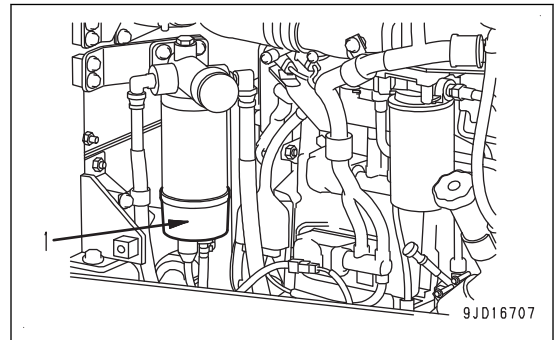
- If the water accumulated in transparent cup (3) freezes, the water separator caution lamp may not light up. After the engine is started, as the temperature around fuel prefilter (1) increases, the frozen water melts and the water separator caution lamp may suddenly light up. In cold season, even if the water separator caution lamp is not lit, drain the water frequently.
- If the water inside transparent cup (3) freezes, wait until the frozen water has melted completely, then follow the procedures to drain the water.

3. Place a container to catch the water under drain hose (4).

4. Loosen plug (2) and drain the water.

5. When fuel starts to be drained from drain hose (4), tighten plug (2) immediately to stop draining.

Tightening torque: 0.2 to 0.45 Nm {0.02 to 0.046 kgfm, 0.14 to 0.33 lbft}



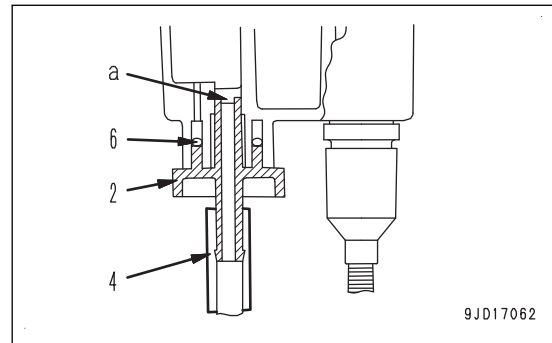
REMARK

- On this machine, a sensor is installed to detect if water accumulates in transparent cup (3). When the water separator caution lamp (5) lights up in red on the machine monitor, it indicates that water accumulates in transparent cup (3). In this case as well, use the procedure above to drain the water.
- When only the water separator caution lamp lights up, it lights up at position (5). If other caution lamps also light up at the same time, the lighting up position of the water separator caution lamp will change.

REMARK

If drain plug (2) is hard to turn, apply grease to O-ring (6) of plug (2) according to the following procedure.

- 1) Place a container under drain hose (4) to catch the drained fuel.
- 2) Loosen plug (2) and drain all the fuel and sediment through drain hose (4).
- 3) Check that nothing more comes out from drain hose (4), then remove plug (2).
- 4) Apply a suitable amount of grease to O-ring (6). At this time, take care that grease will not stick to water drain port (a) and threaded portion of the plug.
- 5) Tighten plug (2) by hand until it stops.
- 6) Remove the container for catching the drained fuel.



- If transparent cup (3) is so dirty that the inside cannot be seen, clean it when replacing the filter.
- In the case that the plug (2) has been removed during the cleaning work, apply grease to O-ring (6) and tighten with your finger until it stops.

METHOD FOR CHECKING COOLANT LEVEL, ADDING COOLANT

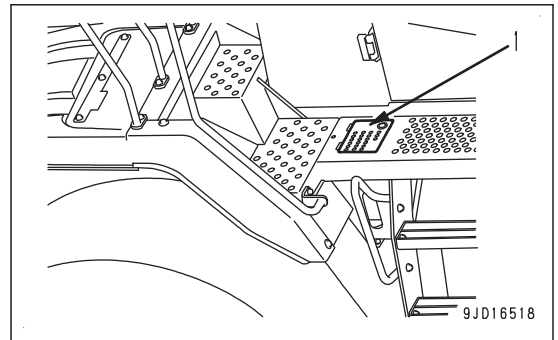
⚠ WARNING

- Do not open the radiator cap unless necessary. When checking the coolant level, check the reservoir tank when the engine is cold.
- Immediately after the engine is stopped, the coolant is at high temperature. And the pressure is still accumulated in the radiator. If the cap is removed in this condition, it is dangerous that you may get burn injury. Always wait for the temperature to go down, and turn the cap slowly to release the pressure.

⚠ CAUTION

When refilling with coolant, support your body securely by using the steps and handrails provided.

1. Open platform cover (1) on the right side 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 the coolant level is low, add coolant to FULL level through the filler port of the reservoir tank.

4. After you add coolant, tighten the cap securely.

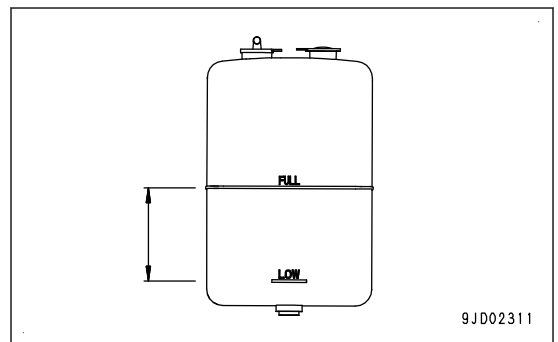
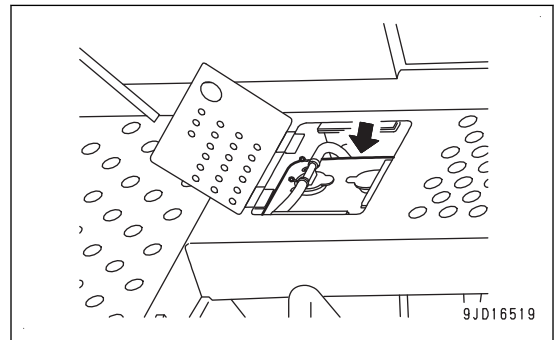
If the reservoir tank is empty, there can be coolant leakage. If a problem is found after inspection, do the repair immediately.

5. If the coolant level was continuously low, check the coolant level in the radiator.

If it is low, add coolant of the same density in radiator by the coolant density table in "METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE", 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.



6. Remove the radiator cap. (2 places)
7. Start the engine and run it at low idle for 5 minutes to bleed air. Then run it at high idle for a further 5 minutes.
8. After air is bled, tighten the radiator cap. (2 places)
9. After the coolant temperature drops, check the coolant level in the radiator and reservoir tank.

If it is low, add coolant of the same density in radiator by the coolant density table in “METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE”, 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.

METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL

⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.

1. Open the engine side cover on the right side of the machine.
2. Pull out dipstick (G) and wipe the oil off with a cloth.
3. Fully insert dipstick (G) into the dipstick pipe, then remove it.

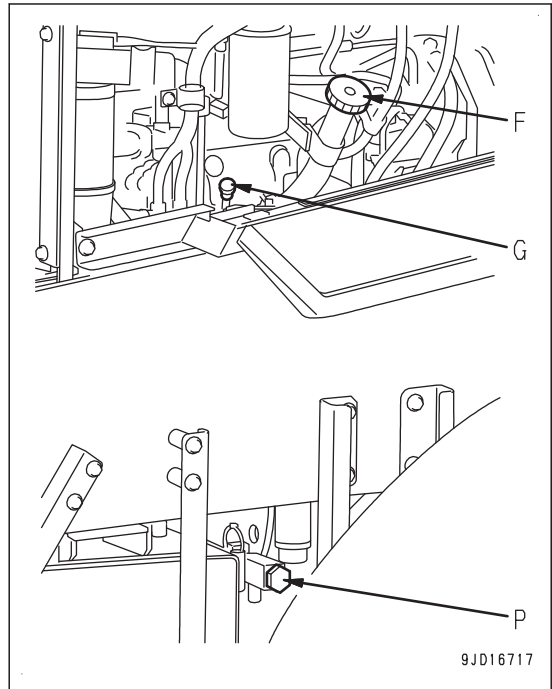
It is appropriate if the oil level is between marks H and L.

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

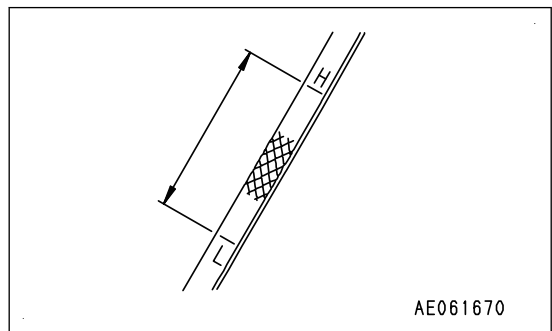
4. If the oil level is higher than H mark, drain excessive oil from drain plug (P).
5. Check the oil level again.
6. If the oil level is proper, tighten oil filler cap (F) securely.
7. Close the engine side cover.

REMARK

- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.
- If the machine is inclining, make it level before checking.
- When the ambient temperature is low, water or emulsified matter may stick to the dipstick, fuel filler cap, etc. or the drained oil may be milky white because of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem.
- If the coolant level is low, add coolant.



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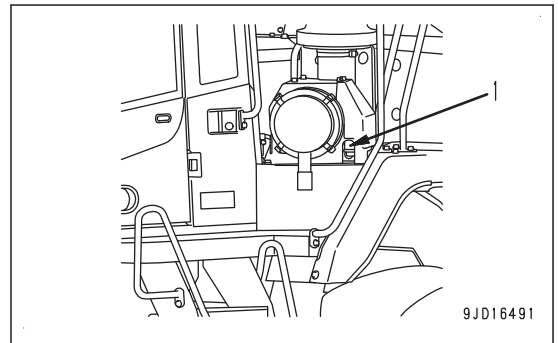
METHOD FOR CHECKING DUST INDICATOR

1. Check that the red line in the transparent portion of dust indicator (1) does not indicate 7.5 kPa (30 INCHES H₂O) {0.076 kgf/cm²}.

If the red line indicates 7.5 kPa (30 INCHES H₂O) {0.076 kgf/cm²}, clean or replace the air cleaner element immediately.

For the cleaning method of the element, see "METHOD FOR CHECKING, CLEANING AND REPLACING AIR CLEANER (4-19)".

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



METHOD FOR CHECKING ELECTRIC WIRING

CAUTION

- If fuses are frequently blown or if there are traces of short-circuiting on the electrical wiring, promptly ask your Komatsu distributor to locate the cause of it and to perform the repair.
- 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.

Perform the following inspection.

- Perform inspection to confirm that the fuses have no defect and their capacity is proper.
- Perform inspection to confirm that there is no disconnection or trace of short-circuiting in the electric wiring and no damage to the coating.
- Perform inspection to confirm that there is no loose terminals, and tighten any loose parts if found.
- Always check if there is any accumulation of combustible material around the battery, and remove such combustible material.

METHOD FOR CHECKING FUEL LEVEL, ADDING FUEL

⚠ WARNING

When refilling with fuel, do not add any more fuel after the fuel filler gun has automatically stopped. If fuel is excessively added, fuel may inflate and flow out when ambient temperature increased, and it is dangerous.

Also, it may cause fire. If any fuel has spilled, wipe it up completely.

Fuel is highly flammable and dangerous. Never bring any open flame near fuel.

NOTICE

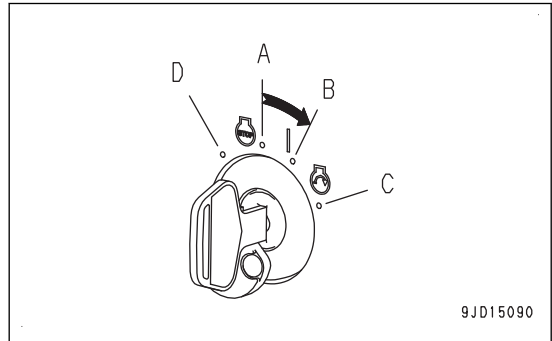
When restarting the engine that has stopped due to run out of fuel, all air must be sufficiently bled from the circuit.

For the method of bleeding air, see “METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE (4-63)”.

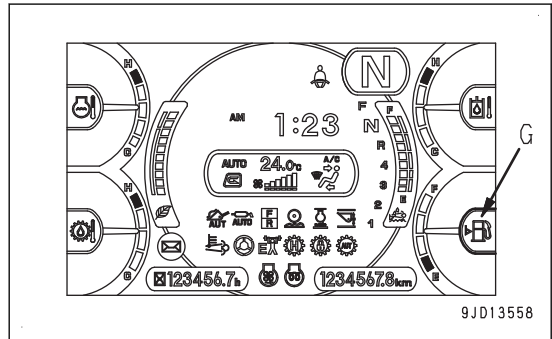
Take care not to cause engine stall due to run out of fuel.

When fuel is used up, you can cut the air bleeding time by filling the fuel tank fully with fuel.

1. Turn the starting switch to ON position (B).



2. Check the fuel level with fuel gauge (G).
3. After checking, turn the starting switch back to OFF position (A).



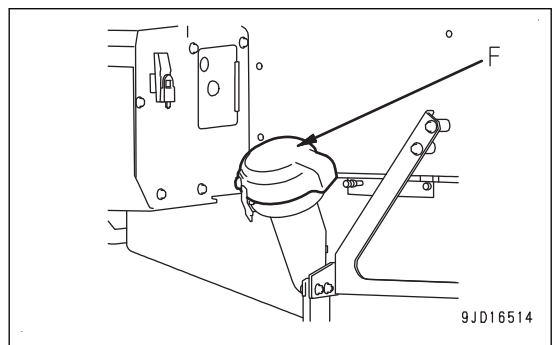
4. After operations are completed, fill the fuel tank fully by adding fuel through oil filler port (F) on the rear right side of the machine.

Once the tank is filled up, do not try to supply additional fuel.

For the cap opening and closing procedure, see “METHOD FOR OPENING AND CLOSING CAP WITH LOCK (3-245)”.

5. After adding, tighten the fuel filler cap securely.

Fuel tank capacity: 300 l {79.3 U.S.Gal}



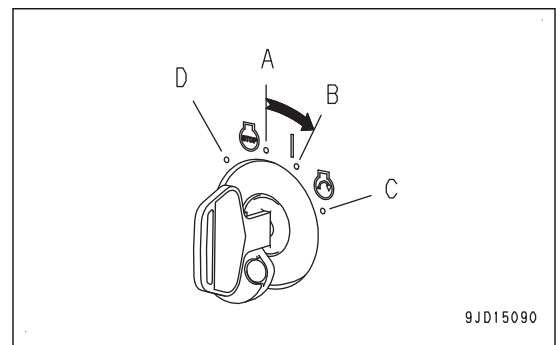
METHOD FOR CHECKING DEF LEVEL AND ADDING DEF

⚠ WARNING

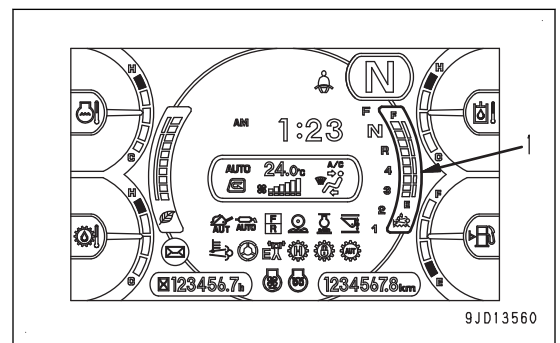
- Do not put fluid other than DEF into DEF tank.
- When opening the cap of DEF tank of the machine, the ammonia vapor may escape. Keep your face away from the filler port.
- Foreign materials in the DEF system or urea deposits caused by precipitation of urea may hinder operation of the devices. Before removing the filler cap, wipe off the dirt from around the filler port. Before inserting 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 unattended and the area is not washed and cleaned, it can cause corrosion to the contaminated area and emit toxic gas.

NOTICE

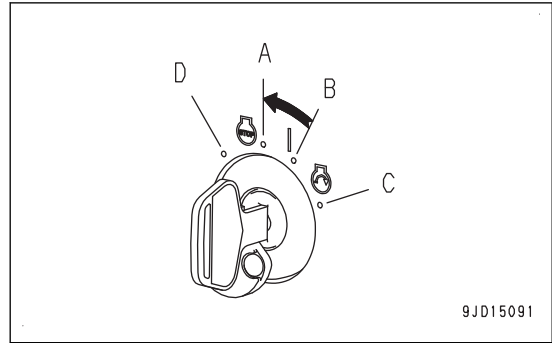
- Do not add DEF more than line F of sight gauge (5). DEF may leak through the breather. When the ambient temperature is low and DEF may freeze, do not add it more than line (9) of sight gauge (5). Be careful of the DEF line to be added when performing operations on a slope or traveling on a rough ground. When the remaining DEF level is low, it may become the warning level if DEF pump sucks air or if DEF level suddenly drops.
 - If DEF is stored in unspecified container, foreign material may mix in it and toxic gas or corrosive substance may be produced by chemical reactions. When adding DEF, do not transfer it to another container.
 - Do not use a funnel when to add DEF. The strainer may be broken.
 - When using a portable DEF refill container, use up DEF each time. If any of DEF is left, remove foreign material, if there is any.
 - Do not wash the adding nozzle in city water. Minerals may 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 audible alert sounds to warn the abnormality. In this case, ask your Komatsu distributor for draining of the wrong fluid and for inspection. DEF injector and/or DEF pump may need to be replaced.
1. Turn the starting switch to ON position (B).



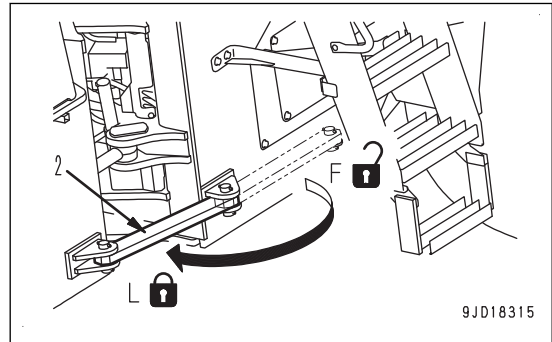
2. Check the DEF level gauge (1) on the machine monitor.



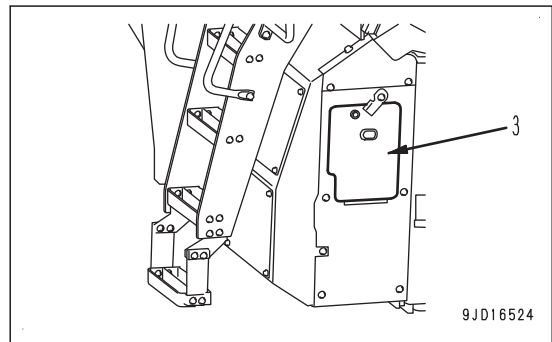
- After checking, turn the starting switch back to OFF position (A).



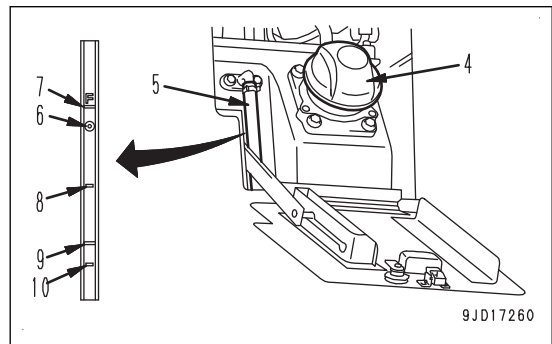
- Set the frame lock bar (2) to LOCK position (L).



- Open up cover (3) at the right side of the machine, clean blue DEF tank filler cap (4) and surrounding area.



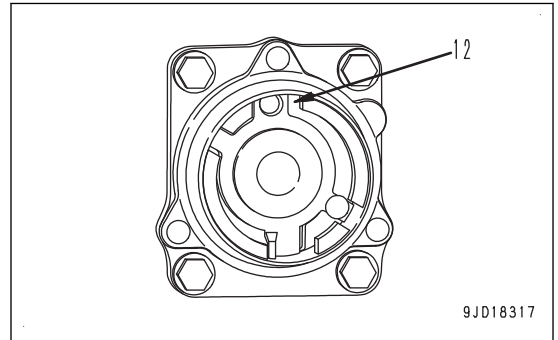
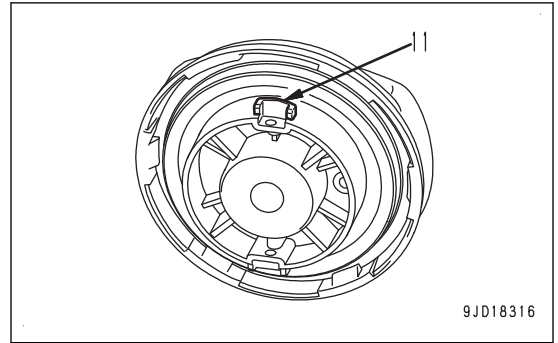
- Turn the cap (4) counterclockwise.
- The caps of DEF tanks are blue, as required by emission regulations.
- By sight gauge (5), add DEF through the filler port until float (6) reaches line F (7).
- Line (8) in the sight gauge indicates approximately 5 l {1.32 U.S.Gal} below line F, and line (10) indicates approximately 10 l {2.64 U.S.Gal} .
- Line (9) is the max adding line when DEF may freeze in cold weather.



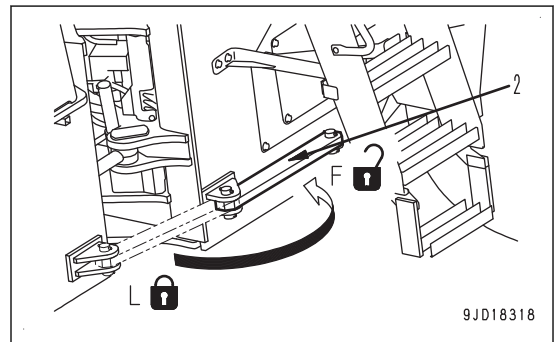
REMARK

When all gradations of the DEF level gauge go off, DEF refilling amount is approximately 26.5 l {7 U.S.Gal} to fill up the DEF tank.

8. After adding, align claw (11) of the cap with groove (12) of the filler port and close the cap securely by turning it clockwise by 90°.



9. Set the frame lock bar (2) to FREE position (F).



REMARK

- It is recommended to use a nozzle having a diameter and a length specified by ISO 22241-4 and an auto stop function to add DEF. When the specified nozzle is used, the magnet installed inside the filler port of the tank cancels the wrong 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 using a nozzle which is not conformed to ISO 22241-4, hold it in your hand and add DEF carefully while checking the sight gauge.
- Add only DEF in clearly marked DEF tanks that have the blue cap.

METHOD FOR CHECKING TIRE PRESSURE

Measure the inflation pressure with tire pressure gauge while the tires are cool, before starting work. Check the tires and rims for damage or wear, check the hub nuts (bolts) for loosening.

Proper inflation pressure varies with the contents of work, etc. For detail, see "TIRE PRESSURE (3-246)".

METHOD FOR CHECKING WINDOW WASHER FLUID SPOUTING OUT

Operate the window washer and check that the washer fluid spouts out normally.

- If the fluid does not spout out normally, clean the washer nozzle hole with a fine wire such as a safety pin.
- If the condition does not become normal, ask your Komatsu distributor to perform inspection and repair.

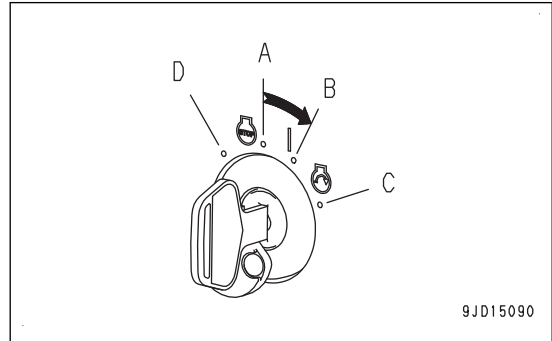
METHOD FOR CHECKING WIPER FUNCTION

Operate the wiper in the “Intermittent”, “Low”, and “High” mode and check that it operates and wipes normally.

- Operate the window washer to wet the glass, and check the operation of the windshield wiper.
- If the wiper does not wipe normally, the glass needs to be cleaned or the wiper blade needs to be replaced.
- If the condition does not become normal, ask your Komatsu distributor to perform inspection and repair.

METHOD FOR CHECKING MACHINE MONITOR

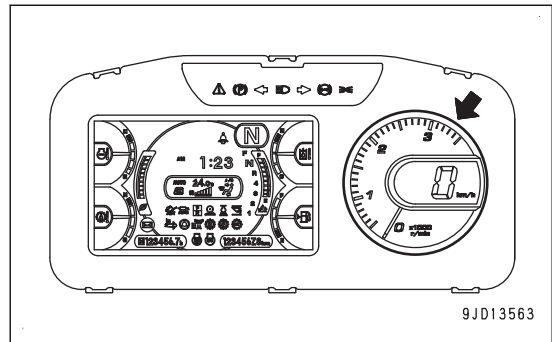
1. Turn the starting switch to ON (B) position.



2. Check that all the monitors and gauges and centralized warning lamp light up for approximately 2 seconds and the alarm buzzer sounds for approximately 2 seconds.

Check that the engine tachometer swings.

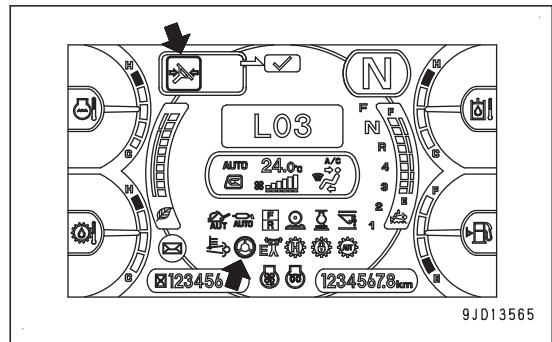
If the lamps do not light up, there may be a failure in the monitor or wire breakage. Ask your Komatsu distributor for inspection.



3. When the machine is equipped with the secondary steering (optional), it performs self check approximately 3 seconds after the starting switch is turned to ON position.

At this time, the steering oil pressure caution lamp (red) and the secondary steering pilot lamp light up simultaneously.

If the machine does not perform the self check or the above lamps do not light up, there may be a failure. Ask your Komatsu distributor for inspection.



Check of the secondary steering is not performed in the following cases.

- When you have turned the starting switch to ON position and, without starting the engine, turned it to OFF position then turned it to ON position again.
- When you have turned the starting switch to ON position again immediately after the engine is stopped when the steering pressure is not completely lowered.
- When the engine preheating is in operation.

METHOD FOR CHECKING HORN

Operate the horn switch and check that the horn sounds.

If there is any abnormality, ask your KOMATSU distributor for testing and repair.

METHOD FOR CHECKING DEFROSTER FUNCTION

- Operate the air conditioner and check that the air flows out of the vents properly onto the front glass.
If there is any abnormality, ask your KOMATSU distributor for testing and repair.
- Operate the rear heated wire glass switch and check that the rear glass surface is heated properly.
If there is any abnormality, ask your KOMATSU distributor for testing and repair.

METHOD FOR CHECKING LOCKS

Check that all places can be locked properly.

(For the locations of the locks, see "LOCK (3-244)".)

If there is any abnormality, ask your KOMATSU distributor for testing and repair.

METHOD FOR CHECKING ALTERNATE EXIT OF CAB

Operate the open knob for alternate exit of cab, and check that the exit opens and closes properly.

If there is any abnormality, ask your KOMATSU distributor for testing and repair.

METHOD FOR ADJUSTING

METHOD FOR ADJUSTING OPERATOR'S SEAT

⚠ WARNING

- Place the machine in a safe place when adjusting the position of the operator's seat. Always set the work equipment lock lever to LOCK position (the pilot lamp in the switch is lit) to prevent any accidental contact with the control levers.
- Adjust it before starting operation or when operators change shift.
- Adjust the position of the operator's seat so that you can depress the brake pedal fully with your back against the seat backrest.

METHOD FOR ADJUSTING SEAT UNIT IN FORE-AND-AFT DIRECTION

Operate the lever upward, set the seat to the desired position, and then release the lever.

Fore-and-aft adjustment: 152.4 mm {6 in} (12.7 mm {0.5 in} x 12 stages)



METHOD FOR RECLINING SEAT

NOTICE

If the backrest is reclined too far, the headrest or seat belt anchor (when the 3-point seat belt (optional) is installed) may contact the rear window glass, so move it to a position where it does not contact the window glass.

1. Pull the lever upward, and move the backrest forward or backward.

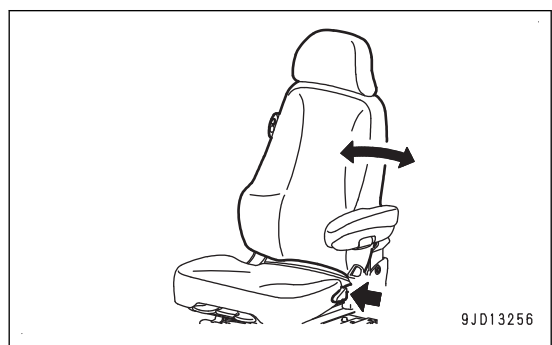
Sit with your back against the backrest when adjusting. If your back is not on the backrest, it may suddenly return to the original position.

Adjustment amount

Forward tilt: 21 °(any degree is acceptable if it is greater than 21 °.)

Backward tilt: 33 °

2. After adjusting, release the lever.



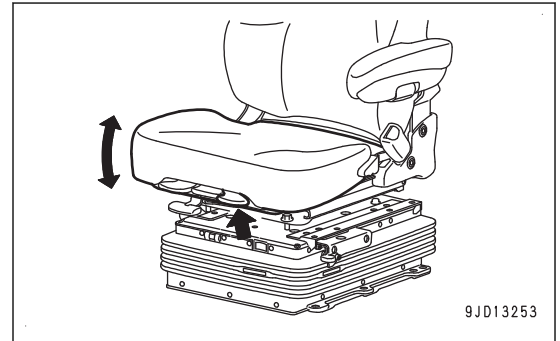
METHOD FOR TILTING SEAT

Pull the lever up and move the front side of the seat cushion up and down to the desired position, then release the lever.

Adjustment amount

Forward tilt: 5 °

Backward tilt: 5 °



METHOD FOR ADJUSTING WEIGHT AND HEIGHT OF SEAT

Turn the engine starting switch to ON position when performing adjustments 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. Doing so can damage the air compressor.

The seat height is adjusted pneumatically and in steps.

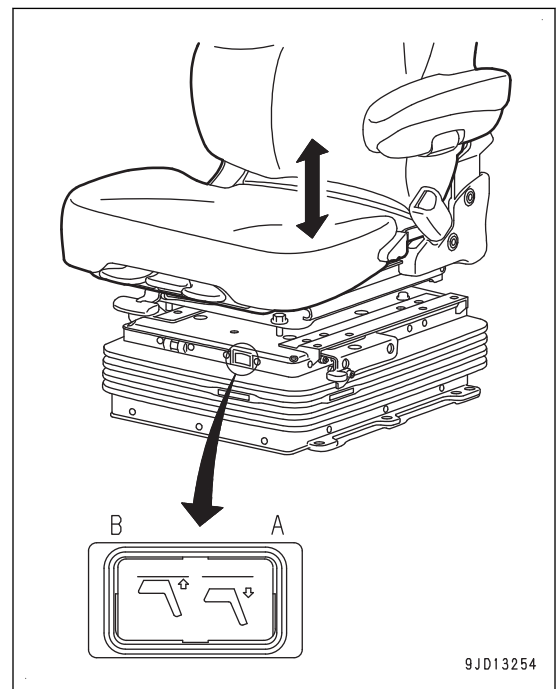
Adjust the suspension strength and seat height by pressing the switch.

Press left side (A) of switch: RAISE

Press right side (B) of switch: LOWER

Release the switch at desired height of the seat.

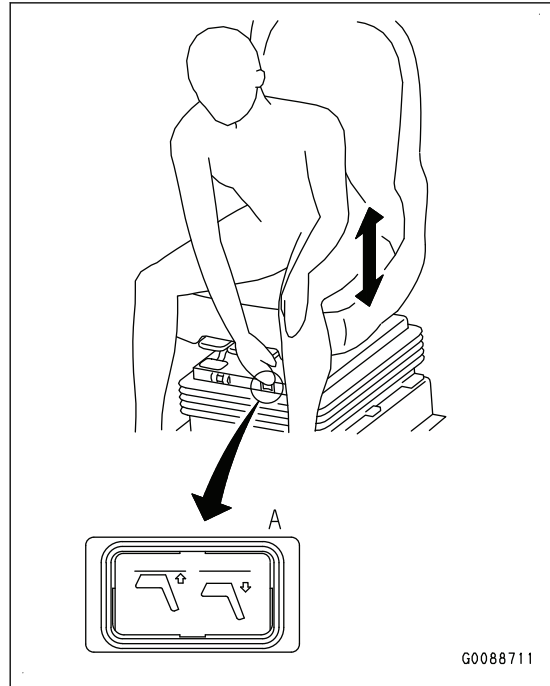
Adjustment amount 152mm {6.0in}



REMARK

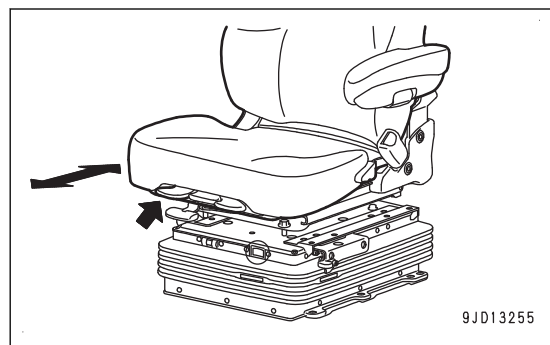
Sit on the seat and push the left side (A) of the switch, then move your hip up and down.

Move the suspension up and down by force. Air comes into it more easily and you can adjust it to the desired position faster.

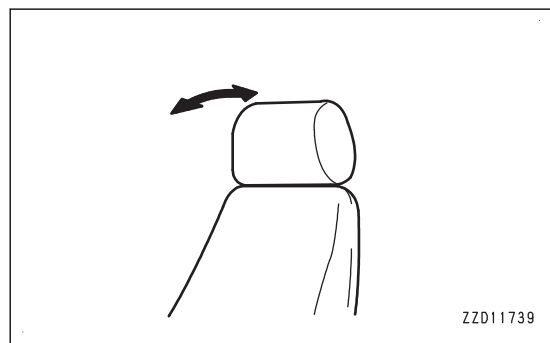
**METHOD FOR ADJUSTING SEAT CUSHION IN FORE-AFTER DIRECTION**

Operate the lever upward, set the seat cushion to the desired position, then release the lever.

Fore-aft adjustment: 60 mm {2.4 in}

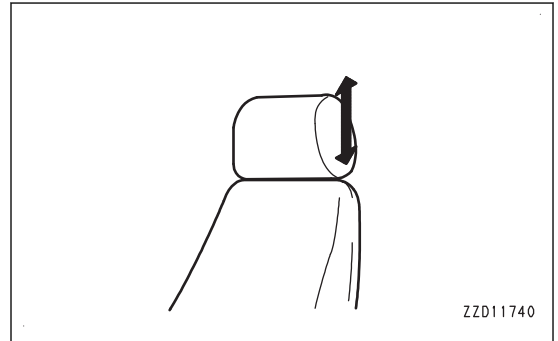
**METHOD FOR ADJUSTING HEADREST ANGLE**

Move the headrest back and forth to set it to the desired angle.
Adjustment amount: 30 °



METHOD FOR ADJUSTING HEADREST IN VERTICAL DIRECTION

Move the headrest up or down to the desired height.
Adjustment amount: 127 mm {5 in}

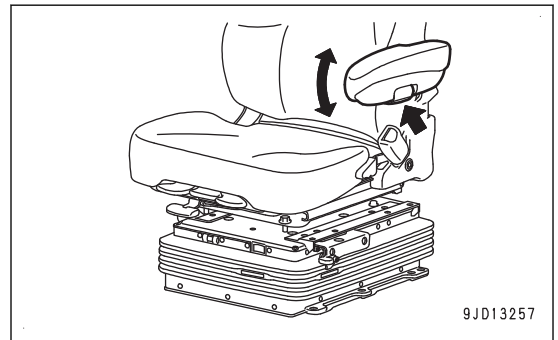


METHOD FOR ADJUSTING ARMREST ANGLE

Turn the knob to adjust the armrest angle.
Amount of adjustment: 35 ° (Forward tilt 12 °, backward tilt 23 °)

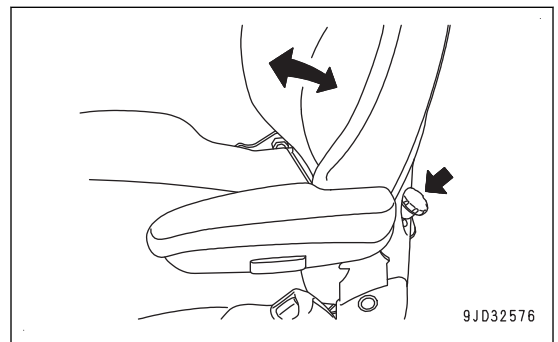
REMARK

You can flip up the armrest.



METHOD FOR ADJUSTING LUMBAR SUPPORT

Turn the knob to the right or left, and give proper tension to the waist part.



METHOD FOR ADJUSTING SUSPENSION DAMPER HARDNESS

By operation of the knob, the damping force of the suspension damper can be adjusted.

- To increase the damping force, move the knob toward bottom (A) of the seat.
- To decrease the damping force, move the knob toward top (B) of the seat.

Adjustment

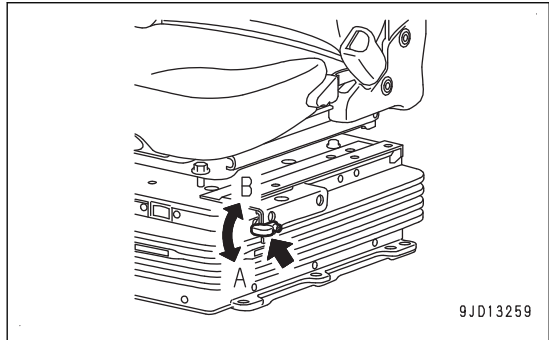
1st stage: (c) position

2nd stage: (d) position

3rd stage: (e) position

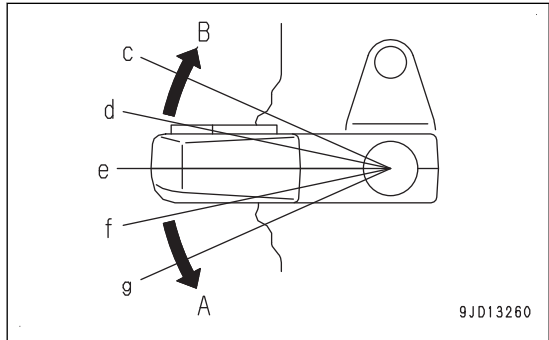
4th stage: (f) position

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 to adjust 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.)

METHOD FOR HEATING SEAT

(option)

CAUTION

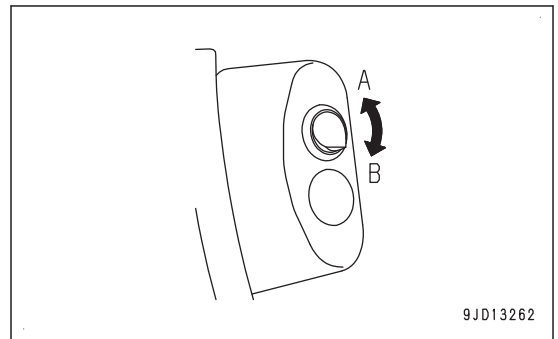
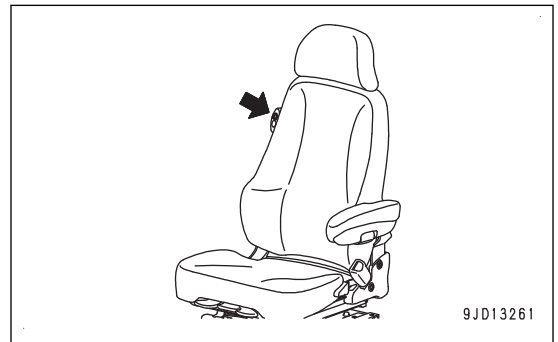
- In the cases that follow, do not use it to prevent low temperature burn or excessive cooling.
 - When a person's ability to sense the temperature is decreased
 - When a person's ability to feel pain is decreased
 - When a person has a delicate skin
- Do not put a heavy object on the seat cushion. Do not stick the seat cushion with needles or nails.
- When you use it, do not put objects which keep heat such as blankets or floor cushions on the seat. The seat heater will overheat and it can cause burn injury or failure.
- Do not use the seat while it is wet. If water or beverage is spilled, immediately wipe it off with a dry cloth and dry it fully. Do not use the seat heater to dry the seat.

When the switch is operated in the (A) direction, the heater inside the seat cushion is activated. When it is operated in the (B) direction, the heater is turned off.

Turn off the switch when the temperature of cushion becomes correct.

REMARK

The heater has no timer function and is not turned off automatically. Be sure to turn off the switch after the heater is used.

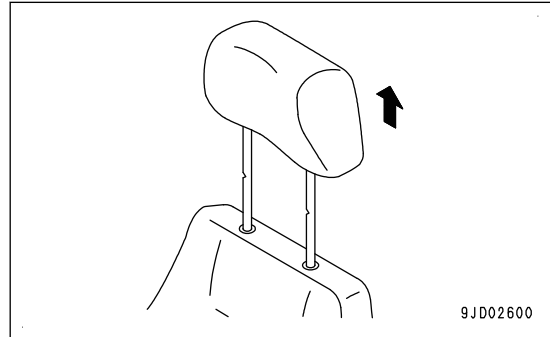


METHOD FOR REMOVING AND INSTALLING HEADREST

METHOD FOR REMOVING HEADREST

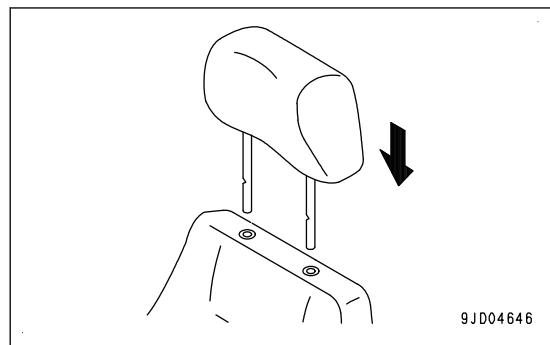
When the headrest is not necessary, remove it according to the following procedure.

1. Pull up the headrest until it stops.
2. Pull up the headrest strongly, and it will come out.



METHOD FOR INSTALLING HEADREST

1. Insert the headrest into the hole at the seat back.
2. Push down the headrest.



METHOD FOR ADJUSTING MIRRORS

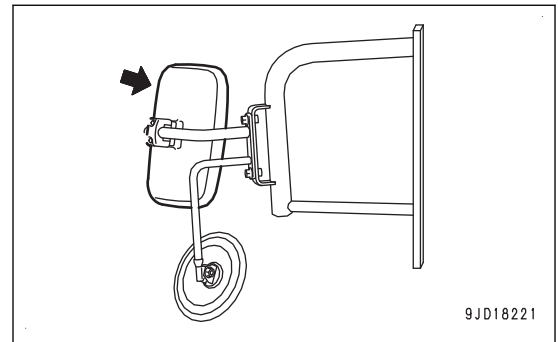
⚠ WARNING

- Be sure to adjust the mirrors before starting work. If they are not adjusted properly, you cannot secure the visibility and may be injured or may lead to a serious personal injury or death.
- The tightening torque for the mirror mounting bolts is set at an optimum value. If it is loosened by unexpected contacts, ask your Komatsu distributor for adjustment.

Mirrors A, B

Adjust the mirror to a position which gives the best view from the operator's seat of the blind spot at the right and left sides at the rear of the machine.

Adjust the mirror angle so that you can see a person who is standing at the right or left rear end position of the machine (or an object having the diameter of approximately 30 cm {11.8 in} and the height of approximately 1 m {3 ft 3 in}).

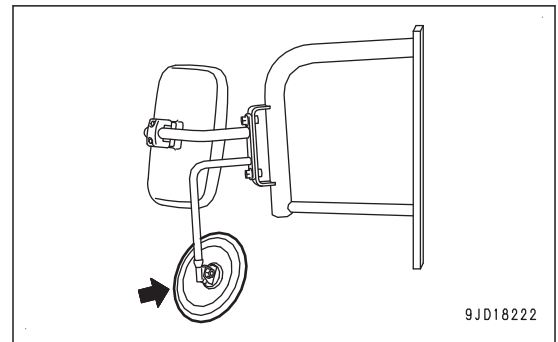


Mirror C

Adjust it so that you can see a person adding DEF at DEF filler port from the operator's seat.

Mirror D

Adjust it to the same installing angle as mirror C.



Install the mirror to a position where you can easily see the hatched area in the figure.

The reference values of the visibility range are as follows.

Visibility range (left): 2500 mm {8 ft 2 in}

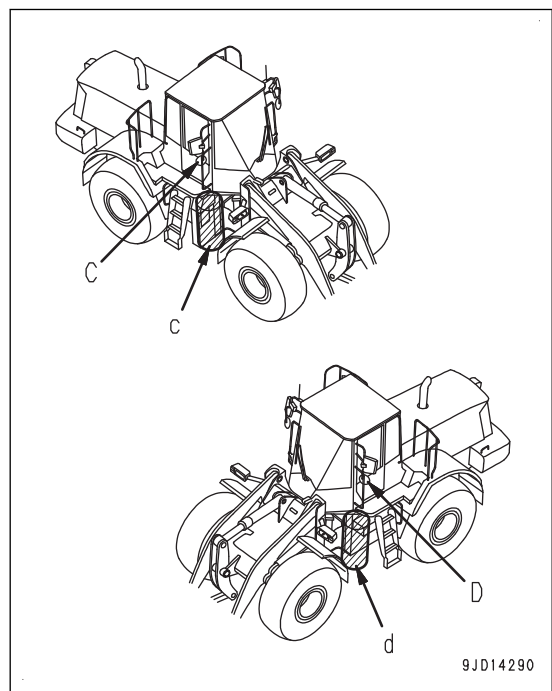
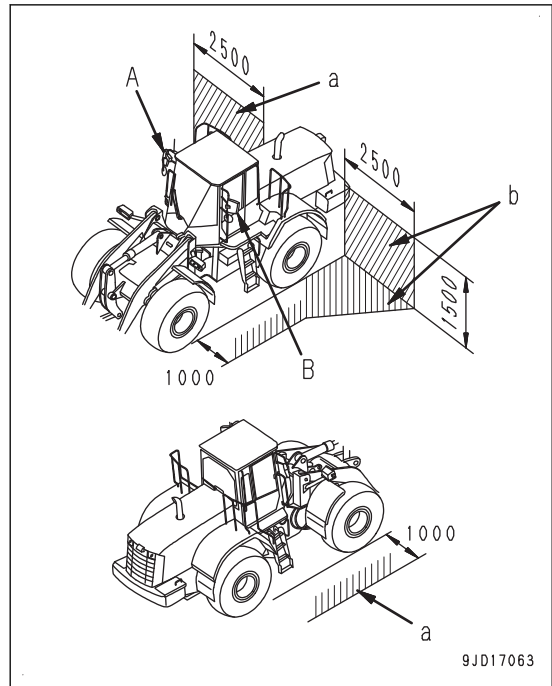
Visibility range (right): 2500 mm {8 ft 2 in}

Mirror A: Hatched area (a) must be in view.

Mirror B: Hatched area (b) must be in view.

Mirror C: Hatched area (c) must be in view.

Mirror D: Hatched area (d) must be in view.



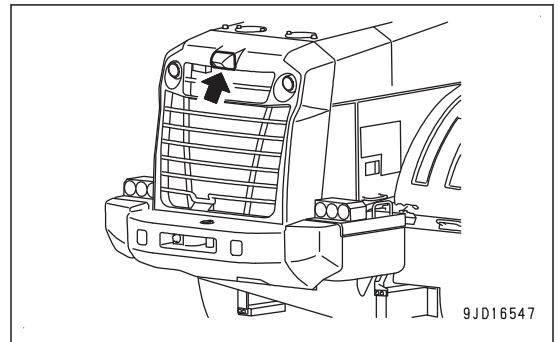
METHOD FOR ADJUSTING REAR VIEW CAMERA

METHOD FOR ADJUSTING REAR VIEW CAMERA ANGLE

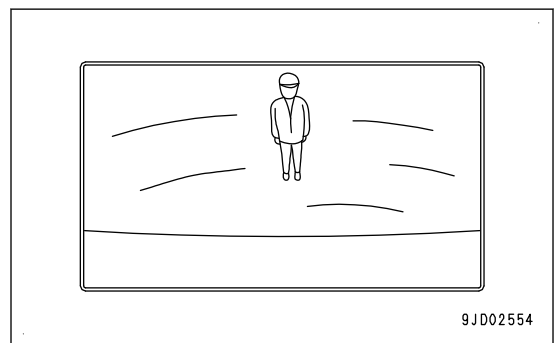
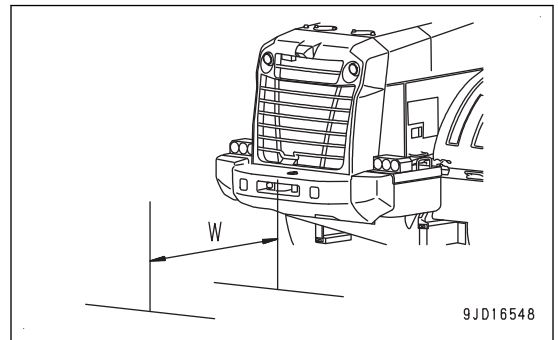
WARNING

- 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 will cause a failure or a serious personal injury.
- 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.

Adjustment of rearview camera angle

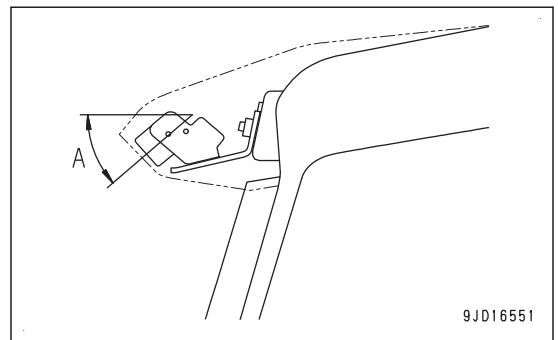


Adjust the angle of the rearview camera to let the person within 1 m {3 ft 3 in} away from the machine's rear part (W) be shown in the monitor at the operator's seat.



If the image on the monitor is not aligned correctly, adjust the mounting angle (A) of the rearview camera.

You can adjust the angle (A) within the range from 32 to 47 °.

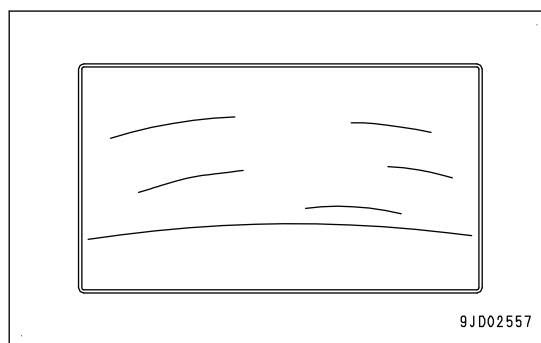
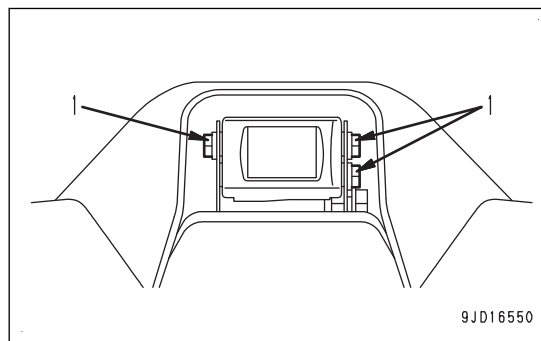
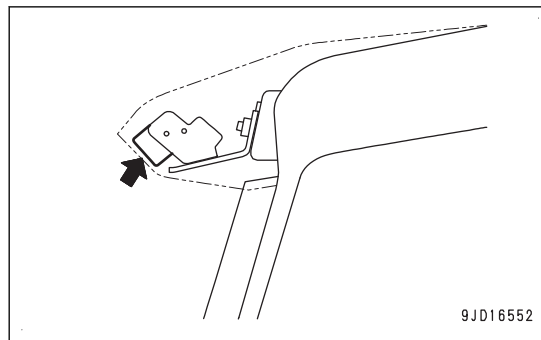


1. Loosen the mounting bolts (1) (3 places) and adjust the angle (A).

REMARK

A part of the machine is shown on the monitor screen.

2. After adjustment, tighten the bolts (1) (3 places).

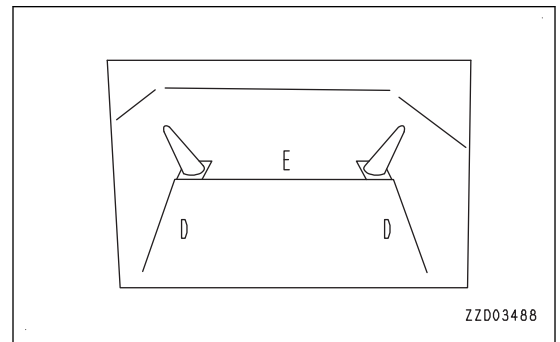
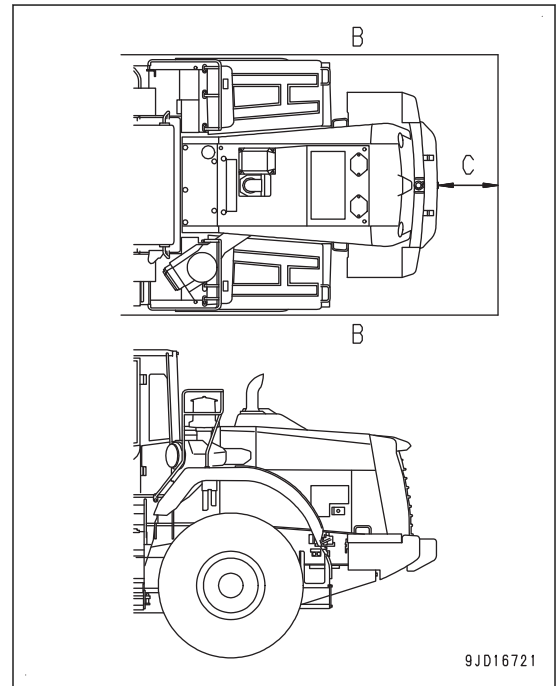


Do the setting of the camera again if the rearview which is reflected on the monitor is not correct even after the angle adjustment. Consult your Komatsu distributor.

CHECK REAR VIEW CAMERA GUIDE LINE

Check that the images on the rear view camera monitor are normal as shown in the figure. Then confirm that machine width reference line (D) matches to tire outside width (B), and horizontal line (E) matches to 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.



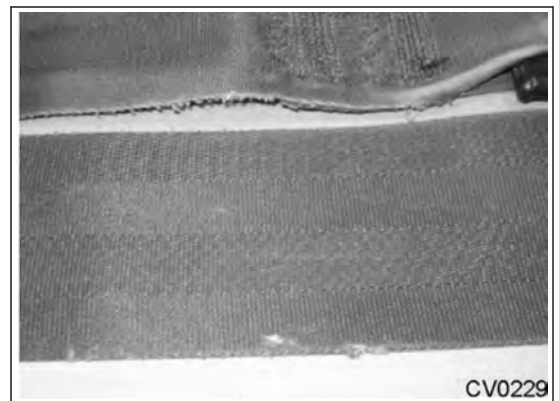
SEAT BELT INSPECTION

A thorough inspection of the entire seat belt system should occur before starting the engine.

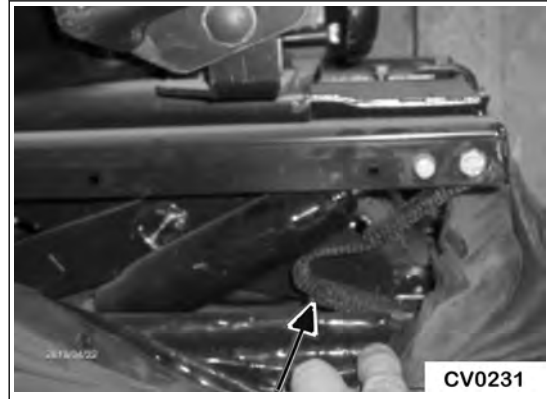
⚠ WARNING

Seat belts must be replaced immediately if there are any signs of wear or damage, no matter how recently they were last replaced.

- Inspect the full length and both sides of the seat belt webbing for wear, abrasion, dirt, oil, mildew, paint or other damage. Replace immediately if worn or damaged.
 - If the webbing is cut, fraying, snagging, kinking, or roping, the seat belt must be replaced. Any of these conditions may limit belt retraction.



- There may be internal and/or external tethers mounted on the suspension mechanism. Inspect these for fatigue as well as the integrity of the mounting hardware.



- Inspect the seat belt attachment and adjustment hardware for wear or damage.

- Retractable and non-retractable buckle housings with damage from abrasions, rubbing, forceful impacts and age, must be replaced. These conditions may weaken the strength of the buckle.
- Examine the seat belt buckle and retractor housing(s) for proper function.
- Dirt, debris, lint, leaves, etc. may become encased inside of the retractor housing. With time, this condition may cause a seat belt malfunction.



- Check the mounting structure integrity. Verify that the mounting bolts are secure. Tighten to specified torque, if necessary.
- Check your records or the seat belt "Date of Installation" label (if equipped). Even if there are no signs of damage, the seat belt must be replaced either five years after the date of manufacture, or every three years after the start of usage, whichever comes first.
 - The manufactured date and "Install By" (if equipped) date may be found on the back of the buckle housing and/or on the seat belt webbing.
 - The location of the "Date of Installation" label (if equipped) may vary slightly, but most frequently it will be found on the plastic molding of the seat belt.

If your machine is equipped with a shoulder harness also, inspect the webbing, the shoulder loop web guide and the height adjuster for wear, damage and proper function capabilities.

METHOD FOR FASTENING AND UNFASTENING SEAT BELT

⚠ WARNING

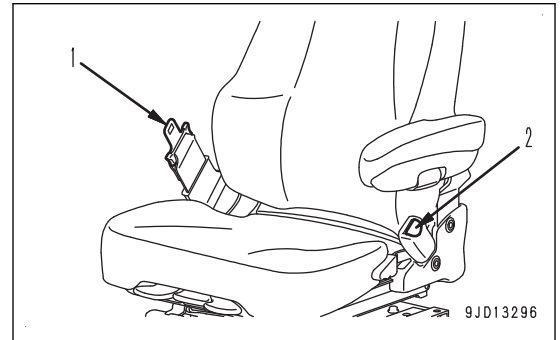
- Before fastening the seat belt, check that there is no problem in the belt mounting bracket or belt. If it is worn or damaged, replace it.
- Even if no problem can be seen in the belt, replace the seat belt every 3 years from starting usage or 5 years after manufacture whichever comes sooner. The date of manufacture of the belt is shown on the back of the belt.
- Before operating, fasten the seatbelt.
- Be sure to use the seat belt during operation.
- Do not twist the seat belt when fastening.

REMARK

The date indicated on the seat belt is the manufactured date. It is the start of the 5-year period. It is not the start of the 3-year period of actual usage.

METHOD FOR FASTENING SEAT BELT

1. Sit in the seat and depress the brake pedal fully. Under this condition, adjust the seat so that your back is fitted to the backrest.
2. Sit on the seat, pull the belt on right side, then insert tongue (1) into buckle (2) until a click is heard. Fasten the seat belt so that it fits tightly, without being too tight.
3. Pull the belt to check that it is securely locked.

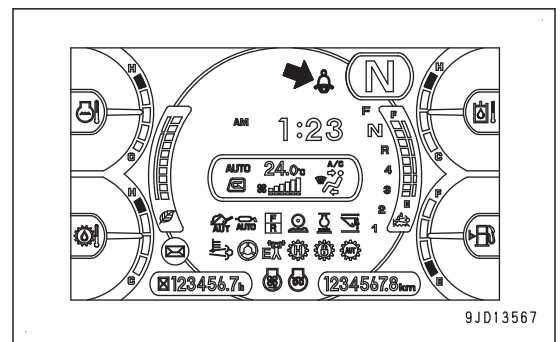


METHOD FOR UNFASTENING SEAT BELT

Press the red button of buckle (2).

REMARK

If the seat belt is not locked, the seat belt caution lamp lights up on the machine monitor.



METHOD FOR ADJUSTING LEVER STAND

WARNING

When adjusting 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 touched by accident when adjusting the lever stand, the work equipment may move suddenly, and cause a serious personal injury or death.

METHOD FOR ADJUSTING ARMREST HEIGHT AND ANGLE

The height and angle of armrest (1) can be adjusted by loosening lock lever (2).

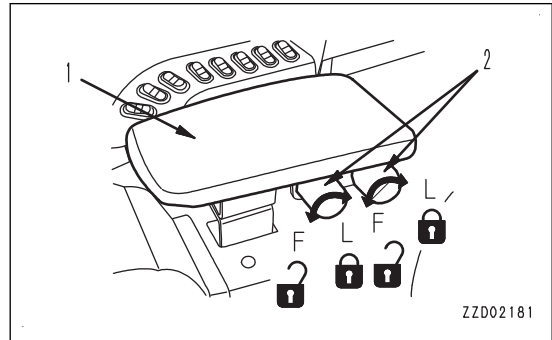
Amount of height adjustment: 30 mm {1.2 in}

Amount of angle adjustment: 44 °

REMARK

Set lock lever (2) to FREE position (F). The lock lever is loosened.

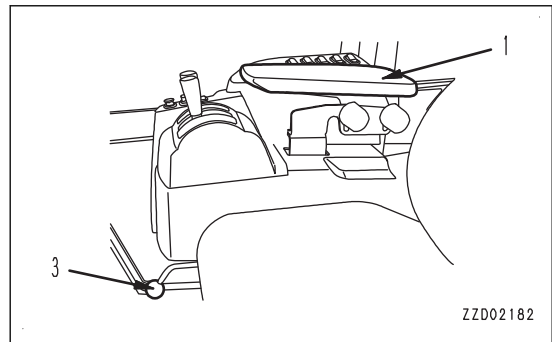
Hold the armrest at the desired height, and set the lock lever in LOCK position (L) to secure the armrest in position.



METHOD FOR ADJUSTING LEVER STAND IN FORE-AND-AFT DIRECTION

While pulling lever (3) up with the left hand, hold armrest (1) with the right hand to move forward or backward, and then release lever (3).

Adjustment amount: 180 mm {7.1 in}



METHOD FOR OPERATIONS AND CHECKS BEFORE STARTING ENGINE

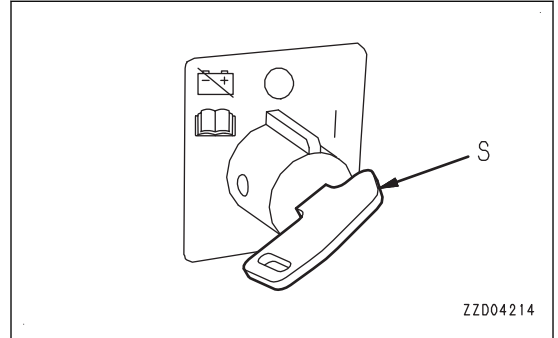
⚠ WARNING

When starting the engine, check that the work equipment is securely locked (the pilot lamp in the switch lights up).

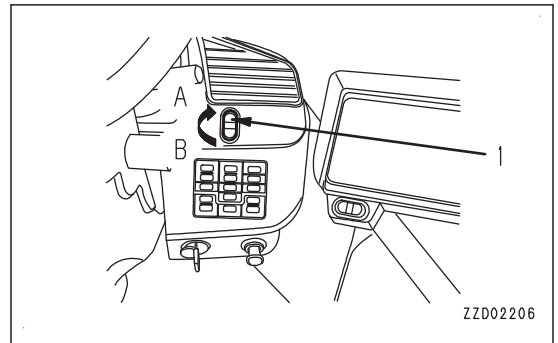
If the work equipment control levers are not locked and they are touched by accident when starting the engine, the work equipment may move unexpectedly, and this may lead to a serious injury or death.

Perform the check before starting the engine according to the following procedure.

1. Check that battery disconnect switch (S) is in ON position (I).



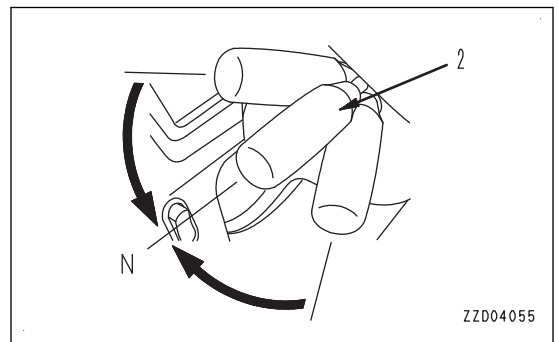
2. Check that parking brake switch (1) is in ON position (A).



3. Check that directional lever (2) is in NEUTRAL position (N).

REMARK

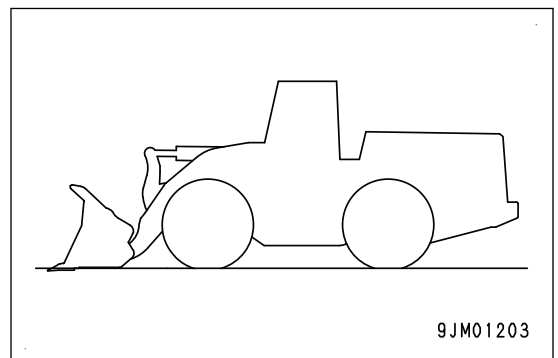
The engine can be started only when the directional lever is in NEUTRAL position (N).



4. Check that the bucket is lowered to the ground.

If not, lower the bucket to the ground in the following procedure.

- 1) Check that the work equipment control lever is at HOLD position, then turn the starting switch to ON position to unlock the work equipment (the pilot lamp in the switch goes out).
- 2) Operate the work equipment control lever and lower the bucket to the ground.
- 3) Check that the work equipment control lever is at HOLD position, then lock the work equipment (the pilot lamp in the switch lights up).
- 4) Turn the starting switch to OFF position.



5. Insert the key in starting switch (3), turn the key to ON position (B), then check that the machine monitor system works.

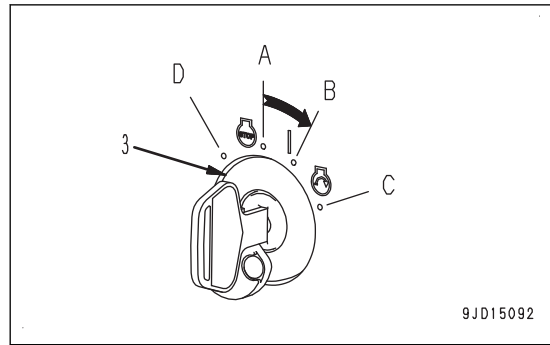
When the starting switch is turned to ON position before starting the engine, all the monitors, gauges and centralized warning lamp light up for approximately 2 seconds and the alarm buzzer sounds for approximately 2 seconds.

The pointer of engine tachometer swings once.

If the monitor does not light up, there may be a failure or wire breakage. Ask your Komatsu distributor for inspection.

Also, after all of the monitors, gauges, and centralized warning lamp light up, perform the self-check to check that the secondary steering function operates normally. For details, see OPERATION, "SELF-CHECK FUNCTION FOR SECONDARY STEERING (3-222)".

6. Check that the work equipment is locked (the pilot lamp in the switch lights up).



METHOD FOR STARTING ENGINE

START ENGINE IN NORMAL WEATHER

WARNING

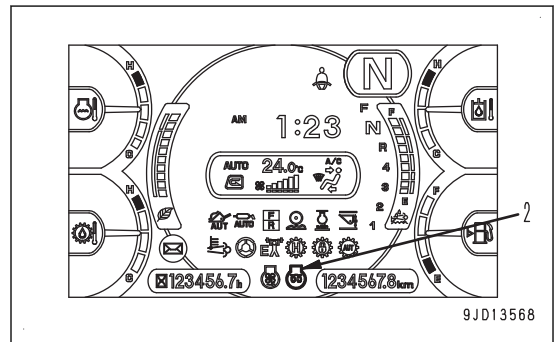
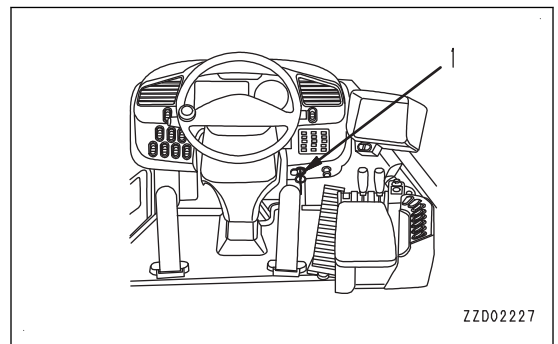
- Start the engine only while sitting down in the operator's seat.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Doing so may cause a fire or serious personal injury or death.
- Check that there is no person or obstacle in the area around the machine, then sound the horn and start the engine.
- Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.

NOTICE

- Do not accelerate the engine abruptly until it is warmed up. Do not operate the starting motor continuously for more than 20 seconds.
- If the engine does not start, wait for 2 minutes or so, and then try to start the engine again.

This machine is equipped with an engine automatic preheating device that functions to start the engine preheating automatically.

When the ambient temperature is low, the preheating pilot lamp (2) lights up when the key in starting switch (1) is turned to ON position to inform the operator that preheating has been started automatically.

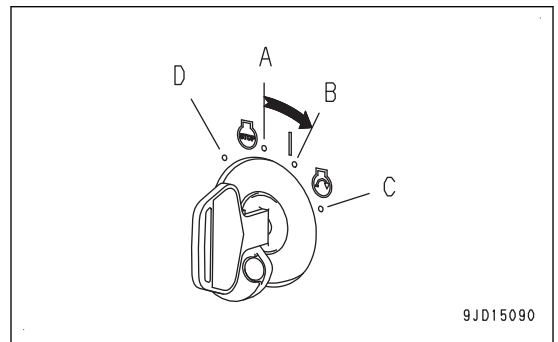


1. Turn the key in starting switch (1) to ON position (B).

When the ambient temperature is low, preheating pilot lamp (2) lights up and automatic preheating is performed. Keep the starting switch key (1) at ON position until preheating pilot lamp (2) goes out.

The time that preheating pilot lamp (2) stays lit depends on the ambient temperature as shown in the table.

Ambient temperature (°C { °F })	Lighting time (sec.)
-1 to -15 {30.2 to 5}	0 to 30
Below -15 {Below 5}	30



REMARK

Usually, the engine is preheated sufficiently by the automatic preheating. If it is needed to extend the preheating time, turn the key in starting switch (1) to position (D) and hold it in the position. Do not preheat the engine more than 30 seconds, however.

- When preheating pilot lamp (2) does not light up, turn the key in starting switch (1) to START position (C) after the engine preheating has been completed.

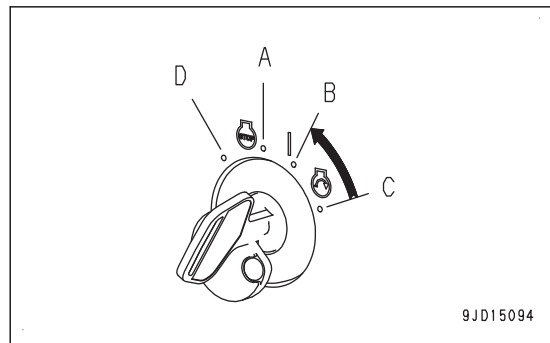
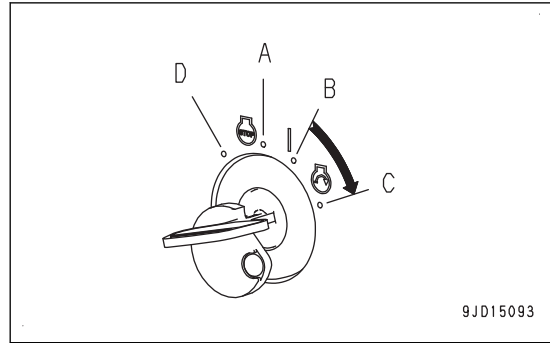
The starting motor keeps running to start the engine.

Keep the key in starting switch (1) at position (C) to keep running the starting motor until the engine starts.

REMARK

When the ambient temperature is low, fuel is not supplied to the engine for 3 seconds to ensure lubrication of the engine and to improve the durability after the key in starting switch (1) is turned to START position (C), so the engine does not start during this time.

- When the engine starts, release the starting switch key (1). The key returns automatically to ON position (B).



When the engine is started, white smoke may come out of the exhaust pipe. It is fine water particles which are produced from moisture or water vapor and which seem white, thus it does not indicate an abnormality.

The smell of the exhaust gas is different from that of the conventional diesel machine because of the exhaust gas filtering function.

START IN COLD WEATHER

⚠ WARNING

- 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. Doing so may cause a fire or serious personal injury or death.
- Check that there is no person or obstacle in the area around the machine, then sound the horn and start the engine.
- Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.

NOTICE

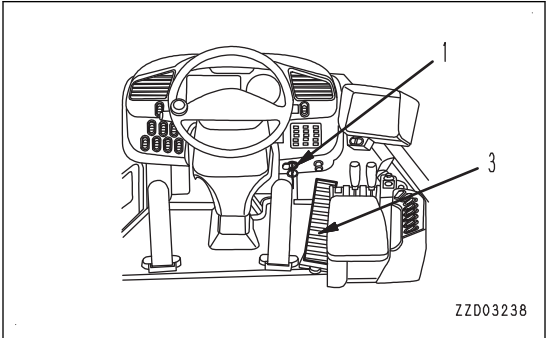
- Do not accelerate the engine abruptly until it is warmed up.
- This machine is equipped with the automatic warm-up function to heat the coolant more quickly and the turbo protect function to protect the turbocharger. In cold weather startup, the engine speed may not change for several seconds immediately after the startup even if accelerator pedal (3) is depressed.
- If the machine is left for a long time with engine running at idle, inside of KCCV and blowby piping may be frozen and blocked. To prevent freeze, stop the engine or, if it is necessary to run the engine at idle, apply the load from time to time.

When the engine is started after it has been left at temperature of approximately -20 °C {-4 °F} for more than a half day, it takes time to attain perfect combustion.

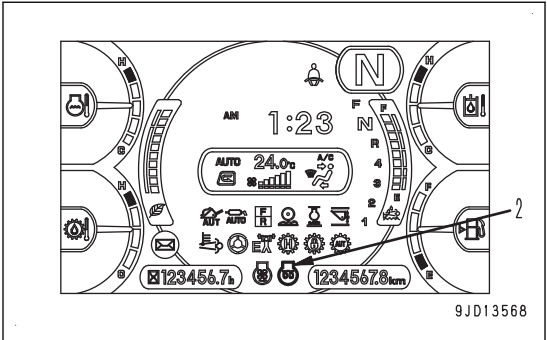
Operate the starting switch according to the following procedure.

1. Turn the key in starting switch (1) to ON position (B).
 When the ambient temperature is low, preheating pilot lamp (2) lights up and automatic preheating is performed. Keep the starting switch key (1) at ON position until preheating pilot lamp (2) goes out.
 The time that preheating pilot lamp (2) stays lit depends on the ambient temperature as shown in the table.

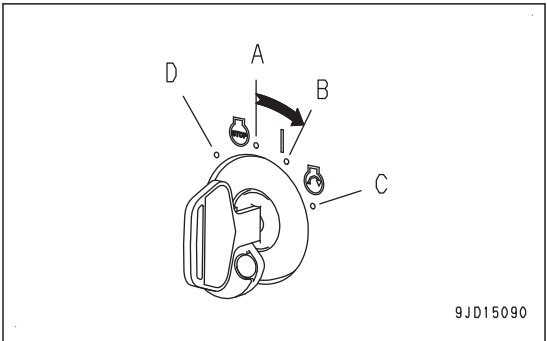
Ambient temperature (°C { °F})	Lighting time (sec.)
-1 to -15 {30.2 to 5}	0 to 30
Below -15 {Below 5}	30



ZZD03238



9JD13568



9JD15090

REMARK

Usually, the engine is preheated sufficiently by the automatic preheating. If it is needed to extend the preheating time, turn the key in starting switch (1) to position (D) and hold it in the position. Do not preheat the engine more than 30 seconds, however.

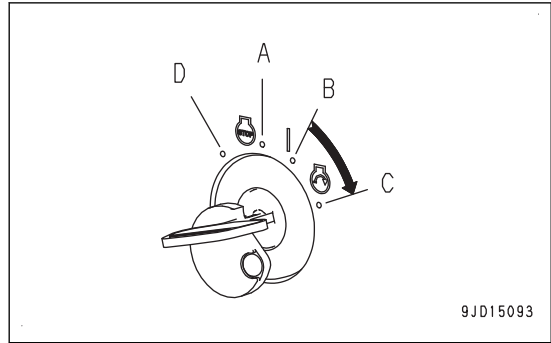
- After preheating pilot lamp (2) goes out, turn starting switch key (1) to START position (C).

Keep the key in starting switch (1) at position (C) to keep running the starting motor until the engine starts.

The starting motor keeps running to start the engine.

REMARK

- Do not operate the starting motor continuously for more than 20 seconds.
- If the engine does not start, release your hand from the starting switch, wait for 1 minute, and then start the engine again.



- After the engine starts and its speed increases, release your hand from the key of starting switch (1).

The key returns automatically to ON position (B).

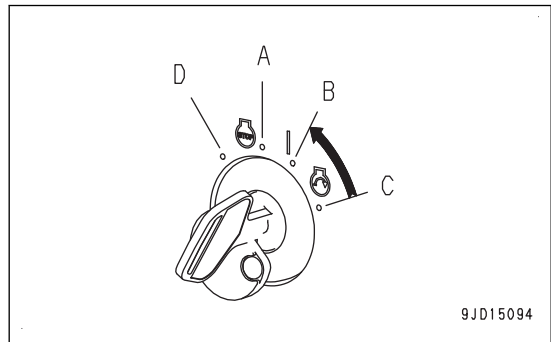
REMARK

When the engine is started, white smoke may come out of the exhaust pipe. It is fine water particles which are produced from moisture or water vapor and which seem white, thus it does not indicate a problem.

The smell of the exhaust gas is different from that of the conventional diesel machine because of the exhaust gas filtering function.

REMARK

Urea SCR system has the function of heating and keeping itself warm to prevent freezing of DEF. If DEF is frozen, DEF system is automatically heated and thawed after the engine is started. The devices do not operate until DEF is thawed and supplied, but this does not indicate any abnormality. When the ambient temperature decreases to a level where DEF may freeze while the machine is in operation, DEF system is warmed automatically to prevent freezing. When the ambient temperature decreases to a level where freezing of DEF is not preventable, the devices stop automatically, but this does not indicate any abnormality. If DEF freezes, thawing operation is performed automatically. Never heat DEF. Harmful ammonia gas may be generated.



TURBOCHARGER PROTECTION FUNCTION

The turbo protect function protects the turbocharger by keeping the engine speed at approximately 1000 rpm or less immediately after the engine is started.

When the turbo protect function and automatic warm-up function operate at the same time, the turbo protect function is given priority.

- While the turbo protect function is operating, increase of the engine speed is restricted even if the accelerator pedal is depressed.
- When the turbo protect function is canceled, the engine speed becomes the speed according to the depressed level of the accelerator pedal.
- The relationship between the actuating time of the turbo protect function and the temperature of the engine coolant is as shown in the table.

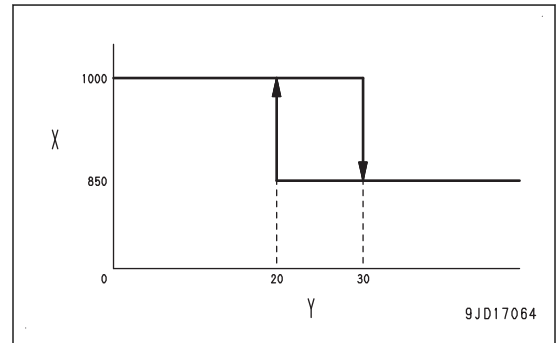
Coolant temperature (°C { °F })	Turbo protect time (sec.)
Min. 10 {Min. 50}	0
10 to -30 {50 to -22}	Variable between 0 and 20

METHOD FOR OPERATING AUTOMATIC WARM-UP SYSTEM

When starting the engine, if the engine coolant temperature is 20 °C {68 °F} or less, the warming-up operation (engine speed: 1000 rpm) is performed automatically and stopped when the engine coolant temperature increases to 30 °C {86 °F} or higher. (Engine speed 850 rpm)

(X): Engine speed (rpm)

(Y): Coolant temperature (°C { °F})



METHOD FOR OPERATIONS AND CHECKS AFTER STARTING ENGINE

WARNING

- If there has been any emergency stop, abnormal actuation, or other trouble, turn the starting switch key to OFF position.
- If you cannot stop the engine by turning the starting switch to OFF position, use the engine shut-down secondary switch to stop the engine.
- If the work equipment is operated without sufficient warming-up operation of the machine, response of the work equipment to movement of the control lever will be slow, and the work equipment may not respond as the operator desires. Be sure to perform the warm-up operation. Particularly in a cold weather, be sure the warm-up operation is completed.
- If the machine is operated without sufficient warming-up operation, sensors may break because of frozen DEF tank.
- Keep away from the exhaust pipe while the engine is running and immediately after stopping the engine.
Keep combustible materials away from the exhaust pipe outlet.

METHOD FOR CHECKING STARTING CONDITION AND UNUSUAL NOISE OF ENGINE

- When starting the engine, check that the engine causes no abnormal noise and that it starts up easily and smoothly.
- Check that there is no abnormal noise when the engine is idling or when the engine speed rises slightly.

When there is an abnormal noise at the engine startup and if that condition continues, the engine may be damaged. In that case, ask your Komatsu distributor to check the engine as soon as possible.

METHOD FOR CHECKING LOW-SPEED RUN AND ACCELERATION OF ENGINE

When stopping the machine during the normal traveling operation, check that the engine does not hunt or stop suddenly.

When the accelerator pedal is depressed, check that the engine speed rises smoothly.

- Perform these checks in a safe place, watching out for danger in the surroundings.
- When the engine performs very badly at low idle and in the acceleration and if that condition continues, it may damage the engine or confuse the operator's sense of driving or lower the braking efficiency, and as a result lead to an unexpected accident. In that case, ask your Komatsu distributor to check the engine as soon as possible.

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 may be discharged for a short time immediately after the engine is started or during the after-treatment devices regeneration in the cold season, but this is not a failure.

METHOD FOR TESTING PARKING BRAKE

Check that the parking brake works properly.

If any problem is found in operation, ask your Komatsu distributor for adjustment.

METHOD FOR CHECKING BRAKE

Drive the machine forward and in reverse slowly on a level ground with no obstacles around and check the brake performance.

If any problem is found in operation of the brake, ask your Komatsu distributor for adjustment.

METHOD FOR CHECKING CLEARANCE BETWEEN BRAKE PEDAL AND FLOOR

Depress the brake pedal fully and check that the pedal is not too close to the floor. Also check that the feeling when operating the brake pedal is normal.

If any problem is found, ask your Komatsu distributor for adjustment.

METHOD FOR CHECKING ABNORMAL POINTS DETECTED UP TO PREVIOUS DAY

Check the area which was abnormal when the machine was used previous day.

If there is any abnormality, ask your KOMATSU distributor for testing and repair.

METHOD FOR RUNNING-IN THE NEW MACHINE

NOTICE

Your Komatsu machine has been thoroughly adjusted and tested before shipment from the factory. However, operating the machine under full load before running in the machine can adversely affect the performance and shorten the machine life.

Be sure to run in the machine for the initial 100 hours (as indicated on the service meter).

Make sure that you fully understand the descriptions in this manual, then run in the machine while paying attention to the following points.

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

METHOD FOR WARM-UP OPERATION

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

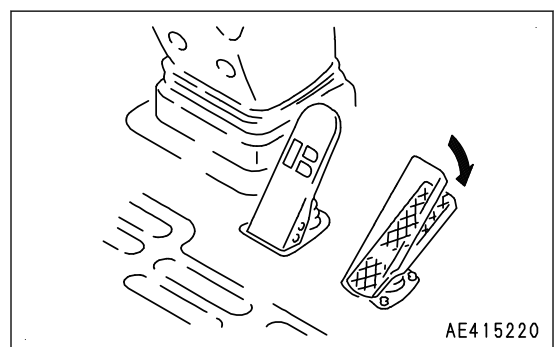
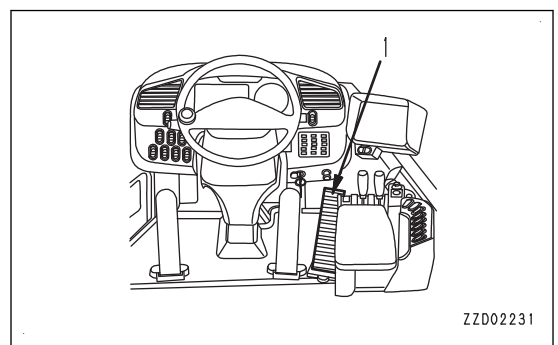
NOTICE

Do not accelerate the engine abruptly until it is warmed up.

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

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

1. Depress accelerator pedal (1) lightly and run the engine at a medium speed for approximately 5 minutes with no load.

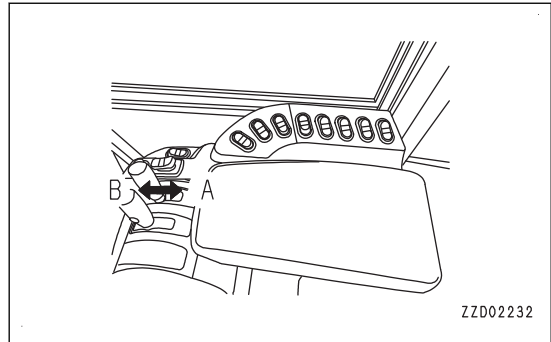


In only cold weather, perform the following operation to warm up the hydraulic oil.

2. After the warm-up operation, check that the engine rotation is smooth, then unlock the work equipment (turn OFF the pilot lamp in the switch).
3. Operate the bucket control lever to TILT position (A) and return to HOLD position (B) repeatedly to warm up hydraulic oil.

Relieve the circuit at TILT position (A) for a maximum of 10 seconds.

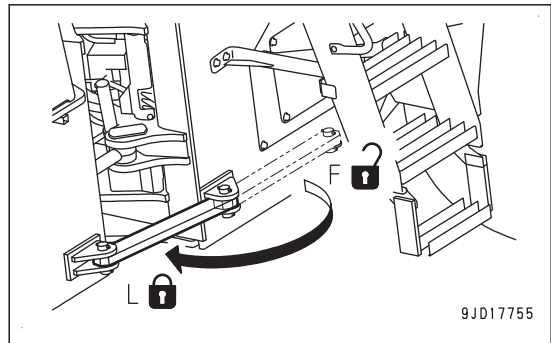
Oil reaches the relief pressure through the above operations and hydraulic oil gets warmer in a shorter time.



4. Turn the steering wheel slowly approximately 10 times to the right and left to warm up hydraulic oil in the steering valve.

⚠ WARNING

If you turn the steering wheel and stop turning it while the oil temperature is low, a time lag might result until the machine stops after the turning operation. In such case, use the frame lock bar to secure safety, and perform the warm-up operation in a large place. At that time, be sure not to relieve the oil pressure in the circuit for more than 5 seconds.



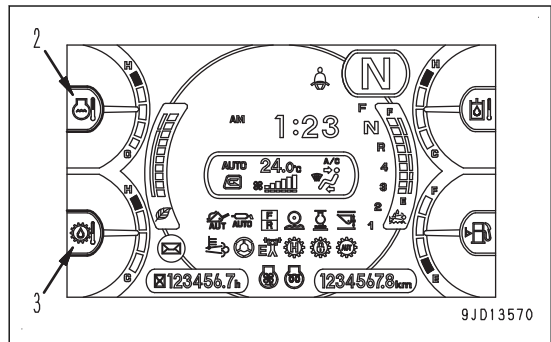
NOTICE

Turn the steering wheel a little and stop in that position. Check that the machine has turned by the angle corresponding to the turning angle of the steering wheel.

5. After the warm-up operation, check that the instruments and pilot lamps are normal. If any problem is found, perform maintenance or repair.

Run the engine with a light load until the pointers of engine coolant temperature gauge (2) and torque converter oil temperature gauge (3) indicate the green range.

6. Check for abnormal exhaust gas color, noise, or vibration. If any abnormality is found, contact your Komatsu distributor.



REMARK

The cooling fan speed varies according to the following conditions, but it is not abnormal. The cooling fan speed increases when the hydraulic oil temperature, engine coolant temperature, or transmission oil temperature is high. when the cooling fan is rotating in reverse, it rotates at a fixed speed in proportion to the engine speed, regardless of any oil or coolant temperature.

METHOD FOR STOPPING ENGINE

⚠ WARNING

Keep away from the exhaust pipe immediately after stopping the engine.

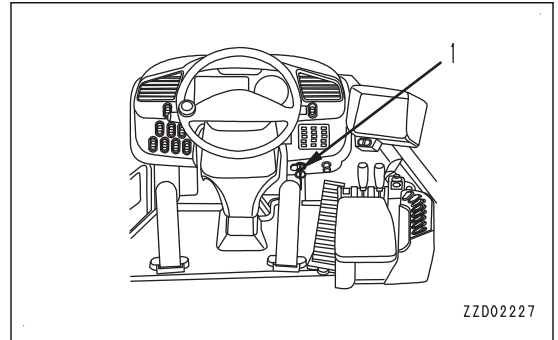
NOTICE

If the engine is abruptly stopped before it has cooled down, service life of the engine parts may be reduced. Do not stop the engine abruptly except the case in an emergency.

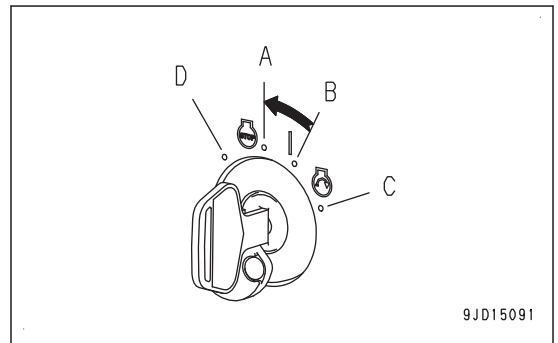
If the engine is overheated, do not try to stop it abruptly but run it at medium speed to allow it to cool down gradually, and then stop it.

Stop the engine according to the following procedure.

1. Run the engine at low idle for approximately 5 minutes to cool down the engine gradually.
2. Turn the key of starting switch (1) to OFF position (A), and stop the engine.

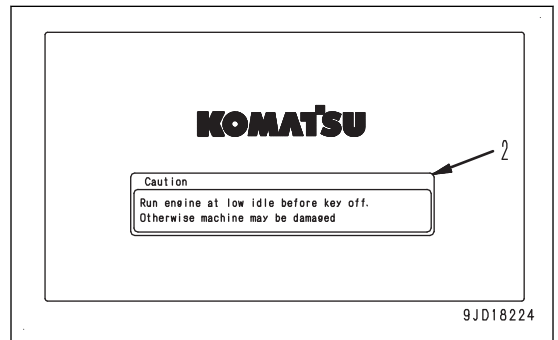


3. Remove the key from starting switch (1).



REMARK

- After the engine is stopped, DEF in DEF injector and pump is automatically purged and returned to the tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea. For this purpose, the devices keep operating for several minutes after starting switch (1) is turned to OFF position, and this does not indicate abnormality. In addition, the system operating lamp lights up while devices are operating to purge DEF to the tank. Do not turn the battery disconnect switch to OFF position while the system operating lamp is lit. After DEF has been purged completely, the devices stop automatically.
- If the starting switch (1) key is turned to OFF position (A) while the engine is still hot, guidance (2) may be displayed on the machine monitor. To cool down the engine before stopping, run it at low idle the next time and after, because it may cause damage to the devices.



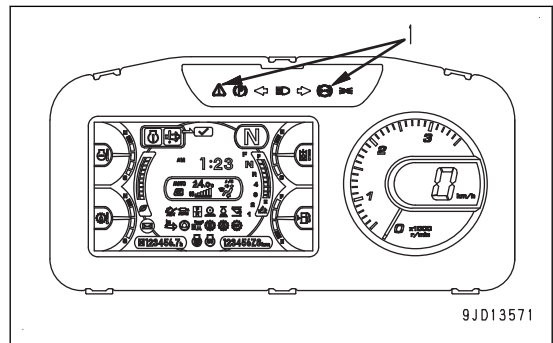
METHOD FOR STARTING MACHINE (TRAVEL FORWARD AND REVERSE, AND SHIFTING GEAR) AND STOPPING MACHINE

METHOD FOR MOVING MACHINE

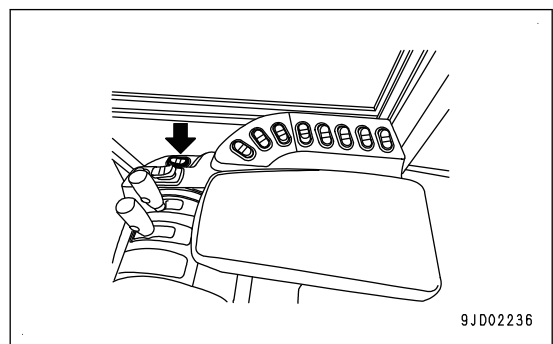
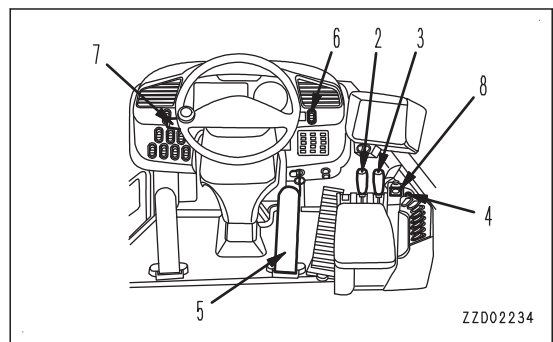
⚠ WARNING

- Always disengage the frame lock bar during traveling. If it is not disengaged, the steering becomes inoperative and this may lead to serious personal injury or death.
- Before moving the machine off, check that the area around the machine is safe, then sound the horn before starting.
- Do not allow anyone to enter the area around the machine.
- Clear any obstacles from the travel path.
- There is a blind spot behind the machine, so be extremely careful when driving the machine in reverse.
- When moving the machine off at an uphill, set the transmission cut-off switch to OFF position, depress the accelerator pedal while depressing L.H. brake pedal and then release the brake pedal gradually to start the machine. This prevents the machine from rolling back.
- Do not try to make directional change abruptly while the engine speed is high.

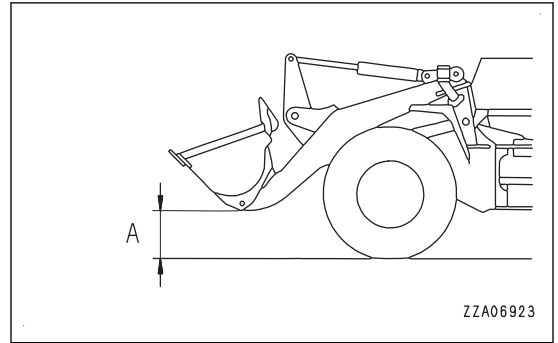
1. Check that caution lamp (1) is not lit.



2. Check that bucket control lever (2) and boom control lever (3) are in HOLD position.
 Unlock the work equipment (turn OFF pilot lamp (4) in the switch).



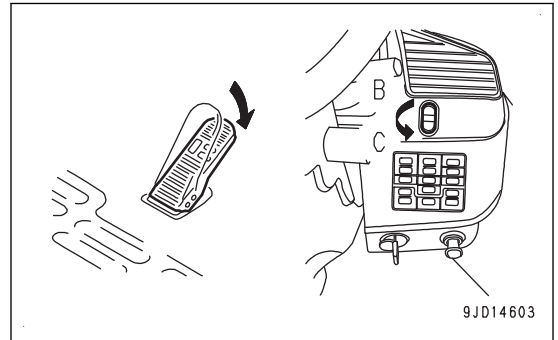
- Operate boom control lever (3) to set the work equipment to travel posture as shown in the figure.
(A): 40 to 50 cm {15.7 to 19.7 in}



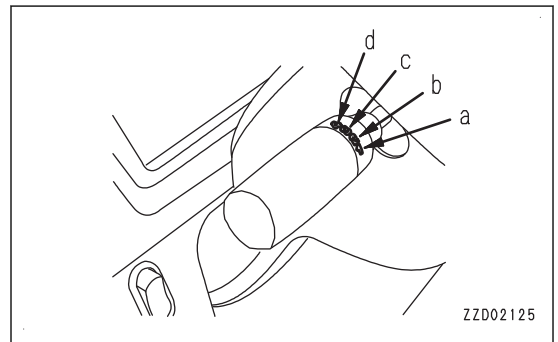
- Depress R.H. brake pedal (5) and set parking brake switch (6) to OFF position (C) to release the parking brake.
Keep R.H. brake pedal (5) depressed.

REMARK

When the parking brake remains applied even if parking brake switch (6) is at OFF position (C), turn the parking brake switch to ON position (B), then turn it to OFF position (C) again.



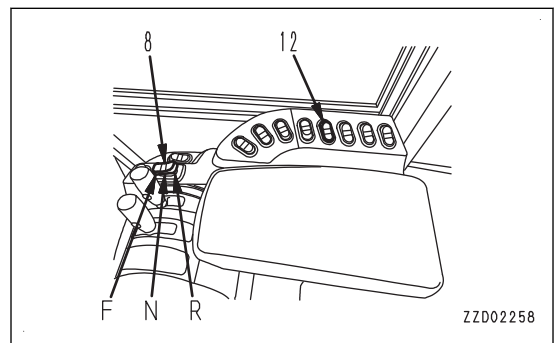
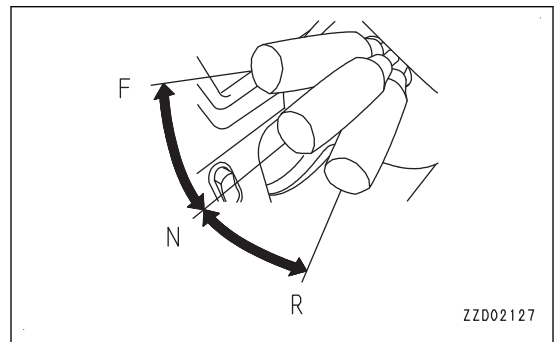
- Set gear speed switch (7) to the desired position.
Position (a): 1st speed
Position (b): 2nd speed
Position (c): 3rd speed
Position (d): 4th speed



- Set directional lever (7) to the desired position.
Position (F): FORWARD
Position (N): NEUTRAL
Position (R): REVERSE
Check that the backup alarm sounds when the directional lever is set to REVERSE.
If the backup alarm does not sound, ask your Komatsu distributor for repairs.

REMARK

Switch (8) also serves to switch the travel direction among FORWARD, NEUTRAL, and REVERSE.
Position (F): FORWARD
Position (N): NEUTRAL
Position (R): REVERSE
When selecting FORWARD, NEUTRAL or REVERSE with this switch (8), set directional lever (7) to NEUTRAL position and directional selector enable switch on R.H. switch panel (12) to ON position.

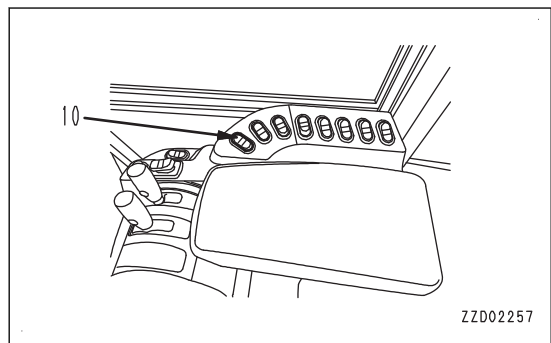
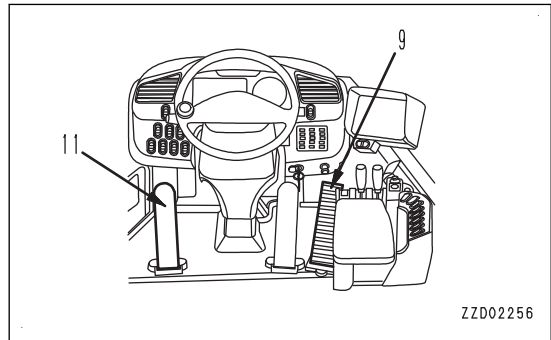
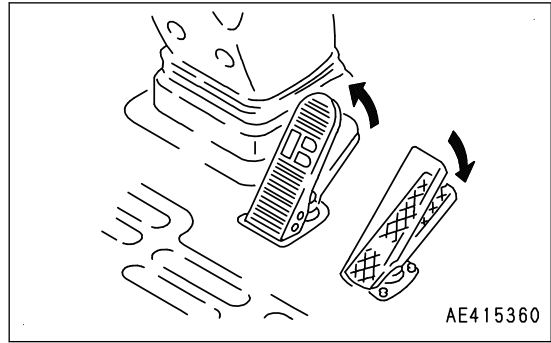


7. Release R.H. brake pedal (5), then depress accelerator pedal (9).

REMARK

When moving the machine off at an uphill, set transmission cut-off switch (10) to OFF position, move the directional lever in position while depressing L.H. brake pedal (11), depress accelerator pedal (9), and then release L.H. brake pedal (11) gradually.

This prevents the machine from rolling back.



METHOD FOR SHIFTING GEAR

WARNING

When the machine is traveling at high speed, do not shift gear abruptly. Use the brake to reduce the travel speed before shifting gear.

Shift gear as follows.

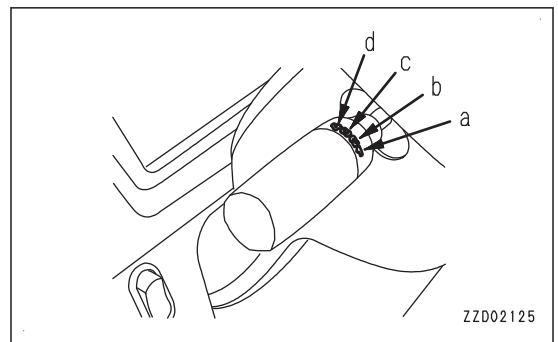
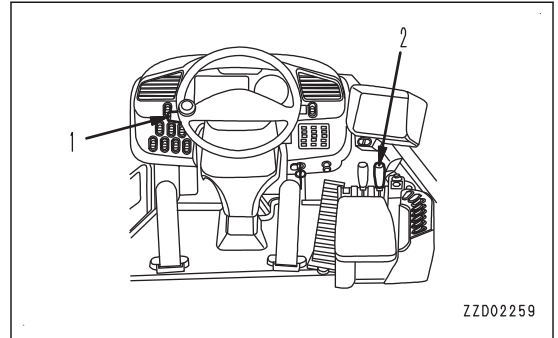
Set gear speed switch (1) to the desired position to shift gear.

Position (a): 1st speed

Position (b): 2nd speed

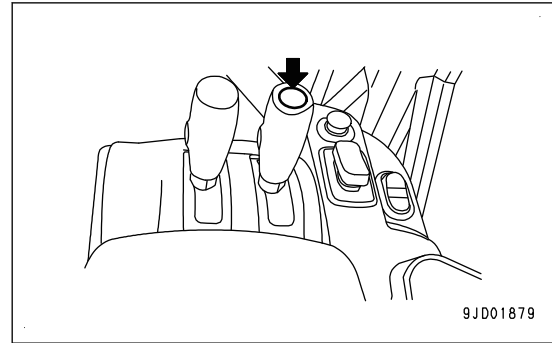
Position (c): 3rd speed

Position (d): 4th speed



REMARK

- If the gear speed switch is operated slowly or is stopped between gear positions, the centralized warning lamp may light up and the alarm buzzer may sound. This is not a failure in this case.
Operate the gear speed switch so that gear shifting is completed in 2 seconds.
- This machine is equipped with kickdown switch (2). When traveling in 2nd, if kickdown switch (2) is pressed, the gear is shifted down to 1st.
Use of the kickdown switch is recommended for the operations such as digging and loading that are performed at 1st and 2nd.
For the operating procedure, see “KICKDOWN SWITCH (3-109)”.
- This machine is equipped with the auto-shift system for the automatic gear shifting. For the operating procedure, see “TRANSMISSION SHIFT MODE SELECTOR SWITCH (3-117)” and “AUTOMATIC SHIFT (3-121)”.
- When the machine is traveling at high speed, if the gear speed switch is operated to a slower gear speed such as from 4th to 3rd and from 4th to 2nd while depressing the accelerator pedal, the shift down is not enabled to protect overrun of the engine.
In such case, the centralized warning lamp lights up and the alarm buzzer sounds.
If the alarm buzzer sounds, release the accelerator pedal immediately, depress the brake pedal to reduce the speed and then shift the gear.



METHOD FOR SWITCHING BETWEEN FORWARD AND REVERSE

⚠ WARNING

- When switching the travel direction between FORWARD and REVERSE, check the safety in new direction in which the machine moves. The area behind the machine is a blind spot. Particularly pay attention when traveling in reverse.
- Do not make directional change while the machine is traveling at a high speed. When switching the direction, depress the brake pedal to reduce the travel speed sufficiently, then switch the direction. (Max. 12 km/h {7.5 MPH})
- When driving the machine downhill through inertia, set the directional lever to the position that matches the machine traveling direction. If the direction lever is set to the direction opposite to that of the machine travel, engine stall can result and it is very dangerous.

You can switch the travel direction without stopping the machine .

Set directional lever (1) to a desired position.

Position (F): FORWARD

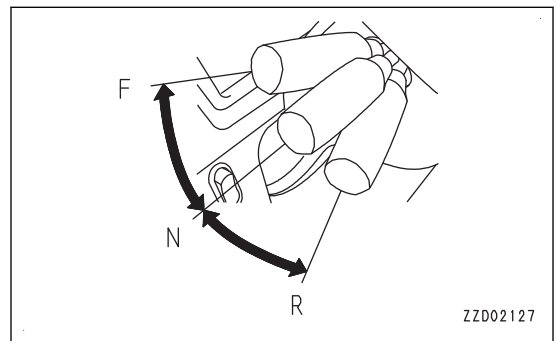
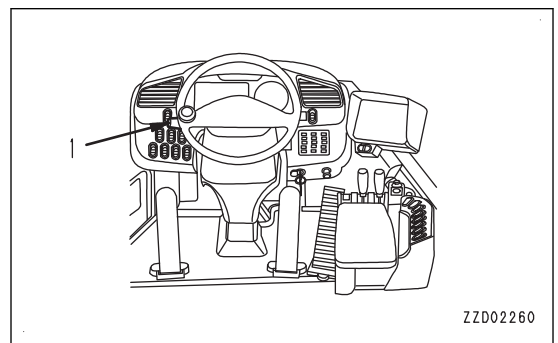
Position (N): NEUTRAL

Position (R): REVERSE

Check that the backup alarm sounds when the directional lever is set to R. If the backup alarm does not sound, ask your Komatsu distributor for repairs.

REMARK

If you operate the directional lever slowly or stop it at midway between the lever positions, the centralized warning lamp may light up and the alarm buzzer may sound. In this case, there is no failure, but operate the directional lever so that directional change is completed within 2 seconds.



If you try to change the direction while the machine is traveling at a high speed (when 3rd or 4th speed is used), the centralized warning lamp lights up and alarm buzzer sounds if the travel speed and engine speed are in (A) or (B) region of the table.

If the alarm buzzer sounds, depress the brake pedal immediately to reduce the travel speed sufficiently, then switch the travel direction.

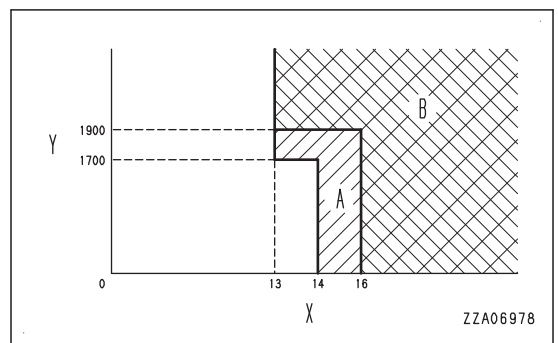
(X): Travel speed (km/h)

(Y): Engine speed (rpm)

In auto shift mode

If you perform a directional change when the auto shift mode is selected, the gear speed changes automatically, for example, from F3 to R2, from F4 to R2, from R3 to F2, or from R4 to F2, allowing you to move the machine off quicker than usual.

However, if you try directional switching during a high-speed travel such as region (A) or (B) in the table, the centralized warning lamp lights up and the alarm buzzer sounds.



If the alarm buzzer sounds, depress the brake pedal immediately to reduce the travel speed sufficiently, then switch the travel direction.

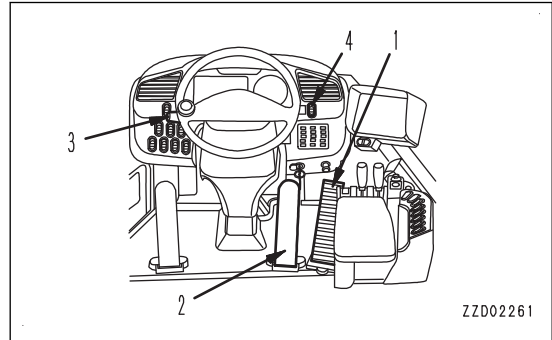
In particular, you must be careful about switching the direction in region (B). In this region, actual gear speed is not changed to 2nd speed but rather switches like F3→R3, F4→R4 or R3→F3, R4→F4. Deceleration of the machine is less than the one available in region (A).

If you set the directional lever to position (N) while the machine is traveling at a high speed (25 km/h {15.5 MPH} or higher), the alarm buzzer sounds. If the alarm buzzer sounds, return the lever to the same position as the travel direction.

METHOD FOR STOPPING MACHINE

WARNING

- Avoid a sudden stop. Stop the machine gradually.
- Do not park the machine on a slope. If it is unavoidable to place the machine on a slope, place the machine at a right angle to the slope face, chock the tires, and then lower the bucket to the ground.
- If the work equipment control levers are touched by mistake, the work equipment may move suddenly causing a serious accident. Before leaving the operator's seat, be sure to lock the work equipment by pressing the work equipment lock switch (the pilot lamp lights up).
- Keep depressing the brake pedal until the parking brake pilot lamp lights up on the machine monitor even when the parking brake switch has been turned ON.

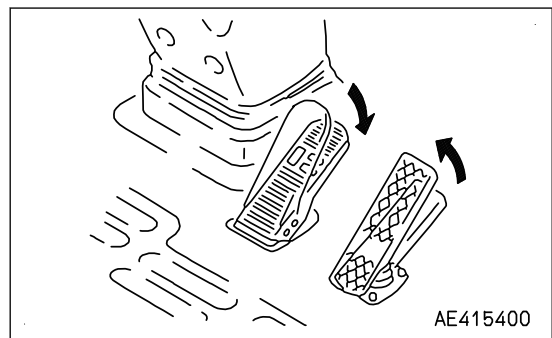


NOTICE

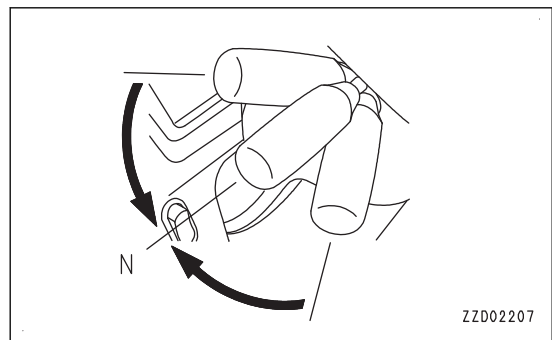
Never use the parking brake switch to brake the machine when the machine is traveling except in an emergency.

Apply the parking brake after the machine is stopped.

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



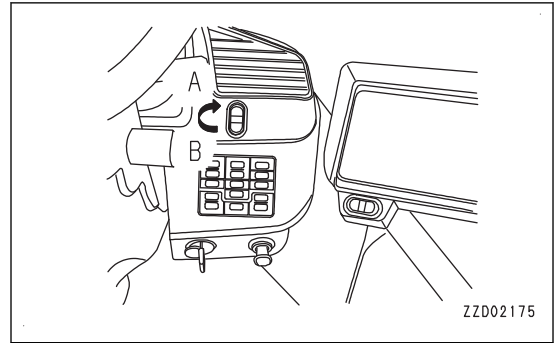
2. Set directional lever (3) in NEUTRAL position (N).



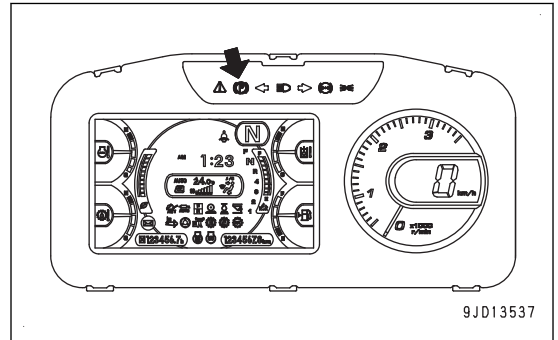
3. Set the parking brake switch (4) to ON position (A) and apply the parking brake.

REMARK

Applying the parking brake automatically sets the transmission to NEUTRAL.



4. After the parking brake pilot lamp lights up, release the brake pedal gradually.



TRANSMISSION CUT-OFF FUNCTION

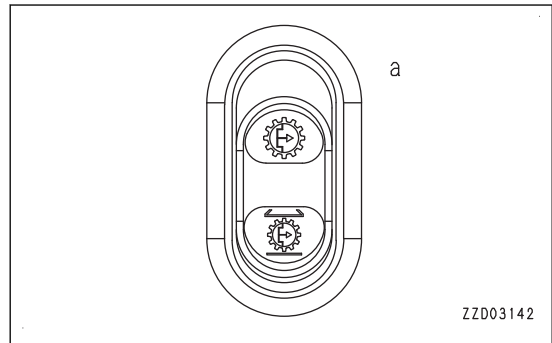
Turn the transmission cut-off switch ON.
 The transmission cut-off pilot lamp lights up on the monitor and the following transmission cut-off function works.

When the brake pedal is depressed, the brakes are actuated and the transmission is returned to NEUTRAL at the adjusted brake pedal depressing position.

Position (a): Each time it is pressed, the transmission cut-off function switches between ON and OFF.

When you release your hand, the switch returns automatically to its original position.

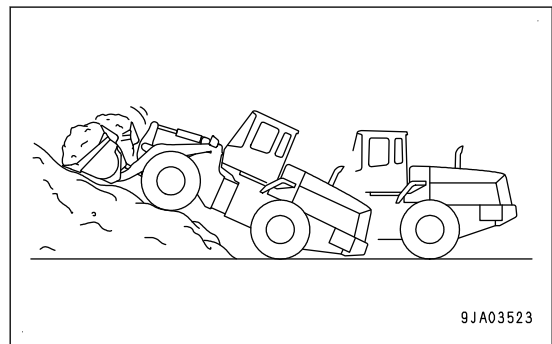
When the brake pedal is depressed, the brakes are actuated and the transmission is returned to NEUTRAL at the adjusted brake pedal depressing position.



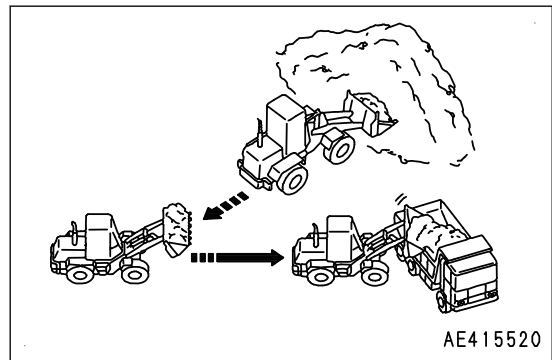
REMARK

- For adjustment of the depressing position of the brake pedal, see “METHOD FOR ADJUSTING TRANSMISSION CUT-OFF POSITION (3-219)”.
- Adjust the depressing position of the brake pedal high or low depending on the type of work described below.

- When performing piling-up operation, set the transmission cut-off (transmission in NEUTRAL) position of the brake pedal to a lower position. In this setting, the power from the transmission is cut with the brake exerting ample braking force, so this prevents the machine from slipping down.



- When approaching a dump truck during loading operation, set the transmission cut-off (transmission in NEUTRAL) position of the brake pedal to a higher position. In this setting, the fine control of the brake is only required just in front of the dump truck, so you can control and stop the machine easily and softly.



- Turn the switch to ON position during operation.
 In the downhill travel, however, turn OFF the transmission cut-off function and use engine braking.
 The brake pedals installed on the right and left sides of the steering post provide the same function.

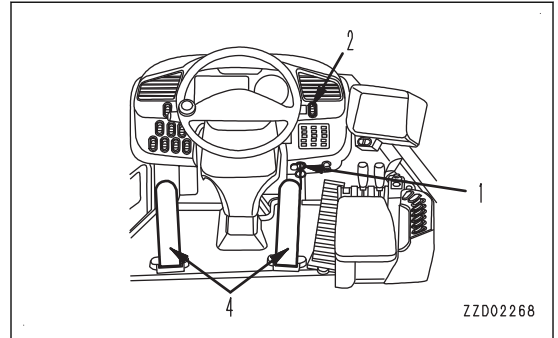
METHOD FOR ADJUSTING TRANSMISSION CUT-OFF POSITION

⚠ CAUTION

Apply the parking brake, before starting adjustment of the transmission cut-off position.

Adjust the brake pedal depressing position.

1. Start the engine with starting switch (1), set parking brake switch (2) to ON (operation) position.



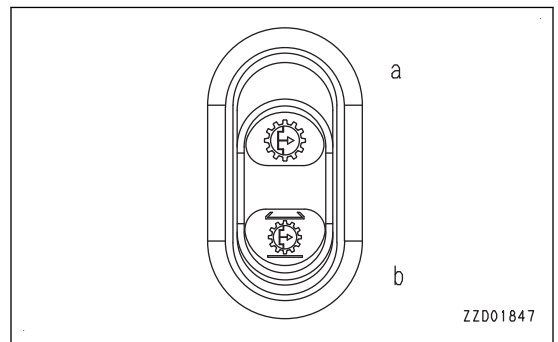
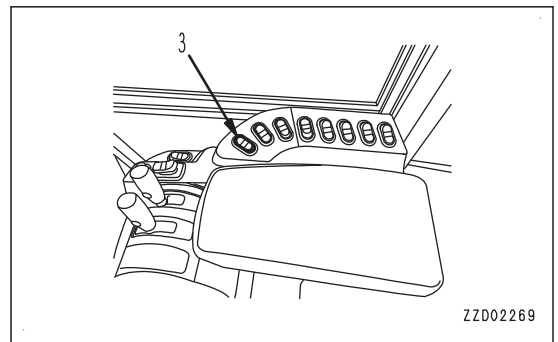
2. Press (a) of transmission cut-off switch (3) to set it to ON position.

Check that the transmission cut-off pilot lamp is lit.

3. Depress brake pedal (4) to adjust the set position where the transmission is NEUTRAL.

4. Press (b) of transmission cut-off switch (3), and release it.

When you release the switch, the buzzer beeps indicating that the cut-off position is set.



Method for canceling the cut-off position

5. Press part (b) of transmission cut-off switch (3) again while the transmission cut-off pilot lamp is flashing. The transmission cut-off pilot lamp flashes for 2 seconds after the buzzer sounds in step 4. Beep of the buzzer sounds, and the adjusted cut-off position is canceled.

METHOD FOR BRAKING WHILE ACTIVATING TRANSMISSION CUT-OFF FUNCTION

If you depress the brake pedal when the transmission cut-off switch is ON, the transmission is set to NEUTRAL position at the adjusted brake pedal depressing position.

REMARK

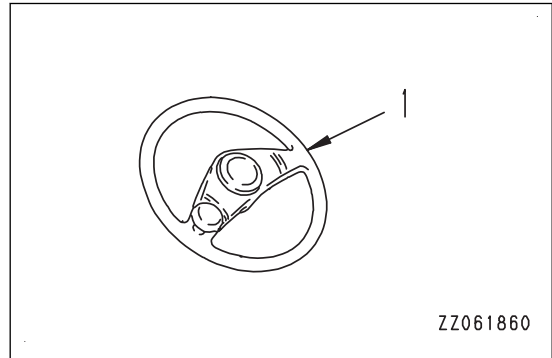
When the transmission cut-off switch is OFF, the transmission is not set to NEUTRAL unless the directional lever is shifted to (N).

METHOD FOR STEERING MACHINE

WARNING

- Avoid steering during high-speed travel or steering on a steep slope, since it is dangerous.
- If the engine is stopped during travel, the secondary steering is actuated. Note that this is only a secondary steering system, so do not stop the engine during travel. It is particularly dangerous if the engine is stopped while the machine is traveling on slopes, so never try such practice. If the engine stops, place the machine immediately in a safe place.

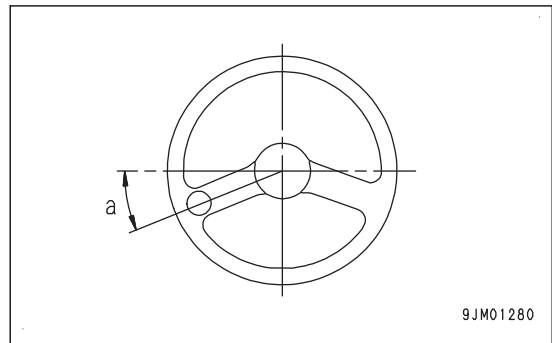
- When the machine is traveling, turn steering wheel (1) to the desired direction, then the machine turns to the direction.
Front and rear frames of this machine articulates around the connection pin (center pin) at which the 2 frames are connected with each other and the rear wheels follow the trace of the front wheels.



- Turn the steering wheel lightly as it follows the turning of machine.

NOTICE

When steering the machine fully, if the steering wheel is turned to its stroke end, do not try to turn it further. Check that play (a) of steering wheel is 50 to 100 mm {2.0 to 3.9 in} , and that operation of steering wheel is normal. If any problem is found, ask your Komatsu distributor for inspection.



HANDLE SECONDARY STEERING SYSTEM

! CAUTION

- Do not actuate the secondary steering except in trouble or checking the function.
- The secondary steering is continuously operable within 60 seconds. Continuous operation beyond 60 seconds may damage the system.
- When using the secondary steering, limit the travel speed to 5 km/h {3.1 MPH} or less.
- If the steering becomes heavy, keep the secondary steering switch pressed, move the machine immediately to a safe place and stop it there.

Even when the engine is stopped due to a trouble or for checking the function, if the secondary steering pilot lamp (green) (2) lights up when you press secondary steering switch (1), steering (turning) operation becomes available.

Secondary steering pilot lamp (green) (2) lights up to inform the operator that the secondary steering system has been actuated.

The secondary steering system is designed to enable the turning (steering) operation under the following conditions.

- The starting switch is at ON position.
- The steering oil pressure is low or there is no pressure.
(When the engine is stopped, or the steering pump is failed, etc.)

3 seconds after the starting switch is turned to ON position, the secondary steering automatically performs a self check for 3 seconds. For detail, see “SELF-CHECK FUNCTION FOR SECONDARY STEERING (3-222)”.

When the secondary steering controller detects lack of oil pressure in the steering system, steering oil pressure caution lamp (red) (3) and centralized warning lamp (4) lights up and the alarm buzzer sounds intermittently.

When this happens, if the machine is traveling at 2 km/h {1.2 MPH} or above, the electric pump motor is automatically actuated and secondary steering pilot lamp (green) (2) lights up.

Steering oil pressure caution lamp (red) (3) lights up to inform the operator that there is a failure in the steering system.

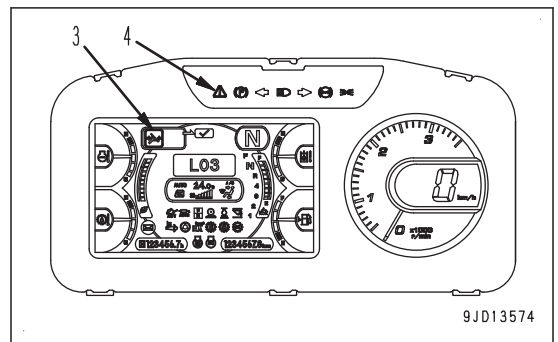
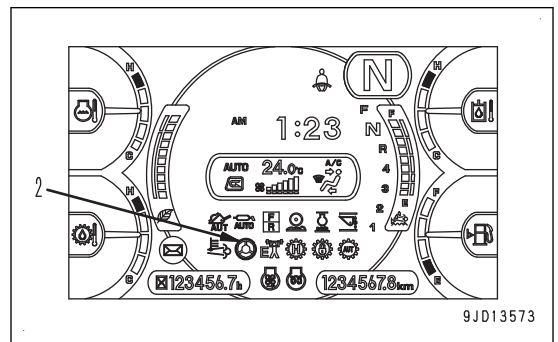
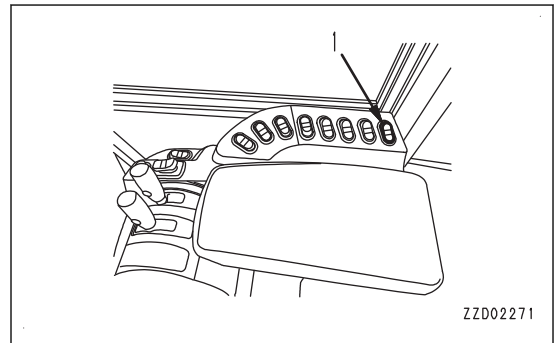
If steering oil pressure caution lamp (red) (3) lights up, move the machine immediately to a safe place and stop it there.

Do not operate the machine until the cause is identified and repair is completed.

REMARK

When engine is running at low speed and when you use some hydraulic system functions, red steering pressure caution lamp (3) may light up temporarily. There is no problem if the lamp is lit only instantaneously.

When the secondary steering controller detects recovery of the oil pressure in the steering system, actuation of the secondary steering system stops.



SELF-CHECK FUNCTION FOR SECONDARY STEERING

The secondary steering is started automatically in approximately 3 seconds after the starting switch is turned to ON position to check the secondary steering function.

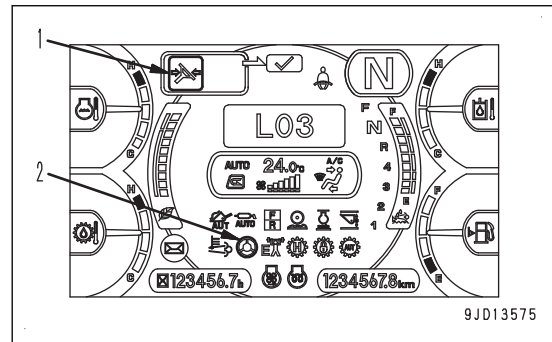
Steering oil pressure caution lamp (red) (1) and secondary steering pilot lamp (green) (2) light up simultaneously.

If the steering oil pressure caution lamp (red) or the secondary steering pilot lamp (green) does not light up, it is abnormal.

Ask your Komatsu distributor for inspection.

CAUTION

**If the machine is steered during self-check, it may move.
Do not steer the machine during self-check.**



Check of the secondary steering is not performed in the following cases.

- When you have turned the starting switch to ON position and, without starting the engine, turned it to OFF position then turned it to ON position again
- When you have turned the starting switch to ON position again immediately after the engine is stopped when the steering pressure is not completely lowered
- When the engine preheating is operated

To check the secondary steering function, press the secondary steering switch after the warm-up operation.

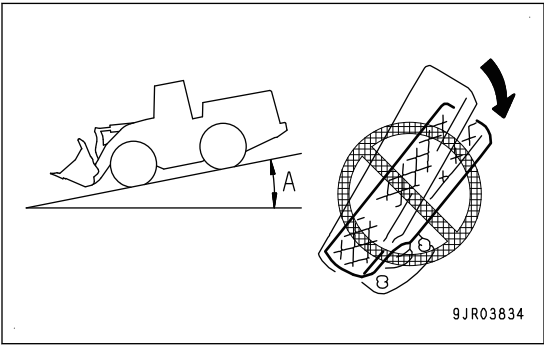
HANDLE TORQUE CONVERTER LOCKUP

When turning the starting switch of this machine to ON position, the lockup mode is turned on.

When changing the setting, see “LOCKUP FUNCTION SETTING WHEN KEY IS ON (3-81)”.

⚠ WARNING

While traveling a downhill (A) of 6° or steeper, do not depress the accelerator pedal to the stroke end regardless of ON or OFF of the torque converter lockup function mode. Otherwise, accidents can be caused by an excessive speed.



NOTICE

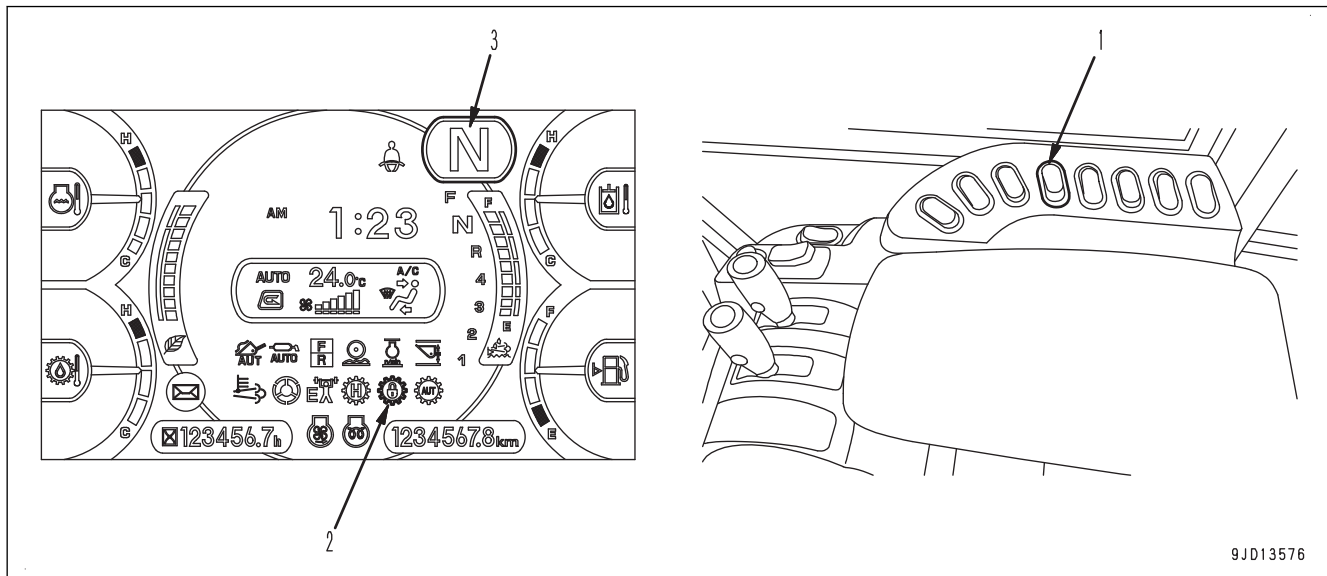
During the high-speed travels listed below, do not shift down the gear speed in order to prevent overrun. (The travel speed specified in this section may vary depending on the conditions of use or on road surface condition.)

- Do not shift down to F2 while the machine is traveling at 18 km/h {11.2 MPH} or faster in F3.
- Do not shift down to F3 while the machine is traveling at 28 km/h {17.4 MPH} or faster in F4.

When the actual gear speed is in the rang of 2nd to 4th in both the forward and reverse, the torque converter lockup function is activated corresponding to the actual travel speed and type of operation to shift the transmission to the direct drive.

In order to prevent overrun, the lockup is automatically canceled if engine speed reaches 2500 rpm or above in each gear speed.

General view



- (1) Torque converter lockup switch
- (2) Torque converter lockup mode display
- (3) Shift indicator (indicates actual gear speed)

The lockup is activated or canceled at the following speed.

Lockup Gear speed	Forward travel speed km/h { MPH}		Reverse travel speed km/h { MPH}	
	Actuated	Canceled	Actuated	Canceled
2nd	8.0 to 11.0 {5.0 to 6.8}	7.0 to 8.0 {4.3 to 5.0}	9.0 to 12.0 {5.6 to 7.4}	8.0 to 9.0 {5.0 to 5.6}
3rd	14.0 to 18.0 {8.7 to 11.2}	14.0 to 15.0 {8.7 to 9.3}	15.0 to 19.0 {9.3 to 11.8}	14.0 to 16.0 {8.7 to 9.9}
4th	22.0 to 26.0 {13.7 to 16.2}	22.0 {13.7}	24.0 to 28.0 {14.9 to 17.4}	23.0 {14.3}

TRAVEL SPEED WARNING FUNCTION

Travel speed warning function

(This function works even when the torque converter lockup function mode is OFF.)

When the travel speed reaches 40.0 km/h {24.9 MPH} or above, the centralized warning lamp lights up and the alarm buzzer sounds.

If the alarm buzzer sounds, depress the brake immediately to reduce the travel speed.

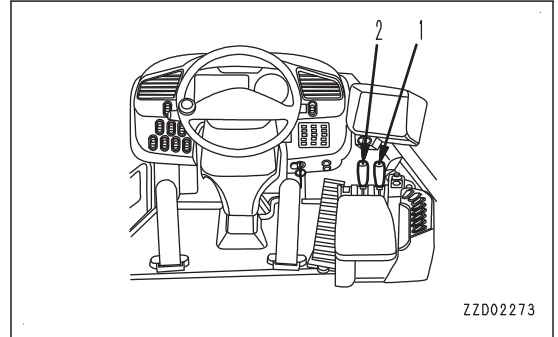
The alarm buzzer stops sounding when the travel speed is reduced to 39.5 km/h {24.5 MPH} or below.

METHOD FOR OPERATING WORK EQUIPMENT

NOTICE

Even if the engine is stopped, if the starting switch is at ON position and lock of the work equipment is canceled (pilot lamp is not lit), the work equipment can be operated.

Boom control lever (1) and bucket control lever (2) are used to operate the boom and bucket in the following manners.



METHOD FOR OPERATING BOOM

The boom control lever is used to control the boom.

NOTICE

Do not use "FLOAT" position when lowering the bucket. Use "FLOAT" when "LEVELING WORK (3-231)".

Position (a): RAISE

If the boom control lever is pulled further from "RAISE" position, the lever stops in that position.

When the remote boom positioner is enabled, the boom stops at the preset position and the lever returns to "HOLD" position at the same time.

When the remote boom positioner is disabled, the boom stops at the highest position and the lever returns to "HOLD" position at the same time.

Position (b): HOLD

The boom remains in the position where it was stopped.

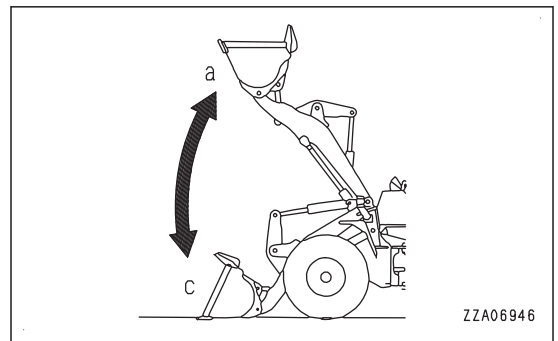
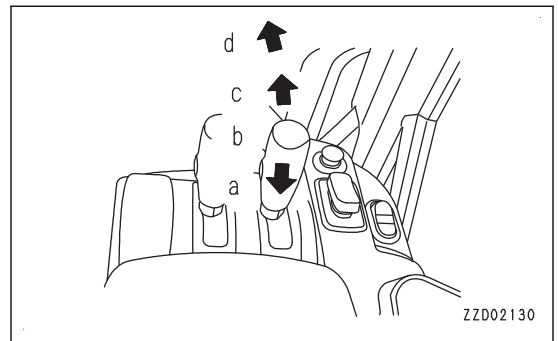
Position (c): LOWER

Position (d): FLOAT

The boom moves freely under external force. If the boom control lever is turned to "FLOAT" position, the lever stops in that position.

When the remote boom positioner is enabled, the boom stops at the preset position and the lever returns to "HOLD" position at the same time.

When the remote positioner is not set, the lever remains in "FLOAT" position and does not return.



METHOD FOR OPERATING BUCKET

The bucket control lever is used to operate the bucket.

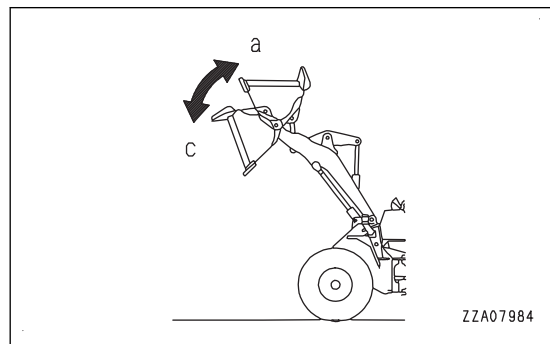
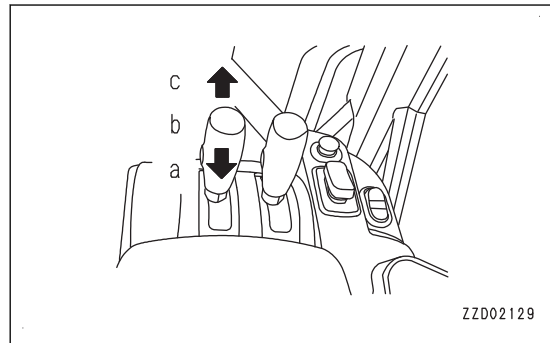
Position (a): TILT

When the bucket control lever is pulled further from TILT position, the lever stops in that position. As soon as the bucket reaches the preset position by the bucket positioner, the lever returns to HOLD position.

Position (b): HOLD

The bucket remains in the position where it was stopped.

Position (c): DUMP



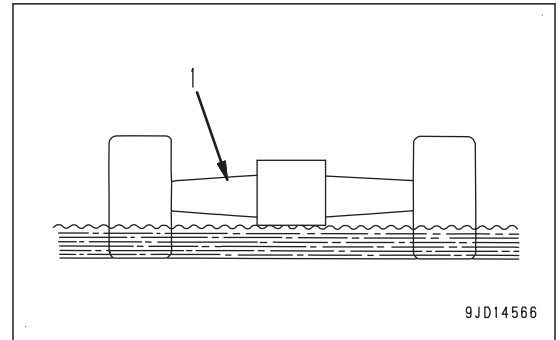
PRECAUTIONS FOR OPERATION

PERMISSIBLE WATER DEPTH

When operating the machine in water or on swampy ground, do not move it to a place where the water depth is beyond the permissible level (up to the bottom surface of axle housing (1)).

After finishing the operations, wash the machine and lubricate the parts that have been exposed to water.

If the brake creaks, change all of the axle oil.



IF BRAKE DOES NOT STOP MACHINE MOVE

If the machine is not stopped by depressing the brake pedal, use the parking brake to stop the machine.

NOTICE

If the parking brake was used as a secondary brake, ask your Komatsu distributor to inspect the parking brake system for any trouble.

PRECAUTIONS WHEN TRAVELING ON SLOPES

LOWER CENTER OF GRAVITY WHEN STEERING MACHINE

When turning the machine on a slope, lower the work equipment to lower the center of gravity before turning. Turning on a steep slope is dangerous and, thus, prohibited.

TRAVEL DOWNHILL

Directional lever or directional selector switch (if equipped) must not be set to NEUTRAL position (N) while traveling or traveling downhill. Set the direction of directional lever or directional selector switch (if equipped) in the traveling direction of the machine.

- It is dangerous that the engine brake is disabled and the steering wheel becomes heavier.
- The transmission and other parts of the power train may be damaged, and it may cause serious personal injury or death.

If you use the foot brake too frequently during downhill travel, the brake may be overheated and damaged.

Set the gear speed switch to a lower gear speed, turn OFF the transmission cut-off function, and drive the machine with engine brake applied effectively.

If the brake oil temperature caution lamp lights up because of frequent use of the brake, take proper actions according to "BRAKE OIL TEMPERATURE CAUTION LAMP (3-24)" in EXPLANATION OF COMPONENTS.

If the gear speed switch is not shifted to the appropriate gear, the torque converter oil may be overheated. In such case, shift down 1 gear range and reduce the oil temperature.

If the gauge does not enter the green range even at 1st speed, stop the machine, return the directional lever to NEUTRAL position (N) and run the engine at medium speed until the gauge enters the green range.

ACTIONS IF ENGINE STOPS

If the engine stops on a slope, apply the parking brake immediately, lower the work equipment and stop the machine. Set the directional lever to NEUTRAL position (N), and start the engine again.

PRECAUTIONS FOR TRAVELING

A long distance travel at high speed can heat the tires extremely and cause premature damage on them. Avoid it as long as possible.

If the machine must be driven for a long distance, take the following precautions.

- Follow the regulations related to this machine, and drive carefully.
- Before driving the machine, perform the checks before starting.
- The most suitable tire pressure and travel speed differ according to the tire type and condition of the travel surface. Contact your Komatsu distributor or tire dealer.
- The following shows the appropriate tire pressure and travel speed when the machine is equipped with standard tires (23.5R25☆) and runs on the paved surface.
The tire pressure of both front and rear wheels is 400 kPa {4.0 kgf/cm², 56.9 PSI}.
Travel speed 14 km/h {8.7 MPH}
- Check the tire inflation pressure before driving, when the tires are cool.
- Stop the machine for 30 minutes after the travel of 1 hour, and check the tires and each part for any abnormality. Check the oil level and coolant level as well.
When stopping the machine in extremely cold areas, do as follows.
Do not stop the engine abruptly to prevent the radiator coolant temperature from rising sharply. Cool the radiator coolant down gradually before stopping the engine.
- Always travel with the bucket empty.
- Never travel with calcium chloride or dry ballast in the tires.

PAY ATTENTION TO DEF LEVEL

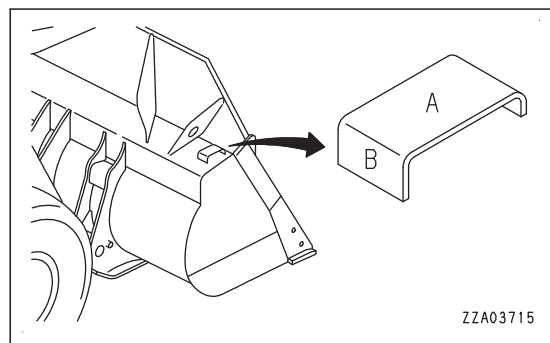
Before working on a slope or traveling on a rough ground, check DEF tank and add sufficient amount of DEF as necessary. If the remaining DEF level becomes low, sudden drop of its level or abnormality in urea SCR system may be detected. If DEF level caution lamp or DEF system caution lamp lights up in red, move the machine to a level place immediately and add DEF.

METHOD FOR CHECKING BUCKET ANGLE

The indicator in the top right side corner of the bucket allows check of the bucket angle during operation.

(A): In parallel with cutting edge

(B): At 90° to cutting edge



RECOMMENDED APPLICATIONS

In addition to the operations that follow, it is possible to further increase the range of applications by use of various attachments.

DIGGING WORK

⚠ WARNING

- You must not do the digging or scooping work while the machine is articulated. The machine loses the balance, and it is dangerous.
- For the machine with ECSS, during the travel or while the work equipment is raised, do not set the ECSS switch to the ON position. If the ECSS switch is set to the ON position, the work equipment will move and it is dangerous.
Before you operate the ECSS switch, be sure to stop the machine and lower the work equipment to the ground.
- For the machines with ECSS, if the machine is operated while the ECSS switch is in the ON position, the work equipment possibly starts moving at the moment when the ECSS is operated.

NOTICE

Be careful that the tires do not slip during digging operation.
If the tires slip, their service lives will decrease.

Put the machine to the target material at right angle, use the bucket edge to do the digging operation while the machine travels forward.

LOAD STOCK PILES AND BLASTED ROCKS

While you drive the machine forward, scoop the stock piles or blasted rocks, and load the truck with them. Be careful of the points that follow to prevent cuts on the tires caused by tire slip.

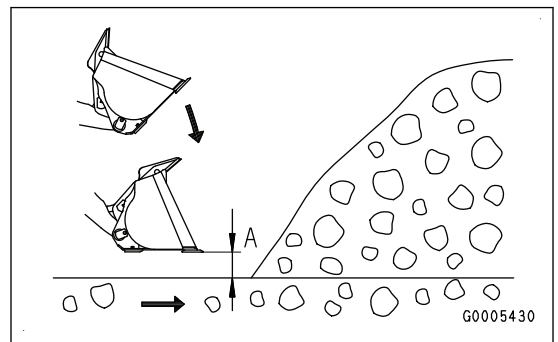
- Always level the jobsite. Remove the blasted rocks.
- The 1st or 2nd gear speed is recommended for stock piles. The 1st gear speed is recommended for blasted rocks.

1. When you lower the bucket while you drive the machine forward, stop the bucket for the moment at height (A), approximately 30 cm{11.8 in} from the ground, then lower it further slowly.

If the bucket hits the ground, the front tires come off the ground, the tires will slip.

2. Shift down in front of the piled soil. Complete the shift down and push the accelerator pedal to scoop the soil at the same time.

Make the accelerator pedal pushing quantity minimum to save fuel consumption. Even if the accelerator pedal is pushed deeply, only fuel consumption is increased. The loading volume does not increase.

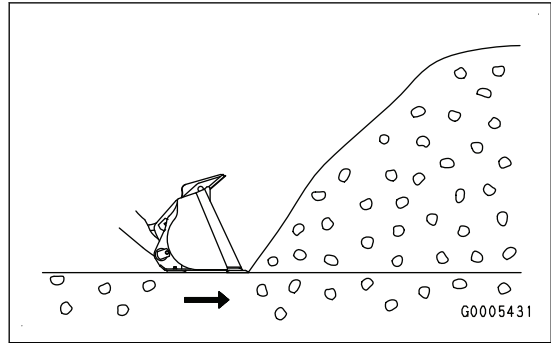


REMARK

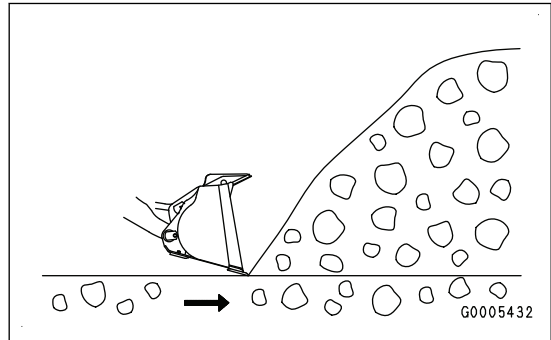
The kickdown switch is useful for the downshift operation. When the auto-kickdown is enabled, the gear is automatically shifted down to 1st speed if the requirements, such as digging is in operation, are satisfied.

3. Change the angle of the bucket edge to the one that agrees with the target material.
Scoop the material in the center of the bucket not to put the load to only one side of the bucket.

- When the target material is stockpile, set the bucket edge horizontal.



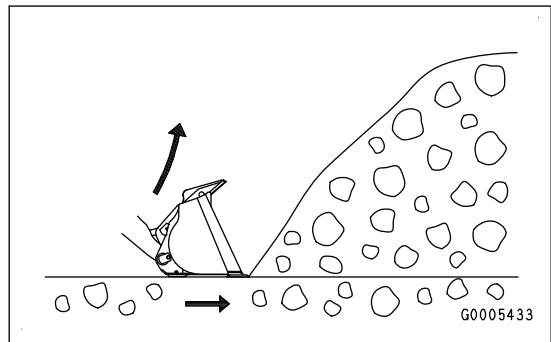
- When the target material is blasted rock, set the bucket edge faced down to a small degree.
Be careful not to get blasted rock under the bucket. This will make the front tires come off the ground and slip.



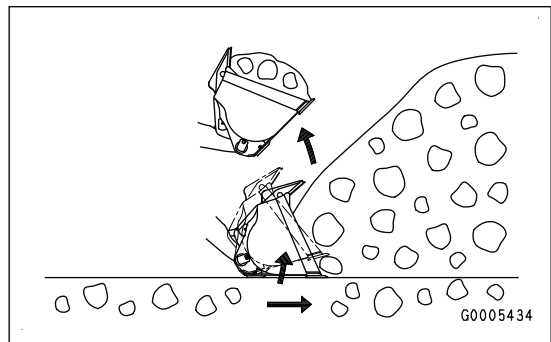
4. Thrust the bucket into the target material, and raise the boom.

When the boom is raised, excessive thrust of the bucket is prevented, and the sufficient traction force is applied to the front wheels.

If the bucket thrusts too much and, as a result, the rise of the boom or forward travel of the machine is stopped, release the accelerator pedal to a small degree. If you operate the accelerator pedal for each type of soil, you can save fuel and decrease wear of the tires.

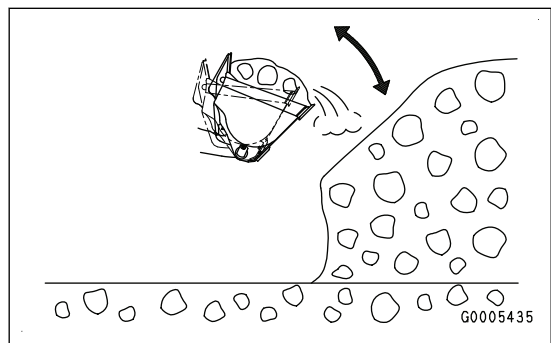


5. Check that material is sufficiently loaded in the bucket.
6. Use the bucket control lever to do the tilting operation several times and load the bucket fully.



7. If excessive material is loaded in the bucket, do the dumping and tilting operation quickly to shake off the excessive load.

If excessive material is loaded in the bucket, the load will spill.



DIG AND LOAD ON HORIZONTAL SURFACE

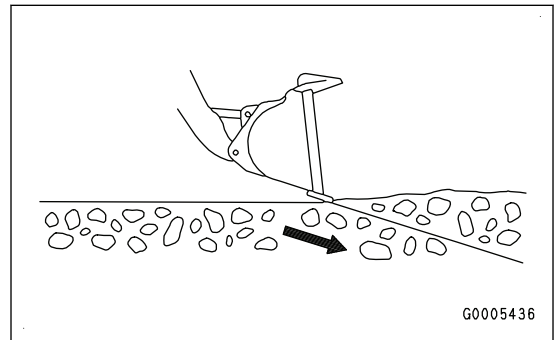
NOTICE

- When the bucket edge is set faced down, do not dump the bucket by 8° or more at the rocky terrain or by 20° or more at the sandy loam. If the bucket edge is bumped into rocks under the ground, a large shock occurs and it can damage the machine.
- For the digging and loading operation on a level ground, set the bucket edge faced down to a small degree as shown below, and drive the machine forward. When you drive the machine forward, always be careful not to put the load to only one side of the bucket. The 1st gear speed is recommended.

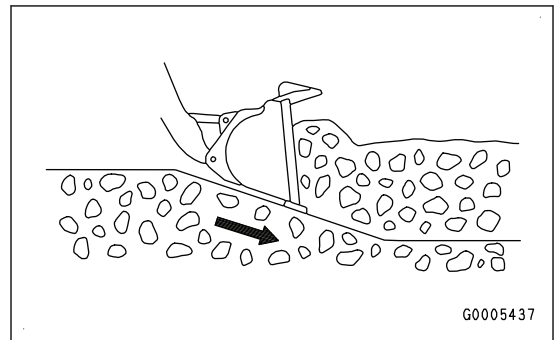
To do the digging and loading operation on a level ground, do the procedure that follows.

1. Set the bucket edge faced down to a small degree than horizontal.

Do not dump the bucket by 8° or more at the rocky terrain or by 20° or more at the sandy loam.

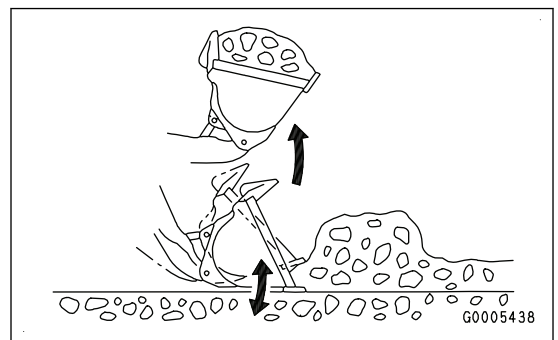


2. Drive the machine forward and dig soil and sand bit by bit as if they are ripped off while the work equipment control lever is tilted to a small degree forward.



3. Drive the machine forward while you adjust the digging depth with the work equipment control lever.

When you dig, do not apply the digging force to only one side of the bucket.



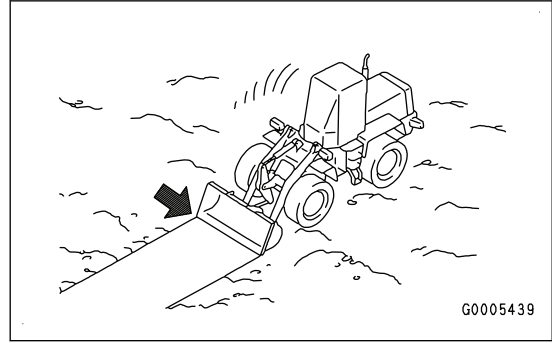
LEVELING WORK

NOTICE

- Always drive the machine in reverse when you do leveling work. When it is unavoidable to drive the machine forward for the leveling work, do not dump the bucket by 8° or more at the rocky terrain or by 20° or more at the sandy loam. The work equipment can be damaged.
- Keep the ECSS switch turned to the OFF position during leveling work.

To do the leveling work, do the procedure that follows.

1. Scoop the soil into the bucket.
2. While you drive the machine in reverse, dump the bucket bit by bit to dump the soil.
3. Lower the boom while the bucket is dumped, and lower the bucket edge to the ground.
4. Drive the machine in reverse while the bucket edge is dragged, and level the ground.
5. Scoop the soil into the bucket.
6. Make the bottom of the bucket horizontal and set the boom to float while the bucket is lowered to the ground.
7. Drive the machine in reverse while the bucket is dragged, and do the finish.



DOZING WORK

NOTICE

- If the bucket is set to the **DUMP** position when you do the dozing operation, the work equipment can be damaged.
- Keep the **ECSS** switch turned to the **OFF** position during the dozing work.

When you do the dozing operation, set the bottom of the bucket parallel with the ground surface.

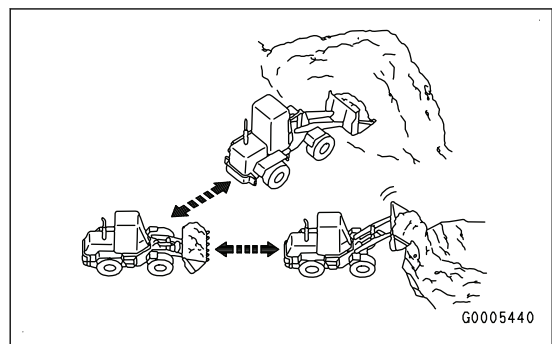
LOAD-AND-CARRY OPERATION

⚠ WARNING

- When the machine carries a load, lower the bucket to lower the center of gravity of the machine.
- For the machine with **ECSS**, during the travel or while the work equipment is raised, do not set the **ECSS** switch to the **ON** position. If the **ECSS** switch is set to the **ON** position, the work equipment will move and it is dangerous.
Before you operate the **ECSS** switch, be sure to stop the machine and lower the work equipment to the ground.
- For the machines with **ECSS**, if the machine is operated while the **ECSS** switch is in the **ON** position, the work equipment possibly starts moving at the moment when the **ECSS** is operated.

The load-and-carry operations with the wheel loader are done continuously in the order of scooping, hauling, and loading (into a hopper, glory hole etc.).

Always keep the travel road in a good condition.



LOADING WORK

WARNING

- Always keep the ground surface of jobsite flat.
- When the load is in the bucket and the boom is raised, sudden steering operation or sudden braking is dangerous.
- When the machine travels at high speed, the thrust-digging work (at the borrow pit or of the crushed rock) is dangerous.
- For the machine with ECSS, during the travel or while the work equipment is raised, do not set the ECSS switch to the ON position. If the ECSS switch is set to the ON position, the work equipment will move and it is dangerous.
Before you operate the ECSS switch, be sure to stop the machine and lower the work equipment to the ground.
- For the machines with ECSS, if the machine is operated while the ECSS switch is in the ON position, the work equipment possibly starts moving at the moment when the ECSS is operated.

NOTICE

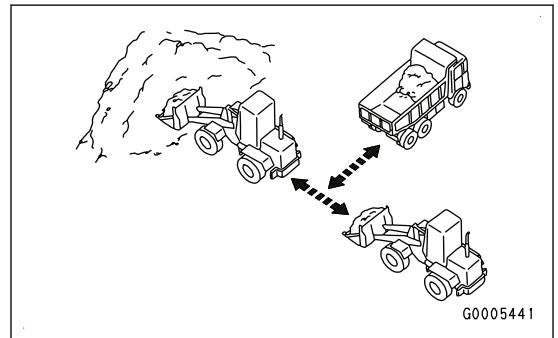
- If the tires slip, their service lives will decrease. Be careful that the tires do not slip during operation.
- Do not shake the bucket too much.

Select an efficient loading method that decreases the number of turns and travel distance to the smallest degrees for the jobsite.

CROSS DRIVE LOADING

Dig the stock pile at a right angle. When scooping is completed, drive the machine straight in reverse. Then, put a truck between the stock pile and the wheel loader, and load the truck.

This method is efficient because it takes the shortest loading time and the cycle time is short.

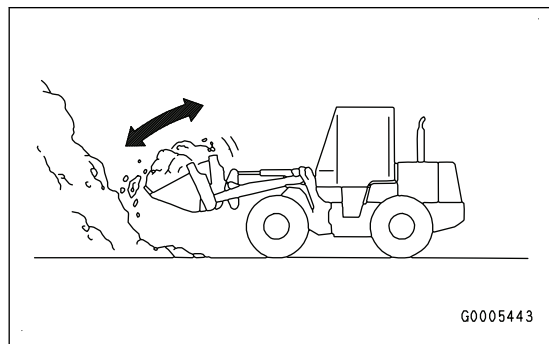
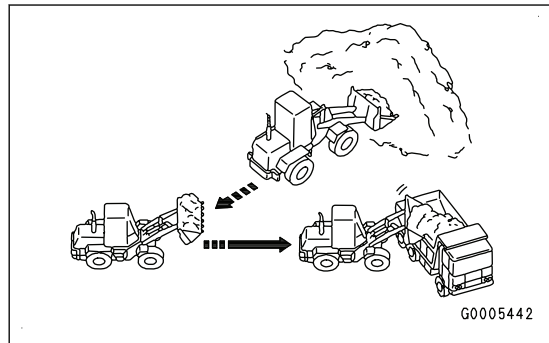


V-SHAPE LOADING

First, park the truck at approximately 60° angle to the direction that wheel loader scoops. When the scooping is completed, drive the wheel loader in reverse and change the direction to the truck at right angle, then drive the wheel loader forward and load the truck.

Make the turn angle as small as possible for the efficient operation.

If you load the bucket full and raise the boom to the maximum height, shake the bucket on the ground to make the load stable before you raise the boom. This prevents load spillage.



PRECAUTIONS FOR FORKING WORK

When you pile up the product soils, be careful not to let the rear counterweight contact with the ground.

Do not set the bucket to the DUMP position when you pile up loads.

PROHIBITED OPERATIONS

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

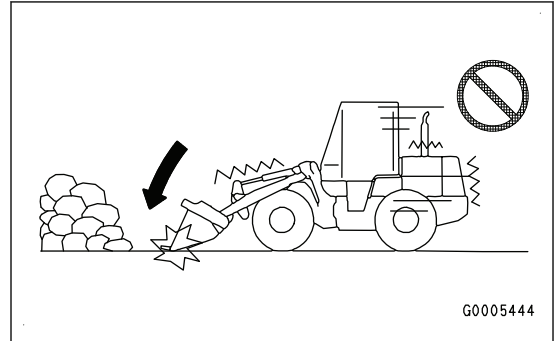
Obey the items that follow.

PROHIBITION OF BUCKET DROP OPERATION

When you go near the cut end wall and lower the bucket to the ground, do not lower the bucket suddenly.

If you lower the bucket suddenly, large shocks are given to the bucket, work equipment, area around the pins, and machine frame. They can be damaged or cracked.

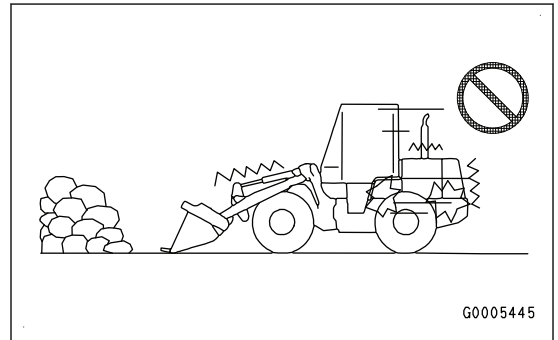
Also, the front wheels are lifted off the ground and the tires easily slip. Decrease the lowering speed near the ground before the bucket contacts with the ground.



PROHIBITION OF ABRUPT SHIFT OPERATION

Do not do the speed shift operation while the accelerator pedal is pushed and the engine is kept at high speed. If you shift the gear while engine is in operation at high speed, a large load is applied to all the power train such as the engine, torque converter, transmission, axle, and final drive.

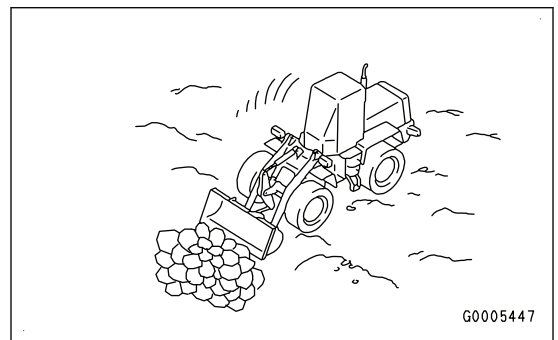
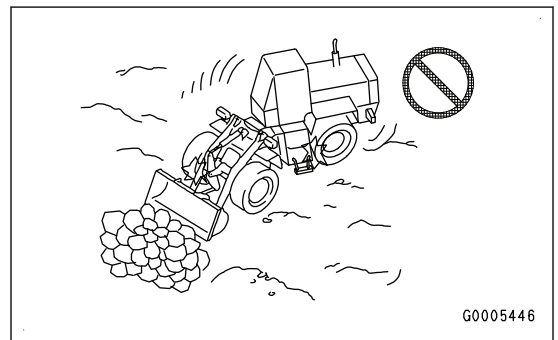
If you shift down the gear to 1st when you thrust the bucket into the cut end wall for digging, release the accelerator pedal to decrease the engine speed. After the engine speed is decreased, shift down the gear and gradually push the accelerator pedal. If you push the accelerator pedal suddenly after the gear is shifted down, a large load is applied to the engine and power train.



PROHIBITION OF DIGGING OPERATION WHILE STEERING

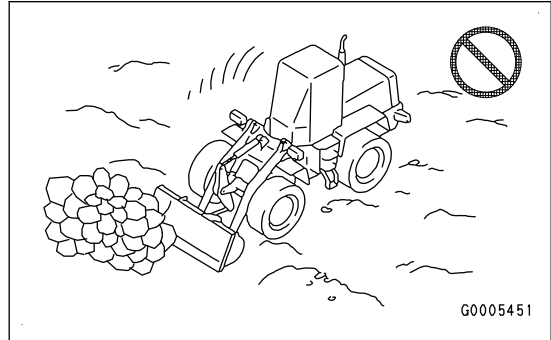
Do not do the digging operation while the machine is articulated. If the machine is articulated, the front and rear wheels face in different directions and the driving force does not work on the front wheels fully. As the result, the digging force is decreased and a large load is applied to the center hinge pin. The force does not work on the right and left front wheels equally, and the load is applied to only one side of the front wheel. The service life of the tire will decrease.

If the machine is articulated while in digging operation, the machine is not stable and the machine will be unbalanced and can fall over.

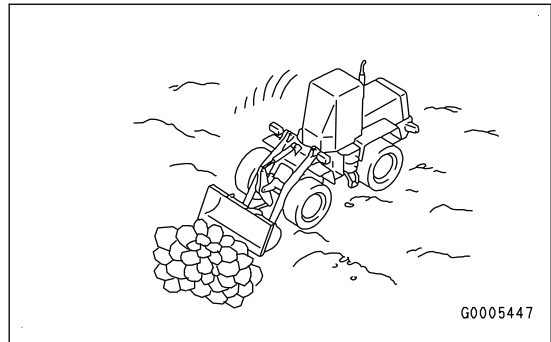


PROHIBITION OF OPERATION WHICH APPLIES LOAD ONLY ON ONE SIDE OF BUCKET

When you load the target material to the bucket by digging and scooping, do not apply a load only to one side of the bucket or bucket corner. If a load is applied only to one side of the bucket or bucket corner, a deformation occurs on the machine, and the service life of the work equipment or frame is decreased.



When you do the digging or scoop operation, be careful that you put the load in the center of the bucket.



PROHIBITION OF DUMPING OPERATION WITH DIGGING BUCKET LOWERED FROM LEVEL POSITION

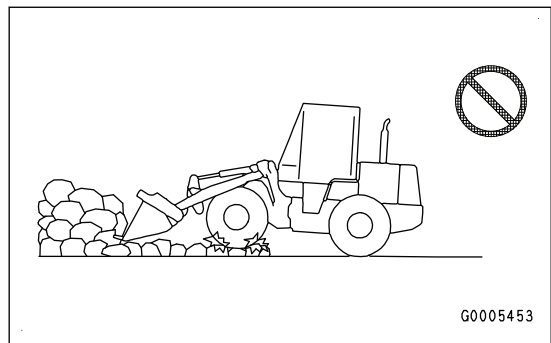
When you do the digging operation, do not do the dumping operation to face the bucket down from the level. If the dumping operation is done to face the bucket down from the level in the digging operation, the machine cannot travel forward, the tires will slip, and a large load will be applied to the work equipment. Do the scoop operation.

PROHIBITION OF RUNNING ON BLASTED ROCKS WITH FRONT WHEEL

Do not drive on piles of blasted rock for operations. If you drive the machine on piles of blasted rock, sharp pieces of blasted rock can damage tires.

Do not especially push the bucket too far or drive the front wheels on the natural ground (roots) near the remaining natural ground (roots) after blasting.

Do not use a wheel loader to do the scooping operation near the natural ground (roots). Use a bulldozer or hydraulic excavator.



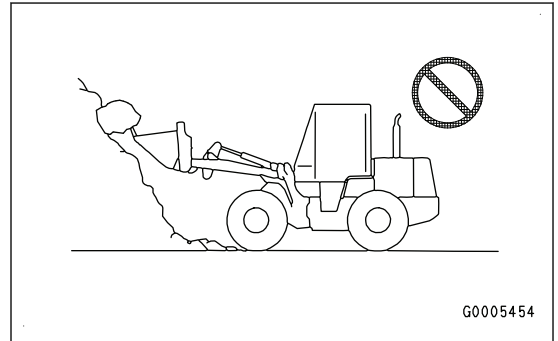
PROHIBITION OF HANDLING PUMICE STONE

Do not handle the pumice stone by this machine.

If the pumice stone falls during operation, there is a danger that it hits the machine body and operator's seat.

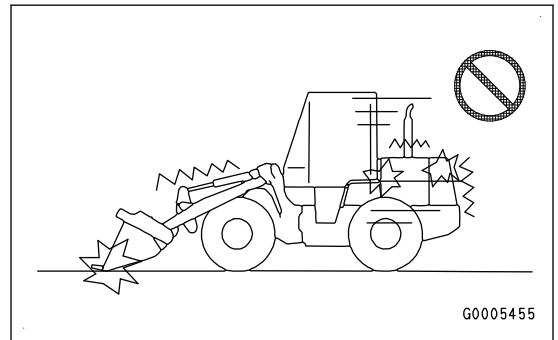
If the stone hit the operator's seat, serious personal injury or death can be caused.

If the stone hit the work equipment cylinder, there is a danger that it is deformed and is not operated.



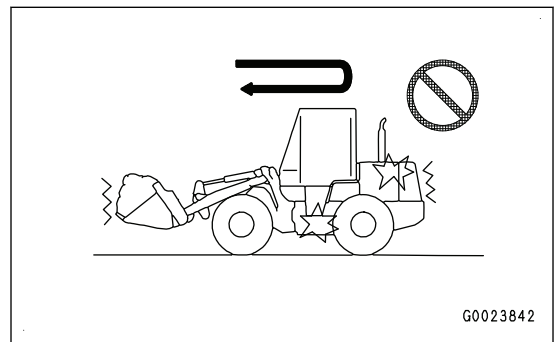
PROHIBITION OF EXCAVATION OPERATION

Do not shave off the remaining natural ground (roots) after blasting. If you shave off the remaining natural ground (roots) after blasting, a large load is applied to the machine, and the work equipment or frame can be damaged. Do not use a wheel loader for the pit excavation. Use a bulldozer or hydraulic excavator.



PROHIBITION OF ABRUPT DIRECTIONAL SELECTION OPERATION

Do not do the directional selection when the travel speed is high or the accelerator pedal is pushed. When the travel speed is high or the accelerator pedal is pushed, the engine speed becomes high. If the directional selection is done in this situation, a large load is applied to the power train of the engine, torque converter, and transmission. The service life of the machine will be decreased. Before you do the directional selection, set the travel speed to low and decrease the engine speed, then stop the machine.



REMOTE POSITIONER

This machine has the functions of the remote bucket positioner and the remote boom positioner.

METHOD FOR OPERATING REMOTE BUCKET POSITIONER

1. Raise the boom and dump the bucket.
2. Operate the bucket control lever to the tilt detent position and release your hand from the lever.

The bucket tilts and then its tilting stops at the moment when the bucket control lever returns from the detent position to the HOLD position.

When the boom is lowered near to the ground, the bucket cutting edge is set to the position specified by remote positioner switch (1).

3. To change the bucket stop position, stop the bucket at a desired position and press position (b) of switch (1).

The buzzer “beeps” and the bucket stop position is set to that position. And the monitor displays the position setup level.

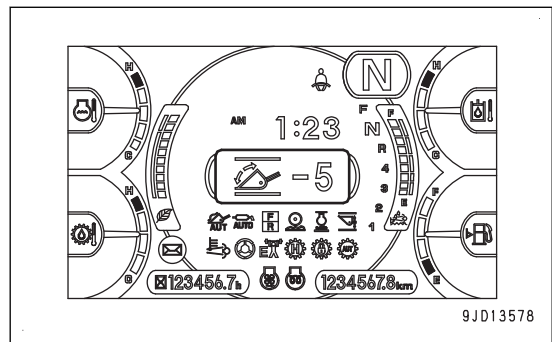
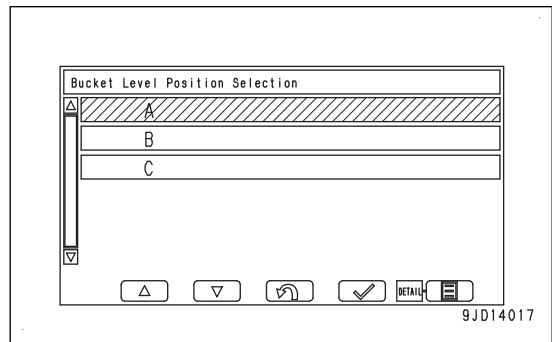
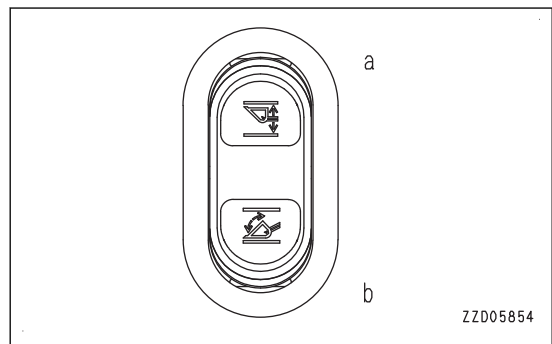
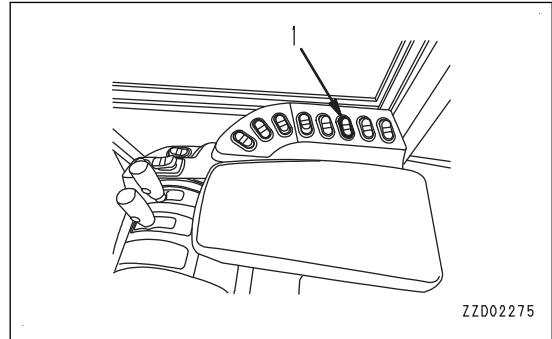
When resetting the bucket stop position, hold down position (b) of switch (1) for more than 1 second.

The buzzer “beeps” indicating that the bucket stop position so far set has been reset. The position is then returned to the level position A, B or C that has been specified from “Bucket Level Position Selection”.

REMARK

The bucket stop position can be set within the range of ± 5 steps of A, B or C that has been set in “Bucket Level Position Selection”.

The bucket stop position cannot be set beyond this range.



The table below shows the relationship between the angle setup level and bucket stop angle of the standard bucket.

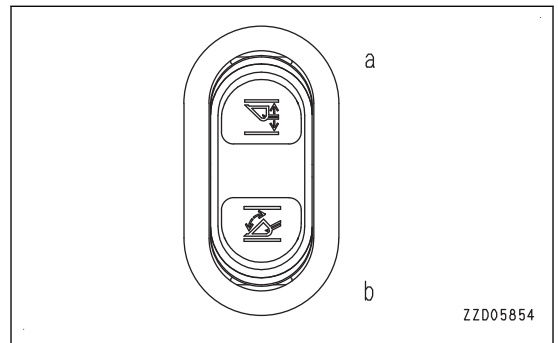
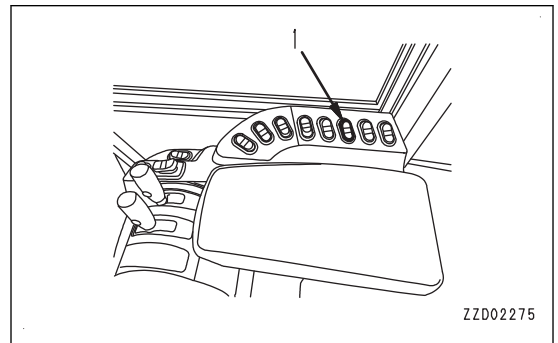
Angle setup level	-5	-4	-3	-2	-1	0	1	2	3	4	5
Bucket stop angle	-5	-4	-3	-2	-1	0	1	2	3	4	5

(The bucket stop angle is a rough indication.)

METHOD FOR OPERATING REMOTE BOOM POSITIONER

METHOD FOR OPERATING RAISE REMOTE BOOM POSITIONER

1. Set the boom to a desired RAISE stop position above the horizontal.
 2. Set the boom control lever to HOLD position and press position (a) of switch (1).
- A “beep” sounds and the position is set.



Operation checkup procedure

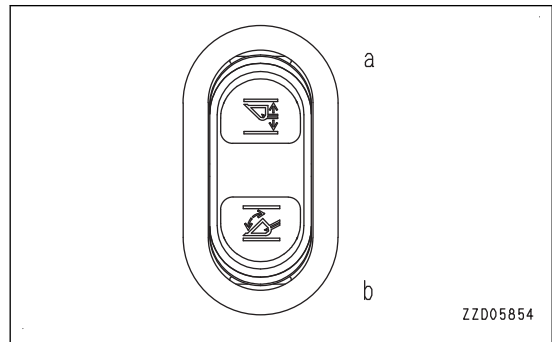
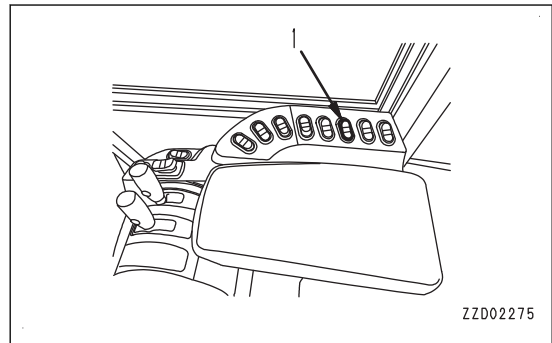
- Lower the boom once, move the boom control lever to RAISE detent position and then release your hand from the lever.
- The boom rises and then stops at the moment when the boom control lever returns from the detent position to HOLD position.

REMARK

When setting RAISE detent, if the boom is very close to the position specified by the positioner (approximately within 2 °), the boom control lever does not set to the detent position.

METHOD FOR RELEASING RAISE REMOTE BOOM POSITIONER

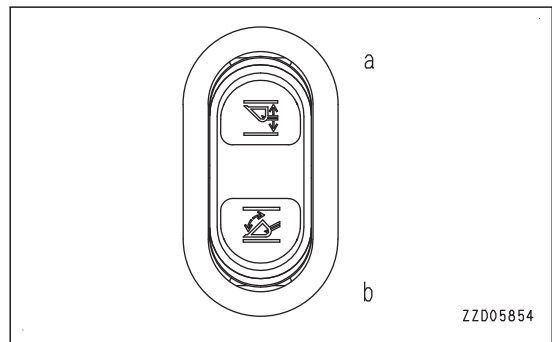
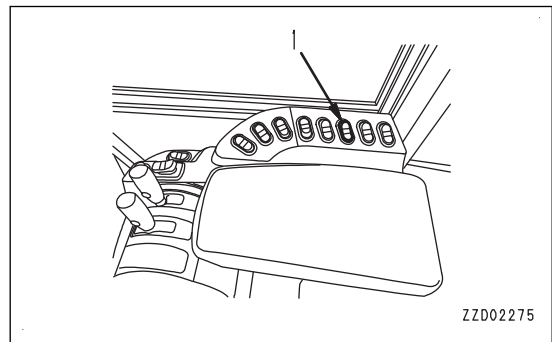
1. Raise the boom above the horizontal level.
2. Set the boom control lever to HOLD position and hold down position (a) of switch (1) for more than 1 second.
A “beep” sounds and the stop position is reset.



With RAISE stop position reset, if the boom control lever is set to the detent position, the boom control lever returns from the detent position to HOLD position when the boom reaches near the maximum height. At the same time, the boom stops.

METHOD FOR OPERATING LOWER REMOTE BOOM POSITIONER

1. Set the boom to a desired LOWER stop position between the horizontal level and approximately 30 cm {11.8 in} above the ground.
2. Set the boom control lever to HOLD position and press position (a) of switch (1).
A “beep” sounds and the position is set.



Operation checkup procedure

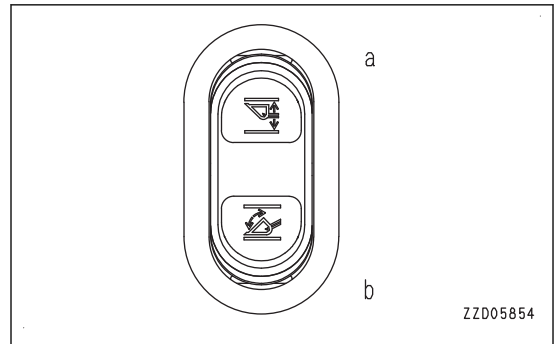
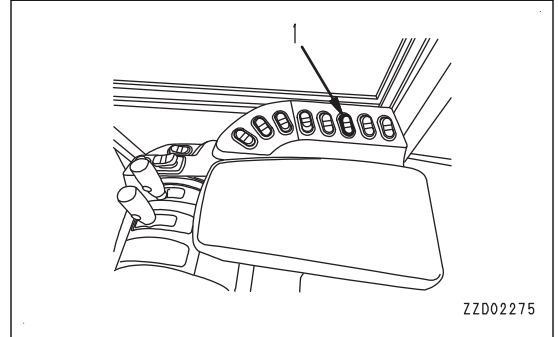
- Raise the boom above the horizontal level once, move the boom control lever to FLOAT position, and then release your hand from the lever.
- The boom starts to lower and then stops lowering at the moment when the boom control lever is returned from FLOAT position to HOLD position.

REMARK

When setting RAISE detent, if the boom is very close to the position specified by the positioner (approximately within 2 °), the boom control lever does not set to the detent position.

METHOD FOR RELEASING LOWER REMOTE BOOM POSITIONER

1. Set the boom between the horizontal level and approximately 30 cm {11.8 in} or more above the ground.



2. Set the boom control lever to HOLD position and hold down position (a) of switch (1) for more than 1 second.

A “beep” sounds and the stop position is reset.

If the boom control lever is set to FLOAT position while the stop position is reset, the boom is set to the float mode and moved freely by the external force applied.

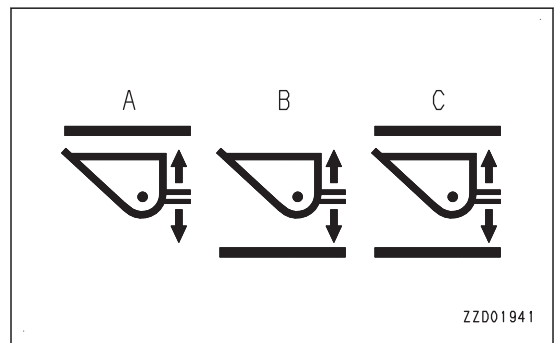
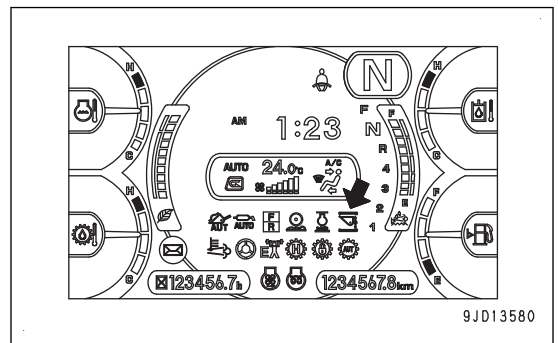
REMARK

- When the boom is above the horizontal level, the boom RAISE stop position setting and its reset operation can be made. And when the boom is below the horizontal level, the boom LOWER stop position setting and its reset operation can be made.
- When the remote positioner is effective, the pilot lamp lights up in the monitor.

(A): When only RAISE is effective

(B): When only LOWER is effective

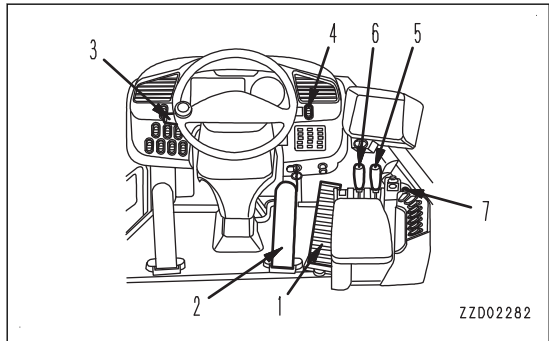
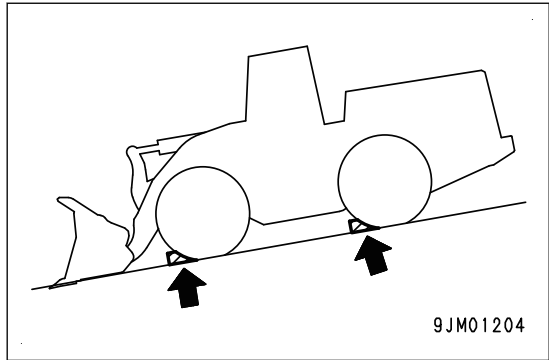
(C): When both RAISE and LOWER are effective



METHOD FOR PARKING MACHINE

⚠ WARNING

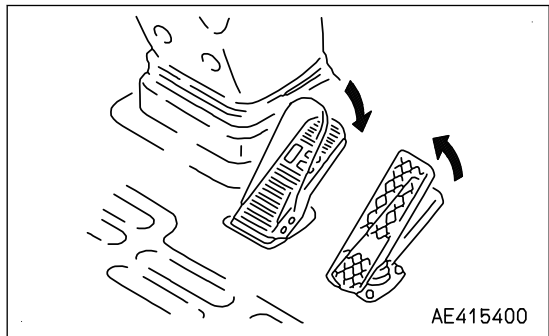
- Avoid a sudden stop. Stop the machine gradually.
- Do not park the machine on a slope.
If it is unavoidable to park the machine on a slope, place the machine at a right angle to the slope face, chock the tires, and then lower the bucket to the ground.
- If the control lever is touched by accident, the machine may move suddenly, and this may lead to a serious personal injury or death. Before leaving the operator's seat, always lock the work equipment (the pilot lamp in the switch lights up).
- Even if the parking brake switch is turned ON, there is danger until the parking brake pilot lamp on the monitor lights up. Keep depressing the brake pedal.



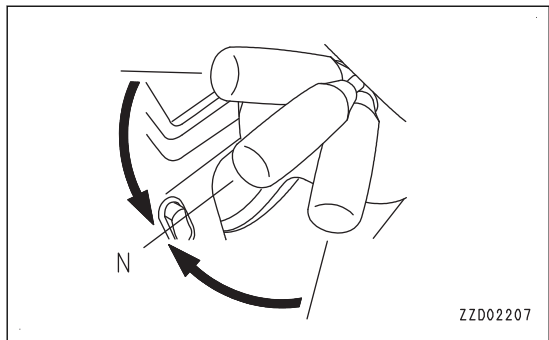
NOTICE

Never use the parking brake switch to brake the machine when the machine is traveling except in an emergency. Apply the parking brake after the machine is stopped.

1. Set the machine to the straight travel condition.
2. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.
The machine stops.



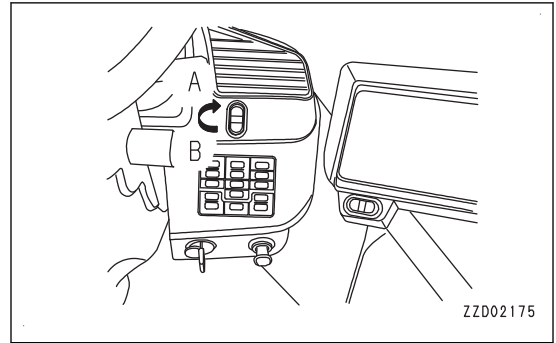
3. Set directional lever (3) in NEUTRAL position (N).



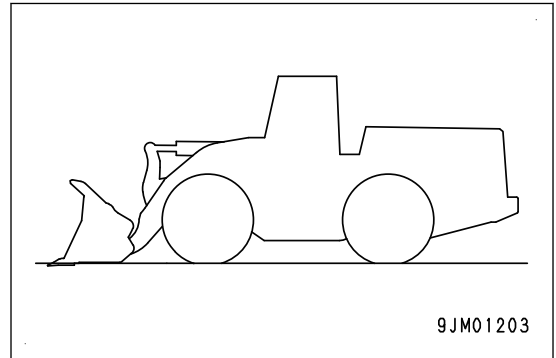
- Set parking brake switch (4) to ON position (A) to apply the parking brake.

NOTICE

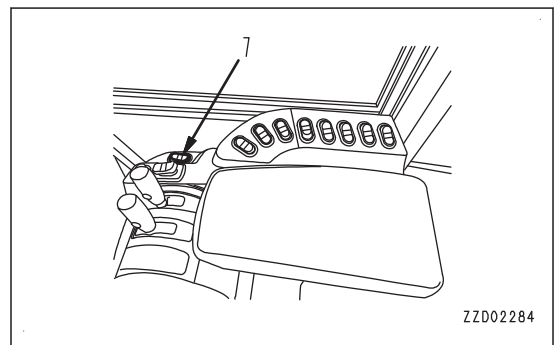
Applying the parking brake automatically sets the transmission to **NEUTRAL**.



- Operate boom control lever (5) to lower the bucket to the ground.



- Check that boom control lever (5) and bucket control lever (6) are in HOLD position. Lock the work equipment (the pilot lamp lights up) with work equipment lock switch (7).



To secure a sufficient space to get off the machine, move the operator's seat backward if it is positioned forward.

METHOD FOR CHECKING AFTER FINISHING WORK

CHECKS BEFORE STOPPING ENGINE

On the machine monitor, check the engine coolant temperature, hydraulic oil temperature, torque converter oil temperature, remaining fuel level, and remaining DEF level.

If the engine has overheated, do not stop the engine suddenly. Run it at a medium speed to cool it gradually before stopping.

CHECKS AFTER STOPPING ENGINE

- Perform walk-around check for oil or coolant leakage and for abnormality in work equipment, exterior parts, and undercarriage.
If oil or coolant leakage or any abnormality is detected, repair it.
- Check DEF tank, pump, injector, hose, and joint for leakage.
If any abnormality is found, ask your Komatsu distributor for repair.
- Fill the fuel tank.
- Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.
- Remove any mud affixed to the undercarriage.

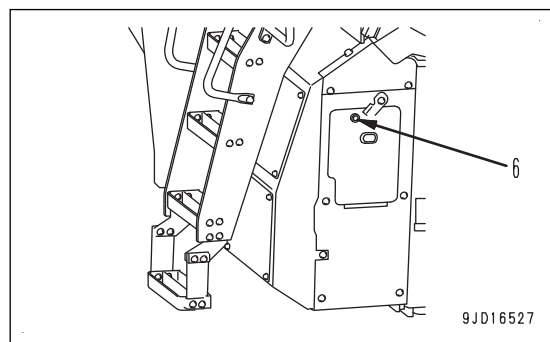
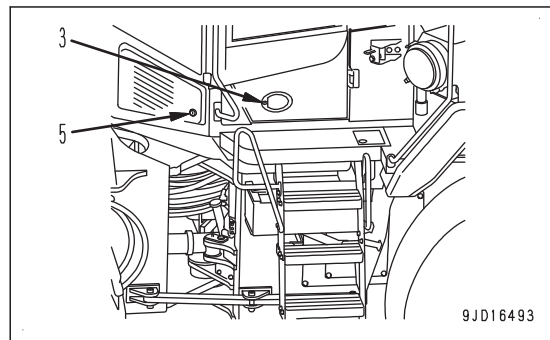
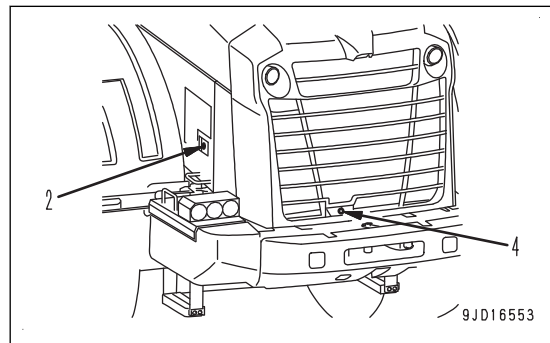
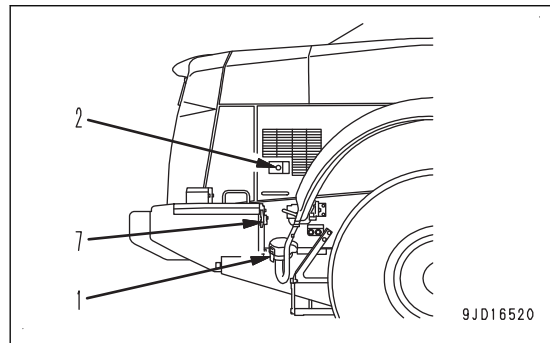
LOCK

Lock position

Always lock the following places.

- (1) Fuel tank filler cap
- (2) Engine side cover (2 places)
- (3) Cab door
- (4) Rear grille
- (5) Air conditioner fresh air filter
- (6) DEF inspection cover
- (7) Battery disconnect switch cover

The starting switch key is commonly used for locks (1) to (7) .



METHOD FOR OPENING AND CLOSING CAP WITH LOCK

The fuel tank filler cap is equipped with lock.

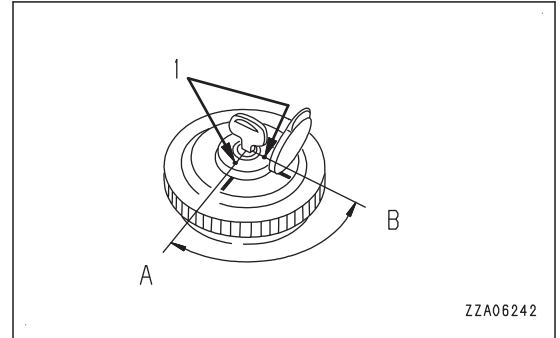
Use the starting switch key to open and close the cap.

METHOD FOR OPENING CAP WITH LOCK

1. Insert the key into the key slot.
2. Turn the key clockwise, align the matching marks (1) of the key groove and the cap, then open the cap.

Position (A): OPEN

Position (B): CLOSE (LOCK)



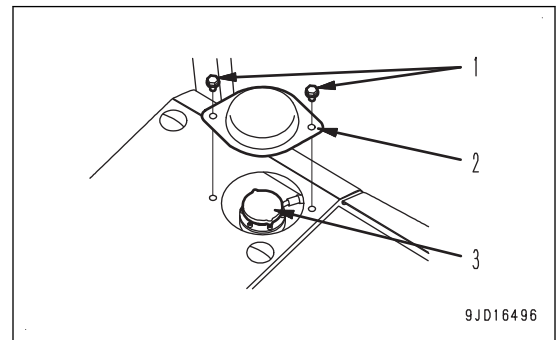
METHOD FOR LOCKING CAP WITH LOCK

1. Screw in the cap until it becomes tight, then insert the key into the key slot.
2. Turn the starting switch key to "CLOSE" position (B), then remove the key.

METHOD FOR OPENING AND CLOSING HYDRAULIC OIL FILLER PORT CAP

PROCEDURES FOR OPENING HYDRAULIC OIL FILLER PORT CAP

1. Remove bolts (1) (2 pieces), then open cover (2).
2. Turn cap (3) counterclockwise and open it.



PROCEDURES FOR CLOSING HYDRAULIC OIL FILLER PORT CAP

1. Turn cap (3) clockwise and close it securely without looseness.
2. Install cover (2) with bolts (1) (2 pieces).

HANDLE TIRE

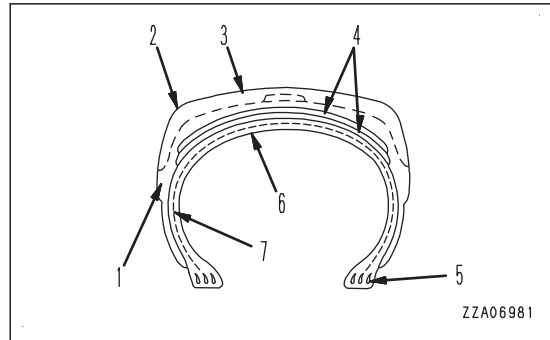
PRECAUTIONS WHEN HANDLING TIRES

CAUTION

If a tire reaches the using limit shown below, it may be damaged and may cause an accident.

For safety, replace such a tire with a new one.

- **Service limit for wear**
 - When the remaining depth of the grooves on construction equipment tires (at a point approximately 1/4 of the tread width) is 15 % of the groove depth on a new tire
 - When an abnormal wear such as uneven wear or stepped wear is found on a tire or when the cord layer of a tire is exposed
- **Service limit for damage**
 - When a damage or crack of a tire has reached the cord
 - When a damage on or dragging of cord is found on a tire
 - When tires are peeled (separated)
 - When a damage is found in the bead of a tire
 - When air leakage or an unreparable damage is found on a tubeless tire
- Do not install the tire protector (mesh chain) to rear wheels.
- Do not to use tires, such as urethane tires, that weigh remarkably more than the standard tires since the machine can be damaged due to an unexpected load.
- If a tire not specified by Komatsu is used, rim displacement may occur between the tire and rim. Operator comfort may be degraded as well.



- (1) Side wall
- (2) Shoulder
- (3) Tread
- (4) Breaker or belt (cord layer)
- (5) Bead
- (6) Inner liner
- (7) Cord

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

TIRE PRESSURE

Check the tire inflation pressure before driving, when the tires are cool.

Excessively low tire inflation pressure induces overload on the tire, and excessively high pressure causes tire cut (surface damage) and shock burst. To prevent these problems, adjust the tire inflation pressure referring to the following table.

Deflection ratio = $(H - h) / H \times 100$

As a guideline that can be checked visibly, the deflection ratio of the front tire (deflection/free height) is as follows.

When carrying normal load (boom horizontal): Approximately 15 to 25 %

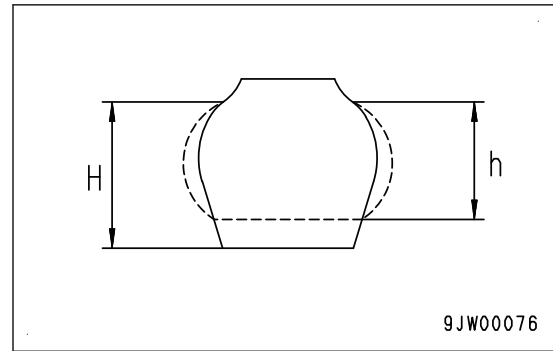
When digging (rear wheels off ground): Approximately 25 to 35 %

In addition to the checking of tire inflation pressure, check for small cuts and peeling on tires, for sticking of nails and metallic pieces that may cause punctures, and for any abnormal wear.

Keep the working road surface constantly clean by removing fallen stones. This will extend the tire life and give improved economy.

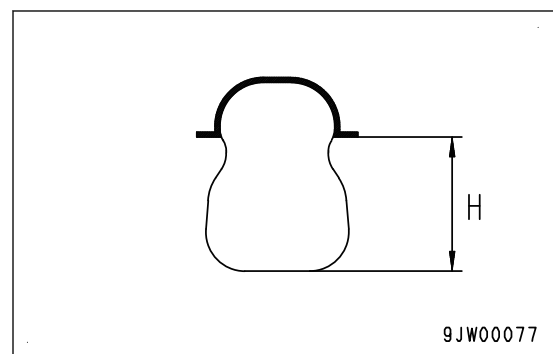
- For operations on normal road surfaces, rock digging operations: High end of range in the following table.
- Stock pile operations on soft ground: Average pressure in air pressure chart
- Operations on sand (operations not using much digging force): Low end of range in the following table

If the deflection of the tire is excessive, raise the inflation pressure within the limits given in the following table to give a appropriate deflection (see deflection ratio).



Tire size (Pattern)	H: Free height (mm)	Air pressure [kPa { kgf/cm ² , PSI }]			When shipped from the plant
		Ground (sandy ground)	Normal road		
		Stock pile	Stock pile	Digging	
23.5-R25☆ (L3: Rock) (Standard specification machine)	420(ML)	240 to 360 {2.4 to 3.6}	260 to 360 {2.6 to 3.6}	260 to 360 {2.6 to 3.6}	Front wheel: 400 {4.0, 56.9}
23.5-25-16PR (L3: Rock) (if equipped)	424(BS) 423(TO YO)				Rear wheel: 400 {4.0, 56.9}
					Front wheel: 310 {3.1, 44.1}
					Rear wheel: 310 {3.1, 44.1}

Stock pile operation means scooping and piling gravel.



PRECAUTIONS FOR LOAD-AND-CARRY OPERATION

When traveling continuously in load-and-carry operation, choose the appropriate tires to match the operating conditions, or choose the operating conditions to match the tires. If this is not done, the tires will be damaged.

Consult your Komatsu distributor or tire dealer.

HANDLE AIR CONDITIONER

NOTICE

- To prevent putting any excessive load on the engine or compressor, use the air conditioner only when the engine is running.
- When running in the air conditioner, always start with the engine running at low speed. Never start the air conditioner when the engine is running at high speed. It will cause failure of the air conditioner.
- If water gets into the control panel or sunlight sensor, it may lead to unexpected failure, take care not to let water get on these parts. In addition, never bring any open flame near them.
- For the auto function of the air conditioner to work properly, always keep the sunlight sensor clean and do not leave anything around the sunlight sensor that may interfere with its sensor function.
- Where there is dust or bad smell in the using environment of the machine, use the RECIRC mode.
- When turning the cooling on, if the temperature inside the cab is high, open the doors and windows to bring in fresh air before using the air conditioner.
- To allow the air conditioner to show its full performance, have inspection and maintenance performed periodically. When adding refrigerant or performing other maintenance, special tools and instruments are needed, so ask your Komatsu distributor to perform inspection and maintenance.
- When the air conditioner is not used every day, to prevent loss of the film of oil at various parts, run the air conditioner with the engine at low speed from time to time and perform 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 air conditioner is left for a long time when the refrigerant is leaking, internal rust may occur, causing failure.
- When the temperature inside the cab is low, the air conditioner may not work. In this case, circulate recirculation air to warm the inside of the cab. After that, turn the air conditioner switch ON, the air conditioner will work.
- If any abnormality is detected in any equipment or sensor used on the air conditioner, the air conditioner system caution lamp lights up on the monitor screen. If the air conditioner system caution lamp lights up, ask your Komatsu distributor for inspection and repair.

Ventilation

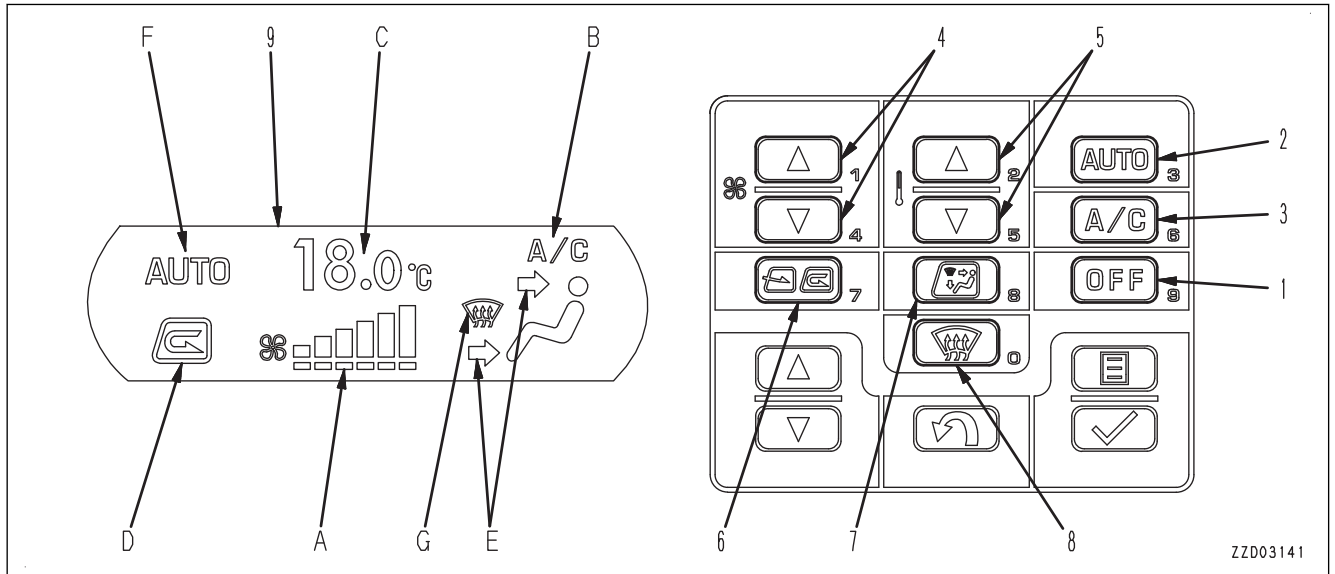
- When running the air conditioner for a long time, turn the lever to FRESH position once an hour to perform ventilation and cooling.
- If you smoke when the air conditioner is on, the smoke may hurt your eyes. In such case, open the window and turn the lever to FRESH for a while for ventilation and cooling to drive smoke out.

Temperature control

For reasons of health, the optimum setting for cooling is considered to be when it feels slightly cool (5 to 6 °C {9 to 10.8 °F} lower than the ambient temperature) when you enter the cab.

Be careful to select the appropriate temperature.

EXPLANATION OF AIR CONDITIONER EQUIPMENT



(1) OFF switch

(2) Auto switch

(3) Air conditioner switch

(4) Fan switch

(5) Temperature control switch

Air conditioner monitor

(A) Air flow bar

(B) Air conditioner operation symbol

(C) Set temperature display

(D) FRESH/RECIRC selector symbol

(6) FRESH/RECIRC air selector switch

(7) Vent selector switch

(8) Defroster switch

(9) Display monitor

(E) Vent display

(F) Automatic operation symbol

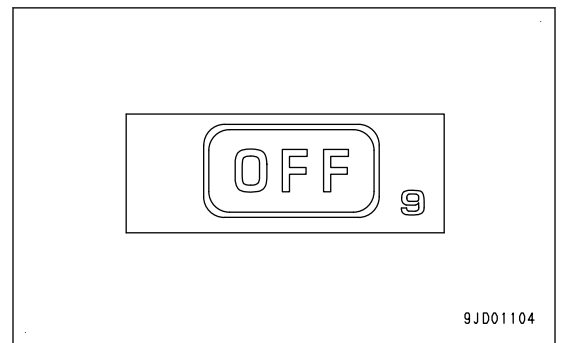
(G) Defroster symbol

OFF SWITCH

The OFF switch is used for stopping the fan and air conditioner.

REMARK

Even if this OFF switch is pressed, the monitor screen does not switch to the air conditioner adjustment screen.



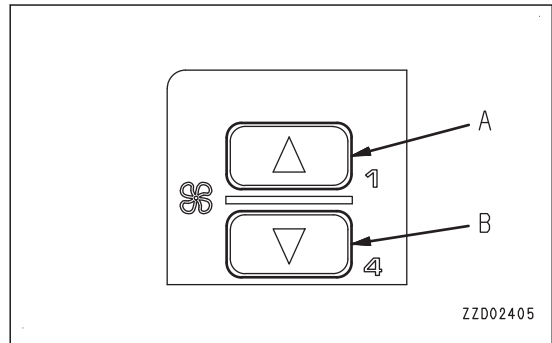
9JD01104

FAN SWITCH

Use the fan switch to adjust the air flow from the fan in the manual operation.

When switch (A) is pressed while the air conditioner power supply is OFF, the electric power for the air conditioner is turned ON. At this time the air flow starts from "LOW".

- The air flow can be adjusted to 6 levels.
- Press switch (A) to increase the air flow and press switch (B) to decrease the air flow.
- During auto operation, the air flow is automatically adjusted.



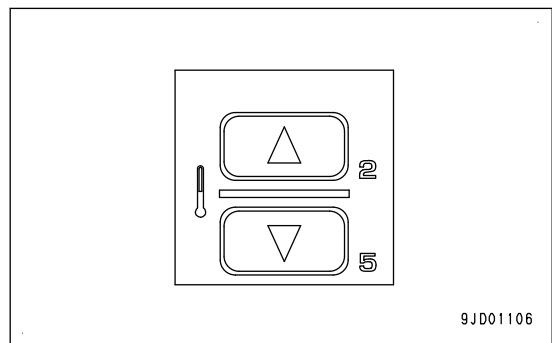
The set position of the air flow is indicated on the display monitor.

Monitor display	Air flow
	Air flow "LOW"
	Air flow "MEDIUM 1"
	Air flow "MEDIUM 2"
	Air flow "MEDIUM 3"
	Air flow "MEDIUM 4"
	Air flow "HIGH"

TEMPERATURE CONTROL SWITCH

Use the temperature control switch to adjust the temperature inside the cab. The temperature can be set in the range of 18 to 32 °C {64.4 to 89.6 °F}.

- Press the Δ switch to raise the set temperature; press the ∇ switch to lower the set temperature. The set temperature is indicated on the display monitor.
- The temperature is generally set at 25 °C {77 °F}.
- The temperature can be set in stages of 0.5 °C {0.9 °F}.



Monitor display and function

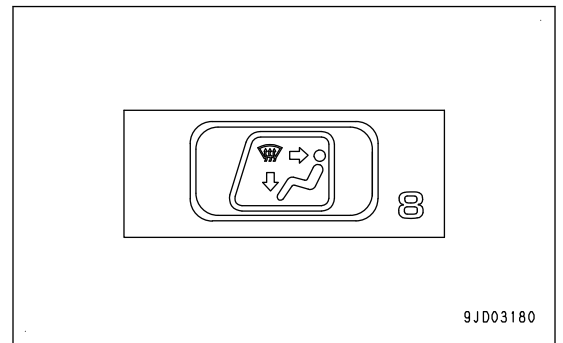
Monitor display	Set temperature
18 °C {64.4 °F}	Max. cooling
18.5 to 31.5 °C {65.3 to 88.7 °F}	Adjusts temperature inside cab to set temperature
32 °C {89.6 °F}	Max. heating

REMARK

If the mode is set to auto mode and the temperature setting is set to 18 °C {64.4 °F} or 32 °C {89.6 °F}, the air flow from the fan is always set to “HIGH” and does not change even when the temperature reaches the set temperature.

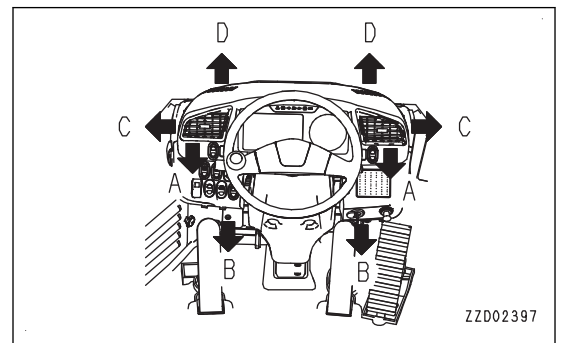
VENT SELECTOR SWITCH

In the manual operation, use the vent selector switch to select the vents.



9JD03180

- There are 4 modes of vents: FACE, FACE/FOOT, FOOT, and FOOT/DEF. (DEF is selected only when the defroster switch is pressed.)
- When the switch is pressed, the display on the display monitor switches in order and air blows out from the vents displayed.
- When this switch is pressed in the defroster mode, the vents right before being switched to DEF is selected.
- During automatic operation, the vents are automatically selected.



ZZD02397

- (A): FACE (2 places)
- (B): FOOT (2 places)
- (C): DEF (2 places)
- (D): DEF (2 places)

Monitor display	Vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Face vent	○				-
	Face and foot vents	○	○			-
	Foot vent		○			-

Monitor display	Vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Foot and defroster vents		○	○	○	-
	Defroster vent			○	○	Cannot be selected for automatic operation

Air blows out from the vents marked with ○.

AUTO SWITCH

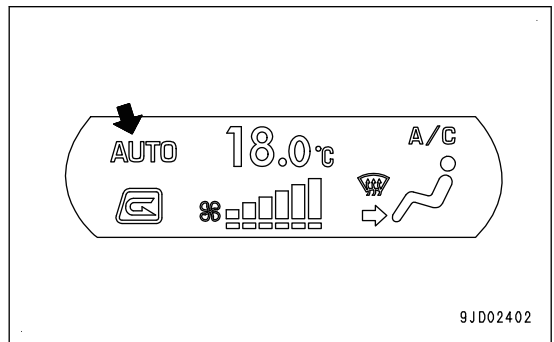
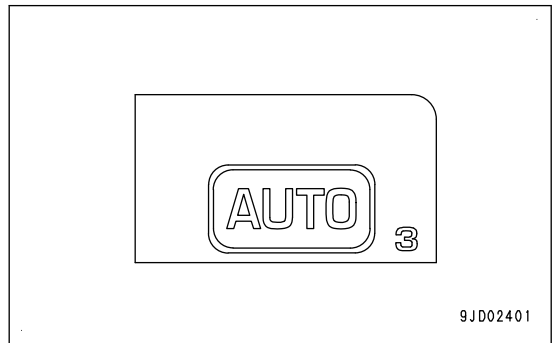
Use auto switch for automatic selection of the air flow and vents according to the set temperature.

This switch is also used as the main switch of the air conditioner.

- When AUTO switch is pressed, AUTO on the display monitor lights up to indicate that the air conditioner is in the automatic mode.
- When switching from automatic operation to manual operation, it is possible to use the switches to select the air flow and vents.
At this time, AUTO on the display monitor goes out.
- When clearing the window mist at low temperature, use the defroster switch.

REMARK

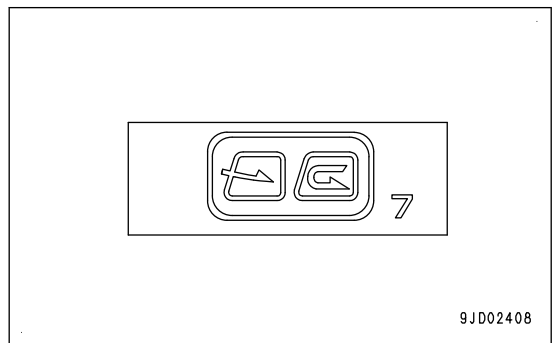
Do not leave the door open for a long time (3 minutes or longer) while air conditioner is working. The automatic air conditioner controls the air automatically according to the environment. If the environment changed suddenly by leaving cab door open for a long time, etc., the control of air conditioner may change temporarily, but this is not a failure. Even if the control changes, it returns automatically to control the air according to the environment after certain period of time elapses.



FRESH/RECIRC AIR SELECTOR SWITCH

Use FRESH/RECIRC air selector switch to switch the air source between recirculation of the air inside the cab and intake of fresh air from the outside.

- In the fresh air mode, (A) is lit on the display monitor.
- In the recirculation air mode, (B) is lit on the display monitor.

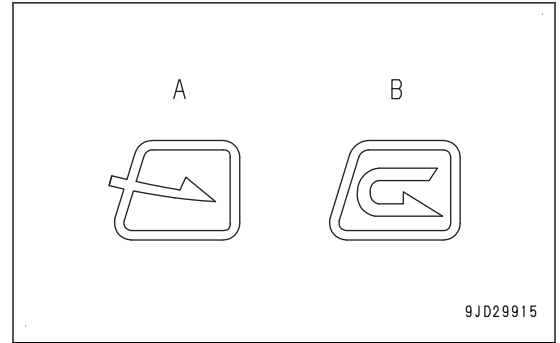


RECIRC

- Only the air inside the cab is circulated. Use this setting to perform quick cooling or heating of the cab or when outside air is dirty.

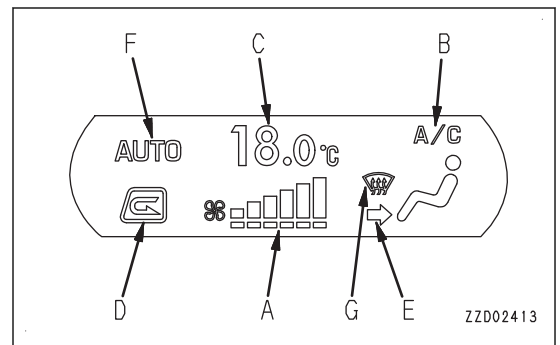
FRESH

- Outside air is taken into the cab. Use this position to make the air inside the cab fresh or to remove the mist from the cab windows.



DISPLAY MONITOR

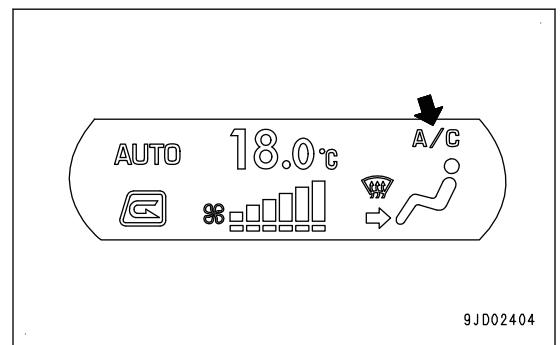
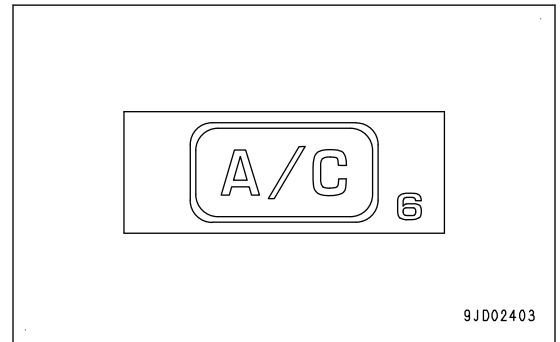
The display monitor displays the state of air flow (A), operation of air conditioner (B), set temperature (C), FRESH/RECIRC air (D), vents (E), automatic operation (F), and defroster (G).



AIR CONDITIONER SWITCH

Use the air conditioner switch to start and stop the cooling, heating, or drying function.

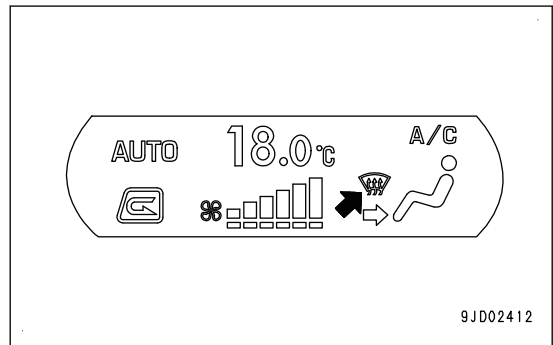
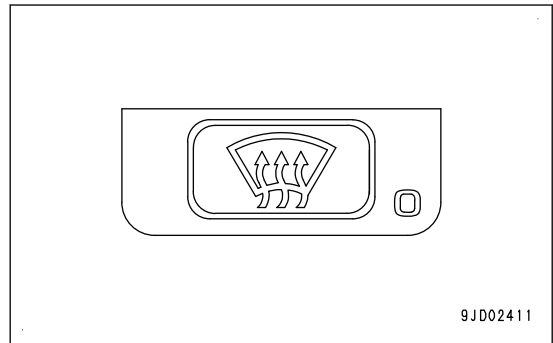
- When the air conditioner switch is pressed while the main power switch is turned ON, the air conditioner is turned ON and the air conditioner operation symbol is indicated on the display monitor.
- If the switch is pressed again, it is turned OFF and the operation symbol on the display monitor goes out.



DEFROSTER SWITCH

The defroster switch is used to set the vents in the defroster mode.

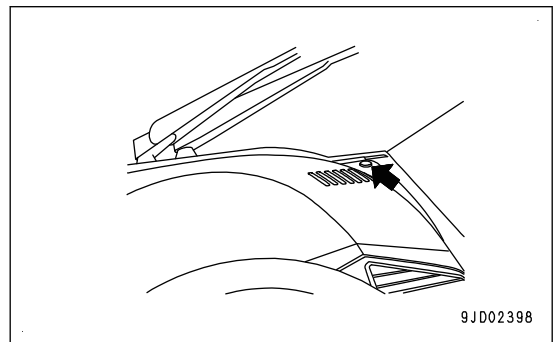
- Use this mode to clear the front glass mist, etc.
- When the defroster switch is pressed during automatic operation, AUTO on the air conditioner monitor goes out and the defroster mark is displayed.



SUNLIGHT SENSOR

Sunlight sensor automatically adjusts the flow of air from the vents to match the strength of the sun's rays. (Only in automatic operation mode)

In addition, it automatically detects changes in the temperature inside the cab caused by changes in the strength of the sun's rays beforehand and automatically adjusts the temperature.

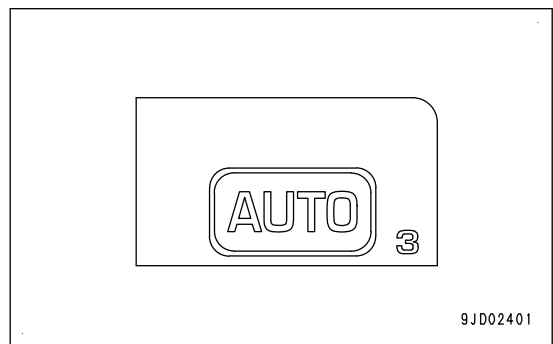


METHOD FOR OPERATING AIR CONDITIONER

The air conditioner can be operated automatically or manually. Select the method of operation as desired.

METHOD FOR AUTOMATIC OPERATION

1. Turn the auto switch ON.
AUTO lights up on the display monitor.

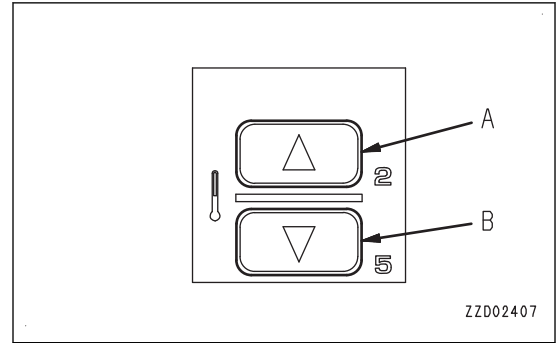


- Press (A) or (B) of the temperature control switch to set to the desired temperature.

The air flow and combination of the vents are automatically selected according to the set temperature, and the air conditioner is operated automatically to provide the set temperature.

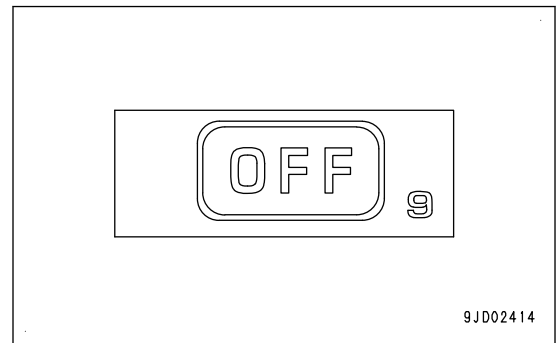
REMARK

- If the air conditioner switch is not turned ON when the ambient temperature is high, air is not cooled and its temperature may not decrease to the set temperature.
- After automatic operation, the air flow may be set to "Lo" for a certain period to prevent cold air from blowing out, depending on the ambient temperature.
- Once the desired temperature is set, do not operate the temperature control switch unnecessarily. It may take longer time to reach the set temperature.
- To heat or cool air quickly, set the temperature display to 18.0 °C {64.4 °F} (max. cooling) or 32.0 °C {89.6 °F} (max. heating).
- If any switch is operated during automatic operation, the function of that switch is applied first, and AUTO on the air conditioner monitor goes out and the manual operation is selected.



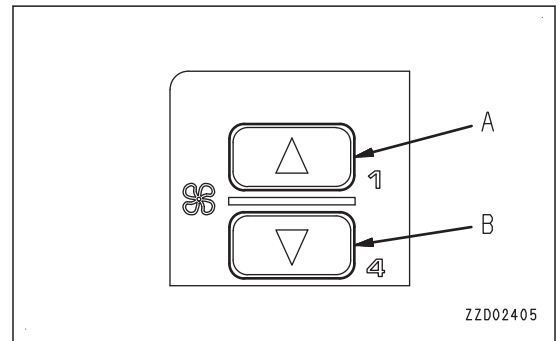
METHOD FOR STOPPING AUTOMATIC OPERATION

Press the air conditioner OFF switch. The display on the display monitor goes out and the operation stops.



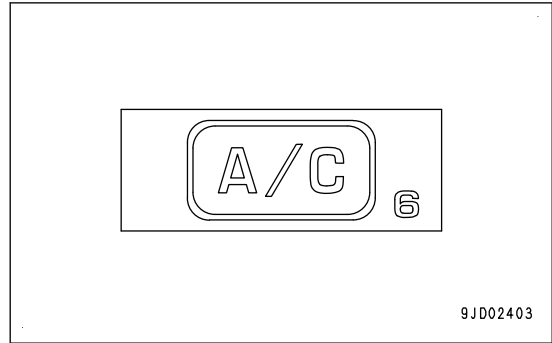
METHOD FOR MANUAL OPERATION

- Press (A) or (B) of the fan switch and adjust the air flow. If fan switch (A) is pressed while the air conditioner power supply is OFF, the air conditioner power supply is turned ON and the air flow is set to "Lo".



- Turn the air conditioner switch ON.

At this time, the air conditioner operation mark lights up on the display monitor.

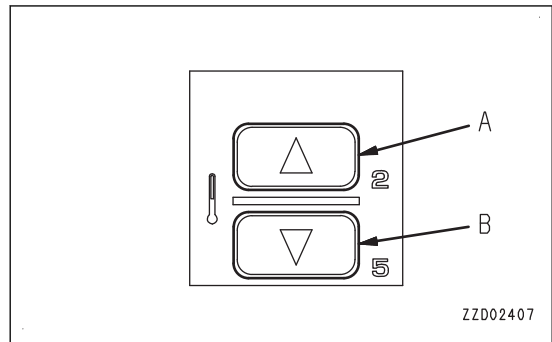


- Press (A) or (B) of the temperature control switch to adjust the temperature in the cab.

REMARK

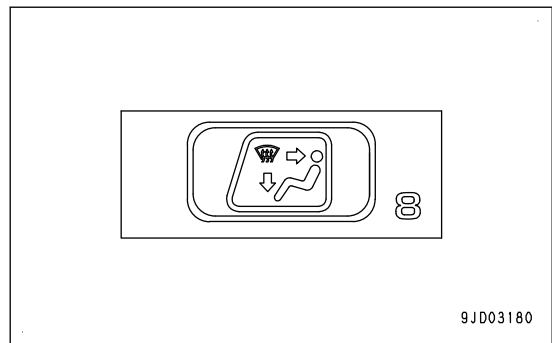
The air temperature is so adjusted that the temperature in the cab becomes the set temperature when the set temperature display is 18.5 °C {65.3 °F} to 31.5 °C {88.7 °F}, even in the manual operation.

To heat or cool the air quickly, set the temperature display to 18.0 °C {64.4 °F} (max. cooling) or 32.0 °C {89.6 °F} (max. heating).



- Press vent selector switch and select the desired vents.

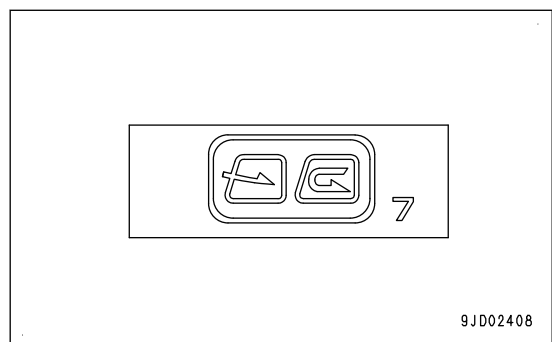
At this time, the display for the vent of the display monitor changes according to the selection.



- Press the FRESH/RECIRC air selector switch and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).

REMARK

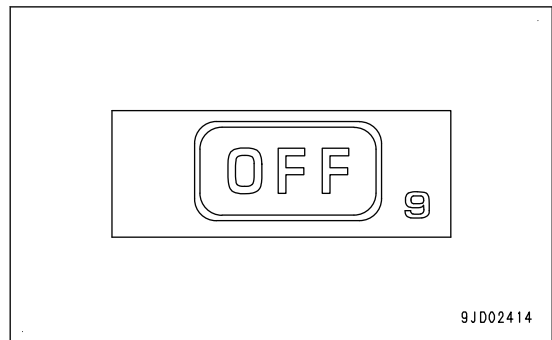
- To heat or cool the air quickly, set the temperature display to 18.0 °C {64.4 °F} (max. cooling) or 32.0 °C {89.6 °F} (max. heating).
- To select the automatic operation during manual operation, press the AUTO switch.



METHOD FOR STOPPING MANUAL OPERATION

Press the air conditioner OFF switch.

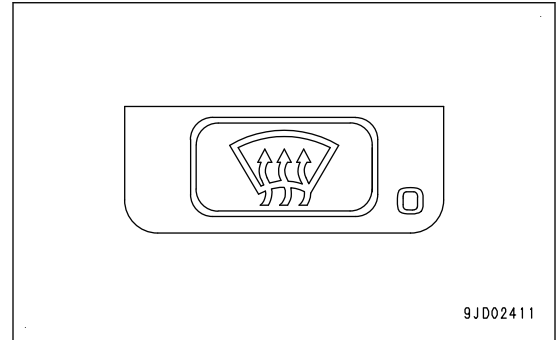
The display on the display monitor goes out and the operation stops.



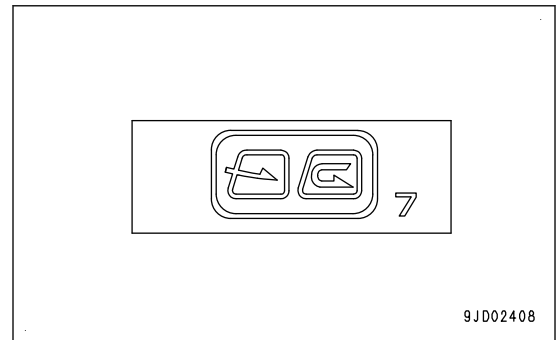
METHOD FOR OPERATING DEFROSTER

Frost adhered to the outside of the window glass can be removed by defroster operation.

1. Press the defroster switch to set the vents in DEF mode.

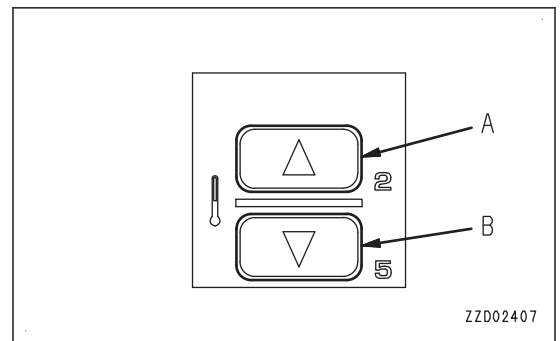


2. Press FRESH/RECIRC air selector switch and set it to RECIRC mode.



3. Press the temperature control switch and set the temperature to 32.0 °C {89.6 °F} .

To remove frost quickly, press the fan switch and set the air flow to "Hi".



METHOD FOR OPERATING DEMIST

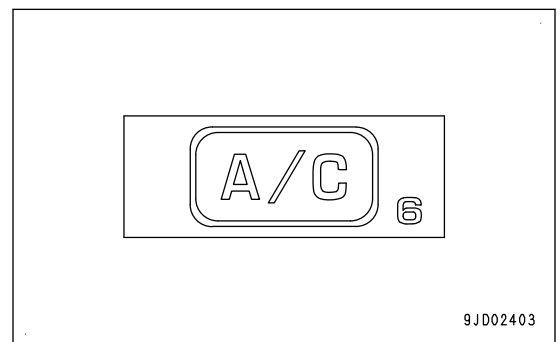
Dew condensation adhered to the inside of the window glass can be removed by demist operation.

1. Press the defroster switch to set the vents in DEF mode.
2. Press air conditioner switch and perform the cooling or dry heating operation.

To remove the dew condensation quickly, press the fan switch to set the air flow to "Hi".

REMARK

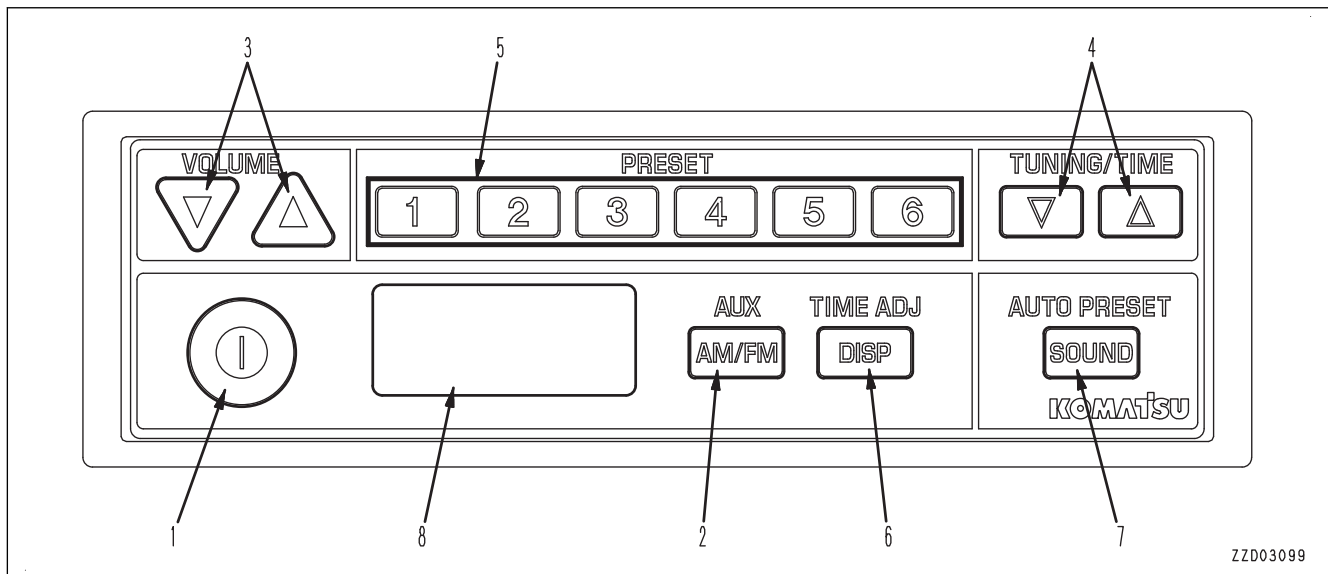
Do not decrease the set temperature too much during the demist operation. If cold air blows against the front window glass, the outside of the glass mists and that may lower the visibility.



HANDLE RADIO

- To ensure safety, always keep the volume to a level where you can hear the outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to failure. Take care not to let water get on them.
- Do not wipe the display or buttons with solvent such as benzene or thinner. Wipe with a dry soft cloth.
- When the battery disconnect switch is turned to OFF position or the power for the machine is turned off for the replacement of the battery, the clock may be initialized. In such a case, set it again.
For handling of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-139)".

EXPLANATION OF RADIO EQUIPMENT



- | | |
|-----------------------------------|-----------------------------|
| (1) Power button | (5) Preset button |
| (2) Band/AUX selector button | (6) Display selector button |
| (3) Volume control button | (7) Sound control button |
| (4) Tuning/time adjustment button | (8) Display |

POWER BUTTON

Press the power button to supply the power to the radio and the frequency is shown on display. As long as AUX is selected, display indicates AUX on it. Press the button again to turn the power off.

BAND/AUX SELECTOR BUTTON

Press band/AUX selector button to select the desired band or AUX.

Each time the button is pressed, the band changes FM → AM → AUX → FM...

VOLUME CONTROL BUTTON

Use the volume control button to control the volume.

Press the Δ button, and the volume increases. Press the ∇ button, and the volume decreases. The range for the volume is 0 to 32.

Hold down this button, and you can change the volume continuously.

TUNING/TIME ADJUSTMENT BUTTON

Use the tuning/time adjustment button to select frequency and step for sound adjustment and to adjust time.

PRESET BUTTON

If you register desired stations to the preset button beforehand, you can select each station by touching this button once.

It is possible to preset 6 stations each for both AM and FM.

DISPLAY SELECTOR BUTTON

Use the display selector button to change frequency and clock shown on the display.

Each time you press this button, frequency, clock and band are shown on the display in this order.

If 1.5 seconds passes while a band is shown, a frequency will be displayed.

As long as AUX is selected, this button alternately switches the display between AUX and the clock.

SOUND CONTROL BUTTON

Press the sound control button, and the sound adjustment is ready.

Each time this button is pressed, BAL (Balance), TRE (Treble) and BAS (Bass) will be selected in this order.

If this button is pressed while BAS is displayed, the sound adjustment will be canceled.

DISPLAY

(A): Band name, "AUX", frequency, clock and other character/numeric information are displayed.

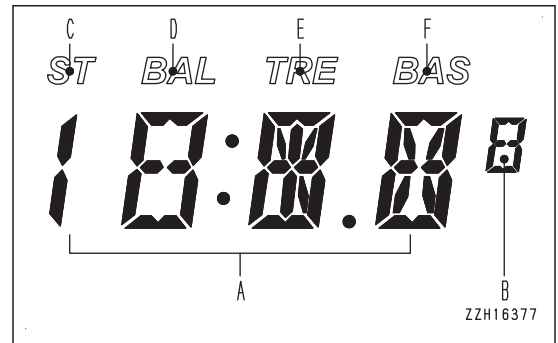
(B): Frequencies are displayed at steps of 50 kHz in certain areas.

(C): Lights up when a stereo broadcasting is heard while a FM station is selected.

(D): Lights up at the time of balance adjustment in the sound adjusting condition.

(E): Lights up at the time of treble adjustment in the sound adjusting condition.

(F): Lights up at the time of bass adjustment in the sound adjusting condition.



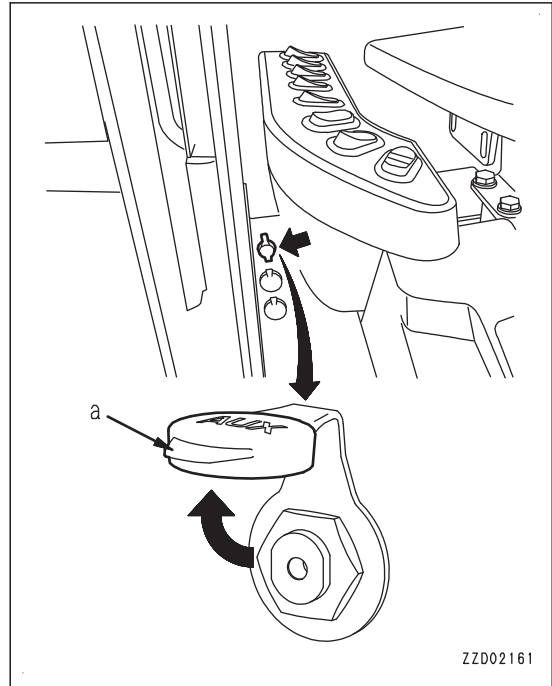
AUX

NOTICE

- **A stereo miniature plug can be connected.**
- **As a power source, use the battery attached to the equipment to connect.**
If you use an electric power supply installed to the machine, the noise may occur.
- **The noise may occur if you pull out the input plug when AUX is selected, or if you push in or pull out the plugs of the equipment to connect.**

You can hear the sound through the speaker of the machine when you connect a commercially available portable audio equipment to the machine.

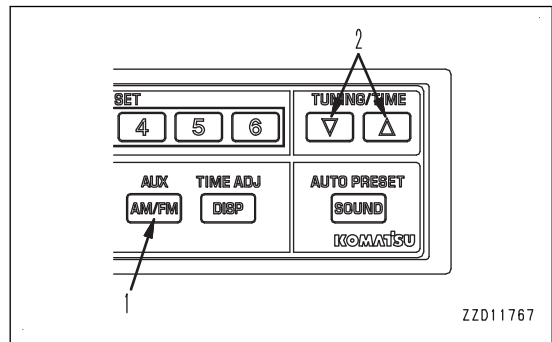
1. Open cap (a).
2. Connect a portable audio equipment by using an commercially available audio cable.
3. Press the band/AUX selector button and select AUX.



METHOD FOR CONTROLLING RADIO

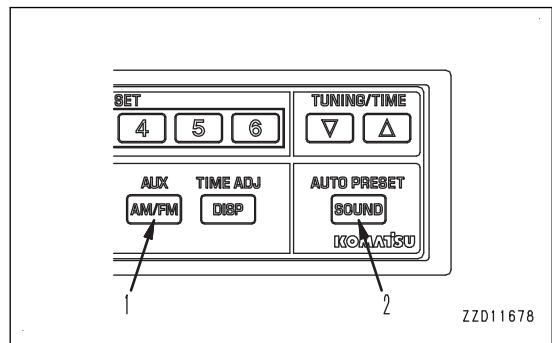
METHOD FOR ADJUSTING FREQUENCY

1. Press band/AUX selector button (1) and select FM or AM.
2. Press tuning/time adjustment button (2) to adjust the frequency.
 - Press the Δ button, and the frequency increases; press the ∇ button, and the frequency decreases.
 - Hold down the Δ button, and the frequency increases continuously; hold down the ∇ button, and the frequency decreases continuously.
 - Hold down the Δ button and release it, then the frequency increases continuously. Hold down the ∇ button and release it, then the frequency decreases continuously as an auto seek. When a proper frequency is picked up, the tuning automatically stops.



METHOD FOR ADJUSTING FREQUENCY (AUTO PRESETTING)

1. Press band/AUX selector button (1) and select FM or AM.
 2. Hold down sound control button (2).
- When a proper frequency is picked up, it is automatically registered to preset memories 1 to 6.



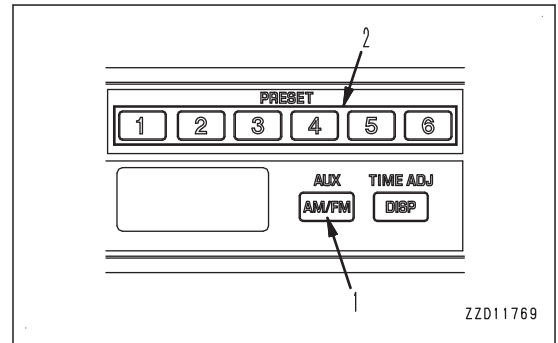
METHOD FOR CALLING PRESET

1. Press band/AUX selector button (1) and select FM or AM.
 2. Press one of 1 to 6 of preset button (2).
- The frequency registered in the preset number of the pressed button is called up and received.

“Example”

While a frequency is displayed, press button 1 of preset button (2), and the preset number “P-1” is displayed on the display.

The preset number is shown for 0.5 seconds, and then the frequency is displayed.



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METHOD FOR REGISTERING PRESET

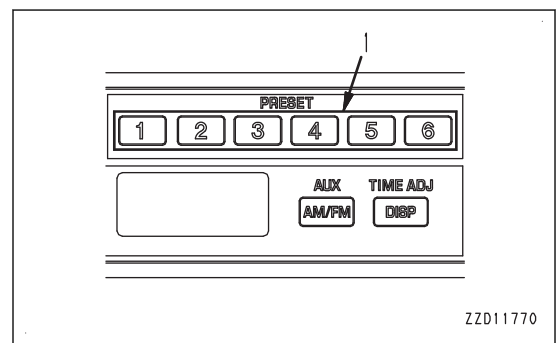
Hold down one of 1 to 6 of preset button (1) while listening to the radio.

The currently received frequency is registered to the preset number corresponding to the pressed button.

“Example”

While a frequency is displayed, keep pressing button 1 of preset button (1), and the preset number “P-1” is displayed.

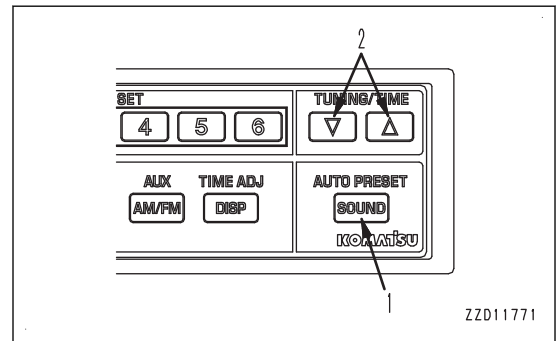
After the preset number flashes 3 times, the frequency is displayed and then registered to preset number “P-1”.



ZZD11770

METHOD FOR ADJUSTING SOUND BALANCE

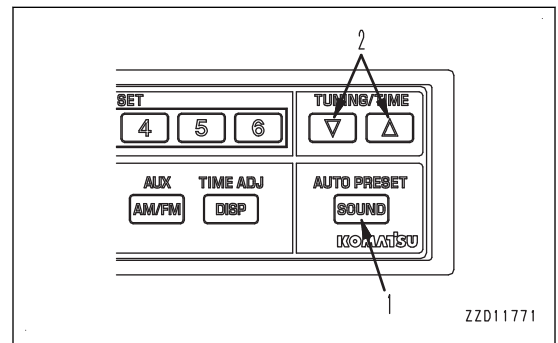
1. Press sound control button (1) to light up “BAL” on the display.
You can adjust the sound (balance).
2. Press tuning/time adjustment button (2) to adjust the sound (balance).
 - Press the Δ button, and the speaker output on the R side increases by 1. (R1 to R7)
 - Press the ∇ button, and the speaker output on the L side increases by 1. (L1 to L7)



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METHOD FOR ADJUSTING HIGH REGISTER RANGE (TREBLE)

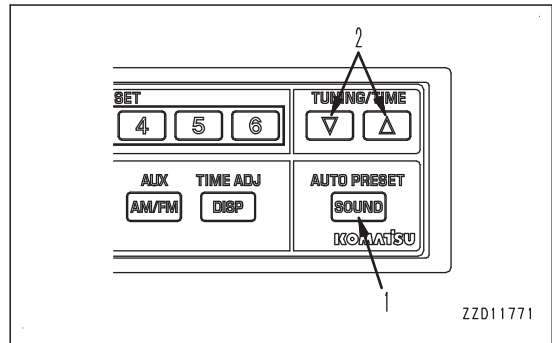
1. Press sound control button (1) to light up “TRE” on the display.
You can adjust the sound (treble).
2. Press tuning/time adjustment button (2) to adjust the sound (treble).
 - Press the Δ button, and the treble level increases by 1. (Maximum +7)
 - Press the ∇ button, and the treble level decreases by 1. (Minimum -7)



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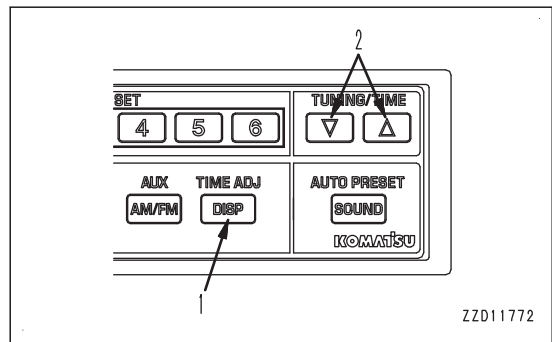
METHOD FOR ADJUSTING LOW REGISTER RANGE (BASS)

1. Press sound control button (1) to light up "BAS" on the display.
You can adjust the sound (bass).
2. Press tuning/time adjustment button (2) to adjust the sound (bass).
 - Press the Δ button, and the bass level increases by 1. (Maximum +7)
 - Press the ∇ button, and the bass level decreases by 1. (Minimum -7)



METHOD FOR ADJUSTING CLOCK

1. Press display selector button (1) to display the time.
2. Hold down display selector button (1) to flash the "HOUR" display portion.
You can adjust the hour.
3. Press tuning/time adjustment button (2) to adjust the hour.
 - If you press Δ button, "HOUR" display increases by 1.
 - If you press ∇ button, "HOUR" display decreases by 1.
4. Press display selector button (1) to flash the "MINUTE" display portion.
You can adjust the minute.
5. Press tuning/time adjustment button (2) to adjust the minute.
 - If you press Δ button, "MINUTE" display increases by 1.
 - If you press ∇ button, "MINUTE" display decreases by 1.
6. Press display selector button (1) to cancel time adjustment.
The screen returns to the clock display.



TRANSPORTATION

TRANSPORTATION PROCEDURE

When transporting the machine, choose the transportation method in reference to the weight and dimensions of machine.

Note that the "SPECIFICATIONS" (weight and dimensions) vary depending on the type of tire and bucket.

LOADING AND UNLOADING WITH TRAILER

WARNING

- When loading or unloading the machine, run the engine at a low speed and operate the machine slowly in low travel speed.
- Select a flat and firm ground when loading or unloading the machine.
Maintain a safe distance from the road shoulder
- Use ramps with ample width, length, thickness, and strength and install them with a maximum slope of 15 °.
When using piled soil, compact the piled soil fully to prevent the slope face from collapsing.
- Remove mud from the undercarriage of the machine so that the machine will not slip sideways on the ramps.
In addition, remove water, snow, ice, grease, oil, etc. from the ramps.
- Never correct your steering on the ramps. There is danger that the machine may tip over.
If it is necessary to change the travel direction, return to the ground or to the bed of the trailer, then change the travel direction.
- The center of gravity of the machine shifts suddenly at the joint of the ramps and the trailer, so there is a danger of the machine losing its balance. Accordingly, pass this point slowly.

When loading or unloading, always use ramps or a platform. Proceed as follows.

PROCEDURES FOR LOADING MACHINE

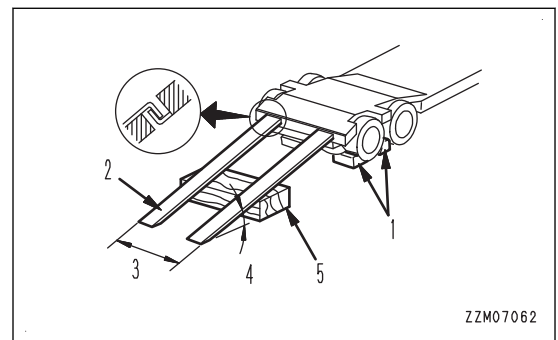
Load on a firm and level ground.

Maintain a safe distance from the road shoulder

1. Apply the brake of the trailer securely.
2. Set chocks (1) to the front and rear of the tires to secure the trailer.
3. Set right and left ramps (2) parallel to each other and equally spaced to the right and left of center (3) of the trailer. Make angle of installation (4) a maximum of 15 °.

If the ramps bend a large amount under the weight of the machine, put blocks (5) under the ramps to prevent them from bending.

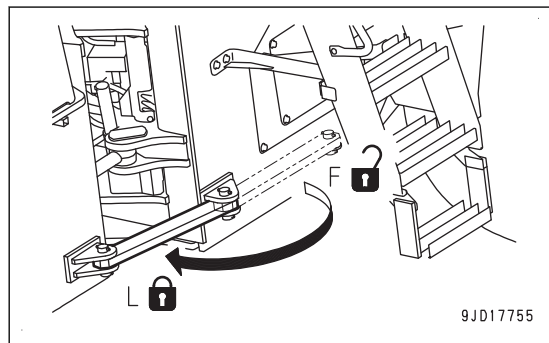
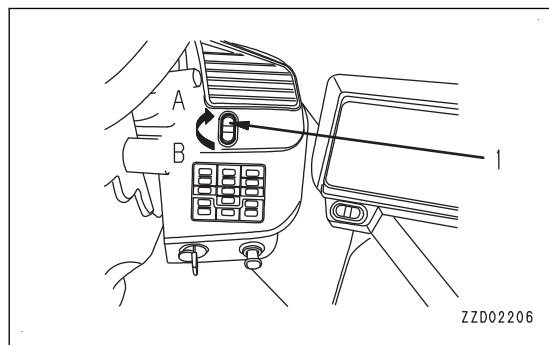
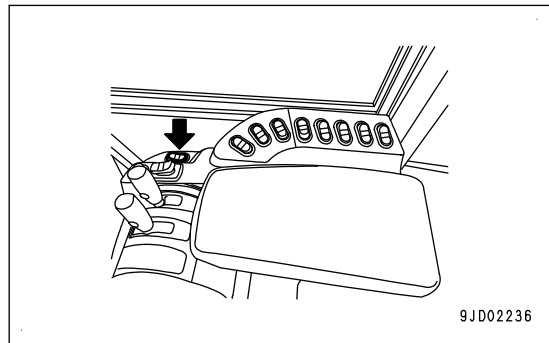
4. Set the travel direction toward the ramps and drive slowly for loading.
5. Load the machine correctly in the specified position on the trailer.



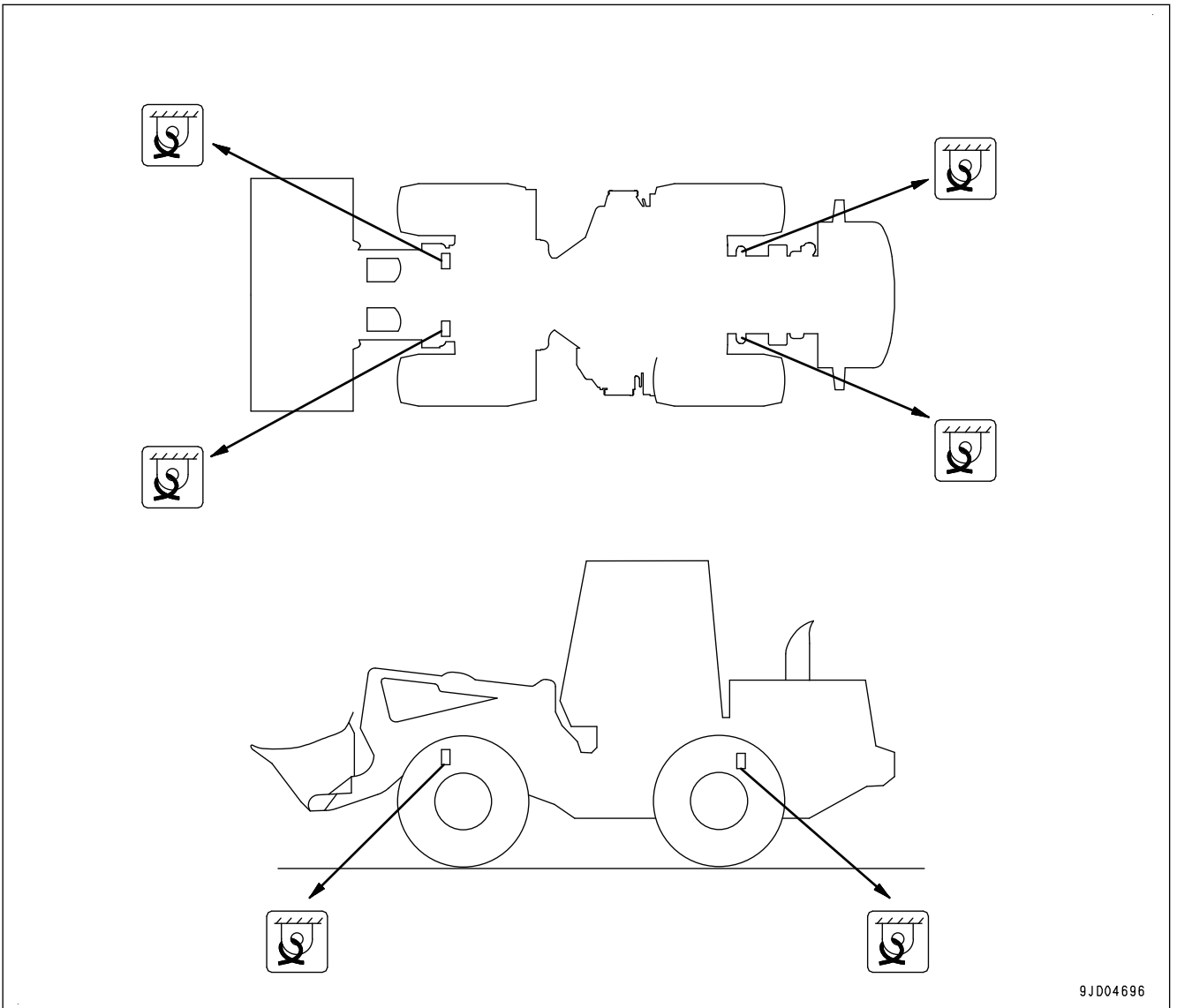
METHOD FOR SECURING MACHINE

After loading the machine onto a trailer, secure the machine as follows.

1. Lower the work equipment slowly.
2. Check that the work equipment control lever is in HOLD position.
Lock the work equipment (the pilot lamp in the switch lights up).
3. Set parking brake switch (1) to ON position (A).
Apply the parking brake securely.
4. Turn the starting switch to OFF position and stop the engine.
Remove the key from the starting switch.
5. Set the frame lock bar to LOCK position (L).
6. Lock the front frame and rear frame.
7. Set chocks at the front and rear of the tires to prevent the machine from moving during transportation.
8. Fix it securely with chains or wire ropes of proper strength.
In particular, fix the machine securely to prevent it from slipping sideways.
9. Stow the antenna, etc.
Securing position



Securing position



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PROCEDURES FOR UNLOADING MACHINE

Perform unloading of the machine on a firm, level ground.

Maintain a safe distance from the road shoulder

1. Apply the brake of the trailer securely.
2. Set chocks (1) to the front and rear of the tires to secure the trailer.
3. Set right and left ramps (2) parallel to each other and equally spaced to the right and left of center (3) of the trailer. Make angle of installation (4) a maximum of 15°.

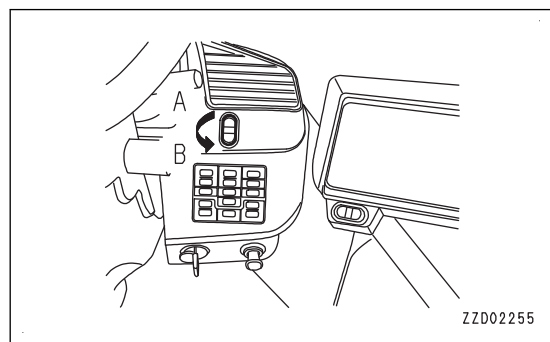
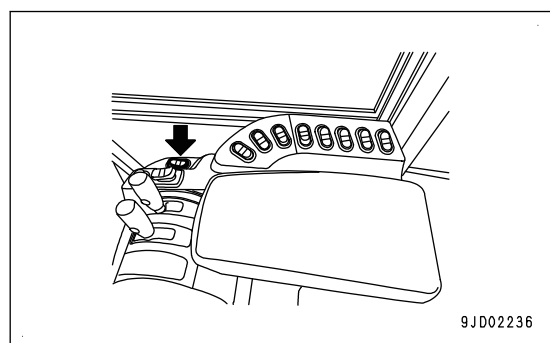
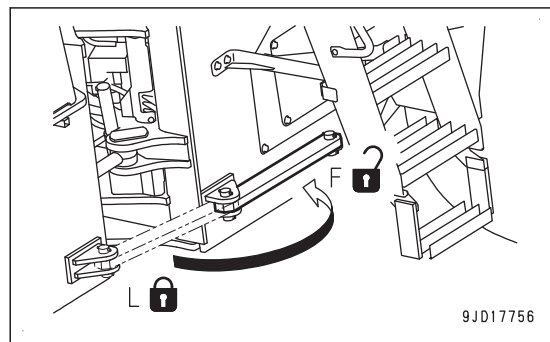
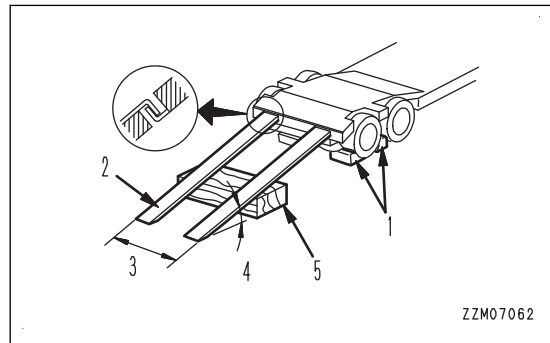
If the ramps bend a large amount under the weight of the machine, put blocks (5) under the ramps to prevent them from bending.

4. Remove the chains and wire ropes fastening the machine.
5. Set the frame lock bar to FREE position (F).
6. Start the engine.

Warm the engine up fully in cold weather.

7. Check that the work equipment control lever is in HOLD position.
8. Unlock the work equipment (the pilot lamp in the switch goes out).

9. Set the parking brake switch to OFF position (B).
Release the parking brake.
10. Set the travel direction toward the ramps and drive slowly for unloading.



METHOD FOR LIFTING MACHINE

⚠ WARNING

- The person using the crane to perform lifting operations must be a qualified crane operator.
- Never raise the machine with any worker on it.
- Always use a wire rope that has ample strength for the weight of the machine.
- When lifting, keep the machine horizontal.
- When performing lifting operations, do as follows to prevent the machine from moving unexpectedly.
 - Set the parking brake switch to “ON” position.
 - Lock the work equipment (the pilot lamp in the switch lights up).
 - Set the frame lock bar to the “LOCK” position.
- Never enter the area under or around a lifted machine.
- There is a danger of the machine losing its balance.
 - Use the procedure below to set the machine in the proper posture and use the sling when lifting the machine.

NOTICE

This method of lifting applies to the standard specification machine.

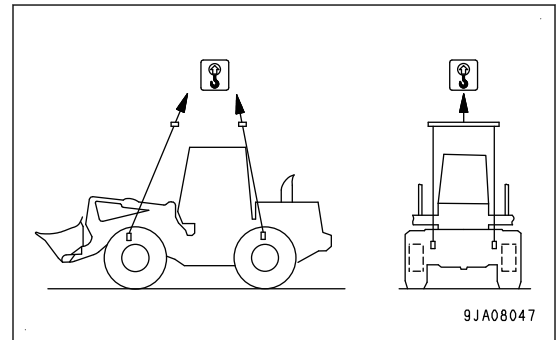
The method of lifting differs depending on the attachments and options installed.

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

For the weight, see “SPECIFICATIONS (5-2)”.

Procedure for lifting machine

Lifting position



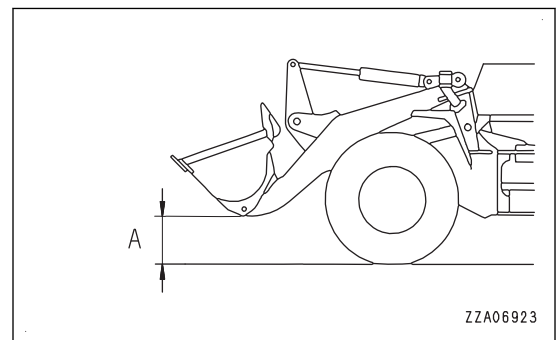
Lifting work is allowed for only machines having lifting marks.

Before starting the lifting work, place the machine on a level ground and perform the following.

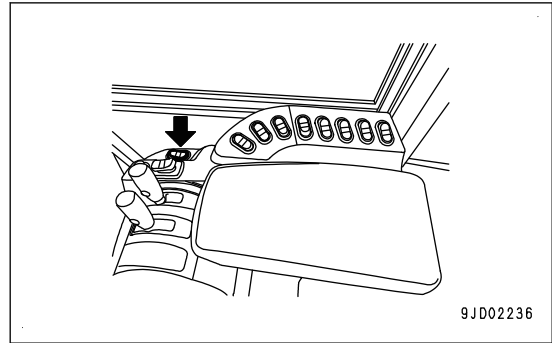
1. Start the engine.
2. Set the machine horizontally and set the work equipment in the travel posture.

For detail, see “METHOD FOR STARTING MACHINE (TRAVEL FORWARD AND REVERSE, AND SHIFTING GEAR) AND STOPPING MACHINE (3-210)”.

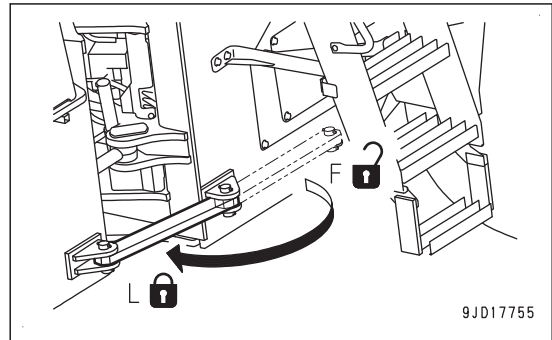
(A): 40 to 50 cm {15.7 to 19.7 in}



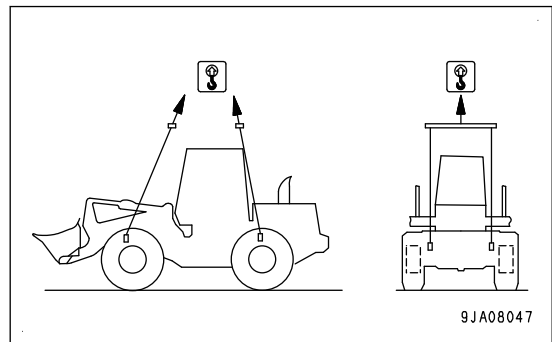
3. Check that the work equipment control lever is at HOLD position, then lock the work equipment (the pilot lamp in the switch lights up).



4. Stop the engine.
Check safety around the operator's compartment, set the frame lock bar to LOCK position (L) to prevent the front frame and rear frame from articulating.

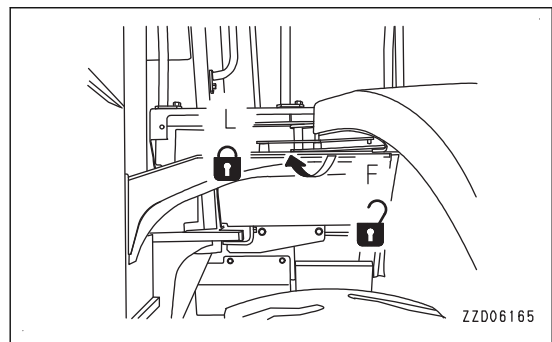


5. Use the lifting tools such as the wire rope and sling suitable for the weight of the machine as shown in the figure of the lifting position. Extend the wire rope and fix the machine.



NOTICE

- Use protectors, etc. so that the wire ropes will not be broken at sharp edges or narrow places.
 - Use spreaders and bars having sufficient width so that they will not touch the machine.
 - Open the rear full-length fender and set lock lever to LOCK position (L).
6. Immediately before lifting up the machine, set the slings and float the machine 100 to 200 mm {3.9 to 7.9 in} above the ground with the sling, and check that the wire ropes are not slack and the machine is level, then lift up slowly.



COLD WEATHER OPERATION

COLD WEATHER OPERATION INFORMATION

If the ambient temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze. Follow the instructions described as follows.

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".

COOLANT

WARNING

- Coolant is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large amount of fresh water and see a doctor immediately.
- When handling the cooling water containing coolant that has been drained during changing the coolant or repair of radiator, contact your Komatsu distributor or request a qualified company to perform the operation. Coolant is toxic, so never pour it into drainage ditches or drain it onto the ground surface.

NOTICE

Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC) for the coolant.

Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, so it is not flammable.

For details on the coolant change interval and the density of Non-Amine Engine Coolant (AF-NAC), see "METHOD FOR CLEANING INSIDE OF COOLING SYSTEM (4-25)".

DEF

NOTICE

- DEF freezes at $-11\text{ }^{\circ}\text{C}$ {12.2 °F} .
If DEF in DEF tank freezes, it may expand to break the devices in the tank. The parts inside the tank may be affected. Add DEF to the specified amount for cold weather (below the level of when DEF may freeze).
For the specified amount of DEF, see "METHOD FOR CHECKING DEF LEVEL AND ADDING DEF (3-179)".
- In cold weather, keep the DEF or the machine installed with the DEF in the indoors where the temperature is at $-11\text{ }^{\circ}\text{C}$ or higher {12.2 °F or higher} to prevent the DEF in the tank from freezing.
If DEF or the machine equipped with DEF system is stored at the outside temperature lower than $-11\text{ }^{\circ}\text{C}$ {12.2 °F}, DEF in the tank may freeze. Ask your Komatsu distributor for discharging of DEF, and keep it in the condition free from freezing.
- When the ambient temperature is low, the tank shrinks and clearance may occur between the fixing plate and tank.
Since this clearance disappears as the tank temperature is increased by the machine operation, no retightening is necessary.

BATTERY

⚠ WARNING

- Do not bring any open flame near the battery. Otherwise, it may explode since the battery generates the flammable gas.
- Battery electrolyte is dangerous object. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.
- Battery electrolyte dissolves paint. If it gets on the bodywork, wash it off immediately with water.
- Do not charge the battery or start the engine with a different power source if the battery electrolyte is frozen. Battery may explode.
- Battery electrolyte is toxic. Do not let it flow into drainage ditches or spray it on to the ground surface.

When the ambient temperature drops, the capacity of the battery will also drop. Maintain the battery charging rate as close as possible to 100 %. Insulate it against cold temperature to ensure that the machine can be started easily in the next morning.

REMARK

Measure the gravity of the electrolyte and calculate the charging rate from the following conversion table.

Electrolyte Temperature Charging Rate (%)	20 °C {68 °F}	0 °C {32 °F}	-10 °C {14 °F}	-20 °C {-4 °F}
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

- When the ambient temperature is low, the capacity of the battery considerably drops. Cover it, or remove it from the machine to place it in the warm place. Restore it again before the operation.
- If the electrolyte level is low, add distilled water in the morning before beginning the work. Do not add water after the day's work to prevent diluted electrolyte in the battery from freezing during the night.

PRECAUTIONS AFTER DAILY WORK COMPLETION IN COLD WEATHER

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

- Remove all the mud and water from the machine body. In particular, wipe the hydraulic cylinder rods clean to prevent damage to the seal caused by mud, dirt, or drops of water on the rod from getting inside the seal.
- Place the machine on a firm, dry ground.
If this is impossible, park the machine on boards.
The boards prevent the tracks from freezing to the ground, and allow the machine to move the next morning.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
- Fill up the fuel tank. This minimizes moisture condensation in the tank when the temperature drops.
- In cold weather condition, add DEF to the defined level strictly. If adding more than the defined level, it may expand to break the devices in the tank when it freezes.
If DEF tank level is lower than the defined level for the cold weather, DEF may freeze easily to damage the parts in DEF system. If the filler cap freezes, defreeze and open.

PRECAUTIONS IN COLD WEATHER

If engine has run at idle for a long time or machine is traveling at 3rd or 4th speed in cold weather, inside of KCCV and KCCV drain piping may freeze and be plugged.

To avoid such long idling of the engine, stop the engine or, if it is necessary to run the engine at idle, apply a load from time to time.

Also, automatic fan reverse is useful to keep engine room warm and prevent inside of KCCV and KCCV drain piping from freezing. Set the automatic fan reverse mode to "mode C" according to "RADIATOR FAN AUTOMATIC REVERSE MODE (3-72)".

AFTER COLD WEATHER SEASON

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

Replace the fuel and oil for all equipment with the ones of the specified viscosity. For details, see "METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

If the machine is parked for long time in the cold weather condition, quality of DEF may be affected by repeated freeze, ask your Komatsu distributor to inspect.

PRECAUTIONS FOR LONG-TERM STORAGE

PREPARATION FOR LONG-TERM STORAGE

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

- Clean and wash all parts of the machine and store it indoors. If the machine has to be stored outdoors, select a level ground and cover the machine with waterproof sheet.
- Fill up the fuel tank. This prevents dew condensation.
- Grease the machine and change the oil before storage.
- Fill up DEF tank (Except cold weather condition).
If the inside dries up, urea is deposited and it may cause failures in component operation.
- Coat the exposed portion of the hydraulic cylinder piston rod with grease.
- After turning the starting switch to OFF position, check that the system operating lamp is not lit. Then set the battery disconnect switch to OFF position and remove the key. When storing the battery, cover it.
For the operation of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-139)".
- Lock the work equipment (the pilot lamp in the switch lights up).
- To prevent rust, fill the cooling circuit with Non-Amine Engine Coolant (AF-NAC) to give a density of at least 30% for the engine coolant.

MAINTENANCE DURING LONG-TERM STORAGE

WARNING

If it is necessary to perform the rust prevention operation while the machine is indoors, open the doors and windows of the building to improve ventilation and prevent gas poisoning.

- During storage, perform the rust prevention operation and move the machine for a short distance once a month so that a new film of oil will coat moving parts. At the same time, charge the battery as well.
- When operating the work equipment, wipe off all the grease from the hydraulic cylinder piston rods.
- If the machine is equipped with an air conditioner, operate the air conditioner for 3 to 5 minutes once a month to lubricate all parts of the air conditioner compressor. Always run the engine at low idle when doing this. In addition, check the refrigerant level twice a year.

Procedure for rust prevention operation

1. Check the safety around the machine, and check for any problem on the machine (leakage of coolant and oil).
2. Check the oil level and coolant level on each part.
Check them in the following order.
 - (1) Reservoir tank coolant level
 - (2) Engine oil level
 - (3) Hydraulic oil level
3. Start the engine and run it at low idle for 5 minutes.
4. Check for abnormality on the machine monitor and machine.
If any abnormality (noise, vibration, etc.) is found, stop the engine immediately, and ask your Komatsu distributor for inspection and maintenance.
5. Check the oil level in the transfer or transmission.
6. Depress the accelerator pedal to the midpoint in order to run the engine at a medium speed, and fully extend and fully retract each hydraulic cylinder repeatedly 5 times.
7. To lubricate the axle, drive the machine forward and reverse (forward and reverse travel of 10 m {32 ft 10 in} for 3 times).

8. Set the machine in the parking posture and stop the engine to park the machine.

STARTING MACHINE AFTER LONG-TERM STORAGE

NOTICE

If the machine has been stored without performing the monthly rust-prevention operation, consult your Komatsu distributor before using it.

When using the machine after long-term storage, perform the following items before using it.

- Wipe off the grease from the hydraulic cylinder rods.
- Add oil and grease at all lubrication points.
- When the machine is stored for a long period, moisture in the air will mix with the oil. Check the oil before and after starting the engine. If there is water in the oil, change all the oil.
- Check for rust on engine pulley and abnormality on belt.
If the surface of pulley where contacting with the belt is covered with too much rust, remove them with wire brush.
- Insert the battery disconnect switch key and turn it to ON position.
For the operation method, see "BATTERY DISCONNECT SWITCH (3-139)".
- If the machine is stored for a long period with the battery disconnect switch OFF or the battery terminal disconnected, the clock information and radio tuning information may be lost. In this case, set them again. For detail, see "CLOCK ADJUSTMENT (3-93)" and "HANDLE RADIO (3-258)".
- If the machine has been stored for more than 2 months, perform the following procedure.
 - Before starting the engine, replace DEF filter and fill up DEF tank.
 - Start the engine and check correctly.
If SCR system has any abnormality, warning is displayed on the monitor screen and the audible alert sounds.
If SCR system has any abnormality, stop the engine, and then start it again.
If SCR system still has abnormality after the engine is restarted, contact your Komatsu distributor.
 - If DEF is kept in DEF tank for more than 1 year, ask your Komatsu distributor for replacement.
Dispose of drained DEF according to the local regulations and rules.
Aged DEF may have smell of ammonia.
Replace DEF in a well-ventilated place and take care not to inhale its vapor.

TROUBLES AND ACTIONS

ACTIONS WHEN RUNNING OUT OF FUEL

⚠ WARNING

When starting the engine again, check safety around the engine thoroughly, and then crank the engine.

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

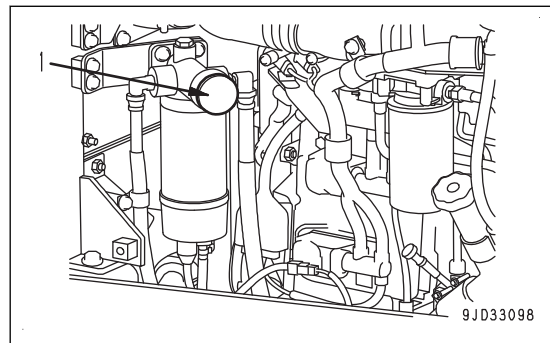
PROCEDURES FOR BLEEDING AIR FROM FUEL CIRCUIT

1. Open the engine side cover on the right side of the machine.
2. Loosen the knob of feed pump (1), pull it out, then pump it in and out until the movement becomes heavy.

REMARK

Air may remain inside of the water separator, however, the engine can be started after pumping the feed pump (1) in and out until it becomes heavy. Leave it as it is for a while after stopping the engine, and air is bled spontaneously.

3. Push in and tighten the knob of feed pump (1).
4. Close the engine side cover on the right side of the machine.

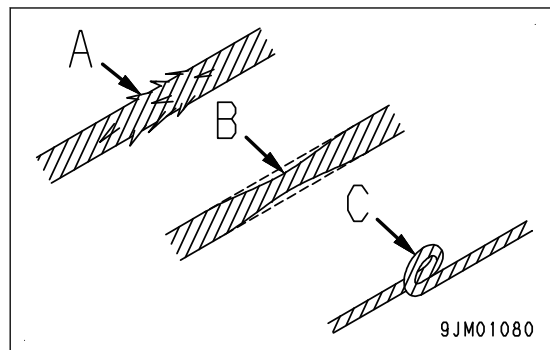


PRECAUTIONS FOR TOWING MACHINE

⚠ WARNING

Always use the correct towing equipment and towing method. Any mistake in the selection of the wire rope or drawbar or the method of towing a disabled machine and being towed may lead to serious personal injury or death.

- Always confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.
- Never use a wire rope which has breaks in strands (A), reduced diameter (B), or kinks (C). There is a danger that the rope may break during the towing operation.
- Always wear leather gloves when handling the wire rope.
- Never tow a machine on a slope.
- During the towing operation, never stand between the towing machine and the machine being towed.
- Operate the machine slowly and be careful not to apply any sudden load to the wire rope.
- If there is a failure in the brake system, the brakes will not work, so be extremely careful.



NOTICE

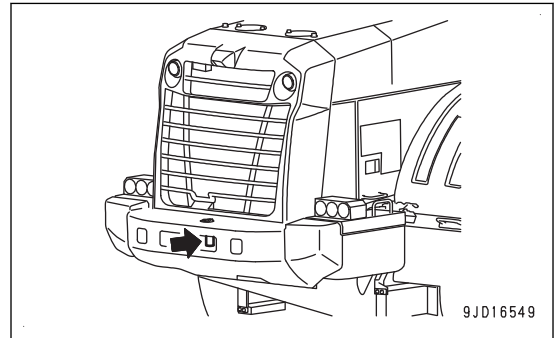
- **Tow the machine only for a short distance, such as to a place for inspection and maintenance. Do not tow the machine for a long distance.**
- **For details of the allowable towing capacity for this machine, see “SPECIFICATIONS (5-2)”.**
- **For details of the procedure for towing a disabled machine, consult your Komatsu distributor.**

This machine must not be towed except in emergencies. However, if it is avoidable to tow the machine, take the following precautions.

- When releasing the brake, secure the machine with chocks. If the wheels are not chocked, the machine may move suddenly.
- When towing a machine, tow it at a low speed of less than 2 km/h {1.2 MPH}, and for a distance of a few meters to a place where repairs can be performed.

This method is applied only in emergencies. If the machine must be moved a long distance, use a transporter.

- If it is impossible to operate the steering and brakes of the machine being towed, do not let anyone ride on the machine.
- Keep the angle of the towing rope as small as possible. Keep the angle between the center lines of the 2 machines to within 30 °.
- Usually, use a towing machine of the same class as the machine being towed. Check that both towing machine and towed machine have ample braking power, and rim pull to allow them to control both machines on slopes or on the tow road.
- When towing a machine downhill, it may be necessary to connect another machine to the rear of the towed machine in order to provide ample rim pull and braking power. The controllability of the machines can be secured by this method.
- Towing may be performed under various conditions, so it is impossible to determine beforehand the required traction force. Towing on flat level roads will require the minimum rim pull, while towing on slopes or on uneven road surfaces will require the maximum rim pull.
- Connect a wire rope to the part indicated with the arrow in the drawing.
When pulling out and inserting the towing pin, see “METHOD OF USING TOWING PIN (3-136)”.

**TOW THE MACHINE WHOSE ENGINE CAN BE STARTED**

- If the transmission and steering wheel can be operated, and the engine is running, it is possible to tow the machine out of mud or to move it for a short distance to the edge of the road.
- The operator should get on the machine being towed and operate the steering in the direction that the machine is towed.

TOW THE MACHINE WHOSE ENGINE CANNOT BE STARTED

When towing the machine with the engine stopped, observe the following procedures.

1. The transmission oil does not lubricate the system, so remove the front and rear drive shafts. If necessary, chock the tires to prevent the machine from moving.
2. The steering cannot be operated, so remove the steering cylinder.
Even if the brakes are in good condition, the brakes can only be used a limited number of times. There is no change in the operating force for the brake pedal, but the braking force is reduced each time the pedal is depressed.
3. Connect the towing equipment securely. When performing towing operations, use 2 machines of at least the same class as the machine being towed. Connect one machine each to the front and rear of the machine being towed, then remove the chocks from the tires and tow the machine.
4. Parking brake
The parking brake cannot be turned OFF. Do as follows to release the parking brake.

METHOD FOR RELEASING PARKING BRAKE

⚠ WARNING

- When releasing the parking brake, stop the machine on a level ground and check that the surrounding area is safe. If it is necessary to release the brake on a slope in an emergency, chock the tires before starting the work.
- When the parking brake is released, the brake is not applied. When moving the machine, be careful with the safety.

If the engine does not run for some reason, release the parking brake according to the following procedure and tow the machine.

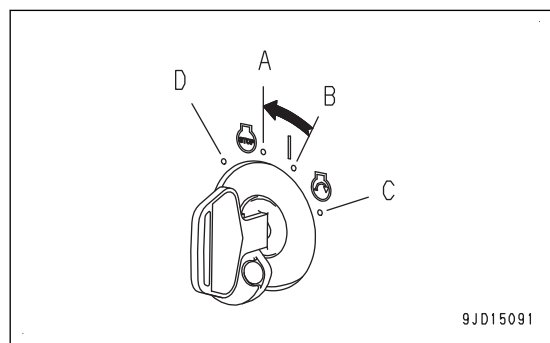
METHOD FOR RELEASING PARKING BRAKE WITH PARKING BRAKE EMERGENCY RELEASE VALVE

⚠ CAUTION

When the parking brake switch is OFF (released) and the parking brake emergency release valve is opened, the parking brake is released instantly.
Under this condition, even if you feel danger and close the parking brake emergency release valve trying to stop the machine, the parking brake does not work immediately.

If the pressure in brake accumulator is high, do as follows. (When the brake oil pressure caution lamp is not lit while the key is turned to ON position.)

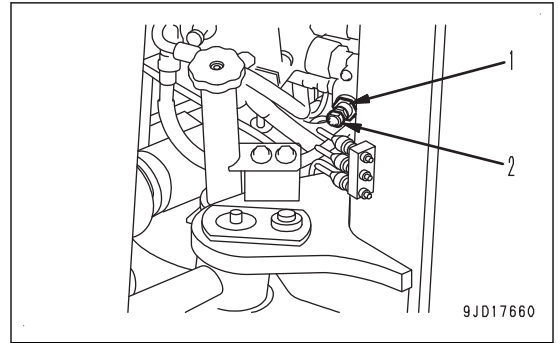
1. Turn the starting switch to OFF position (A).



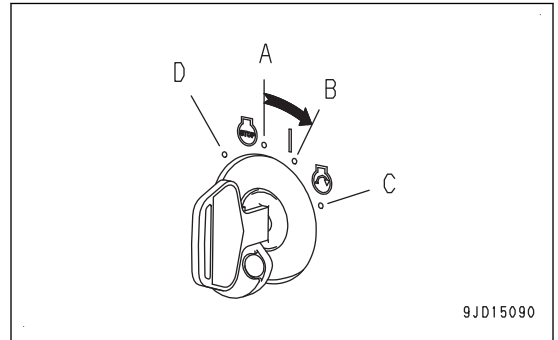
2. Loosen lock nut (1) of the release valve by turning it counterclockwise.
3. Open the release valve by turning grip (2) counterclockwise.

REMARK

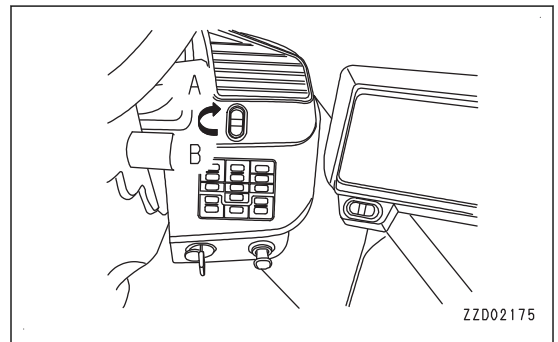
The release valve is located at the left front part inside the rear frame and installed to the accumulator mounting bracket.



4. Turn the starting switch to ON position (B).



5. Set the parking brake switch to ON position (A) (operated).
6. Set to OFF position (B) (released).
The parking brake is released.



7. To restore the function of the parking brake, turn grip (2) of the release valve clockwise to close the release valve, then turn locknut (1) clockwise to lock.

Tightening torque

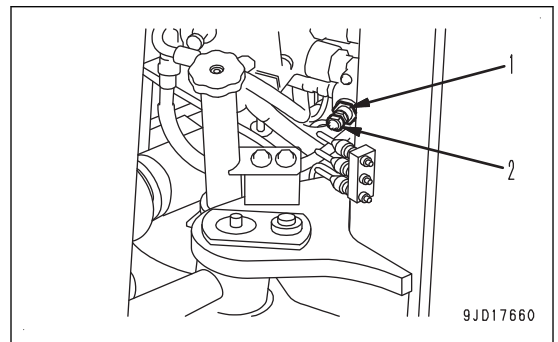
Grip (2): $20 \pm 5 \text{ Nm}$ { $2.0 \pm 0.5 \text{ kgfm}$, $14.5 \pm 3.6 \text{ lbft}$ }

Lock nut (1): $20 \pm 5 \text{ Nm}$ { $2.0 \pm 0.5 \text{ kgfm}$, $14.5 \pm 3.6 \text{ lbft}$ }

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

The parking brake is applied.

To release the parking brake again, repeat the procedure in steps 1 to 6.

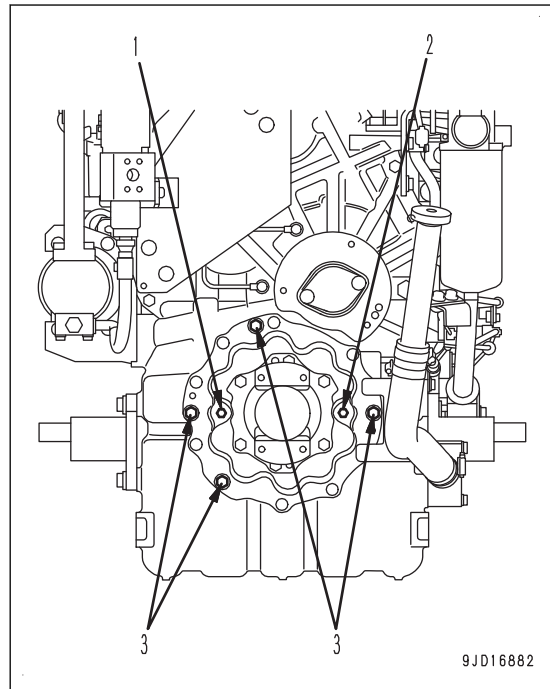


REMARK

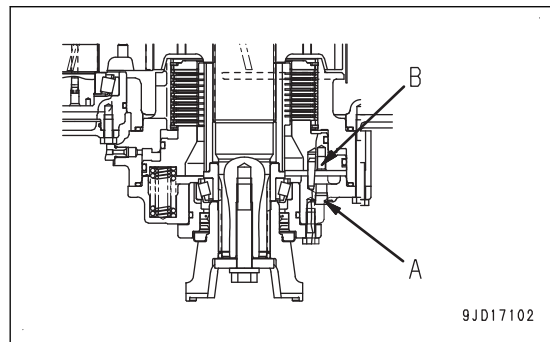
If the pressure in brake accumulator is low, the parking brake caution lamp may not go out or the alarm buzzer may sound (continuous beep). In this case, release the brake. For details, see "METHOD FOR RELEASING PARKING BRAKE WITH BOLT (3-278)".

METHOD FOR RELEASING PARKING BRAKE WITH BOLT

1. Remove plugs (1) and (2) in front of the transmission case.
2. Remove 2 bolts among mounting bolts (3) (4 pieces), with higher mounting seat (3 mm {0.1 in}), being used for mounting the parking brake chamber cover.



3. Insert bolts (3) into the holes from which plugs (1) and (2) were removed.
Screw in the bolts evenly until they stop.
The parking brake is released.
(A): Plug mounting hole (M16: O-ring boss)
(B): Releasing screw hole (M12)



METHOD FOR OPERATING MACHINE IN EMERGENCY

The normal gear shifting operation is performed by electric signals. If there should be a failure in the electrical system, and the machine does not move, ask your Komatsu distributor.

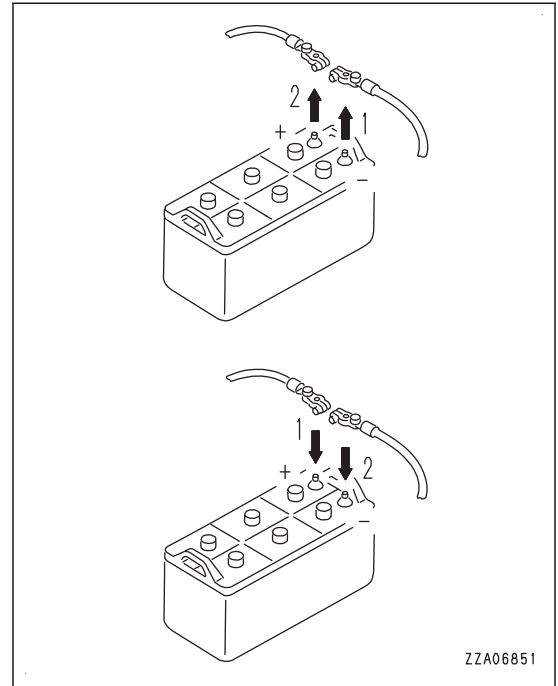
NOTICE

If an emergency travel operation is needed, ask your Komatsu distributor to perform it.

PRECAUTIONS FOR DISCHARGED BATTERY

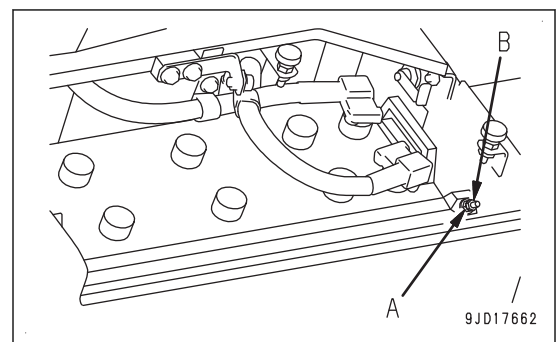
⚠ WARNING

- It is dangerous to charge a battery when installed on a machine. Make sure that it is removed before charging.
- When checking or handling the battery, stop the engine and turn the starting switch and battery disconnect switch keys to OFF positions.
- The battery generates hydrogen gas, and it is dangerous that it may explode. Do not bring open flame such as lighted cigarettes near the battery, or do nothing that will cause sparks.
- Battery electrolyte is dilute sulfuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, immediately wash it off with a large amount of clean water.
If it gets in your eyes, wash the eyes immediately with clean water, then consult a doctor for medical treatment.
- When handling batteries, always wear protective eye-glasses and rubber gloves.
- When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, first connect the cable to the positive (+) terminal.
If a tool touches the positive terminal and the chassis, it is dangerous that it may cause a spark. Be extremely careful.
- If the terminals are loose, it is dangerous that the defective contact may generate sparks, and it may cause an explosion.
Install the cable terminals securely.
- When removing or installing the cable terminals, check which is the positive (+) terminal and which is the negative (-) terminal.



PRECAUTIONS FOR REMOVING AND INSTALLING BATTERY

1. Before removing battery, remove the ground cable (normally connected to the negative (-) terminal).
If any tool touches the positive terminal of the battery and the chassis, there is a danger that it will cause a spark. Loosen the nuts of the terminal and remove the wires from the battery.
2. When replacing the battery, fix the battery body with the battery mounting fixtures.
Tightening torque
Nut (A): 5.9 to 9.8 Nm {0.6 to 1.0 kgfm, 4.3 to 7.2 lbft}
Nut (B): 5.9 to 9.8 Nm {0.6 to 1.0 kgfm, 4.3 to 7.2 lbft}
3. When installing the battery, connect the ground cable last. Insert the hole of the terminal on the battery and tighten the nut.
Tightening torque: 5.9 to 9.8 Nm {0.6 to 1.0 kgfm, 4.3 to 7.2 lbft}



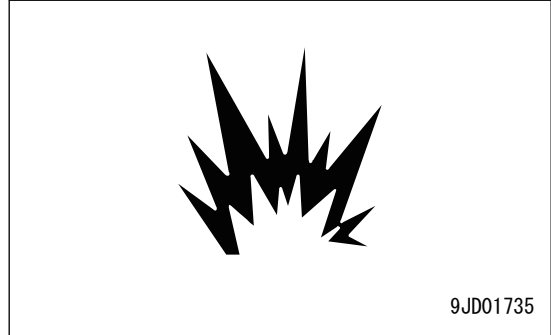
REMARK

The batteries are on both sides at the rear of the machine. The ground wire side battery is on the right side of the machine.

PRECAUTIONS FOR CHARGING BATTERY**⚠ WARNING**

When charging the battery, if the battery is not handled correctly, it is dangerous that the battery may explode. Always follow the instruction manual accompanying the charger, and observe the following.

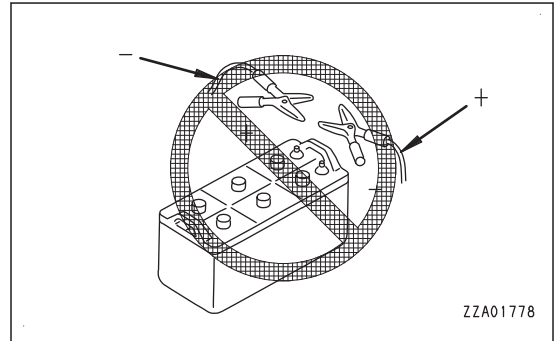
- Set the voltage of the charger to match the voltage of the battery to be charged. If the correct voltage is not selected, the charger may overheat and cause an explosion.
- Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to attach the clips securely.
- Set the charging current to 1/10 of the value of the rated battery capacity; when performing rapid charging, set it to less than the rated battery capacity.
If the charger current is too high, the electrolyte will leak or the battery cells will dry up, and this may cause the battery to catch fire and explode.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. It is dangerous that this may ignite the battery electrolyte and cause the battery to explode.
- Do not use or charge the battery if the battery electrolyte level is below LOWER LEVEL line. This may cause an explosion. Check the battery electrolyte level periodically and add the purified water (such as a commercial battery fluid) to bring the electrolyte level to UPPER LEVEL line.



START ENGINE WITH JUMPER CABLES

WARNING

- When connecting the cables, never contact the positive (+) and negative (-) terminals.
- Always wear protective eyeglasses and rubber gloves when starting the engine by using the jumper cable.
- Be careful not to let the normal machine and failed machine contact each other.
The sparks caused near the battery could ignite the hydrogen gas generated from the battery, so be careful not to let it happen.
- Make sure that there is no mistake in the jumper cable connections. In the last connection (to the upper structure frame), a spark will be caused, connect the cable to a spot as far away from the battery as possible. (However, do not connect to the work equipment since the current does not flow well through it.)
- When disconnecting the jumper cable, take care not to bring the clips in contact with each other or with the machine.
- Never start the engine by short-circuiting the starting motor (jump start).



NOTICE

- The starting system for this machine uses 24 V. Accordingly, the normal machine must be equipped with a 24 V power supply.
- The sizes of the jumper cables and clips should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the failed machine.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check that the lock levers and parking brake levers (if equipped) of both machine are in LOCK position.
- Check that each lever is in NEUTRAL position.
- To prevent damage of the electric devices of the failed machine, turn the starting switch of the failed machine to OFF position, check that the system operating lamp is not lit, and then turn the battery disconnect switch key to OFF position and remove it before connecting the jumper cable.
For the operating method of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-139)".

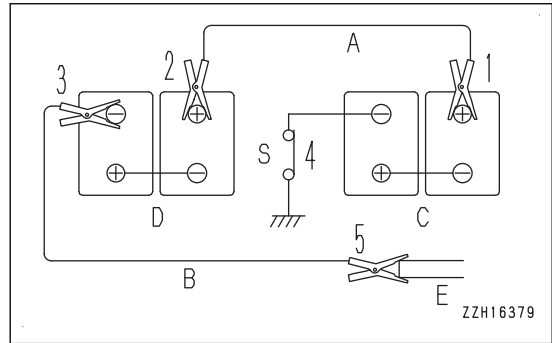
REMARK

If the battery disconnect switch is turned to OFF position, the radio tuning information etc. may be lost. In this case, set again. For detail, see "HANDLE RADIO (3-258)".

PROCEDURE FOR CONNECTING JUMPER CABLES

Turn the starting switch and battery disconnect switch of the failed machine, and the starting switch of the normal machine to OFF position.

1. Connect the clip of jumper cable (A) to the positive (+) terminal of battery (C) on the failed machine.
2. Connect the clip at the other end of jumper cable (A) to the positive (+) terminal of battery (D) on the normal machine.
3. Connect the clip of jumper cable (B) to the negative (-) terminal of battery (D) on the normal machine.
4. Turn the battery disconnect switch (S) of the failed machine to ON position.
5. Connect the clip at the other end of jumper cable (B) to engine block (E) of the failed machine.



METHOD FOR STARTING ENGINE

! WARNING

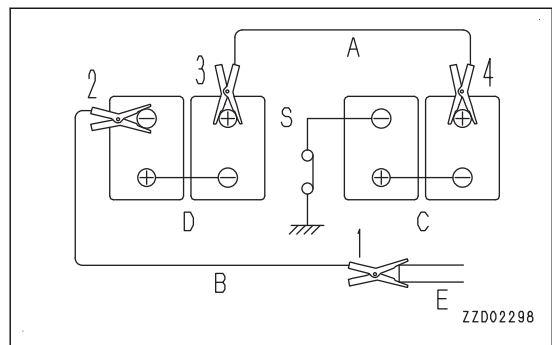
Check both of normal machine and failed machine that the lock lever is set to LOCK position (the pilot lamp in the switch lights up). Check also that all the control levers are in NEUTRAL position.

1. Make sure the clips are firmly connected to the battery terminals.
 2. Start the engine of the normal machine and run it at high idle (max. speed).
 3. Turn the starting switch of the failed machine to START position and start the engine.
- If the engine does not start, try it again after 2 minutes or more.

PROCEDURE FOR DISCONNECTING JUMPER CABLES

After the engine has 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 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.



OTHER TROUBLE

PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM

- For the remedies indicated with (*) in the remedy column, always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speeds.	Defective wiring	Check and repair loose terminals, open circuit. (*)
	Defective adjustment of belt tension	Check alternator belt tension. See "EVERY 1000 HOURS MAINTENANCE".
Lamp flickers while engine is running.	Defective wiring	Check and repair loose terminal or wire breakage, replace battery. (*)
	Defective adjustment of belt tension	Check alternator belt tension. See "EVERY 1000 HOURS MAINTENANCE".
Unusual noise is generated from alternator.	Defective alternator	Replace. (*)
Battery charge level caution lamp lights up while engine is running.	Defective alternator	Replace. (*)
	Defective wiring	Check, repair. (*)
	Defective adjustment of belt tension	Check alternator belt tension. See "EVERY 1000 HOURS MAINTENANCE".
Starting motor does not rotate even when starting switch is turned to START position.	Defective wiring	Check, repair. (*)
	Defective starting motor	Replace. (*)
	Battery disconnect switch at OFF	Turn ON.
	Engine shutdown secondary switch at "engine stop" position	Set it "NORMAL" position. Install cover.
	Insufficient battery charge	Charge battery.
Pinion of starting motor repeats engaging and disengaging (rattles).	Insufficient battery charge	Charge battery.
	Defective starting motor	Replace. (*)
Starting motor turns engine sluggishly.	Insufficient battery charge	Charge battery.
	Defective starting motor	Replace. (*)
Starting motor disengages before engine starts.	Defective wiring	Check, repair. (*)
	Defective ring gear and pinion	
	Insufficient battery charge	Charge battery.
Preheating pilot lamp does not light up.	Defective wiring	Check, repair. (*)
	Defective heater relay, heater controller and temperature sensor	Replace. (*)
	Defective monitor	Replace. (*)
Engine does not start. ("L04" lights up on monitor.)	Damaged data in the controller	Check, repair. (*)
	Other system troubles	Check, repair. (*)

PHENOMENA AND ACTIONS FOR CHASSIS

- For the remedies indicated with (*) in the remedy column, always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Transmission		
Engine runs but machine does not move.	Parking brake is applied.	Release the parking brake.
	Directional lever is not shifted in position completely.	Set the lever completely in position.
	Lack of oil in transmission case	Add specified capacity of oil. See WHEN REQUIRED.
Machine moves slowly and lacks power even with engine running at full throttle.	Lack of oil in transmission case	Add specified capacity of oil. See WHEN REQUIRED.
	Clogged screen	Disassemble and clean. (*)
Oil overheats.	Lack or excess oil in transmission case	Add oil to specified level or drain excessive oil. See Maintenance when required.
	Traveling in incorrect speed range	Use correct speed range.
	Too long torque converter stall operation	Reduce stall time.
	Engine overheating	Check engine. (*)
Noise is generated.	Lack of oil in transmission case	Add specified capacity of oil. See WHEN REQUIRED.
Axle		
Noise is generated.	Lack of oil	Add specified capacity of oil. See WHEN REQUIRED.
	Improper oil used (for machines with limited slip differential)	Change the oil to the specified oil.
Brake		
Brake does not work even when pedal is depressed.	Disc has worn to wear limit.	Replace disc. (*)
	Hydraulic oil in the hydraulic tank is insufficient.	Add oil to specified level. See EVERY 100 HOURS MAINTENANCE.
	Air is in brake system.	Bleed air (*)
Brake drags or remains applied.	Vent hole of brake valve is clogged.	Clean.
Brake squeals.	Disc has worn.	Replace disc. (*)
	Large amount of water is in axle oil	Change the axle oil.
	Axle oil is deteriorated due to overuse of brake.	Change the axle oil.
Steering		
Steering wheel is heavy.	Hydraulic oil in the hydraulic tank is insufficient.	Add oil to specified level. See EVERY 100 HOURS MAINTENANCE.
Steering wheel is jolting.	Play in steering cylinder pin	Lubricate the bearing. Change the pins and bushings. (*)
	Hydraulic oil in the hydraulic tank is insufficient.	Add oil to specified level. See EVERY 100 HOURS MAINTENANCE.

Problem	Main causes	Remedy
Parking brake		
Braking effect is poor.	Disc has worn.	Replace disc. (*)
Brake drags or remains applied.	Lack of oil in transmission case	Add specified capacity of oil. See WHEN REQUIRED.
	Clogged screen	Disassemble and clean. (*)
Hydraulic system		
Power lacks when raising the bucket.	Hydraulic oil in the hydraulic tank is insufficient.	Add oil to specified level. See EVERY 100 HOURS MAINTENANCE.
It takes time to raise the bucket.	Hydraulic tank filter is clogged.	Replace the filter. See Every "EVERY 2000 HOURS MAINTENANCE".
Excessive bubbles are in oil.	Poor quality of oil	Replace the oil with oil of good quality.
	Hydraulic oil in the hydraulic tank is insufficient.	Add oil to specified level. See EVERY 100 HOURS MAINTENANCE.
	Air is in oil system.	Replace the filter. See Every "EVERY 2000 HOURS MAINTENANCE".
Oil pressure is low.	Pump sucks air because of insufficient hydraulic oil in the hydraulic tank.	Add oil referring to "EVERY 100 HOURS MAINTENANCE", and bleed air referring to "EVERY 2000 HOURS MAINTENANCE".
Movement of cylinder is irregular.	Hydraulic oil in the hydraulic tank is insufficient.	Add oil to specified level. See EVERY 100 HOURS MAINTENANCE.

PHENOMENA AND ACTIONS FOR ENGINE RELATED PARTS

- For the remedies indicated with (*) in the remedy column, always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Engine oil pressure caution lamp lights up.	Lowered oil level in engine oil pan (sucking in air)	Set oil to specified level. See CHECKS BEFORE STARTING.
	Improper oil is used. (Viscosity is improper.)	Replace oil. See USE OF FUEL, METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE.
	Clogged oil filter cartridge	Replace cartridge. See EVERY 500 HOURS MAINTENANCE.
	Oil leakage due to improper connection or breakage of oil pipe or pipe joint	Check, repair. (*)
	Defective engine oil pressure sensor	Replace sensor. (*)
	Defective monitor	Replace monitor. (*)
Steam spurts out from top of radiator (pressure valve).	Lowered coolant level, leakage of coolant	Check, add coolant, or repair. See WHEN REQUIRED.
	Defective fan pump or motor	Check, repair. (*)
Indicator of engine coolant temperature gauge is in red range	Accumulation of dirt or scale in cooling system	Check, add coolant, or repair. See WHEN REQUIRED.
Engine coolant temperature caution lamp lights up.	Clogged radiator fins or damaged fin	Clean or repair them. See WHEN REQUIRED.
	Defective thermostat	Replace thermostat. (*)
	Defective sealing of thermostat	Replace thermostat seal. (*)
	Loose radiator filler cap (In high altitude operation)	Tighten cap or replace packing.
	Defective coolant temperature gauge	Replace coolant temperature gauge. (*)
	Defective coolant level sensor	Replace sensor.
	Defective monitor	Replace. (*)
Indicator of engine coolant temperature gauge does not rise up to the green range	Defective thermostat	Replace thermostat. (*)
	Defective coolant temperature gauge	Replace coolant temperature gauge. (*)
	Defective monitor	Replace. (*)

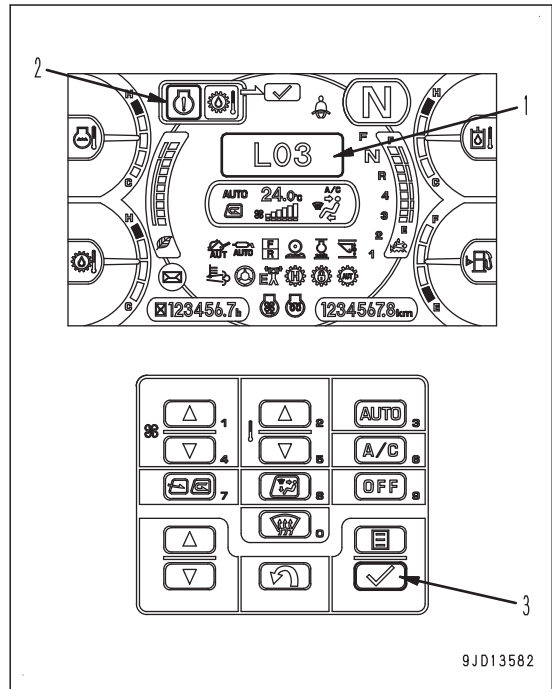
Problem	Main causes	Remedy
Starting motor turns but engine does not start.	Lack of fuel	Add fuel. See CHECKS BEFORE STARTING.
	Air in fuel system	Repair portion where air is sucked in.
	Fuel filter is not filled with fuel.	Fill filter with fuel. See EVERY 500 HOURS MAINTENANCE.
	Defective fuel injection pump or injector	Replace pump or injector. (*)
	Starting motor turns engine sluggishly.	See PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM.
	Starting motor does not turn.	See PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM.
	Preheating pilot lamp does not light up.	See PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM.
	Incorrect valve clearance (Defective compression)	Adjust valve clearance. (*)
Exhaust gas color is white or bluish.	Water entry in the aftertreatment devices	Check, repair. (*)
	Breakage of the aftertreatment devices	Replace the aftertreatment devices. (*)
	Excessive oil in oil pan	Set oil to specified level. See CHECKS BEFORE STARTING.
	Improper fuel	Replace with specified fuel.
Exhaust gas turns black from time to time.	Breakage of the aftertreatment devices	Replace the aftertreatment devices. (*)
	Clogged air cleaner element	Clean or replace. See WHEN REQUIRED.
	Defective injector	Replace injector. (*)
	Defective compression	See the above section on defective compression. (*)
	Defective turbocharger	Check, replace turbocharger. (*)
Combustion makes breathing sound from time to time.	Defective nozzle	Replace nozzle. (*)
Abnormal noise is generated. (Combustion or mechanical)	Low grade fuel being used	Replace with specified fuel.
	Overheating	Refer to "Indicator of engine coolant temperature gauge is in red range" as above.
	Breakage of inside of the aftertreatment devices	Replace the aftertreatment devices. (*)
	Excessive valve clearance	Adjust clearance. (*)
DEF level caution lamp lights up.	Lowering of DEF level	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, press switch (3) to display "Current Abnormality" and check the details and remedy.

For the contents of the action level monitor and caution lamp, see "BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE IN ABNORMAL SITUATION (3-15)".

- When the machine has not run out of fuel, if "CA2249" or "CA559" is displayed on "Current Abnormality" screen, replace both fuel main filter and fuel prefilter immediately. For details of replacement, see "METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE (4-65)" and "METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE (4-63)".
If "CA2249" or "CA559" is not cleared even after the replacement, ask your Komatsu distributor for an inspection immediately, even though the machine can perform normal operation.
- When failure code "CA4166 SCR Temperature Sensor ECU High Temperature Error" is displayed, raise the cooling fan speed by raising engine speed to emit heat inside the engine room.



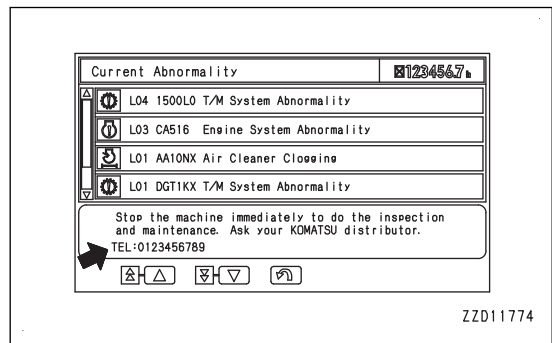
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Telephone number for the point of contact if an error occurs

When an error screen is displayed on the monitor, press switch (3) to display "Current Abnormality" screen and telephone number for the point of contact is displayed in the message column at the bottom of the screen.

REMARK

If no point of contact telephone number is registered, no telephone number is displayed. Ask your Komatsu distributor for the telephone number registration if necessary.



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MAINTENANCE

WARNING

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

PRECAUTIONS FOR MAINTENANCE

Do not perform any inspection and maintenance operation that are not found in this manual.

CHECK SERVICE METER READING

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

KOMATSU GENUINE REPLACEMENT PARTS

Komatsu recommends using Komatsu genuine parts specified in Parts Book as replacement parts.

KOMATSU GENUINE LUBRICANTS

For lubrication of the machine, Komatsu recommends using Komatsu genuine lubricants. Moreover use oil of the specified viscosity according to the ambient temperature.

ALWAYS USE CLEAN WASHER FLUID

Use automobile window washer fluid, and be careful not to let any dirt get into it.

FRESH AND CLEAN LUBRICANTS

Use clean oil and grease. Also, keep the containers of the oil and grease clean. Keep foreign materials away from oil and grease.

CHECK DRAINED OIL AND USED FILTER

At the replacement of the filters when oil is changed, check the old oil and filters for metal particles and foreign materials. If large quantity of metal particles or foreign materials are found, always report to the person in charge, and perform suitable action.

PRECAUTIONS FOR REFILLING OIL OR FUEL

If your machine is equipped with a strainer, do not remove it while filling oil or fuel.

PRECAUTIONS FOR ADDING DEF

Do not remove the strainer while adding DEF.

It is recommended to use a nozzle having a diameter and a length specified by ISO 22241-4 and an auto stop function to add DEF.

PRECAUTIONS FOR WELDING

- When conducting weld repair, turn the starting switch to OFF position and, after confirming that the system operating lamp is turned off, set the battery disconnect switch key to OFF position and pull it out.
- Do not apply a voltage higher than 200 V continuously.
- Connect grounding cable within 1 m {3 ft 3 in} of the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may malfunction.
- Prevent seals, bearings or bushings from entering the space between the weld zone and grounding point. Seals and the like can cause damage to the nearby parts by catching fire from sparks.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point. Sparks generated there can damage the plated portion.

DO NOT DROP THINGS INSIDE MACHINE

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

PRECAUTIONS FOR KDPF

When performing inspection and maintenance during or just after regeneration, take care of the high temperature parts.

Even after the engine stops the parts around KDPF may be at high temperature.

PRECAUTIONS FOR SCR ASSEMBLY

Be careful for the high temperature parts when performing inspection and maintenance. Even after the engine stops the parts around SCR device may be at high temperature.

DUSTY JOBSITES

When working at dusty jobsites, observe the following.

- Clean the radiator fins and other parts of the heat exchange equipment more frequently, and take care not to let the fins become clogged.
- Replace the fuel filter more frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
- When checking and replacing the oil or filters, move the machine to a place where there is no dust and take care to prevent dust from entering the system.

AVOID MIXING OIL

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

LOCK INSPECTION COVERS

Lock inspection cover securely into position with the lock bar, etc. If inspection or maintenance is performed with inspection cover not locked in position, there is a danger that it may be suddenly shut by the wind and cause personal injury.

BLEED AIR FROM HYDRAULIC CIRCUIT

When hydraulic equipment is repaired or replaced, or the hydraulic piping is disconnected, the air must be bled from the circuit. For bleeding air, see "METHOD FOR REPLACING HYDRAULIC OIL FILTER ELEMENT (4-72)".

PRECAUTIONS WHEN INSTALLING HYDRAULIC HOSES

- When removing parts at locations where there are O-rings or gasket seals, clean the mounting surface, and replace them with new parts.
When doing this, be careful not to forget to assemble O-rings and gaskets.
- When installing the hoses, do not twist them or bend them sharply.
If they are installed so, their service life will be extremely shortened and they may be damaged.

CHECKS AFTER INSPECTION AND MAINTENANCE

If you forget to perform the inspection and maintenance, unexpected problems may occur, and this may lead to personal injury. Always observe the following.

Checks after operation (with engine stopped)

- Have any inspection and maintenance points been forgotten?
- Have all inspection and maintenance items been performed correctly?
- Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside the machine and get caught in the lever linkage mechanism.
- Are there any leakage of coolant or oil? Have all nuts and bolts been tightened?

Checks while the engine is running

- For details of the checks when the engine is running, see SAFETY, “TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (2-40)” and pay attention to safety.
- Do not run the engine for long hours with the engine hood open. The engine hood may be damaged by heat of exhaust gas.
- Increase the engine speed to check for the leakage of fuel or oil.
- Check if the inspected and serviced area is normally operated.

FUEL AND LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE

It is necessary to select fuel or lubricant according to the ambient temperature.

CLOSE ENGINE SIDE COVER SECURELY

When closing the engine side cover after inspection and maintenance, lock it securely with the catcher.

If the engine side cover is not locked with the catcher, the engine side cover may open.

OUTLINE OF MAINTENANCE

- Komatsu recommends using Komatsu genuine parts for replacement parts, grease or oil.
- When changing the oil or adding oil, do not mix different types of oil. When changing the type of oil, drain all the old oil and fill completely with the new oil. Always replace the filter at the same time. (There is no problem if the small amount of oil remaining in the piping mixes with the new oil.)
- Unless otherwise specified, when the machine is shipped from the 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)
Transmission case	Power train oil TO10 (Komatsu genuine)
Hydraulic tank	Power train oil TO10 (Komatsu genuine)
Axle	Axle oil AXO80 (Komatsu genuine)
Radiator	Non-Amine Engine Coolant (AF-NAC) (Komatsu genuine) (Density of 30% or above)

HANDLE OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.
Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in Operation and Maintenance Manual.
Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
The majority of failures with the machine are caused by the entry of such impurities.
Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
Having too much oil or too little oil are both causes of failures.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, consult your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend that you have an oil analysis periodically to check the condition of the machine. For those who wish to use this service, consult your Komatsu distributor.
- When using commercially available oil, it may be necessary to reduce the oil change interval. We recommend that you use the Komatsu oil clinic to check the characteristics of the oil in detail.

NOTICE

Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure, shortening of the machine life, lowering of performance and increase of fuel consumption.

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 which 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 $-15\text{ }^{\circ}\text{C}\{5\text{ }^{\circ}\text{F}\}$), 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.

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 AND WATER FOR DILUTION

- The coolant has the important function of preventing corrosion as well as preventing freezing. Even in the areas where freezing is not an issue, the use of coolant is essential. 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 another coolant, it may cause serious problems, such as corrosion of the engine and aluminum parts of the cooling system.

- When using antifreeze, always observe the precautions given in Operation and Maintenance Manual.
- Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, so it is not flammable.
- The coolant density needs to be changed according to the ambient temperature. For the coolant density, see "METHOD FOR CLEANING INSIDE OF COOLING SYSTEM (4-25)". Even in areas where it is not considered necessary to prevent freezing, always use Non-Amine Engine Coolant (AF-NAC) with a density of over 30 % in order to prevent corrosion of the cooling system. Non-Amine Engine Coolant (AF-NAC) is diluted with distilled water that does not contain any ions or water-hardening substances. Never dilute with water.
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating, and will also cause problems with corrosion due to air entering the coolant.

DEF

- If DEF gets on your skin, it may 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 thoroughly. If your skin becomes irritated or begins to hurt, immediately consult a doctor for treatment.
- Do not induce vomiting if swallowed. If swallowed, thoroughly rinse 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 protective eyeglasses when exposed to DEF to protect from solution splashing in your eyes. Wear rubber gloves when you perform work handling 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.

- 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 create and emit a toxic gas.
- DEF is non-flammable; however, in the case of a fire it may generate an ammonia gas.
- If DEF is spilled, immediately wash and clean the area with water. If spilled DEF is left unattended and the area is not washed and cleaned, it can cause corrosion to the contaminated area and emit toxic gas.
- When disposing of DEF, treat it as an industrial waste. The container for DEF is an industrial waste as well. It should be treated in the same way.
- Never use an iron or aluminum container when disposing DEF, because toxic gas may develop and a chemical reaction may corrode the container. Use a container made of resin (PP, PE) or stainless steel when handling the fluid waste of DEF.

NOTICE

If you add any additional additive agents or water to DEF, the devices in the Urea SCR system may be defective, and conformance to the exhaust gas regulations will be lost.

GREASE

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

PERFORM KOWA (Komatsu Oil Wear Analysis)

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

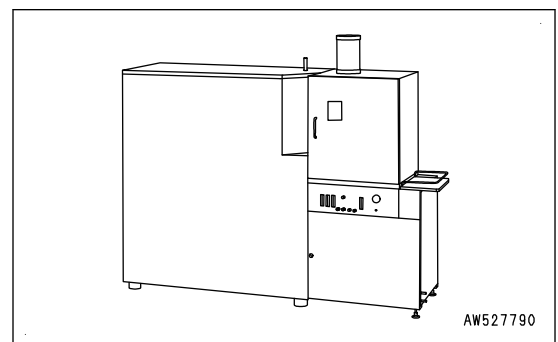
Thanks to long term experience and ample data accumulated, we can grasp condition of your machine accurately and provide proper recommendation.

We strongly recommend you to use this service. The oil analysis is performed at actual cost, so the cost is low, and results of the analysis and recommendations are reported promptly.

KOWA analysis items

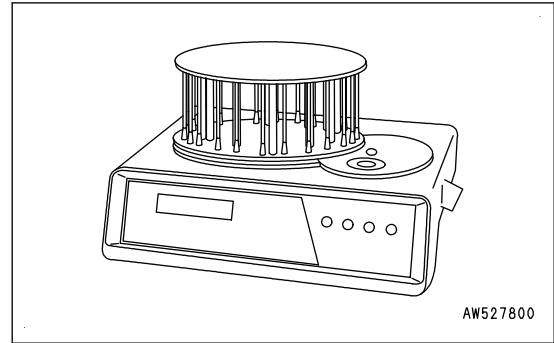
Measurement of metallic powder concentration

An ICP (Inductively Coupled Plasma) analyzer is used for measuring the concentration of iron, copper, and other metal powder in the oil.



Measurement of quantity of iron particles

A PQI (Particle Quantifier Index) measuring instrument is used for measuring the quantity of iron particles of 5 μm or more, enabling early detection of failures.



Others

Measurements are made of items such as the ratio of water, coolant, and fuel in the oil, and dynamic viscosity, if necessary, to enable a highly precise diagnosis of the machine and the components' condition.

Oil sampling interval

500 hours

Precautions when sampling

- Make sure that the oil is well mixed before sampling.
- Perform sampling at regular fixed intervals.
- Do not perform sampling on rainy or windy days when water or dust can get into the oil.

For further details of KOWA, contact your Komatsu distributor.

STORE OIL AND FUEL

- Keep oil and fuel indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, lay the drums so that the filler ports of the drums are located in the lower part of the side to prevent moisture from being sucked in. If drums have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

STORE DEF

- Completely seal up its container for storage. Only open containers in a well-ventilated area.
- When storing DEF, avoid direct sunlight. Always use the original container. Make sure that transfer equipment and tank must meet DEF compatible material specification. If DEF is stored in an iron or aluminum container, toxic gas may develop and a chemical reaction may 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
Max.10 °C {50 °F}	Up to 36 months
Max.25 °C {77 °F}	Up to 18 months
Max.30 °C {86 °F}	Up to 12 months
Max.35 °C {95 °F}	Up to 6 months

*: Do not store DEF in the temperature of 35 °C {95 °F} or above.

FILTER

- Filters are extremely important safety parts. They prevent impurities in the oil, fuel, and air circuits from entering important equipment and causing problems. Replace all filters periodically. For details, see Operation and Maintenance Manual.
However, when working in severe conditions, replace the filters at shorter intervals according to the oil and fuel (sulfur content) being used.
- Never try to clean and use again the filters (cartridge type). Always replace them with new filters.
- When replacing oil filters, check if any metal particles are attached to the old filters.
If any metal particles are found, consult your Komatsu distributor.
- Do not open packages of spare filters until just before they are to be used.
- Komatsu recommends using Komatsu genuine filters.

HANDLE ELECTRICAL COMPONENTS

WARNING

- When the battery disconnect switch key is turned to OFF position for the maintenance work, always pull out the key and keep it with you. If the key is left in the switch, someone may turn ON the power by mistake. It is dangerous that causes an electric shock.
For the operation of the battery disconnect switch, see “BATTERY DISCONNECT SWITCH (3-139)”.
 - It is extremely dangerous if the electrical component becomes wet or the covering of the wiring is damaged. This will cause an electrical leakage and may lead to malfunction of the machine. Do not wash the inside of the operator's cab with water. When washing the machine, be careful not to let water get into the electrical components.
-
- When removing the connectors of electrical components after washing the machine or in the rain, wipe off the water drop stuck around connectors before removing the connectors and keep the water drop away from inside of the connectors.
 - Checking and maintenance items are checking fan belt tension, checking damage of the fan belt and checking battery fluid level.
 - Never install any electrical components other than those specified by Komatsu.
 - External electro-magnetic interference may cause malfunction of the control system controller. Accordingly, consult your Komatsu distributor before installing a radio receiver or other wireless equipment to the machine.
 - When working at the seashore, keep the electrical component clean to prevent corrosion.
 - When installing electrical component, connect it to the special power supply connector. Do not connect the optional power supply to the fuse or starting switch or battery relay, etc.

STANDARD TIGHTENING TORQUE FOR BOLTS AND NUTS

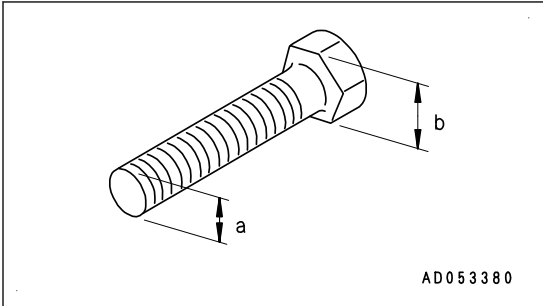
Tightening torque list

⚠ CAUTION

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

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

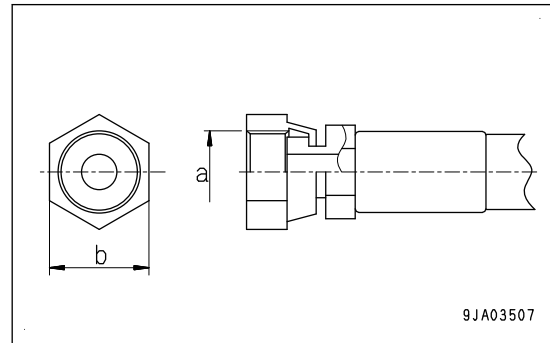
If it is necessary to replace any nut or bolt, Komatsu recommends using Komatsu genuine part of the same size as the part that is removed.



Thread diameter of bolt "a" (mm)	Width across flats "b" (mm)	Tightening torque					
		Target value			Allowable range		
		Nm	kgfm	lbft	Nm	kgfm	lbft
6	10	13.3	1.35	9.8	11.8 to 14.7	1.2 to 1.5	8.7 to 10.8
8	13	31	3.2	22.8	27 to 34	2.8 to 3.5	20.3 to 25.3
10	17	67	6.8	48.8	59 to 74	6 to 7.5	43.4 to 54.2
12	19	111	11.3	81.4	98 to 123	10 to 12.5	72.3 to 90.4
14	22	172	17.5	127	153 to 190	15.5 to 19.5	112 to 141
16	24	260	26.5	192	235 to 285	23.5 to 29.5	170 to 213
18	27	360	37	268	320 to 400	33 to 41	239 to 297
20	30	510	52.3	378	455 to 565	46.5 to 58	336 to 420
22	32	688	70.3	508	610 to 765	62.5 to 78	452 to 564
24	36	883	90	651	785 to 980	80 to 100	579 to 753
27	41	1295	133	957	1150 to 1440	118 to 147	853 to 1060
30	46	1715	175	1265	1520 to 1910	155 to 195	1120 to 1410
33	50	2205	225	1630	1960 to 2450	200 to 250	1450 to 1810
36	55	2745	280	2025	2450 to 3040	250 to 310	1810 to 2240
39	60	3260	333	2405	2890 to 3630	295 to 370	2130 to 2680

Torque list for hoses

Tighten the hoses by the following torque shown in the table.



Taper seal

Nominal No. of hose	Thread size "a" (mm)	Width across flats "b" (mm)	Tightening torque					
			Target value			Allowable range		
			Nm	kgfm	lbft	Nm	kgfm	lbft
02	14	19	44	4.5	32.5	34 to 63	3.5 to 6.5	25.3 to 47
03	18	24	78	8.0	57.9	59 to 98	6.0 to 10.0	43.4 to 72.3
04	22	27	103	10.5	75.9	84 to 132	8.5 to 13.5	61.5 to 97.6
05	24	32	157	16.0	116	128 to 186	13.0 to 19.0	94 to 137
06	30	36	216	22.0	159	177 to 245	18.0 to 25.0	130 to 181
10	33	41	216	22.0	159	177 to 245	18.0 to 25.0	130 to 181

Face seal

Nominal No. of hose	Nominal size - threads per inch "a"	Width across flats "b" (mm)	Tightening torque					
			Target value			Allowable range		
			Nm	kgfm	lbft	Nm	kgfm	lbft
02	$\frac{9}{16}$ -18UN	19	44	4.5	32.5	34 to 54	3.5 to 5.5	25.3 to 39.8
03	$\frac{11}{16}$ -16UN	22	74	7.5	54.2	54 to 93	5.5 to 9.5	39.8 to 68.7
04	$\frac{13}{16}$ -16UN	27	103	10.5	75.9	84 to 132	8.5 to 13.5	61.5 to 97.6
05	1-14UNS	32	157	16.0	116	128 to 186	13.0 to 19.0	94.0 to 137.4
06	$1\frac{3}{16}$ -12UN	36	216	22.0	159	177 to 245	18.0 to 25.0	130.2 to 180.8

MAINTENANCE SCHEDULE

- When using the engine oil for cold district, the maintenance intervals of the engine oil and filter cartridge are changed to for every 250 hours.
- If the currently used diesel fuel which does not include the bio-fuel is changed to the one mixed with the bio-fuel, the replacement interval of the fuel filter is changed as well. See “MAINTENANCE INTERVAL WHEN DIESEL FUEL MIXED WITH BIO-FUEL IS USED”.
- Ask your Komatsu distributor for changing the maintenance interval of the machine monitor.

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MAINTENANCE INTERVAL WHEN DIESEL FUEL MIXED WITH BIO-FUEL IS USED

If the diesel fuel which does not include the bio-fuel is changed to the diesel fuel mixed with bio-fuel, set the maintenance interval as follows.

Replace the fuel prefilter cartridge

When the machine is operated first 250 hours after the diesel fuel has been changed to the diesel fuel mixed with bio-fuel, and when the machine is operated further 250 hours.

After that, replace it within 500 hours as a periodic replacement by the service meter reading.

Replace the fuel main filter cartridge

When the machine is operated first 250 hours after the diesel fuel has been changed to the diesel fuel mixed with bio-fuel, and when the machine is operated further 250 hours.

After that, replace it within 1000 hours as a periodic replacement by the service meter reading.

Maintenance interval after the diesel fuel has been changed to the diesel fuel mixed with bio-fuel

	Operating hours of the machine			Service meter			
	When changed	250 hours after changing	500 hours after changing	Every 500 hours		Every 1000 hours	
				Within 500 operating hours after changing	After 500 operating hours after changing	Within 500 operating hours after changing	After 500 operating hours after changing
Fuel prefilter cartridge	Replace.	Replace.	Replace.	-	Replace.	-	Replace.
Fuel main filter cartridge	Replace.	Replace.	Replace.	-	-	-	Replace.

MAINTENANCE PROCEDURE

INITIAL 10 HOURS MAINTENANCE (ONLY FOR THE FIRST 100 HOURS)

Until first 100 hours operation, perform the following maintenance every 10 hours.

- Lubrication of work equipment
- Lubrication of steering cylinder pin

For details of the method of replacement or maintenance, see EVERY 100 HOURS MAINTENANCE and EVERY 250 HOURS MAINTENANCE.

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

Perform the following maintenance work only after the first 250 hours of operation on new machines.

- Replace transmission oil filter cartridge
- Replace hydraulic tank oil filter element

For details of the method of replacement or maintenance. See EVERY 1000 HOURS MAINTENANCE and EVERY 2000 HOURS MAINTENANCE.

WHEN REQUIRED

METHOD FOR CHECKING, CLEANING AND REPLACING AIR CLEANER

⚠ WARNING

- When using compressed air, there is a danger that dirt may scatter and cause personal injury. Always wear protective eyeglasses, dust mask, or other protective equipment.
- When removing the outer element from the air cleaner body, it is dangerous to pull it out by force. When working in high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

NOTICE

- Do not clean the element before the air cleaner clogging caution lamp on the machine monitor lights up, or the yellow piston of the dust indicator laps over the peripheral red zone (7.5 kPa, {0.076 kgf/cm², 1.08 PSI}).

If the element is cleaned frequently before the air cleaner clogging caution lamp on the machine monitor lights up or the yellow piston of the dust indicator laps over the peripheral red zone (7.5 kPa, {0.076 kgf/cm², 1.08 PSI}), the air cleaner will not be able to display its performance fully, and the cleaning efficiency will also go down.

In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.

- If any dirt enters the engine, it can damage the engine. Be sure to stop the engine before checking, cleaning, or servicing the air cleaner. Do not check, clean, or service the air cleaner in strong winds, or in a dusty place.
In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.
- Replace the outer element if it is cleaned 6 times repeatedly or used throughout a year. Replace the inner element as well at the same time.

METHOD FOR CHECKING AIR CLEANER

NOTICE

The electric air cleaner clogging sensor and dust indicator are used to indicate clogging on the air cleaner. The electric air cleaner clogging sensor indicates the cleaning timing of the air cleaner element and the dust indicator indicates the level of clogging.

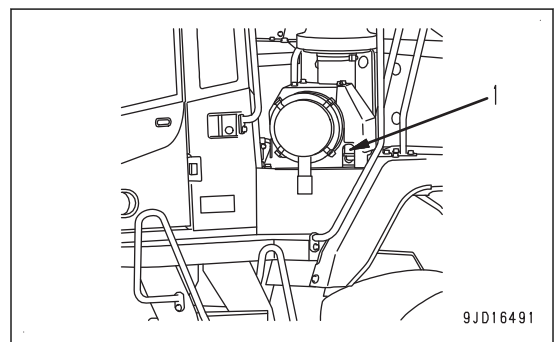
Check the dust indicator before operating the machine so that cleaning of the air cleaner element is not required during operation.

Clean the element when the yellow piston shown in dust indicator (1) display of the air cleaner entered the red (7.5 kPa) position.

After the cleaning, press the dust indicator button to reset it.

If the yellow piston enters the red (7.5 kPa) position soon after the cleaning, the element must be replaced.

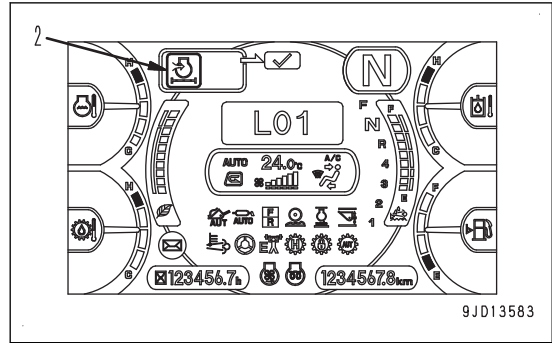
For the element replacement procedure, see "METHOD FOR REPLACING AIR CLEANER ELEMENT (4-23)".



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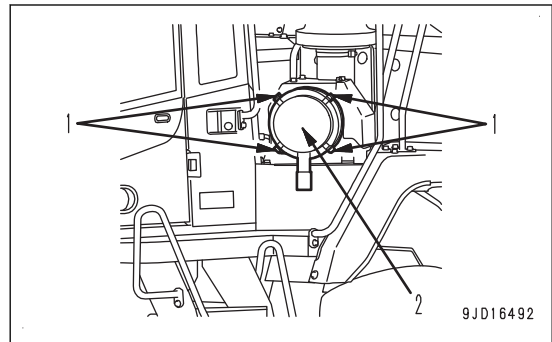
Electric air cleaner clogging sensor

Clean the air cleaner element when the yellow piston of dust indicator (1) display entered the red (7.5 kPa) position or air cleaner clogging caution lamp (2) of the machine monitor lights up.

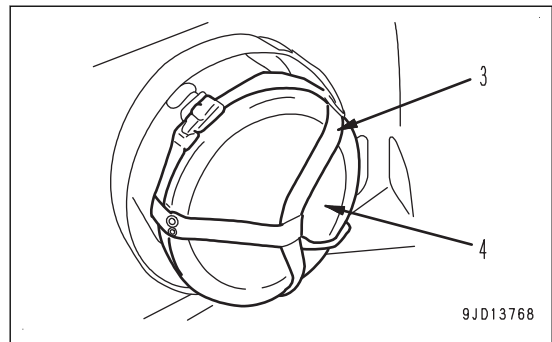
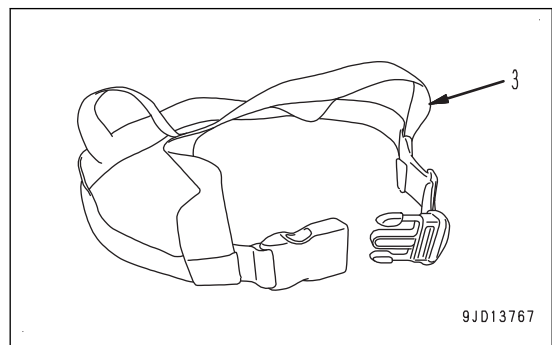


METHOD FOR CLEANING AIR CLEANER OUTER ELEMENT

1. Remove clips (1) (4 pieces) and remove cover (2).



2. Install on-board air cleaner pull-out jig (3) to the narrow part of outer element (4).

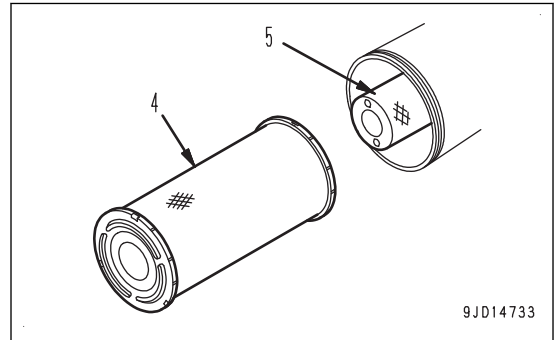
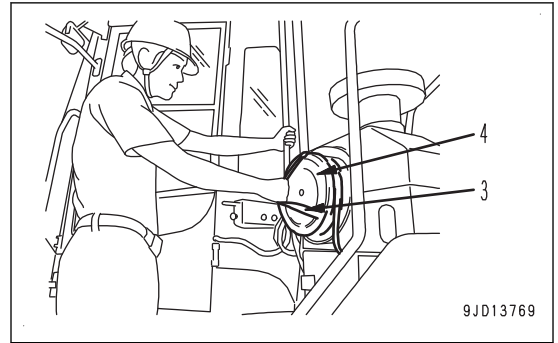


3. Pull air cleaner pull-out jig (3) in a pull-out posture shown in the figure and pull out outer element (4).

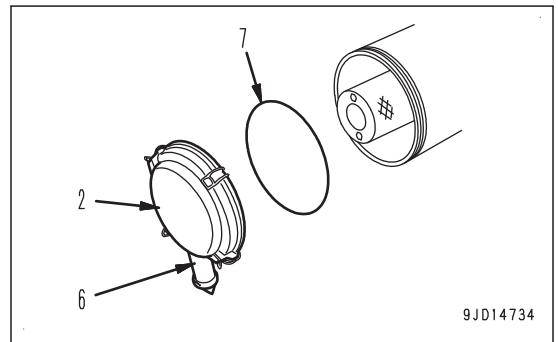
When pulling out the element, use the air cleaner pull-out jig, hold the handrail tight in one hand, and put your feet on the step to support your body.

NOTICE

Never remove inner element (5). Dusts may enter, causing the engine failure.



4. Clean the inside of the air cleaner body, cover (2) and vacuator valve (6).



NOTICE

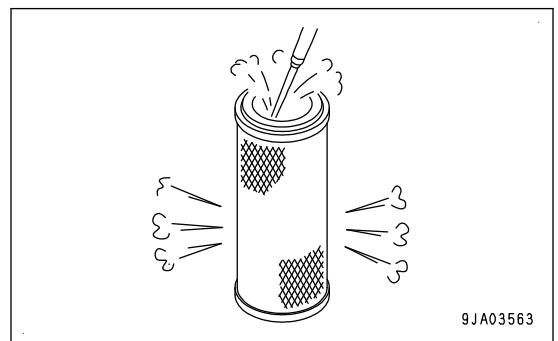
Do not clean and reuse the inner element. When replacing the outer element, replace the inner element with new one at the same time.

When cleaning the element, do not tap it or hit it against something.

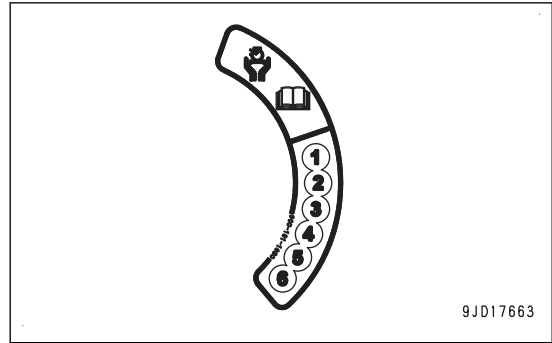
Do not use the element with damaged pleats or a damaged gasket or seal.

Wrap an unused element and keep it in a dry place.

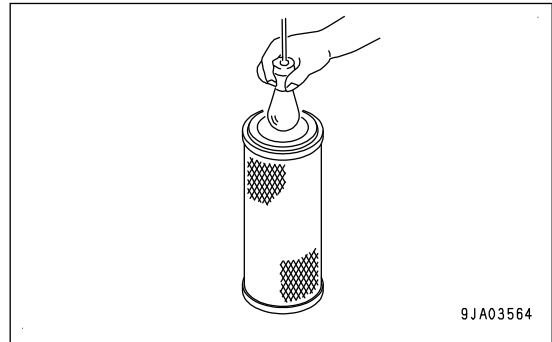
5. Blow dry compressed air (Max. 0.2 MPa {2.1 kgf/cm², 30.0 PSI}) from the inside of the outer element along the pleats.
6. Blow along the pleats from the outside, then blow again from the inside.



7. Peel off a seal after cleaning the element each time.



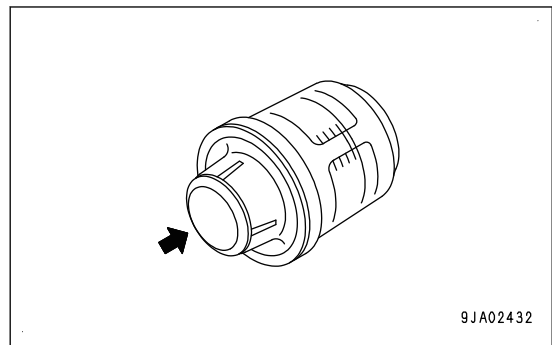
8. After cleaning, illuminate the inside of the element with an electric bulb to check.
If the element has a small hole or thin part, replace it.



⚠ CAUTION

When installing the cover (2), check O-ring (7) for scratches or damages and replace O-ring with a new one if any.

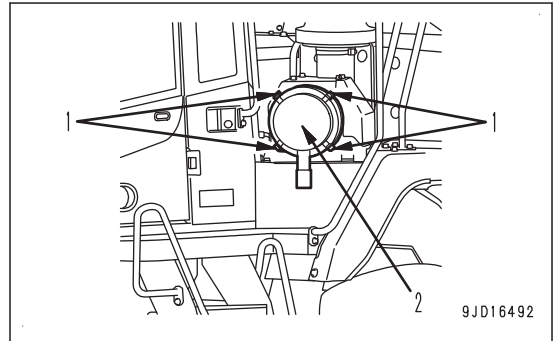
- 9. Set cleaned outer element (4).
- 10. Install cover (2) and fix it with clip (1).
- 11. Push the button of dust indicator.
The yellow piston returns.



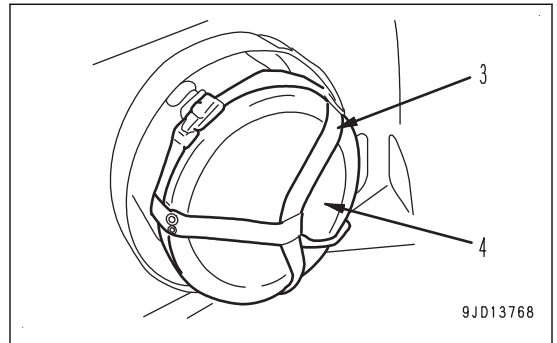
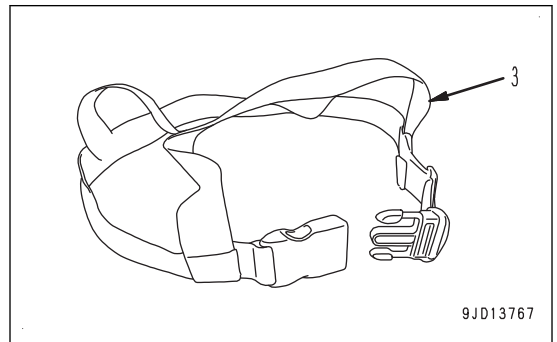
Even though the outer element has not been cleaned up to 6 times, if the yellow piston of dust indicator laps over the red zone (7.5 kPa {0.08 kgf/cm²}) soon after the cleaning, or if the air cleaner clogging caution lamp lights up, replace both the inner and outer elements.

METHOD FOR REPLACING AIR CLEANER ELEMENT

1. Remove clips (1) (4 pieces) and remove cover (2).

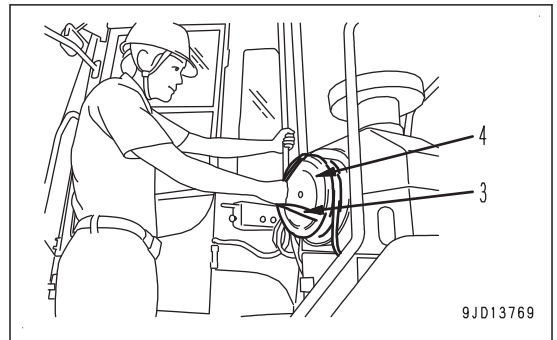


2. Install on-board air cleaner pull-out jig (3) to the narrow part of outer element (4).



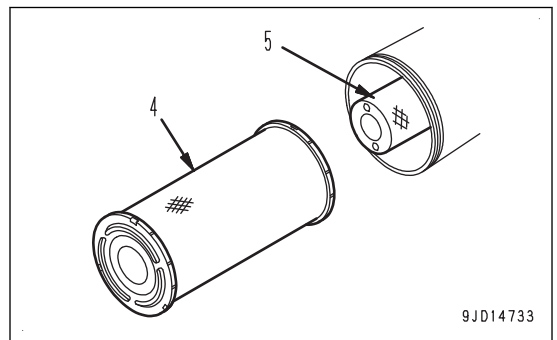
3. Pull air cleaner pull-out jig (3) in a pull-out posture shown in the figure and pull out outer element (4).

When pulling out the element, use the air cleaner pull-out jig, hold the handrail tight in one hand, and put your feet on the step to support your body.
Do not remove inner element (5) at this time.



4. Clean dusts inside of the air cleaner body and on cover (2) by using a clean cloth or brush.

5. Remove inner element (5), then quickly install the new inner element.



NOTICE

Be sure to install the air cleaner element facing in the correct direction.

Install so that the bottoms (A) and (B) of the air cleaner element (face where no hole is drilled) come to cover (2) end. If it is installed in wrong direction, it may cause breakage of the air cleaner element or serious damage to the engine.

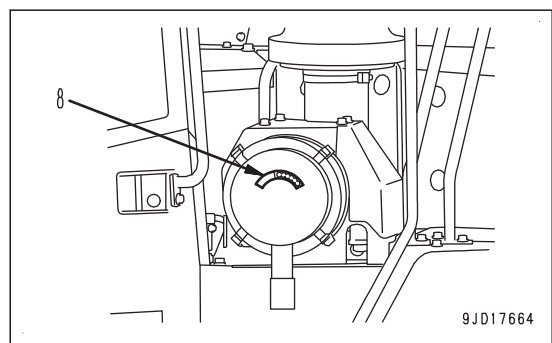
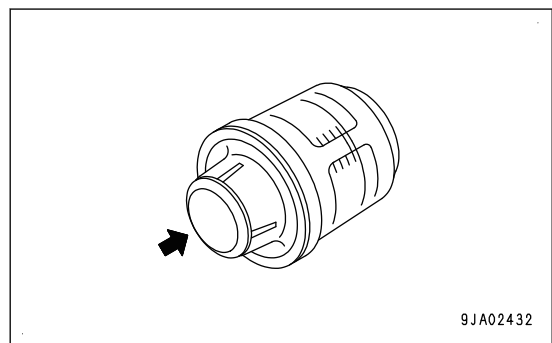
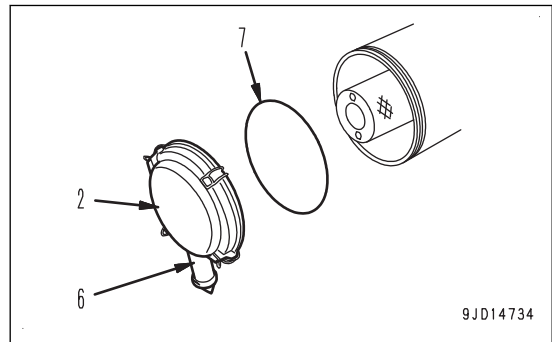
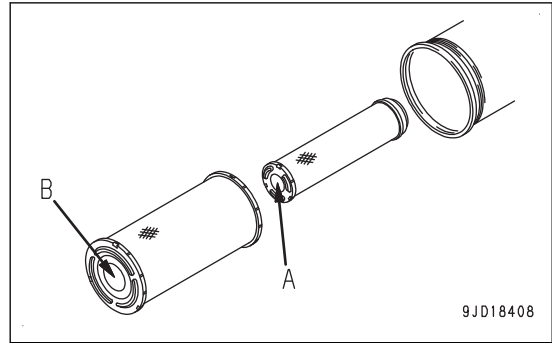
6. Install cover (2) according to the following procedure.

- 1) Set a new outer element (4).
- 2) Replace O-ring (7) with a new one.
- 3) Install cover (2) and fix it with clip (1).

7. Push the button of dust indicator.

The yellow piston returns.

8. Replace seal (8) on the cover (2) with a new one.



METHOD FOR CLEANING INSIDE OF COOLING SYSTEM

⚠ WARNING

- Immediately after the engine is stopped, the coolant is still hot and the pressure is accumulated in the radiator. If the cap is removed under this condition and the coolant is drained, it may cause burns. Always wait for the temperature to go down, and turn the cap slowly to release the pressure.
- Start the engine and clean the inside of the cooling system. When standing up or leaving the operator's seat, set the lock lever to LOCK position.
- For details of starting the engine, see OPERATION, MACHINE OPERATIONS AND CONTROLS, "CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE (3-169)" and "METHOD FOR STARTING ENGINE (3-201)".
- Keep away from the rear of the machine while the engine is running. Since the engine is operated during cleaning, the machine may suddenly move. If you are around the rear of the machine, it may be dangerous.

Place the machine on a level ground when cleaning or changing the coolant.

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

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 important function of preventing corrosion as well as preventing freezing.

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

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 other coolant, it can cause dangerous failure such as corrosion of the engine and aluminum parts of the cooling system.

To maintain the anti-corrosion properties of Non-Amine Engine Coolant (AF-NAC), always keep the density of Non-Amine Engine Coolant between 30 % and 64 %.

Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water. When using coolant, investigate the lowest temperature in the past and decide the density for the coolant from the coolant density table below.

When deciding the density for the coolant, set it for a temperature 10 °C {18 °F} below the actual lowest temperature in the working area.

The coolant density varies according to the ambient temperature, but it must be over 30 % at least.

Coolant density table

Min. atmospheric temperature	°C	Min. -10	-15	-20	-25	-30	-35	-40	-45	-50
	°F	Min. 14	5	-4	-13	-22	-31	-40	-49	-58
Density (%)		30	36	41	46	50	54	58	61	64

⚠ WARNING

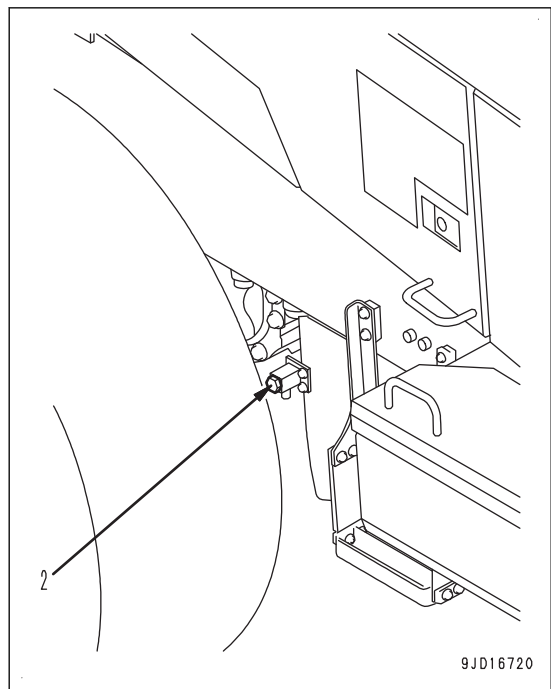
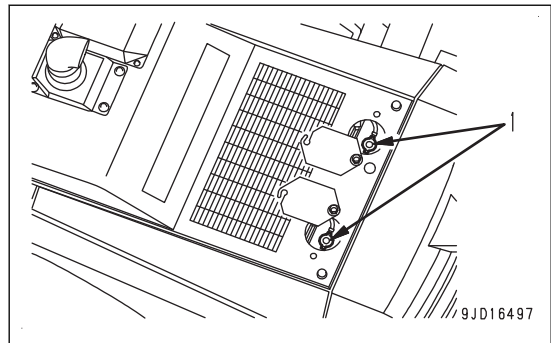
- Coolant is toxic. When opening the drain valve, be careful not to get coolant on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor immediately.
- When handling the cooling water containing coolant that has been drained during changing the coolant or repairing the radiator, contact your Komatsu distributor or request a qualified company to perform the operation. Coolant is toxic, so never pour it into drainage ditches or drain it onto the ground surface.

Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, so it is not flammable. (For dilution water, see “COOLANT AND WATER FOR DILUTION (4-8)”.)

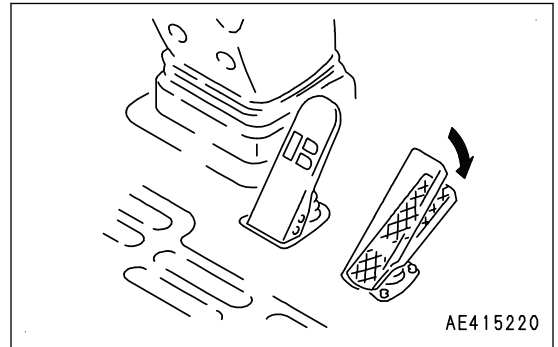
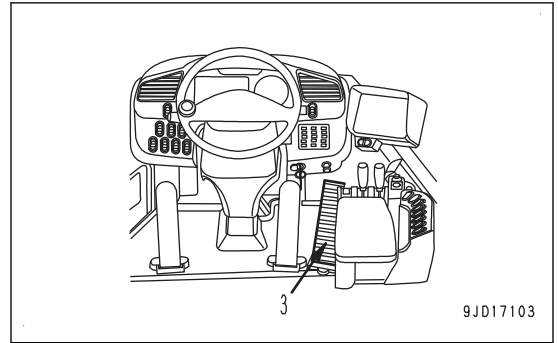
Check the density with a coolant tester.

Items to be prepared

- A container whose capacity is enough to receive the specified capacity of coolant
 - A hose to add coolant
1. Place the machine on a level ground, then stop the engine.
 2. Remove radiator top cover.
 3. Check that the coolant temperature is low enough to make it possible to touch the radiator cap surface by bare hand, turn radiator cap (1) slowly until it hits the stopper, and release the pressure.
 4. Then, while pushing radiator cap (1), turn it until it touches the stopper, and remove it.
 5. Prepare a container to catch the coolant.
 6. Open drain valve (2) on the left side of the fuel tank, and drain the coolant.
 7. Tighten drain valve (2) and add tap water.
Add water until it fills the radiator.
 8. Start the engine.

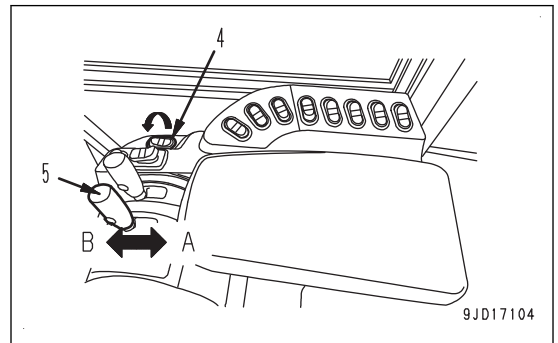


9. Depress accelerator pedal (3) lightly and run the engine at a medium speed for approximately 5 minutes with no load.



10. Check that the engine rotation has become smoother, then press work equipment lock switch (4) to release the work equipment lock (pilot lamp goes out).
11. Operate bucket control lever (5) to TILT position (A) and return to HOLD position (B) repeatedly to warm up hydraulic oil.

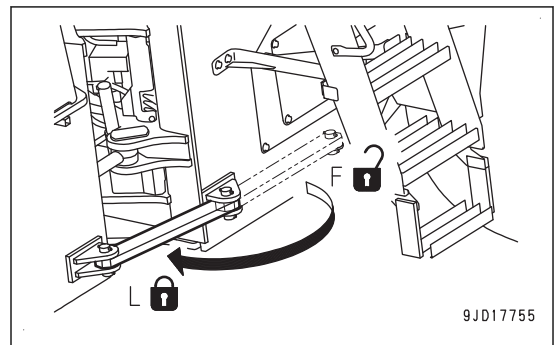
Oil reaches the relief pressure through the above operations and hydraulic oil gets warmer in a shorter time.



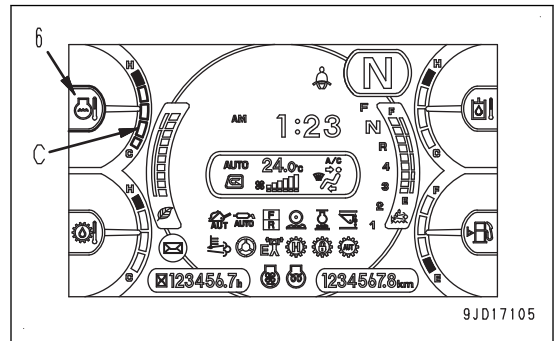
12. Turn the steering wheel slowly approximately 10 times to the right and left to warm up hydraulic oil in the steering valve.

⚠ WARNING

If you turn the steering wheel and stop turning it while the oil temperature is low, a time lag might result until the machine stops after the turning operation. In such case, set the frame lock bar to LOCK position (L) for safety and perform the warm-up operation in a large place. At that time, be sure not to relieve the oil pressure in the circuit for more than 5 seconds.



Repeating the operations from step 10 to 12 moves the pointer of engine coolant temperature caution lamp (6) upward. The pointer of engine coolant temperature caution lamp (6) once drops at around the center of scale (C), after that, continue the operations for approximately 10 seconds.



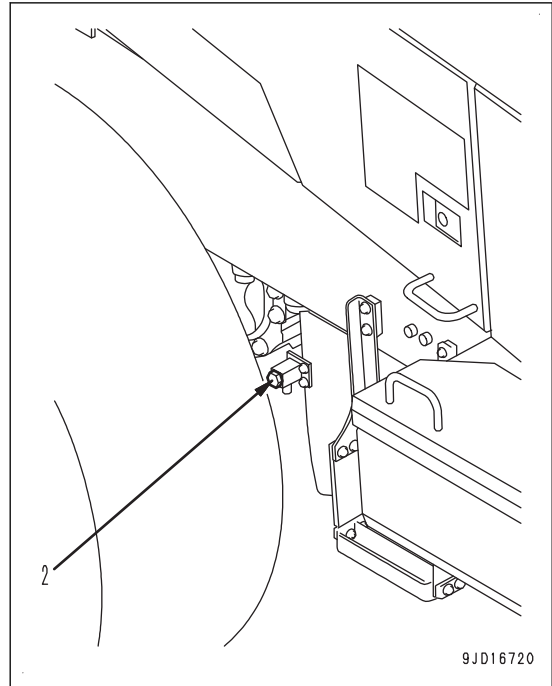
- 13. Stop the engine.
- 14. Open drain valve (2) to drain the coolant.
- 15. Close drain valve (2).
- 16. Add Non-Amine Engine Coolant through the coolant filler port up to the mouth of the port.
For the concentration of Non-Amine Engine Coolant, see "Coolant density table".

NOTICE

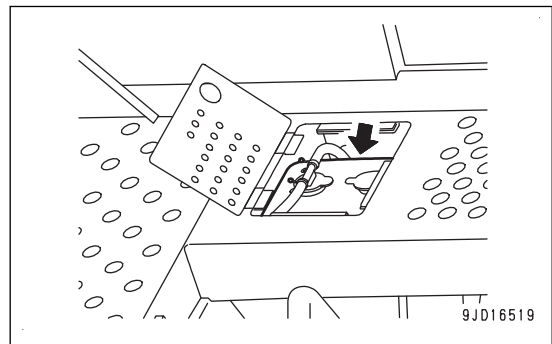
Add less than 12 l/min {3.17 US gal/min} of Non-Amine Engine Coolant. If large amount of coolant is added at a time, more air is mixed into the coolant, and the cooling performance may be lowered. It will cause overheat.

- 17. Run the engine at low idle for 5 minutes to remove the air from the coolant, then run at high idle for a further 5 minutes.
At this time, keep both of the R.H. and L.H. radiator caps removed.

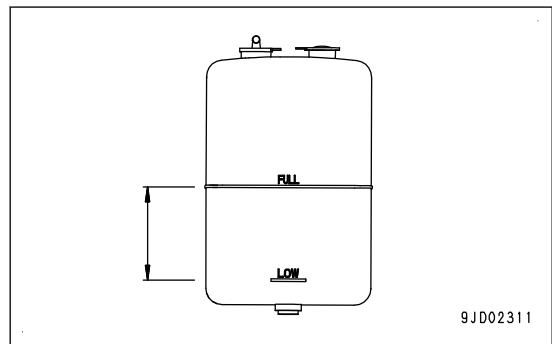
- 18. Drain the coolant in reservoir tank.
- 19. Clean the inside of reservoir tank.
- 20. Add Non-Amine Engine Coolant to the middle between FULL and LOW.
- 21. Stop the engine.
- 22. Approximately 3 minutes later, add Non-Amine Engine Coolant up to the mouth of the coolant filler port.
- 23. Tighten the radiator cap.



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9JD16519



9JD02311

METHOD FOR CHECKING OIL LEVEL IN TRANSMISSION CASE, ADDING OIL

⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.

Perform this operation when ooze of oil on the transmission case is recognized or when oil in the coolant is recognized.

1. Stop the engine.

REMARK

You cannot measure the exact oil level until 12 hours elapses after the engine is stopped because the oil remains in various parts.

2. Remove the cap of oil filler port (F).
3. Pull out dipstick (G) and wipe the oil off with a cloth.
4. Fully insert dipstick (G) into the dipstick pipe, then remove it.

REMARK

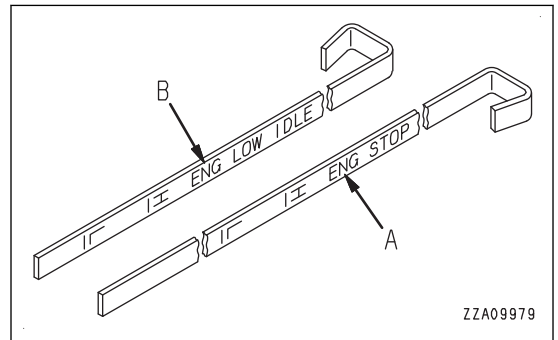
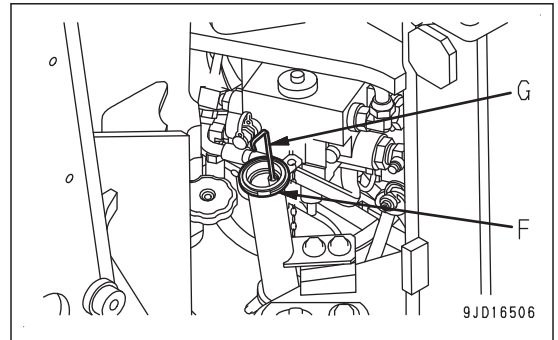
Whenever inserting the dipstick, be sure to insert it into the dipstick pipe.

The oil level should be between the H and L marks on dipstick (G).

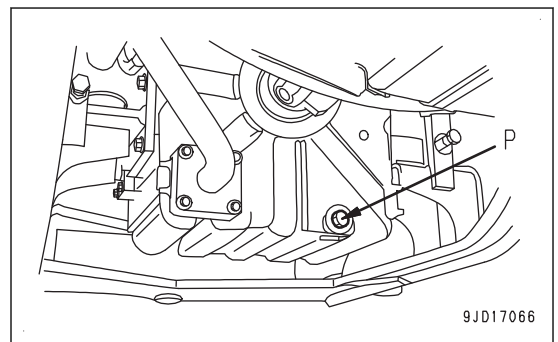
5. If the oil level is below the L mark, add oil through oil filler port (F).

The following levels are marked on the dipstick.

- (A): ENG STOP (Engine is stopped)
- (B): ENG LOW IDLE (Engine is running at low idle)



6. If the oil level is above H, drain the excessive oil through drain plug (P), and then check the oil level again.
7. If the oil is at the correct level, insert dipstick (G) in the dipstick pipe and tighten the oil filler cap.

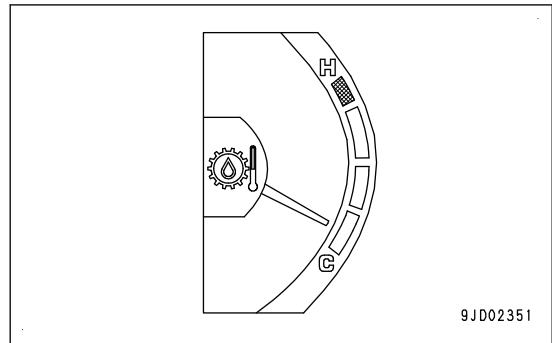


Checking of the oil level must be done at "ENG STOP" position after 12 hours or more elapsed after the engine is stopped.

The check can also be performed while the engine is running at low idle. Perform the check as follows.

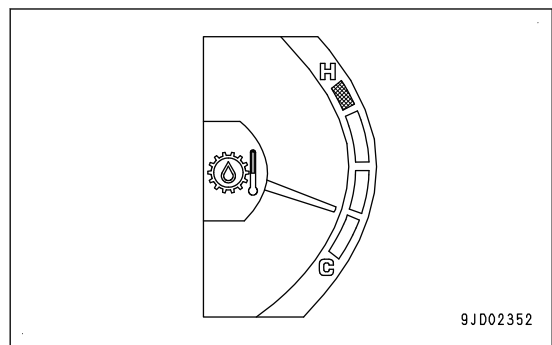
- When the machine is continuously operated (check during lunch time or check at replacement)

Leave the engine running at idle for 15 minutes or more and check the level when the indication of the torque converter oil temperature gauge is at the middle point of the lowest scale.



- When shipped from plant, etc.

When the indication of the torque converter oil temperature gauge becomes to the middle point between the lowest and the second lowest scales due to temperature increase in the stall condition, run the engine at idle for approximately 5 minutes and check the oil level.



METHOD FOR CHECKING OIL LEVEL IN AXLE CASE AND ADDING OIL**⚠ WARNING**

- When checking the oil level, apply the parking brake and fix the front and rear frames using the frame lock bar.
- Immediately after the engine is stopped, parts and oil are still very hot. Wait for the temperature to go down, and then start the work.

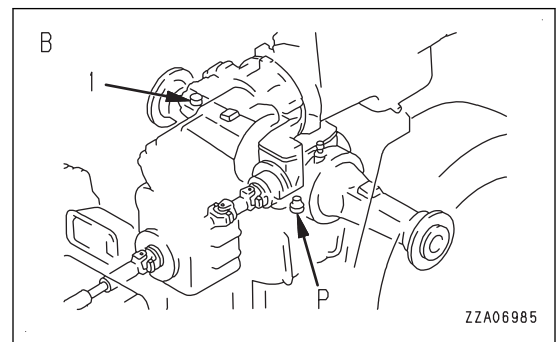
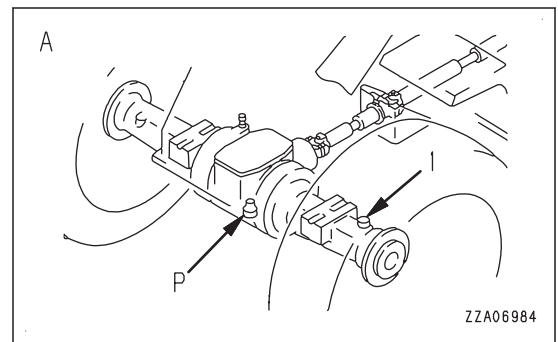
If ooze of oil is recognized on the axle case, perform the checks.

Place the machine on a level ground before starting the check.

(If the machine is inclined in the right or left, the oil level cannot be checked correctly.)

A: Front, B: Rear

1. Stop the engine and remove plug (1).
2. Wipe off oil of dipstick (G) installed to plug (1) by using a piece of cloth.

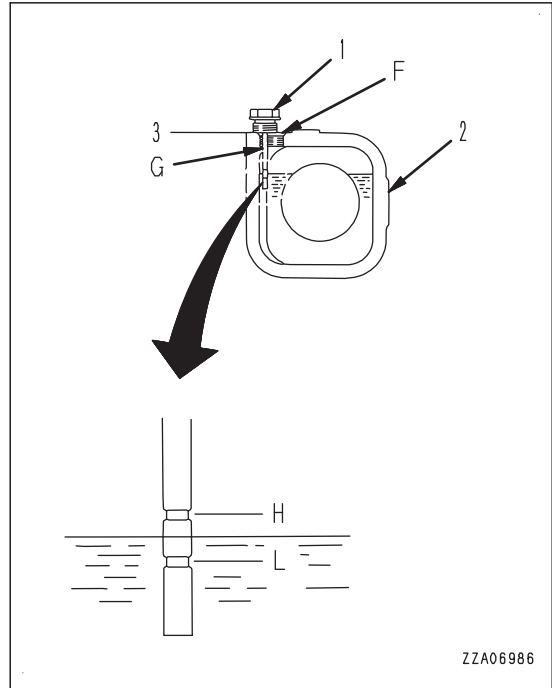


- 3. Set dipstick (G) as shown in the figure.
(2): Axle
(3): Spot facing surface
- 4. The level is appropriate if it is between 2 grooves (H) and (L) of the dipstick.
If the oil does not reach the lower groove (L), supply axle oil from oil filler port (F).

REMARK

Be careful that the amount of the lubricating oil for the axle with Limited Slip Differential may be different. Always use the specified lubricating oil.

- 5. If the oil level exceeds the upper groove (H), drain the excessive oil through drain plug (P), and then check the oil level again.
- 6. If the oil level is appropriate, install plug (1).
Tightening torque: 127 to 177 Nm {13 to 18 kgfm, 94.0 to 103.2 lbft}



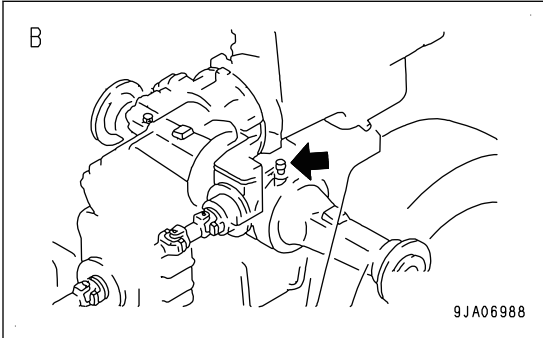
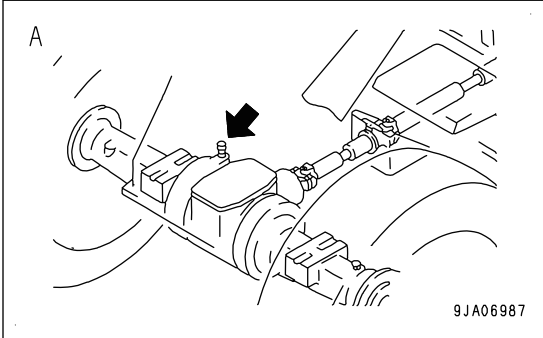
METHOD FOR CLEANING AXLE BREATHER

⚠ WARNING

When cleaning, apply the parking brake and fix the front and rear frames by using the frame lock bar.

A: Front, B: Rear

1. Remove mud and dust around the breather by using a brush, etc.
2. Remove the breather, immerse it in detergent liquid, and clean it.
 - Clean the breathers in 2 locations, the front and rear sides.
 - While the breather is removed, use care to prevent entry of dusts through the mounting location of the breather.



METHOD FOR CLEANING AIR CONDITIONER CONDENSER

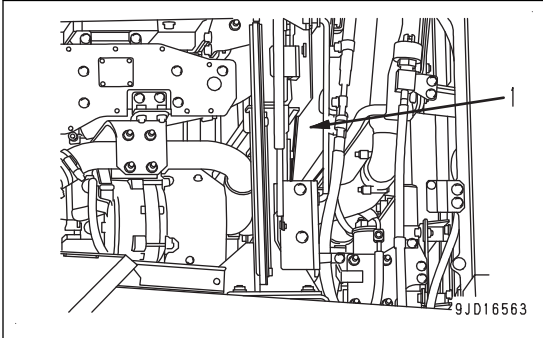
⚠ WARNING

- Do not use a steam cleaner for the cleaning since it is dangerous as the condenser is heated.
 - If the pressurized water hits a person directly or dirt scatters by using pressurized water, there is a danger of personal injury.
- Always wear protective equipment such as protective eyeglasses and dust mask.**

If dirt or dust is stuck to the condenser, clean them by using water.

If water pressure is excessive, the fin may be deformed. So cleaning by using pressurized water must be done from a sufficiently distant position.

1. Open the engine side cover.
2. Wash condenser (1) with water from the top.



METHOD FOR CLEANING RADIATOR FIN AND COOLER FIN

WARNING

- When the engine is running, do not open the engine side cover. When cleaning the fin, stop the engine rotation completely.
- If compressed air, high-pressure water, or steam hits your body directly or dirt is scattered by the compressed air, high-pressure water, or steam, there is a danger of personal injury. Always wear protective equipment such as protective eyeglasses and dust mask.

Perform this procedure if there is any mud or dirt stuck to the radiator.

METHOD FOR CLEANING FINS BY ROTATING COOLING FAN IN REVERSE

NOTICE

When rotating the fan in the reverse direction, beware extremely that dirt will not fly out and cloth, etc. will not be wound in the fan.

Since dust may be blown up, check that there is no people around while the fan is rotating in reverse.

On the job site where the dirt sticks easily to radiator or cooler, set the automatic cooling fan to rotate the fan in reverse. This will blow off any dirt stuck to radiator or cooler, and can extend the cleaning interval.

METHOD FOR REVERSING MANUAL OPERATION FAN

NOTICE

- Never rotate the fan in reverse by hand when performing the operation.
- Before operating the manual reverse rotation of the fan, set the engine speed to low idle.

For the manual reverse rotation of the fan, see "RADIATOR FAN MANUAL REVERSE MODE (3-70)".

- After reverse rotation of the fan is started, set the engine speed to high idle.
- Set the high idle operation time as follows, depending on the clogging level.
Ordinary clogging: 1 to 2 minutes
Excessive clogging: 2 to 3 minutes

When the cleaning is completed, set the engine speed to low idle and restore the rotation of the fan to normal.

METHOD FOR REVERSING AUTOMATIC OPERATION FAN

For the automatic reverse rotation of the fan, see "RADIATOR FAN AUTOMATIC REVERSE MODE (3-72)".

REMARK

- When the fan rotation direction is switched, the fan reverse pilot lamp flashes.
After a heavy load operation, the fan rotation direction may not change to protect the machine.
Set the engine speed to low idle and wait until the oil and coolant temperature goes down before operating the switch.
- In a cold circumstance, perform the cleaning by Fan Reverse Mode within less than 5 minutes.
If the fan reverse rotation is performed for a long time, DEF hose may freeze.

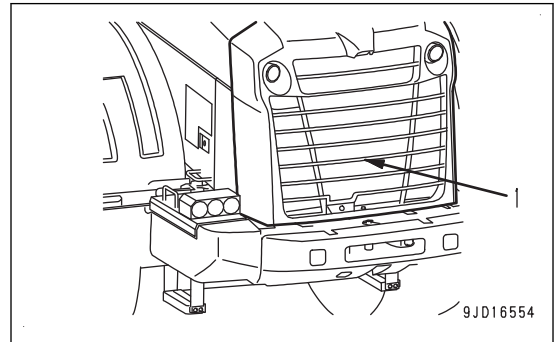
METHOD FOR CLEANING FIN WITH COMPRESSED AIR

⚠ WARNING

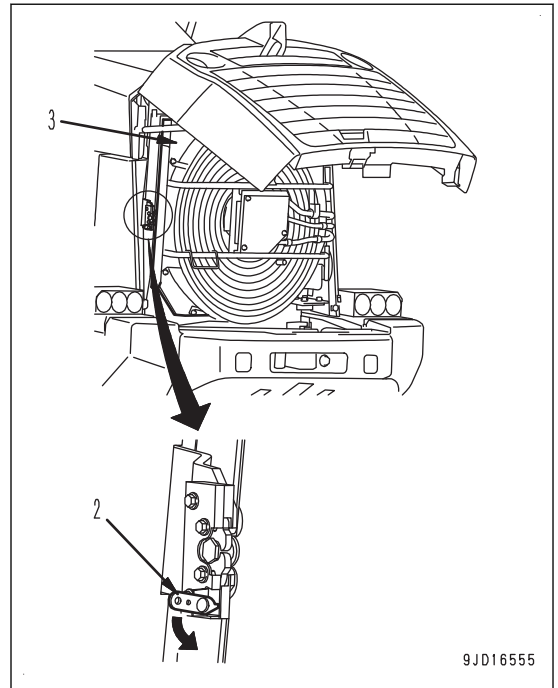
When opening fan guard, stop the engine, and display warning tag on work equipment control lever.

METHOD FOR CLEANING FINS WITH REAR GRILLE OPENED

1. Open rear grille (1).



2. Press down lever (2) and open fan guard (3).



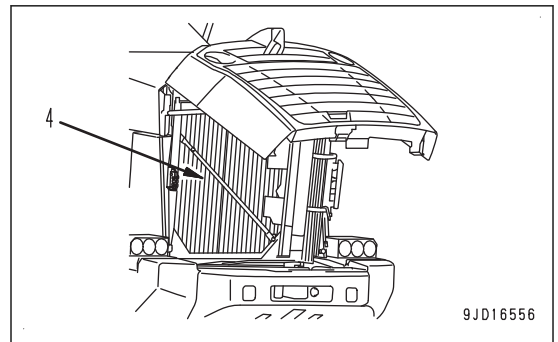
3. Blow off mud, dirt, leaves, etc. in radiator fins (4) with compressed air.

NOTICE

Steam or water may be used instead of the compressed air.

However, when using the powerful steam cleaning equipment (high-pressure machine wash) for the heat exchange equipment (radiator and cooler), keep a sufficient distance to the target machine.

If steam cleaning (high-pressure machine wash) is performed at close distance, there is a danger that the internal fins of the heat exchange equipment may be deformed, and this will cause early clogging and breakage of the equipment.



4. Check the rubber hoses. If any hose is cracked or hardened by age, replace with a new one. Also check and tighten all loose hose clamps.

5. After cleaning, close fan guard (3) and rear grille (1).

METHOD FOR CLEANING FIN WITH ENGINE SIDE COVER OPEN

1. Open the engine side cover on the right and left sides of the machine.

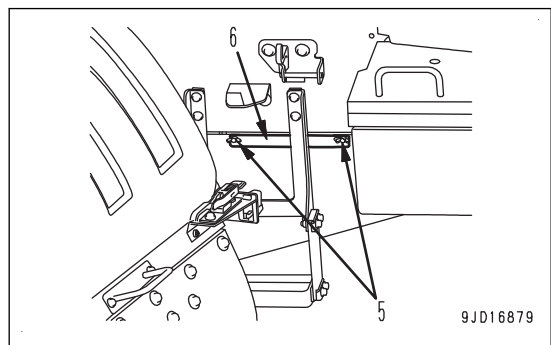
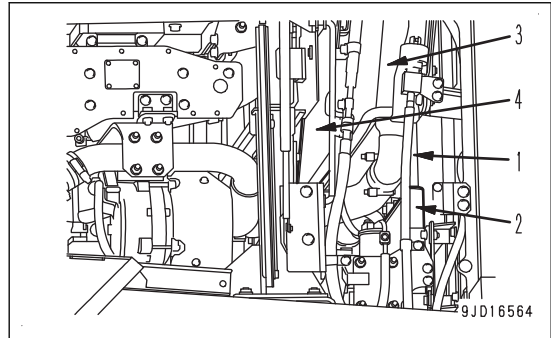
2. Insert the air nozzle through the clearance between radiator (1), oil cooler (2), aftercooler (3), and air conditioner condenser (4) to clean.

Steam or water may be used instead of the compressed air.

3. Check the rubber hoses. If any hose is cracked or hardened by age, replace with a new one. Also check and tighten all loose hose clamps.
4. For soil and dust fallen down, blow them out of the machine according to the following procedure.

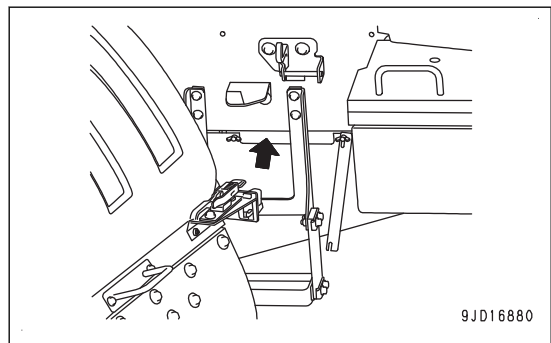
- For the standard specification machine

- 1) Loosen wing bolts (5) (2 pieces), and slide covers for cleaning (6) on the right and left sides of the machine, and open those covers.



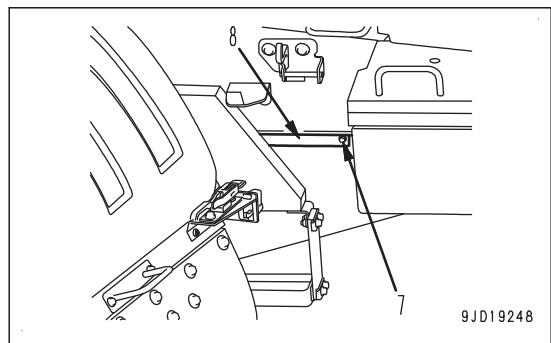
- 2) Insert the air nozzle, and blow dust out forward of the machine. Steam or water may be used instead of the compressed air.

- 3) Install covers for cleaning (6) on the right and left side of the machine after blowing dust out.

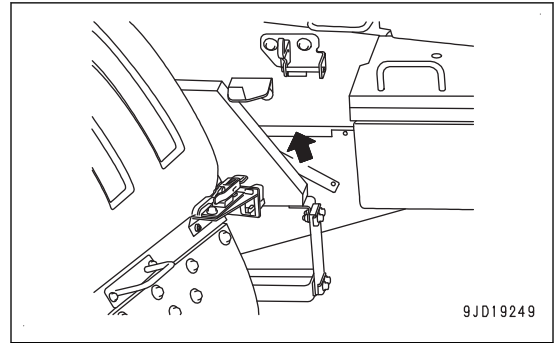


- For the machine with high lift boom specification (if equipped)

- 1) Remove bolts (7), and slide covers for cleaning (8) on the right and left sides of the machine, and open those covers.



- 2) Insert the air nozzle, and blow dust out forward of the machine. Steam or water may be used instead of the compressed air.
- 3) Install covers for cleaning (8) on the right and left side of the machine after blowing dust out.



METHOD FOR INVERTING AND REPLACING BOLT ON CUTTING EDGE

WARNING

It is dangerous if the work equipment moves by mistake when the cutting edge or end bit is being replaced.

Set the work equipment in a stable condition, stop the engine, then lock the work equipment (the pilot lamp in the switch lights up).

Turn or replace the cutting edge before the wear reaches the edge of the bucket.

1. Raise the bucket to a suitable height, then put a block (A) under the bucket to prevent the bucket from lowering.

Raise the bucket to make its bottom surface level.

2. Remove bolts and nuts (1), then remove cutting edge (2).
3. Clean the mounting surface of cutting edge (2).
4. Turn cutting edge (2) and install it to the bucket.

When turning the edge, install it to the opposite side (left edge to right side, right edge to left side).

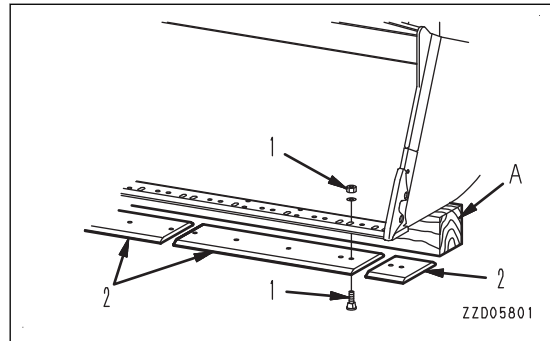
If both sides of the cutting edge are worn out, replace with new ones.

If the wear extends to the mounting surface, repair the mounting surface before installing the cutting edge.

5. Tighten bolts and nuts (1) uniformly so that there is no gap between the bucket and cutting edge.

Tightening torque of mounting bolt: 745 ± 108 Nm { 76 ± 11 kgfm, 549.7 ± 79.6 lbft}

6. After operating for several hours, retighten the mounting bolts.

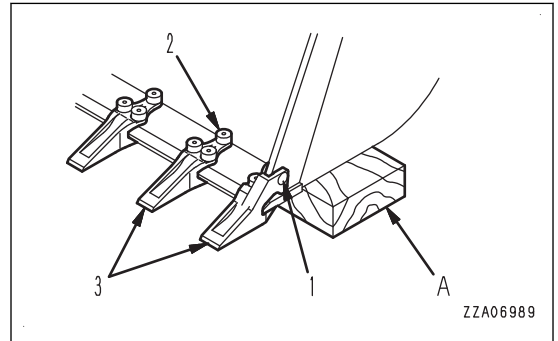


METHOD FOR REPLACING BUCKET TEETH

(if equipped)

Replace the bucket teeth before they are worn to the bucket end face.

1. Raise the bucket to a suitable height, then put a block (A) under the bucket to prevent the bucket from lowering.
Raise the bucket to make its bottom surface level.
2. Remove the bolts and nuts (1) and (2), and remove bucket teeth (3).
3. Clean the mounting surface of bucket teeth (3).
4. Install a new teeth to the bucket.



Eliminate the clearance between the teeth and top face of the bucket by inserting shims.

Continue the adjustment with shims until the insertion of 0.5 mm {0.02 in} thick of shim becomes impossible.

If the wear extends to the mounting surface, repair the mounting surface before installing.

5. In order to eliminate the clearance between the bucket teeth and the top end of the bucket, tighten bolts and nuts (1) and (2) lightly, then tap the teeth ends using a hammer.

Tightening torque of mounting bolt

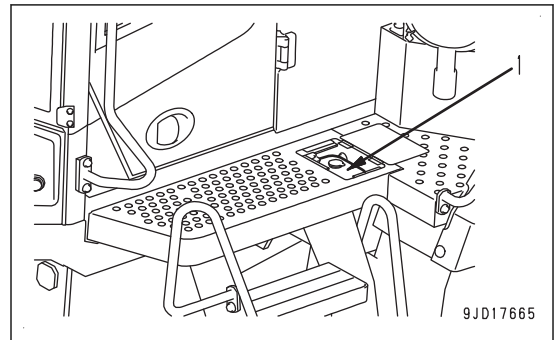
(1): 637 to 853 Nm {65 to 87 kgfm, 470 to 629 lbft}

(2): 618 Nm {63 kgfm, 456 lbft}

6. After operating for several hours, retighten the mounting bolts.

METHOD FOR CHECKING WINDOW WASHER FLUID LEVEL, ADDING FLUID

Check the water level in window washer tank (1), and if it is insufficient, add the window washer fluid for automobiles. Be careful not to let dirt or dust get in when adding fluid.

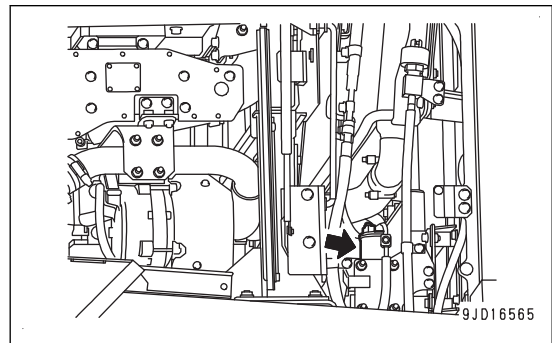


METHOD FOR CHECKING AND MAINTENANCE AIR CONDITIONER

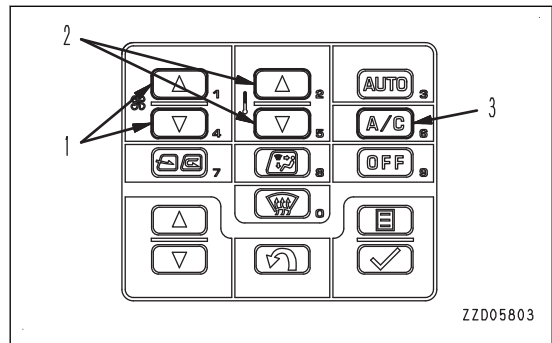
METHOD FOR CHECKING LEVEL OF REFRIGERANT (GAS)

⚠ WARNING

If the refrigerant used in the air conditioner gets into your eyes or is splashed on your hands, it may cause loss of sight or frostbite. Never touch the refrigerant. Do not loosen any part of the refrigerant circuit. Do not bring any open flame close to any point where the refrigerant gas is leaking.



1. Start the engine and set the engine speed to approximately 1500 rpm.
2. Press fan switch (1) and set the air flow to "Hi".
3. Press temperature adjustment switch (2) and set the temperature to 18 °C {64.4 °F} .
4. Fully open the doors and windows.
5. Press air conditioner switch (3) to turn the air conditioner switch ON.
6. Check the condition of the refrigerant gas (Hydrofluorocarbons HFC-134a) that circulates the refrigerant circuit, through sight glass (5) (inspection window) of air conditioner hose (4).



A: Quantity of refrigerant

B: Condition viewed through sight glass

a: Appropriate: Just after the air conditioner switch is turned ON, a small number of bubbles are seen. Then, the sight glass becomes milky white, and then becomes pale.

b: Insufficient: After the air conditioner switch is turned ON, bubbles are seen continuously.

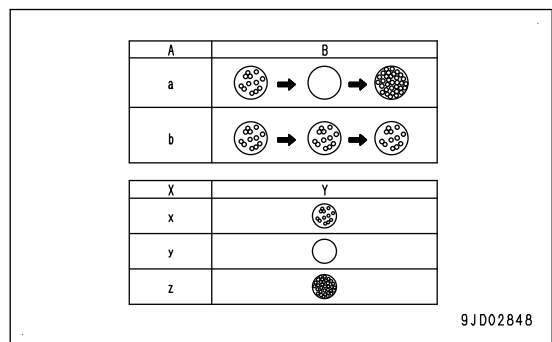
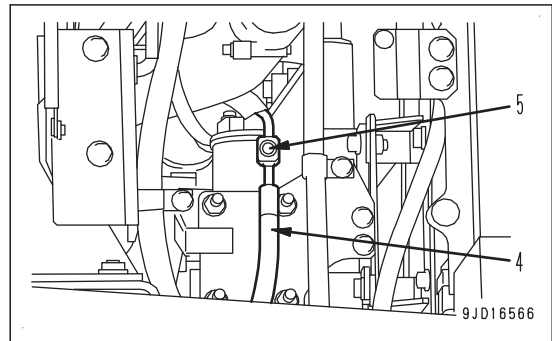
X: State of refrigerant flow

Y: Condition viewed through sight glass

x: Bubbles are seen: Gaseous and liquid refrigerants are mixed.

y: No bubble: All refrigerant becomes liquid and transparent.

z: Milky white: Oil and refrigerant are separated and their mixture is milky white.



MAINTENANCE AND SCHEDULE OF AIR CONDITIONER

Check point	Check items	Maintenance schedule		
		Check before operation	6 months inspection	Replacement interval
Filter	Clogging, dirt	Implement	-	2 years
Condenser	Clogging, dirt	Implement	-	-
Belt	Looseness, damage	Implement	-	2 years
Refrigerant gas	Charge amount	-	Implement	-
Piping	Looseness, damage, leakage	-	Implement	-
Receiver drier	-	-	-	2 years

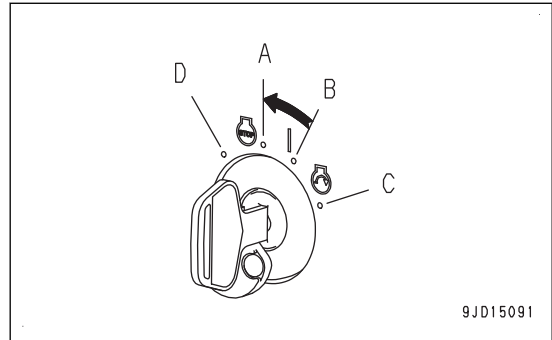
METHOD FOR REPLACING SLOW-BLOW FUSE

NOTICE

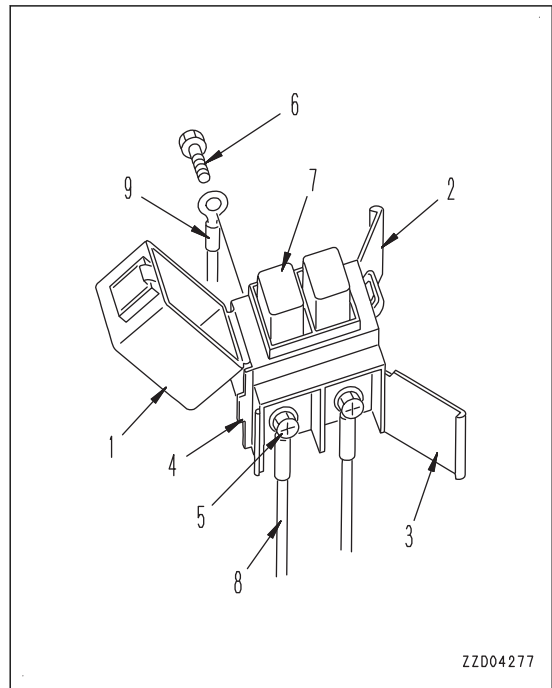
- When replacing the slow-blow fuse, be sure to turn the starting switch to OFF position and, after confirming that the system operating lamp is not lit, set the battery disconnect switch key to OFF position.
- Replace the slow blow fuse with the one of the same capacity.

Should the slow-blow fuse is blown, investigate the cause and take necessary actions.

1. Turn the starting switch to OFF position (A).
2. Turn the battery disconnect switch key to OFF position.
Check that the system operating lamp is off.
3. Remove the slow-blow fuse box from the machine body.



4. Open covers (1), (2) and (3) of the slow-blow fuse box.
You can remove the box easily by removing the covers (2) and (3) with a flat-head screwdriver using projection (4) as a fulcrum.
5. Loosen and remove screws (5) and (6).
When you remove screws (5) and (6), slow-blow fuse (7) comes off along with electric wiring (8) and (9).
6. Install a new slow-blow fuse to the slow-blow fuse box along with electric wiring (8) and (9) with screws (5) and (6).
7. Close covers (1), (2), and (3).
8. Install the slow-blow fuse box to the machine.



METHOD FOR CHECKING FUNCTION OF ECSS ACCUMULATOR

For handling of the accumulator, see "HANDLE ACCUMULATOR AND GAS SPRING (2-45)".

1. Turn on the ECSS switch.

The function of the hydraulic spring of the accumulator reduces the bounce of the machine by absorbing the vertical motion of the machine in travel.

2. Compare the vertical motion of the machine when the ECSS switch is turned to ON position and OFF position.

If there is no change in the vertical motion between the 2 settings, the accumulator gas pressure has probably dropped.

Ask your Komatsu distributor for inspection.

REMARK

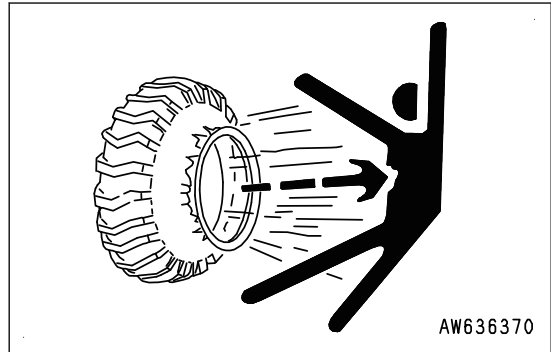
The inspection must be performed with the gear speed of the 2nd to the 4th, and with the travel speed of 5 km/h {3.1 MPH} or faster. ECSS (Electronically Controlled Suspension System) does not operate if the gear speed is set to 1st or travel speed is 5 km/h {3.1 MPH} or lower even if the ECSS switch is turned to ON position.

SELECT AND CHECK TIRES

⚠ WARNING

If a tire or a rim is handled improperly, the tire may burst or may be damaged and the rim may be broken and scattered, and that can cause serious injury or death.

- Since maintenance, disassembly, repair and assembly of the tires and rims require special equipment and skill, be sure to ask a tire repair shop to do the work.
- Never perform welding or light a fire near the tire.



TIRE SELECTION

⚠ WARNING

Select the tires according to the conditions of use and the weight of the attachments on the machine. Use only specified tires and inflate them to the specified pressure.

Select the tires according to the conditions of use and the weight of the attachments of the machine.

Use the tires shown in the following table.

The travel speed displayed varies with the tire size.

NOTICE

For usability of tires, consult your Komatsu distributor.

- Do not install the tire protector (mesh chain) to rear wheels.
- Do not to use tires, such as urethane tires, that weigh remarkably more than the standard tires since the machine can be damaged due to an unexpected load.
- If a tire not specified by Komatsu is used, rim displacement between the tire and rim may occur. Operator comfort, as well, may be degraded.

	Tire size
Standard	Front tire: 23.5R25☆ Rear tire: 23.5R25☆
Optional	Front tire: 23.5-25-16PR Rear tire: 23.5-25-16PR

METHOD FOR CHECKING AND INFLATING TIRE

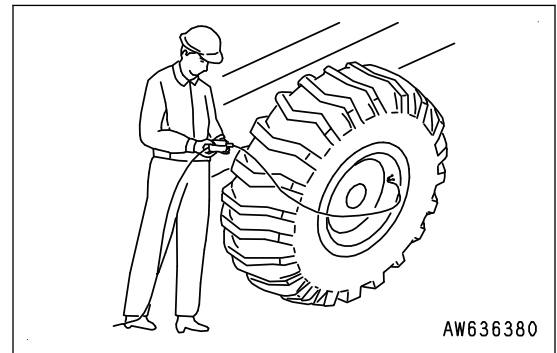
⚠ WARNING

- When pumping up the tires, check that no other person is standing near the tire, and install an air chuck with a clip that can be secured to the air valve.
- To prevent the tire inflation pressure from becoming too high, measure the pressure from time to time with an air gauge while pumping up the tire.
- When it is inflated, the rim parts may fly out, if they are not fitted properly. 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 work.
- Abnormal drop of inflation pressure and abnormal fitting of the rim indicate a trouble in the tire or rim. In this case, be sure to ask a tire repair shop for repair.
- Be sure to observe the specified inflation pressure.
- Do not adjust the tire inflation pressure immediately after traveling at high speed or operating under heavy load.

Check the tire inflation pressure before starting work while the tires are cold.

When inflating a tire, use an air chuck which can be fixed to the air valve of the tire as shown in the figure.

Do not work in front of the rim but work on the tread side of the tire.



1. Measure the inflation pressure with a tire inflation pressure gauge.
2. Adjust the inflation pressure properly.

The proper inflation pressure is shown below.

	Tire size	Standard inflation pressure
Standard	23.5R25☆	Front wheel: 400 kPa {4.0 kgf/cm ² , 56.9 PSI} Rear wheel: 400 kPa {4.0 kgf/cm ² , 56.9 PSI}
Optional	23.5-25-16PR	Front wheel: 310 kPa {3.1 kgf/cm ² , 44.1 PSI} Rear wheel: 310 kPa {3.1 kgf/cm ² , 44.1 PSI}

NOTICE

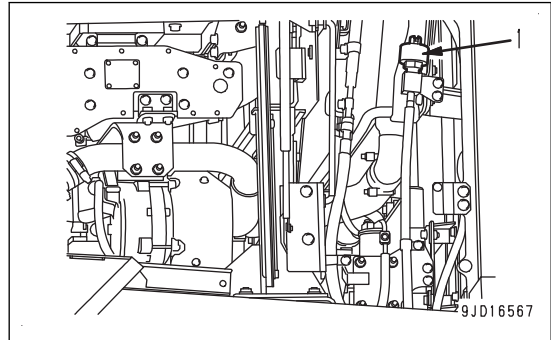
Appropriate inflation pressure varies depending on the given type of work. For details, see “HANDLE TIRE (3-246)”.

METHOD FOR CLEANING AND REPLACING FUEL TANK BREATHER ELEMENT

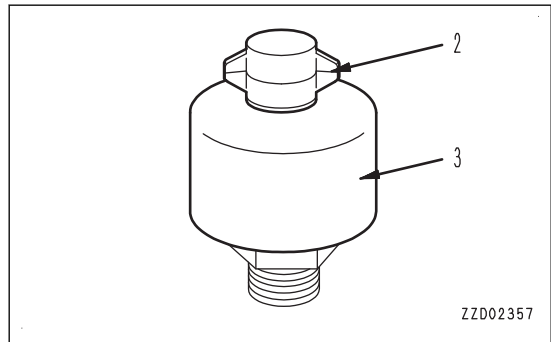
⚠ CAUTION

If you inspect or clean while engine is running, dirt enters the fuel tank and damages the engine. Be sure to stop the engine before performing these works.

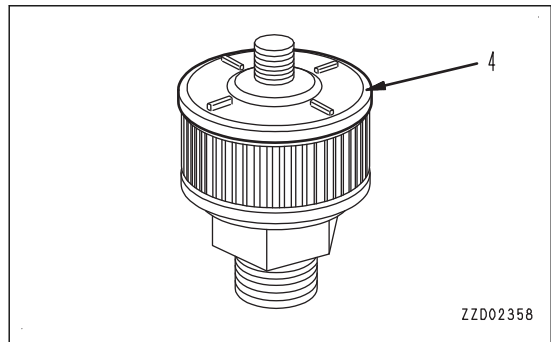
1. Open the engine side cover on the left side of the machine.
2. Loosen nut (2) at the top of fuel breather (1) which is located left upper of fan guard and remove it.



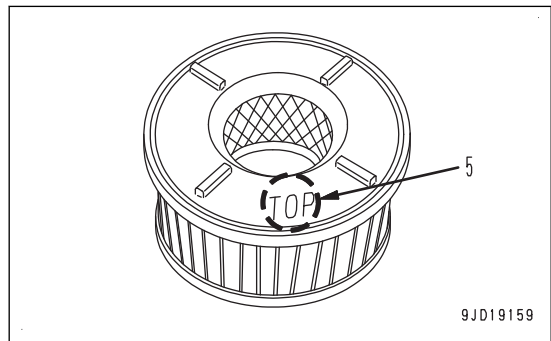
3. Turn cover (3) counterclockwise and remove it.



4. Remove element (4) upwards.
5. Blow the dry compressed air from the inside of the element.



6. After cleaning, install the element to the breather body. At that time, install the element in correct direction. Direct the surface marked (5) towards up and install.
7. Install cover (3).
8. Tighten nut (2).
Tightening torque: 10 to 14 Nm {1.0 to 1.4 kgfm, 7.2 to 10.1 lbf}
9. Close the engine side cover.



NOTICE

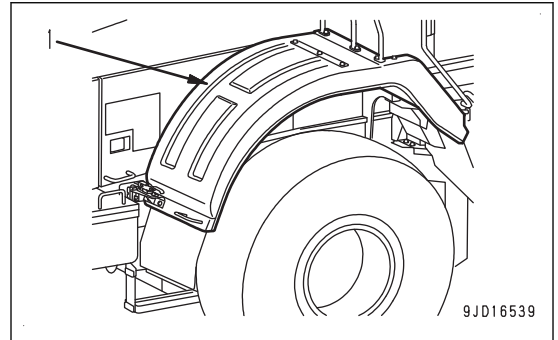
If the element is dirty or damaged, replace with new one.

METHOD FOR LUBRICATING REAR FULL-LENGTH FENDER HINGE

If rear full-length fender is hardly opened or closed, lubricate the hinge portion.

1. Install rear full-length fender (1).

For the opening method of the rear full-length fender, see "METHOD FOR OPENING REAR FULL-LENGTH FENDER AND ENGINE SIDE COVER (3-137)".

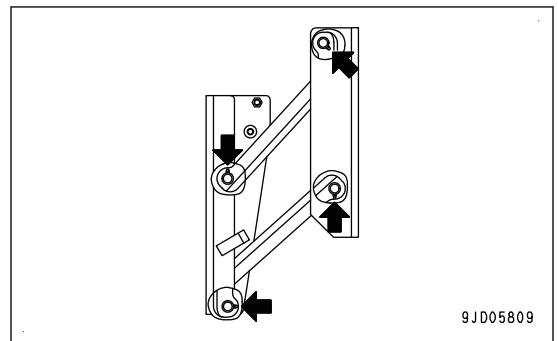
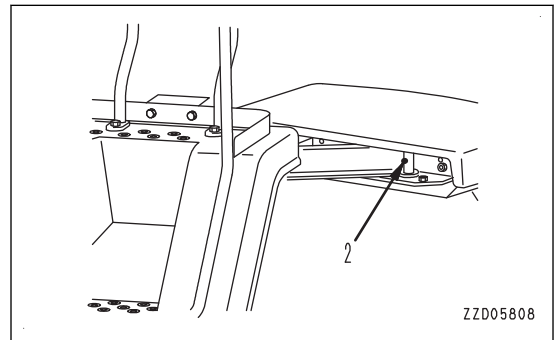


2. By using a grease pump, pump in grease through grease fittings (2).

REMARK

There are 4 grease fittings per one hinge.

3. After greasing, repeat open and close several times for the grease to fit completely.



CHECKS BEFORE STARTING

For details of the following items, see the pages where they are explained.

Checks before starting engine

“”

- Check for damage, wear, play in work equipment, cylinders, linkage, and hoses
- Remove dirt and debris from around the engine, battery, and radiator
- Check around the engine for leakage of coolant, oil, and exhaust gas
- Check the fuel line for leakage
- Remove dirt and check DEF line for leakage
- Remove dirt from around the aftertreatment devices
- Check around the aftertreatment devices for exhaust gas leakage
- Check KCCV piping for gas leakage and oil leakage
- Check around SCR for exhaust gas leakage
- Check transmission case, axle, hydraulic tank, hoses, and joints for oil leakage
- Check brake line for oil leakage

- Check the tires, wheels, and wheel hub bolts and nuts for damaged and wear, and check the wheel hub-bolts and nuts for looseness
- Check the handrails and steps for damages and check the bolts for looseness
- Check the gauges and monitor for problem
- Check the rearview mirrors
- Check the side under view mirrors
- Check the air cleaner mounting bolts for looseness
- Check battery terminals for looseness
- Check the seat belt and mounting hardware
- Clean cab windows
- Check the tires
- Check the wheel rims
- Check the rearview monitor

“METHOD FOR CHECKING BEFORE STARTING (3-173)”

- Check Water Separator, Draining Water And Sediment
- Check Coolant Level, Adding Coolant
- Check Oil Level In Engine Oil Pan, Adding Oil
- Check Dust Indicator
- Check Electric Wiring
- Check Fuel Level, Adding Fuel
- Check DEF Level And Adding DEF
- Check Tire Pressure
- Check Window Washer Fluid Spouting Out
- Check Wiper Function
- Check Machine Monitor
- Check Horn
- Check Defroster Function
- Check Locks
- Check Alternate Exit Of Cab

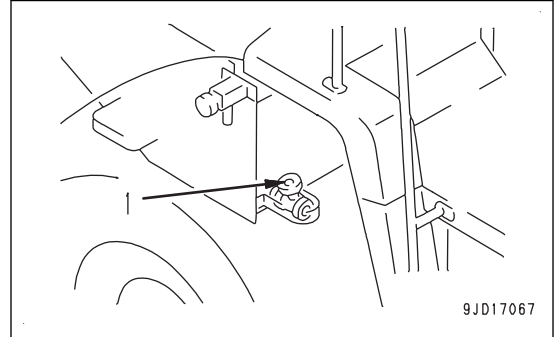
“METHOD FOR OPERATIONS AND CHECKS AFTER STARTING ENGINE (3-206)”

- Check Starting Condition And Unusual Noise Of Engine
- Check Low-Speed Run And Acceleration Of Engine
- Test Parking Brake
- Check Brake
- Check Clearance Between Brake Pedal And Floor
- Check Abnormal Points Detected Up To Previous Day
- Run-In The New Machine
- For Ordinary Operation

EVERY 50 HOURS MAINTENANCE

METHOD FOR DRAINING WATER AND SEDIMENT FROM FUEL TANK

1. Open the rear full-length fender on the right side of the machine.
2. Place a container to catch drained fuel under drain valve (1) on the right side of the fuel tank.
3. Open drain valve (1) on the right side of the fuel tank, and drain the sediment and water accumulated at the bottom together with fuel.
4. When only the clean fuel flows out, close drain valve (1).



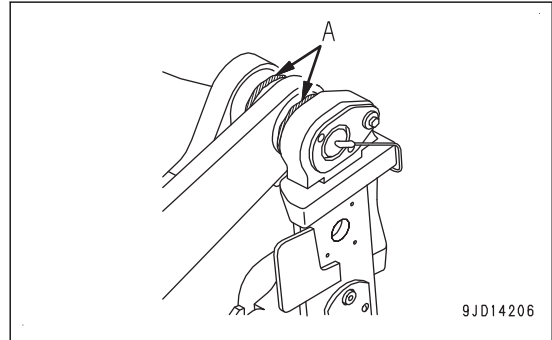
EVERY 100 HOURS MAINTENANCE

Maintenance for every 50 hours service must be done at the same time.

METHOD FOR LUBRICATING WORK EQUIPMENT

1. By using a grease pump, pump in grease through the grease fittings shown by arrows.

Pump in grease until new grease (A) comes out through the gaps on the right and left (or top and bottom) of the lubricated portion.

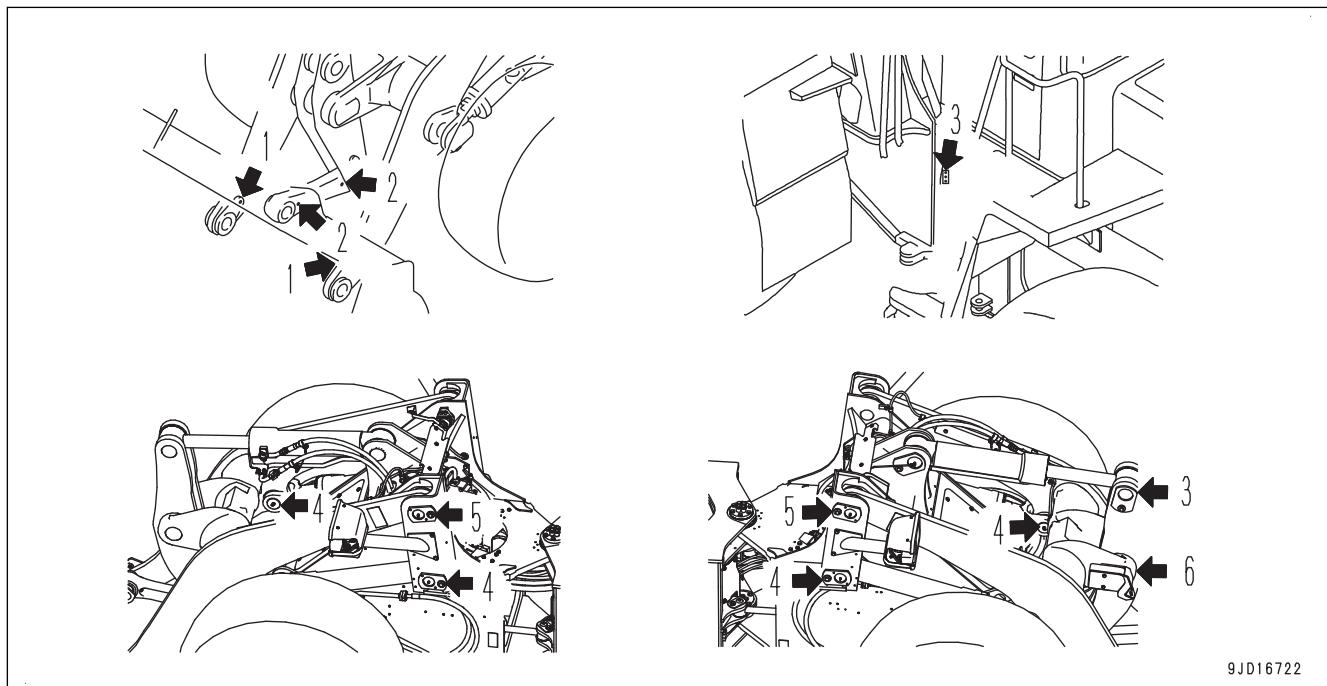


2. After greasing, wipe off any old grease that is pushed out.

NOTICE

Shorten the greasing interval than usual in a job site where the machine works for severe operations, or for continuous operations that last 8 or more hours.

Grease the machine once for every 10 hours until the initial 100 hours are reached.

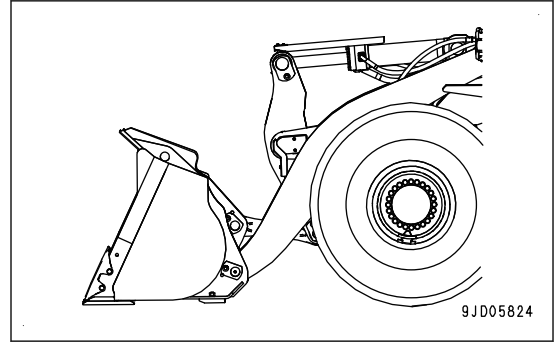


- (1) Bucket pin (2 places)
- (2) Bucket link pin (2 places)
- (3) Bucket cylinder pin (2 places)

- (4) Lift cylinder pin (4 places)
- (5) Boom pivot pin (2 places)
- (6) Bell crank pin (1 place)

Grease bucket pin (1), boom pivot pin (5) and bell crank pin (6) with the work equipment in the posture shown in the figure.

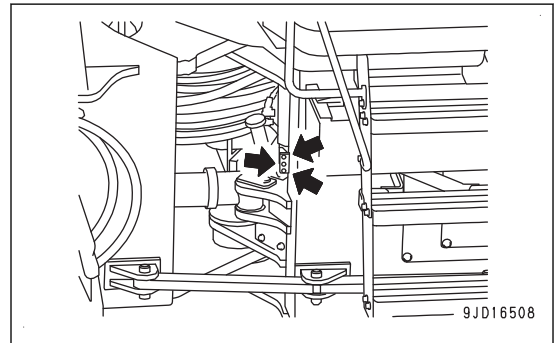
Lower the bucket to the with its bottom parallel to the ground.



METHOD FOR LUBRICATING REAR AXLE PIVOT PIN

(3 places)

1. By using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that is pushed out.



METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL

⚠ WARNING

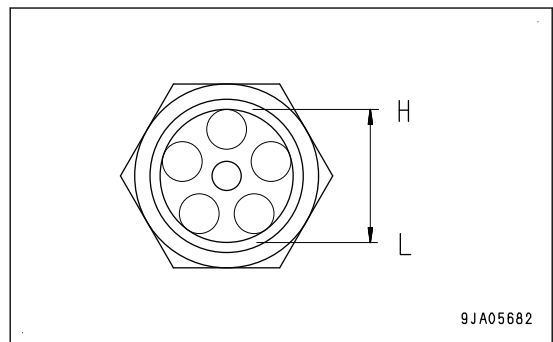
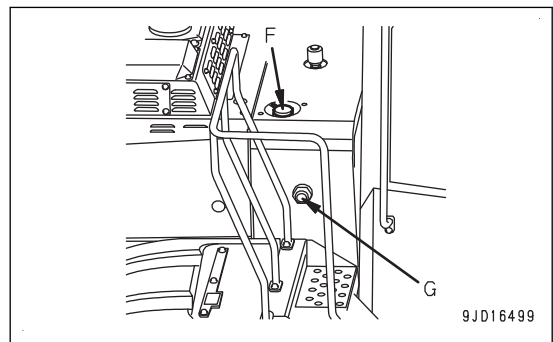
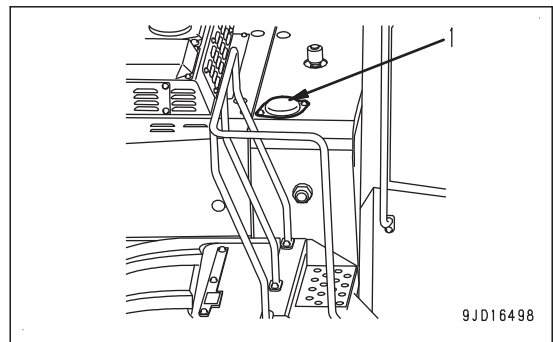
- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it carefully.

NOTICE

If the oil is added to above H mark, stop the engine and wait for the hydraulic oil to cool down. Then drain excessive oil through the drain plug. It may damage the oil circuit and cause the oil to spurt out.

Lower the bucket to the ground and stop the engine. Wait for 5 minutes before checking oil level. Oil level should be between H and L marks on sight gauge (G).

1. Check with sight gauge (G).
2. Loosen the bolt, turn cover (1), and open it.
3. If the level is below L mark, add through filler port (F).



METHOD FOR CLEANING AIR CONDITIONER FRESH AIR FILTER

⚠ WARNING

When using compressed air, there is a danger that dirt may scatter and cause personal injury. Always wear protective equipment such as protective eyeglasses and dust mask.

When the air conditioner is used, clean the air conditioner fresh air filter.

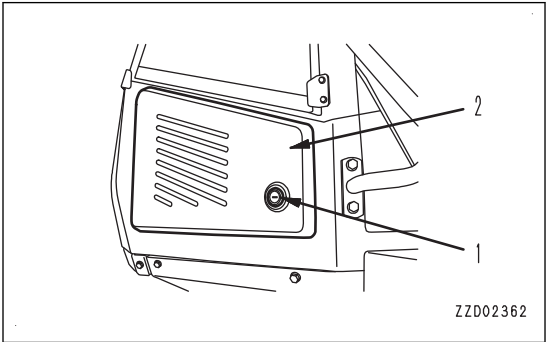
Before cleaning the filter, stop the air conditioner.

When replacing the filter, always set the frame lock bar to LOCK position.

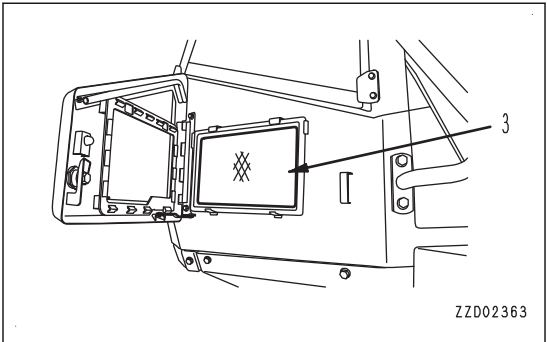
1. Insert the starting switch into key slot (1) and release the lock.
2. Pull the key and open cover (2).

REMARK

If the cover does not open easily by turning the key, push the cover with your hand to facilitate its opening.



3. Take out filter (3) and clean it.
4. Blow dry compressed air (0.2 MPa {2.1 kgf/cm², 30.0 PSI} or below) from the inside of each filter along the pleats. Next, blow along the pleats from the outside, then blow again from the inside. Replace the filter with a new one when the dirt clogging the filter cannot be removed by blowing air or every year.
5. After cleaning, return filter (3) to its original position and close the cover.



At this time, lock the cover with the starting key. Do not forget to remove the starting key.

REMARK

If the filter becomes clogged, the air flow will be reduced, and there will be a rumbling sound from the air conditioner unit.

EVERY 250 HOURS MAINTENANCE

Maintenance for every 50 hours service should be performed at the same time.

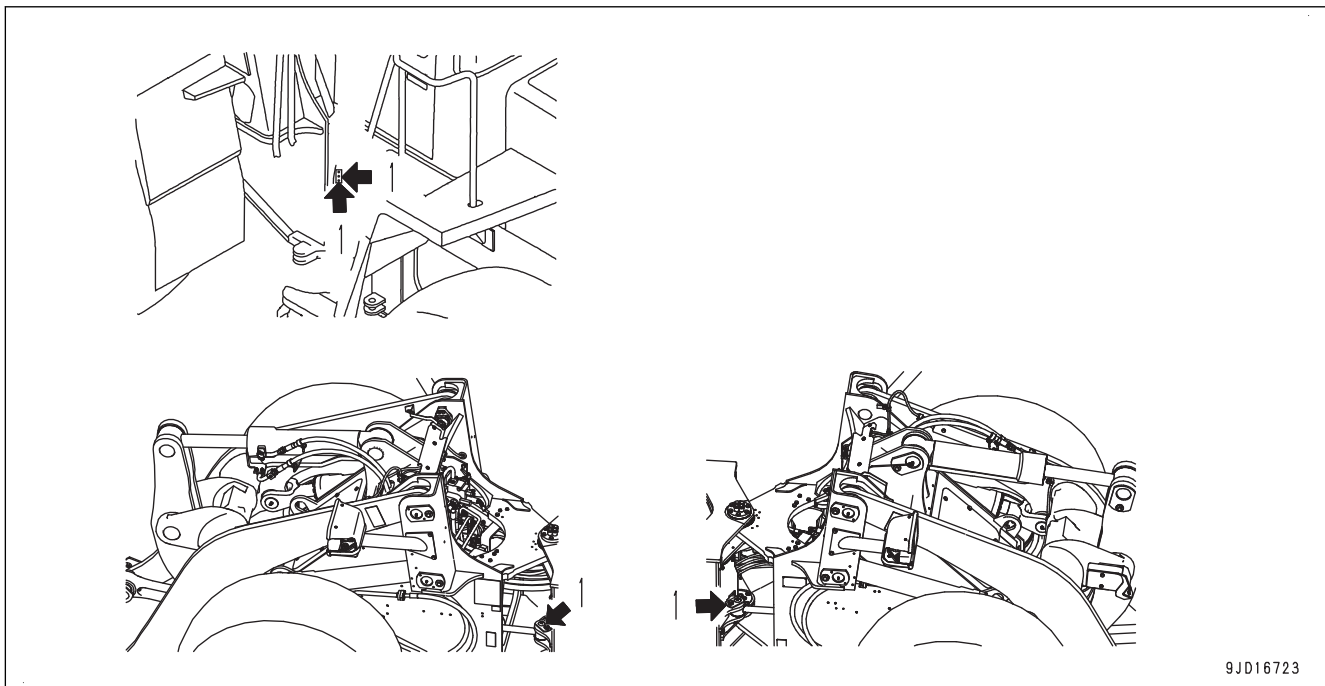
METHOD FOR LUBRICATING STEERING CYLINDER PIN

1. By using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that is pushed out.

NOTICE

Shorten the greasing interval than usual in a job site where the machine works for severe operations, or for continuous operations that last 8 or more hours.

Grease the machine once for every 10 hours until the initial 100 hours are reached.



(1) Steering cylinder pin (4 places)

METHOD FOR CHECKING BATTERY ELECTROLYTE LEVEL

Perform this procedure before operating the machine.

Inspect the battery electrolyte level according to the standard at least once a month.

WARNING

- Do not use the battery if the battery electrolyte level is below LOWER LEVEL line. If you do so, it will reduce the service life of the battery. In addition, it may cause an explosion.
- The battery generates inflammable hydrogen gas and there is a danger of explosion. Do not bring any open flame near the battery.
- Battery electrolyte is dangerous object. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.
- Do not use a dry wipe to clean the battery. A wet wipe will prevent fire or explosion from static electricity.

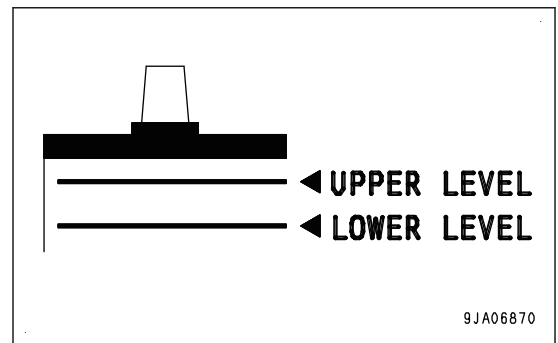
NOTICE

- Do not add the electrolyte to the battery exceeding UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.
- If there is a fear that the battery water may freeze after refilling with purified water (such as a commercial battery fluid), do the replenishment before the day's work on the next day.

METHOD FOR CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

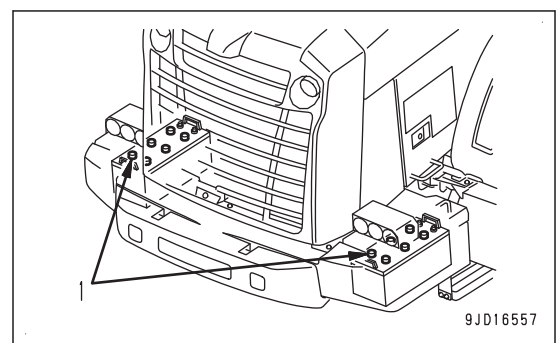
If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Open the cover of the battery box.
One each of the battery box is provided on both sides of the rear part of the machine.
2. Clean around the electrolyte level line with a cloth wet with water.
Check that the electrolyte level is between UPPER LEVEL (U.L.) line and LOWER LEVEL (L.L.) line.
3. When the electrolyte level is below the center between UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.), remove cap (1) immediately.
4. Add purified water (example: commercially available battery liquid) up to UPPER LEVEL (U.L.)
5. When you add the purified water to the cell of cap (1), add it to other cells as well.
6. Clean the vent hole of the battery cap, then close the cap securely.
Keep the battery top surface clean and wipe off dirt on it using a wet cloth.



REMARK

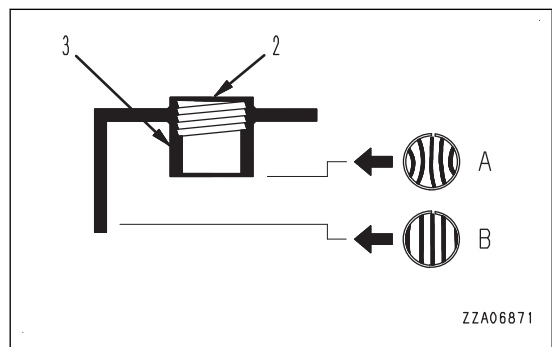
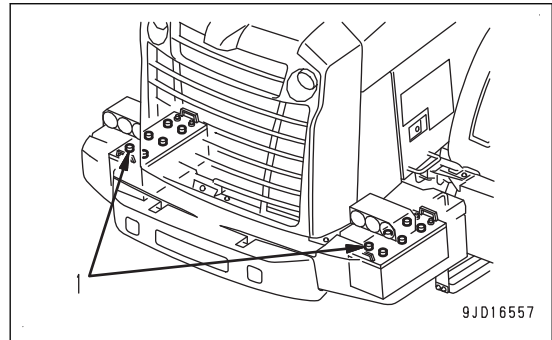
If purified water is added to above the UPPER LEVEL (U.L.) line, use a syringe to lower the level to the UPPER LEVEL (U.L.) line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water. If necessary, consult your Komatsu distributor or a battery manufacturer.



METHOD FOR CHECKING ELECTROLYTE LEVEL WHEN IT IS IMPOSSIBLE TO CHECK FROM SIDE OF BATTERY

If it is impossible to check the electrolyte level from the side of the battery, or there is no UPPER LEVEL line on the side of the battery, check according to the following procedures.

1. Open the cover of the battery box.
One each of the battery box is provided on both sides of the rear part of the machine.
2. Remove cap (1) at the top of the battery and check the electrolyte level through electrolyte filler port (2).
3. If the electrolyte does not reach the sleeve (3), always add the purified water (e.g. commercially available replenishment water for a battery) so that the level reaches the bottom of the sleeve (UPPER LEVEL line).
 - (A) Correct level: Electrolyte level is up to bottom of sleeve, so surface tension causes electrolyte surface to bulge and pole plate appears to be warped.
 - (B) Low level: Electrolyte level does not reach the bottom of sleeve, so pole plate appears straight and not to be warped.
4. When you add the purified water to the cell of cap (1), add it to other cells as well.
5. After adding the purified water, tighten cap (1) securely.



REMARK

If the purified water is added to above the bottom of the sleeve, use a syringe to remove electrolyte. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water. If necessary, consult your Komatsu distributor or a battery manufacturer.

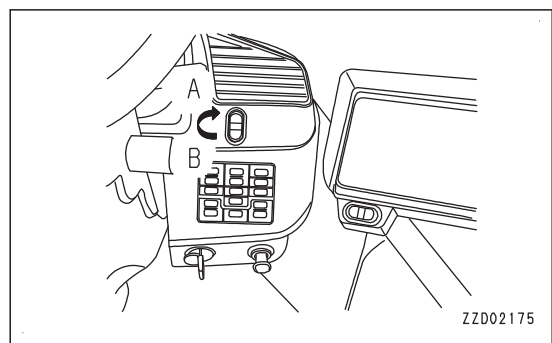
METHOD FOR CHECKING ELECTROLYTE LEVEL WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL

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

METHOD FOR TESTING PARKING BRAKE

1. Stop the machine by using the brake pedal on a dry slope road (downhill).
2. Set the parking brake switch from OFF position (B) to ON position (A).
3. Check that the machine is stopped and held at the current position.

If any problem is found, ask your Komatsu distributor for adjustment.



METHOD FOR CHECKING AND ADJUSTING AIR CONDITIONER COMPRESSOR BELT TENSION

WARNING

When checking and adjusting the air conditioner compressor belt tension, stop the engine, and display the warning tag on the work equipment control lever.

METHOD FOR CHECKING AIR CONDITIONER COMPRESSOR BELT

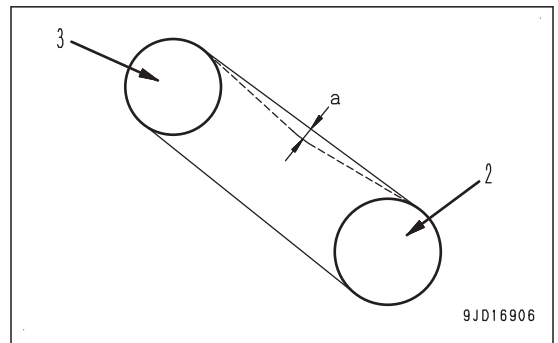
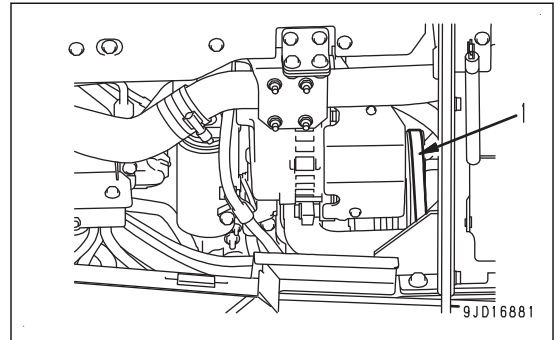
1. Open the engine side cover on the left side of the machine.
2. Check air conditioner compressor belt (1).

Press the middle point between air conditioner compressor pulley (2) and crankshaft pulley (3) with your thumb (approximately 98N {10kgf}).

If deflection (a) is 11 to 15mm {0.43 to 0.59in}, the belt tension is normal.

If the deflection is out of the standard range, adjust it into the standard range.

When you use a belt tension gauge, the tension is normal if it is in the range of 353 to 530N {36 to 54kgf}.



METHOD FOR TESTING WHEN AIR CONDITIONER COMPRESSOR BELT IS REPLACED

Press the middle point between the compressor pulley and crankshaft pulley with your thumb (approximately 98N {10kgf}).

The standard deflection is 8 to 11.5mm {0.32 to 0.45in}.

When you use a belt tension gauge, the tension is normal if it is in the range of 530 to 745N {54 to 76kgf}.

REMARK

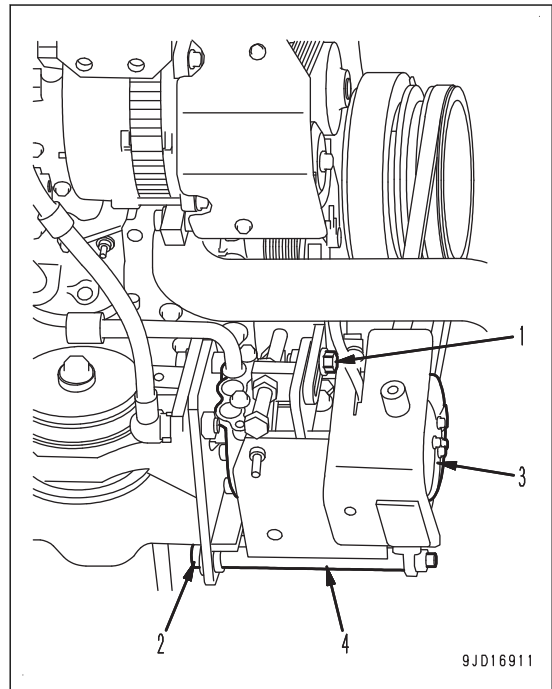
When the belt is replaced with a new one, the above value is employed as the initial tension since a stronger tension is required.

METHOD FOR ADJUSTING AIR CONDITIONER COMPRESSOR BELT

1. Open the engine side cover on the right side of the machine.
2. Loosen bolts (1) and (2).

REMARK

When the bolts (1) and (2) are loosened, bracket (4) to which compressor (3) is installed can move, using the mounting position of bolt (2) as a fulcrum.



3. Loosen nut (5) which is installed to the bracket first, and then tighten bolt (6). Compressor (3) moves in direction A, and compressor belt (7) can be stretched.
4. After adjusting the belt tension properly, tighten nut (5) until it touches boss (8) and tighten it further in direction B.

Tightening torque: 153 to 190 Nm {15.5 to 19.5 kgfm, 112 to 141 lbft}

5. Tighten bolts (1) and (2), and fix bracket (4).

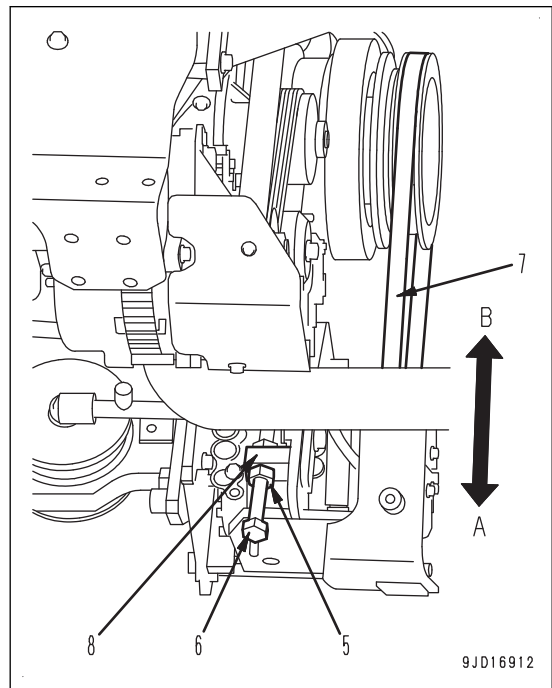
Tightening torque

Bolt (1): 98 to 123 Nm {10 to 12.5 kgfm, 72.3 to 90.4 lbft}

Bolt (2): 98 to 123 Nm {10 to 12.5 kgfm, 72.3 to 90.4 lbft}

NOTICE

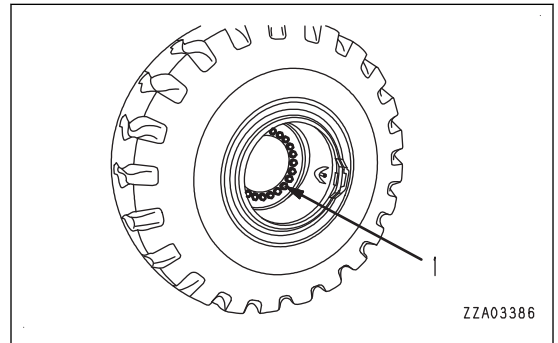
- Check each pulley for damage, wear of the V-groove, and the wear of the V-belt. In particular, be sure to check that the V-belt is not touching the bottom of the V-groove.
- Replace the belt with a new one if the belt is stretched and has no allowance for adjustment, or has slipping sound or squeak because of cuts or cracks of the belt.
- When the new V-belt is installed, readjust it after operating for 1 hour.



METHOD FOR CHECKING LOOSENESS OF WHEEL HUB BOLTS, RETIGHTENING BOLTS

Loosening of wheel hub bolt (1) accelerates the wear of the tires and causes accidents.

1. Check the bolt for loosening and tighten it further if necessary.
 Always turn the bolts in the direction of tightening.
 Tightening torque: 824 to 1030 Nm {84 to 105 kgfm, 608 to 759 lbft}
2. If the bolt is broken, replace all of the bolts of the wheel.



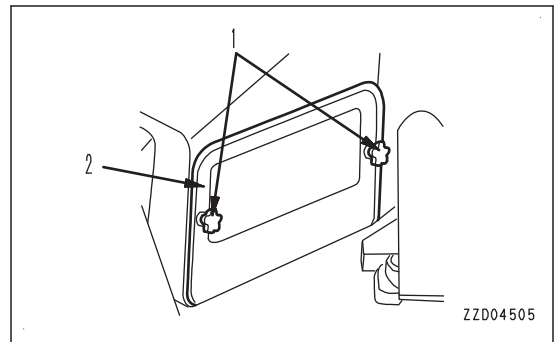
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METHOD FOR CLEANING AIR CONDITIONER RECIRC AIR FILTER

WARNING

When using conditioner fresh air filter, there is a danger that dirt may scatter and cause personal injury. Always wear protective equipment such as protective eyeglasses and dust mask.

1. Loosen knob (1) and tilt the top of filter inspection cover (2) together with the filter.

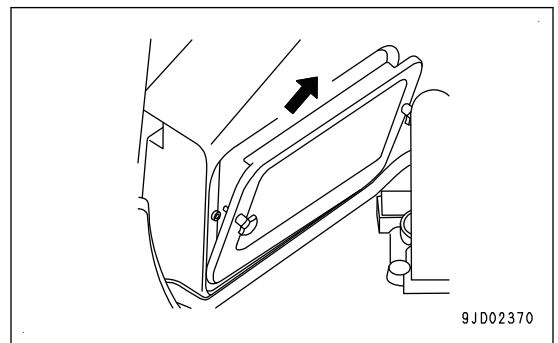


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2. Remove cover (2) and filter together in the direction of the arrow.
3. Remove the filter from cover (2).
4. Clean it by using compressed air as you did for the fresh air filter.

Replace the filter with a new one when the dirt clogging the filter cannot be removed by blowing air or every year.

5. When installing the filter, fit it to cover (2) first.
 Insert the filter and cover (2) together between the filter box and the floor mat from a diagonally upper position.
6. Tighten the knob aligning it with the knob installation position.



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REMARK

If the filter becomes clogged, the air flow will be reduced, and there will be a rumbling sound from the air conditioner unit.

METHOD FOR CHECKING FUNCTION OF BRAKE ACCUMULATOR

For handling of the accumulator, see "HANDLE ACCUMULATOR AND GAS SPRING (2-45)".

If the engine stops during travel, the brake can be operated with the oil pressure in the accumulator temporarily.

1. Park the machine on a level ground and lower the work equipment to the ground.
2. Apply the parking brake.
3. Start the engine and run it at medium speed for 1 minute and then stop it.
4. Turn the starting switch to ON position and repeat depressing the brake pedal.
 - If the brake oil pressure caution lamp does not light up when the brake pedal is depressed 6 times, the gas pressure in the accumulator is normal.
 - If the brake oil pressure caution lamp lights up when the brake pedal is depressed 5 times or less, the gas pressure in the accumulator may be low. Ask your Komatsu distributor for inspection.

REMARK

The inspection must be done within 5 minutes after the engine stops. If the engine is kept stopped, the gas pressure in the accumulator lowers and the inspection cannot be made.

EVERY 500 HOURS MAINTENANCE

Maintenance for every 50, 100 and 250 hours must be done at the same time.

METHOD FOR CHANGING OIL IN ENGINE OIL PAN, REPLACING ENGINE OIL FILTER CARTRIDGE

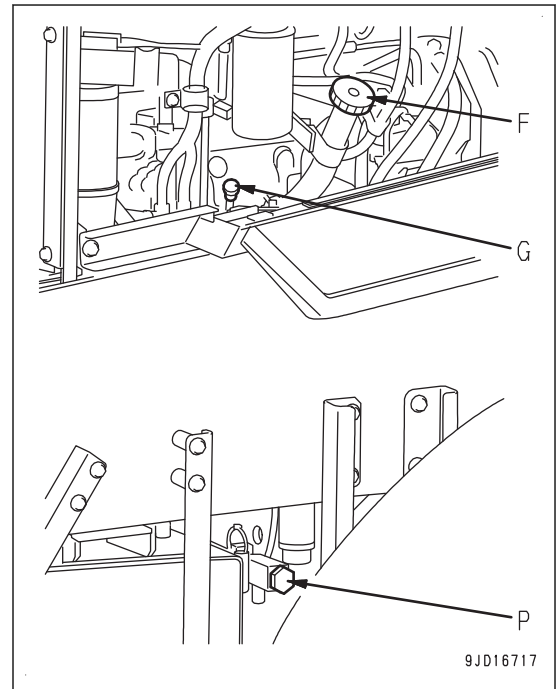
WARNING

- Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it carefully.

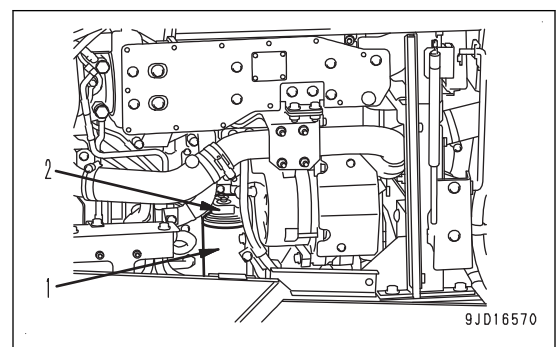
Refill capacity: 23 ℓ {6.08 U.S.Gal}

Items to be prepared

- Container to catch drained oil
 - Filter wrench
1. Open the engine side cover on the right side of the machine.
 2. Open engine oil filler (F).
 3. Place an oil container right under drain plug (P) to catch the drained oil.
 4. Remove drain plug (P) and drain the oil.
Check the drained oil. If it contains much metallic powder or foreign material, contact your Komatsu distributor.
 5. Tighten drain plug (P).



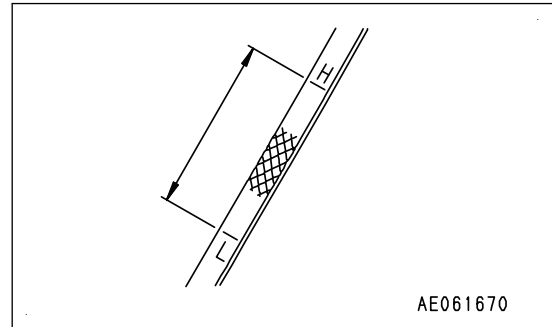
6. Open the engine side cover on the left side of the machine.
7. Turn filter cartridge (1) counterclockwise by using the filter wrench, and remove it.
If this operation is performed immediately after stopping the engine, a large amount of oil will come out, so wait for 10 minutes before starting the work.
8. Clean filter holder (2), fill the new filter cartridge with clean engine oil, coat the seal and thread of the new filter cartridge with engine oil (or apply thin film of grease), then install it.



REMARK

Check that there is no old packing stuck to filter head (2). If there is any old packing stuck to the holder, it will cause leakage of oil.

9. When installing the cartridge, tighten it until the sealing surface contacts filter head (2), then tighten it 3/4 turn.
10. After replacing the filter cartridge, refill with engine oil through oil filler port (F) until the oil level is between H and L marks on dipstick (G).
11. Run the engine at low idle for a time, then stop the engine and check that the oil level is between H and L marks on the dipstick. For details, see "METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL (3-176)".

**REMARK**

When the ambient temperature is low, water or emulsified matter may stick to the dipstick, oil filler cap, etc. or the drained oil may be milky white because of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem.

There is no problem even if the emulsified matter cannot be removed completely after changing oil.

METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE

⚠ WARNING

- Just after the engine stops, all parts are still very hot, so do not replace the filter immediately. Wait for all of parts to cool down before starting the work.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any open flame close.

NOTICE

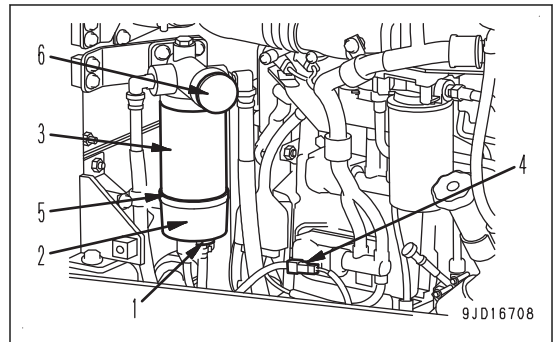
- Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing parts, Komatsu recommends using Komatsu genuine parts.
- The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection pump and nozzles. If any cartridge other than a Komatsu genuine filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Never use a substitute.
- When performing inspection and maintenance of the fuel system, be careful not to let any foreign material get in, more than ever before. If dust sticks to the fuel system, wash it off thoroughly with fuel.

Items to be prepared

- Container to catch the drained fuel
- Filter wrench

When replacing the fuel main filter cartridge (every 1000 hours), replace the fuel prefilter cartridge first.

1. Open the engine side cover on the right side of the machine.
2. Place a container under the fuel prefilter cartridge to catch the fuel.
3. Loosen drain valve (1) and drain water and sediments from transparent cup (2), and also drain all the fuel from filter cartridge (3).
4. Disconnect connector (4).
5. Wrap connector (4) with a plastic bag, etc. so that fuel, oil and water do not get onto the disconnected connector.



6. Turn transparent cup (2) counterclockwise by using the filter wrench, and remove it. Transparent cup (2) is used again.
7. Turn filter cartridge (3) counterclockwise by using the filter wrench, and remove it.
8. Install currently removed transparent cup (2) to the bottom of the new fuel prefilter cartridge. At this time, be sure to replace O-ring (5) with a new one.

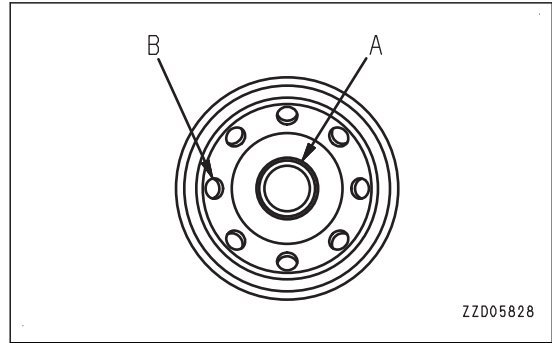
NOTICE

When installing the transparent cup, thinly apply oil to the packing surface, contact it to the sealing surface of filter cartridge (3), and then tighten it 1/4 to 1/2 turn. If the transparent cup is tightened too much, O-ring may be damaged, and this will cause the leakage of fuel. If it is not tightened enough, fuel will leak through the gap at O-ring. Be sure to observe the tightening angle.

9. Clean the filter head.
10. Fill the new filter cartridge with clean fuel.

NOTICE

- When filling the filter cartridge with fuel, do not remove cap (A) at the center. Always fill with fuel from small holes (B) (8 places) on the dirty side.
- After filling with fuel, remove cap (A) and install the fuel filter.
- Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (A) when filling with fuel. Be careful not to let dirt or dust get into the center portion on the clean side.



11. Thinly apply oil to the packing surface of the new filter cartridge, then install the filter cartridge to the filter head.

NOTICE

- When installing the filter cartridge, tighten it 3/4 of a turn after the packing surface contacts the seal surface of the filter head.
If the filter cartridge is tightened too much, the packing may be damaged and this will cause the leakage of fuel. If it is not tightened enough, fuel will leak through the gap at packing. Be sure to observe the tightening angle.
- When tightening with a filter wrench, be extremely careful not to dent or damage the filter.

12. Check that drain valve (1) is closed securely.
13. Remove the plastic bag wrapping connector (4), then connect connector (4).

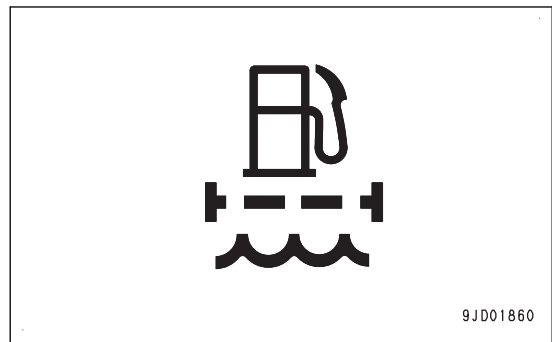
REMARK

- If water gets on connector (4), the sensor may malfunction and the water separator caution lamp may flash. When removing connector (4), be extremely careful not to let water get on the connector.
- If water gets on connector (4), dry it completely before connecting it.

14. After completing the replacement of filter cartridge (3), bleed air from the circuit.

Bleed the air as follows.

- 1) Fill up the fuel tank with fuel (to the level where the float is at the highest position).
- 2) Loosen the knob of feed pump (6), pull it out, then pump it in and out until the movement becomes heavy.



REMARK

It is not necessary to remove the plugs at the fuel prefilter head and at the fuel main filter head.

15. After bleeding air, push in the knob of feed pump (6) and tighten it.
16. After replacing the filter cartridge, start the engine and run it at low idle for 10 minutes.
17. Check the filter seal surface and the mounting face of the transparent cup for fuel leakage.
If there is any leakage of fuel, check the tightening condition of the filter cartridge.
If there is still fuel leakage, perform steps 1 to 7 to remove the filter cartridge, and if any damage or pinched foreign material on the packing surface is found, replace it with a new cartridge and repeat steps 8 to 17.

REMARK

When bleeding air, air may remain inside of the water separator. However, the engine can be started after pumping feed pump (6) in and out until it becomes heavy. Leave it as it is for a while after stopping the engine, and air is bled spontaneously.

EVERY 1000 HOURS MAINTENANCE

Maintenance for every 50, 100, 250 and 500 hours must be done at the same time.

METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE

⚠ WARNING

- Immediately after the engine is stopped, the parts are still very hot. Do not replace the filter immediately. Wait for all of parts to cool down before starting the work.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any open flame close.

NOTICE

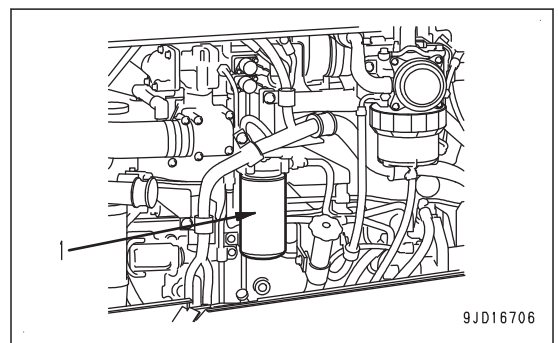
- Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing parts, Komatsu recommends using Komatsu genuine parts.
- The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection pump and nozzles. If any cartridge other than a Komatsu genuine filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Never use a substitute.
- When performing inspection and maintenance of the fuel system, be careful not to let any foreign material get in, more than ever before. If dust sticks to the fuel system, wash it off thoroughly with fuel.
- After removing the filter cartridge, fuel drops fall down from the filter head. In order to prevent outflow of the fuel, be sure not to leave the machine while the filter cartridge is being removed.

Items to be prepared

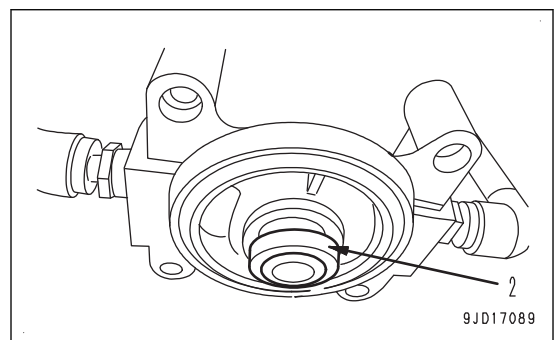
- Container to catch the drained fuel
- Filter wrench

After replacing the fuel prefilter cartridge, replace the fuel main filter cartridge.

1. Open the engine side cover on the right side of the machine.
2. Place a container under the filter cartridge to catch the fuel.
3. Turn filter cartridge (1) counterclockwise by using the filter wrench, and remove it.



4. Clean the filter head.
Replace inner seal (2) with a new one.



- 5. Thinly apply oil to the packing surface of the new filter cartridge, then install the filter cartridge to the filter head.

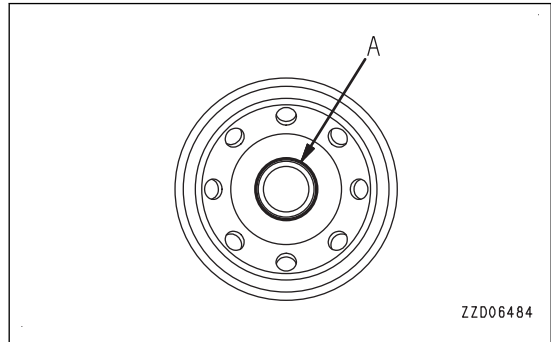
NOTICE

- Do not fill the new filter cartridge with fuel.
- Remove cap (A) at center and install the filter cartridge.

- 6. When installing the cartridge, tighten it until the packing surface contacts the sealing surface of the filter head, then tighten it 3/4 turn.

REMARK

If the filter cartridge is fastened too much, the packing will be damaged and this leads to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing clearance. Be sure to observe the tightening angle. When tightening with a filter wrench, be extremely careful not to dent or damage the filter.



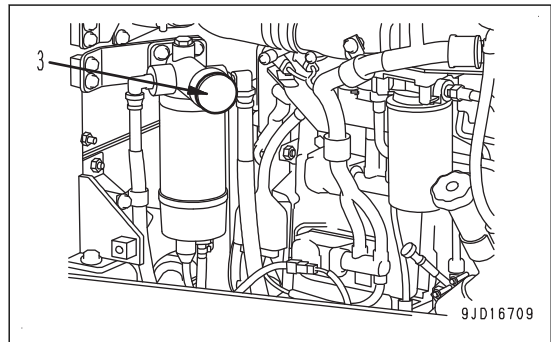
- 7. After completing the replacement of filter cartridge (1), bleed air from the circuit.

Bleed the air as follows:

- 1) Fill up the fuel tank with fuel (to the level where the float is at the highest position).
- 2) Loosen the knob of feed pump (3), pull it out, then pump it in and out until the movement becomes heavy.

REMARK

It is not necessary to remove the plugs at the fuel prefilter head and at the fuel main filter head.



- 8. Push in and tighten the knob of feed pump (3).
- 9. After replacing the filter cartridge, start the engine and run it at low idle for 10 minutes.
- 10. Check the filter seal surface for fuel leakage.

If there is any leakage of fuel, check the tightening condition of the filter cartridge.

If there is still leakage of fuel, follow steps 2 and 3 to remove the filter cartridge, then check the packing surface for damage or foreign material. If any problem is found, replace the cartridge with a new one, then repeat steps 4 to 10 to install the filter cartridge.

REMARK

When bleeding air, air may remain inside of the water separator. However, the engine can be started after pumping feed pump (3) in and out until it becomes heavy. Leave it as it is for a while after stopping the engine, and air is bled spontaneously.

METHOD FOR CHANGING OIL IN TRANSMISSION CASE AND CLEANING TRANSMISSION CASE STRAINER

⚠ WARNING

- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it carefully.

Refill capacity: 54 ℓ {14.3 U.S.Gal}

Items to be prepared

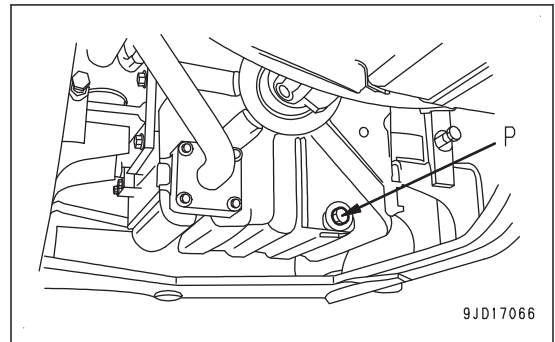
- Container to catch drained oil

1. Place a container under drain plug (P) to catch the oil.
2. Remove drain plug (P) and drain the oil.

Loosen drain plug (P) gradually so that the oil will not spout out, and then remove it.

3. After draining the oil, install drain plug (P).

Tightening torque: 68.6 ± 9.8 Nm {7.0 ± 1.0 kgfm, 50.6 ± 7.23 lbft}

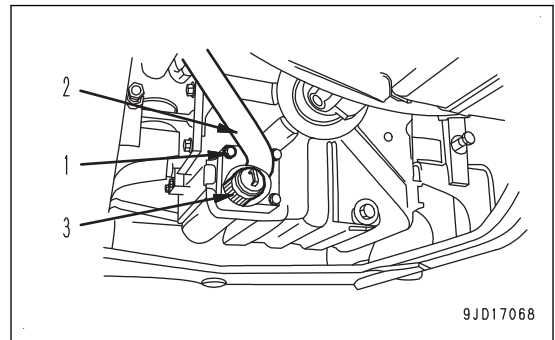


4. Remove bolts (1) (4 pieces) and move tube (2).
5. Remove strainer (3).
6. Remove all dirt from strainer (3), then wash it in clean diesel fuel or flushing oil.

If strainer (3) is damaged, replace it with a new one.

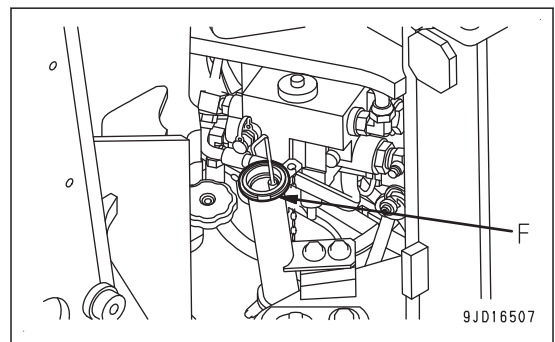
7. Install strainer (3) to the case.

Replace O-ring of tube (2) with a new one and install tube (2).



8. Add the refill capacity of oil through oil filler port (F).
9. After adding oil, check that the oil level is proper. For details, see "METHOD FOR CHECKING OIL LEVEL IN TRANSMISSION CASE, ADDING OIL (4-29)".

10. Check the transmission case for oil leakage.



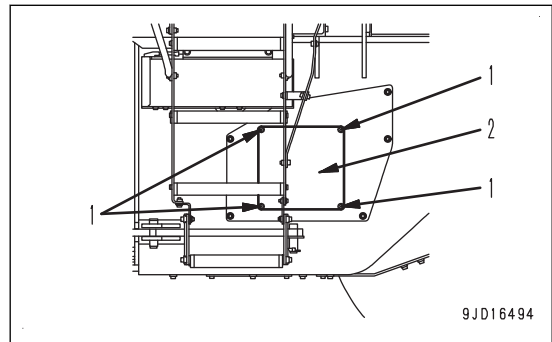
METHOD FOR REPLACING TRANSMISSION OIL FILTER CARTRIDGE

WARNING

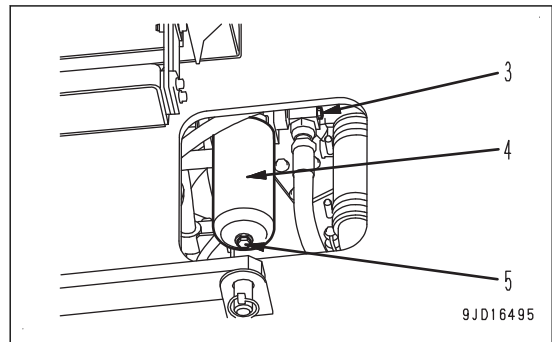
Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.

Items to be prepared

- Container to catch drained oil
 - Filter wrench
 - Wrench (Width across flats: 24 mm {0.9 in})
1. Loosen bolts (1) (4 pieces) and remove cover (2).



2. Place a container under the transmission oil filter to catch the oil.
3. Remove transmission oil filter plug (3).
4. Drain the oil, then tighten the plug (3).
5. Turn transmission oil filter cartridge (4) counterclockwise by using nut (5) welded to transmission oil filter cartridge (4) and remove it.

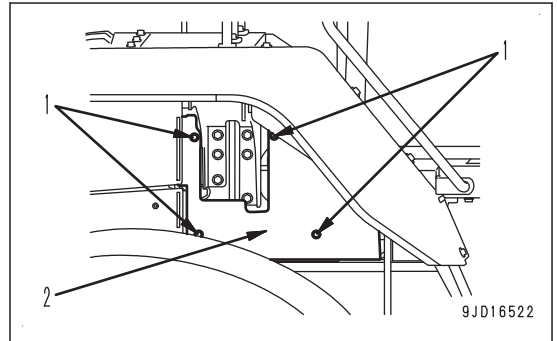


6. Clean the filter holder, coat the seal surface and thread of the new filter cartridge with transmission oil, then install it. When the seal surface comes into contact with the filter holder, tighten a further 2/5 turns with the filter wrench.

7. Check that the oil level is proper. For details, see "METHOD FOR CHECKING OIL LEVEL IN TRANSMISSION CASE, ADDING OIL (4-29)".
8. Check the transmission oil filter for oil leakage.

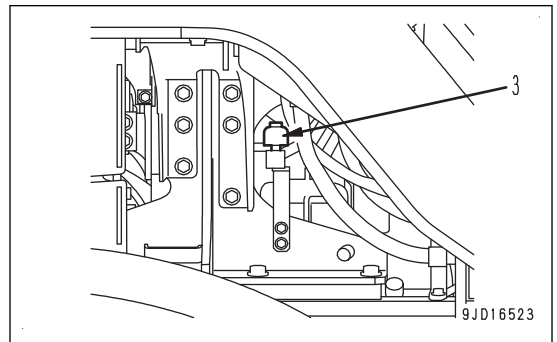
METHOD FOR CLEANING TRANSMISSION BREATHER

1. Loosen bolts (1) (4 pieces) and remove cover (2).



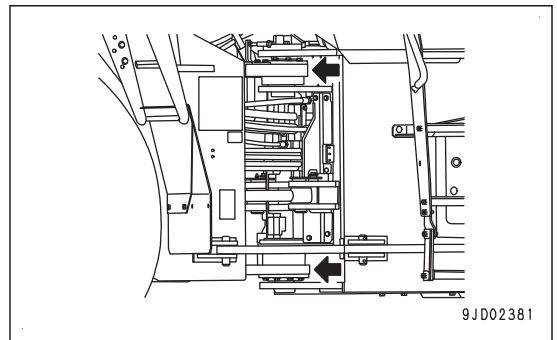
2. After removing dirt and dusts around breather, remove breather (3) and immerse it in detergent liquid to clean.

While the breather is removed, take care to prevent entry of dusts through the mounting location of the breather.



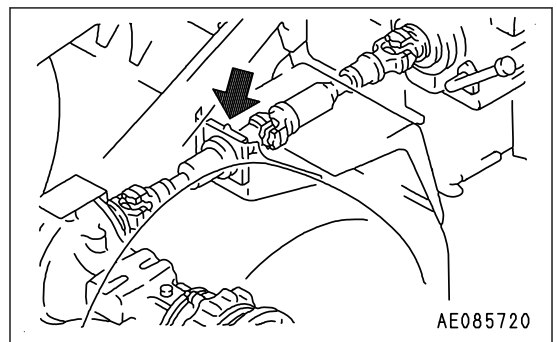
METHOD FOR LUBRICATING CENTER HINGE PIN

1. By using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that is pushed out.
Center hinge pin (2 places)



METHOD FOR LUBRICATING DRIVE SHAFT CENTER SUPPORT

1. By using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that is pushed out.
Drive shaft center support (1 place)



METHOD FOR CHECKING ALL TIGHTENING POINTS OF ENGINE INTAKE PIPE CLAMPS

Ask your Komatsu distributor for checking the tightening of the clamps between the air cleaner - turbocharger - aftercooler - engine.

CHECK ALTERNATOR BELT TENSION, CHECK AND REPLACE AUTO-TENSIONER

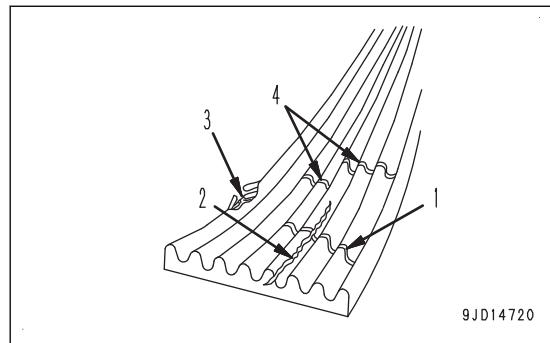
The alternator belt tension is automatically adjusted by auto-tensioner (belt tensioner). Normally, no belt tension adjustment is required. But, if there is a problem of the tension of alternator belt, you need to check the fan belt and auto-tensioner.

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).



9JD14720

EVERY 2000 HOURS MAINTENANCE

Maintenance for every 50, 100, 250, 500 and 1000 hours must be done at the same time.

METHOD FOR CHANGING OIL IN HYDRAULIC TANK, CLEANING HYDRAULIC TANK STRAINER

WARNING

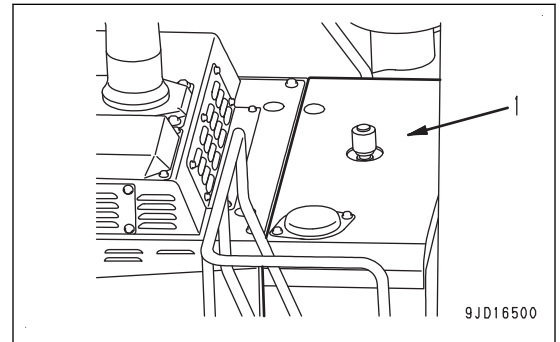
- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it carefully.

Refill capacity : 142 ℓ {37.5 U.S.Gal}

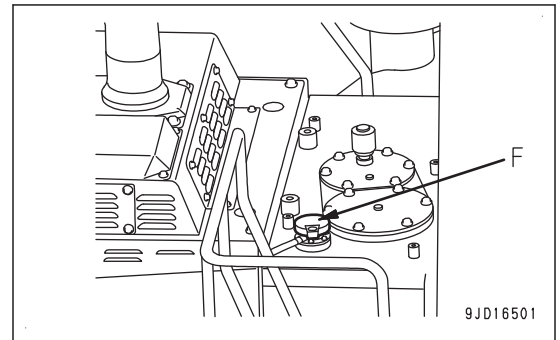
Items to be prepared

- Container to catch drained oil

1. Lower the bucket to the ground with its bottom level, apply the parking brake, then stop the engine.
2. Loosen the bolts and remove cover (1).



3. Remove the cap of oil filler port (F).

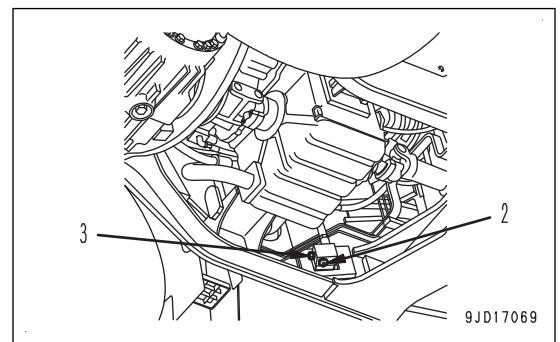


4. Place a container under drain plug (2) to catch the drained oil.
5. Remove drain plug (2).
6. Open drain valve (3) gradually to drain the oil.
7. After draining the oil, close drain valve (3) and tighten drain plug (2).

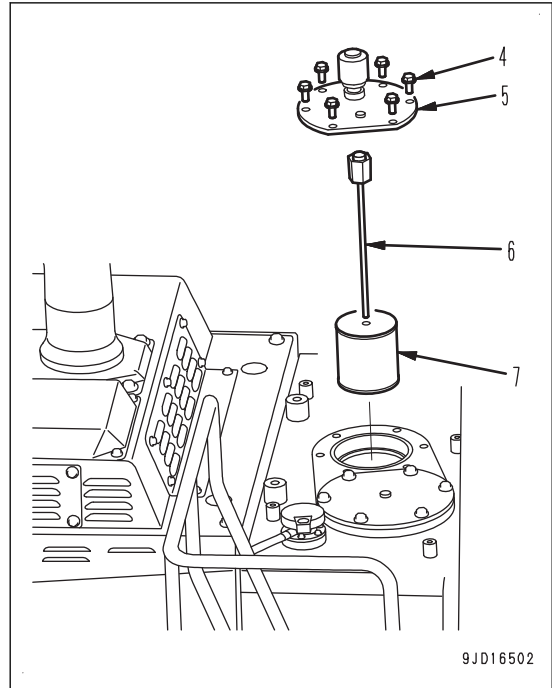
Tightening torque

Drain plug (2): 68.6 ± 9.8 Nm {7.0 ± 1.0 kgfm, 50.6 ± 7.2 lbft}

Drain valve (3): 63.7 ± 14.7 Nm {6.5 ± 1.5 kgfm, 47.0 ± 10.8 lbft}



8. Remove bolts (4) (6 pieces) and remove cover (5).
When doing this, if the O-ring of the cover is damaged or deteriorated, replace it.
9. Hold the top of rod (6) and pull it up to remove strainer (7).
10. Remove any dirt stuck to strainer (7), then wash it in flushing oil.
If strainer (7) is damaged, replace it with a new one.
11. Refill with the specified quantity of hydraulic oil through oil filler port (F), then install the cap.
12. Check the hydraulic oil level.
Check that the hydraulic oil is at the specified level. For details, see "METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (4-52)".

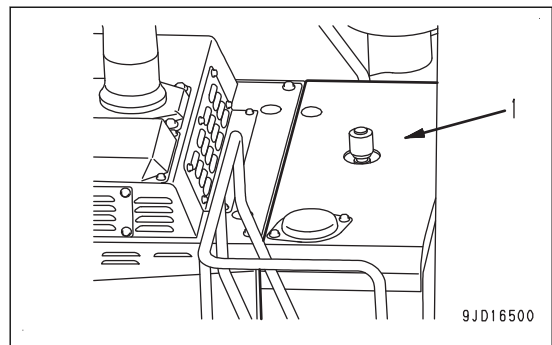


METHOD FOR REPLACING HYDRAULIC OIL FILTER ELEMENT

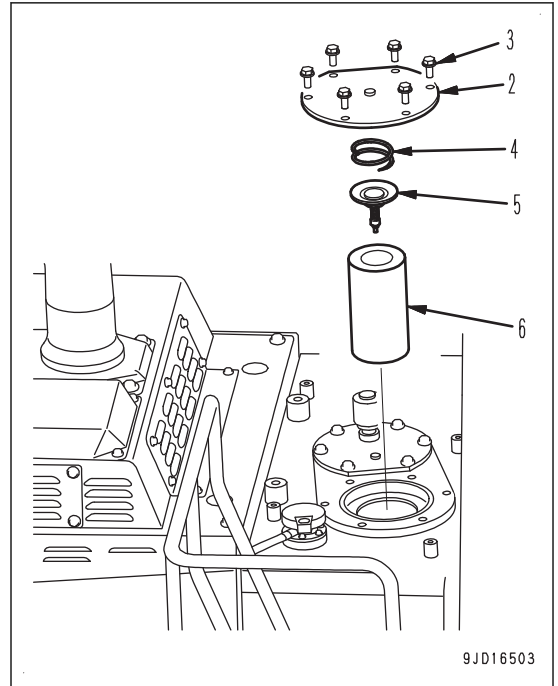
⚠ WARNING

- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it carefully.

1. Lower the bucket to the ground with its bottom level, apply the parking brake, then stop the engine.
2. Loosen the bolts and remove cover (1).



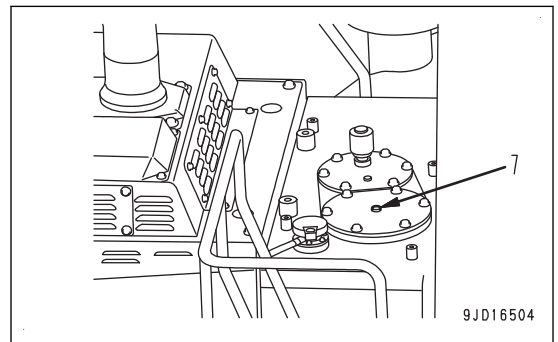
3. Remove mounting bolts (3) (6 pieces) of filter cover (2) on the top of the tank, then remove the cover.
The cover may be jumped out by spring (4).
While pressing down the cover, remove the bolts.
4. Remove spring (4) and bypass valve (5), then pull out element (6).
5. Check inside of the tank for foreign material, then clean it.
6. Install new element (6), then set bypass valve (5), spring (4), and cover (2) to the tank.
If the O-ring of the cover is damaged or deteriorated, replace it.
7. While pressing down the cover, tighten the mounting bolts evenly.
8. Check the hydraulic oil level.
Check that the hydraulic oil is at the specified level. For details, see "METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (4-52)".
9. Run the engine at low idle, and extend and retract each of the steering, bucket, and boom cylinders 4 to 5 times, taking care not to move them to the stroke end (stop them approximately 100 mm {3.9 in} before the stroke end).



NOTICE

If the engine is run at high speed immediately after startup or a cylinder is pushed up to its stroke end, air taken inside the cylinder may cause damage to the piston packing.

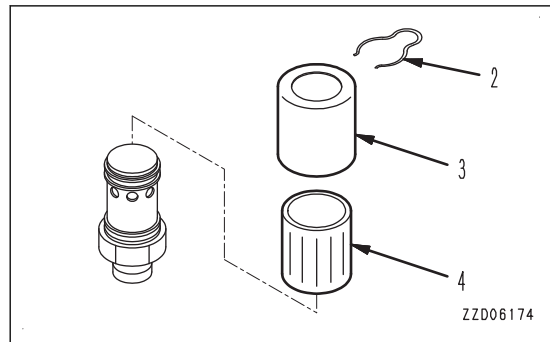
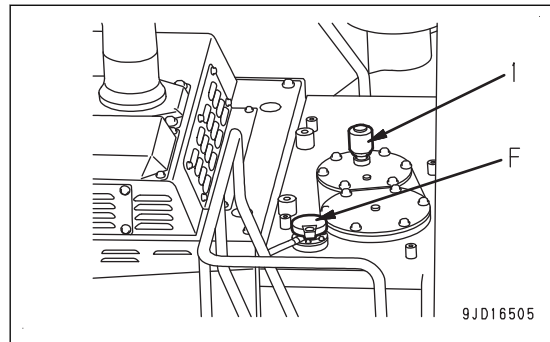
10. Extend and retract each of the steering, bucket, and boom cylinders to the stroke end 3 to 4 times.
11. Stop the engine, then loosen air bleeding plug (7).
12. After bleeding air from the hydraulic tank, tighten plug (7).
13. Bleed air while running the engine at low idle.
14. Check the hydraulic oil level.
Check that the hydraulic oil is at the specified level. For details, see "METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (4-52)".
15. Increase the engine speed and bleed air according to step 9.
Repeat this work until no air is discharged from plug (7).
16. After bleeding air, tighten plug (7).
Tightening torque: $11.3 \pm 1.5 \text{ Nm}$ { $1.15 \pm 0.15 \text{ kgfm}$, $8.3 \pm 1.1 \text{ lbft}$ }
17. Check the hydraulic oil level.
Check that the hydraulic oil is at the specified level. For details, see "METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (4-52)".
18. Check the filter cover mount for oil leakage.
19. Install cover (1).



METHOD FOR REPLACING HYDRAULIC TANK BREATHER ELEMENT**⚠ WARNING**

- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it carefully.

1. Before removing the breather, wipe off dirt and dusts around it.
2. Loosen the bolts and remove the cover.
3. Remove the cap of oil filler port (F).
4. Remove snap ring (2) of breather (1), remove breather cap (3), and replace filter element (4) with a new one.
5. Install breather cap (3) and snap ring (2).
6. Close the cap of oil filler port (F).



METHOD FOR CHANGING OIL IN AXLE CASE

⚠ WARNING

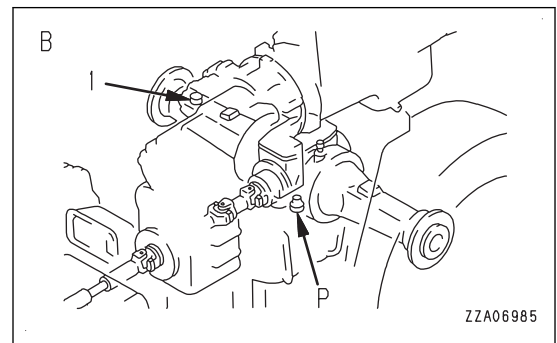
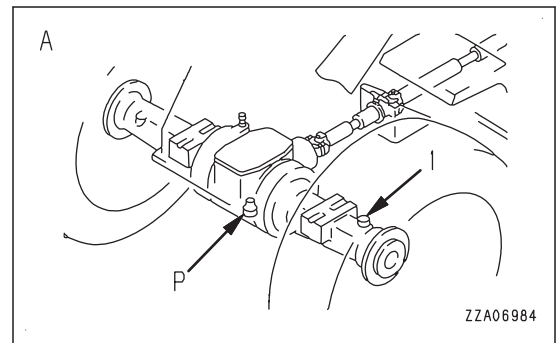
- When changing the oil, apply the parking brake and secure the front and rear frames with the frame lock bar.
- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.
- If the plug is removed, oil may spurt out, so turn it slowly to release the internal pressure, then remove it carefully.

Refill capacity of oil: 40 ℓ {10.6 U.S.Gal} (both of front and rear)

Items to be prepared

- Container to catch drained oil

A: Front, B: Rear



1. Place a container under drain plug (P) to catch the drained oil.
2. Remove front and rear plugs (1), then remove drain plug (P) to drain the oil.

REMARK

Remove the mud and dirt from around plug (1), then remove the plug.

3. After draining the oil, clean and install drain plug (P).
4. Add the refill capacity of oil through plug hole (1).

REMARK

Be sure to use the only specified lubricating oil for the axle with Limited Slip Differential.

5. Check that the oil level is proper by using level plug (1).
See "METHOD FOR CHECKING OIL LEVEL IN AXLE CASE AND ADDING OIL (4-31)".

REMARK

When the given work requires to use the brake more frequently than usual, replace the axle oil earlier than the usual timing.

METHOD FOR REPLACING AIR CONDITIONER FRESH/RECIRC AIR FILTERS

Remove both the recirculation air filter and fresh air filter in the same way as in the cleaning procedure, and replace them with new ones.

For replacement of the recirculation air filter, see "METHOD FOR CLEANING AIR CONDITIONER RECIRC AIR FILTER (4-59)".

For replacement of the fresh air filter, see "METHOD FOR CLEANING AIR CONDITIONER FRESH AIR FILTER (4-53)".

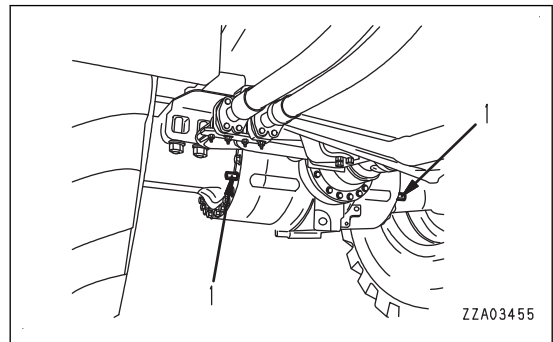
METHOD FOR CHECKING BRAKE DISC WEAR AMOUNT

⚠ WARNING

- When checking the condition, apply the parking brake and fix the front and rear frames by using the frame lock bar.
- Perform this check when the brake oil temperature is 60 °C {140 °F} or below.
- If the disc wear approaches the wear limit, check the condition frequently, regardless of the maintenance interval.

Inspection of wear on the brake disc must be done for 4 places, namely on both sides of the front and rear axle. Perform the inspection in same procedure for all of them.

1. Remove cap nut (1).



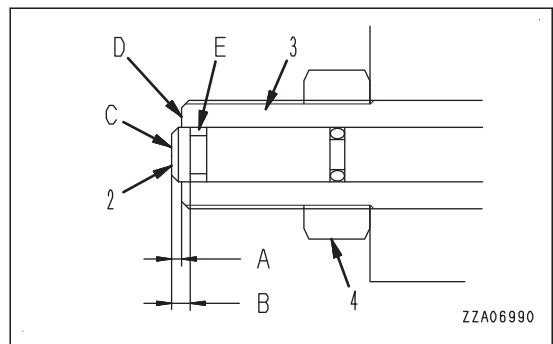
2. Push in rod (2) fully while depressing the brake pedal.

The amount of the protrusion of rod end face (C) from guide end face (D) corresponds to wear amount (A). Measure the protrusion.

Allowable disc wear limit (B) corresponds to the distance between groove (E) and end face (D) of the guide.

In such case, ask your Komatsu distributor to perform inspection and replacement of the part.

If the disc wear approaches the wear limit, check the condition frequently, regardless of the maintenance interval.



3. Install cap nut (1).

Tightening torque: 29.4 to 39.2 Nm {3.0 to 4.0 kgfm, 21.7 to 28.9 lbft}

REMARK

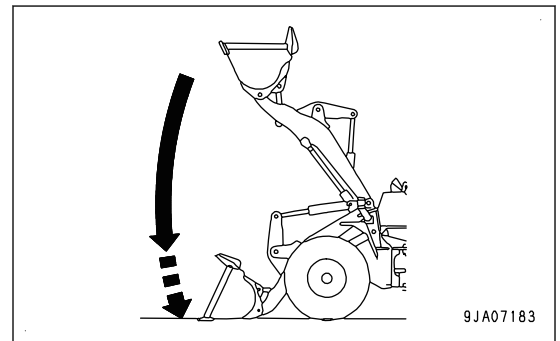
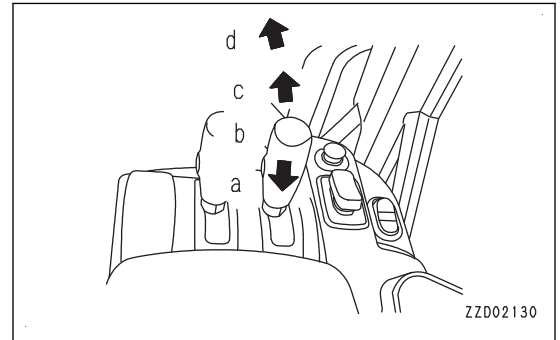
- On a new machine, the position of the end face of rod (2) is adjusted so that it matches the end face of guide (3). Therefore, do not loosen lock nut (4) except when replacing the disc.
- Perform the operation with 2 workers. One worker depresses the brake pedal and the other pushes in the rod.

METHOD FOR CHECKING FUNCTION OF PPC ACCUMULATOR

For handling of the accumulator, see “HANDLE ACCUMULATOR AND GAS SPRING (2-45)”.

When you cannot restart the stopped engine while the work equipment is raised, you can use, as urgent measures, the oil pressure stored in the accumulator to active the valve, thereby, lower the work equipment to the ground.

1. Apply the parking brake.
2. Raise the work equipment to the upper end and operate the boom control lever to HOLD position (b).
3. Stop the engine.
4. Turn the starting switch to ON position.
5. Press the work equipment lock switch and unlock the work equipment (the pilot lamp goes out).
6. After checking safety around the machine, operate the boom control lever to FLOAT position (d) and lower the work equipment to a position 1m {3ft 3in} from the ground.
7. After the work equipment is lowered to a position 1m {3ft 3in} from the ground, return the boom control lever to LOWER position (c) and lower the work equipment gradually to the ground.



REMARK

The check must be done within 15 seconds after the engine stops. If the engine is kept stopped, the gas pressure in the accumulator lowers and the inspection cannot be made.

If the work equipment stops halfway, the accumulator gas pressure may be low.

Ask your Komatsu distributor for inspection.

Replace the accumulator for every 4000 hours or every 2 years.

METHOD FOR CHECKING ALTERNATOR

Ask your Komatsu distributor to have the alternator checked.

If the engine is started frequently, have this inspection performed every 1000 hours.

METHOD FOR CHECKING AND ADJUSTING ENGINE VALVE CLEARANCE

Special tools are necessary for inspection and maintenance. Ask your Komatsu distributor to perform this work.

METHOD FOR CHECKING VIBRATION DAMPER

Check that there are no cracks or peeling in the outside surface of the rubber.

If any cracks or peeling are found, contact your Komatsu distributor to have the parts replaced.

METHOD FOR REPLACING KCCV FILTER ELEMENT

⚠ WARNING

After the engine has been operated, all of the parts are still very hot. Do not replace the filter element immediately. Wait until all of parts cool down before starting the work. Always stop the engine before starting the part replacement.

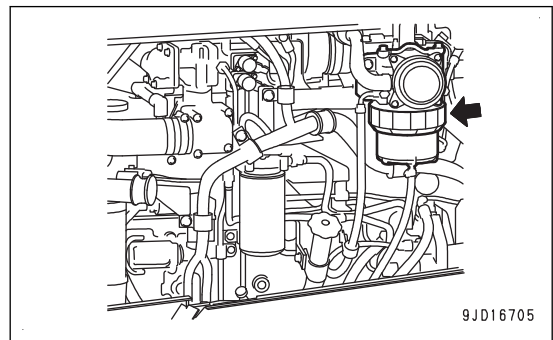
NOTICE

- Komatsu recommends using Komatsu genuine parts for replacement parts.
- If the engine is operated without the filter element, the turbocharger and aftercooler become dirty and their performance will lower and it can cause engine problems such as overrun caused by suction of oil. Never try such practice.
- The filter element cannot be flushed. Flushing or regenerating of the filter element will degrade performance of the filter. As a result, the turbocharger and aftercooler become dirty and the performance lowers or the crankcase pressure increases. Never reuse the filter element since it can cause an engine failure.
- After the filter element is replaced, if KCCV is not assembled correctly, oil or blowby gas may leak. Replace the filter element in the correct procedure.

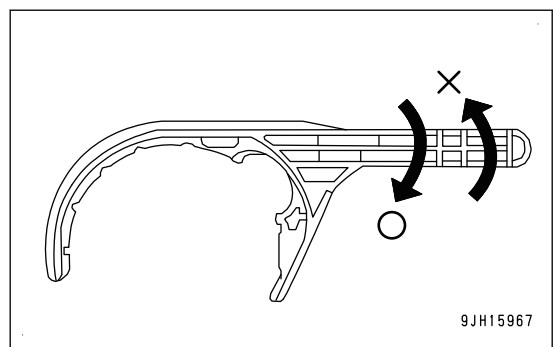
Items to be prepared

- Container to catch drained oil
- Special wrench for KCCV

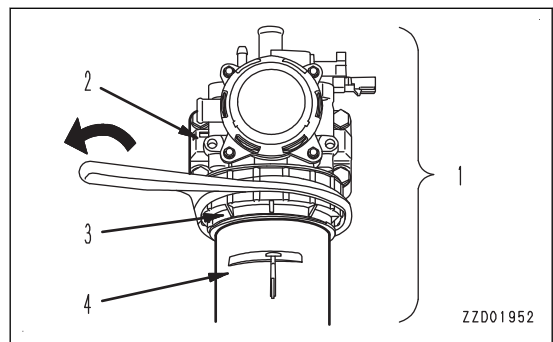
The KCCV ventilator is located in the positions shown in the figure.



For the use of the special wrench, see the figure.



1. By using the special wrench, loosen ring (3) of KCCV ventilator (1).

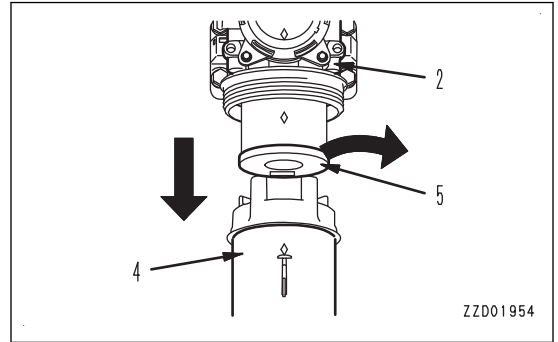


- After ring (3) comes off, remove case (4) from body (2) and remove element (5).

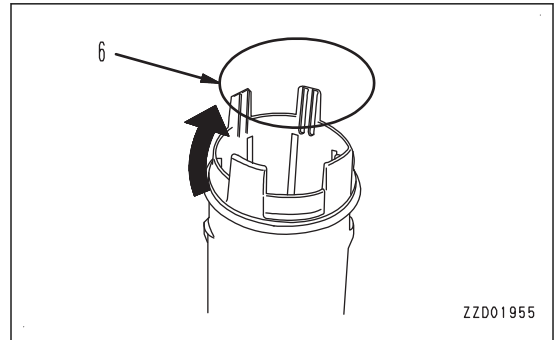
There may be oil accumulated or sticking in the case and element. Take care not to spill the oil when replacing the element.

REMARK

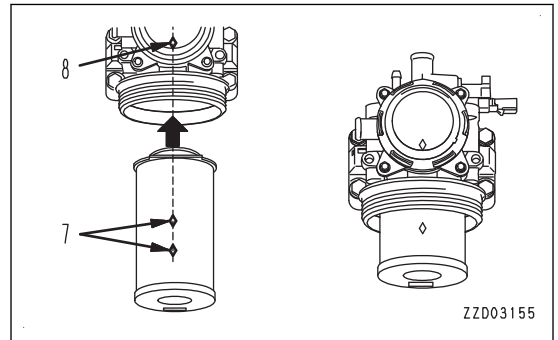
When the ambient temperature is low, water or emulsified matter may stick to the inside of KCCV because of condensation of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem.



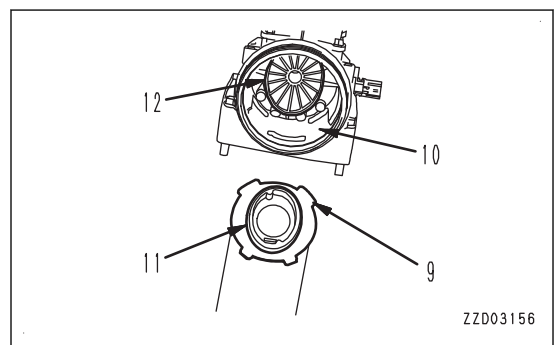
- Remove used O-ring (6) sticking to case (4) and install a new O-ring contained in the service kit. Apply engine oil to the new O-ring.



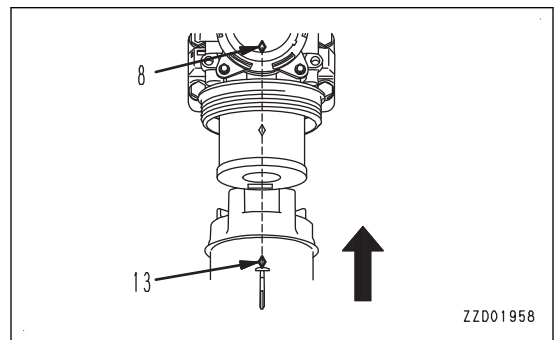
- While matching \diamond marks (7) of the new element with \diamond mark (8) of the body label, insert the element thoroughly into the end of the body.



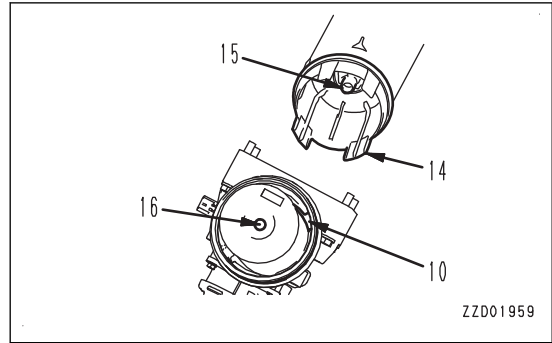
The element can be installed only when its claws (9) are correctly inserted in grooves (10) of the filter body. Bases (11) and (12) are oval. When inserting, take extreme care so that those bases are matched with each other.



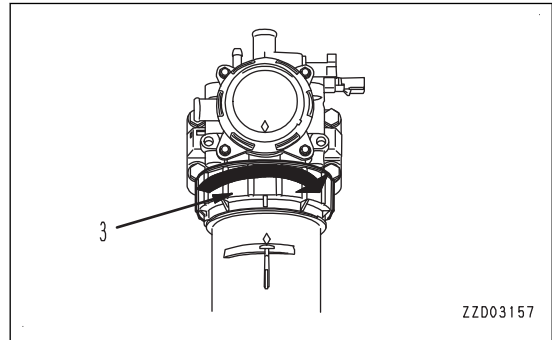
- Align the position of \diamond mark (13) on the case with that of \diamond mark (8) of the filter body label, then install the case to the filter body.



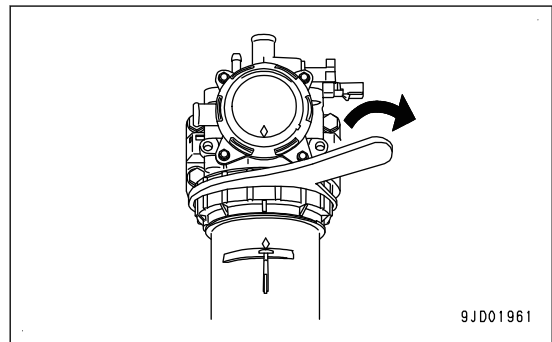
The case can be installed only when its claws (14) are correctly inserted in grooves (10) of the filter body. When inserting, take extreme care so that protrusion (15) in the case is joined together with rubber lip (16) of the element.



6. Fit ring (3) to the threaded part of the body and tighten it with the hand firmly until it stops.



7. By using the special wrench, further tighten the ring 1/15 to 2/15 turns (1 to 2 ridges of the ring).
If the engine is operated with the ring tightened insufficiently, oil and blowby gas may leak.



Check the KCCV hose for leakage, crack, and loose clamp, and replace it if necessary.

METHOD FOR REPLACING DEF FILTER

WARNING

Immediately after the engine is stopped, the parts are still very hot. Do not replace the filter immediately. Wait until all of parts cool down before starting the work.

NOTICE

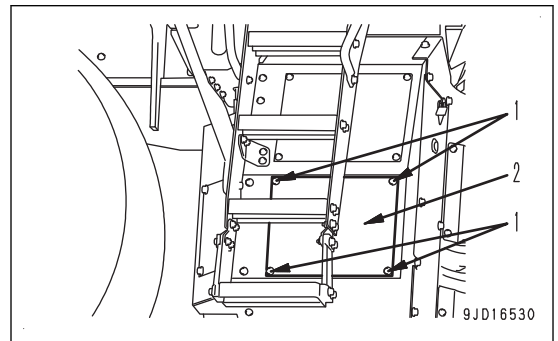
- **Komatsu recommends using Komatsu genuine parts for replacement parts.**
- **If the machine is operated without DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials may enter into DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without DEF filter attached, nor use the filter other than Komatsu genuine parts.**
- **DEF filter cannot be flushed. Flushing or regenerating of it will degrade the performance of filter, and will cause the breakage of DEF tank. Never reuse the DEF filter.**
- **Improper assembly of DEF filter may cause leakage of DEF. Replace the DEF filter in the correct procedure.**
- **DEF freezes at $-11\text{ }^{\circ}\text{C}$ {12.2 °F}. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around DEF pump is higher than $-11\text{ }^{\circ}\text{C}$ {12.2 °F}, and in the condition that DEF is not frozen.**

After the engine is stopped, DEF system devices automatically purge DEF in DEF injector and DEF pump and return it to DEF tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.

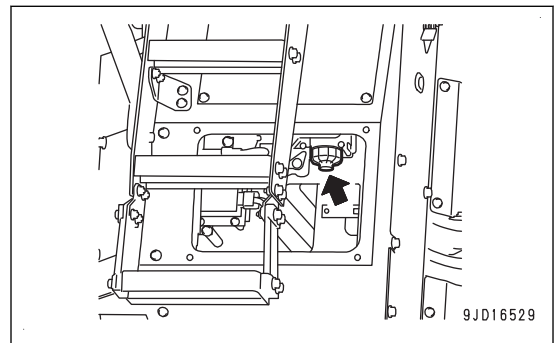
After the engine is stopped, the devices are operated for a few minutes. Before replacing the filter, clean around the DEF pump first after DEF system devices stop.

Items to be prepared

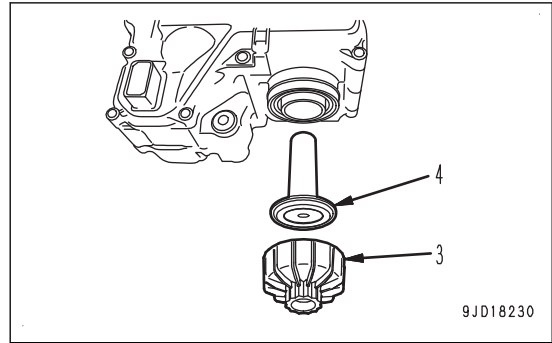
- DEF filter removal tool
 - Torque wrench
1. Remove the bolts (1) (4 pieces) to remove cover (2).



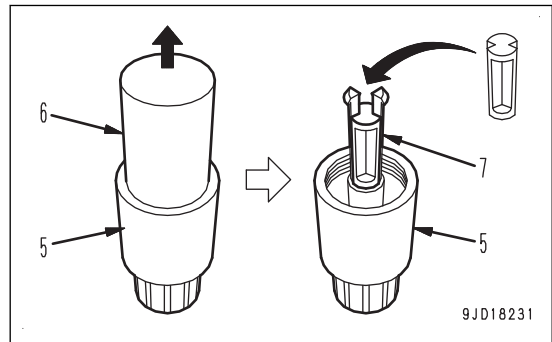
The DEF filter is located at the positions shown in the figure.



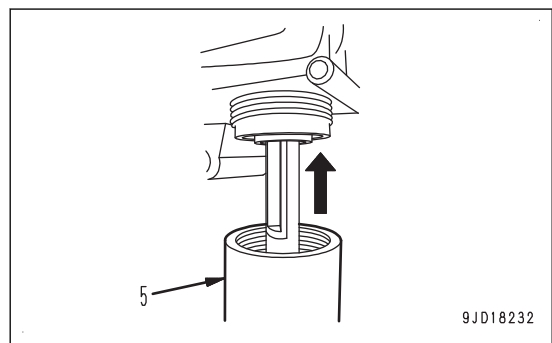
- 2. Remove filter cap (3) at the bottom of DEF pump, and remove equalizing element (4).



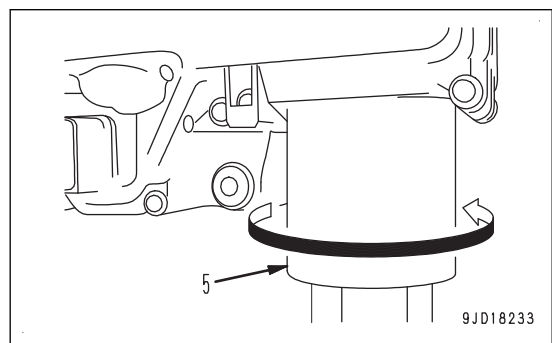
- 3. Turn cap (6) of filter removal tool (5) and remove it.
- 4. Check the installation of spacer (7).



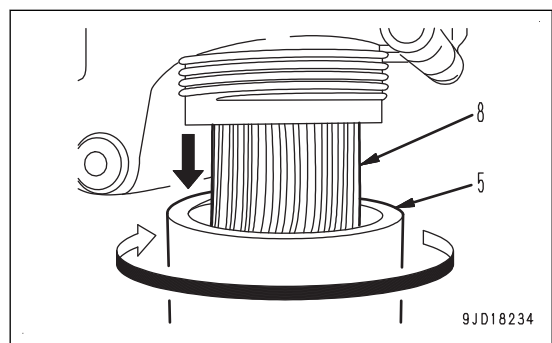
- 5. Insert filter removal tool (5) into the bottom of the DEF pump and thrust in with hand.



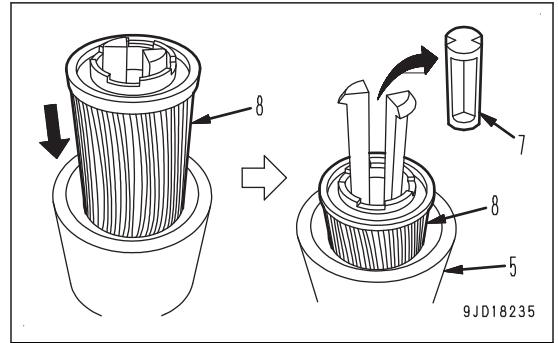
- 6. Check that filter removal tool (5) is fully inserted to the end. Insert the filter to the end where you cannot thrust it in any further.



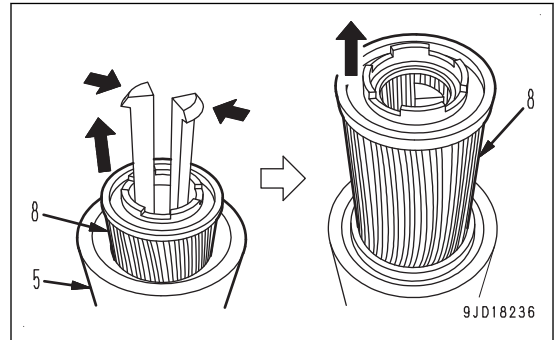
- 7. Turn filter removal tool (5) in reverse, and remove filter (8). Filter (8) is removed and you can take it out together with filter removal tool (5).
If filter (8) cannot be removed from DEF pump, grip filter removal tool (5), pull it down, then it will be removed.



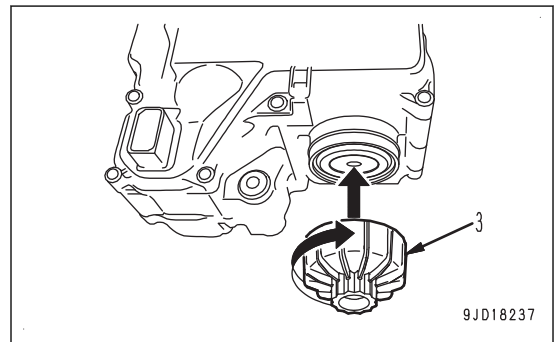
8. Slide filter (8) down, and remove spacer (7) from filter removal tool (5).



9. Pull filter (8) up while pushing in the tip of filter removal tool (5), and remove it.
10. Return the removed spacer (7) to filter removal tool (5), and keep them.
11. Insert a new filter and a new equalizing element into the bottom of DEF pump, and lightly tighten them with hand.



12. Tighten filter cap (3).
Tightening torque: 20 to 25 Nm {2.0 to 2.5 kgfm, 14.5 to 18.1 lbft}
13. Install cover (2) with bolts (1).



METHOD FOR REPLACING DEF TANK BREATHER ELEMENT

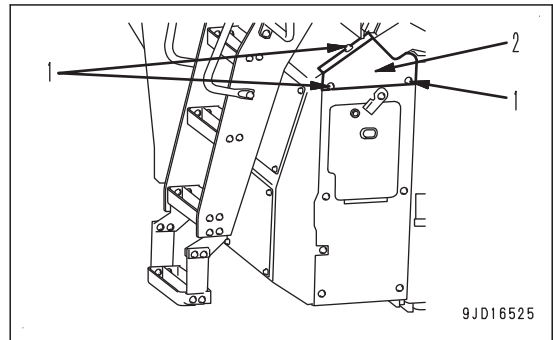
⚠ WARNING

Do not replace the element immediately after engine is stopped.

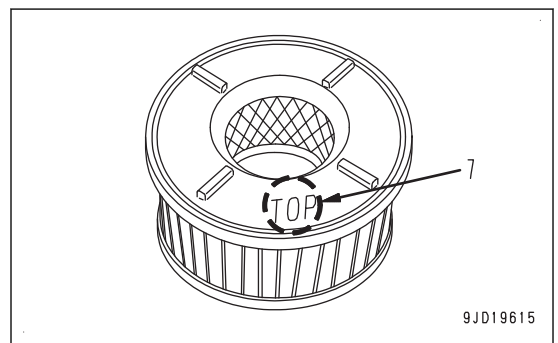
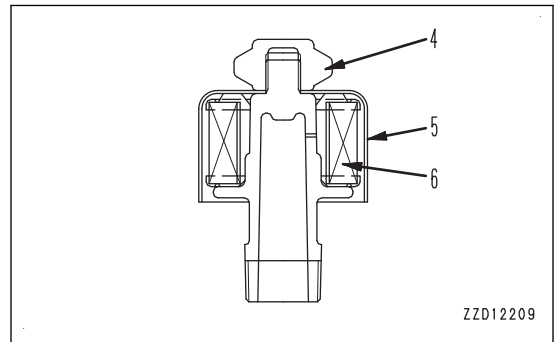
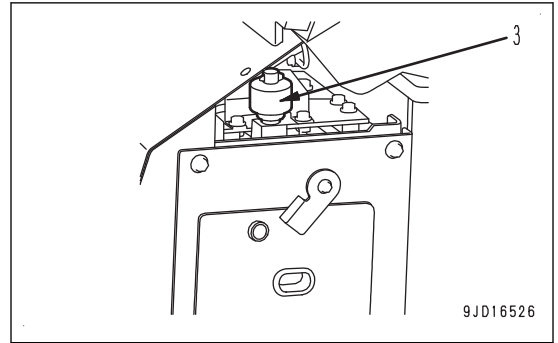
NOTICE

- Komatsu recommends using Komatsu genuine parts for replacement parts.
- If the machine is operated without DEF tank breather element attached, or with the element other than Komatsu genuine parts, foreign materials may enter into DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without DEF tank breather element attached, nor use the element other than Komatsu genuine parts.
- Do not flush DEF tank breather element. Flushing or regenerating of it will degrade the performance of element, and will cause the breakage of DEF tank. Never reuse the DEF element.
- Always stop the engine and clean around DEF tank before replacing.
- After the engine is stopped, DEF system devices automatically purge DEF in DEF injector and DEF pump and return it to DEF tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.
After the engine is stopped, the devices are operated for a few minutes. Replace the element after DEF system devices stop.
- Improper assembly of DEF tank breather element may cause leakage of DEF. Replace the element in the correct procedure.

1. Remove bolts (1), and remove cover (2).



2. Remove nut (4) of breather assembly (3) at the top of DEF tank, then remove cover (5).
3. Replace breather (6) with a new one.
When installing breather element (6), direct the surface of TOP mark (7) towards up and install.
4. Install cover (5) and nut (4).
5. Install cover (2) with bolt (1).



EVERY 4000 HOURS MAINTENANCE

Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours must be done at the same time.

REPLACE DEFINED LIFE PARTS

Material quality of these parts can change as time passes and they are likely to wear out or deteriorate.

Replace them every 2 years or every 4000 hours, whichever comes sooner.

DEFINED LIFE PARTS LIST

No.	Periodical replacement parts		
1	Fuel system	Fuel hose Spill hose	
2	Steering system	High pressure circuit hose	
3	Brake system	Brake oil pressure hose	
4	Torque converter, transmission system	Transmission circuit hose	
5	Work equipment hydraulic system	Main pump delivery hose	Ask your Komatsu distributor for replacement.
		Main pump delivery hose other than described above	
		Main pump LS hose	
		Hydraulic drive fan hose (Intake fan)	
		Hydraulic drive fan hose (Exhaust fan)	
		External work equipment hose <ul style="list-style-type: none"> • Lift cylinder hose • Bucket cylinder (bottom) hose • Bucket cylinder (head) hose • Hydraulic tank hose • Main valve hose • ECSS hose 	
6	Others	PPC accumulator	

METHOD FOR LUBRICATING DRIVE SHAFT

Use the special grease for drive shaft, and perform greasing every 4000 hours or every 2 years.

If the special grease is not used but common lithium base grease is used, perform greasing every 1000 hours after then.

Part No. of special grease for drive shaft: 56B-20-19910

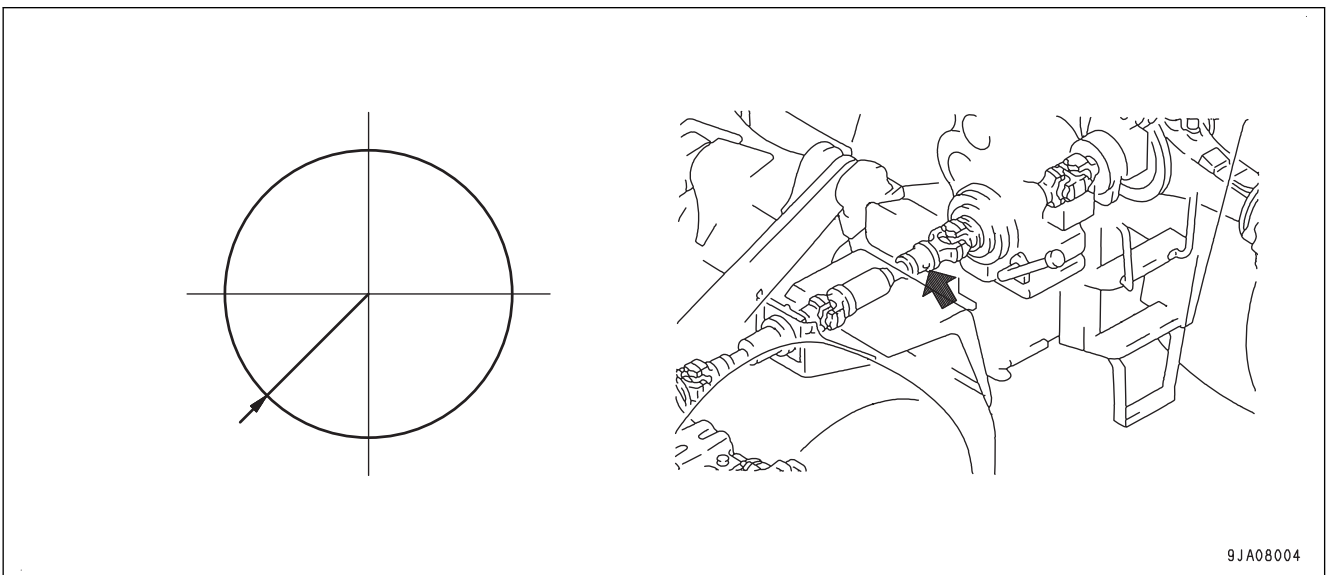
1. By using a grease pump, pump in grease through the grease fittings shown by arrows.

For the greasing, stop the drive shaft when the grease fitting of center drive shaft spline (1) comes to the position shown in the figure, and then pump in grease from the bottom side of the machine.

The position of the grease fitting at this point is the one circled and indicated by the arrow when viewed from the rear side of the machine. See the figure below.

2. After greasing, wipe off any old grease that is pushed out.

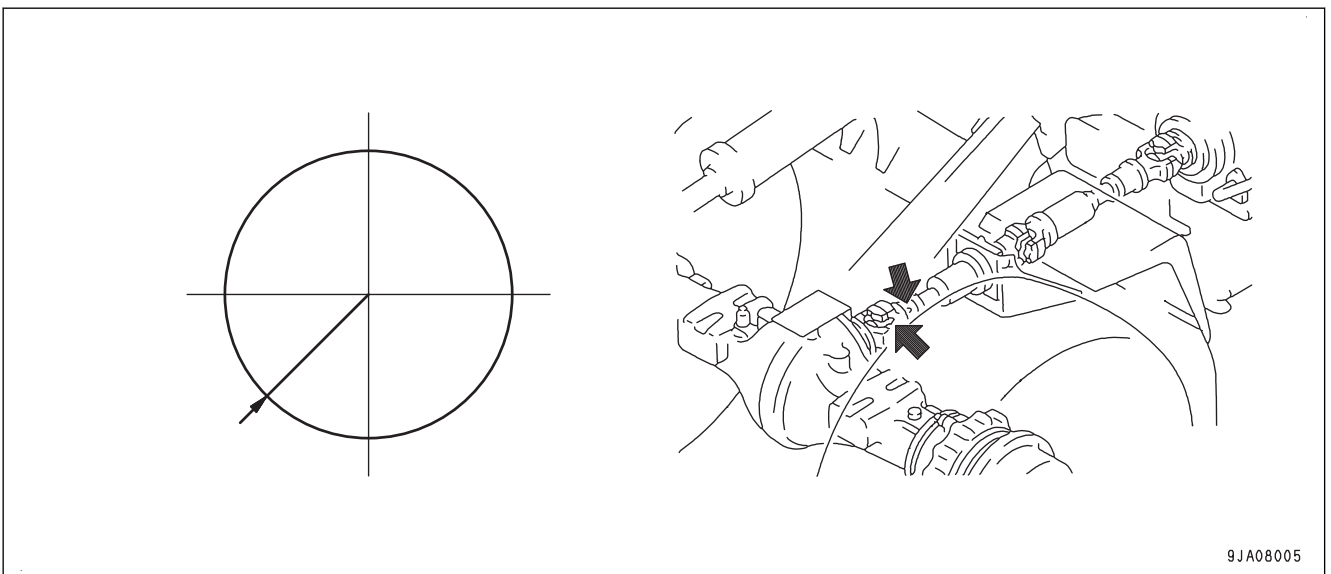
(1) Center drive shaft spline (1 place)



9JA08004

Viewed from the rear side of the machine.

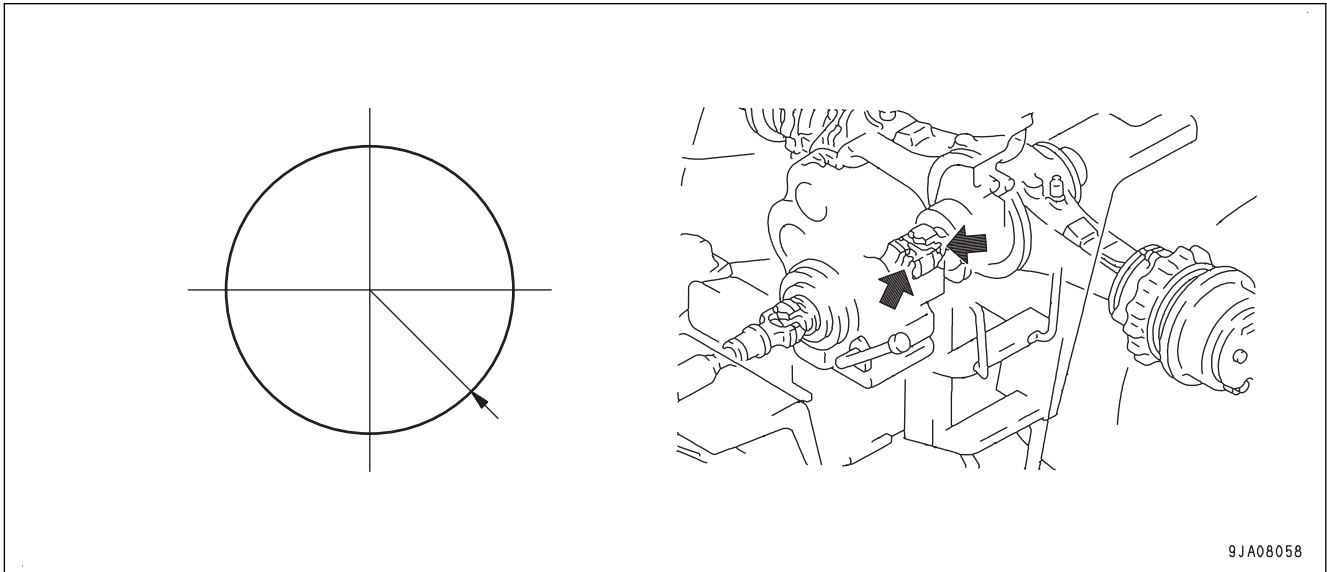
(2) Front drive shaft (2 places)



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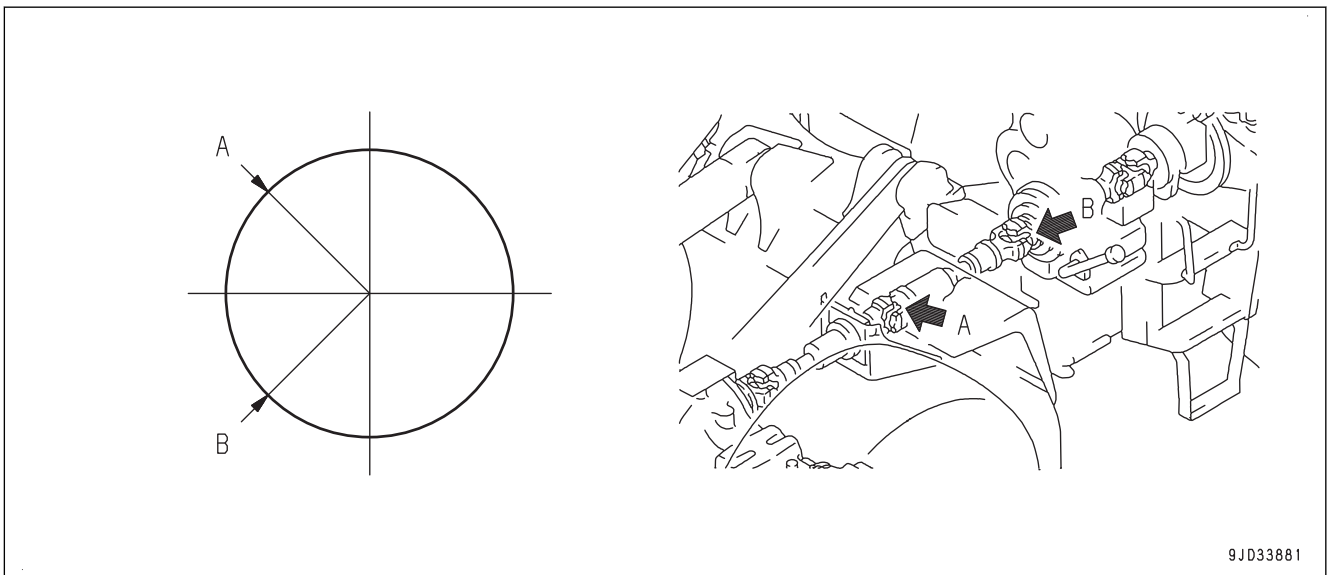
Viewed from the rear side of the machine.

(3) Rear drive shaft (2 places)



Viewed from the rear side of the machine.

(4) Center drive shaft (2 places)



Viewed from the rear side of the machine.

METHOD FOR CHECKING WATER PUMP

Check for leakage of water and oil around the water pump. If any problem is found, ask your Komatsu distributor to perform disassembly, repair, or replacement.

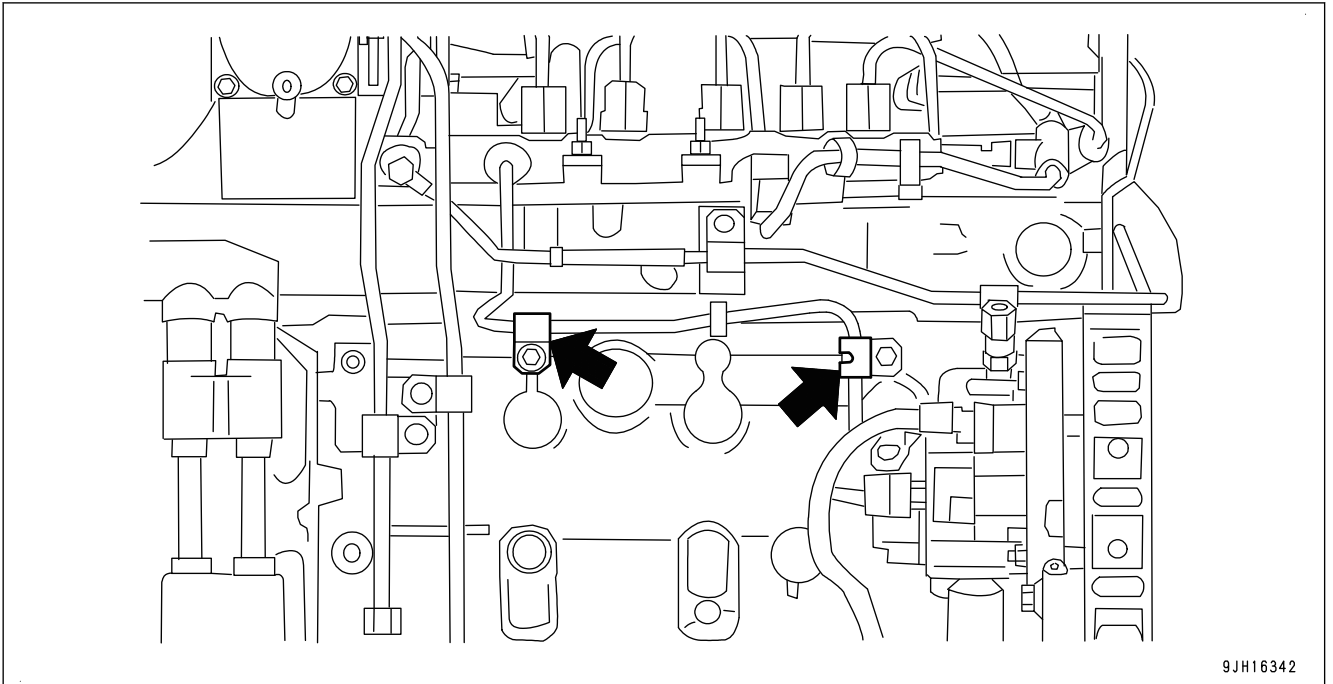
METHOD FOR CHECKING STARTING MOTOR

Consult your Komatsu distributor for inspection of the starting motor.
If you start the engine frequently, consult for inspection every 1000 hours.

METHOD FOR CHECKING AND ADJUSTING AIR CONDITIONER COMPRESSOR

Ask your Komatsu distributor to perform the work.

METHOD FOR CHECKING FOR LOOSENESS OF ENGINE HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER



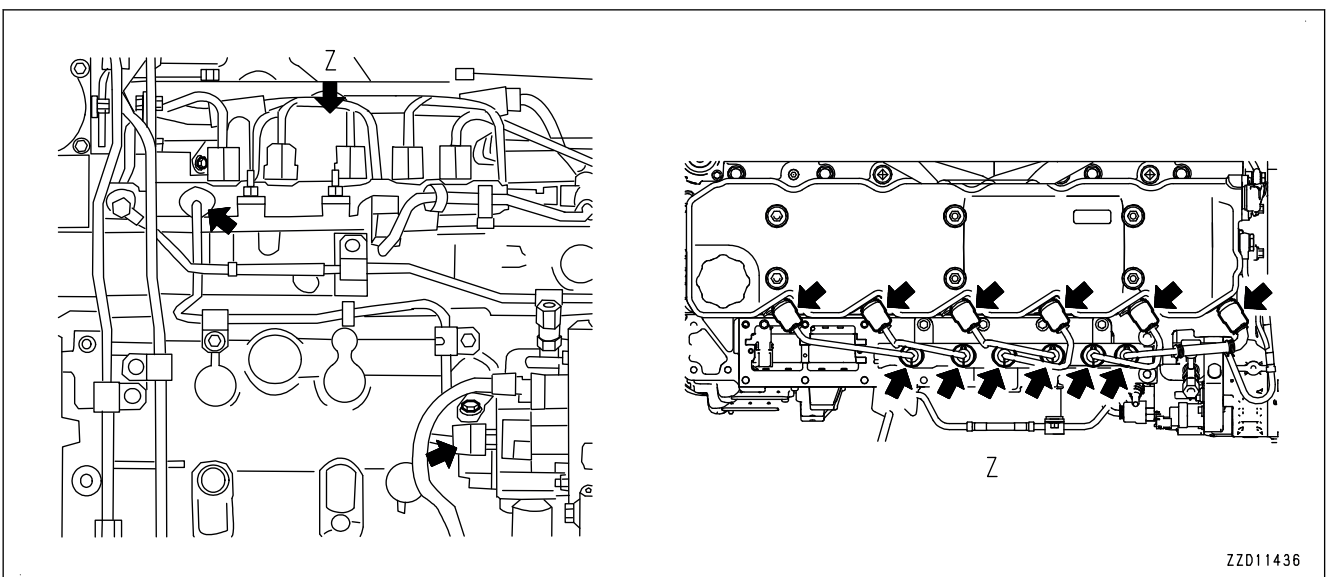
9JH16342

Check visually and touch by hand to check that there is no hardening of the rubber and no loose bolts of the mounting clamps (2 places) for the high-pressure piping between the supply pump and the common rail. Replacement of the high-pressure piping must be made as an assembly.

If there are any problems, the parts must be replaced. Ask your Komatsu distributor for replacement.

METHOD FOR CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

The fuel spray prevention caps on the fuel injection piping and both ends of the high-pressure piping act to prevent the fuel from coming into contact with high-temperature parts of the engine and causing a fire if the fuel should leak or spray out.



ZZD11436

Check fuel spray prevention caps (14 places) visually or with a finger to see if any of them has fell off, or the rubber portion is hardened.

If there are any problems, the related parts must be replaced. Ask your Komatsu distributor for replacement.

EVERY 4500 HOURS MAINTENANCE

Maintenance for every 50, 100, 250 and 500 hours service should be performed at the same time.

METHOD FOR CLEANING KDPF

Contact your Komatsu distributor for cleaning of the KDPF.

METHOD FOR CLEANING DEF TANK

Ask your Komatsu distributor for cleaning of the DEF tank.

METHOD FOR REPLACING DEF TANK FILLER PORT FILTER

WARNING

Immediately after the engine is stopped, the parts are still very hot. Do not replace the filter immediately. Wait until all of parts cool down before starting the work.

NOTICE

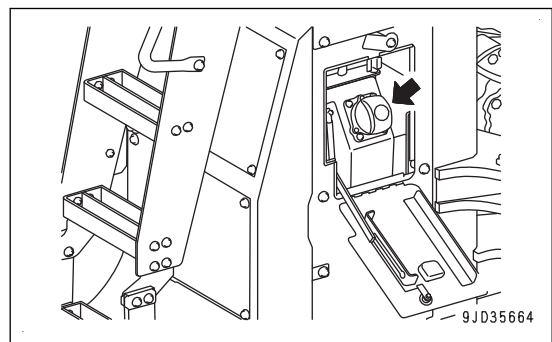
- If the filter other than Komatsu genuine parts is used, foreign materials may enter the DEF pump and DEF injector which will cause failure of the machine. Komatsu recommends using Komatsu genuine parts for replacement parts.
- DEF tank filler port filter cannot be flushed. Flushing or regenerating of it will degrade the performance of filter, and will cause the breakage of the DEF pump. Never reuse the filter.
- Improper assembly of the DEF tank filler port filter may cause leakage of the DEF. Replace the DEF tank filler port filter in the correct procedure.
- DEF freezes at $-11\text{ }^{\circ}\text{C}\{12.2\text{ }^{\circ}\text{F}\}$. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around the DEF pump is higher than $-11\text{ }^{\circ}\text{C}\{12.2\text{ }^{\circ}\text{F}\}$, and in the condition that the DEF will not freeze.
- Before starting the work, clean around the DEF filler port, and be careful not to let dirt or dust get into the tank during the work.
- If adding DEF is not easy because of the clogging in the DEF tank filler port filter, replace the DEF tank filler port filter even when it has not reached the specified replacement time.

Items to be prepared

- Torque wrench
- Distilled water

Do not replace the DEF tank filler port filter if DEF tank is full.

DEF tank filler port filter is located at the position shown in the figure.



1. Park the machine on a level place.
2. Check the sight gauge on DEF tank that the tank is not filled with DEF.

3. Turn the cap (1) counterclockwise to remove it.
4. Remove the bolts (2) (4 pieces).
5. Remove the DEF tank filler (3) together with the DEF tank filler port filter (4).

Perform the work carefully since DEF in the DEF tank filler port filter (4) may spill out.

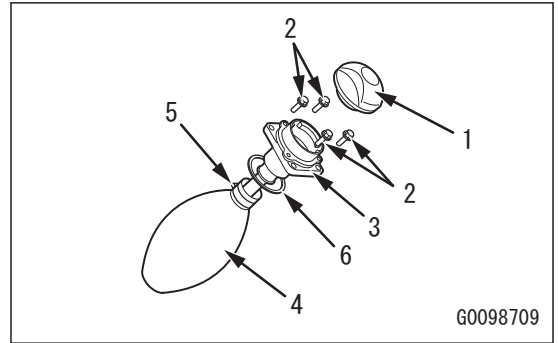
6. Loosen the band (5) and remove the DEF tank filler port filter (4) from the DEF tank filler (3).
7. Remove the old O-ring (6) and replace it with a new one.

Apply the distilled water as a lubricant to the new O-ring.

8. Install the new DEF tank filler port filter (4) to the DEF tank filler (3), and tighten the band (5).
Tightening torque: $4.4 \pm 0.49 \text{ Nm}$ { $0.45 \pm 0.05 \text{ kgfm}$, $3.25 \pm 0.36 \text{ lbft}$ }

9. Install the DEF tank filler (3) together with the DEF tank filler port filter (4).

When installing the DEF tank filler (3), take care about the direction.

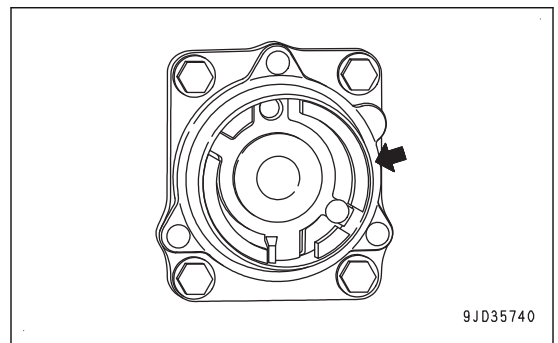


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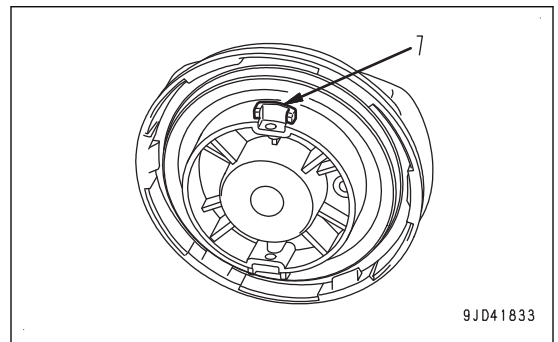
10. Install the bolts (2) (4 pieces).

Tightening torque: $9.5 \text{ to } 10.5 \text{ Nm}$ { $0.97 \text{ to } 1.07 \text{ kgfm}$, $7.02 \text{ to } 7.74 \text{ lbft}$ }

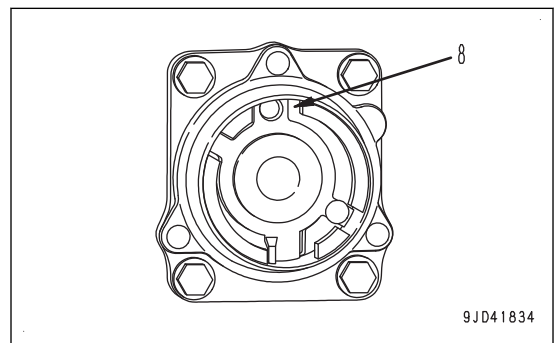
11. Align the claw (7) of cap (1) with groove (8) of the filler port and close the cap securely by turning it clockwise by 90° .



9JD35740



9JD41833



9JD41834

EVERY 8000 HOURS MAINTENANCE

Maintenance for every 50, 100, 250, 500, 1000, 2000 and 4000 hours must be done at the same time.

METHOD FOR REPLACING FUEL SPRAY PREVENTION CAP

Ask your Komatsu distributor for replacement of the fuel spray prevention caps.

METHOD FOR REPLACING STARTING MOTOR

(For the machines equipped with the auto idle stop function)

Ask your Komatsu distributor for replacement of the starting motor.

EVERY 9000 HOURS MAINTENANCE

Maintenance for every 50, 100, 250, 500, 1000 and 4500 hours service should be performed at the same time.

METHOD FOR REPLACING DEF HOSE

Ask your Komatsu distributor for replacement of the DEF hose.

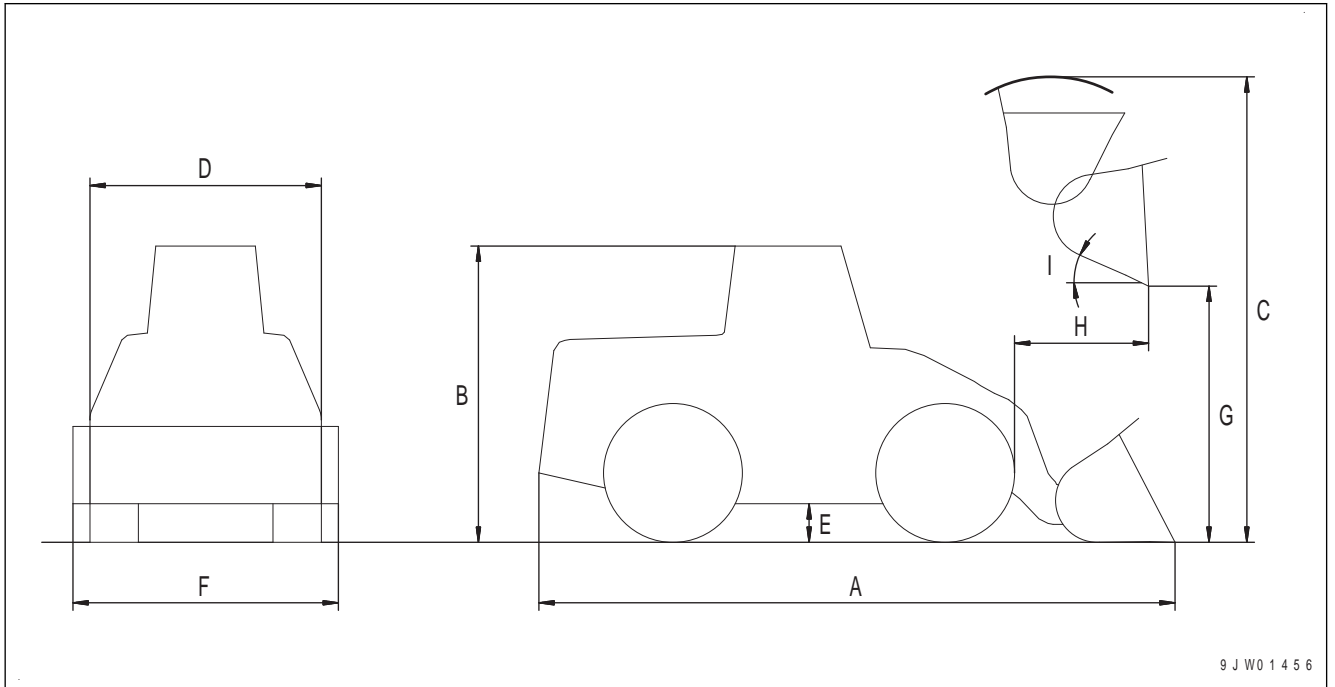
SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS: WA380-8

Item		Unit	WA380-8 (in POWER mode)	
Operating weight (with bolt on cutting edge (BOC))		kg { lb}	18455 {40693}	
Normal load		kg { lb}	5280 {11642}	
Bucket capacity	Heaped	m ³ { cu.yd}	3.3 {4.3}	
Engine model		-	KOMATSU SAA6D107E-3	
Rated horsepower	SAE J1995 (gross)	kW {HP} / min ⁻¹ {rpm}	143 {192} / 2100 {2100}	
	ISO9249 / SAE J1349 (net)		143 {191} / 2100 {2100}	
A	Overall length	mm {ft in}	8310 {27' 3"}	
B	Overall height	mm {ft in}	3390 {11' 1"}	
C	Overall height with bucket lifted up	mm {ft in}	5600 {18' 4"}	
D	Overall width	mm {ft in}	2780 {9' 1"}	
E	Min. ground clearance	mm {ft in}	455 {1' 6"}	
F	Bucket width	mm {ft in}	2905 {9' 6"}	
G	Dumpling clearance (*1)	Cutting edge [BOC tip]	mm {ft in}	3035 {9' 11"} [2950 {9' 8"}]
H	Dumpling reach (*1)	Cutting edge [BOC tip]	mm {ft in}	1105 {3' 8"} [1150 {3' 9"}]
I	Bucket dump angle(max. height)		deg.	50
Min. turning radius	Cutting edge [BOC tip]		mm {ft in}	7220 {23' 8"}
	Center of outside tire		mm {ft in}	6320 {20' 9"}
Permissible towing load		kN {kgf}	131 {13360}	
Max. speed [At lock up]	Forward	1st	km/h { MPH}	6.6 {4.1} [-]
		2nd	km/h { MPH}	11.7 {7.3} [12.4 {7.7}]
		3rd	km/h { MPH}	20.9 {13.0} [22.5 {14.0}]
		4th	km/h { MPH}	36.1 {22.4} [37.5 {23.3}]
	Reverse	1st	km/h { MPH}	7.1 {4.4} [-]
		2nd	km/h { MPH}	12.4 {7.7} [13.3 {8.3}]
		3rd	km/h { MPH}	22.3 {13.9} [24.1 {15.0}]
		4th	km/h { MPH}	38.6 {24.0} [37.5 {23.3}]

*1: Value when bucket dump angle is 45°.



ATTACHMENTS AND OP- TIONS

WARNING

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

BUCKET AND TIRE SELECTION

Select the most suitable bucket and tires for the type of the work and condition of the job site.

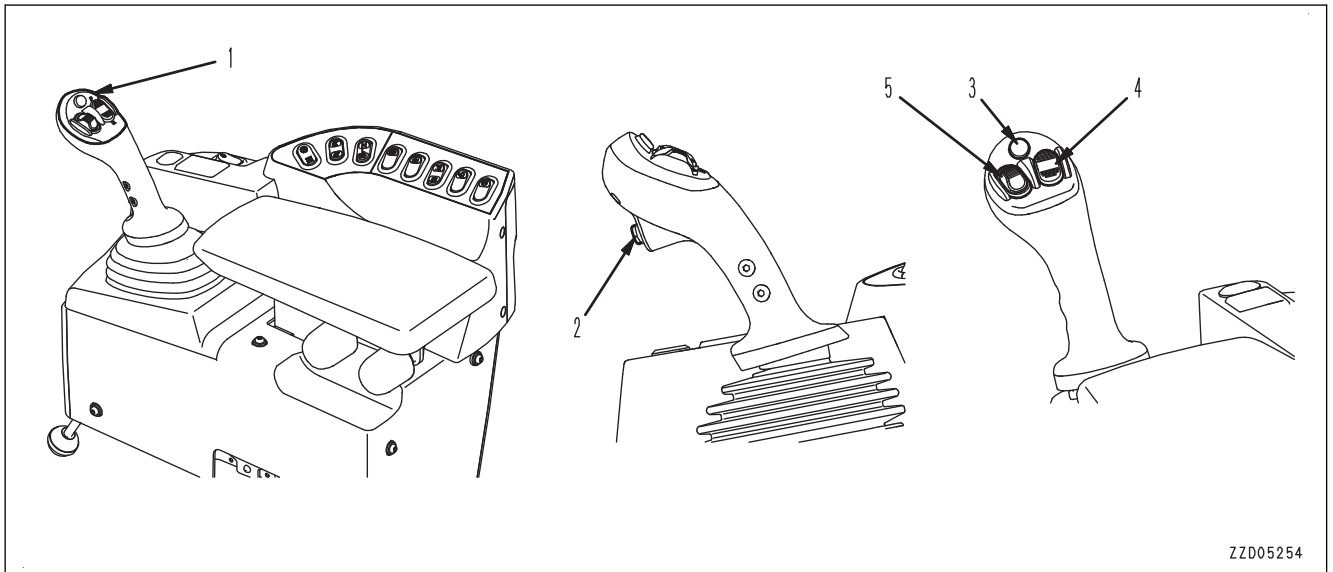
Type of operation	Bucket	Foothold conditions	Tires
<ul style="list-style-type: none"> • Loading of products • Loading and carrying of products 	<ul style="list-style-type: none"> • Stock pile bucket (with BOC) (3.3 m³ {4.3 cu.yd}) • Stock pile bucket (with tooth) (3.1 m³ {4.1 cu.yd}) 	General foothold	23.5R25☆ (L3: Rock) 23.5-25-16PR (L3: Rock)
		Leveled ground	23.5R25☆ (L3: Rock) 23.5-25-16PR (L3: Rock)
		Soft ground	23.5-25-16PR (L3: Rock)
Loading of blasted rock	Excavating bucket (with segment edge) (2.9 m ³ {3.8 cu.yd})	General foothold	23.5R25☆ (L3: Rock) 23.5-25-16PR (L3: Rock)
		Soft ground	23.5R25☆ (L3: Rock) 23.5-25-16PR (L3: Rock)
		Ground with many large boulders	23.5R25☆ (L3: Rock) 23.5-25-16PR (L3: Rock)
		Soft ground with many large boulders	23.5R25☆ (L3: Rock) 23.5-25-16PR (L3: Rock)

BOC: Abbreviation for Bolt On Cutting edge

The speed display varies with the tire size. When installing optional tires, ask your Komatsu distributor for installation.

HANDLE MULTIFUNCTION MONO-LEVER

EXPLANATION OF EQUIPMENT ON MULTIFUNCTION MONO-LEVER



(1) Multifunction mono-lever

(2) Kickdown switch

(3) Hold switch

(4) Multifunction mono-lever directional selector switch

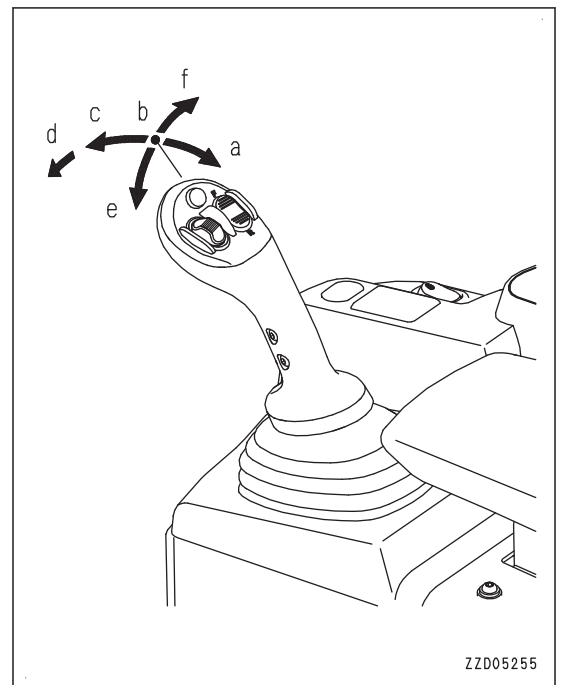
(5) PCS (Proportional Control Switch)

MULTIFUNCTION MONO-LEVER

The multifunction mono-lever is used to operate the boom and bucket.

NOTICE

Do not use "FLOAT" position when lowering the bucket.
Use "FLOAT" for leveling work.

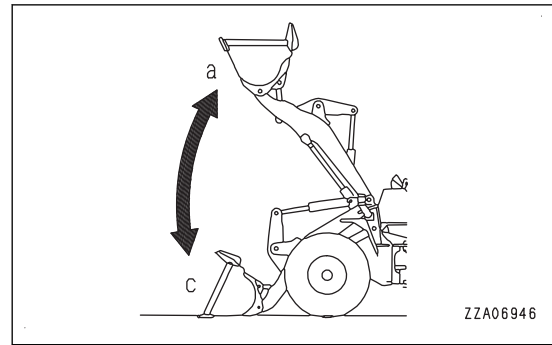


Position (a): RAISE

When the multifunction mono-lever is pulled further from the "RAISE" position, the lever stops in that position.

When the remote boom positioner is enabled, the boom stops at the preset position and the lever returns to "HOLD" position at the same time.

When the remote boom positioner is disabled, the boom stops at the highest position and the lever returns to "HOLD" position at the same time.

**Position (b): HOLD**

The boom and bucket remain in the positions where they are stopped.

Position (c): LOWER**Position (d): FLOAT**

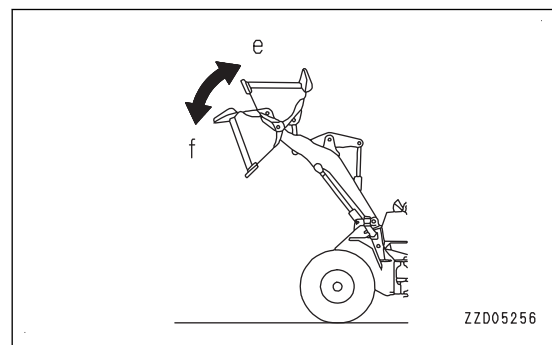
The boom moves freely under external force. When the lever is set to "FLOAT" position, the lever stops in that position.

When the remote boom positioner is enabled, the boom stops at the preset position and the lever returns to "HOLD" position at the same time.

When it is disabled, the lever remains in "FLOAT" position and does not return.

Position (e): TILT

When the multifunction mono-lever is pulled further from the "TILT" position, the lever stops in that position. When the bucket reaches the position preset by the bucket positioner, the lever returns to the "HOLD" position.

Position (f): DUMP

KICKDOWN SWITCH

When traveling in forward 2nd, if kickdown switch (2) is pressed, the gear is shifted down to forward 1st.

Use this switch to increase the traction force during excavation.

When the transmission shift range (actual gear speed) is at forward 1st (F1) and the power mode selector switch is set to E mode, if the switch is pressed, the power mode changes to P mode.

Use this switch to increase the traction force further during excavation or for scrape-up work.

In E mode

2nd	→	1st	→	1st
E mode		E mode		P mode

In P mode

2nd	→	1st
P mode		P mode

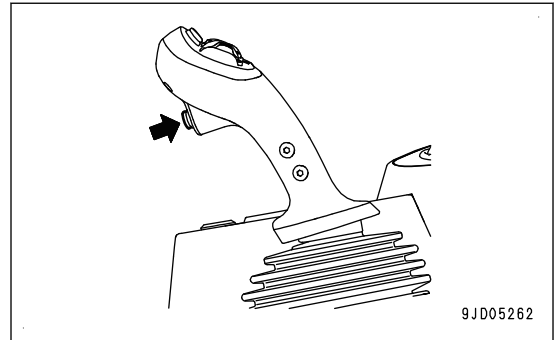
When the transmission is in the auto-shift mode and the travel speed is 10.5 km/h {6.5 MPH} or slower, the kickdown switch operates and the gear speed can be shifted down to 1st gear speed from any gear speed of the forward or reverse travel.

This function facilitates the load-and-carry operation.

When the travel speed is higher than 10.5 km/h {6.5 MPH}, each time the kickdown switch is pressed the gear speed is shifted down by one gear speed in the order F4, F3, and F2.

REMARK

- To cancel the kickdown, operate the directional lever. In the manual shift mode, the kickdown can also be canceled by setting the gear speed switch to a position other than the 2nd.
- When the starting switch is turned to OFF position and then to ON position again while the gear speed is kicked down, the kickdown is canceled.
- Even if the auto-kickdown is enabled, the downshift or the change to P mode with this kickdown switch is enabled.
- In the auto-shift mode, if the travel speed increases after a kickdown, the gear speed is shifted up automatically.
- In the auto-shift mode, when the travel speed is above 14 km/h {8.7 MPH} in 3rd gear speed or above 26 km/h {16.2 MPH} in 4th gear speed, the gear speed is not shifted down to prevent the engine from over-running even if the kickdown switch is pressed.



HOLD SWITCH

When HOLD switch on the top of the lever is pressed to fix the gear speed in the auto-shift mode, the transmission is fixed to the gear speed indicated on shift indicator (A) of the machine monitor and shift hold pilot lamp (B) lights up.

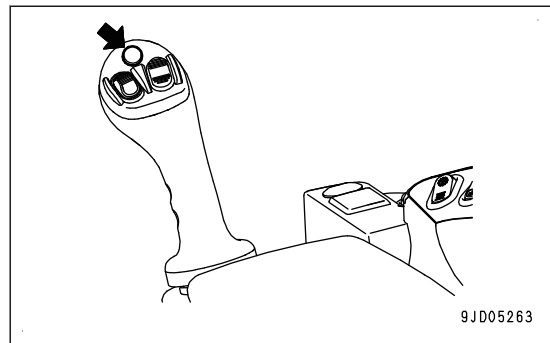
When this switch is pressed again, the shift hold function is canceled and the pilot lamp goes out.

Use this switch to set the gear speed to any position for uphill or downhill travel or grading.

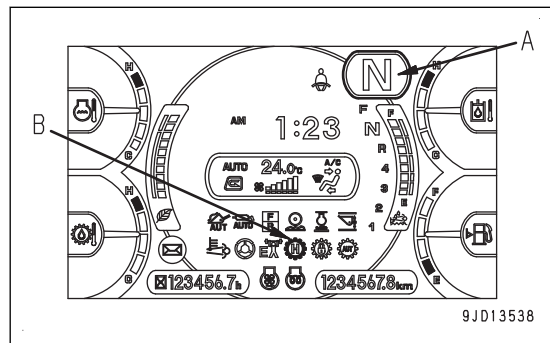
REMARK

You can cancel holding by one of the following operations.

- Operation of directional lever
- Operation of gear speed switch
- Operation of setting transmission shift mode selector switch to MANUAL mode
- Operation of turning starting switch to OFF position



9JD05263



9JD13538

DIRECTIONAL SELECTER SWITCH ON MULTIFUNCTION MONO-LEVER

⚠ WARNING

Do not maintain the multifunction mono-lever directional selector switch at the intermediate position between positions (F) and (N), or between positions (N) and (R). Such practice sounds the alarm buzzer and sets the transmission in NEUTRAL.

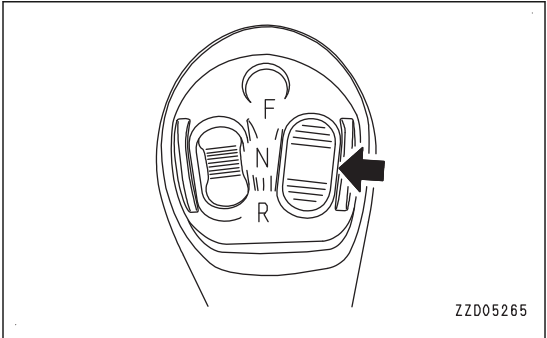
You can select FORWARD, NEUTRAL, or REVERSE with the multifunction mono-lever directional selector switch.

The basic operation is as follows.

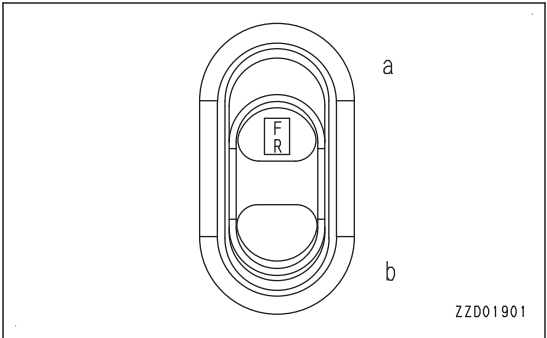
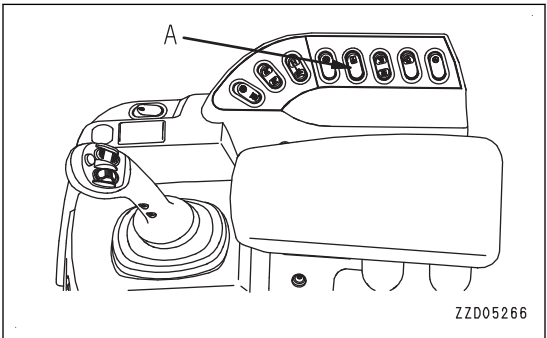
Position (F): FORWARD

Position (N): NEUTRAL

Position (R): REVERSE



Before using this switch to change the travel direction, set the directional lever to NEUTRAL position and set directional selector enable switch (A) of R.H. switch panel to position (a).



PCS(PROPORTIONAL CONTROL SWITCH)

PCS (Proportional Control Switch) is used to operate the third attachment.

The hydraulic oil discharged by the switch operation is in proportion to the stroke of the switch.

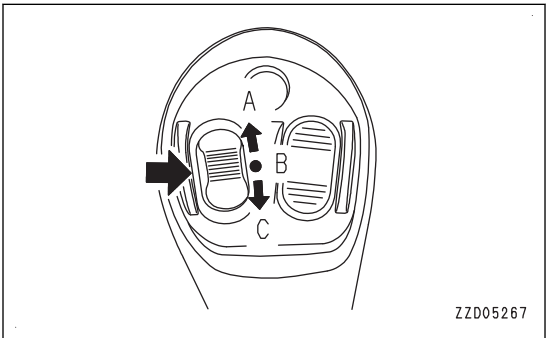
The switch has 2 control modes; continuous mode and proportional mode.

You can set the maximum flow when the switch is operated and change the control mode on the monitor.

Position (A): RETRACT

Position (B): NEUTRAL

However, when switch is operated to limit of position (C) to enable the detent control in the continuous mode, this position is for HOLD.



Position (C): EXTEND

Continuous mode

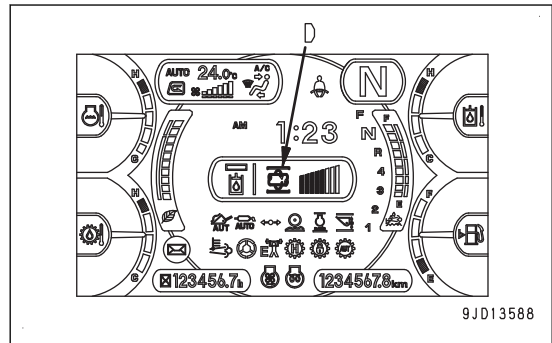
When switch is operated to the limit of position (C), the set maximum flow is held and the third attachment continues the operation even if the switch operation is stopped. This action is called the detent control.

Use this control when the installed attachment requires continuous hydraulic oil flow.

Detent control operation pilot lamp (D) lights up during the detent control.

The detent control is canceled by any of the following operations.

- Operate the switch again.
- Turn the work equipment lock switch ON.
- Turn the starting switch key to OFF position.
- Stop the engine.
- Cancel the continuous mode on the monitor.



Proportional mode

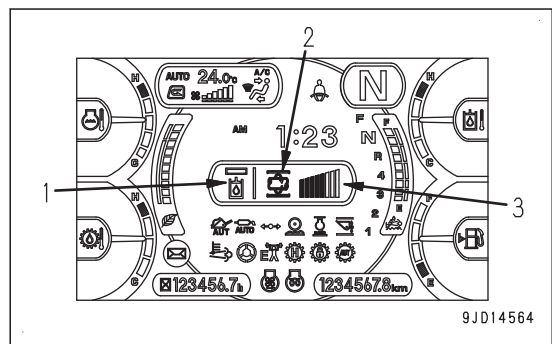
This mode does not have the detent control function which the continuous mode has.

REMARK

The hydraulic oil discharged volume is in proportion to the stroke of the switch in both continuous mode and proportional mode.

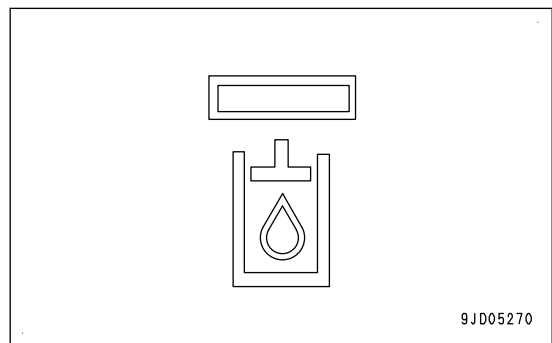
LCD UNIT

- (1) Flow control mode pilot lamp (Continuous mode/Proportional mode)
- (2) Detent operation pilot lamp
- (3) Attachment oil flow level



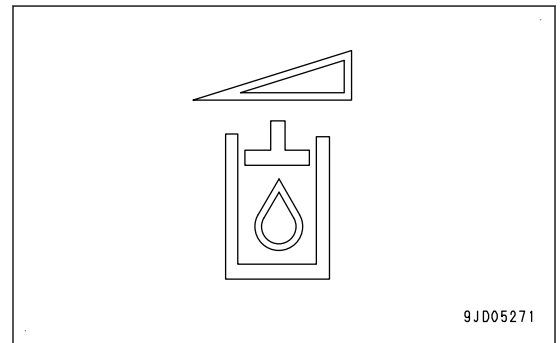
OIL FLOW CONTROL MODE PILOT LAMP (FIXED OIL FLOW MODE)

The flow control mode pilot lamp (continuous mode) lights up when the flow control of PCS is in the continuous mode.



OIL FLOW CONTROL MODE PILOT LAMP (PROPORTIONAL OIL FLOW MODE)

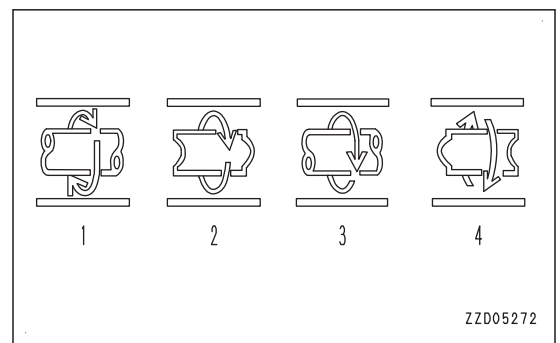
The flow control mode pilot lamp (proportional mode) lights up when the flow control of PCS is in the proportional mode.



DETENT OPERATION PILOT LAMP

The detent operation pilot lamp lights up when the detent control is performed in the continuous mode.

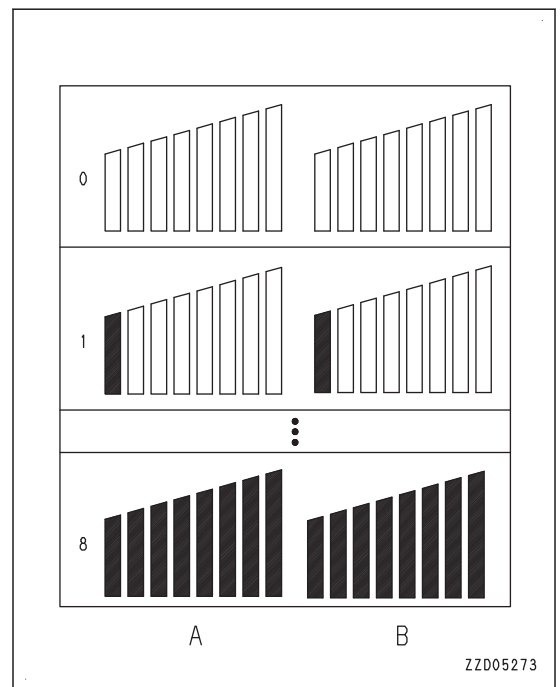
(1) to (4) are displayed in order at intervals of 0.5 seconds.



ATTACHMENT OIL FLOW LEVEL

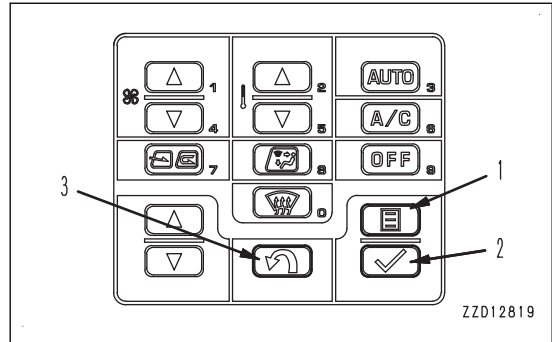
The attachment oil flow level indicates the set maximum flow level.

It indicates level 0 to 8 according to the set attachment oil flow in green (A) in the normal state and in orange (B) in the detent control mode.

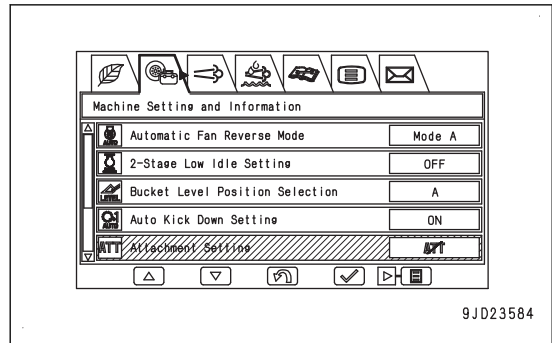


METHOD FOR SETTING PCS

1. Press menu switch (1) and enter the setting mode.



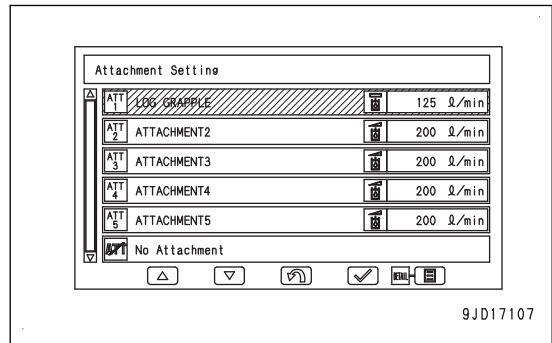
2. Select "Attachment Setting" on "Machine Setting and Information" menu, and press ENTER switch (2).



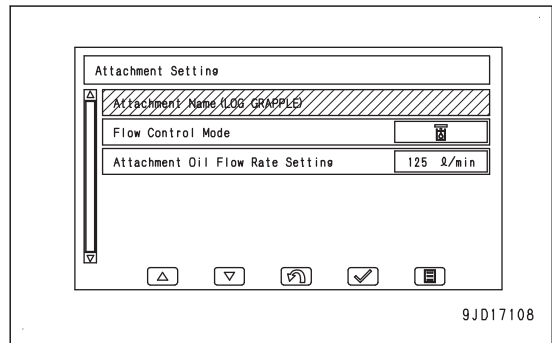
If the flow rate mode and maximum flow rate are set already, select any setting, and the setting is completed.

If you press menu switch (1) at this time, you can change the setting of the selected attachment.

You can save up to 5 settings.

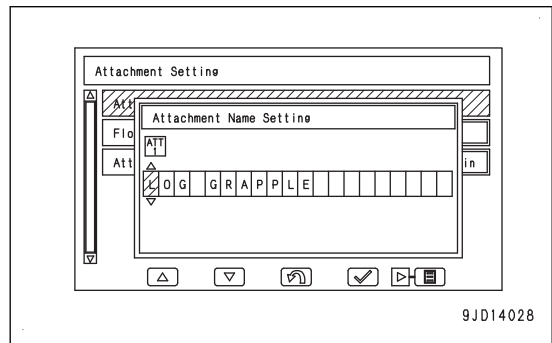


3. To change the setting name, select "Attachment Name" and press ENTER switch (2).

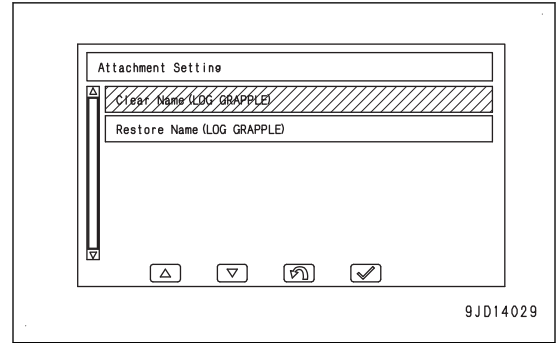


Change the alphabet at the cursor with UP or DOWN switches and move the cursor with menu switch (1).

After completing the change, press ENTER switch (2).

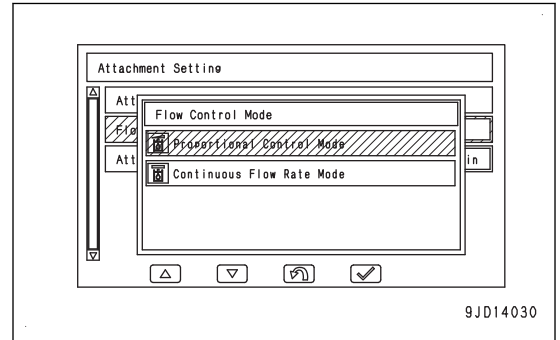


If you select “Attachment Name” and press menu switch (1), you can delete the setting name or return it to the default value.



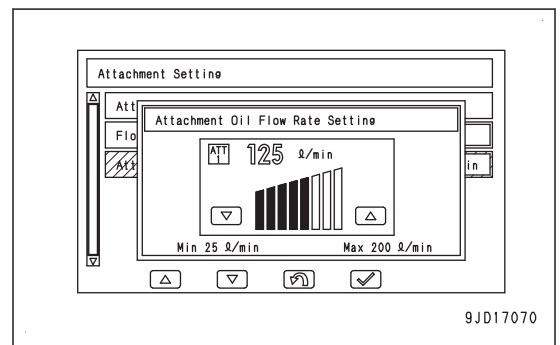
9JD14029

4. Select “Flow Control Mode”, and press ENTER switch (2). You can select “Proportional Mode” or “Continuous Mode”.



9JD14030

5. Select “Attachment Flow”, and press ENTER switch (2). You can set the maximum flow at the switch full stroke and the flow during the detent control in the continuous mode. Change the flow with UP or DOWN switches, and then press ENTER switch (2). You can set the maximum flow in the range of 25 to 200 l/min {6.61 to 52.8 US gal/min} at intervals of 25 l/min {6.61 US gal/min}.



9JD17070

METHOD FOR CLEANING CAB FRONT GLASS

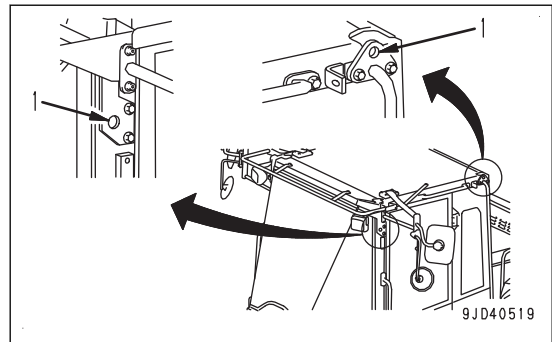
(Machine with steps for cab front glass cleaning)

⚠ WARNING

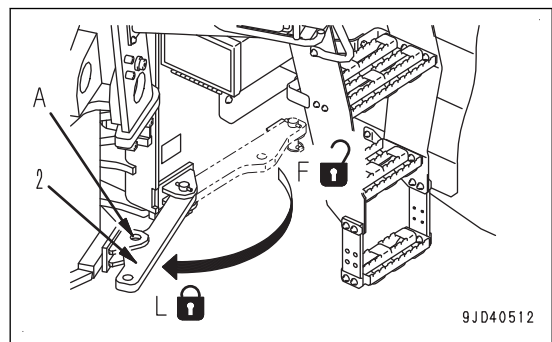
- When you clean the cab front glass, turn the collapsible stay 180 ° to the detent position where the mirror is to be locked and not to move.
If you clean the cab front glass while the collapsible stay is turned 90 °, there is a possibility that you hit your head or your clothes gets caught, and you could fall down. It is very dangerous.
- Do not turn the collapsible stay of mirror to other than the detent position (the position where mirror is not locked and movable) during the work. The stay could suddenly fall, and it is very dangerous.
- Be sure to turn the collapsible stay of mirror to the initial detent position during travel.
- During the work, lower the work equipment to the ground, then stop the engine.
- For the work, keep the machine body articulated by 20 °.
If the work is done in other articulation angle than 20 °, there is a danger of falling and it is very dangerous.

REMARK

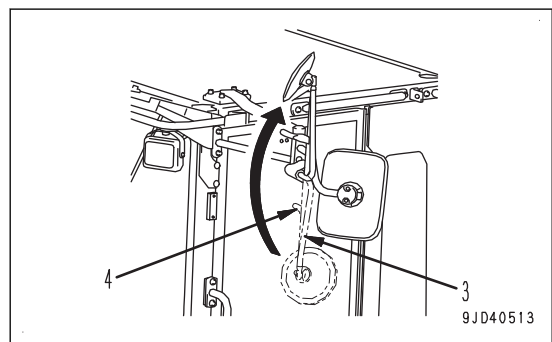
If the anchor point for tie-off (1) (2 places each on right and left sides) (option) is installed to the machine, you can install the safety belt to the anchor point (1).



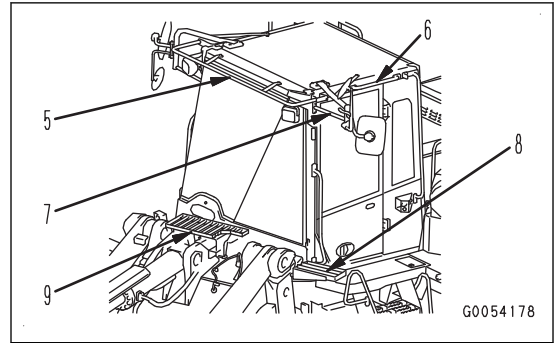
1. Lower the work equipment to the ground and stop the engine.
2. Make the machine articulated by 20 °, and set the frame lock bar (2) to the LOCK position (A).



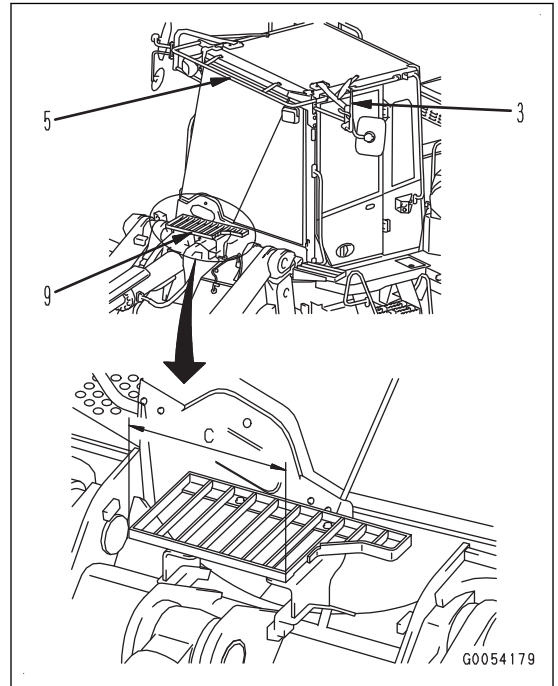
3. To move to the steps for cab front glass cleaning (left) (8), hold the handle (4) of the collapsible stay (3) of mirror, turn it upward 180 °, and keep it at the detent position.



4. Hold the handrails (5) and (6), and handle (7), keep the three-point contact, then move from the step for cab front glass cleaning (left) (8) to the step for cab front glass cleaning (center) (9).



5. In the range of (C) of the step for cab front glass cleaning (center) (9), hold the handrail (5), keep the three-point contact, and clean the cab front glass.
6. After you cleaned the cab front glass, keep the three-point contact, and go back to the platform, then return the collapsible stay (3) of mirror to the original position.



REPLACEMENT PARTS

PERIODIC REPLACEMENT OF DEFINED LIFE PARTS

For using the machine safely for an extended period of time, Komatsu highly recommends the periodic replacement of the defined life and fire prevention-related parts listed in the table of the defined life parts.

Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.

Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.

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

Also perform the following checks with hydraulic hoses which need not to be replaced periodically. 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.

Have your Komatsu distributor replace the defined life parts.

DEFINED LIFE PARTS LIST

No.	Periodical replacement parts		Replacement interval
1	Fuel system	Fuel hose Spill hose	Every 2 years or 4000 hours, whichever comes sooner
2	Steering system	High pressure circuit hose	
3	Brake system	Brake oil pressure hose	
4	Torque converter, transmission system	Transmission circuit hose	
5	Work equipment hydraulic system	Main pump delivery hose	
		Main pump delivery hose other than described above	
		Main pump LS hose	
		Hydraulic drive fan hose (Intake fan)	
		Hydraulic drive fan hose (Exhaust fan)	
6	Others	PPC accumulator	Every 3 years from start of usage or 5 years after manufacturing of seat belt, whichever comes sooner
		Seat belt	

CONSUMABLE PARTS

Replace consumable parts such as the filter element or air cleaner element at the time of periodic maintenance or before they reach the wear limit. The consumable parts should be replaced correctly in order to ensure more economic use of the machine. When replacing parts, Komatsu recommends using Komatsu genuine parts.

As a result of our continuous efforts to improve product quality, the part number may change. Inform your Komatsu distributor of the machine serial number and check the latest part number when ordering parts.

CONSUMABLE PARTS LIST

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

Item	Part No.	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		
Transmission strainer	56D-15-19311	Strainer	1	-	
	(07000-75085)	(O-ring)	(1)	Every 1000 hours	
DEF tank breather	421-60-35170	Element	1	Every 2000 hours	
KCCV filter	600-331-2900	Element	1		
Hydraulic oil filter	423-60-45461	Element	1		
	(07000-15195)	(O-ring)	(1)		
Hydraulic tank breather	285-62-17320	Element	1		
Air conditioner filter	Fresh air	423-07-52440	Filter		1
	Recirculation air	423-07-52410	Filter		1
DEF filter	6540-71-2320	Filter kit	1		
DEF tank filler port	56D-02-57690 (07000-G2075)	Filter assembly (O-ring)	1 (1)	Every 4500 hours	
Hydraulic tank strainer	22B-60-11160	Strainer	1		
	(07000-15160)	(O-ring)	(1)		
Fuel tank breather	421-60-35170	Element	1		
Air cleaner	600-185-4100	Element assembly	1		
Bolt-on cutting edge	424-815-1111	Center edge	1	-	
	424-815-1131	Side edge	2		
	(02090-11485)	(Bolt)	(14)		
	(02290-11422)	(Nut)	(14)		
	(01643-32260)	(Washer)	(14)		

RECOMMENDED FUEL, COOLANT, AND LUBRICANT

NOTICE

- **Komatsu genuine oils are adjusted to keep the reliability and durability of Komatsu construction equipment and components.**
To keep your machine in the best condition for long period of time, follow the instructions in this Operation and Maintenance Manual.
- **Failure to follow these recommendations can cause shortened life or excessive wear of the engine, power train, cooling system, and other components.**
- **Commercially available lubricant additives can be good or bad for the machine. Komatsu does not recommend the commercially available lubricant additive.**
- **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.**
- **Use the fuels, oils, and lubricants which are recommended in response to the ambient temperature.**
- **If the machine is operated at a temperature of -20 °C {-4 °F} or below, separate devices are needed, so consult your Komatsu distributor.**

NOTICE

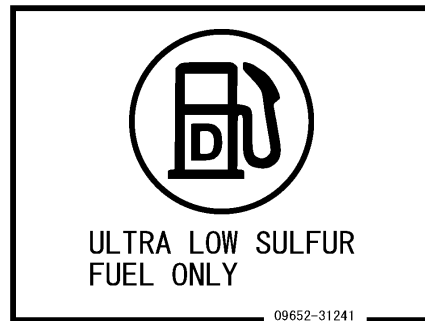
Be sure to use the ultra-low sulfur diesel fuel.

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 for this machine. 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. For the fuel, do not use additive agents that contain metal component.

Metal component in the additives will not be burned during the KDPF regeneration, and can cause abnormal conditions 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 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 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 urea SCR system.

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.

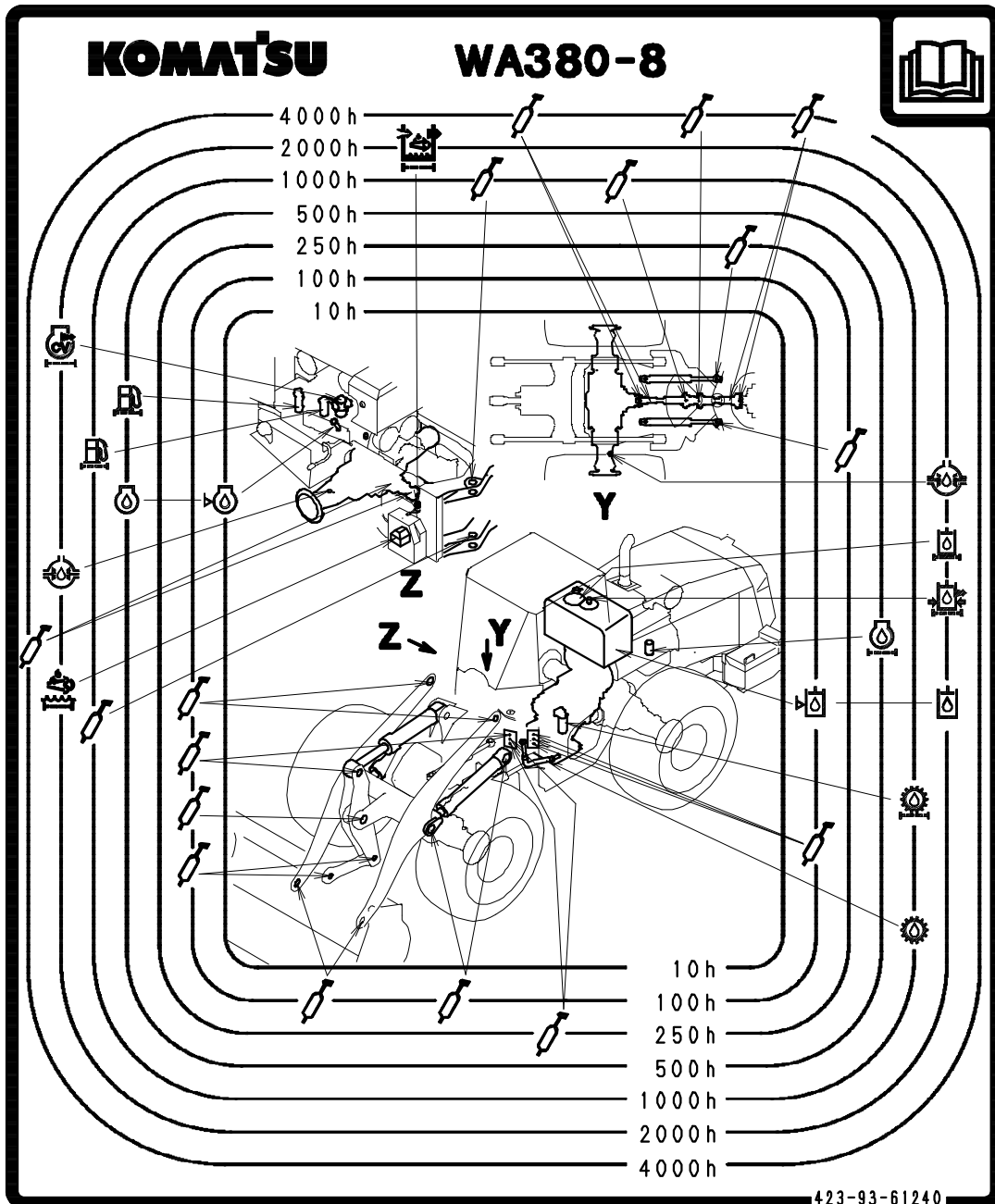
In North America, use the DEF (Diesel Exhaust Fluid) which is certified by API (American Petroleum Institute). The certified DEF has the API DEF Certification Mark. Look for the mark when you purchase the DEF.

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



















LUBRICATION CHART

- The lubrication chart uses symbols to show the lubrication points and types of lubricant by each lubrication interval.
- Even if the same symbol is used in the lubrication chart, the recommended genuine oil may differ according to the lubrication points and the ambient temperature. For details, see "METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-9)".
- For details of lubrication, see "MAINTENANCE SCHEDULE (4-15)".



The symbols used in the lubrication chart are explained as follows.

Symbol	Meaning of the symbol	Symbol	Meaning of the symbol
	Read the Operation and Maintenance Manual.		Greasing of the grease

Symbol	Meaning of the symbol	Symbol	Meaning of the symbol
	Change of the engine oil		Check oil level in engine oil pan
	Change hydraulic oil		Check hydraulic oil level
	Change power train oil		Change power train oil filter
	Change engine oil filter		Change hydraulic oil filter
	Change breather element in hydraulic tank		Change fuel filter
	Change KCCV filter breather element		Change axle oil
	Change DEF tank breather element		Change DEF filter

METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

Reservoir	Fluid type	Recommended Komatsu Fluids	Ambient temperature			
			°C		°F	
			Min	Max	Min	Max
Engine oil pan	Engine oil for KDPF used in cold terrain (Oil Change interval 250 hours) (Note.1)	EOS5W30-LA (KES)	-25	35	-13	95
		EOS5W40-LA (KES)	-25	40	-13	104
	Engine oil for KDPF (Oil Change interval 500 hours)	EO10W30-LA (KES)	-20	40	-4	104
		EO15W40-LA (KES)	-15	50	5	122
Transmission case	Power train oil	TO10 (KES)	-30	50	-22	122
Hydraulic System	Power train oil	TO10 (KES)	-20	50	-4	122
	Hydraulic oil	HO46-HM (KES)	-20	50	-4	122
	Engine oil	EO10W30-DH (KES)	-20	50	-4	122
		EO15W40-DH (KES)	-15	50	5	122
Axle	Axle oil (Note.2)	AXO80 (KES)	-30	50	-22	122
	Power train oil (Note.3)	TO50 (KES)	40	50	104	122
Pin / Bushing Grease fitting	Hyper grease (Note.4)	G2-TE (KES)	-20	50	-4	122
	Lithium EP grease	G2-LI (KES)	-10	50	14	122
Cooling system	Non-Amine Engine Coolant AF-NAC (Note.5)	AF-NAC (KES)	-30	50	-22	122
Fuel tank	Diesel fuel	ASTM D975 No.1-D S15	-30	20	-22	68
		ASTM D975 No.2-D S15	0	50	32	122
DEF tank	DEF (Note.6)	DEF	-30	50	-22	122

KES: Komatsu Engineering Standard

ASTM: American Society of Testing and Material

Reservoir	Specified capacity		Refill capacity	
	ℓ	US gal	ℓ	US gal
Engine oil pan	25.5	6.7	23	6.0
Transmission case	62	16.4	54	14.3
Hydraulic System	213	56.3	142	37.5
Axle (Front)	40	10.6	40	10.6
Axle (Rear)	40	10.6	40	10.6
Cooling system	60.6	16.0	-	-
Fuel tank	300	79.3	-	-

Reservoir	Specified capacity		Refill capacity	
	ℓ	US gal	ℓ	US gal
DEF tank	36	9.5	-	-

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. For changing the maintenance time of machine monitor, ask your Komatsu distributor to perform the work.

Note 2: Axle oil AXO80 is capable of preventing the brake and LSD (Limited Slip Differential) from creaking. When only AXO80 is recommended, use Komatsu genuine AXO80 or equivalent.

Note 3: If the daily operation hours of the machine at ambient temperature above 45 °C {113 °F} exceed 12 hours, TO50 is recommended instead of AXO80.

If TO50 is used, the brake may creak but there is no problem in performance and durability of the brake.

If the machine is equipped with Limited Slip Differential, use AXO80, regardless of the ambient temperature. Do not use TO50.

Note 4: Hyper grease (G2-TE) has a high performance. When it is necessary to improve the lubricating ability of the grease in order to prevent squeaking of pins and bushings, the use of G2-TE is recommended.

Note 5: Non-Amine Engine Coolant (AF-NAC)

- The coolant has the important function of preventing corrosion as well as preventing freezing. Even in the areas where freezing is not an issue, the use of coolant is essential. Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC). If you use another coolant, it may 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.

- 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. (Never dilute the Non-Amine Engine Coolant with ordinary water.)

Coolant density table

Min. atmospheric temperature	°C	-10 or more	-15	-20	-25	-30	-35	-40	-45	-50
	°F	14 or more	5	-4	-13	-22	-31	-40	-49	-58
Density (%)		30	36	41	46	50	54	58	61	64

Note 6: 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**

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

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