

Operation & Maintenance Manual

PC138US-11

HYDRAULIC EXCAVATOR

SERIAL NUMBERS

PC138US-11 F50001 and up
50001 and up



WARNING

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

ORIGINAL INSTRUCTIONS

KOMATSU

FOREWORD

WARNING

Komatsu recommends that any service parts used for maintenance, repair or replacement of emission control systems be genuine new Komatsu or Komatsu approved 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 personal injury or death).

READ THIS MANUAL

This manual gives details of the operation and methods of inspection and maintenance for this machine that must be obeyed 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 storing location so that all relevant personnel can read it at any time.

Keep it in the magazine box rear inside the cab.

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.

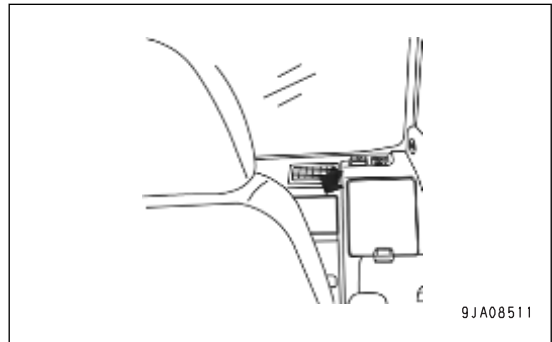
For details regarding the machine model name and the serial No., see the machine serial No. plate. In order to arrange the proper Operation and Maintenance Manual, you will need to provide the machine model name and the serial No.

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. Consult Komatsu or your Komatsu distributor for the latest available information concerning your machine or with questions regarding information contained in this manual.

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.



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



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



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.

SAFETY LABELS

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

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

SAFETY LABELS USING PICTOGRAMS

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

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

If any procedures or actions not specifically recommended or allowed in this manual are used, it is your responsibility to take the necessary steps to ensure safety.

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

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

Consult Komatsu or your Komatsu distributor for the latest available information of your machine or for questions regarding information in this manual.

The numbers in the illustrations correspond to the numbers in () in the text.



NOISE

Two labels indicating the machine noise level are affixed on the machine.

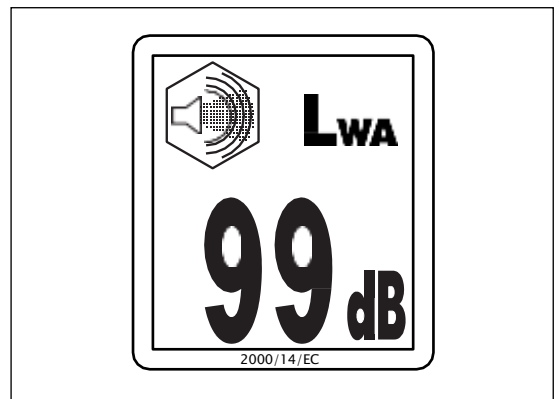
- Sound pressure level at the operator's station, measured according to ISO 6396 (Dynamic test method, simulated working cycle).

The maximum value of the standard deviation of the measured time-averaged A-weighted emission sound pressure level at the operator's position is 2.5dB, in accordance with ISO 11201.



- Sound power level emitted by the machine, measured according to ISO 6395 (Dynamic test method, simulated working cycle).

This is the guaranteed value as specified in European directive 2000/14/EC. This value includes an uncertainty of 1.0 dB.



VIBRATION LEVELS

When used for its intended purpose, levels of vibration for the earth-moving machine transmitted from the operator's seat are lower than or equal to the tested vibrations for the relative machinery class in compliance with ISO 7096.

The actual acceleration value for the hands and arms is less than or equal to 2.5 m/s^2 , the uncertainty for this value is 0.61 m/s^2 for right arm and 0.74 m/s^2 for left arm according to EN12096:1997.

The actual acceleration value for the body is less than or equal to 0.5 m/s^2 , the uncertainty for this value is 0.39 m/s^2 according to EN12096:1997.

These values were determined using a representative machine and measured during the typical operating condition indicated below according to the measurement procedures that are defined in the standards ISO 2631/1 and ISO 5349.

VIBRATION - OPERATING CONDITION

Excavating (Digging-loading-rotating-unloading-rotating)

GUIDE TO REDUCE VIBRATION LEVELS ON MACHINE

The following guides can help an operator of this machine to reduce the whole body vibration levels:

1. Use the correct equipment and attachments.
2. Maintain the machine according to this manual
 - Tension of crawler (for crawler machines)
 - Brake and steering systems
 - Controls, hydraulic system and linkages
3. Keep the terrain where the machine is working and travelling in good condition
 - Remove any large rocks or obstacles
 - Fill any ditches and holes
 - Site manager should provide machine operators with machine and schedule time to maintain terrain conditions
4. Use a seat that meets ISO 7096 and keep the seat maintained and adjusted
 - Adjust the seat and suspension for the weight and size of the operator
 - Wear seat belt
 - Inspect and maintain the seat suspension and adjustment mechanisms
5. Steer, brake, accelerate, and move the attachment levers and pedals slowly so that the machine moves smoothly
6. Adjust the machine speed and travel path to minimize the vibration level
 - When pushing with bucket or blade, avoid sudden loading; load gradually
 - Drive around obstacles and rough terrain conditions
 - Slow down when it is necessary to go over rough terrain
 - Make the curve radius of travelling path as large as possible
 - Travel at low speed when travelling around sharp curves
7. Minimize vibrations for long work cycle or long distance travelling
 - Reduce speed to prevent bounce
 - Transport machines long distances between worksites
8. The following guidelines can be effective to minimize risks of low back pain
 - Operate the machine only when you are in good health
 - Provide breaks to reduce long periods of sitting in the same posture
 - Do not jump down from the cab or machine

- Do not repeatedly handle and lift loads

INTRODUCTION

MAIN USE OF MACHINE

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

- Digging work
- Ditching work
- Loading work
- Levelling work

For details of work procedure, see MACHINE OPERATIONS AND CONTROLS “RECOMMENDED APPLICATIONS (3-187)”.

WARNING

The excavator used in handling operations must conform with current local regulations and be equipped with safety valves and an overload alarm in compliance with EN 474-5.

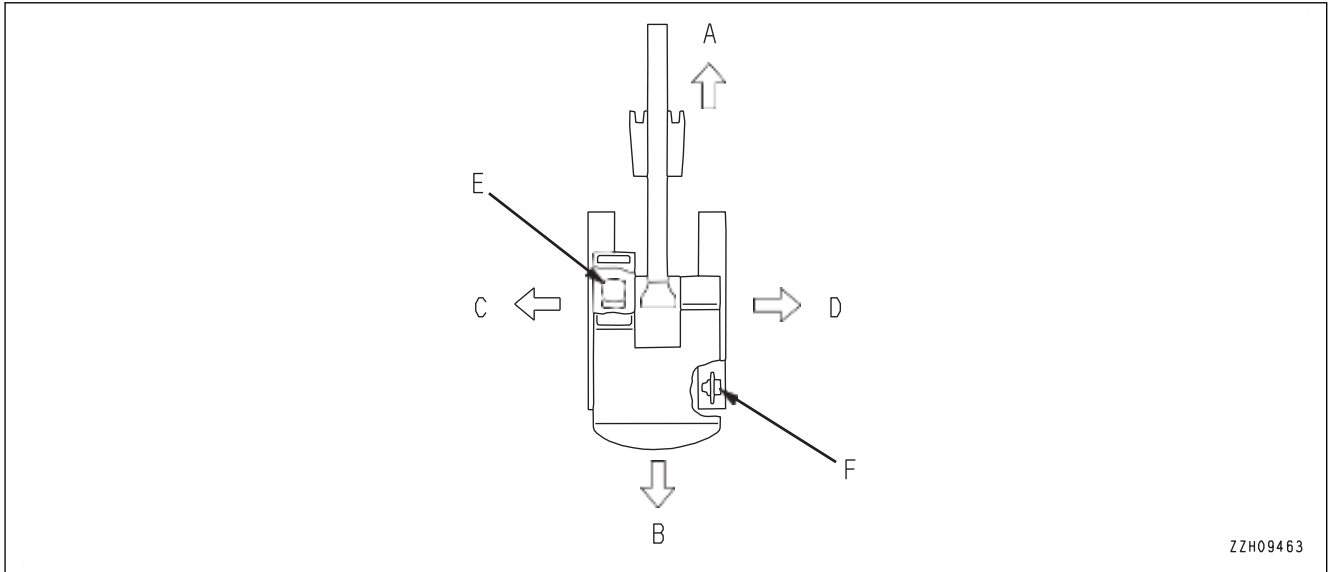
DEMOLITION WORK

WARNING

- A demolition machine is a machine based on earth moving machinery (see EN ISO 6165) and including equipment and attachment (working tool - e.g. processor or breaker) specifically designed to demolish, cut, loosen, separate, pick up, transport and distribute component parts of buildings or civil engineering structures.
- This machine is not prepared for use in Demolition.
- Using this machine in demolition work gives an increased risk of serious injury or death.
- All Komatsu machines that are specifically designed, and can be used for demolition work, will display the Komatsu demolition decal.
- If the machine does not display this decal and it is necessary to carry out demolition work, contact your distributor for information on demolition machinery compliant with the applicable standards.



DIRECTIONS OF MACHINE



(A) Front

(D) Right

(B) Rear

(E) Operator's seat

(C) Left

(F) Sprocket

In this manual, the terms front, rear, left, and right refer to the travel direction as seen from the operator's seat when the operator's seat is facing the front and the sprocket is at the rear of the machine.

VISIBILITY FROM OPERATOR'S SEAT

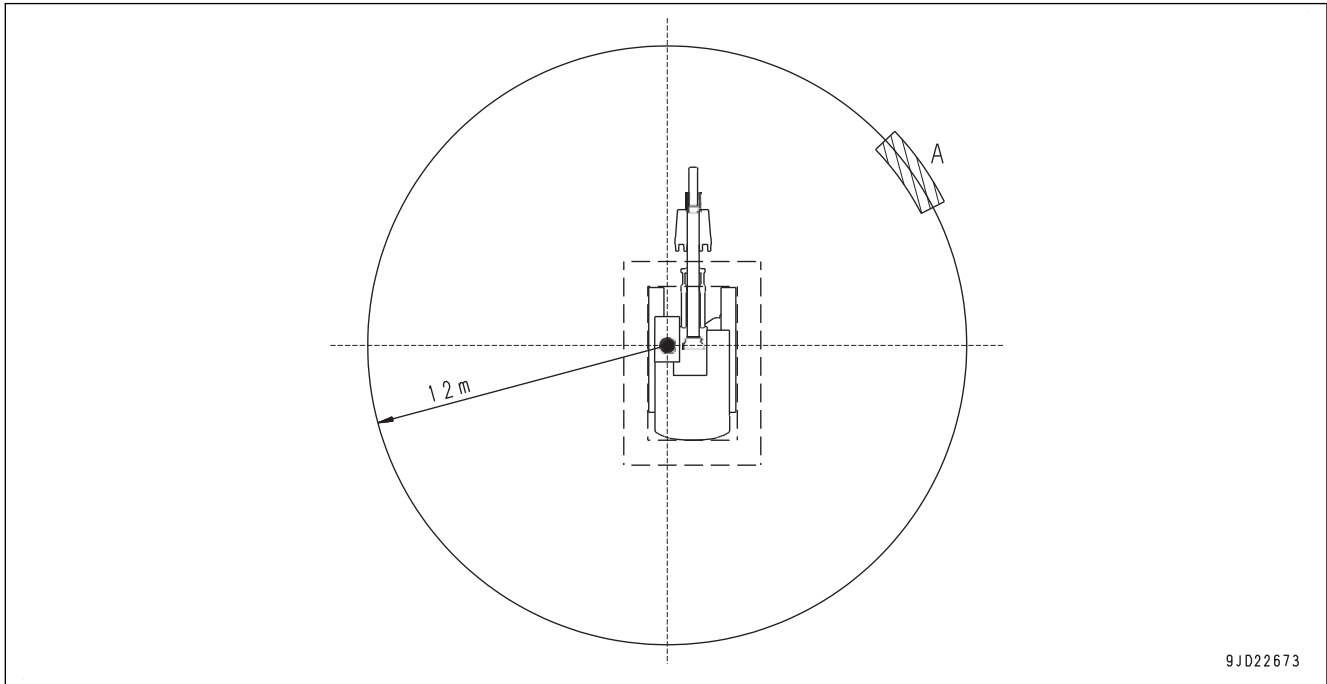
The visibility of this machine required by visibility standards (ISO 5006) are shown in the drawing below.

Proximity visibility

The figure below shows a visibility from the machine at a spot 1.0 m away from outside the machine and 1.5 m above the ground.

12 m radius visibility

The figure below shows a visibility from the machine for a radius of 12 m. Shaded areas (A) in the figure show areas, the views of which are blocked when the machine is equipped with the mirrors and other visibility assistant devices. Be fully aware that there is an area where the operator cannot see when operating the machine.



Protective structures

This machine is equipped with a structure to protect the operator (ROPS) conforming to ISO12117-2: 2008.

ENGINE TECHNOLOGY TO CONFORM EXHAUST GAS EMISSION

About Engine Technology

This engine technology combines a Komatsu Diesel Oxidation Catalyst (KDOC) and Komatsu's Urea Selective Catalytic Reduction (SCR) to conform EU Stage IV emission regulation in the European Union.

- Komatsu Diesel Oxidation Catalyst (KDOC): The system makes possible to eliminate the need for regeneration and simplifies the engine control system.
- Komatsu's Urea SCR system: A device which decomposes the toxic nitrogen oxides (NOx) mixed in the exhaust gas into harmless nitrogen and water. Spraying the reagent (Diesel Exhaust Fluid) into the exhaust gas produces a reaction between the nitrogen oxides and ammonia generated from the urea solution and decomposes the nitrogen oxides into nitrogen and water.

About Diesel Exhaust Fluid (DEF)

Diesel Exhaust Fluid is the reagent for the SCR system.

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

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

Commercial DEF, commonly referred to as AdBlue® in the European Union, that quality standards are maintained in accordance with DIN70070 and ISO 22241-1, to be used.

AdBlue® is a registered trade-mark of VDA (Verband der Automobilindustrie e.V.: Automobile Association of Germany).

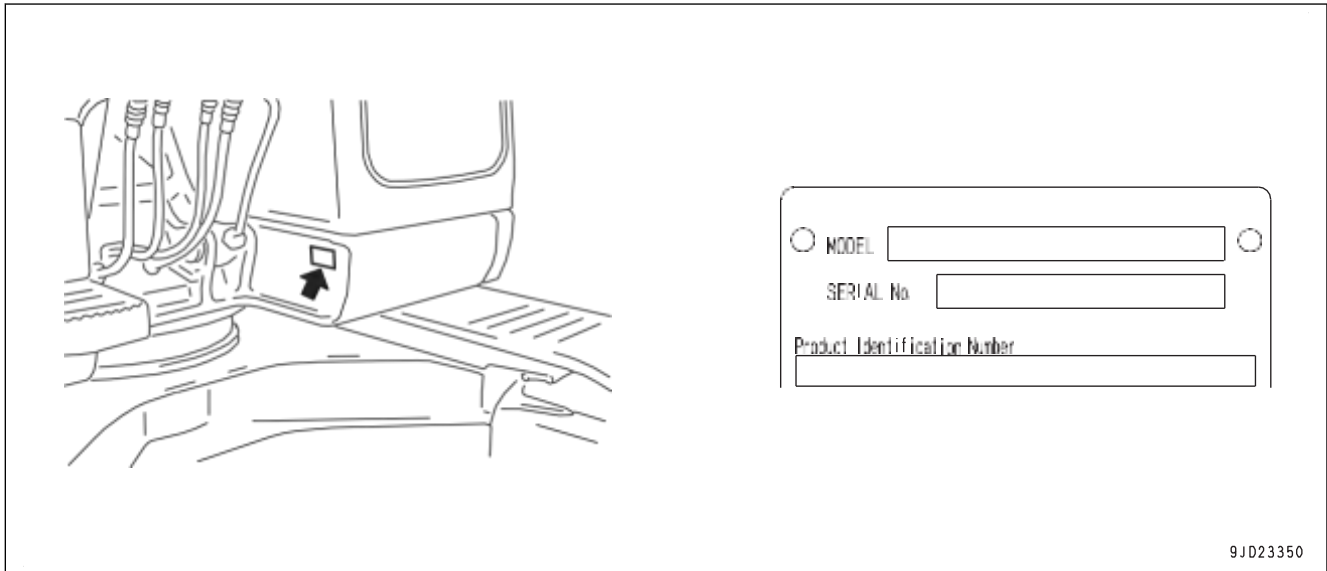
PRODUCT INFORMATION

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

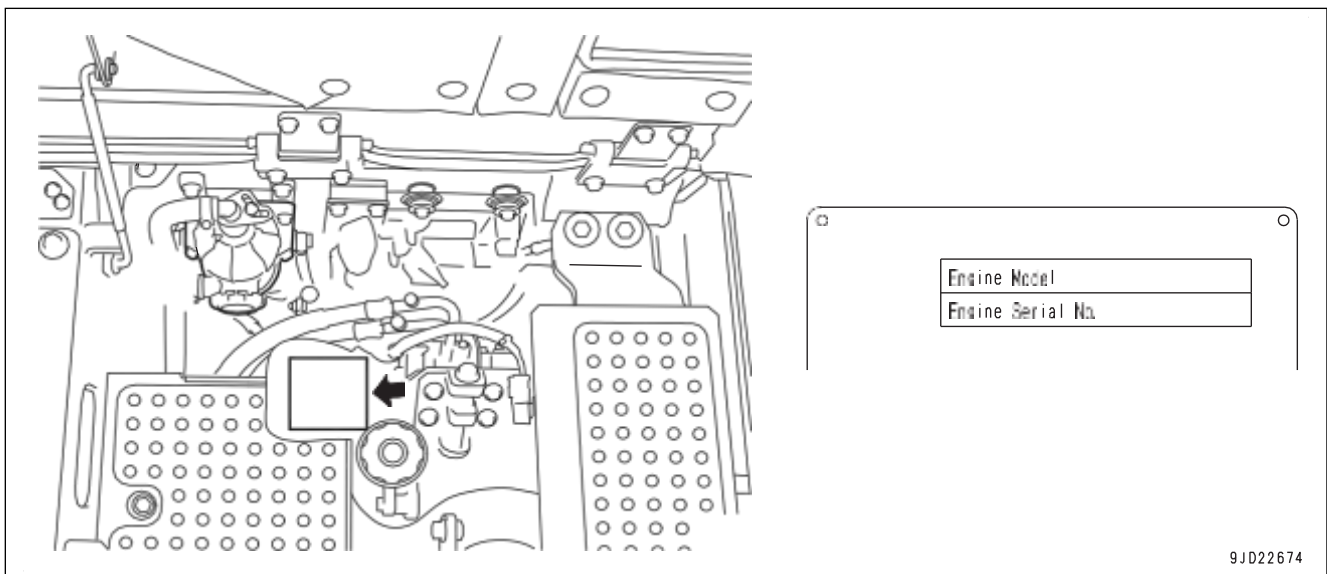
It is located on the right bottom of the operator's cab.

The design of the nameplate differs according to the district.



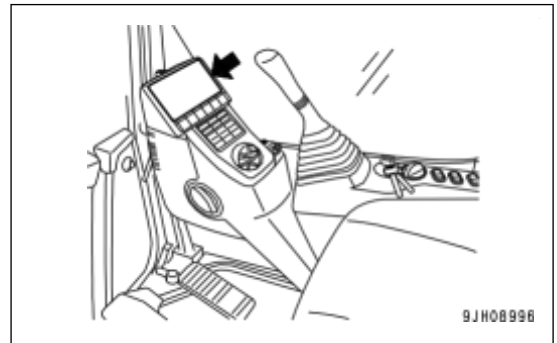
LOCATION OF ENGINE NUMBER PLATE

This is on the side of the filler port bracket.



SERVICE METER LOCATION

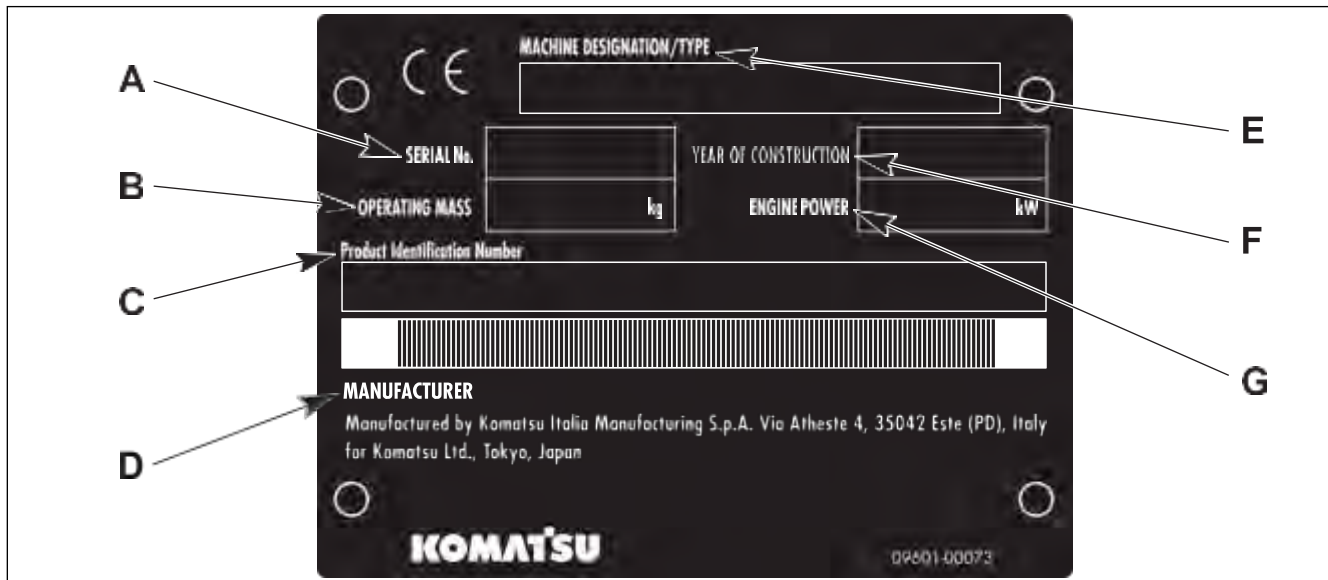
This is displayed on the machine monitor.



YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR

Machine serial No.	
Engine serial No.	
Product identification number (PIN)	
Manufacturers name: Address:	Komatsu Italia Manufacturing S.p.A. Via Atheste, 4 35042 Este (PD) Italy
Distributor name	
Address	
Service Personnel	
Phone/Fax	

SERIAL PLATE



A	SERIAL NUMBER	E	MACHINE DESIGNATION/TYPE
B	WEIGHT	F	YEAR OF CONSTRUCTION
C	PRODUCT IDENTIFICATION NUMBER	G	ENGINE POWER
D	MANUFACTURER		

DECLARATION OF CONFORMITY

The manufacturer:

Komatsu Italia Manufacturing S.p.A.

Via Atheste, 4

35042 Este (PD)

Italy

Declares that this machine:

PC138US-11

Fulfils all the relevant provisions of following EC Directives:

Machine Directive	2006/42/EC
Electro Magnetic Compatibility Directive	2004/108/EC until 19 April 2016 2014/30/EU after 20 April 2016
Outdoor Noise Directive	2000/14/EC amended by 2005/88/EC
Radio Equipment and Telecommunications Terminal Equipment Directive	1999/5/EC until 12 June 2016
Radio Equipment Directive	2014/53/EU after 13 June 2016

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SAFETY

WARNING

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

SAFETY

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SAFETY LABELS

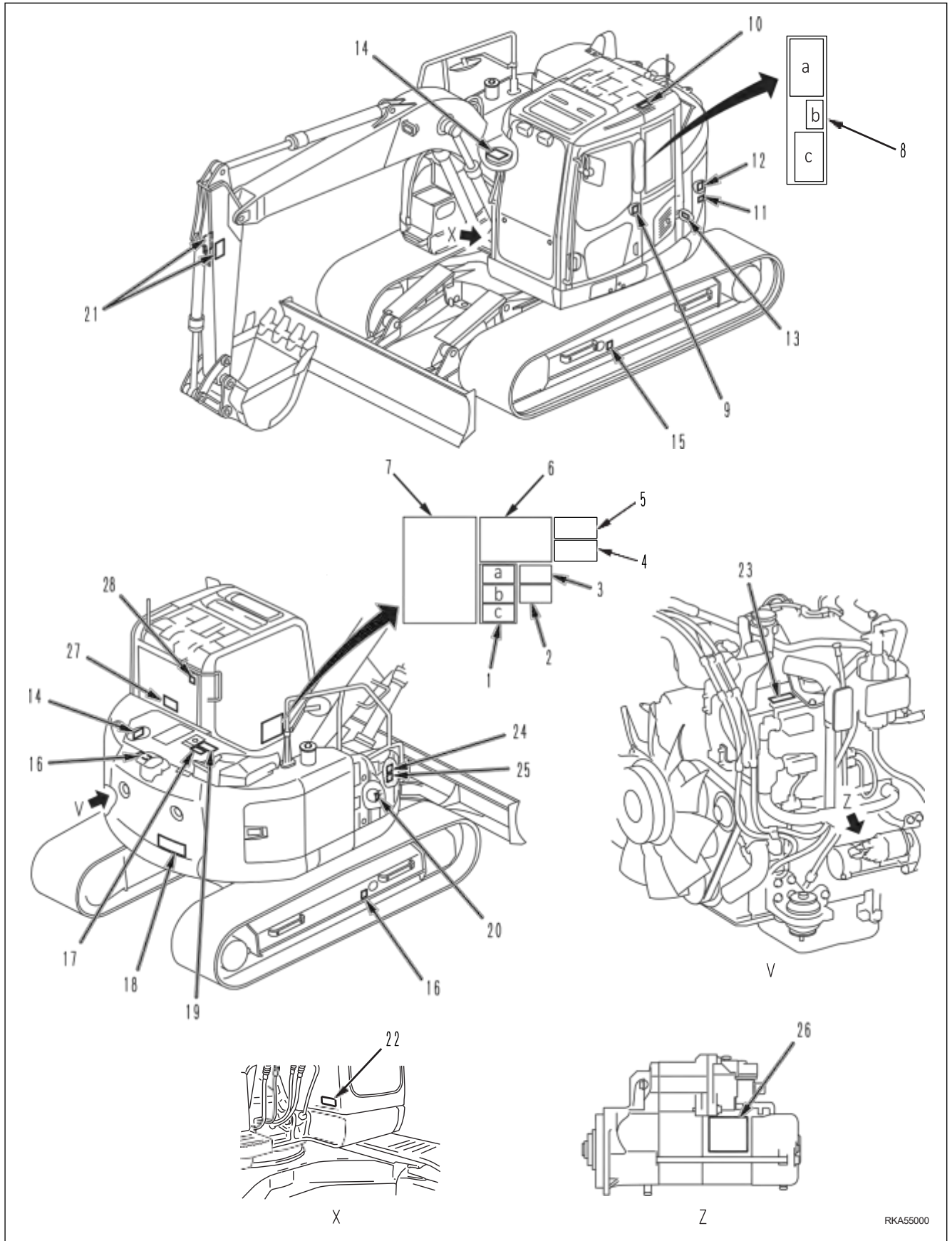
WARNING

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



(1) Combined safety information label

(a) Warning against high-voltage cable

- (b) Warning when leaving the operator's seat
- (c) Warning for operation, inspection and maintenance
- (2) Warning no passengers
- (3) Warning danger of falling objects
- (4) Caution for blast jobsite
- (5) Warning for quick coupler system
- (6) Caution for overloading machine
- (7) Lifting capacity diagram
- (8) Combined safety information label
 - (a) Warning prohibited to enter in swing radius
 - (b) Caution when standing in operator cab
 - (c) Control levers operational function diagram
- (9) Warning when swinging and travelling in reverse
- (10) Caution when stowing front window
- (11) Battery main switch
- (12) Caution for handling battery
- (13) Caution for handling cable

- (14) Caution for high temperature coolant and hydraulic oil
- (15) Caution for adjusting track tension
- (16) Caution against falling
- (17) Caution stop rotation during inspection and maintenance
- (18) Caution against falling
- (19) Danger do not enter within swing range
- (20) Caution for handling accumulator and gas spring
- (21) Caution for work equipment
- (22) Warning for handling ROPS
- (23) Caution do not start by short-circuiting
- (24) Caution for handling DEF
- (25) Caution for handling DEF
- (26) Caution for high-temperature fuel
- (27) Emergency escape
- (28) Lock front window

CONTENTS OF SAFETY LABELS

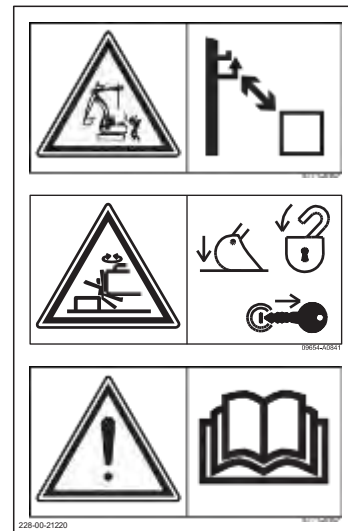
(1) Combined safety information label

(22B-00-21220)

- Warnings for operation, inspection and maintenance.
- Improper operation and maintenance can cause serious injury or death.
- Read the manual and labels before operation and maintenance.

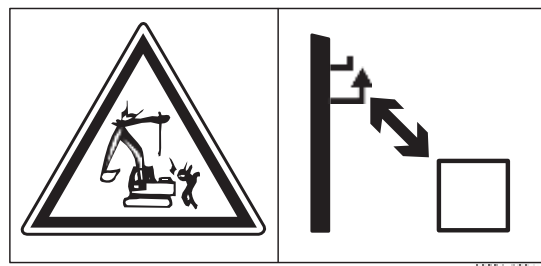
Follow instructions and warnings in manual and in labels on machine.

Detailed explanations of the content of each label are as follows:



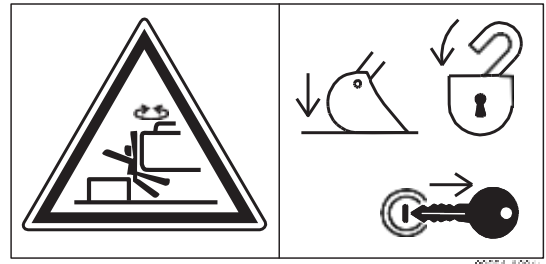
(a) Warning against high-voltage cable

- An electrocution hazard if the machine is brought too near to electric power lines.
- Keep a safe distance from electric power lines.



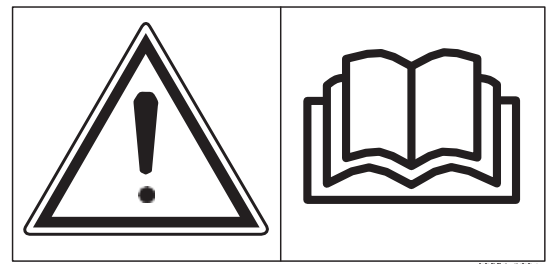
(b) Warning when leaving the operator's seat

- Before standing up from operator's seat.
- Lower the work equipment to the ground and move safety lock lever (located near seat) to lock position to avoid hitting unlocked operation levers.
- Sudden and unwanted machine movement can cause serious injury or death.



(c) Warning for operation, inspection and maintenance

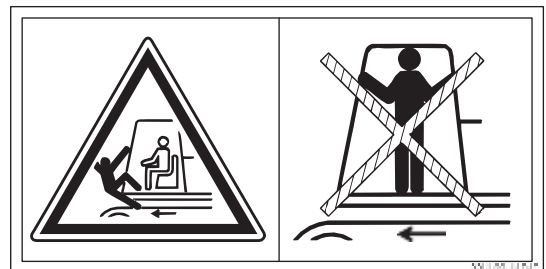
- Warning
- Read the manual before operating, inspection, maintenance, disassembly, assembly and transportation.



(2) Warning no passengers

(22U-00-11910)

- No passengers allowed to ride on the machine while it is moving.

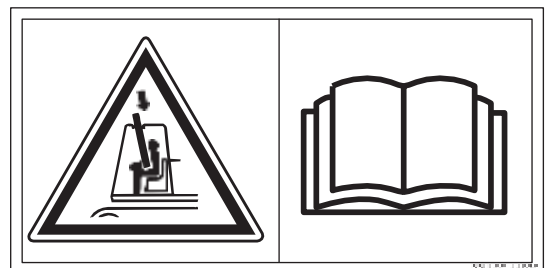


(3) Warning danger of falling objects

(22U-00-11920)

- Do not operate where a danger of falling objects exists.

Consult your dealer for fitting of FOPS (FALLING OBJECT PROTECTIVE STRUCTURE) protection.

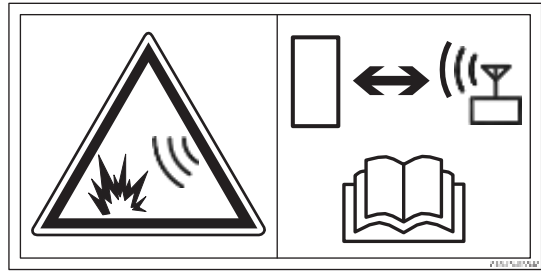


(4) Caution for blast jobsite

(09845-00640)

Caution of an explosive hazard caused by active radio transmitter at a blast zone.

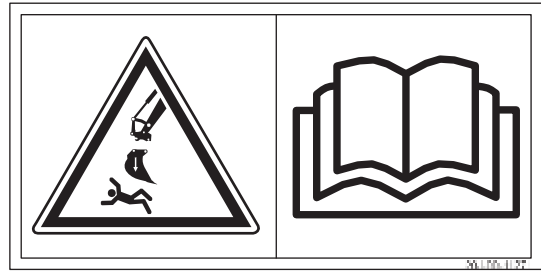
- Keep machine at a safe distance from blast zone and a detonator.



(5) Warning for quick coupler system

(20J-00-11271)

- There is a danger of an exposed person being killed by falling attachment.
- Read the manual for safe operation.

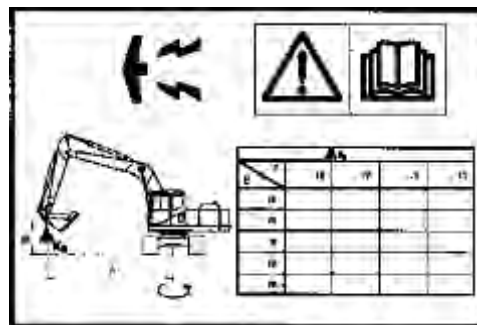


(6) Caution for overloading machine

(Machine with standard boom: 22B-00-41630)

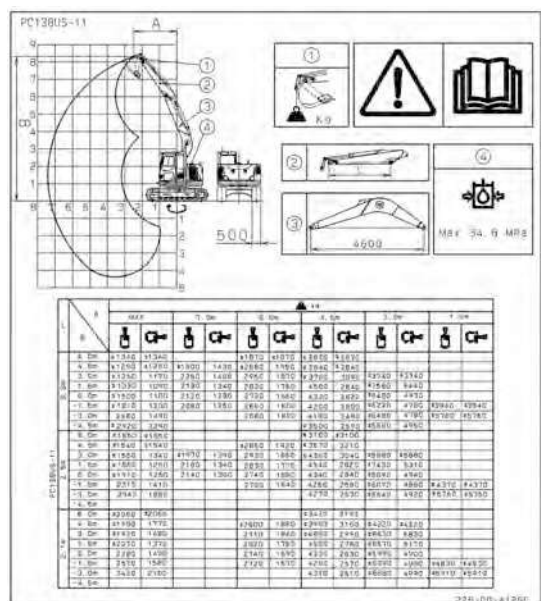
(Machine with 2-piece boom: 22B-00-R1631)

- Do not exceed the safe working loads.



(7) Lifting capacities diagram

(22B-00-41260)



(8) Combined safety information label

(22B-00-21712)

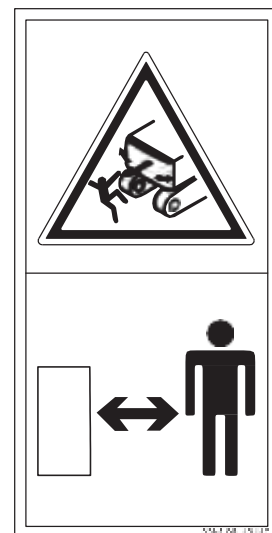
Follow instructions and warnings in manual and in labels on machine.

Detailed explanations of the content of each label are as follows:



(a) Warning prohibited to enter in swing radius

- There is a danger of getting caught when upper structure swings.
- Do not enter range of swing.

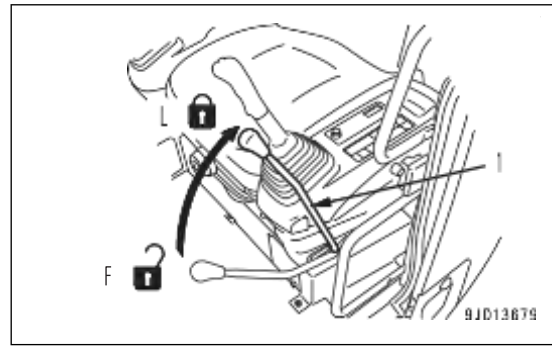
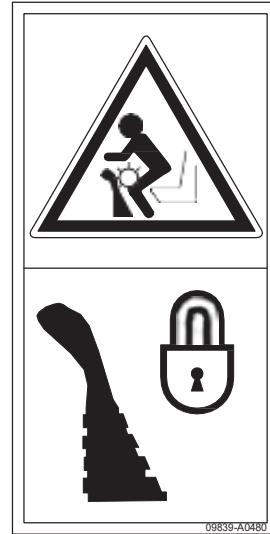


(b) Caution when standing in operator cab

(09839-A0480)

- Take care when standing in the operator cab.

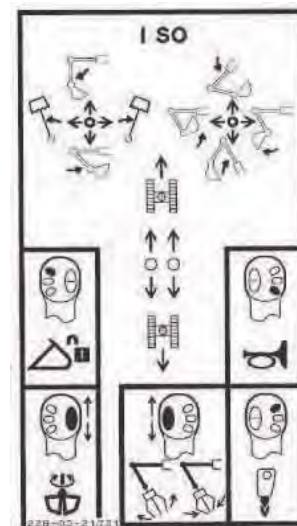
- Before standing up from the operator's seat (such as when opening or closing the front window, or when removing or installing the bottom window, or when adjusting the operator's seat), always lower the work equipment completely to the ground, set lock lever (1) securely to the LOCK position (L), then stop the engine. If you accidentally touch the control levers (pedals) when they are not locked, there is a hazard that the machine may suddenly move and cause serious injury or property damage.



(c) Control levers operational function diagram

(22B-00-21721)

In order to prevent an accident resulting in injury or death caused by error-operation, confirm the machine motion and indicated operating pattern, when operating machines. Pay attention to the circumference and operate slowly when confirming the machine motion.



(9) Warning when swinging or travelling in reverse

(09833-A0881)

**WARNING**

- When swinging or backing up excavator, press button to change display mode on monitor so you can see rear and side of the machine.
Before moving, look around and at mirror and monitor to confirm that no one is around the machine. Failure to do so can result in serious injury or death.

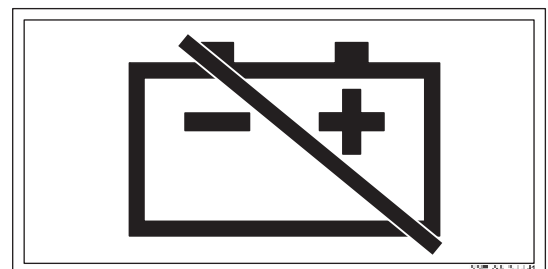
**(10) Caution when stowing front window**

(09803-A0481)

- Sign indicates a hazard from falling window.
- After raising window, be sure to lock it in place with lock pins.

**(11) Battery main switch**

(22E-98-21141)



(12) Caution for handling battery

(09664-60001)



(a) Never smoke or use any naked flame near the batteries, no sparks.



(b) Always wear safety glasses when working with batteries.



(c) Keep children away from batteries.



(d) Caution battery acid.



(e) Read the operator's manual before working with batteries.



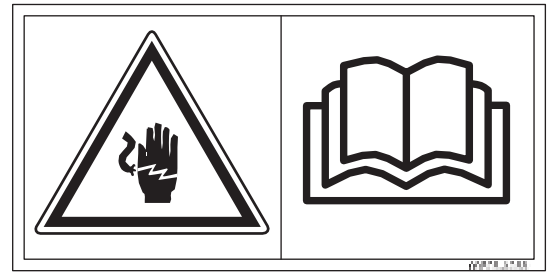
(f) Caution - explosive gases.



(13) Caution for handling cable

(09808-A0881)

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



(14) Caution for high temperature coolant and hydraulic oil

(09653-A0481)

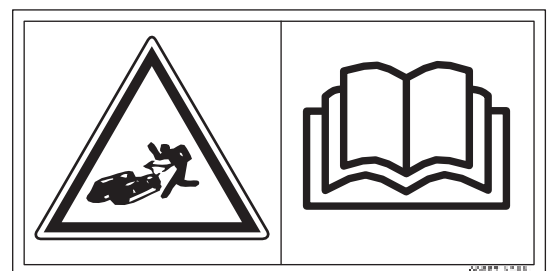
- Never remove the cap when the engine is at operating (high) temperature. Steam or high temperature oil blowing up from the radiator or hydraulic tank will cause personal injury and/or burns.
- Never remove the radiator cap or hydraulic tank oil filler cap when cooling water or hydraulic oil is at high temperature.



(15) Caution for adjusting track tension

(09657-A0881)

- Sign indicates a hazard of flying plug from track adjuster that could cause injury.
- Read manual regarding adjusting track for safe and proper handling.



(16) Caution against falling

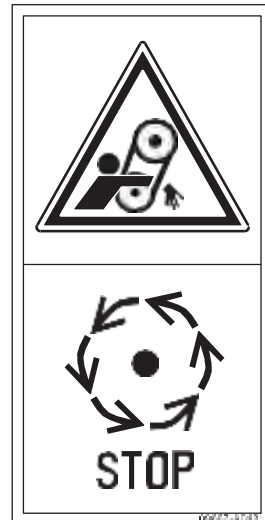
(09805-A0481)

- Sign indicates a hazard of falling.
- Do not stand on the place here.

**(17) Caution stop rotation during inspection and maintenance**

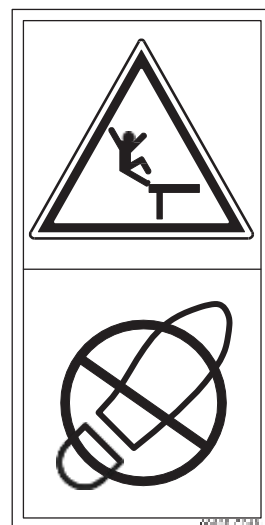
(09667-A0481)

- Sign indicates a hazard of rotating parts such as belt, fan etc.
- Turn off before inspection and maintenance.

**(18) Caution against falling**

(09805-C0481)

- Sign indicates a hazard of falling.
- Do not stand on the place here.



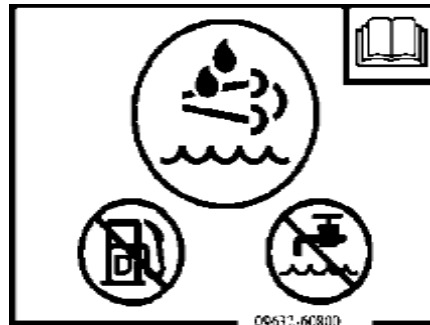
Prohibition of short-circuit start



(24) Caution for handling DEF

(09632-60800)

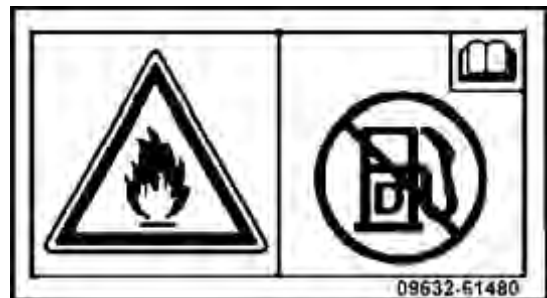
- To avoid engine damage or fire, fill with Diesel Exhaust Fluid (DEF) only.
- Never use diesel fuel.



(25) Caution for handling DEF

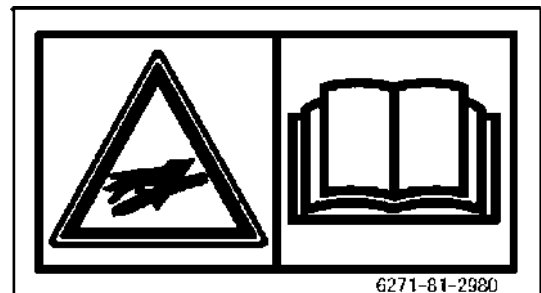
(09632-61480)

- To avoid engine damage or fire, fill with Diesel Exhaust Fluid (DEF) only.
- Never use diesel fuel.



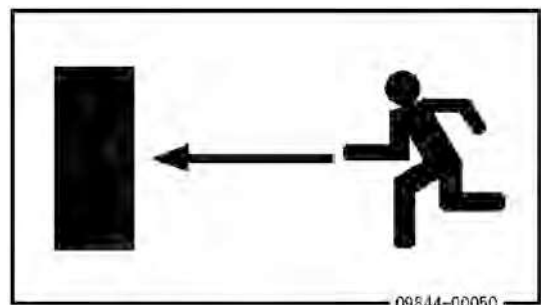
(26) Caution for high-pressure fuel

(6271-81-2980)



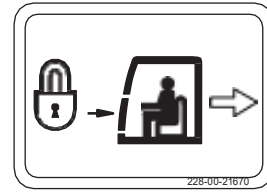
(27) Emergency escape

(09844-00050)



(25) Lock front window

(22B-00-21670)



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

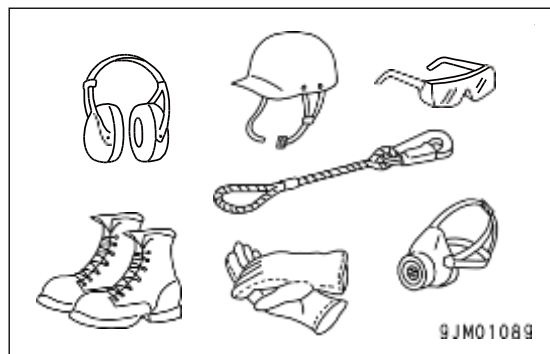
- Be sure that all guards, covers, cameras, and mirrors are in their proper position. Repair them immediately if they are damaged.
- Understand the using method of the safety related devices and use them properly.
- Never remove any safety related devices. Always keep them in good operating condition.

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 when operating or maintaining the machine.
- 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. Defective camera cannot monitor surrounding area. When cleaning, do not allow the high-pressure water to get into camera directly, and 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.



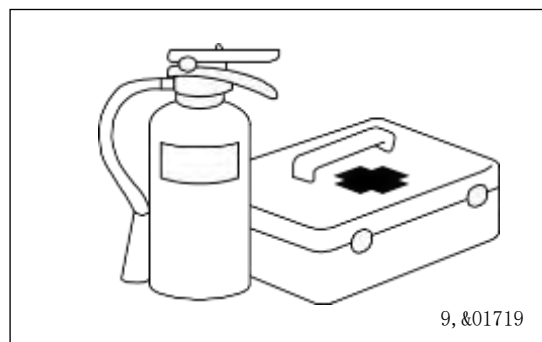
PRECAUTIONS FOR INSIDE OPERATOR'S COMPARTMENT

- 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.

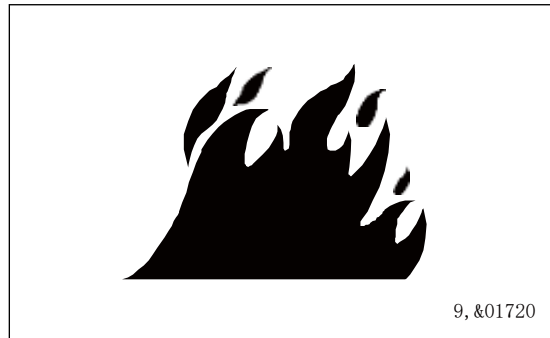
- After a fire, harmful compounds may be left. If it touches your skin, it may have a bad influence on your body.
Be sure to wear rubber gloves when handle the materials left after the fire.
The material of the gloves, which is recommended is polychloroprene (Neoprene) or polyvinyl chloride (in the lower 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 the exhaust gas aftertreatment devices which purify the exhaust gas.

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.

When there are thatched houses, dry leaves or pieces of paper near the job site, stop the regeneration before starting the work in order to prevent fire hazards due to highly heated exhaust gas during the aftertreatment devices regeneration.

Explosion caused by lighting equipment

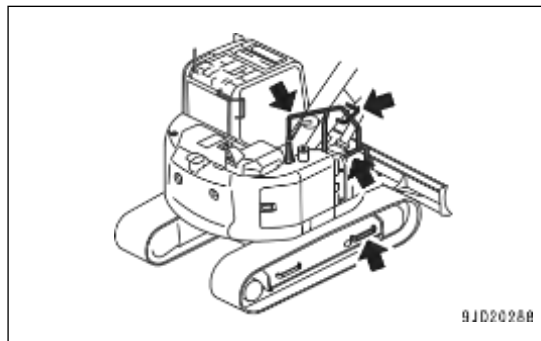
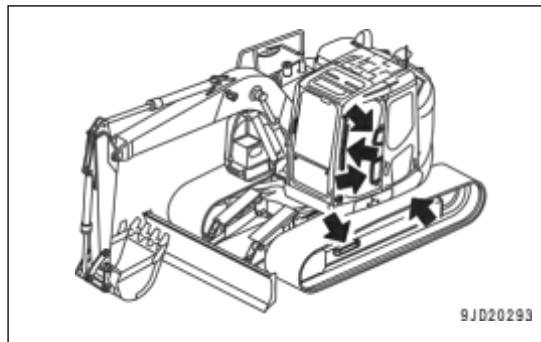
- When checking fuel, oil, battery electrolyte, or coolant, always use lighting with anti-explosion specifications.
- When taking the electrical power for the lighting equipment from the machine, see “POWER SUPPLY OUTLET (3-106)”.

PRECAUTIONS WHEN GETTING ON OR OFF MACHINE

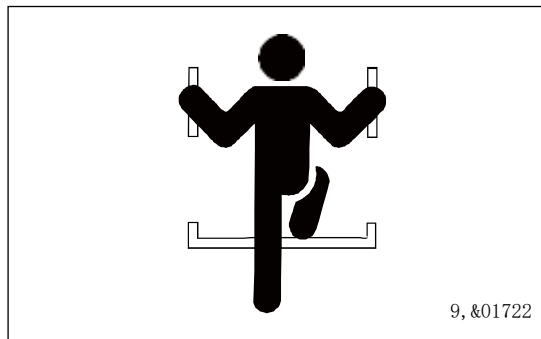
USE HANDRAILS AND STEPS WHEN GETTING ON OR OFF MACHINE

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 on the right 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 or lock lever when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- 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.

LIFTING OF PERSONNEL PROHIBITED

Under no circumstances should this machine be used for the lifting of personnel.

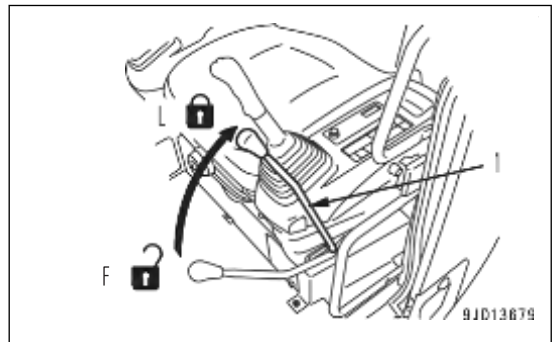
NO PEOPLE ON ATTACHMENTS

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 the operator's seat, such as when opening or closing the front window or ceiling window, when removing or installing the bottom window, or adjusting the position of the seat, always lower the work equipment completely to the ground, set lock lever (1) to lock position (L), and stop the engine.

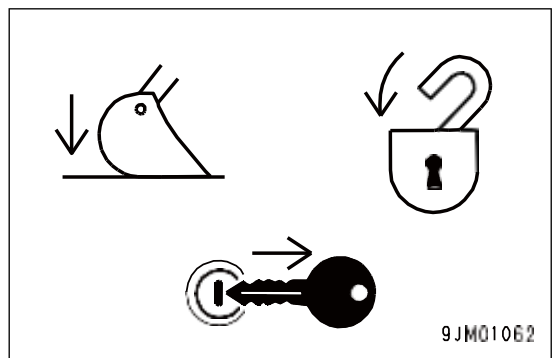
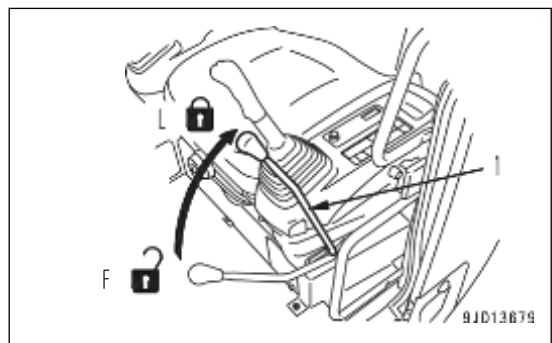
If the control levers are touched by mistake, there is danger that the machine may suddenly move and cause serious personal injury or death.



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.

When leaving the machine, always lower the work equipment completely to the ground, set lock lever (1) to lock position (L), and stop the engine. In addition, lock all places and always take the key with you and keep it in the specified location.



EMERGENCY EXIT FROM OPERATOR'S CAB

- If it should be impossible to open the door of the cab, break the window glass with the hammer supplied and use the window as an emergency escape.
For details, see "EMERGENCY ESCAPE HAMMER (3-104)" in this manual.
- When escaping, remove the pieces of glass from the window frame first and be careful not to cut yourself on the glass. Be careful also not to slip on the broken pieces of glass on the ground.

ELECTROMAGNETIC INTERFERENCE

When the machine is operating close to a source of high electromagnetic interference, such as a radar station, some abnormal phenomena may be observed.

- The display on the monitor panel may behave erratically.
- The warning buzzer may sound.

These effects do not signify a malfunction and the machine will return to normal as soon as the source of interference is removed.

DO NOT GET CAUGHT IN WORK EQUIPMENT

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.

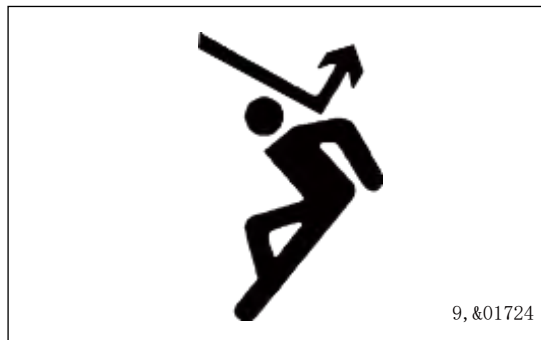
PRECAUTIONS RELATED TO PROTECTIVE STRUCTURES

The operator's compartment is equipped with a structure (such as ROPS, OPG) 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.



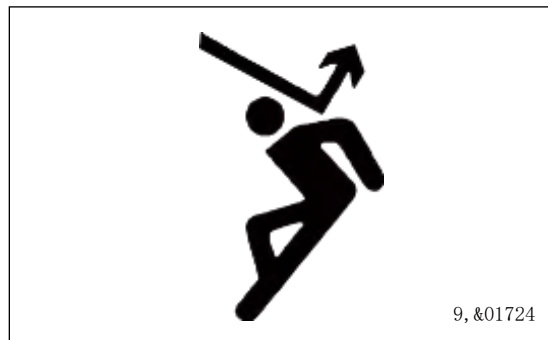
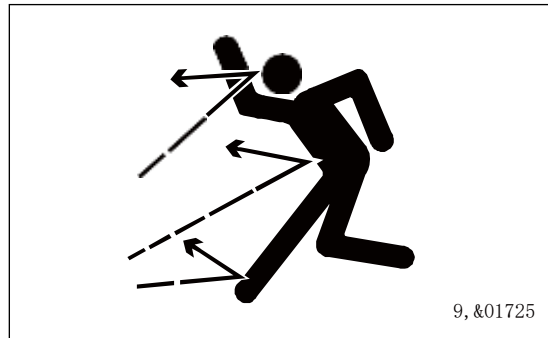
PROTECTION AGAINST FALLING, FLYING OR INTRUDING OBJECTS

On jobsites where there is a hazard that falling objects, flying objects, or intruding objects may hit or enter the operator's cab, consider the operating conditions and install the necessary guards to protect the operator.

- When working in mines or quarries where there is a hazard of falling rock, install FOPS and a front guard, and use a laminated coating sheet on the front glass (internal side). When carrying out the above operations, always close the front window. Always check that there is no one except the operator in the surrounding area. They may be hit by falling objects or flying objects.
- When carrying out breaker operations, use a fully transparent laminated coating sheet on the front glass (internal side). Keep all the windows closed when operating and always check that there is no one except the operator in the surrounding area. They may be hit by flying objects.

The above recommendations assume that the conditions are for standard operations, but it may be necessary to add additional guards according to the operating conditions on the job-site. Always contact your Komatsu distributor for advice.

In such a case, do not operate the machine without an additional guard. Be sure to consult with your Komatsu distributor about necessary guards.



ACTIONS IN THE EVENT OF DAMAGE TO SAFETY STRUCTURES

The following components comprise the machine safety structure that can prevent injury to the operator from falling objects, flying objects and intruding objects as detailed in the previous section.

- Operator cabin
- FOPS (falling object protective structure)
- Roof window glass
- Front window guard
- Front window glass

In the event any of the above parts become broken or damaged such that their function would be impaired, they must be replaced with genuine Komatsu replacement parts.

No attempt should be made to repair these parts as this may have an adverse effect on component strength or durability.

If such a repair is undertaken without authorisation from Komatsu there is a danger that a problem might occur that will lead to serious personal injury.

If in doubt please contact your Komatsu distributor.

Komatsu can not take any responsibility for accidents, failures or damage caused by unauthorised repair to the above mentioned components.

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 serious personal injury, or product failures, or physical loss or damage resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.

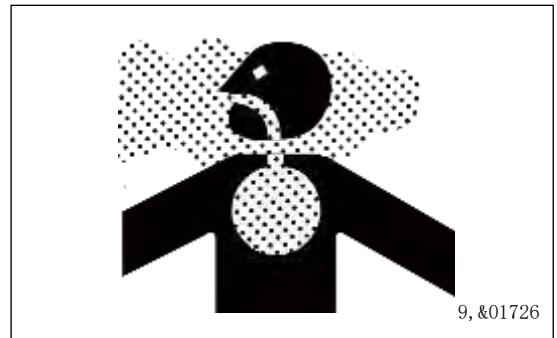
- When installing optional parts or attachments, contact your Komatsu distributor for advice to any potential problems or safety and legal requirements.
- The machine weight will not exceed ROPS certified value as long as the optional attachments written in the attachment combination table of this manual are installed. When installing optional parts or attachments which are not written in this manual, the machine weight must not exceed ROPS certified value. Always contact your Komatsu distributor before installing.
- Installing some work equipment combinations may cause interference and damage with the cab or other parts of the machine during operation and could cause serious personal injury or death. Before using unfamiliar work equipment, always check for potential interference while operating the machine. Always ensure the operator's safety when working with unfamiliar work equipment.
- 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 RELATED TO CAB GLASS

- If the cab glass is broken during operations, stop operations and repair the cab glass immediately.
- If the cab glass on the work equipment side is broken, there is a hazard that the operator may be directly hit or caught in the work equipment. If the glass is broken, stop operation immediately and replace the glass.
- The ceiling window is made of plastic, so if it is scratched, the visibility will become poor and there is danger that it may break. If the ceiling window is scratched, replace it with the new one as soon as possible. If the ceiling window is scratched and is not replaced, there is a danger that any rocks falling on it will cause it to break, leading to injury to the operator.

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.



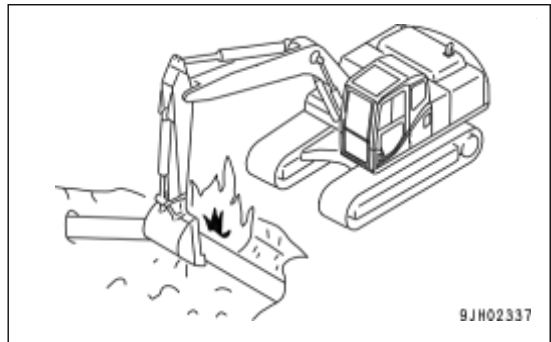
PRECAUTIONS FOR OPERATION

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 houses, 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.



PRECAUTIONS WHEN WORKING ON LOOSE GROUND

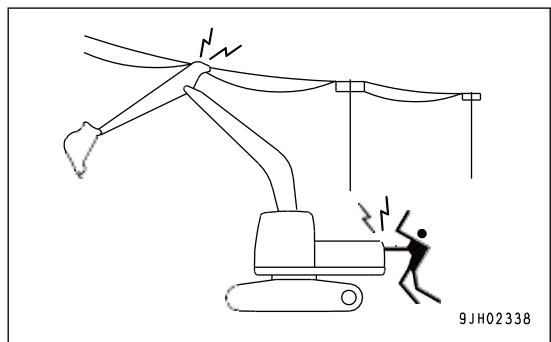
- Avoid driving or operating the machine near the edge of cliffs, road edges, and deep ditches. The ground may be weak in such areas. If the ground should collapse under the weight or vibration of the machine, there is a hazard that the machine may fall or tip over. Remember that the soil is weak in 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 of Cables	Safety Distance
100 V, 200 V	Min. 2 m
6600 V	Min. 2 m
22000 V	Min. 3 m
66000 V	Min. 4 m
154000 V	Min. 5 m



Voltage of Cables	Safety Distance
187000 V	Min. 6 m
275000 V	Min. 7 m
500000 V	Min. 11 m

- 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 (machines equipped with cameras) to ensure good visibility, there are places that cannot be seen from the operator's seat. Be careful when performing operation.

When driving the machine 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 driving the machine 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 head lamps installed to the machine, and set up additional lighting 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 to ensure good visibility.
- Clean off any dirt from the lens of cameras installed to the machine, and make sure that the camera gives a clear view.

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 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 an approved respirator.



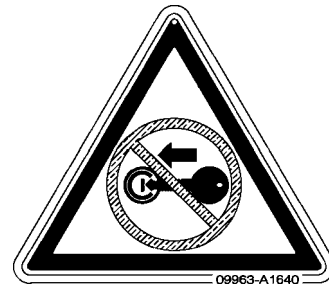
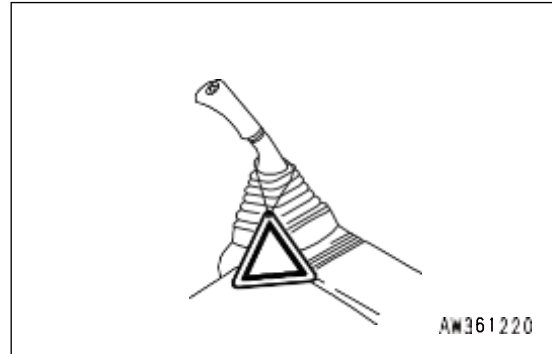
- Prohibit anyone other than the operator from coming close to the machine during operation.
- Always observe the regulations for jobsite and environmental standards.

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.

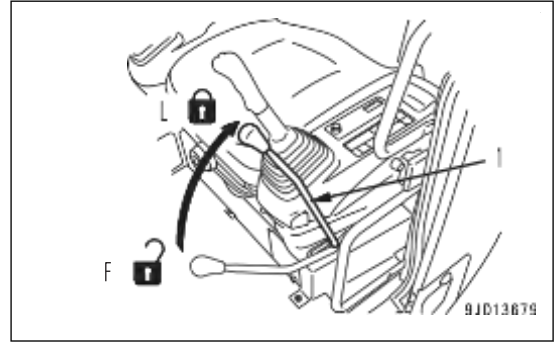


CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE

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 "METHOD FOR WALK-AROUND CHECK (3-129)".
- Remove all dirt from the surface of the lens of the headlamps and working 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 any pedals, 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.

- Before starting the engine, check that lock lever (1) is in LOCK position (L).
- Adjust the mirrors to have a good rear view from the operator's seat.
For the adjustment, see "METHOD FOR ADJUSTING MIRRORS (3-145)".
- Adjust the mirrors to have a good view of the surrounding area from the operator's seat.
For the adjustment, see "METHOD FOR ADJUSTING REAR VIEW CAMERA ANGLE (3-147)".
- Check that there is no person or obstacle above, below, or in the area around the machine.



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.

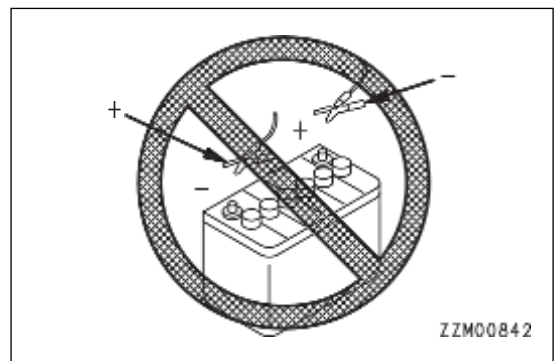
IN COLD WEATHER

- 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 (3-110)". 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 (3-240)”.

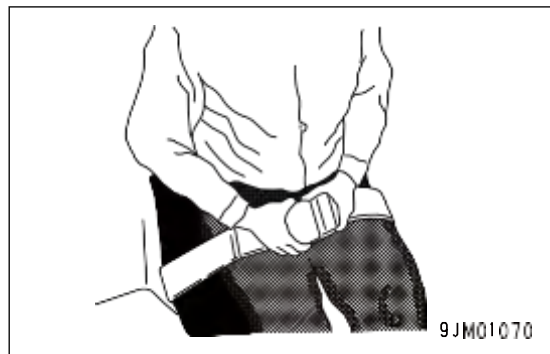
PRECAUTIONS FOR OPERATION

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.

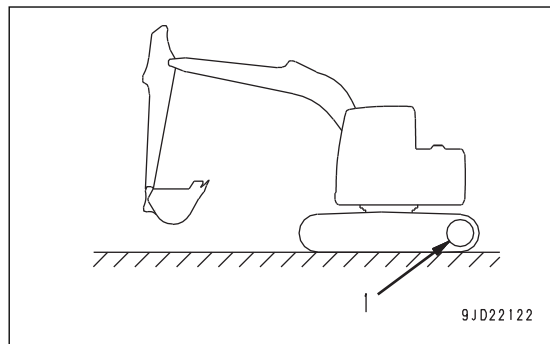
When performing the checks, move the machine to a wide area with no obstructions, and pay careful attention to the surroundings. Prohibit other personnel from coming close to the machine during checks.

- 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 that the movement of the machine matches the display on the control pattern card. If it does not match, replace it immediately with the correct control pattern card.
- Check the operating condition of the machine, work equipment, and travel and swing 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.



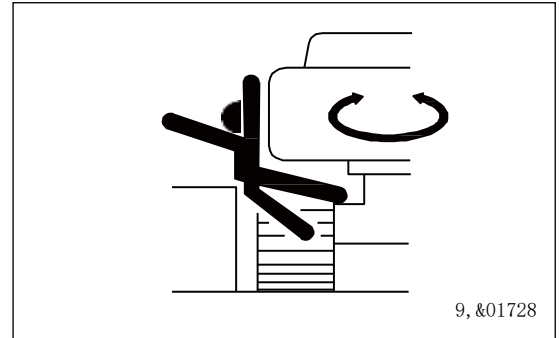
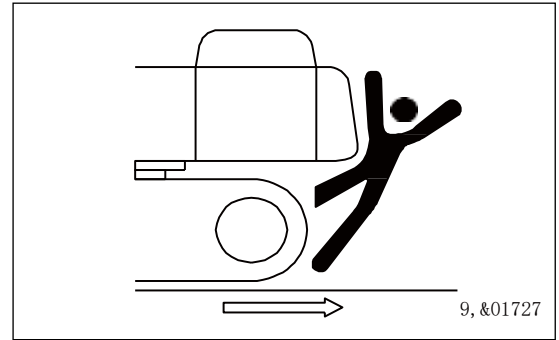
PRECAUTIONS WHEN TRAVELING IN FORWARD OR REVERSE AND SWINGING

- When driving the machine, drive with sprocket (1) at the rear of the machine. If sprocket (1) is at the front, the operation of the travel levers will be the opposite of the actual direction of travel, so there is a hazard that the machine may travel in an unexpected direction, leading to serious injury or death.
- Always lock all the doors and windows of the operator's compartment in position regardless of whether it is open or closed. Always close all the windows and doors on jobsites where there is danger of scattering fragments, and things which may intrude into operator's cab.
- Prohibit anyone other than the operator to get on the machine.
- If there are any people 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. Before starting travel or swing, be sure to observe the following.



- 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 travel alarm and other alarms work properly.
- If there is an area in the rear of the machine which cannot be seen, position a signalman. Be extremely careful not to hit any people or object, and drive or swing slowly.

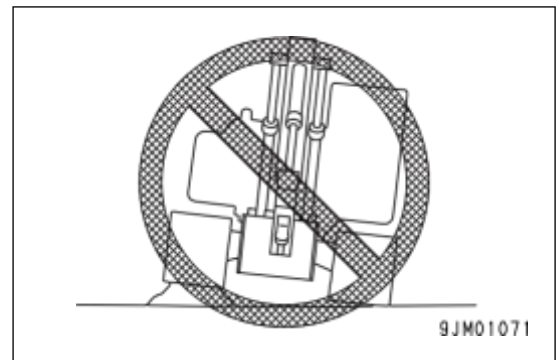
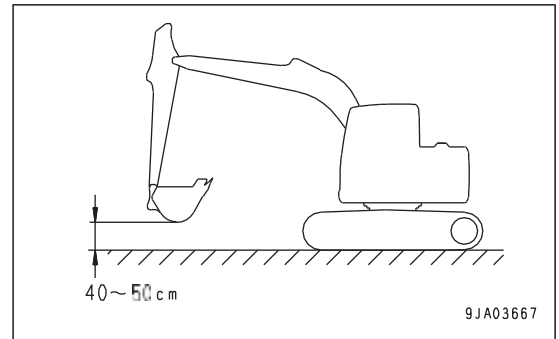
Always be sure to perform the above precautions even when the machine is equipped with mirrors and cameras.



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.

- 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 approximately 40 to 50 cm 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.
- If the view to the right side is poor, raise the boom to ensure better visibility.
- Always turn the auto-deceleration switch OFF (cancel) when driving the machine on rough ground or steep slopes. If the machine is operated with the auto-deceleration system ON (activated), the engine speed will rise and the machine travel speed may suddenly become faster.
- 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.

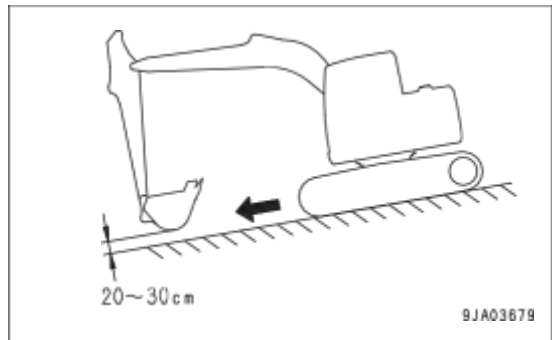
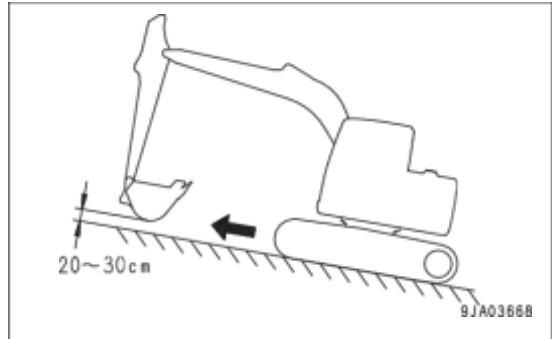


- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the machine body or work equipment hit anything.

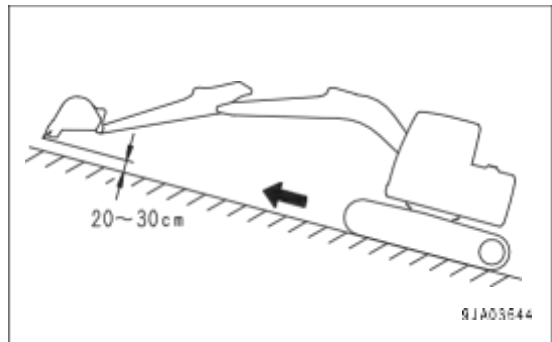
PRECAUTIONS WHEN TRAVELING ON SLOPES

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

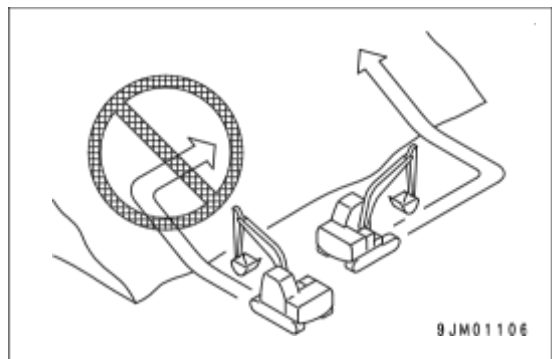
- Keep the work equipment approximately 20 to 30 cm above the ground. In case of emergency, lower the work equipment to the ground immediately to help stop the machine.
- When driving the machine up slopes, set the operator's cab facing uphill, when driving downhill, set the operator's cab facing downhill. Always be sure of the safety of the ground under the front of the machine when driving.



- When driving the machine up a steep slope, extend the work equipment to the front to improve the balance, keep the work equipment approximately 20 to 30 cm above the ground, and drive it at low speed.



- When driving the machine downhill, lower the engine speed, keep the travel lever close to NEUTRAL position, and drive it at low speed.
- 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.

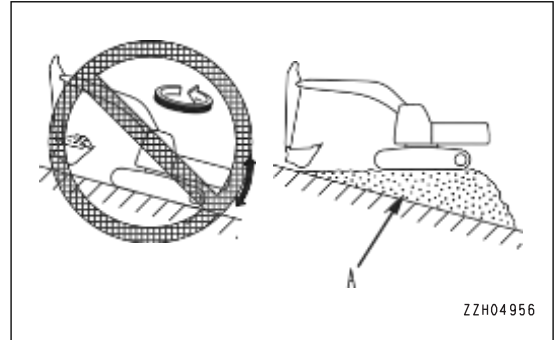


- Do not drive the machine on a slope covered with the steel plates. Even with slight slopes there is a hazard that the machine may slip.
- Even with slight slopes, there is a hazard that the machine may slip.

- If the engine stops, move the control levers immediately to NEUTRAL position, set the lock lever to LOCK position, and then start the engine.

PRECAUTIONS WHEN OPERATING ON SLOPES

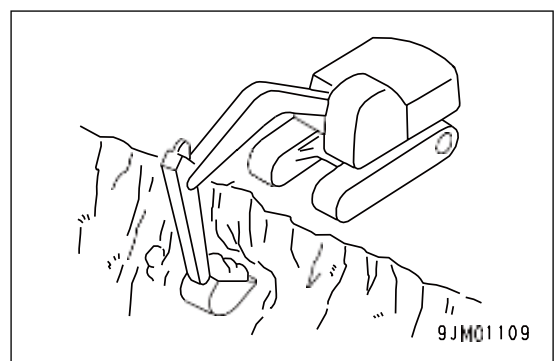
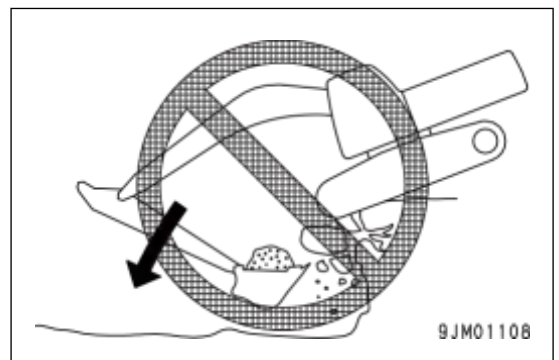
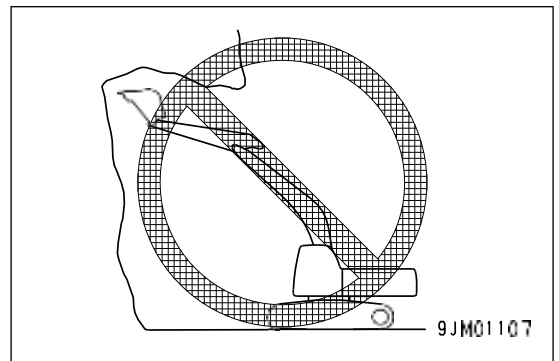
- When working on slopes, there is a hazard that the machine may lose its balance and turn over when performing swing or work equipment operations. This may lead to serious personal injury or death. Always provide a stable place when performing these operations, and operate carefully.
- Do not swing the work equipment from the uphill side to the downhill side when the bucket is loaded. This operation is dangerous, and may cause the machine to turn over.
- If the machine has to be used on a slope, pile the soil to make a platform (A) that will keep the machine as horizontal as possible.
- Do not work on a slope covered with the steel plates. Even with slight slopes there is a hazard that the machine may slip.



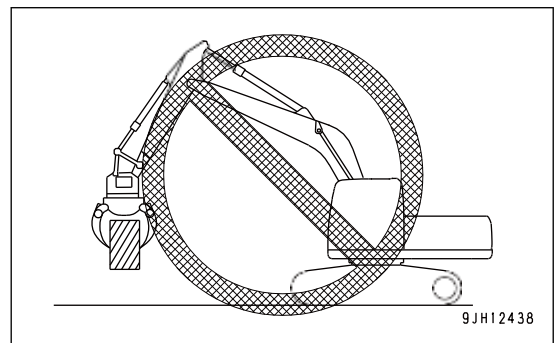
PROHIBITED OPERATIONS

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

- It is dangerous to work under an overhang. Mudslide or rockfall may occur, or the overhang may collapse. Never perform digging under an overhang.
- Do not excavate too deeply under the front of the machine. The ground under the machine may collapse and cause the machine to fall.
- For a quick escape in an emergency, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when performing road operations.



- 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.
- Generally speaking, the machine is more liable to tip over when the work equipment is at the side than when it is at the front or rear of the machine.
Be extremely careful when swinging the work equipment from the front or rear to the side of machine while it is carrying a load. It is dangerous that the machine may tip over.
- When using a breaker or other heavy work equipment, it is dangerous that the machine may lose its balance and tip over. When operating the machine on the flat ground as well as on slopes, observe the following.
 - Do not suddenly lower, swing, or stop the work equipment.
 - Do not suddenly extend or retract the boom cylinder. It is dangerous that the machine may tip over by the impact.
- In the operation using the fork or grapple, do not attempt to pick up an object with the tips.
The picked up object can easily slip off. Machine may be damaged, or personal injury or death may occur.



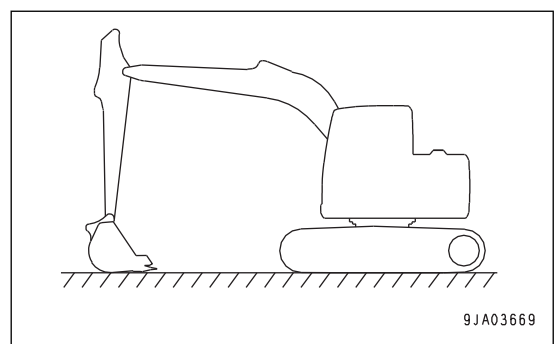
PRECAUTIONS WHEN OPERATING ON SNOW OR FROZEN SURFACES

- Snow-covered or frozen surfaces are slippery, so be extremely careful when driving 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.
- 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.

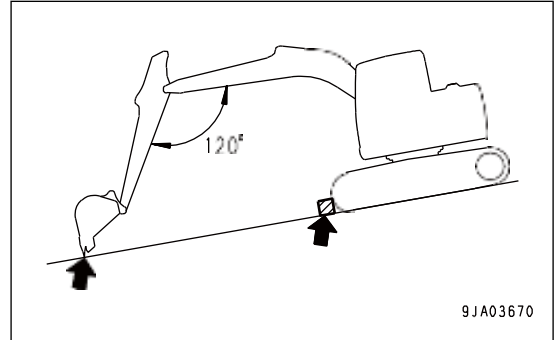
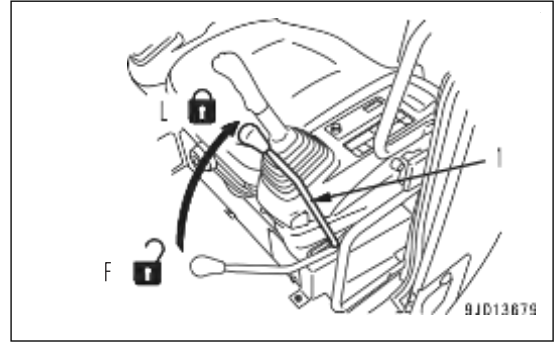
PRECAUTIONS WHEN PARKING MACHINE

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.
- Lower the work equipment to the ground.



- When leaving the machine, set lock lever (1) to LOCK position (L), then stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from 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, always observe the following.
 - Set the work equipment on the downhill side and dig it into the ground.
 - In addition, block the tracks from movement.



PRECAUTIONS FOR TRANSPORTATION

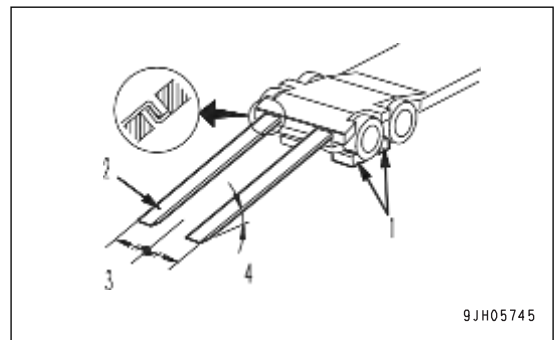
When the machine is transported on a trailer, serious personal injury or death may result because of the accident during transportation. Always observe the following.

- Always check the machine dimensions carefully. Depending on the work equipment and optional devices 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 may need to be divided into components for transportation depending on the regulation. When transporting the machine, consult your Komatsu distributor.

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.
- Never use the work equipment to load or unload the machine. There is danger that the machine may fall or tip over.
- 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) Center of ramp
 - (4) Angle of ramp: Max. 15 °
- 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.
- Always turn the auto-deceleration switch OFF (cancel). If the machine is operated with the auto-deceleration system ON (activated), there is danger that the engine speed will suddenly rise, the machine will suddenly move off, or the machine travel speed will become faster.



- Run the engine at low idle and drive the machine slowly at low speed.
- When on the ramps, do not operate any lever except for the travel lever (travel forward and reverse).
- Never correct your steering on the ramps. If necessary, drive off the ramps onto the ground, correct the direction, then enter the ramps again.
- The center of gravity of the machine will change suddenly at the joint between the ramps and the loading platform, and there is danger of the machine losing its balance. Drive slowly over this point.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- When swinging the upper structure on the loading platform, lower the work equipment, retract it, and perform the operation slowly.
- Always fold the mirrors and stow the radio antenna.
For the method of folding the mirrors and stowing the antenna, see “METHOD FOR ADJUSTING MIRRORS (3-145)” and “STOW ANTENNA (3-216)”.
- For machines equipped with a cab, always lock the door after loading the machine. To prevent the door from opening during transportation.
For detail, see “TRANSPORTATION (3-219)”.
- 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.

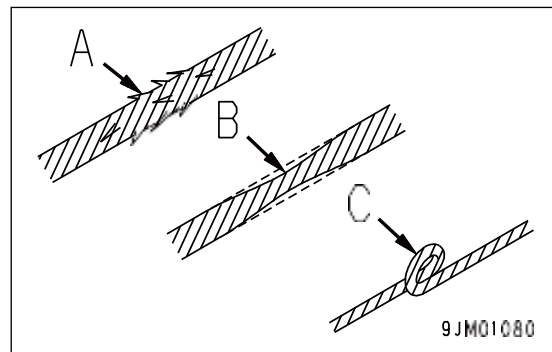
TOWING AND BEING TOWED

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 (3-235)”.

- 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.



LIFTING OBJECTS WITH BUCKET LINK LIFTING DEVICE (OPTIONAL EQUIPMENT)

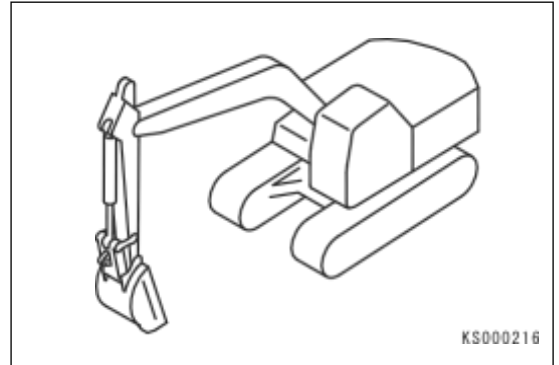
SAFETY RULES FOR LIFTING OBJECTS

- Determine the signals to be used and place a signalman in position.
- To prevent the machine from tipping over or falling, carry out the operation on flat ground.
- To prevent the danger of contact with a raised load or the danger from a falling load, do not allow any worker inside the area.
- Do not exceed the specified lifting load.
For details of the maximum lifting load permitted for this machine, see the lifting capacity decal and link markings.

NOTICE

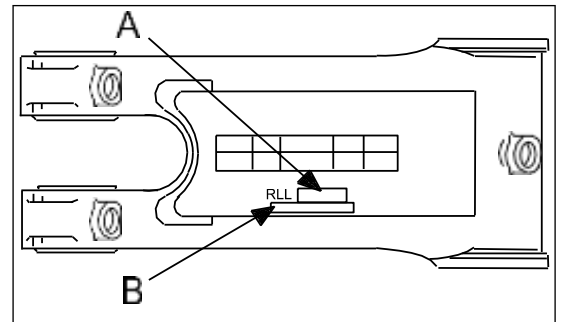
RLL (Rated Lifting Load) for the link may not be the same as the lifting capacity of the machine. Always be sure to lift within the relevant lifting limits.

- The lifting link RLL (Rated Lifting Load) and part number are stamped on the link as shown below.
- All components in the load line (eg. chains, shackles etc.) must be rated correctly for the load to be lifted.
- When swinging or operating the work equipment, check carefully that the surrounding area is clear from objects, structures or any persons working around the machine.
- During the lifting operation, reduce the engine speed and carry out the operation in L mode.
- Never travel the machine while lifting the load.
- Do not swing or operate the work equipment suddenly. There is a danger that this may cause the load to swing and the machine to become unstable or tip over.
- Do not leave the operator seat when there is a raised load.
- If the load approaches the lifting limit of the machine, a warning is shown on the monitor panel and an audible alarm sounds. In this case, lower the load to the ground.



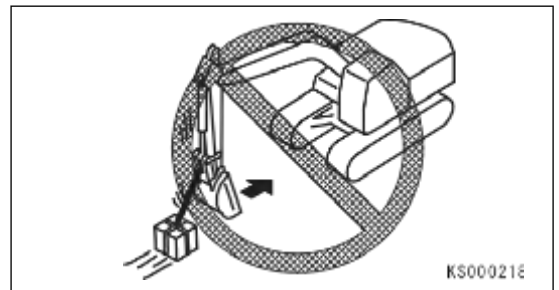
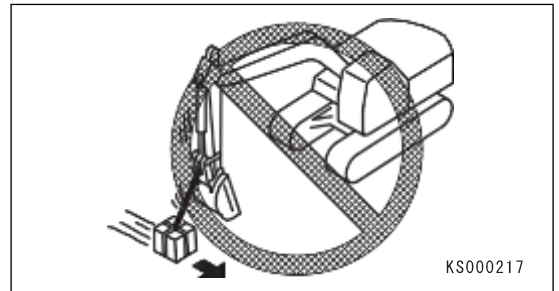
(A) RLL (Rated Lifting Load) number.

(B) Part number.



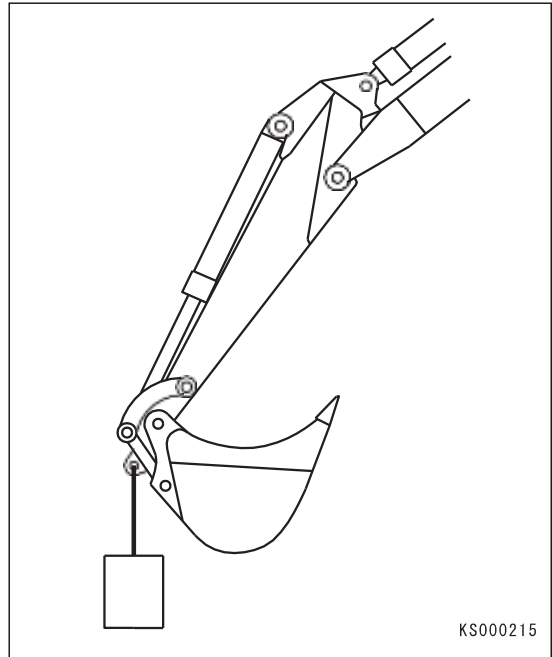
- Do not use the work equipment or swing to pull the load in any direction.

There is a danger that the lifting eye may be damaged due to abnormal loading making it unsafe to lift.

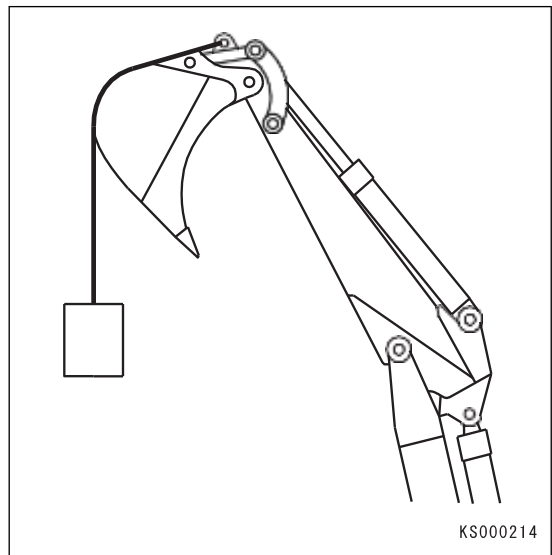


- The operator or person attaching the sling should inspect the bucket link lifting device and all the components in the load line (e.g. chains, shackles etc.) visually for damage or deformation before use to ensure that they are not damaged or worn.

Any damaged, deformed or worn parts should not be used and must be replaced.



- Where possible the lifting operation should be carried out with the bucket curled in order to increase visibility and prevent any obstruction or deflection of the sling or chain away from the vertical position.
- If the load is to be lifted at a height where this is not possible, the sling or chain must only be guided by the back wall of the bucket and not any other part of the machine.



LIFTING OBJECTS WITH BUCKETS

SAFETY RULES FOR LIFTING OBJECTS

- Determine the signals to be used and place a signalman in position.
- To prevent the machine from tipping over or falling, carry out the operation on flat ground.
- To prevent the danger of contact with a raised load or the danger from a falling load, do not allow any worker inside the area.
- Do not exceed the specified lifting load.
For details of the maximum lifting load permitted for this machine, see the decal and bucket manufacturers RLL (Rated Lifting Load).

NOTICE

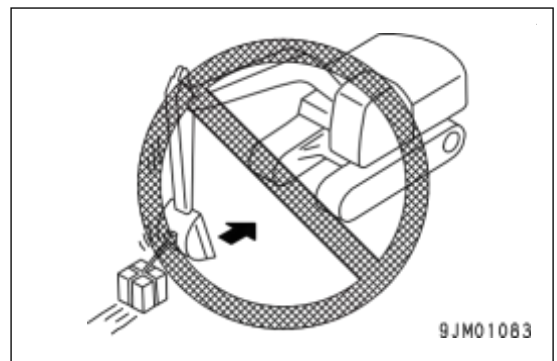
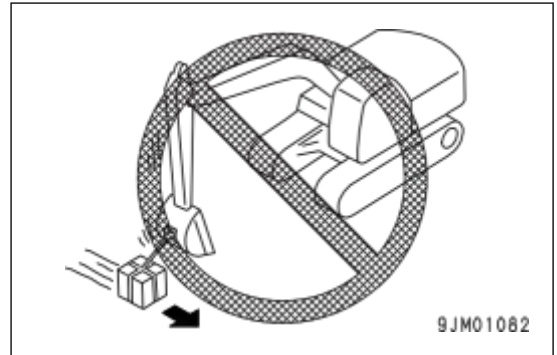
RLL (Rated Lifting Load) for the bucket may not be the same as the lifting capacity of the machine. Always be sure to lift within relevant lifting limits.

- All components in the load line (eg. chains, shackles etc.) must be rated correctly for the load to be lifted.
- It is dangerous if the raised load hits any person or structure. When swinging or operating the work equipment, check carefully that the surrounding area is safe.

- Do not swing or operate the work equipment suddenly.
There is a danger that this may cause the load to swing and the machine to become unstable or tip over.
- Do not leave the operator seat when there is a raised load
Do not leave the operator seat when there is a raised load.
- Do not use the work equipment or swing to pull the load in any direction.

There is a danger that the hook may be break and the load come off, causing the work equipment to move suddenly and cause personal injury.

- When swinging or operating the work equipment, check carefully that the surrounding area is clear from objects, structures or any persons working around the machine.
- During the lifting operation, reduce the engine speed and carry out the operation in L mode.
- Never travel the machine while lifting the load.
- If the load approaches the lifting limit of the machine, a warning is shown on the monitor panel and an audible alarm sounds. In this case, lower the load to the ground.



PRECAUTIONS FOR MAINTENANCE

PRECAUTIONS BEFORE STARTING INSPECTION AND MAINTENANCE

DISPLAY WARNING TAG DURING INSPECTION AND MAINTENANCE

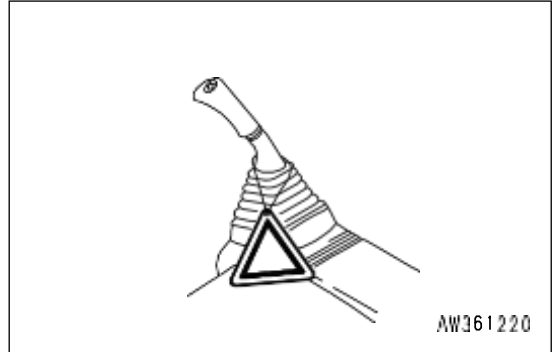
During inspection and maintenance, always display the "DANGER! Do NOT operate!" warning tag.

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-A1640

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.
- When cleaning the ceiling window which is made of organic glass (polycarbonate), use tap water and avoid use of organic solvents for cleaning. An organic solvent like benzene, toluene or methanol can invite a chemical reaction like dissolution and decomposition on the window glass, deteriorating polycarbonate in use.

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.

STABILITY

- When dismantling or assembling the machine for the purpose of maintenance, repair or transportation, always ensure that at each stage of the process, care is taken to ensure that the machine remains stable. Failure to do this could result in serious injury or death.

GUARDS

- Guards are installed in the area of the engine to protect personnel from moving parts. These guards should only be removed by Komatsu service engineer unless specific instructions are given in this manual.

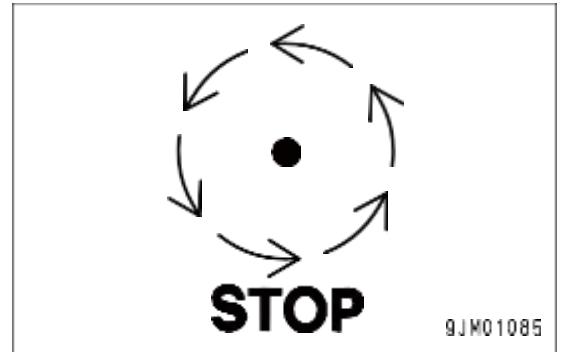
END OF SERVICE LIFE

- For safe dismantling of the machine at the end of service life, please contact your Komatsu distributor.

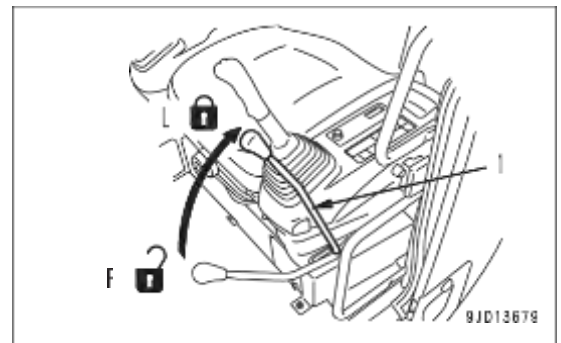
STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

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.

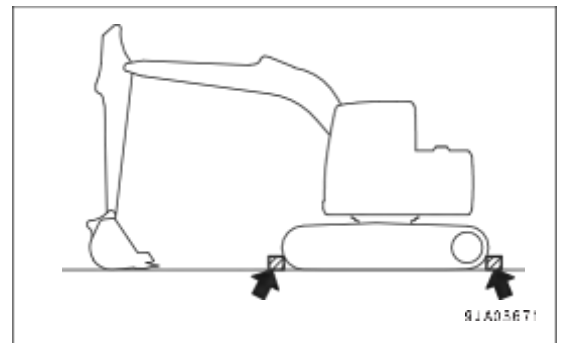
- Lower the work equipment to the ground and stop the engine before performing any inspection and maintenance.



- Turn the starting switch to ON position. Operate the work equipment control lever back and forth, right and left a few times fully to release the remaining internal pressure in the hydraulic circuit. Then move lock lever (1) to LOCK position (L) and turn the starting switch to OFF position.
- Check that the battery relay is off and main power is not conducted. (After turning the starting switch to OFF position, wait for approximately 1 minute and press the horn switch. If the horn does not sound, power is not conducted.)



- Block the tracks from movement.

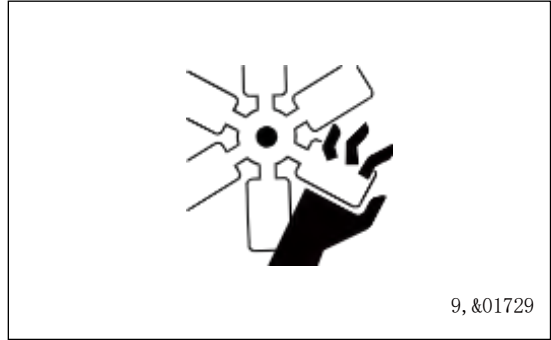


TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

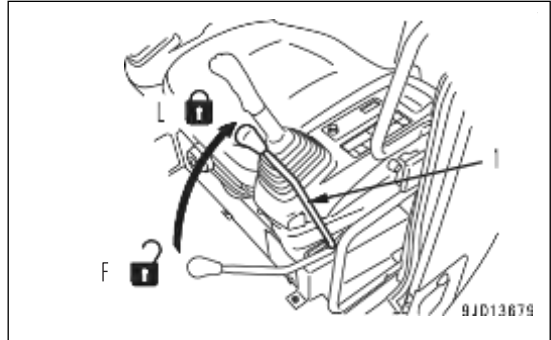
To prevent accident, do not perform maintenance with the engine running. When it is necessary to perform the maintenance with the engine running, always observe the following.

- 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.
- Stop the regeneration of the aftertreatment devices during the maintenance.

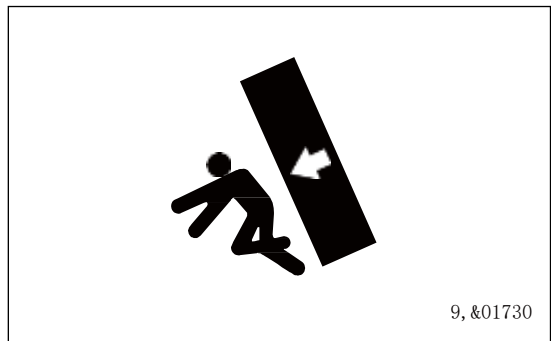


- Release the remaining pressure in the hydraulic system, and place lock lever (1) to LOCK position (L). For the procedure for releasing the remaining pressure, see “METHOD FOR RELEASING PRESSURE IN ACCUMULATOR (4-67)”.
- Do not touch the control levers or pedals. When it is necessary to operate the control levers or pedals, always give a signal to your fellow workers to evacuate them to a safe place.



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 ON MACHINE

- When performing maintenance work on the machine, maintain the foothold clean and orderly to prevent falling. Always observe the followings.
 - Avoid spilling of oil and grease.
 - Do not litter the tools.
 - Watch your step when walking around on the machine.
 - Remove mud and greases stuck to the shoe sole.



- Never jump down from the machine. 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.
- You must walk along the access aisle for checking being paved with non-slip pads. Never climb on the engine hood and cover to prevent personal injuries from falling or failing over due to losing your footing.

PRECAUTIONS WHEN WORKING UNDER MACHINE OR WORK EQUIPMENT

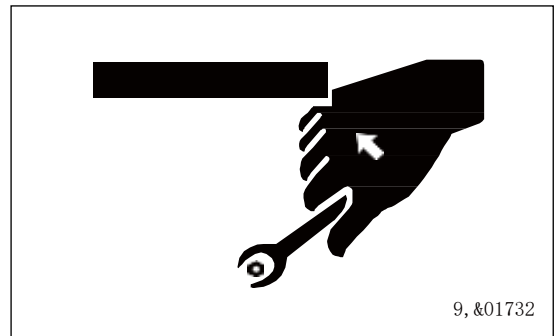
Machine or work equipment may fall, and it is dangerous that serious personal injury or death may occur. Always observe the following.

- Make sure the hoists or hydraulic jacks you use are in good condition 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 element wire of wire rope is frayed, twisted or pinched. Never use bent or distorted hooks.
- It is extremely dangerous to work under the machine if the track shoes are lifted off the ground and the machine is supported only with the work equipment. If any of the control levers is touched by accident, or there is damage occurring to the hydraulic piping, the work equipment or the machine will suddenly fall. Never work under the work equipment or the machine.
- If it is necessary to raise the work equipment or the machine and then go under it to perform inspection or maintenance, support the work equipment and machine securely with blocks and stands strong enough to support the weight of the work equipment and machine.
If the work equipment and machine are not supported, they may come down and it may cause serious personal injury or death.
- 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.

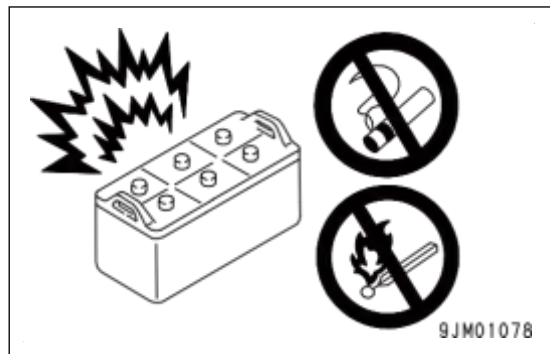
HANDLE BATTERY

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.

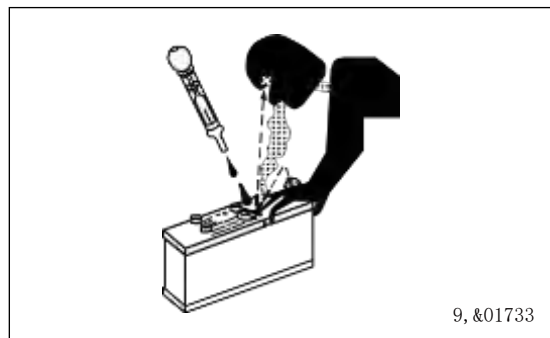
- Do not use or charge the battery if the battery electrolyte is below LOWER LEVEL mark. This may cause an explosion. Always perform periodic inspection of the battery electrolyte level, and add purified water (such as a commercial battery fluid) to UPPER LEVEL mark.
- Do not use a dry wipe to clean 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.

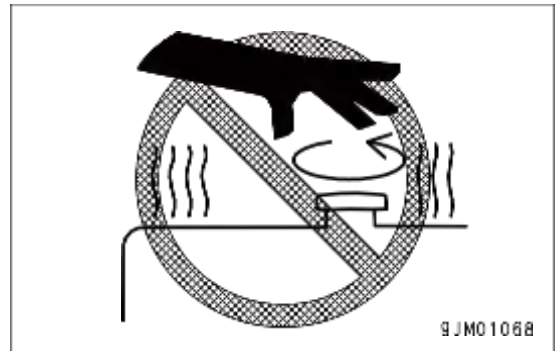
- If hard metal parts such as pins, bucket teeth, cutting edges, or bearings are hit with a hammer, pieces might be scattered, and it may cause serious personal injury or death. Always wear protective eyeglasses and gloves.
- If the pin is hit with strong force, it may come out, and injure people in the surrounding area. Do not allow anyone to enter the surrounding area.



9, &01734

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.



9 JMO1068

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.



9 JMO1067

PRECAUTIONS FOR HIGH-TEMPERATURE PARTS

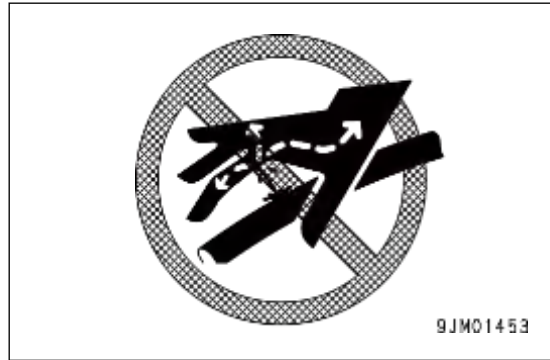
To prevent burns from touching high-temperature parts, when checking or performing maintenance after stopping engine, check the parts have been cooled down to touch with bare hand before checking or maintenance.

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 result. Always observe the following.

- Do not perform inspection or replacement work with the circuit under pressure. Release the pressure. For details, see "METHOD FOR RELEASING PRESSURE IN ACCUMULATOR (4-67)".
- 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.



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.

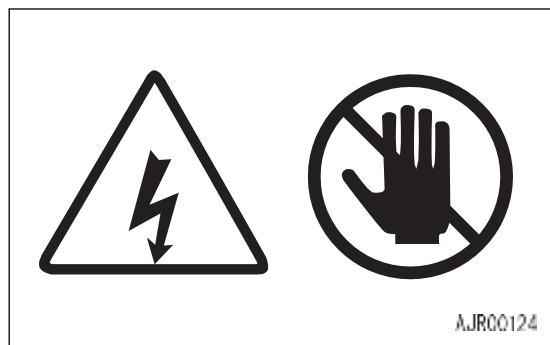
If any damaged or deformed hoses or piping are found, consult your Komatsu distributor.

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 HIGH VOLTAGE

When the engine is running and immediately after it is stopped, high voltage is generated inside the engine controller and the engine injector, and there is danger of electric shock. Never touch the inside of the engine controller or the injector part of the engine. If it is necessary to touch the inside of the engine controller or the injector part of the engine, consult your Komatsu distributor.



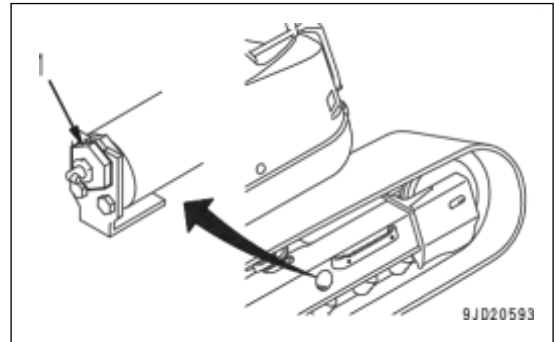
PRECAUTIONS FOR NOISE

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.

PRECAUTIONS FOR HIGH-PRESSURE GREASE WHEN ADJUSTING TRACK TENSION

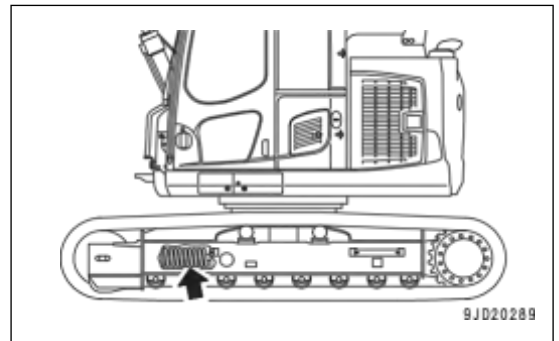
- Grease is pumped into the track tension adjustment system under high pressure. If the specified procedure for maintenance is not followed when making adjustment, grease drain plug (1) may fly out and cause serious injury or death or property damage.
- When loosening grease drain plug (1) to loosen the track tension, never loosen it more than 1 turn. Loosen the grease drain plug slowly.
- Never put your face, hands, feet, or any other part of your body close to grease drain plug (1).



DO NOT DISASSEMBLE RECOIL SPRING

Never disassemble the recoil spring assembly.

The recoil spring assembly has a powerful spring that acts to reduce the impact on the idler. If it is disassembled by mistake, the spring may shoot out and cause serious personal injury or death. If it is necessary to disassemble it, ask your Komatsu distributor to perform the work.



HANDLE ACCUMULATOR AND GAS SPRING

This machine is equipped with an accumulator. Even after the engine stops, if the work equipment control lever is operated after stop of the engine in the direction to lower the work equipment, the work equipment goes down with its own weight.

After stopping the engine, set the lock lever to LOCK 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.

CHEMICAL HAZARD

During maintenance or dismantling operations, where there is the risk of contact with hazardous chemical substances, relevant safety precautions should be taken.

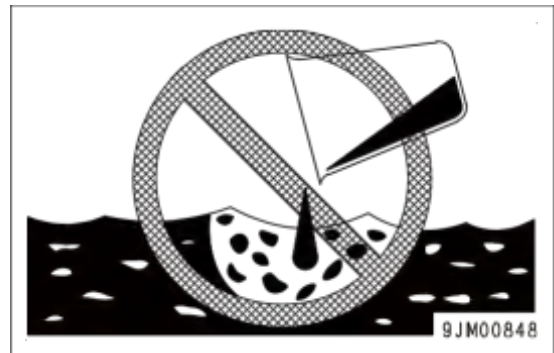
If any doubt exists, contact your Komatsu distributor.

See also “PRECAUTIONS FOR DISPOSING OF WASTE MATERIALS (2-48)” and “MAINTENANCE OF AIR CONDITIONER (2-48)”

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 defined life parts that have a particularly close relation to safety, such as hoses and the seat belt.
Replacement of defined life parts: See REPLACEMENT PARTS, “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 defined life parts if any defect is found, even when they have not reached the specified replacement time.

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.

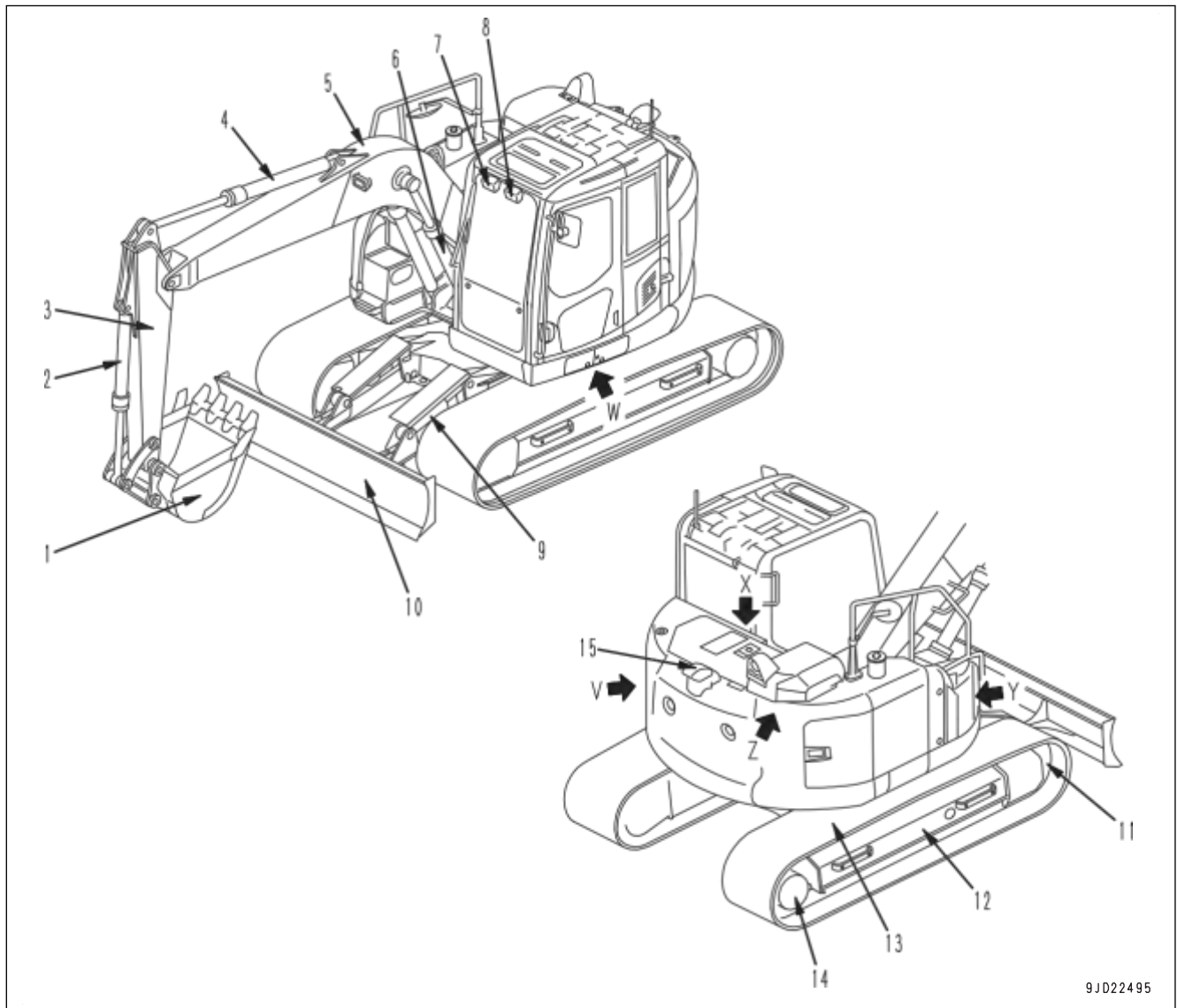
OPERATION

WARNING

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

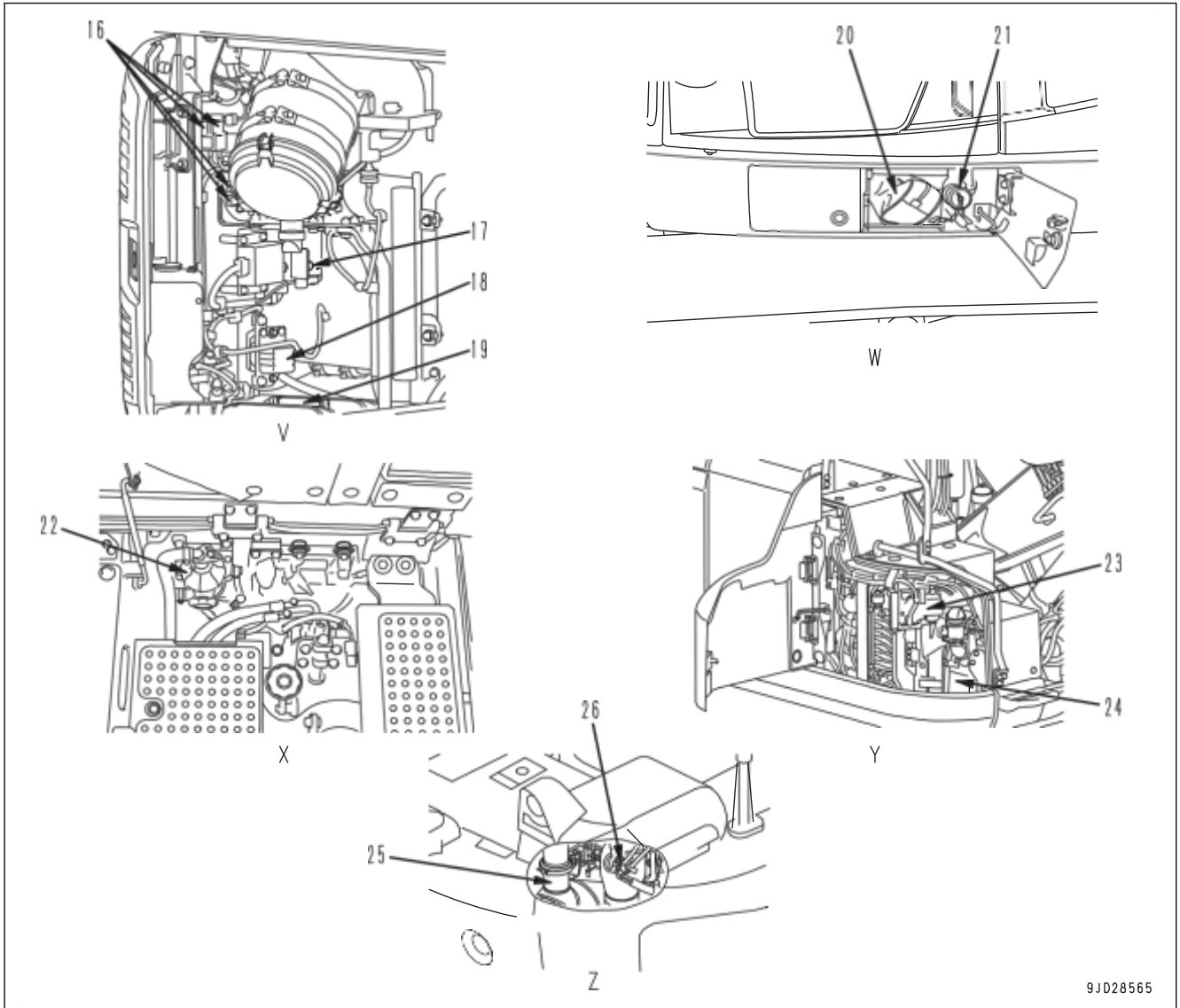
GENERAL VIEW

MACHINE EQUIPMENT NAME



9JD22495

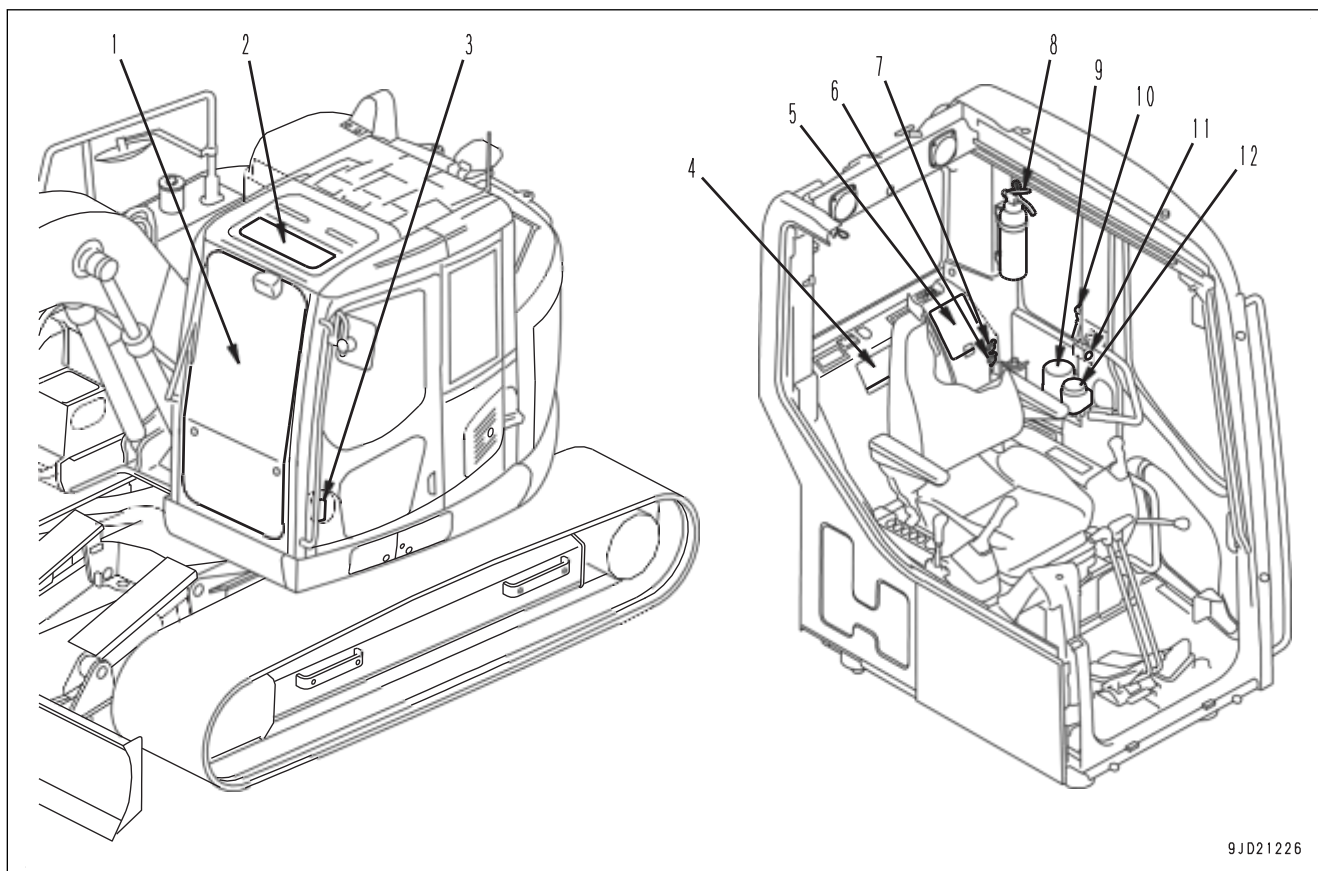
- (1) Bucket
- (2) Bucket cylinder
- (3) Arm
- (4) Arm cylinder
- (5) Boom
- (6) Boom cylinder
- (7) Additional lamp (if equipped)
- (8) Working lamp
- (9) Blade cylinder (blade specification)
- (10) Blade (blade specification)
- (11) Idler
- (12) Track frame
- (13) Track
- (14) Sprocket
- (15) Rear view camera



9JD28565

- | | |
|--------------------------------|---|
| (16) Fusible link | (22) Komatsu Closed Crankcase Ventilation (hereafter KCCV) ventilator |
| (17) System operating lamp | (23) DEF pump |
| (18) Battery disconnect switch | (24) DEF tank |
| (19) Battery | (25) SCR |
| (20) Toolbox | (26) DEF injector |
| (21) Grease pump holder | |

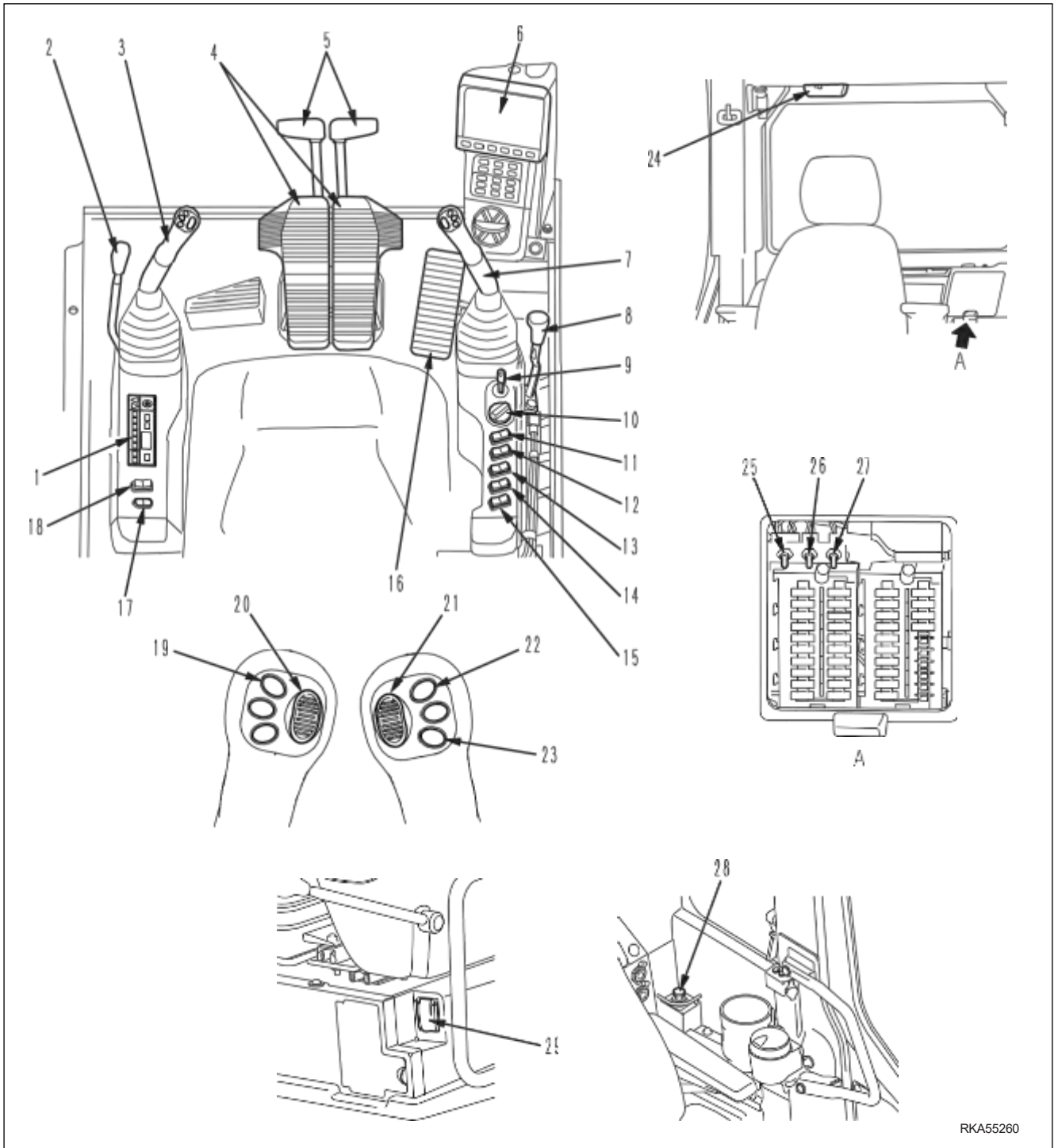
CAB EQUIPMENT NAMES



- (1) Front window
- (2) Ceiling window
- (3) Door handle
- (4) Magazine box
- (5) Fuse
- (6) 12 V Power supply 1

- (7) 12 V Power supply 2
- (8) Fire extinguisher (if equipped)
- (9) Cup holder
- (10) Emergency escape hammer
- (11) AUX
- (12) Ashtray

CONTROLS AND GAUGES NAMES



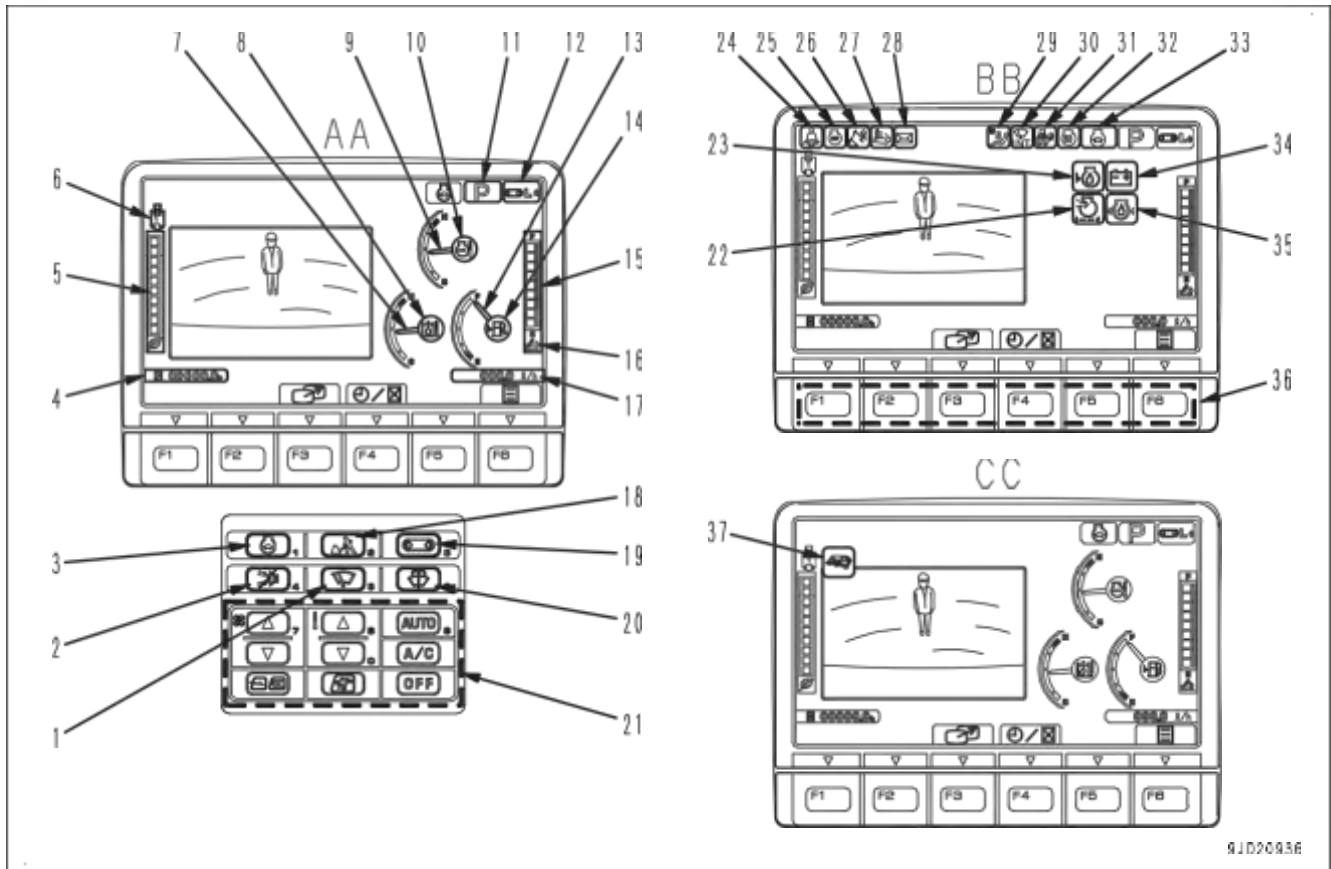
- (1) Radio
- (2) Lock lever
- (3) L.H. work equipment control lever
- (4) Travel pedal
- (5) Travel lever
- (6) Machine monitor
- (7) R.H. work equipment control lever
- (8) Blade control lever (blade specification)

- (9) Starting switch
- (10) Fuel control dial
- (11) Lamp switch
- (12) Swing lock switch
- (13) Beacon switch (if equipped)
- (14) Additional lamp switch (if equipped)
- (15) Wiper switch (if equipped)
- (16) Attachment control pedal (if equipped)

- (17) Seat heater switch (if equipped)
- (18) Quick coupler switch
- (19) Quick coupler switch
- (20) 2nd attachment proportional switch
- (21) 1st attachment proportional switch
- (22) Breaker switch
- (23) Horn switch
- (24) Room lamp switch
- (25) Pump secondary drive switch
- (26) Swing parking brake cancel switch
- (27) Lock lever automatic lock cancel switch
- (28) Cigarette lighter
- (29) Engine shutdown secondary switch

MACHINE MONITOR EQUIPMENT NAME

The display method of the monitor is partly different when the machine is not equipped with the KomVision. For details, see ATTACHMENTS AND OPTIONS, "MACHINE MONITOR EQUIPMENT NAME (6-38)".



AA: Standard screen, BB: Check before starting screen, CC: Maintenance time warning screen

- (1) Wiper switch
- (2) Buzzer cancel switch
- (3) Auto-deceleration switch
- (4) Service meter/clock
- (5) ECO gauge
- (6) Camera switch display
- (7) Hydraulic oil temperature gauge
- (8) Hydraulic oil temperature caution lamp
- (9) Engine coolant temperature gauge
- (10) Engine coolant temperature caution lamp
- (11) Working mode display
- (12) Travel speed display
- (13) Fuel gauge
- (14) Fuel level caution lamp
- (15) DEF level gauge
- (16) DEF level caution lamp
- (17) Fuel consumption gauge
- (18) Working mode selector switch
- (19) Travel speed selector switch
- (20) Window washer switch
- (21) Air conditioner control switch
- (22) Air cleaner clogging caution lamp
- (23) Engine oil level caution lamp
- (24) Seat belt caution lamp

- (25) Engine stop pilot lamp
- (26) Work equipment lock pilot lamp
- (27) Aftertreatment devices regeneration display
- (28) Message display
- (29) Air conditioner pilot lamp
- (30) Wiper pilot lamp
- (31) Swing lock pilot lamp

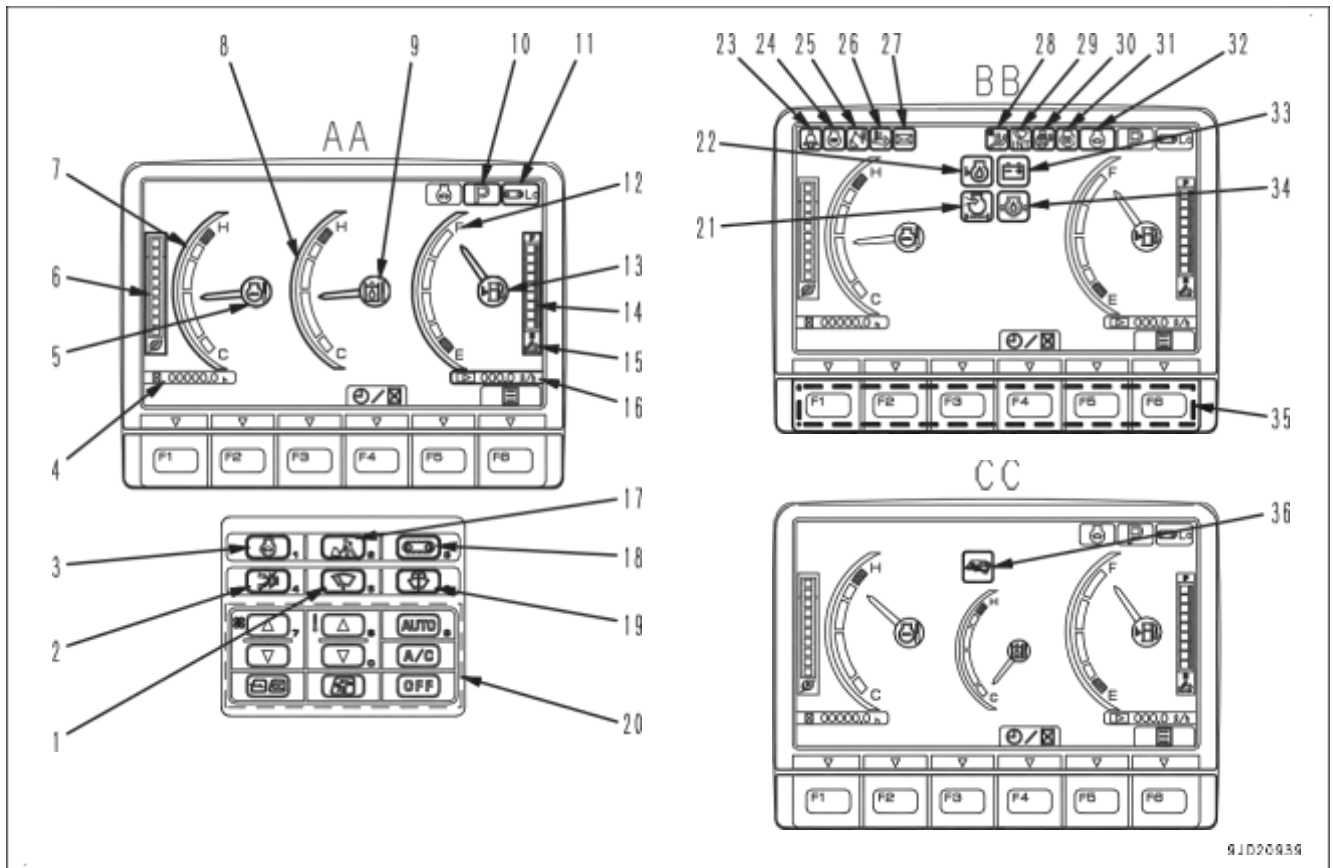
- (32) Preheating pilot lamp
- (33) Auto-deceleration pilot lamp
- (34) Charge level caution lamp- (35) Engine oil pressure caution lamp
- (36) Function switches (F1 to F6)
- (37) Maintenance time caution lamp

REMARK

The above figure does not show all of the caution lamp symbols. For details of the caution lamps, see “WARNING DISPLAY (3-17)”.

Displaying only meter

On the standard screen (camera display, meter display), press switch F3, and only the meter is displayed. For details, see “CAMERA IMAGE SELECTOR SWITCH (3-51)”.



AA: Standard screen, BB: Check before starting screen, CC: Maintenance time warning screen

- (1) Wiper switch
- (2) Buzzer cancel switch
- (3) Auto-deceleration switch
- (4) Service meter/clock
- (5) Engine coolant temperature caution lamp
- (6) ECO gauge
- (7) Engine coolant temperature gauge
- (8) Hydraulic oil temperature gauge
- (9) Hydraulic oil temperature caution lamp
- (10) Working mode display
- (11) Travel speed display
- (12) Fuel gauge
- (13) Fuel level caution lamp
- (14) DEF level gauge
- (15) DEF level caution lamp
- (16) Fuel consumption gauge
- (17) Working mode selector switch
- (18) Travel speed selector switch

- | | |
|--|--|
| (19) Window washer switch | (28) Air conditioner pilot lamp |
| (20) Air conditioner control switch | (29) Wiper pilot lamp |
| (21) Engine oil pressure caution lamp | (30) Swing lock pilot lamp |
| (22) Charge level caution lamp | (31) Preheating pilot lamp |
| (23) Seat belt caution lamp | (32) Auto-deceleration pilot lamp |
| (24) Engine stop pilot lamp | (33) Engine oil level caution lamp |
| (25) Work equipment lock pilot lamp | (34) Air cleaner clogging caution lamp |
| (26) Aftertreatment devices regeneration display | (35) Function switches (F1 to F6) |
| (27) Message display | (36) Maintenance time caution lamp |

REMARK

The above figure does not show all of the caution lamp symbols. For details of the caution lamps, see "WARNING DISPLAY (3-17)".

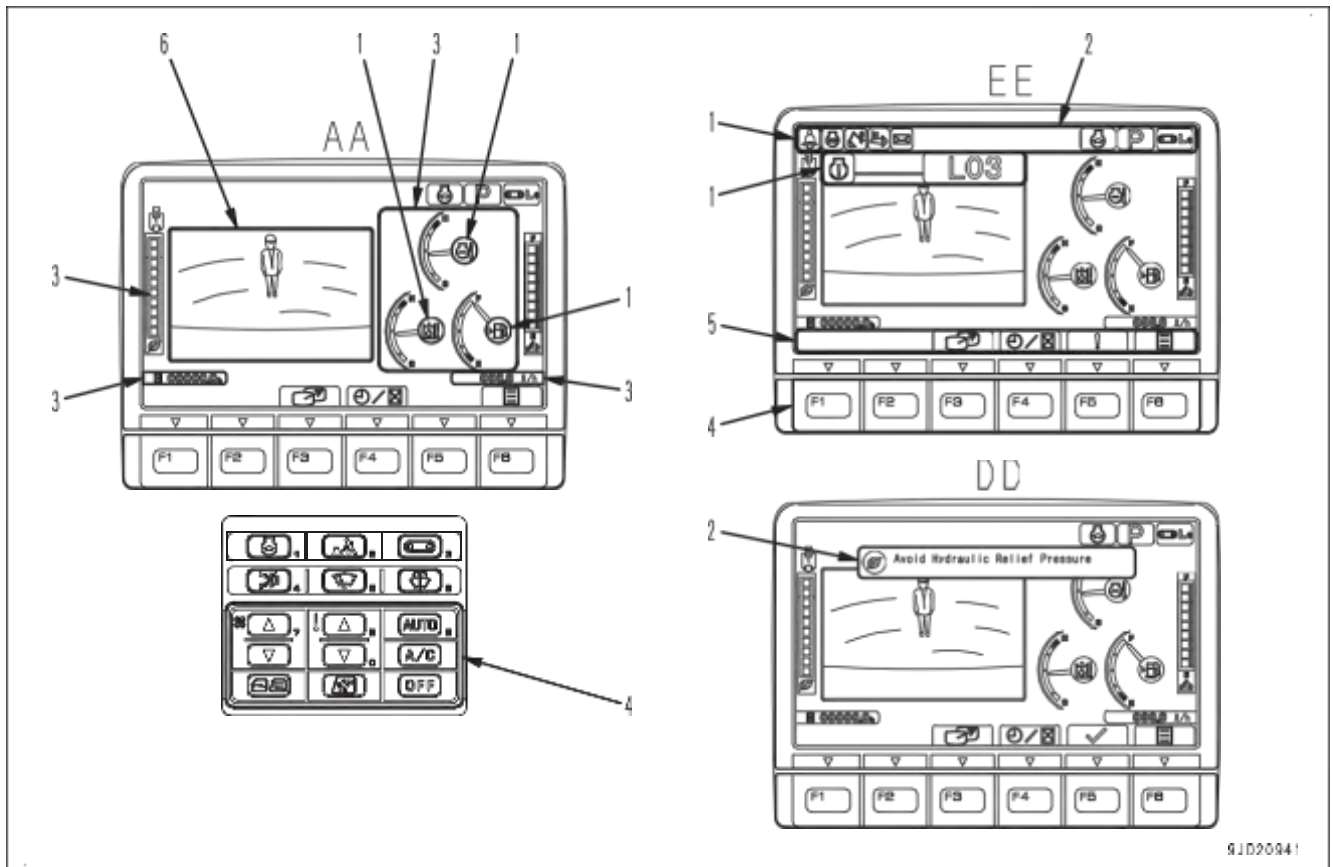
EXPLANATION OF COMPONENTS

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

The display method of the monitor is partly different when the machine is not equipped with the KomVision. For details, see ATTACHMENTS AND OPTIONS, "EXPLANATION OF MACHINE MONITOR EQUIPMENT (6-39)".



AA: Standard screen, EE: Warning or Error screen, DD: Guidance screen

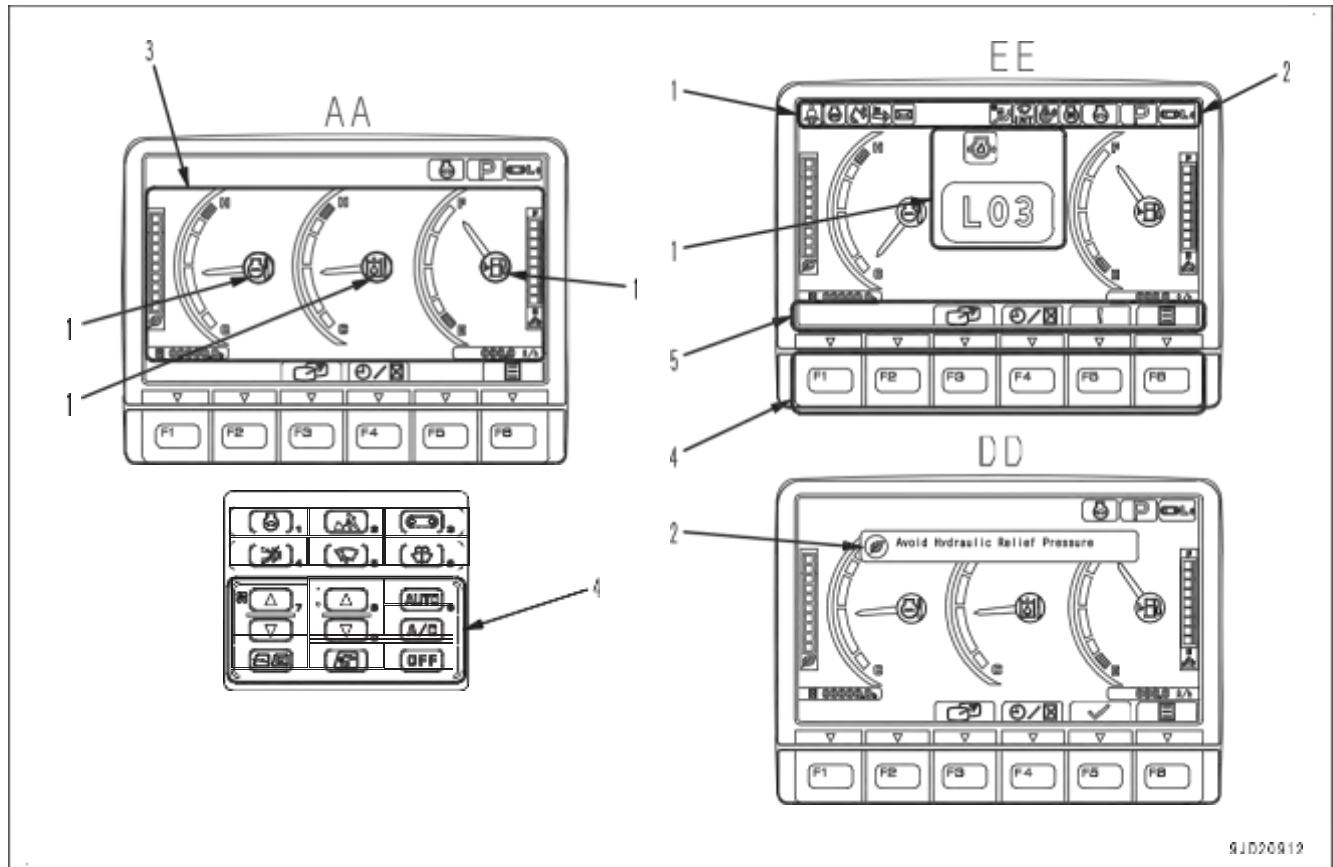
- (1) Warning display
- (2) Pilot display
- (3) Meter display
- (4) Monitor switch area
- (5) Guidance icon display
- (6) Camera image display

REMARK

- For the user menu used for setting various items of the machine on the machine monitor, see "USER MENU DISPLAY SWITCH (3-55)".
- If environmental temperature of the machine monitor is high, brightness may be automatically reduced to protect the liquid crystal.
- Intensity or color of the objects may change because of the automatic adjustment function of the camera.

Displaying only meter

On the standard screen (camera display, meter display), press switch F3, and only the meter is displayed.
 For details, see “CAMERA IMAGE SELECTOR SWITCH (3-51)”.



AA: Standard screen, EE: Warning or Error screen, DD: Guidance screen

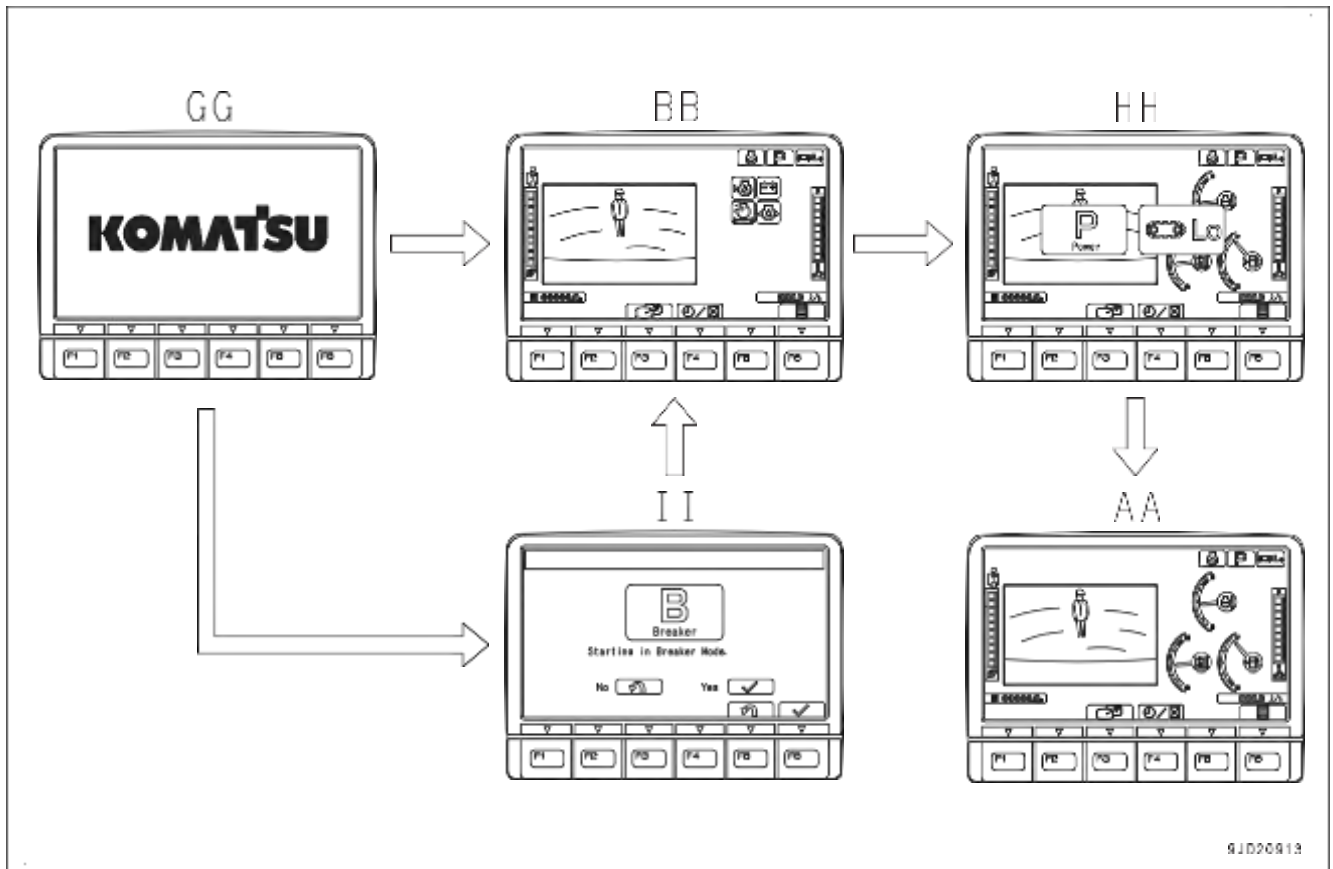
- (1) Warning display
- (2) Pilot display
- (3) Meter display
- (4) Monitor switch area
- (5) Guidance icon display

REMARK

- For the user menu used for setting various items of the machine on the machine monitor, see “USER MENU DISPLAY SWITCH (3-55)”.
- If environmental temperature of the machine monitor is high, brightness may be automatically reduced to protect the liquid crystal.
- Intensity or color of the objects may change because of the automatic adjustment function of the camera.

BASIC OPERATION OF MACHINE MONITOR

BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE IN NORMAL SITUATION

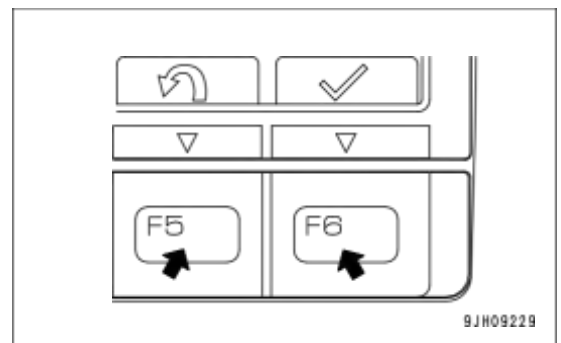


- When the starting switch is turned to ON position, opening screen GG is displayed.
- After opening screen GG is displayed for 2 seconds, the screen switches to Check before starting screen BB.
- After the check before starting screen BB is displayed for 2 seconds, the screen switches to the working mode/ travel mode display screen HH.
- After the working mode/ travel mode display screen HH is displayed for 2 seconds, the screen switches to standard screen AA.
- If the working mode when the engine is started is B mode, the opening screen GG is displayed for 2 seconds, and the screen then switches to the breaker mode confirmation screen II.

When starting with B mode, press switch F6. If you do not want to start B mode, press switch F5. In this case, the system starts with E mode.

REMARK

- When the engine is started, the battery voltage may suddenly drop depending on the temperature and the battery condition. If this happens, the machine monitor may restart, but this does not indicate any abnormality.

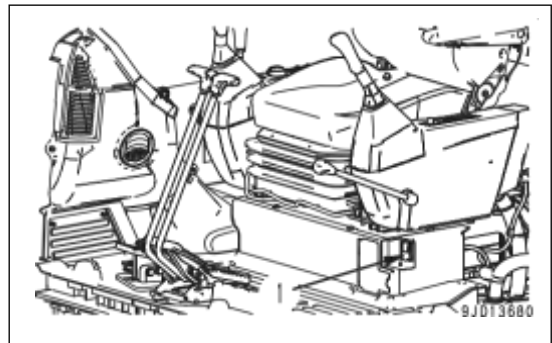


BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE WHILE ENGINE SHUTDOWN SECONDARY SWITCH IS ON

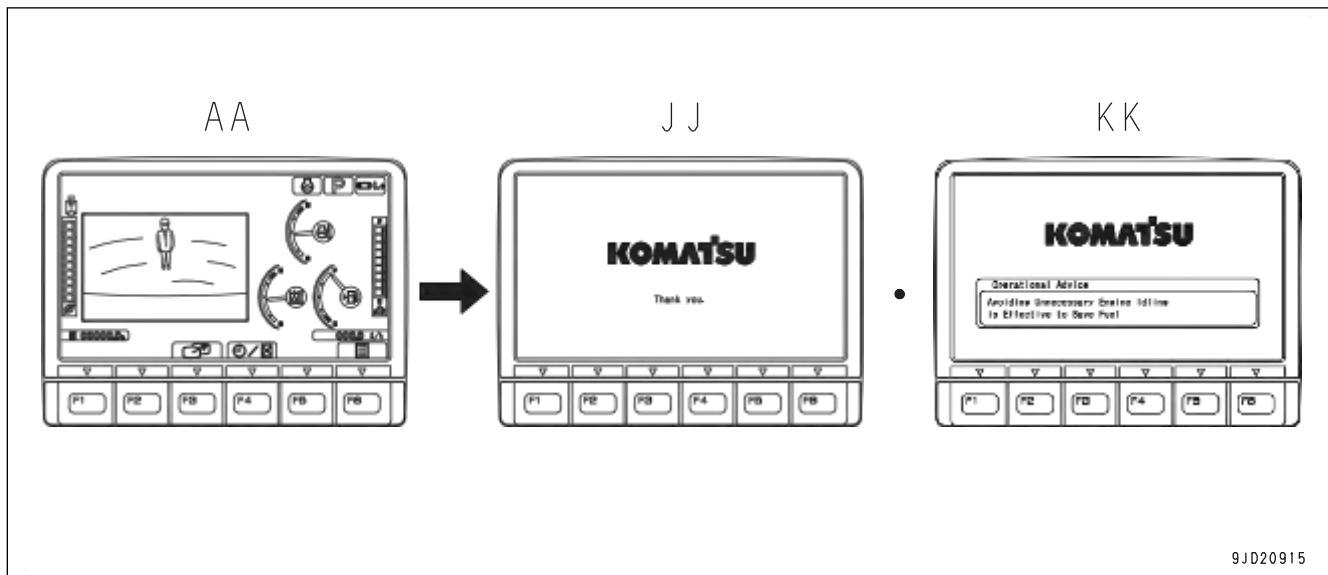
While engine shutdown secondary switch (1) is ON (engine is stopped), when the starting switch is turned to ON position, the screen shown in the figure is displayed and engine does not start.

If engine shutdown secondary switch (1) is turned OFF (normal), the machine monitor switches to the standard screen, and you can start the engine with usual starting switch key operation.

For the function and operating method of engine shutdown secondary switch (1), see "ENGINE SHUTDOWN SECONDARY SWITCH (3-92)".



BASIC OPERATION OF MACHINE MONITOR WHEN STOPPING ENGINE IN NORMAL SITUATION



When the starting switch is turned to OFF position, end screen JJ or KK is displayed for 5 seconds, then the screen goes out.

End screen when any message has been received

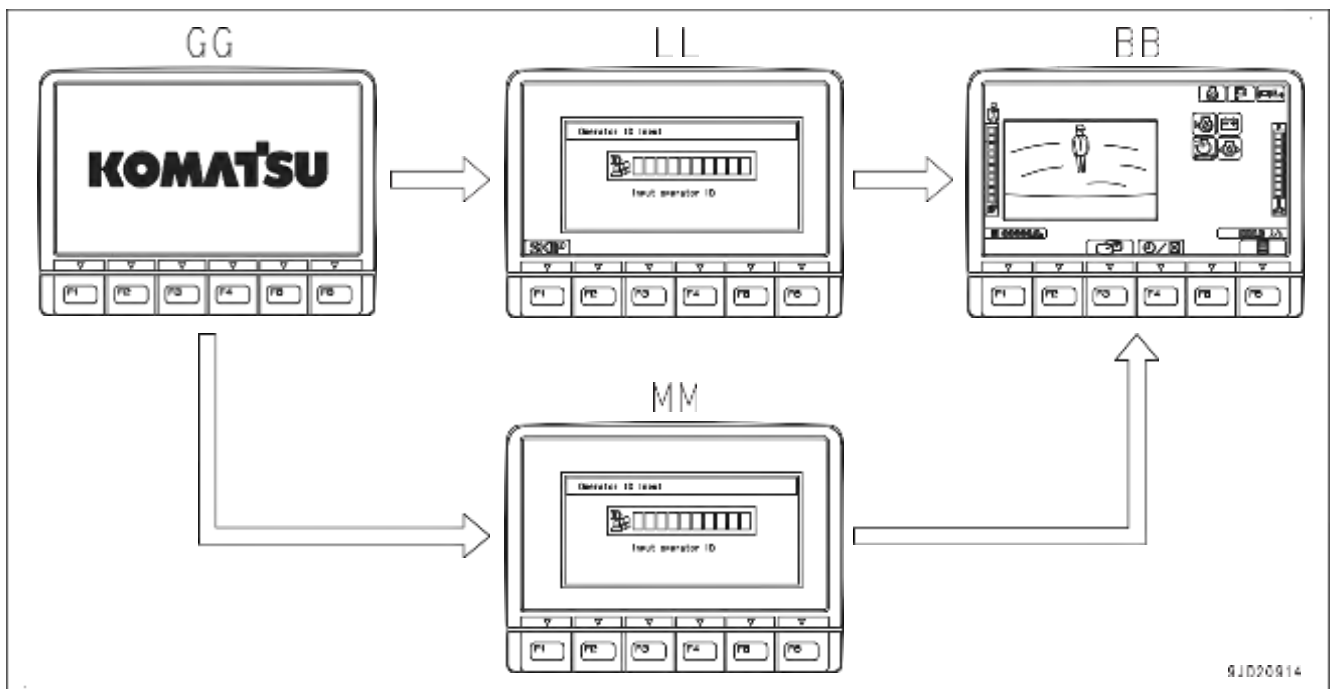
If there is any message from your Komatsu distributor, it is displayed on the end screen.

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.

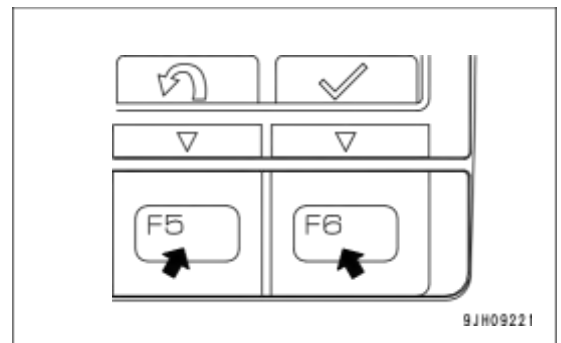
For the method of displaying and replying KOMTRAX messages, see "MESSAGE DISPLAY (3-83)".



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



- If "ID Number Input (with SKIP)" for "Operator ID Setting" is set, the opening screen GG switches to "Operator ID Input" (with SKIP) when the starting switch is turned to ON position.
- If "ID Number Input (without SKIP)" for "Operator ID Setting" is set, the opening screen GG switches to "Operator ID Input" (without SKIP) when the starting switch is turned to ON position.
- On "Operator ID Input" (with SKIP) screen LL or "Operator ID Input" (without SKIP) screen MM, input the already registered ID number, and press switch F6. The screen changes to Check Before Starting screen BB. If you input an incorrect ID number, press switch F5, and clear an input character at a time.



On "Operator ID Input" screen LL (with SKIP), press switch F1, and the screen changes to Check Before Starting screen BB without inputting ID number.

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 "Operator ID Holding Time with Key OFF" for Operator ID Function Setting function, even when operator ID of "Operator ID Setting" has been inputted, "Operator ID Input" (with SKIP) screen LL or "Operator ID Input" (without SKIP) MM screen may not be displayed when the starting switch is turned to ON position.

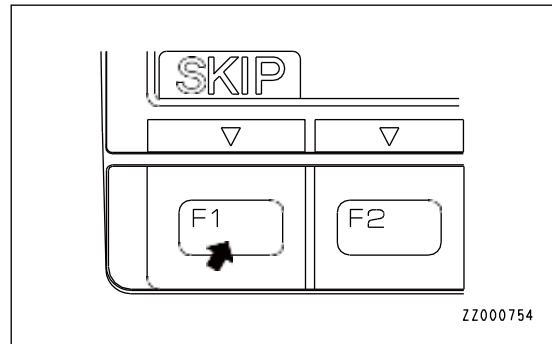
If inputting incorrect ID number for 3 times continuously, you cannot input ID number for 5 minutes. Wait for more than 5 minutes, try inputting ID number again.

As long as "Operator ID 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.

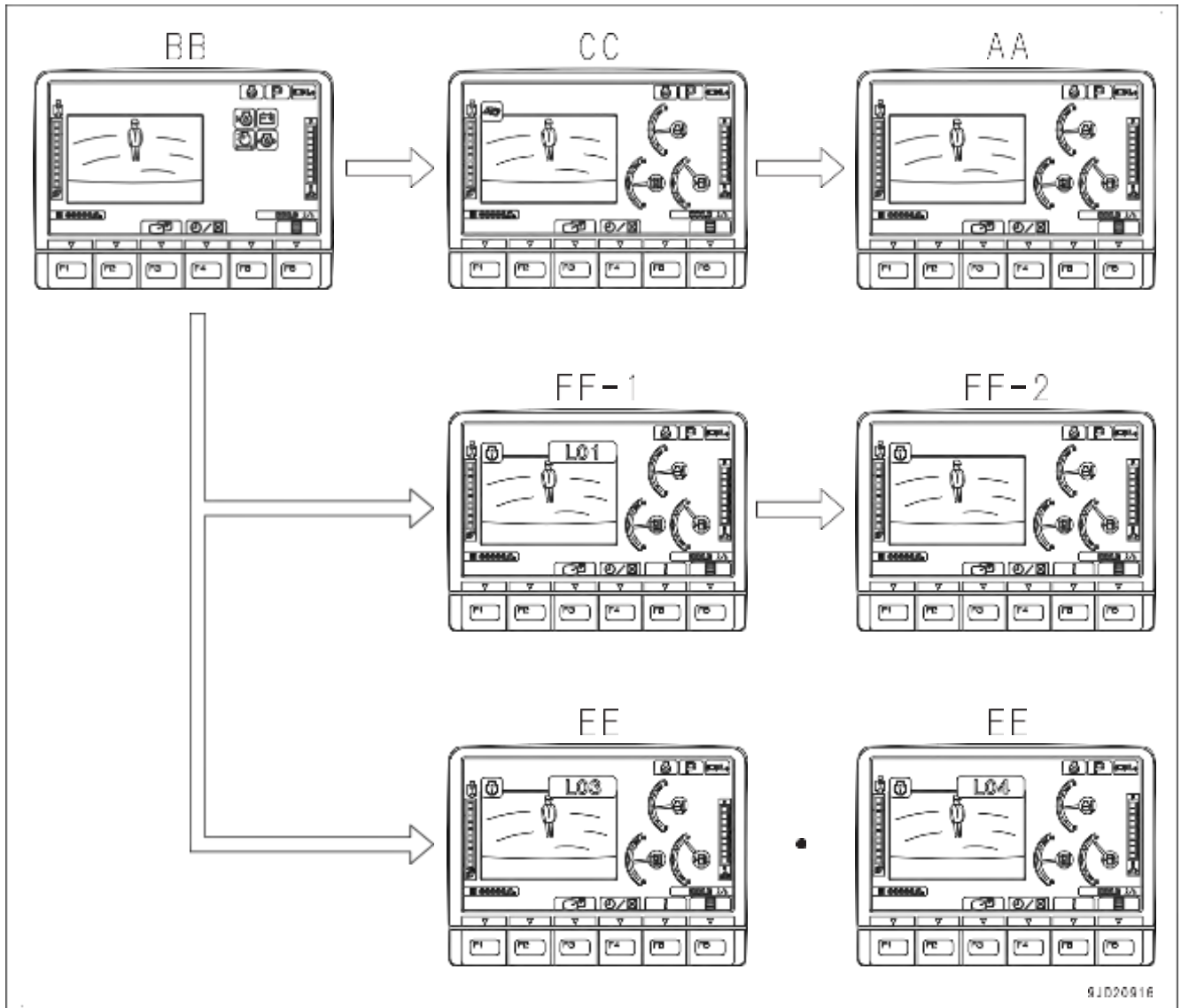
NOTICE

Since the purpose of the operator identification function is neither security enhancement nor a protection against theft, it has no anti-theft 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.

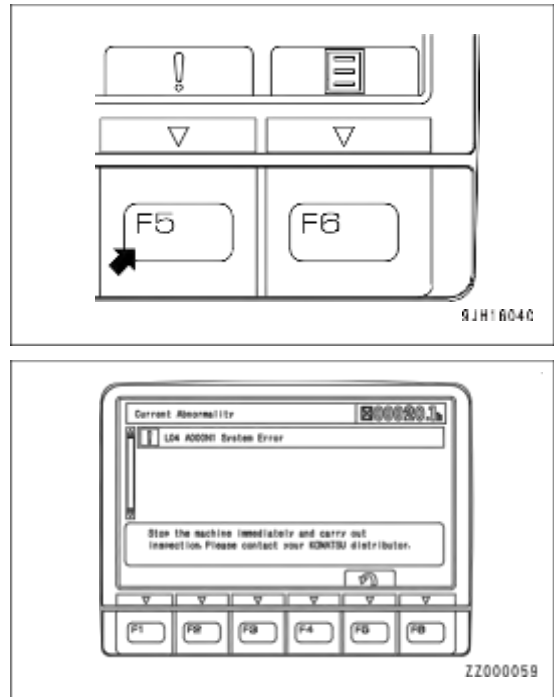


BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE IN ABNORMAL SITUATION

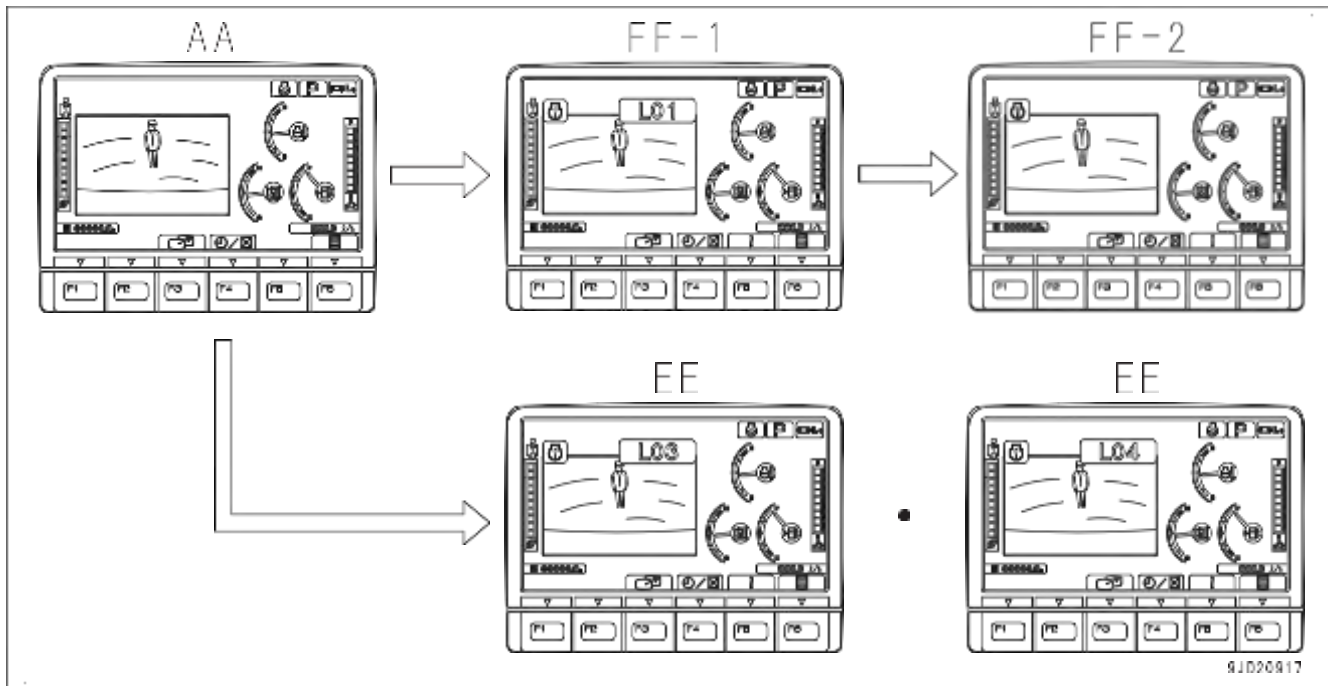


- If there is any abnormality when starting the engine, the check before starting screen BB changes to the maintenance time warning screen CC, warning screen FF, or error screen EE.
- After displaying the checks before starting screen BB for 2 seconds, the screen changes to the maintenance time warning screen CC.
- After displaying the maintenance time warning screen CC for 30 seconds, the screen returns to the standard screen AA.
- After displaying the check before starting screen BB for 2 seconds, the screen changes to the warning screen FF-(1) or error screen EE.
- After displaying the warning screen FF-(1) for 2 seconds, the screen automatically changes to the warning screen FF-(2).

If there is any error existing, “!” is displayed on top of switch F5. Press switch F5 to check the detail of the error. Current abnormality screen is displayed.

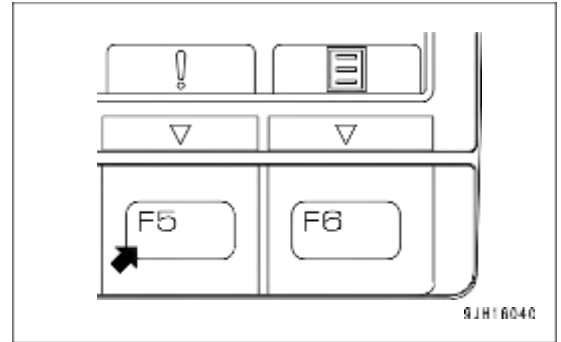


BASIC OPERATION OF MACHINE MONITOR WHEN TROUBLE OCCURS WHILE OPERATING MACHINE



- If any abnormality occurs during operation, the standard screen AA changes to warning screen FF-(1) or the error screen EE.
- After displaying warning screen FF-(1) for 2 seconds, the screen automatically changes to warning screen FF-(2).

If there is any error existing, “!” is displayed on top of switch F5.
 Press switch F5 to check the detail of the error. Current abnormality screen is displayed.



WARNING DISPLAY

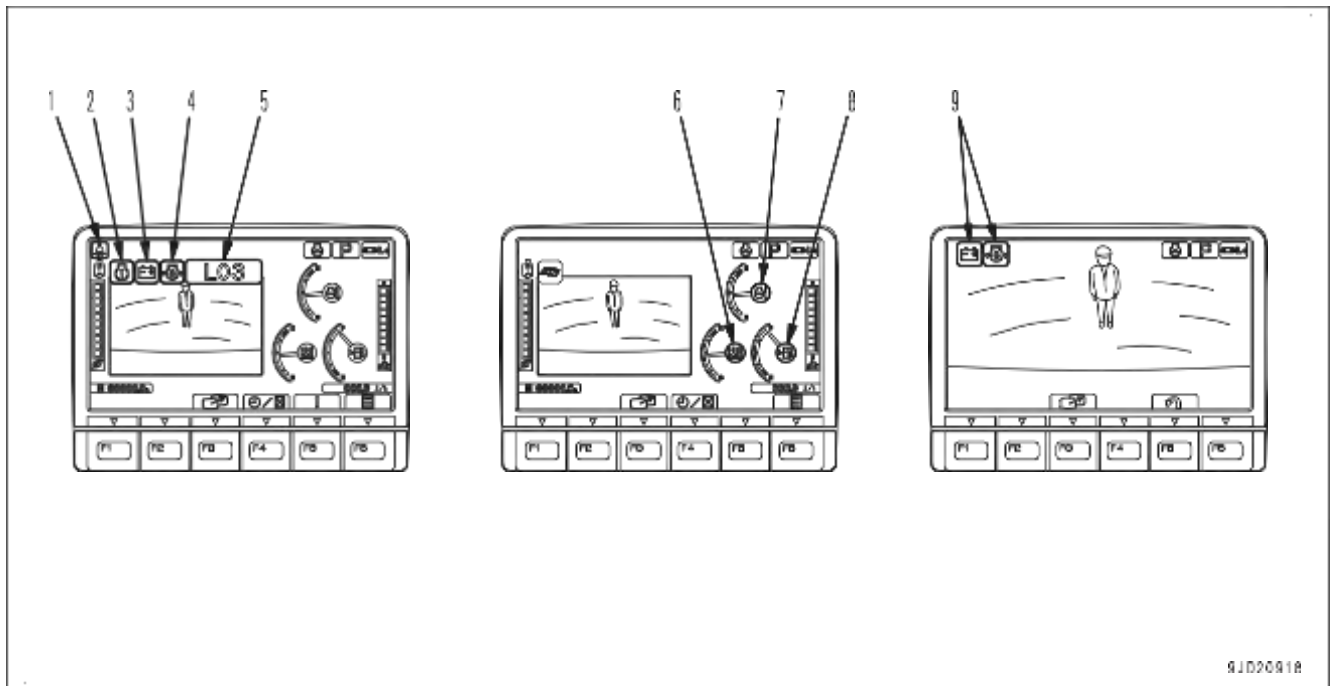
NOTICE

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

Take appropriate actions following the list of action level displays and required actions.

The caution lamp that lights up in red when an action level is displayed warns operator to stop the machine urgently, stop or pause the current operation.

If no action is taken, the machine can be seriously affected. Take necessary actions immediately.



- (1) Seat belt caution lamp
- (2) Caution lamp
- (3) Caution lamp
- (4) Caution lamp
- (5) Action level display
- (6) Hydraulic oil temperature caution lamp
- (7) Engine coolant temperature caution lamp
- (8) Fuel level caution lamp
- (9) Caution lamp

(9) Caution lamp

Standard screen (camera display and meter display)

When 1 type of caution is generated, it is displayed on caution lamp (2).

When 2 types of cautions are generated, they are displayed on caution lamps (2) and (3).

When 3 types of cautions are generated, they are displayed on caution lamps (2), (3), and (4).

When 4 types or more of caution are generated, they are displayed on caution lamps (2), (3), and (4) alternately at intervals of 2 seconds.

Whole camera image display screen

The current cautions are indicated by flashing of caution lamp (9).

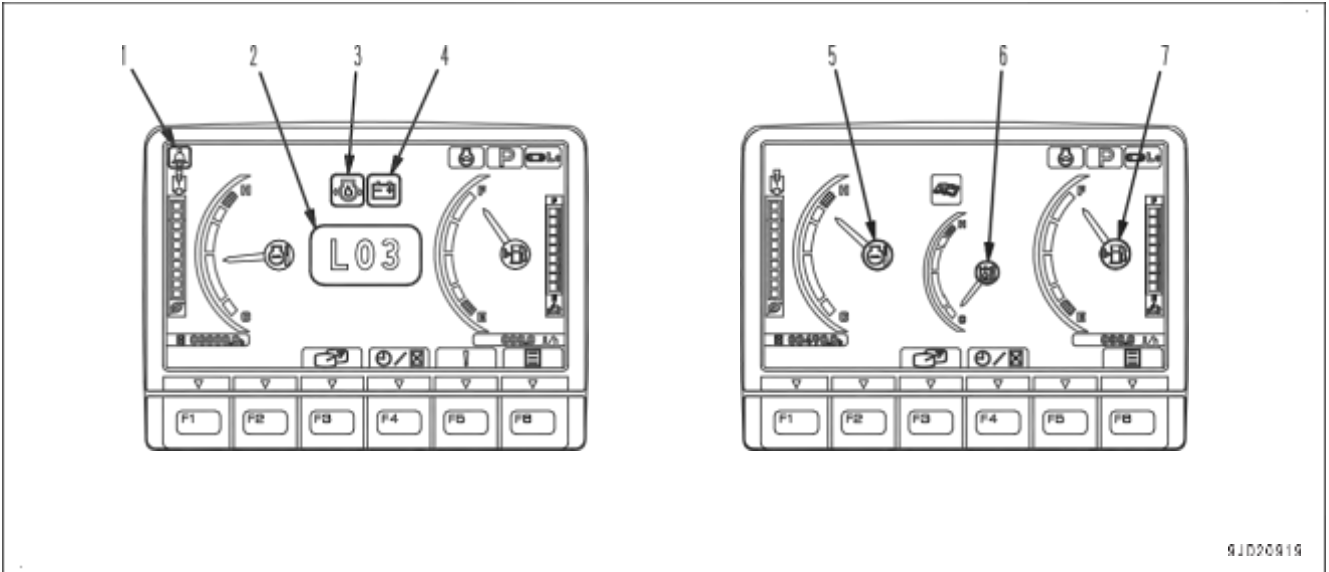
When 2 or more cautions are generated, they are sequentially displayed starting from the leftmost side of the screen.

REMARK

For the action level display, see "ACTION LEVEL DISPLAY (3-20)".

Displaying only meter

On the standard screen (camera display, meter display), press switch F3, and only the meter is displayed.
For details, see "CAMERA IMAGE SELECTOR SWITCH (3-51)".



(1) Seat belt caution lamp

(2) Action level display

(3) Caution lamp

(4) Caution lamp

(5) Engine coolant temperature caution lamp

(6) Hydraulic oil temperature caution lamp

(7) Fuel level caution lamp

Standard screen (only meter display)

When 1 type of caution is generated, it is displayed on caution lamp (3).

When 2 types of caution are generated, they are displayed on caution lamps (3) and (4).

When 3 types or more of caution are generated, they are displayed on caution lamps (3) and (4) alternately at intervals of 2 seconds.

REMARK

For the action level display, see "ACTION LEVEL DISPLAY (3-20)".

ACTION LEVEL DISPLAY

Action level display indicates the degree of urgency of the abnormality currently generated on the machine by “L01” to “L04”.

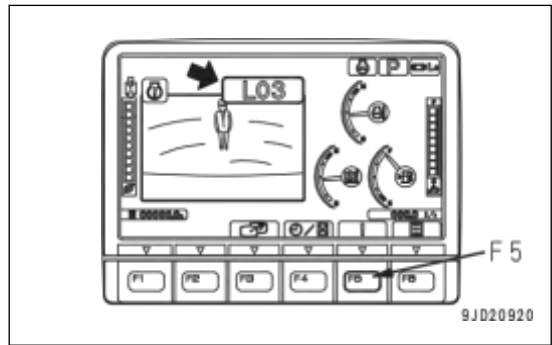
The larger the number in the table is, the more serious effects the abnormality may have on the machine if it is left with no action.

If the machine monitor indicates an action level, check the message displayed on the monitor.

When switch F5 is pressed on the standard screen while the action level is displayed, the list of the current abnormality are displayed.

For the display method of failures, see “CURRENT ABNORMALITY DISPLAY SWITCH (3-23)”.

Take appropriate actions by following the message displayed on the monitor.



List of action levels and required actions













Degree of urgency	Action level	Buzzer	Color of caution lamp	Required action
High ↑ ↓ Low	L04	Sounds continuously	Lights up in red	Stop the machine immediately and ask your Komatsu distributor for inspection and maintenance.
	L03	Sounds intermittently	Lights up in red	Stop the work, move the machine to a safe place, and then ask your Komatsu distributor for inspection and maintenance.
	L02	Sounds intermittently	Lights up in red	Stop the work and run the engine at medium speed with no load or stop it. If the condition is not improved, ask your Komatsu distributor for inspection and maintenance.
	L01	Does not sound	Lights up in yellow	Some functions may be restricted from use, but the machine can operate. When you finish the operation, always have the inspection and maintenance performed. Ask your Komatsu distributor for the inspection and maintenance as needed.











CAUTION LAMP LIST

NOTICE

- These caution lamps do not guarantee the condition of the machine. Do not simply rely on the caution lamp when performing checks before starting (start-up inspection). Always get off the machine and check each item directly.
- When the caution lamp is displayed in red, if no action is taken, the machine can be seriously affected. Take the action immediately.
- The engine output or engine speed is limited and the machine operation speed may become slow, depending on the contents of the warning.

Caution lamps and display colors

Symbol	Type of caution lamp	Display color/ Machine condition (Action level)			
		Red	Yellow	White	Blue
 9J022677	Engine coolant temperature caution lamp	High temperature (L02)	-	Low temperature	Normal
 9J020477	Hydraulic oil temperature caution lamp	High temperature (L02)	-	Low temperature	Normal
 9J022678	Fuel level caution lamp	Low level	-	-	Normal
 9J020299	System state caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9J020478	Hydraulic system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9J020300	Aftertreatment devices system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9J020301	Regeneration performance caution lamp	Abnormal (L03)	Accumulated (L01)	-	-
 9J020479	DEF level caution lamp	Abnormal (L04, L03)	-	Sensing is disabled	-
 9J020480	DEF system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9J020481	DEF system high temperature stop caution lamp	-	Engine stopped at high temperature (L01)	-	-
 9J020302	Engine system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9J020303	Engine oil pressure caution lamp	Low oil pressure (L03)	-	-	-

Symbol	Type of caution lamp	Display color/ Machine condition (Action level)			
		Red	Yellow	White	Blue
 9JD20482	Engine oil level caution lamp	-	Low oil level (L01)	-	-
 9JD20304	Charge level caution lamp	Abnormal (L03)	-	-	-
 9JD20483	Air cleaner clogging caution lamp	-	Clogged (L01)	-	-
 9JD20484	Air conditioner system caution lamp	-	Abnormal (L01)	-	-
 9JD20305	Maintenance time caution lamp	Due time is over	Notice	-	-
 9JD20306	Seat belt caution lamp	Seat belt is not fastened	-	-	-
 9JD20307	Engine overrun caution lamp	Abnormal (L02)	-	-	-
 9JD20485	Auto idle stop sudden stop caution lamp	Excessive frequency (L03)	Excessive frequency (L01)	-	-
 9JD20486	Fan control system caution lamp	Abnormal (L03)	Abnormal (L01)	-	-
 9JH16433	Overload caution lamp	Overload	-	-	-

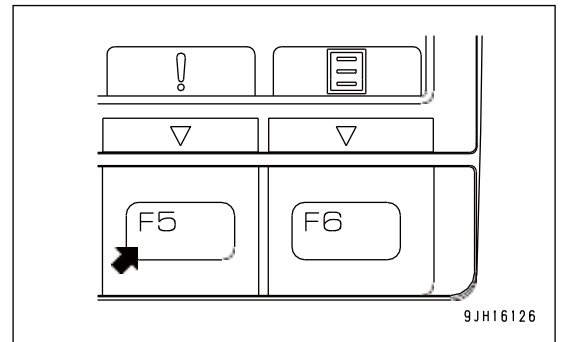
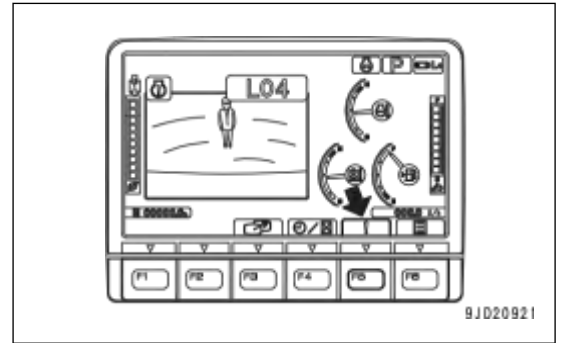
For the meaning of each caution lamp and the action to take for it, see the section of each caution lamp.

CURRENT ABNORMALITY DISPLAY SWITCH

If there is any abnormality currently generated, “!” is displayed on top of switch F5.

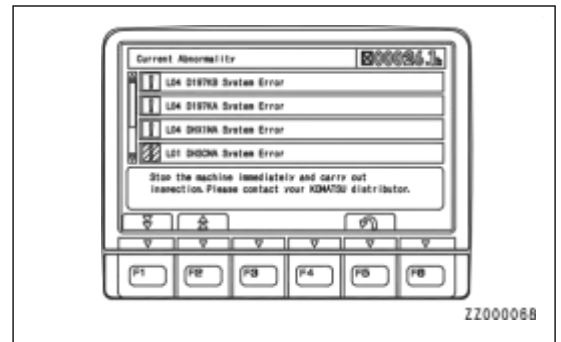
While “!” is displayed, press switch F5 to shift the monitor display screen to “Current Abnormality” screen.

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



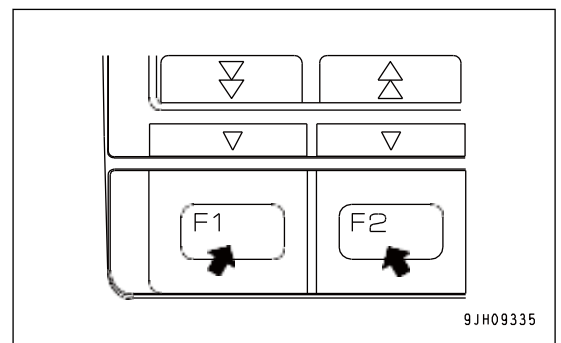
Operation on “Current Abnormality” screen

On “Current Abnormality” screen, you can perform the following operations with switches F1, F2 and F5.

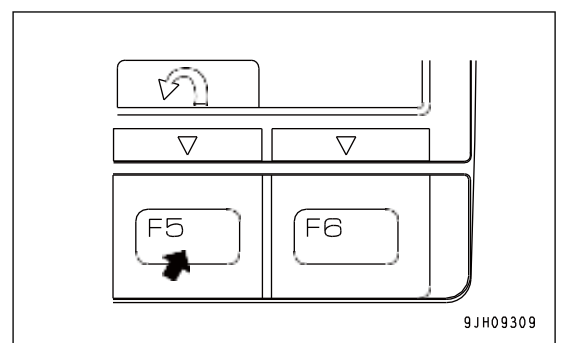


F1: Displays next page. When on the last page, it displays the first page.

F2: Displays the previous page. When on the first page, it displays the last page.



F5: Returns the screen to the standard screen.



ENGINE COOLANT TEMPERATURE CAUTION LAMP

Engine coolant temperature caution lamp warns about states caused by engine coolant temperature.

When abnormal

The caution lamp lights up in red and action level "L02" is displayed.

The engine coolant temperature is abnormally high.

While this lamp is lit, the overheat prevention system is automatically actuated and the engine speed drops.

Stop operations and run it at low idle until the caution lamp changes to the normal display color (lights up in blue) at the correct temperature.

When temperature is low

The caution lamp lights up in white.

The engine coolant temperature is low.

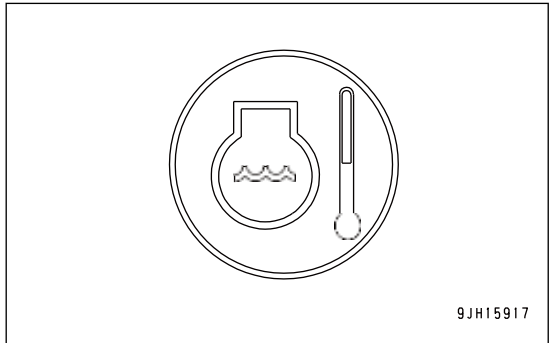
The engine needs to be warmed up.

Perform the warm-up operation for the engine until the caution lamp changes to the normal display color (lights up in blue) at the correct temperature.

For detail, see "METHOD FOR ENGINE WARM-UP OPERATION (3-159)".

When temperature is correct

The caution lamp lights up in blue.



HYDRAULIC OIL TEMPERATURE CAUTION LAMP

The hydraulic oil temperature caution lamp warns about states of hydraulic oil temperature.

When abnormal

The caution lamp lights up in red and action level "L02" is displayed.

The hydraulic oil temperature is abnormally high.

Stop operations and stop the engine or run it at low idle until the caution lamp changes to the normal display color (lights up in blue) at the correct temperature.

When temperature is low

The caution lamp lights up in white.

The hydraulic oil temperature is low.

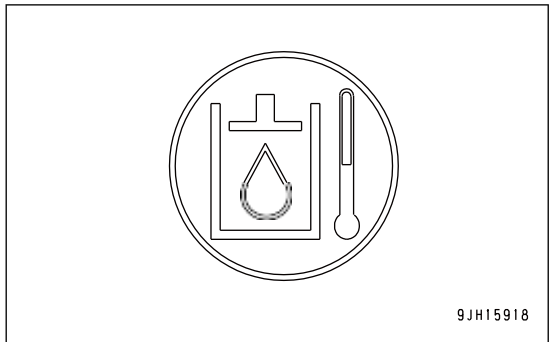
It is necessary to warm up the hydraulic component.

Perform the warm-up operation for the hydraulic component until the caution lamp changes to the normal display color (lights up in blue) at the correct temperature.

For detail, see "METHOD FOR HYDRAULIC SYSTEM WARM-UP OPERATION (3-161)".

When temperature is correct

The caution lamp lights up in blue.



FUEL LEVEL CAUTION LAMP

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

When fuel level is low

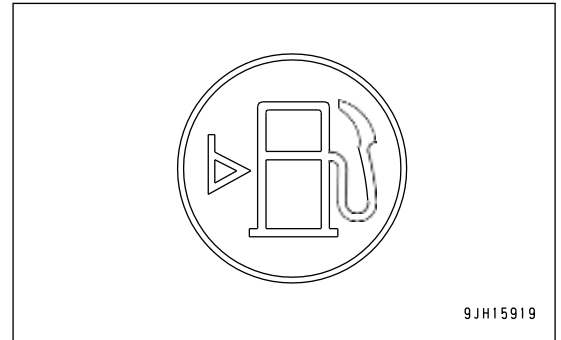
The caution lamp lights up in red.

The remaining fuel amount is approximately 32 ℓ or less.

Add fuel as soon as possible.

When normal

The caution lamp lights up in blue.



SYSTEM CAUTION LAMP

The system caution lamp warns about abnormality in the machine system, including the sensors.

When action level “L04” is displayed

The caution lamp lights up in red 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 and the alarm buzzer sounds intermittently.

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

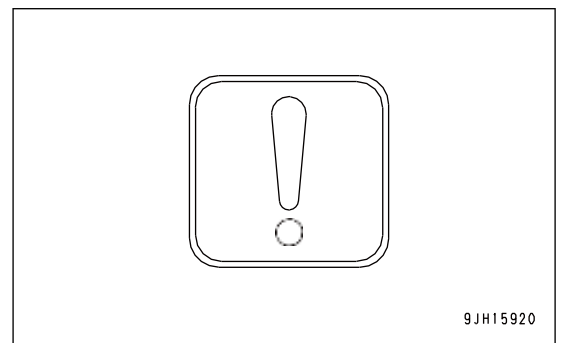
When action level “L01” is displayed

The caution lamp lights up in yellow.

Some functions may be restricted for use, but the machine can operate.

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

Ask your Komatsu distributor for inspection and maintenance as needed.



HYDRAULIC SYSTEM CAUTION LAMP

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

When action level “L04” is displayed

The caution lamp lights up in red 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 and the alarm buzzer sounds intermittently.

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

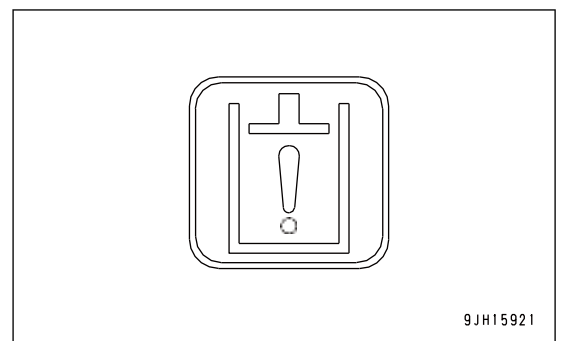
When action level “L01” is displayed

The caution lamp lights up in yellow.

Some functions may be restricted for use, but the machine can operate.

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

Ask your Komatsu distributor for inspection and maintenance as needed.



AFTERTREATMENT DEVICE SYSTEM CAUTION LAMP

This warns about defects of the aftertreatment devices system.

When action level “L04” appears on screen.

The caution lamp comes on in red and the alarm buzzer operates continuously.

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

When action level “L03” appears on screen.

The caution lamp comes on in red and the alarm buzzer operates intermittently.

Stop the work and move the machine to a safe area. Ask your Komatsu distributor for inspection and maintenance.

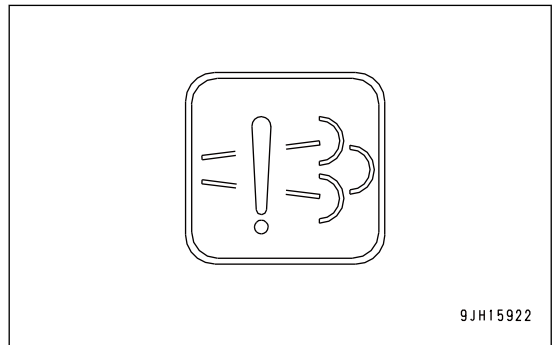
When action level “L01” appears on screen.

The caution lamp comes on in yellow.

It is not necessary to stop the machine immediately.

However, it is recommended to inspect the machine for maintenance after you finish operations.

Ask your Komatsu distributor for inspection and maintenance as necessary.



REGENERATION PERFORMANCE CAUTION LAMP

This warns about the deterioration of regeneration performance of aftertreatment devices.

When action level “L03” appears on screen.

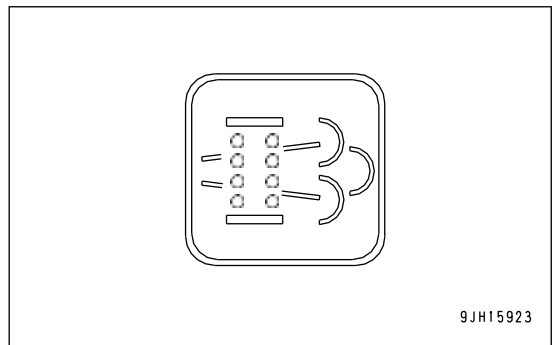
The caution lamp comes on in red and the alarm buzzer operates continuously.

Move the machine to a safe area and activate manual stationary regeneration.

When action level “L01” appears on screen.

The caution lamp comes on in yellow.

Move the machine to a safe area and activate manual stationary regeneration after the end of work.



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,

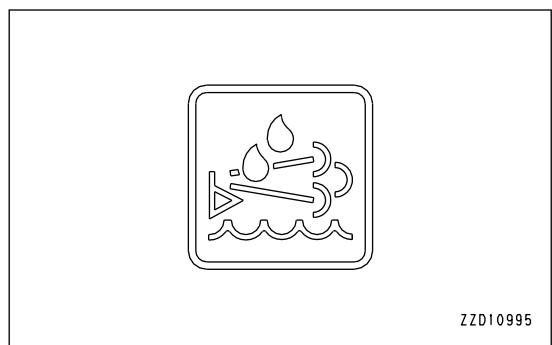
With Action level “L04”, DEF tank level is too low. Inducement status is “Final Inducement”. Engine speed is fixed at low idle.

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.

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.

DEF SYSTEM HIGH TEMPERATURE STOP CAUTION LAMP

DEF system 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 (3-167)".

ENGINE SYSTEM CAUTION LAMP

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

When action level "L04" appears on screen

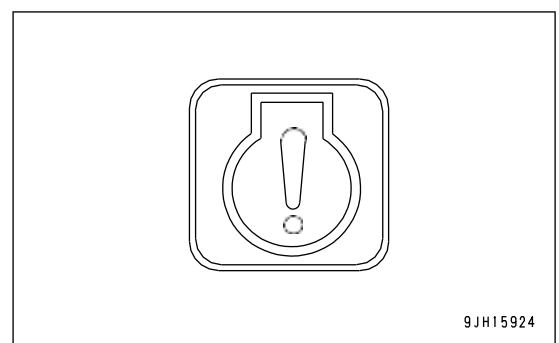
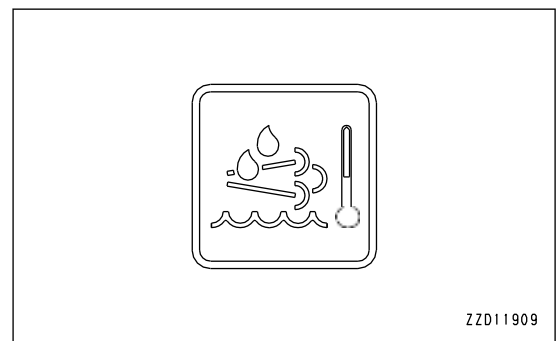
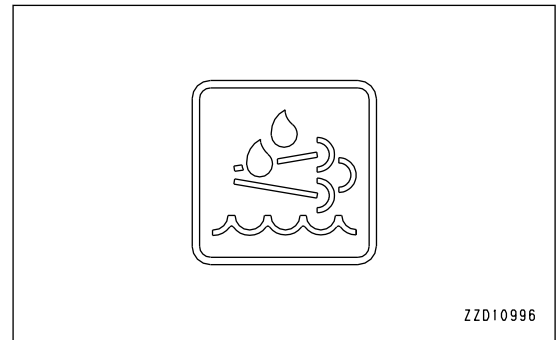
The caution lamp comes on in red and the alarm buzzer operates continuously.

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

When action level "L03" appears on screen.

The caution lamp comes on in red and the alarm buzzer operates intermittently.

Move the machine to a safe area and stop the machine, then ask your Komatsu distributor for inspection and maintenance.



When action level “L01” appears on screen.

The caution lamp comes on in yellow.

It is not necessary to stop the machine immediately.

However, it is recommended for maintenance after the end of ongoing work.

Ask your Komatsu distributor for inspection and maintenance as necessary.

ENGINE SUDDEN STOP BY AUTO IDLE STOP CAUTION LAMP

The auto idle stop sudden stop caution lamp warns about the abnormality when the engine is stopped abruptly by the auto idle stop function for more than the specific times.

When action level “L03” is displayed

The caution lamp lights up in red and the alarm buzzer sounds intermittently.

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

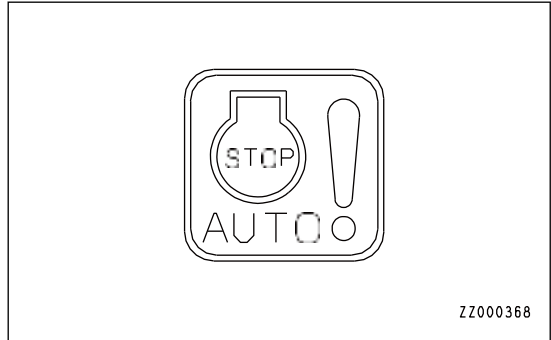
When action level “L01” is displayed

The caution lamp lights up in yellow.

The engine durability may be lower but the machine can operate.

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

Ask your Komatsu distributor for inspection and maintenance as needed.



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 and the alarm buzzer sounds intermittently.

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

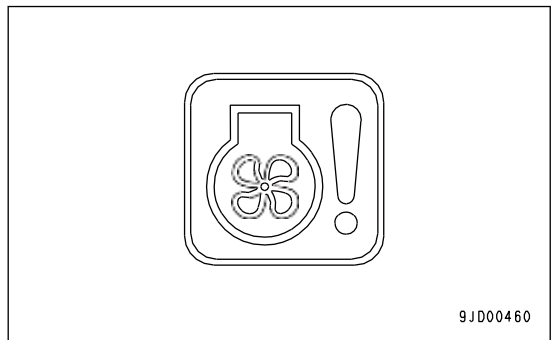
When action level “L01” is displayed

The caution lamp lights up in yellow.

Some functions may be restricted for use, but the machine can operate.

When you finish the operation, always have the inspection and maintenance performed.

Ask your Komatsu distributor for inspection and maintenance as needed.



ENGINE OIL PRESSURE CAUTION LAMP

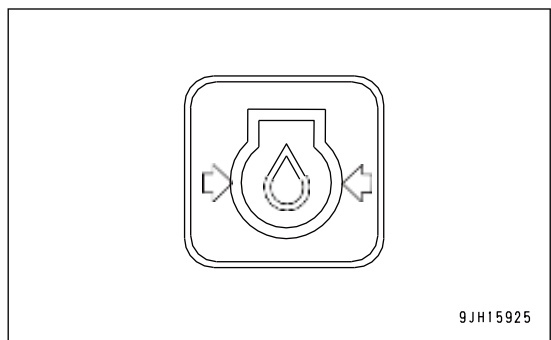
Engine oil pressure caution lamp warns about abnormality of engine lubricating oil pressure.

When oil pressure is low

The caution lamp lights up in red and indicates action level “L03”.

The alarm buzzer sounds intermittently.

Stop the operation and move the machine to a safe place, 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.

When oil level is low

The caution lamp lights up in yellow and indicates action level "L01".

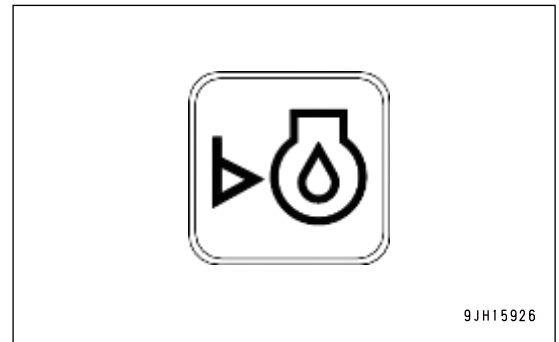
The oil level in the engine oil pan is insufficient.

Check the oil level in the oil pan and add oil.

For detail, see "METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL (3-134)".

If the oil level drops again in a short time, the engine oil may be leaking.

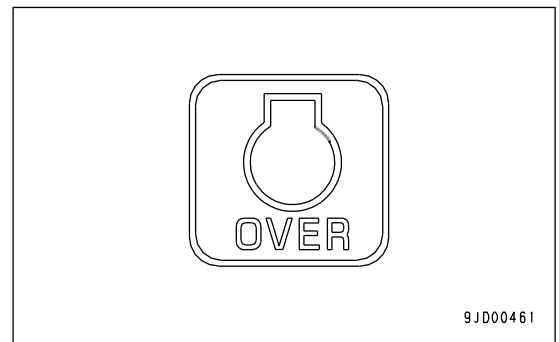
For the inspection and maintenance, ask your Komatsu distributor.



ENGINE OVERRUN CAUTION LAMP

The engine overrun caution lamp lights up when engine overrun occurs.

Since overrun can damage the engine and hydraulic components, stop the work immediately and operate at low travel speed until the overrun caution lamp goes out.



CHARGE LEVEL CAUTION LAMP

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

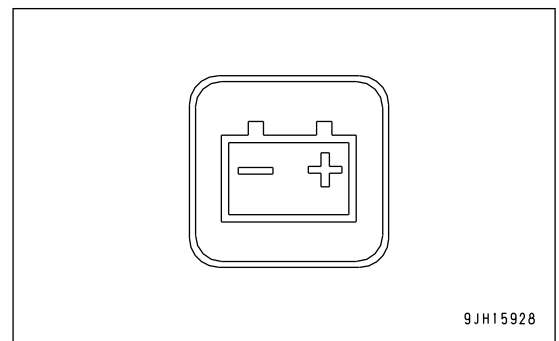
When abnormal

The caution lamp lights up in red and indicates action level "L03".

The alarm buzzer sounds intermittently.

Charging is not being performed normally while the engine is running.

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



AIR CLEANER CLOGGING CAUTION LAMP

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

When clogged

The caution lamp lights up in yellow and indicates action level "L01".

The air cleaner is clogged.

Stop the engine and check and clean the air cleaner.

For detail, see "METHOD FOR CHECKING, CLEANING AND REPLACING AIR CLEANER".



AIR CONDITIONER SYSTEM CAUTION LAMP

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

When abnormal

The caution lamp lights up in yellow and indicates action level “L01”.

The air conditioner system has abnormality.

Ask your Komatsu distributor for inspection and maintenance as soon as possible.



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 the due time is over

The caution 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.

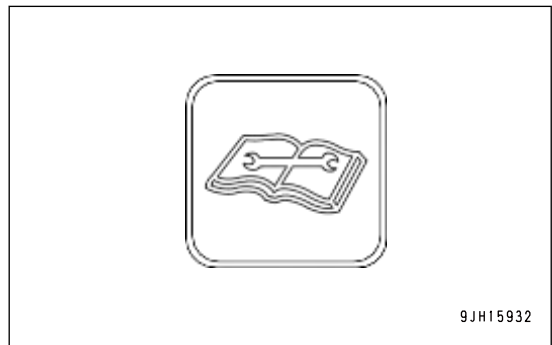
Perform necessary maintenance as soon as possible.

When giving the notice of the due time

The warning lamp lights up in yellow.

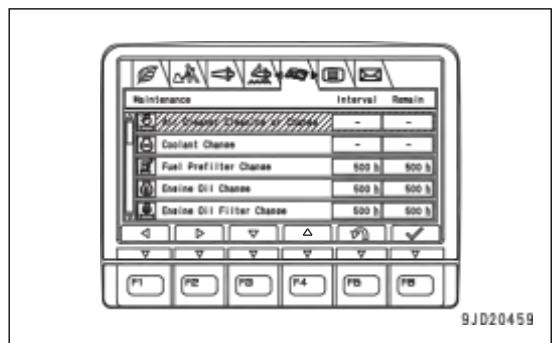
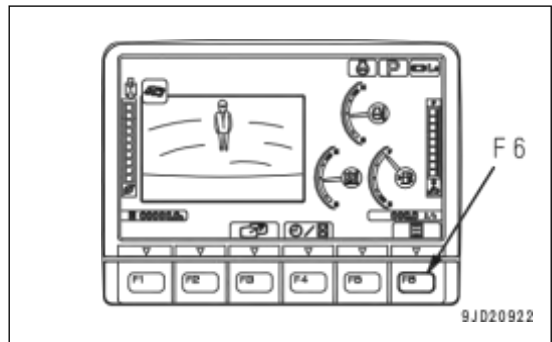
The maintenance due time is approaching.

Prepare necessary parts for the maintenance.



REMARK

- Check maintenance items on “Maintenance” tab screen by pressing switch F6 on the maintenance time warning screen shown in the right drawing or on the standard screen.
- The lighting time of maintenance due time notice (yellow) has been initially set to 30 hours, but it can be changed. To change the setting, ask your Komatsu distributor.
- For operations on “Maintenance” tab screen, see “MAINTENANCE SCREEN SETTING (3-73)”.



OVERLOAD CAUTION LAMP

The overload caution lamp warns that the machine is close to tipping due to the load (an audible warning is also given), if the warning is given lower the load.

Refer to the lifting capacity chart for safe load.



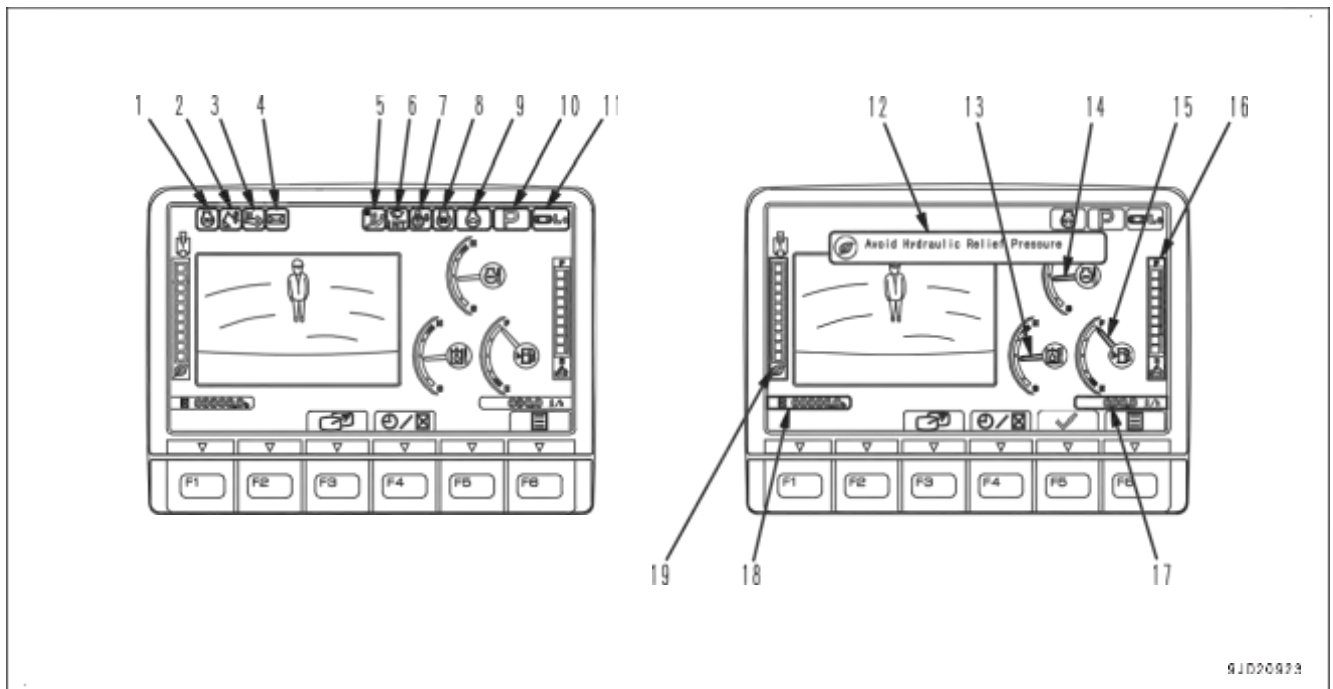
SEATBELT CAUTION LAMP

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

For fastening the seat belt, see “METHOD FOR FASTENING AND UNFASTENING SEAT BELT”.



PILOT DISPLAY AND METER DISPLAY



Pilot display

- | | |
|---|----------------------------------|
| (1) Engine stop pilot lamp | (7) Swing lock pilot lamp |
| (2) Work equipment lock pilot lamp | (8) Preheating pilot lamp |
| (3) Aftertreatment devices regeneration display | (9) Auto-deceleration pilot lamp |
| (4) Message display | (10) Working mode display |
| (5) Air conditioner pilot lamp | (11) Travel speed display |
| (6) Wiper pilot lamp | (12) ECO guidance |

Meter display

(13) Hydraulic oil temperature gauge

(14) Engine coolant temperature gauge

(15) Fuel gauge

(16) DEF level gauge

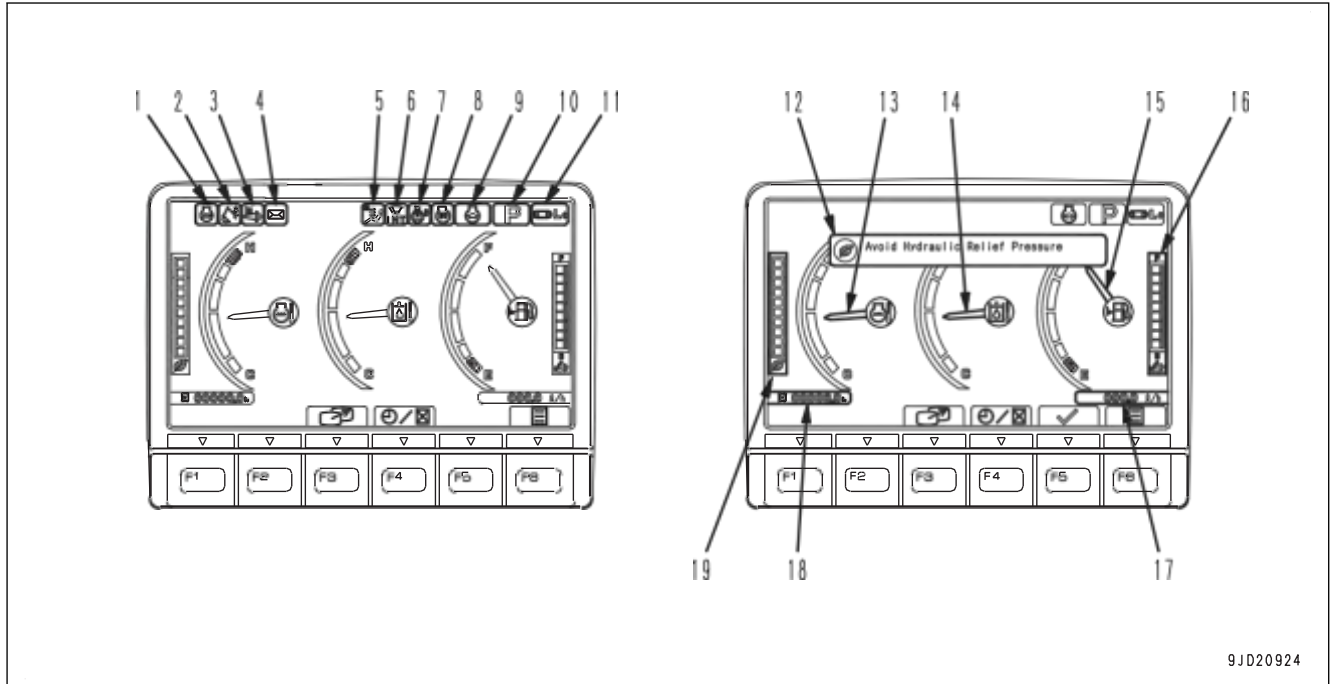
(17) Fuel consumption gauge

(18) Service meter/ clock

(19) ECO gauge

Displaying only meter

On the standard screen (camera display, meter display), press switch F3, and only the meter is displayed. For details, see "CAMERA IMAGE SELECTOR SWITCH (3-51)".



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Pilot display

- | | |
|---|----------------------------------|
| (1) Engine stop pilot lamp | (7) Swing lock pilot lamp |
| (2) Work equipment lock pilot lamp | (8) Preheating pilot lamp |
| (3) Aftertreatment devices regeneration display | (9) Auto-deceleration pilot lamp |
| (4) Message display | (10) Working mode display |
| (5) Air conditioner pilot lamp | (11) Travel speed display |
| (6) Wiper pilot lamp | (12) ECO guidance |

Meter display

- | | |
|---------------------------------------|-----------------------------|
| (13) Hydraulic oil temperature gauge | (17) Fuel consumption gauge |
| (14) Engine coolant temperature gauge | (18) Service meter/ clock |
| (15) Fuel gauge | (19) ECO gauge |
| (16) DEF level gauge | |

PILOT DISPLAY

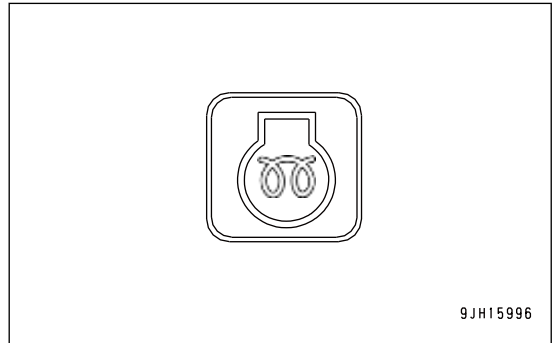
The pilot display at the top of the screen consists of the pilot lamps to check the actuation of each function. When the starting switch is turned ON, the pilot lamps light up when the displayed items are functioning.

PREHEATING PILOT LAMP

The preheating pilot lamp is displayed while the engine is preheated before started.

When the temperature is low (in cold weather) and the automatic preheating function operates, the preheating pilot lamp lights up. When the preheating is completed, it goes out.

Automatic preheating is for a maximum of approximately 30 seconds.



WIPER PILOT LAMP

The wiper pilot lamp shows the operating state of the windshield wiper.

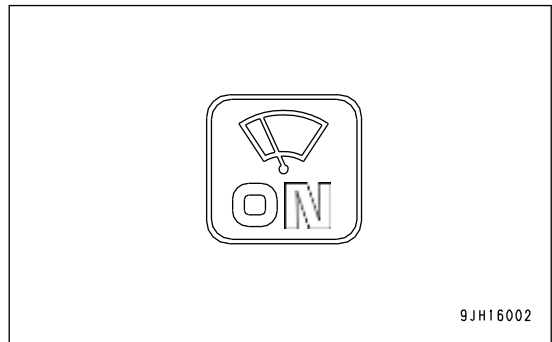
The operation of the wiper switch is indicated by the pilot lamp as follows.

When ON lights up: Windshield wiper operates continuously

When INT lights up: Windshield wiper operates intermittently

OFF: Windshield wiper stops

For the position of the wiper switch, see "MACHINE MONITOR EQUIPMENT NAME (3-6)".



SWING LOCK PILOT LAMP

Swing lock pilot lamp informs that the swing lock is being actuated.

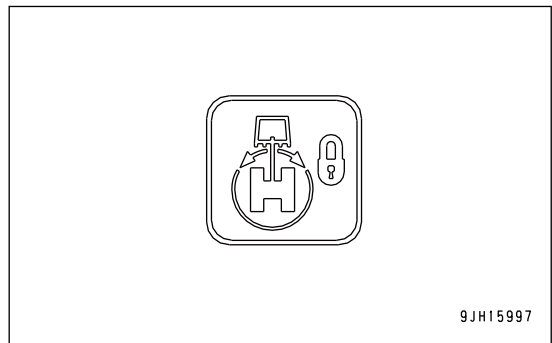
Pilot lamp lights up: The swing lock is being actuated.

When the swing lock switch is turned on (LOCK), this lamp lights up.

When the swing parking brake cancel switch is turned to "Cancel" position, this lamp flashes.

REMARK

The swing motor is equipped with a disc brake that mechanically stops the rotation. When the swing lock pilot lamp is lit, the brake remains applied.



AUTO-DECELERATION PILOT LAMP

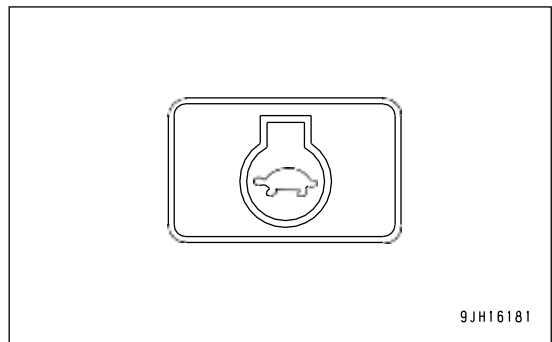
The auto-deceleration pilot lamp shows the setting of the auto-deceleration either ON or OFF.

The pilot lamp display when the auto-deceleration switch is operated is as follows.

Pilot lamp lights up: Auto-deceleration ON

Pilot lamp goes out: Auto-deceleration OFF

For the location of the auto-deceleration switch, see "MACHINE MONITOR EQUIPMENT NAME (3-6)".



WORKING MODE DISPLAY

The working mode display shows the setting of the working mode.

The working mode set with the working mode switch is shown as follows.

“P”: P mode (for heavy-duty operations)

“E”: E mode (for operations with emphasis on fuel consumption)

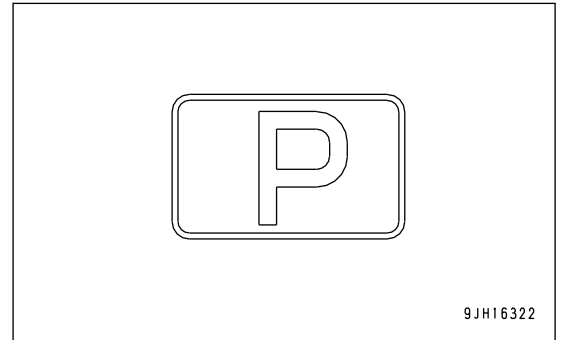
“L”: L mode (for fine control operations)

“B”: B mode (for breaker operations) (For machines ready for installation of attachments)

“ATT/P”: ATT/P mode (for operations of 2-way attachments like crusher, etc.)

“ATT/E”: ATT/E mode (for operations of 2-way attachments like crusher in emphasis of fuel consumption)

- For the position of the working mode switch, see “MACHINE MONITOR EQUIPMENT NAME (3-6)”.
- When E mode is selected, E0 to E03 are displayed. For details, see “ADJUST ECONOMY MODE (3-66)”.



TRAVEL SPEED DISPLAY

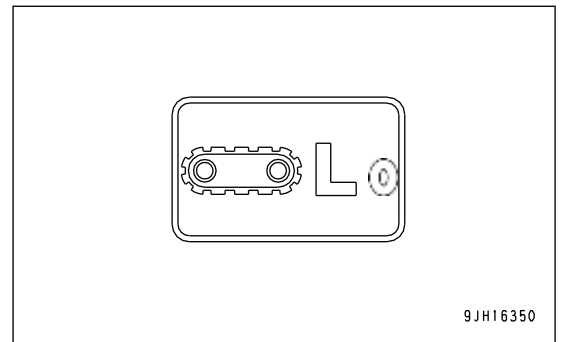
The travel speed display shows the set mode of the travel speed.

The travel speed is indicated as follows according to the setting of the travel speed selector switch.

“Lo”: Low-speed travel

“Hi”: High-speed travel

For the position of the travel speed selector switch, see “MACHINE MONITOR EQUIPMENT NAME (3-6)”.

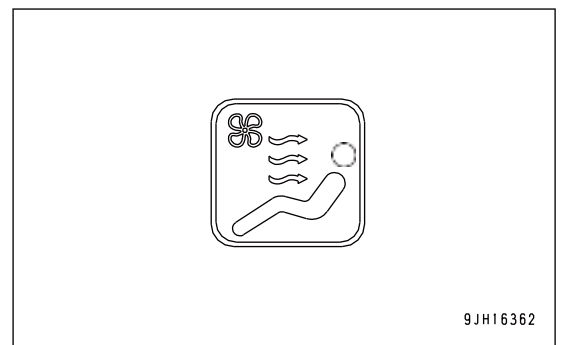


AIR CONDITIONER PILOT LAMP

The air conditioner pilot lamp shows the operating state of the air conditioner.

Pilot lamp lights up: Air conditioner ON

Pilot lamp goes out: Air conditioner OFF



MESSAGE DISPLAY

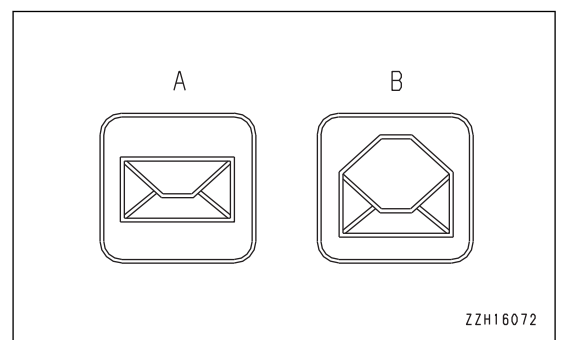
The message display lights up when there is a message from Komatsu.

To read the message, see “MESSAGE DISPLAY (3-83)”.

Lights up in green (A): There is unread message.

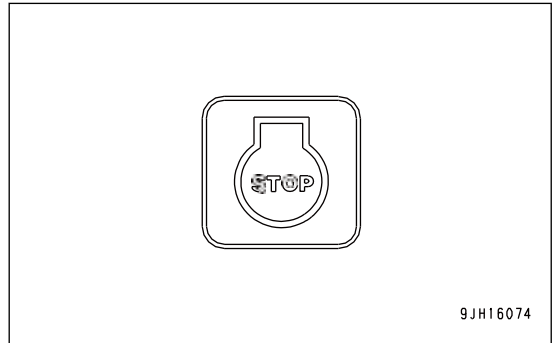
Lights up in blue (B): There is any read message to which no reply is made.

OFF: No messages



ENGINE STOP PILOT LAMP

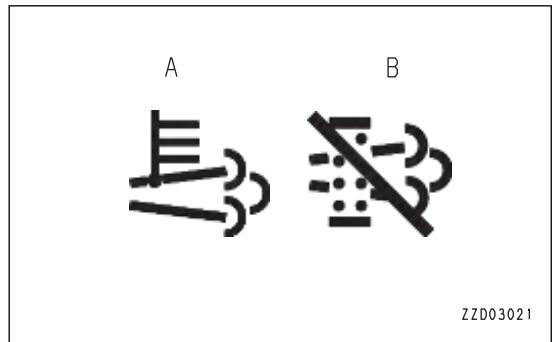
The engine stop pilot lamp is displayed while the engine is stopped. It goes out when the engine is started.



AFTERTREATMENT DEVICES REGENERATION DISPLAY

This displays the regeneration status and automatic regeneration setting status of the aftertreatment devices.

- (A): Comes on during regeneration.
- (B): Comes on when setting automatic regeneration disable.

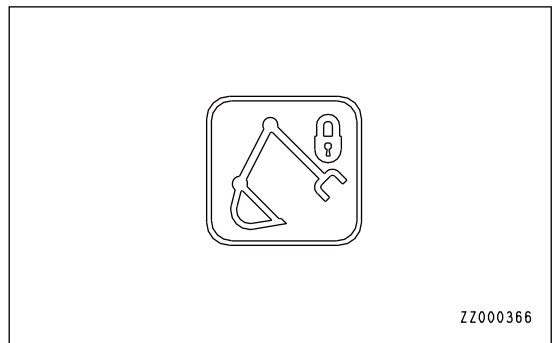


WORK EQUIPMENT LOCK PILOT LAMP

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

It lights up when the work equipment is switched from the unlock mode to the lock mode.

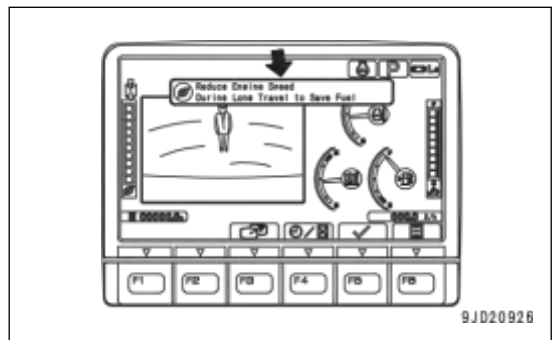
For detail, see "LOCK LEVER (3-94)".



ECO GUIDANCE

The guidance for energy saving operation to reduce the fuel consumption may be displayed during operation.

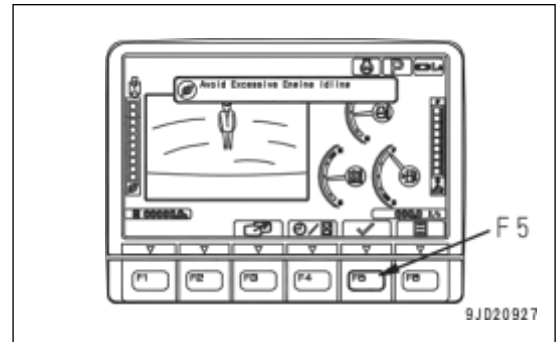
The details of the guidance are as follows:



Idling stop guidance

If no operation is performed for more than 5 minutes, and the engine is idling, the idling stop message is displayed on the monitor. When waiting for work or taking short break, stop the engine to reduce unnecessary fuel consumption.

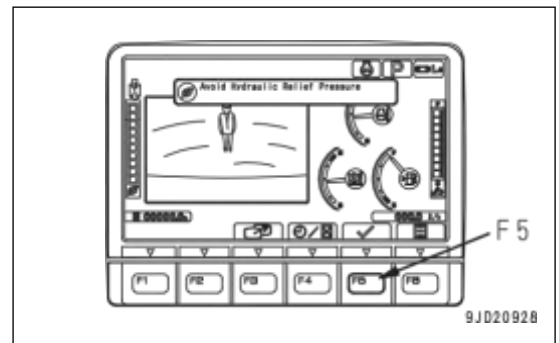
The idling stop message goes out if any lever is operated again or switch F5 is pressed.



Hydraulic relief deterrence guidance

If the hydraulic oil is kept relieved for more than 3 seconds during operation, the hydraulic relief deterrence message is displayed on the monitor.

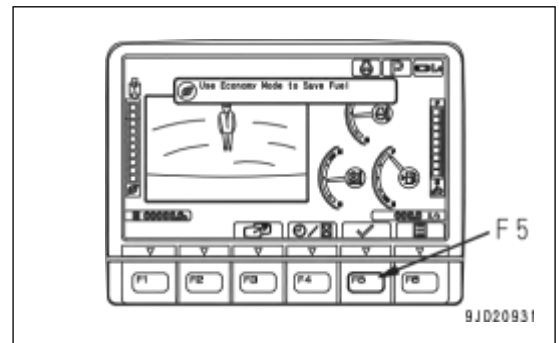
The hydraulic relief deterrence message goes out 10 seconds later or when switch F5 is pressed.



E mode recommendation guidance

If light-load work is continued for more than 10 minutes in P or ATT/P mode, E mode recommendation message is displayed. When working on light load, set the working mode to E to reduce unnecessary fuel consumption.

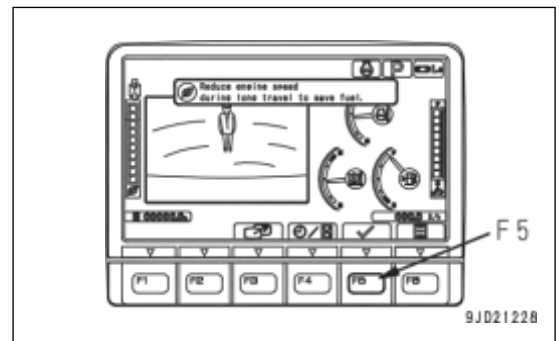
E mode recommendation message goes out more than 10 seconds after or when switch F5 is pressed.



Reduce Travel Speed (Recommended) Guidance

If the machine keeps traveling for more than 2 minutes with the travel mode Hi and the fuel control dial at the High idle (MAX) position, the travel partial mode recommendation message is displayed. When traveling for a long time, the fuel consumption can be reduced by lowering the fuel control dial.

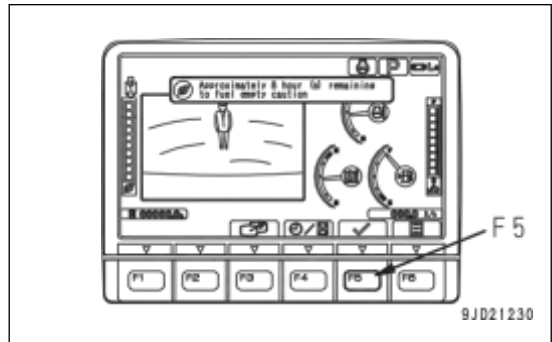
The travel partial mode recommendation message goes out more than 10 seconds after or when switch F5 is pressed.



Low Fuel Level Guidance

If the operable time estimated from the current fuel level and the latest average fuel consumption is shorter than 8 hours, the low fuel level message is displayed.

The low fuel level message goes out more than 10 seconds after or when switch F5 is pressed.

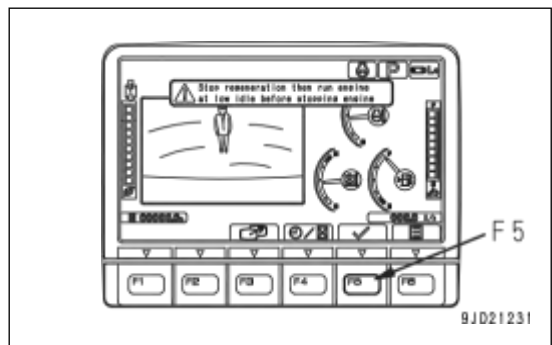


Guidance for engine stop operation during the aftertreatment devices regeneration

Immediately after starting aftertreatment devices regeneration, the information about engine stop operation during the aftertreatment devices regeneration is displayed.

When stopping the engine during regeneration of the aftertreatment devices, stop the regeneration first according to "PROCEDURE FOR SETTING AFTERTREATMENT DEVICES-REGENERATION DISABLE (3-116)", then stop the engine after running it at low idle for approximately 5 minutes.

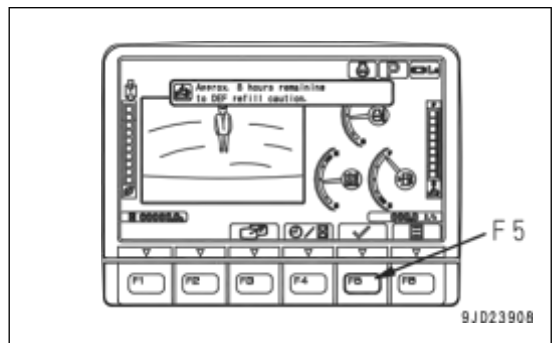
The information about engine stop operation during the aftertreatment devices regeneration goes out 10 seconds later or when switch F5 is pressed.



DEF level low error guidance

If the operable time estimated from the current DEF level and the latest average DEF consumption is shorter than 8 hours, the low DEF level message is displayed.

The low DEF level message goes out more than 10 seconds after or when switch F5 is pressed.



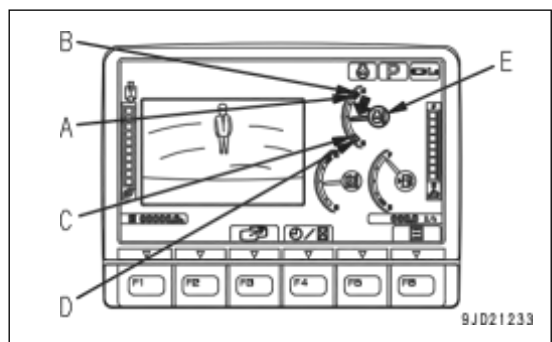
METER DISPLAY

ENGINE COOLANT TEMPERATURE GAUGE

Engine coolant temperature gauge shows the engine coolant temperature.

If the indicator is in green range during operations, it is normal. When the indicator goes beyond (A) of red range during operations, the overheat prevention system is actuated.

- (A) to (B): Red range
- (A) to (C): Green range
- (C) to (D): White range



The overheat prevention system is actuated as follows.

Red range (A) position: Engine coolant temperature caution lamp (E) shows abnormality display.

Red range (B) position: Engine speed changes to low idle, engine coolant temperature caution lamp (E) shows abnormality display and alarm buzzer sounds at the same time

The overheat prevention system continues to operate until the pointer enters the green range.

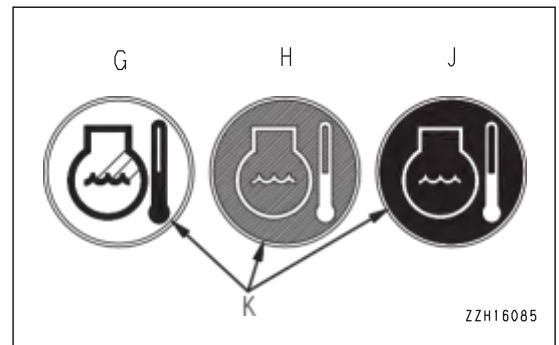
When the engine is started, if the indicator is at position (D), engine coolant temperature caution lamp (E) shows the low-temperature display.

In this case, perform warm-up operation. For details, see “METHOD FOR ENGINE WARM-UP OPERATION (3-159)”.

Display (G) when temperature is low: Caution lamp background (K) is white.

Display (H) when temperature is correct: Caution lamp background (K) is blue.

Display (J) when condition is abnormal: Caution lamp background (K) is red.



HYDRAULIC OIL TEMPERATURE GAUGE

Hydraulic oil temperature gauge shows the hydraulic oil temperature.

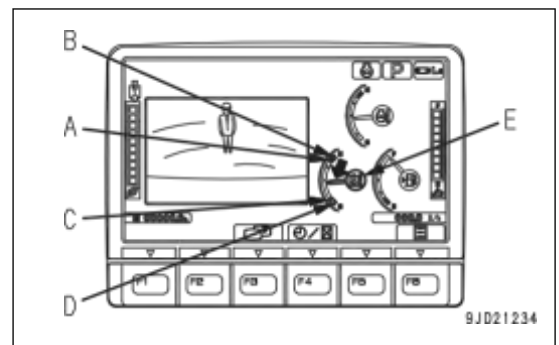
If the indicator is in green range during operations, it is normal.

When the indicator nears the red range (A) during operation, the hydraulic oil temperature has exceeded 102 °C. Then run the engine at low idle or stop it and wait for the hydraulic oil temperature to drop.

(A) to (B): Red range

(A) to (C): Green range

(C) to (D): White range



REMARK

When the indicator reaches red range (A), the hydraulic oil temperature is as follows.

Red range (A) position: 102 °C or more

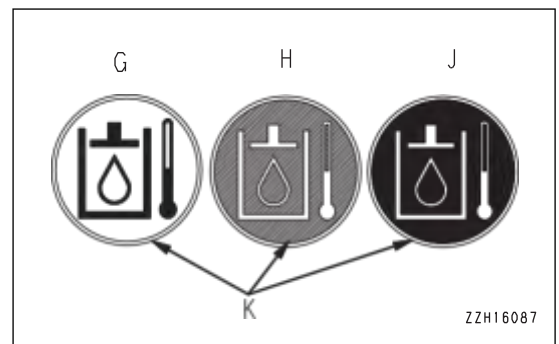
Red range (B) position: 105 °C or more

When the indicator is in red range (A) to (B), hydraulic oil temperature caution lamp (E) indicates abnormality. When the engine is started, if the indicator is at position (C), the hydraulic oil temperature is below 20 °C and hydraulic oil temperature caution lamp (E) indicates low temperature. In this case, perform warm-up operation. For details, see “METHOD FOR HYDRAULIC SYSTEM WARM-UP OPERATION (3-161)”.

Display (G) when temperature is low: Caution lamp background (K) is white.

Display (H) when temperature is correct: Caution lamp background (K) is blue.

Display (J) when condition is abnormal: Caution lamp background (K) is red.



FUEL GAUGE

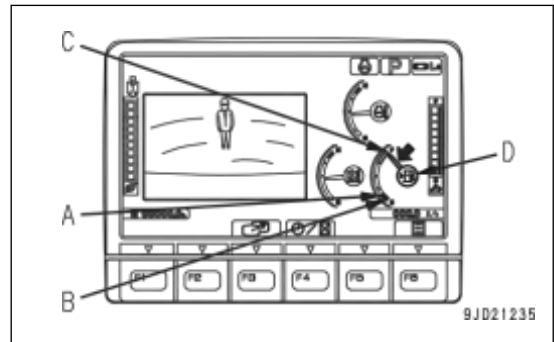
Fuel gauge shows the amount of fuel in the fuel tank.

The indicator should be in the green range during operations.

If the indicator starts to enter red range (A) during operation, the remaining fuel is 52 l or less, so perform inspection and add fuel.

(A) to (B): Red range

(A) to (C): Green range



REMARK

When the indicator reaches red range (B), the remaining fuel is 32 l or less.

When the indicator is in red range (B), fuel level lamp (D) lights up in red.

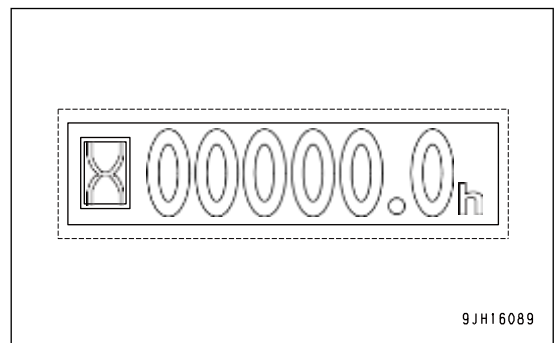
The correct fuel level may not be displayed for a short time when the starting switch is turned to ON position, but this is not an abnormality.

SERVICE METER / CLOCK

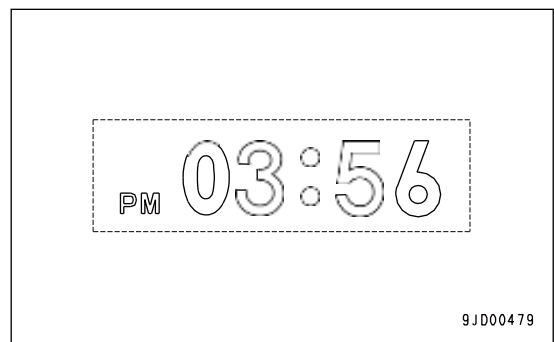
The service meter/clock shows the total hours of operation of the machine or the present time.

When the engine is running, the service meter advances even when the machine is not moving. The service meter advances 0.1 every 6 operation minutes, regardless of the engine speed.

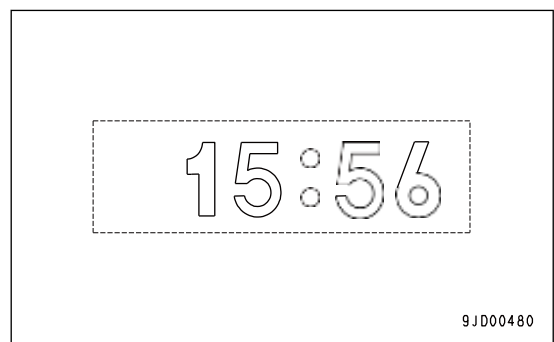
- Service meter display



- Clock display (12-hour display)



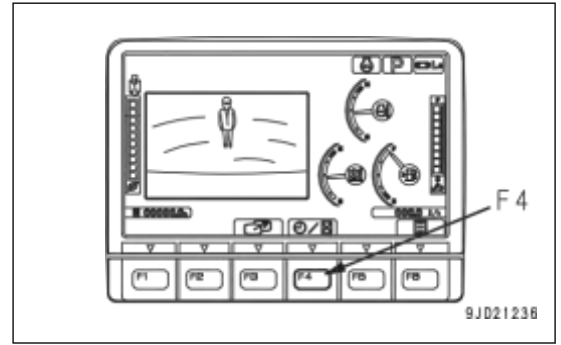
- Clock display (24-hour display)



On the standard screen, when function switch F4 is pressed, it is possible to switch between the clock display and the service meter display alternately.

REMARK

- If the battery is disconnected for a long period for storage etc., the time information may be lost.
- Clock display (12-hour or 24-hour display is available)
- For details of setting and correction of time, see “CLOCK ADJUSTMENT (3-76)”.



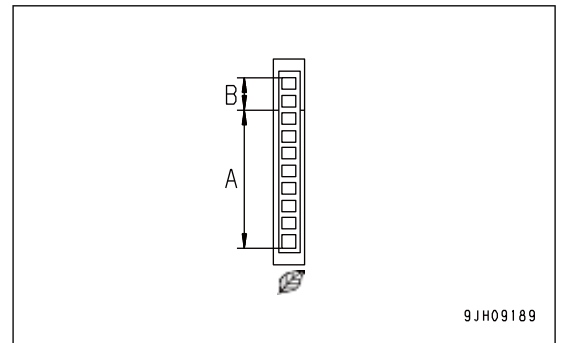
ECO GAUGE

ECO gauge shows the instantaneous fuel consumption.

The instantaneous fuel consumption means the fuel consumption rate at each current moment, which varies with the work load and engine speed.

When the gauge is in green range A, the instantaneous fuel consumption is at a good to medium level.

When the gauge is in yellow range B, the instantaneous fuel consumption is at a bad level.



REMARK

Although there is no abnormality on the machine when the gauge enters the yellow range, reduce the engine output to a point where there is no adverse effect on the operation for the protection of the global environment. Perform energy-saving operations in the green range. Travel less frequently. It also helps to save energy. Consider the best way of operation for saving energy.

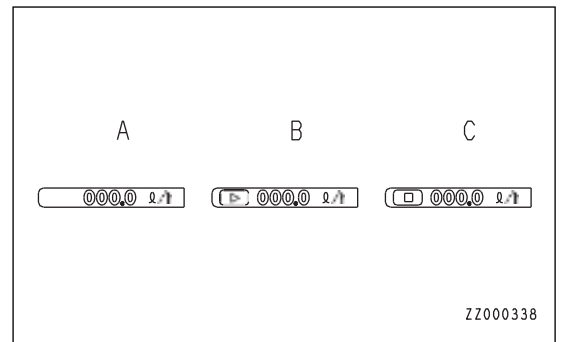
FUEL CONSUMPTION GAUGE

Fuel consumption gauge shows the average fuel consumption of the machine.

(A): Shows the average fuel consumption of a day (from 0:00 a.m. of the day to 0:00 a.m. of the next day).

(B): Shows the split fuel consumption under measurement.

(C): Shows the split fuel consumption while measurement is stopped.



REMARK

Display on the fuel consumption gauge can be switched between the average fuel consumption per day and the average fuel consumption during a selected period (split fuel consumption).

For the procedure for switching the display, see “ENERGY SAVING GUIDANCE (3-58)”.

DEF LEVEL GAUGE

DEF level gauge 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.

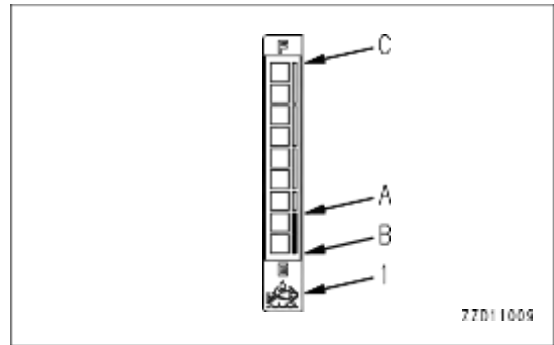
(A) to (B): Red range

(A) to (C): Green range

When the indicator is in red range from (A) to (B), DEF level caution lamp (1) lights up in red.

If DEF level further decreases after the lamp lights up in red, the engine power is derated.

When remaining level of DEF cannot be detected, DEF level caution lamp (1) lights up in white.



REMARK

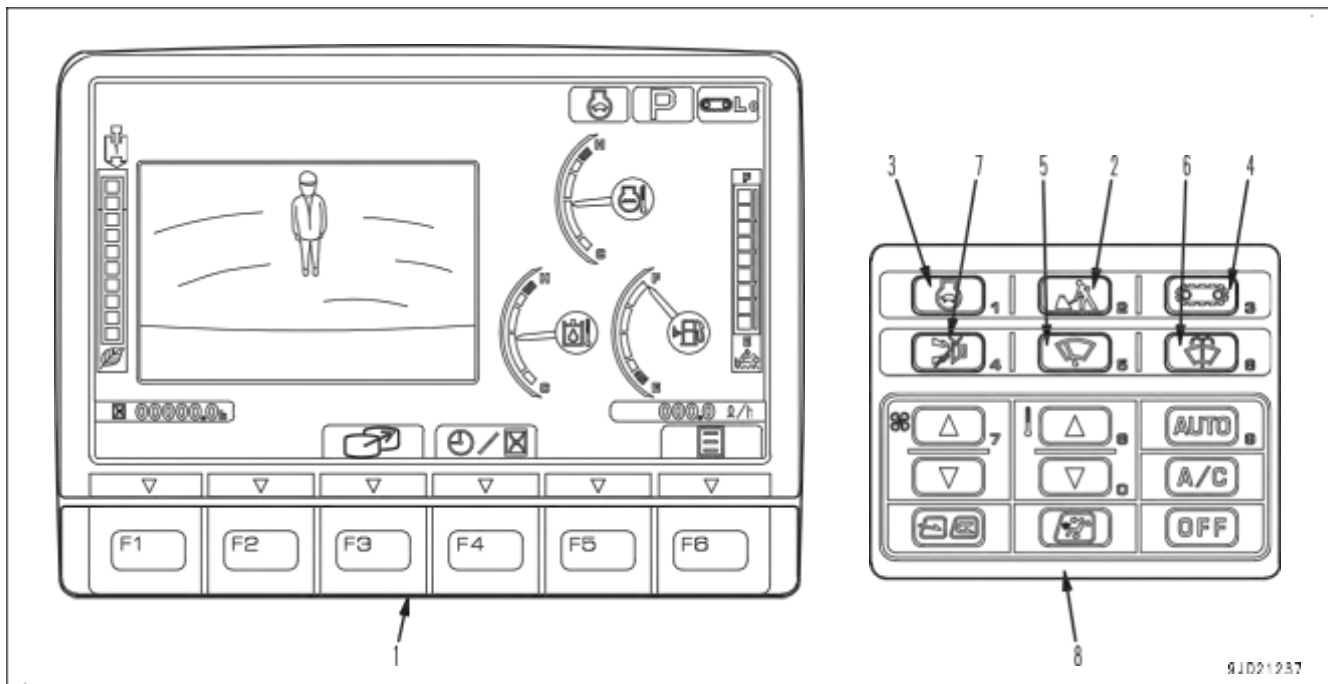
- Immediately after turning the starting switch to ON position and during the engine is running, DEF level caution lamp (1) lights up in white. However, this does not indicate abnormality.
- In cold weather, DEF level cannot be detected and DEF level caution lamp (1) lights up in white for approximately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



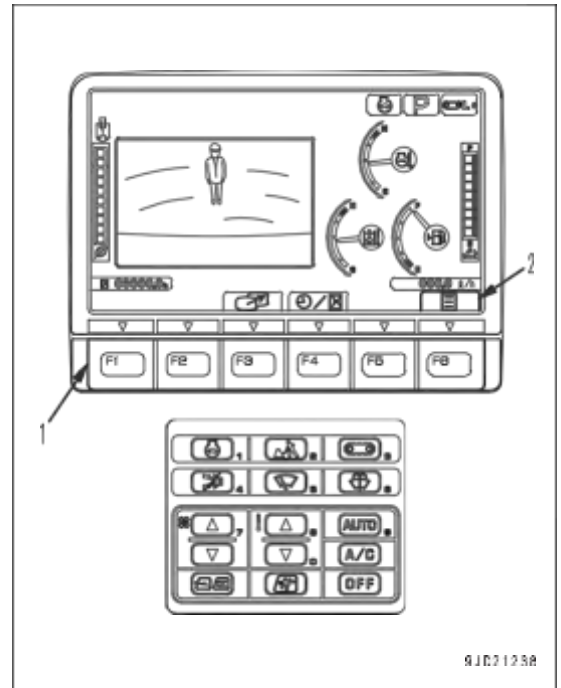
- (1) Function switch
- (2) Working mode selector switch
- (3) Auto-deceleration switch
- (4) Travel speed selector switch
- (5) Wiper switch
- (6) Window washer switch

(7) Buzzer cancel switch

(8) Air conditioner switch

FUNCTION SWITCHES AND GUIDANCE ICONS

- There are 6 function switches (1) (F1 to F6) at the bottom of the monitor display. The function of each switch differs according to the content of each screen.
- The function of each function switch (1) on each screen can be confirmed by guidance icons (2) displayed above that switch.
- While guidance icon (2) is not displayed, function switch (1) does not function even if it is pressed.
- Even if guidance icon (2) is pressed, it does not function. Press function switch (1) directly under guidance icon (2) to operate the function.

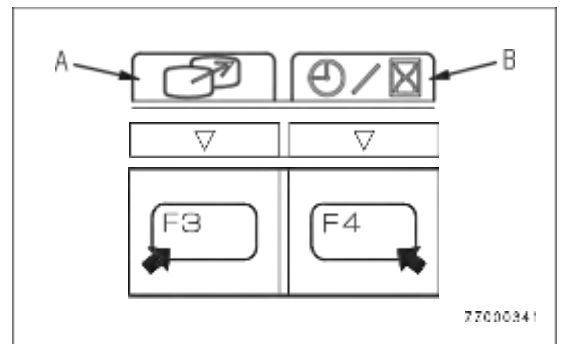


When the monitor display shows the standard screen, the types of guidance icons and functions of function switches are as follows:

For the details of each function, see the detailed explanation of each item.

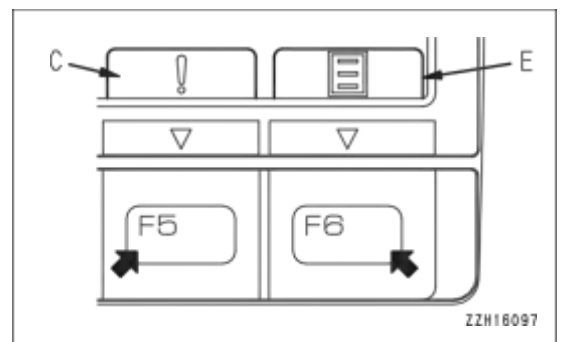
(A) Switch F3: Camera image selector switch.

(B) Switch F4: Service meter/clock display selector switch

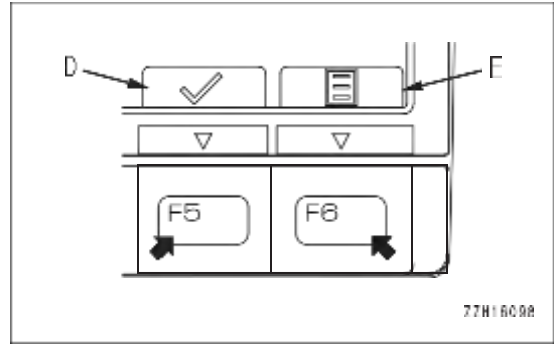


(C) Switch F5: "Current Abnormality" display switch

(Only while caution lamp is lit)

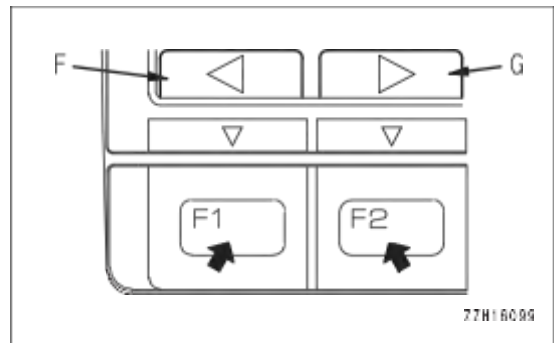


- (D) Switch F5: ECO guidance erase switch
(While ECO guidance is displayed)
- (E) Switch F6: User menu display switch

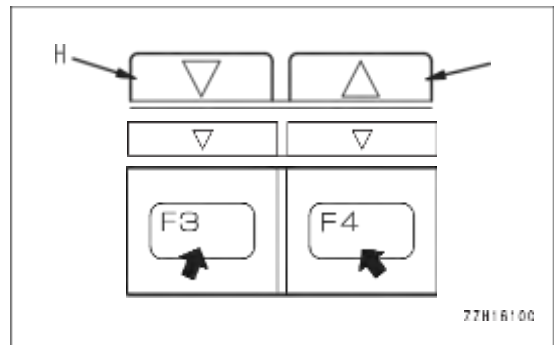


Guidance icons and their functions differ with the contents of the displayed screen, but representative guidance icons frequently used and their functions are as follows:

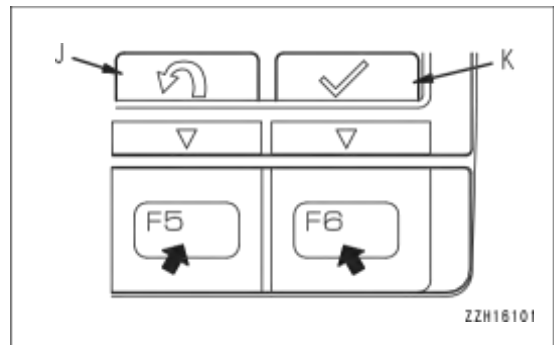
- (F) Switch F1 or F3: Moves to the left item. (When on the left end, it moves to the right end.)
- (G) Switch F2 or F4: Moves to the right item. (When on the right end, it moves to the left end.)



- (H) Switch F3: Moves to the item below (forward). (When on the last line, it moves to the first line.)
- (I) Switch F4: Moves to the item above (backward). (When on the first line, it moves to the last line.)



- (J) Switch F5: Cancels any change and returns the screen to the previous screen.
- (K) Switch F6: Enters the selection and contents to change, and proceeds the screen to the next screen.



REMARK

- Even if some icons look the same, their display positions and corresponding function switches may differ according to the screens to be displayed.
- For the guidance icons and their functions not explained above, see the pages where the control methods of respective screens are explained.

WORKING MODE SELECTOR SWITCH

Use working mode selector switch to set the movement or power of the work equipment.

The operation becomes easier by selecting the mode to match the content of the operation.

P mode: For heavy-duty operations

E mode: For operations with emphasis on fuel consumption

L mode: For fine control operations

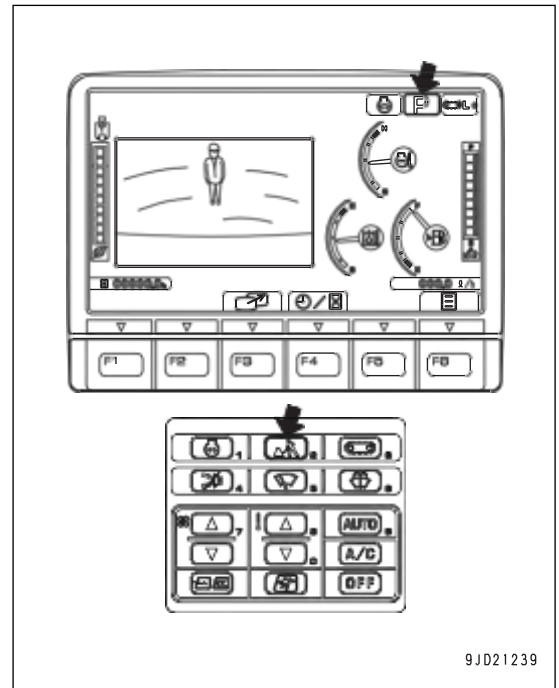
B mode: For breaker operations

ATT/P mode: For operations of 2-way attachments like crusher (For machines ready for installation of attachment)

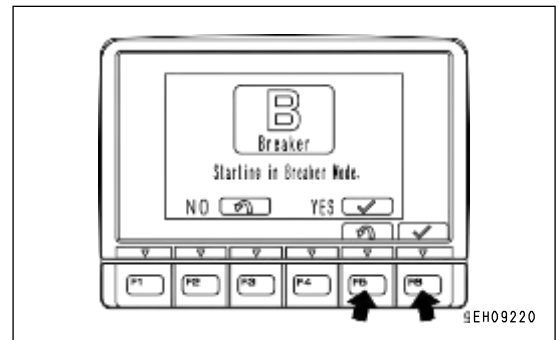
ATT/E mode: For operations emphasizing fuel consumption out of those of 2-way attachments like crusher (For machines ready for installation of attachment)

- When the monitor is turned on, it is automatically set to the mode used when the starting switch was turned to OFF position last.
- When the working mode selector switch is pressed, the Working Mode selector screen is displayed. For each set mode, P, E, L, B, ATT/P, ATT/E are displayed at the top right of the monitor display.
- For machines ready for installation of attachment, the attachment mode is added to the display. For handling of machines ready for installation of attachment, see "HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-16)".
- When the monitor starts up, if the working mode setting is B mode, the confirmation message in the figure is displayed and the buzzer sounds.
- Press function switch F6 always when starting up in B mode. If you press F5, the system starts up in E mode.

If you want to have automatic setting of P, E, L, B, ATT/P or ATT/E mode (optional default setting) when starting engine, ask your Komatsu distributor to change the setting.



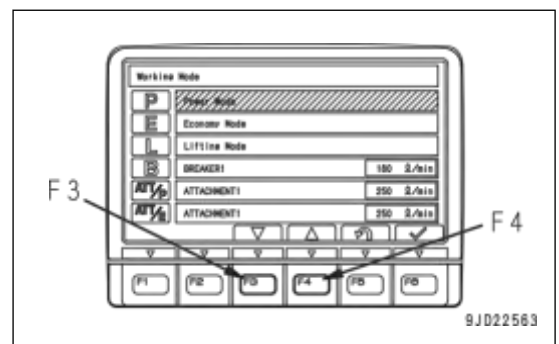
9JD21239



EH09220

How to use working mode selector switch

1. When working mode selector switch is pressed, the Working Mode selector screen is displayed on the monitor.

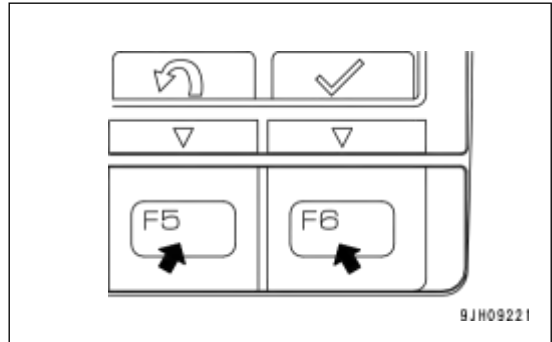


9JD22563

2. Press function switches F3 or F4 at the bottom of the screen or the working mode selector switch to change the mode selection one at a time. If no switch is touched for more than 5 seconds, the selected working mode is automatically set as the working mode and the screen changes to the one for steps 3 and 4.

REMARK

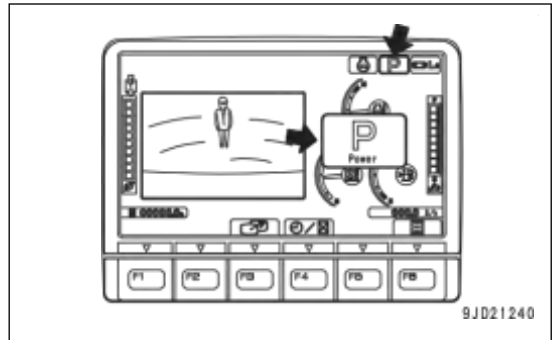
To return to the standard screen without changing the working mode, press function switch F5.



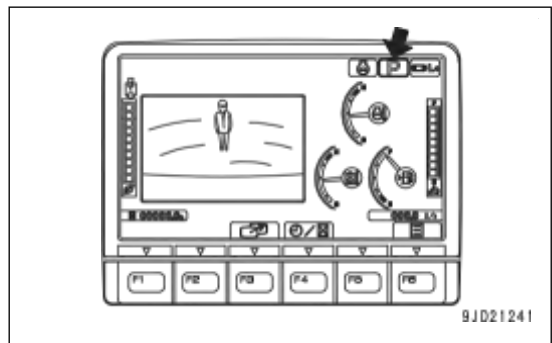
- 3. After selecting the desired mode, press function switch F6 and the mode is displayed in the center of the monitor display.

(Example: When the power mode is selected: P)

- 4. After 2 seconds, the working mode display at the top right of the screen is highlighted in yellow.

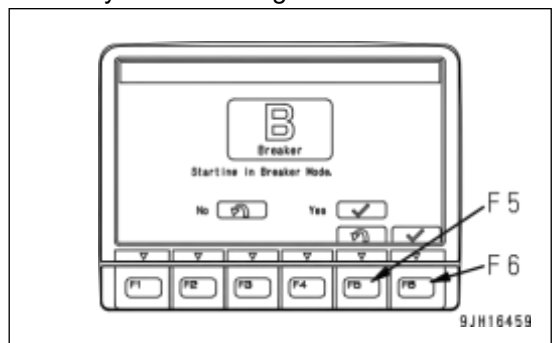


- 5. After 2 seconds, the screen returns to the standard screen. The working mode display highlighted in yellow in step 4 returns to blue.



REMARK

When setting the working mode to B mode, to ensure safety, the buzzer sounds and at the same time, the message in the illustration is displayed. Press function switch F6 always when setting to the breaker mode. When function switch F5 is pressed, the breaker mode is not set, and the screen returns to working mode selection screen.



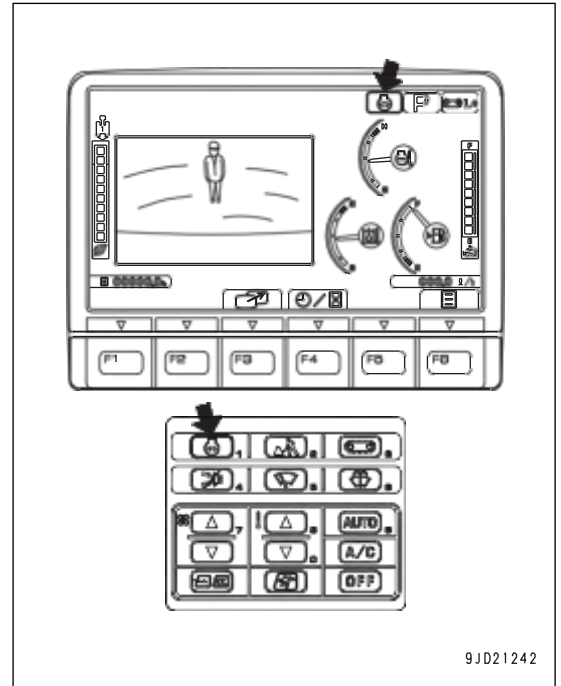
AUTO-DECELERATION SWITCH

Auto-deceleration switch automatically lowers the engine speed and turns on the function to reduce fuel consumption when the control levers are at NEUTRAL position.

Auto-deceleration pilot lamp lights up: Auto-deceleration ON

Auto-deceleration pilot lamp goes out: Auto-deceleration OFF

Each time the switch is pressed, the auto-deceleration is switched between ON and OFF.



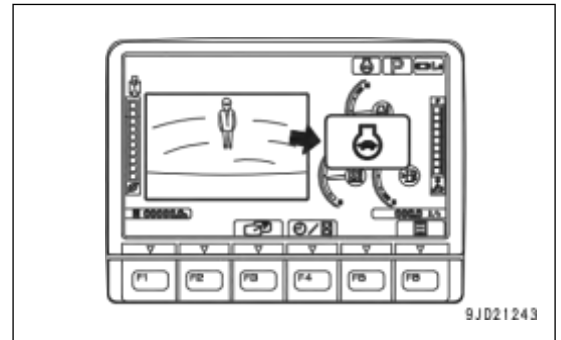
Function of auto-deceleration

When the auto-deceleration function is ON, if the work equipment lever and travel lever are returned to NEUTRAL position, the engine speed will drop approximately after 4 seconds from the operating speed to idle speed.

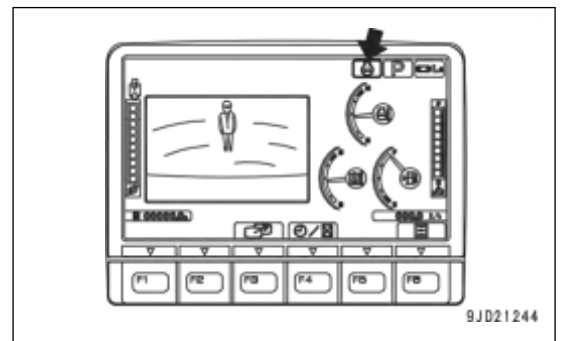
As a result, fuel consumption can be reduced.

If any lever is operated in this condition, engine speed will return to the previous operating speed, and you can perform the operation.

1. When the auto-deceleration switch is pressed and the auto-deceleration function is turned ON, the mode is displayed in the center of the monitor display, and after 2 seconds, the screen returns to the standard screen.



2. On the standard screen, auto-deceleration pilot lamp lights up.
(When the auto-deceleration is OFF, the pilot lamp goes out.)



TRAVEL SPEED SELECTOR SWITCH

WARNING

- Drive the machine at low speed (set it to Lo) always when loading to or unloading from a trailer. Never operate the travel speed selector switch during travel.
- If the travel speed is switched between Hi and Lo when the machine is traveling, the machine may deviate to one side, even when traveling in a straight line. Stop the machine before switching the travel speed.
- The operator cannot see the rearward of the machine. Check the rearward of the machine with rear-view monitor always when traveling reverse.

Travel speed selector switch is used to select the travel speed from 2 stages.

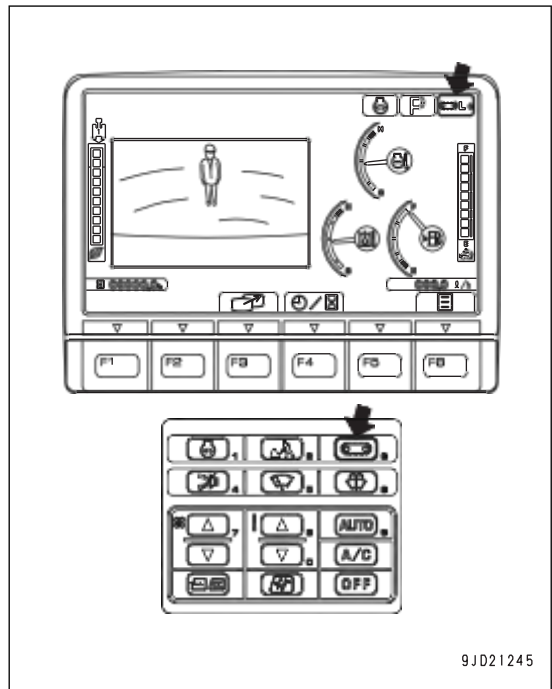
Lo lights up: Low-speed travel

Hi lights up: High-speed travel

When the engine is started, the speed is automatically set to Lo.

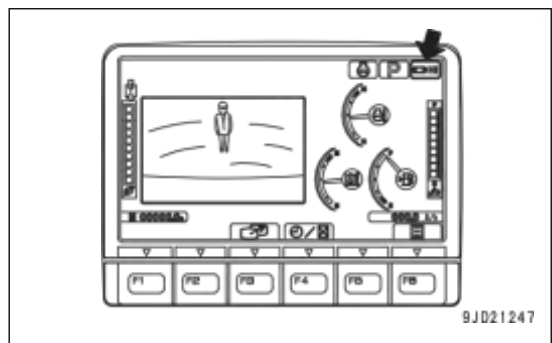
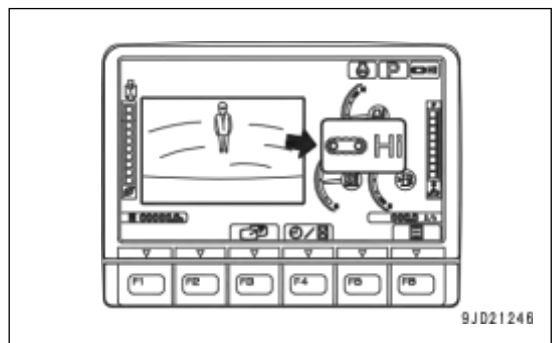
Each time that the switch is pressed, the display changes Lo→Hi→Lo in turn.

Even if the travel speed is set to high-speed (Hi), when the machine travels on soft ground or uphill and travel power is needed, the system automatically shifts down to low-speed travel (Lo) and you do not need to operate the switch. In this case, the travel speed on the monitor display stays lit at Hi (high-speed).



REMARK

Each time the travel speed selector switch is switched, the mode is displayed on the monitor display, and after 2 seconds, the screen returns to the standard screen.



WIPER SWITCH

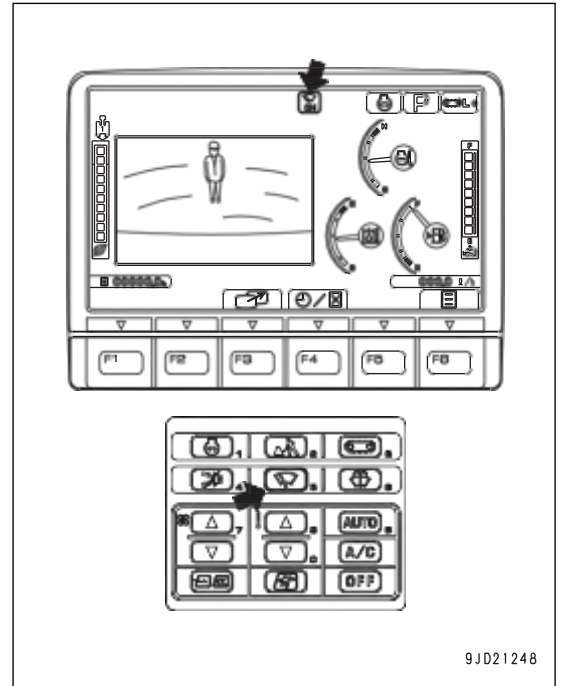
Wiper switch actuates the front window windshield wiper.

Each time the switch is pressed, it changes INT → ON → stop (lamp goes out).

Windshield wiper pilot lamp INT lights up: Windshield wiper operates intermittently

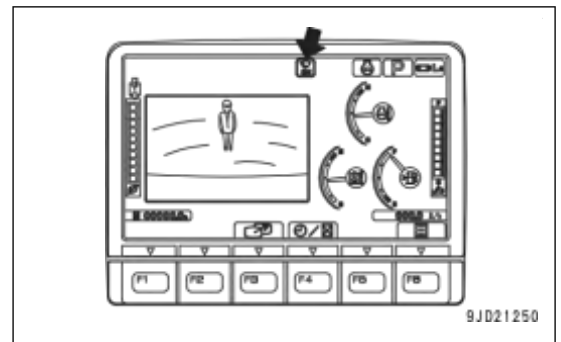
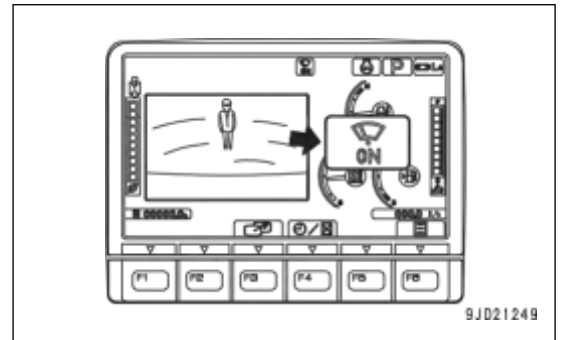
Windshield wiper pilot lamp ON lights up: Windshield wiper operates continuously

Windshield wiper pilot lamp off: Windshield wiper stops



REMARK

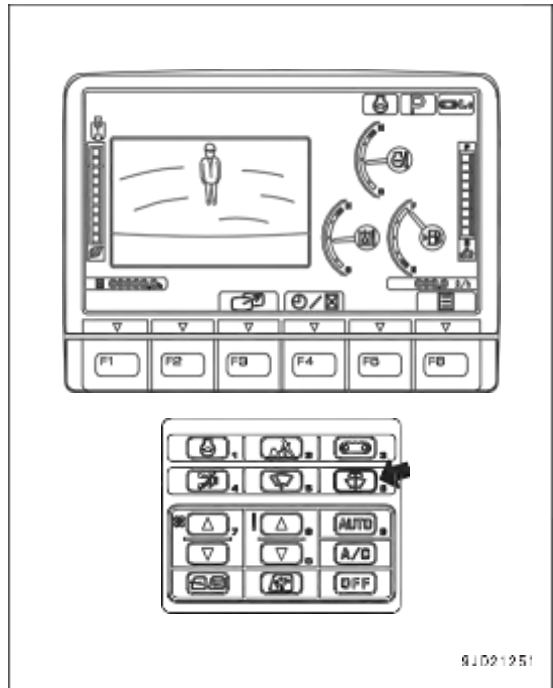
Each time wiper switch is pressed, the mode is displayed in the center of the monitor display, and after 2 seconds, the screen returns to the standard screen.



WINDOW WASHER SWITCH

Keep pressing this switch continuously, and window washer fluid is sprayed out on the front glass. When releasing the switch, the spray stops.

- If keep pressing the switch when the wiper is stopped, the window washer fluid is sprayed out. At the same time, the wiper is actuated continuously. When releasing switch, the wiper continues to operate for 2 cycles, then stops.
- If the wiper is moving intermittently and the switch is kept pressed continuously, the window washer fluid is sprayed out. At the same time, the wiper is actuated continuously. When releasing switch, the wiper continues to operate for 2 cycles, then return to intermittent operation.

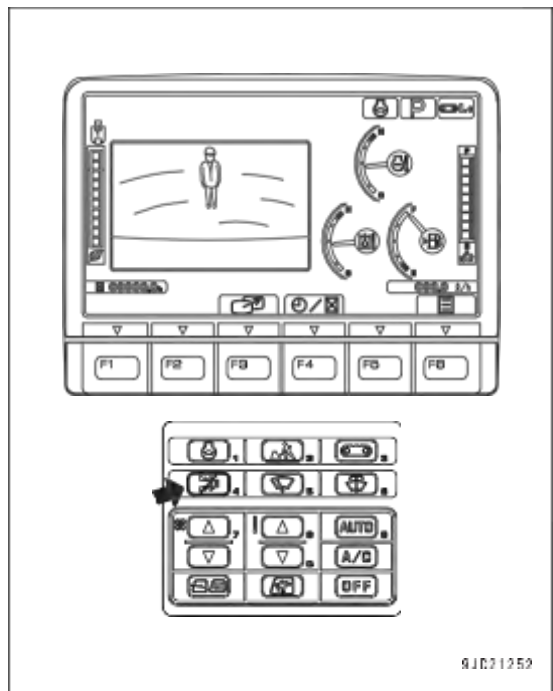


BUZZER CANCEL SWITCH

Buzzer cancel switch is used to stop the alarm buzzer for the warning item where there is an abnormality.

REMARK

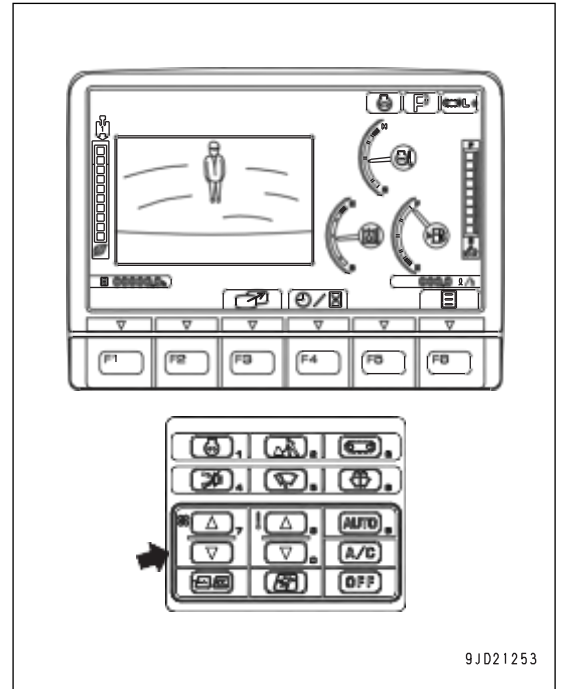
The buzzer cannot be stopped depending on the content of the warning.



AIR CONDITIONER SWITCH

The air conditioner switch consists of 9 switches.

For explanation of each switch, see “HANDLE AIR CONDITIONER (3-199)”.

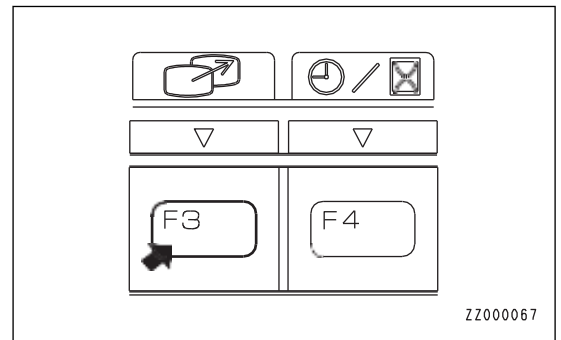


FUNCTION SWITCHES

The operation of the function switches in the standard screen

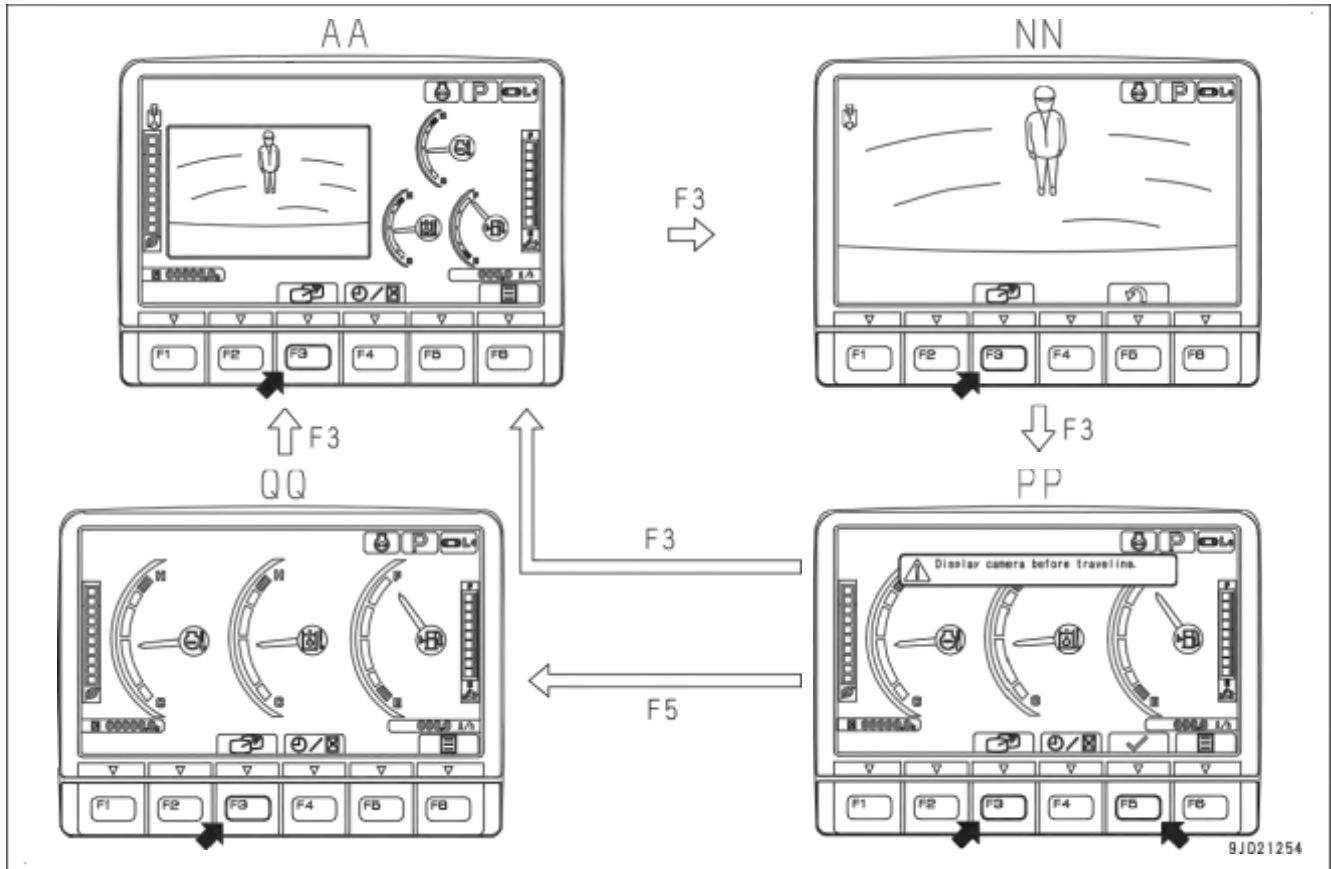
CAMERA IMAGE SELECTOR SWITCH

On the standard screen, you can select a display only for the camera image or a display only for the meter by pressing switch F3.



Operation of camera image display screen

Operate the following for changing the camera image display on the monitor.



- On standard screen AA, the camera image is always displayed on the left part of the monitor.
- On standard screen AA, when switch F3 is pressed, camera image full-screen display NN is displayed. Camera image full-screen display NN is displayed on the entire screen.
- When switch F3 is pressed on camera image full-screen display NN, message screen PP is displayed and no camera image is displayed.
- On message screen PP, when switch F3 is pressed or when no switch is operated for 10 seconds, standard screen AA is displayed.
- On message screen PP, when switch F5 is pressed, the message disappears and meter display screen QQ is displayed.

For safety, display the camera image during travel.

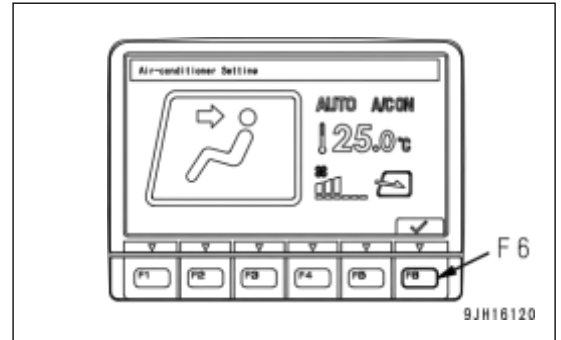
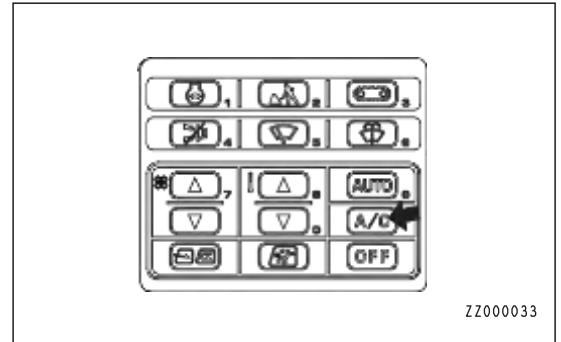
Other mode operations while camera image is displayed

Even when the camera image is displayed, it is possible to operate following modes.

- The air conditioner can be operated.

If the air conditioner switch is operated, the screen switches to the air conditioner operation screen. When the screen switches to the air conditioner operation screen, press switch F6 to return to the camera image screen. In addition, if no operation is performed for 5 seconds after the screen switches to the air conditioner operation screen, the screen automatically returns to the camera image display.

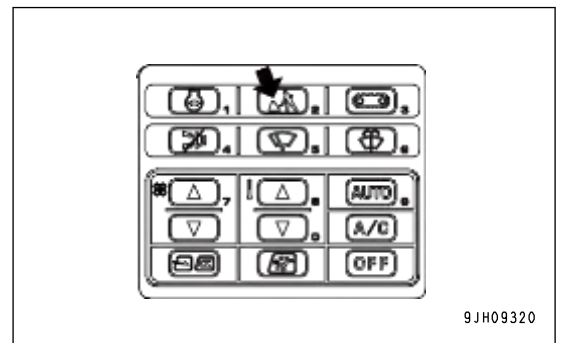
For details of the air conditioner operation, see "HANDLE AIR CONDITIONER (3-199)".



- It is possible to change the working mode by pressing the working mode selector switch.

For the working mode selector switch, see "WORKING MODE SELECTOR SWITCH (3-45)".

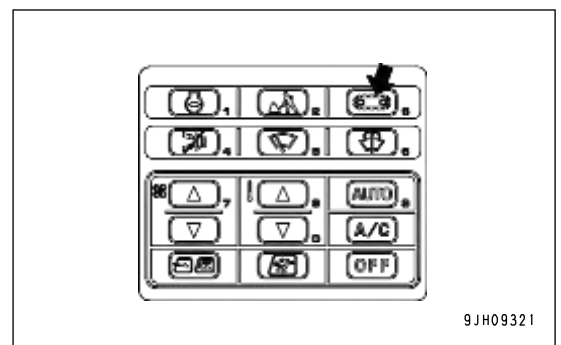
When the working mode is changed, the screen returns automatically to the camera image screen. At this time, the working mode display at the top right of the monitor display is highlighted in yellow for 2 seconds, then returns to blue.



- Press the travel speed selector switch to change the travel speed.

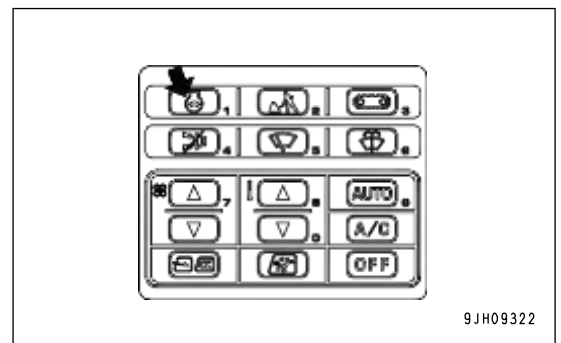
For the travel speed selector switch, see "TRAVEL SPEED SELECTOR SWITCH (3-48)".

When the travel speed is changed, the travel speed display at the top right of the monitor display is highlighted in yellow for 2 seconds, then returns to blue.

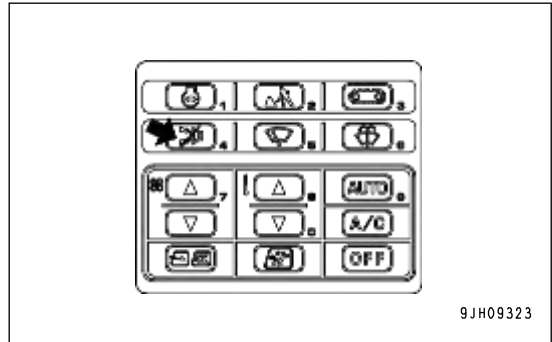


- Press the auto-deceleration switch to turn the auto-deceleration function ON/OFF.

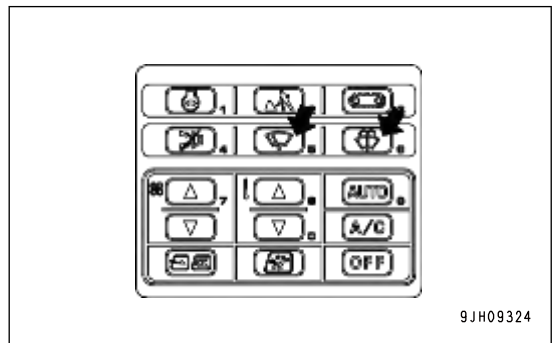
Even if the auto-deceleration switch is pressed, the camera image display screen neither switches to another screen nor returns to the standard screen display.



- It is possible to stop the alarm buzzer for the warning item where there is an abnormality, by pressing the buzzer cancel switch.
 Even if the buzzer cancel switch is pressed, the camera image display screen neither switches to another screen nor returns to the standard screen.
 Depending on the warning, alarm buzzer does not stop sounding by pressing the buzzer cancel switch.

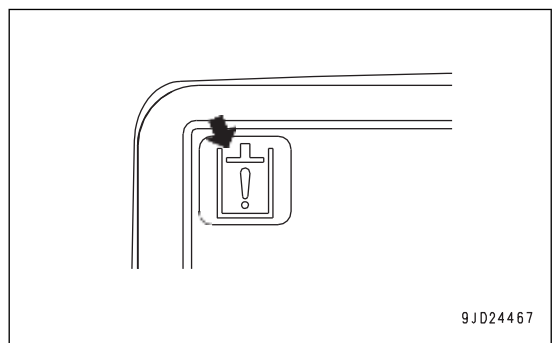
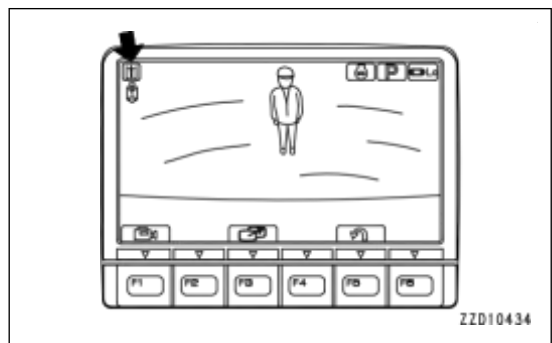


- Press the wiper switch and washer switch to operate the wipers and washer.
 Even if the wiper switch or washer switch is pressed, the camera image display neither switches to another screen nor returns to the standard screen.

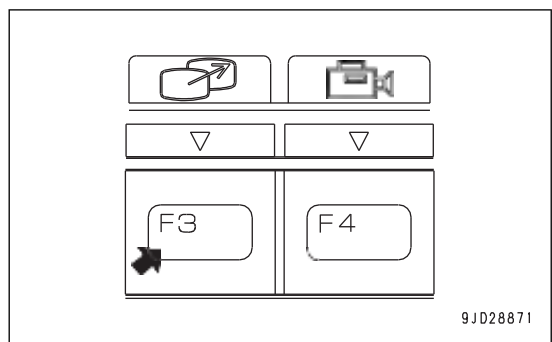


Actions against warning during camera image display

If any abnormality is generated on the machine while the camera image is displayed, the caution lamp flashes at the top left of the screen.

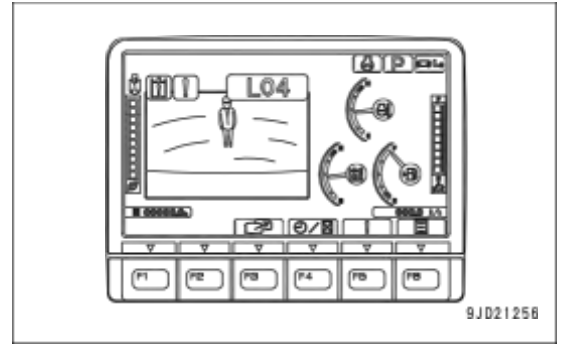


- If the caution lamp is displayed, press switch F3 to return to the standard screen, and check the content of the abnormality or warning display.
 While the caution lamp is flashing, if no lever is operated for 10 seconds or more, the screen automatically returns to the standard screen.



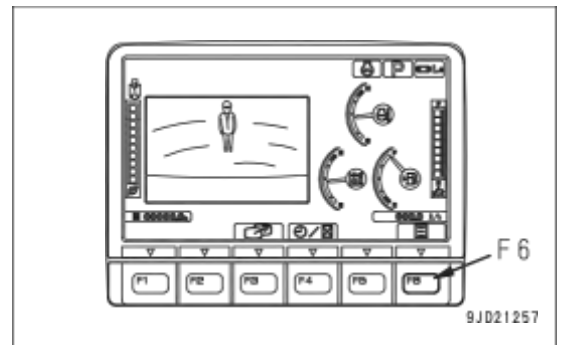
When the screen returns to the standard screen, the caution lamp at the top left of the screen goes out and the caution lamp and action level are displayed on the left part of the screen.

- If a caution lamp is displayed, move the machine to set it in a safe posture, then have inspection performed immediately.
- For the contents of the warning display, see “WARNING DISPLAY (3-17)” and “TROUBLES AND ACTIONS (3-234)”.



USER MENU DISPLAY SWITCH

On the standard screen, press switch F6 to display the user menu screen on which you can make various settings for the machine in the monitor display.



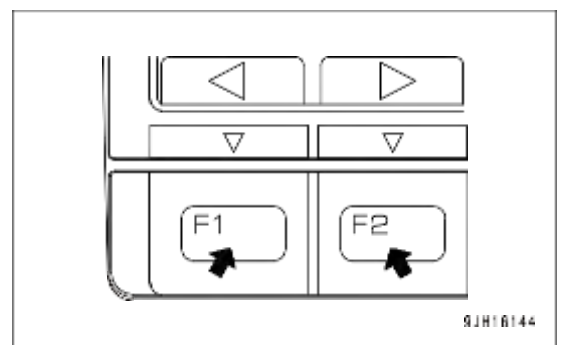
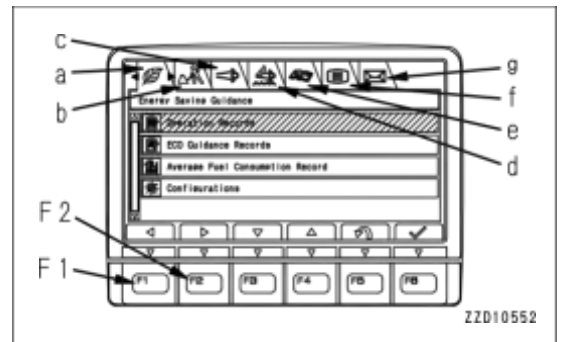
USER MENU

The user menu consists of the following kinds. Press switches F1 and F2 to move to right and left for selecting menu screens.

- (a): “Energy Saving Guidance”
- (b): “Machine Setting”
- (c) “Aftertreatment Devices Regeneration”
- (d): “SCR Information”
- (e): “Maintenance”
- (f): “Monitor Setting”
- (g): Mail Check

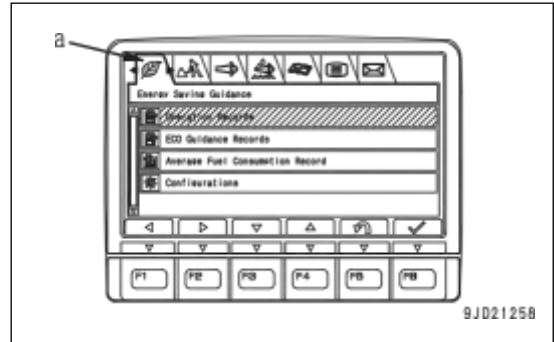
These menus (a) to (g) are for setting and confirming the following items:

For operations in each menu, see the detailed explanation pages of respective items.



(a) “Energy Saving Guidance”

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



(b) “Configurations”

- “Economy Mode Adjustment”
- “Breaker Setting” (if equipped)
- “Attachment Setting” (if equipped)
- “Auto Idle Stop Timer Setting”



(c) “Aftertreatment Devices Regeneration”

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



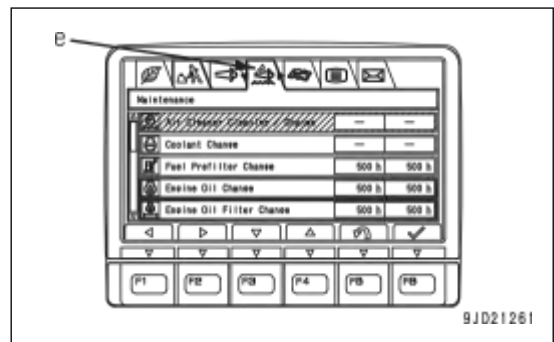
(d) “SCR Information”

- Check of DEF level
- Urea SCR system information



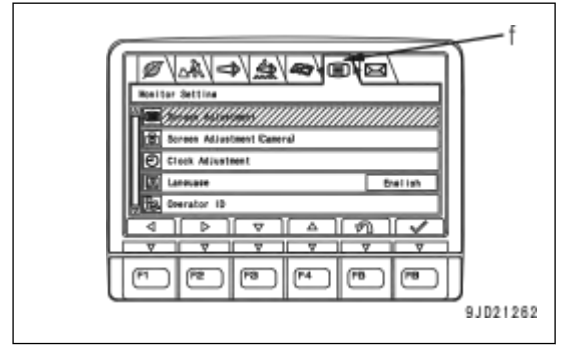
(e) “Maintenance”

- Check and reset of various maintenance times



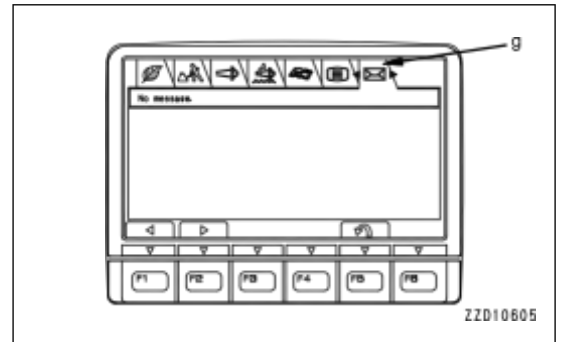
(f) "Monitor Setting"

- "Screen Adjustment"
- Screen Adjustment (Camera)
- "Clock Adjustment"
- "Language Setting"
- "Operator ID"

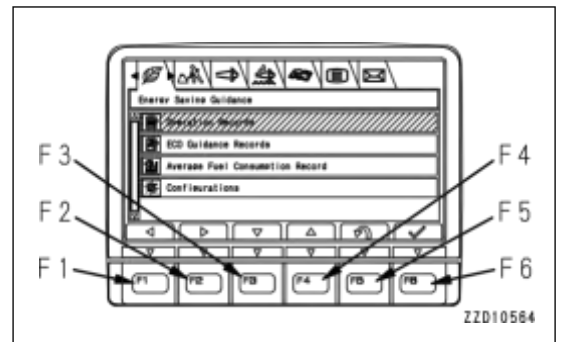


(g) Mail Check

- Check of mail contents and reply to mail

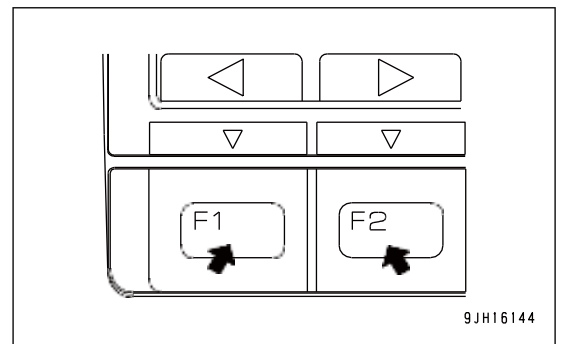


On the user menu screen, it is possible to perform the following operations with switches F1 to F6.



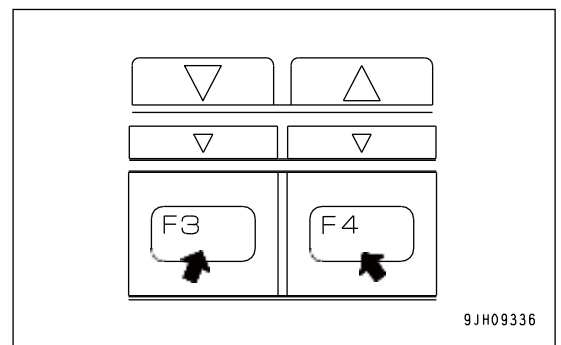
F1: Moves to the left menu. When on the left end menu, it moves to the right end menu.

F2: Moves to the right menu. When on the right end menu, it moves to the left end menu.



F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.

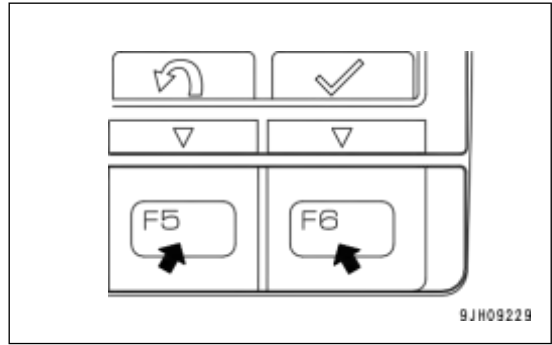
F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.



F5: Returns the screen to the standard screen.

F6: Displays the setting screen for selected item.

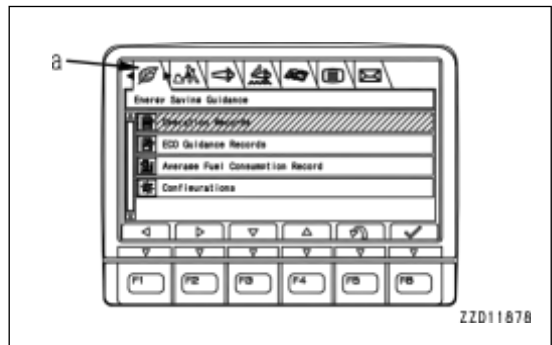
- If no switch is operated for 30 seconds on the user menu screen, the screen automatically returns to the previous screen.



ENERGY SAVING GUIDANCE

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

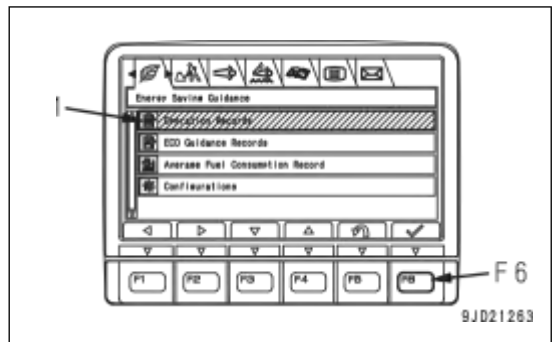
- “Operation Records”
- “Eco Guidance Records”
- “Average Fuel Consumption Record”
- “Configurations”



CHECK OPERATING RECORD

Select “Operation Records” (1) from “Energy Saving Guidance” menu screen, then press switch F6.

On “Operation Records” menu, “working hours”, “Average Fuel Consumption”, “Actual working hours”, “Ave. Fuel Consumption (Actual Working)”, “Fuel Consumption”, “Idling Hours” and “E mode time ratio” on daily basis or on a split measurement period basis are displayed.



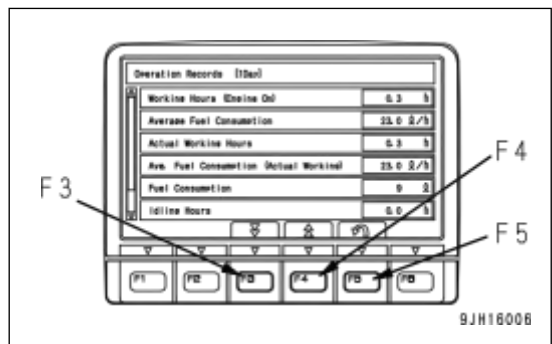
Operation on “Operation Records” screen

On “Operation Records” screen, you can perform the following operations by pressing switch F3 to F5.

F3: Displays the next page. When on the last page, it displays the first page.

F4: Displays the previous page. When on the first page, it displays the last page.

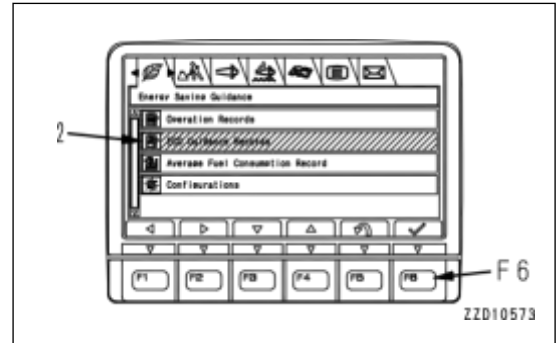
F5: Returns the screen to “Energy Saving Guidance” menu screen.



CHECK ECO GUIDANCE RECORD

Select "ECO Guidance Records" (2) from "Energy Saving Guidance" menu screen, then press switch F6.

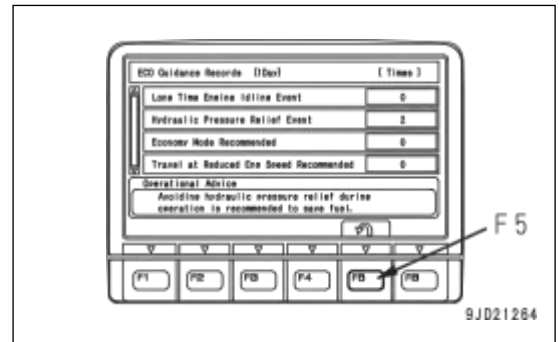
On the "ECO Guidance Records" menu, display the frequency of display of the ECO guidance on a daily basis or during the split measurement period.



Operations on "ECO Guidance Records" screen

Press switch F5 to perform the following operation on "ECO Guidance Records" screen.

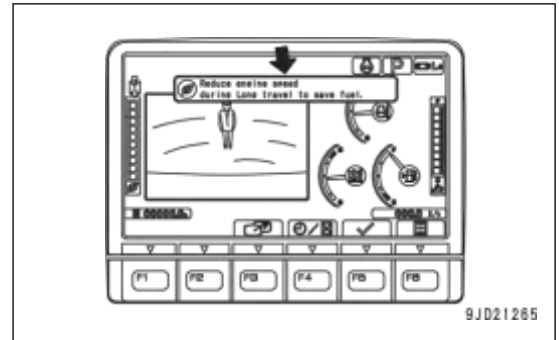
F5: Returns to "Energy Saving Guidance" menu screen.



REMARK

ECO guidance denotes displaying the guidance for energy saving operation. This display may appear on the standard screen while the machine is in operation.

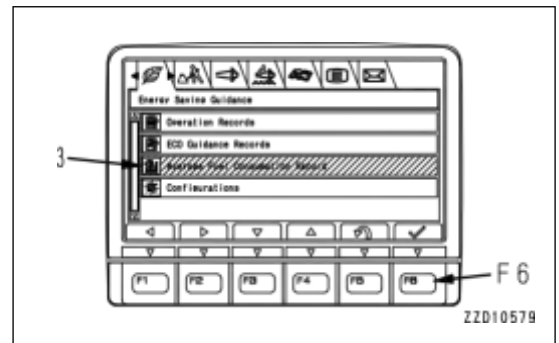
For detail, see "ECO GUIDANCE (3-36)".



CHECK FUEL CONSUMPTION RECORD

Select "Average Fuel Consumption Record" (3) from "Energy Saving Guidance" menu screen, then press switch F6.

On "Average Fuel Consumption Record" menu, display the graph of hourly average fuel consumption during "Last 12 hours" or the graph of daily fuel consumption "Last 7 days".



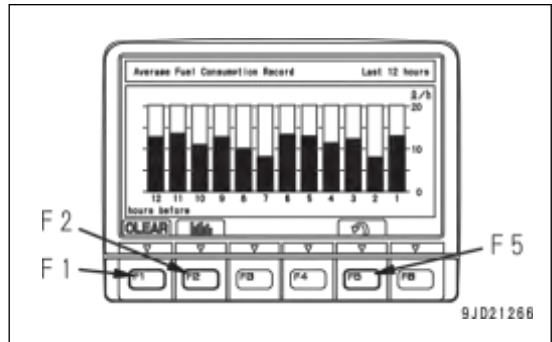
Operation on “Average Fuel Consumption Record” screen

Press switch F1, F2 or F5 on “Average Fuel Consumption Record” screen to perform the following operations.

F1: Clears the graph data.

F2: Switches graphical displays of the average fuel consumption.

F5: Returns the screen to “Energy Saving Guidance” menu screen.



REMARK

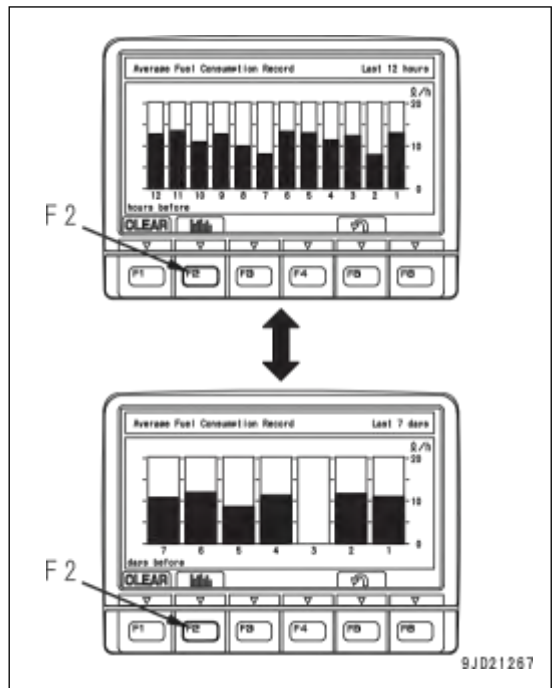
The displayed value of fuel consumption may differ from the actual value due to the operating conditions of the customers (fuel, weather or work contents, etc.).

Switching of displayed graph

Press F2 on “Average Fuel Consumption Record” screen to change the currently displayed graph to another.

REMARK

There are 2 types of graphs. One shows hourly average fuel consumption during “Last 12 hours” and the other is daily average fuel consumption during “Last 7 days”. Switching between them is available.

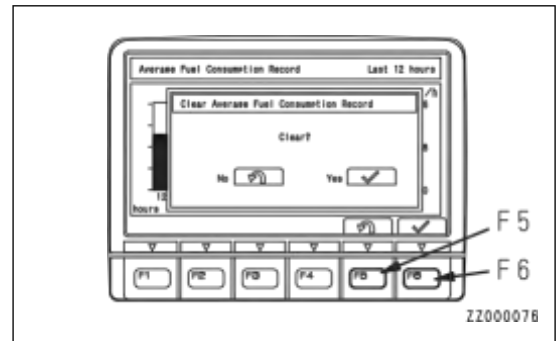
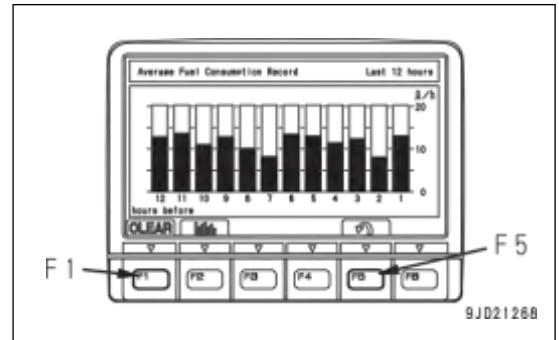


Deleting “Average Fuel Consumption Record”

1. When the switch F1 (“CLEAR”) is pressed, the reconfirmation screen shown in the figure is displayed.
2. When the switch F6 is pressed, graphs of data of “Last 12 hours” and “Last 7 days” are both deleted, and the screen returns to the “Average Fuel Consumption Record” screen.

REMARK

When canceling data deletion (clear), press switch F5.

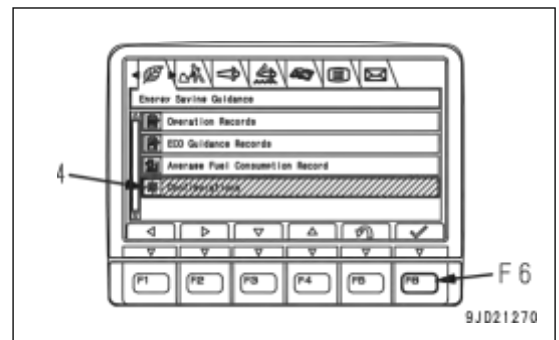


CHANGE DISPLAY SETTING

Select “Configurations” (4) from “Energy Saving Guidance” menu screen, then press switch F6.

You can perform the following operations on “Configurations” menu.

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



Operations on “Configurations” screen

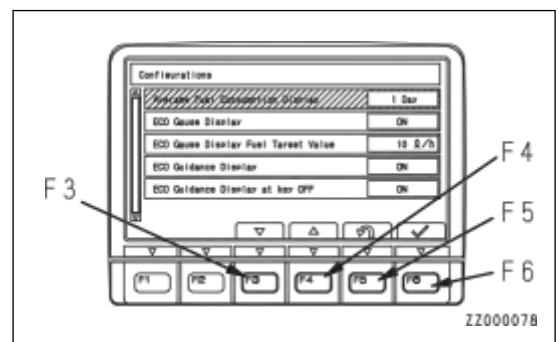
On “Configurations” screen, it is possible to perform the following operations with switches F3 to F6.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.

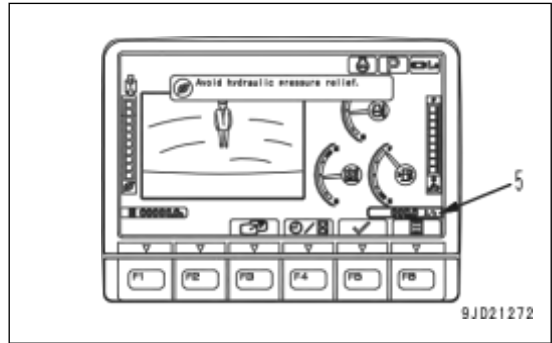
F5: Returns to “Energy Saving Guidance” menu screen.

F6: Displays the setting screen for selected item.

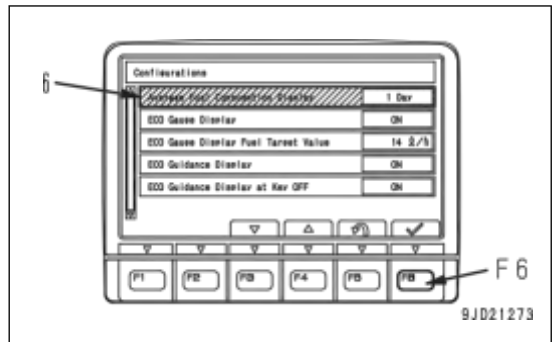


SET DISPLAY OF FUEL CONSUMPTION GAUGE

It is possible to change the display of fuel consumption gauge (5) and the setting of Display/Non-display.



1. Select "Average Fuel Consumption Display" (6) from "Configurations" screen, then press switch F6.

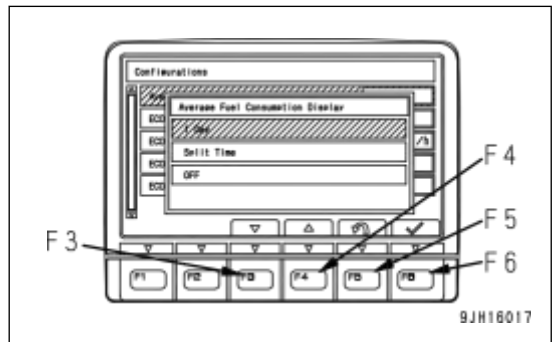


2. "Average Fuel Consumption Display" screen appears.
 - "1 Day"

Displays the average fuel consumption from 0:00 a.m. of the day to 0:00 a.m. of the next day.
 - "Split Time"

Displays the average fuel consumption during the "Split Time" measurement period. Select "Split Time" to start the automatic measurement of fuel consumption.
 - "OFF"

Does not display the fuel consumption gauge.



On this screen, it is possible to perform the following operations with switches F3 to F6.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.

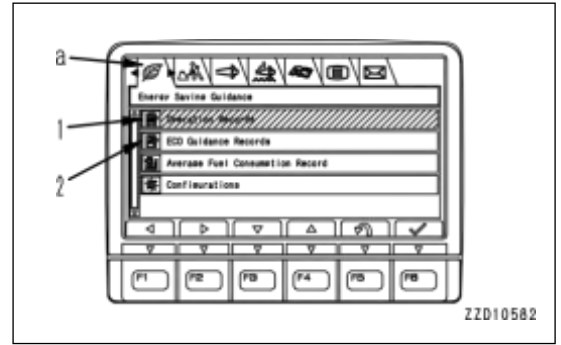
F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.

F5: Cancels the setting change and returns to "Configurations" screen.

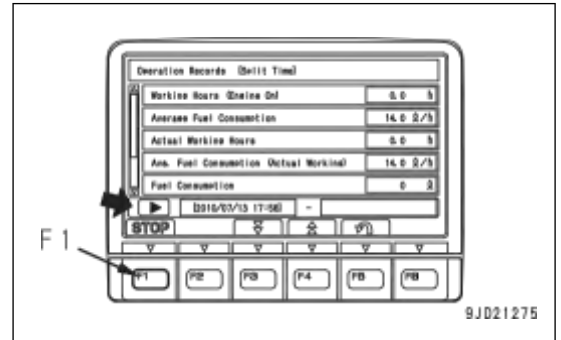
F6: Changes the setting and returns the screen to "Configurations" screen.

REMARK

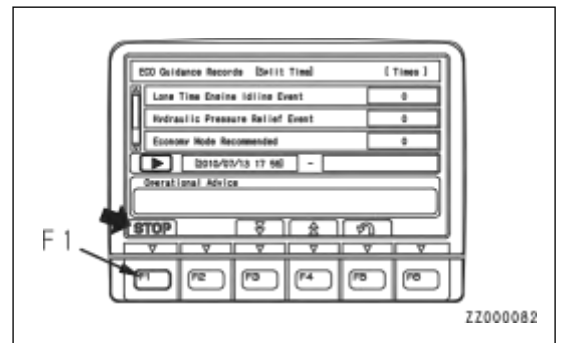
When you select “Split Time” measurement, the measurement stop switch (“STOP”) is displayed on “Operation Records” screen and “ECO Guidance Records” screen.
 When you stop the measurement, move from “Energy Saving Guidance” menu (a) screen to “Operation Records” (1) screen or “ECO Guidance Records” (2) screen, then press the measurement stop switch F1 (“STOP”).



ZZD10582



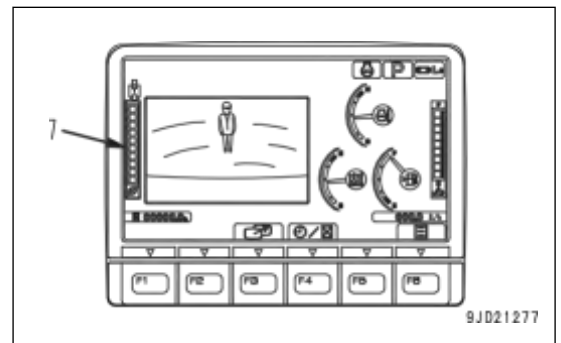
9JD21275



ZZ000082

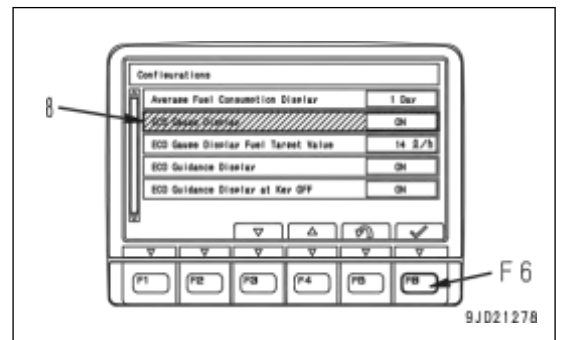
SWITCH DISPLAY/NON-DISPLAY OF ECO GAUGE

It is possible to change the setting of Display/Non-display of ECO gauge (7).



9JD21277

1. Select “ECO Gauge display” (8) from “Configurations” screen, then press switch F6.



9JD21278

2. "ECO Gauge Display" setting screen appears.
 - "ON": Displays the ECO gauge (7) on the standard screen.
 - "OFF": Does not display ECO gauge (7) on the standard screen.

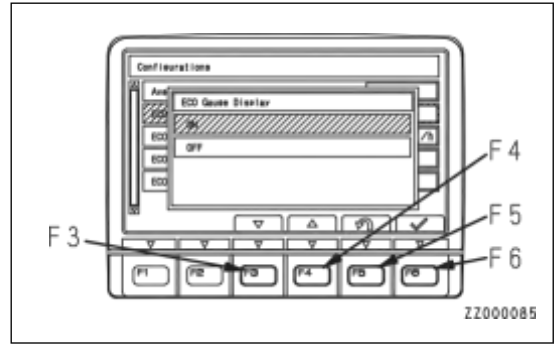
On this screen, it is possible to perform the following operations with switches F3 to F6.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.

F5: Cancels the setting and returns the screen to "Configurations" screen.

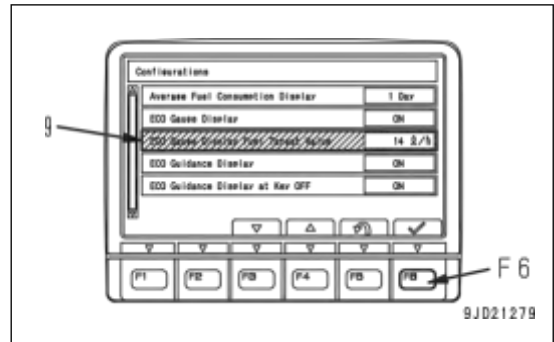
F6: Changes the setting and returns the screen to "Configurations" screen.



SET TARGET FUEL CONSUMPTION VALUE DISPLAYED IN ECO GAUGE

It is possible to change the target fuel consumption value (the upper limit value of the green range) of the ECO gauge (7).

1. Select the target fuel consumption value displayed in "ECO Gauge Display Fuel Target Value" (9) from "Configurations" screen, then press switch F6.



2. "ECO Gauge Display Fuel Target Value" appears.

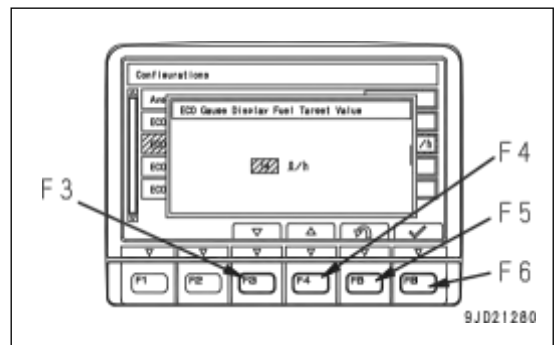
On this screen, it is possible to perform the following operations with switches F3 to F6.

F3: Decreases the target fuel consumption value by 1 l/h.

F4: Increases the target fuel consumption value by 1 l/h.

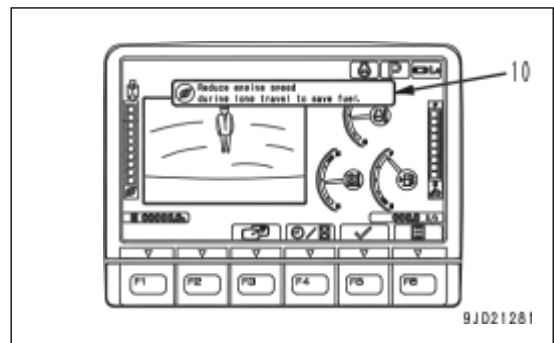
F5: Cancels the setting and returns the screen to "Configurations" screen.

F6: Changes the setting and returns the screen to "Configurations" screen.

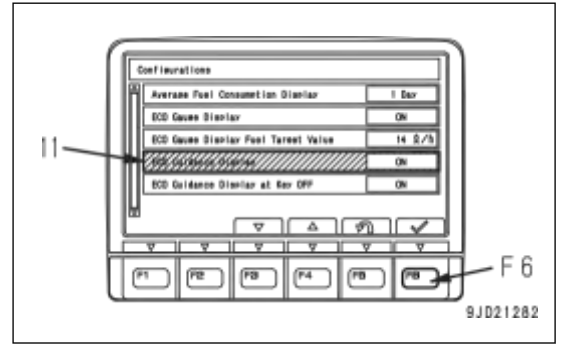


SWITCH DISPLAY/NON-DISPLAY OF ECO GUIDANCE

It is possible to change the setting of Display/Non-display of ECO guidance (10).



1. Select “ECO Guidance display” (11) from “Configurations” screen, then press switch F6.



2. “ECO Guidance Display” setting screen appears.
 - “ON”: Displays ECO Guidance (10) on the standard screen.
 - “OFF”: Does not display ECO Guidance (10) on the standard screen.

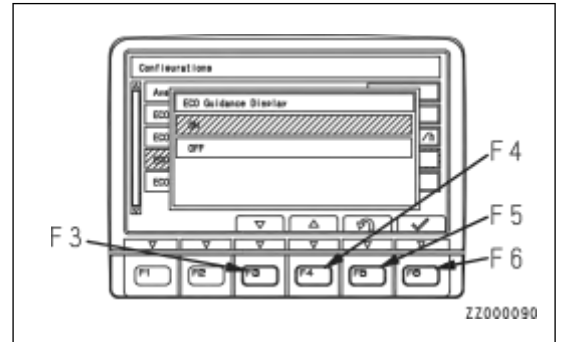
On this screen, it is possible to perform the following operations with switches F3 to F6.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line on the next page.

F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line on the previous page.

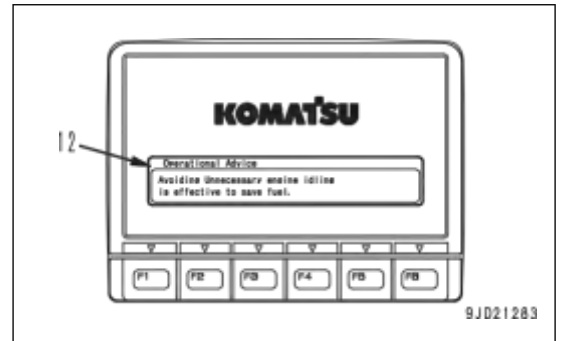
F5: Cancels the setting and returns the screen to “Configurations” screen.

F6: Changes the setting and returns the screen to “Configurations” screen.

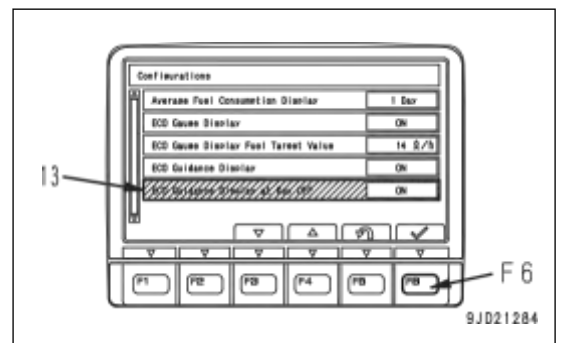


SWITCH DISPLAY/NON-DISPLAY OF GUIDANCE WHEN KEY IS OFF

It is possible to change the setting of Display/Non-display of guidance (12) when the starting key is turned off.



1. Select “ECO Guidance Display at Key OFF” (13) from “Configurations” screen, then press switch F6.



2. The setting screen for “ECO Guidance Display at Key OFF” appears.

- “ON”: Displays ECO Guidance (12) on the end screen.
- “OFF”: Does not display ECO Guidance (12) on the end screen.

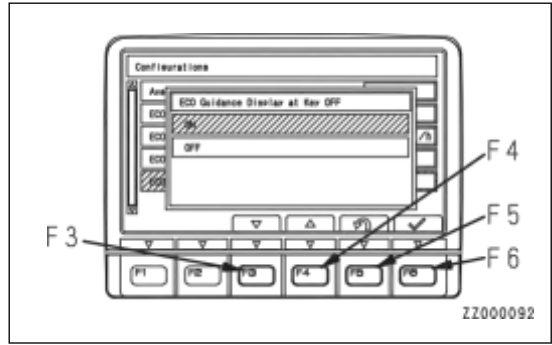
On this screen, it is possible to perform the following operations with switches F3 to F6.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line on the next page.

F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line on the previous page.

F5: Cancels the setting and returns the screen to “Configurations” screen.

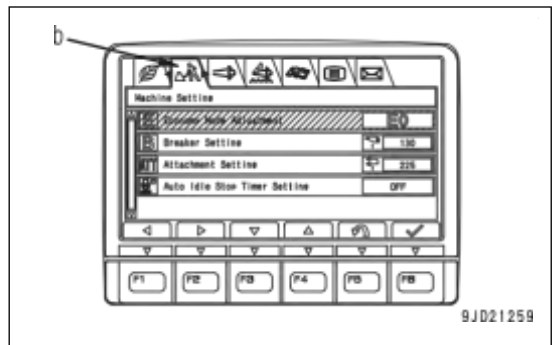
F6: Changes the setting and returns the screen to “Configurations” screen.



MACHINE SETTINGS

Each item of “Machine Setting” menu (b) is used for setting items of machine.

- “Economy Mode Adjustment”
- “Breaker Setting”
- “Attachment Setting”
- “Auto Idle Stop Timer Setting”

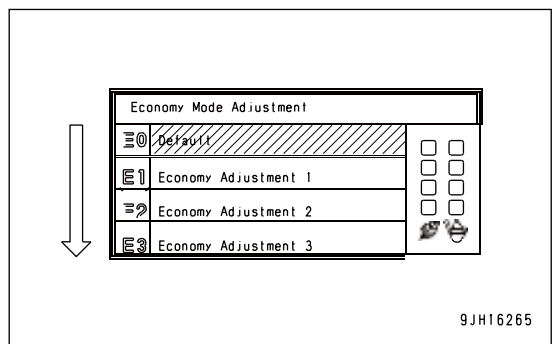
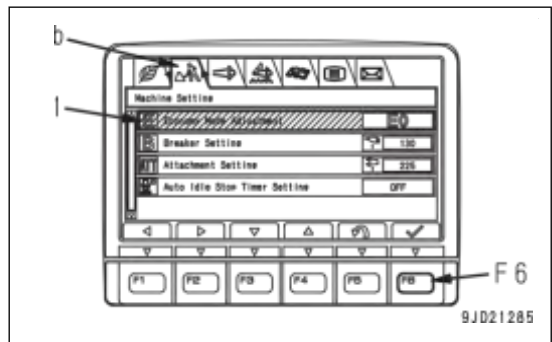


ADJUST ECONOMY MODE

Select “Economy Mode Adjustment” (1) on “Machine Setting” menu screen, then press switch F6.

On the “Economy Mode Adjustment menu”, you can adjust the engine output in E mode.

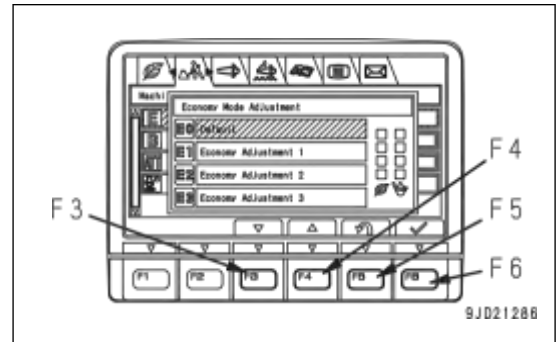
In the Economy Mode, the higher the selected number starting from E0 becomes, the lower the engine output becomes. In the meantime, the better the fuel efficiency becomes.



Operation on “Economy Mode Adjustment” screen

On “Economy Mode Adjustment” screen, you can perform the following operations with switches F3 to F6.

- F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.
- F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.
- F5: Cancels the selection and returns the screen to “Machine Setting” menu screen.
- F6: Selects the Adjustment Mode and returns the screen to “Machine Setting” menu screen.

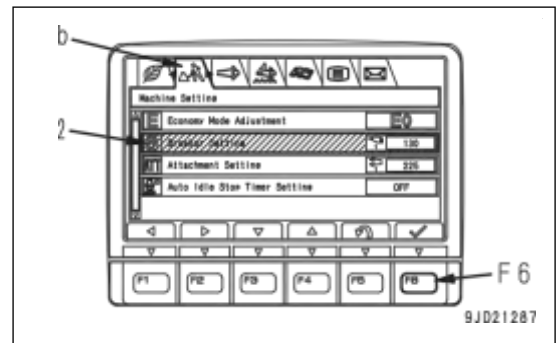


BREAKER SETTING

On the “Breaker Setting” menu, you can change the name of breaker displayed on the monitor and the breaker oil flow setting.

For machines that have no attachment, the “Breaker Setting” menu is not displayed.

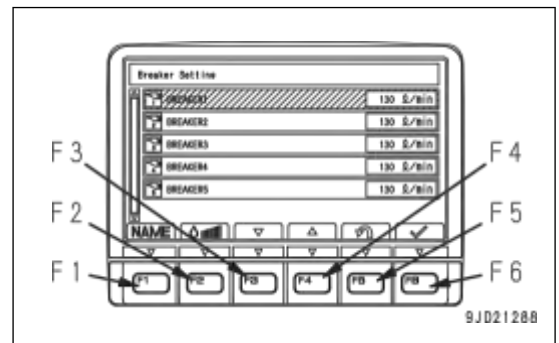
1. Select “Breaker Setting” (2) on “Machine Setting” (b) screen, then press switch F6.



2. On “Breaker Setting” screen shown in the figure, select breaker, and press switch F6.

On the “Breaker Setting” screen shown in the figure, you can perform the following operations with switches F1 to F6.

- F1: Changes the name of the selected breaker setting.
- F2: Changes the oil flow rate of the selected breaker setting.
- F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.
- F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.
- F5: Cancels the selection and returns the screen to “Machine Setting” menu screen.
- F6: Allocates the selected setting to the setting when B mode is selected.

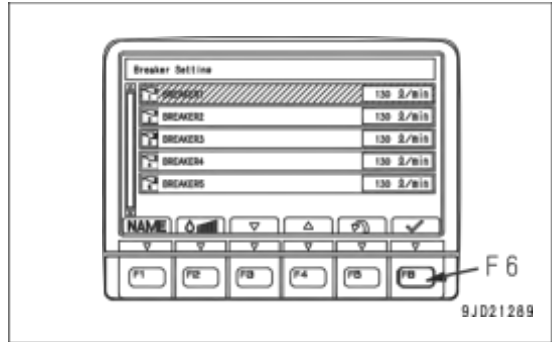


Changing the Breaker Setting name

You can change the Breaker Setting name as you like.

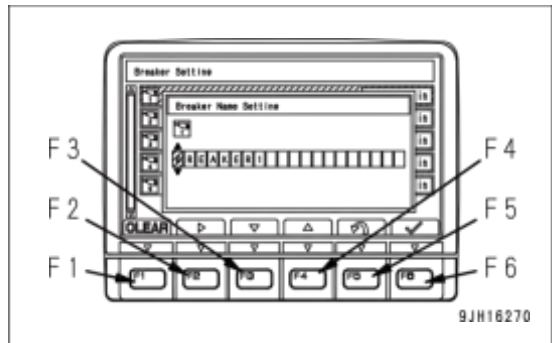
You can use alphabet letters A to Z, Arabic numerals 0 to 9, symbols #, *, +, -, and /, and the space.

- On “Breaker Setting” screen, select a breaker to change its name, then press switch F6.



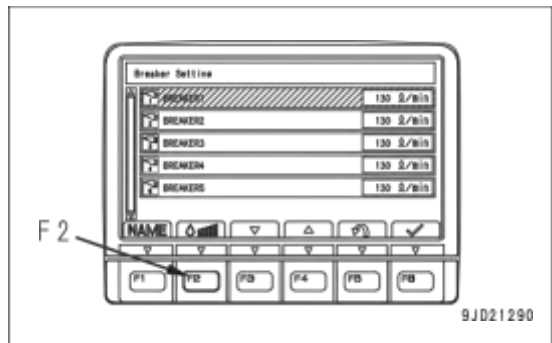
- The “Breaker Name Setting” screen is displayed. On the “Breaker Name Setting” screen, you can perform the following operations with switches F1 to F6.

- F1: “CLEAR” Clears all the letters. (If some letters are left.)
- F1: “DEFAULT” Displays the initial name. (If all the letters are deleted.)
- F2: Moves to the right letter.
- F3: Moves to the next alphabet, numeral, or symbol.
- F4: Moves to the previous alphabet, numeral, or symbol.
- F5: Returns the screen to the “Breaker Setting” screen without changing the name.
- F6: Enters the change and returns the screen to the “Breaker Setting” screen.



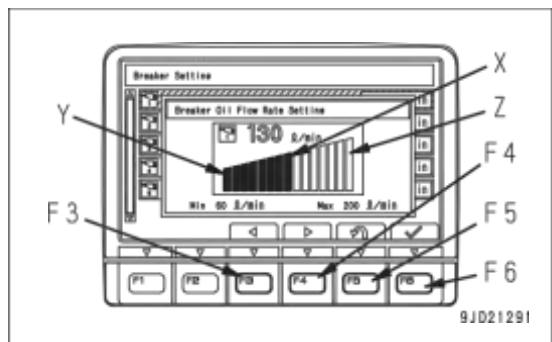
Changing Breaker Oil Flow Rate Setting

- On “Breaker Setting” screen, select a breaker to change its oil flow, then press switch F2.



- The “Breaker Oil Flow Rate Setting” screen is displayed. On the “Breaker Oil Flow Rate Setting” screen, you can perform the following operations with switches F3 to F6.

- F3: Decreases the flow rate by 1 level.
- F4: Increases the flow by 1 level.
- F5: Returns the screen to the “Breaker Setting” screen without changing the oil flow.
- F6: Enters the oil flow rate setting and returns the screen to the “Breaker Setting screen”.
- (X): Present oil flow setting
- (Y): Min. oil flow for adjustment
- (Z): Max. oil flow for adjustment

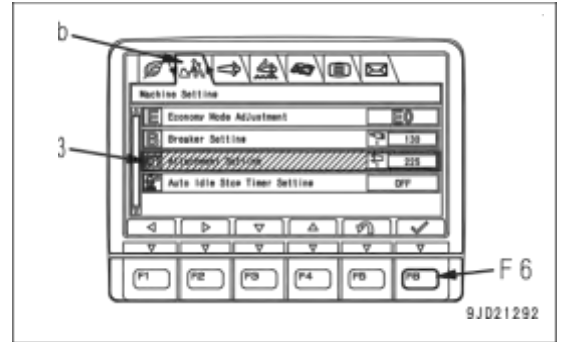


ATTACHMENT SETTING

On machines ready for installation of attachment, you can adjust the oil flow rate in ATT/P mode and ATT/E mode to match the attachment on the “Attachment Setting” menu.

For machines that have no attachment, the “Attachment Setting” menu is not displayed.

1. Select "Attachment Setting" (3) on "Machine Setting" (b) screen, then press switch F6.



2. On "Attachment Setting" screen shown in the figure, select an attachment to adjust and press switch F6.

On "Attachment Setting" screen shown in the figure, you can perform the following operations with switches F1 to F6.

F1: Changes the name of the selected attachment setting.

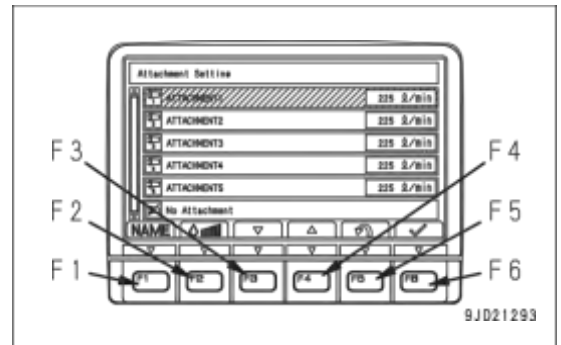
F2: Changes the oil flow rate of the selected attachment setting.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.

F5: Cancels the selection and returns the screen to "Machine Setting" menu screen.

F6: Allocates the selected setting to that of ATT/P or ATT/E mode.

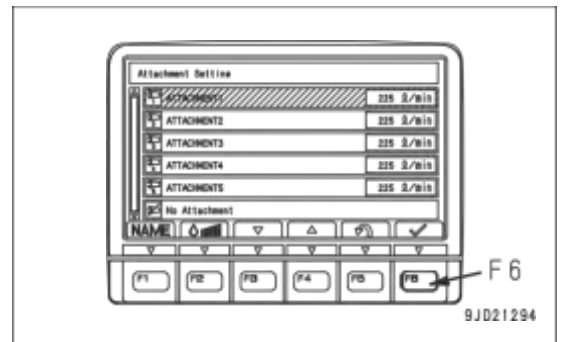


Changing Attachment Setting name

You can change the name for Attachment Setting name as you like.

You can use alphabet letters A to Z, Arabic numerals 0 to 9, symbols #, *, +, -, and /, and the space.

1. Select an attachment to change its name on "Attachment Setting" screen, then press switch F6.



2. The "Attachment Name Setting" screen is displayed.

On the "Attachment Name Setting" screen, you can perform the following operations with switches F1 to F6.

F1: "CLEAR" Clears all the letters. (If some letters are left.)

F1: "DEFAULT" Displays the initial name. (If all the letters are deleted.)

F2: Moves to the right letter.

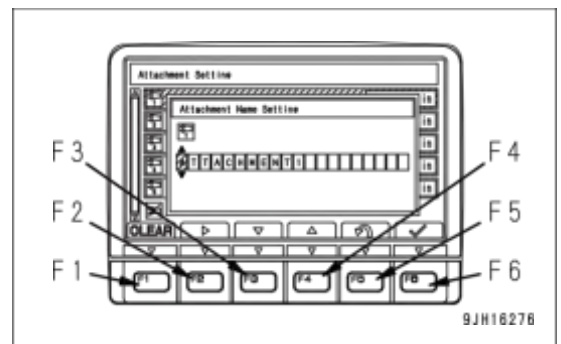
F3: Moves to the next alphabet, numeral, or symbol.

F4: Moves to the previous alphabet, numeral, or symbol.

F5: Returns the screen to "Attachment Setting" screen without changing the name.

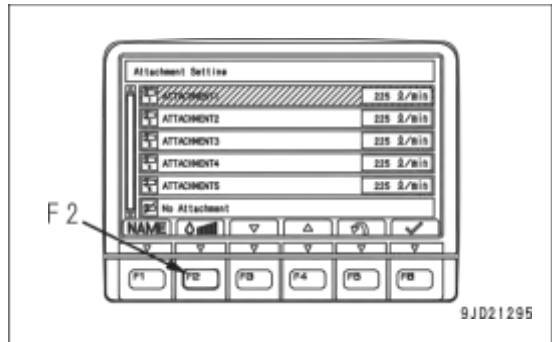
F6: Enters the change and returns the screen to "Attachment Setting" screen.

It is not possible to change the name for "No Attachment" setting.



Changing “2-Way Attachment Oil Flow Rate Setting”

1. Select an attachment to change its oil flow on “Attachment Setting” screen, then press switch F2.



2. The “2-Way Attachment Oil Flow Rate Setting” screen is displayed.

On the “2-Way Attachment Oil Flow Rate Setting” screen, you can perform the following operations with switches F3 to F6.

F3: Decreases the oil flow rate by 1 level.

F4: Increases the oil flow rate by 1 level.

F5: Returns to the “Attachment Setting” screen without changing the oil flow rate.

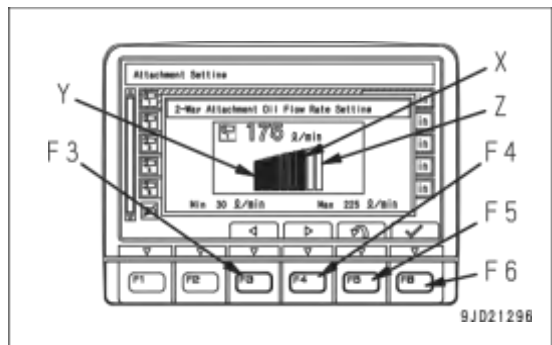
F6: Enters the oil flow setting and returns to the “Attachment Setting” screen.

(X): Present oil flow setting

(Y): Min. oil flow for adjustment

(Z): Max. oil flow for adjustment

It is not possible to change the oil flow for “No Attachment” setting.



AUTO IDLE STOP TIMER SETTING

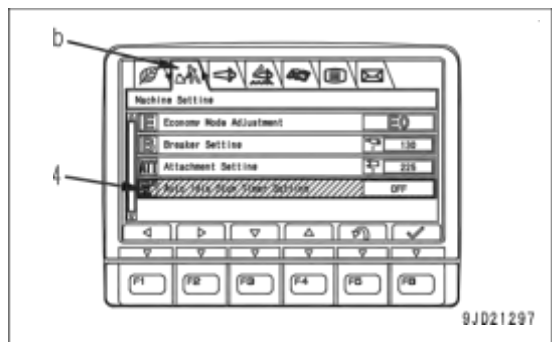
The auto idle stop function stops the engine automatically when the engine is operated continuously at idle with the lock lever in LOCK position for a set time.

The auto idle stop function operates only when the following conditions are satisfied.

- The engine is running normally.
- The lock lever is in LOCK position.
- The engine coolant and hydraulic oil are not overheating.
- The engine is not in warm-up operation.
- The exhaust gas aftertreatment devices are not being regenerated.
- The machine is not in L mode.

You can set the time to operate the auto idle stop function on the “Auto Idle Stop Timer Setting”.

1. Select “Auto Idle Stop Timer Setting” (5) on the “Machine Setting menu” (b) screen, and then press switch F6.



2. Select the set time on the “Auto Idle Stop Timer Setting” screen shown in the figure, and then press switch F6.

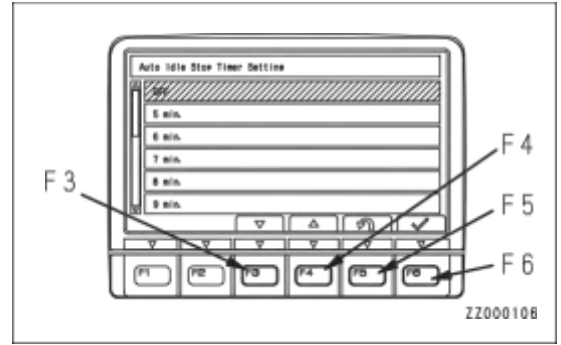
On the “Auto Idle Stop Timer Setting” screen shown in the figure, you can perform the following operations with switches F3 to F6.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.

F5: Cancels the selection and returns the screen to “Machine Setting” menu screen.

F6: Allocates the selected setting to that of the Auto Idle Stop Timer Setting.

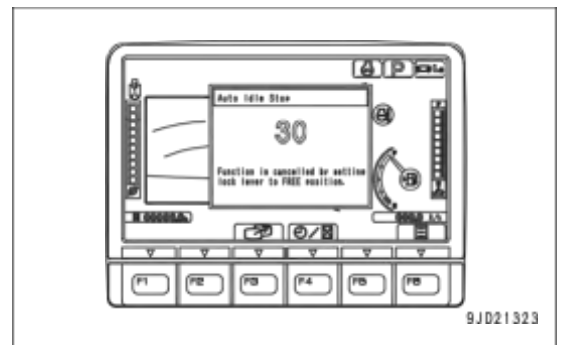


REMARK

- Choosing “OFF” disables operation of the auto idle stop function.
- You cannot select a time longer than that specified in the Service Menu.

3. When the idling time reaches 30 seconds before the set time, the monitor returns to the standard screen and changes to the countdown screen.

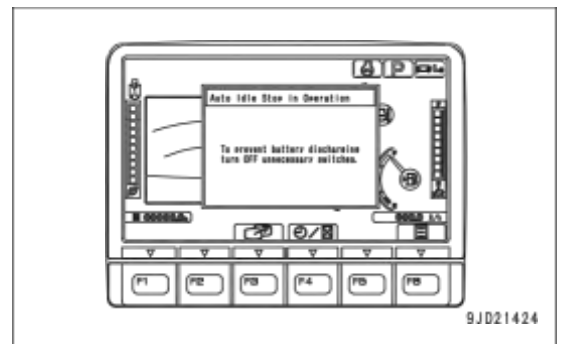
If you set the lock lever to FREE position, countdown stops and the screen returns to the standard screen.



4. When countdown reaches 0, the engine stops and the screen changes to the Auto Idle Stop in Operation screen.
5. To prevent battery discharging, turn off unnecessary switches.

REMARK

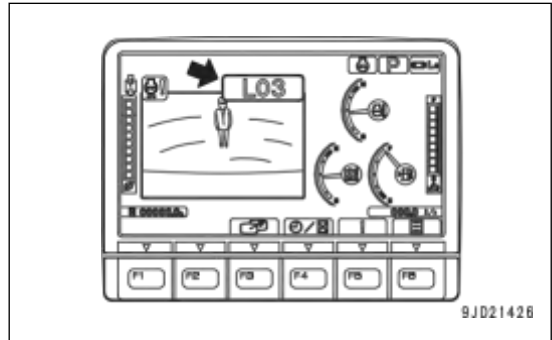
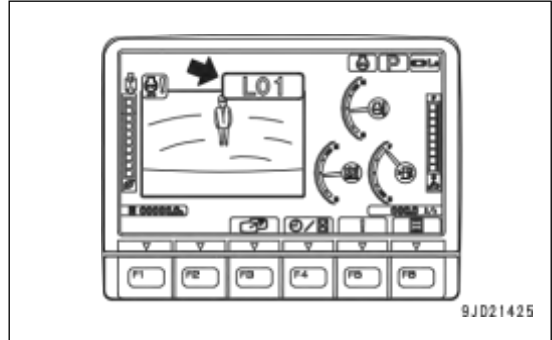
While the auto idle stop is activated, only the engine is stopped and the machine monitor, inverter, etc., as well as the electrical components including the air conditioner, radio, lamps, and wipers keep their states before the engine is stopped.



6. To prevent causing flat battery, turn the starting switch to OFF position.
7. When restarting the engine, turn the starting switch as usual.

REMARK

While the auto idle stop function is ON, the number of the times that the engine was stopped when it was not at low idle (the engine speed is 1400 rpm or higher) is displayed as “L01” at and after 1000 and as “L03” at and after 2000 on the monitor.



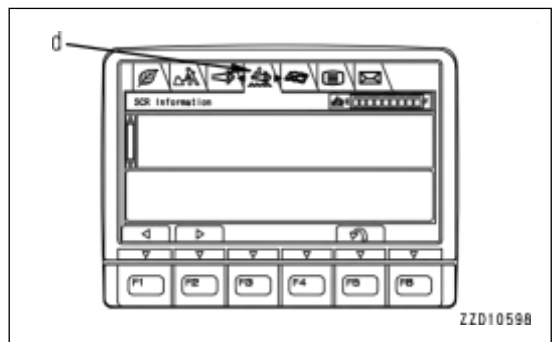
AFTERTREATMENT DEVICES REGENERATION

Each item of “Aftertreatment Devices Regeneration” menu (c) is to make settings for the aftertreatment devices regeneration.



SCR INFORMATION

Each item in “SCR Information” menu (d) is for displaying information related to SCR and DEF.

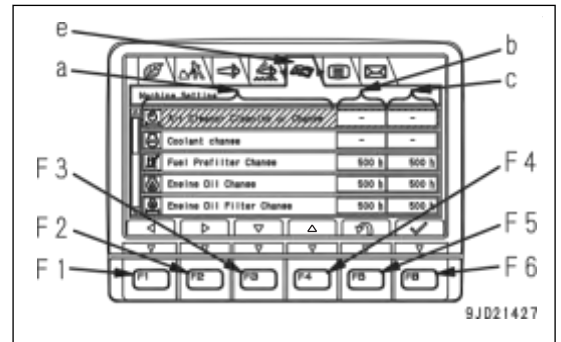


MAINTENANCE SCREEN SETTING

Each item of setting menu (e) on “Maintenance” screen is used for displaying and setting the notification relevant to maintenance.

The items on “Maintenance” display are as follows.

a	b
Air Cleaner Cleaning or Change	-
Coolant Change	-
Fuel Prefilter Change	500
Engine Oil Change (*1)	500
Engine Oil Filter Change (*1)	500
Hyd Oil Tank Breather Change	1000
Fuel Main Filter Change	1000
Hydraulic Oil Filter Change	1000
PTO Case Oil check & Refilling	1000
Swing Machinery Case Oil Change	1000
DEF Tank Breather Change	1000
Final Drive Case Oil Change	1000
KCCV Filter Change	2000
DEF Filter Change	2000
DEF Tank Washing	4500
Hydraulic Oil Change	5000



a: Maintenance item

b: Default maintenance interval settings (h)

c: Time remaining to maintenance (h)

*1:

When using engine oil for cold district, the maintenance interval setting must be changed. For details of the oil, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.

On “Maintenance” screen, it is possible to perform the following operations with switches F1 to F6.

F1, F2: Moves to the right and left menus.

F3: Moves to the next item (1 line below). When on the last line, it moves to the first line.

F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line.

F5: Returns the screen to the standard screen.

F6: If this switch is kept pressed, the screen changes to the screen for resetting the remaining time to the maintenance for the selected item.

REMARK

When resetting the remaining time to the maintenance, keep switch F6 pressed for at least 1.5 seconds. If this time is short, the switch operating sound can be heard, but the screen does not switch to the screen for resetting the remaining time to the maintenance.

- If no switch is operated for 30 seconds on “Maintenance” screen, the screen automatically returns to the standard screen.
- When the maintenance time caution lamp is lit on the standard screen, press switch F6 on the standard screen and the screen automatically displays “Maintenance” screen.

- On “Maintenance” screen, if the time remaining to the maintenance for any item is less than 30 hours (initial setting value), the remaining time display (c) is highlighted in yellow. If the time remaining to the maintenance is less than 0 hours, display (c) is highlighted in red.
- If you want to change the setting for the maintenance time or maintenance notice time (initial setting: 30 hours), consult your Komatsu distributor.

Operations on “Maintenance Due Time Reset” screen

On “Maintenance” screen, if switch F6 is kept pressed for 1.5 seconds or more, the screen changes to “Maintenance Due Time Reset” screen.

Reset the remaining time to the maintenance on this screen.

1. Press switch F6 on “Maintenance Due Time Reset” screen.

REMARK

- When canceling the reset, press switch F5. The screen returns to the “Maintenance” screen.
- On the reset screen, if no switch is operated for more than 30 seconds, the screen automatically changes to the “Maintenance” menu screen.

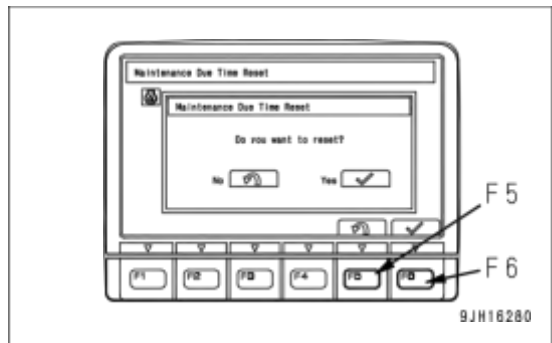


2. The reconfirmation screen is displayed.

If switch F6 is pressed again, the remaining time is reset and the screen switches to “Maintenance” screen.

REMARK

- When canceling the reset, press switch F5. The screen returns to the “Maintenance” screen.
- On the reconfirmation screen, if no switch is operated for more than 30 seconds, the screen automatically returns to “Maintenance” screen.



MONITOR SETTINGS

Each item of this menu (f) is for setting the monitor.

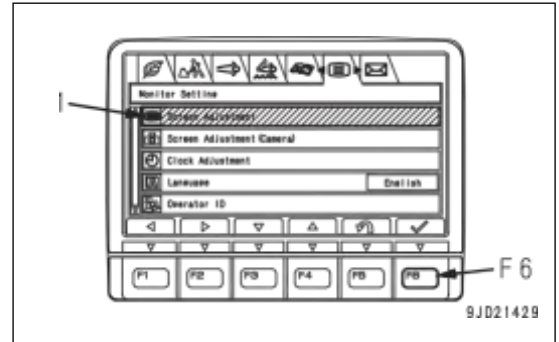
- “Screen Adjustment”
- “Screen Adjustment (Camera)”
- “Clock Adjustment”
- “Language”
- “Operator ID”



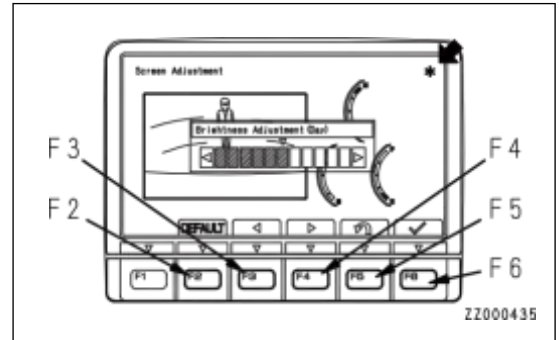
SCREEN ADJUSTMENT

Use “Screen Adjustment” menu to adjust brightness of the monitor screen.

1. Select "Screen Adjustment" (1) on "Monitor Setting" menu screen, then press switch F6.



2. Use switches F2 to F6 to adjust brightness of the screen.
 - F2: Resets an adjusted value to default value.
 - F3: Moves the indicator to the left by one level.
 - F4: Moves the indicator to the right by one level.
 - F5: Cancels the change and returns the screen to the "Monitor Setting" menu screen.
 - F6: Accepts the change and then returns to the "Monitor Setting" menu screen.



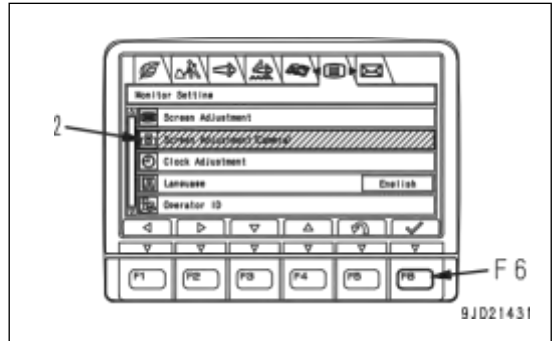
REMARK

- If the light switch is at night mode ON, and the screen is adjusted, it is possible to adjust the brightness of the monitor screen (night mode).
- If the light switch is at day mode ON, and the screen is adjusted, it is possible to adjust the brightness of the monitor screen (day mode).
- As long as "*" mark is displayed in the upper right corner of the screen, brightness is automatically restricted by the machine monitor to protect the liquid crystal. Screen adjustment may not change the screen brightness as long as "*" mark is displayed. However, it is not an error.
- The state of the previous screen display (camera display and meter display or only meter display) is reflected on the background of the "Screen Adjustment" screen.

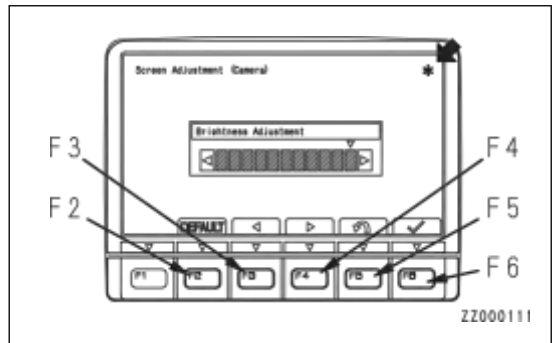
Screen adjustment (camera)

Use “Screen Adjustment (Camera)” to adjust brightness of the camera screen.

1. Select Screen Adjustment (Camera) (2) on “Monitor Setting” menu screen, then press switch F6.



2. Use switches F2 to F6 to adjust brightness of the screen.
 - F2: Resets an adjusted value to default value.
 - F3: Moves the indicator to the left by one level.
 - F4: Moves the indicator to the right by one level.
 - F5: Cancels the change and returns the screen to the “Monitor Setting” menu screen.
 - F6: Accepts the change and then returns to the “Monitor Setting” menu screen.



REMARK

As long as “*” mark is displayed in the upper right corner of the screen, brightness is automatically restricted by the machine monitor to protect the liquid crystal. Screen adjustment may not change the screen brightness as long as “*” mark is displayed. However, it is not an error.

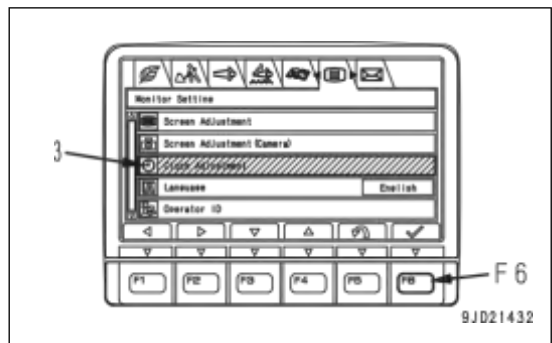
CLOCK ADJUSTMENT

“Clock Adjustment” menu is used to change the setting of the clock displayed on the standard screen of the monitor.

1. Select “Clock Adjustment” (3) on “Monitor Setting” menu screen, then press switch F6. The screen switches to “Clock Adjustment” screen for selecting a menu.

The following 5 items can be changed.

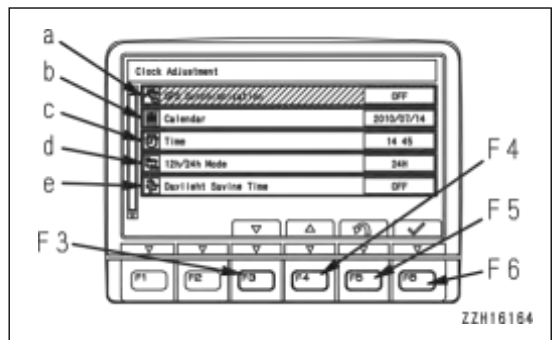
- (a): “GPS Synchronization”
- (b): “Calendar”
- (c): “Time”
- (d): “12h/24h Mode”
- (e): “Daylight Saving Time”



REMARK

- “Calendar” (b) and “Time” (c) need to be readjusted since they are reset after a long-term storage.
- When “GPS Synchronization” (a) is set to ON, the above are automatically readjusted. While “GPS Synchronization” (a) is ON, you cannot select the menus of “Calendar” (b) and “Time” (c).

2. Perform the following setup procedure by operating switches F3 to F6 on the selection menu screen for “Clock Adjustment”.



GPS SYNCHRONIZATION SETTING

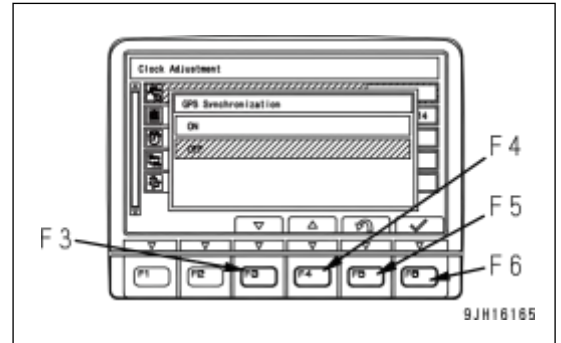
On machines equipped with KOMTRAX, turning on “GPS Synchronization” menu enables automatic setting of the monitor’s date and time in accordance with the clock of GPS.

F3: Moves to the next item (1 line below). Moves to the top line when on the bottom line.

F4: Moves to the previous item (1 line above). Moves to the bottom line when on the top line.

F5: Cancels change and returns to “Clock Adjustment” screen.

F6: Displays the setting screen for selected item.



REMARK

- When the machine is in the environment where the radio waves from GPS cannot be received, such as inside of a building, the automatic setting function may not work.
- While “GPS synchronization” menu is turned on, the menu for “Calendar” (b) and “Time” (c) cannot be selected.

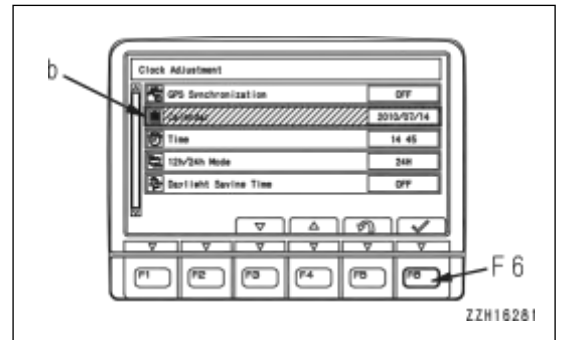
CALENDAR SETTING

Adjust the date of the monitor.

REMARK

As long as “GPS Synchronization” menu is turned on, “Calendar” menu is not selectable.

1. Select “Calendar” (b) on “Clock Adjustment” screen, then press switch F6.



2. The “Calendar” screen is displayed.

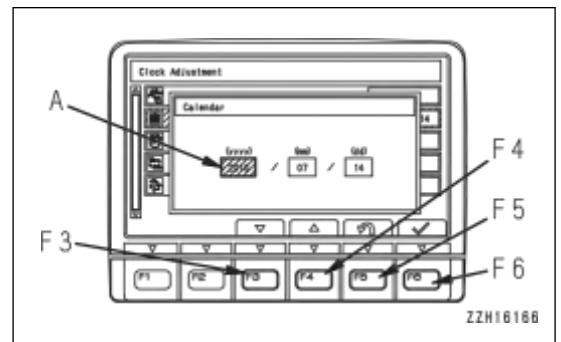
When year display (A) is highlighted in yellow, operate the switches as follows to change year display (A). If it is not necessary to change the year setting, press switch F6.

F3: Calendar goes back 1 year.

F4: Calendar advances 1 year.

F5: Cancels change and returns the screen to “Clock Adjustment” screen.

F6: Proceeds to setting for month



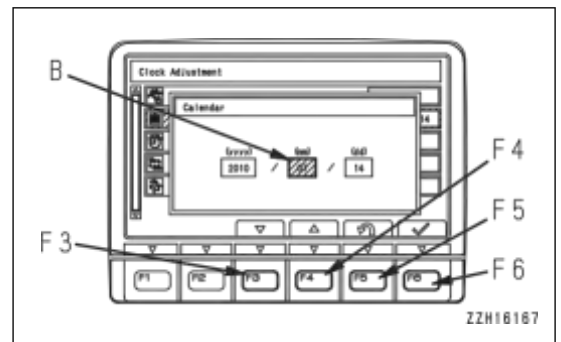
3. When month display (B) is highlighted in yellow, operate the switches as follows to change month display (B). If it is not necessary to change the month, press switch F6.

F3: Calendar goes back 1 month.

F4: Calendar advances 1 month.

F5: Cancels change and returns to the year setting screen.

F6: Proceeds to setting for date.



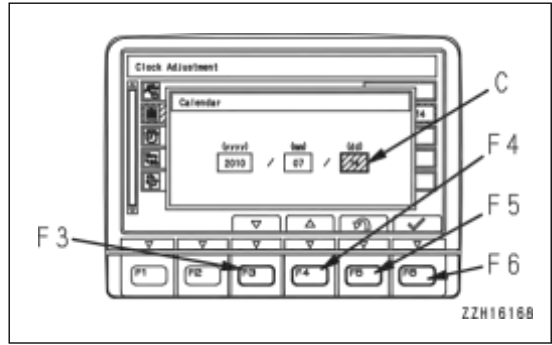
4. When date display (C) is highlighted in yellow, operate the switches as follows to change day display (C). If it is not necessary to change the day, press switch F6.

F3: Calendar goes back 1 day.

F4: Calendar advances 1 day.

F5: Cancels change and returns to the month setting screen.

F6: Accepts change and returns the screen to "Clock Adjustment" screen.



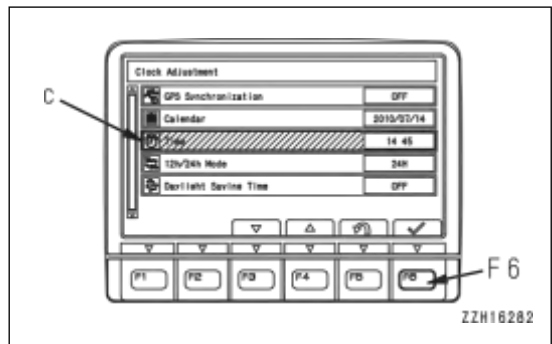
TIME SETTING

Adjust the time of the monitor clock.

REMARK

As long as "GPS Synchronization" is turned on, "Time" menu is not selectable.

1. Select "Time" (c) on "Clock Adjustment" screen, then press switch F6.



2. The "Time" screen is displayed.

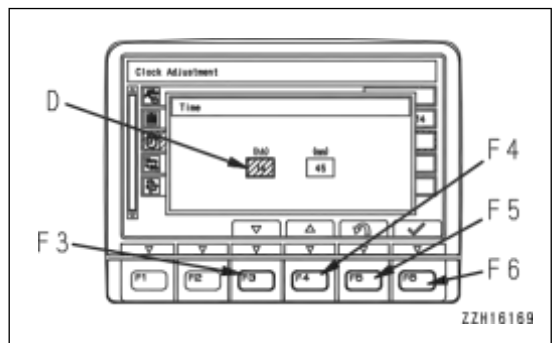
When the hour display (D) is highlighted in yellow, operate the switches as follows to change hour display (D). If it is not necessary to change the hour setting, press switch F6.

F3: The time goes back 1 hour.

F4: The time advances 1 hour.

F5: Cancels change and returns the screen to "Clock Adjustment" screen.

F6: Proceeds to setting for the minute.



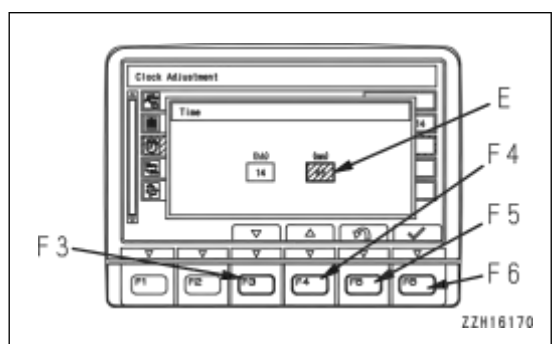
3. When minute display (E) is highlighted in yellow, operate the switches as follows to change minute display (E). If it is not necessary to change the minute, press switch F6.

F3: The time goes back 1 minute.

F4: The time advances 1 minute.

F5: Cancels change and returns to the time setting screen.

F6: Accepts change and returns the screen to "Clock Adjustment" screen.

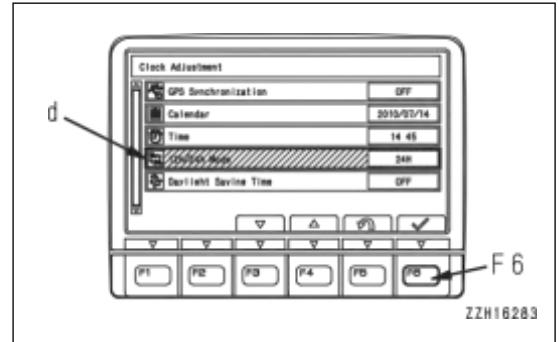


SWITCH 12H/24H DISPLAY MODE

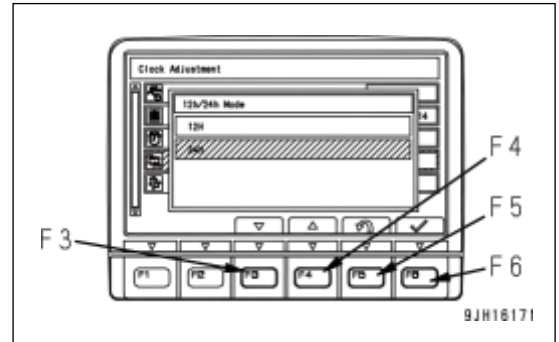
Choose either a 12-hour display (am/pm) or a 24-hour display.

- 24-hour system display
- 12-hour system display (AM/PM)

1. Select "12h/24h Mode" (d) on "Clock Adjustment" screen, then press switch F6.



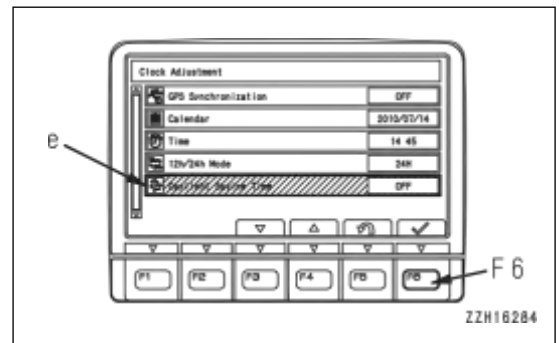
2. "12h/24h Mode" screen appears.
 - F3: Moves to the next item (1 line below). Moves to the top line when it is on the bottom line.
 - F4: Moves to the previous item (1 line above). Moves to the bottom line when it is on the top line.
 - F5: Cancels the change and returns the screen to "Clock Adjustment" screen.
 - F6: Accepts change and returns to "Clock Adjustment" screen.



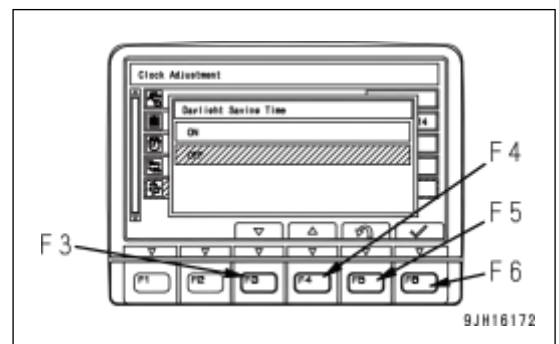
DAYLIGHT SAVING TIME (SUMMER TIME) SETTING

If "Daylight Saving Time" is turned on, the clock display becomes 1 hour forward. If "Daylight Saving Time" is turned off, the clock display returns to the set time.

1. Select "Daylight Saving Time" (e) on "Clock Adjustment" screen, then press switch F6.



2. The "Daylight Saving Time" screen is displayed.
 - F3: Moves to the next item (1 line below). Moves to the top line when on the bottom line.
 - F4: Moves to the previous item (1 line above). Moves to the bottom line when on the top line.
 - F5: Cancels change and returns to "Clock Adjustment" screen.
 - F6: Accepts change and returns the screen to "Clock Adjustment" screen.



REMARK

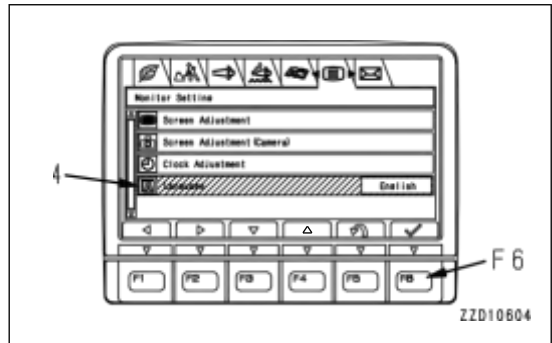
Daylight saving time or summer time means moving the clock forward an hour to take advantage of the fact that the sun rises early in summer in our daily life.

LANGUAGE SETTINGS

On "Language Setting" menu, it is possible to select the language used on the monitor display. 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, Turkish, Serbian

- 1. Select "Language" (4) on "Monitor Setting" menu, then press switch F6.



- 2. Select the language to use for the display, then press switch F6. The screen display changes to the selected language.

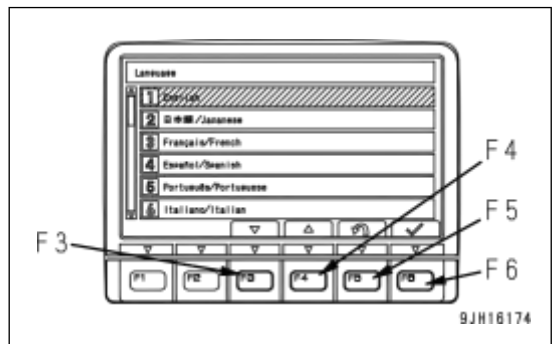
On "Language" screen, it is possible to perform the following operations with switches F3 to F6.

F3: Moves to the item below.

F4: Moves to the item above.

F5: Cancels change and moves the screen to the "Monitor Setting" screen.

F6: Accepts the change and then returns to the "Monitor Setting" menu screen.



OPERATOR ID

You can check and change the "Operator ID" which is under identification on the "Operator ID" menu.

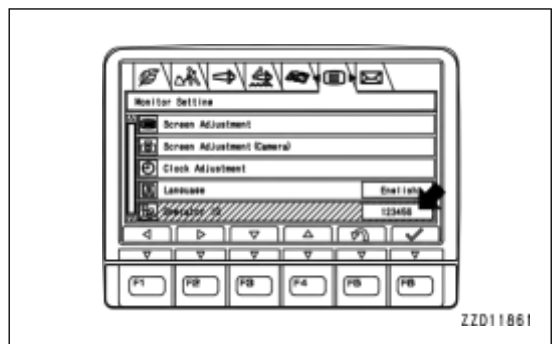
The "Operator ID" menu is not displayed when the operator identification function is disabled.

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.

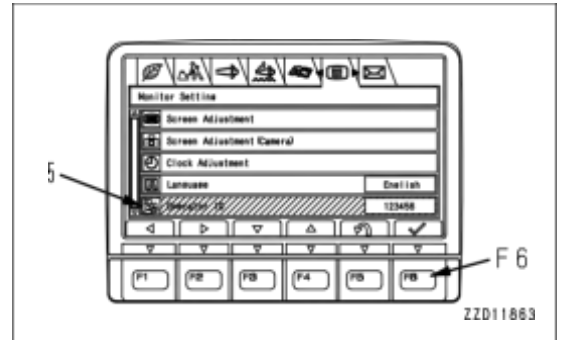


When the starting switch is ON and “SKIP” is selected, “****” is displayed in the column of “Operator ID” on the “Monitor Setting” menu screen.

1. Select “Operator ID” (5) on the “Monitor Setting” menu screen, then press switch F6 for 1 second.

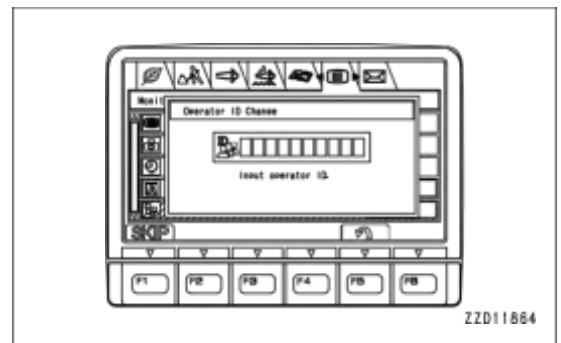


2. The “Operator ID Change” screen is displayed.



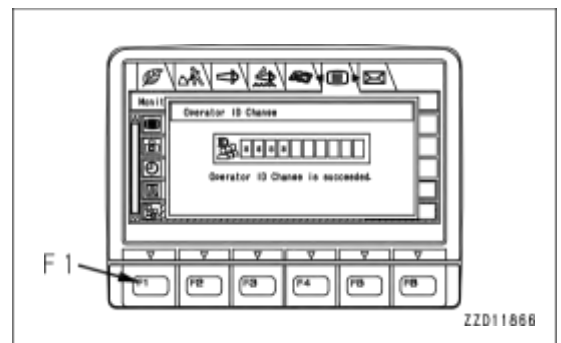
- Input the already registered ID on the “Operator ID Change” screen and press F6. Then, the identified ID can be changed.

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 switch F1 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.

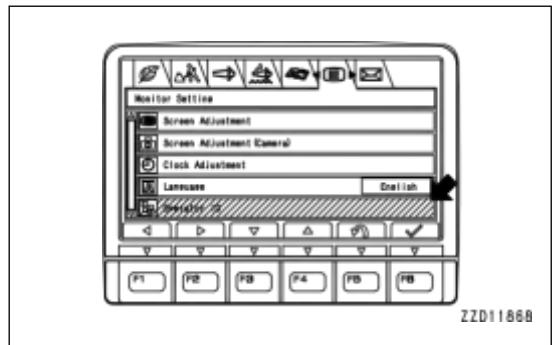


- When you press switch F6 after inputting the ID which is not registered to the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.
In this case, the identified ID is not changed.
- On the “Operator ID Change” screen, if no switch is 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.

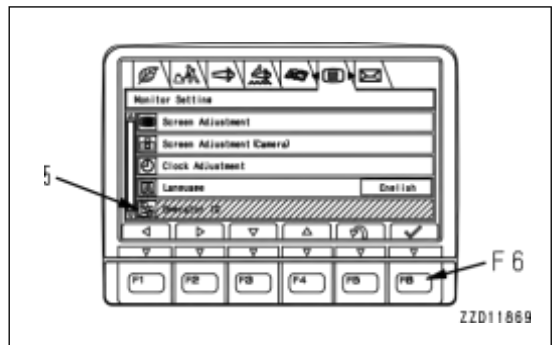


WHEN OPERATOR IDENTIFICATION FUNCTION IS AVAILABLE WITHOUT SKIP

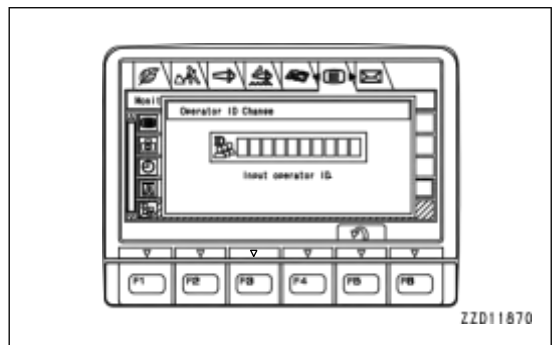
When the operator identification function is available without SKIP, the identified ID number is not displayed in the “Operator ID” column of “Monitor Setting” screen.



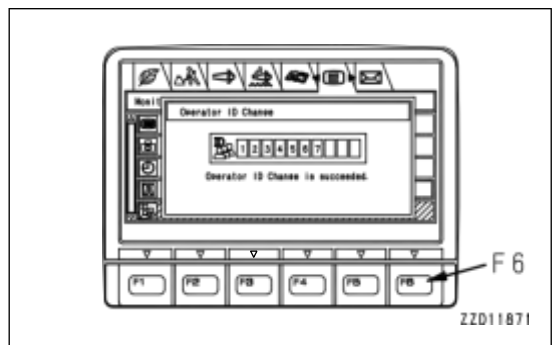
- Select “Operator ID” (5) on the “Monitor Setting” menu screen, then press switch F6 for 1 second.



- The “Operator ID Change” screen is displayed.



- Input the already registered ID on the “Operator ID Change” screen and press F6. Then, the identified ID can be changed.
A message is displayed below and the screen returns to the “Monitor Setting” menu screen.

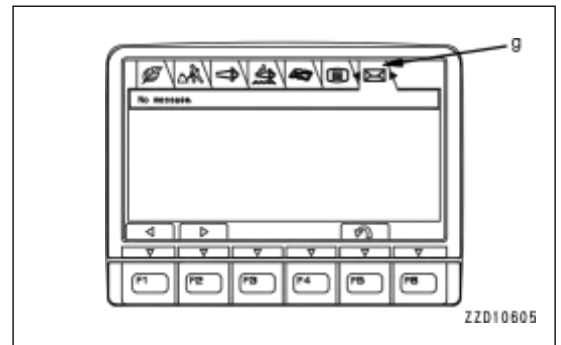


- When you press switch F6 after inputting the ID which is not registered to the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.
In this case, the identified ID is not changed.
- On the “Operator ID Change” screen, if no switch is 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.



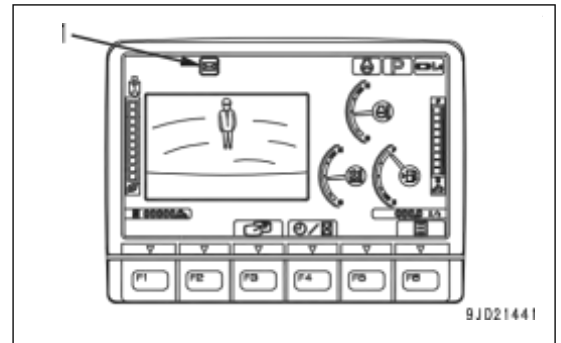
MESSAGE DISPLAY

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, the message display of the standard screen lights up.



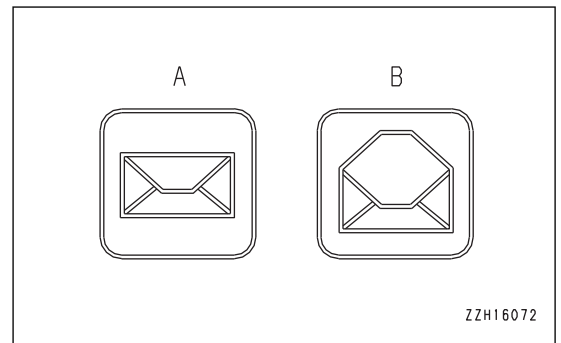
Message is distinguished as follows according to the lighting states of User Message (1).

- Lights up in green (A): There is unread message.
- Lights up in blue (B): There is any read message to which no reply is made.
- OFF: No messages



REMARK

- When the message display lights up in blue (B), it means that no reply has been made yet to any read message to your Komatsu distributor. Reply to the message in accordance with the replying method mentioned below.
- If the starting switch is turned to OFF position when there is any unread message, the message will be displayed on the end screen, and when the monitor is started next time, the message will change to a read message (the message display: lights up in blue (B)).
- The message will be deleted when it becomes out of date or when a new message arrives.

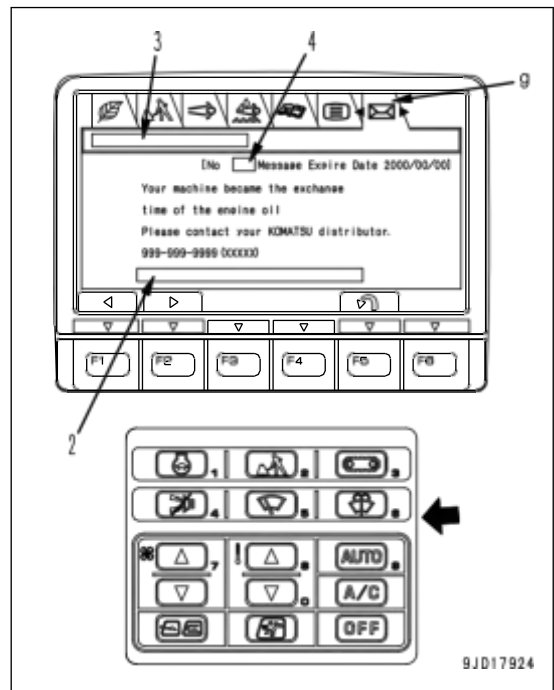
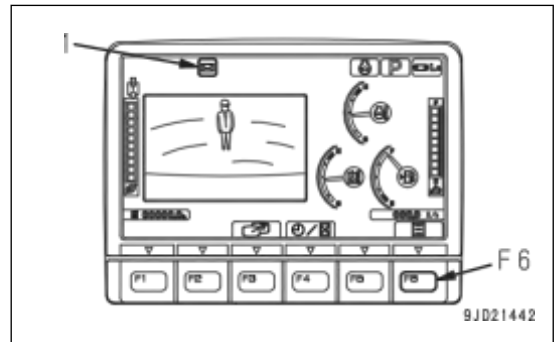


CHECK MESSAGE

- On the standard screen, press switch F6.
When there is any message, message display (1) lights up.
While message display (1) is lit, press switch F6, and the mail confirmation menu (g) directly opens.
- Select the mail confirmation menu (g), and you can read the received message.
- If a message requests reply, the Numeric Input: box (2) is displayed at (g) of the mail confirmation menu. Make a reply to the message.

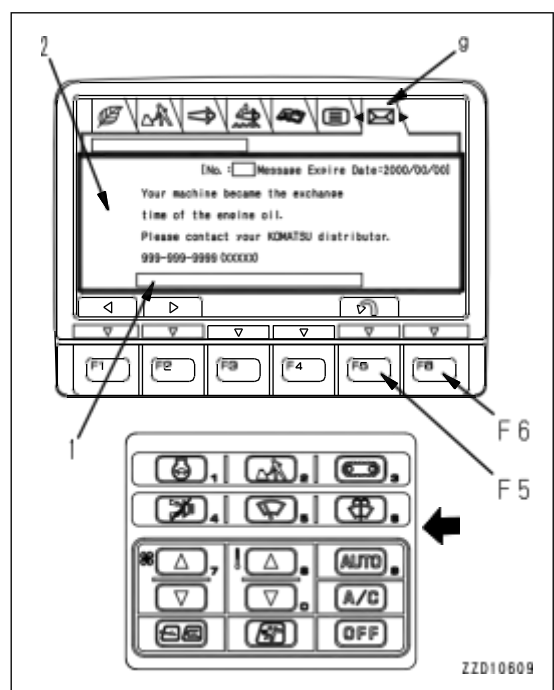
REMARK

- (3) is the subject of the received message. When no message is received, "No message" is displayed in place (3). is displayed.
- (4) is the serial number of the received messages.



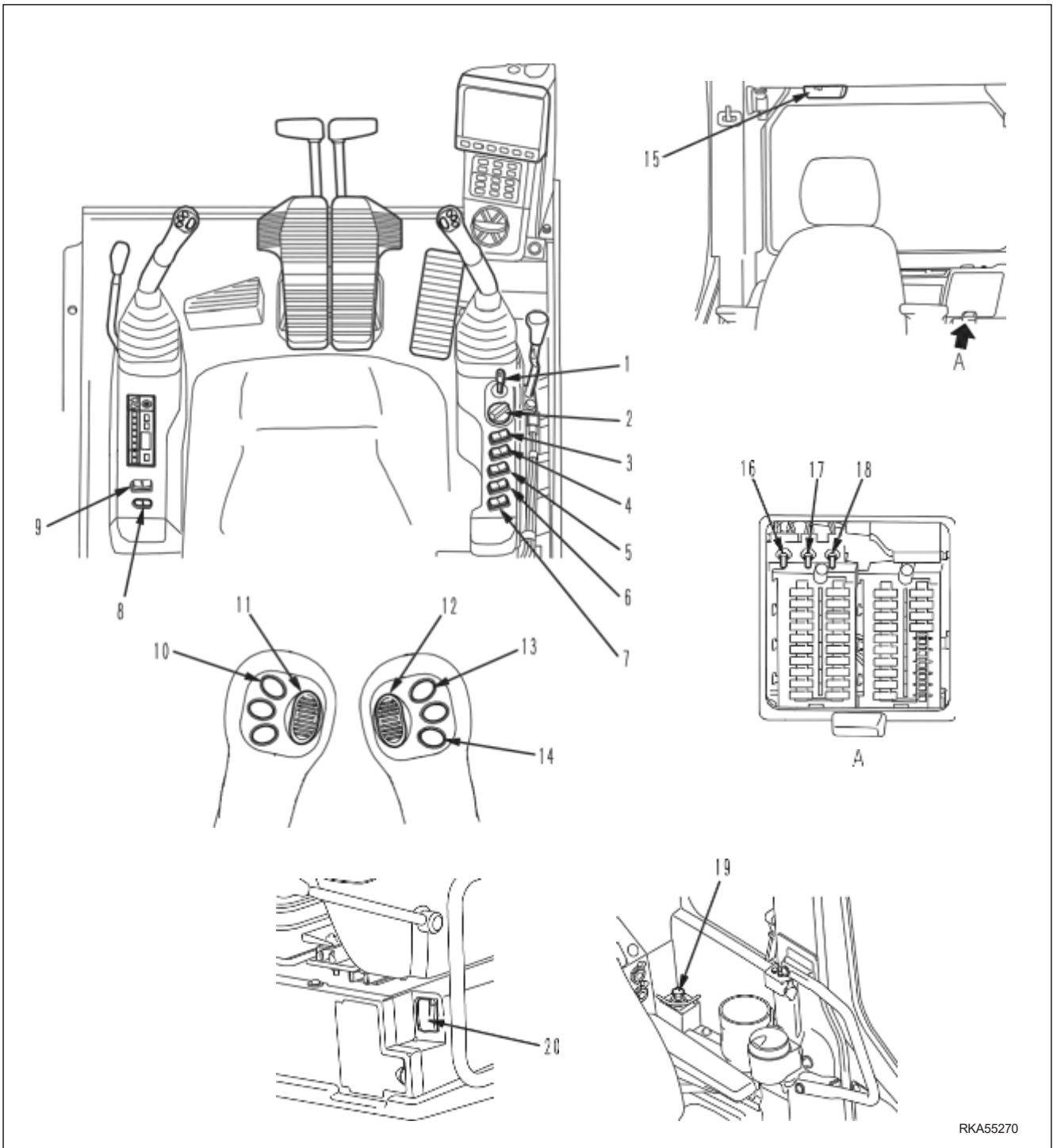
REPLY TO MESSAGE

- When replying to a message, input the selected item number in "Numeric Input" box (1) on the screen of mail confirmation menu (g). The selected item number is written in place (2) of the message text.
 - Input the number by using the machine monitor switch. Each switch corresponds to the numerical value shown on the lower right of the switch.
 - If you input an incorrect number, press switch F5, and you can clear an input character at a time.
 - If switch F5 is pressed when the input column is blank, the screen returns to the standard screen.
- After inputting a selected item number, press switch F6.
- When the message "Do you send Numeric Input?" is displayed in the column (1) of the mail confirmation menu screen, press switch F6 again. When this message is displayed, press F6 switch again. The input value will be sent out.



When “Do you send Numeric Input?” is displayed, press the switch F5, and the screen returns to the screen for replying to message. At this time, the previous input value will be cleared.

SWITCHES



- | | |
|--|---|
| (1) Starting switch | (7) Wiper switch (if equipped) |
| (2) Fuel control dial | (8) Seat heater switch (if equipped) |
| (3) Lamp switch | (9) Quick coupler switch |
| (4) Swing lock switch | (10) Quick coupler switch |
| (5) Beacon switch (if equipped) | (11) 2nd attachment proportional switch |
| (6) Additional lamp switch (if equipped) | (12) 1st attachment proportional switch |

- (13) Breaker switch
- (14) Horn switch
- (15) Room lamp switch
- (16) Pump secondary drive switch

- (17) Swing parking brake cancel switch
- (18) Lock lever automatic lock cancel switch
- (19) Cigarette lighter
- (20) Engine shutdown secondary switch

STARTING SWITCH

Starting switch is used to start or stop the engine.

(A) : OFF position

The key can be inserted or withdrawn. Switches for the electrical system (except room lamp) are all turned off, and the engine is stopped.

(B) : ON position

Electric current flows through the charging and lamp circuits. Keep the starting switch key at this position while the engine is running.

(C) : START position

This is the position to start the engine. Keep the key at this position during cranking.

The key will return to ON position (B).

(D) : HEAT (preheating) position

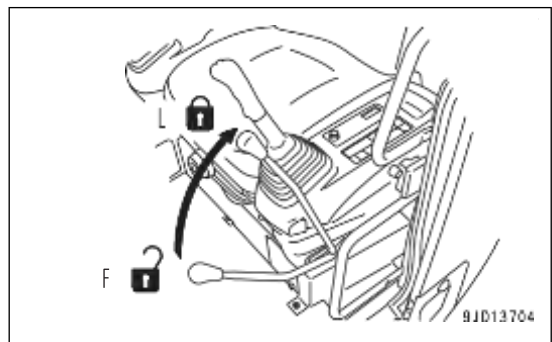
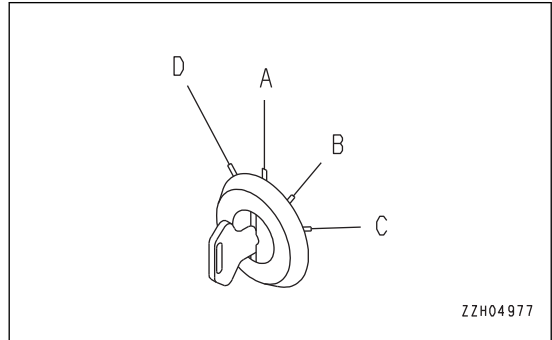
When starting in cold weather, turn the key to this position.

When the key is turned to HEAT (preheating) position (D), the preheating pilot lamp lights up. Keep the key at this position until the preheating pilot lamp flashes. Release the key immediately after the preheating pilot lamp flashes. When you release the key, it returns to OFF position (A). Start the engine immediately by turning the key to START position (C).

REMARK

If the lock lever is not at LOCK position (L), the engine does not start.

Check that the lock lever is at LOCK position (L) when operating the starting switch.



FUEL CONTROL DIAL

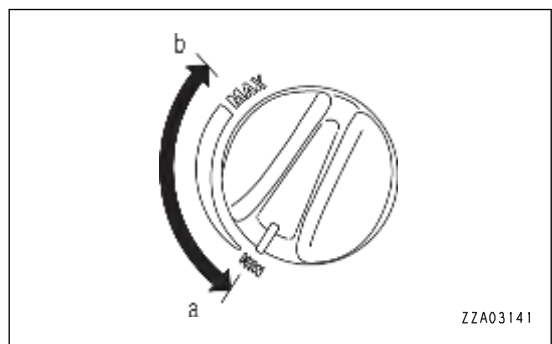
Fuel control dial is used to control the engine speed and output.

(a) Low idle (MIN)

The position where turning the dial fully to the left.

(b) High idle (MAX)

The position where turning the dial fully to the right.



REMARK

This machine controls the main pump for the best matching by controlling the engine electronically. The dial has a dead zone but it is not abnormal.

Range (c)

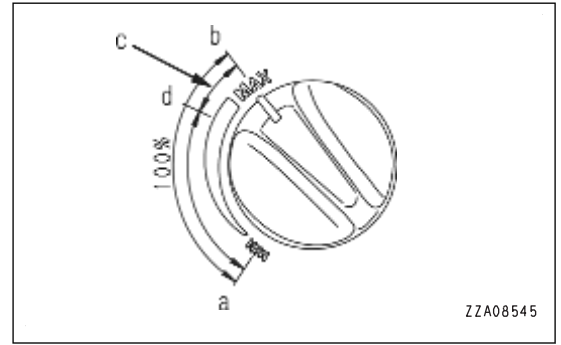
Dead zone (engine speed is constant)

P mode: 29%

E mode: 36%

Position (d)

High idle



ZZA08545

CIGARETTE LIGHTER

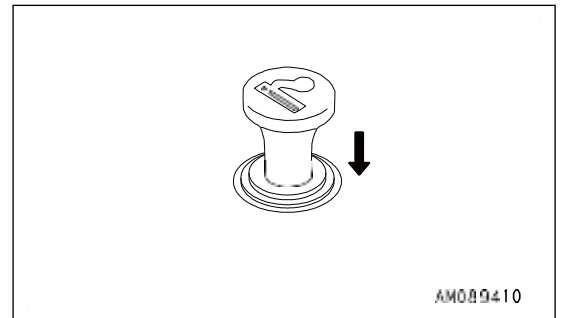
The cigarette lighter is used to light cigarettes.

When the cigarette lighter is pushed in, it will return to its original position after several 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 source.

NOTICE

This cigarette lighter is for 24 V. Do not use as a power supply for 12 V equipment.



AM089410

ATTACHMENT 1 PROPORTIONAL SWITCH

The 1st-line attachment proportional switch is used to operate the attachment.

For handling of the 1st-line attachment proportional switch, see "HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-16)".



9JA09732

ATTACHMENT 2 PROPORTIONAL SWITCH

The 2nd-line attachment proportional switch is used to operate the attachment.

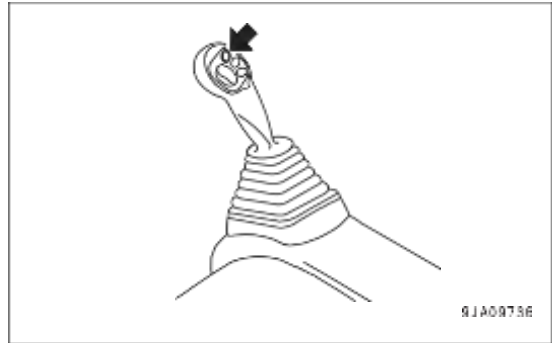
For handling of the 2nd-line attachment proportional switch, see "HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-16)".



9JA09844

BREAKER OPERATION SWITCH

The breaker control switch is used to operate the breaker.
For handling of the breaker control switch, see "HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-16)".



SWING LOCK SWITCH

⚠ WARNING

- When not using the swing operation, e.g. when traveling, put the swing lock switch to ON position.
- On slopes, even when the swing lock switch is at ON position, the weight of the work equipment may cause the upper structure to swing if the swing control lever is operated in the downhill direction.

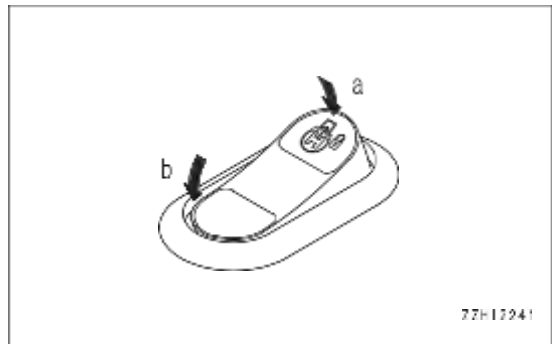
Swing lock switch is used to lock the upper structure so that it cannot swing.

(a) ON position

The swing lock is always applied, and the upper structure does not swing even when the swing is operated. In this condition, the swing lock pilot lamp lights up.

(b) OFF position

The swing lock is canceled allowing the upper structure to swing when operating the swing control lever.



LAMP SWITCH

Lamp switch is used to light up the working lamp and monitor illumination.

(a) Night position

Lamps light up and monitor illumination is set to night mode.

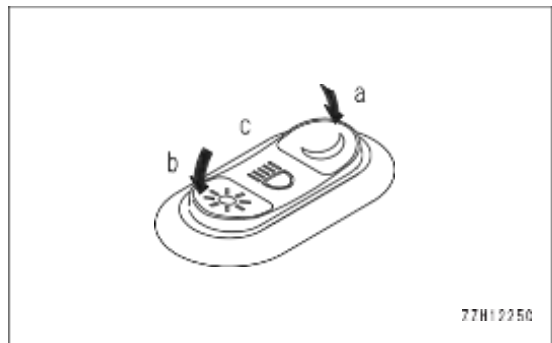
(b) Day position

Lamps light up and monitor illumination is set to day mode.

(c) OFF position

Lamps go out.

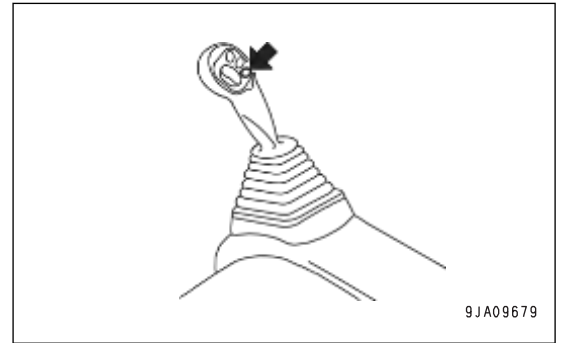
(The monitor illumination is set to day mode.)



HORN SWITCH

The horn switch is used to sound the horn.

Press the horn switch on the R.H. work equipment control lever, and the horn sounds.



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.

Use room lamp switch to light up the room lamp.

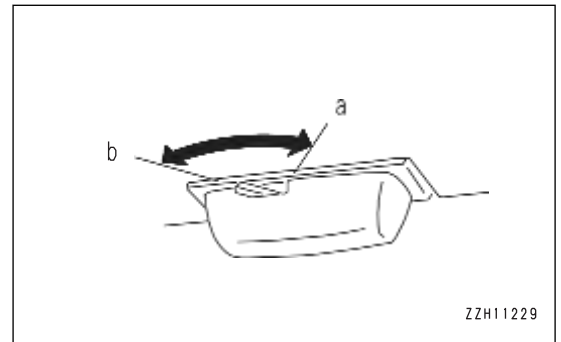
(a) ON position

Lights up

(b) OFF position

OFF

The room lamp lights up even when the starting switch is at OFF position.



PUMP SECONDARY DRIVE SWITCH

NOTICE

- The pump secondary drive switch enables you to operate the work equipment or the machine temporarily when any problem occurs on the pump control system. Do not use it except for emergency. Repair the problem as soon as possible.
- If this switch is moved to Emergency position by mistake while the machine is operating normally, "L02" is displayed on the machine monitor.
If "L02" is displayed during operation, press the monitor function switch F5 to check whether the current failure code includes any of the hydraulic system errors "DXA9KB", "DXA8KB", "DXA9KA", and "DXA8KA". Then make sure this switch is set to "Normal" position.

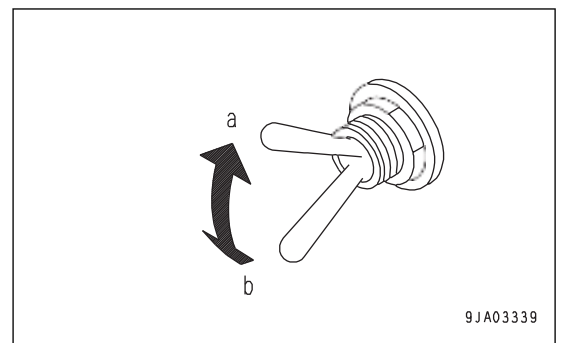
The pump secondary drive switch is a switch which enables the work equipment or the machine to perform operation temporarily when any problem occurs on the pump control system.

(a) In an emergency

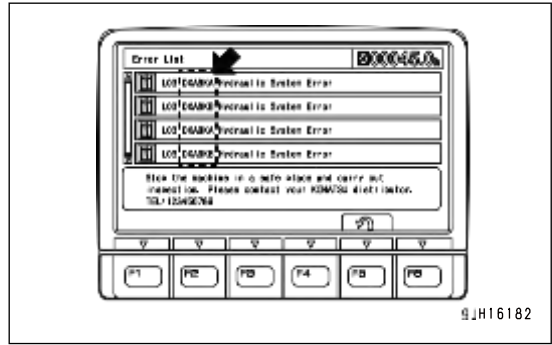
When abnormal (switch is set to upper position)

(b) Normal

When normal (switch is set to lower position)



If the Current Abnormality list includes any of the hydraulic system errors “DXA9KB”, “DXA8KB”, “DXA9KA” or “DXA8KA”, you can perform operation temporarily by setting this switch to “Emergency” position (a).



SWING PARKING BRAKE CANCEL SWITCH

NOTICE

Swing operations can be performed temporarily with swing parking brake cancel switch when there is a problem in the swing parking brake system. Do not use it except for emergency. Repair the problem as soon as possible.

Swing operations can be performed temporarily with swing parking brake cancel switch when there is a problem in the swing parking brake system (when the upper structure does not swing but the machine monitor does not show “L03”).

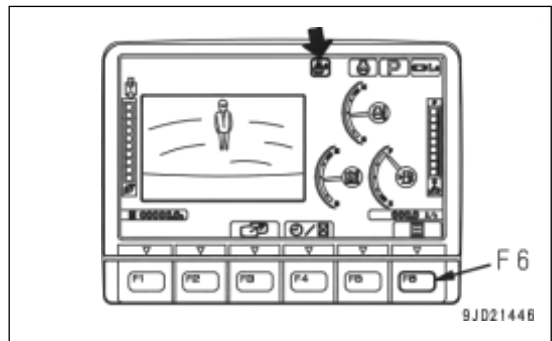
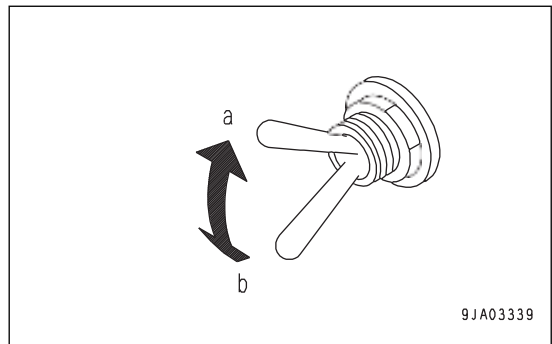
(a) Cancel

When abnormal (switch is set to upper position)

(b) Normal

When normal (switch is set to lower position)

- When the upper structure does not swing but the machine monitor does not show “L03”, move this switch to Cancel position (a), and operation can be performed.
- When the switch is moved to Cancel position (a), the swing lock pilot lamp flashes.



LOCK LEVER AUTOMATIC LOCK CANCEL SWITCH

NOTICE

The lock lever automatic lock cancel switch is used to disable the lock lever automatic lock function and enable the operations of the work equipment and machine temporarily, when the lock lever automatic lock function is abnormal. Use this switch only when the machine or working machine needs to be moved temporarily in an abnormal and emergency condition. Repair the problem as soon as possible.

For details of the lock lever automatic lock function, see “LOCK LEVER (3-94)”.

If the lock lever automatic lock function is abnormal, when the lock lever is canceled normally under the condition that the work equipment control lever or travel lever is in neutral position, this function is actuated by mistake and the machine or the work equipment may not move. The machine or the work equipment can be operated temporarily by setting the lock lever automatic lock cancel switch to cancel position (a).

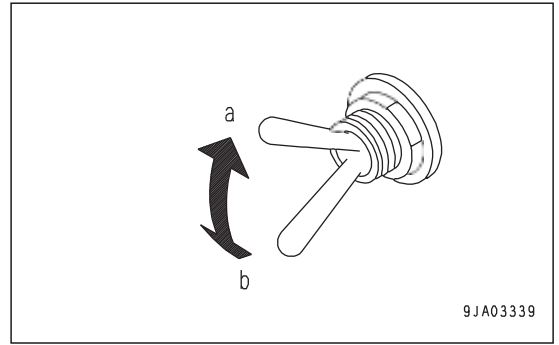
(a) Cancel

When in abnormal and emergency condition (switch is set to upper position)

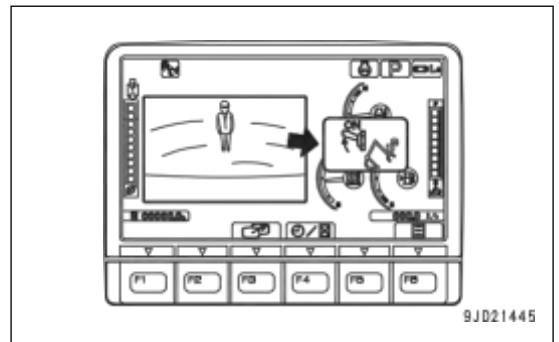
(b) Normal

When normal (switch is set to lower position)

- When the lock lever automatic lock cancel switch is set to cancel position (a), the lock lever automatic lock cancel pilot lamp lights up. At the same time, the mode is displayed in the center of the monitor display, and after 2 seconds, the screen returns to the standard screen.
- After moving the machine or work equipment temporarily by operating this switch, stop the engine, return the switch to normal position (b), and then ask your Komatsu distributor for repair.



9JA03339



9JD21445

REVOLVING LAMP SWITCH

(if equipped)

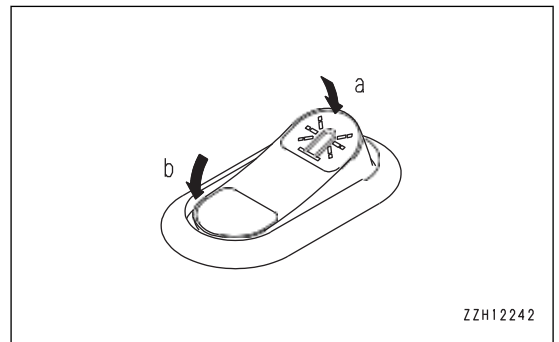
Revolving lamp switch is used to light up the yellow revolving lamp on top of the cab.

(a) ON

Lights up

(b) OFF

OFF



ZZH12242

LOWER WIPER SWITCH

(if equipped)

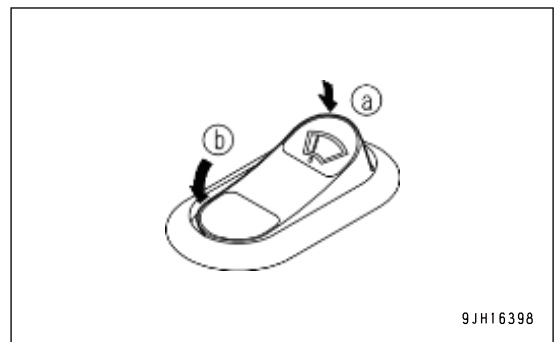
When the lower wiper switch is pressed, the lower wiper is turned on.

(a) ON

Lower wiper operates.

(b) OFF

Lower wiper stops.



9JH16398

ENGINE SHUTDOWN SECONDARY SWITCH

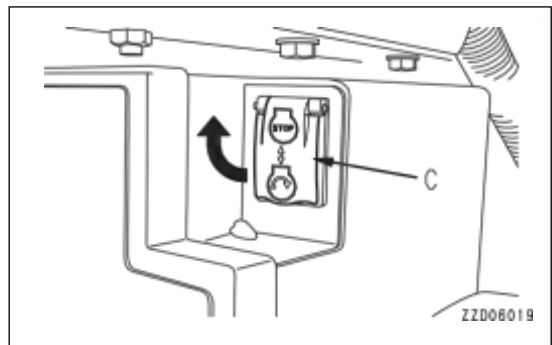
NOTICE

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 moved to engine stop 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 mode position. If not, set it to normal mode position.

1. Raise cover (C) to open it.



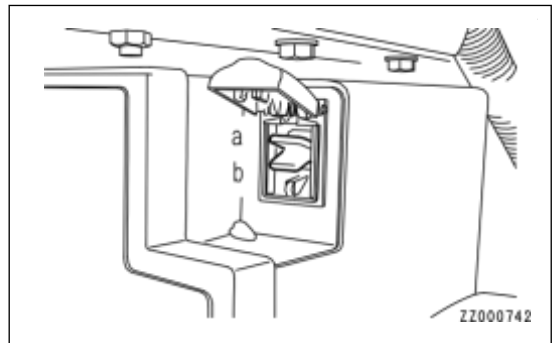
2. Turn the engine shutdown secondary switch to upper position (a) and the engine stops.

(a) Engine stop

When abnormal (switch is set to upper position)

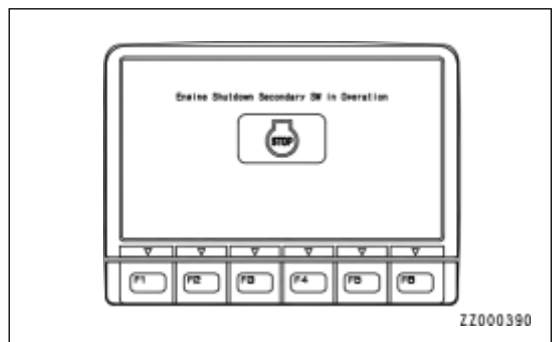
(b) Normal mode

When normal (switch is set to lower position)



- When cover (C) 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 the engine stop 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 (b).



SEAT HEATER SWITCH

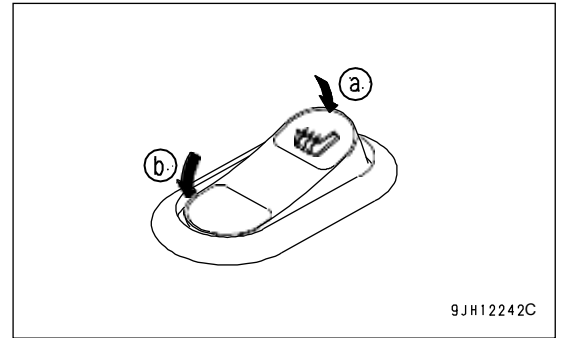
This seat heater switch is used to warm the seat.

(a) ON

Start the seat heating and the seat becomes warm.

(b) OFF

Stops the seat heating.



9JH12242C

QUICK COUPLER SWITCHES

To operate the quick coupler circuit switches on RHS console and on LH PPC lever, must be operated together. Refer to "TO RELEASE A BUCKET OR ATTACHMENT (6-5)" for an explanation of these switches operation.

ADDITIONAL LAMPS SWITCH

(if equipped)

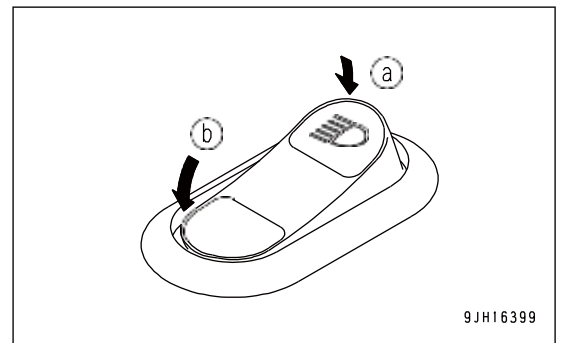
The additional lamps switch is used to turn on the cab front lamps, cab rear lamps and extra boom lamps (If fitted by customer)

(a) ON

Lamps light up.

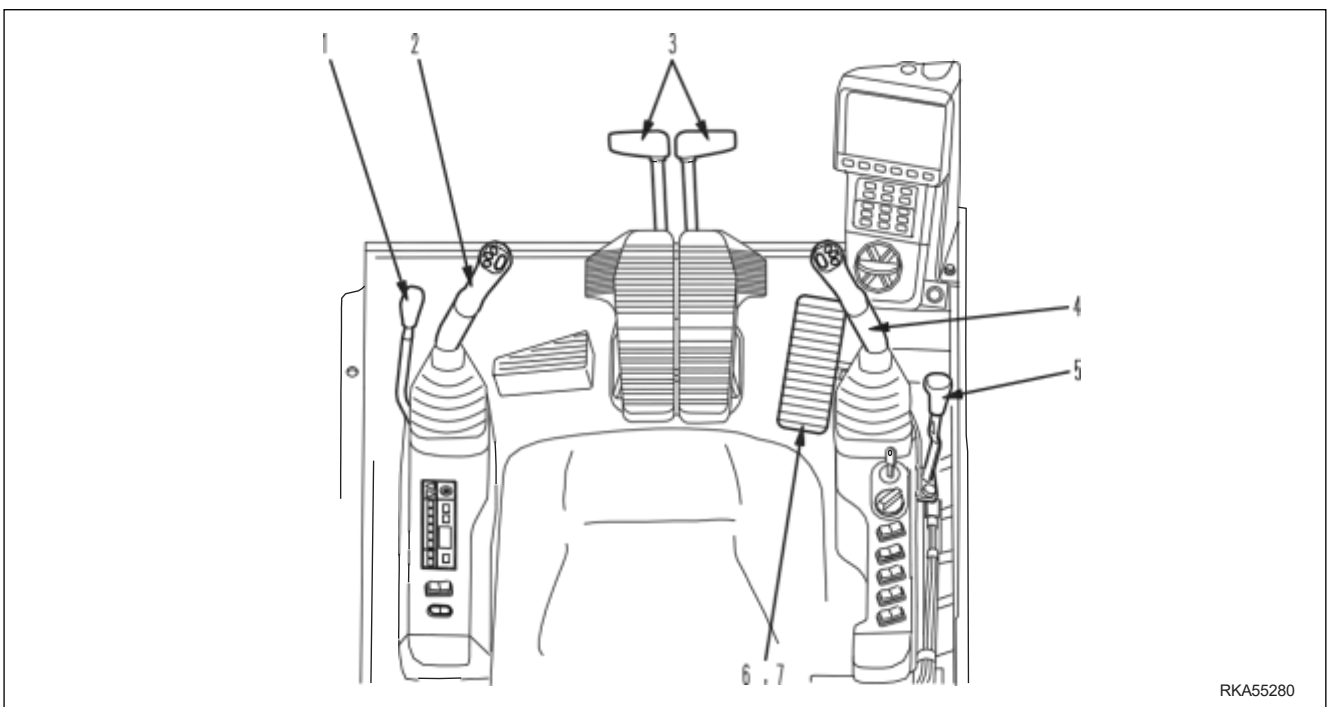
(b) OFF

Lamps go out.



9JH16399

CONTROL LEVERS AND PEDALS



RKA55280

- (1) Lock lever
- (2) L.H. work equipment control lever (with auto-deceleration system)
- (3) Travel levers (with pedal and auto-deceleration system)

- (4) R.H. work equipment control lever (with auto-deceleration system)
- (5) Blade control lever (with auto-deceleration system)

- (6) Attachment control pedal (with auto-deceleration system)
- (7) Lock pin (if equipped)

LOCK LEVER

WARNING

- When leaving the operator's seat, set the lock lever securely to LOCK position. If the lock lever is not at LOCK position and the control levers or control switches are touched by mistake, it may lead to serious personal injury or death.
- Always check that the lock lever is in LOCK position.
- When pulling the lock lever up, or when pushing the lock lever down, be careful not to touch the work equipment control lever.
- Before setting the lock lever to FREE position, make sure that all levers and pedals are set to NEUTRAL position. If any of them is out of NEUTRAL position, the work equipment or machine may move suddenly and cause a serious personal injury or death.

The lock lever is a device to lock the work equipment, swing, travel, and attachment control levers.

(L) LOCK position

Even if a control lever or an attachment control pedal is operated, machine does not move.

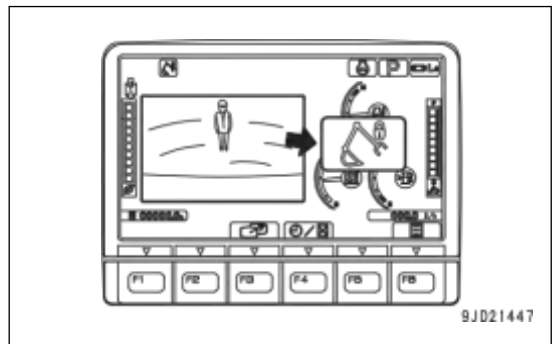
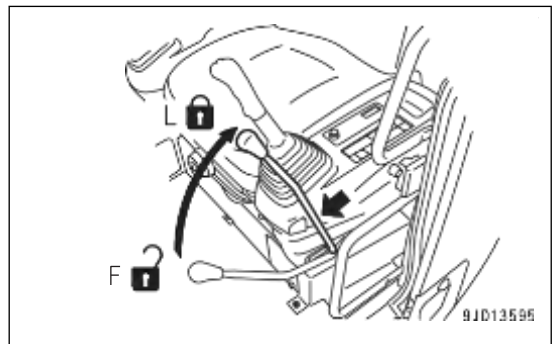
(F) FREE position

The operator can operate the machine by operating the control levers and attachment control pedals.

When the lock lever is set to LOCK (L) position, the work equipment lock pilot lamp lights up. At the same time, the mode is displayed in the center of the monitor display, and after 2 seconds, the screen returns to the standard screen.

REMARK

The lock lever is of hydraulic lock type. Accordingly, when it is in LOCK position (L), the control levers and control switches move but the machine does not move.



Automatic lock function of lock lever

WARNING

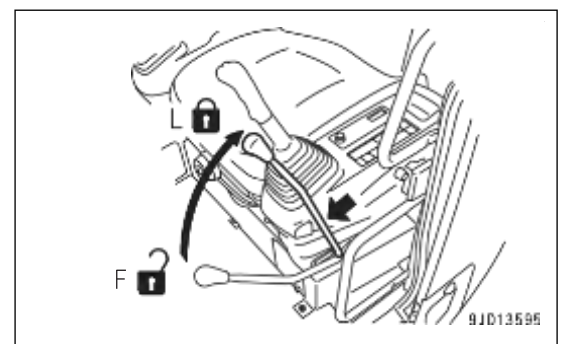
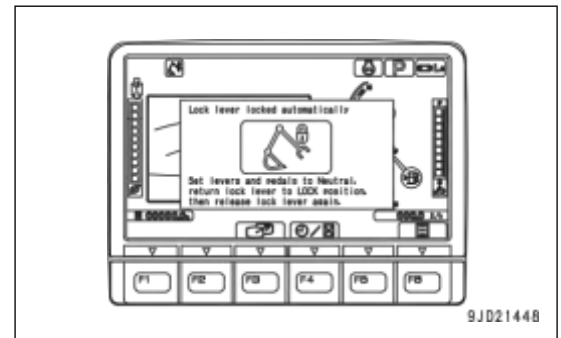
- The lock lever automatic lock function assists the operator in judgment to reduce damage caused by accident. It does not stop the work equipment or machine in all situations.
- Even if the lock lever automatic lock function works, the work equipment or machine may not stop immediately or may stop after moving by a certain distance. Also, the lock lever automatic lock function may not work in the following cases. Accordingly, do not rely on it too much.
 - When the hydraulic oil temperature is low (When the hydraulic oil temperature caution lamp indicates low temperature)
 - When the viscosity of the hydraulic oil used is higher than that of the genuine hydraulic oils which Komatsu recommends
For the genuine hydraulic oils which Komatsu recommends, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.
 - When the system has a failure
- Before setting the lock lever to FREE position, make sure that all levers and pedals are set to NEUTRAL position. If any of them is out of NEUTRAL position, the work equipment or machine may move suddenly and cause a serious personal injury or death.

The lock lever automatic lock function automatically sets the lock lever in the locked state to prevent the work equipment or machine from operating continuously when the lock lever is released while the work equipment control lever or travel lever is operated.

When this function works, the operations of the work equipment, swing, travel, and attachment are locked automatically and the message shown in the figure is displayed.

While this function is in operation, the machine does not move even if a control lever or the attachment control switch is operated while the lock lever is in FREE position (F).

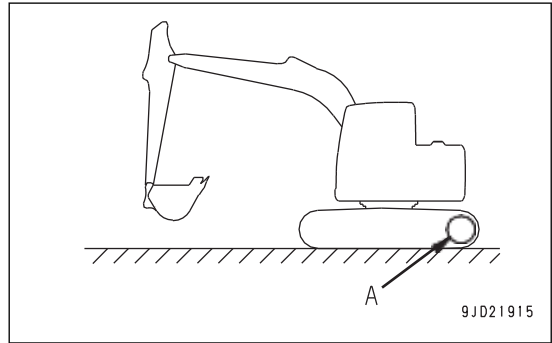
To cancel the lock, return the lock lever to LOCK position (L), check that each control lever and the attachment switch are in neutral, and then release the lock lever again.



TRAVEL LEVER

WARNING

- If you perform operations with your foot on the pedal, the machine may suddenly start if you depress the pedal by mistake, and this may lead to serious personal injury or death. Be extremely careful when using the pedal for travel and steering operations, and do not put your foot on the pedal when it is not necessary.
- When the track frame is facing the rear, the direction of operation of the steering lever is the opposite to the direction of movement of the machine (forward/reverse, right/left turn).
When operating the travel lever, always check if the track frame is facing the front or the rear. (When the sprocket (A) is at the rear, the track frame is facing the front.)



The travel lever is used to change the direction of travel between forward and reverse. () shows the pedal operation.

(a) FORWARD

The lever is pushed forward
(Depress the front side of pedal.)

(b) REVERSE

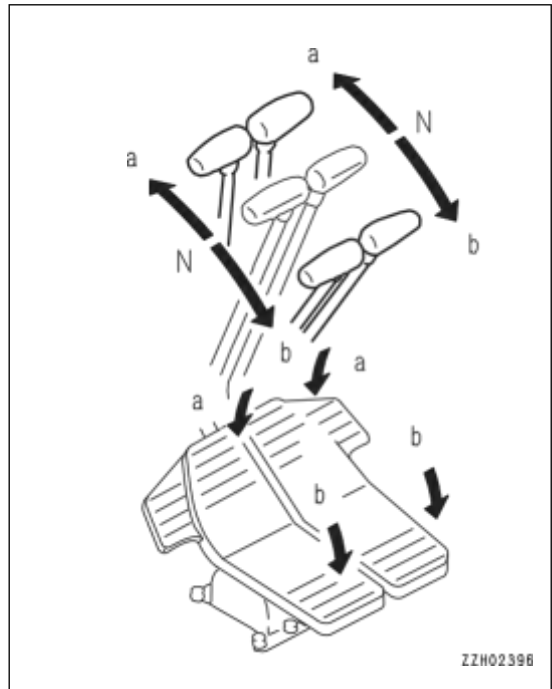
The lever is pulled back
(Depress the rear side of pedal.)

(N) NEUTRAL

The machine stops.

REMARK

If the lever is shifted to FORWARD or REVERSE position from NEUTRAL position, the alarm sounds to warn that the machine is starting to move.



BLADE CONTROL LEVER

(Machine with blade)

The blade control lever is used to control the blade.

(a) Blade LOWER

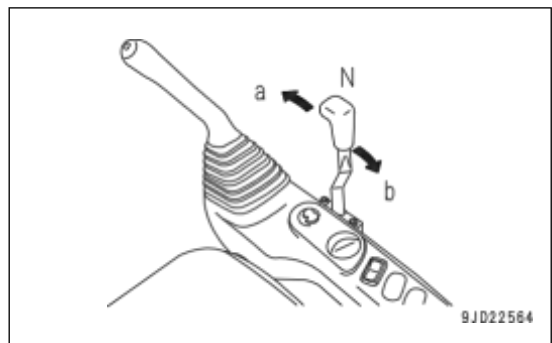
The blade control lever is pushed forward.

(b) Blade RAISE

The blade control lever is pulled back.

(N) NEUTRAL

Blade is held at current position.



WORK EQUIPMENT CONTROL LEVER

The left work equipment control lever is used to operate the arm and upper structure.

Swing control

(a): Swing RIGHT

(b): Swing LEFT

Arm control

(c): Arm IN

(d): Arm OUT

N (NEUTRAL)

The upper structure and arm are held in position and do not move.

The R.H. work equipment control lever is used to operate the boom and bucket.

Boom control

(e): Boom RAISE

(f): Boom LOWER

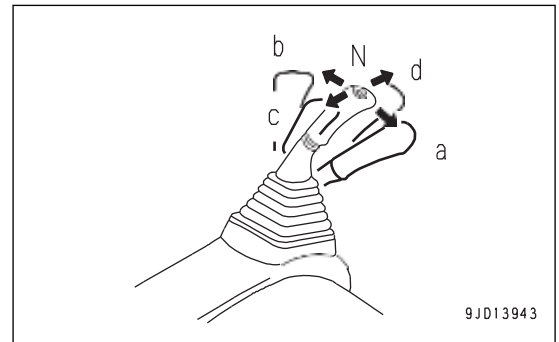
Bucket control

(g): Bucket DUMP

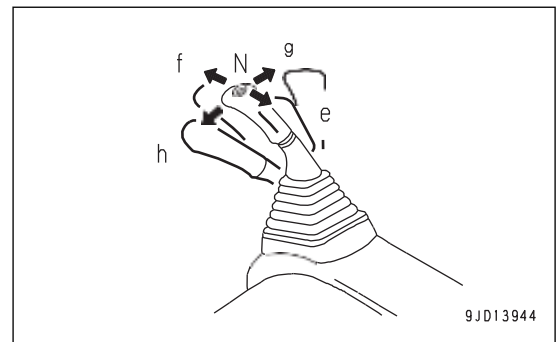
(h): Bucket CURL

N (NEUTRAL)

The boom and bucket are held in position and do not move.



9JD13943



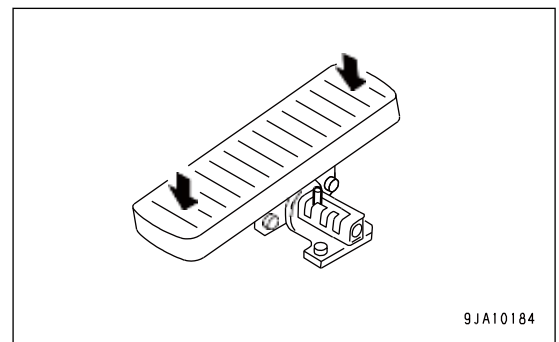
9JD13944

ATTACHMENT CONTROL PEDAL

(if equipped)

The attachment control pedal is used to control the attachment.

For handling of the attachment control pedals, see "HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-16)".



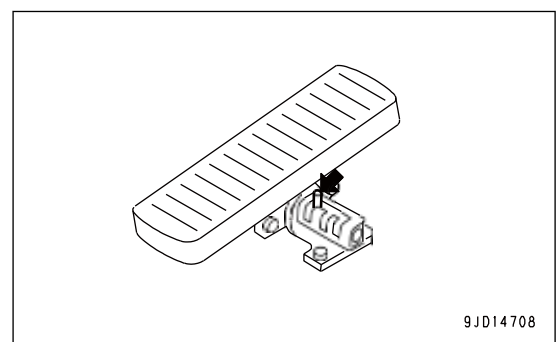
9JA10184

LOCK PIN

(if equipped)

The lock pin is used to lock the attachment control pedals.

For handling of the lock pin, see "HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-16)".



9JD14708

OTHER EQUIPMENT

METHOD FOR OPENING AND CLOSING CEILING WINDOW

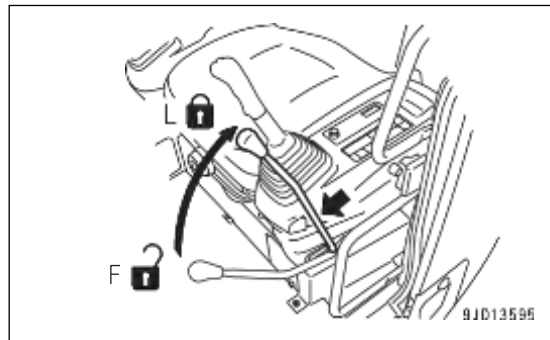
WARNING

When leaving the operator's seat, set the lock lever securely to LOCK position.

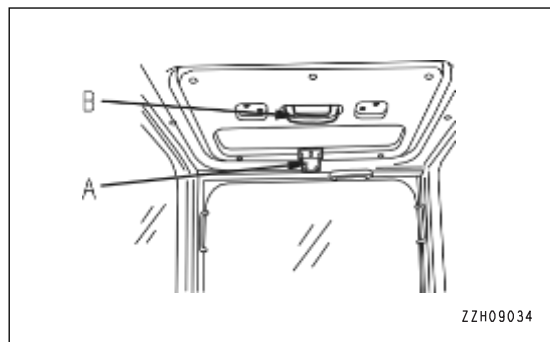
If the lock lever is at FREE position and the control lever, control pedal, or control switch is touched by mistake, it is dangerous and may cause serious personal injury or death.

When opening

1. Set the lock lever securely to LOCK position (L).



2. Push up lock (A) in the front center of the ceiling window and check that the lock is released. Then hold grip (B) and push up the ceiling window.



When closing

Hold grip (B), lower the ceiling window, and apply lock (A). If the lock cannot be applied, "open" the ceiling window, then pull it in again and apply the lock.

METHOD FOR OPENING AND CLOSING CAB FRONT WINDOW

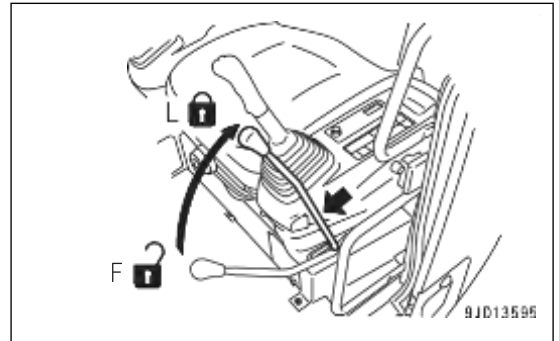
WARNING

- Set the lock lever in LOCK position always when opening or closing the front window, bottom window, or door.
If the lock lever is at FREE position and the control lever, control pedal, or control switch is touched by mistake, it may cause serious personal injury or death.
- When opening or closing the front window, stop the machine on a level ground, lower the work equipment to the ground, stop the engine, and then perform the work.
- When opening the front window, hold the handle securely with both hands to pull up, and do not release your hands until the front window is locked by the lock catch.
- When closing the front window, the window may move quicker under its own weight. Hold the handles securely with both hands when closing it.

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

When opening

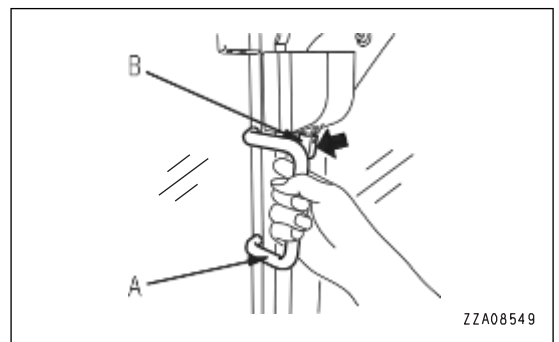
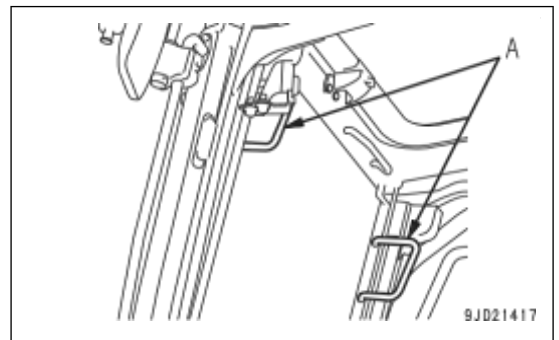
1. Stop the machine on a level ground, lower the work equipment to the ground, then stop the engine.
2. Set the lock lever securely in LOCK position (L).



3. Check that the wiper blade is stowed in the right stay.



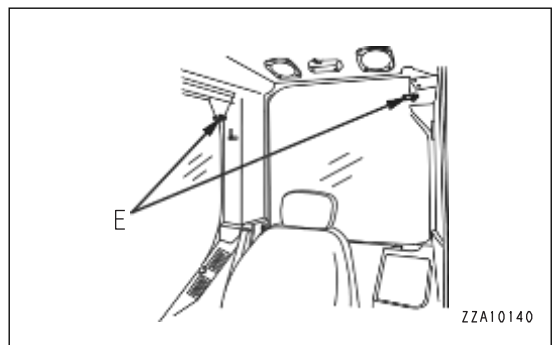
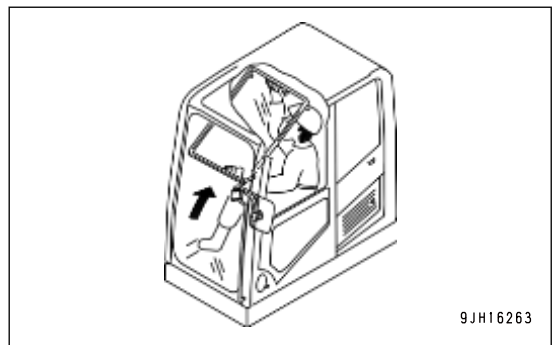
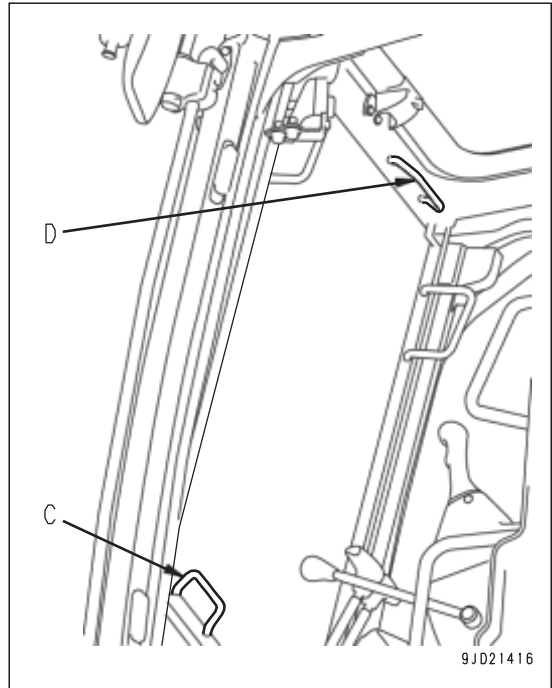
4. Hold two handles (A) on the right and left top sides of the front window, and pull two levers (B) to release the locks at the top of the front window. The top of the front window will come out.



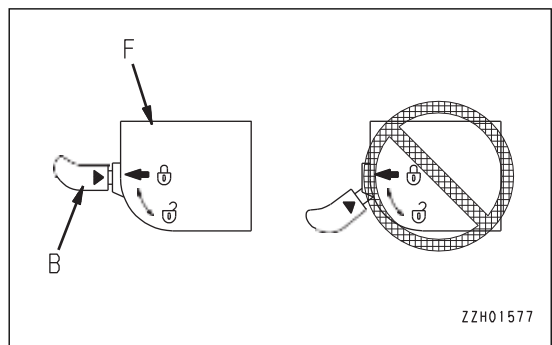
- 5. Hold lower handle (C) with your left hand from inside the operator's cab, and with your right hand, grip top handle (D), pull it up, and push it against lock catch (E) at the rear of the cab securely to lock the window.

REMARK

Handles (A) on the right and left top sides of the front window are not for pulling up the front window. Do not pull up the front window with the handles (A).



- 6. Check that lever (B) is securely in LOCK position.
 - If the arrow on lock case (F) matches the position of the arrow on lever (B), the lock is engaged. Check visually.
 - If the arrow on lock case (F) does not match the position of the arrow on lever (B), the lock is not engaged. Repeat the operation in step 5 to engage the lock.

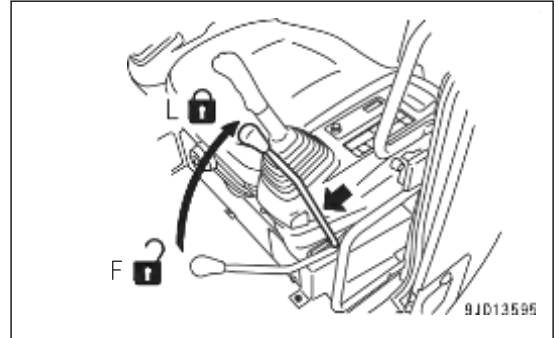


When closing

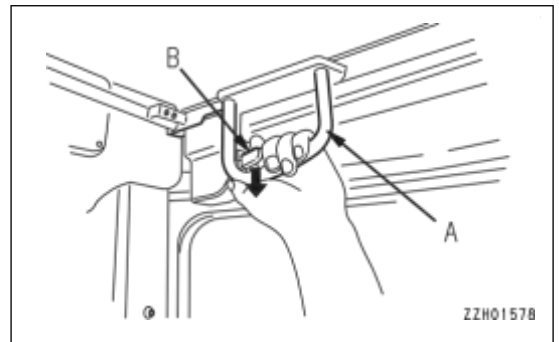
CAUTION

When closing the window, lower it slowly and be careful not to get your hand caught.

1. Stop the machine on a level ground, lower the work equipment to the ground, then stop the engine.
2. Set the lock lever securely in LOCK position (L).



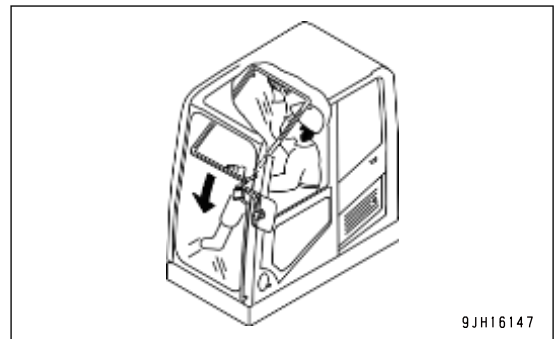
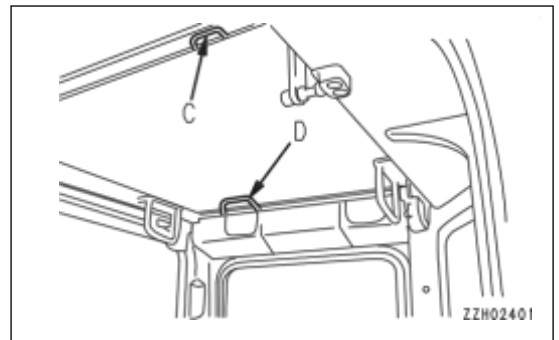
3. Grip right and left handles (A), and pull down lever (B) to release the lock.



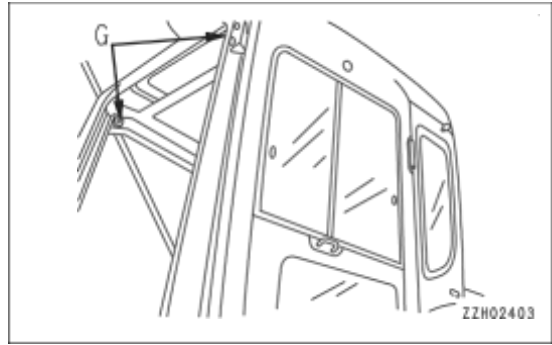
4. Grip handle (C) at the bottom of the front window with your left hand and handle (D) at the top with your right hand, push to the front, then lower slowly.

REMARK

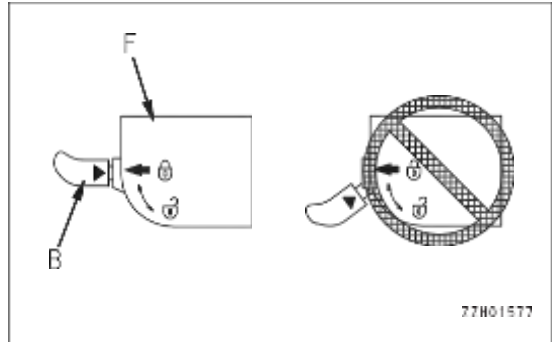
The handles (A) on the right and left sides of the front window top are not for pulling up and down the window. Do not pull down the front window with the handles (A).



5. When the bottom of the window reaches the top of lower side window, push the top of the window to the front to push it against right and left lock catches (G) and engage the lock.

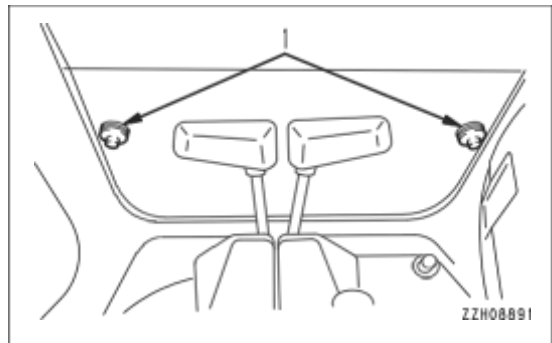


6. Check that lever (B) is securely in LOCK position.
- If the arrow on lock case (F) matches the position of the arrow on lever (B), the lock is engaged. Check visually.
 - If the arrow on lock case (F) does not match the position of the arrow on lever (B), the lock is not engaged. Repeat the operation in step 5 to engage the lock.



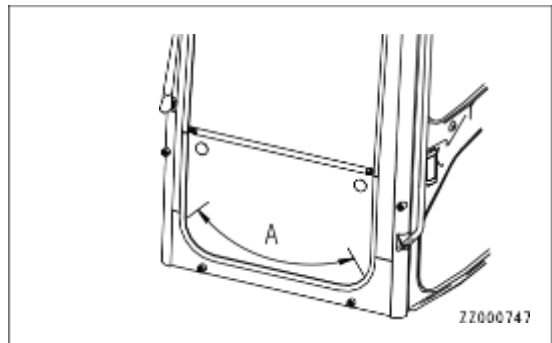
Removal of front window (lower side)

1. Open the front window (upper side), then hold grip (1), pull up, and remove the lower side window.



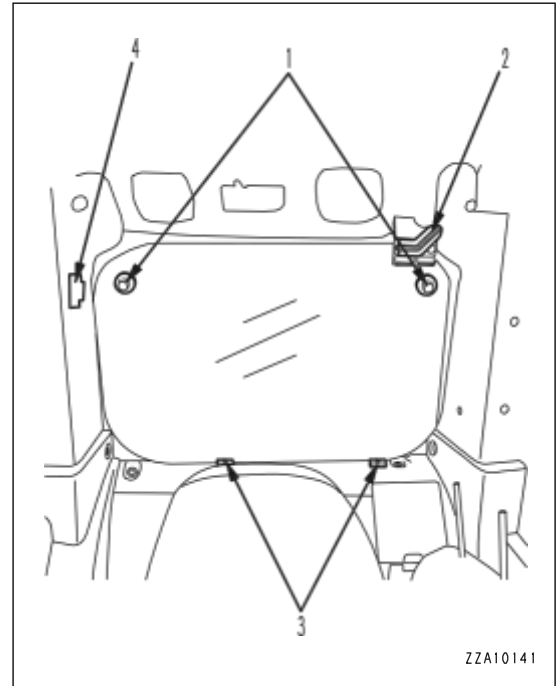
REMARK

If sand or dust is collected at the bottom of the front window (lower side), it will be difficult to remove the window. In addition, when stowing, the sand and dust stuck to the glass will be carried inside the cab. To prevent this, clean area (A) before removing.

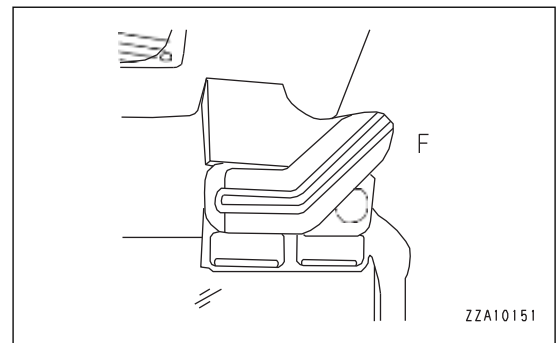


2. After removing the bottom window, store it at the rear of the operator's cab and lock it securely with lock (2). The procedure for stowing is as follows.

- 1) Set it with the protruding part of grip (1) on the glass on the inside and insert the bottom of the glass into the groove in seat (3).
- 2) Insert the top right of the glass into the groove in seat (4).



- 3) Set lock (2) to FREE position (F) and press the upper side of the glass.

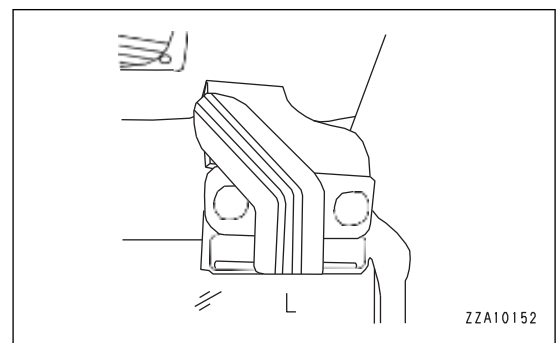


- 4) Turn lock (2) 90° counterclockwise to LOCK position (L) to fix the upper side of the glass.

NOTICE

When stowing the glass, lock it securely and check that there is no play. If there is play or the lock is not properly applied, there is danger that the glass may fall.

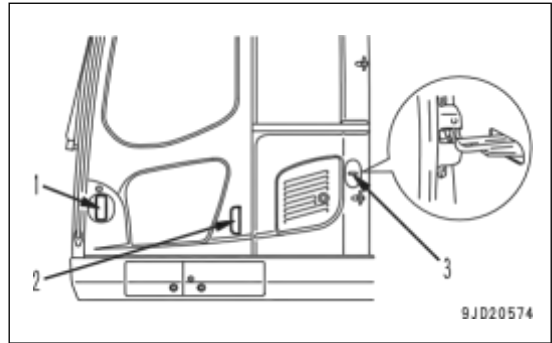
- 5) When removing the bottom window from the stowing position, perform the stowing procedure in the reverse order.



SLIDE DOOR

CAUTION

- Be sure to check that the sliding 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.
- When opening or closing the door, always use door handle (1) and knob (2).
- 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.



Door lock

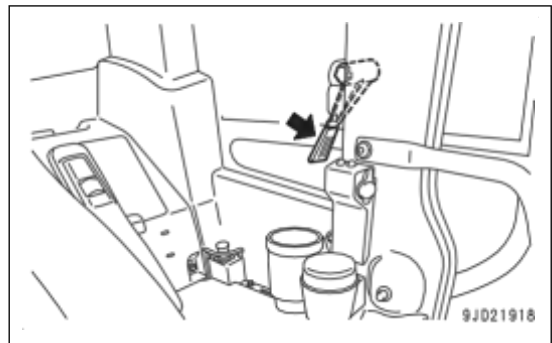
When closing the door, pull door handle (1) back to unlatch lock (3), then pull the door to the front.

EMERGENCY ESCAPE HAMMER

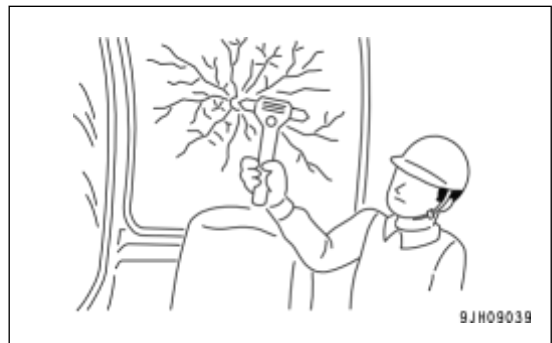
CAUTION

- If it is necessary to break the window glass with the hammer, be extremely careful not to get injured with scattered pieces of broken glass.
- To prevent injury, remove the broken pieces of glass remaining in the frame before escaping through the window. Be careful also not to slip on the broken pieces of glass.

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



To escape from the operator's cab, use hammer to break the glass and escape through the window.

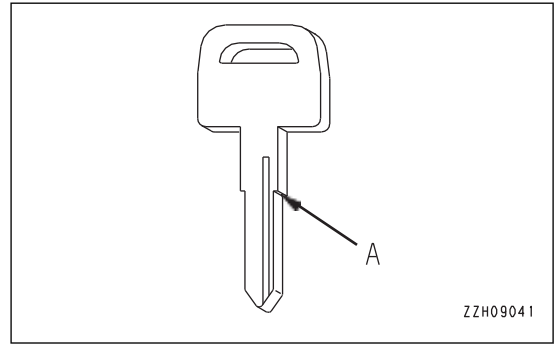


CAP AND COVER WITH LOCK

Use the starting switch key to open and close the locks on the caps and covers.

For the locations and opening or closing method of the cap with lock and cover, see "LOCK (3-194)".

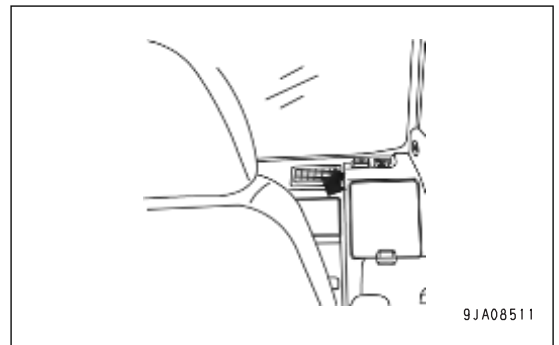
Insert the key as far as it will go to the shoulder (A) and turn it. If the key is turned when it is not inserted all the way to the end, it may break.



MAGAZINE BOX

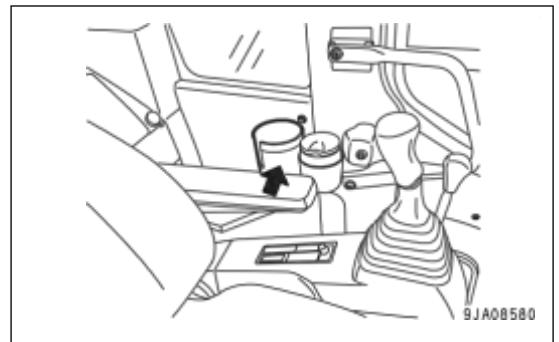
A pocket is provided the rear inside the cab for keeping Operation and Maintenance Manual and oil chart.

Keep Operation and Maintenance Manual in this pocket so that it can be read whenever necessary.



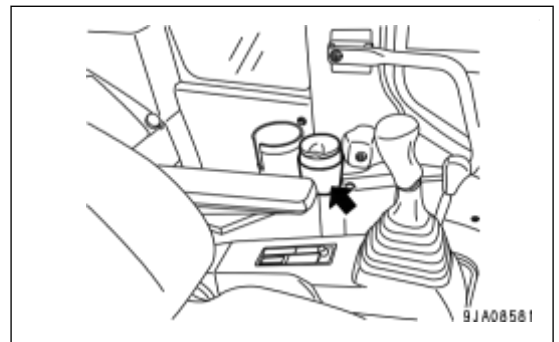
CUP HOLDER

The cup holder is located on the left side of the operator's seat.



ASHTRAY

Ashtray is on the left side of the operator's cab.



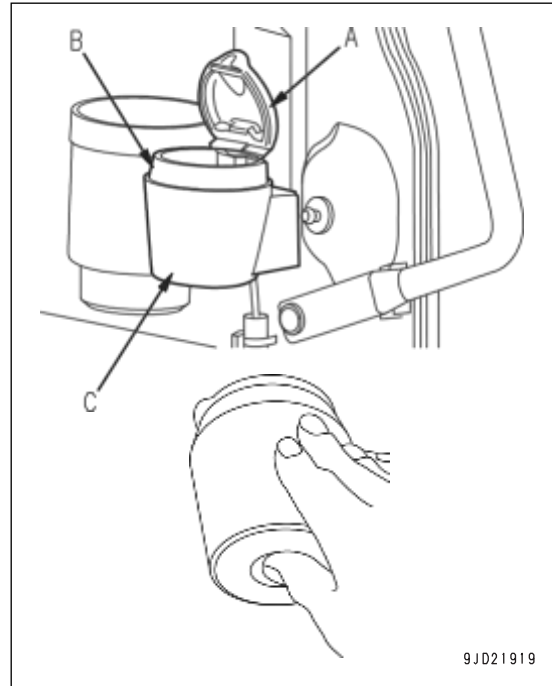
Always extinguish your cigarette before putting it in the ashtray, then be sure to close the lid (A).

When removing ashtray, open the lid (A), hold ashtray body (B), and twist it.

Or, push up ashtray body (B) with a finger through the hole at the bottom of ashtray holder (C).

NOTICE

If you hold and twist lid (A) of ashtray, there is a danger that the ashtray may break.



POWER SUPPLY OUTLET

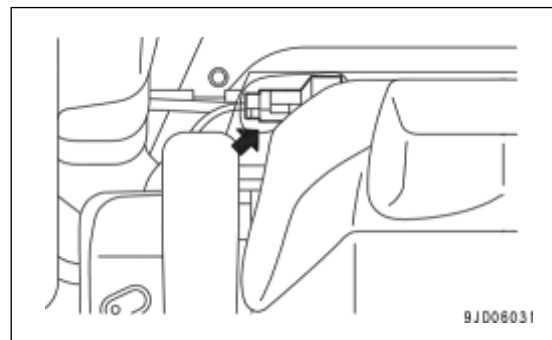
NOTICE

When installing an electrical component which is not a product of Komatsu, limit its capacity to maximum 240 W in the 24 V specification (equivalent to 10 A). When installing an electrical component of capacity larger than above value, consult your Komatsu distributor.

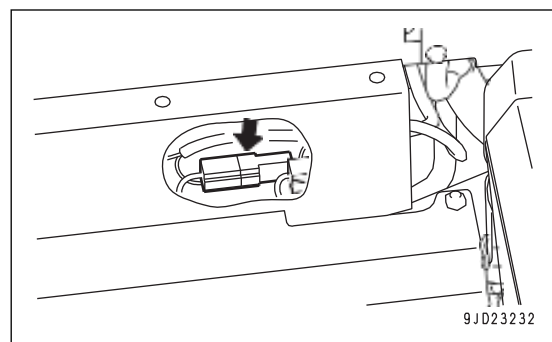
The connectors to take out electric power for optional parts are fixed to the right and left under the floor console. Remove them when using.

Take out power from these connectors for electric parts which are not products of Komatsu.

Right connector No.: M09



Left connector No.: M10



For the connection type connector, see the following table.

Right connector No.: M09

	M type housing (2 poles)		Terminal		
	Body	Rear holder	AVS 0.5	AVS 0.85 to 2	AVS 3
Komatsu part No.	08056-00211	08056-00230	08056-00050	08056-00051	08056-00052

Left connector No.: M10

	X type housing (2 poles)		Terminal		Grommet	
	Body	Rear holder	AVS 0.5 to 1.25	AVS 2 to 3	AVS 0.5 to 1.25	AVS 2 to 3
Komatsu part No.	08055-00212	08055-00230	08055-00040	08055-00041	08055-00060	08055-00061

24V power supply

NOTICE

Do not use as a power supply for a 12 V device.

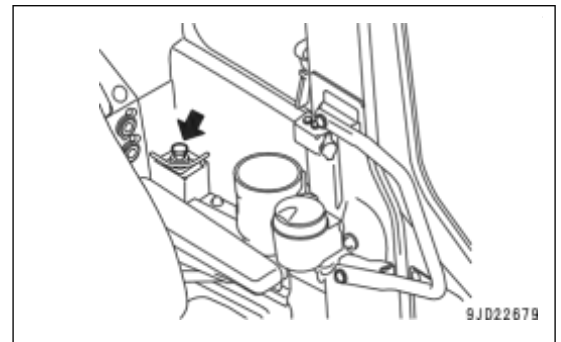
This will cause failure of the equipment.

When cigarette lighter is removed, the lighter socket can be used as a power source.

The capacity of the cigarette lighter is 85 W (24 V x 3.5 A)

REMARK

Use this power source while engine is running.



12V power supply

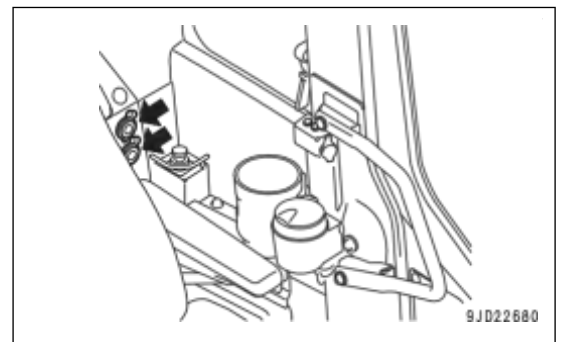
Capacity of this power supply is 144W (12 V x 12 A).

When it is used at 1 place: 144 W (12 V x 12 A)

When it is used at 2 places: 144W in total

REMARK

Use this power source while engine is running.

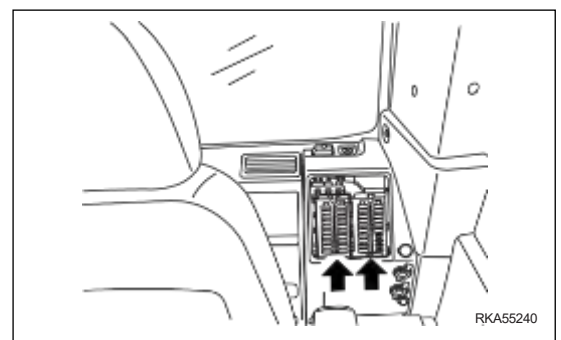


FUSE

NOTICE

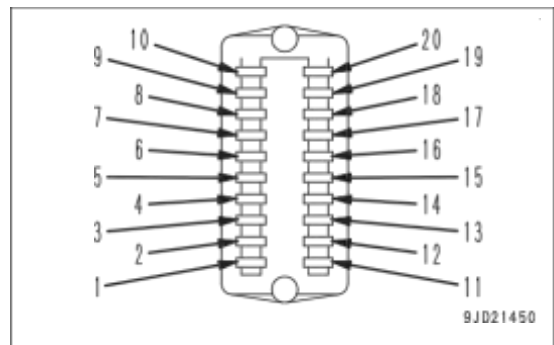
Before replacing a fuse, be sure to turn the starting switch to OFF position, then turn the battery disconnect switch to OFF position.

- The fuse holder is installed inside the cover at the rear left of the operator's seat.
- 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.

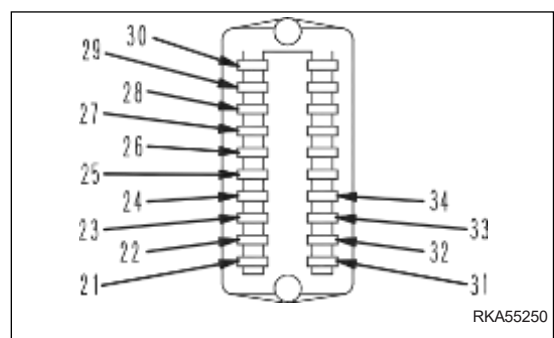


Fuse capacities and circuit names

No.	Fuse	Name of circuit
(1)	5 A	Secondary switch, working lamp relay
(2)	30 A	Solenoid valve
(3)	5 A	PPC hydraulic lock solenoid
(4)	10 A	Window washer, cigarette lighter
(5)	10 A	Horn
(6)	5 A	Spare
(7)	10 A	Revolving lamp (if equipped)
(8)	10 A	Radio, speaker, L.H. knob switch
(9)	20 A	Working lamp
(10)	20 A	Air conditioner unit
(11)	10 A	Headlamp (if equipped)
(12)	10 A	Optional power supply (1)
(13)	30 A	Optional power supply (2)
(14)	5 A	Air conditioner ECU power source
(15)	5 A	Key ACC signal
(16)	10 A	Radio backup, room lamp, system operating lamp
(17)	20 A	Monitor, pump controller, KomVision (if equipped)
(18)	30 A	Engine controller
(19)	5 A	Air conditioner ECU backup
(20)	10 A	Optional power supply (continuous power supply)

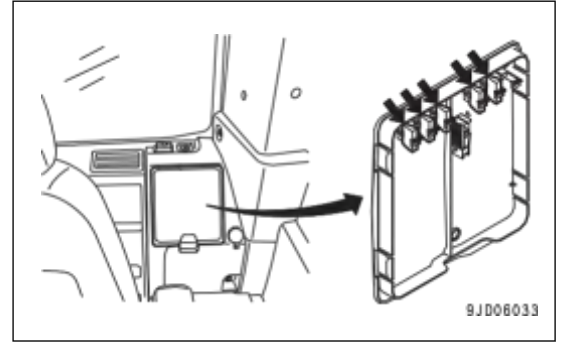


No.	Fuse	Name of circuit
(21)	10 A	Cab head light (1)
(22)	10 A	Cab rear light
(23)	10 A	Lower wiper
(24)	10 A	Quick coupler
(25)	10 A	Refuel pump
(26)	10 A	Cab head light (2)
(27)	10 A	Option light
(28)	20 A	Autogrease
(29)	30 A	Option heater
(30)	10 A	Spare
(31)	20 A	Sensor power relay (1)
(32)	10 A	Sensor power relay (2)
(33)	10 A	DEF pump heater
(34)	20 A	DEF heater relay



REMARK

- Spare fuses are installed in the back of the fuse holder lid at the rear left of the operator's seat.
- After using spare fuses, replenish them immediately.
- One spare fuse is installed for each 5 A, 10 A, 20 A, 25 A, and 30 A.



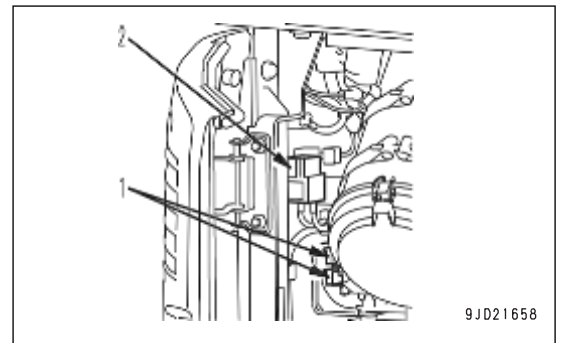
FUSIBLE LINK

NOTICE

When replacing the fusible link, 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.

If the following phenomena occur, fusible links are suspected of disconnection. Open the battery inspection cover, and perform checking and replacing.

- If the engine starting motor does not operate even when the engine starting switch key is turned to the START position, fusible link (1) may be broken.
- If the engine does not start easily in cold weather even if the starting switch is set to HEAT (preheat) position, fusible link (2) may be broken.



REMARK

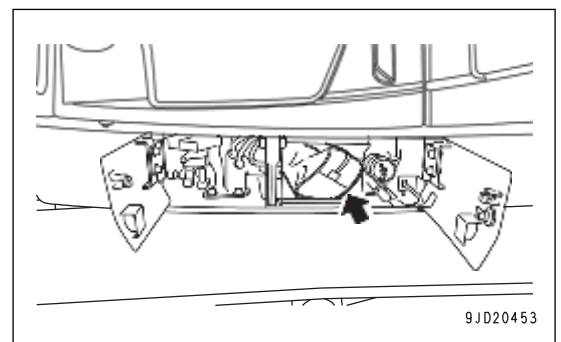
A fusible link refers to the large-sized fuse wiring installed in the high current flow portion of the circuit. It protects electrical components and wiring from burning, in the same way as an ordinary fuse.

No.	Capacity	Name of circuit	Connector No.	Part No.
(1)	65 A	Standard power supply	F02	22U-06-11270
		Continuous power supply	F03	
(2)	120 A	Preheat	F06	421-06-22830

TOOL BOX

Open the cover of the tool box on the left side of the machine, and you see the standard toolbox in it.

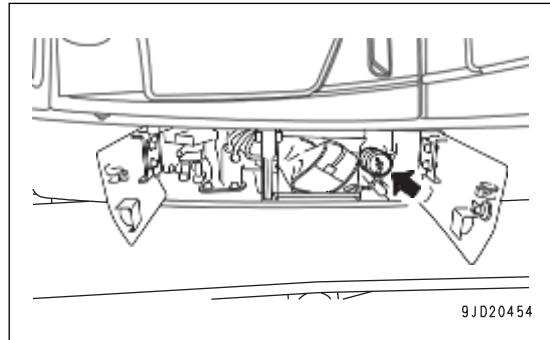
Store the tools in the attached tool bag.



GREASE PUMP HOLDER

Open the tool box cover on the left side of the machine, and you see the grease pump storage place.

When storing the grease pump, pass its nozzle through the hole at the end until it stops.

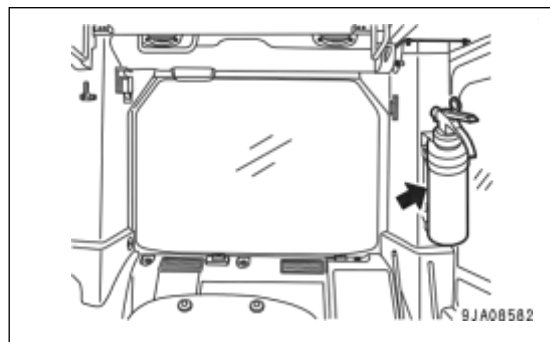


FIRE EXTINGUISHER

(if equipped)

A fire extinguisher is prepared at the rear part inside the operator's cab.

The directions are described on the nameplate affixed to the fire extinguisher. Just in case, carefully read and understand them beforehand.



BATTERY DISCONNECT SWITCH

CAUTION

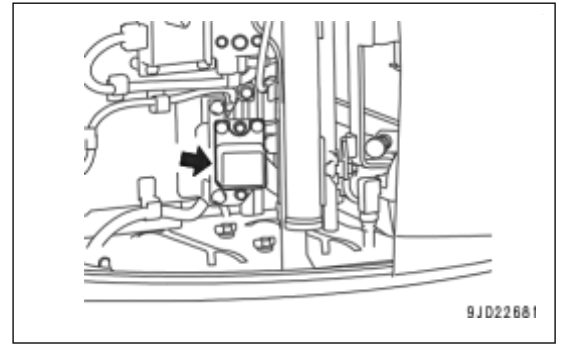
- Do not operate the battery disconnect switch while the engine is running. The large current generated by the alternator may burn the electric parts and cause a fire. Operate the battery disconnect switch only when the engine is stopped.
- If the battery disconnect switch is turned to OFF position, 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 the 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 information of the clock and the radio tuning information may be lost. In this case, set the information again. For detail, see "CLOCK ADJUSTMENT (3-76)" and "HANDLE RADIO (3-211)".

The battery disconnect switch is used to cut out the electricity from the battery.

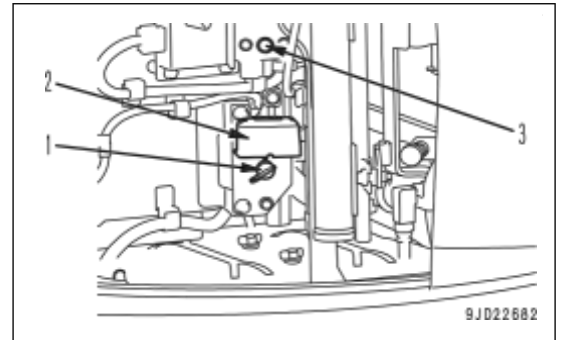
This is inside the battery inspection cover.



Raise rubber cover (2), and the battery disconnect switch (1) is seen.

REMARK

Operate this switch while system operating lamp (3) is not lit.



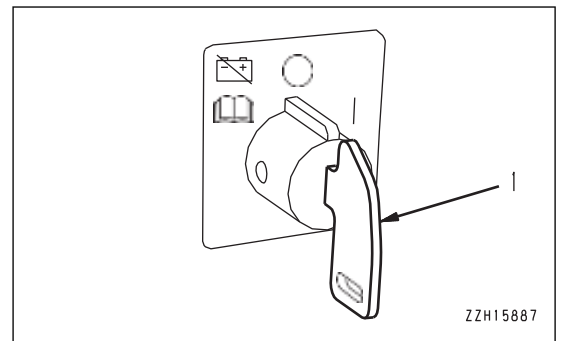
(O): OFF position

Switch key (1) can be pulled out (and inserted) and the current from the battery is cut out.

(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.



SYSTEM OPERATING LAMP

System operating lamp (1) indicates that the controller mounted on the machine is turned ON.

System operating lamp (1) lights up in green when the controller is turned ON and goes out in a few minutes after the starting switch is turned to OFF position.

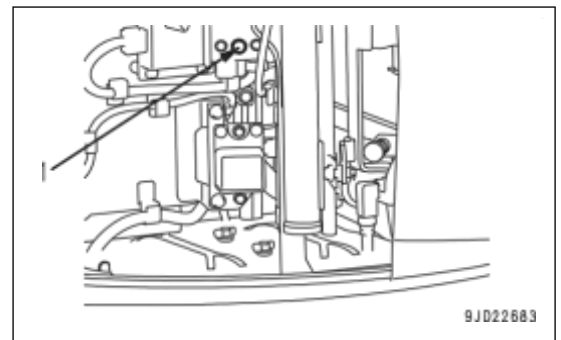
Before operating the battery disconnect switch, check that system operating lamp (1) is turned OFF.

NOTICE

If the battery disconnect switch is turned OFF while the system operating lamp is lit, the data in the controller may be lost.

REMARK

- Even if the starting switch is in OFF position, the controller may operate. The system operating lamp lights up at this time, but it is not a failure.
- After the starting switch has been turned OFF, the system operating lamp may stay lit for a long time. In such case, consult your Komatsu distributor.

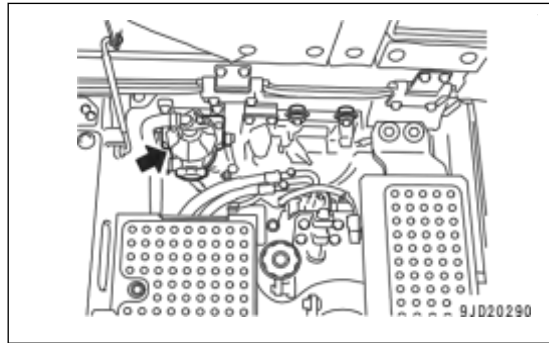


Komatsu Closed Crankcase Ventilation (KCCV)

KCCV is a device to clean the gas discharged from the engine crankcase with the filter element and return it to the engine air intake system.

NOTICE

- The KCCV filter element needs to be replaced every 2000 hours. For details of the replacement procedure, see “METHOD FOR REPLACING KCCV FILTER ELEMENT (4-68)”.
- If the engine is operated without KCCV filter element or if a filter element other than the Komatsu genuine one is used, the engine sucks oil and foreign material which can cause a failure. Always install Komatsu genuine KCCV filter element.
- The filter element cannot be flushed. Never reuse the filter element since it can cause a performance decrement of engine, and it result in a failure even if it is cleaned.



HANDLE UREA SCR SYSTEM WARNING

WARNING

- Exhaust gas temperature may increase during regeneration and remain very hot after the end of regeneration.
Do not come near the exhaust pipe outlet nor the aftertreatment devices.
Do not put any combustibles near the outlet of the exhaust pipe nor the aftertreatment devices.
- Disable the regeneration system while the machine operates in an environment containing flammable materials.

The Urea SCR system device sprays DEF into the exhaust gas to convert toxic nitrogen oxides (NO_x) from exhaust gas into harmless nitrogen and water. DEF decomposes and hydrolyzes to produce ammonia (NH₃), which selectively reacts with nitrogen oxides to convert nitrogen and water.

The Komatsu Urea SCR System continuously monitors machine operation conditions and gathers information on defective operations such as malfunctions. The information is used for system diagnostics and also for Inducement, required on engine systems that use Urea SCR systems. Inducement is intended for the operators to take prompt procedures to maintain and correct inappropriate behaviors of Urea SCR systems. Alerts in Inducement of the Komatsu Urea SCR System progress step by step. It starts with visual indications on the machine monitor with audible sounds to engine power deration to avoid dangerous conditions.

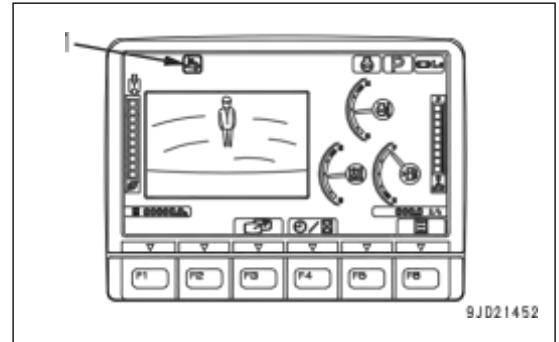
The Komatsu Urea System also monitors recurrences of defective operations of the system. Inducement is activated when another defective operation occurs less than 40 hours after the first defect is repaired.

When the purification function of the Komatsu Urea System is deteriorated from the machine operating conditions, regeneration may activate.

NOTICE

- Do not put anything other than DEF into the DEF tank. Foreign materials in DEF, such as dried urea when you disconnect the hose and change the filter, may cause a malfunction of the equipment.
- Do not paint the DEF injector or pump. Cover the pump and injector whenever you paint around them.
- Use only DEF which complies with the quality standards. If you add any additive agents, water, etc. to DEF, the equipment will not operate correctly, and will not comply with the exhaust gas regulations. It may also cause a failure in the engine system. If you supply a solution other than DEF, contact Komatsu distributor.

To prevent deterioration of the aftertreatment devices, the exhaust gas temperature rises automatically, which is regeneration. During regeneration, the aftertreatment devices regeneration display (1) comes on in the indicator lamp.

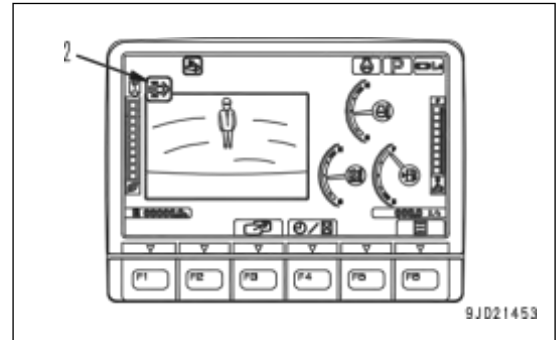


When the engine is idled for long periods of time, regeneration will occur more frequently. This is not an error in regeneration. When regeneration performance caution lamp (2) comes on, stop the machine in a safe area and start manual stationary regeneration.

Depending on the urgency, two steps to request manual stationary regeneration are started.

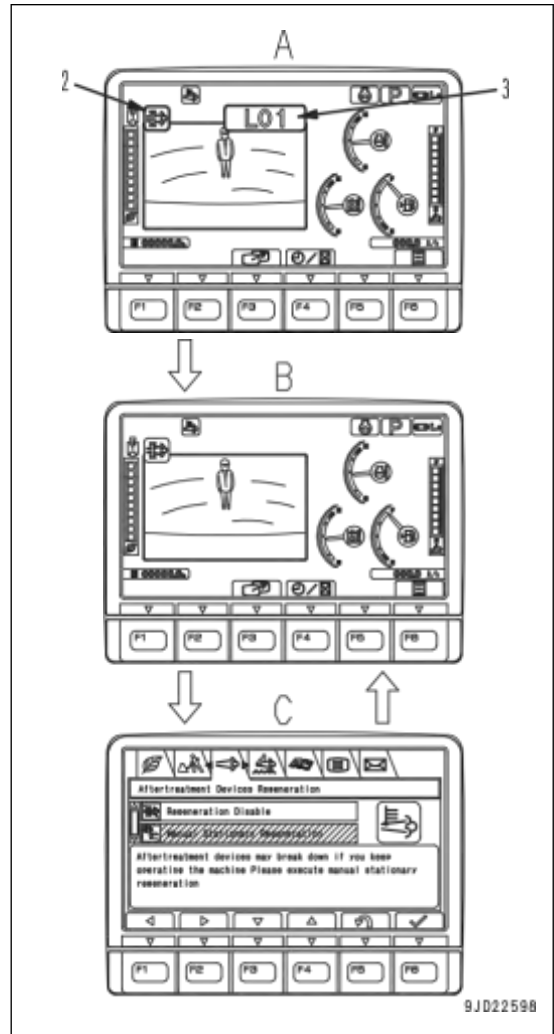
Stop the engine during regeneration. Run the engine for about 5 minutes at low idling RPM.

When you press F6 on the main menu screen, the machine monitor shows "Aftertreatment Devices Regeneration" screen in the user menu.



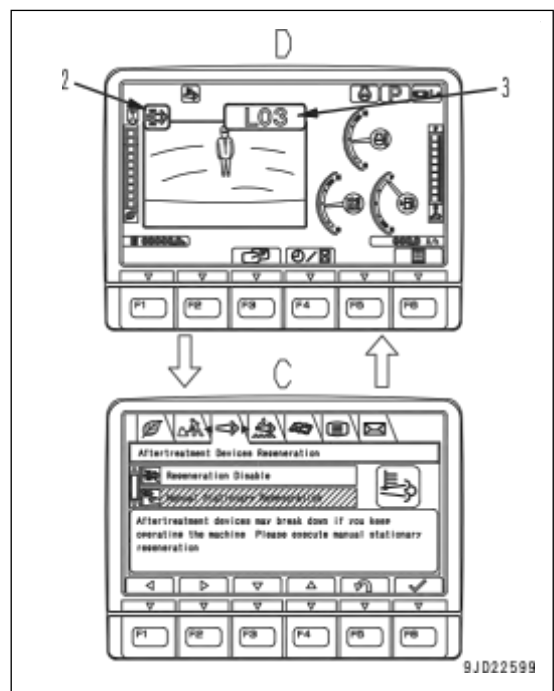
Low-level requirement for regeneration

- When caution lamp (2) comes on in yellow (action level (3): “L01”, screen (A) is displayed first.
 - The action level goes out after 2 seconds and the screen changes to standard screen (B).
 - When you set the lock lever to LOCK position or all the work equipment control levers in NEUTRAL, the “After-treatment Devices Regeneration” screen (C) will appear after 3 seconds. If you do not activate manual stationary regeneration, normal screen(B) will appear after 30 seconds.
- The “Aftertreatment Devices Regeneration” screen (C) is shown for 30 seconds every 2 hours until regeneration is performed.
- When caution lamp (2) comes on in yellow, after the end of ongoing work stops the machine in a safe area and activate manual stationary regeneration.



High-level requirement for regeneration

- When caution lamp (2) and action level: “L03” comes on in red (3).
- When you set the lock lever to LOCK position or all the work equipment control levers in NEUTRAL, “Aftertreatment Devices Regeneration” screen (C) shows after 3 seconds. Then, the “Aftertreatment Devices Regeneration” screen (C) and standard screen (D) alternate automatically until manual stationary regeneration is activated.
- When caution lamp (2) comes on in red, stop the machine immediately in a safe area and activate the manual stationary regeneration.



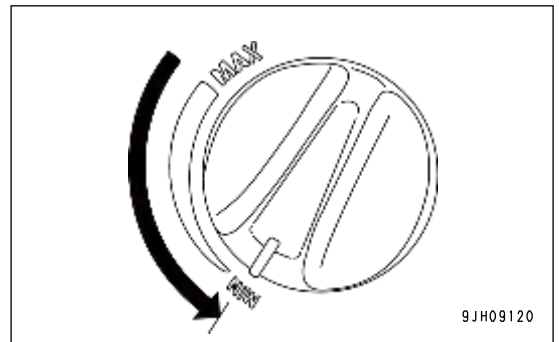
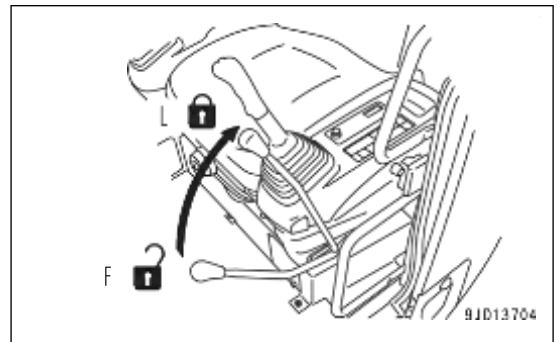
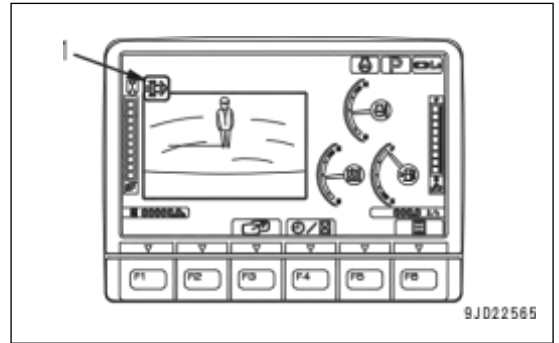
PROCEDURE FOR MANUAL STATIONARY REGENERATION

When the manual stationary regeneration is required, check if the caution lamp (1) is lit.

During manual stationary regeneration, there are times when engine low idle speed increases automatically.

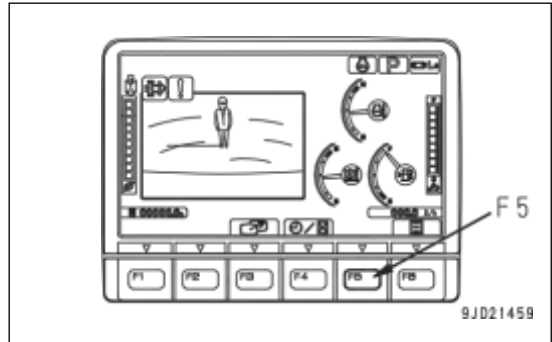
1. Move the machine to a safe area and stop it with the engine running.
2. Make sure there are no persons or combustible materials around the exhaust pipe outlet and aftertreatment devices.
3. Set the lock lever to LOCK position (L).
4. Set the fuel control dial to Low idle (MIN) position.
5. Push F6 to show the “Aftertreatment Devices Regeneration” screen.
6. Select manual stationary regeneration, and push F6.

If the screen shown in the figure does not change after you push F6 in Procedure 6, recheck procedures 1 through 5, and then push switch F6 again.



When manual stationary regeneration is not activated even after you push the switch F6, return to the normal screen. Then push the switch F5, and follow the instructions shown on the screen.

Manual stationary regeneration may continue for over 40 minutes. Do not operate any screen switches, fuel control dial, etc before until regeneration is completed.

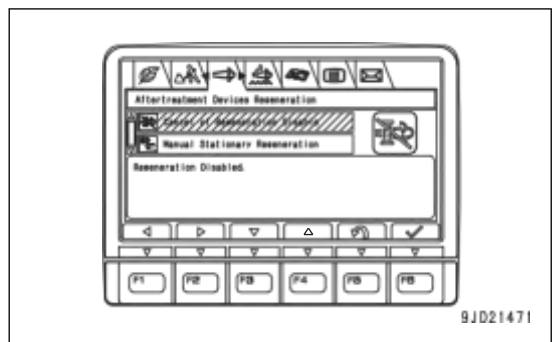
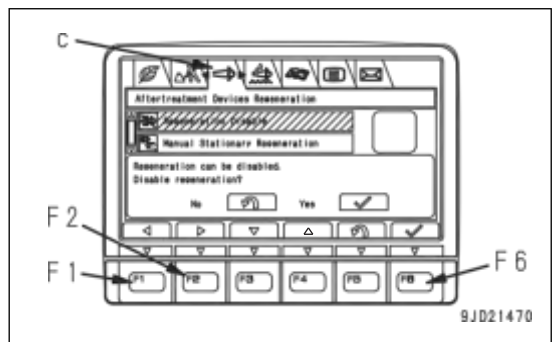
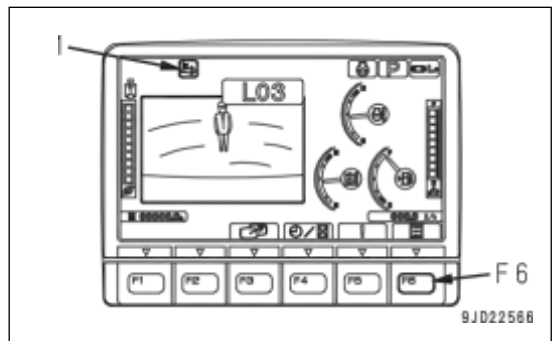


PROCEDURE FOR SETTING AFTERTREATMENT DEVICES-REGENERATION DISABLE

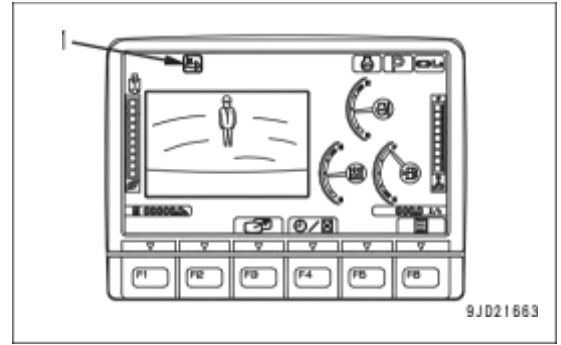
If necessary, it is possible to disable automatic regeneration. Also, it is possible to stop regeneration in progress.

Procedures to disable automatic regeneration

1. When the aftertreatment devices regeneration display (1) is not lighting on the standard screen, push F6 on the standard screen.
2. Use F1 and F2 to select the "Aftertreatment Devices Regeneration" menu (C) and display the "Aftertreatment Devices Regeneration" screen.
3. With regeneration disable highlighted, push function switch F6 to disable regeneration.

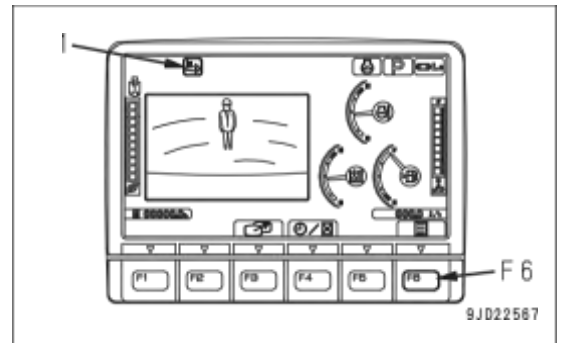


Even if regeneration is disabled, the aftertreatment device regeneration display (1) may come on under certain condition. In this case, it is impossible to disable regeneration.



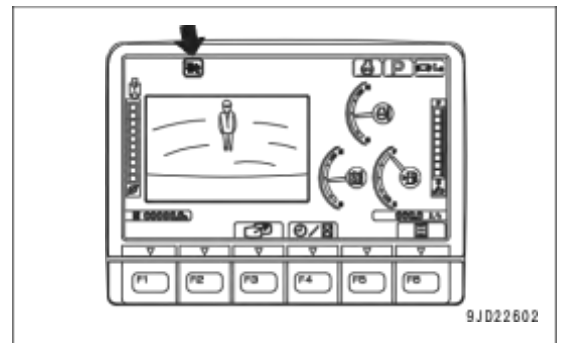
Procedures to stop the regeneration

1. When aftertreatment device regeneration display (1) is lit on the standard screen, push F6 on the standard screen to open the “Aftertreatment Devices Regeneration” screen.



2. With regeneration disable highlighted, push function switch F6 to disable regeneration.

It may be impossible to disable regeneration during regeneration.



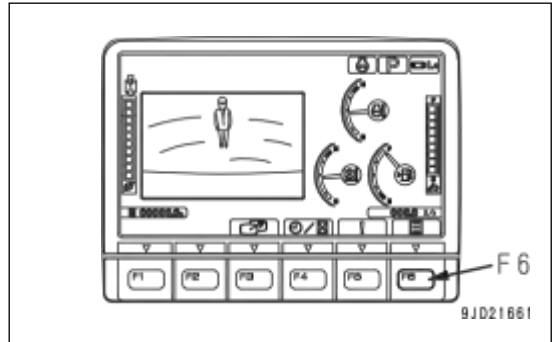
PROCEDURE FOR CANCELING REGENERATION DISABLE

CAUTION

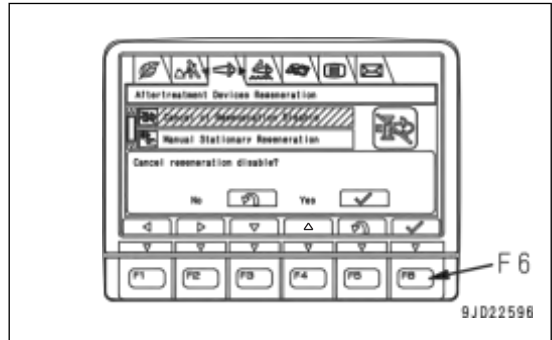
Before you start regeneration again, move the machine to a safe area first.

1. Set the lock lever to the lock position and the fuel control dial to the low idle position.

- Push F6 on the normal screen, to open the “Aftertreatment Devices Regeneration” screen.
If this screen does not show, push F1 and F2 to toggle to this screen.



- Select Yes to cancel regeneration disable and push F6.



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 °C.

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.

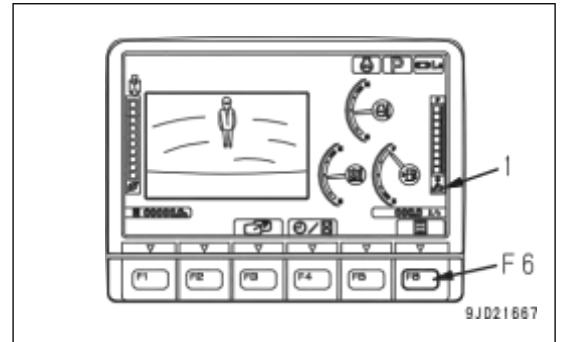
If operation is continued further without adding DEF at Severe Inducement, engine speed will be fixed at low idle. (Final Inducement)

The content of the warning can be checked on the “SCR Information” screen of the user menu.

Perform the following procedure.

Press F6 on the standard screen to display the “SCR Information” screen of the user menu.

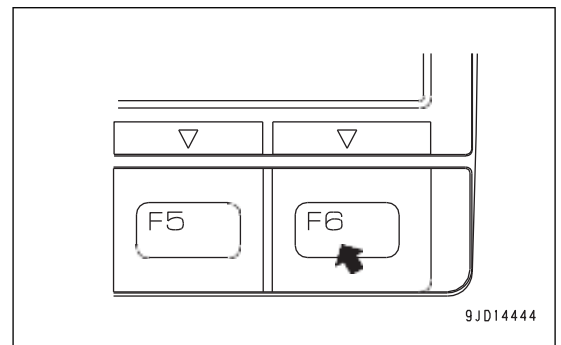
If either the lock lever is set to LOCK position or the travel lever and control levers are in NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



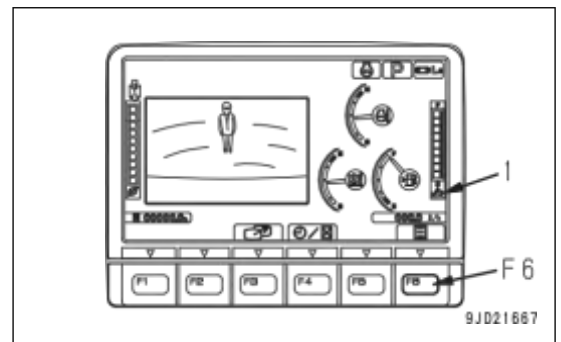
“SCR Information” screen displays the DEF level caution lamp (1), the DEF level gauge (2), information on the Urea SCR System condition (3), and the current status of Inducement (4).

If Inducement starts, stop the machine in a safe place and add DEF.

Once the audible alert starts, “The buzzer cancel switch” does not work unless DEF is added.



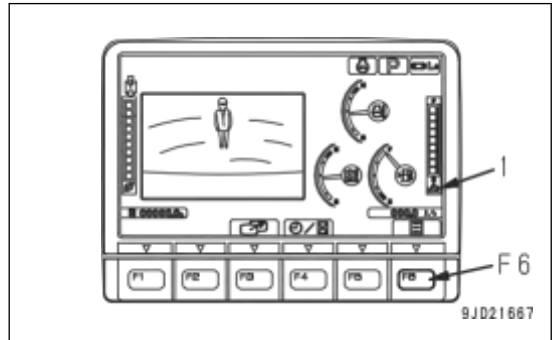
- Warning:
 - 2 gradations of the DEF level gauge light up in the red range.
 - The DEF level caution lamp (1) lights up in red.
 - No audible alert.
 - No Action level is displayed.
 - Press F6 to display the “SCR Information” screen.



Inducement status (4): "1 DEF low level warning appears."
Add DEF to the DEF tank immediately.



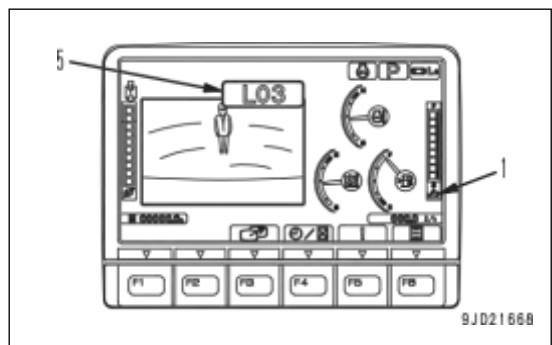
- Escalated Warning:
The audible alert sounds in repetition of "three beeps and a pause".
2 gradations of the DEF level gauge light up in the red range.
DEF level caution lamp (1) lights up in red.
No Action level is displayed.
Press F6 to display the "SCR Information" screen.



Inducement status (4): "2 Without treatment, engine power will be derated."
Add DEF to the DEF tank immediately.



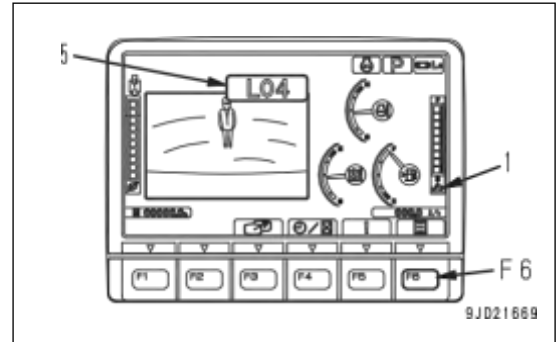
- Mild Inducement:
The audible alert sounds in short and sharp beeps.
1 gradation of the DEF level gauge light up in red.
The DEF level caution lamp (1) lights up in red.
Action Level "L03" is displayed in red (5).
Press F6 to display the "SCR Information" screen.



Inducement status (4): "3 Engine power is under deration."
Add DEF to the DEF tank immediately.



- Severe Inducement:**
 The audible alert sounds in continuous beep.
 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 F6 to display the "SCR Information" screen.
 When all gradations of the DEF level gauge go off, DEF re-filling amount is approximately 12.6 ℓ to fill up the DEF tank.



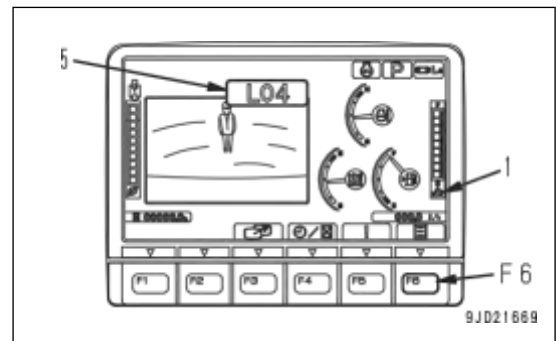
Inducement status (4): "4 Engine power is under heavy deration."

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 beep.
 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 F6 to display the "SCR Information" screen.



Inducement status (4): "5 Engine is running at low idle."

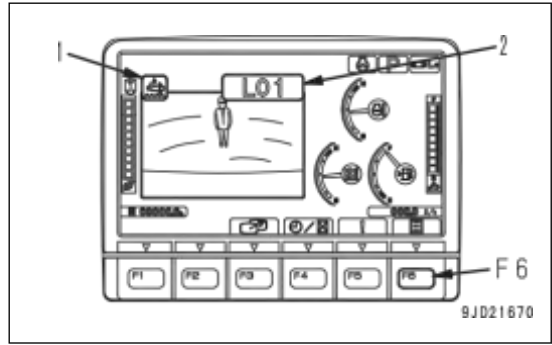
Engine speed is fixed at low idle to disable practical machine operation.
 Add DEF to the DEF tank immediately.
 In case the system does not come out of Inducement even if DEF is added in the tank, contact your Komatsu Distributor.



INDUCEMENT STRATEGY WHEN ABNORMALITIES ARE DETECTED IN THE UREA SCR SYSTEM DEVICES

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 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.

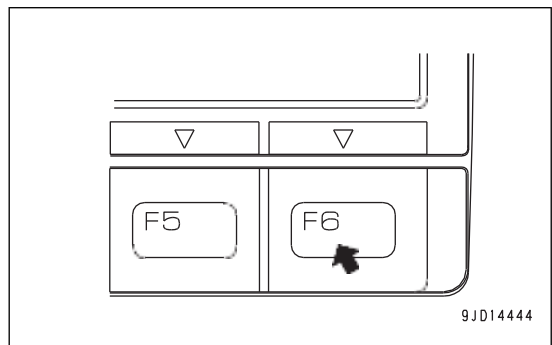


The content of the warning can be checked on the "SCR Information" screen of the user menu.

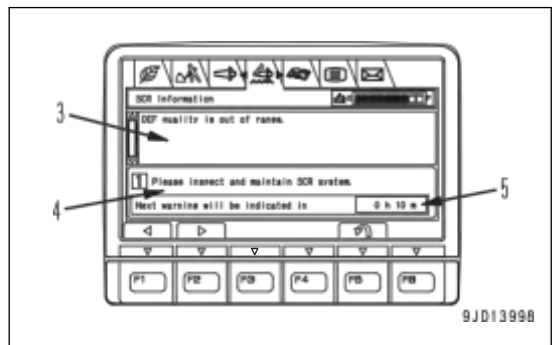
Perform the following procedure.

Press F6 on the standard screen to display the "SCR Information" screen of the user menu.

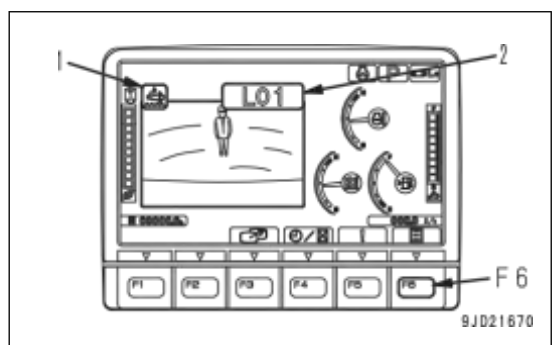
If either the parking brake lever and work equipment lock lever are set to LOCK position or the joystick (steering, directional and gear shift lever) is in NEUTRAL position for over 3 seconds, "SCR Information" screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



"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 2 seconds and goes out.
Press F6 to display the "SCR Information" screen.



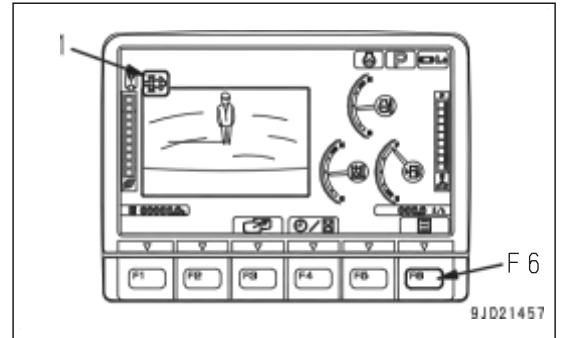
“SCR Information” screen message (4): “1 Please inspect and maintain SCR system.”

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 repetition of “three beeps and a pause”.
 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 F6 to display the “SCR Information” screen.



“SCR Information” screen message (4): “2 Without treatment, engine power will be derated.”

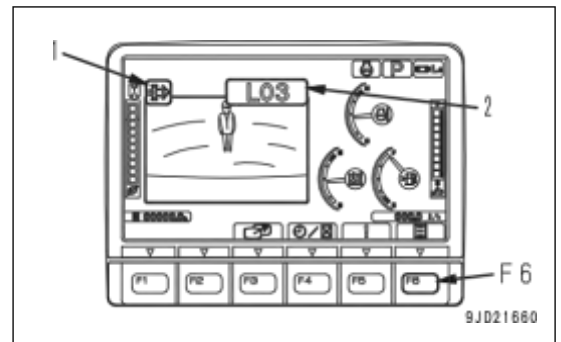
Move the machine to the safe place and contact your Komatsu Distributor.

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 short and sharp beeps.
 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 F6 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.

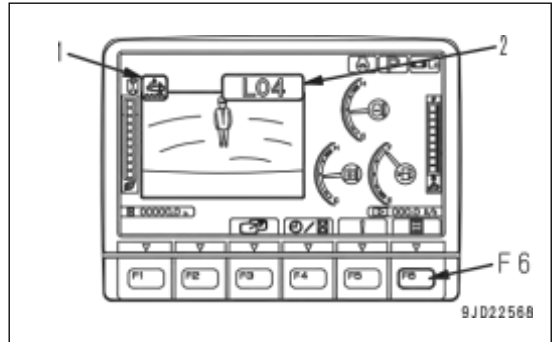
Move the machine to the safe place and contact your Komatsu Distributor.

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 beep.
The DEF system caution lamp (1) lights up in red.
Action level "L04" lights up in red (2).
Press F6 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.

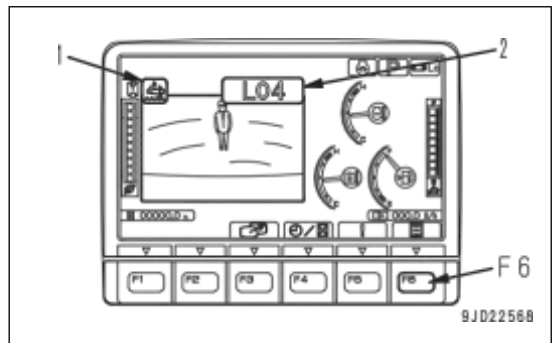
The duration of "Severe Inducement" is 1 hour. The remaining time (Minutes) to "Final Inducement" is displayed in the column (5) of the "SCR Information" screen.

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 beep.
The DEF system caution lamp (1) lights up in red.
Action level "L04" lights up in red (2) and stays on.
Press F6 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.



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.

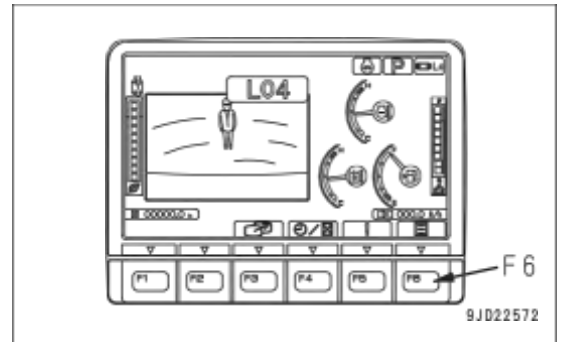
“Temporary Restoration from Inducement” can be activated only when the Urea SCR system is in “Severe Inducement”. The maximum duration is limited to 30 minutes in each restoration operation, and 3 operations are allowed, but “Temporary Restoration from Inducement” is turned off whenever the system advances 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 F6 to display the “SCR Information” screen when the Standard screen is on, only when the Urea SCR system is in “Severe Inducement”.



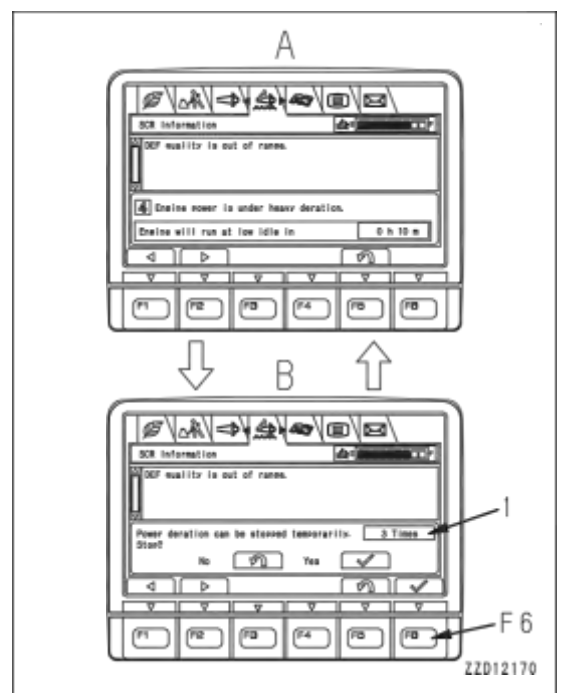
2. Press F6 to display the menu windows popping up in the bottom half of the “SCR Information”.

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.



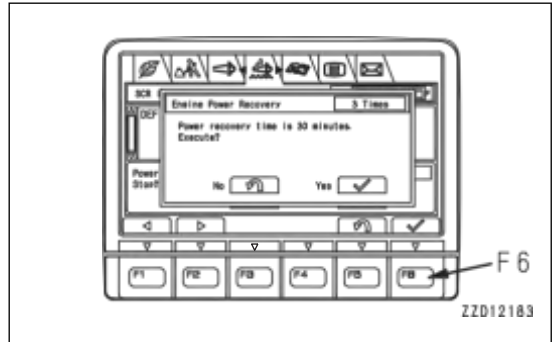
3. Press F6 while the pop-up menu screen B is displayed.

The “Engine power Recovery” window will be displayed. If F6 is not pressed for 30 seconds, “ Standard Screen” will be displayed, and start again by pressing F6. The remaining number of operations of Temporary Restoration from inducement is displayed in the column (1) of the pop-up menu window B.



- 4. Press F6 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 (2) on the “SCR Information” screen.

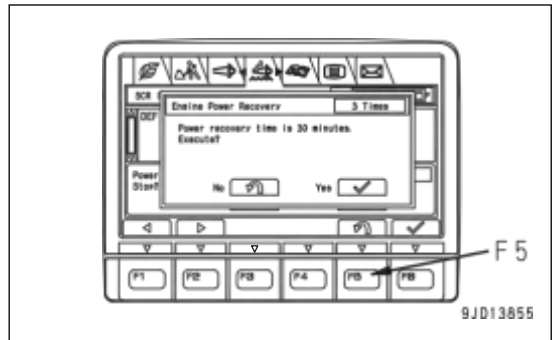


If it is decided NOT to activate “Temporary Restoration from Inducement” after having progressed to the “Engine Power Recovery” window, follow the steps explained in this section.

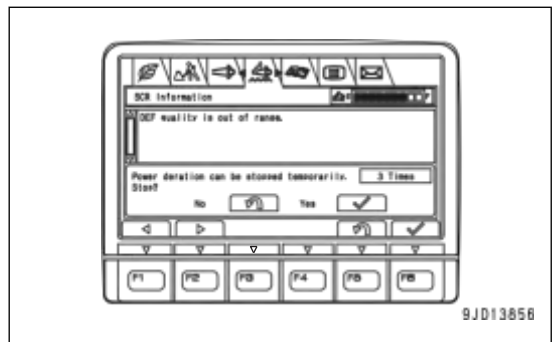
To deactivate “Temporary Restoration from Inducement” function.

- 1. Press F5 while the “Engine Power Recovery” window is displayed.

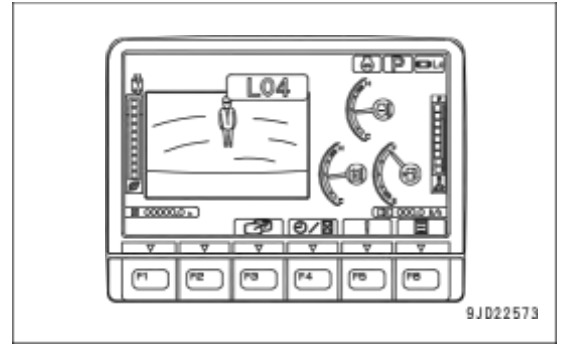
This procedure is split from procedure 4 in “Temporary Restoration from Inducement”.



“SCR Information” screen is displayed.



2. Move any operating lever to display "Standard Screen" is displayed.
"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.

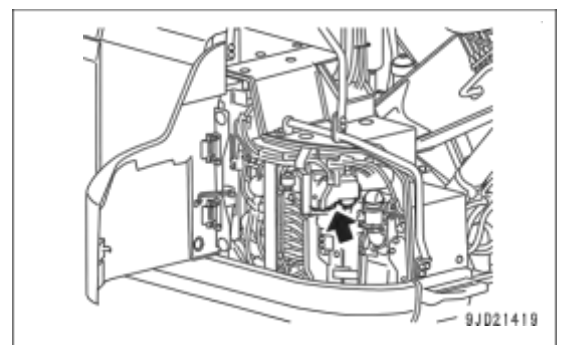
To activate "Temporary Restoration from Inducement", refer to the "Temporary Restoration from Inducement" section in this manual.

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 (4-71)".
- 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 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 key in the starting switch of the KOMTRAX system is at OFF position, a small amount of electric power is consumed.
It is recommended to run the engine periodically to charge the battery. When storing the machine for a long period, see "PRECAUTIONS FOR LONG-TERM STORAGE (3-232)".
- 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 is possible to prevent power consumption of the battery, but the functions of KOMTRAX stop at the same time.
For operation of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-110)".
- 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 starting the engine, walk around the machine and look at the underside of chassis for anything unusual like loose bolts and nuts, leakage of fuel, oil and coolant. Also check the condition of the work equipment and the hydraulic system.

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

WARNING

Any combustible materials accumulated around the exhaust pipe, aftertreatment devices, turbocharger, or other high temperature engine parts or the battery, and leakage of fuel or oil will cause the machine to catch fire.

Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.

Always perform the following inspections and cleaning every day before starting 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 any problem is found, repair it.
2. Remove dirt and debris from around the engine, battery, and radiator.
Check for dirt accumulated around the engine and radiator. Also check for combustible material (dry leaves, twigs, etc.) around the battery, exhaust pipe, aftertreatment devices, turbocharger, or other high temperature engine parts. If any dirt or combustible materials are found, remove them.
For removal of dirt from the radiator, see "METHOD FOR CHECKING AND CLEANING RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS (4-53)".
3. Check around the engine for coolant and oil leakage.
Check for oil leakage from the engine and coolant leakage from the cooling system. If any 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 any problem is found, repair it.
5. Remove dirt and check DEF line for leakage.
Check for dirt accumulated around the DEF tank and clean blue DEF tank filler cap and surrounding area. Check DEF tank, pump, injector, and hoses and their connections for leakage. If any problem is found, ask your Komatsu distributor for repair.
6. Check the hydraulic equipment, hydraulic tank, hoses, and joints for oil leakage.
Check for oil leakage. If any problem is found, repair the place where the oil is leaking.
7. Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers.
If any problem is found, repair it.
8. Check the handrails and steps for problems and check the bolts for looseness.
If any problem is found, repair it. Tighten any loose bolts.
9. Check the gauges and monitor for problem.
Check for problem in the gauges and monitor in the operator's cab. If any problem is found, replace the part. Clean off any dirt on the surface.

REMARK

When cleaning the stains deposited on the monitor surface such as dusts, brush them 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.

- 10. Check and clean the rearview mirrors.

Check for damage to the rear view mirror. If it is damaged, repair it. Clean the surfaces of the mirrors and adjust the angle so that the area at the rear can be seen from the operator's seat.

- 11. Check the windows for coming off and breakage.

Check the windows for coming off and breakage. If any of them is broken, repair it. If any window comes off or be broken during operation, do not continue the operation but repair the window immediately.

- 12. Check the seat belt and mounting hardware.

Check the seat belt and mounting hardware for any abnormality. If any damage is found, ask your Komatsu distributor to replace it with new one.

- 13. Check the bucket with hook (if equipped) for damage.

Check for damage to the hook, guide, and hook mount. If any problem is found, ask your Komatsu distributor for repair.

- 14. Check and clean the camera

Check the camera for any abnormality. If any problem is found, ask your Komatsu distributor for repair.

- 15. Removal dirt from around the aftertreatment devices.

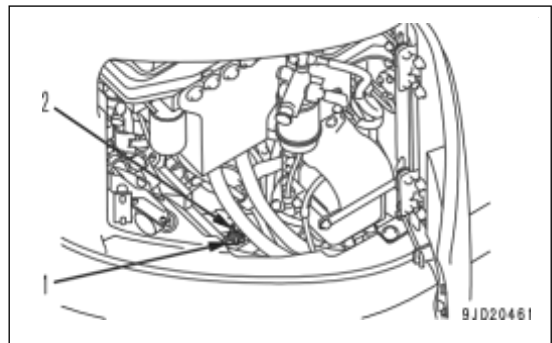
Check for dirt and combustible materials (dry leaves, twigs, etc.) accumulated around the aftertreatment devices. If any dirt or combustible materials are found, remove them.

METHOD FOR CHECKING BEFORE STARTING

Always check the items in this section before starting the engine each day.

METHOD FOR DRAINING WATER AND SEDIMENT FROM FUEL TANK

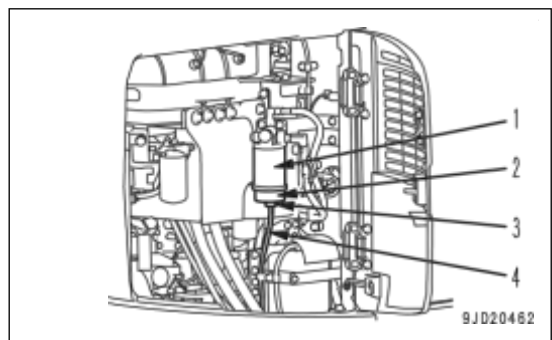
1. Open the fuel filter inspection cover on the right side of the machine.
2. Prepare a container under drain hose (1) to receive fuel.
3. Turn drain valve (2) to OPEN position to drain all the sediment and water accumulated at the bottom together with fuel to the container to receive.
4. When only the clean fuel flows out, turn drain valve (2) to CLOSE position.
5. Close the fuel filter inspection cover on the right side of the machine.



METHOD FOR CHECKING WATER SEPARATOR, DRAINING WATER AND SEDIMENT

1. Open the fuel filter inspection cover on the right side of the machine.
2. Check for water and sediment.

The water separator forms one unit with fuel prefilter (1). It is possible to judge the water level and amount of sediment by looking through transparent cup (2). If there is water or sediment accumulated, drain it according to steps 3 to 5.



NOTICE

If the water inside transparent cup (2) freezes, wait until the frozen water has melted completely, then follow the procedure to drain the water.

REMARK

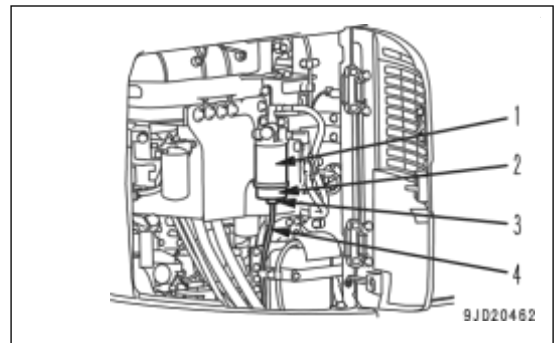
- If transparent cup (2) is dirty or it is difficult to see the inside, clean transparent cup (2) when replacing fuel prefilter cartridge (1).
- When the drain valve (3) has been removed during the cleaning operation, coat O-ring with grease and tighten until it contacts the bottom.

3. Put a container to receive the water under drain hose (4).
4. Loosen the drain valve (3) and drain the water.
5. When fuel starts to drain from drain hose (4), tighten drain valve (3) immediately.
6. Close the fuel filter inspection cover on the right side of the machine.

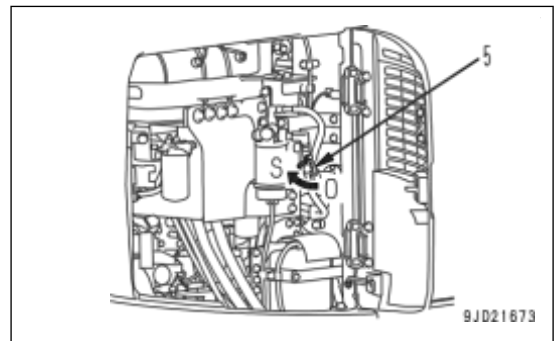
METHOD FOR ADJUSTING DRAIN VALVE

If drain valve (3) is stiff, coat O-ring of the drain valve with grease to make the movement smooth.

1. Open the fuel filter inspection cover on the right side of the machine.



2. Set valve (5) to CLOSE position (S).
3. Place a container under the fuel prefilter cartridge to receive the fuel.
4. Loosen the drain valve (3) and drain water and sediments from transparent cup (2), and also drain all the fuel from fuel prefilter cartridge (1).
5. Check that nothing more comes out from drain hose (4), then remove drain valve (3).

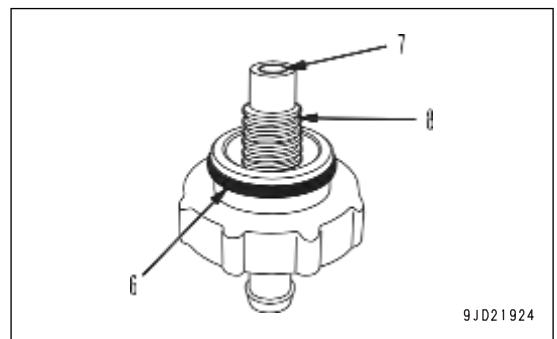


6. Apply a suitable amount of grease to O-ring (6).

REMARK

When applying grease, be careful not to allow the grease to adhere to the drain port (7) and the threaded portion (8) of the drain valve.

7. Tighten the drain valve (3) by hand until it contacts the bottom of transparent cup (2).
8. Remove the container for catching the drained fuel.
9. Turn valve (5) to OPEN position (O).

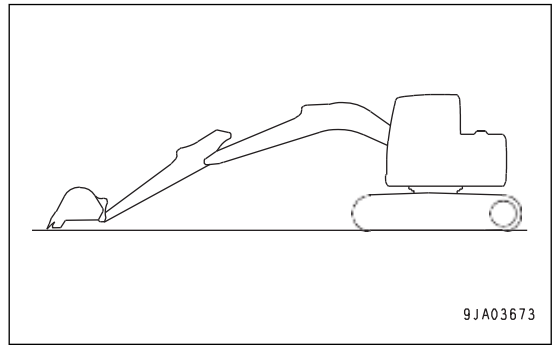


METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL

 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.

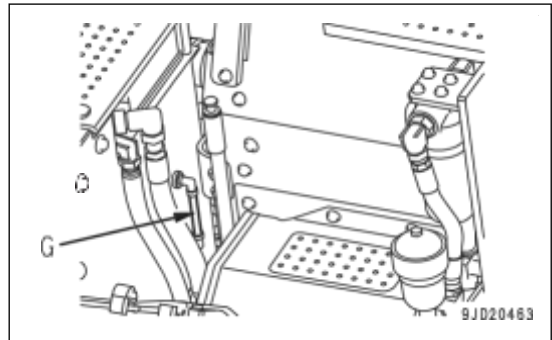
1. Set the machine in the posture shown in the figure.
If the machine is not set as shown in the figure, set it according to the following procedure.
 - 1) Start the engine, and run it at low speed.
 - 2) Retract the cylinder rod for arm and bucket to the end.
 - 3) Lower the boom and lower the bucket tooth to the ground.
 - 4) Stop the engine.



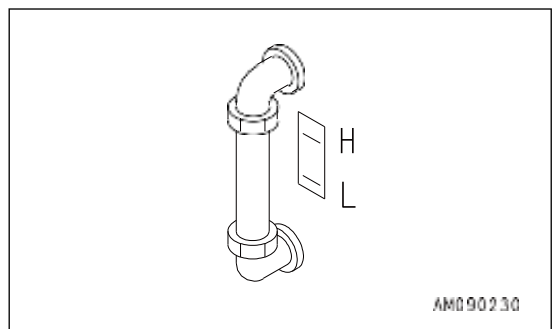
2. Turn the starting switch key to ON position within 15 seconds after stopping the engine, and move each control lever (for work equipment and travel) to the full stroke in all directions.
The internal pressure is released by this operation.

3. Stop the engine.

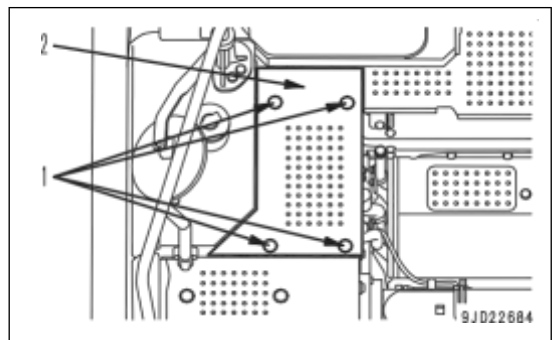
4. Check the sight gauge (G) on the left side of the hydraulic tank from inside the operator cab.
When the oil level is between the lines H and L, it is appropriate.



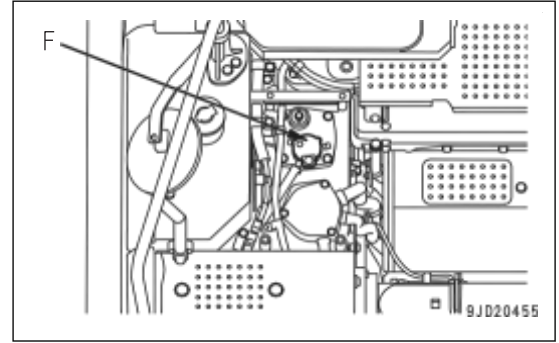
If the oil level is below level L, the hydraulic oil is insufficient. Perform the following procedure.



5. Remove the bolts (1) (4 pieces), and remove the hydraulic tank top cover (2).



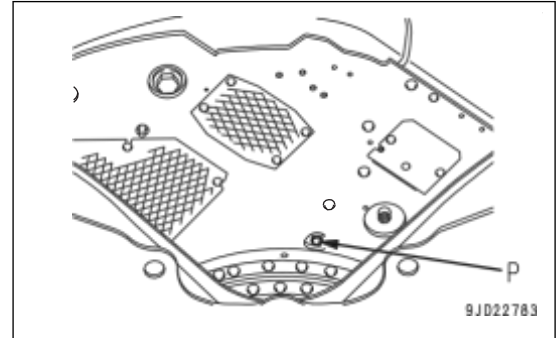
6. Add oil through oil filler port (F) of the hydraulic tank until the oil level comes between levels H and L of sight gauge (G).



NOTICE

Do not add oil above H line. It may damage the oil circuit and cause the oil to spurt out.

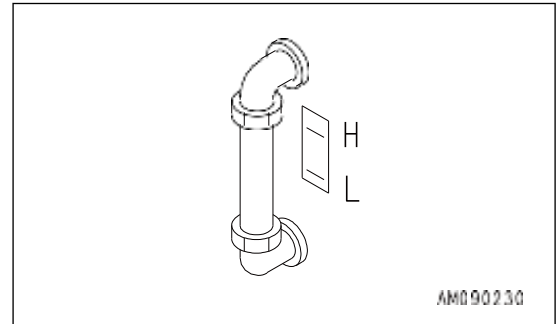
If oil has been refilled exceeding H level, swing the upper structure until drain plug (P) beneath the hydraulic tank comes between the right and left tracks. Stop the engine. After the hydraulic oil has been cooled down, remove cover (1) and drain the excess oil through drain plug (P) to the container for receiving the oil.



REMARK

The oil level varies with the oil temperature. Use the following as a guide for check.

- Before starting operation: Between H and L levels (Oil temperature 10 to 30 °C)
- Normal operation: Around H Level (Oil temperature 50 to 80 °C)



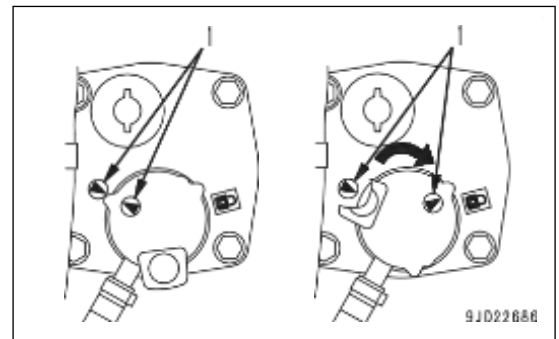
METHOD FOR INSTALLING HYDRAULIC TANK OIL FILLER CAP

CAUTION

If the oil filler cap is inserted in reverse, it only rotates by approximately 1/4 turns and cannot be locked.

Install the oil filler cap according to the following procedure.

1. Match the ▲ marks (1) on both of the oil filler cap and the tank, and insert it.
2. Rotate the oil filler cap clockwise, and lock it with the key. The ▲ mark (1) on the oil filler cap matches with the key mark on the tank.



METHOD FOR CHECKING COOLANT LEVEL, ADDING COOLANT

WARNING

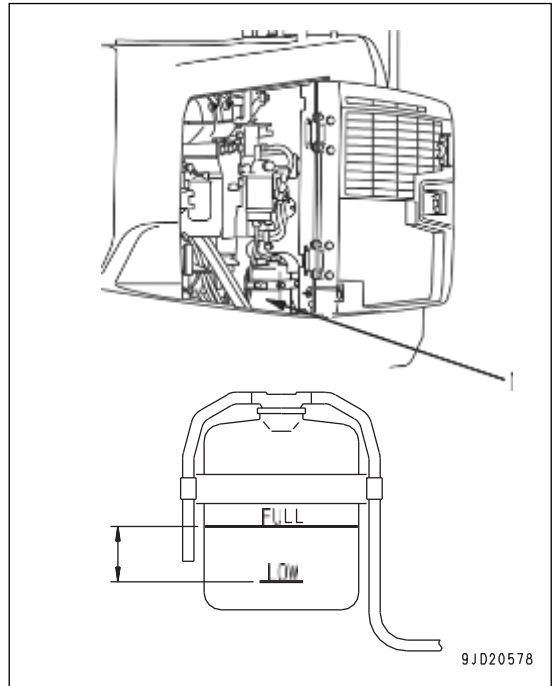
- Do not open the radiator cap unless necessary. When checking the coolant level, check it with the reservoir tank when the engine is cold.
- Immediately after the engine is stopped, the coolant is still hot and the pressure is accumulated in the radiator. If the cap is removed in this condition, it is dangerous that you may get burn injury. Always wait for the temperature to go down, turn the cap slowly to release the pressure, then remove the cap with care.

1. Open the fuel filter inspection cover on the right side of the machine.
2. Check the reservoir tank (1).
If the coolant level is within the range between FULL and LOW, the coolant amount is at a proper level.
3. If the coolant level is below LOW, add coolant to FULL level through the filler port of reservoir tank (1).

NOTICE

If reservoir tank (1) is empty, leakage of coolant should be suspected. After checking, repair any abnormality immediately. If no abnormality is found, check the level of the coolant in the radiator. If it is low, add coolant of the same density in radiator according to the coolant density table in "METHOD FOR CLEANING INSIDE OF COOLING SYSTEM (4-18)", then add coolant to reservoir tank (1).

4. Tighten the cap securely after the refilling.
5. Close the fuel filter inspection cover.



METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL

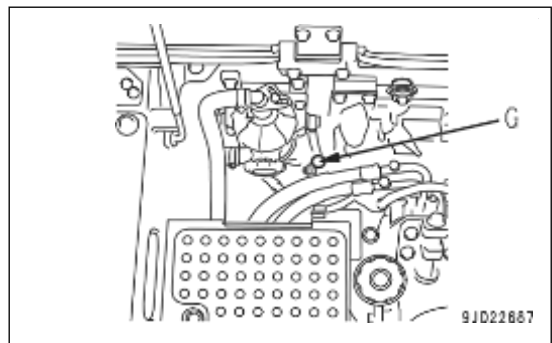
WARNING

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.

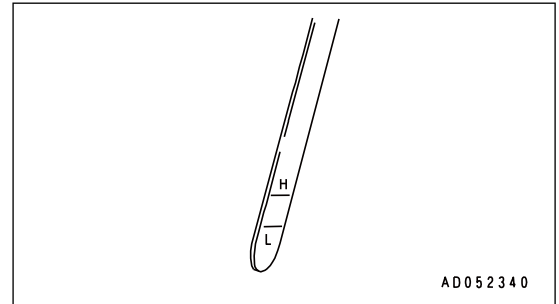
When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine.

If the machine is inclining, make it level before checking.

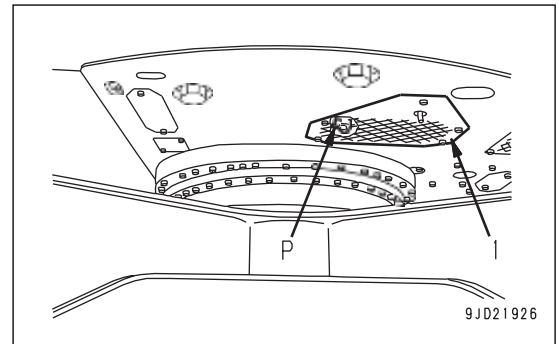
1. Open the engine hood.
2. Pull out dipstick (G) and wipe the oil off with a cloth.
3. Fully insert dipstick (G) into the dipstick pipe, then remove it.



4. Check if the oil is sticking up to between marks H and L on dipstick (G).
It is appropriate if the oil level is between marks H and L.
5. If the oil level is below the L mark, add oil through oil filler port (F).
6. If the oil level is higher than H, decrease it to a proper level according to the following procedure.
 - 1) Remove the undercover (1).
 - 2) Place a container under drain plug (P) at the bottom of the engine oil pan to receive the oil.
 - 3) Drain excess engine oil through drain plug (P).
 - 4) Check the oil level again.
7. If the oil level is proper, tighten the oil filler cap securely.
8. Close the engine hood.



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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 make the repair.
- Keep the top surface of the battery clean and check the breather hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap to clear the breather hole.

NOTICE

Perform inspection for the piping of “battery”, “starting motor”, and “alternator” with particular care.

- 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.
- 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

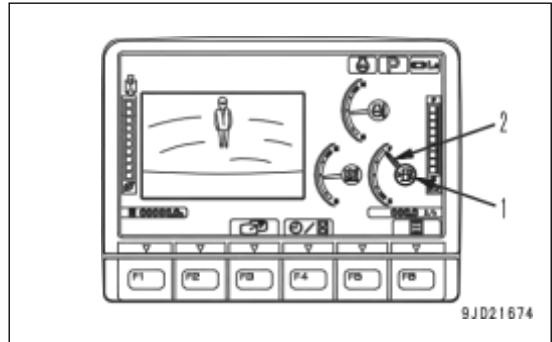
When adding fuel, never spill the fuel or let it overflow. This may cause fire.

If any fuel has spilled, wipe it up completely. If fuel has spilled over soil or sand, remove that soil or sand.

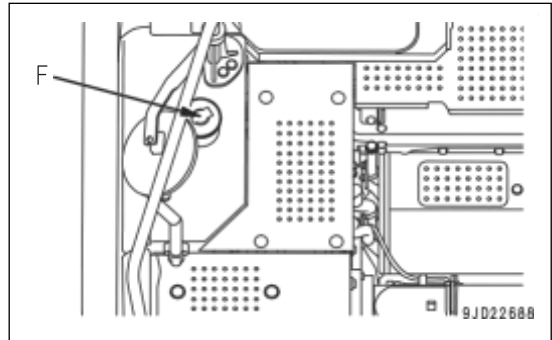
Fuel is highly flammable and dangerous. Never bring any open flame near fuel.

1. Turn the starting switch to ON position.

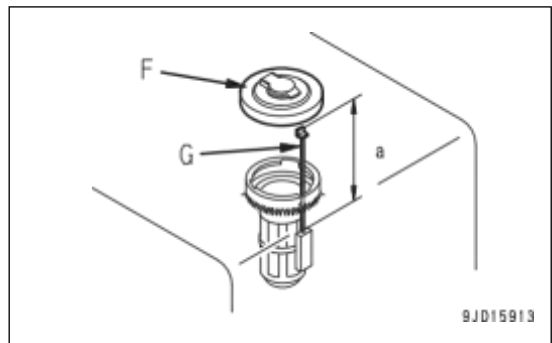
2. When the fuel level caution lamp lights up in red, check the fuel level with fuel level gauge (1) on the machine monitor.
When the fuel gauge pointer (2) reads the red range, the fuel amount is 52 ℓ or less.
The fuel level is low. Add fuel.
3. After checking, turn the starting switch back to OFF position.



4. Open fuel filler cap (F) of the fuel tank.



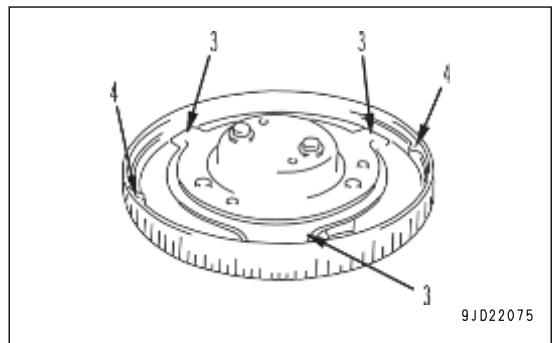
5. Add fuel through the fuel filler port until float gauge (G) rises to the maximum position.
Fuel tank capacity: 200 ℓ
Position (a) of tip of float gauge (G) when fuel tank is full:
Approximately 130 mm above top of fuel tank



6. After adding fuel, push float gauge (G) straight down with fuel filler cap (F). Be careful not to get float gauge (G) caught in the tab (3) of fuel filler cap, and tighten fuel filler cap (F) securely.

REMARK

If breather hole (4) in the cap is clogged, the pressure inside the tank will go down and this may cause the fuel to stop flowing. To prevent this, clean the breather hole from time to time.



METHOD FOR ADDING FUEL WITH REFUELLING PUMP

(If equipped)

WARNING

When adding fuel, never spill the fuel or let it overflow. The fuel may cause fire. If any fuel has spilled, wipe it up completely. If fuel has spilled over soil or sand, remove that soil or sand. Fuel is highly flammable and dangerous. Never bring any open flame near fuel.

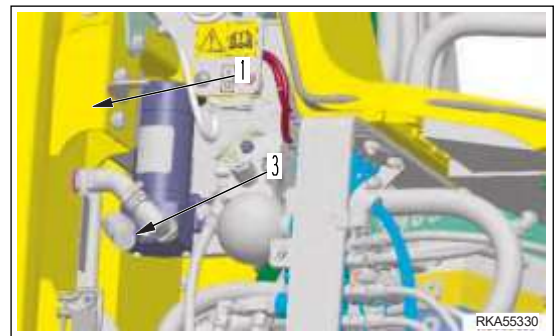
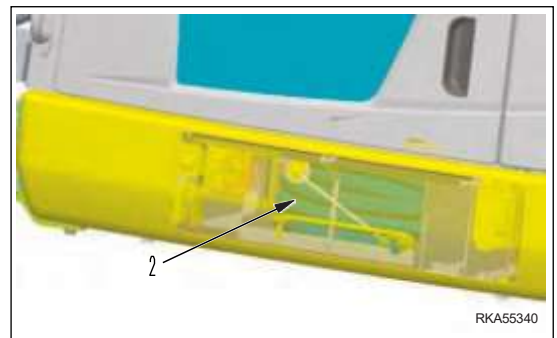
CAUTION

- Never leave the machine unattended during the refilling and check.
- After each overflow or fuel leaks, check the machine to detect that there are no fuel traces next to the electrical or high temperature components.
- Do not dry up the refilling pump. Monitor the fuel level during refilling, in order to avoid pump dry up.
- Check that the filter placed at the end of the pipe is clean.
- In case of malfunction of the refilling automatic stop system, consult the Komatsu local Distributor and do not use the system until the problem is solved.

When the machine is operate on sites without fuel tank and pump, the machine can be refuelled by the refilling pump with fuel barrels. The refuelling pump is placed inside the right hand door (1).

The refuelling hose (2) is stored under the operator cabin.

1. Take the hose (2) and connect it to the refuel pump using the quick release connectors (3).
2. Ensure that the foot valve is open, and place the free end of the refuelling hose into the fuel barrel. Remove the cap from the fuel tank.



3. Refuel switch bracket (4) is located on the right hand side pump compartment. Switch ON the master switch of the refuel system (5) on the refuel switch box. To start refuelling press switch (6) once. Refuelling will continue automatically until the tank has reached capacity (float switch (7) will reach its limit and the pump will stop). It is important to ensure the machine is parked on level ground and monitor refuelling to avoid fuel overflow or spillage.

Refuelling can be stopped at any time by turning off the master switch (5).

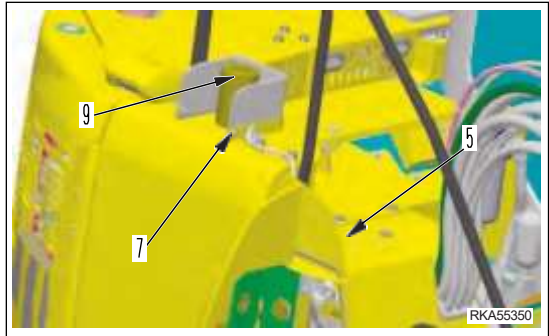
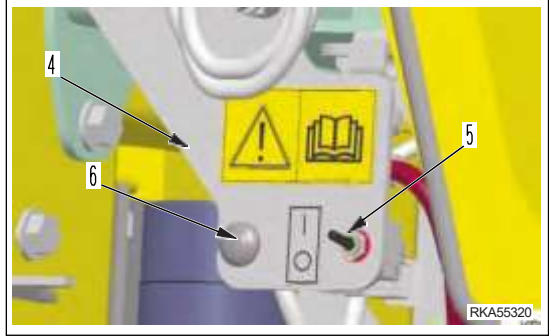
****NO SIGNAL****

If more fuel is needed in the fuel tank after the float switch has stopped the pump, press and hold switch (6).

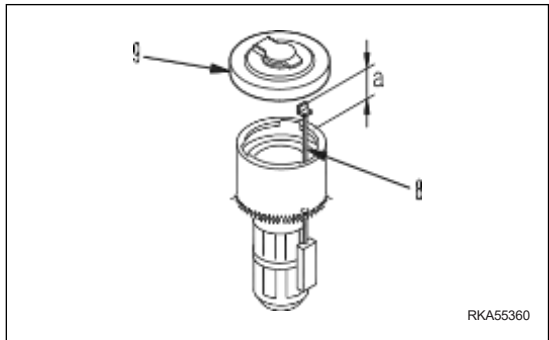
When switch (6) is pressed and held, the refuel pump will fill the tank. Releasing switch (6) will stop the refuel pump in this override condition.

When using this override, the level of the tank must be monitored to prevent overfilling and fuel spillage. If fuel is allowed to overflow stop refuelling immediately by turning off the master switch.

After finishing refuelling make sure the master switch (5) is returned to the OFF position.



- 4. Push float gauge (8) straight down with fuel filler cap (9), be careful not to get the float gauge (8) caught in the tab of the fuel filler cap (9) and tighten fuel filler cap (9) securely.

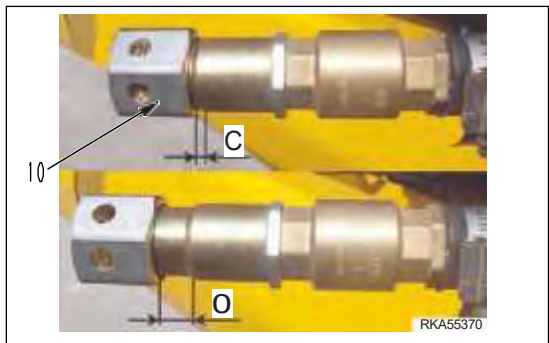


- 5. Tighten strainer valve cap (H) to the closed position to prevent leakage of fuel left in the hose.

(O): Open position

(C): Closed position

- 6. Replace the fuel hose into storage tray.



METHOD FOR CHECKING DEF LEVEL, ADDING DEF

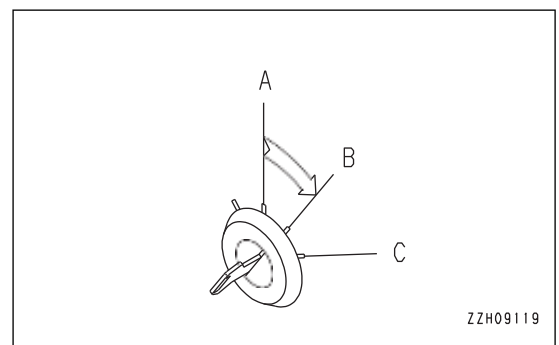
WARNING

- 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 wiped and cleaned, it can cause corrosion to the contaminated area and emit toxic gas.

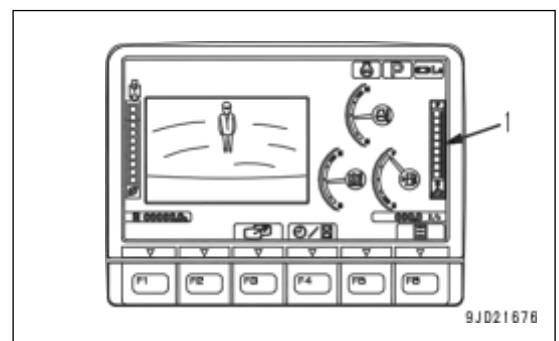
NOTICE

- Do not add DEF more than line F of sight gauge (3). DEF may leak through the breather. When the ambient temperature is low and DEF may freeze, do not add it more than line (8) of sight gauge (3).
Be careful of the remaining DEF level 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.

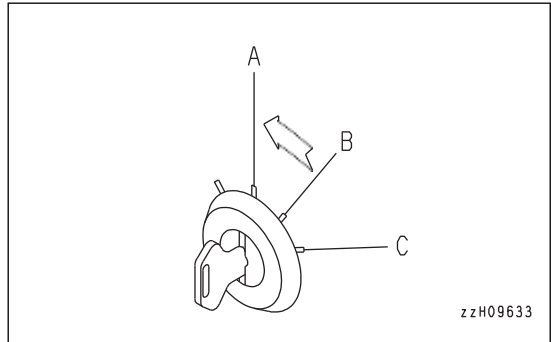
1. Turn the starting switch to ON position (B).



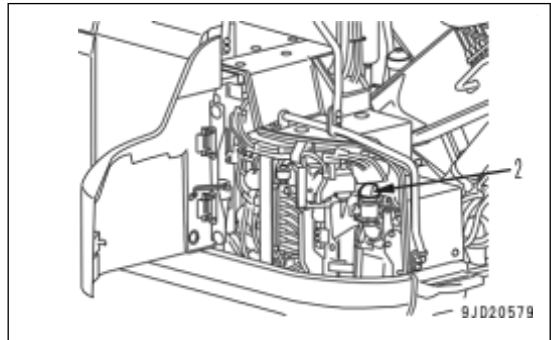
2. Check the DEF level gauge (1) on the machine monitor.



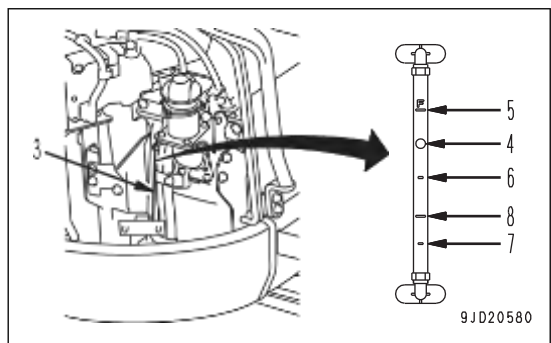
- 3. After checking, turn the starting switch back to OFF position (A).



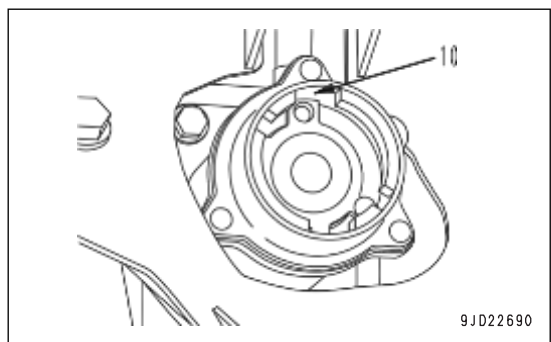
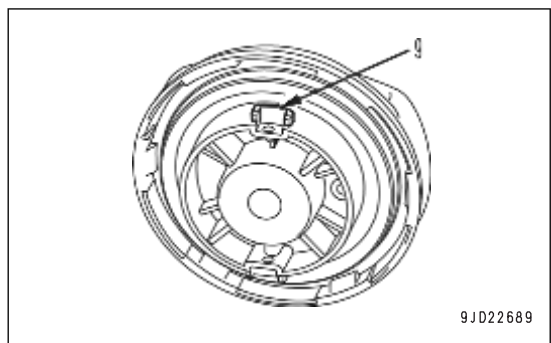
- 4. Open the machine right front cover, turn the filler cap (2) counterclockwise.
Open the filler cap.
The caps of DEF tanks are blue, as required by emission regulations.



- 5. By sight gauge (3), add DEF through the filler port until float (4) reaches line F (5).
Line (6) in the sight gauge indicates approximately 5 l below line F, and line (7) indicates approximately 10 l.
Line (8) is the max adding line when DEF may freeze in cold weather.

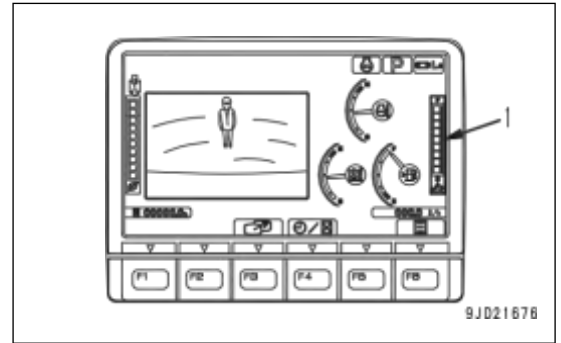


- 6. After adding, align claw (9) of the cap with groove (10) of the filler port and close the cap securely by turning it clockwise by 90 °.



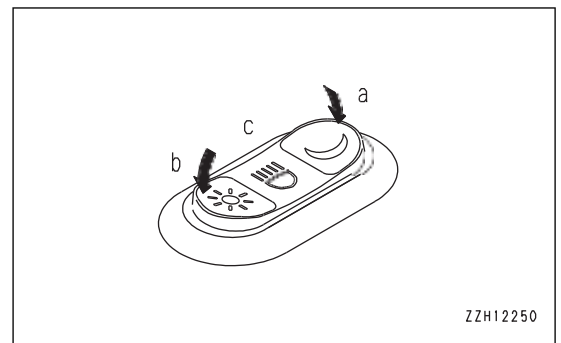
REMARK

- 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.
- When the key is turned to ON position soon after the DEF is added, the DEF level gauge (1) on the machine monitor may not follow promptly.

**METHOD FOR CHECKING WORKING LAMP**

Check that the working lamps and lamps inside the instruments light up properly. Check also that there is no dirt or damage.

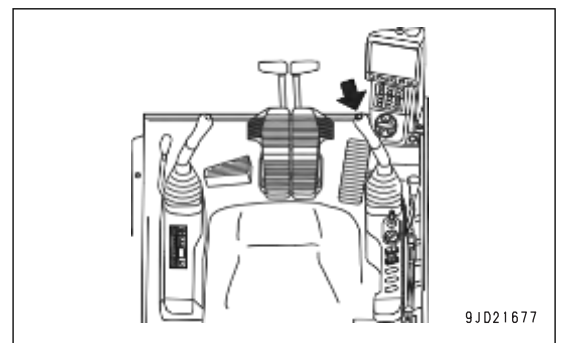
1. Turn the starting switch to ON position.
2. Check that the working lamp lights up properly when the lamp switch is at night mode (a) and at day mode (b).
3. After inspection, turn the lamp switch to OFF position (c), and the working lamp goes out.
4. After checking, turn the starting switch back to OFF position.



If the lamps do not light up, a broken bulb or disconnected wire are the possible causes. Ask your Komatsu distributor for repairs.

METHOD FOR CHECKING HORN

1. Turn the starting switch to ON position.
2. Check that the horn sounds immediately when the horn switch is pressed.
3. After checking, return the starting switch to OFF position.



If the horn does not sound, ask your Komatsu distributor for repair.

METHOD FOR ADJUSTING

METHOD FOR ADJUSTING OPERATOR'S SEAT

WARNING

When adjusting the position of the operator's seat, always set the lock lever to LOCK position to prevent any malfunction due to accidental contact with the control levers.

- Always adjust the operator's seat before starting each operation or when the operators change shift.
- Adjust the operator's seat so that control levers and switches can be operated freely and easily with the operator's back against the backrest.

METHOD FOR ADJUSTING SEAT IN FORE-AND-AFT DIRECTION

Pull up fore-aft adjustment lever (1), set the seat to the desired position, then release fore-aft adjustment lever (1).
Fore-and-aft adjustment: 50 mm (5 stages)



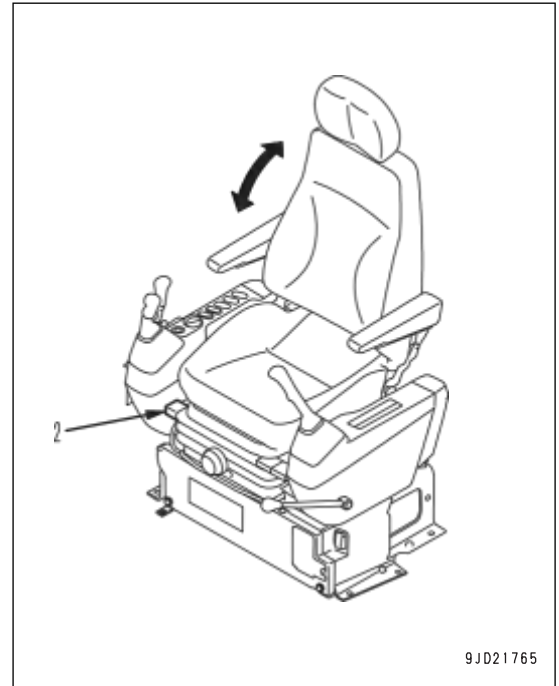
METHOD FOR RECLINING SEAT

The seat can be reclined more when the seat is pushed to the front. The amount of reclining decreases as the seat is pushed back, so when moving the seat back, return the backrest to the original position.

Pull up reclining adjustment lever (2) and set the seat back to a position which is comfortable for operation, then release reclining adjustment lever (2).

REMARK

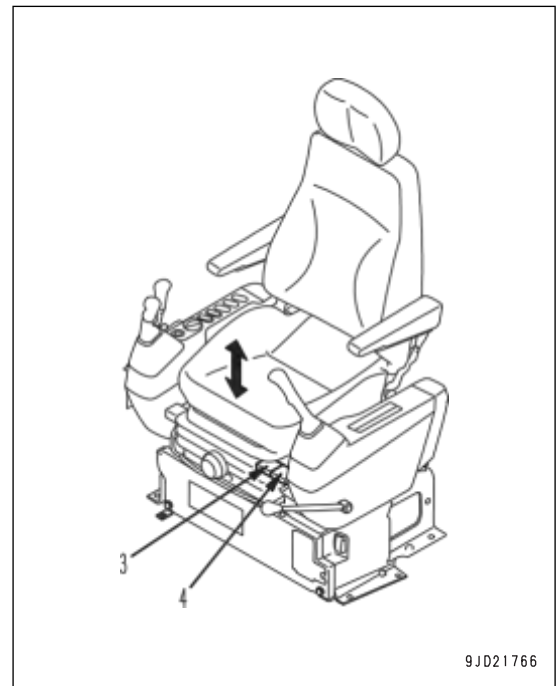
Sit with your back against the backrest when adjusting. If your back is not touching the backrest, it may suddenly move forward.



METHOD FOR TILTING SEAT

- Push down the tilt adjustment lever (3), and adjust the front angle of the seat.
 - To raise the front angle of the seat, apply your weight to the rear of the seat while pushing down the lever.
 - To lower the front angle of the seat, apply your weight to the front of the seat while pushing down the lever.
- Pull up the tilt adjustment lever (4) and adjust the rear angle of the seat.
 - To raise the rear of the seat, get up while pulling up the lever.
 - To lower the rear angle of the seat, apply your weight to the rear of the seat while pushing down the lever.

Tilt adjustment: Up 13 °, down 13 ° (4 levels)

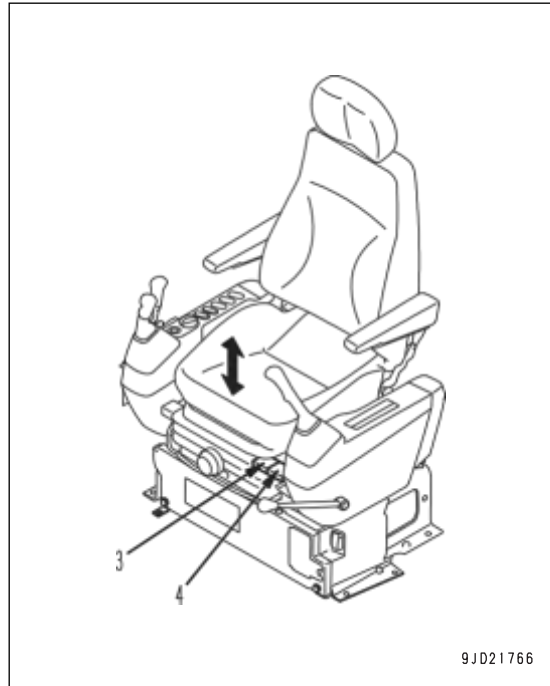


METHOD FOR ADJUSTING SEAT HEIGHT

You can adjust the seat height by combination of the front and rear seat angle adjustments.

1. Operate the tilt adjustment lever (4) upward or the tilt adjustment lever (3) downward, and set the seat tilt angle to the desired position.
2. Set the seat horizontally by the opposite inclination operation, and release the tilt adjustment lever.

Adjustment amount: 60 mm

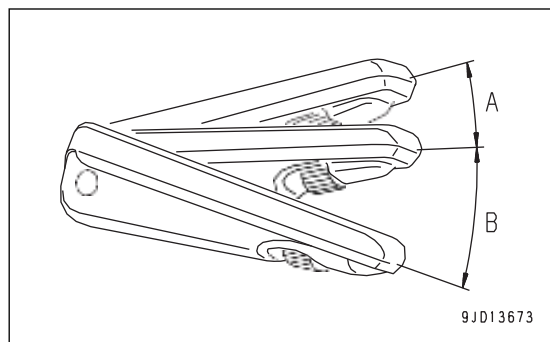
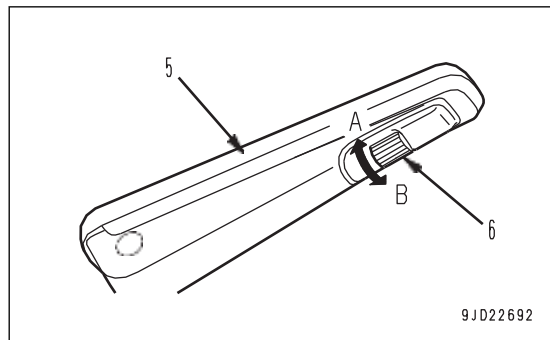


METHOD FOR ADJUSTING ARMREST ANGLE

- Raise and adjust armrest (5) to a position in the range of approximately 90°.
- Finely adjust the vertical angle of the armrest by turning adjustment dial (6) at the bottom of the armrest. If adjustment dial (6) is turned clockwise (counterclockwise), the armrest is raised (lowered).
- When it is raised or lowered to the maximum position, adjustment dial (6) cannot be turned any more. In such case, turn adjustment dial (6) counterclockwise (clockwise) when the armrest is at the maximum raised (lowered) position. Amount of angle adjustment: 25° ((A): 5°, (B): 20°)

REMARK

If the seat back is tipped to the front without raising armrest (5), armrest (5) rises automatically.



METHOD FOR ADJUSTING SEAT UNIT IN FORE-AND-AFT DIRECTION

Pull fore-aft adjustment lever (7) to the right, adjust the seat to the desired position, then release fore-aft adjustment lever (7). The operator's seat, right and left control levers, and lock lever all slide (move) together.

Fore-and-aft adjustment: 120 mm (12 stages)



METHOD FOR ADJUSTING SUSPENSION SEAT HARDNESS

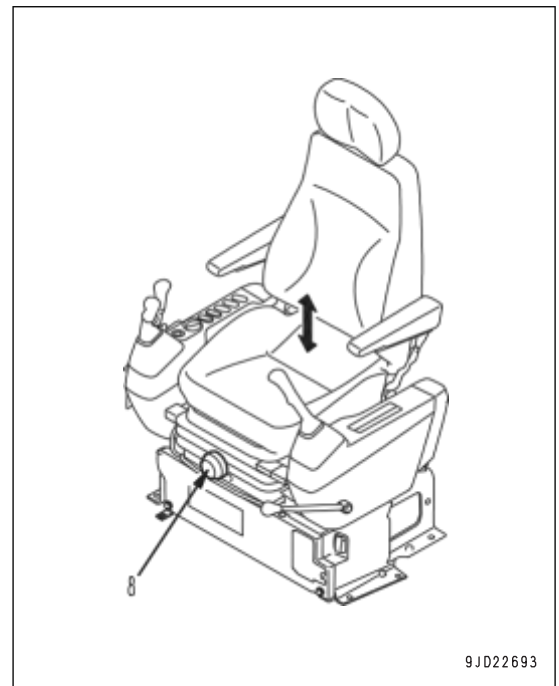
(for suspension seat)

The figures of weight is indicated on adjustment dial (8). Turn it so that the figure of your weight is at the top.

Adjustment range by the weight: 60 to 150 kg

To make the seat softer, turn the adjustment dial in the direction for lighter weight. To make the seat harder, turn the adjustment dial in the direction for heavier weight.

When traveling on rough road surfaces, make the seat harder in advance.



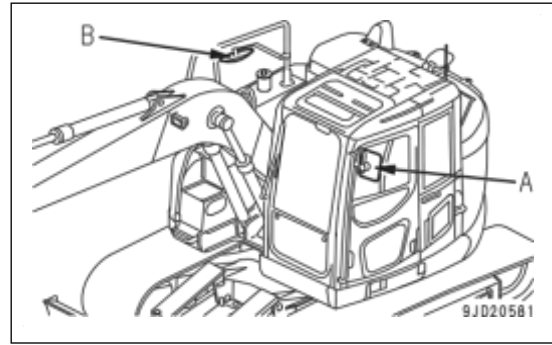
METHOD FOR ADJUSTING MIRRORS

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 serious personal injury or death.

Mirror (A): Machine L.H. front mirror

Mirror (B): Machine rear mirror



PROCEDURE FOR ADJUSTING MACHINE LEFT FRONT MIRROR (A)

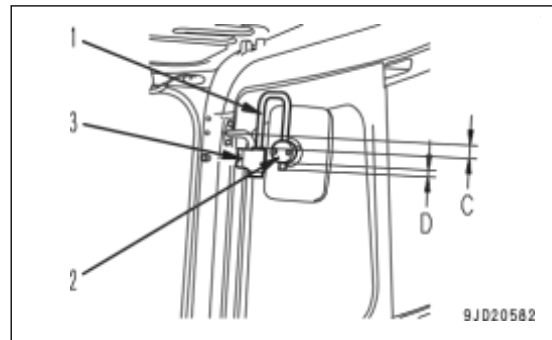
Adjust the mirror so that the operator can see a person at the rear left of the machine.

1. If the mirror is removed, install it to the position shown in the figure.

(C) : 35 mm

(D) : 15 mm

Fix the mirror securing stay (1) the way the side view mirror stretches outward to the maximum.

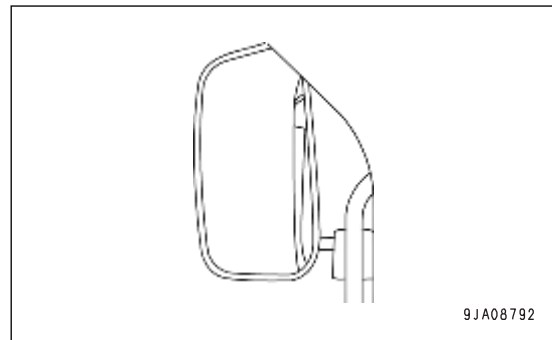


2. Adjust the mirror so that the side of the machine is reflected in the mirror as shown in the figure.

If the mirror does not move smoothly when adjusting it, loosen mirror fixing bolt (2) and stay mounting bolt (3).

Tightening torque of bolt (2): 5.98 to 6.96 Nm

3. Check that you can see a person at the rear left end of the machine.



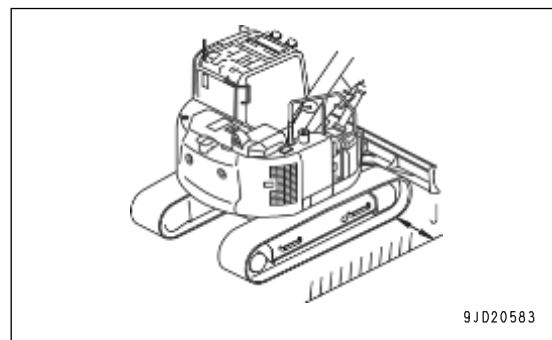
PROCEDURE FOR ADJUSTING MACHINE REAR MIRROR (B)

CAUTION

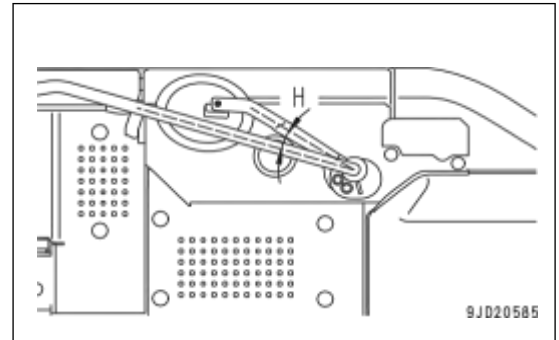
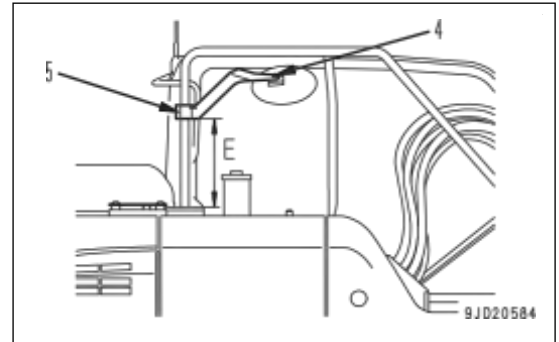
When adjusting the mirror, use a step. If you step on the engine hood, you may fall.

Adjust the mirror so that a person within 1 m away from around the machine can be seen from the operator's seat.

(J) : 1 m



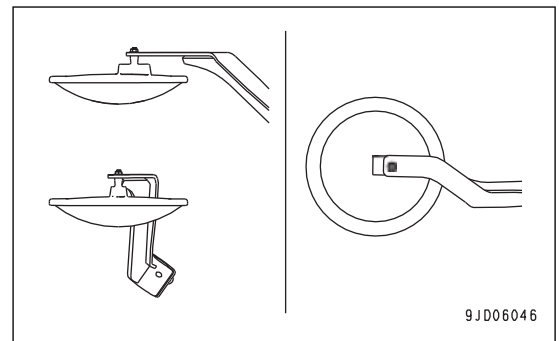
- If the mirror is removed, install it to the position shown in the figure.
(E): 360 mm
(H): 15 °



If mirror does not move smoothly when adjusting its angle, loosen mirror fixing screw (4) and mirror fixing bolt (5).

Tightening torque of screw (4): 3.0 to 3.5 Nm

- Check that you can see a person within 1 m away from around the machine.

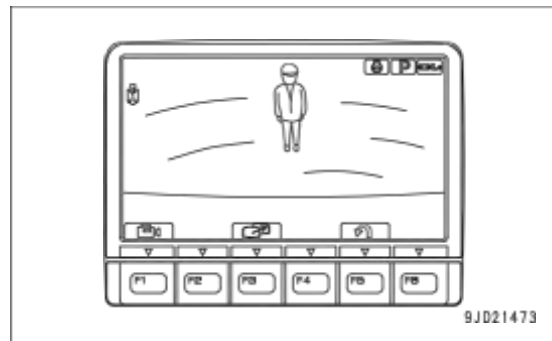
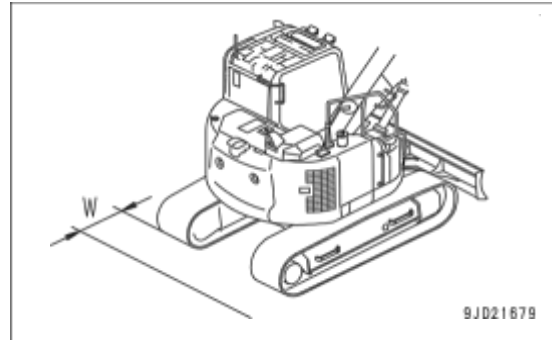
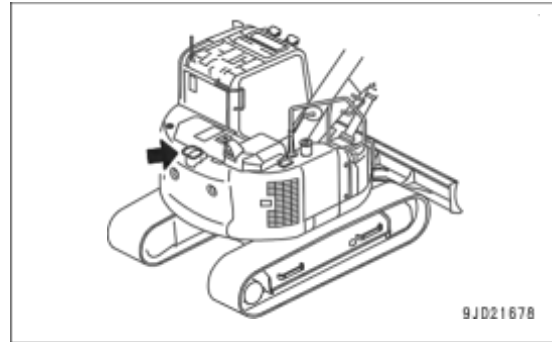


METHOD FOR ADJUSTING REAR VIEW CAMERA ANGLE

WARNING

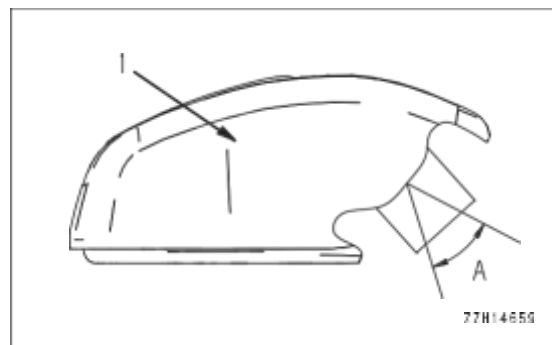
- Before starting operation, always check the visibility of the camera. If it is improper, adjust it. If it is not adjusted properly, you cannot secure the visibility and a serious personal injury or death may result.
- When adjusting the angle of the camera, prepare a scaffold first in order to provide a safe working platform.
If you try to work standing on the counterweight, there is a danger of serious injury or death due to falling off from the machine.

Adjust the angle of the rear view camera so that people within 1 m away from the machine's rear part (W) appears in the machine monitor at the operator's seat.

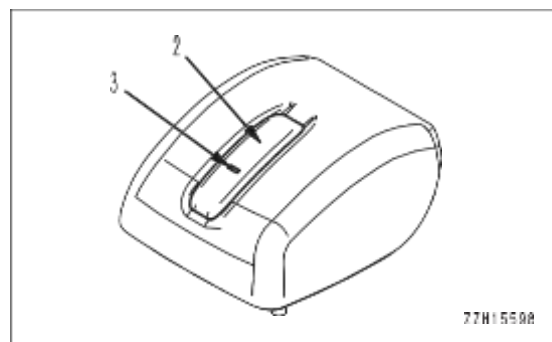


If the image on the monitor is not aligned correctly, adjust mounting angle (A) of the rear view camera in the following procedure.

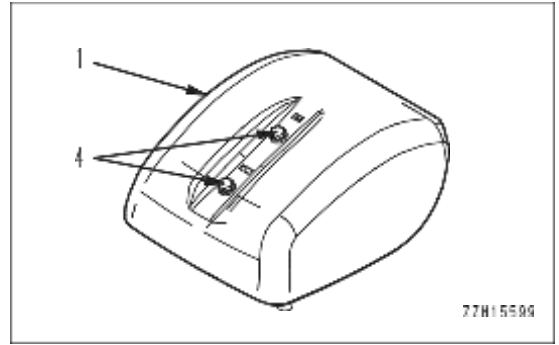
Angle (A) can be adjusted within the range from 30 to 60 °.



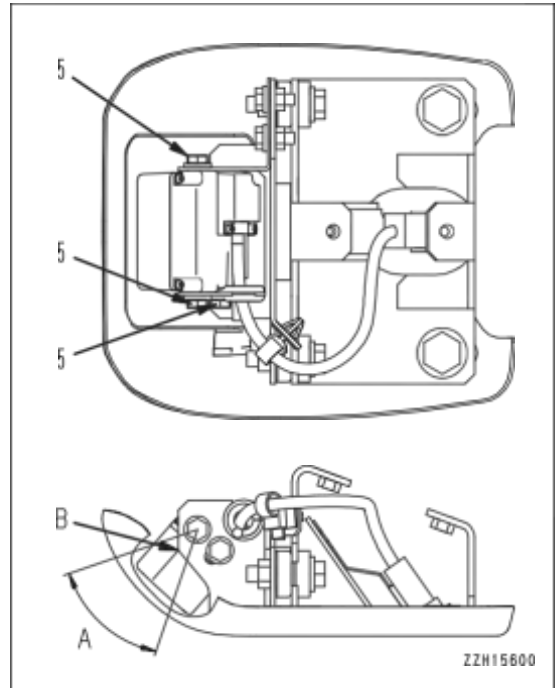
1. Insert a flat-head screwdriver into hole (3) of bolt cover (2) and remove bolt cover (2) while pressing the internal claw.



2. Remove bolts (4) (2 places).
3. Remove cover (1).



4. Loosen mounting bolts (5) (3 places) of the camera, and adjust camera installing angle (A) so that the side of camera matches the edge of bracket (B).

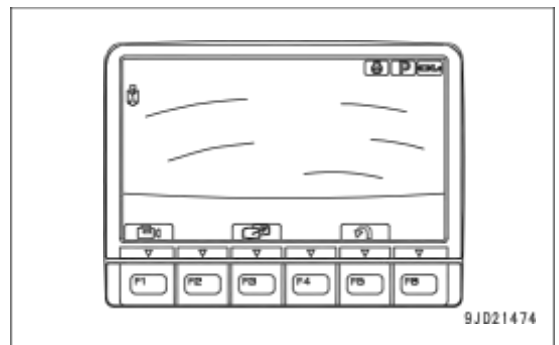


5. After adjusting, tighten bolts (5).
Tightening torque: 11.8 to 14.7 Nm

REMARK

A part of the machine is shown on the monitor screen.

6. Install covers (1) and (2).



METHOD FOR FASTENING AND UNFASTENING SEAT BELT

WARNING

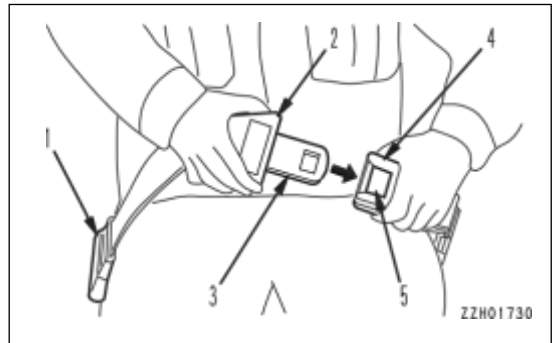
- Before fastening the seat belt, check that there is no problem in the belt mounting bracket or belt. If it is worn or damaged, replace it.
- Even if no problem can be seen in the belt, replace the seat belt every 3 years from starting usage or 5 years after manufacture whichever comes sooner.
- Be sure to use the seat belt during operation.
- Do not twist the seat belt when fastening.

REMARK

- The date of manufacture of the belt is shown on the back of the belt.
- 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.
- This seat belt has a retractable device, so it is not necessary to adjust the length.

METHOD FOR FASTENING SEAT BELT

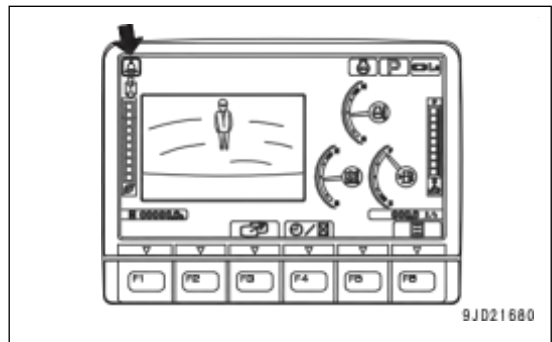
1. Hold grip (2) and pull out the belt from retractable device (1).
2. Check that the belt is not twisted, and then inset tongue (3) into buckle (4) securely.



3. Pull the belt lightly to check that it is properly locked.

REMARK

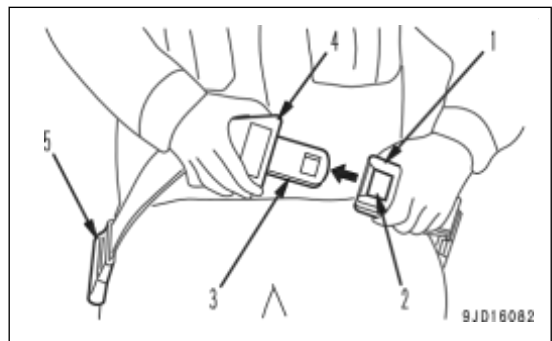
If the tongue is not inserted in the buckle, the seatbelt caution lamp is displayed at the top left of the monitor. Fasten the seat belt.



METHOD FOR UNFASTENING SEAT BELT

1. Press button (2) in buckle (1) and remove tongue (3) from buckle (1).
2. Hold grip (4) and slowly return the belt into retractable device (5).

The belt retracts automatically.

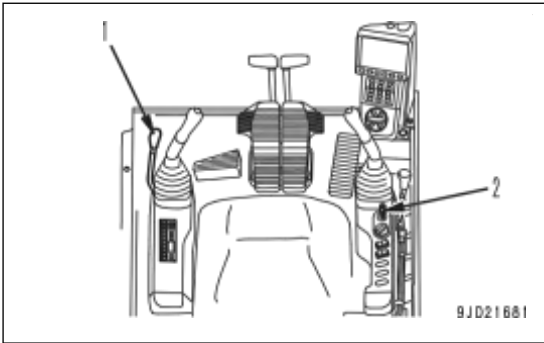


METHOD FOR OPERATIONS AND CHECKS BEFORE STARTING ENGINE

 WARNING

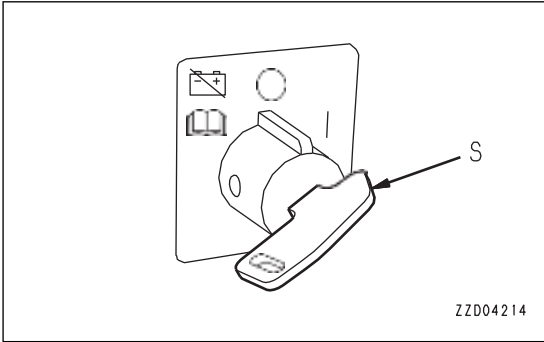
When starting the engine, check that the lock lever is securely at LOCK position. If the lock lever is not locked securely and the control levers or control pedal are touched when the engine is started, the machine may move unexpectedly, and this may lead to serious personal injury or death.

1. Check that battery disconnect switch (S) is in ON position (I).

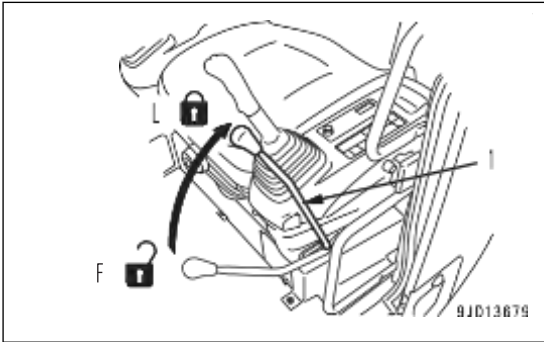


2. Check that lock lever (1) is at LOCK position (L).
3. Check that all control levers and control pedals are at NEUTRAL position.

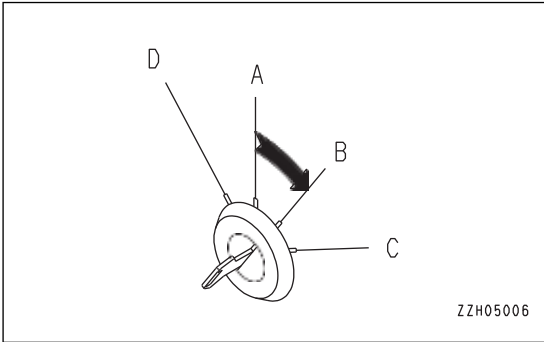
If the control levers and control pedals are not being touched, they will be at NEUTRAL position.



4. Insert the key into starting switch (2) and turn it to ON position (B).

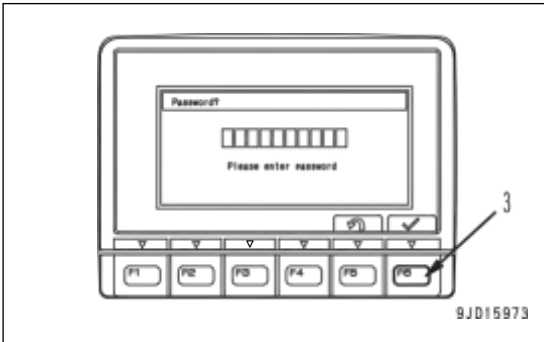


- If a password is set, the input display screen will be indicated on the monitor screen. On the input display screen displayed on the monitor, input the password and push input confirmation switch F6 (3).



REMARK

Contact your Komatsu distributor for details of the method of setting, changing, or canceling the password.

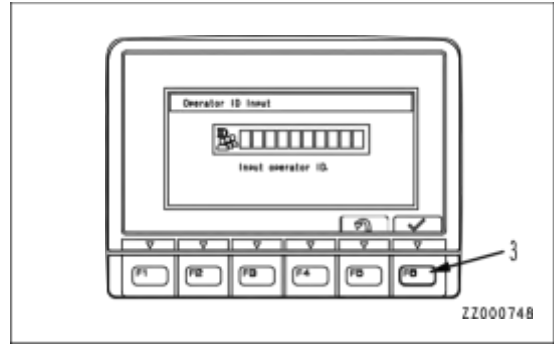


- If inputting ID number for operator identification function (with SKIP) is set, “ID Number Input” screen is displayed on the monitor when the starting switch is turned to ON position. When “ID Number Input” screen is displayed on the monitor, input the ID number and press input confirmation switch F6 (3).

For detail, see “BASIC OPERATION OF MACHINE MONITOR WHEN STARTING SWITCH IS ON WHILE OPERATOR ID INPUT IS SET (3-13)”.

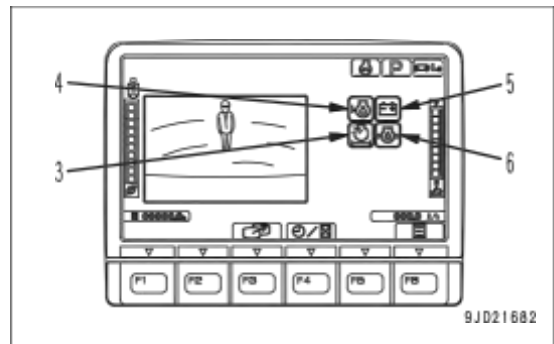
REMARK

Contact your Komatsu distributor for details of the method of setting, changing, or canceling the operator identification function.

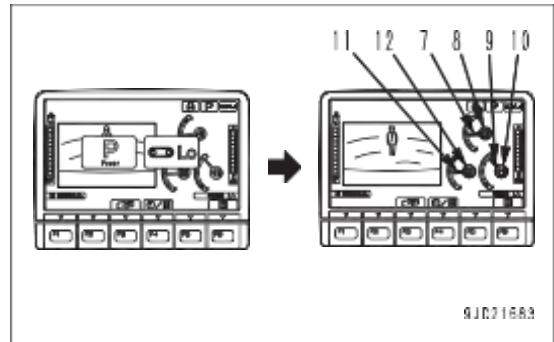


5. Perform the following inspection on the machine monitor.
 - 1) The buzzer sounds for approximately 2 seconds and the following caution lamps light up for approximately 2 seconds.
 - Air cleaner clogging caution lamp (4)
 - Engine oil level caution lamp (5)
 - Charge level caution lamp (6)
 - Engine oil pressure caution lamp (7)

If any caution lamp does not light up or the buzzer does not sound, there is probably a failure in the monitor, so ask your Komatsu distributor for repair.

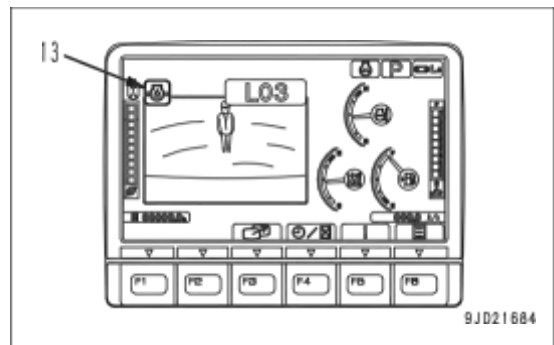


- 2) The screen changes to the working mode and travel speed display screen after approximately 2 seconds, and then it changes to the standard screen.
 - Engine coolant temperature gauge (8)
 - Engine coolant temperature caution lamp (9)
 - Fuel gauge (10)
 - Fuel level caution lamp (11)
 - Hydraulic oil temperature gauge (12)
 - Hydraulic oil temperature caution lamp (13)



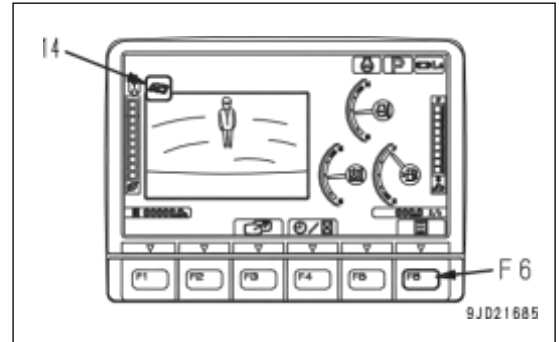
- 3) If the hydraulic oil temperature gauge goes out or caution lamp (14) stays lit in red, immediately check the item lit in red.

For the contents and check methods for caution lamp, see “WARNING DISPLAY (3-17)”.



- 4) If the maintenance due time has passed for certain items, maintenance time caution lamp (15) is lit in red for 30 seconds.
- 5) Press user menu display switch (16), check the item which has exceeded the maintenance interval, and perform maintenance immediately.

For the method of checking the maintenance interval, see EXPLANATION OF COMPONENTS, "MAINTENANCE TIME CAUTION LAMP (3-30)".



METHOD FOR STARTING ENGINE

METHOD FOR STARTING ENGINE IN NORMAL WEATHER

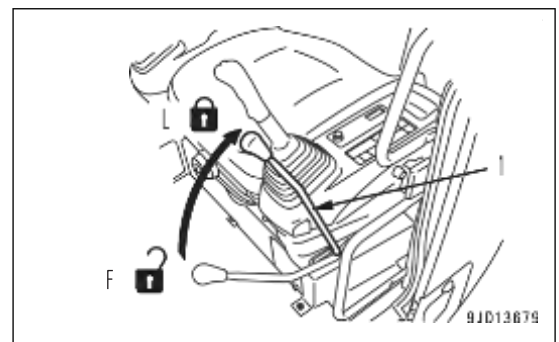
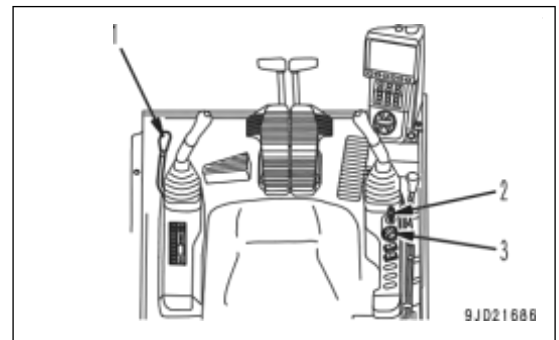
WARNING

- 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 are no persons or obstacles 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.
- Keep the engine hood and covers closed during operation unless you are checking the machine.

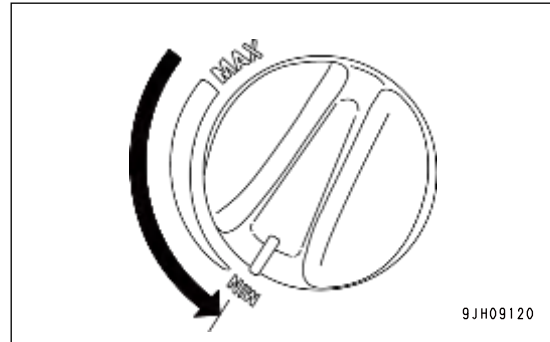
NOTICE

- Do not start the engine with the fuel control dial (3) near High idle (MAX) position. If you do so, the engine parts may be damaged.
- Do not keep the key in starting switch (2) at the START position 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.

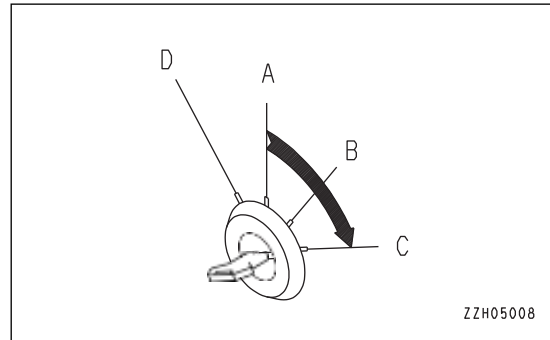
1. Check that lock lever (1) is at LOCK position (L). If lock lever (1) is in FREE position (F), the engine does not start.



2. Turn fuel control dial (3) to Low idle (MIN) position.



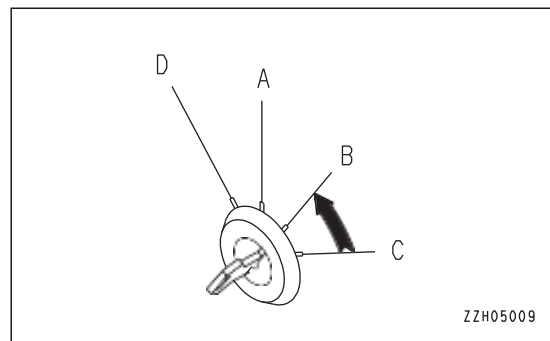
3. Turn starting switch key (2) to START position (C).
The engine starts.



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

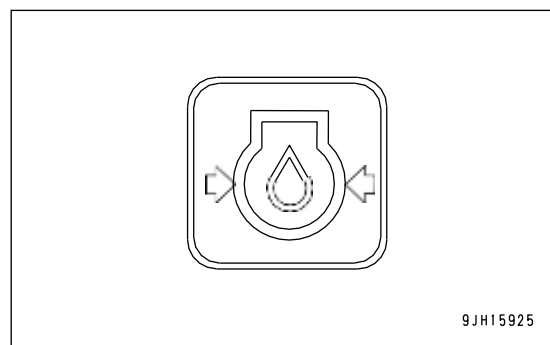
REMARK

When the engine is started, the battery voltage may suddenly drop depending on the temperature and the battery condition. If this happens, the display on the machine monitor may momentarily go out, but this does not indicate any abnormality.



NOTICE

- After the engine starts, wait for the engine oil pressure caution lamp to go out. Do not touch the control levers or control pedal while the engine oil pressure caution lamp is lit.
- If the engine oil pressure caution lamp does not go out even after 4 to 5 seconds have passed, stop the engine immediately. Check the oil level, check for leakage of oil, and take the necessary action.



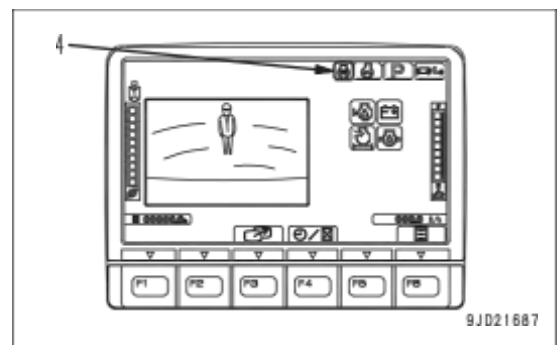
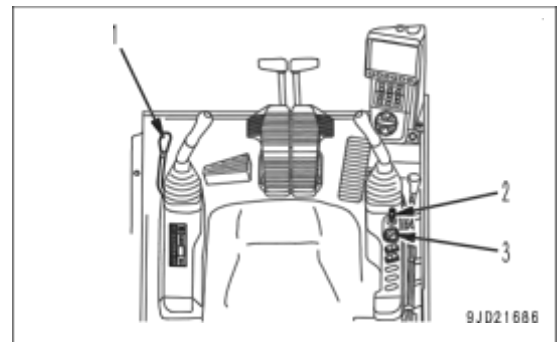
METHOD FOR STARTING ENGINE IN COLD WEATHER

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. This may cause fire, 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.
- Never use starting aid fluids, otherwise they may cause explosions.
- Exhaust gas is toxic.
When starting the engine in confined spaces, be particularly careful to ensure good ventilation.
- Keep the engine hood and covers closed unless you perform inspection.

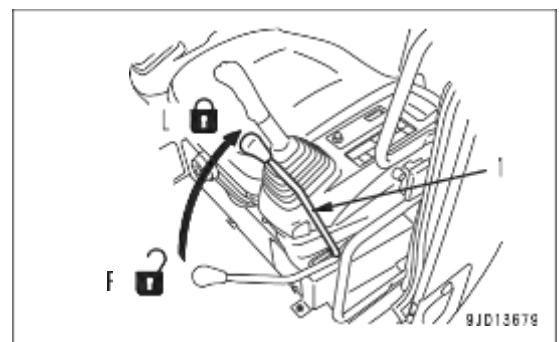
NOTICE

- Do not start the engine with the fuel control dial near the maximum speed position. If you do so, the engine parts may be damaged.
- Do not keep the key in starting switch (2) at the START position continuously for more than 20 seconds. If the engine does not start, wait for approximately 2 minutes, and then try to start the engine again.
- After the engine starts, wait for the engine oil pressure caution lamp to go out. Do not touch the control levers or control pedal while the engine oil pressure caution lamp is lit.

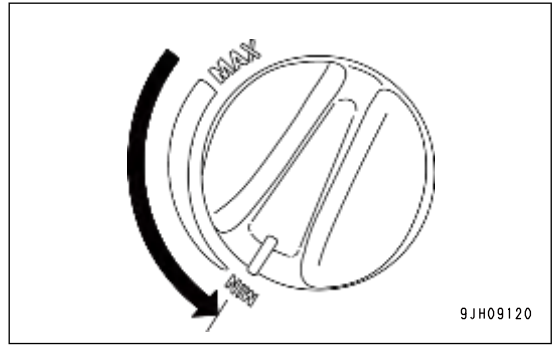


When the ambient temperature is low, start the engine according to the following procedure.

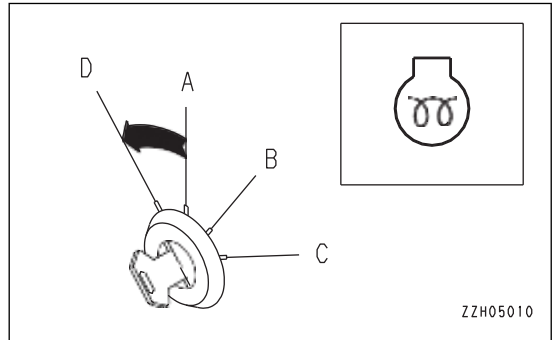
1. Check that lock lever (1) is at LOCK position (L).
When starting the engine, if lock lever (1) is in FREE (F) position, the engine does not start.



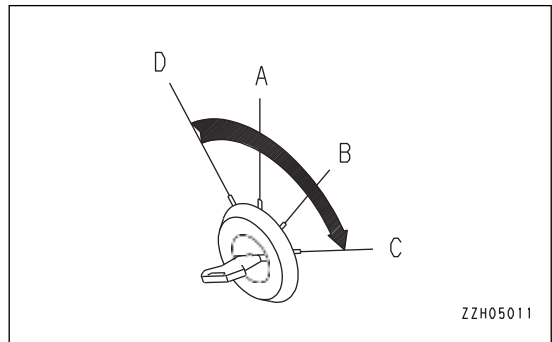
2. Turn fuel control dial (3) to Low idle (MIN) position.



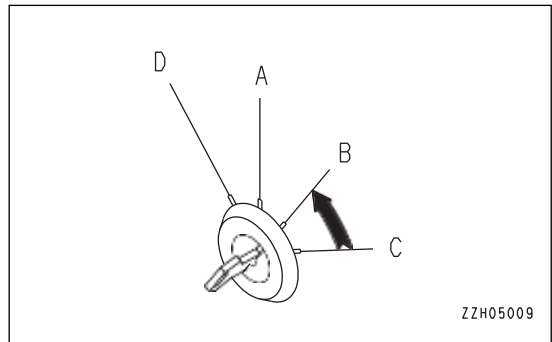
3. Hold starting switch key (2) in HEAT (preheating) position (D).
Preheating pilot lamp (4) lights up, and approximately 30 seconds later it flashes for 10 seconds to notify completion of preheating.



4. After preheating pilot lamp (4) goes out, turn starting switch key (2) to START position (C).
The engine starts.



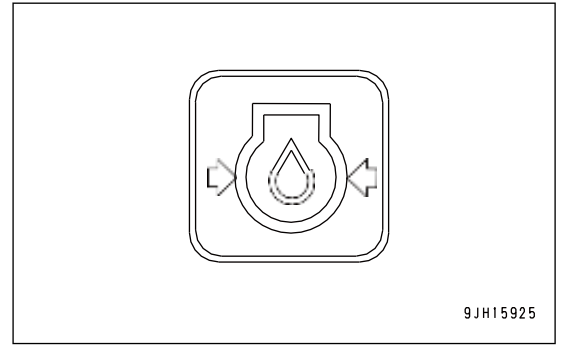
5. When the engine starts, release the starting switch key (2).
The key will return automatically to ON position (B).



NOTICE

- Run the engine at idle for 15 seconds immediately after it started. Do not operate the control levers or fuel control dial during this time.

- After the engine starts, wait for the engine oil pressure caution lamp to go out. Do not touch the control levers or control pedal while the engine oil pressure caution lamp is lit.
- If the engine oil pressure caution lamp does not go out even after 4 to 5 seconds have passed, stop the engine immediately. Check the oil level, check for leakage of oil, and take the necessary action.



TURBOCHARGER PROTECTION FUNCTION

The turbo protect function protects the turbocharger by keeping the engine speed at approximately 1100 rpm or less immediately after the engine is started.

- When the turbo protect function is actuated, the engine speed is held at approximately 1100 rpm or less, regardless of the position of the fuel control dial.
- When the turbo protect function is actuated, the engine speed is held at approximately 1100 rpm or less, even if the fuel control dial is operated.
- When the turbo protect function is canceled, the engine speed is set to the speed for the position of the fuel control dial.
- The actuation time of the turbo protect function is limited to 20 seconds.

AMBIENT TEMPERATURE RANGE FOR OPERATION AND STORAGE

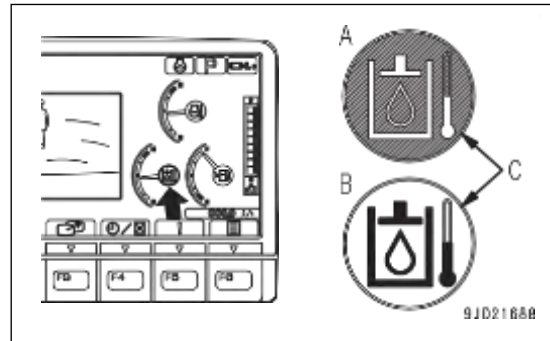
- The recommended ambient temperature range for operation and storage is -20 to +45 °C.
- When operating in ambient below 0 °C, refer to “COLD WEATHER OPERATION (3-229)” for details of precautions.

METHOD FOR OPERATIONS AND CHECKS AFTER STARTING ENGINE



WARNING

- If there is any trouble such as emergency stop, abnormal actuation, etc., turn the starting switch key to OFF position.
- Do not perform operations nor operate the levers or pedal abruptly while the hydraulic oil is at low temperature. Always perform the warm-up operation for the hydraulic equipment until the hydraulic oil temperature caution lamp displays the correct temperature. When the hydraulic oil temperature is low, the low temperature display shown in the figure is given.
 - Display (A) when temperature is proper: Caution lamp background (C) is blue.
 - Display (B) when temperature is low: Caution lamp background (C) is white.
- Perform the warm-up operation for the hydraulic component thoroughly. The reaction of the machine to the operation of the control levers and pedals are slow, and the machine may not move as the operator intends if the hydraulic component is not warm enough. Particularly in a cold weather, perform the warm-up operation for the hydraulic component thoroughly.
- 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.



There are 2 types of warm-up operation: warm-up of the engine and warm-up of the hydraulic component. In addition, depending on the environment, the method of performing the warm-up operation may differ, so perform the warm-up operation according to the descriptions given in the appropriate section.

The hydraulic component is not warmed by simply performing engine warm-up operation. Perform the warm-up operations for the hydraulic component separately from that for the engine. Perform the warm-up operation for the hydraulic component, so that the hydraulic oil is also warmed up and it circulates in all the control circuits.

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.
- Check that the engine speed rises smoothly when the fuel control dial is turned to High idle (MAX) position.
 - 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 filtering function.
- Black or white smoke may be discharged for a short time just after the engine is started in the cold season, but this is not trouble.

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 breaking the machine in can adversely affect the performance and shorten the machine life.

Be sure to break 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.

- Run the engine at idle for 15 seconds immediately after starting it up. Do not operate the control levers or fuel control dial during this time.
- Perform warm-up operation for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speed.
- Immediately after starting the engine, avoid sudden starts, sudden acceleration, unnecessary sudden stops, and sudden changes in direction of the machine.

METHOD FOR ENGINE WARM-UP OPERATION**NOTICE**

- **Do not accelerate the engine abruptly until it is warmed up.**
- **Do not run the engine at low idle or high idle under no load for more than 20 minutes. This will have an adverse effect on the environment and also on the internal structure of the engine. If it is necessary to run the engine at idle for 20 minutes or more, apply a load from time to time or run at a medium speed.**

This machine is equipped with an automatic engine warm-up system, so if the engine coolant temperature is 30 °C or less after the engine is started, the engine warm-up operation starts automatically. When the engine automatic warm-up operation starts, the engine speed is maintained higher than the normal speed at low idle.

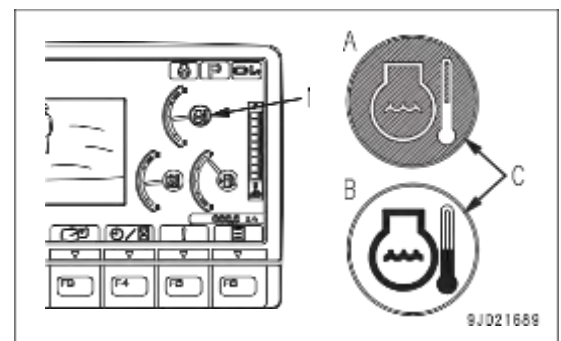
If the engine coolant temperature goes 30 °C or more or if the warm-up operation is continued for more than 10 minutes, the automatic warm-up operation is canceled and the engine speed drops to the normal speed at low idle.

Do not start operating the machine immediately. First, perform the following operations and checks.

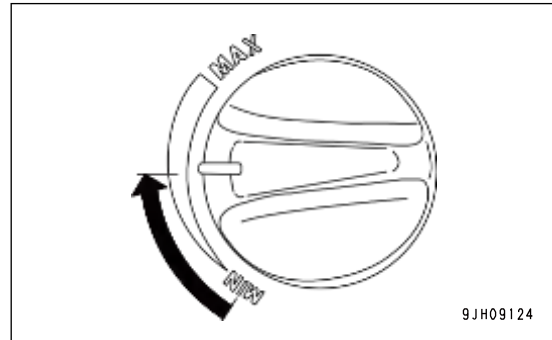
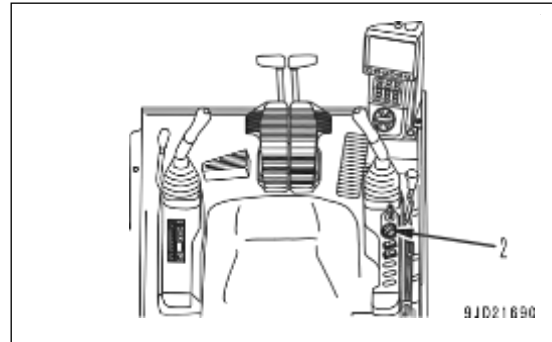
1. Check that engine coolant temperature caution lamp (1) displays the correct temperature.

If the display indicates low temperature, perform additional warm-up operation of the engine according to step 2 until it indicates the correct temperature.

- Display (A) when temperature is correct: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.



- Turn fuel control dial (2) to the middle between Low idle (MIN) and High idle (MAX) to run the engine at a medium speed.



Run the engine with no load until engine coolant temperature caution lamp (1) displays correct temperature.

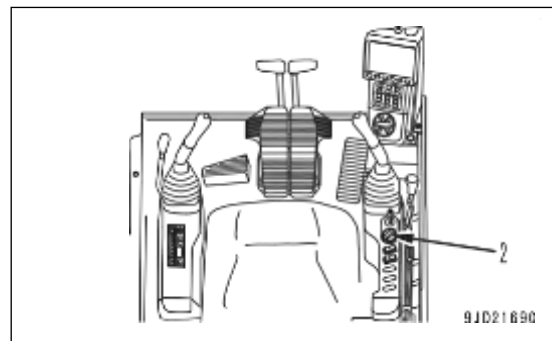
- Display (A) when temperature is correct: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

If the engine coolant temperature caution lamp displays the correct temperature, the engine warm-up operation is completed.

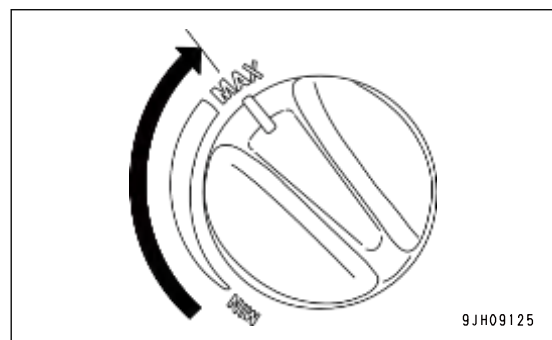
Then, perform the warm-up operation for the hydraulic components.

METHOD FOR CANCELING AUTOMATIC WARM-UP OPERATION

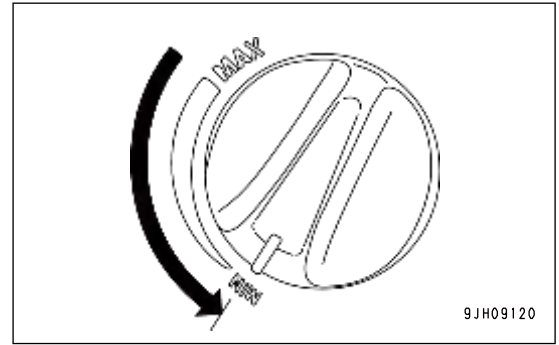
When you are forced to urgently cancel the automatic warm-up operation or to lower the engine speed to low idle, do as follows.



- Turn fuel control dial (2) to High idle (MAX) position and hold it for 3 seconds or more.



2. Turn fuel control dial (2) to Low idle (MIN) position.
The engine automatic warm-up is canceled, and the engine speed is lowered.



REMARK

Turbo protect function takes priority over the engine automatic warm-up.

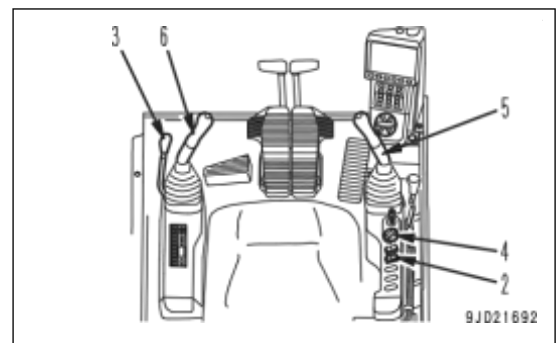
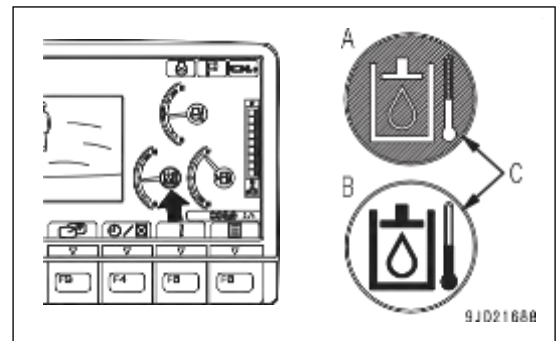
When the turbo protect function activates, run the engine at low idle even the engine coolant temperature is 30 °C or less. Then the engine automatic warm-up starts automatically to increase the engine speed.

For details of the turbocharger protect function, see "TURBOCHARGER PROTECTION FUNCTION (3-157)".

METHOD FOR HYDRAULIC SYSTEM WARM-UP OPERATION

WARNING

- Before performing the warm-up operation for the hydraulic equipment, set the swing lock switch on, check on the monitor that the swing lock is actuated, then start the warm-up operation.
- When warming up the hydraulic equipment, check that there is no person or obstacle in the area around the machine, then sound the horn and start the operation.
- Perform the warm-up operation for the hydraulic equipment until the hydraulic oil temperature caution lamp displays the correct temperature.
When the hydraulic oil temperature is low, the low temperature display shown in the figure is given.
 - Display (A) when temperature is correct: Caution lamp background (C) is blue.
 - Display (B) when temperature is low: Caution lamp background (C) is white.
- The warm-up operation for the hydraulic equipment is necessary not only for the circuit between the pump and cylinders and between the pump and motor, but also for the control circuits. Do not perform the operation just for one cylinder or motor, or the operation just in one direction. Perform the operation in all directions for all the work equipment (boom, arm and bucket), swing, travel, and attachment (if equipped).
- Before operating the travel lever, check the direction of the track frame.

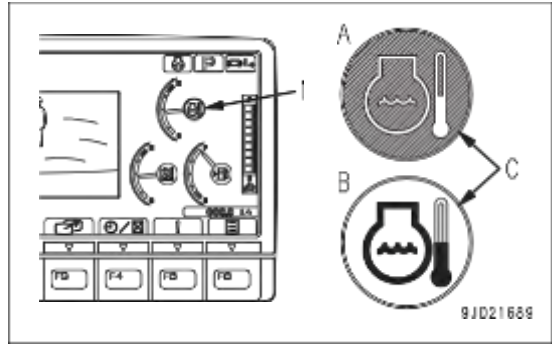


1. Check that engine coolant temperature caution lamp (1) displays the correct temperature.

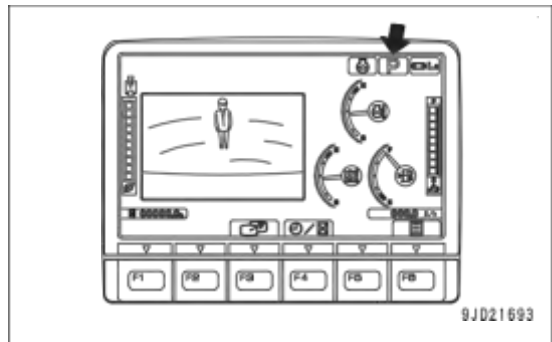
- Display (A) when temperature is correct: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

If it displays low temperature, perform additional warm up of the engine until engine coolant temperature caution lamp (1) displays the correct temperature.

For detail, see “METHOD FOR ENGINE WARM-UP OPERATION (3-159)”.



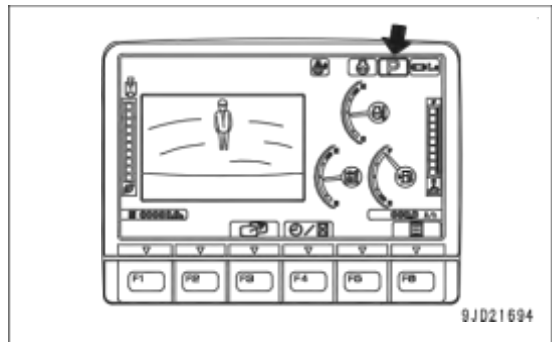
2. Set swing lock switch (2) to ON position and check that the swing lock pilot lamp is lit.



3. Set the working mode to P mode (heavy-duty operation mode).

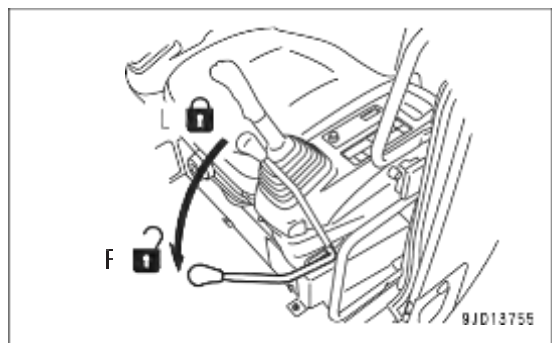
Warm up the hydraulic component quickly.

For the working mode setting procedure, see “WORKING MODE SELECTOR SWITCH (3-45)”.

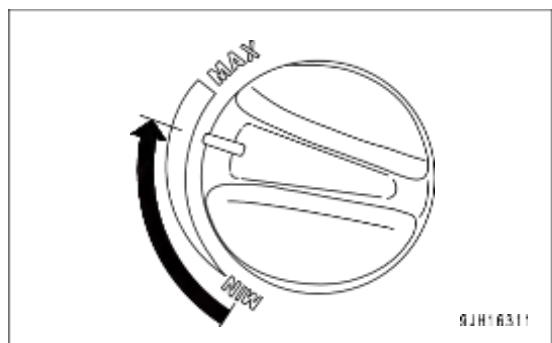


4. Move lock lever (3) slowly and securely to FREE position (F).

5. Raise the bucket from the ground.



6. Turn the fuel control dial (4) to a point of 2/3 between Low idle (MIN) position and High idle (MAX) position.

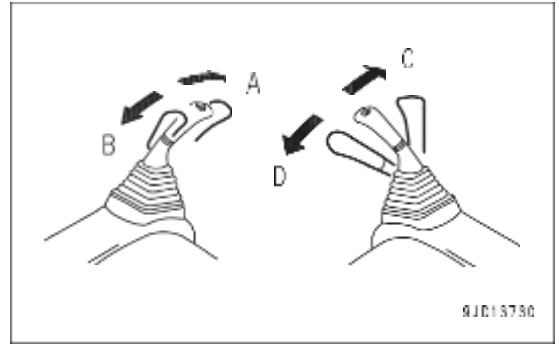


- Operate the work equipment to warm up the hydraulic components.

NOTICE

When the work equipment is operated, take care that it does not interfere with the machine or ground.

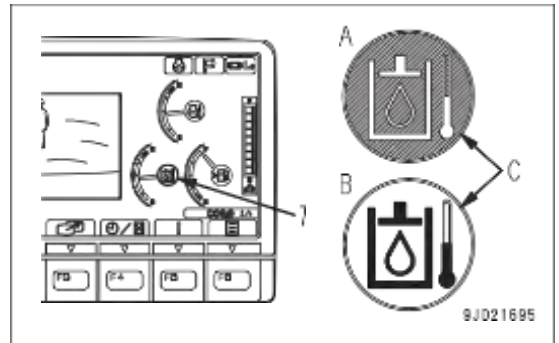
- Move R.H. work equipment control lever (5) slowly in the direction of bucket CURL position (D). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
- Move R.H. work equipment control lever (5) slowly in the direction bucket DUMP position (C). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
- Next, move L.H. work equipment control lever (6) slowly in the direction arm IN position (B). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
- Move L.H. work equipment control lever (6) slowly in the direction arm OUT position (A). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.



- Repeat the operation of step 7 for 5 minutes.
- Check that hydraulic oil temperature caution lamp (7) displays correct temperature.

- Display (A) when temperature is correct: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

If hydraulic oil temperature caution lamp (7) displays low temperature, repeat step 7 until the lamp displays the correct temperature.

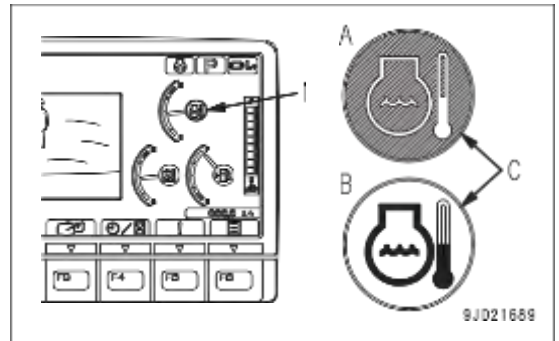


- Check that engine coolant temperature caution lamp (1) displays the correct temperature.

- Display (A) when temperature is correct: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

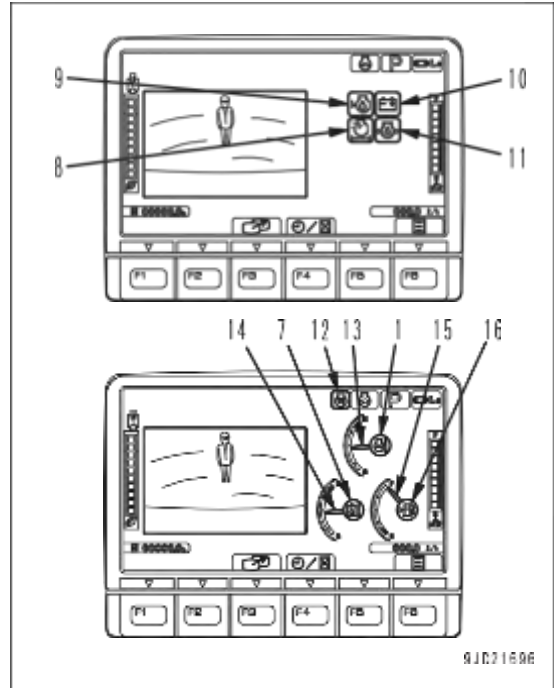
If engine coolant temperature caution lamp (1) displays low temperature, perform warm-up operation until the correct temperature is displayed.

For detail, see "METHOD FOR ENGINE WARM-UP OPERATION (3-159)".



11. Check that hydraulic oil temperature caution lamp (7) and engine coolant temperature caution lamp (1) display the correct temperature, then check that all the caution lamps, pilot lamps, and gauges on the machine monitor are in the following conditions.

- Air cleaner clogging caution lamp (8): OFF
- Engine oil level caution lamp (9): OFF
- Charge level caution lamp (10): OFF
- Engine oil pressure caution lamp (11): OFF
- Engine preheating pilot lamp (12): OFF
- Engine coolant temperature gauge (13): Indicator in green range
- Engine coolant temperature caution lamp (1): Displays correct temperature
- Hydraulic oil temperature gauge (14): Indicator is in green range
- Hydraulic oil temperature caution lamp (7): Displays correct temperature
- Fuel gauge (15): Indicator in green range
- Fuel level caution lamp (16): Displays appropriate level

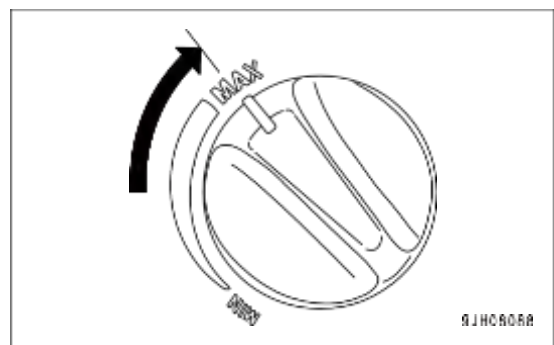


12. Check for abnormal exhaust gas color, noise, or vibration. If any abnormality is found, contact your Komatsu distributor.
13. Hydraulic system warm-up operation in cold weather

NOTICE

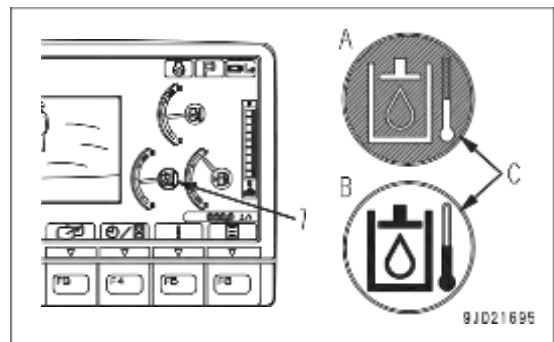
In cold temperatures (ambient temperature below 0 °C), even when the hydraulic oil temperature caution lamp displays the correct temperature, perform the "Hydraulic system warm-up operation in cold weather" to warm up all the hydraulic equipment.

- 1) Turn fuel control dial (4) to High idle (MAX) position.

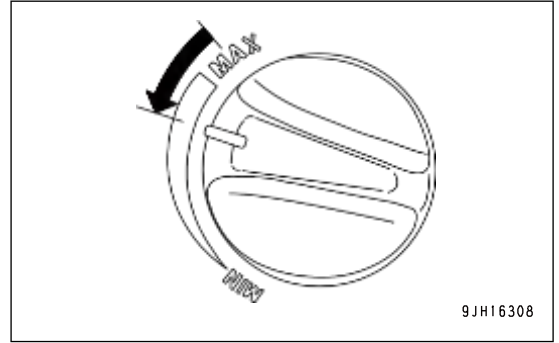


- 2) Repeat the work equipment operation of step 7 for 3 to 5 minutes.
- 3) Check that hydraulic oil temperature caution lamp (7) displays correct temperature.
 - Display (A) when temperature is correct: Caution lamp background (C) is blue.
 - Display (B) when temperature is low: Caution lamp background (C) is white.

If hydraulic oil temperature caution lamp (7) displays low temperature, repeat the work equipment operation in step 7 until the lamp displays the correct temperature.



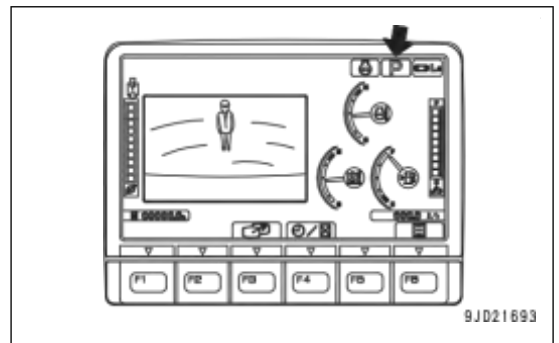
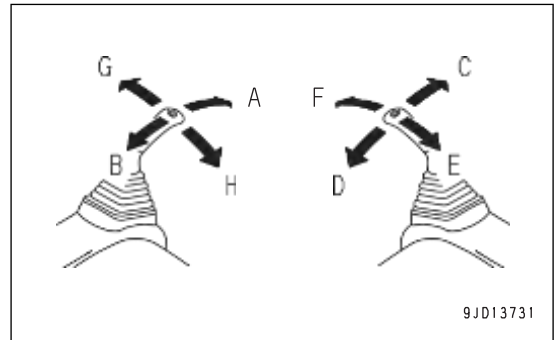
14. Before starting the work, check that fuel control dial (4) is at a 2/3 position between Low idle (MIN) position and High idle (MAX) position.
 If it is not at the 2/3 point, set it to the 2/3 point and run the engine at 2/3 speed between MIN and MAX before operating.



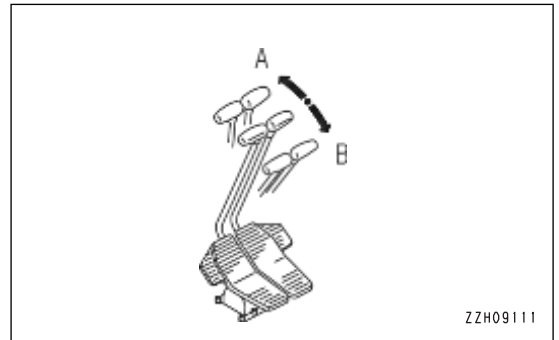
15. Before starting actual operations, repeat the following operations slowly 3 to 5 times to circulate warm oil through the all control circuits.

- Boom control RAISE (E) ↔ LOWER (F)
- Arm control IN (B) ↔ OUT (A)
- Bucket control CURL (D) ↔ DUMP (C)
- Swing control LEFT (G) ↔ RIGHT (H)

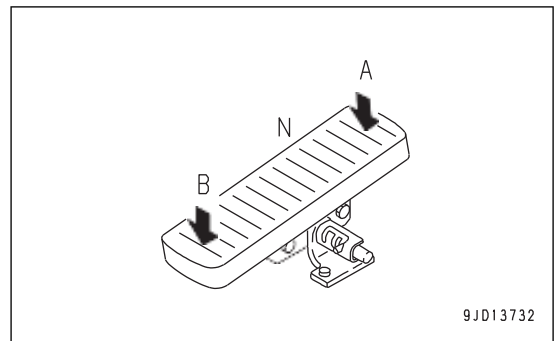
When performing swing operations, release swing lock switch (2), check that the swing lock pilot lamp is OFF, then operate the swing.



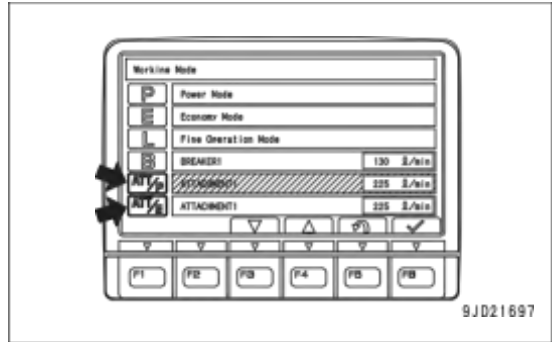
- Travel (Lo) control FORWARD (A) ↔ REVERSE (B)



- Attachment control One side (A) ↔ The other side (B)

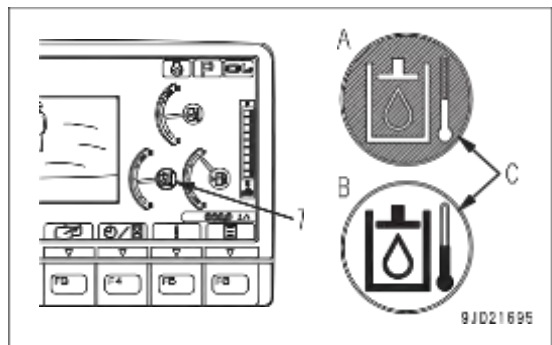


For attachment operations (if equipped), change the working mode to the attachment mode.



16. Check that hydraulic oil temperature caution lamp (7) displays correct temperature.
 - Display (A) when temperature is correct: Caution lamp background (C) is blue.
 - Display (B) when temperature is low: Caution lamp background (C) is white.

If the caution lamp is not displaying the correct temperature, repeat the work equipment operation in step 6 until the lamp displays the correct temperature.



If hydraulic oil temperature caution lamp (7) displays the correct temperature, the hydraulic equipment warm-up operation is completed.

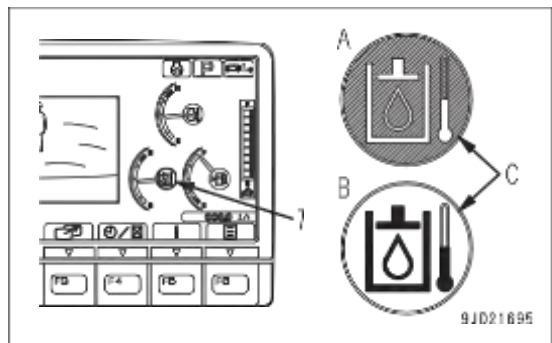
After checking that hydraulic oil temperature caution lamp (7) displays the correct temperature, perform the operation after completion of the warm-up operation.

METHOD FOR OPERATION AFTER COMPLETION OF WARM-UP OPERATION

1. Check that hydraulic oil temperature caution lamp (7) displays proper temperature.

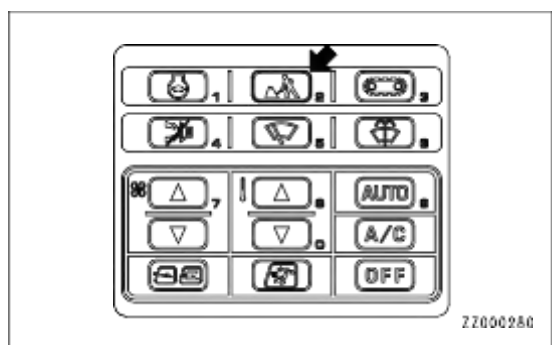
Display (A) when temperature is proper: Caution lamp background (C) is blue.

Display (B) when temperature is low: Caution lamp background (C) is white.

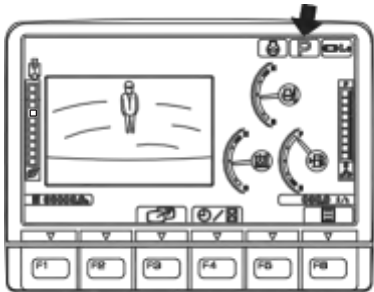
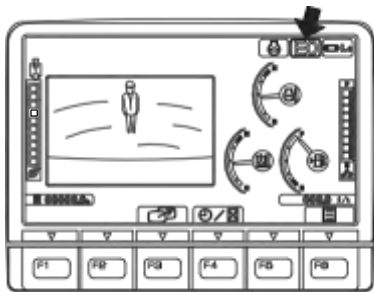
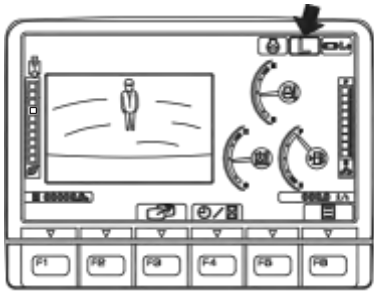
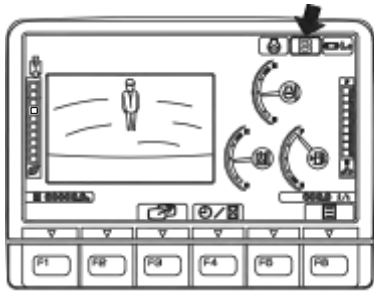
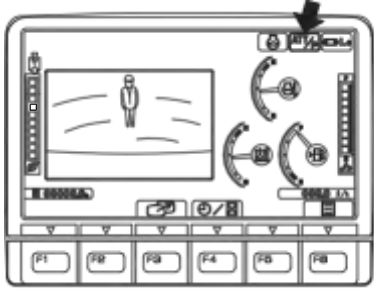
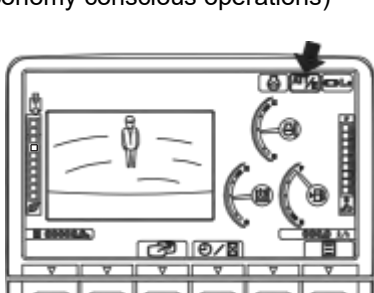


2. Press the working mode selector switch of the machine monitor to select the working mode to be used.

For change of the working mode, see “WORKING MODE SELECTOR SWITCH (3-45)”.



Display of working mode

<p>P mode For heavy-duty operations</p>  <p>9JD21693</p>	<p>E mode For fuel economy conscious operations</p>  <p>9JD21700</p>
<p>L mode For operations requiring fine control and lifting operation</p>  <p>9JD21698</p>	<p>B mode For breaker operations</p>  <p>9JD23909</p>
<p>ATT/P mode For operations of 2-way attachment such as crusher</p>  <p>9JD21699</p>	<p>ATT/E mode For operations of 2-way attachment such as crusher (fuel economy conscious operations)</p>  <p>9JD21701</p>

METHOD FOR STOPPING ENGINE

 **WARNING**

Keep away from the exhaust pipe immediately after stopping the engine.

NOTICE

Do not stop the engine abruptly except in an emergency. Otherwise, the service lives of component parts of the engine will be reduced.

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.

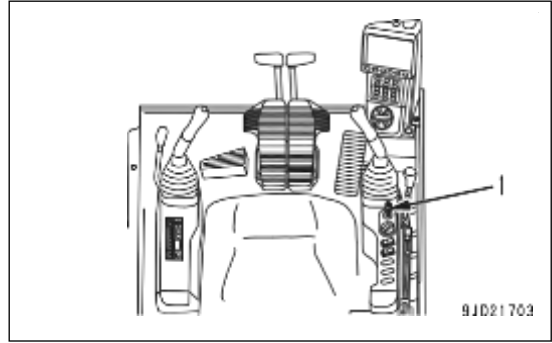
If the engine is stopped during the aftertreatment devices regeneration, the components may be damaged.

When stopping the engine, stop the aftertreatment devices regeneration first according to “PROCEDURE FOR SETTING AFTERTREATMENT DEVICES-REGENERATION DISABLE (3-116)”, then stop the engine after running it at low idle for approximately 5 minutes. Then stop the engine.

Stop the engine according to the following procedure.

1. Run the engine at low idle for approximately 5 minutes to cool it down gradually.
2. Turn the key in starting switch (1) to OFF position (A).

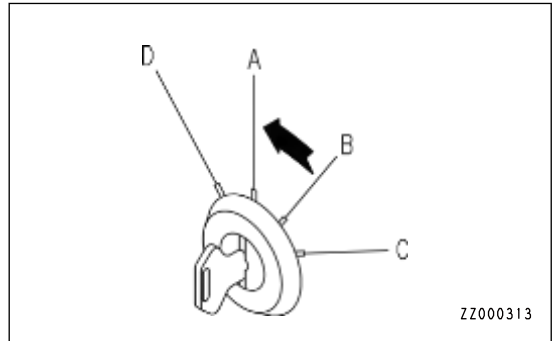
The engine will stop.



9JD21703

3. Remove the key from starting switch (1).

When you stop the engine, the regeneration disable setting is canceled. If necessary, disable the regeneration again after you start the engine.



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REMARK

- When the key in starting switch (1) is turned to OFF position (A), the engine stops but the power supply to the machine is not turned off immediately. During this period, the power is supplied to the controller to save the operating condition and then finish the system. The time to keep supplying the power depends on the operating condition.
- 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 for approximately 5 minutes, because it may cause damage to the devices.
- 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. The devices continue operation for several minutes for this reason after the engine starting key is turned to OFF position, but this is not abnormal. Do not turn the battery disconnect switch OFF, while the devices are operating to return DEF. After finishing the drawing operation, the devices stop automatically.

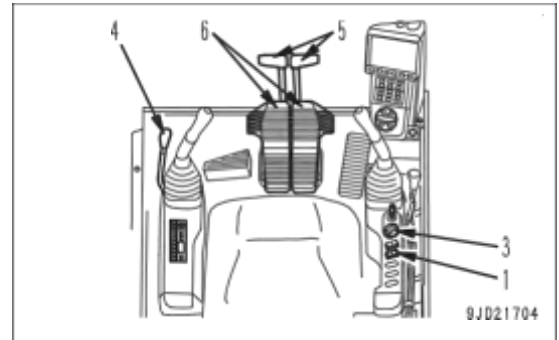


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METHOD FOR STARTING MACHINE (TRAVEL FORWARD AND REVERSE) AND STOPPING MACHINE

WARNING

- Check the direction of the track frame before operating the travel lever and travel pedal.
If the track frame is facing the rear (if the sprocket is at the front), the machine moves in the opposite direction to the direction of the operation of the travel levers or travel pedals (front and rear travel are reversed, right and left steering are reversed).
- Check that the area around the machine is safe, sound the horn before starting the machine.
- Prohibit anyone other than the operator from coming close to the machine during checks.
- Clear any obstacles from the travel path.
- There is a blind spot at the rear of the machine, so be particularly careful when traveling in reverse.
- Operate the levers carefully. The engine speed may suddenly increase during the autodeceleration.
- When traveling, check that the travel alarm sounds normally.

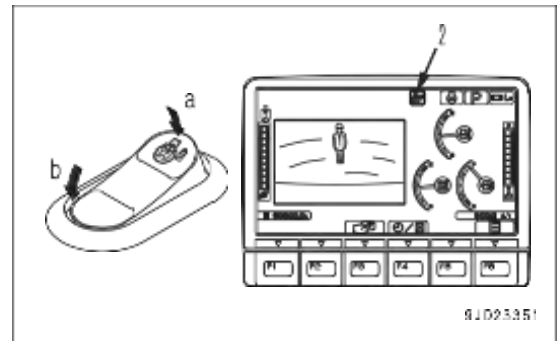


PREPARATIONS FOR MOVING MACHINE

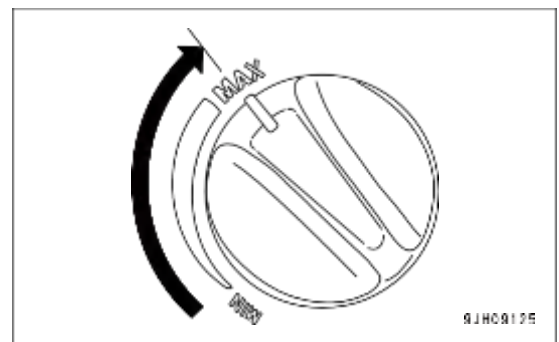
Prepare for moving the machine according to the following procedure.

1. Set swing lock switch (1) to ON (actuated) position and check that the swing lock pilot lamp (2) is lit.

- (a): ON position
- (b): OFF position

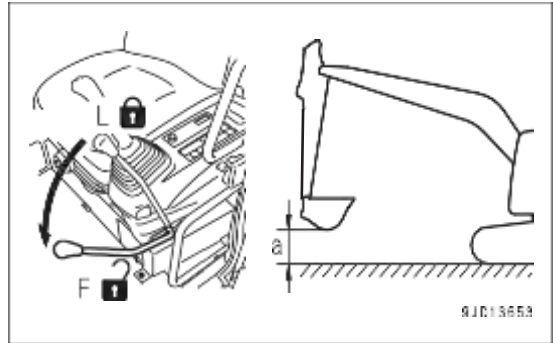


2. Turn fuel control dial (3) to High idle (MAX) position.
Increase the engine speed.

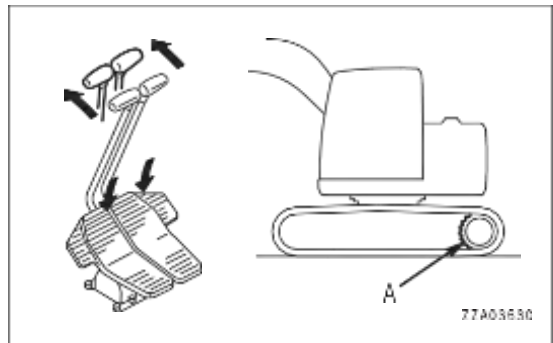


METHOD FOR TRAVELING FORWARD

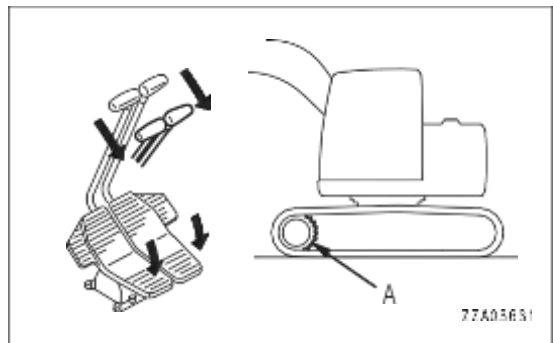
- 1. Set the lock lever (4) to FREE position (F).
- 2. Set the work equipment in the travel posture and raise it to height (a).
- (a) : 40 to 50 cm
- 3. Raise the blade if the machine is equipped with a blade.



- 4. Operate right and left travel levers (5) or right and left travel pedals (6) as follows:
 - When sprocket (A) is at the rear of the machine:
 - Start the machine either by pushing right and left travel levers (5) forward slowly or by depressing the front parts of right and left travel pedals (6) slowly.



- When sprocket (A) is at the front of the machine:
 - Start the machine either by pulling right and left travel levers (5) backwards slowly or by depressing the rear parts of right and left travel pedals (6) slowly.



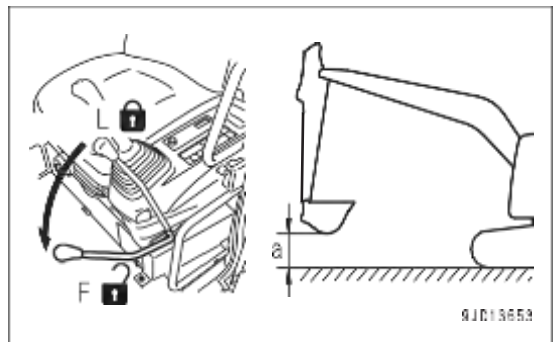
- 5. When traveling, check that the alarm sounds normally.
 - If the travel alarm does not sound, contact your Komatsu distributor for repair.

REMARK

In low temperatures, if the machine travel speed is not normal, thoroughly perform the warm-up operation. In addition, if the undercarriage is packed with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

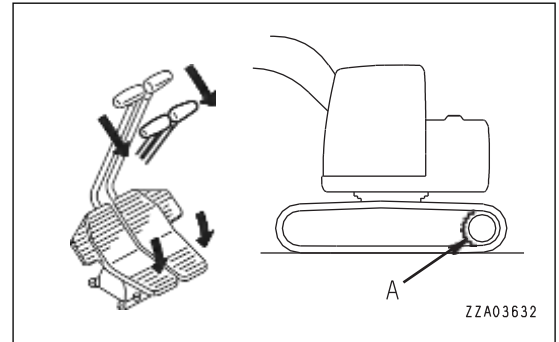
METHOD FOR TRAVELING REVERSE

- 1. Set the lock lever (4) to FREE position (F).
- 2. Set the work equipment in the travel posture and raise it to height (a).
- (a) : 40 to 50 cm
- 3. Raise the blade if the machine is equipped with a blade.

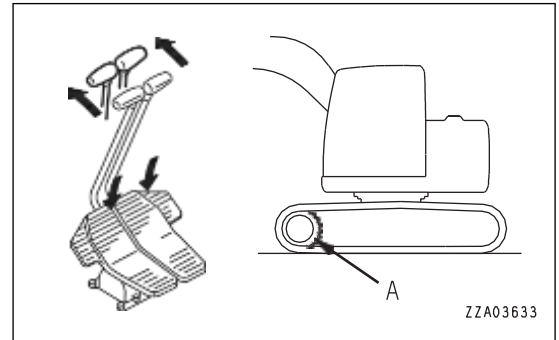


- 4. Operate right and left travel levers (5) or right and left travel pedals (6) as follows:

- When sprocket (A) is at the rear of the machine:
Start the machine either by pulling levers (5) backwards slowly or by depressing the rear parts of pedals (6) slowly.



- When sprocket (A) is at the front of the machine:
Start the machine either by pushing levers (5) forward slowly or by depressing the front parts of pedals (6) slowly.



- When traveling, check that the alarm sounds normally.
If the travel alarm does not sound, contact your Komatsu distributor for repair.

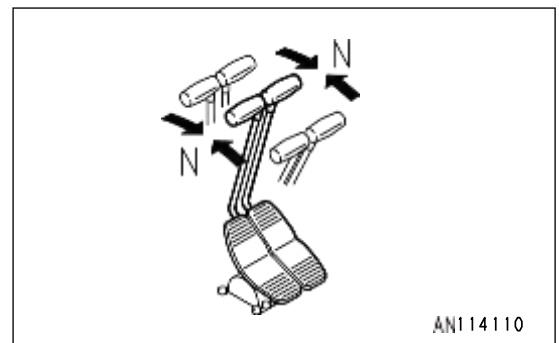
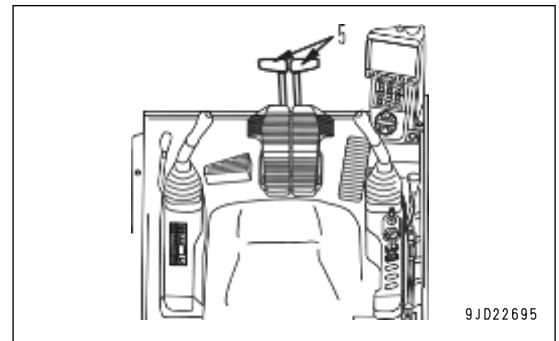
REMARK

In low temperatures, if the machine travel speed is not normal, thoroughly perform the warm-up operation. In addition, if the undercarriage is packed with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

METHOD FOR STOPPING MACHINE

Avoid a sudden stop. Stop the machine gradually.

Set right and left travel levers (5) in NEUTRAL position (N).
The machine stops.



METHOD FOR STEERING MACHINE

METHOD FOR STEERING (CHANGE THE DIRECTION) MACHINE

WARNING

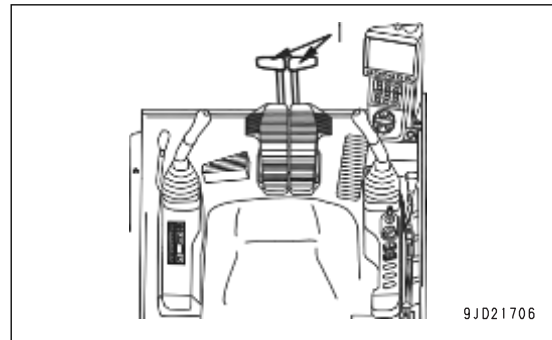
Before operating the travel levers or travel pedals, check the direction that the track frame is facing (the position of the sprocket).

When the sprocket is at the front, the directions of operations of the travel levers or control pedals are the opposite to the direction of movement of the machine.

Use the travel levers to change direction.

Avoid sudden changes of direction to travel as much as possible. Especially when performing counter-rotation turn (spin turn), stop the machine before turning.

Operate 2 travel levers (1) as follows.



Pivot turn

When turning forward left, push the right travel lever forward.

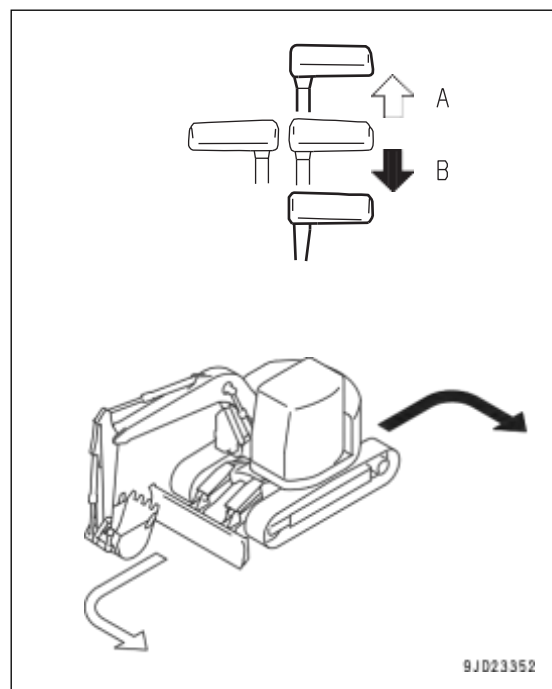
When turning reverse left, pull the right travel lever backward.

(A): Forward left turn

(B): Reverse left turn

REMARK

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



Change direction of machine

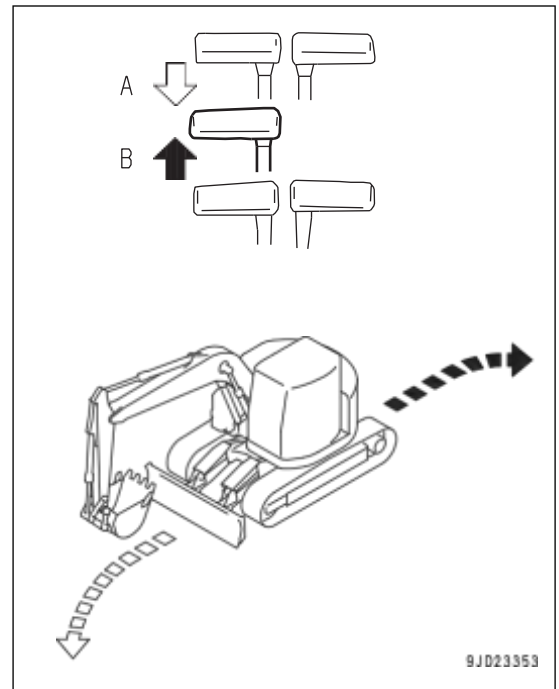
When turning left, return the left travel lever to the neutral position.

(A): Forward left turn

(B): Reverse left turn

REMARK

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

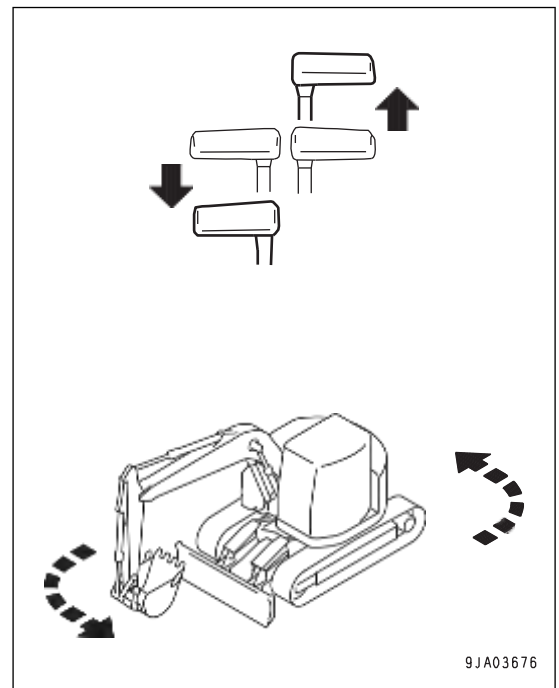


Counter-rotation turn (spin turn)

When performing counter-rotation turn (spin turn) to the left, pull the left travel lever backward and push the right travel lever forward.

REMARK

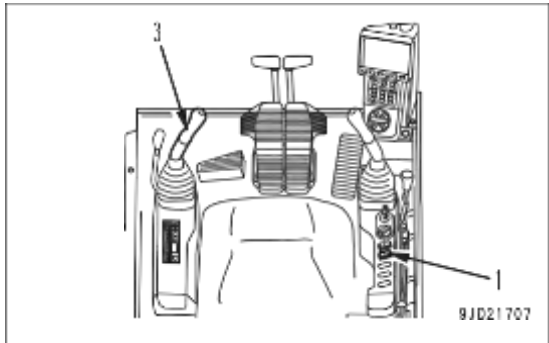
When performing counter-rotation turn to the right, pull the right travel lever backward and push the left travel lever forward.



METHOD FOR SWINGING MACHINE

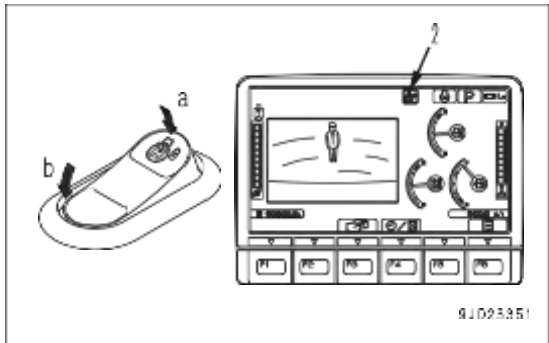
WARNING

- The tail of the machine extends outside the tracks. Check that there is no one around the machine before operating the swing.
- If the travel levers are operated when the engine speed is decreased by the auto-deceleration function, the engine speed will suddenly increase. Operate the levers carefully.

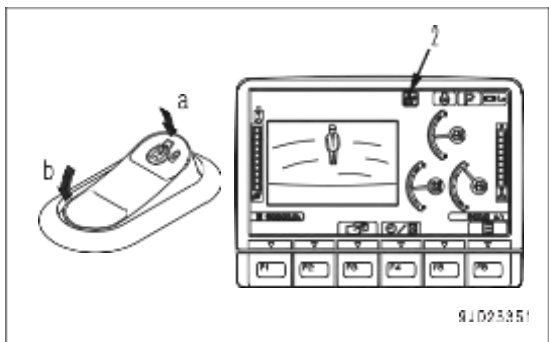
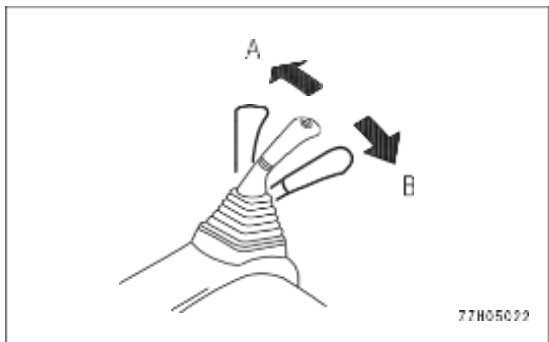


When swinging the upper structure, do as follows.

1. Before swinging, turn swing lock switch (1) OFF (canceled).
 - (a) : ON position
 - (b) : OFF position
2. Check that swing lock pilot lamp (2) is not lit.
3. Operate L.H. work equipment control lever (3) to swing the upper structure.
 - (A) : Swing LEFT
 - (B) : Swing RIGHT



4. When not performing the swing, turn swing lock switch (1) ON (activated).
 - (a) : ON position
 - (b) : OFF position
5. Check that swing lock pilot lamp (2) is lit.



METHOD FOR OPERATING WORK EQUIPMENT

WARNING

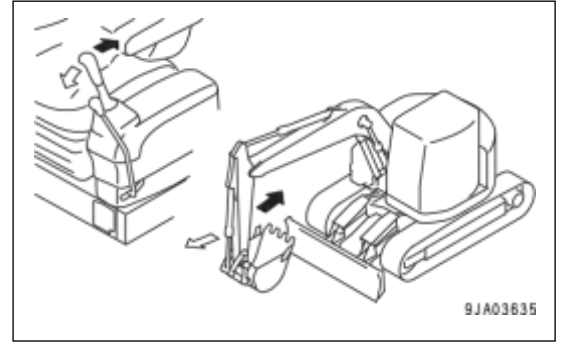
If the travel levers are operate when the engine speed is decreased by the auto-deceleration function, the engine speed will suddenly increase. Operate the levers carefully.

Use the R.H. and L.H. work equipment control levers to operate the work equipment. When the work equipment control levers are released, they return to NEUTRAL position and the work equipment is held in that position.

- Arm operation

Move the L.H. work equipment control lever back and forth.

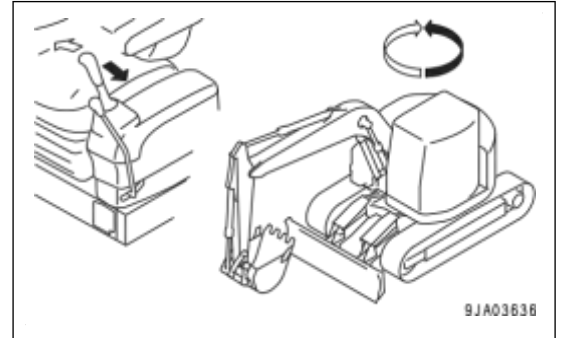
You can operate the arm.



- Swing operation

Move the L.H. work equipment control lever to the right and left.

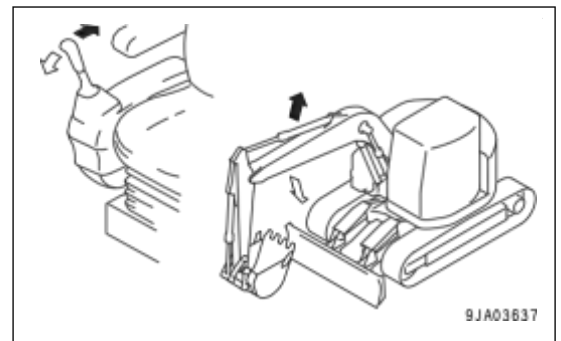
The upper structure swings.



- Boom operation

Move the R.H. work equipment control lever back and forth.

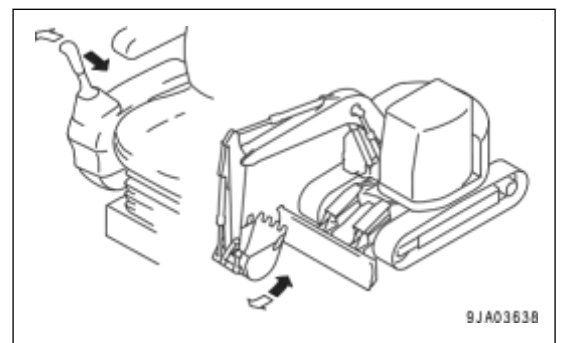
You can operate the boom.



- Bucket operation

Move the R.H. work equipment control lever to the right and left.

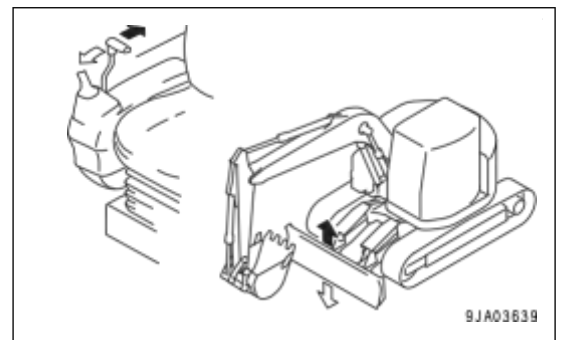
You can operate the bucket.



- Blade operation (Machine with blade)

Operate the blade control lever back and forth.

You can operate the blade.



If the work equipment control levers are returned to NEUTRAL position when the machine is stopped, even if the fuel control dial is set to High idle (MAX) position, the auto-deceleration mechanism works to reduce the engine speed to the low speed.

REMARK

This machine is equipped with an accumulator in the control circuit. Even if the engine is stopped, if the starting switch key is turned to ON position within 15 seconds after stopping the engine, and the lock lever is set to FREE position, it is possible to use the lever operation to lower the work equipment to the ground.

This procedure can also be used for releasing the remaining pressure in the hydraulic cylinder circuits or for lowering the boom after loading the machine onto a trailer.

HANDLE WORKING MODE

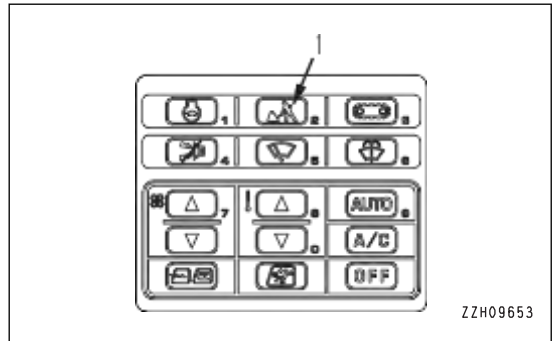
METHOD FOR SELECTING WORKING MODE

Use working mode selector switch (1) to select the working mode that matches the operating conditions or purpose. This will make it possible to perform operations efficiently.

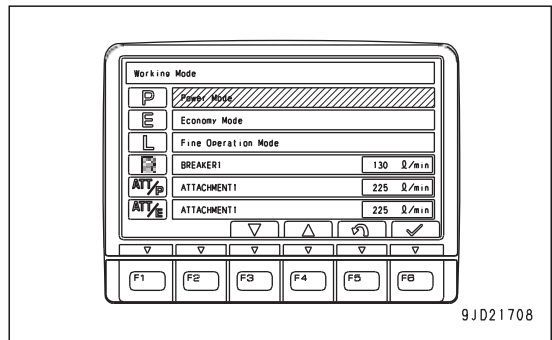
Use the following procedure to select the most efficient working mode.

When the starting switch is turned on, the working mode is set to the mode that was in operation when the starting switch was last turned off.

Use the working mode selector switch to set the mode to the most efficient mode to match the type of work.



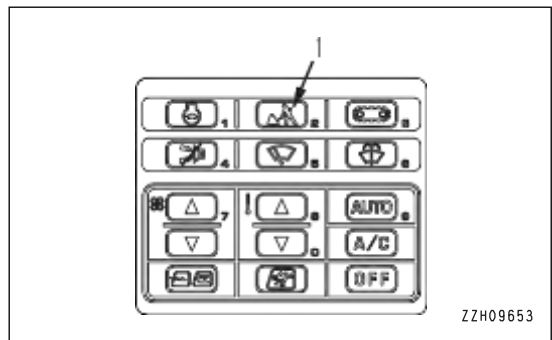
Working mode	Applicable operations
P mode	Normal digging or loading operations (production conscious operation)
E Mode	Normal digging or loading operations (fuel consumption conscious operation)
L mode	Positioning operations (fine control operations)
B mode	Breaker operation
ATT/P mode	Operations of 2-way attachment such as crusher, etc. (production conscious operation)
ATT/E mode	Operations of 2-way attachment such as crusher, etc. (fuel consumption conscious operation)



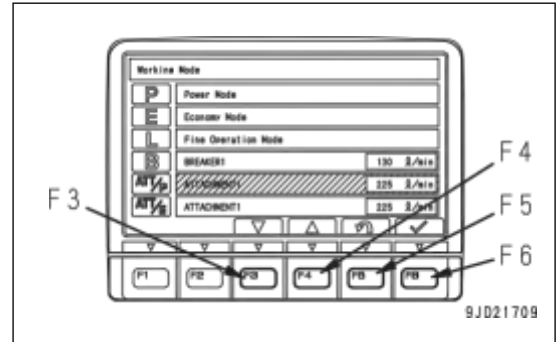
NOTICE

Do not perform breaker operations in any mode other than the breaker mode. Otherwise, the breakage of hydraulic component will occur.

1. Press working mode selector switch (1).
The screen changes to "Working Mode" screen.

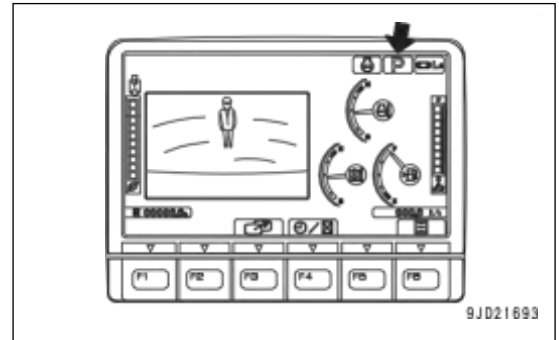


- Press the working mode selector switch or, function switch F3 or F4 to select the appropriate mode.



- Select a desired working mode and press function switch F6.
The change is entered and the screen returns to the standard screen.

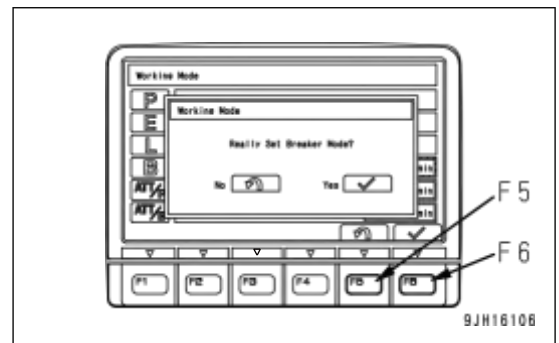
If function switch F5 is pressed, the screen returns to the standard screen without changing the mode.



- If a working mode is selected, and nothing is done for 5 seconds, the selected working mode is automatically accepted and the screen returns to the standard screen.
- If a working mode is selected and working mode selector switch (1) is kept pressed, the selected mode is accepted and the screen returns to the standard screen.
- If the breaker mode is selected, "Really Set Breaker Mode?" is displayed on the screen.

When setting to the breaker mode, press function switch F6.

If function switch F5 is pressed, the screen returns to the working mode selection screen.



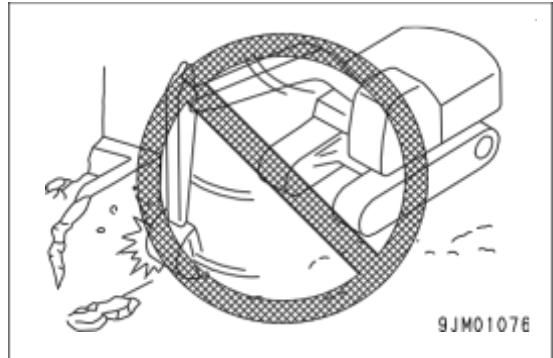
PROHIBITED OPERATIONS

WARNING

- Do not operate the work equipment control lever when the machine is traveling.
- If any lever is operated when the auto-deceleration is being actuated, the engine speed will suddenly increase, so be careful when operating.

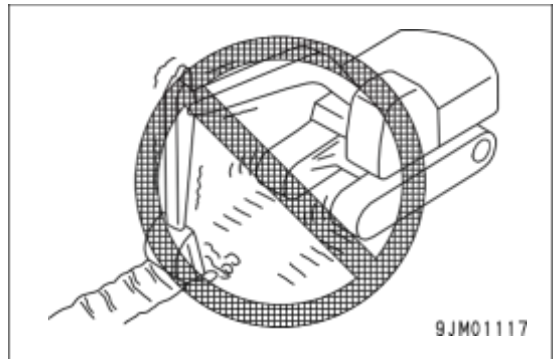
PROHIBITION OF OPERATIONS USING SWING FORCE

Do not use the swing force to compact soil or break objects. This is not only dangerous, but also drastically reduces the life of the machine.



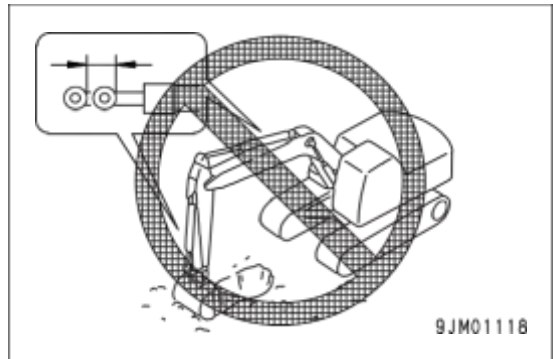
PROHIBITION OF OPERATIONS USING TRAVEL FORCE

Do not use the travel force to perform excavation by digging the bucket into the ground. This damages the machine or work equipment.



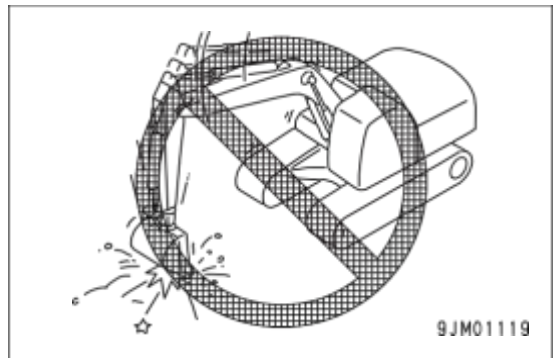
PROHIBITION OF OPERATIONS USING HYDRAULIC CYLINDERS TO STROKE END

If the work equipment is used with the cylinder rod operated to its stroke end, and given impact by some external force, the hydraulic cylinders may be damaged, causing personal injury. Do not perform operations with the hydraulic cylinder fully retracted or fully extended.



PROHIBITION OF OPERATIONS USING BUCKET DROPPING FORCE

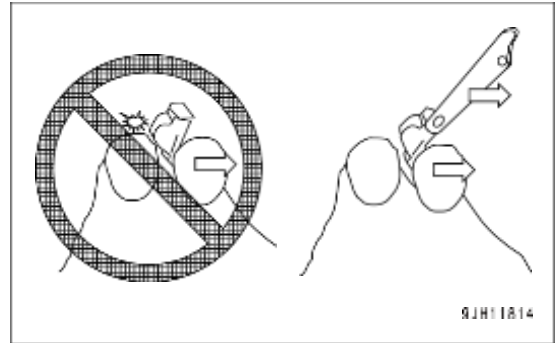
Do not use the dropping force of the machine for digging, nor use the dropping force of the bucket as a mattock, breaker, or pile driver. This will drastically reduce the life of the machine.



PROHIBITION OF OPERATIONS USING BUCKET AS LEVER

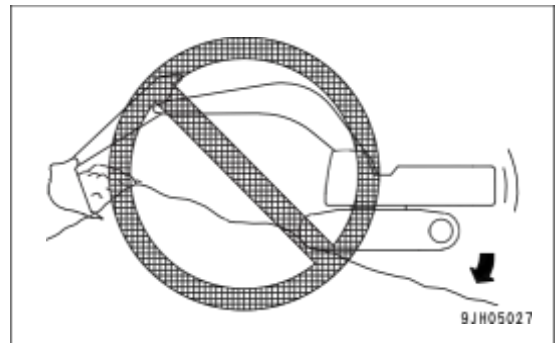
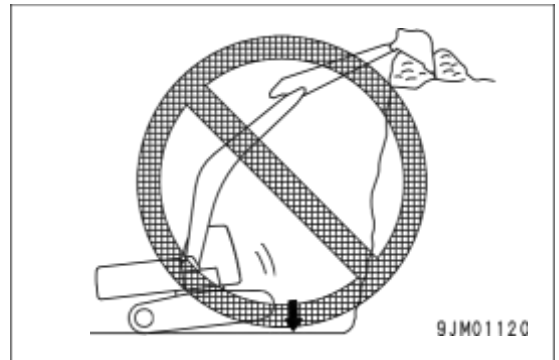
Do not put the bucket back to a rock and use it as a lever to dig. This can apply an excessive force to the chassis and bucket, and the machine may break.

In this case, dig by using only the force of the arm or bucket. If an excessive force is applied, the safety valve of the hydraulic system controls it into a proper range to prevent breakage of the machine.



PROHIBITION OF OPERATIONS USING MACHINE DROPPING FORCE

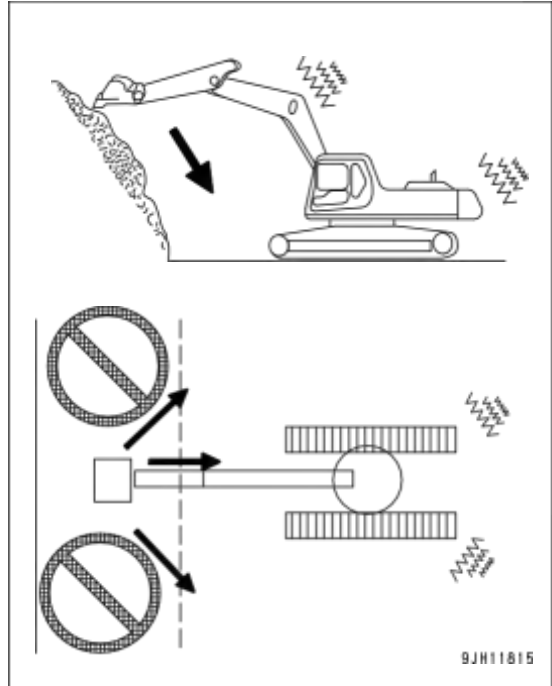
Do not use the dropping force of the machine for digging.



PROHIBITION OF DIGGING OPERATION AT AN ANGLE WITHOUT ENGAGING TEETH

If the machine swings and digs simultaneously while the bucket blade does not bite into hard rocks at a position higher than the machine, the teeth slide down on the rock surfaces. As a result, large vibration occurs in the machine and can crack the work equipment or frame.

If the bucket blade slides and collides with a rock, an excessive impact load occurs in the work equipment and frame and can shorten the service life of the machine.

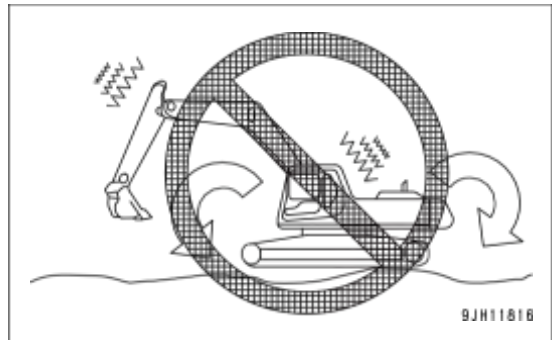


PROHIBITION OF DIGGING OPERATION ON HARD ROCKY GROUND

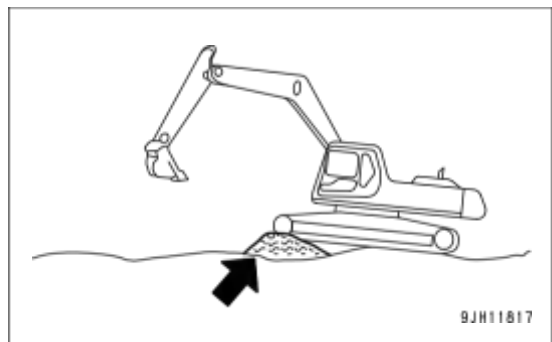
Do not attempt to directly excavate hard rocky ground with the work equipment. It is better to excavate it after breaking up by some other means. This will not only save the machine from damage but will make for better economy.

PROHIBITION OF OPERATIONS WHEN MACHINE IS NOT STABLE

If the machine is operated while its undercarriage is unstable, torsional loads occur in the frames and can shorten the service life of the machine.



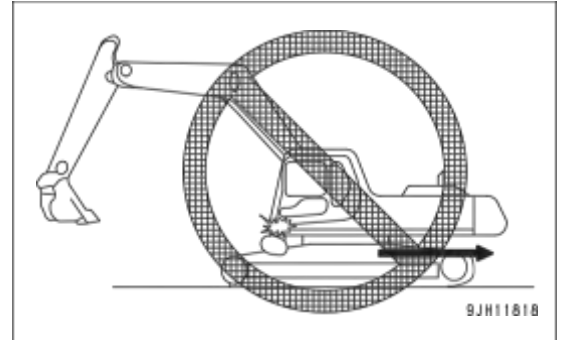
In this case, prepare an embankment, etc. in front of the track to stabilize the machine.



PROHIBITION OF SWINGING OR TRAVELING WHEN ROCK IS ON TOP OF TRACK ASSEMBLY

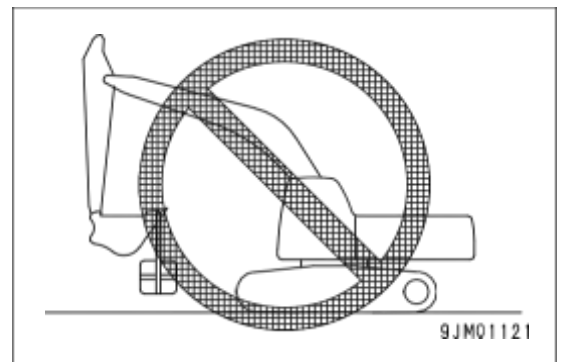
If the machine travels or swings with crushed stones, soil, or sand on the track, they hit and damage the undercover and frame. In the worst case, the hydraulic components are damaged and a serious accident can result.

During operation, keep checking the track top for crushed stones, soil, and sand.



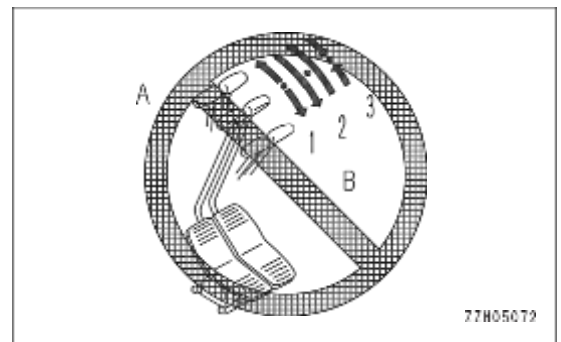
DO NOT PERFORM LIFTING OPERATIONS

Although lifting operation with this machine is prohibited, it is permitted only when the special lifting hook is installed.



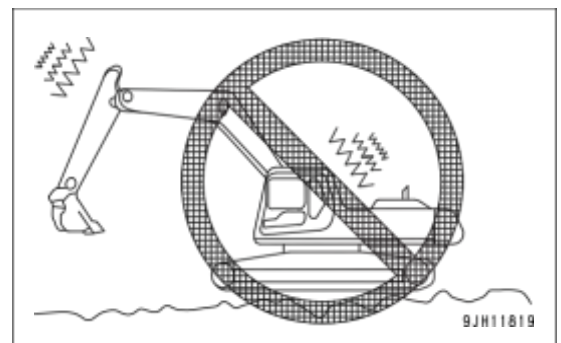
PROHIBITION OF SUDDEN LEVER OR PEDAL SHIFT DURING HIGH SPEED TRAVEL

- (1) Do not operate the levers and pedals suddenly nor take any other action to move the machine quickly.
- (2) Do not operate the levers or pedals suddenly from FORWARD (A) to REVERSE (B) (or from REVERSE (B) to FORWARD (A)).
- (3) Do not operate the levers or pedals suddenly (do not release them suddenly) to stop the machine when driving it at high speed.

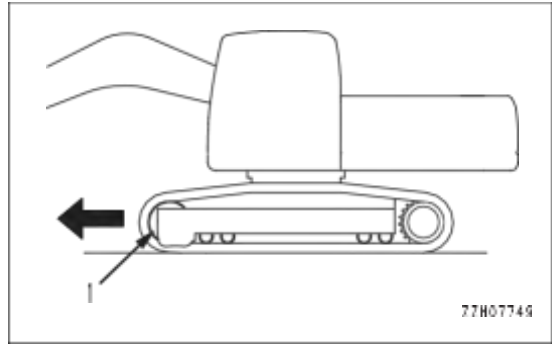


PROHIBITION OF HIGH-SPEED TRAVEL OPERATIONS ON ROUGH GROUND

If the machine travels on rough ground (rock-bed, etc.) at high speed, large push-up loads are applied to the chassis, thus the service life of the chassis is shortened.

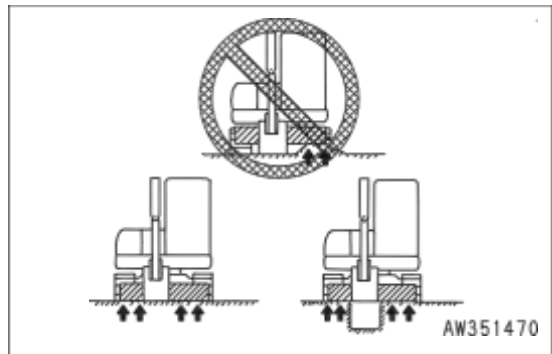


When driving on rough ground (rock-bed, etc.), direct the idler (1) having the cushion mechanism in the travel direction and drive the machine at low speed.



GROUND WHOLE THE BOTTOM SIDE OF BLADE TO SUPPORT MACHINE

When using the blade as an outrigger, never support the machine with only one end of the blade.



DO NOT TRAVEL LONG -TIME CONTINUOUSLY

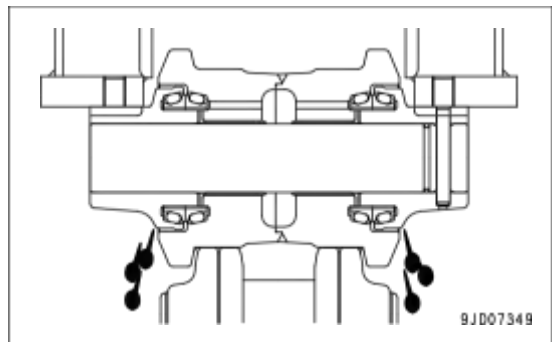
If the machine travels continuously at high speed for 1.5 hours or more, the temperature of lubricating oil inside the track rollers and final drive will rise up. This may cause breakage to the oil seal or leakage of oil.

When driving the machine continuously for a long time, stop it for 30 minutes every one and a half hours to cool the lubricating oil inside the track rollers and final drives.

If the machine travels continuously for a long time with the tracks loosened, it may break the undercarriage parts.

When driving the machine for a long time, check the track tension every 1.5 hours and adjust any looseness.

For the adjustment, see MAINTENANCE, "METHOD FOR CHECKING TRACK TENSION (4-23)".

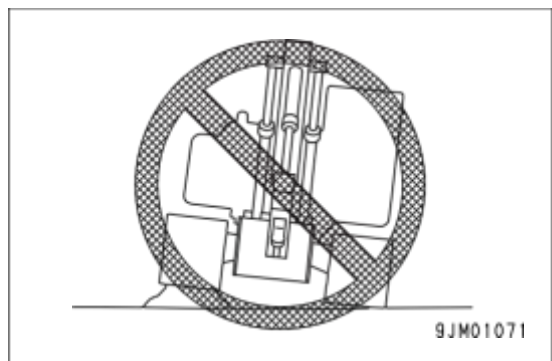


PRECAUTIONS FOR OPERATION

PRECAUTIONS FOR TRAVELING

Traveling over boulders, tree stumps, or other obstacles will cause a big shock to the chassis (and in particular to the undercarriage), and this will cause damage to the machine. For this reason, always remove any obstacles or drive the machine around them, or take other steps to avoid traveling over such obstacles as far as possible.

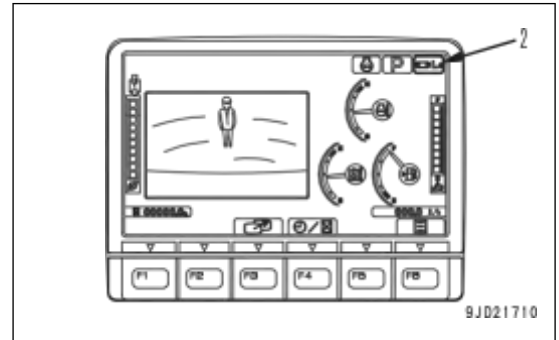
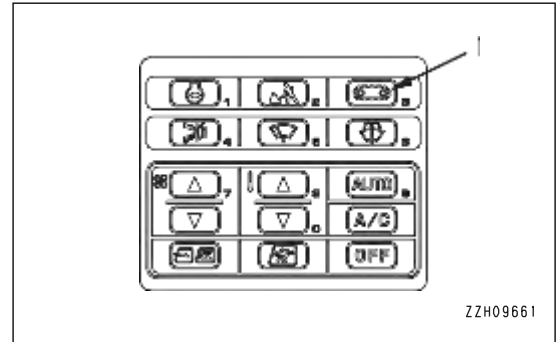
If there is no way to avoid traveling over an obstacle, reduce the travel speed, keep the work equipment close to the ground, and try to drive the machine so that the center of the track passes over the obstacle.



PRECAUTIONS FOR HIGH SPEED TRAVEL

On uneven roadbeds such as rock beds or uneven roads with large rocks, drive the machine at "Lo" speed. When driving the machine at "Hi" speed, direct the idler forward.

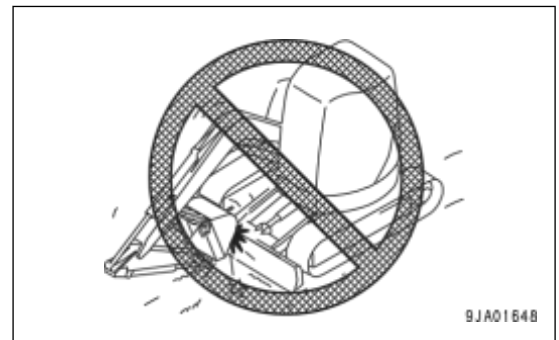
- Press travel speed selector switch (1) to switch the travel speed. The travel speed (“Lo”, “Hi”) is displayed on travel speed display (2).



PRECAUTIONS FOR FOLDING WORK EQUIPMENT

(Machine with blade)

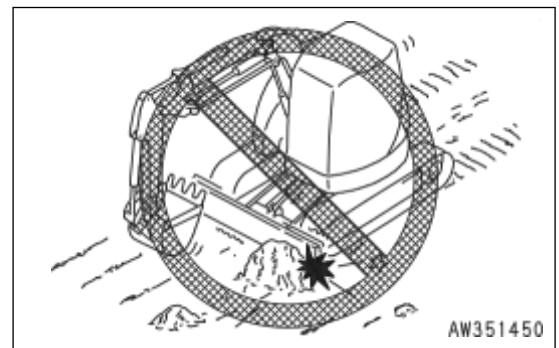
When folding in the work equipment to the travel or transportation posture, be careful not to let the bucket hit the blade.



PRECAUTIONS FOR HITTING BLADE AGAINST OBJECTS DURING OPERATING BLADE

(Machine with blade)

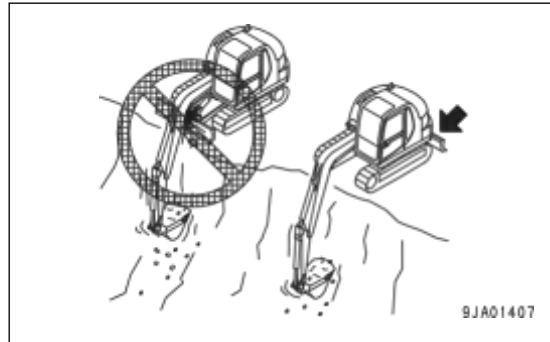
Be careful not to hit the blade against rocks or boulders. This will cause premature damage to the blade or cylinders.



PRECAUTIONS FOR BLADE POSITION DURING BACKHOE OPERATION

(Machine with blade)

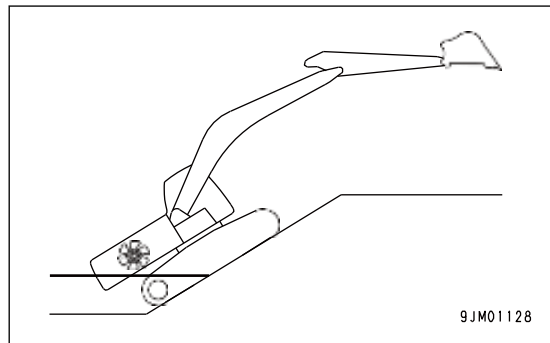
When performing the backhoe operation near the blade, take care that the boom cylinder does not touch the blade. Dig with the blade at the rear usually, and dig in front of the blade only when required.



PERMISSIBLE DEPTH OF WATER, SOIL AND DIRT

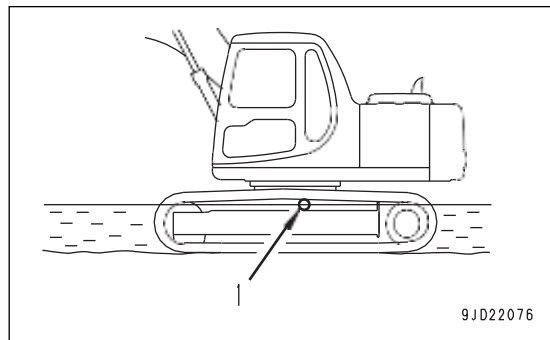
NOTICE

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



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

After the job, be sure to supply grease to the parts which have been under water for a long time until the used grease is projected. (Around the bucket pin, in particular)

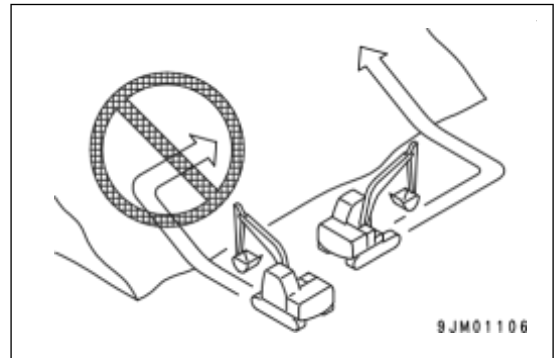
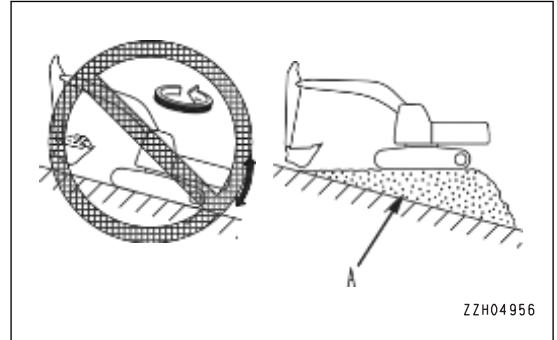


PRECAUTIONS FOR WORKING ON SLOPE

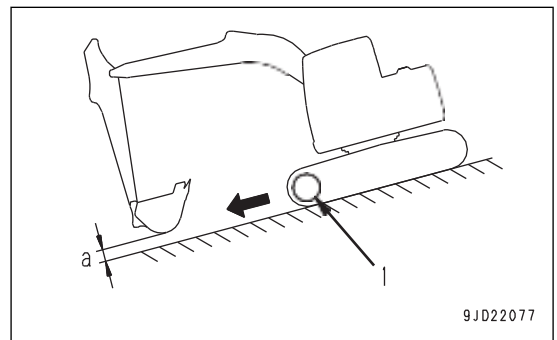


WARNING

- Swinging operations or operating the work equipment on slopes machine may lose its balance and tip over. Avoid such operations as much as possible. It is particularly dangerous to swing downhill when the bucket is loaded. If it is unavoidable to perform such operations, prepare an embankment to make a platform (A) on the slope so that the machine is horizontal.
- Do not work or travel on a slope covered with the steel plates. Even with slight slopes, there is a hazard that the machine may slip.
- Do not travel up or down on steep slopes. There is a danger that the machine may turn over.
- When driving the machine, raise the bucket approximately 20 to 30 cm above the ground. Do not travel downhill in reverse.
- Never turn on slopes or travel across slopes. Go down to a flat place once, and take a safer way such as a detour.
- Stay alert while driving and operating the machine in order to stop it safely when the machine slips or becomes unstable.
- When traveling uphill, if the shoes slip or it is impossible to travel uphill using only the force of the tracks, do not use the pulling force of the arm to help the machine travel uphill. There is danger that the machine may tip over. Accordingly, do not travel uphill with this method.

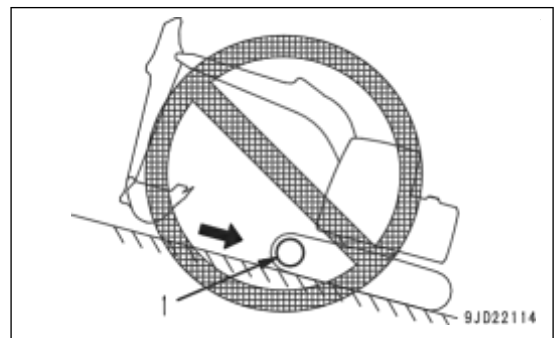


- When traveling down steep hills, use the travel lever and fuel control dial to keep the travel speed low. When traveling down a steep hill of more than 15° , set the machine to the posture shown in the figure with sprocket (1) downward and lower the engine speed. (a): 20 to 30 cm

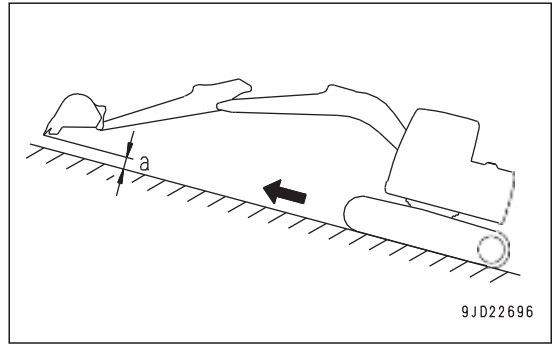


REMARK

Travel down with sprocket (1) downward. If the machine travels down with sprocket (1) upward, the tracks may be loosened and may jump teeth.



- When traveling up a steep hill of more than 15°, set the work equipment to the posture shown in the figure.
(a) : 20 to 30 cm



Braking on downhill slope

Set the travel lever in NEUTRAL position, and the brake is applied automatically.

If engine stops

If the engine stops when traveling uphill, move the travel levers to NEUTRAL position, lower the bucket to the ground, stop the machine, then start the engine again.

When operating on slope

- Never perform the swing operation on a slope by using the left work equipment control lever if the engine is stopped. Otherwise, the upper structure will swing under its own weight.
- Do not open or close the slide door while traveling or operating the machine on a slope. The operating effort may suddenly change.
Always keep the slide door locked.
- When opening or closing the slide door while the machine is stopped, take extreme care. The door opens or closes suddenly under its own weight, and it is dangerous.

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 ESCAPING FROM MUD

Always operate carefully to avoid getting stuck in mud. If the machine does get stuck in mud, do as follows to get the machine out.

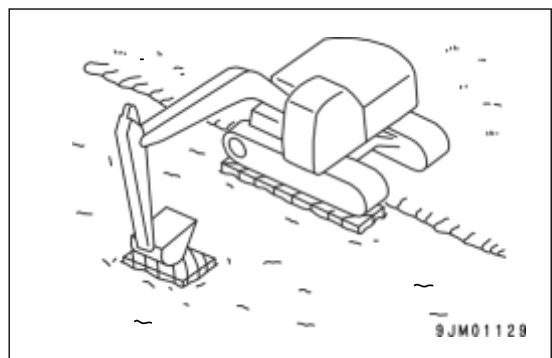
METHOD FOR ESCAPING WHEN TRACK ON ONE SIDE IS STUCK

NOTICE

**When using the boom or arm to raise the machine, push the ground by using the bottom of the bucket. (Do not raise with the teeth in contact with the ground)
The angle between the boom and arm should be 90° to 110°.
The same applies when using the bucket installed in the reverse direction.**

When the track on either side gets stuck, pull out the machine according to the following procedure.

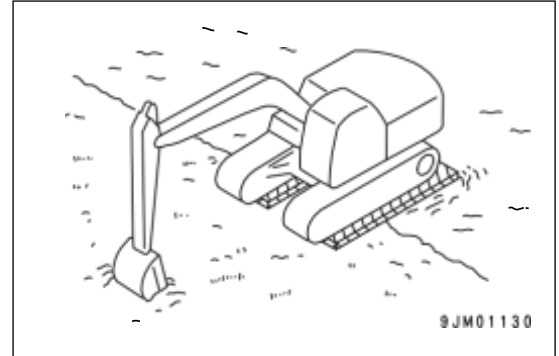
- Move the bucket to the side of the stuck track and press the ground with it.
The track is raised.
- Place logs, wooden blocks, etc. under the track.
- Raise the bucket and escape.



METHOD FOR ESCAPING WHEN TRACKS ON BOTH SIDES ARE STUCK

When the tracks on both sides get stuck, pull out the machine according to the following procedure.

1. Place logs, wooden blocks, etc. under the tracks according to the above procedure.
2. Push the bucket into the front ground.
3. Move the arm IN as in digging work and set the travel lever to FORWARD to pull out the machine.



RECOMMENDED APPLICATIONS

In addition to the following, it is possible to further increase the range of applications by using various attachments.

RECOMMENDED APPLICATIONS

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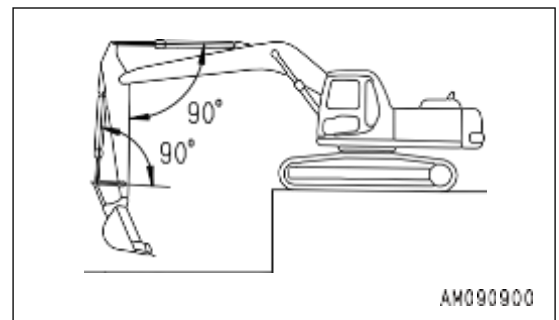
DIGGING WORK

BACKHOE WORK

A backhoe is suitable for excavating areas that are lower than the machine.

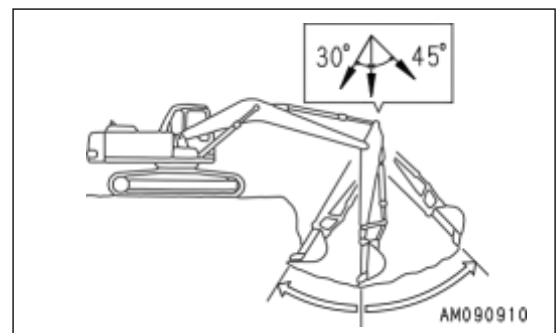
When the condition of the machine is as shown in the figure (angle between "bucket cylinder and link" and "arm cylinder and arm" is 90 deg.), the maximum excavation force is obtained from the pushing force of each cylinder.

When excavating, you can optimize your working efficiency by using this angle effectively.



The range for excavating with the arm is from a 45 deg. angle away from the machine to a 30 deg. angle towards the machine.

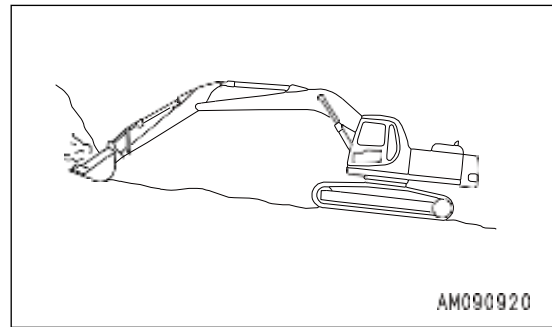
There may be some differences depending on the excavation depth, but try to stay within the above range rather than operating the cylinder to the end of its stroke.



SHOVEL WORK

A shovel is suitable for excavating at a position higher than the machine.

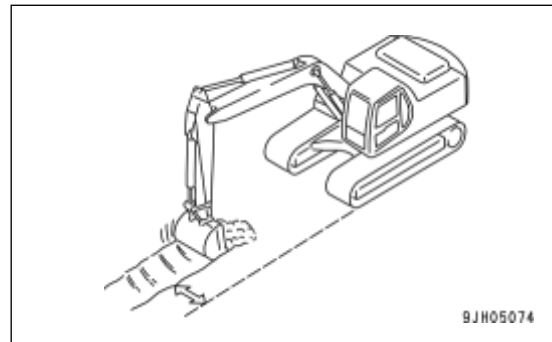
Shovel work is performed by attaching the bucket in the reverse direction.



DITCHING WORK

Ditching work can be performed efficiently by attaching a bucket which matches the digging operation and then setting the tracks parallel to the line of the ditch to be excavated.

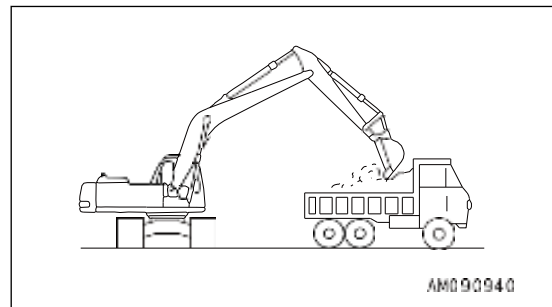
To excavate a wide ditch, first dig both sides and then finally remove the center portion.



LOADING WORK

In places where the swing angle is small, work efficiency can be enhanced by locating the dump truck in a place easily visible to the operator.

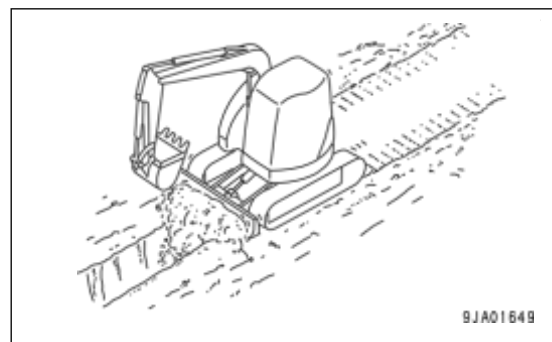
Loading is easier and capacity becomes greater if you stop the machine at the rear of the dump truck than if loading is done from the side.



LEVELING WORK

(Machine with blade)

Use the blade for back filling and leveling work after digging ground.



METHOD FOR REPLACING AND INVERTING BUCKET

WARNING

- When pins are knocked in with a hammer, pieces of metal may fly and cause serious injury. When performing this operation, always wear protective eyeglasses, hard hat, gloves, and other protective equipment.
- Place the removed bucket in a stable condition.
- The pin is hit with a strong force to remove, so the pin may fly out and injure people in the area around the machine. Make sure that there is no one in the area around the machine before starting the work.
- When pulling out the pins, do not stand behind the bucket. In addition, take extreme care not to put your foot under the bucket since the bucket may fall and cause serious injury.
- When removing or inserting pins, be extremely careful not to get your fingers caught.
- Never insert your fingers into the pin holes when aligning the holes.

Stop the machine on a firm and flat surface and do the work. When performing joint work, appoint a leader and follow that person's instructions and signals.

METHOD FOR CHANGING BUCKET

1. Lower the bucket to the flat ground.

REMARK

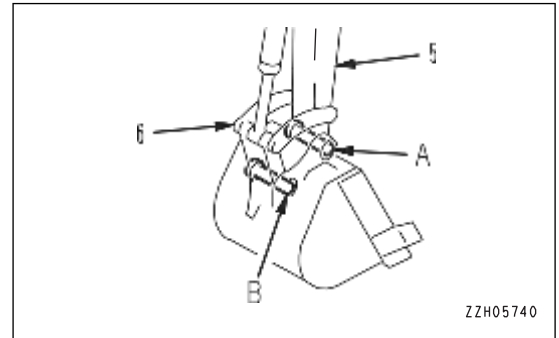
When removing the pins, place the bucket so that it is in light contact with the ground.

If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.

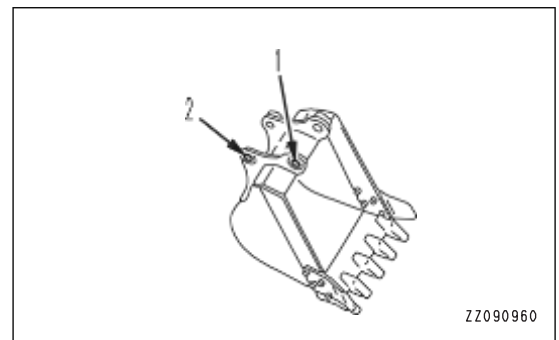
NOTICE

After removing the pins, make sure that mud or sand does not get on them. Dust seals are fitted at both ends of the bushings, be careful not to damage them.

2. Remove the double nut of stopper bolt at arm pin (A) and link pin (B), then pull out the bolts.
3. Pull out arm pin (A) and link pin (B), then remove the bucket.

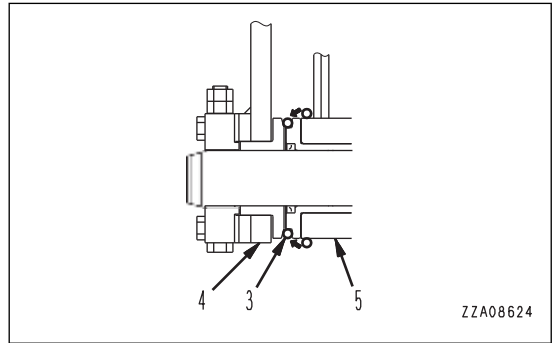


4. Align arm (5) with hole (1) of the replacement bucket.
5. Align link (6) with hole (2) of the replacement bucket.
6. Apply grease to pins (A) and (B) and insert them into holes (1) and (2) of the bucket.



REMARK

- Perform installation in the reverse order to removal.
- Fit O-ring (3) to arm (5) as shown in the figure since it is damaged easily when bucket (4) is installed. After inserting the pin, fit it in the regular groove.



7. Install the lock bolt and nut of each pin.
8. Apply grease to each pin.

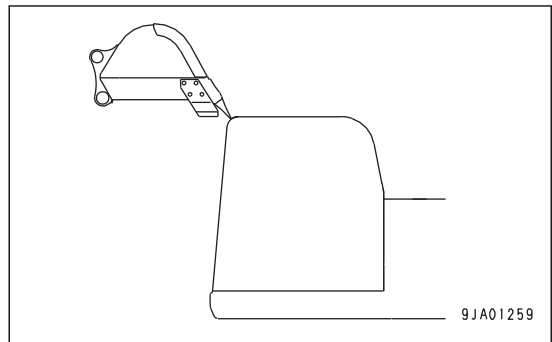
REMARK

- Lubricate with grease thoroughly until the grease comes out from the end faces.
- When replacing the bucket, replace the dust seal with a new one if it is damaged. If a damaged one is used without being replaced, sand and dirt may enter the part of pin and cause abnormal wear of the pin.

METHOD FOR INVERTING BUCKET

WARNING

When reversing a bucket, there is the danger that the bucket tooth tip overruns the normal trajectory and interferes with the cab, thus causing a serious trouble. Pay good attention to the work when reversing a bucket so that the bucket and the cab may not interfere with each other.



1. Lower the bucket to the flat ground.

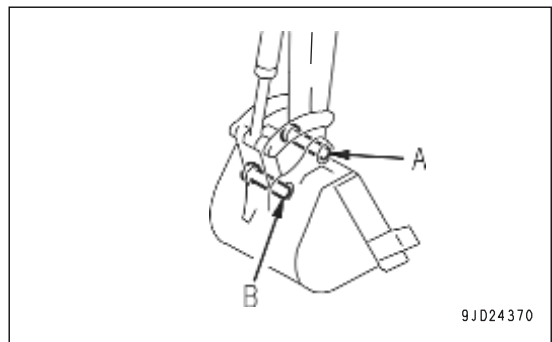
REMARK

When removing the pins, place the bucket so that it is in light contact with the ground. If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.

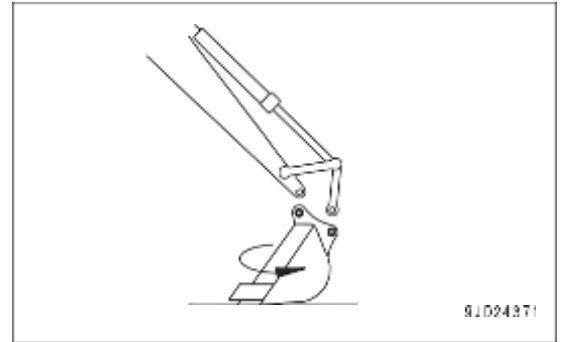
NOTICE

After removing the pins, make sure that mud or sand does not get on them. Dust seals are fitted at both ends of the bushings, be careful not to damage them.

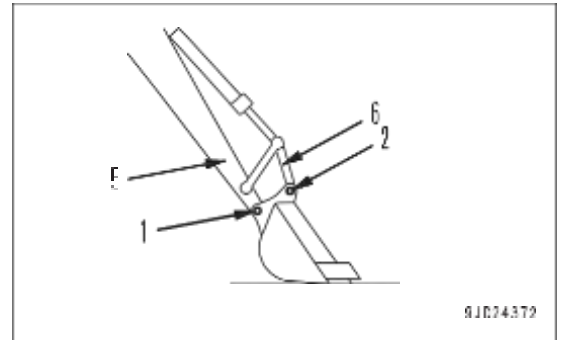
2. Remove the double nut of stopper bolt at arm pin (A) and link pin (B), then pull out the bolts.
3. Pull out arm pin (A) and link pin (B), then remove the bucket.



4. Invert the removed bucket.



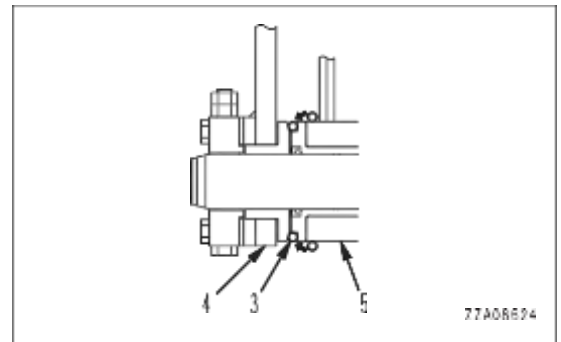
5. Align arm (5) with mounting portion (1).
 6. Align link (6) with mounting portion (2).
 7. Insert grease-coated pins (A) and (B) into mounting portion (1) and mounting portion (2) respectively.



REMARK

Fit O-ring (3) to mounting portion (1) of arm (5) and bucket (4).

Fit O-ring (3) to arm (5) as shown in the figure since it is damaged easily when bucket (4) is installed.
 After inserting the pin, fit it in the regular groove.



8. Install the lock bolt and nut of each pin.
 9. Apply grease to each pin.

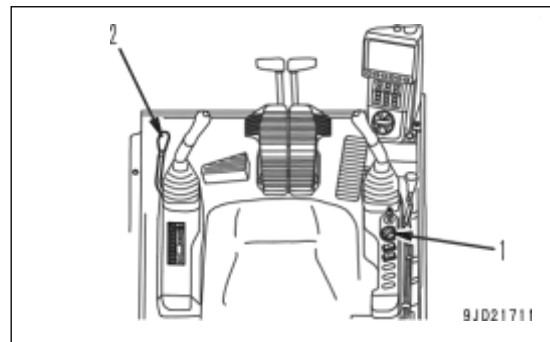
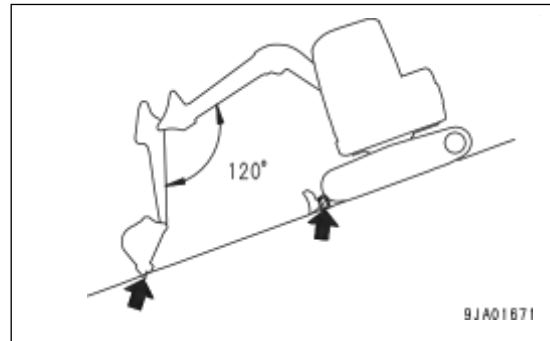
REMARK

- Lubricate with grease thoroughly until the grease comes out from the end faces.
- When replacing the bucket, replace the dust seal with a new one if it is damaged. If a damaged one is used without being replaced, sand and dirt may enter the part of pin and cause abnormal wear of the pin.

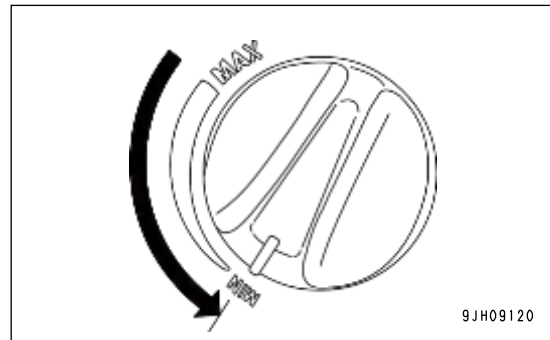
METHOD FOR PARKING MACHINE

WARNING

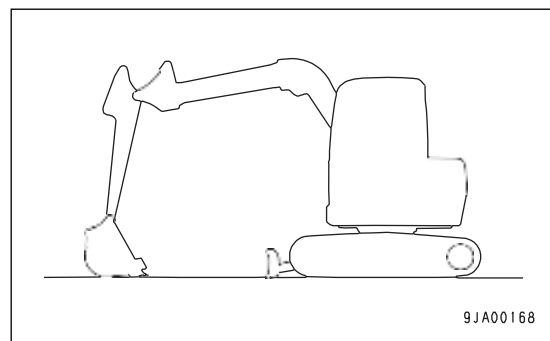
- Place the machine on a firm and level place.
Do not park the machine on a slope.
If it is unavoidably necessary to park the machine on a slope, block the tracks from movement. As an additional safety measure, thrust the work equipment into the ground.
- If the control lever is touched by accident, the machine may move suddenly, and this may lead to a serious personal injury or death. Set the lock lever securely to LOCK position always before leaving the operator's seat.
- Lower the blade to the ground on the downhill side if the machine is equipped with a blade.



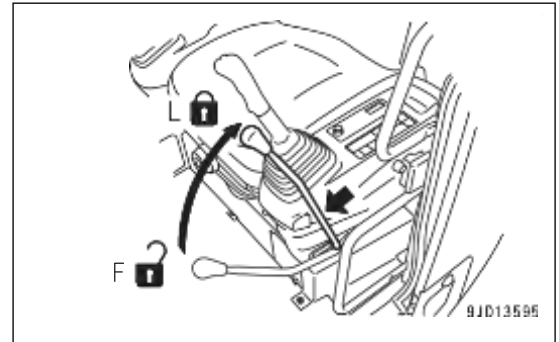
1. Stop the machine.
For details, see "METHOD FOR STOPPING MACHINE (3-171)".
2. Turn the fuel control dial (1) to Low idle (MIN) position and lower the engine speed.



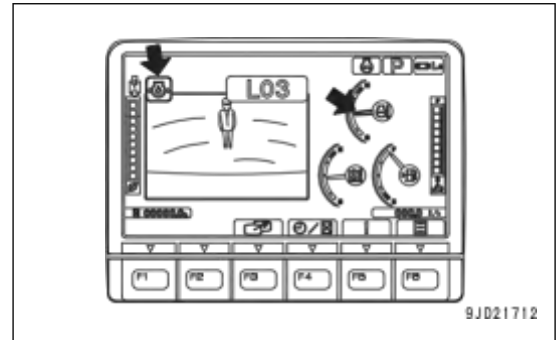
3. Lower the bucket horizontally until the bottom touches the ground.
4. Lower the blade to the ground if the machine is equipped with a blade.



5. Set the lock lever (2) to LOCK position (L).



6. Check the engine coolant temperature and engine oil pressure with the machine monitor.
- If the engine coolant temperature gauge is in the red range, cool down the coolant until the gauge enters the green range, and stop the engine. Then, inspect and take necessary remedy according to “TROUBLES AND ACTIONS (3-234)”.
 - If the engine oil pressure caution lamp is lit, stop the engine immediately. Then, inspect and take necessary remedy according to “TROUBLES AND ACTIONS (3-234)”.



7. Stop the engine.

For the stopping procedure of the engine, see “METHOD FOR STOPPING ENGINE (3-167)”.

METHOD FOR CHECKING AFTER FINISHING WORK

Perform it after stopping the engine.

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

LOCK

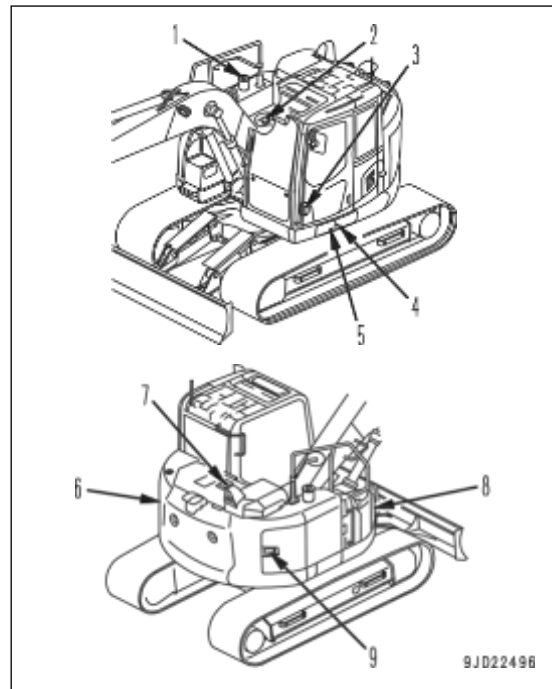
Position to be locked

Always lock the following places.

- (1) Fuel tank filler cap
- (2) Hydraulic tank oil filler cap
- (3) Operator's cab door
- (4) Toolbox and grease pump storage cover
- (5) Left front cover of the machine
- (6) Battery inspection cover
- (7) Engine hood
- (8) Machine right front cover
- (9) Fuel filter inspection cover

REMARK

Use the starting switch key to lock and unlock all these places.



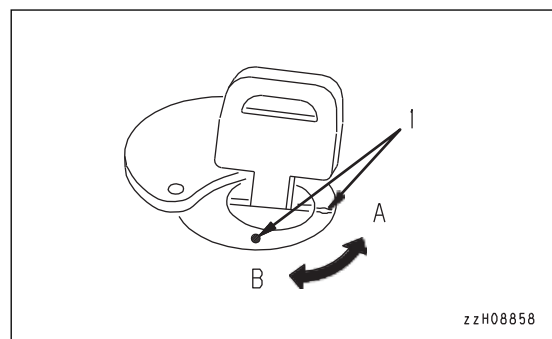
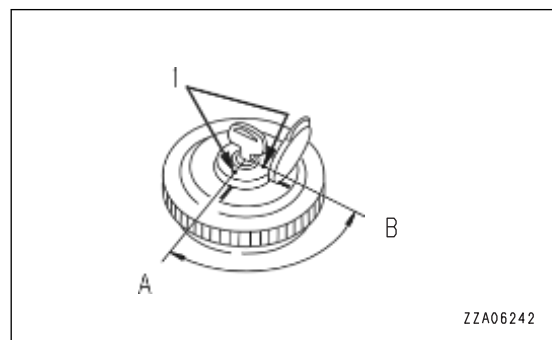
METHOD FOR OPENING AND CLOSING CAP WITH LOCK

PROCEDURE 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)



PROCEDURE FOR CLOSING 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.

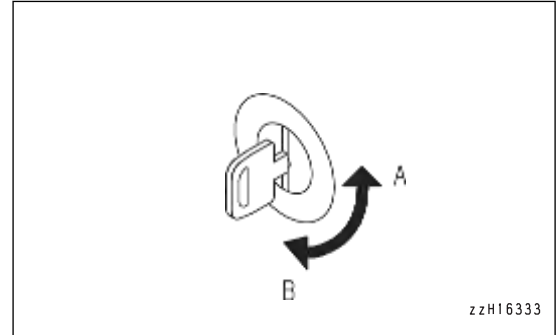
METHOD FOR OPENING AND CLOSING COVER WITH LOCK

METHOD FOR OPENING COVER WITH LOCK

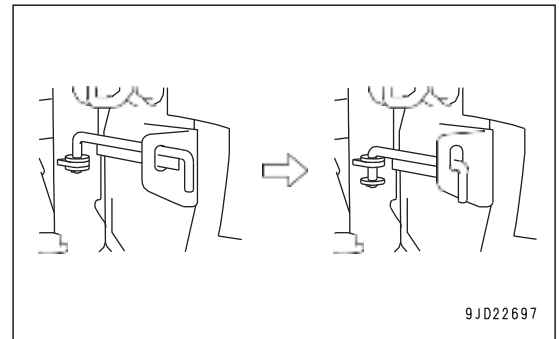
1. Insert the key into the key slot.
2. Turn the key counterclockwise, and pull the cover handle.

Position (A): OPEN

Position (B): CLOSE (LOCK)

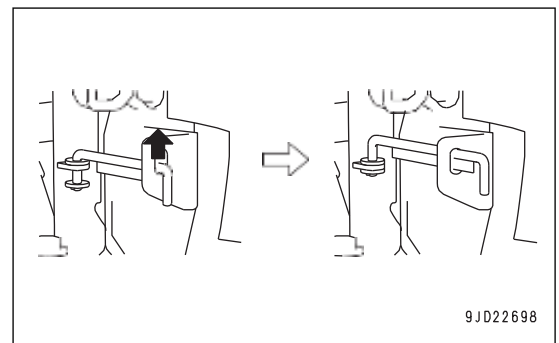


3. If it is equipped with stay for supporting the cover, open the cover wide until the stay is set in LOCK position.



METHOD FOR LOCKING COVER WITH LOCK

1. If it is equipped with a stay for supporting the cover, hold up the stay from the LOCK position.
2. Close the cover and insert the key into the key slot.
3. Turn the key clockwise and remove it.



METHOD FOR OPENING AND CLOSING ENGINE HOOD

CAUTION

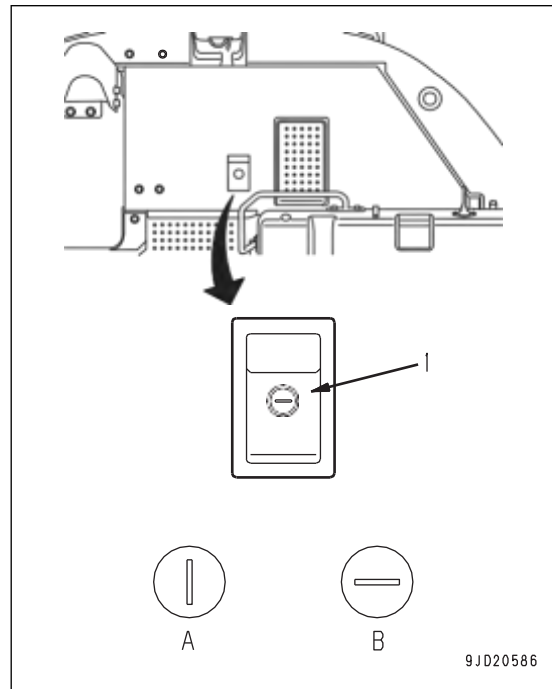
- When opening or closing the engine hood, place the machine on a level ground, lower the work equipment to the ground, stop the engine, then perform the operation.
- When opening the engine hood, do not release the handle until the hood support stay is set in the lock position securely.
- When closing the engine hood, hold the handle securely since the engine hood may moves down because of its own weight.
If the engine hood is not locked, it may close suddenly because of wind, etc.
- Immediately after the engine is stopped, the engine hood is still hot. Accordingly wait until it has cooled down before opening or closing the engine hood.

NOTICE

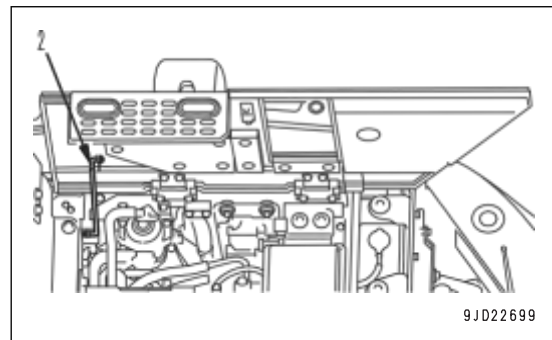
Always keep the hood locked unless you need to open it.

METHOD FOR OPENING ENGINE HOOD

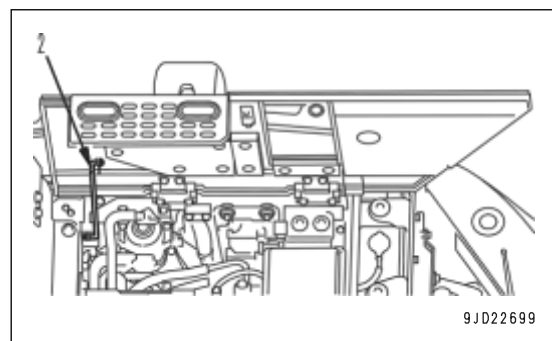
1. Insert the key into the key slot.
2. Turn the key counterclockwise (A) and remove it.
Position (A): OPEN
Position (B): CLOSE (LOCK)
3. Unlock the lock by pulling the engine hood open lever (1) to your side.
4. Hold the engine hood grip, and open the engine hood.



5. Set the hood support stay (2) to the hood fixing position.

**METHOD FOR LOCKING ENGINE HOOD**

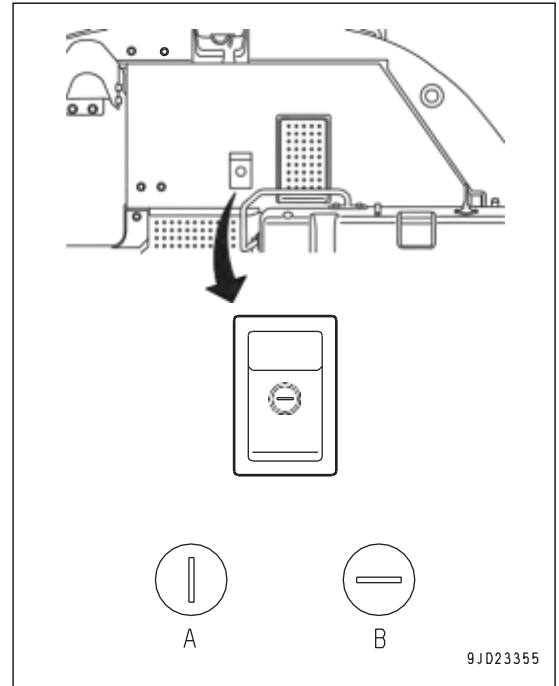
1. Hold the grip of engine hood, and remove the hood support stay (2) from the hood fixing position.
2. Check that stay (2) is set in sliding position, and then close the engine hood.
3. Close the hood slowly and push it to lock it securely.
4. Insert the key into the key slot.



5. Turn the key clockwise (B) and remove it.

(A): OPEN

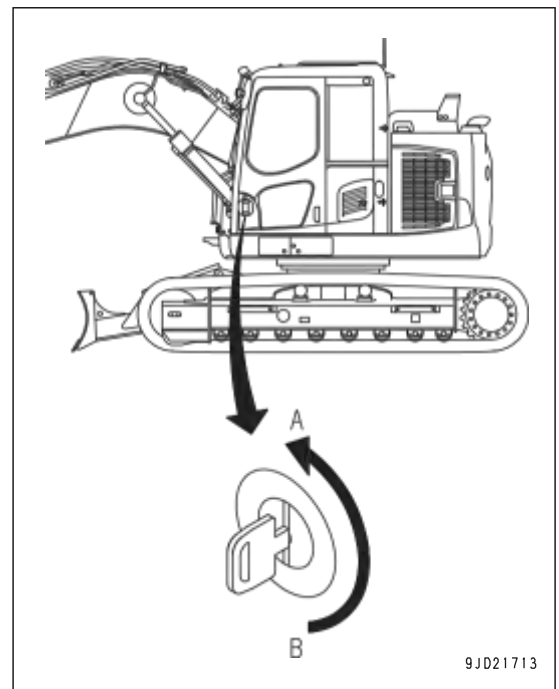
(B): CLOSE



METHOD FOR OPENING AND CLOSING CAB DOOR

METHOD FOR OPENING CAB DOOR

1. Insert the key into the key slot.
2. Turn the key counterclockwise (A) and remove it.
Position (A): OPEN
Position (B): CLOSE (LOCK)

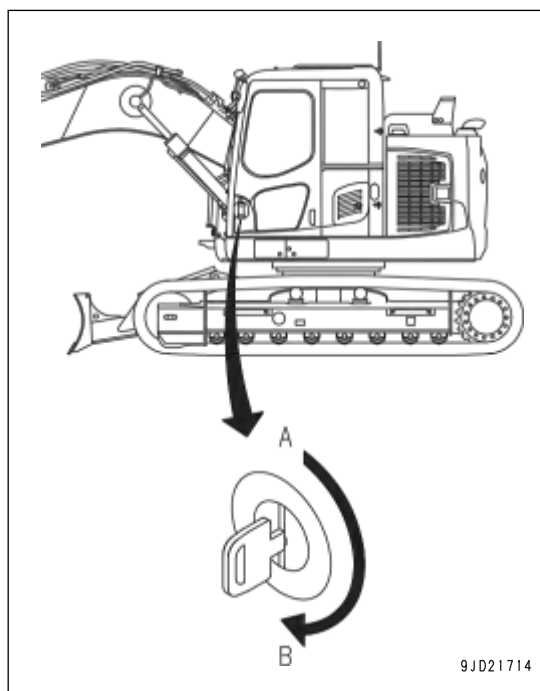


METHOD FOR LOCKING CAB DOOR

1. Close the door and insert the key into the key slot.
2. Turn the key clockwise (B) and remove it.

Position (A): OPEN

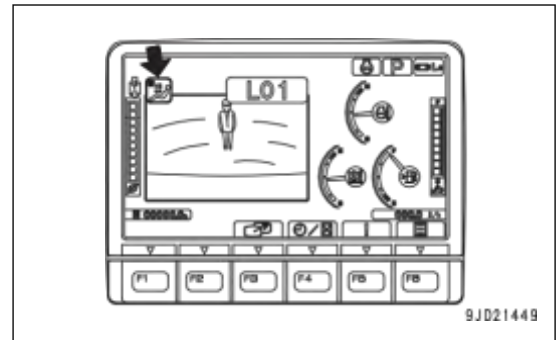
Position (B): CLOSE (LOCK)



HANDLE AIR CONDITIONER

NOTICE

- 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 these parts.
- 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.
- When the air conditioner is not being 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.
- 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

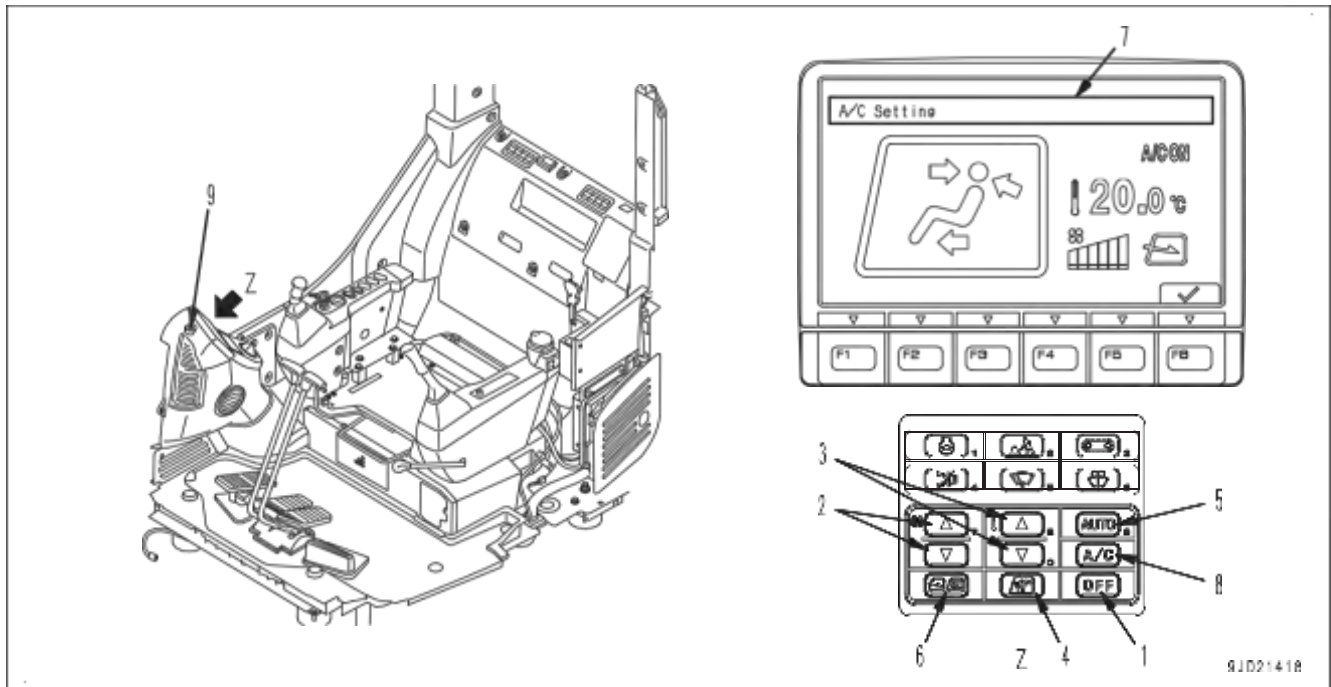
- When running the air conditioner for a long time, turn the lever to FRESH position once an hour to perform ventilation and cooling.
- If you smoke when the air conditioner is on, the smoke may hurt your eyes. In such case, open the window and turn the lever to FRESH for a while for ventilation and 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 lower than the ambient temperature) when you enter the cab.

Be extremely careful to select the appropriate temperature.

EXPLANATION OF AIR CONDITIONER EQUIPMENT



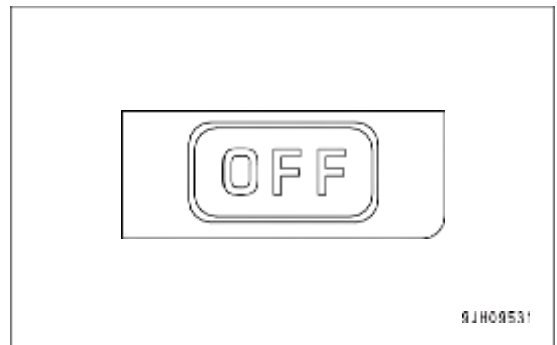
- (1) OFF switch
- (2) Fan switch
- (3) Temperature control switch
- (4) Vent selector switch
- (5) Auto switch
- (6) FRESH/RECIRC air selector switch
- (7) Monitor
- (8) Air conditioner switch
- (9) Sunlight sensor

OFF SWITCH

This 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.

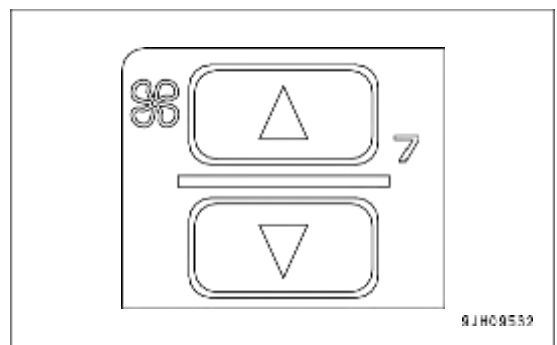


FAN SWITCH







You can adjust the air flow by using the fan switch.

The air flow can be adjusted to 6 levels.

- Press the Δ switch to increase the air flow; press the ∇ switch to decrease the air flow.
- During auto operation, the air flow is automatically adjusted.



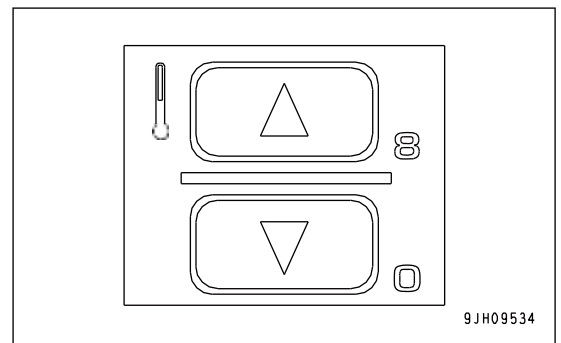
Monitor display and air flow

Monitor display	Air flow rate
	Air flow "low"
	Air flow "medium 1"
	Air flow "medium 2"
	Air flow "medium 3"
	Air flow "medium 4"
	Air flow "high"

TEMPERATURE SET SWITCH

Use the temperature set switch to adjust the temperature inside the cab. The temperature can be set between 18°C and 32°C.

- 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.
- The temperature can be set in stages of 0.5°C.



Monitor display and function

Monitor display (°C)	Set temperature
18.0	Max. cooling
18.5 to 31.5	Adjusts temperature inside cab to set temperature
32.0	Max. heating

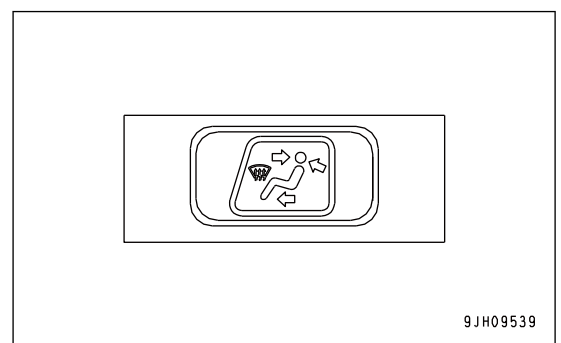
REMARK

If the mode is set to auto mode and the temperature setting is set to 18.0°C or 32.0°C, the air flow from the fan is always set to HIGH and does not change even when the temperature reaches the set value.

VENT SELECTOR SWITCH

Use vent selector switch to select the vents.

- When vent selector switch is pressed, the arrow display on the monitor switches and air blows out from the vents displayed.
- During automatic operation, the vents are automatically selected.



(A): Rear vent (2 places)

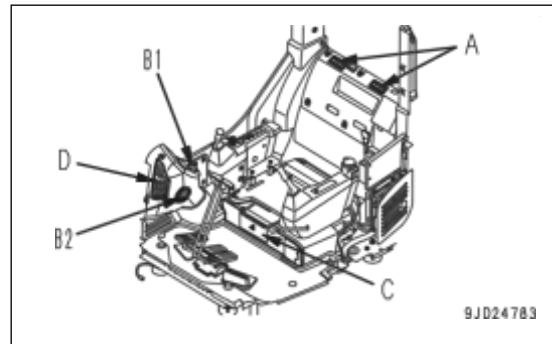
(B1): Face vent (1 place)

(B2): Foot vent (1 place)

(C): Foot vent (1 place)

(D): Front window glass vent (2 places)

Air blows out from the vents marked with ○.



Monitor display	Air vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Front and rear vents	○	○			-
	Front, rear, and foot vents	○	○	○		-
	Foot vent			○		-
	Foot vent Defroster vent	○		○	○	Not selected in auto mode
	Defroster vent	○			○	Not selected in auto mode

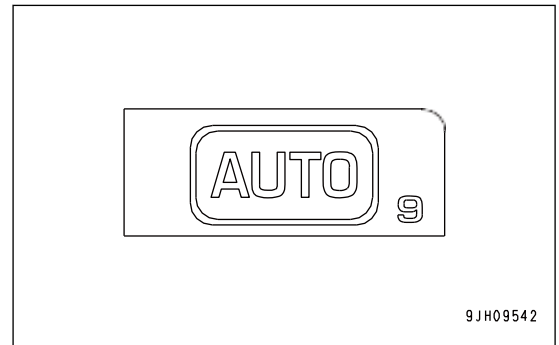
AUTO SWITCH

Use the auto switch for automatic selection of the air flow, vents, and air source (FRESH/RECIRC) according to the set temperature.

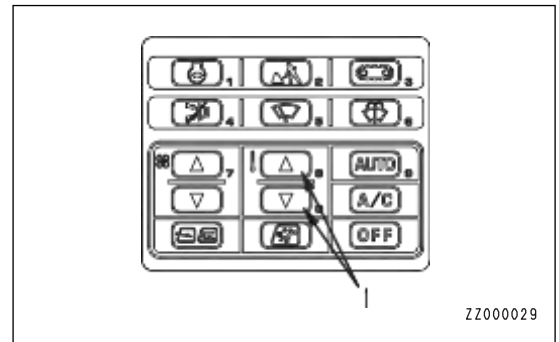
- Press this switch, then use temperature control switch (1) to set the temperature, and run the air conditioner under automatic control.
- When switching from automatic operation to manual operation, it is possible to use the switches to select the vents and air source (FRESH/RECIRC).

REMARK

When Auto Mode is selected, if the set temperature is set to 18.0 °C or 32.0 °C, the air flow is always set to High, but this is not a problem.



9JH09542



ZZ000029

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.

During automatic operation, the selection of inside air (RECIRC) and outside air (FRESH) is performed automatically.

RECIRC

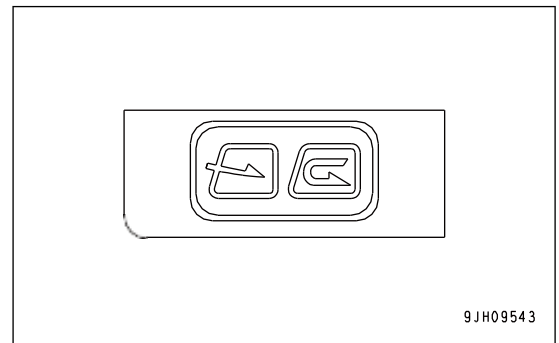
Outside air is shut off and only air inside the cab is circulated.

Use this setting to perform rapid cooling of the cab or when outside air is dirty.

FRESH

Outside air is taken into the cab.

Use this setting to take in fresh air or to demist the window glass.

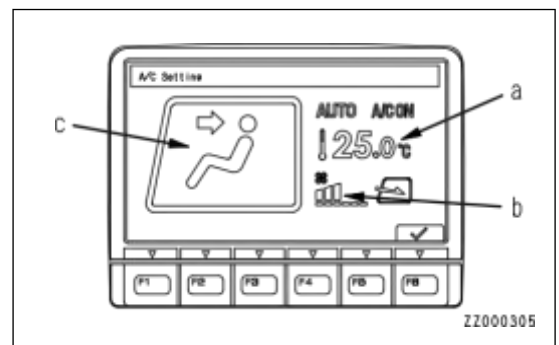


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DISPLAY MONITOR

"A/C Setting" (air conditioner setting) screen of monitor (7) indicates the state of temperature setting (a), air flow (b), and vents (c).

When OFF switch is pressed, the display of temperature setting (a) and air flow (b) goes out, and operation stops.

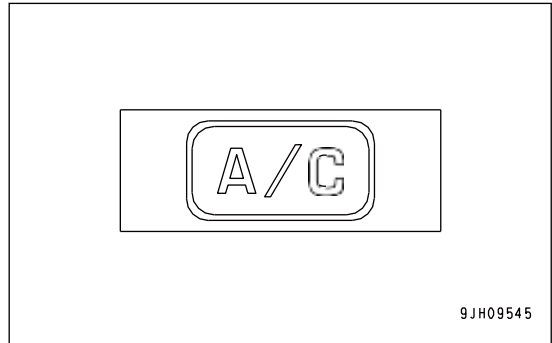


ZZ000305

AIR CONDITIONER SWITCH

Use air conditioner switch for turning the air conditioner (cooling, dry heating) ON or OFF.

- Press air conditioner switch when the fan is operating (when display (b) is shown on the display monitor). The air conditioner is switched ON and starts to work. Press the switch again to stop the air conditioner.
- Air conditioner cannot be operated while the fan is stopped.



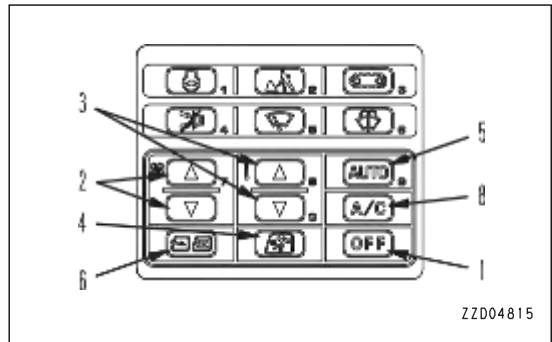
SUNLIGHT SENSOR

Sunlight sensor automatically adjusts the flow of air from the vents to match the strength of the sun's rays. 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.



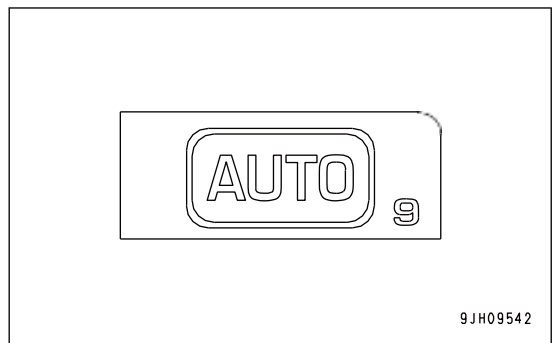
METHOD FOR OPERATING AIR CONDITIONER

The air conditioner can be operated automatically or manually. Select the method of operation as desired.

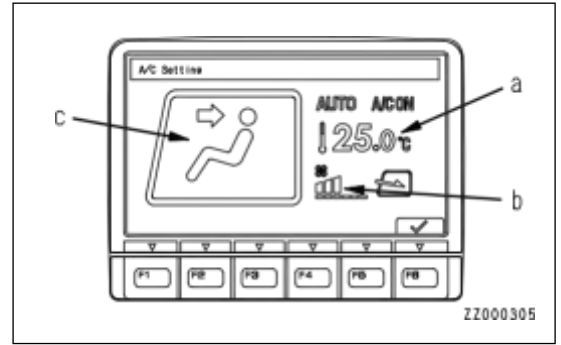


METHOD FOR AUTOMATIC OPERATION

1. Press auto switch (5) to turn it ON.

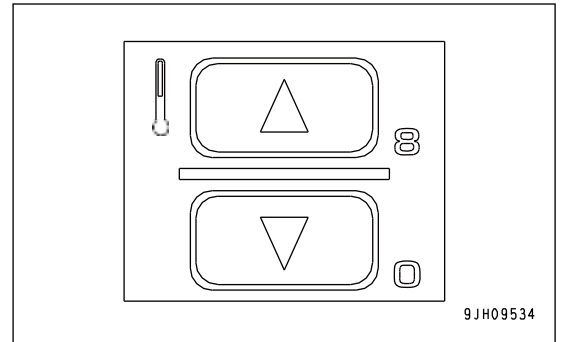


Set temperature (a) and air flow rate (b) are displayed on "A/C Setting" screen.



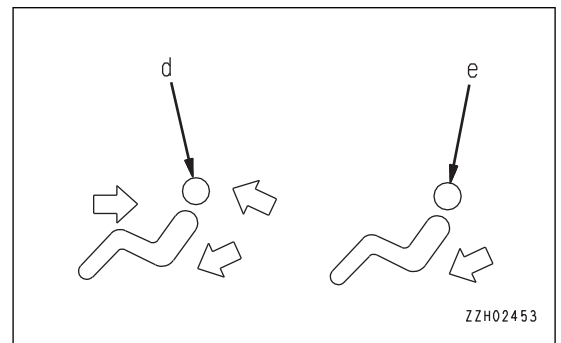
- Use temperature control switch (3) to set to the desired temperature.

The air flow, combination of vents, and selection of fresh or recirculated air is automatically selected according to the set temperature, and the air conditioner is operated automatically to provide the set temperature.



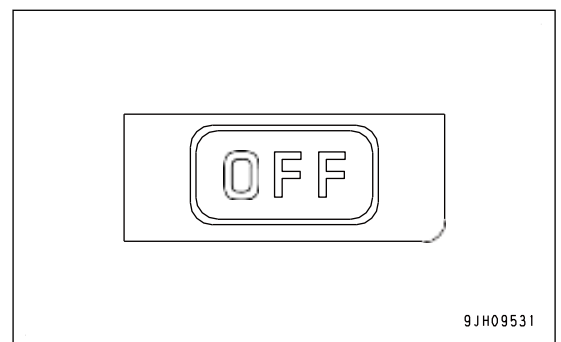
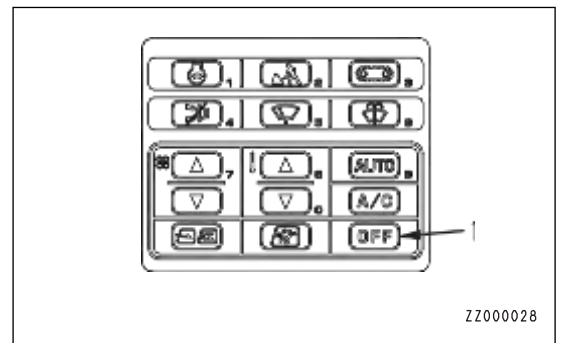
REMARK

When (d) or (e) is displayed in vent (c), if the engine coolant temperature is low, the air flow is automatically limited to prevent cold air from blowing out.



METHOD FOR STOPPING AUTOMATIC OPERATION

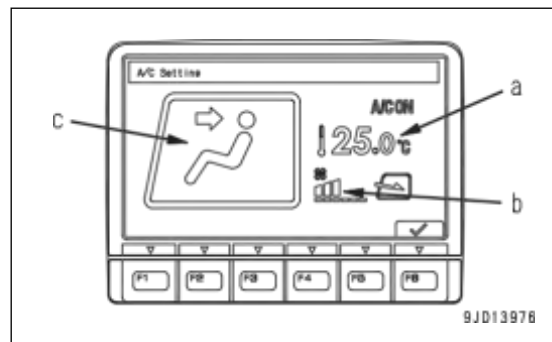
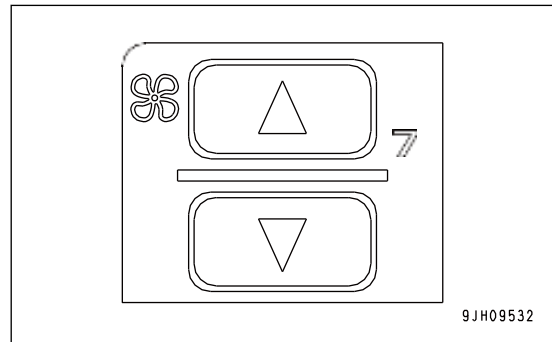
Press OFF switch (1).
The air conditioner stops.



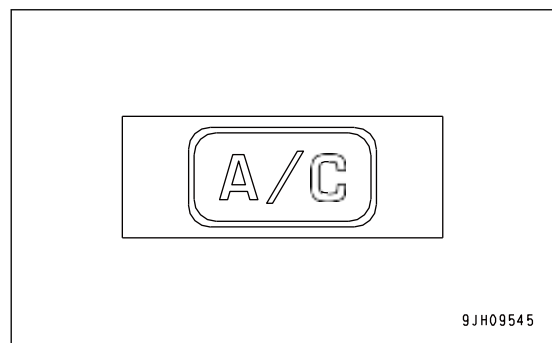
METHOD FOR MANUAL OPERATION

1. Press fan switch (2) and adjust the air flow.

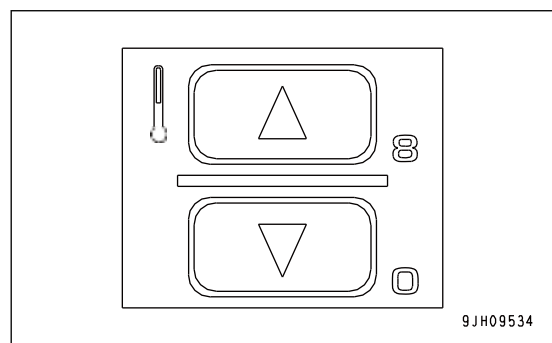
At this time, check that set temperature (a) and air flow rate (b) are displayed on "A/C Setting" screen of the monitor.



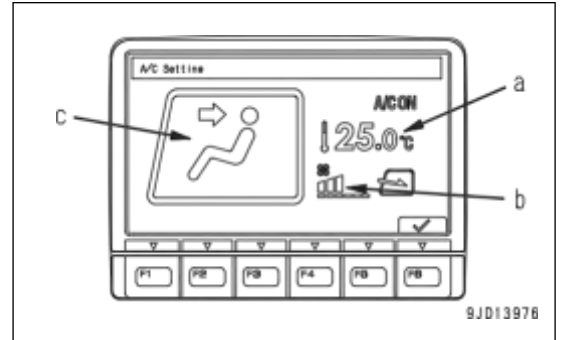
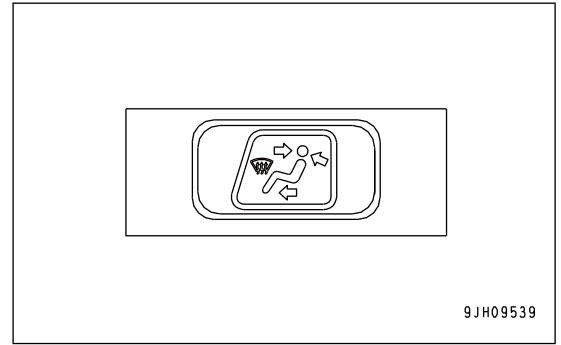
2. Press air conditioner switch (8) to turn it ON.



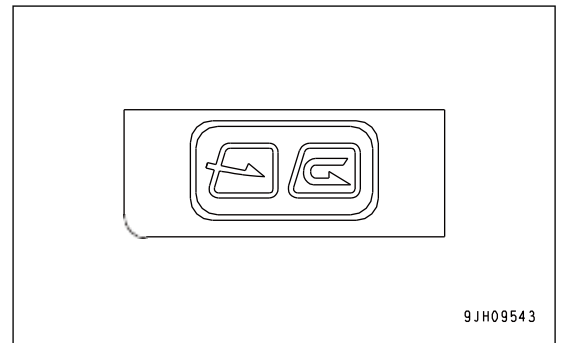
3. Press temperature control switch (3) to select desired temperature.



- Press vent selector switch (4) and select the desired vents.
At this time, the display of vent (c) on "A/C Setting" screen of the monitor changes according to the selection.

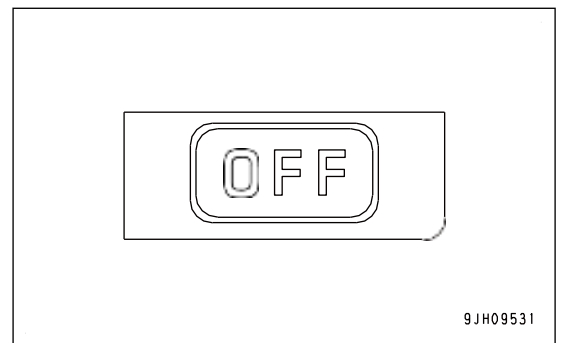
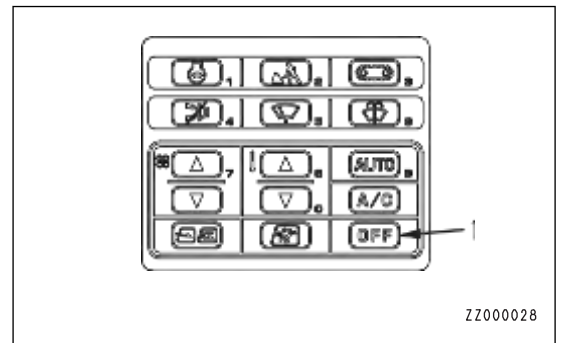


- Press FRESH/RECIRC selector switch (6) and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).



METHOD FOR STOPPING MANUAL OPERATION

Press OFF switch (1).
The air conditioner stops.

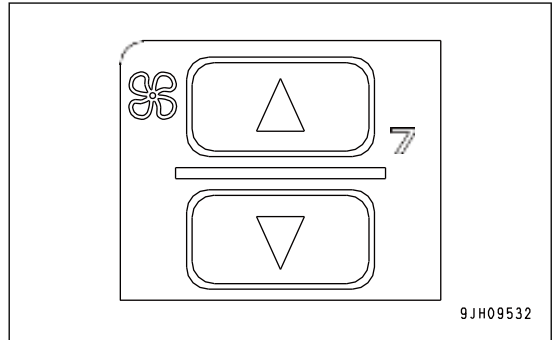


METHOD FOR OPERATING WITH COLD AIR TO FACE AND WARM AIR TO FEET

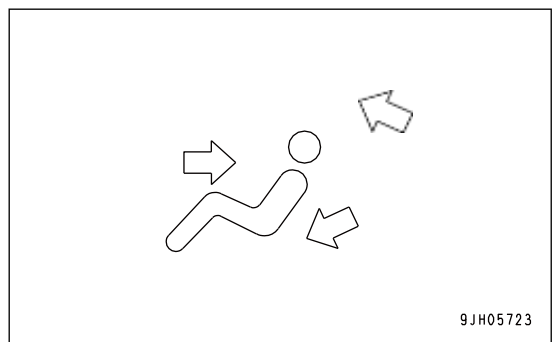
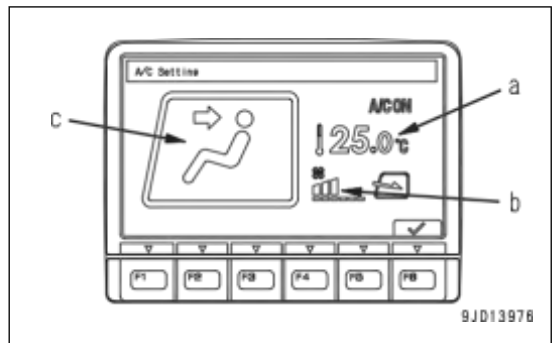
To operate with cold air blowing to the face and warm air blowing to the feet, set as follows.

1. Press fan switch (2) and adjust the air flow.

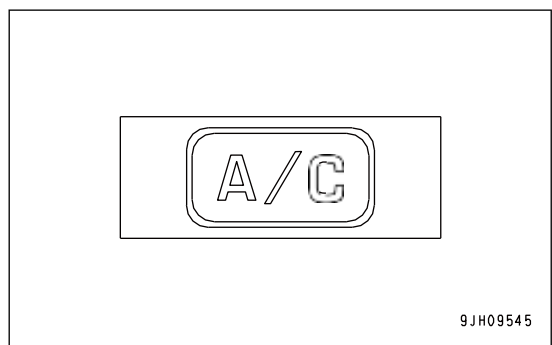
At this time, check that set temperature (a) and air flow rate (b) are displayed on "A/C Setting" screen of the monitor.



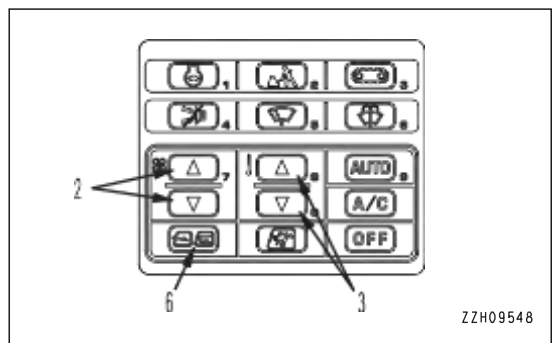
2. Press vent selector switch (4) and set the vent display as shown in the figure.



3. Press air conditioner switch (8) to turn it ON.

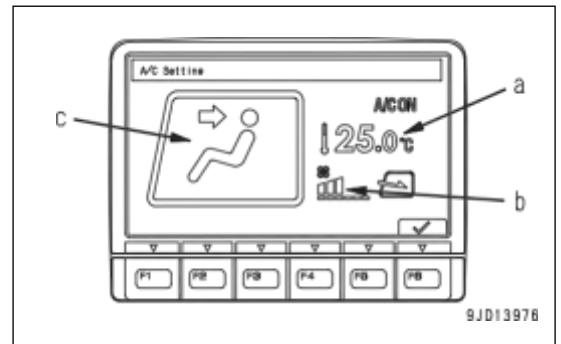
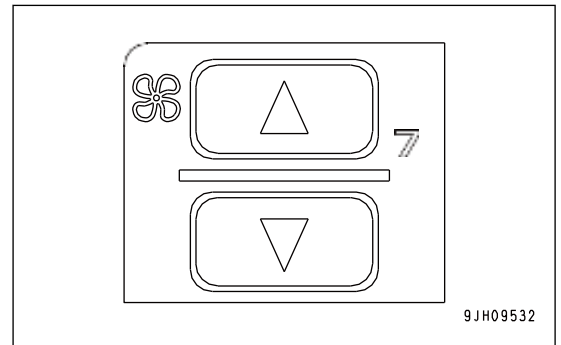


4. Adjust fan switch (2), temperature control switch (3) and FRESH/RECIRC selector switch (6) to the desired positions.

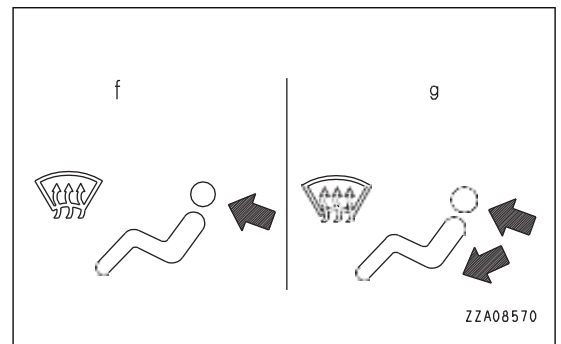
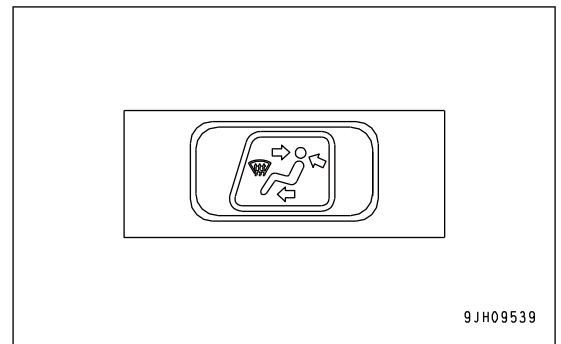


METHOD FOR OPERATING DEFROSTER

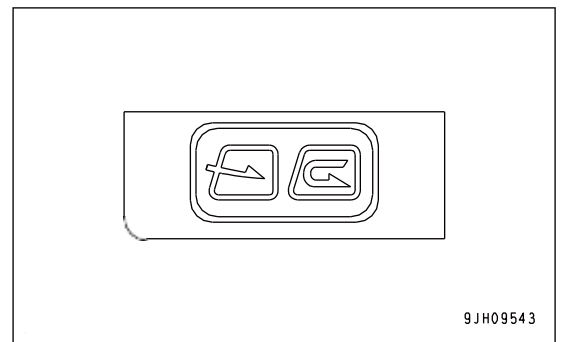
1. Press fan switch (2) and adjust the air flow rate.
At this time, check that set temperature (a) and air flow rate (b) are displayed on "A/C Setting" screen of the monitor.



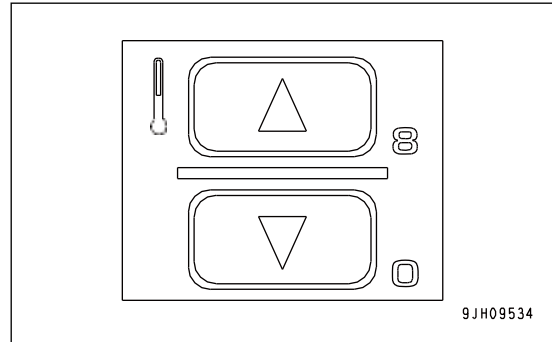
2. Press vent selector switch (4) and set the vent display to (f) or (g) shown in the figure.



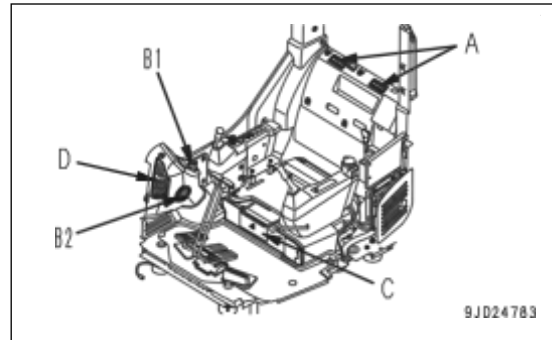
3. Press FRESH/RECIRC selector switch (6) and set it to FRESH mode.



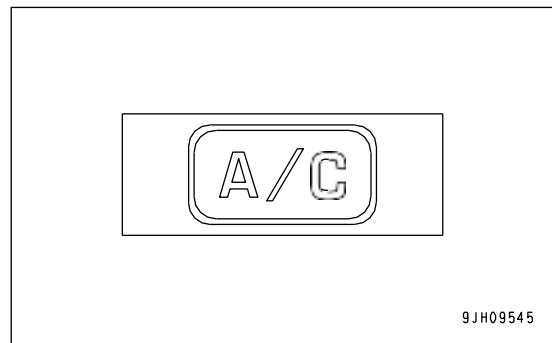
4. Press temperature control switch (3) and set temperature to 32.0 of maximum heating.



5. Adjust vents (A), (B1), and (B2) so that the air blows onto the window glass.
(Vents (C) and (D) are fixed and cannot be adjusted.)



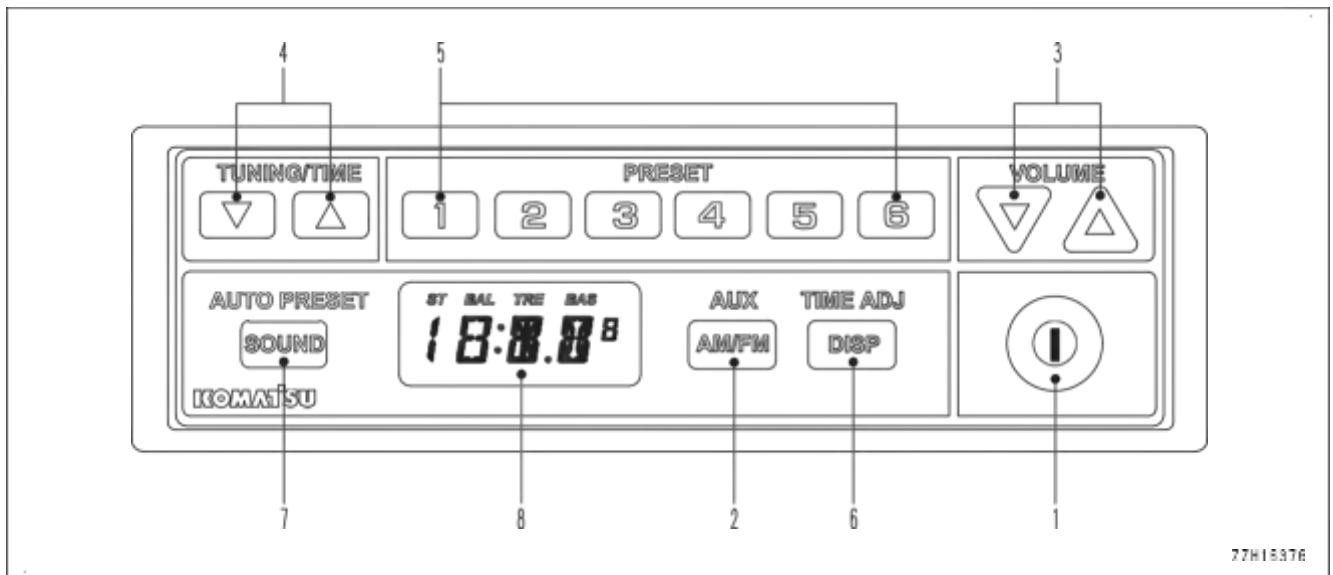
6. When operating in the rainy season or when it is desired to remove the mist from the window glass or to dehumidify the air, press air conditioner switch (8) to turn it ON.



HANDLE RADIO

- To ensure safety, always keep the sound to a level where it is possible to hear outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to an unexpected failure, so be careful not to get water on the equipment.
- Do not wipe the 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 off at 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 (3-110)".

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.

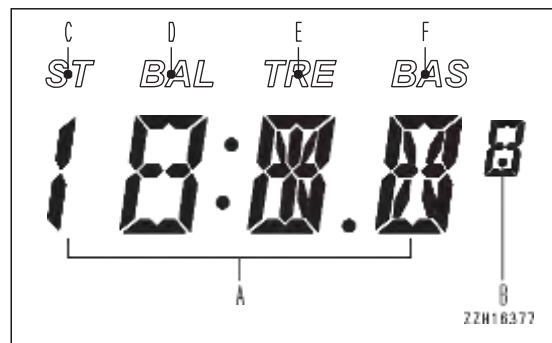
(B): Frequencies are displayed at steps of 50 kHz in certain areas.

(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.



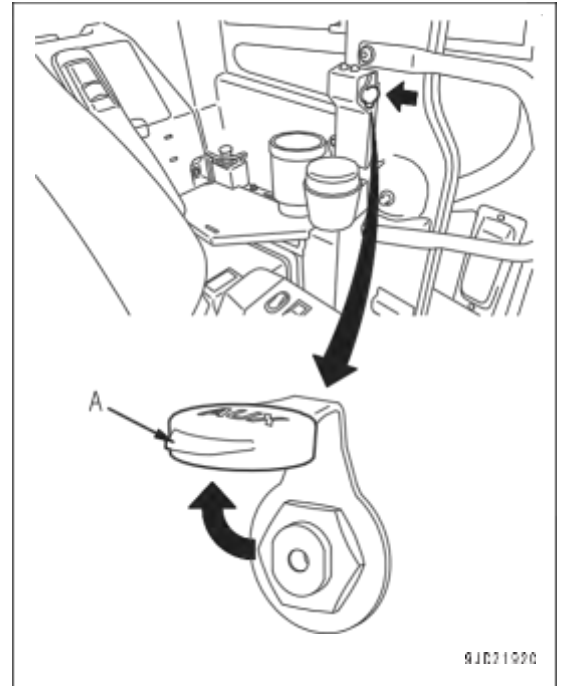
AUX

NOTICE

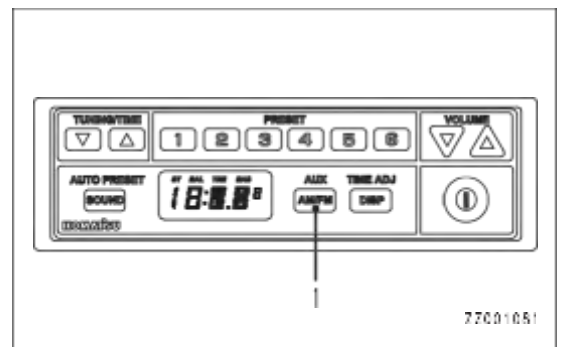
- **A stereo miniature plug can be connected.**
Read the instruction manual of the equipment to connect carefully.
- **As a power source, use the battery attached to the equipment to connect.**
If you use an electric power supply installed to the machine, the noise may occur.
- **The noise may occur 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) at the rear right of the operator's seat.
2. Connect a portable audio equipment by using an commercially available audio cable.



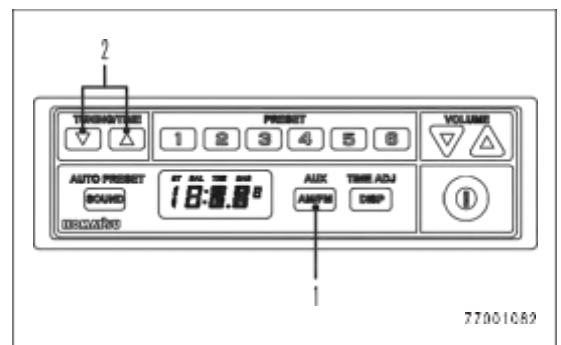
3. Press band/AUX selector button (1) to select "AUX".



METHOD FOR CONTROLLING RADIO

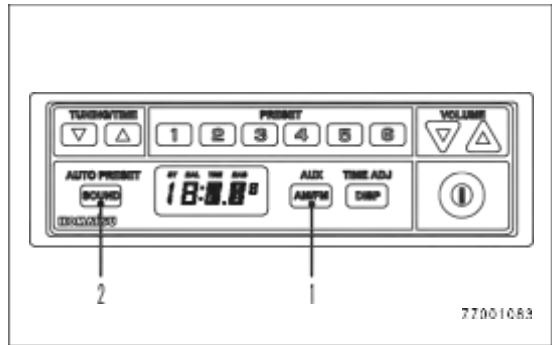
METHOD FOR ADJUSTING FREQUENCY

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)

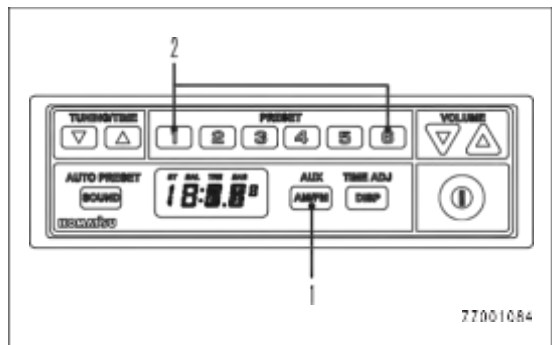
1. Press band/AUX selector button (1) and select FM or AM.
2. Hold down sound control button (2).



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.

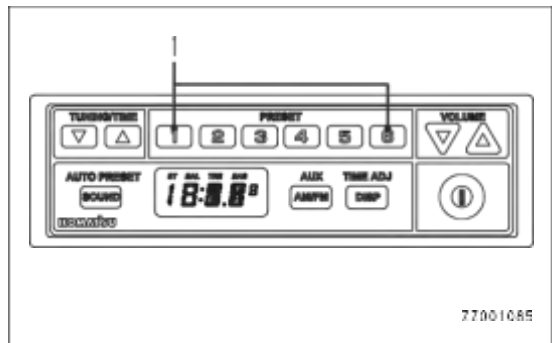
“Example”

While a frequency is displayed, press button 1 of preset button (2), and the preset number “P-1” appears on the display.

The preset number is shown for 0.5 seconds, and then the frequency is displayed.

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.

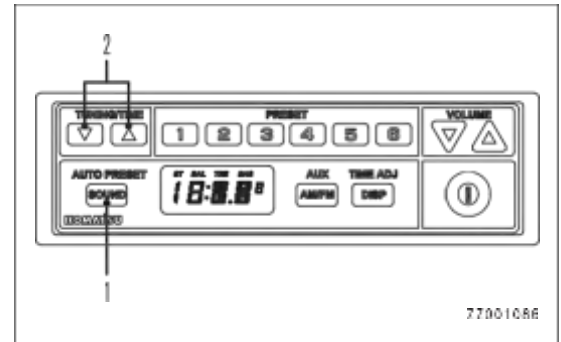
“Example”

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”.

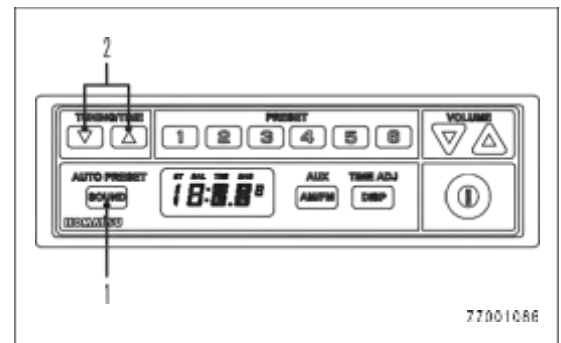
METHOD FOR ADJUSTING SOUND BALANCE

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)



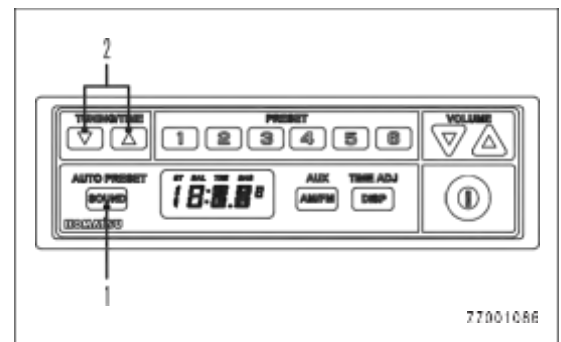
METHOD FOR ADJUSTING HIGH REGISTER RANGE (TREBLE)

1. Press sound control button (1) to light up “TRE” on the display.
You can adjust the high register range (treble) of the sound.
2. Press tuning/time adjustment button (2) to adjust the high register range (treble).
 - Press the Δ button, and the high register range (treble) level increases by 1. (Maximum + 7)
 - Press the ∇ button, and the high register range (treble) level decreases by 1. (Minimum - 7)



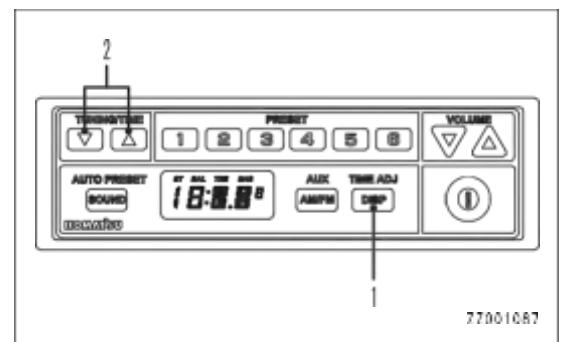
METHOD FOR ADJUSTING LOW REGISTER RANGE (BASS)

1. Press sound control button (1) to light up “BAS” on the display.
You can adjust the low register range (bass) of the sound.
2. Press tuning/time adjustment button (2) to adjust the low register range (bass).
 - Press the Δ button, and the low register range (bass) level increases by 1. (Maximum + 7)
 - Press the ∇ button, and the low register range (bass) level decreases by 1. (Minimum - 7)



METHOD FOR ADJUSTING CLOCK

1. Press display selector button (1) to display the clock.
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.

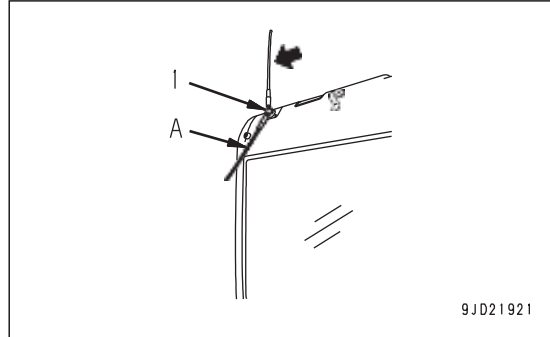


6. Press display selector button (1) to cancel time adjustment.
The screen returns to clock display.

STOW ANTENNA

Before transporting the machine putting it inside a building, store the antenna to prevent any interference.

1. Loosen antenna mounting bolt (1) and store the antenna at position (A).
2. After storing the antenna, tighten bolt (1).



HANDLE ROAD LINERS

(Road liner specification)

RECOMMENDED USE OF ROAD LINERS

The road liners have good features the steel shoes do not have. However, if they are used in the same manner as the steel shoes are, the features are not used fully.

Perform the optimum operation according to the condition of the site and contents of work.

COMPARISON OF ROAD LINERS AND STEEL SHOES

	Road liner	Steel shoe
Less vibration	◎	△
Smooth travel (No creak)	○	○
Small sound	◎	△
No risk of damaging pavement	◎	△
Resistant to damage	○	◎
Large traction force	◎	◎

◎: Very good

○: Good

△: Fair

The road liners have many advantages for the performance unique to their material, but the weak point is the strength. Accordingly, you can extend the service life of the road liner and use their advantages fully by understanding their features and observing the prohibited matter and precautions for handling.

Before using, be sure to read "PRECAUTIONS WHEN USING ROAD LINERS".

WARRANTY OF ROAD LINERS

The warranty does not cover any damage caused by a customer's mistake, including neglect of check and maintenance of the track tension, disregard of prohibited matter such as "operation on the corners of a steel plate, a U-bend trap, a concrete block, reinforcing bars, scrap steel, etc. which can cut the road liner" and precautions.

PRECAUTIONS WHEN USING ROAD LINERS

Prohibited operations

Do not perform the following work.

- If the machine is operated or swung on crushed stones, very irregular hard rock-bed, reinforcing bars, scrap steel, edges of steel plates, the road liner can be damaged.
- In a riverbed, etc. where there are many large boulders, the road liner may be damaged by stones caught in them and may come off the rollers. If the machine is used to doze forcibly while the shoes slip, the service lives of the road are shortened.
- Take care that oil, fuel, or chemical solvent does not stick to the road liner. If any of them sticks, wipe it off immediately. Do not travel on a road where oil, etc. is accumulated.
- When storing the machine for a long period (3 months or more), store it indoors to avoid direct sunlight and rain.
- Do not drive the machine into a high temperature place such as a bonfire, steel plate exposed to the hot sun, newly spread asphalt, etc.
- If the rubber parts of the road liner are worn and damaged and the mounting bolt heads are damaged, replace the shoes with new ones immediately. If the head of a bolt is crushed, that bolt cannot be removed.

- Install to all the links of the right and left tracks always when installing the road liner. If it is installed partially or to only one portion, its service life is shortened remarkably.

Precautions during operation

When operating, observe the following.

- Do not make a pivot turn on a concrete road since rubber marks are made on the road surface.
- Avoid turning sharply whenever possible, since that can cause early wear and chipping of the road liner.
- Avoid turning on a large level difference. When riding over a level difference, travel perpendicularly to it to prevent the shoes from coming off.
- Once you raise the machine by using the work equipment, lower it slowly.
- Avoid handling crushed and oily material (cakes of soybean, corn, rapeseed, etc.) or wash the machine with water after the work.
- Avoid handling salt, ammonium sulfate, potassium chloride, potassium sulfate, and triple superphosphate or wash the machine with water after the operation since they corrode the adhesive of the core metal.
- Do not use the rubber shoes and road liners on seashore since the adhesive of the core metal is corroded by the salt.
- When the road liners are used to handle salt, sugar, wheat, soybeans, etc., if it has a deep cut, rubber chips may be mixed in the handled material. To prevent this, repair any cut before using.
- Do not rub the road liner against concrete ridges, walls, etc. during operation.
- The road liners are very slippery on wet steel plates, snow-covered or frozen road surfaces, or clay soil. Beware of slipping and skidding when traveling or working on a slope.
- If the road liners are used in an extremely cold district, their characteristics change and their service lives are shortened accordingly.
- Use the road liner in a temperature range from -25 to +65 °C.
- Take care not to damage the road liner with the bucket during operation.

TRANSPORTATION

PRECAUTIONS FOR TRANSPORTING MACHINE

When transporting the machine, observe all related laws and regulations, and be careful to assure safety.

SELECT TRANSPORTATION METHOD

When transporting the machine, choose the transportation method in reference to the weight and dimensions shown in "SPECIFICATIONS".

Note that the weight and dimension shown in "SPECIFICATIONS" may differ in accordance with the type of track shoe or arm, or other attachments.

LOADING AND UNLOADING WITH TRAILER

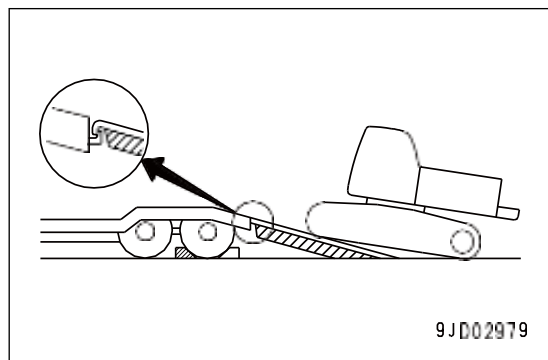
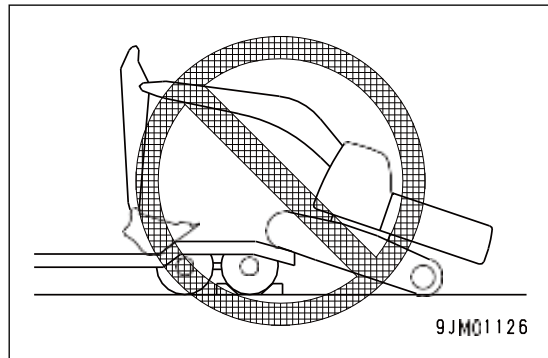
PRECAUTIONS FOR LOADING AND UNLOADING WITH TRAILER



WARNING

Always observe the following when loading or unloading the machine from a trailer.

- Select the firm, level ground when loading or unloading the machine.
Maintain a safe distance from the road shoulder
- Always turn the auto-deceleration switch OFF (cancel). If the auto-deceleration switch is left ON, the machine may suddenly start moving.
- Always set the travel speed switch to low speed (Lo), run the engine at low idle, and operate the machine slowly when loading or unloading the machine.
- Perform the warming-up operation thoroughly and make sure that the engine speed is stable before performing the loading or unloading the machine.
- Never correct your steering on the ramps. There is danger that the machine may tip over.
If necessary, drive off the ramps or back on to the trailer and correct the direction.
- On the ramps, do not operate any lever except the travel lever.
- It is dangerous to use the work equipment for loading and unloading operations. Always use ramps.
- The center of gravity of the machine shifts suddenly at the joint between the ramps and the trailer, and it is dangerous that the machine loses its balance.
Accordingly, pass this point slowly.
- If it is necessary to swing the work equipment on the trailer platform, the footing is unstable, so be extremely careful that the machine does not tip over.
If the work equipment is installed to the machine, pull the work equipment in, and operate slowly to prevent the machine from losing its balance.
- Position a flagman to give guidance to prevent the machine from coming off the ramps and to ensure safety in the operation.
- Always check that the sliding door of the cab is at LOCK position, regardless of whether the door is open or closed. Avoid opening or closing the door on the ramps or trailer platform because the operating effort may suddenly change.



WARNING

Always observe the following regarding the ramps and trailer platform.

- Use ramps with ample width, length, thickness, and strength and install them with a maximum slope of 15 deg.
When using piled soil, compact the piled soil fully to prevent the slope face from collapsing.
- Clean the machine tracks and ramps before starting in order to prevent the machine from slipping on the ramps.
There is danger of the machine slipping if there is water, snow, grease, oil, or ice on the ramp surface.

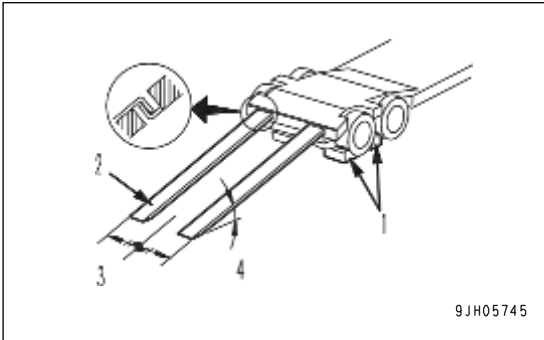
PROCEDURES FOR LOADING MACHINE

Load on a firm and level ground.

Maintain a safe distance from the road shoulder

1. Apply the trailer brakes securely, then put chocks (1) under the tires to prevent the trailer from moving.
2. 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 installation angle (4) at maximum of 15 deg.

If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.

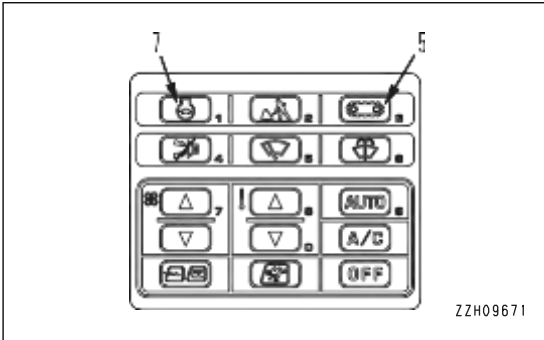


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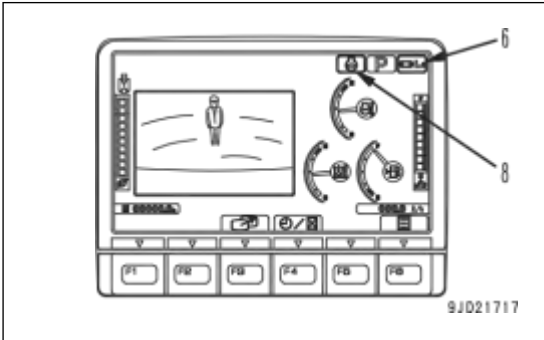
3. Push travel speed selector switch (5) to set the travel speed to low ("Lo" lights up).
The travel speed ("Lo", "Hi") is displayed on travel speed display (6).
4. Turn auto-deceleration switch (7) OFF and operate the fuel control dial to set the engine to low speed.

Each time auto-deceleration switch (7) is pressed, it switches OFF to ON to OFF in turn.

When auto-deceleration switch (7) is turned off, the auto-deceleration pilot lamp (8) goes out.



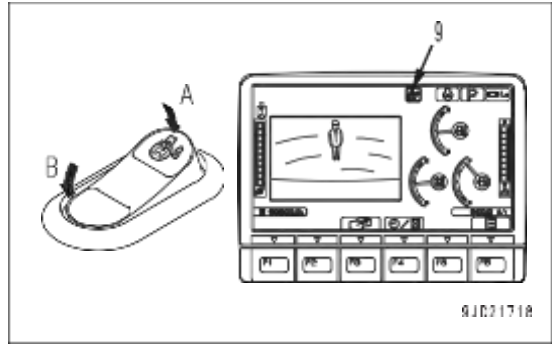
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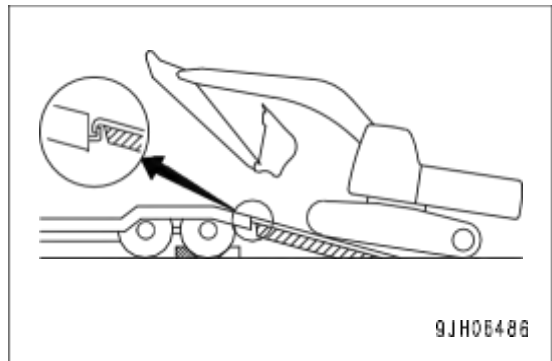
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- 5. Turn the swing lock switch ON to apply the swing lock.
When the swing lock switch is turned to ON position, swing lock pilot lamp (9) lights up.

(A): ON position
(B): OFF position



- 6. If the machine is equipped with work equipment, set the work equipment at the front, and travel forward to load it; if it has no work equipment, travel in reverse to load it.
Follow instructions and signals of a conductor particularly when traveling in reverse.



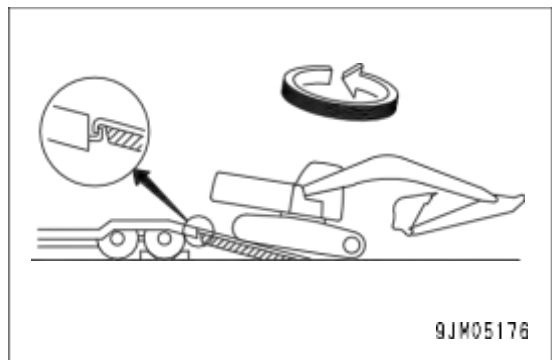
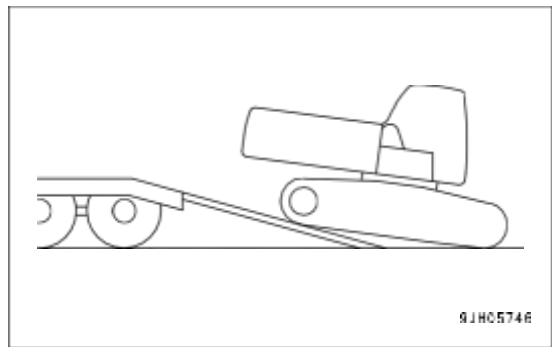
- 7. Before moving the machine onto the ramps, check that the machine is positioned in a straight line with the ramps and that the centerline of the machine matches that of the trailer.

- 8. Set the travel direction toward the ramps and drive slowly.
Lower the work equipment as far as possible without causing interference.

On the ramps, operate only the travel lever. Do not operate any other lever.

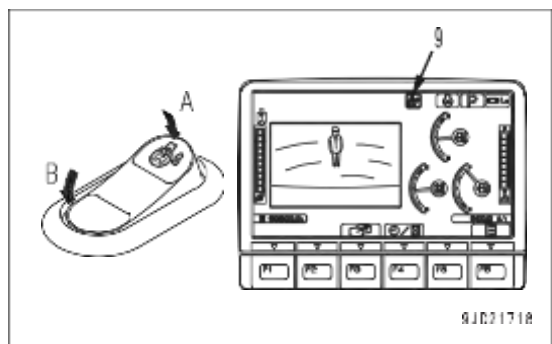
- 9. For the machine equipped with the work equipment, swing the upper structure 180 ° according to the following procedure.

- 1) While the tracks are on both the ramps and the ground surface, turn off the swing lock switch.
- 2) Swing the upper structure slowly 180 °.



- 3) Turn the swing lock switch ON to apply the swing lock.
When the swing lock switch is turned to ON position, swing lock pilot lamp (9) lights up.

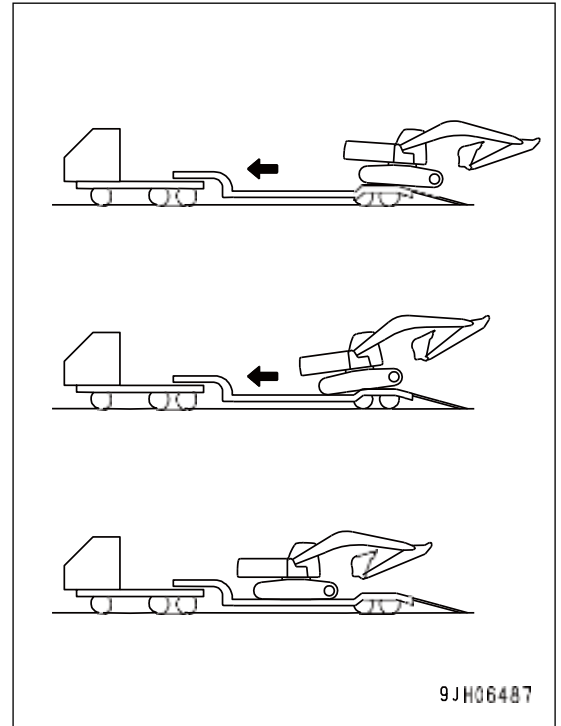
(A): ON position
(B): OFF position



10. Drive the machine slowly in reverse to load it onto the trailer.

When the machine travels over the rear wheels of the trailer, it becomes unstable. Drive the machine carefully and slowly. (Never operate the steering.)

When the machine passes over the rear wheels, it inclines backward. Carefully travel in reverse to the specified point, and then stop.



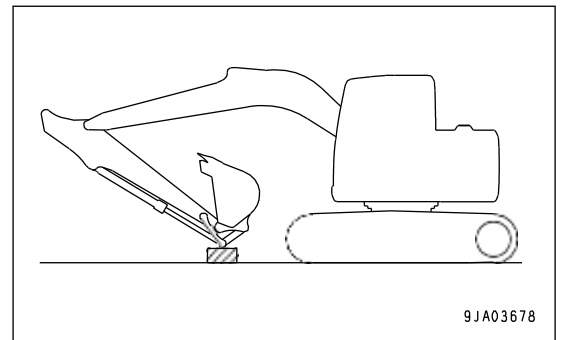
METHOD FOR SECURING MACHINE

After loading the machine onto a trailer, secure the machine as follows.

1. Lower the blade if the machine is equipped with a blade.
2. Extend the bucket and arm cylinders fully, then lower the boom slowly.

NOTICE

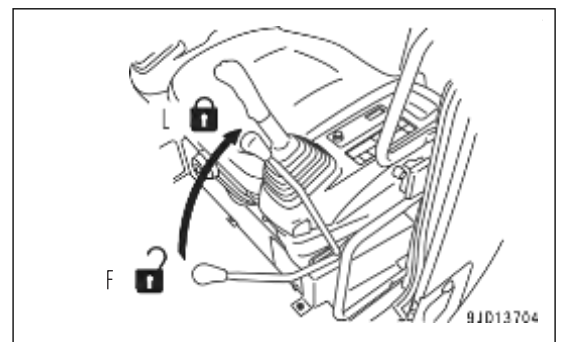
Prevent the machine from moving during transportation, by putting wooden blocks on the front and rear sides of the tracks.



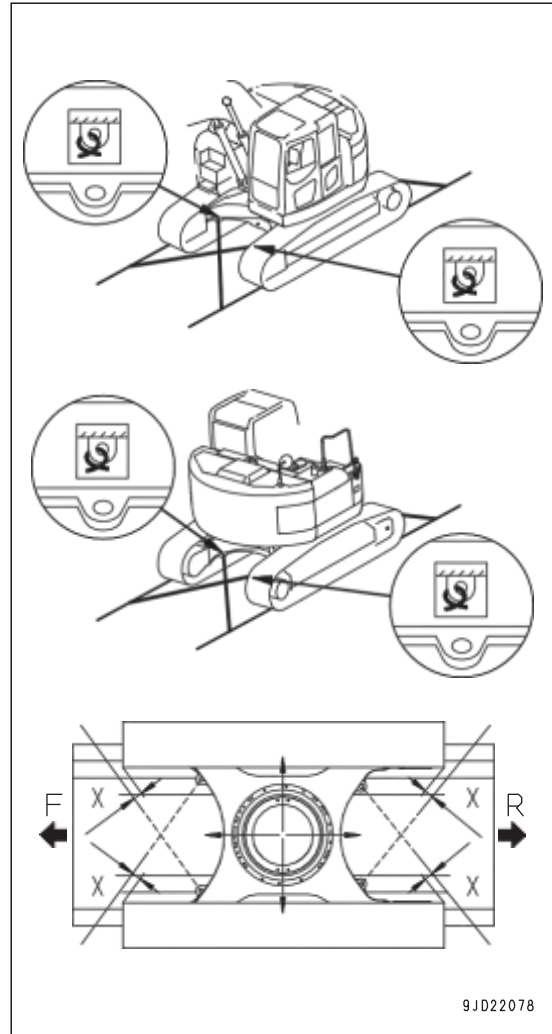
3. Set the lock lever securely to LOCK position (L).
4. Stop the engine, then remove the key from the starting switch.
5. Close all of the doors, windows, and covers.
6. Stow the antenna.

For details, see "STOW ANTENNA (3-216)".

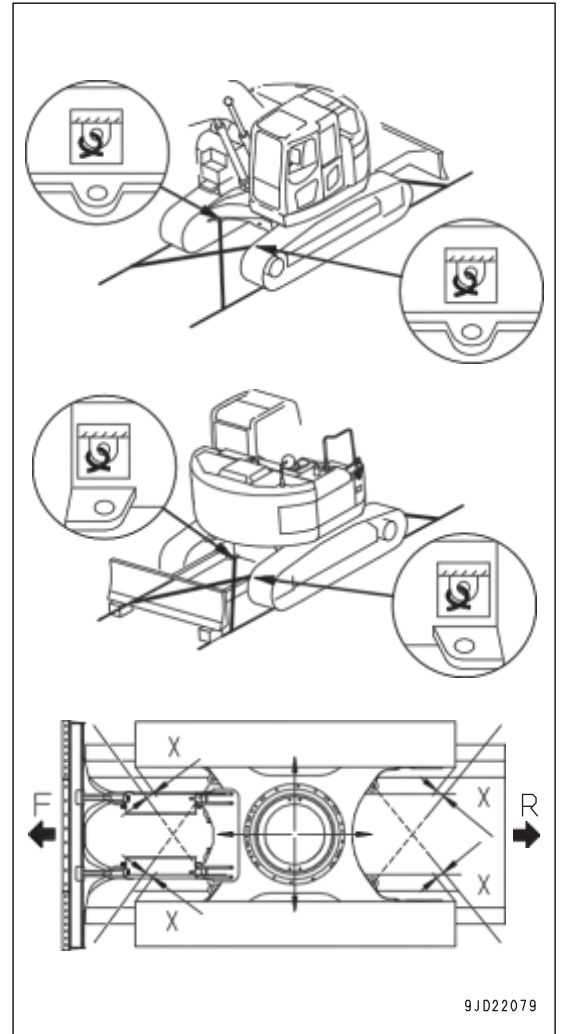
7. Reassemble the mirrors so that they are within the width of the machine.
8. Lock the lockable doors, covers, and caps.
9. Select the way of secure the machine according to the transportation form of each territory from the following.



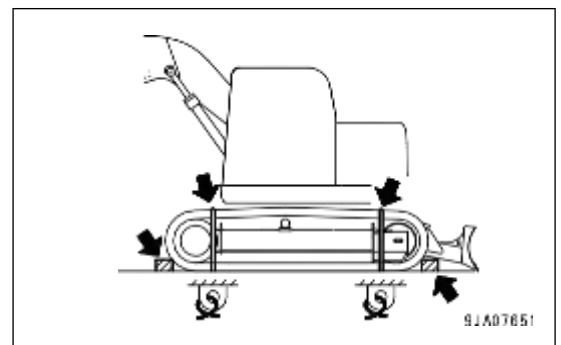
- Securing the machine when using tie-down point (1)
Tie one end of each chain or wire rope of appropriate strength to the tie-down holes on the track frame.
X : 50 to 100 mm
(Keep the chains off the track frame.)



(Machine with blade)



- Method for securing the machine without tie-down point
Prevent the machine from moving during transportation, by putting wooden blocks on the front and rear sides of the tracks, and secure the machine with chains or wire ropes of suitable strength. At this time, place pieces of wood between the wire ropes and the machine to prevent damage to the ropes and the machine. In particular, fix the machine securely to prevent it from slipping sideways.



PROCEDURES FOR UNLOADING MACHINE

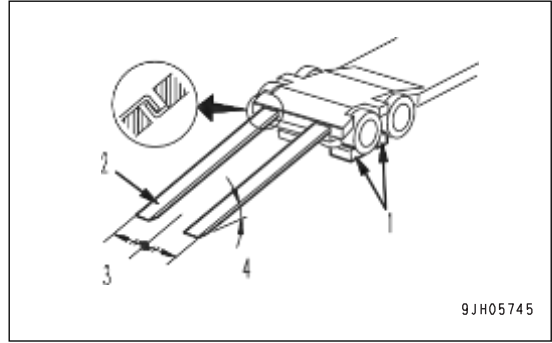
Perform unloading of the machine on a firm, level ground.

Maintain a safe distance from the road shoulder

1. Apply the trailer brakes securely, then put chocks (1) under the tires to prevent the trailer from moving.
2. 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 deg.

If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.

3. Install the mirrors as before.
4. Remove the chains and wire ropes fastening the machine.
5. Start the engine.
Warm the engine up fully in cold weather.
6. Set the lock lever to FREE position (F).



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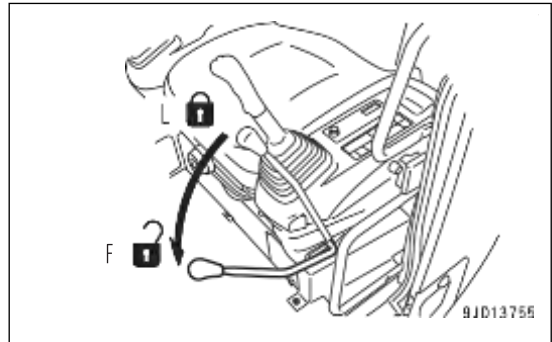
7. Turn the travel speed selector switch to low-speed travel ("Lo" lamp lights up).

Press travel speed selector switch (5) to switch the travel speed. The travel speed ("Lo", "Hi") is displayed on travel speed display (6).

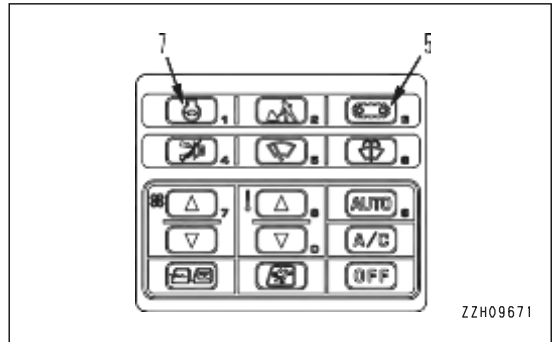
8. Turn auto-deceleration switch (7) OFF and operate the fuel control dial to set the engine to low speed.

Each time auto-deceleration switch (7) is pressed, it switches OFF to ON to OFF in turn.

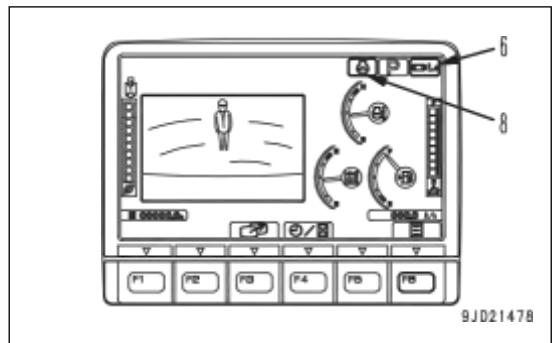
When auto-deceleration switch (7) is turned OFF, the auto-deceleration pilot lamp (8) goes out.



9JD13755



ZZH09671



9JD21478

9. Raise the work equipment, curl the arm under the boom, then move the machine slowly.

CAUTION

Check the position of the sprocket, then operate the travel lever.

10. When the machine is horizontal on the top of the rear end of the trailer, stop the machine.
11. Set the angle between the arm and boom to 90 to 110 deg.

NOTICE

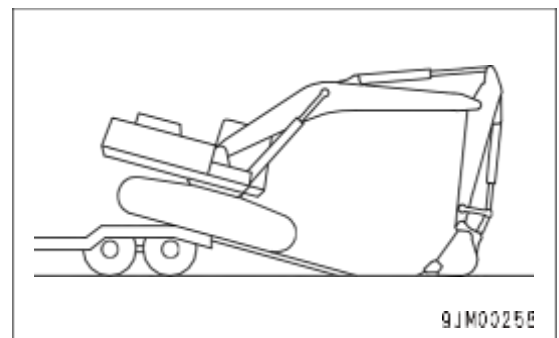
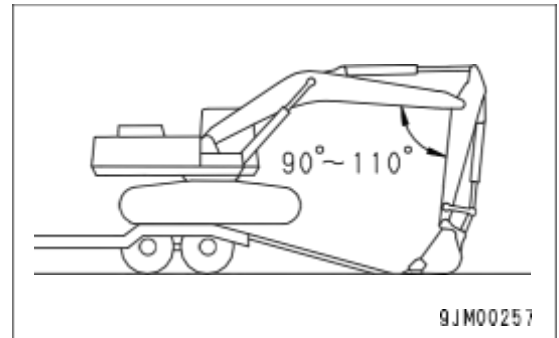
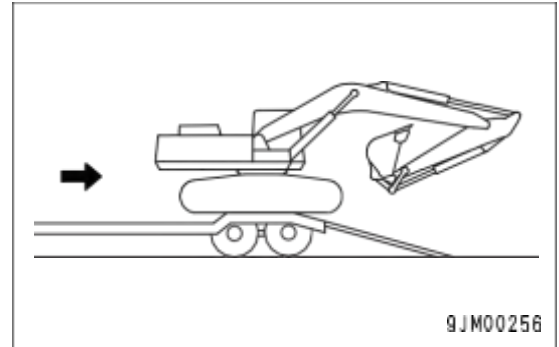
When unloading the machine, always set the angle between the arm and boom to 90 to 110 deg. If the machine is unloaded while the arm is IN, it will cause damage to the machine.

12. Lower the bucket to the ground.

NOTICE

Do not hit the bucket against the ground to prevent damage to the hydraulic cylinders.

13. With the bucket lowered to the ground, move to the ramps slowly from the rear end of the trailer.
14. Operate the boom and arm slowly to lower the machine carefully until it is completely off the ramps.



METHOD FOR LIFTING MACHINE

WARNING

- The person using the crane to perform lifting operations must be a qualified crane operator.
- Do not lift the machine with someone in 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, set the lock lever to LOCK position to prevent the machine from moving unexpectedly.
- Never enter the area under or around a lifted machine.

Never try to lift the machine in any posture other than the posture given in the following procedures nor using other lifting equipment.

There is a danger that the machine loses its balance.

NOTICE

This lifting method applies to the standard specification machine.

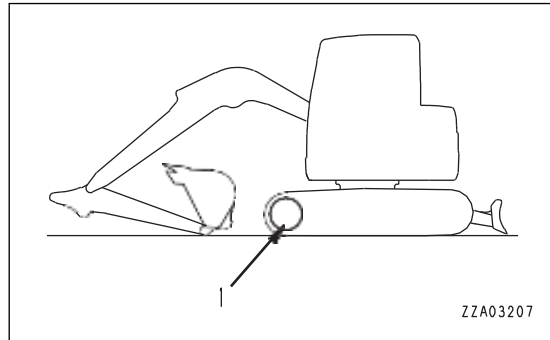
The method of lifting differs depending on the attachments and options installed.

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

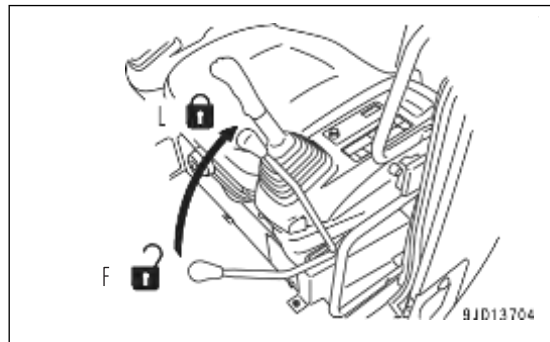
For the weight, see "SPECIFICATIONS (5-2)".

When lifting the machine, perform the operation on a flat ground according to the following procedure.

1. Start the engine.
2. Swing the upper structure in order for the position of the work equipment to come to the sprocket (1) side if the machine is equipped with a blade.
3. Extend the bucket cylinder and arm cylinder fully, then lower the work equipment to the ground using the boom cylinder as shown in the figure.
4. Lower the blade to the ground if the machine is equipped with a blade.



5. Set the lock lever securely to LOCK position (L).
6. Stop the engine.



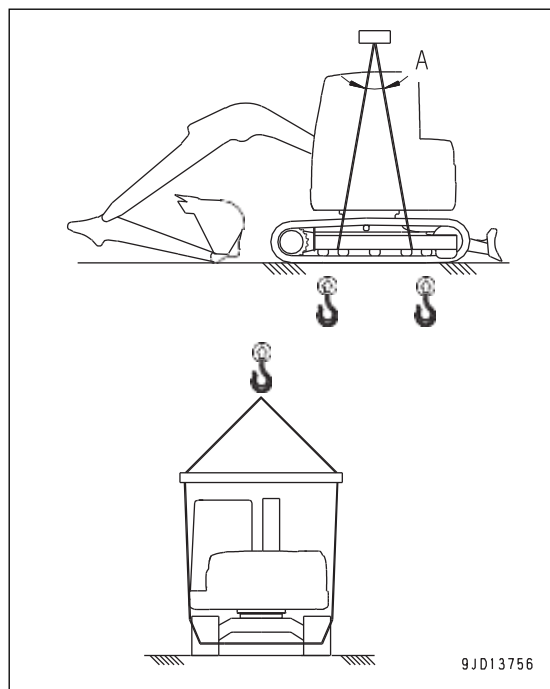
7. Check that there is nothing around the operator's seat, and then get off the machine.

Close the cab door and front window securely.

8. Pass wire ropes between the 1st and 2nd track rollers from the front and between the 1st and 2nd track rollers from the rear.

Place pieces of wood between the wire ropes and the machine to prevent damage to the ropes and the machine.

9. Set the lifting angle (A) of the wire rope to 30 to 40 °, then sling the machine slowly.
10. After the machine comes off the ground, check the hook condition and the lifting posture, and then sling the machine 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 fuel and oil with ones of low viscosity for all components.

For the specified viscosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)".

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 using 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 (4-18)".

DEF

NOTICE

- DEF freezes at -11°C .
If DEF in DEF tank freezes, it may expand and the devices in the tank may be broken or the parts 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, ADDING DEF (3-139)".
- If DEF or the machine equipped with DEF system cannot be stored at the outside temperature is lower than -11°C , DEF in the tank may freeze. Ask your Komatsu distributor for discharging of DEF, and keep it in the condition free from freezing.

BATTERY

WARNING

- Battery generates flammable gas. Never bring any open flame near fuel.
- 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.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is danger that the battery may explode.
- Battery electrolyte is toxic. Do not let it flow into drainage ditches or spray it on to the ground surface.

When the ambient temperature drops, the capacity of the battery will also drop. 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	20 °C	0 °C	-10 °C	-20 °C
Charging Rate (%)				
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.

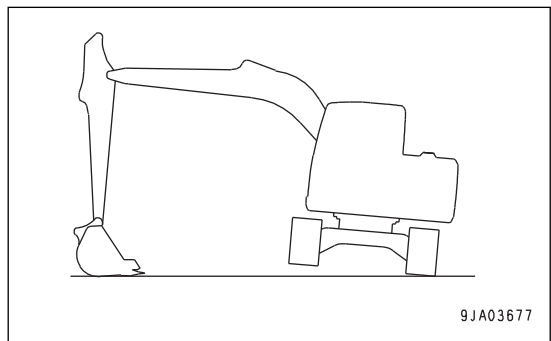
PRECAUTIONS AFTER DAILY WORK COMPLETION

 **WARNING**

Performing idling of the tracks is dangerous, stay well away from the tracks.

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.
- After operation in water or mud, remove water from undercarriage according to the procedure to extend undercarriage service life.
 1. Swing 90 deg. with engine at low idle and bring the work equipment to the side of the track.
 2. Push up the machine until the track is raised slightly from the ground. Perform idle rotation of track. Repeat this procedure on both the right and left sides.



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 "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)".

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.

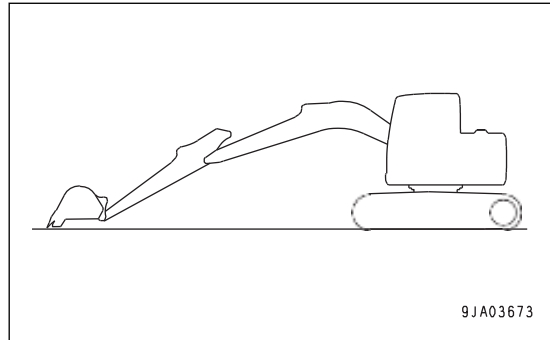
PRECAUTIONS FOR LONG-TERM STORAGE

PREPARATION FOR LONG-TERM STORAGE

NOTICE

When storing the machine (1 month or more), set the machine in the posture shown in the figure to protect the cylinder rods.

(To prevent the cylinder piston rods from rusting)



When putting the machine in storage for a long time (more than 1 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.
- Fill up DEF tank (Except cold weather condition). If the inside dries up, urea is deposited and it may cause failures in component operation.
- Grease the machine and change the oil before storage.
- Coat the exposed portion of the hydraulic cylinder piston rod with grease.
- Turn the starting switch to OFF position and turn the battery disconnect switch key to OFF position, and remove it. When storing the battery, cover it.
For the operation of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-110)".
- Set the attachment control pedal to the lock position on the machines ready for attachments.
- If the machine is ready for installation of attachment, set the stop valve to the LOCK position. Install the blind plugs to the elbows.
For explanation of LOCK and FREE states of the stop valve, see "METHOD FOR REMOVING AND INSTALLING ATTACHMENT (6-20)".
- 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 to improve ventilation and prevent gas poisoning.

- During storage, operate 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 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.

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.
- Insert the battery disconnect switch key and turn it to ON position.
For the operation method, see “BATTERY DISCONNECT SWITCH (3-110)”.
- 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 again. For detail, see “CLOCK ADJUSTMENT (3-76)” and “HANDLE RADIO (3-211)”.
- When starting the engine, warm it up sufficiently according to the procedure in “METHOD FOR ENGINE WARM-UP OPERATION (3-159)”.

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 according to the procedure in “METHOD FOR REPLACING DEF FILTER (4-71)”.
- 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

When starting the engine again after running out of fuel, fill it up with fuel and bleed air from the fuel system before starting.

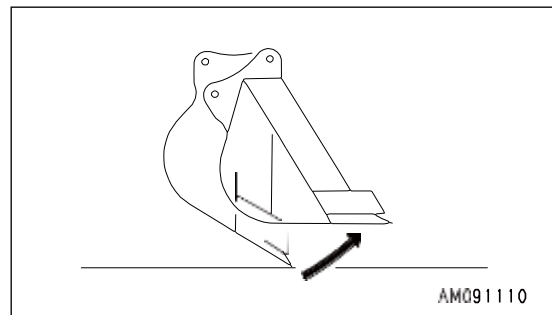
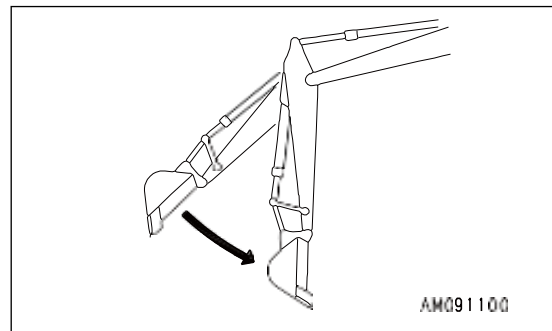
Always check the fuel level to prevent running out of fuel.

For the method of bleeding air, see "METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE (4-50)" and "METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE (4-60)".

PHENOMENA THAT ARE NOT FAILURES

Note that the following phenomena are not failures:

- When the arm is operated IN from a high position for digging under no load, the arm speed drops momentarily at the vertical position.
- When performing bucket CURL operation from a high position for digging under no load, the bucket speed drops momentarily at the horizontal position.
- The bucket or arm wobbles by itself during heavy-duty digging operations.
- When starting or stopping the swing, a noise is generated from the brake valve.
- When going down a steep slope at low speed, a noise is generated from the travel motor brake valve.



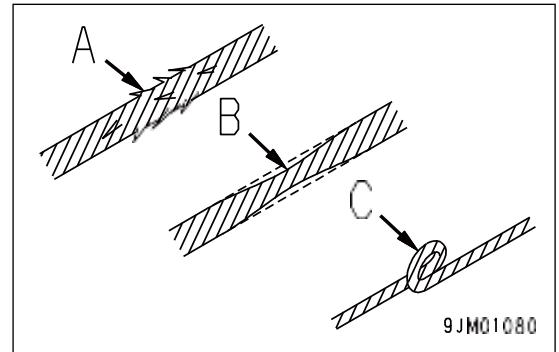
PRECAUTIONS FOR TOWING MACHINE



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.
- Do not use the holes for towing light objects or tie-down holes when towing the machine.



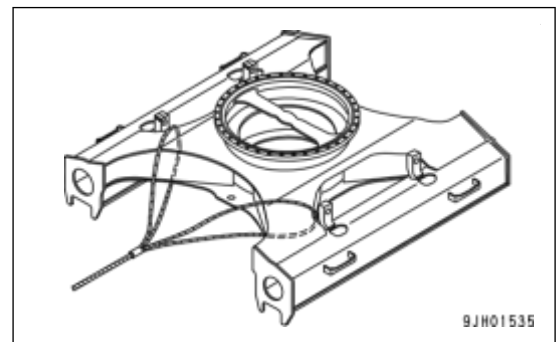
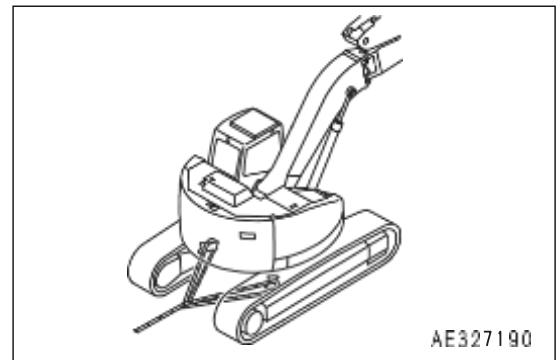
NOTICE

The maximum towing capacity for this machine is 95200 N {9710 kg} .

Do not tow any load greater than this.

- If the machine sinks in mud and cannot get out under its own power, or if the machine tows a heavy object, use a wire rope as shown in the figure.
- Place pieces of wood between the wire ropes and the machine to prevent damage to the ropes and the machine.
- Hold the wire rope level and set it straight to the track frame.
- When towing a machine, travel at a speed of less than 1 km/h for a distance of only a few meters to a place that is suitable for performing repairs.

This method is applied only in an emergency.



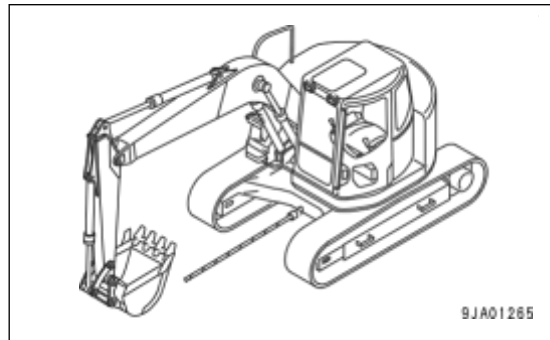
PRECAUTIONS FOR USING LIGHTWEIGHT TOWING HOLE

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. Select the appropriate tools and methods.
- Always use the shackle.
- Hold the wire rope level and set it straight to the track frame.
- Move the machine slowly and be careful not to apply any sudden load to the wire rope.
- Do not use the tie-down holes for towing the machine.

There is a hole in the track frame to fit the shackle when towing light objects.

Permissible towing load : 65700 N {6700 kg} or less



PRECAUTIONS FOR SEVERE JOB CONDITION

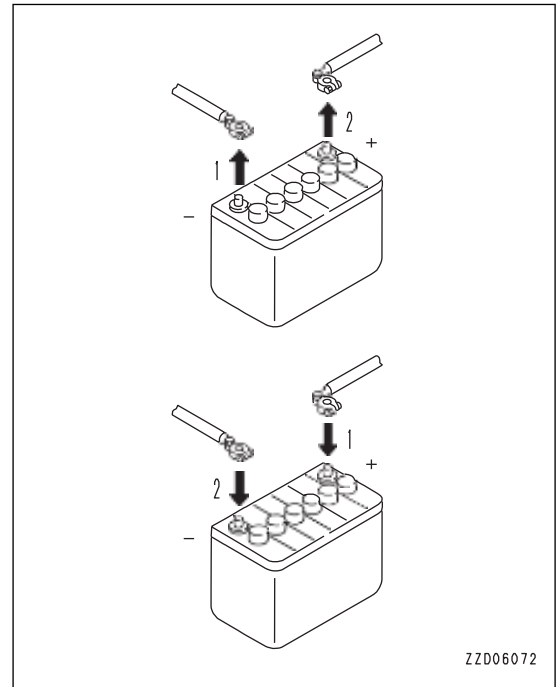
- When performing digging operations in water, if the work equipment mounting pin goes into the water, perform greasing every time the operation is performed.
- For heavy-duty operations and deep digging, perform greasing of the work equipment mounting pins every time before operation.
After greasing, operate the boom, arm, bucket, and blade several times, then grease again.

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 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.



METHOD FOR REMOVING AND INSTALLING BATTERY

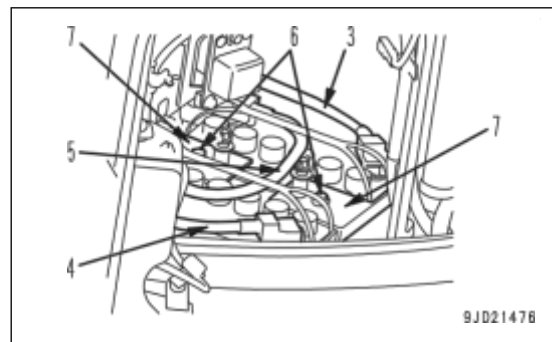
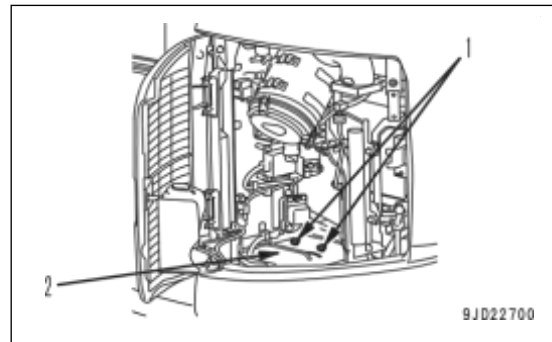


WARNING

When handling the battery, stop the engine and turn the starting switch and battery disconnect switch keys to OFF positions.

METHOD FOR REMOVING BATTERY

1. Open the battery inspection cover.
Open the battery inspection cover wide until the stay is set in LOCK position.
2. Remove the wing nuts (1) (2 places).
3. Remove the rubber cover (2).
4. Remove the cable (3) on the negative (-) terminal side (ground side) first.
5. Remove the cable (4) on the positive (+) terminal side and connecting cable (5).
6. Remove the mounting bolts (6) (2 places).
7. Remove the mounting hardware (7).
8. Take the battery out of the machine.

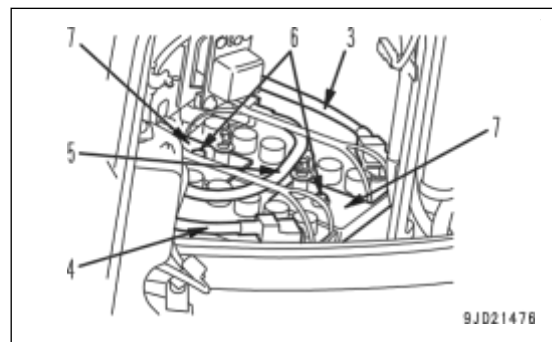


METHOD FOR INSTALLING BATTERY

NOTICE

**After securing the battery, check that it does not move.
If it moves, tighten it again securely.**

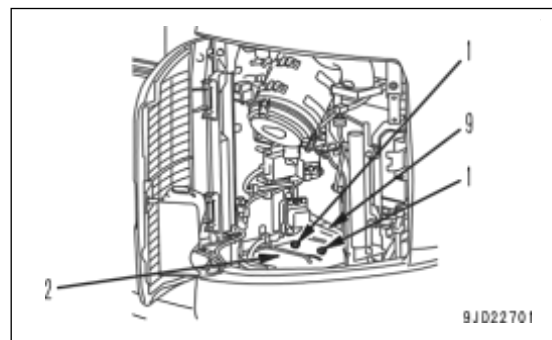
1. Place the battery in the specified position.
2. Fix the battery firmly by using mounting hardware (7) and mounting bolts (6).
Tightening torque of mounting bolt: 9.8 to 19.6 Nm
3. Install cable (4) on the positive (+) terminal side.
4. Connect connecting cable (5) to the positive (+) terminal side first.
5. Connect cable (3) on the negative (-) terminal side (ground side).
6. Install rubber cover (2) with wing nuts (1).



NOTICE

- For prevention of a fire, install rubber cover (2) carefully so that it will not roll up.
- If rubber cover (2) rolls up and blocks the fuel cooler, the fuel may overheat. Take care to insert rubber cover (2) under fuel cooler (9).

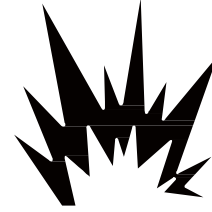
7. Insert rubber cover (2) under fuel cooler (9).
8. Close the battery inspection cover as holding up the stay from LOCK position.



PRECAUTIONS FOR CHARGING BATTERY**WARNING**

When charging the battery, if the battery is not handled correctly, there is a danger that the battery may explode. Follow the instruction manual accompanying the battery 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 distilled water to bring the electrolyte level to UPPER LEVEL line.



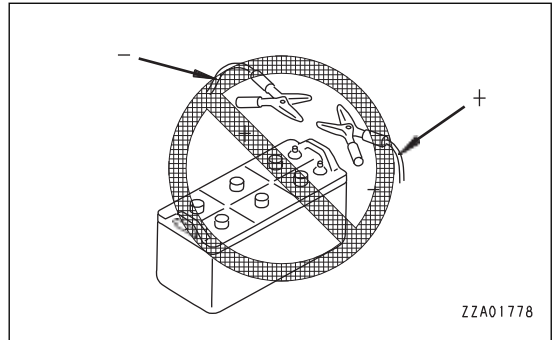
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START ENGINE WITH JUMPER CABLES



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.



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 cables. For the operating method of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-110)".

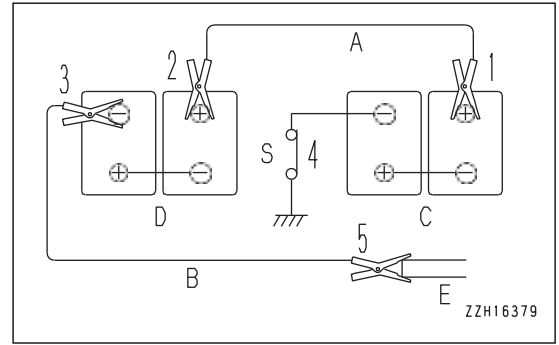
REMARK

If the battery disconnect switch is turned to OFF position, the radio tuning information, etc. may be lost. In this case, set the information again by referring to "HANDLE RADIO (3-211)".

PROCEDURE FOR CONNECTING JUMPER CABLE

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 other clip of jumper cable (B) to the revolving frame (E) of the failed machine.



METHOD FOR STARTING ENGINE

WARNING

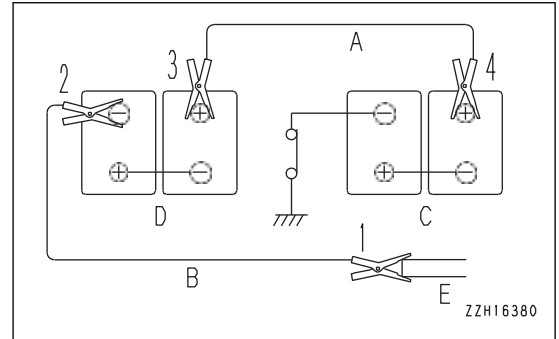
Check both of normal machine and failed machine that the lock lever is set to LOCK position. Check also that all the control levers are in NEUTRAL position.

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 at first, try again after 2 minutes or more.

PROCEDURE FOR REMOVING JUMPER CABLE

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 the revolving frame (E) of 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, deterioration of battery	Check and repair loose terminal or wire breakage, replace battery. (*)
	Loosening and damage of fan belt	Check fan belt tension and replace. (*)
Lamp flickers while engine is running.	Defective wiring, deterioration of battery	Check and repair loose terminal or wire breakage, replace battery. (*)
	Loosening and damage of fan belt	Check fan belt tension and replace. (*)

Problem	Main causes	Remedy
Charge level caution lamp does not go out even when engine is running.	Defective alternator	Replace. (*)
	Defective wiring	Check, repair. (*)
	Loose fan belt	Check fan belt tension and replace. (*)
Unusual noise is generated from alternator.	Defective alternator	Replace. (*)
Starting motor does not rotate even when starting switch is turned to START position.	Defective wiring	Check, repair. (*)
	Defective starting motor	Replace. (*)
	Insufficient battery charge	Charge battery.
	Battery disconnect switch at OFF position	Turn ON.
	Engine shutdown secondary switch at "engine stop" position	Set it to "Normal" position and install a cover to it.
Pinion of starting motor repeats engaging and disengaging (rattles).	Insufficient battery charge	Charge battery.
	Defective safety relay	Replace. (*)
Starting motor turns engine sluggishly.	Insufficient battery charge	Charge battery.
	Defective starting motor	Replace. (*)
Starting motor disengages before engine starts.	Defective wiring, defective ring gear and pinion	Check, repair. (*)
	Insufficient battery charge	Charge battery.
Preheating pilot lamp does not light up.	Defective wiring	Check, repair. (*)
	Defective heater relay	Replace. (*)
	Defective monitor	Replace. (*)
Oil pressure caution lamp does not light up when engine is stopped (starting switch is at ON position).	Defective monitor	Replace. (*)
	Defective caution lamp switch	Replace. (*)
When startability at low temperature is poor, if you touch the outside of the electric heater by hand after preheating, it is not felt warm.	Defective wiring	Check, repair. (*)
	Wire breakage in electrical intake air heater	Replace. (*)
	Defective operation of heater relay	Replace. (*)
	Blown fuse of heater	Replace. (*)
Engine does not start. (L04 lights up on monitor.)	Damaged data in the controller	Check, repair. (*)
	Other system troubles	Check, repair. (*)
When travel lever is operated, travel alarm does not sound.	Defective wiring	Check and repair loose connector terminal or wire breakage. (*)
	Defective alarm	Replace. (*)
	Defective PPC pressure sensor	Replace. (*)
Rearview monitor displays nothing. (Machine with rearview camera)	Defective wiring	Check and repair loose or disconnected connector or wire breakage. (*)
	Defective camera	Replace. (*)
	Defective monitor	Replace. (*)

Problem	Main causes	Remedy
The engine does not start even if the key in the starting switch is turned to START position and the starting motor rotates.	Defective engine controller power supply circuit	Replace. (*)
	Defective relay	Replace. (*)
	Defective connector on engine side	Check and repair loose or disconnected connector or wire breakage. (*)

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
Speed of travel, swing, boom, arm, bucket is slow	Lack of hydraulic oil	Set oil to specified level. See CHECKS BEFORE STARTING.
Pump generates abnormal noise. (sucking in air)	Clogged element in hydraulic tank strainer, lack of oil	Clean. See EVERY 2000 HOURS MAINTENANCE.
Excessive rise in hydraulic oil temperature	Loose fan belt	Check fan belt tension and replace. (*)
	Dirty oil cooler	Clean. See EVERY 500 HOURS MAINTENANCE.
	Lack of hydraulic oil	Set oil to specified level. See CHECKS BEFORE STARTING.
Track comes off.	Track too loose	Adjust track tension, see WHEN REQUIRED.
Abnormal wear of sprocket	Track too loose	Adjust track tension, see WHEN REQUIRED.
Boom rises slowly or does not rise.	Lack of hydraulic oil	Set oil to specified level. See CHECKS BEFORE STARTING.
Does not swing.	Swing lock switch still applied	Turn swing lock switch OFF.
	Swing brake system error	Check, adjust. (*) When move of machine to safe place is required, turn the swing parking brake cancel switch to ON position temporarily.

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.

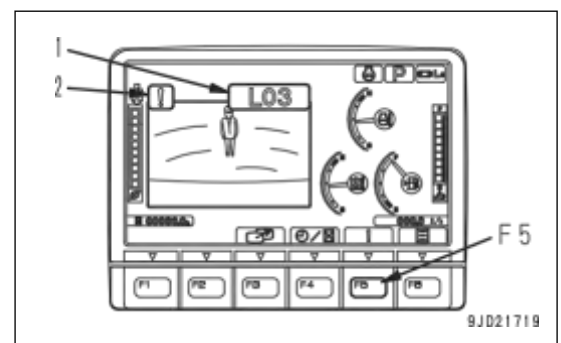
Problem	Main causes	Remedy
Engine oil pressure caution lamp lights up.	Lowered oil level in engine oil pan (sucking in air)	Set oil to specified level. See CHECKS BEFORE STARTING.
	Improper oil is used. (Viscosity is improper.)	Replace oil. See METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE and KOMATSU GENUINE LUBRICANTS.
	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, repair. See CHECKS BEFORE STARTING.
	Loose fan belt	Check fan belt tension, replace. (*)
	Dirt or scale accumulated in cooling system	Change coolant, flush inside of cooling system. See WHEN REQUIRED.
	Clogged radiator fins or damaged fin	Clean or repair. See EVERY 500 HOURS MAINTENANCE.
	Defective thermostat	Replace thermostat. (*)
	Loosened radiator filler cap (in high altitude operation)	Tighten cap or replace packing.
	Defective monitor	Replace monitor. (*)
Indicator of engine coolant temperature gauge is in red range.	Lowered coolant level, leakage of coolant	Check, add coolant, repair. See CHECKS BEFORE STARTING.
	Loose fan belt	Check fan belt tension, replace. (*)
	Dirt or scale accumulated in cooling system	Change coolant, flush inside of cooling system. See WHEN REQUIRED.
	Clogged radiator fins or damaged fin	Clean or repair. See EVERY 500 HOURS MAINTENANCE.
	Defective thermostat	Replace thermostat. (*)
	Loosened radiator filler cap (in high altitude operation)	Tighten cap or replace packing.
	Defective monitor	Replace monitor. (*)

Problem	Main causes	Remedy
Starting motor rotates but engine does not start.	Lack of fuel	Add fuel. See CHECKS BEFORE STARTING.
	Air in fuel system	Repair place where air is sucked in. See EVERY 500 HOURS MAINTENANCE.
	Defective fuel injection pump or defective nozzle	Replace pump or nozzle. (*)
	Starting motor turns engine sluggishly.	See PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM.
	Preheating pilot lamp does not light up.	See PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM.
	Defective compression (Defective valve clearance)	Adjust valve clearance. (*)
Exhaust gas color is white or bluish.	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.	Clogged air cleaner element	Clean or replace. See WHEN REQUIRED.
	Defective nozzle	Replace nozzle. (*)
	Defective compression	See the above section on defective compression. (*)
	Defective turbocharger	Clean or 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	See the above section on "Indicator of engine coolant temperature gauge is in red range".
	Damage inside muffler	Replace muffler. (*)
	Excessive valve clearance	Adjust valve clearance. (*)
Engine stalls during operation.	Clogging of pre-filter or main filter	Replace filter cartridge.
	Defective engine and fuel circuit	Check, repair. (*)

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 F5 to display the "Current Abnormality" and check the details and remedy.

For the contents of the action level display and caution lamp, see "WARNING DISPLAY (3-17)".



- When “DXA8KA” or “DXA8KB” or “DXA9KA” or “DXA9KB” is on the “Current Abnormality” screen, it enables operations temporarily by turning the pump secondary drive switch to upper (emergency) position. For details of the switch, see “PUMP SECONDARY DRIVE SWITCH (3-89)”.

After that, immediately ask your Komatsu distributor for inspection and repair.

- 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 the method of replacement, see “METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE (4-50)”, “METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE (4-60)”.

If “CA2249” or “CA559” is not cleared even after the replacement, ask your Komatsu distributor for inspection immediately, even though the machine can perform normal operation.

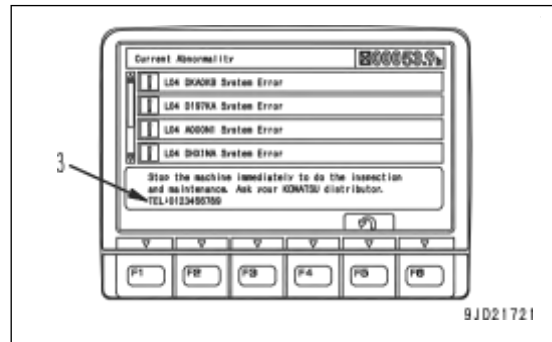
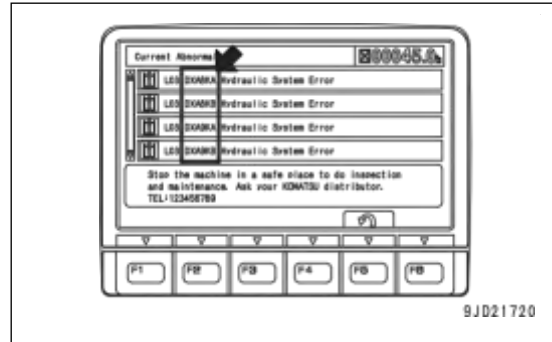
Telephone number for the point of contact if an error occurs

When an error screen is displayed on the monitor, press the switch F5 to display the “Current Abnormality” screen, and telephone number (3) 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.



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.

WELDING INSTRUCTIONS

- 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 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.

BURN PREVENTION

Do not touch the hot parts, such as the engine, oil or coolant during inspection and maintenance.

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 air bleeding, see "METHOD FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT (4-37)".

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 (2-41)" and pay attention to safety.
- 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.

For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)".

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)
PTO gear case	Power train oil TO30 (Komatsu genuine)
Swing machinery case	
Final drive case	
Hydraulic oil system	Power train oil TO10 (Komatsu genuine)
Radiator	Non-Amine Engine Coolant (AF-NAC) (Komatsu genuine) (density: 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 you to use the Komatsu oil clinic to check the characteristics of the oil in detail.

FUEL

- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank with fuel after completing the day's work.
- The fuel pump is a precision equipment, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified for the temperature that is described in Operation and Maintenance Manual.
 - If the fuel is used at the temperatures lower than the specified temperature (particularly at temperatures below -15 °C, the fuel will solidify.
 - If the fuel is used at temperatures higher than the specified temperature, the viscosity will drop, and it may result in troubles such as a drop of output.

- Before starting the engine, or after 10 minutes of adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters are replaced, it is necessary to bleed the air from the circuit.
- If there is any foreign material in the fuel tank, wash the tank and fuel system.

NOTICE

Always use ultra-low-sulfur diesel fuel.

The ASTM diesel fuel recommended by Komatsu may contain 5 % or less of biofuel. The EN diesel fuel may contain 7 % or less of it. Use the fuel which is filled into the storage tank or the fuel tank of the machine as soon as possible.

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 2 years or 4000 hours. 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 details of the coolant density, see “METHOD FOR CLEANING INSIDE OF COOLING SYSTEM (4-18)”. 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 it with city 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. Follow the instructions and precautions according to “ACTIONS IF FIRE OCCURS (2-19)”.
- 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. For treatment of the waste, see “PRECAUTIONS FOR DISPOSING OF WASTE MATERIALS (2-48)”. 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.

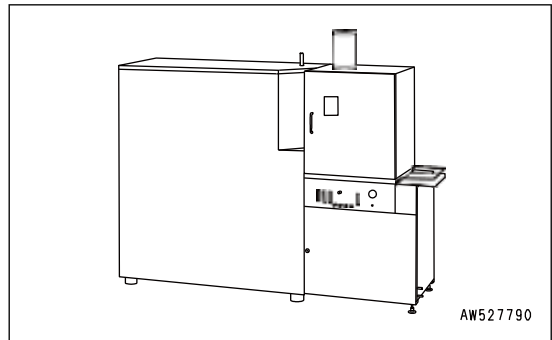
Thanks to long term experience and ample data accumulated, we can grasp condition of your machine accurately and provide proper recommendation.

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

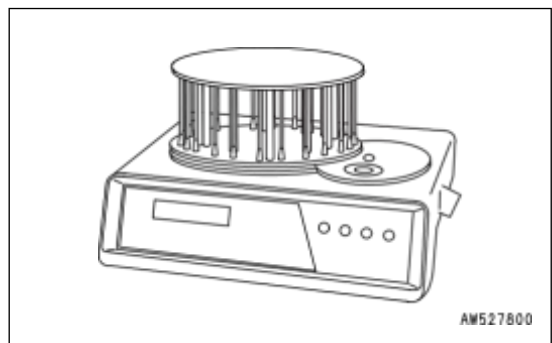
Measurement of metallic powder concentration

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	Up to 36 months
Max.25 °C	Up to 18 months
Max.30 °C	Up to 12 months
Max.35 °C	Up to 6 months

*: Do not store DEF in the temperature of 35 °C or above.

For the storage in cold weather, see the section about DEF in “COLD WEATHER OPERATION (3-229)”.

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 (3-110)”.**
 - **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.**
-
- Wipe off the water drop stuck around connectors before removing the connectors, and do not let water drop get into the connectors when removing the connectors of electrical components after washing the machine or in the rain.
 - Checking and maintenance items are checking fan belt tension, checking damage of the fan belt and checking battery fluid level.
 - Komatsu recommends installing electric components 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

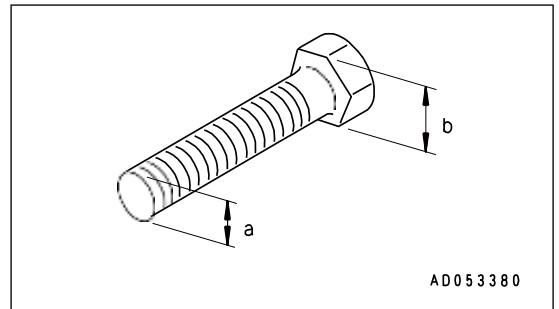
Tightening torque list

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.

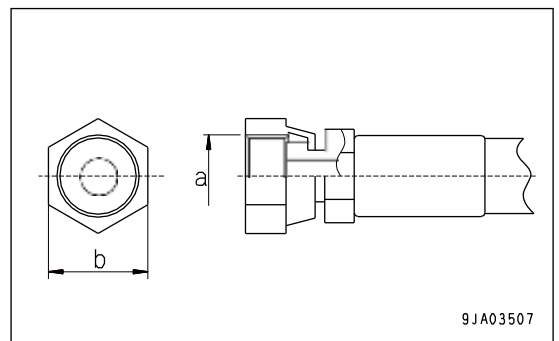
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.

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	kgm	Nm	kgm
6	10	13.2	1.35	11.8 - 14.7	1.2 - 1.5
8	13	31	3.2	27 - 34	2.8 - 3.5
10	17	66	6.7	59 - 74	6.0 - 7.5
12	19	113	11.5	98 - 123	10.0 - 12.5
14	22	172	17.5	153 - 190	15.5 - 19.5
16	24	260	26.5	235 - 285	23.5 - 29.5
18	27	360	37.0	320 - 400	33.0 - 41.0
20	30	510	52.3	455 - 565	46.5 - 58.0
22	32	688	70.3	610 - 765	62.5 - 78.0
24	36	883	90.0	785 - 980	80.0 - 100.0
27	41	1,295	132.5	1,150 - 1,440	118.0 - 147.0
30	46	1,720	175.0	1,520 - 1,910	155.0 - 195.0
33	50	2,210	225.0	1,960 - 2,450	200.0 - 250.0
36	55	2,750	280.0	2,450 - 3,040	250.0 - 310.0
39	60	3,280	335.0	2,890 - 3,630	295.0 - 370.0

Apply the following table for hydraulic hose.



Nominal - No. of threads "a"	Width across flats "b" (mm)	Tightening torque			
		Target value		Allowable range	
		Nm	kgm	Nm	kgm
9/16-18UNF	19	44	4.5	35 to 54	3.5 to 5.5
11/16-16UN	22	74	7.5	54 to 93	5.5 to 9.5
13/16-16UN	27	103	10.5	84 to 132	8.5 to 13.5
1-14UNS	32	157	16.0	128 to 186	13.0 to 19.0
1 3/16-12UN	36	216	22.0	177 to 245	18.0 to 25.0

MAINTENANCE SCHEDULE

- If the machine is equipped with a hydraulic breaker, the maintenance schedule for some parts are different. When maintaining the machine, check “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-12)” for the maintenance interval.
- 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. For details, see the oil part number and note in “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.
- Contact your Komatsu distributor for changing the maintenance interval of the machine monitor.

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MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER

For machine equipped with a hydraulic breaker, the hydraulic oil deteriorates faster than for normal bucket digging operations, so set the maintenance intervals as follows.

Replace hydraulic filter element

On a new machine, replace the element after the first 100 to 150 hours, then perform further replacement of the element according to the table.

Change oil in hydraulic tank

Change the oil according to the table.

Replace additional filter element for breaker (if equipped)

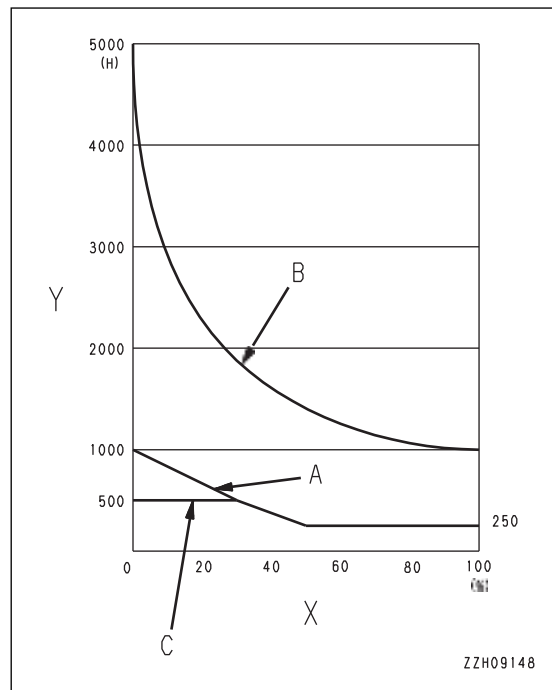
Use a guideline of 250 hours for use of the breaker (operating ratio of the breaker: 50% or more), and replace the element according to the table.

- X: Breaker operating ratio (%)
- Y: Replacement interval (H)
- (A):Element of hydraulic tank
- (B):Hydraulic oil
- (C):Element of additional filter

REMARK

Breaker operating ratio 100% means that only the breaker is used

Breaker operating ratio 0% means that the breaker is not used



MAINTENANCE PROCEDURE

WHEN REQUIRED

METHOD FOR CHECKING, CLEANING AND REPLACING AIR CLEANER

⚠ WARNING

- If inspection, cleaning, or maintenance is performed while the engine is running, dust enters into the engine and damages it. Be sure to stop the engine before performing these works.
- When using compressed air, there is a danger that dirt may scatter and cause personal injury. Wear the protective equipment such as protective eyeglasses and dust mask.
- When working on a high place or in the place where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

NOTICE

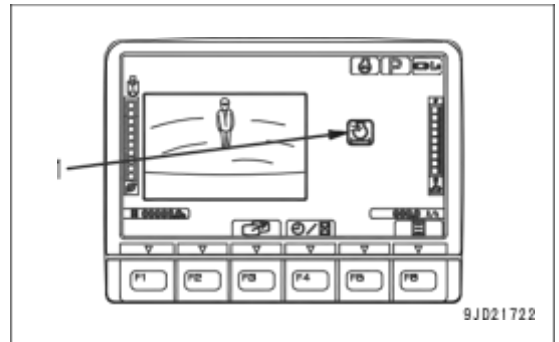
If the air cleaner is not cleaned or maintained sufficiently, the mass air flow sensor which is installed to the air cleaner does not function correctly, and it may cause a decrease in the engine performance.

METHOD FOR CHECKING AIR CLEANER

The air cleaner clogging caution lamp informs when the air cleaner element should be checked.

Check that air cleaner clogging caution lamp (1) on the machine monitor is lit.

If the air cleaner clogging caution lamp (1) lights up, clean the air cleaner element.



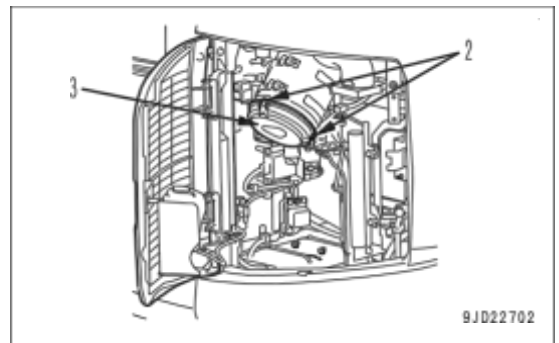
METHOD FOR CLEANING AIR CLEANER OUTER ELEMENT

NOTICE

- Never remove the inner element. If it is removed, dirt will enter and can cause an engine trouble.
- Do not use a screwdriver or other tool.
- When cleaning the element, do not hit it or hit anything with the element.
- Before and after cleaning the element, do not leave or keep it under direct sunlight.

Clean the outer element in the following procedure.

1. Open the battery inspection cover on the left side of the machine, remove the hooks (2) (3 places), and remove the cover (3).



2. Hold the outer element (5), rock it lightly up and down and to the right and left, and pull it out while turning it to the right or left.

3. When outer element (5) is removed, check that the inner element does not come out of position and is not at an angle.

If it is at an angle, push it straight to the bottom with your hand.

4. After removing outer element (5), cover the inner element (6) with a clean cloth or tape to prevent dirt or dust from entering.

5. Clean dust sticking inside air cleaner body (7) and on cover (3) by using a clean cloth or brush.

6. If any dust is attached to vacuator valve (4) installed to cover (3), remove it.

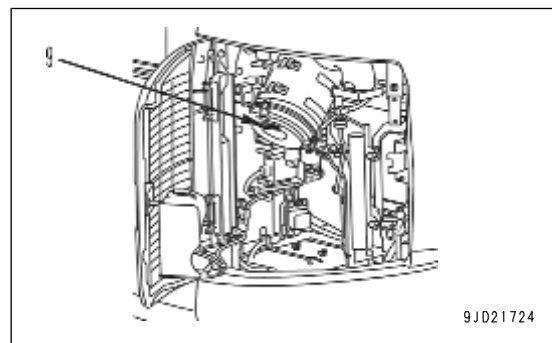
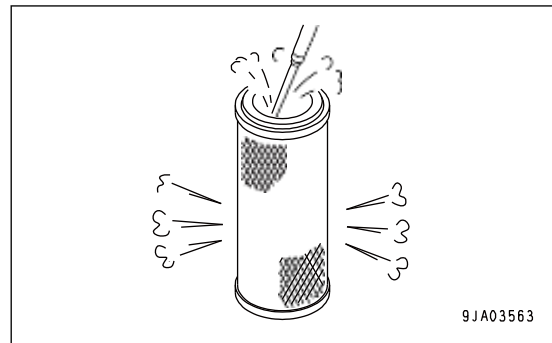
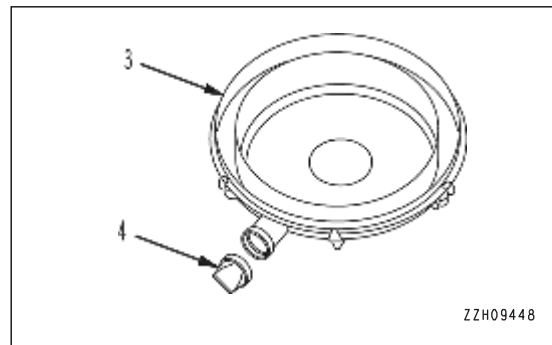
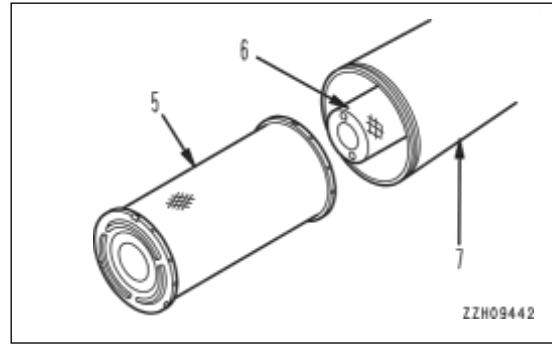
7. When the outer element has been cleaned 6 times or used for 1 year, replace it.

- When the element needs to be replaced
Replace the inner and outer elements with new ones. For details, see METHOD FOR REPLACING ELEMENT.
- When the element does not need to be replaced
Clean the outer element. Continue the cleaning procedure.

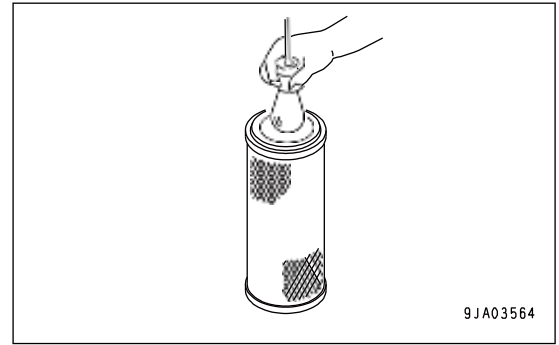
8. Blow dry compressed air (Max. 0.2 MPa) from the inside of the outer element along the pleats.

9. Blow along the pleats from the outside, then blow again from the inside.

10. Peel off a seal (9) every time after the cleaning of the element.



11. After cleaning, illuminate the inside of the element with an electric bulb to check.
If any holes or thin places are found, replace the inner and outer elements.
12. Remove the cover of cloth or tape attached to inner element (6).

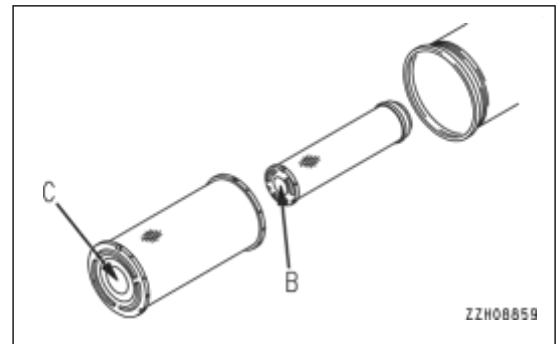


NOTICE

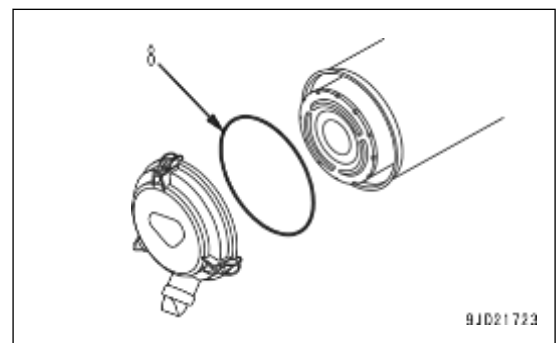
- Do not use the element with damaged pleats or a damaged gasket or seal.
 - If the element and O-ring are cleaned and used again after they are used for more than one year, it will cause problems. Do not use them again.
13. Check the seal of the cleaned or new element for sticking of dusts and oil and wipe them off, if any.

NOTICE

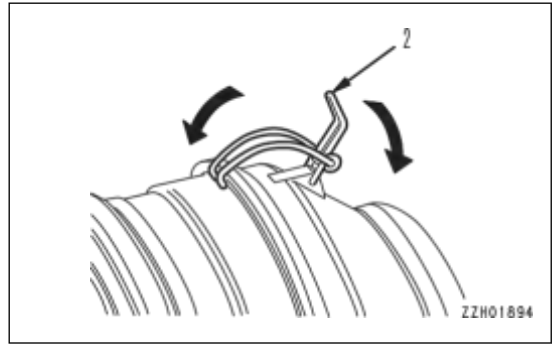
- Be sure to install the air cleaner element facing in the correct direction. Install so that the bottom of the air cleaner element (face where no hole is drilled) (B), (C) comes to cover (3) end. If it is installed in wrong direction, it may cause breakage of the air cleaner element or serious damage to the engine.
- When inserting the element into the body, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is installed by force with hook (2), there is a danger that the hook and air cleaner body may be damaged, so be careful when installing.



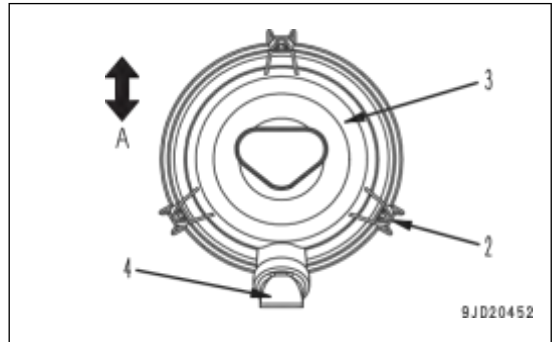
14. Push the outer element in straight with your hand when installing it to the air cleaner body.
Hold the outer element, and rock it lightly up and down and to the right and left while pushing it in, the outer element can be inserted easily.
15. Install cover (3) according to the following procedure.
 - 1) Check that O-ring (8) is fitted to cover (3).
 - 2) Align cover (3) with the element.



- 3) Lock the tip of hook (2) on the protrusion of the air cleaner body.



- 4) Always install the cover (3) so that vacuator (4) faces right below (A).
- 5) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large.
If the clearance is too large, remove cover (3), and then install it again.



- 16. Check the air cleaner clogging caution lamp (1) on the machine monitor.
If it light up just after cleaning of the elements has been finished, replace the inner and outer elements.

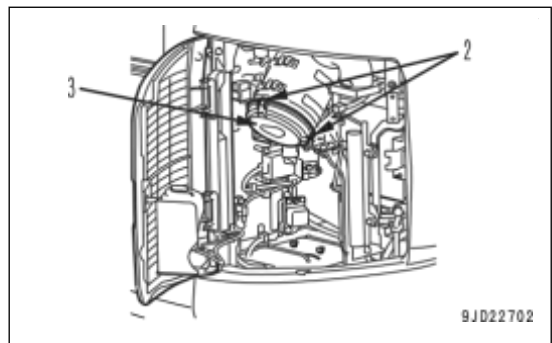
METHOD FOR CHANGING AIR CLEANER ELEMENT

NOTICE

- Do not clean and reuse the inner element. When replacing the outer element, replace the inner element with a new one at the same time.
- If the outer element and cover are installed while the inner element is not installed properly, the outer element may be damaged.
- The sealing portion of the improper part lacks precision, and allows the entry of dust, which leads to damage of the engine. Do not use such improper part.

Replace the outer element in the following procedure.

- 1. Open the battery inspection cover on the left side of the machine, remove the hooks (2) (3 places), and remove the cover (3).

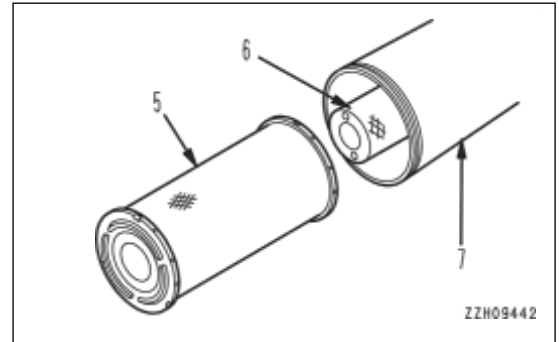


- 2. Hold the outer element (5), rock it lightly up and down and to the right and left, and pull it out while turning it to the right or left.

Do not remove inner element (6) at this time.

3. When outer element (5) is removed, check that the inner element does not come out of position and is not at an angle.

If the inner element is inclined, push it in straight by hand to the end.



4. Clean dust sticking inside air cleaner body (7) and on cover (3) by using a clean cloth or brush.
5. If any dust is attached to vacuator valve (4) installed to cover (3), remove it.

6. Remove the inner element (6), then quickly install the new inner element.

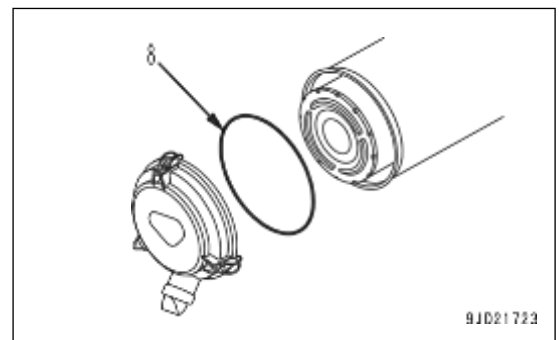
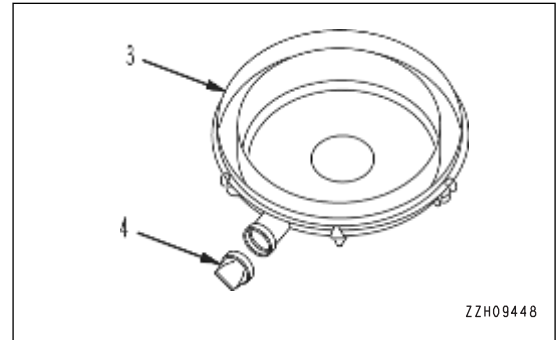
Install the inner element securely so that it does not move.

7. Push new outer element (5) in straight with your hand into the air cleaner body.

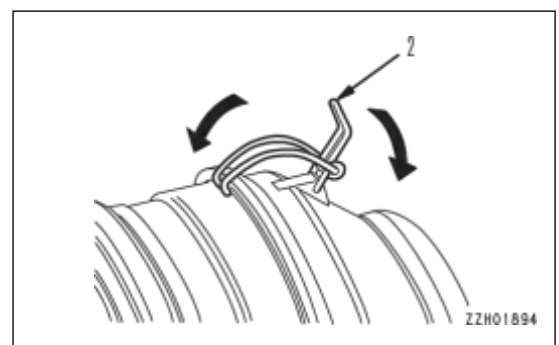
Hold the element, and rock it lightly up and down and to the right and left while pushing it in, the element can be inserted easily.

8. Install the cover (3) according to the following procedure.

- 1) Check that O-ring (8) is fitted to cover (3).
- 2) Align the cover (3) with the element.



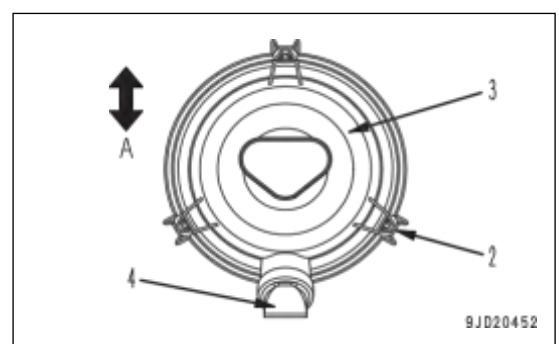
- 3) Lock the tip of hook (2) on the protrusion of the air cleaner body.



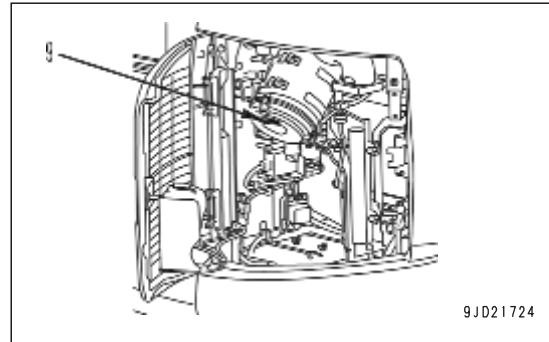
- 4) Always install the cover (3) so that vacuator (4) faces right below (A).

- 5) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large.

If the clearance is too large, remove cover (3), and then install it again.



9. Replace the seal (9) on the cover (3) with a new one.



CHECK AND REPLACE VACUATOR VALVE

Check vacuator valve (4) for damage and deformation of its rubber portion.

If the vacuator is damaged or its rubber part is deformed, replace it 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 (3-129)", and "METHOD FOR STARTING ENGINE (3-153)".
- Do not stand behind the machine. Because the engine is operated during cleaning, the machine may suddenly move, and you may be hit if you are standing behind it. Keep away from the rear of the machine while the engine is running.

Place the machine on a level ground when cleaning or changing the coolant.

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

Coolant	Interval for cleaning inside of cooling system and changing coolant
Non-Amine Engine Coolant (AF-NAC)	Every 2 years or every 4000 hours 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 2 years or 4000 hours.

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.

To maintain the anticorrosion 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 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
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.**

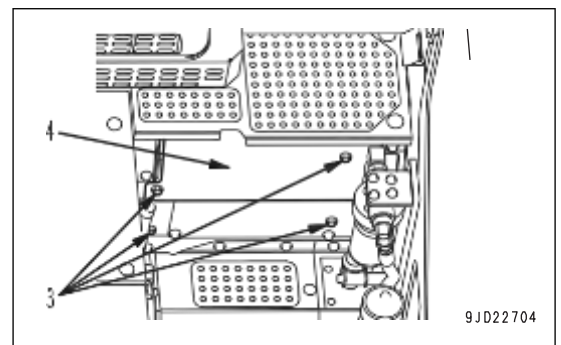
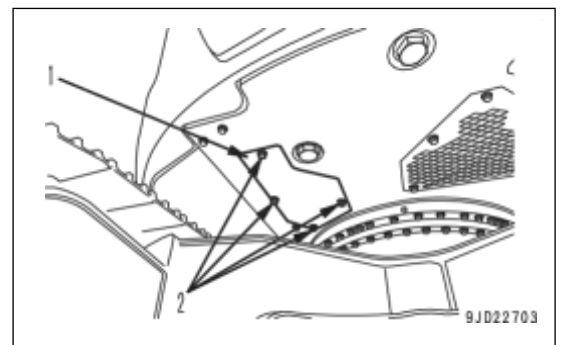
Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, so it is not flammable. (For dilution water, see "HANDLE OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC (4-4)".)

Check the density with a coolant tester.

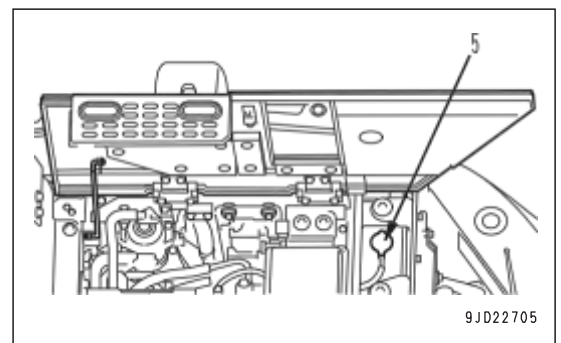
Prepare a container whose capacity is larger than the specified coolant volume to catch drained coolant.

Prepare a hose to fill with coolant and water.

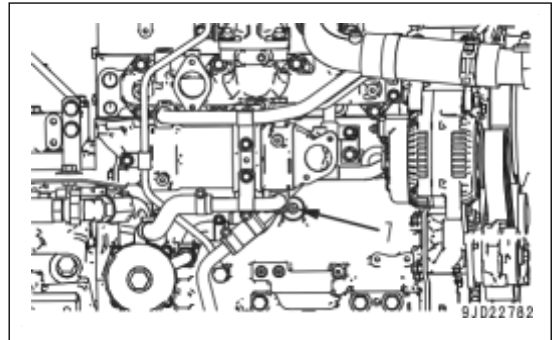
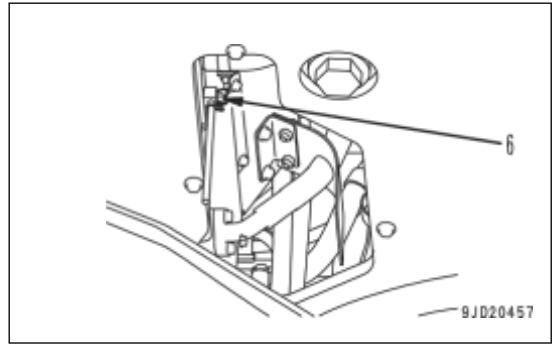
1. Stop the engine.
2. Remove the cover mounting bolt (2) (4 places) and remove the undercover (1).
3. Remove the cover mounting bolt (3) (4 places) and remove the cover (4) between the hydraulic tank and operator cab.



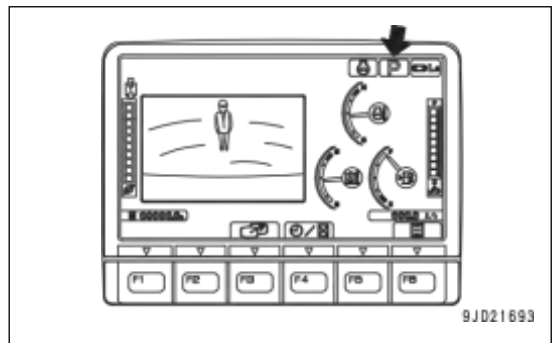
4. Check that the coolant temperature is low enough to touch the radiator cap surface by bare hand, turn radiator cap (5) slowly until it hits the stopper, and release the pressure.
5. Then, while pushing radiator cap (5), turn it until it touches the stopper, and remove it.



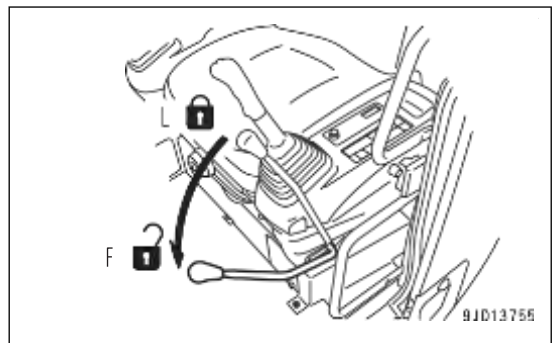
6. Place the containers to catch the coolant under the drain hose installed to drain valve (6) and under coolant drain plug (7) of the engine cylinder block.
7. Open the drain valve (6) at the bottom of the radiator.
8. Remove the drain plug (7) of the cylinder block and drain the coolant.
9. After draining the coolant, close the drain valve (6).
10. Tighten the drain plug (7) and add tap water.
Add water until it fills the radiator.
11. Start the engine.



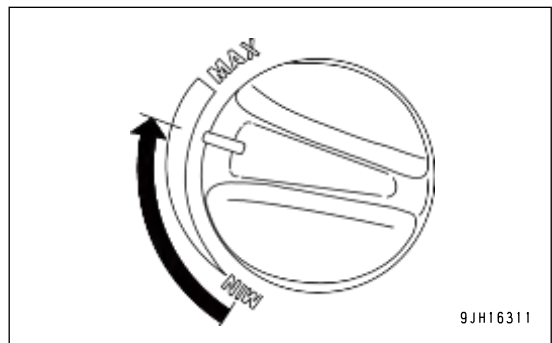
12. To complete the warm-up operation of the hydraulic equipment more quickly, set the working mode to P mode (heavy-duty mode).
For the details of the working mode setting procedure, see "METHOD FOR SELECTING WORKING MODE (3-176)".



13. Move the lock lever slowly to FREE position (F).
14. Raise the bucket from the ground.



15. Turn the fuel control dial to a point of 2/3 between Low idle (MIN) position and High idle (MAX) position.



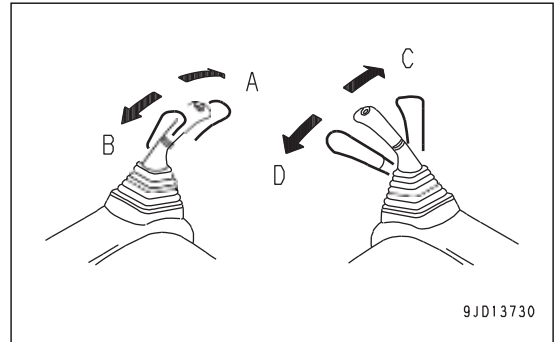
16. Operate the work equipment control levers according to the following procedure.

NOTICE

When the work equipment is operated, take care that it does not interfere with the machine or ground.

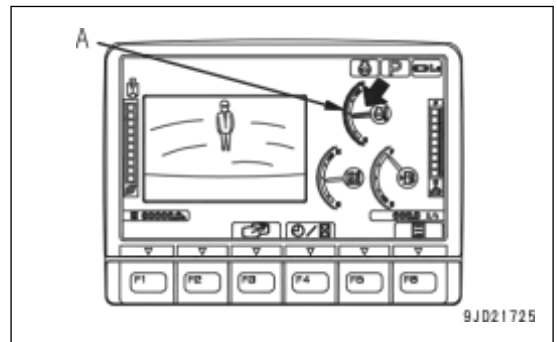
- 1) Move the R.H. work equipment control lever slowly in the direction to the bucket CURL side (D). Operate the lever to the end of its travel and hold it in position for 30 seconds.
- 2) Move the R.H. work equipment control lever slowly in the direction to the bucket DUMP side (C). Operate the lever to the end of its travel and hold it in position for 30 seconds.
- 3) Next, move L.H. work equipment control lever slowly in the direction arm IN position (B). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
- 4) Move the L.H. work equipment control lever slowly in the direction to the arm OUT side (A). Operate the lever to the end of its travel and hold it in position for 30 seconds.

Repeating the operations from step 1 to 4 moves the pointer of the engine coolant temperature caution lamp (4) upward. The pointer of the engine coolant temperature caution lamp moves down temporarily around the center of gauge (A). Then, continue the operation for approximately 10 minutes.

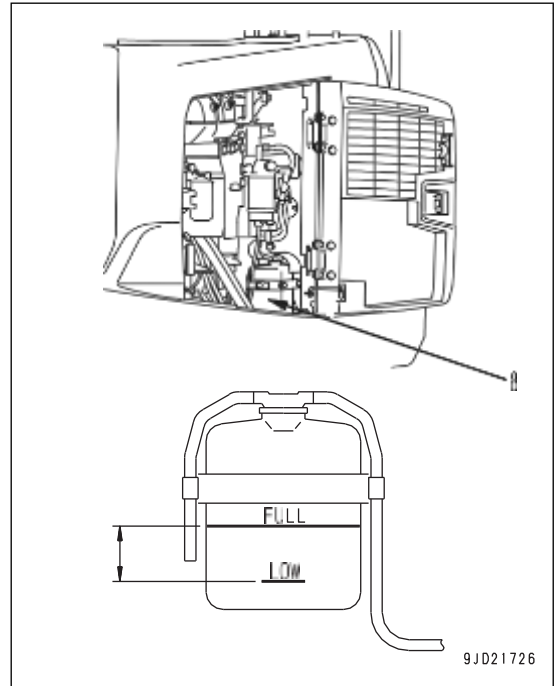


17. Stop the engine.
18. Open the drain valve (6).
19. Remove the drain plug (7) and drain the coolant.
20. After draining the coolant, close the drain valve (6).
21. Wind a sealing tape onto drain plug (7) and tighten the plug.
22. Install the covers (1) and (4).
23. Add Non-Amine Engine Coolant through the coolant filler port up to the mouth of the port.
For the concentration of Non-Amine Engine Coolant, see "Coolant density table".
24. 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.

Keep the radiator cap (5) removed during the above operations.



25. Drain the coolant in reservoir tank (8).
26. Clean the inside of reservoir tank.
27. Add Non-Amine Engine Coolant to the middle between FULL and LOW.
28. Stop the engine.
29. After approximately 3 minutes, add Non-Amine Engine Coolant (AF-NAC) up to the mouth of the coolant filler port.
30. Tighten the radiator cap (5).



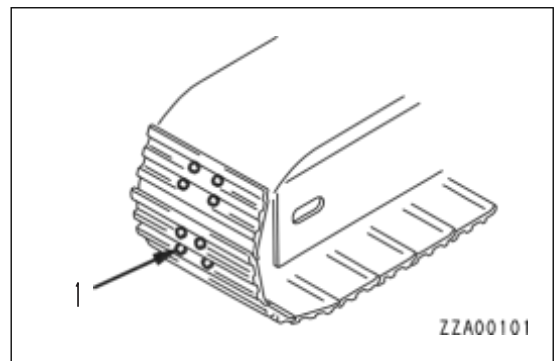
METHOD FOR CHECKING LOOSENESS AND TIGHTENING TRACK SHOE BOLTS

(Steel shoe specification)

NOTICE

If the machine is used with track shoe bolts loose, they will break. Tighten any loose shoe bolts immediately.

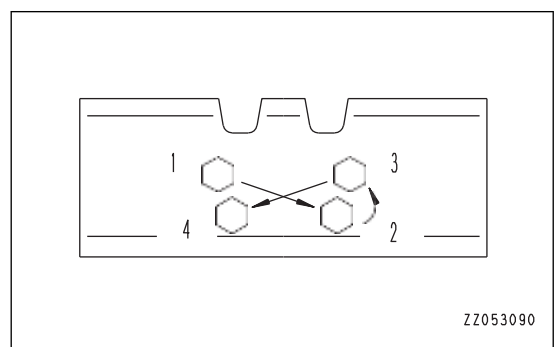
1. Check for looseness of the track shoe bolt (1).



2. If any looseness of the bolt is found, tighten it in order shown in the figure.

Tightening torque: 176.4 to 215.6 Nm

3. Check that the nut and shoe are in close contact with the link contact surface.
4. After checking, tighten a further 80 to 100 ° of tightening angle. (If the machine is equipped with swamp shoes, tighten a further 100 to 130 ° of tightening angle.)

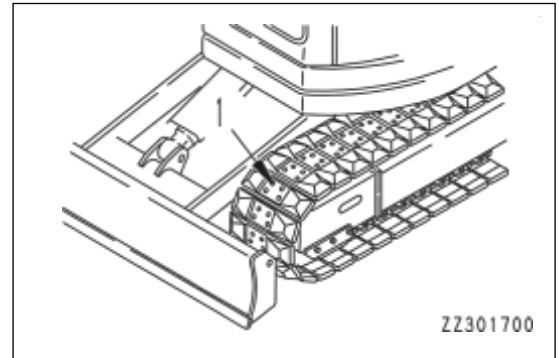


METHOD FOR CHECKING LOOSENESS AND TIGHTENING ROAD LINER SHOE BOLTS

NOTICE

If the machine is used with road liner shoe bolts loose, they will break. Tighten any loose shoe bolts immediately.

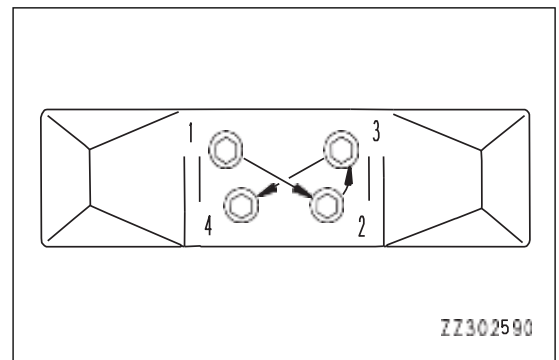
1. Check for looseness of the road liner shoe bolt (1).



2. If any looseness of the bolt is found, tighten it in order shown in the figure.

Tightening torque: 176.4 to 215.6 Nm

3. Check that the nut and shoe are in close contact with the link contact surface.



METHOD FOR CHECKING AND ADJUSTING TRACK TENSION

The wearing of the pins and bushings in the undercarriage depends on the working condition and type of soil. Check the track tension occasionally and keep it in the standard range.

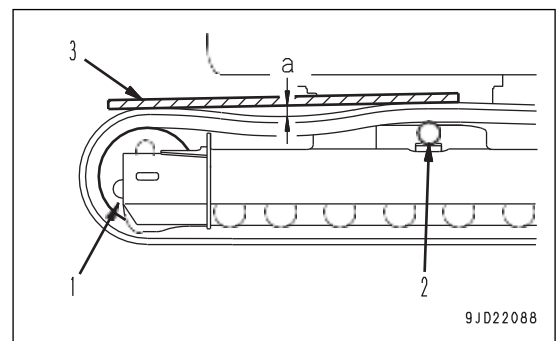
For performing the inspection and adjustment of the track shoes, park the machine on the level and solid ground.

METHOD FOR CHECKING TRACK TENSION

1. Run the engine at low idle, then move the machine forward for a distance equal to the track length on ground, and slowly stop the machine.
2. Place straight wooden square bar (3) which reaches from idler (1) to carrier roller (2) on the track.
3. Measure the maximum deflection (a) between the bottom surface of the wooden bar and top surface of the track shoes.

Standard deflection

Deflection (a) should be 10 to 30 mm.

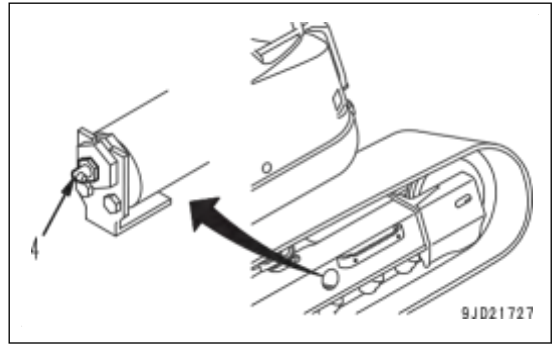


If the deflection is out of the standard range, adjust it into the standard range.

METHOD FOR INCREASING TRACK TENSION

Prepare a grease pump.

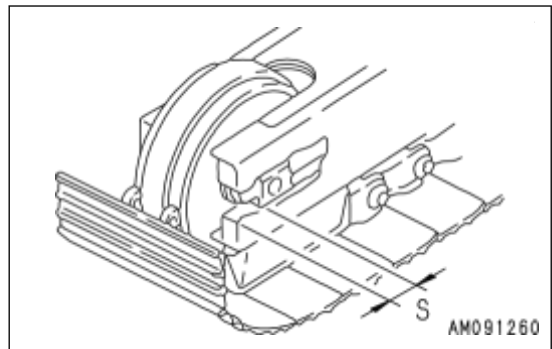
1. Pump in grease through grease fitting (4) by using a grease pump.
2. To check if the tension is correct, run the engine at low idle, move the machine slowly forward (by an amount equal to the length of track on ground), then stop the machine.



3. Check the track tension again, and if the tension is not correct, adjust it again.

Continue to pump in grease until S becomes 0 mm. If the tension is still loose, the pins and bushings are excessively worn, so they must be either turned 180° or replaced.

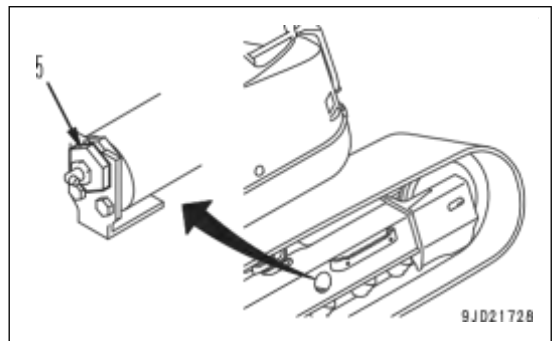
Ask your Komatsu distributor for repair.



METHOD FOR DECREASING TRACK TENSION

WARNING

- **Never loosen plug (5) more than 1 turn.**
If plug (1) is loosened more than 5 turn, there is a danger of plug (1) flying out under the high internal pressure of the grease.
Never loosen any part other than plug (5). Never put your face in the mounting direction of plug (5).
- **It is extremely dangerous to release the grease by any method other than the procedure shown here.**
If track tension is not relieved by this procedure, contact your Komatsu distributor for repairs.



1. Loosen plug (5) gradually to release the grease.
When loosening plug (5), turn it a maximum of 1 turn.
2. If the grease does not come out smoothly, move the machine forward and backward a short distance.
3. Tighten plug (5).
4. To check if the tension is correct, run the engine at low idle, move the machine slowly forward (by an amount equal to the length of track on ground), then stop the machine.
5. Check the track tension again, and if the tension is not correct, adjust it again.

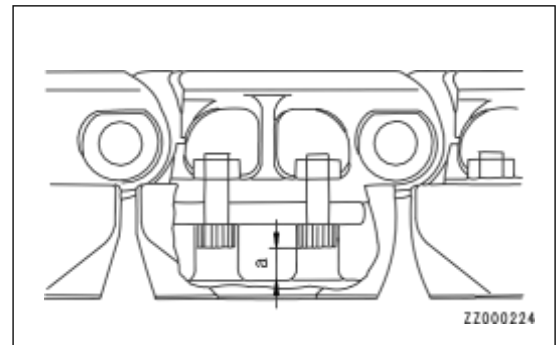
METHOD FOR CHECKING ROAD LINER

(Road liner specification)

If the road liners are in the following condition, they must be replaced. Ask your Komatsu distributor for replacement.

Lug height

- When lug height (a) is reduced to 5 mm or less, replace the road liner with a new one.
If lug height (a) is reduced by wear, the drawbar pull will drop.



For judgment of replacement, repair, and continuation of use of the road liner, consult your Komatsu distributor.

METHOD FOR REPLACING ROAD LINER

(Road liner specification)

- When all the road liners of the machine need to be replaced, ask your Komatsu distributor to replace them.
- When replacing only part of the road liner, use the special road liner removal tool. Order the tool from your Komatsu distributor.

METHOD FOR REPLACING BUCKET TEETH (VERTICAL PIN TYPE)

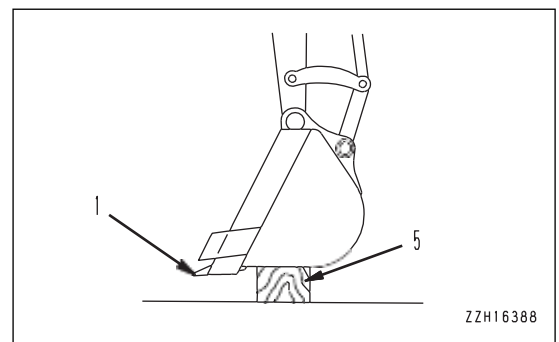
Replace the bucket teeth before the adapter starts to wear.

WARNING

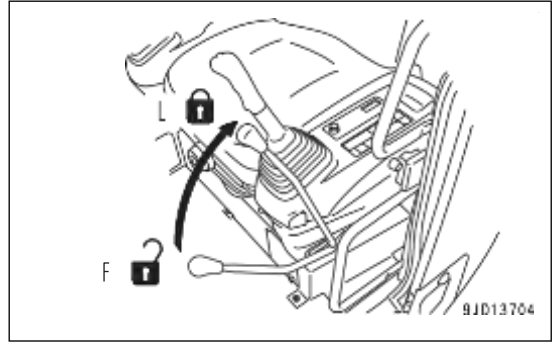
- **It is dangerous if the work equipment moves by mistake when the tooth is being replaced. Set the work equipment in a stable condition, set the lock lever securely to LOCK position, and stop the engine.**
- **As the pin is driven out with strong force, it is dangerous that the pin may fly out. Check that there is no people in the area around the machine.**
- **Broken pieces may fly during the replacement work, so always wear the protective equipment such as protective eyeglasses and gloves.**

Items to be prepared

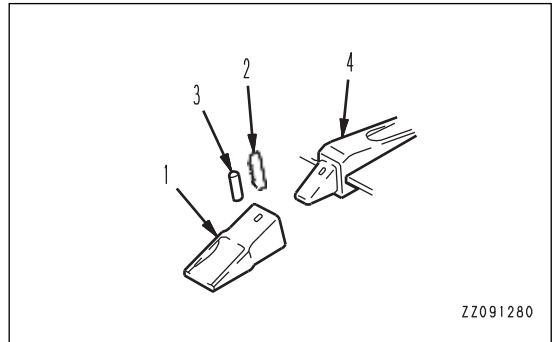
- Hammer
 - Bar
1. To make it possible to drive out a pin of tooth (1), put block (5) under the bottom of the bucket, and make the bottom of the bucket horizontal.



2. Check that the work equipment is in a stable condition, then set the lock lever to LOCK position (L).



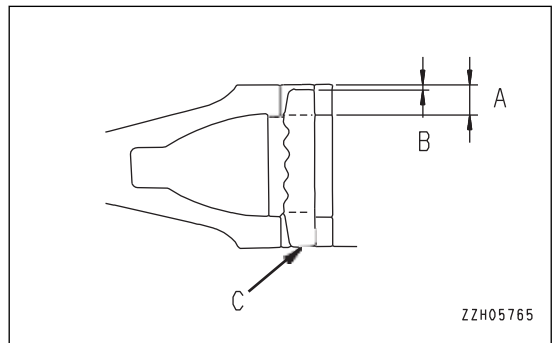
3. Use a hammer and bar to drive out lock pin (2).
 If the bar is set against rubber pin lock (3) when it is hit, the rubber pin lock may break. Set it against the back of the pin.



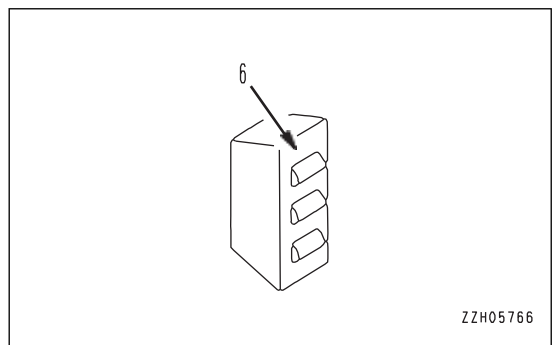
4. After removing lock pin (2) and rubber pin lock (3), check them.

If lock pin (2) and rubber pin lock (3) are used in the condition below, it will cause tooth (1) to come off during operation. Check the shape of the parts. If they have any damage, replace them.

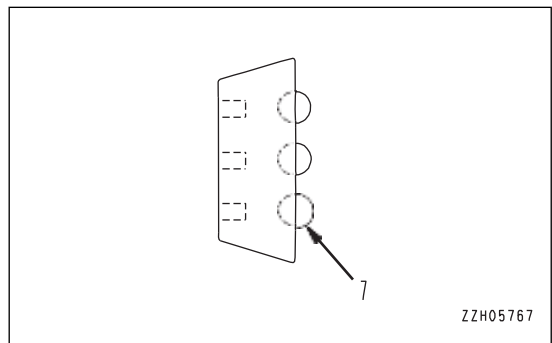
- Lock pin (2) is too short.
 Dimension (B) is 1/3 or more of dimension (A) when lock pin (2) is aligned with bottom face (C).



- The steel ball is about to come off.
 Rubber (6) of the rubber pin lock is broken.



- The steel ball sinks.
 The rubber of the rubber pin lock is deteriorated and steel ball (7) sinks into it when you press it.



5. Remove the soil stuck to adapter (4) by using a knife.

6. Use your hand or a hammer to push rubber pin lock (3) into the hole of adapter (4).

When doing this, be careful that rubber pin lock (3) does not fly out from the adapter surface.

7. Clean the inside of tooth (1), then install it to adapter (4).

If there is mud affixed to it or if there are protrusions, the tooth (1) will not enter adapter (4) properly, and there will not be proper contact at the mating portion.

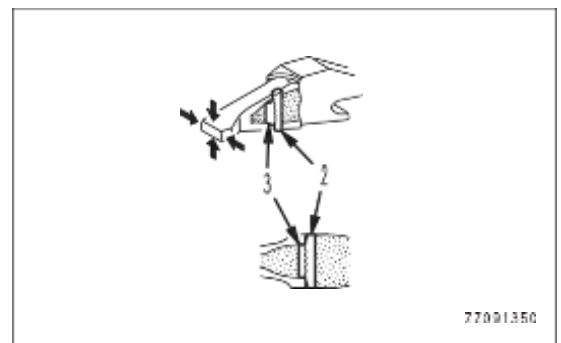
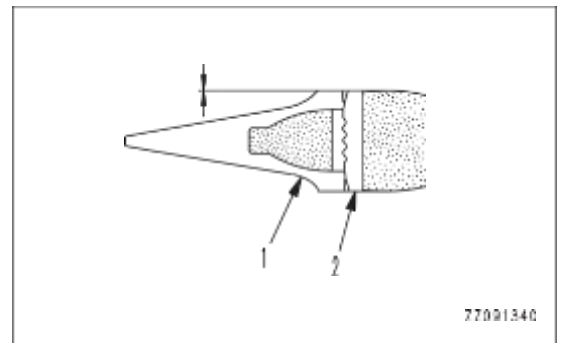
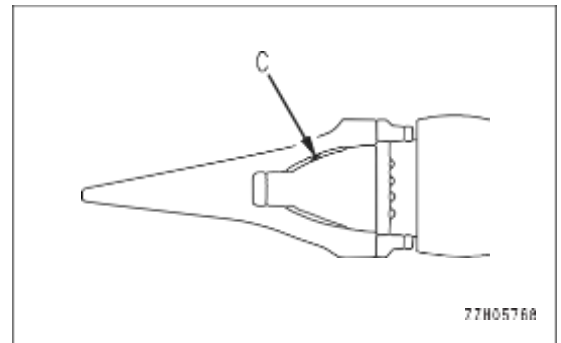
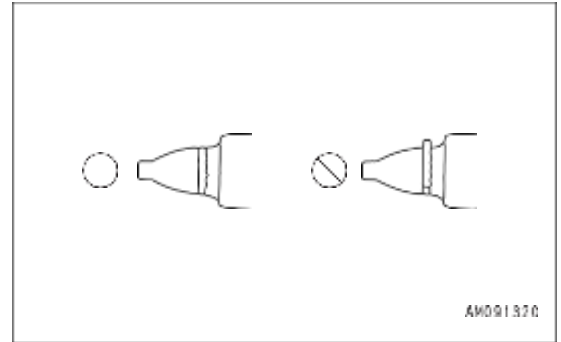
8. Fit tooth (1) to adapter (4), and check that when tooth (1) is pressed strongly, the rear face of the hole for the pin of tooth (1) is at the same level as the rear face of the hole for the pin of adapter (4).

If the rear face of the pin hole of tooth (1) protrudes in front of the rear face of the pin hole of adapter (4), do not drive the pin in.

There is sticking matter (C) which prevents tooth (1) from fitting into adapter (4) perfectly.

Find out remove the sticking matter and fit tooth (1) into adapter (4) sufficiently, and then drive lock pin (2).

9. Insert lock pin (2) in the pin hole in tooth (1), and drive it in so that the top surface of lock pin (2) is the same height as the surface of tooth (1).



10. After replacing a bucket tooth, always check the following.

- After lock pin (2) is driven in completely, it is secured by tooth (1) and surface.
- Lightly hit lock pin (2) in the reverse direction from which it was hit in.
- Lightly hit the tip of tooth (1) from above and below, and hit its sides from right and left.
- Rubber pin lock (3) and lock pin (2) are set as shown in the figure.

REMARK

If tooth (1) is turned, the wear will become uniform. This will extend the service life of the tooth and reduce the frequency of replacement.

When replacing tooth (1), replace rubber pin lock (3) and lock pin (2) with new ones as well. This will prevent tooth (1) from falling out.

METHOD FOR REPLACING BUCKET TEETH (HORIZONTAL PIN TYPE)

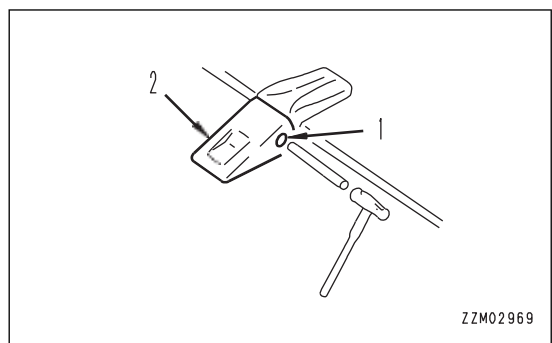
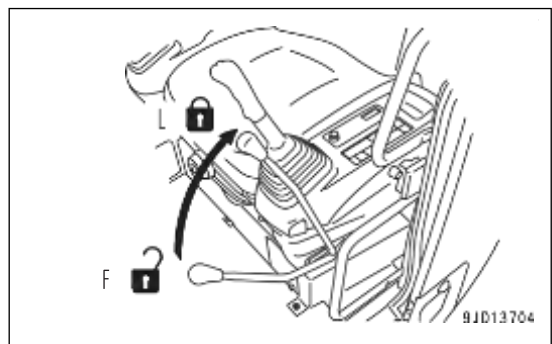
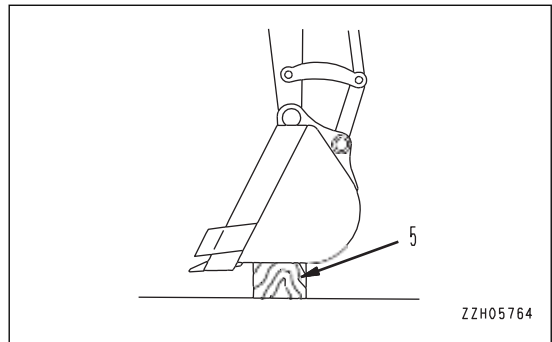
Replace the bucket teeth before the adapter starts to wear.

WARNING

- It is dangerous if the work equipment moves by mistake when the tooth is being replaced. Set the work equipment in a stable condition, set the lock lever securely to LOCK position, and stop the engine.
- As the pin is driven out with strong force, it is dangerous that the pin may fly out. Check that there is no people in the area around the machine.
- Broken pieces may fly during the replacement work, so always wear the protective equipment such as protective eyeglasses and gloves.

Items to be prepared

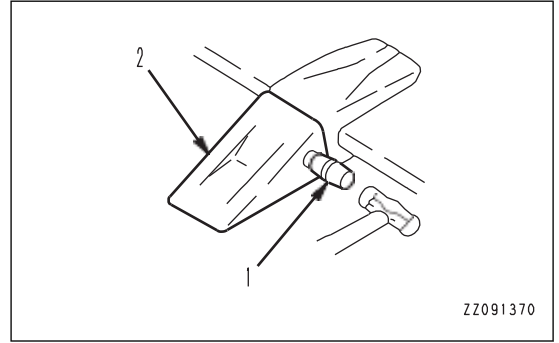
- Hammer
 - Bar
1. To pull out pin (1) of tooth (2), put block (5) under the bottom of the bucket, and make the bottom surface of the bucket horizontal.
 2. Check that the work equipment is in a stable condition, then set the lock lever to LOCK position (L).
 3. Place a bar on the head of pin (1), hit the bar with a hammer to knock out the pin, then remove tooth (2).



REMARK

- The bar must be round and thinner than the pin.
- If it cannot be removed by this method, ask your Komatsu distributor to have the replacement performed.

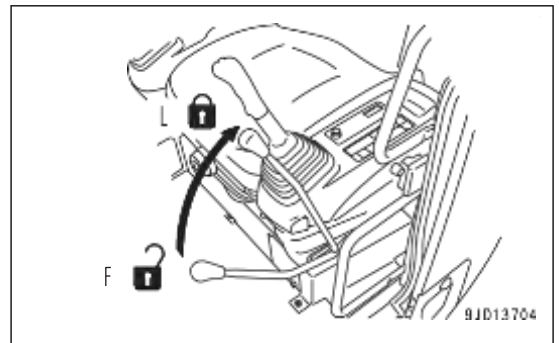
4. Clean the mounting face and fit new tooth (2) to the adapter.
5. Insert pin (1) halfway, and drive it with the hammer to install it to the bucket.



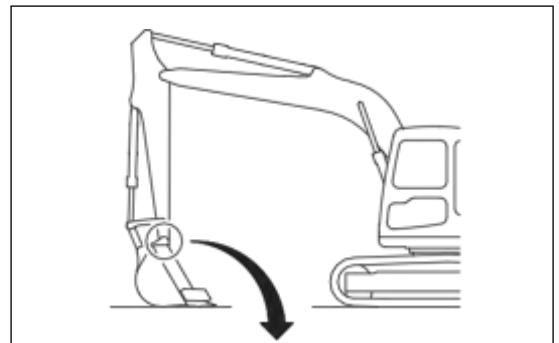
METHOD FOR ADJUSTING BUCKET CLEARANCE

WARNING

It is dangerous if the work equipment moves by mistake when adjusting the bucket clearance. Lower the work equipment to the ground stably, set the lock lever securely to LOCK position (L), and stop the engine.



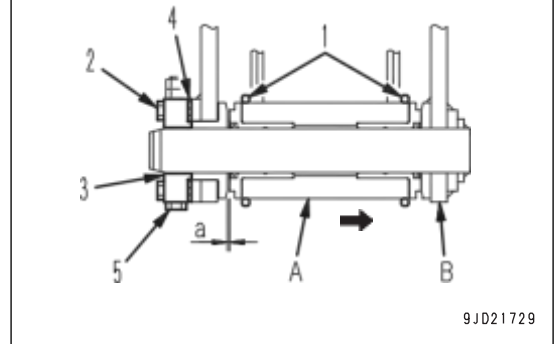
1. Set the work equipment in the posture shown in the figure, set the lock lever to LOCK position (L), and stop the engine.
A: Arm
B: Bucket



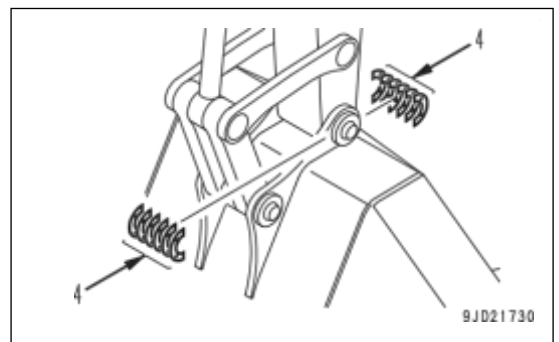
2. Shift the O-ring (1) of connecting portion and measure the amount of play (a).

REMARK

Measurement is easier if you move the bucket to one side so that all the play can be measured at 1 place (the right side in the figure). Use a clearance gauge for easy and accurate measurement.



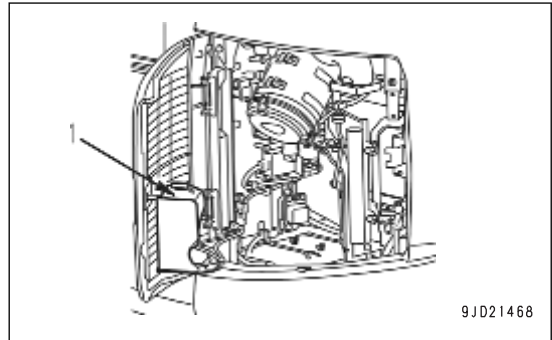
3. Loosen the plate mounting bolts (2) (4 pieces) and loosen the plate (3).
The shim is a split type, so the work can be performed without removing the bolts.
4. Remove the shim (4) corresponding to the amount of play (a).
2 types of 1.0 mm and 0.5 mm of shim (4) are installed.
When play (a) is smaller than 1 shim, do not adjust it by tightening bolts (2).
5. Tighten the bolts (2) (4 pieces).
If bolts (2) are too stiff to tighten, pull out pin stopper bolt (5) for easier tightening.



METHOD FOR CHECKING WINDOW WASHER FLUID LEVEL, ADDING FLUID

If air is in the window washer fluid, check the fluid level in window washer tank (1).

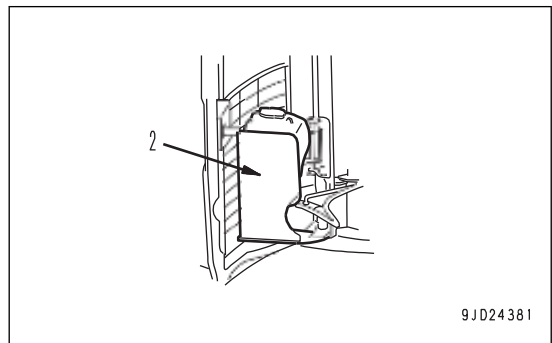
1. Check the fluid level in window washer tank (1).



2. If the level is low, add window washer fluid for automobile.

Take the following precautions when filling.

- Be careful not to let dust enter.
- Be careful that the window washer fluid level does not exceed the top edge of the bracket (2).



REMARK

There is an air bleeding hole on the cap of window washer tank in order to prevent breakage caused by negative pressure in the tank when window washer is operated. The washer fluid may leak from the air bleeding hole according to its volume or the vibration of the machine, however, it does not indicate abnormality.

Mixture ratio of pure washer fluid and water

The proper mixing proportion varies with the ambient temperature. Add washer fluid diluted with water at the following proportion.

Area, season	Mixing proportion	Freezing temperature
Normal	Washer fluid 1/3: water 2/3	-10 °C
Winter in cold district	Washer fluid 1/2: water 1/2	-20 °C
Winter in extremely cold district	Pure washer fluid	-30 °C

There are 2 types depending on the freezing temperature: -10 °C (general use) and -30 °C (cold district use), select according to the area and season.

METHOD FOR CHECKING AND MAINTENANCE AIR CONDITIONER

SERVICE ITEM

Some maintenance items of the air conditioner are to be inspected periodically and the others are to be inspected when required. Check and maintenance the air conditioner according to the following list to use it effectively.

Check and maintenance items	Content of check and maintenance	Guideline for maintenance interval
Refrigerant (gas)	Charge amount	Twice a year (spring, autumn)
Air conditioner condenser	Clogged fins	Every 500 hours "METHOD FOR CHECKING AND CLEANING RADIATOR FINS, OIL COOLER FINS, AFTER-COOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS (4-53)"
Compressor	Operating condition	Every 4000 hours

Check and maintenance items	Content of check and maintenance	Guideline for maintenance interval
V-belt	Damage, tension	Every 250 hours "METHOD FOR CHECKING AND ADJUSTING AIR CONDITIONER COMPRESSOR BELT TENSION (4-45)"
Blower motor, fan	Operating condition (Check for unusual noise)	When required
Control mechanism	Operating condition (Check that function is normal)	When required
Piping mounts	Mounting condition, looseness at tightening or connecting portions, leakage of gas, damage	When required

Even during the off-season, operate the air conditioner for 3 to 5 minutes once a month to maintain the oil film at all parts of the compressor.

METHOD FOR CHECKING REFRIGERANT LEVEL FOR AIR CONDITIONER (GAS)

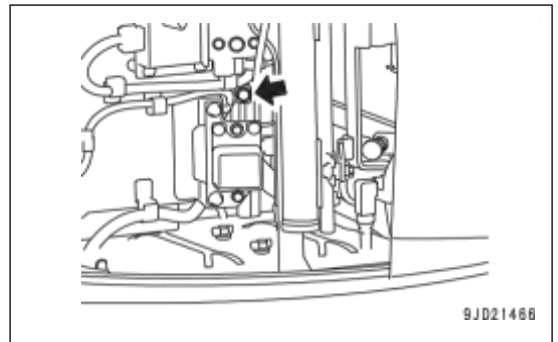
 WARNING

If the refrigerant used in the air conditioner gets into your eyes or is splashed on your hands, it may cause loss of sight or frostbite. Never touch the refrigerant. Do not loosen any part of the refrigerant circuit.

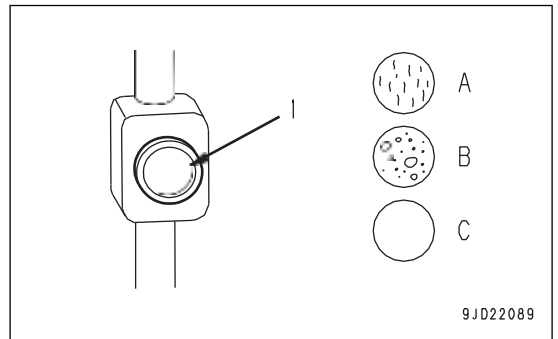
Do not bring any open flame close to any point where the refrigerant gas is leaking.

If the level of the refrigerant (gas) is low, the cooling effect will be reduced. Perform the check while running the engine at high idle and operating the air conditioner at high speed.

Check the condition of the refrigerant gas (Hydrofluorocarbons HFC -134a) that circulates the refrigerant circuit, through sight glass (1) (inspection window) at the refrigerant hose fitting.



- (A) No bubbles in refrigerant flow: Suitable
- (B) Some bubbles in refrigerant flow (bubbles pass continuously): Insufficient
- (C) Colorless, transparent: No refrigerant



REMARK

When there are bubbles, the refrigerant gas level is low, so contact your Komatsu distributor to have refrigerant added. If the air conditioner is run with the refrigerant gas level low, it will cause damage to the compressor.

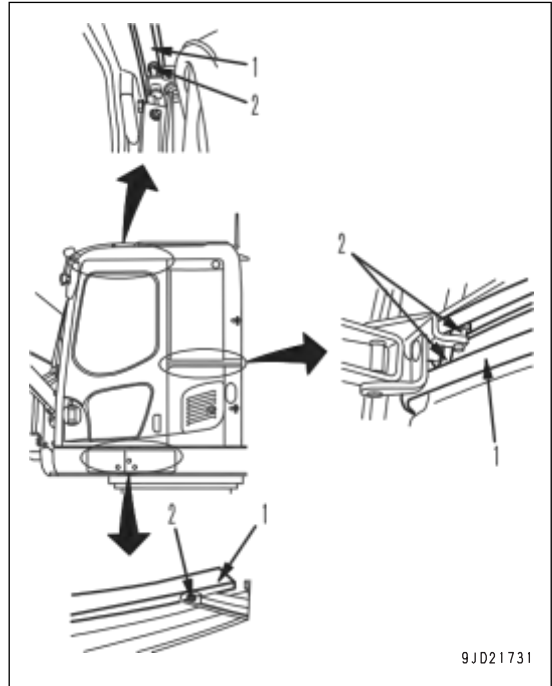
METHOD FOR CHECKING, CLEANING AND LUBRICATING SLIDE DOOR RAIL AND ROLLER

METHOD FOR CHECKING SLIDE DOOR RAIL AND ROLLER

Open and close the sliding door and check if mud, etc. is stuffed between sliding door rail (1) and roller (2) at the 3 places in the figure.

If mud, etc. is stuffed, the door does not move smoothly.

If the door does not slide smoothly due to stuffed mud, etc., clean and grease the sliding door rail (1) and roller (2).



METHOD FOR CLEANING SLIDE DOOR RAIL

1. Open and close the sliding door, and use a brush to remove any dirt from rail (1).
2. Use a cloth to wipe off any dirt from rail (1).

METHOD FOR LUBRICATING SLIDE DOOR RAIL AND ROLLER

NOTICE

Do not use high-viscosity lubricating oil.

Recommendation by manufacturer: "PANDO 18C" manufactured by THREEBOND

Prepare lubricant.

1. Spray rail (1) and roller (2) thoroughly with lubricant.
2. After spraying with lubricant, slide the door and check that the door opens and closes smoothly.

If the movement is not smooth, consult your Komatsu distributor.

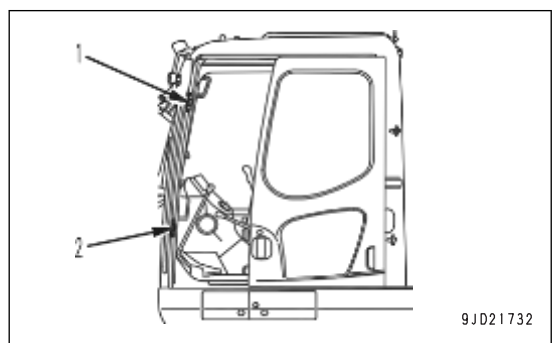
METHOD FOR CHECKING, CLEANING AND LUBRICATING SLIDE DOOR STOPPER

Prepare lubricant.

Lubricant recommended by manufacturer: Lithium grease

1. Check that stopper portions (1) and (2) of the sliding door do not creak, or the sliding door is not hard to be closed.
2. If they are creaking or the sliding door becomes hard to close, wipe off the stain at the stoppers.
3. Grease the stoppers.

If the stoppers are worn, consult your Komatsu distributor.



METHOD FOR CHECKING STOPPER CLEARANCE IN OPENING FRONT DOOR IS UP

WARNING

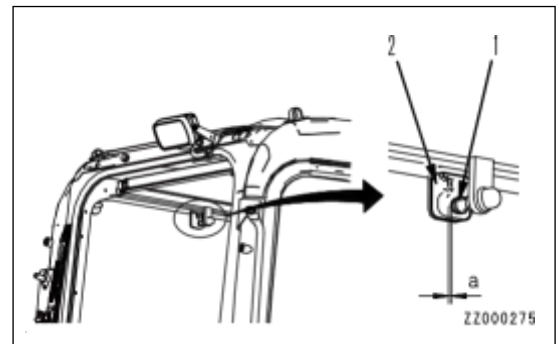
- When opening or closing the front window, lower window, or door, always set the lock lever to LOCK position.
If the lock lever is at FREE position and the control lever or control switch is touched by mistake, it is dangerous and may cause serious personal injury or death.
- When opening or closing the front window, stop the machine on a level ground, lower the work equipment to the ground, stop the engine, then perform the operation.
- When opening the front window, hold the handle securely with both hands, pull up, and do not let go until the lock catch is locked.
- When closing the front window, the window will move quicker under its own weight. Hold the handles securely with both hands when closing it.

If the front window has backlash when it is pulled up, perform the following.

Check if there is clearance (a) between rubber stopper (1) and plastic guide (2).

Rubber stopper (1) may be worn partially, but it does not affect the function as long as there is no backlash or clearance.

If there is any clearance, consult your Komatsu distributor.



METHOD FOR REPLACING ADDITIONAL FILTER ELEMENT FOR BREAKER

(if equipped)

WARNING

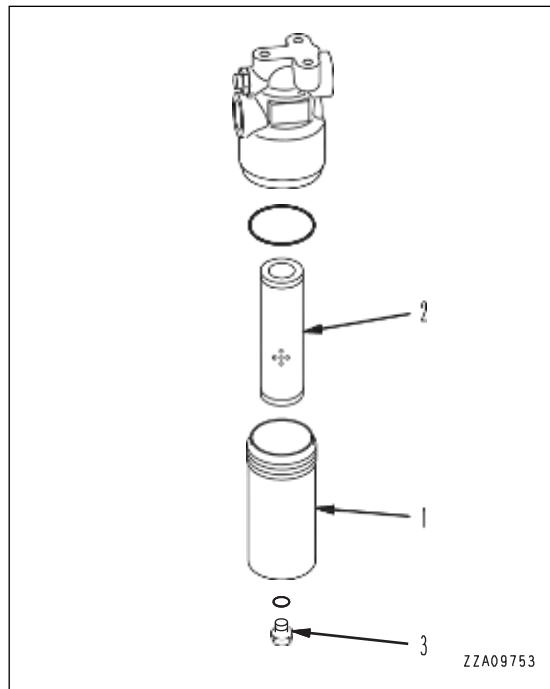
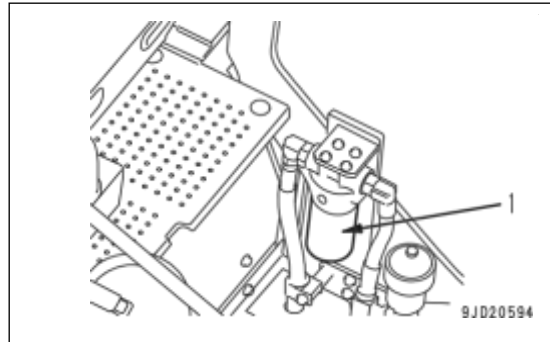
- Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.
- Turn oil filler cap (F) slowly to release the internal pressure, then remove it with care.

NOTICE

For the element replacement interval, see “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-12)”.

Prepare a container to catch oil.

1. Place a container to catch drained oil under the filter element.
2. Turn filter case (1) counterclockwise and remove it.
3. Remove element (2).
4. Remove plug (3) from filter case (1).
5. After checking that the hydraulic oil temperature has dropped, turn filter case (1) counterclockwise, remove it, then take out element (2).
6. Clean the removed parts.
7. Install new element (2).
8. Install filter case (1) and plug (3).
Tighten filter case (1) and plug (3) to the following torque.
Tightening torque
Filter case (1): 90.0 to 110.0 Nm
Plug (3): 15.0 to 17.0 Nm



METHOD FOR WASHING WASHABLE FLOOR

On the washable cab floor, it is possible to flush out the dirt directly with water.

 **WARNING**

Select a firm flat place for work.
When setting the machine at an angle, use strong blocks to stabilize the base of the machine and be extremely careful when performing the work.
If the control lever is touched by accident, the machine may move suddenly, and this may lead to serious personal injury or death. Always set the lock lever securely to LOCK position (L) before leaving the operator's seat.

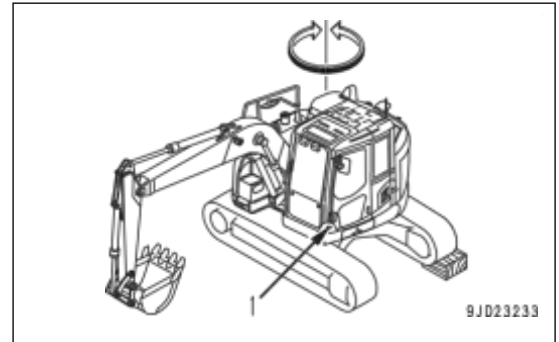
METHOD FOR CLEANING CAB FLOOR

NOTICE

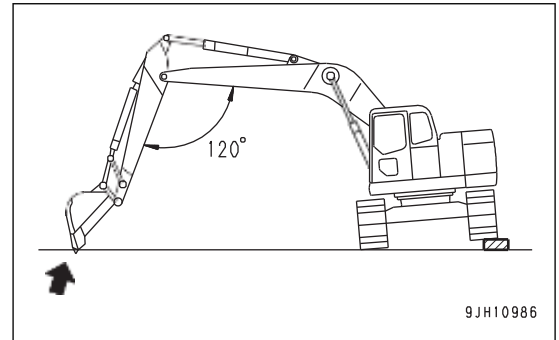
Do not let the monitors, connectors, air conditioner and the filters inside the operator cab get wet during the cleaning.

1. Set the machine at angle.
Referring to "METHOD FOR SETTING MACHINE AT ANGLE (4-35)", select a safe method, depending on the state of the machine.
In this example, the machine is set at angle by using blocks.

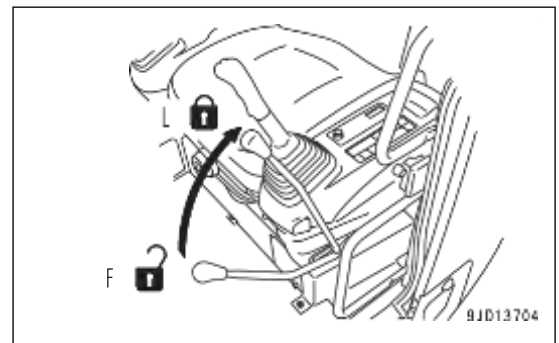
- Swing the upper structure slowly so that water drain holes (1) in the cab floor are at a low position.



- Lower the work equipment to the ground and set the machine in a stable condition.



- Set the lock lever to LOCK position (L).
- Stop the engine.
- Remove the floor mat.
- Flush out the dirt on the floor directly with water through water drain hole (1).
- After finishing the cleaning, install the floor mat.



METHOD FOR SETTING MACHINE AT ANGLE

You can set the machine at an angle by using a slope or blocks. Consider the condition of the machine and select the safe method.

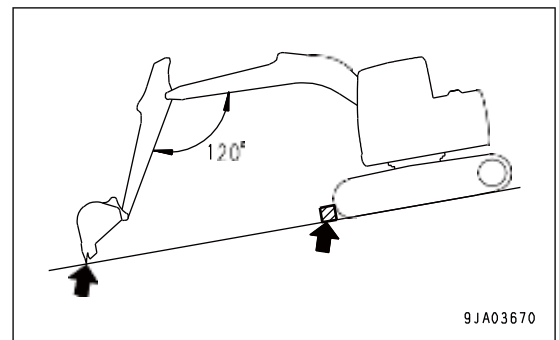
METHOD FOR USING SLOPE

WARNING

Select a solid and smooth slope.

Always block the tracks from movement, and thrust the work equipment into the ground.

- Stop the machine with the work equipment on the downhill side on a slope.
- Block the tracks from movement and thrust the work equipment into the ground.



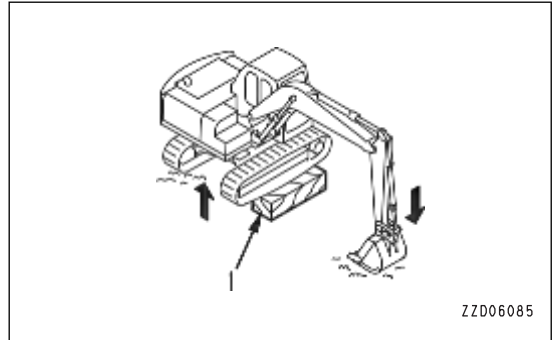
METHOD FOR USING BLOCK

WARNING

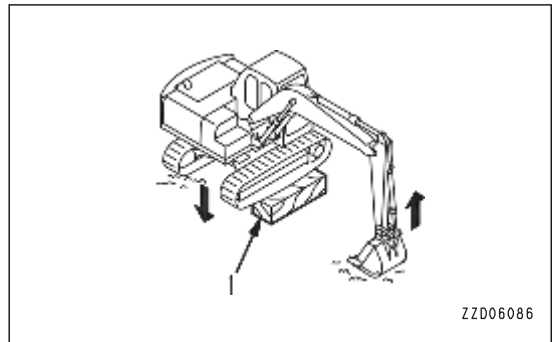
Select a firm flat place.

Put strong blocks under the undercarriage to stabilize the machine and be extremely careful when performing the operation.

1. Raise the machine off the ground by using the boom and arm.
When doing this, operate the levers slowly.
2. Place block (1) under the raised track and make sure that the machine is stable.



3. Raise the boom slowly and lower the machine.
When doing this, check that the machine is always stable.



METHOD FOR CHECKING GAS SPRING

WARNING

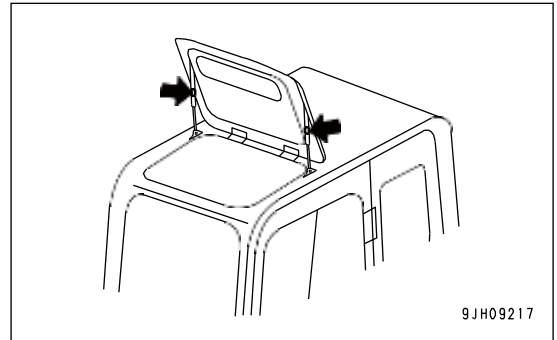
The gas spring is charged with high-pressure nitrogen gas, so improper handling may cause an explosion resulting in serious personal injury or death. When handling, always observe the following.

- Do not disassemble.
- Do not bring it near open flame or dispose of it in fire.
- Do not perform drilling, welding or flame-cutting.
- Do not hit or roll it, or subject it to any impact.
- When disposing of it, the gas must be released. Ask your Komatsu distributor to perform this work.

The gas springs are installed inside the left console (1 place) and at the cab ceiling window (2 places).

In the following cases, ask your Komatsu distributor for inspection, repair, and replacement.

- The lock lever cannot be pulled up lightly or the cab ceiling window cannot be opened lightly.
- The lock lever dose not stay at LOCK position.
- The cab ceiling window does not stay open.
- Oil or gas is found to be leaking from the gas spring.



METHOD FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT

When starting the engine, see “METHOD FOR STARTING ENGINE (3-153)”. If necessary, see the paragraphs for starting the engine, and moving/steering/stopping the machine in OPERATION section.

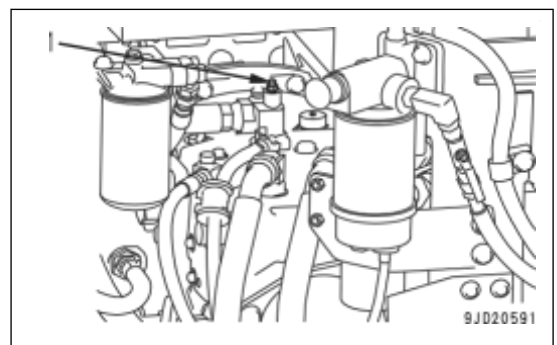
METHOD FOR BLEEDING AIR FROM PUMP

Perform it when any hydraulic component or oil has been replaced.

NOTICE

If the pump is operated without filling the pump case with hydraulic oil, abnormal heat will be generated and this may cause a premature damage to the pump. Bleed air securely.

1. Run the engine at low idle.
2. Open the fuel filter cover on the right side of the machine.
3. Loosen the air bleeder (1) installed to the pump and check that oil oozes out from the air bleeder.
4. After bleeding air, tighten air bleeder (1).



METHOD FOR BLEEDING AIR FROM PUMP AND HYDRAULIC TANK

Perform it when any hydraulic component or oil has been replaced.

NOTICE

If you run the engine at high speed without bleeding air from the piping between the pump and hydraulic tank, the pump may heat abnormally and may be broken in a short period.

1. Start and run the engine at medium speed (1650 rpm).
For starting the engine, see “METHOD FOR STARTING ENGINE (3-153)”.
2. Operate the work equipment slowly for approximately 5 minutes, and bleed air.

METHOD FOR BLEEDING AIR FROM CYLINDER

Perform it when any hydraulic component or oil has been replaced.

NOTICE

If the engine runs at high speed immediately after startup or a cylinder is pushed up to its stroke end, air mixed into the cylinder may cause damage to the piston packing or etc.

1. Run the engine and keep it at low idle speed.
2. Extend and retract each cylinder 4 to 5 times, taking care that a cylinder is not moved to the stroke end. (Stop the cylinder approximately 100 mm short of its stroke end.)
3. Operate each cylinder 4 to 5 times to each stroke end.
All air is bled.

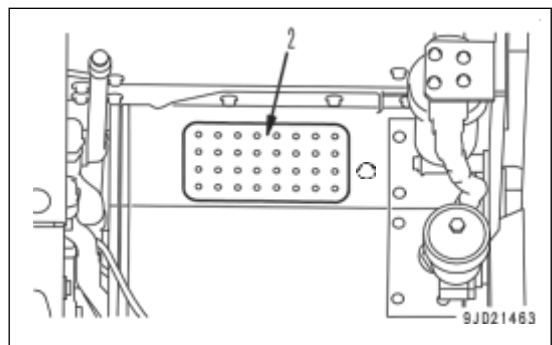
METHOD FOR BLEEDING AIR FROM SWING MOTOR

Perform it only when the oil inside the swing motor case is drained.

NOTICE

If the air is not bled from the swing motor, the motor bearings may be damaged.

1. Run the engine at low idle.
2. Remove the cover (2).

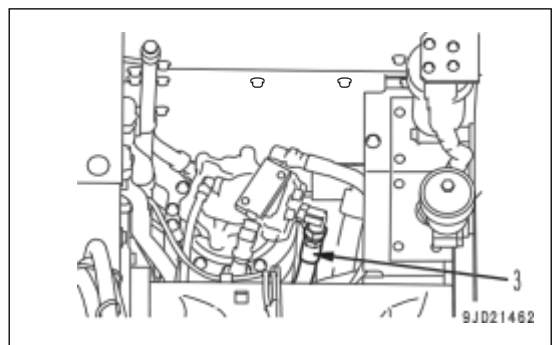


3. Loosen the hose at motor S port (3), and check that oil oozes out from the fitting of the motor S port (3).

NOTICE

At this time, do not swing the upper structure.

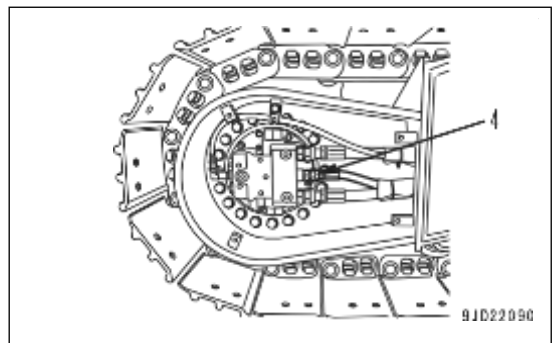
4. If oil does not ooze out, stop the engine, remove the motor S port (3), and fill the motor case with hydraulic oil.
5. After completely bleeding the air, tighten the motor S port (3).
6. Run the engine at low idle and slowly swing at least 2 turns uniformly to the right and left.



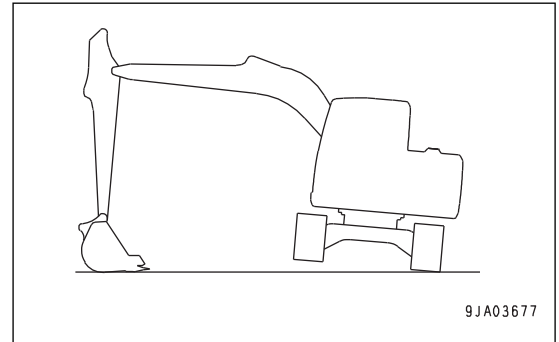
METHOD FOR BLEEDING AIR FROM TRAVEL MOTOR

Bleed air only when the oil in the swing motor case is drained.

1. Run the engine at low idle.
2. Loosen the hose (4) of port C. When oil flows out, tighten it.



3. Run the engine at low idle and swing the upper structure 90 ° to bring the work equipment to the side of the track.
4. Push up the machine until the track is raised slightly from the ground. Perform idle rotation of track for 2 minutes. Repeat this procedure on both the right and left sides. When rotating the track off the ground at low idle, rotate equally both forward and in reverse.



METHOD FOR BLEEDING AIR FROM ATTACHMENT (WHEN ATTACHMENT IS EQUIPPED)

Perform it when any hydraulic component or oil has been replaced.

NOTICE

If the air bleeding procedure is specified on the attachment by the manufacturer, bleed the air according to that procedure.

If a breaker or other attachment is installed, perform the air bleeding procedure until the air is completely bled from the attachment circuit.

1. Run the engine at low idle.
2. Operate the attachment control switch repeatedly (approximately 10 times).
Air is bled.

NOTICE

- **After completing the air bleeding operation, stop the engine, leave the machine for 5 minutes, and then start the operation. This discharges the air bubbles in the oil inside the hydraulic tank.**
- **Check for oil leakage and wipe off any spilled oil.**

CHECKS BEFORE STARTING

For the following items, see OPERATION, "METHOD FOR CHECKING BEFORE STARTING".

- Method for draining water and sediment from fuel tank
- Method for checking water separator, draining water and sediment
- Method for checking oil level in hydraulic tank, adding oil
- Method for checking coolant level, adding coolant
- Method for checking oil level in engine oil pan, adding oil
- Method for checking electric wiring
- Method for checking fuel level, adding fuel
- Method for checking DEF level, adding DEF
- Method for checking working lamp
- Method for checking horn

EVERY 100 HOURS MAINTENANCE

METHOD FOR LUBRICATING WORK EQUIPMENT

NOTICE

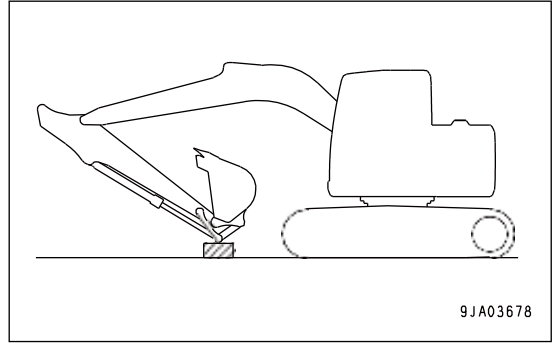
If any unusual noise is generated from any greasing point, perform greasing regardless of the greasing interval.

Perform greasing every 10 hours for the first 50 hours operation on a new machine.

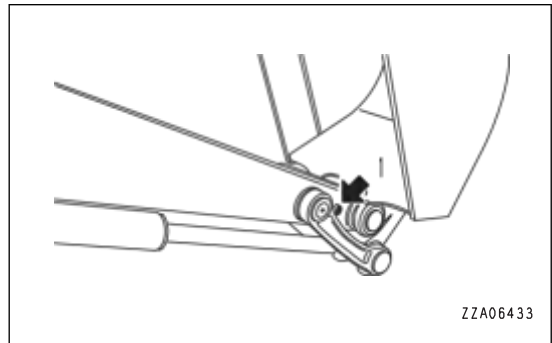
After the machine is subjected to digging work in the water, be sure to grease the wet pins.

Prepare a grease pump.

1. Set the machine to the greasing posture shown on the figure, lower the work equipment to the ground, and stop the engine.



2. Pump in grease through the grease fittings shown by arrows by using a grease pump.
(1) Arm and Bucket connection pin (1 place)
3. After greasing, wipe off any old grease that is pushed out.

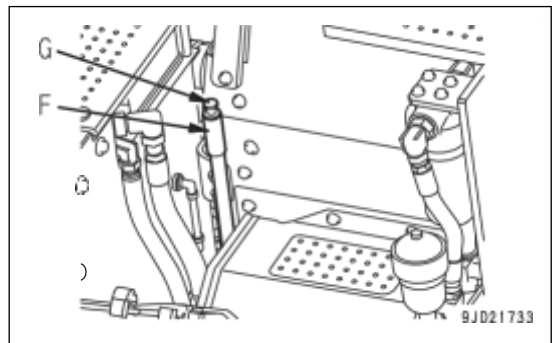


METHOD FOR CHECKING OIL LEVEL IN SWING MACHINERY CASE, ADDING OIL

WARNING

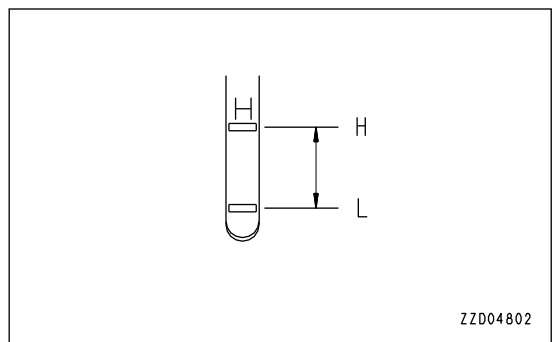
Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.

- Prepare a container to receive the oil.
1. Pull out dipstick (G).
 2. Wipe off the oil from the dipstick with a cloth.
 3. Fully insert dipstick (G) into the dipstick pipe, then remove it.
 4. Check the oil level with dipstick (G).

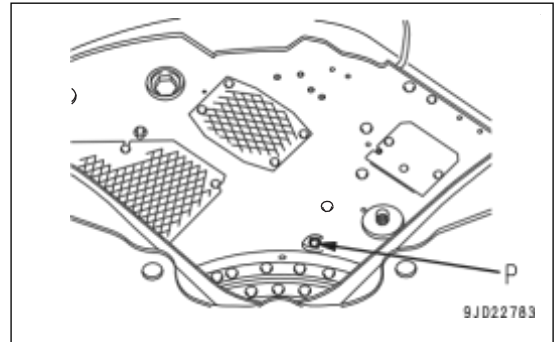


The oil level should be between H and L marks on the dipstick.

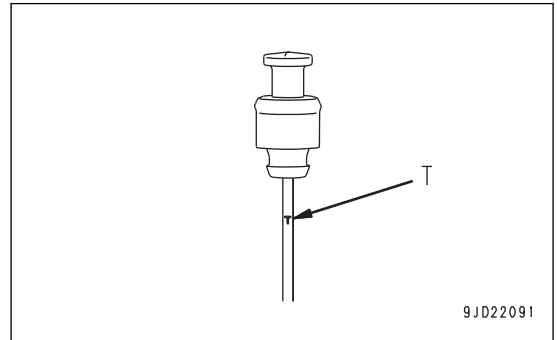
5. Add the engine oil through the oil filler port (F) by the refill capacity if the oil level does not reach the stamping mark (L) of the oil level gauge (G).
6. If the oil level is higher than (H) mark on dipstick (G), lower it to a proper level according to the following procedure.



- 1) Place a container to receive the oil under drain valve (P).
- 2) Loosen drain valve (P) and drain excessive oil.
- 3) Check the oil level again.



7. After the oil level check and the adding the oil, insert the oil level gauge so that the stamping mark (T) of it faces the center of the swing machinery.



EVERY 250 HOURS MAINTENANCE

METHOD FOR CHECKING OIL LEVEL IN FINAL DRIVE CASE, ADDING OIL

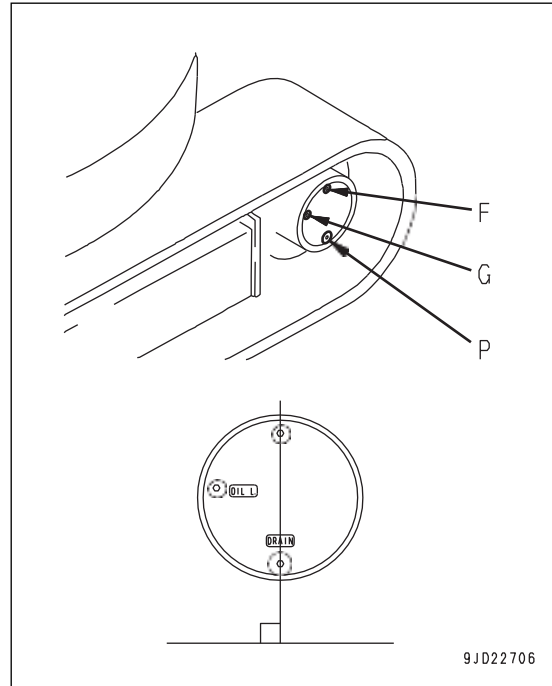
WARNING

- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.
- If there is remaining pressure inside the case, the oil or plug may jump out. Loosen the plug slowly to release the pressure.
- Do not stand in front of the plug when you loosen the plug.

Items to be prepared

- Container to catch oil
- Hexagonal wrench

1. Set the plug (F) at the top so that the line running on the plug (F) and plug (P) is perpendicular to the ground surface.
2. Place the container to catch oil under plug (P).
3. Remove plug (G) with the hexagonal wrench.
4. Check the oil level.
The oil level should be near the lower edge of the hole of plug (G).
5. If the oil level is low, remove plug (F) with the hexagonal wrench and add oil through the hole of plug (F).
Add engine oil until it overflows from the hole of plug (G).
6. After checking, install the plugs (F) and (G).



METHOD FOR CHANGING OIL IN LARGE CAPACITY FINAL DRIVE CASE

(if equipped)

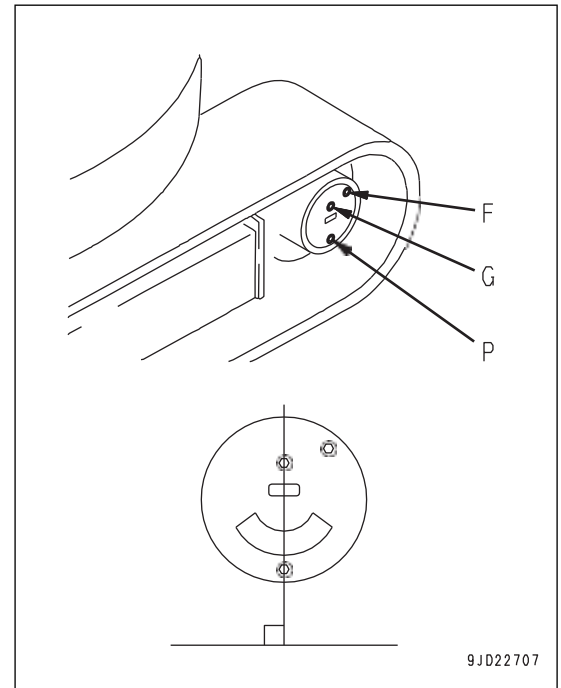
WARNING

- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.
- If there is remaining pressure inside the case, the oil or plug may jump out. Loosen the plug slowly to release the pressure.
- Do not stand in front of the plug when you loosen the plug.

Items to be prepared

- Container to catch oil
- Hexagonal wrench

1. Set the plug (G) at the top so that the line running on the plug (G) and plug (P) is perpendicular to the ground surface.
2. Place the container to receive the oil under plug (P).
3. Remove the plug (G) with the hexagonal wrench.
4. Check the oil level.
The oil level should be near the lower edge of the hole of plug (G).
5. If the oil level is low, remove plug (F) with the hexagonal wrench and add oil through the hole of plug (F).
Add engine oil until it overflows from the hole of plug (G).
6. After checking, install the plugs (F) and (G).



METHOD FOR CHECKING BATTERY ELECTROLYTE LEVEL

Perform this procedure before operating the machine.

Inspect the battery electrolyte level 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 combustible 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.

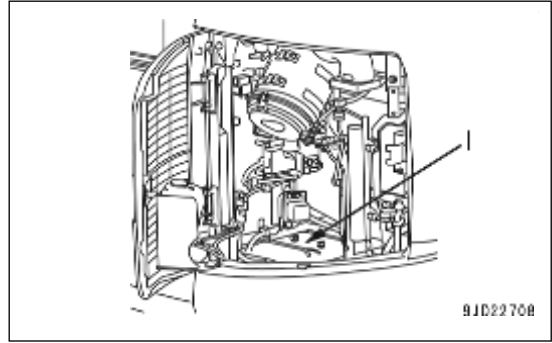
NOTICE

- 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.
- When adding purified water in cold weather, add it before starting operations in the next morning to prevent the purified water from freezing.
- Install the rubber cover to prevent a fire while taking care not to roll it up.
- If the rubber cover rolls up and blocks the fuel cooler, the fuel cooler may overheat. Put the rubber cover under the fuel cooler.

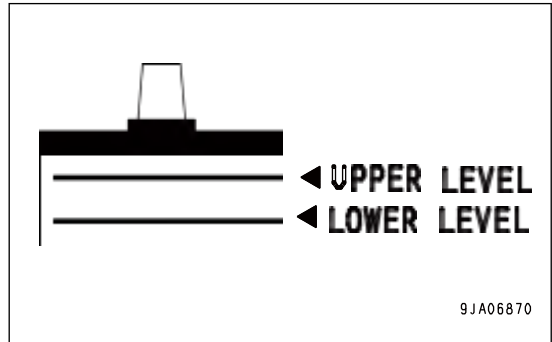
METHOD FOR CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

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

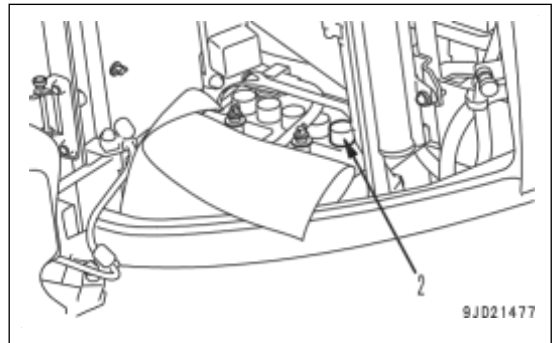
1. Open the battery inspection cover.
2. Roll up rubber cover (1) installed on the top of the battery.
3. Clean around the electrolyte level line with a cloth wet with water.



4. Check that the electrolyte level is between UPPER LEVEL (U.L.) line and LOWER LEVEL (L.L.) line.



5. If the electrolyte level is below the middle between UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines, immediately remove cap (2) and add purified water (e.g. commercially available replenishment water for a battery) to U.L. line.
6. After adding the purified water, tighten cap (2) securely.
7. Return rubber cover (1) to its original position.



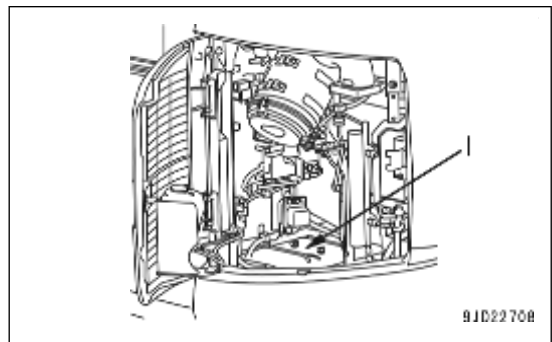
REMARK

If the purified water is added to above UPPER LEVEL (U.L.) line, remove the fluid by using a syringe to lower the level to UPPER LEVEL (U.L.) line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water. If necessary, consult your Komatsu distributor or a battery manufacturer.

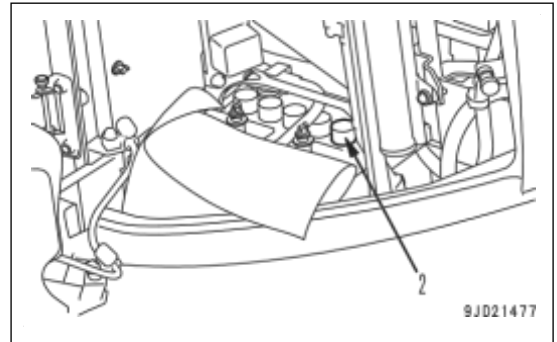
METHOD FOR CHECKING ELECTROLYTE LEVEL WHEN IT IS IMPOSSIBLE TO CHECK FROM SIDE OF BATTERY

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 battery inspection cover.
2. Roll up rubber cover (1) installed on the top of the battery.



- Remove caps (2) from the top of the battery.



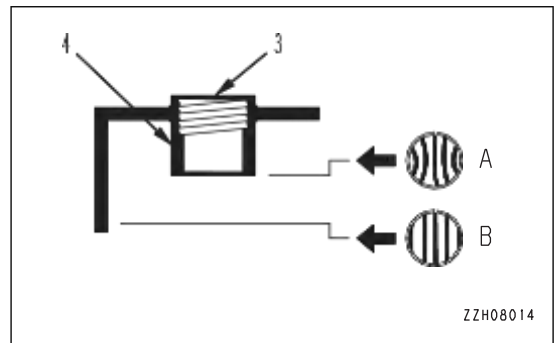
- Look into fluid filler port (3) and check the electrolyte level.
- If the electrolyte does not reach the sleeve (4), always add the purified water (e.g. commercially available replenishment water for a battery) so that the level reaches the bottom of the sleeve (UPPER LEVEL line).

(A) Suitable level

Electrolyte level is up to bottom of sleeve, so surface tension causes electrolyte surface to bulge and poles appear bent.

(B) Low level

Electrolyte level is not up to bottom of sleeve, so poles appear straight and not bent.



- After adding the purified water, tighten cap (2) securely.
- Return rubber cover (1) to its original position.

REMARK

If purified water is added to above the bottom tip 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 your battery manufacturer.

METHOD FOR CHECKING ELECTROLYTE LEVEL ON INDICATOR ETC

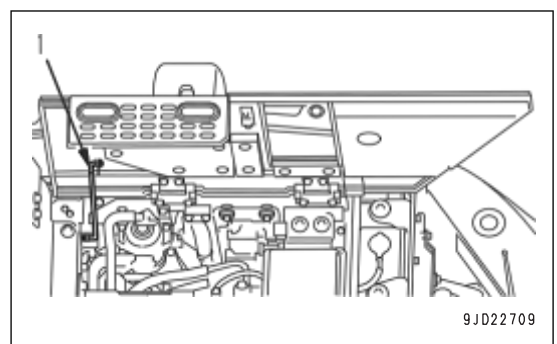
If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

METHOD FOR CHECKING AND ADJUSTING AIR CONDITIONER COMPRESSOR BELT TENSION

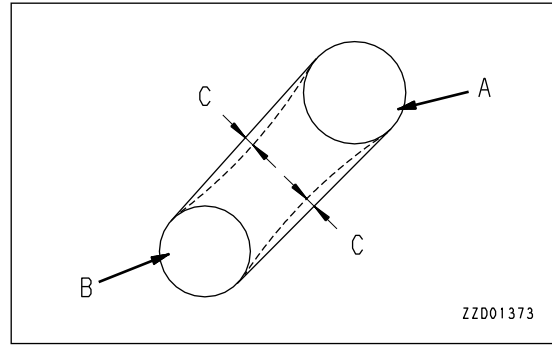
The followings are the periodic maintenance items for the air conditioner. Perform inspection and maintenance to use the air conditioner effectively.

METHOD FOR CHECKING AIR CONDITIONER COMPRESSOR BELT

- Open the engine hood.
- Lock the engine hood securely with the hood support lever (1).

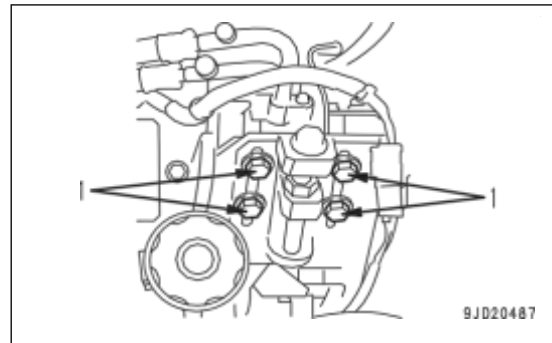
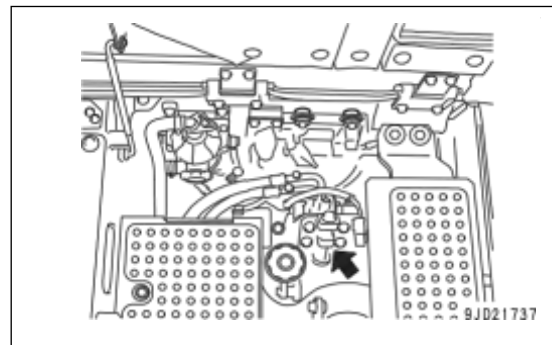


3. Press the center between compressor pulley (A) and fan pulley (B) with a finger (approximately 60 N).
If deflection (C) is 6 to 9 mm, the belt tension is normal.
If the deflection is out of the standard, adjust it to the standard value.

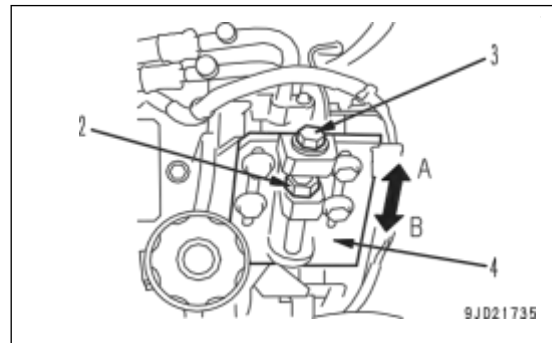


METHOD FOR ADJUSTING AIR CONDITIONER COMPRESSOR BELT

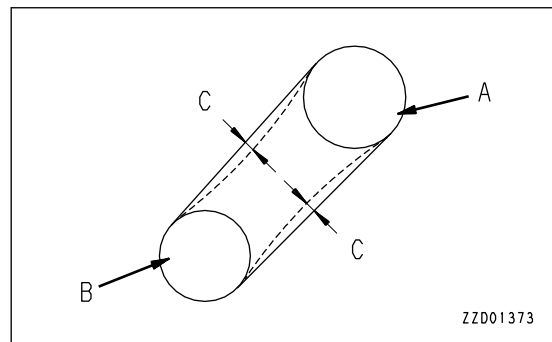
1. Loosen the bolts (1) (4 pieces).
There is no need of removing bolt (1). Also, take care not to loosen too much.



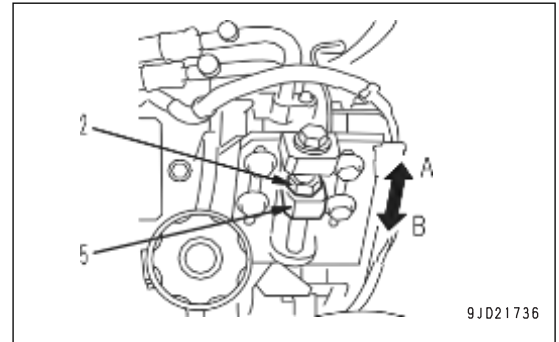
2. Loosen nut (2) in direction (A).
Nut (2) is provided to prevent loosening of jack bolt (3).
3. Tighten the jack bolt (3).
Compressor (4) moves in direction (A), and the compressor belt is tensed.



4. Press the center between drive pulley (A) and compressor pulley (B) with a finger (approximately 60 N).
If deflection (C) is 6 to 9 mm, the belt tension is normal.



5. After adjusting the belt tension properly, tighten the nut (2) until it touches the boss (5) and tighten it further in direction B so that it does not become loose.
Tightening torque: 108 to 132 Nm
6. Tighten the bolts (1) (4 pieces) to fix them.
Tightening torque: 58.8 to 73.5 Nm
7. After fixing, check again that the belt tension is proper.
Adjust it again if the tension is not within the proper range.
8. 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.
9. 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.



NOTICE

- When the new V-belt is installed, readjust it after operating for 1 hour.

EVERY 500 HOURS MAINTENANCE

Maintenance for every 100 and 250 hours should be performed at the same time.

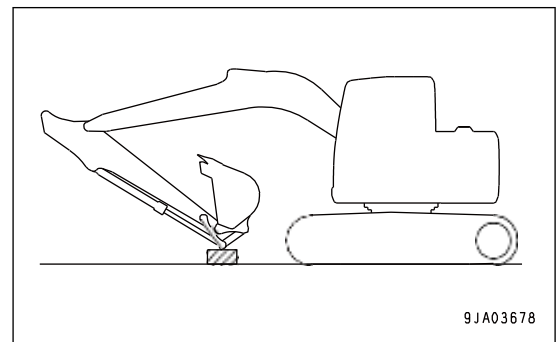
METHOD FOR LUBRICATING

NOTICE

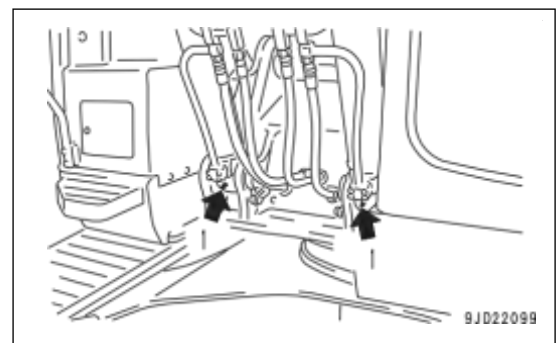
- If any unusual noise is generated from any greasing point, perform greasing regardless of the greasing interval.
- Perform greasing every 10 hours for the first 50 hours of operation on a new machine.
- After the machine is subjected to digging work in the water, be sure to grease the wet pins.

Prepare a grease pump.

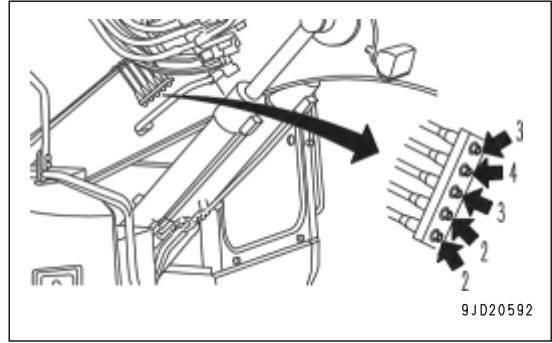
1. Set the machine to the greasing posture shown on the figure, lower the work equipment to the ground, and stop the engine.



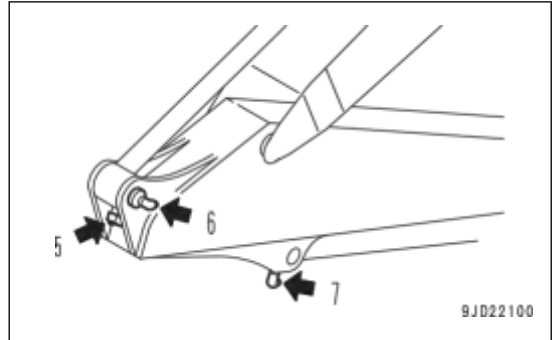
2. By using a grease pump, pump in grease through the grease fitting shown by arrow.
(1) Boom cylinder foot pin (2 places)



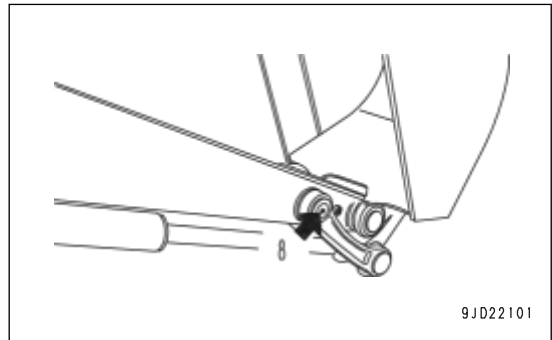
- (2) Boom foot pin (2 places)
- (3) Boom cylinder rod end pin (2 places)
- (4) Arm cylinder foot pin (1 place)



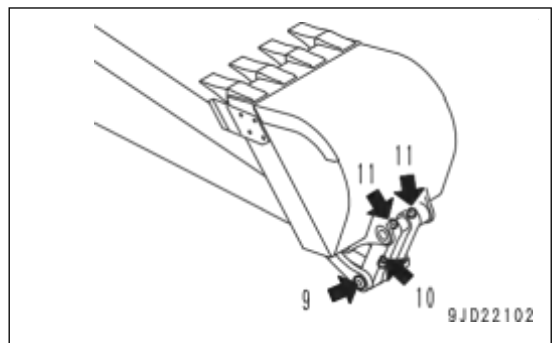
- (5) Boom and arm connection pin (1 place)
- (6) Arm cylinder rod end (1 place)
- (7) Bucket cylinder foot pin (1 place)



- (8) Arm-Link connection pin (1 place)

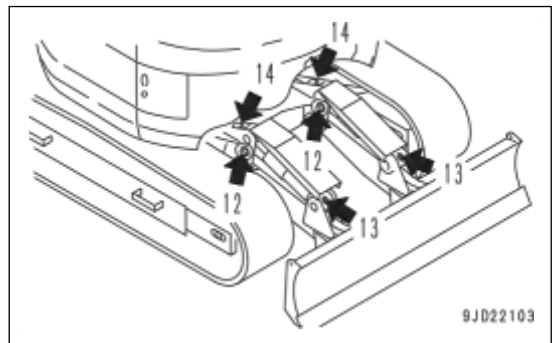


- (9) Link connection pin (1 places)
- (10) Bucket cylinder rod end (1 place)
- (11) Bucket and Link connection pin (2 places)



- (12) Blade connection pin (2 places)
- (13) Blade cylinder foot pin (2 places)
- (14) Blade cylinder rod end pin (2 places)

3. After greasing, wipe off any old grease that is pushed out.



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.

Refill capacity of oil pan: 11.5 ℓ

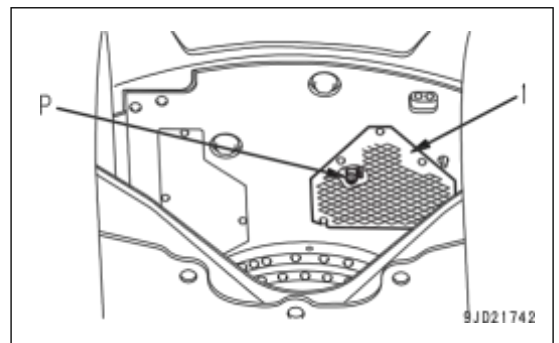
Items to be prepared

- Filter wrench
- Container to receive the oil

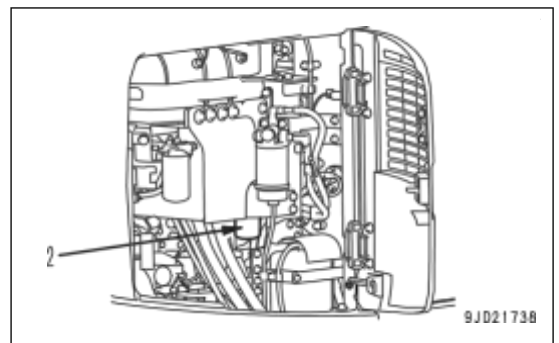
REMARK

When changing the oil filter, always replace the fuel prefilter at the same time.

1. Remove the undercover (1) at the bottom of the machine.
2. Place the oil container to receive the oil under drain plug (P).
3. Loosen drain plug (P) to drain oil. Do it slowly so that you do not get splashed with drained oil.
4. Tighten the drain plug (P).



5. Open the fuel filter inspection cover on the right side of the machine.

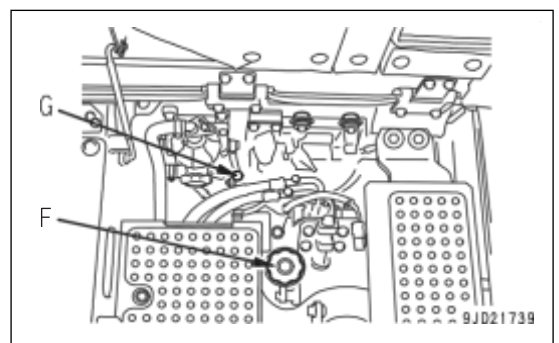


6. Turn the filter cartridge (2) counterclockwise by using the filter wrench, and remove it.
7. Clean the filter head.

REMARK

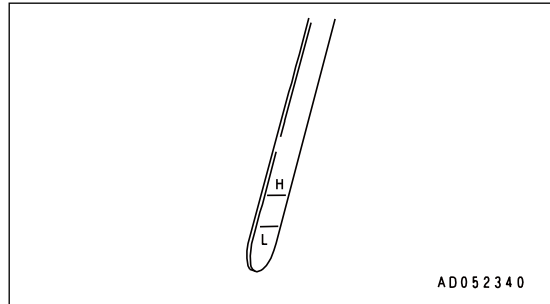
Check that there is no old packing stuck to the filter holder. If there is any old packing stuck to the filter, it will cause oil leakage.

8. When installing the new filter cartridge, apply clean engine oil (or grease) to its packing and thread portion.



When installing the cartridge, tighten it until the packing surface contacts the seal surface of the filter holder, then tighten it 1/2 or more turns.

9. After replacing the filter cartridge, refill with engine oil through oil filler port (F) until the oil level is between the H and L marks on dipstick (G).
10. Run the engine at low idle for a while and then stop it.
11. Check the oil level in the engine oil pan.
 Check that the oil level is between H and L marks on the dipstick.
 For the oil level check procedure, see “METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL (3-134)”.
12. Install undercover (1).



METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE

WARNING

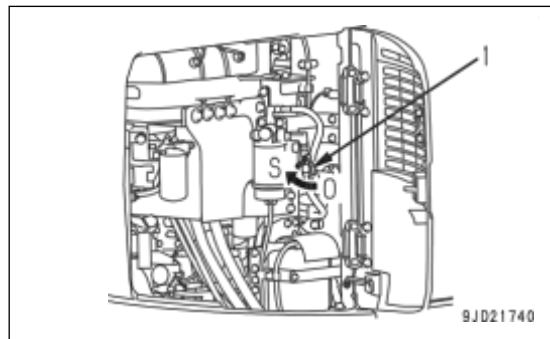
- Immediately after the engine stops, all parts are still very hot, so do not replace the filter immediately. Wait for all of parts to cool down before starting the work.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for 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 dirt or dust get in, more than ever before. If dust sticks to the fuel system, wash it off thoroughly with fuel.

Items to be prepared

- Filter wrench
 - Container to receive the oil
1. Open the fuel inspection cover on the right side of the machine.
 2. Turn the valve (1) to CLOSE position (S).



3. Place a container under the fuel prefilter cartridge to receive the fuel.
4. Loosen the drain valve (2) and drain water and sediments from transparent cup (3), and also drain all the fuel from filter cartridge (4).
5. Turn the transparent cup (3) counterclockwise to remove it by using the filter wrench.

This cup is used again.

6. Turn the filter cartridge (4) counterclockwise by using the filter wrench, and remove it.

7. Install currently removed transparent cup (3) to the bottom of the new filter cartridge.

At this time, be sure to replace O-ring (5) with a new one.

When installing the transparent cup, thinly apply oil to the packing surface, contact it to the sealing surface of filter cartridge (4), and then tighten it 1/4 to 1/2 turn.

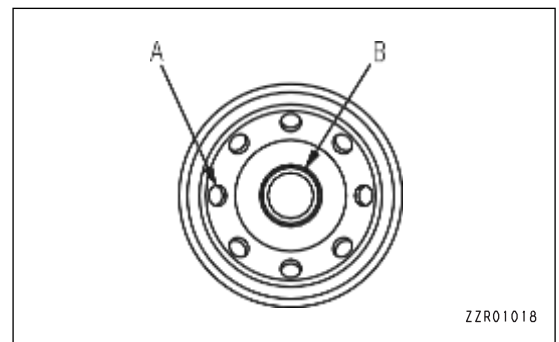
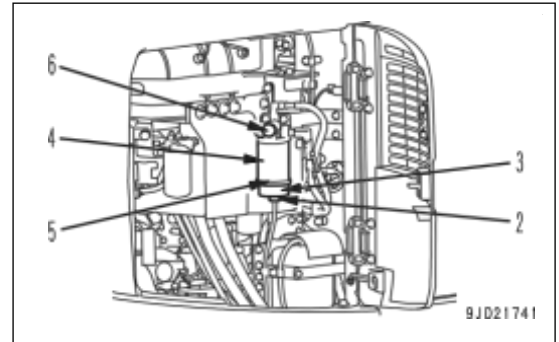
If the transparent cup is fastened too much, the O-ring will be damaged and this leads to leakage of fuel. If it is too loose, fuel will also leak from gaps of the O-ring. Be sure to observe the tightening angle.

8. Clean the filter head.

9. Fill the new filter cartridge with clean fuel, thinly apply oil to the packing surface, then install it to the filter head.

NOTICE

- **When filling the filter cartridge with fuel, do not remove cap (B). Always fill with fuel from 8 small holes (A) on the dirty side.**
- **After filling with fuel, remove cap (B) and install the fuel filter.**
- **Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (B) when filling with fuel. Be careful not to let dirt or dust get into the center portion on the clean side.**



When installing the cartridge, tighten it until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.

If the filter cartridge is tightened too 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.

10. Check that drain valve (2) is closed securely.
11. Turn the valve (1) to OPEN position (O).
12. After completing the replacement of filter cartridge (4), bleed air according to the following procedure.
 - 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.
- When the engine runs out of fuel, use the same procedure to operate feed pump (6) and bleed the air.

13. After bleeding air, push in the knob of feed pump (6) and tighten it.
14. After replacing the filter cartridge (4), start and run the engine at low idle for 10 minutes.
15. Check for leakage of oil from the filter seal surface and transparent cup mounting face.

If the leakage is noticed, check the filter cartridge for its tightening condition.

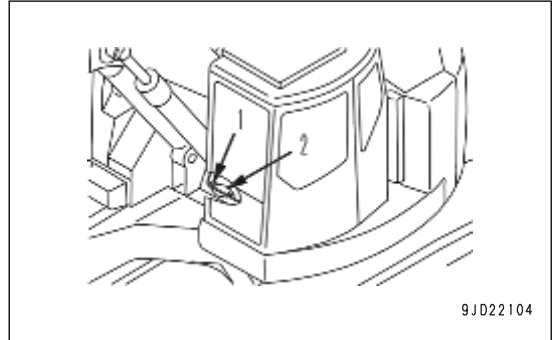
If there is still fuel leakage, repeat steps 2 to 8 to remove the filter cartridge, and if any damage or pinched foreign material on the packing surface is found, replace it with a new cartridge and repeat steps 9 to 14 to install it.

METHOD FOR CHECKING SWING PINION GREASE LEVEL, ADDING GREASE

Items to be prepared

Scale

1. Remove bolts (1) (2 pieces) on the top of the revolving frame, and remove cover (2).



2. Insert ruler (3) into the grease through inspection and adjustment hole (A). Check that the height of grease (S) in the area where the pinion passes is at least 4 mm.

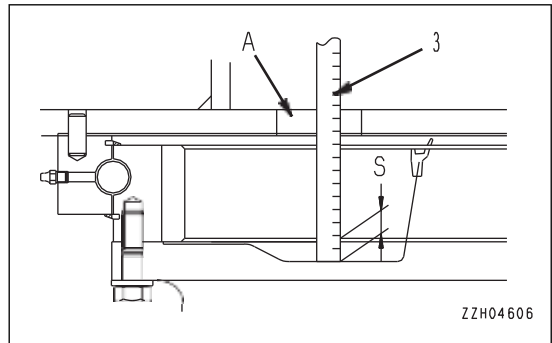
Add grease if the grease amount (S) is less than 4 mm.

3. Check that the grease is not milky white.

Total amount of grease: 10 ℓ

If the grease is milky white, it needs to be replaced. Ask your Komatsu distributor to replace it.

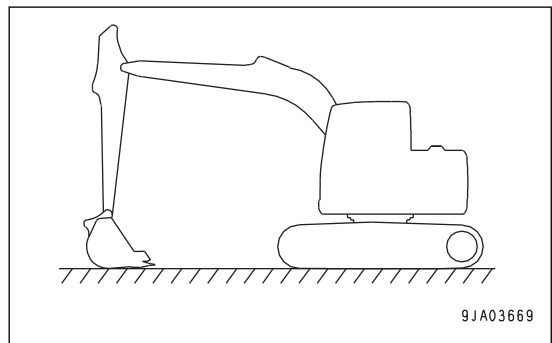
4. Install cover (2) with bolt (1).



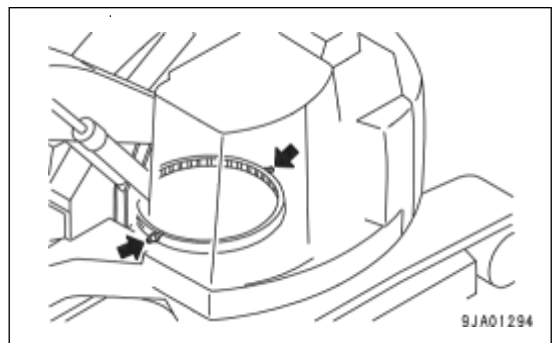
METHOD FOR LUBRICATING SWING CIRCLE

Prepare a grease pump.

1. Lower the work equipment to the ground.



2. By using a grease pump, apply grease to the grease fittings marked by arrows (2 places).
3. After greasing, wipe off any old grease that is pushed out.



METHOD FOR CHECKING AND CLEANING RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS

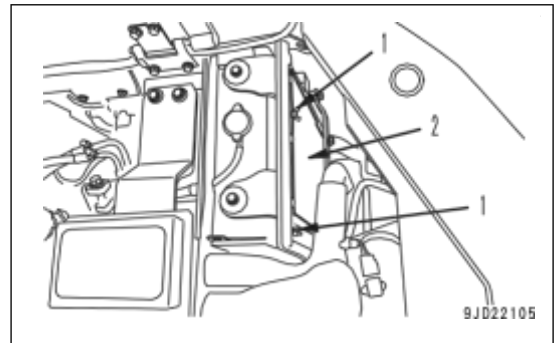
 WARNING

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. Wear protective equipment such as protective eyeglasses and dust mask.

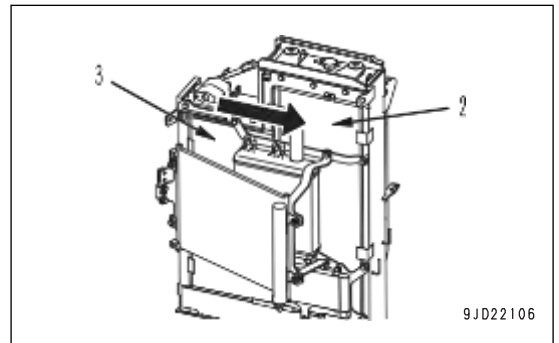
NOTICE

- When using compressed air for cleaning, blow it from some distance as perpendicular to the core as possible to avoid damaging the fins. Damage on the fins can cause water leakage and overheating.
- In a dusty job site, check the fins every day, regardless of the maintenance interval.

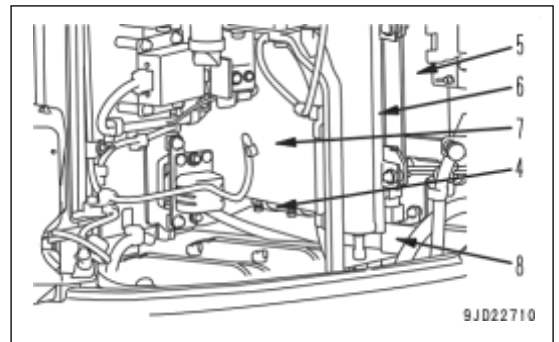
1. Open the battery inspection cover on the left side of the machine.
2. Remove the wing screws (1) (2 pieces) and remove nets (2) and (3).



3. Clean nets (2) and (3).



4. Check the front and rear surfaces of oil cooler fins (4), radiator fins (5), aftercooler fins (6), air conditioner condenser fins (7), and fuel cooler fins (8). If there is any mud, dirt, or leaves stuck to the fins, blow it off with compressed air.



NOTICE

Steam or water may be used instead of the compressed air. However, when performing powerful steam cleaning (high-pressure machine wash) of the heat exchange equipment (radiator, oil cooler, aftercooler, fuel cooler, air conditioner condenser), maintain sufficient distance from the machine when performing the work. 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 logging and breakage of the equipment.

- 5. Check the rubber hoses and check the hose clamps for looseness.
If the rubber hoses are cracked or fragile, replace them.
If the hose clamps are loosened, tighten them.
- 6. After inspecting and cleaning, install nets (2) and(3) as they were.

METHOD FOR CLEANING AIR CONDITIONER FRESH/RECIRC AIR FILTERS

 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.
- Always check that the slide door is locked at the open or closed position before cleaning FRESH or RECIRC air filter. If the slide door is free, there is a danger that it may suddenly move and catch your fingers or break the cover.

NOTICE

- As a guideline, the filters should be cleaned every 500 hours, but on dusty jobsites, clean the filters more frequently.
- When washing the floor, take care not to splash water over the filter.

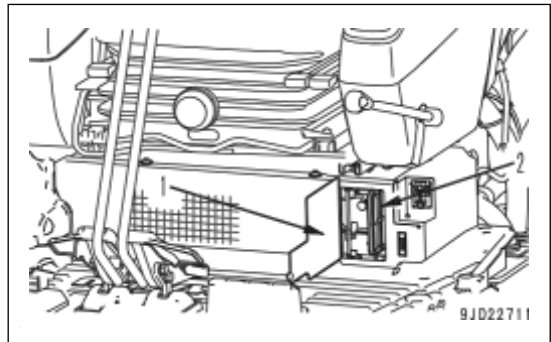
METHOD FOR CLEANING RECIRCULATION AIR FILTER

- 1. Open cover (1) at the front bottom left of the operator's seat.
- 2. Take out recirculation air filter (2).
- 3. Clean recirculation air filter (2) with compressed air.

If there is oil on the filter, or if the filter is extremely dirty, wash it in a neutral detergent. After rinsing it in water, dry it thoroughly before using it again.

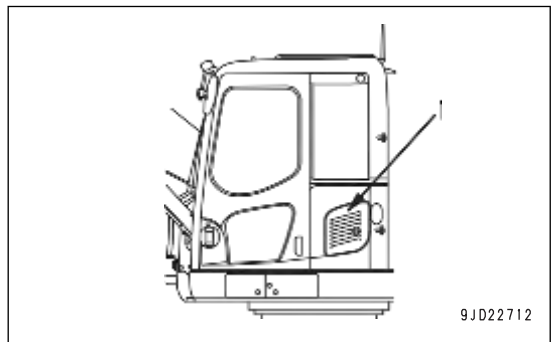
Replace the filter with a new one every year. If the clogging of the filter cannot be removed by blowing with air or washing in water, replace the filter immediately.

- 4. Return cleaned recirculation air filter (2) and close cover (1).



METHOD FOR CLEANING FRESH AIR FILTER

- 1. Unlock cover (1) at the rear left of the operator's cab with the starting switch key.



2. Open cover (1) with the hand.
3. Fix the cover with cover support lever (3).
4. Remove fresh air filter (2).
5. Clean fresh air filter (2) with compressed air.

If there is oil on the filter, or if the filter is extremely dirty, wash it in a neutral detergent. After rinsing it in water, dry it thoroughly before using it again.

Replace the filter with a new one every year. If the clogging of the filter cannot be removed by blowing with air or washing in water, replace the filter immediately.

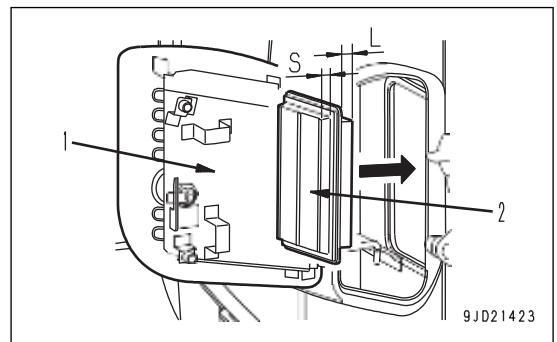
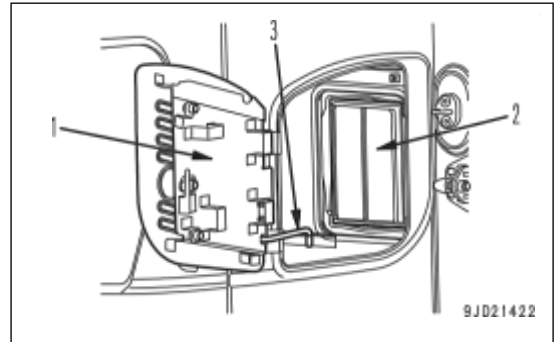
6. Return fresh air filter (2).

REMARK

- The fresh air filter must be installed facing it in the correct direction.
When installing, insert the long (L) end of filter (2) into the filter case first. If the short (S) end is installed first, cover (1) will not close.
- Install the fresh air filter by fitting at 4 corners.

7. Release cover support lever (3).
8. Close cover (1).
9. Lock with the starting switch key.

Do not forget to remove the starting switch key after locking.



EVERY 1000 HOURS MAINTENANCE

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

METHOD FOR REPLACING HYDRAULIC OIL FILTER ELEMENT

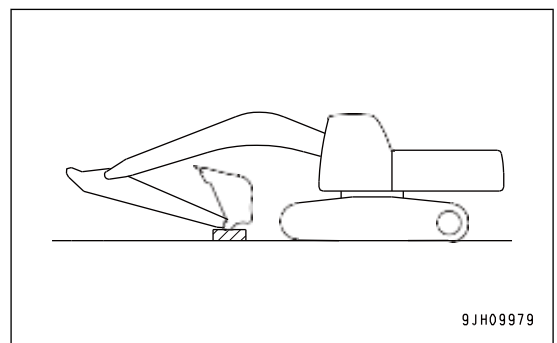
WARNING

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.

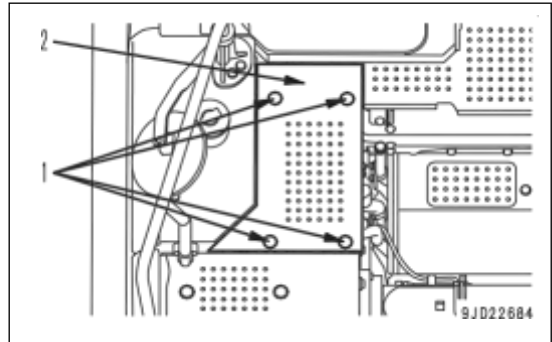
NOTICE

If the machine is equipped with a hydraulic breaker, the hydraulic oil deteriorates faster than in the normal bucket digging operation. Accordingly, perform maintenance referring to “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-12)”.

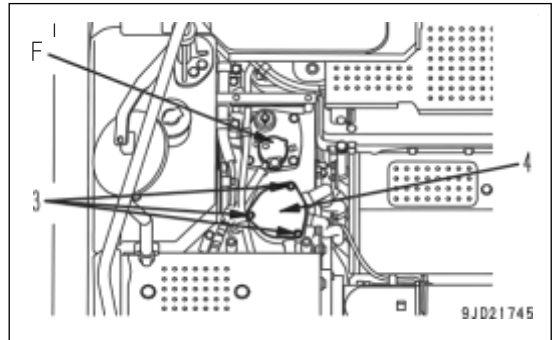
1. Set the work equipment on the level and firm ground in the maintenance posture as shown in the figure, then lower it to the ground and stop the engine.



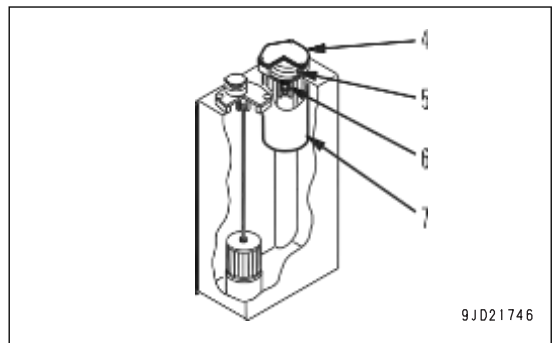
2. Remove the bolts (1) (4 pieces), and open hydraulic tank top cover (2).



3. Remove the cap of oil filler port (F) gradually to release the internal pressure.
4. Remove the cap of oil filler port (F).



5. Loosen the bolts (3) (3 pieces) and remove cover (4).
Cover (4) may jump out under the force of spring (5), so hold cover (4) down when removing the bolts.
6. After removing the spring (5) and valve (6), take out element (7).
7. Clean the removed parts by using cleaning oil.
8. Install the new element in the place where old element (7) was installed.
9. Check the O-ring to be set between the hydraulic tank and cover (4).



If the O-ring is damaged, replace it.

10. Place the valve (6) and spring (5) onto the element.
11. Install the cover (4) with the bolts (3) (3 pieces) while pressing it with the hand.
12. Install the cap of oil filler port (F).
13. Close the hydraulic tank top cover, and install the bolts (1) (4 pieces).
14. Start the engine and run it at low idle for 10 minutes to bleed air. For details, see "METHOD FOR STARTING ENGINE (3-153)".
15. Stop the engine.

REMARK

Leave the engine stopped for at least 5 minutes, and then start it. This will remove the air bubbles in the oil inside the tank.

16. Check that there is no leakage of oil and wipe off any oil that is spilled.

METHOD FOR CHANGE OIL IN SWING MACHINERY CASE

WARNING

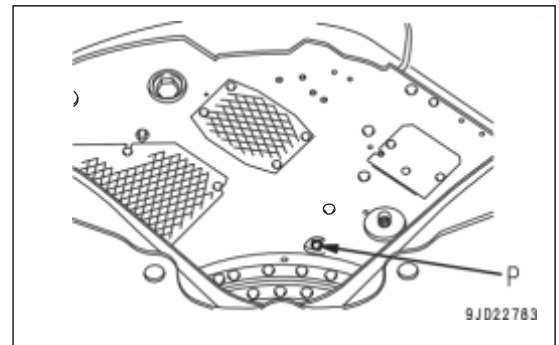
Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.

Refill capacity: 2.5 ℓ

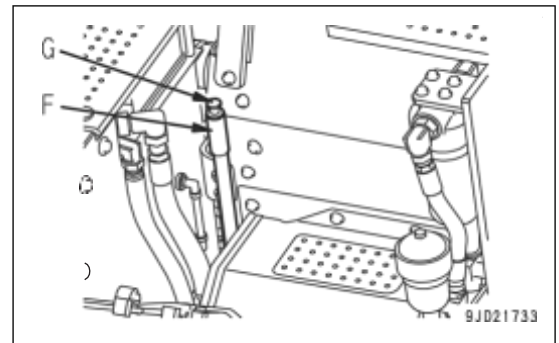
Prepare a container to receive the oil.

1. Swing the upper structure so that drain plug (P) on the underside of the machine is in the middle between the right and left tracks.
2. Place the oil container to receive the oil under drain plug (P).
3. Remove the drain plug (P), drain the oil, then tighten the plug again.

Tightening drain plug (P) to 44.1 to 93.1 Nm.



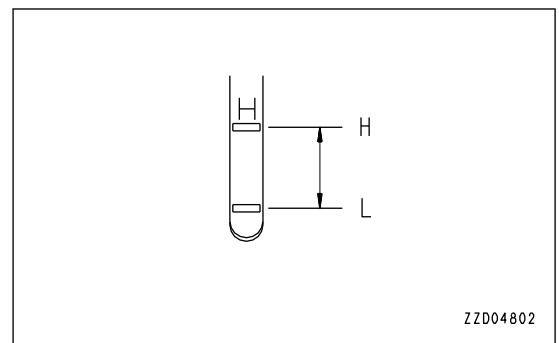
4. Add the refill capacity of engine oil through oil filler port (F).
Method for changing oil in swing machinery case



5. Check the oil level in the swing machinery case.

Check that the oil level is between H and L marks on dipstick (G).

For the oil level check procedure, see "METHOD FOR CHECKING OIL LEVEL IN SWING MACHINERY CASE, ADDING OIL (4-40)".



METHOD FOR CHANGING OIL IN FINAL DRIVE CASE

WARNING

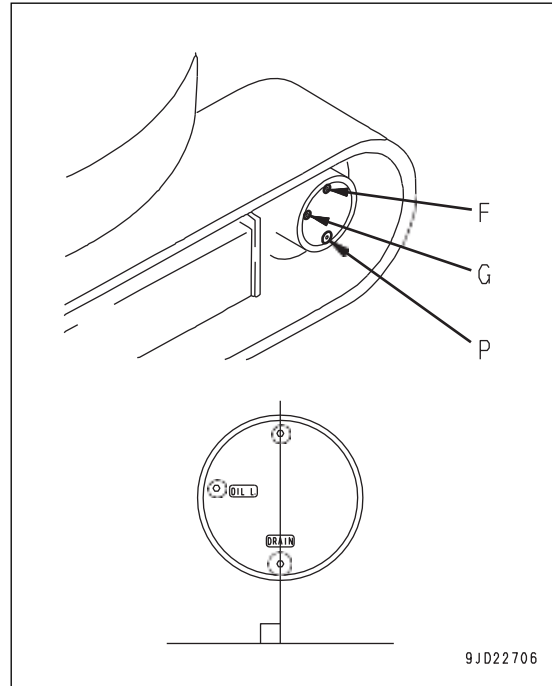
- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.
- If there is remaining pressure inside the case, the oil or plug may jump out. Loosen the plug slowly to release the pressure.
- Do not stand in front of the plug when you loosen the plug.

Refill capacity (each of right and left): 2.1 ℓ

Items to be prepared

- Container to catch oil
- Hexagonal wrench

1. Set the plug (G) at the top so that the line running on the plug (G) and plug (P) is perpendicular to the ground surface.
2. Place the oil container to catch oil under plug (P).
3. By using a hexagonal wrench, remove plugs (P), (G), and (F), and drain the oil.
4. Tighten plug (P).
5. Add the refill capacity of engine oil through oil filler port (F).
6. When oil begins to overflow from plug (G) hole, install plugs (G) and (F).



METHOD FOR CHANGING OIL IN LARGE CAPACITY FINAL DRIVE CASE

(if equipped)

WARNING

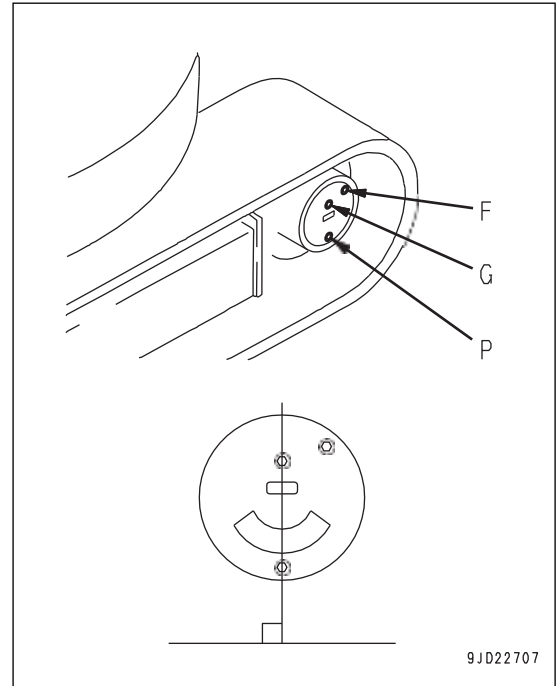
- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.
- If there is remaining pressure inside the case, the oil or plug may jump out. Loosen the plug slowly to release the pressure.
- Do not stand in front of the plug when you loosen the plug.

Refill capacity: each of right and left 4.7 ℓ

Items to be prepared

- Container to receive the oil
- Hexagonal wrench

1. Set the plug (G) at the top so that the line running on the plug (G) and plug (P) is perpendicular to the ground surface.
2. Place the container to receive the oil under plug (P).
3. Remove plugs (P), (G), and (F) by using a hexagonal wrench, and drain the oil.
4. Tighten the plug (P).
5. Add the refill capacity of engine oil through oil filler port (F).
6. When oil begins to overflow from plug (G) hole, install plugs (G) and (F).



METHOD FOR CHECKING OIL LEVEL IN PTO GEAR CASE, ADDING OIL

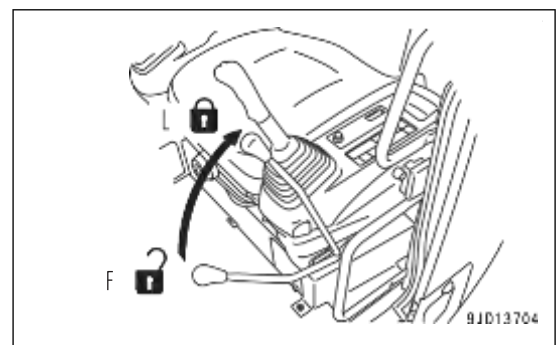
 **WARNING**

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.

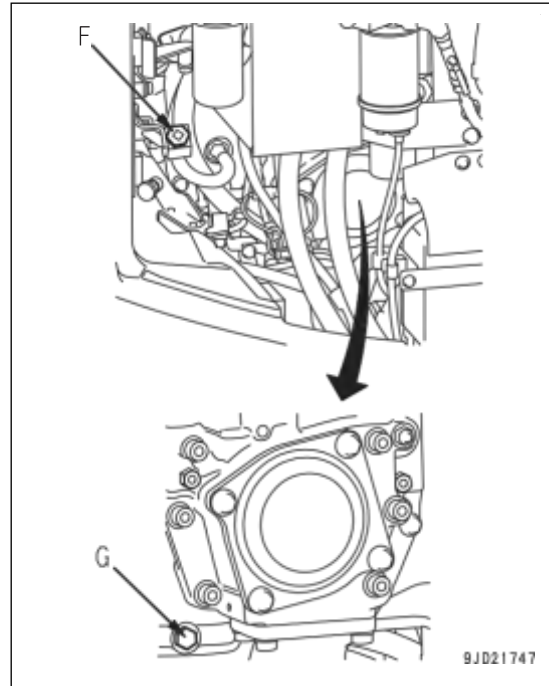
Items to be prepared

- Ratchet
- Extension (2 pieces)
- Socket

1. Swing the upper structure so that PTO gear case is at the center between the right and left tracks.
2. Set the lock lever to LOCK position (L).
3. Stop the engine.



4. Open the fuel filter inspection cover on the right side of the machine.
5. Remove the oil level check plug (G) and check the oil level.
If the oil level is close to the lower edge of the hole of plug (P), the oil level is appropriate.
6. If the oil is insufficient, open the fuel filter inspection cover on the right side of the machine, remove the plug of oil filler port (F), and add oil.
Add oil to close to the lower edge of the hole of oil level check plug (G).
7. Install the oil level check plug (G) and the plug of oil filler port (F).
8. Install the cover (1).



METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE

WARNING

- 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

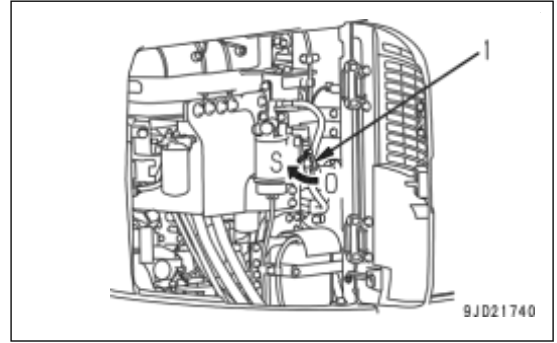
- Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing parts, Komatsu recommends using Komatsu genuine parts.
- The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection 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 the inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt sticks to any part, use fuel to wash it off completely.

Items to be prepared

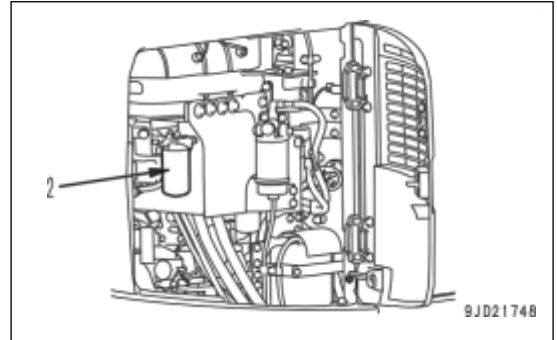
- Container to receive the oil
- Filter wrench

1. Open the fuel filter inspection cover on the right side of the machine.

2. Turn the valve (1) to CLOSE position (S).



- 3. Place the container to receive the oil under filter cartridge (2).
- 4. Turn the filter cartridge (2) counterclockwise by using the filter wrench, and remove it.
- 5. Clean the filter head.



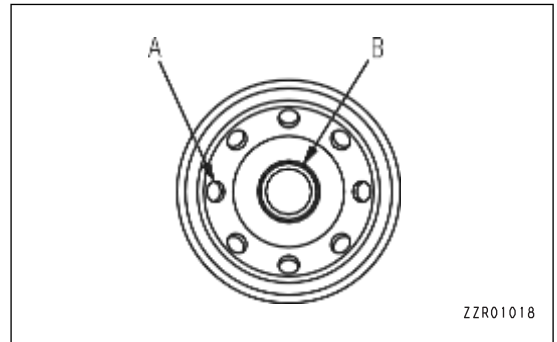
6. Thinly apply oil to the packing surface of the new filter cartridge, then install the filter cartridge to the filter head.

NOTICE

- Do not fill the new filter cartridge with fuel.
- Remove the cap (B) at center and install the filter cartridge.

When installing the cartridge, tighten it until the packing surface contacts the seal surface of the filter holder, then tighten it 2/3 or more turns.

If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is tightened too loose, fuel will also leak from the packing, so always tighten to the specified angle.

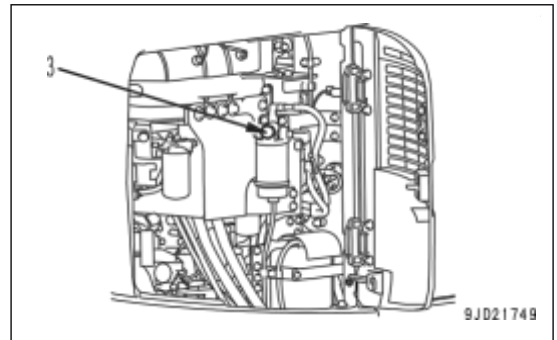


- 7. Turn the valve (1) to OPEN position (O).
- 8. After completing the replacement of filter cartridge (2), bleed air according to the following procedure.
 - 1) Fill up the fuel tank with fuel (to the level where the float is at the highest position).
 - 2) Loosen the knob of feed pump (3), pull it out, then pump it in and out until the movement becomes heavy.

REMARK

- It is not necessary to remove the plugs at the fuel pre-filter head and at the fuel main filter head.
- When the engine runs out of fuel, use the same procedure to operate feed pump (3) and bleed the air.

9. After bleeding air, push in the knob of feed pump (3) and tighten it.



- 10. After replacing the filter cartridge (2), start and run the engine at low idle for 10 minutes.
- 11. Check for leakage of oil from the filter seal surface and transparent cup mounting face.
If the leakage is noticed, check the filter cartridge for its tightening condition.

If there is still fuel leakage, repeat steps 2 to 4 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 5 to 10 to install it.

METHOD FOR CHECKING ALL TIGHTENING POINTS OF ENGINE INTAKE PIPE CLAMPS

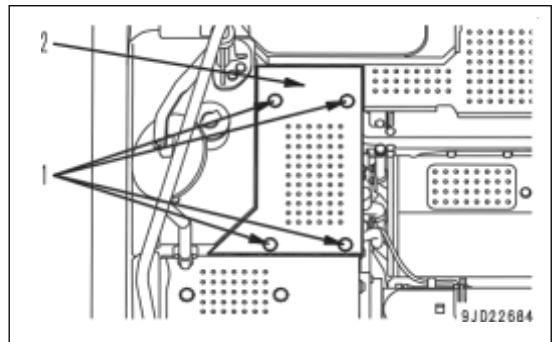
Ask your Komatsu distributor for checking the tightening of the clamps between the air cleaner - turbocharger - aftercooler - engine.

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.

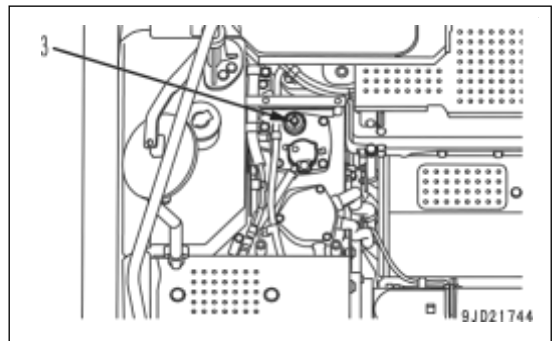
1. Remove the bolts (1) (4 pieces), and open hydraulic tank top cover (2).



2. Remove the nut (4) of breather assembly (3) at the top of the hydraulic tank, then remove the cover (5).

3. Replace the filter element (6) with a new one.

4. Install the cover (5) and nut (4).

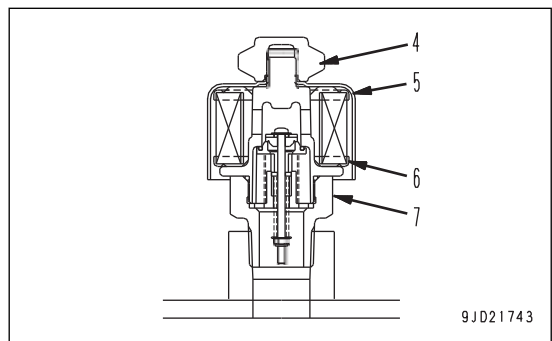


In order not to damage the threaded portion of nut, tighten nut (4) by hand until it is seated, then tighten it 15 to 30° by using a tool.

NOTICE

If the breather assembly (3) is removed for replacement, apply a tool to the bolt (7) and tighten it.

Tightening torque: 30 to 40 Nm



METHOD FOR REPLACING DEF TANK BREATHER ELEMENT

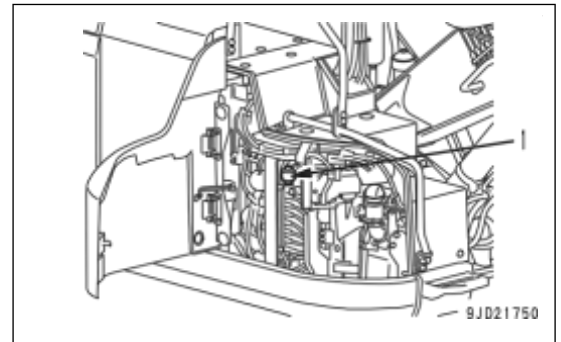
WARNING

Do not replace the element immediately after the engine is stopped.

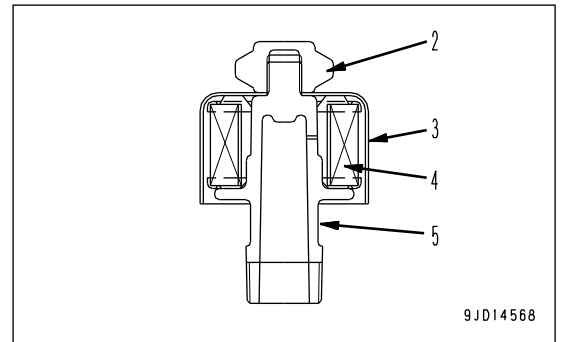
NOTICE

- **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 the 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 the DEF system devices stop.
- **Improper assembly of DEF tank breather element may cause leakage of DEF. Replace the element in the correct procedure.**

1. Open the machine right front cover.



2. Remove nut (2) of breather assembly (1) at the top of DEF tank, then remove cover (3).
3. Replace element (4) with a new one.
4. Install cover (3) and nut (2).



In order not to damage the threaded portion of nut, tighten nut (2) by hand until it is seated, then tighten it 15 to 25 ° by using a tool.

NOTICE

If the breather assembly (1) is removed for replacement, apply a tool to the bolt (5) and tighten it.
Tightening torque: 6.5 to 8.5 Nm

5. Close the machine right front cover.

METHOD FOR CHECKING FAN BELT TENSION AND REPLACING FAN BELT

Special tools are required for the inspection and replacement.

Ask your Komatsu distributor to perform this work.

REMARK

As the automatic fan belt tensioner is installed to this machine, no belt tension adjustment is required.

EVERY 2000 HOURS MAINTENANCE

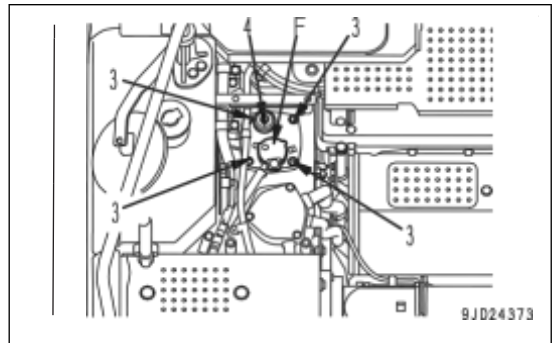
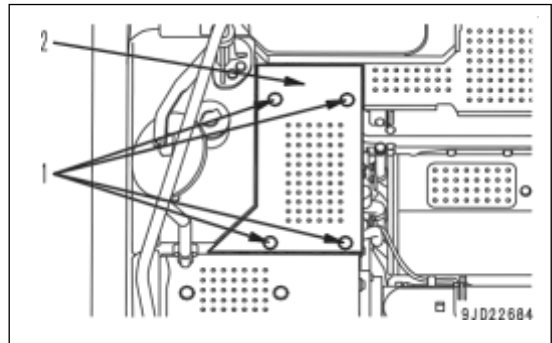
Maintenance for every 100, 250, 500 and 1000 hours service should be performed at the same time.

METHOD FOR CLEANING HYDRAULIC TANK STRAINER

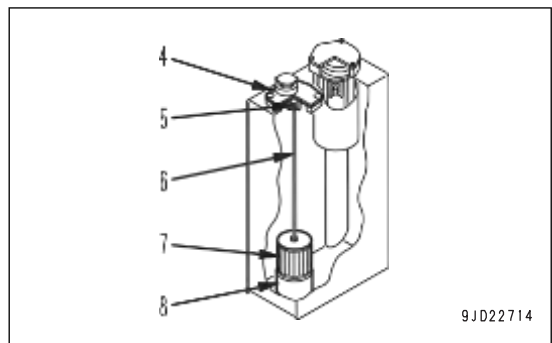
 **WARNING**

- 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.

1. Remove the bolts (1) (4 pieces), and open the hydraulic tank top cover (2).
2. Remove the cap for oil filler (F), and release the internal pressure.



3. Remove the bolts (3) (4 pieces) and remove cover (4).
The cover (4) may be jumped out by spring (5). While pressing down the cover, remove the bolts.
4. Hold the top of rod (6), pull it up, and remove spring (5) and strainer (7).
5. Remove any dirt stuck to strainer (7), then wash it in flushing oil. If strainer (7) is damaged, replace it with a new one.
6. Insert the strainer (7) and set it in projected portion (8) of the tank.



7. Install the cover (4) so that the protruding part at the bottom of cover (4) holds spring (5), then fasten the cover with the bolts.
8. Close the hydraulic tank top cover, and install the bolts (3) (4 pieces).

METHOD FOR CHECKING AND RELEASING NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (FOR CONTROL CIRCUIT)

WARNING

The accumulator is charged with high-pressure nitrogen gas, so improper operation may cause an explosion, which will lead to serious injury or death. For handling, always observe the following.

- The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when performing the operation. In addition, loosen the bolts slowly when performing the work.
- Do not disassemble it.
- Do not bring open flame close to it or do not dispose of it in fire.
- Do not perform drilling, welding or flame-cutting.
- Do not hit or roll it, or subject it to any impact.
- When disposing of it, the gas must be released. Ask your Komatsu distributor to have this work performed.

NOTICE

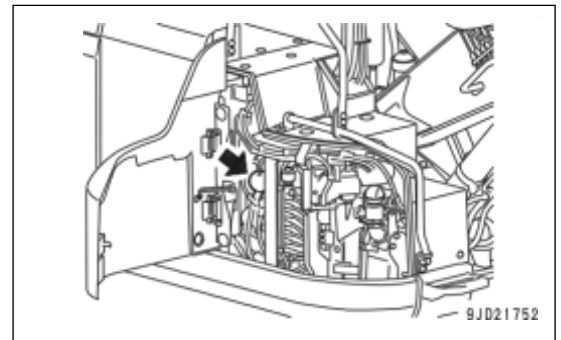
If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it becomes impossible to release the remaining pressure inside the hydraulic circuit if a failure occurs on the machine.

FUNCTION OF ACCUMULATOR

The accumulator has function of storing the pressure of the control circuit in it. Even after the engine is stopped, the control circuit can be operated, so the following actions are possible.

- If the control lever is operated in the direction to lower the work equipment, it is possible for the work equipment to go down under its own weight.
- The pressure in the hydraulic circuit can be released.

The accumulator is installed to the position shown in the figure.



METHOD FOR CHECKING FUNCTION OF ACCUMULATOR

CAUTION

When performing the inspection, check first that there is no person or obstacle in the area around the machine.

Replace the accumulator every 2 years or every 4000 hours, whichever comes sooner.

Check the nitrogen gas charge pressure as follows.

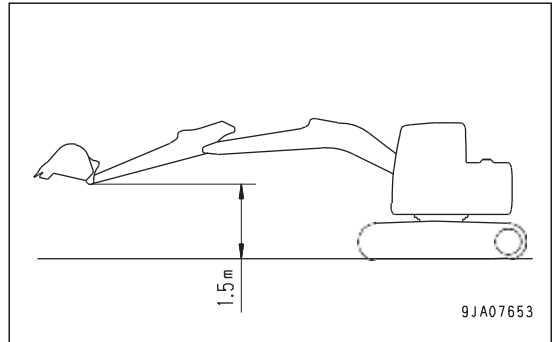
1. Place the machine on a flat ground.

2. Hold the work equipment in the maximum reach posture (arm fully out, bucket fully dumped) at height 1.5 m from the ground.
3. Perform the following procedure within 15 seconds.

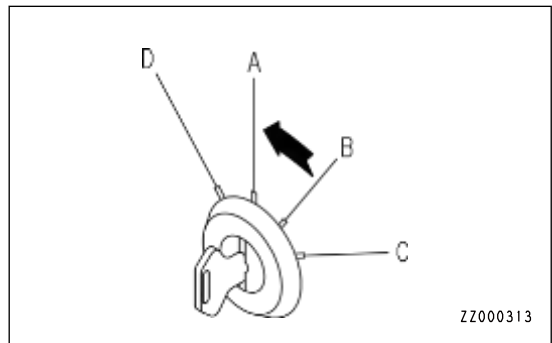
REMARK

After the engine stops, the accumulator pressure decreases gradually. You can check only just after the engine stops.

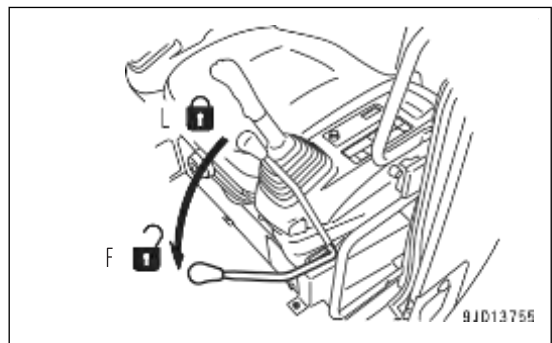
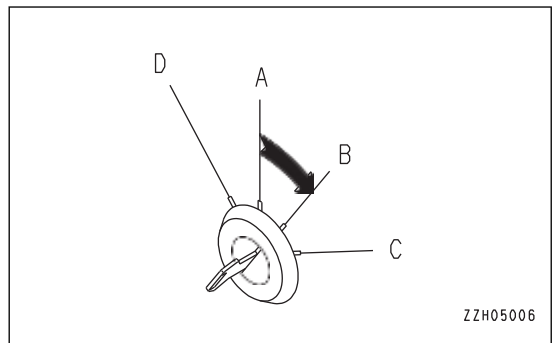
- 1) Keep the work equipment at the maximum reach posture, turn the starting switch to OFF position (A), and stop the engine.



- 2) Turn the starting switch to ON position (B).

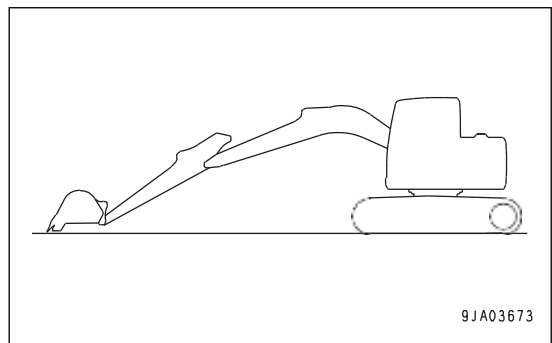


- 3) Set the lock lever to FREE position (F).
- 4) Slowly set the work equipment control lever in LOWER direction and check that the work equipment touches the ground.



If the work equipment goes down under its own weight and contacts the ground, the accumulator is normal.

If the work equipment does not go down or stops in midway, the charged pressure of the gas in the accumulator for the hydraulic circuit has probably dropped. Ask your Komatsu distributor for inspection.



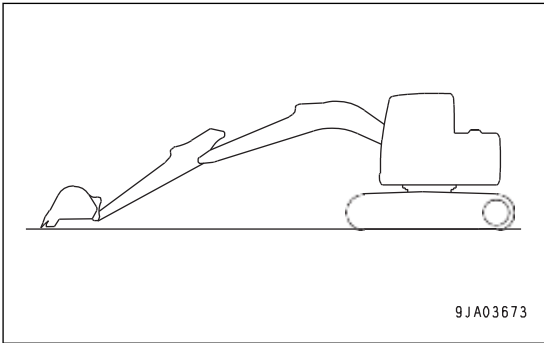
This completes the inspection. After completion of the inspection, set the lock lever to LOCK position and turn the starting switch to OFF position.

METHOD FOR RELEASING PRESSURE IN ACCUMULATOR

1. Lower the work equipment to the ground.

REMARK

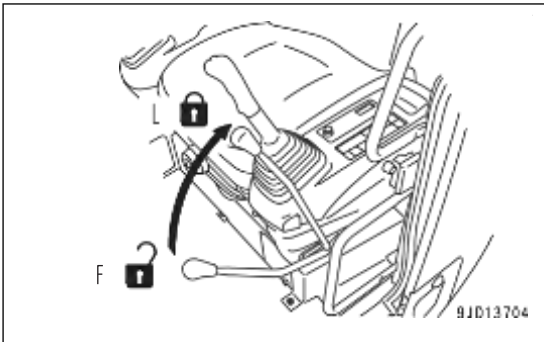
Close the crusher attachment jaws, etc.



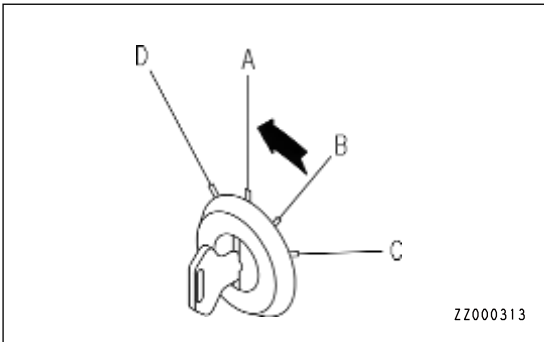
2. Set the lock lever to LOCK position (L).
3. Perform the following procedure within 15 seconds.

REMARK

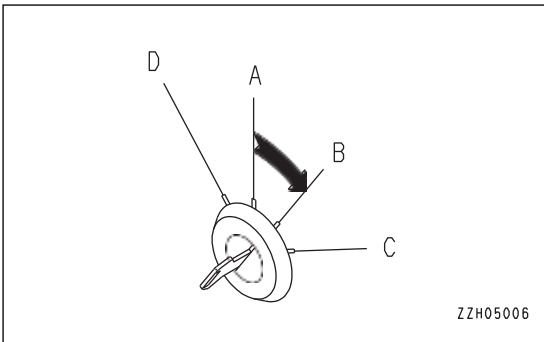
After the engine stops, the accumulator pressure decreases gradually. You can release the pressure only just after the engine stops.



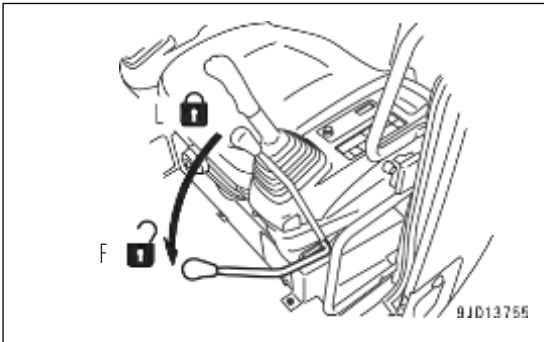
- 1) Turn the starting switch to OFF position (A), and then stop the engine.



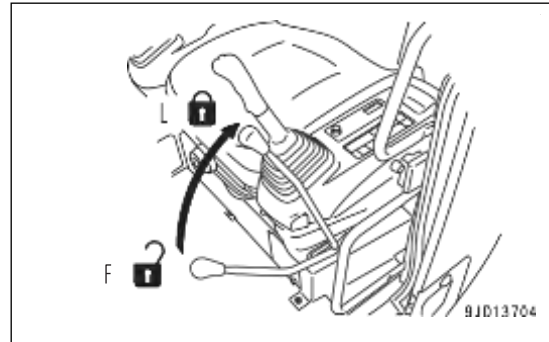
- 2) Turn the starting switch to ON position (B).



- 3) Set lock lever to FREE position (F), then operate the work equipment control levers and the attachment control pedal fully to the front, rear, right, and left to release the pressure in the control circuit.



- 4. Set lock lever to LOCK position (L) and lock the work equipment control levers and the attachment control pedal.



METHOD FOR CHECKING ALTERNATOR AND STARTING MOTOR

The brushes may be worn or the bearing may have run out of grease, contact your Komatsu distributor for inspection and repairs.

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 REPLACING KCCV FILTER ELEMENT

 **WARNING**

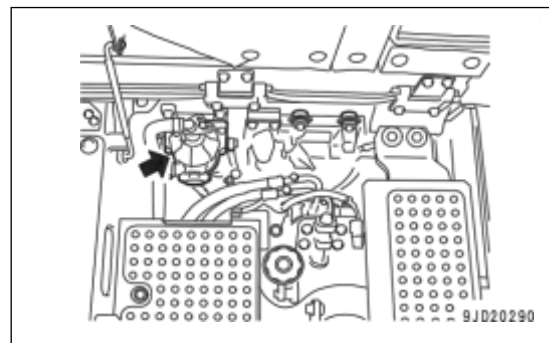
After the engine has been operated, all of parts are still very hot. Do not replace the filter element immediately. Wait until all of parts cool down before starting the work.

NOTICE

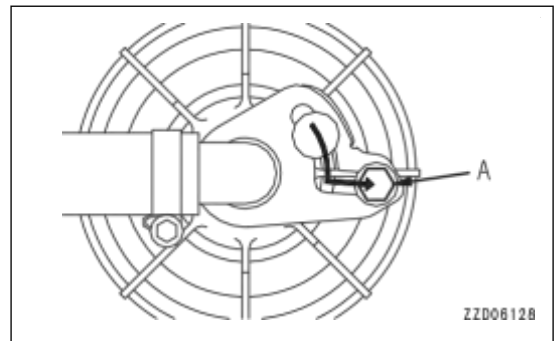
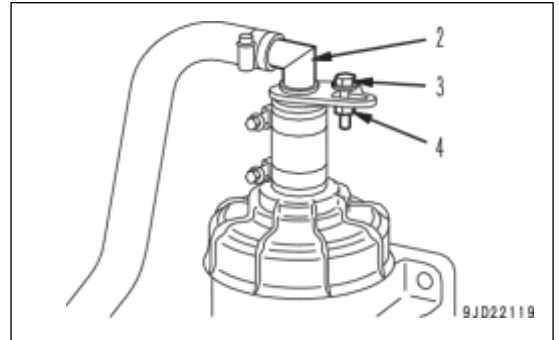
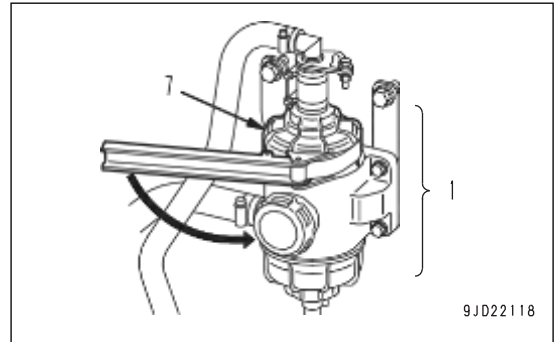
- If the engine is operated without the filter element, the turbocharger and aftercooler become dirty and their performance will lower and that can cause engine problems such as overrun caused by suction of oil. Therefore, do not start the engine without the filter element.
- The filter element cannot be cleaned. If the filter element is cleaned or refurbished, the filter performance lowers. As a result, the turbocharger and aftercooler become dirty and 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.

Prepare a container to catch oil.

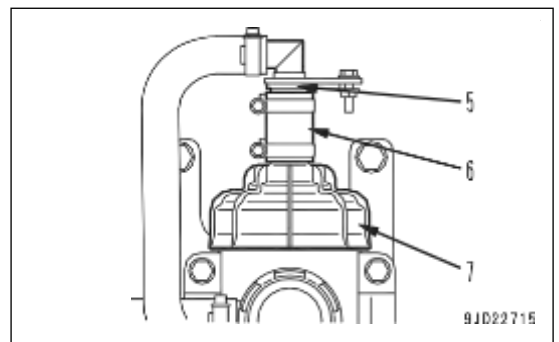
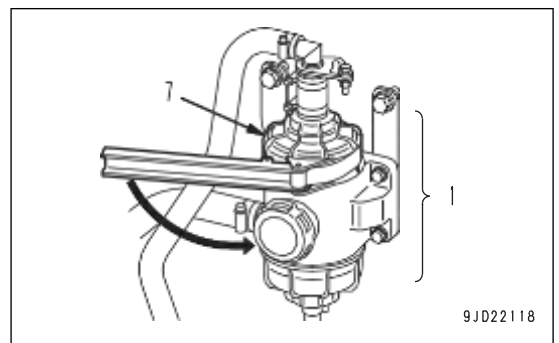
The KCCV ventilator is located in the positions shown in the figure.



1. By using tools, loosen bolt (3) and nut (4) of elbow (2) above KCCV ventilator (1).
2. Move loosened bolt (3) and nut (4) along the groove of elbow (2) to position (A) shown in the figure.



3. By using the filter wrench, loosen cover (7) of KCCV ventilator (1).
At this time, tube (5) and hose (6) rotate together with cover (7).



- 4. After removing cover (7) from ventilator body (8), remove element (9).

Oil may be accumulated in or sticking to cover (7) and element (9). When replacing the element, take care that the oil will not spill out.

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, as far as the coolant level is normal, it is not a problem.

- 5. Apply engine oil to O-rings (11) (2 pieces) fitted to the top and bottom of the new element and insert the element into the body.

REMARK

You can install the element with either side up.

- 6. Replace O-ring (10) of ventilator body (8) with new one and apply engine oil to it, and then install cover (7) to the body.

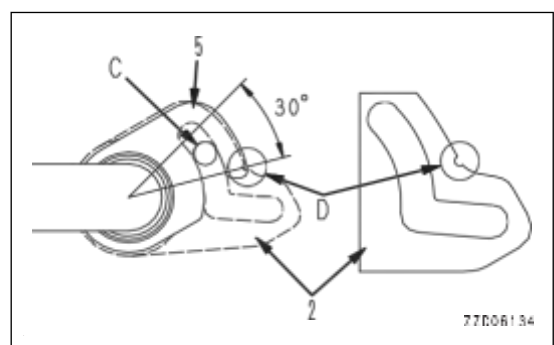
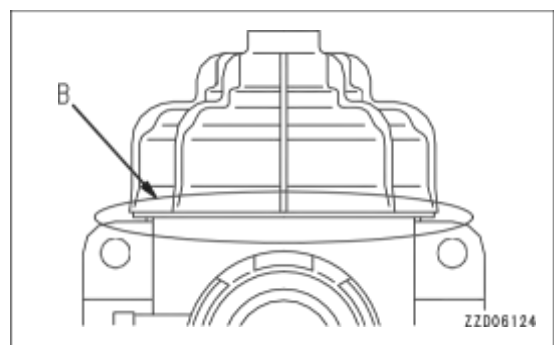
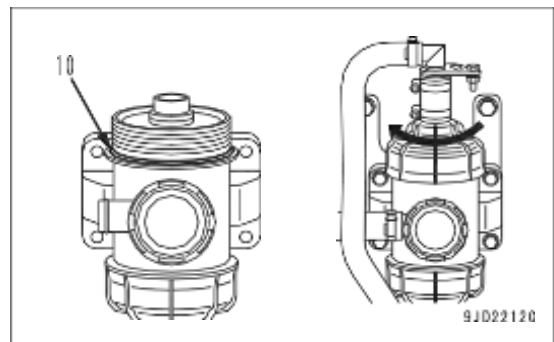
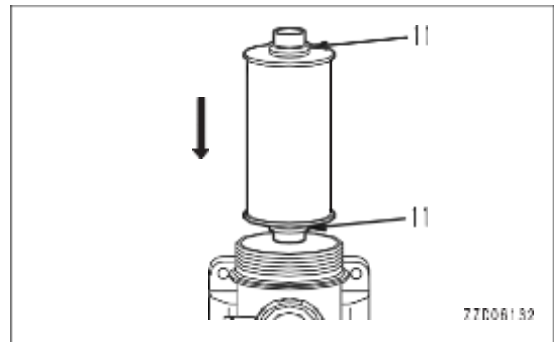
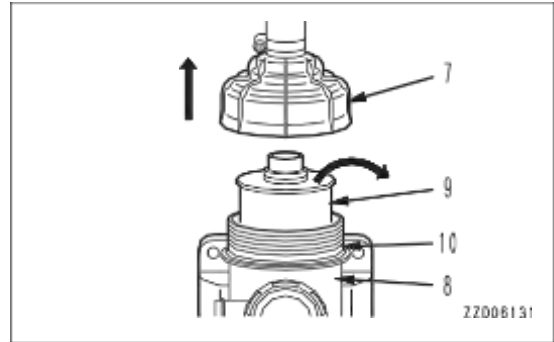
Tighten the cover firmly with the hand until you cannot tighten any more.

- 7. Tighten the cover until clearance (B) between it and body is eliminated with the bare hand or a filter wrench.

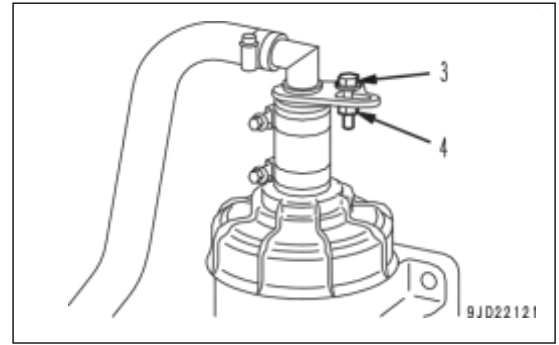
At this time, check that bolt-fixed position (C) of tube (5) is within the range of the groove of elbow (2).

REMARK

As a mark, notch (D) is made on the plate.



8. By using tools, tighten bolt (3) and nut (4).



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 for all of parts to cool down before starting the work.

NOTICE

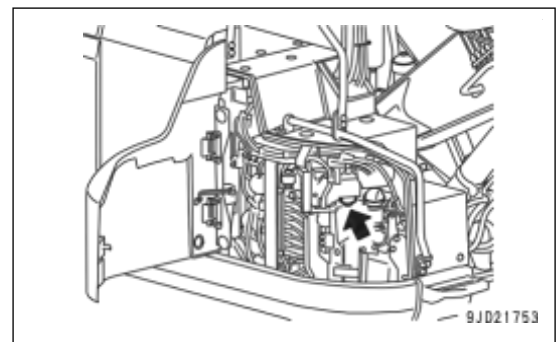
- **Komatsu recommends using Komatsu genuine parts for replacement parts.**
- **If the machine is operated without the DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials may enter the DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without the DEF filter attached, nor use the filter other than Komatsu genuine parts.**
- **The DEF filter cannot be flushed. Flushing or regenerating of it will degrade the performance of filter, and will cause the breakage of the DEF tank. Never reuse the element.**
- **Improper assembly of the DEF filter may cause leakage of the DEF. Replace the DEF filter in the correct procedure.**
- **The DEF freezes at -11 °C. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around the DEF pump is higher than -11 °C, and in the condition that the DEF is not frozen.**

After the engine is stopped, the DEF system devices automatically purge the DEF in the DEF injector and DEF pump and return it to the DEF tank to prevent malfunction of the devices caused by freezing of the DEF or deposition of urea.

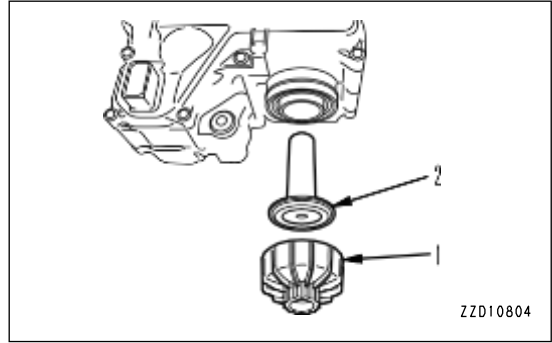
After the engine is stopped, the devices are still operated for a few minutes. Before replacing the filter, clean around the DEF pump first after the DEF system devices stop.

Prepare the DEF filter removal tool.

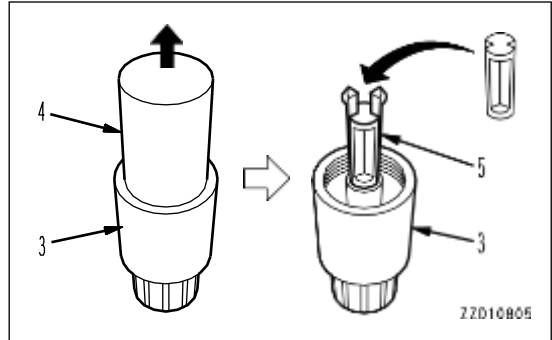
The DEF filter is located at the positions shown in the figure.



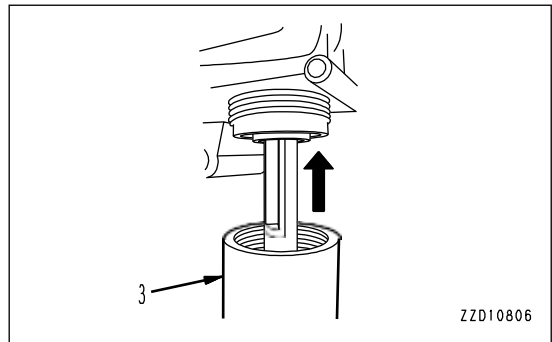
- 1. Remove the filter cap (1) at the bottom of the DEF pump, and remove equalizing element (2).



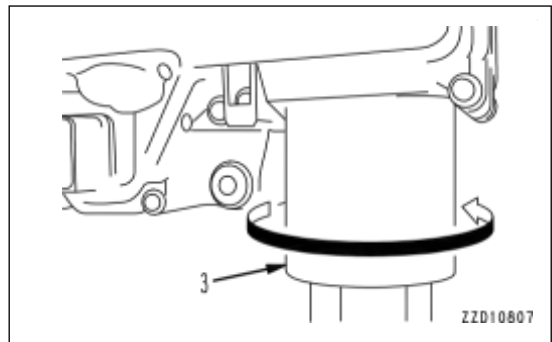
- 2. Turn the cap (4) of filter removal tool (3) and remove it.
- 3. Check the installation of spacer (5).



- 4. Insert the filter removal tool (3) into the bottom of the DEF pump and thrust in with hand.



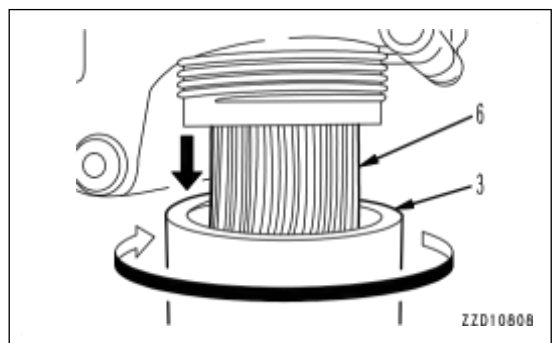
- 5. Check that filter removal tool (3) is fully inserted to the end. Insert the filter to the end where you cannot thrust it in any further.



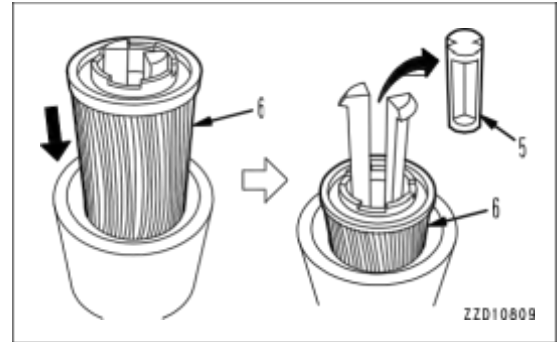
- 6. Turn the filter removal tool (3) in reverse, and remove filter (6).

Filter (6) is removed and you can take it out together with filter removal tool (3).

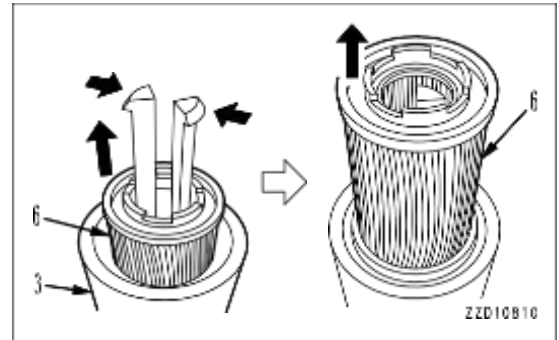
If filter (6) cannot be removed from the DEF pump, grip filter removal tool (3), pull it down, then it will be removed.



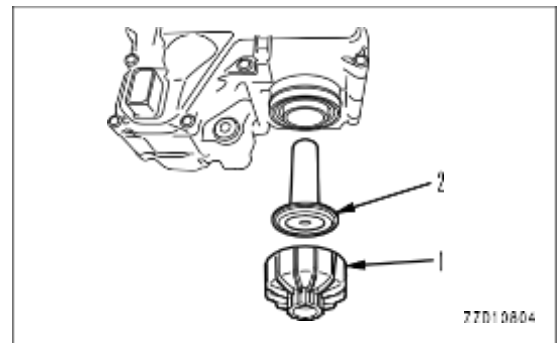
7. Slide the filter (6) down, and remove spacer (5) from filter removal tool (3).



8. Pull the filter (6) up while pushing in the tip of filter removal tool (3), and remove it.
9. Return the removed spacer (5) to filter removal tool (3), and keep them.
10. Insert a new filter and a new equalizing element into the bottom of the DEF pump, and lightly tighten them with hand.



11. Tighten the filter cap (1).
Tightening torque: 20 to 25 Nm



EVERY 4000 HOURS MAINTENANCE

Maintenance for every 100, 250, 500, 1000 and 2000 hours service should be performed 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		Ask your Komatsu distributor for replacement.
1	Fuel system	Fuel hose Spill hose	
2	Engine lubrication system	Turbocharger lubrication hose Engine oil filter hose	
3	Work equipment hydraulic system	Main pump delivery hose Main pump LS hose Swing line hose Travel line hose	
		External work equipment hose <ul style="list-style-type: none"> • Boom foot connection hose • Boom cylinder hose • Arm connection hose • Arm cylinder hose • Bucket cylinder hose • Line hose for additional attachment • Blade cylinder hose 	
4	Others	PPC accumulator Accumulator for additional attachment	

METHOD FOR CHECKING WATER PUMP

Check for play of the pulley, oil leakage, water leakage, and clogging of weep hole (drain hole). If anything abnormal is found, ask your Komatsu distributor for disassembly and repair or replacement.

METHOD FOR REPLACING ACCUMULATOR (FOR CONTROL CIRCUIT)



The accumulator is charged with high-pressure nitrogen gas, so mistaken operation may cause an explosion, which will lead to serious injury or death or damage. For handling, always observe the following.

- The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when performing the operation. In addition, loosen the bolts slowly when performing the operation.
- Do not disassemble it.
- Do not bring it near open flame or dispose of it in fire.
- Do not perform drilling, welding or flame-cutting.
- Do not hit or roll it, or subject it to any impact.
- When disposing of it, the gas must be released. Ask your Komatsu distributor to have this work performed.

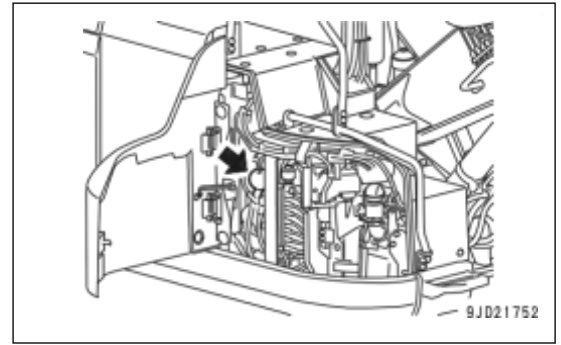
NOTICE

If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it becomes impossible to release the remaining pressure inside the hydraulic circuit if a failure occurs on the machine.

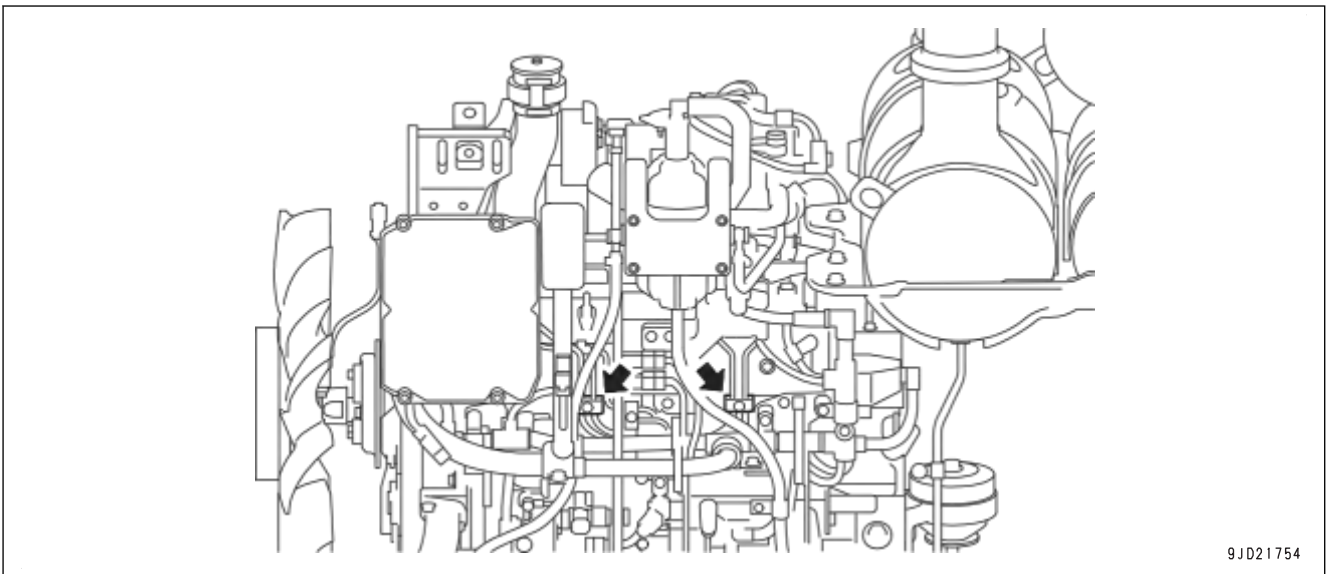
Replace the accumulator every 2 years or every 4000 hours, whichever comes sooner.

Ask your Komatsu distributor for replacement.

The accumulator is installed to the position shown in the figure.



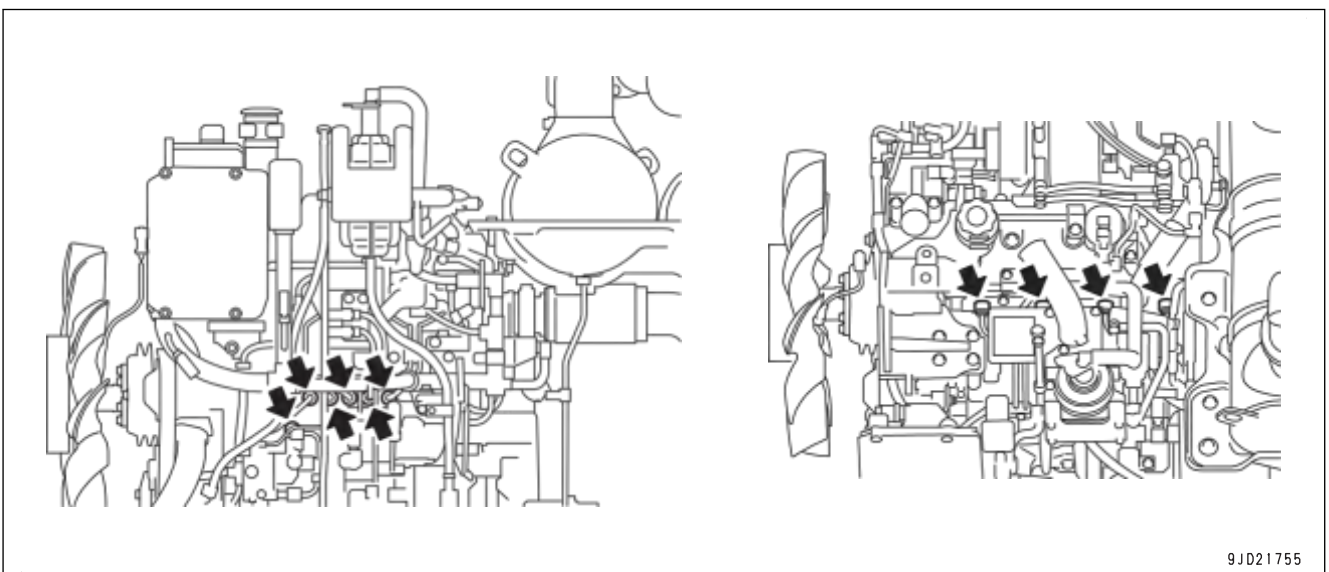
METHOD FOR CHECKING FOR LOOSENESS OF ENGINE HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER



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.

If there are any problems, the replacement must be performed. Ask your Komatsu distributor for replacement.

METHOD FOR CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER



The fuel spray prevention caps (10 places) 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.

Check visually and touch by hand to check that there are no missing fuel spray prevention cap, loose bolts or hardening of the rubber.

If there is any problem, the replacement must be performed. Ask your Komatsu distributor for replacement.

EVERY 4500 HOURS MAINTENANCE

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

REPLACE KCCV HOSE

Ask your Komatsu distributor for replacement of the KCCV hose.

METHOD FOR CLEANING DEF TANK

Ask your Komatsu distributor for cleaning of the DEF tank.

EVERY 5000 HOURS MAINTENANCE

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

METHOD FOR CHANGING OIL IN HYDRAULIC TANK

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.

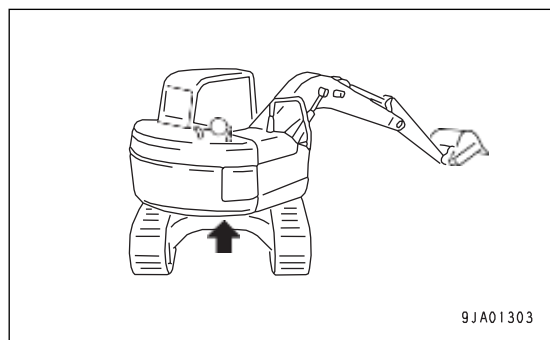
NOTICE

If the machine is equipped with a hydraulic breaker, the hydraulic oil deteriorates faster than in the normal bucket digging operation. Accordingly, perform maintenance referring to “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-12)”.

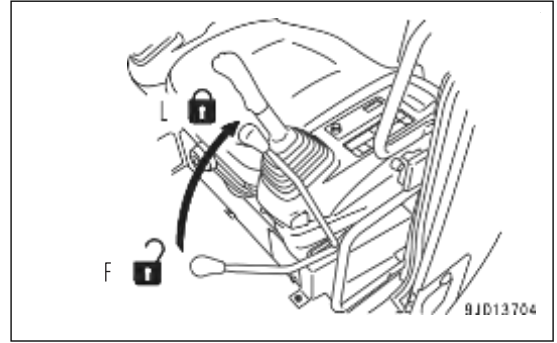
Refill capacity: 69 ℓ

Items to be prepared

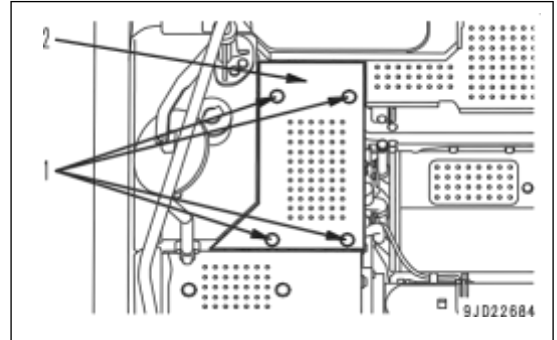
- Container to catch drained oil
 - Socket wrench handle
1. Swing the upper structure so that the drain plug of the hydraulic tank comes to the middle between the right and left tracks.
 2. Retract the arm and bucket cylinder rods, then lower the boom to lower the teeth to the ground.



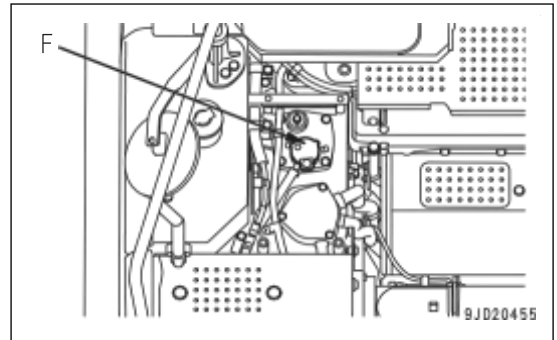
3. Set the lock lever to LOCK position (L) and stop the engine.



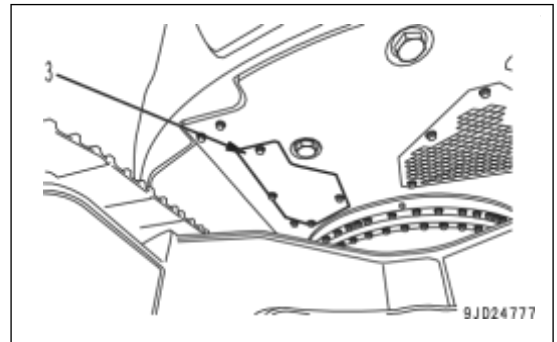
4. Remove the bolts (1) (4 pieces), and remove the hydraulic tank top cover (2).



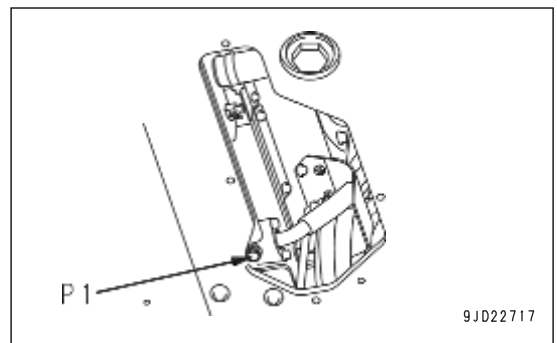
5. Remove the cap of oil filler port (F).



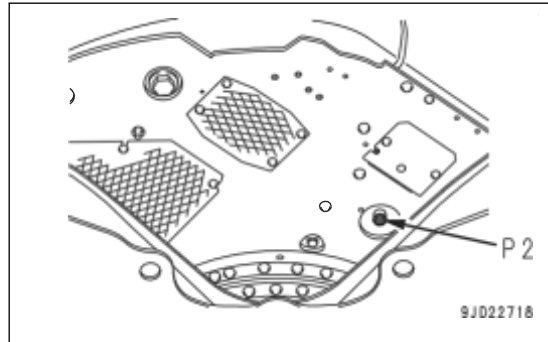
6. Remove the undercover (3).
7. Place the oil container under the drain plug (P1) at the bottom of the machine.



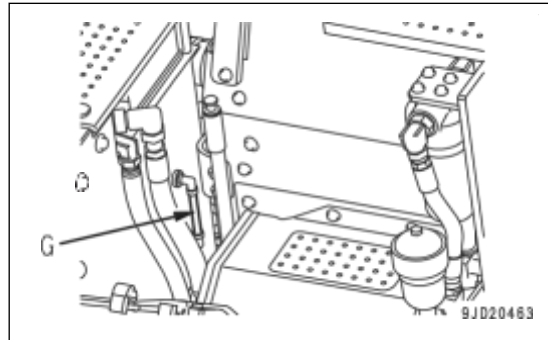
8. Remove the drain plug (P1), and drain the oil.
 - When removing the drain plug (P1), be careful not to get oil on yourself. Check the installed O-ring for damage. Replace the O-ring with a new one if necessary.
9. After draining the oil, tighten the drain plug (P1).
Tightening torque: 35 to 63 Nm
10. Install the undercover (3).
11. Place the oil container under the drain plug (P2) at the bottom of the machine.



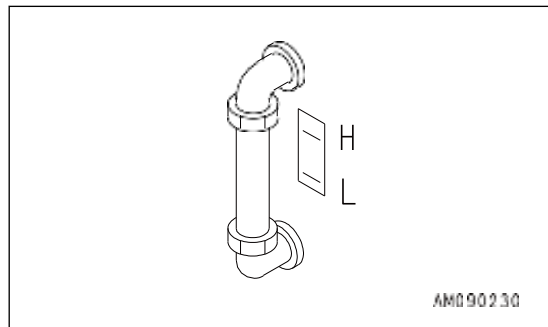
12. Remove the drain plug (P2), and drain the oil.
 - When removing the drain plug (P2), be careful not to get oil on yourself. Check the installed O-ring for damage. Replace the O-ring with a new one if necessary.
13. After draining the oil, tighten the drain plug (P2).
Tightening torque: 58.8 to 78.4 Nm
14. Add the refill capacity of oil through oil filler port (F).



15. Check that the oil level is between H and L lines on sight gauge (G).
For applicable oils, see “METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-6)”.
For the check of oil level and the installation procedure of the oil filler cap, see “METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (3-132)”.



16. Bleed air from the hydraulic circuit.
For the air bleeding procedure of hydraulic circuit, see “METHOD FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT (4-37)”.
17. Install the hydraulic tank top cover (2).



EVERY 8000 HOURS MAINTENANCE

Maintenance for every 100, 250, 500, 1000, 2000 and 4000 hours service should be performed at the same time.

METHOD FOR REPLACING ENGINE HIGH-PRESSURE PIPING CLAMP

Special techniques and tools are required for this work.

Ask your Komatsu distributor for replacement of the engine high-pressure piping.

METHOD FOR REPLACING FUEL SPRAY PREVENTION CAP

Ask your Komatsu distributor for replacement of the fuel spray prevention caps.

EVERY 9000 HOURS MAINTENANCE

Maintenance for every 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.

END OF SERVICE LIFE

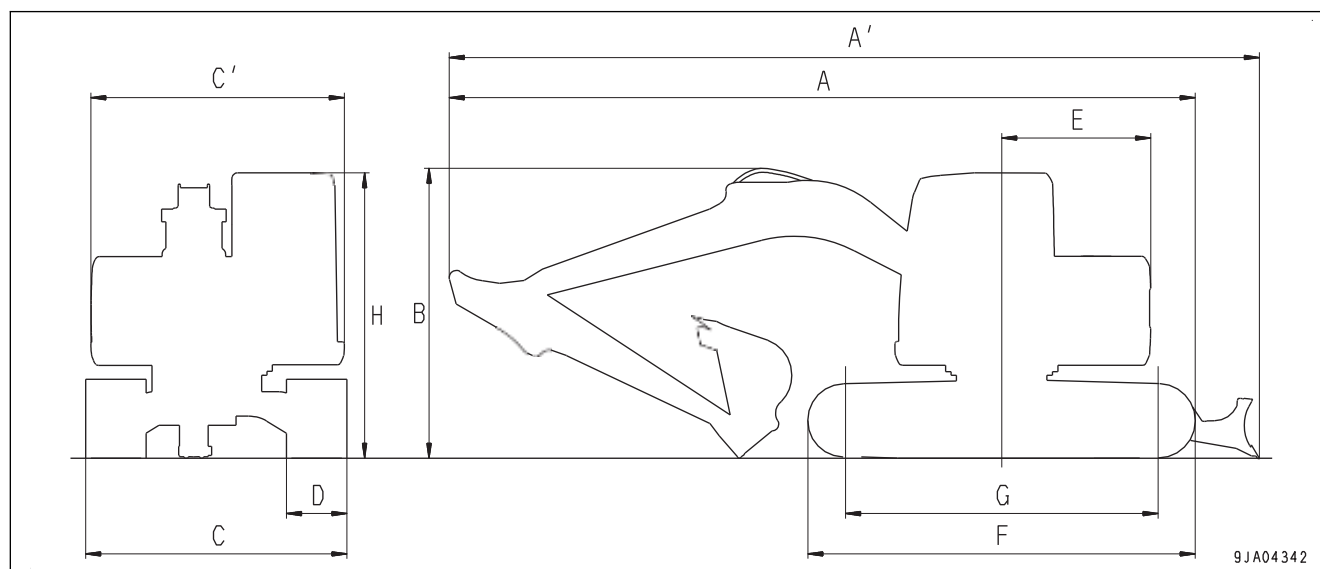
- For safe dismantling of the machine at the end of service life, please contact your Komatsu distributor.

SPECIFICATIONS

SPECIFICATIONS

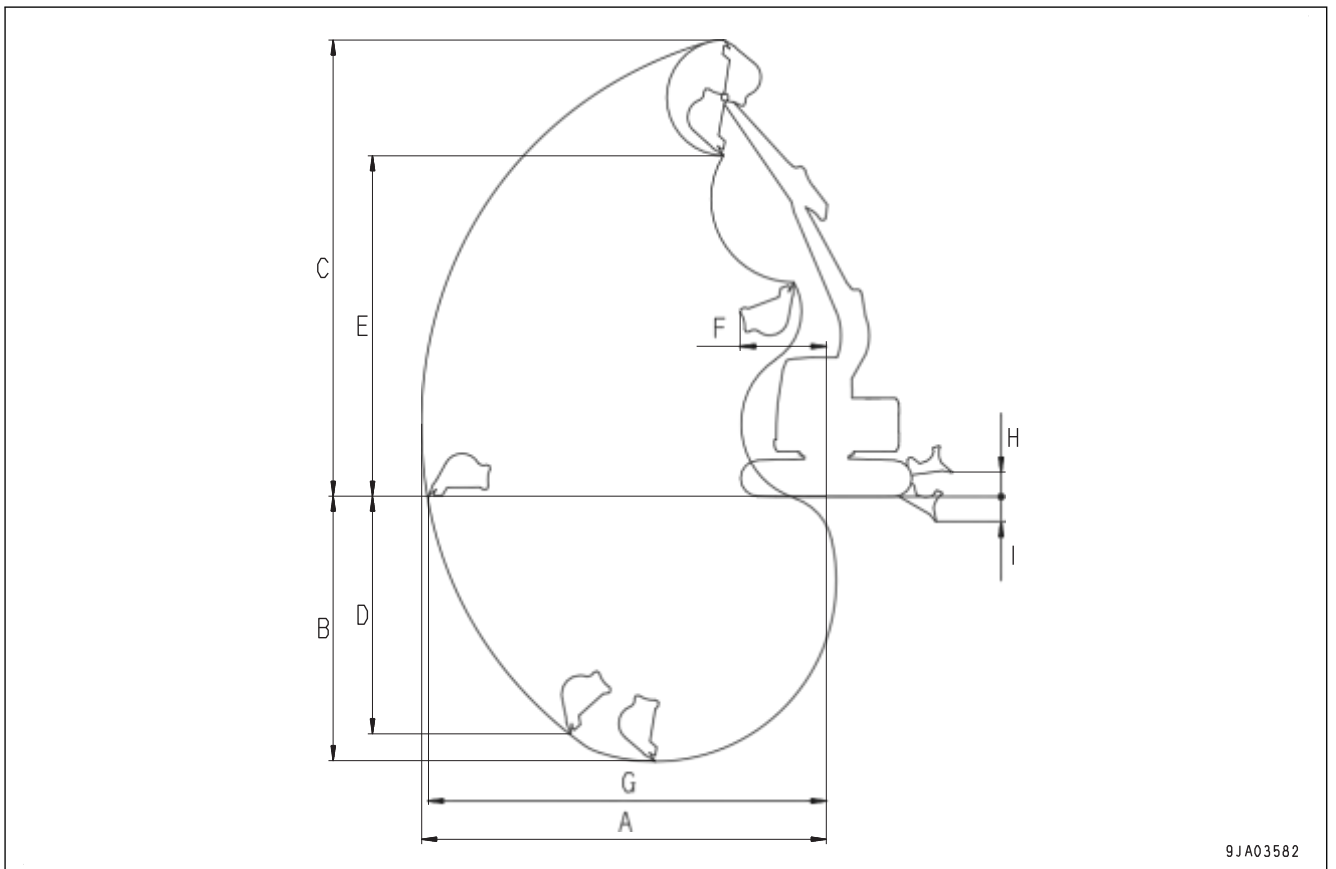
SPECIFICATIONS: PC138US-11

Item		Unit	PC138US-11
Machine weight		kg	13800
Bucket capacity		m ³	0.50
Engine model		-	Komatsu SAA4D95LE-7 diesel engine
Rated horsepower	SAE J1995 (gross)	kW / rpm	72.6/2050
	ISO 9249/SAE J1349 (net)		72.5/2050
A	Overall length (standard specification)	mm	7280
A'	Overall length (blade specification)	mm	7970
B	Overall height	mm	2950
C	Overall width	mm	2490
C'	Overall width	mm	2490
D	Shoe width	mm	500
E	Tail swing radius	mm	1480
F	Overall length of track	mm	3610
G	Distance between tumbler centers	mm	2880
H	Cab height	mm	2815
Minimum ground clearance		mm	395
Travel speed (Lo/Hi)		km/h	2.9/5.1
Continuous swing speed		rpm	11.0



Working range drawing

	Working ranges	Unit	PC138US-11
A	Max. digging reach	mm	8300
B	Max. digging depth	mm	5480
C	Max. digging height	mm	9340
D	Max. vertical wall digging depth	mm	4900
E	Max. dumping height	mm	6840
F	Min. swing radius of work equipment	mm	1980
G	Max. reach at ground level	mm	8180
H	Max. blade lift above ground	mm	470
I	Max. blade drop below ground	mm	525



EXPLANATION OF LIFT CAPACITY CHART

WARNING

The excavator used in handling operations must conform with current local regulations and be equipped with safety valves and an overload alarm in compliance with EN 474-5.

Legend

A: Reach from swing centre

B: Bucket hook height

(1) Position of lifting point

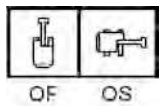
(2) Arm length

(3) Boom length

(4) Hydraulic pressure: 34.8 MPa

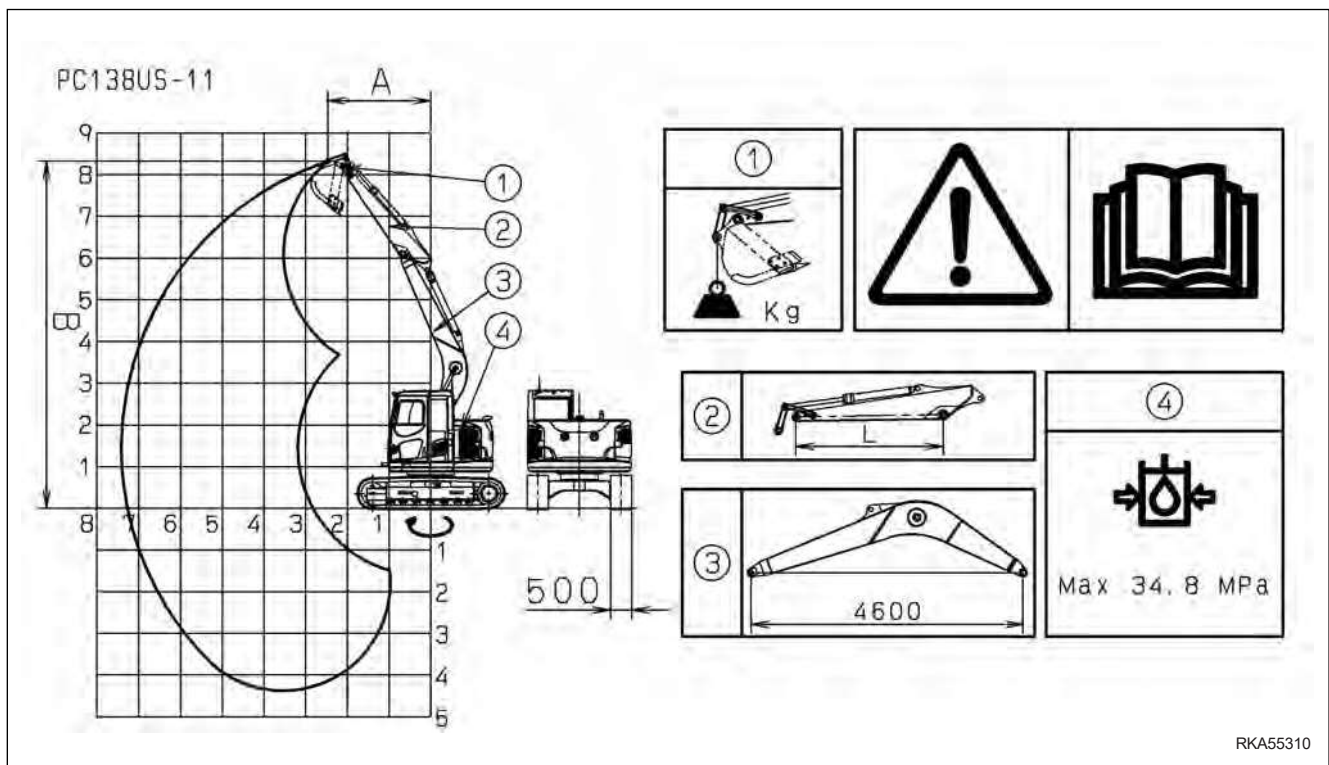
OF: Lifting capacity (rating overfront)

OS: Lifting capacity (rating overside)



Working conditions

- Bucket: 0.50 m³ ISO - 400 kg
- Width shoe: 500 mm
- With fully extended bucket cylinder.
- On a compact horizontal level ground.
- If object handling is performed with other tool installed, the weight difference of the tool shall be deducted from value of this table.



RKA55310

Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (* load limited by hydraulic capacity rather than tipping).

L A B		kg											
		MAX		7.0m		6.0m		4.5m		3.0m		1.5m	
3.0m	6.0m	*1340	*1340			*1870	*1870	*2670	*2670				
	4.5m	*1250	*1250	*1600	1430	*2680	1950	*2840	*2840				
	3.0m	*1250	1170	2250	1400	2950	1870	*3760	3090	*3740	*3740		
	1.5m	*1330	1090	2180	1340	2830	1760	4580	2840	*7560	5440		
	0.0m	*1500	1100	2120	1280	2720	1660	4330	2820	*6480	4930		
	-1.5m	*1810	1200	2080	1250	2650	1600	4200	2500	*6220	4760	*3840	*3840
	-3.0m	2460	1490			2660	1600	4180	2490	*6480	4780	*5760	*5760
	-4.5m	*2920	2290					*3500	2590	*5500	4950		
2.5m	6.0m	*1650	*1650					*3100	*3100				
	4.5m	*1540	*1540			*2850	1920	*3570	3210				
	3.0m	*1550	1340	*1970	1390	2930	1860	*4360	3040	*5880	*5880		
	1.5m	*1660	1250	2180	1340	2830	1770	4540	2820	*7430	5310		
	0.0m	*1910	1260	2140	1300	2740	1680	4340	2640	*6090	4940		
	-1.5m	2310	1410			2700	1640	4250	2560	*6070	4860	*4370	*4370
	-3.0m	2940	1800					4270	2570	*6540	4920	*5750	*5750
	-4.5m												
2.1m	6.0m	*2060	*2060					*3420	3190				
	4.5m	*1900	1770			*2600	1880	*3960	3160	*4220	*4220		
	3.0m	*1920	1480			2910	1840	*4680	2990	*6630	5830		
	1.5m	*2070	1370			2820	1760	4500	2780	*6570	5170		
	0.0m	2280	1400			2740	1690	4330	2630	*5990	4900		
	-1.5m	2570	1580			2720	1670	4260	2570	*6090	4880	*4830	*4830
	-3.0m	3420	2100					4310	2610	*6680	4990	*5910	*5910
	-4.5m												

RKA55300

ATTACHMENTS AND OP- TIONS

WARNING

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

PRECAUTIONS FOR USING ATTACHMENT AND OPTIONS

WARNING

Install only attachments or options authorized by Komatsu. Komatsu cannot accept any responsibility for any not authorized by Komatsu. Any personal injury, failure, or property damage caused by the use of unauthorized attachments or options will not be the responsibility of Komatsu.

When installing attachments or options to the machine, it is necessary to pay attention to safety. Observe the following precautions strictly when selecting, installing or removing, or using attachments or options.

PRECAUTIONS WHEN SELECTING

Consult your Komatsu distributor before installing attachments or options to the machine. Depending on the type of attachment or option, it may be necessary to install a front guard, overhead guard, or other safety structure to the machine. There may also be problems of the attachment or option hitting the operator's cab.

READ THE OPERATION AND MAINTENANCE MANUAL THOROUGHLY

Before installing or using any attachment or option, make sure that you thoroughly read and understand the instruction manuals for the machine and the attachment or option.

If you lose the instruction manual or it is damaged, obtain a new copy from the attachment manufacturer or your Komatsu distributor.

PRECAUTIONS WHEN REMOVING AND INSTALLING

When removing or installing the attachment or option, observe the following precautions, and take care to ensure safety during the operation.

- Perform the removal and installation operation on a level and firm ground surface.
- When the operation is performed by 2 or more workers, choose the leader and follow his/her instructions.
- Use a crane when handling heavy objects (25 kg or more).
(The crane must be operated by a qualified operator.)
- Never go under a load raised by the crane.
- Do not perform operations with the load kept raised by the crane. Always use a stand to prevent the load from falling.
- When removing a heavy part, consider the machine balance after it is removed. To prevent the machine from tipping over, set a support in position if necessary before removing the part.
- Before installing or after removing the attachment or option, set it in a stable condition to prevent it from falling over.
- For details of the removal or installation operation, consult your Komatsu distributor.

PRECAUTIONS WHEN USING

When long or heavy work equipment is installed, remember the following precautions. Before starting operations, move the machine to a safe place and perform a test operation to make sure that you fully understand the movement, center of gravity, and working range of the machine.

- Do not perform the swing operation if the machine is at an angle. If the swing is performed with the machine at an angle, there is a danger that the machine may tip over.
- Always maintain a safe distance from obstacles in the surrounding area when operating the machine. If long work equipment is installed, the working range becomes larger.
- If heavy work equipment is installed, pay attention to the following precautions.
 - The swing overrun (the distance the work equipment moves before completely stopping after the swing brake is applied) will be greater. There is a danger of hitting objects if the swing overrun is miscalculated, so allow extra space to the position you want to stop swinging when performing the swing.

- The hydraulic drift of the work equipment (the amount of the work equipment moves down under its own weight when it is stopped in a raised position) also becomes greater. Do not stop the work equipment in air.
- Do not suddenly swing, lower, or stop the work equipment. It is dangerous that the machine may tip over.
- Do not suddenly extend or retract the boom cylinder rod. The shocks may cause the machine to tip over.

 **WARNING**

NOTE: When calculating the allowable mass of attachments, the mass of the bucket, see the following “EXPLANATION OF LIFT CAPACITY CHART (5-4)” should be taken into consideration.

For an attachment not intended to bear a load, for example a breaker, it should not exceed the **minimum** lift capacity of the machine as shown on the related lift capacity charts (see SPECIFICATIONS section Chapter 5).

For attachments intended to bear a load, for example clamshell bucket or grapple, the combined mass of the attachment plus load, should not exceed the **maximum** lift capacity figures as shown in the related lift capacity charts (see SPECIFICATIONS section Chapter 5).

QUICK COUPLER SYSTEM

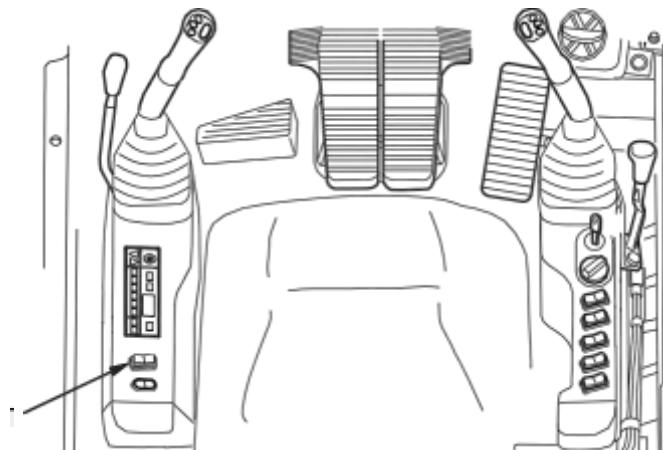
HANDLING QUICK COUPLER

WARNING

Quick coupler operation can be dangerous. There is a risk of death to exposed persons. Follow these instructions strictly.

- Use only quick couplers which comply with European standard EN474. In particular, it must be possible to confirm from the operator's position that the locking of the attachment or bucket has been completed.
- Use only quick couplers which include a pilot operated check valve in the locking cylinder. This is to ensure that there is no risk of the bucket or attachment coming loose in the case of loss of hydraulic pressure. If in doubt consult the manufacturer of the coupler.
- Read the instruction manual of the quick coupler carefully and follow the recommendations. If in doubt about the installation or operation consult your Komatsu distributor.
- Pressure regulation valve (2) allows the attachment pressure and the release pressure for the quick coupler to be limited according to the coupler manufacturer's recommendation respectively. Check that the valve is correctly set.
- Ensure that the quick coupler is installed by a suitably qualified technician. If in doubt contact your Komatsu dealer.

LOCATIONS



RKA55290

- | | |
|--|--|
| (1) Quick coupler switch | (3) Piping (quick coupler lock direction) |
| (2) Adjustable pressure regulating valve | (4) Piping (quick coupler release direction) |

TO RELEASE A BUCKET OR ATTACHMENT

WARNING

Pressure in the system can cause injury. Follow all instructions in ATTACHMENT REMOVAL AND INSTALLATION.

If the bucket or attachment has any hydraulic connections to the machine these must be disconnected before proceeding.

- Position the attachment on the ground safely where it is to be left. Take care that it will not roll or slide after release.

(1) Operation switch

REMARK

The switch has a safety lock mechanism to prevent accidental operation. Slide the lock towards you then rock the switch. The lamp on the switch will come on and a warning buzzer will sound.

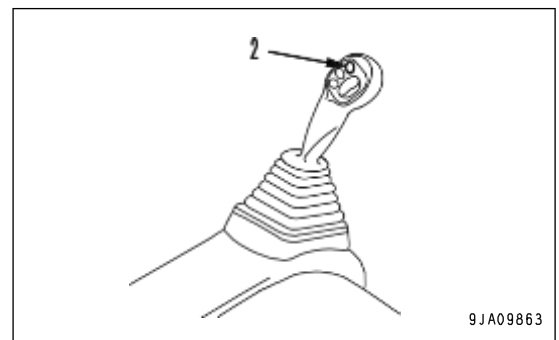
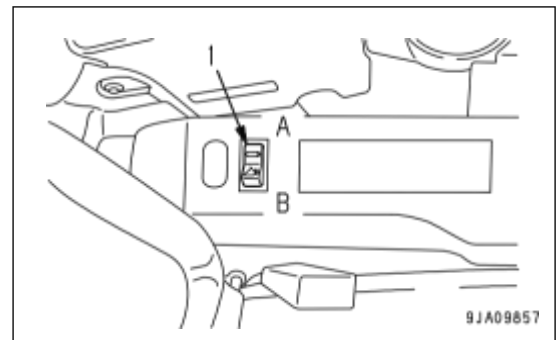
NOTICE

Operation will only take place if button (2) is also pressed.

(A) : When depressed at this point quick coupler deactivated. (Lock bucket/attachment)

(B) : When depressed at this point quick coupler is ready to be activated. (Release bucket/attachment)

- With switch (1) in position "B" press and hold button (2) on the left hand lever to activate quick coupler.
- Depending on the design of the quick coupler it may be necessary to operate one of the hydraulic functions of the machine (bucket, boom, arm or swing) to raise the pressure in the hydraulic system.



The quick coupler will now release the attachment/bucket.

TO PICK UP A NEW BUCKET OR ATTACHMENT

WARNING

- Check daily that the hoses and fittings in the quick coupler piping system are in good condition. Pay particular attention to the hoses and fittings at the arm end as these can be damaged easily. In case of damage or leakage of oil stop work. Loss of oil could lead to the bucket or attachment falling and killing an exposed person. The damage or leakage must be repaired before continuing work.
- This machine has a system installed to give a warning if there is a failure to maintain pressure in the quick coupler system. If the buzzer sounds in the cab make sure that the cause is clarified before continuing work. In particular check for leaks in the system. If in doubt call your Komatsu distributor.

- Position the quick coupler over the new bucket or attachment.

2. Operate switch (1), and with switch (1) in position “B” press and hold button (2) on the left hand lever, to activate quick coupler.

NOTICE

The switch has a safety lock mechanism to prevent accidental operation. Slide the lock towards you then rock the switch. The lamp on the switch will come on and a warning buzzer will sound.

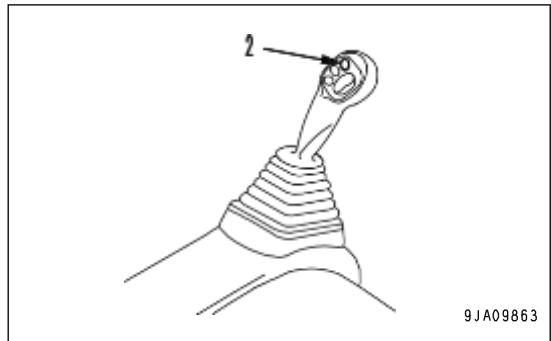
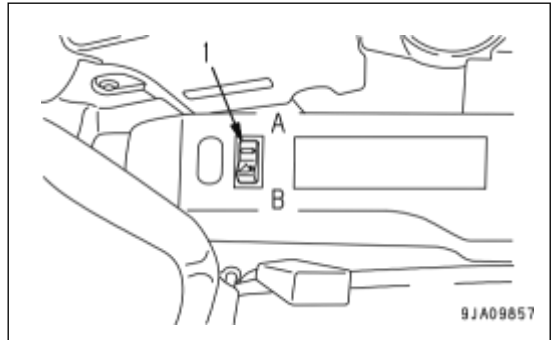
3. Depending on the design of the quick coupler it may be necessary to operate one of the hydraulic functions of the machine (bucket, boom, arm or swing) to raise the pressure in the hydraulic system. The quick coupler will move to released position.
4. Position the quick coupler in the mating portion of the bucket or attachment, moving the bucket cylinder, arm and boom as necessary.

Follow the quick coupler manufacturer's instructions.

5. Release button (2).

If the bucket or attachment needs a connection to the hydraulic system of the machine, follow all instructions in ATTACHMENT REMOVAL AND INSTALLATION.

The quick coupler will lock onto the bucket or attachment, if necessary operate one of the machine control levers to raise the system pressure.



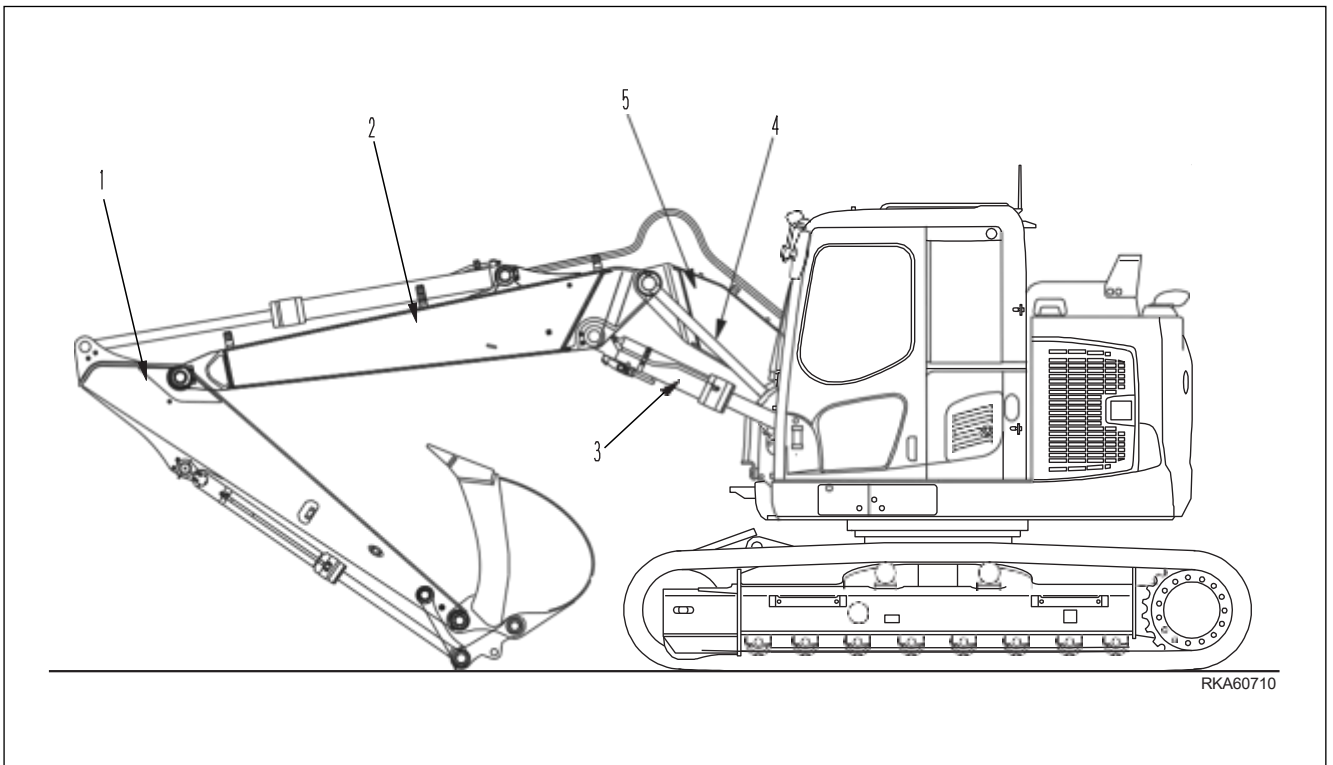
 **WARNING**

European safety standards require that it is possible to check the locked position of the quick coupler from the operator's position. Failure to check could cause the death of exposed persons. Check carefully that all the locking of the quick coupler is complete and secure. Follow the manufacturer's instructions carefully, including the installation of any safety device, if required.

6. Return switch (1) to position “A” (OFF).
The lamp will go off and the buzzer stop.

2-PIECE BOOM

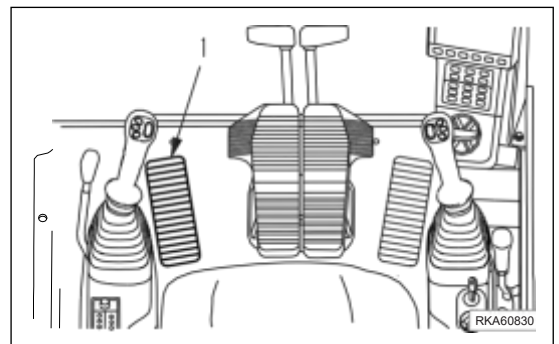
2-PIECE BOOM COMPONENTS



- (1) Arm
- (2) Second boom
- (3) Second boom adjust cylinder
- (4) First boom raise cylinder
- (5) First boom

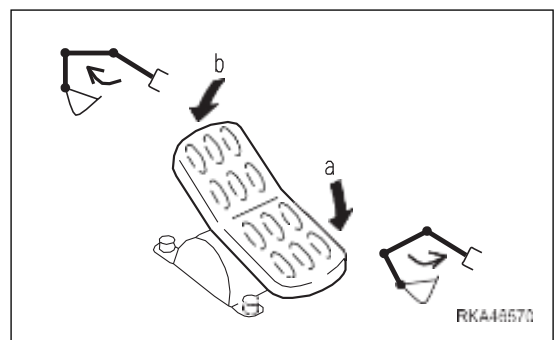
2-PIECE BOOM CONTROL PEDAL

The 2-piece boom control pedal is situated at the left of travel levers.



It controls the extension and folding of the 2-piece boom according to the movements indicated.

- (a) Boom folding
- (b) Boom extension
- N (Neutral): boom at rest.



METHOD FOR LUBRICATING 2-PIECE BOOM

NOTICE

Perform greasing every 500 hours.

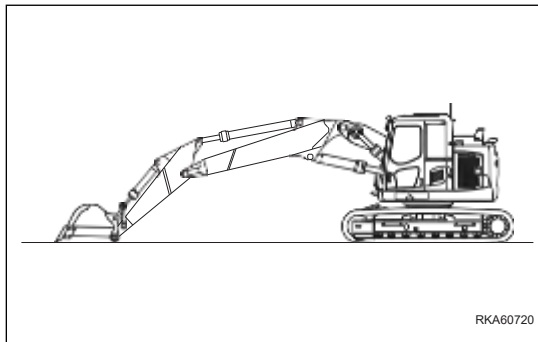
If any unusual noise is generated from any greasing point, perform greasing regardless of the greasing interval.

Perform greasing every 10 hours for the first 50 hours operation on a new machine.

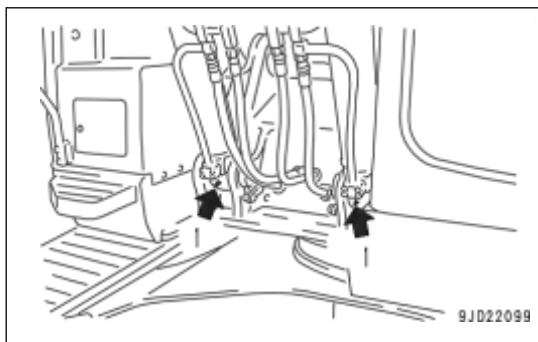
After the machine is subjected to digging work in the water, be sure to grease the wet pins.

Set the machine to the greasing posture shown on the figure, lower the work equipment to the ground, and stop the engine.

By using a grease pump, pump in grease through the grease fittings shown by arrows.



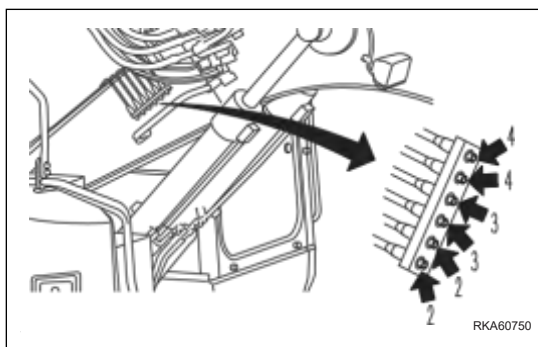
(1) Boom cylinder foot pin (2 places)



(2) Boom foot pin (2 places)

(3) Boom cylinder rod end pin (2 places)

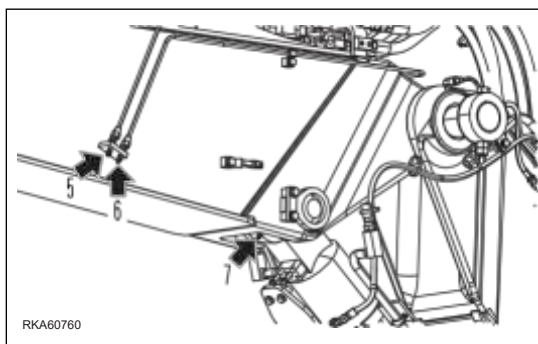
(4) 2-piece boom pin (2 places)



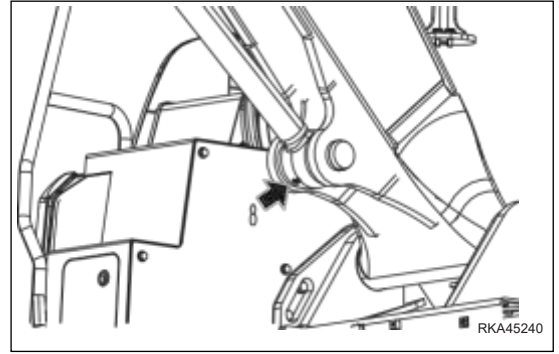
(5) Arm cylinder foot pin (1 place)

(6) 2-piece boom pin central (1 place)

(7) 2-piece boom cylinder foot pin (1 place)



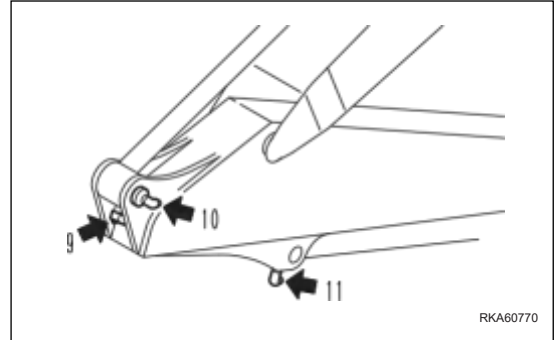
(8) 2-piece boom cylinder rod end pin (1 place)



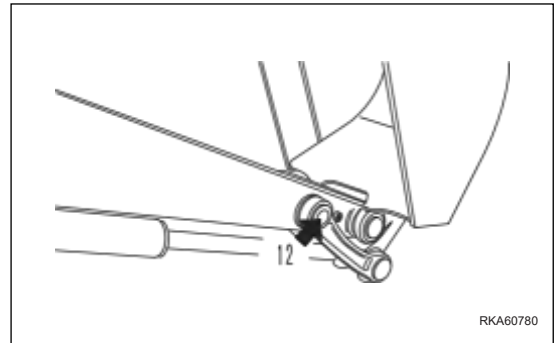
(9) Boom and arm connection pin (1 place)

(10) Arm cylinder rod end pin (1 place)

(11) Bucket cylinder foot pin (1 place)



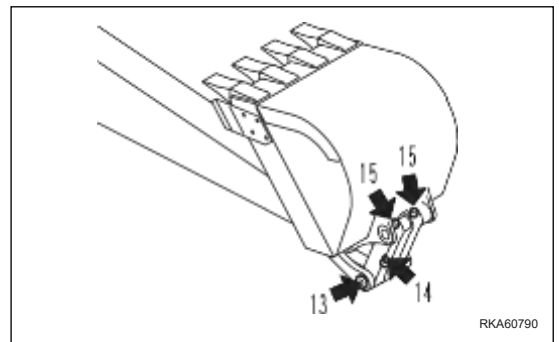
(12) Arm-link connection pin (1 place)



(13) Link connection pin (1 place)

(14) Bucket cylinder rod end pin (1 place)

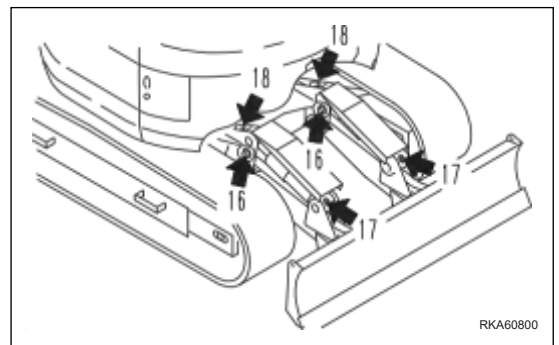
(15) Bucket and link connection pin (2 places)



(16) Blade connection pin (2 places)

(17) Blade cylinder foot pin (2 places)

(18) Blade cylinder rod end pin (2 places)

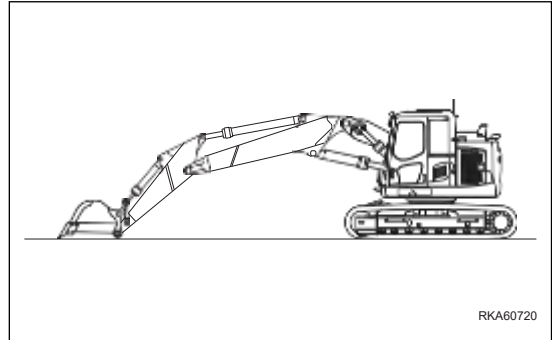


PREPARATION FOR STORAGE AND LIFTING MACHINE

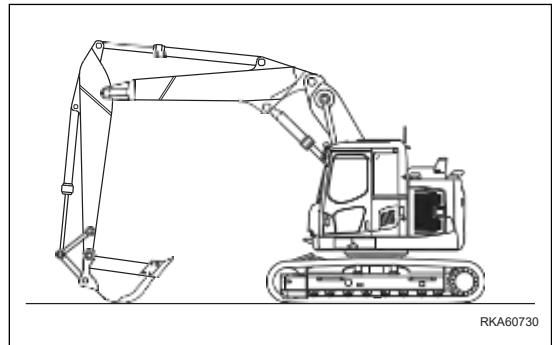
Preparation for storage machine

When leaving the operator's cab, set the machine in the following posture for safety reason.

When leaving the machine for a long time.



When leaving the machine for a short time.



Preparation for lifting machine

WARNING

Do not operate the adjust cylinder during lift operations as work equipment may move suddenly and cause serious damage.

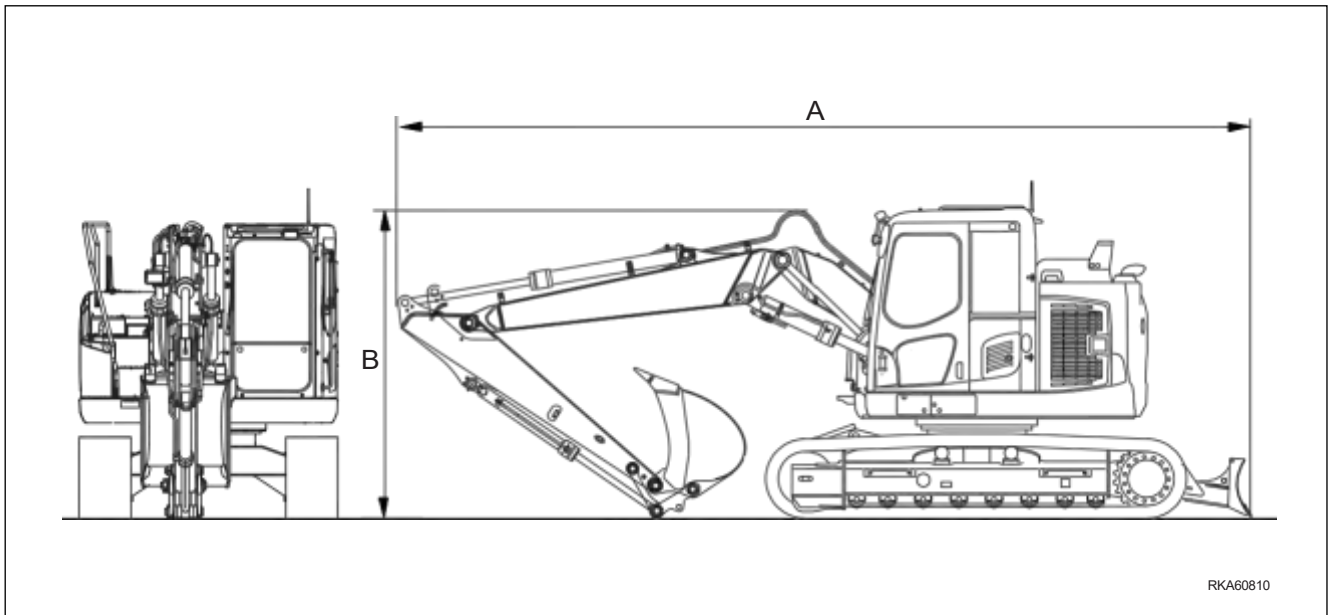
When the second boom adjust cylinder is retracted, the bucket or attachment can hit the operator's cab or revolving frame.

Operate work equipment slowly and carefully to avoid any injury and damage.

Recommended posture during lifting operations is with adjust cylinder fully retracted.

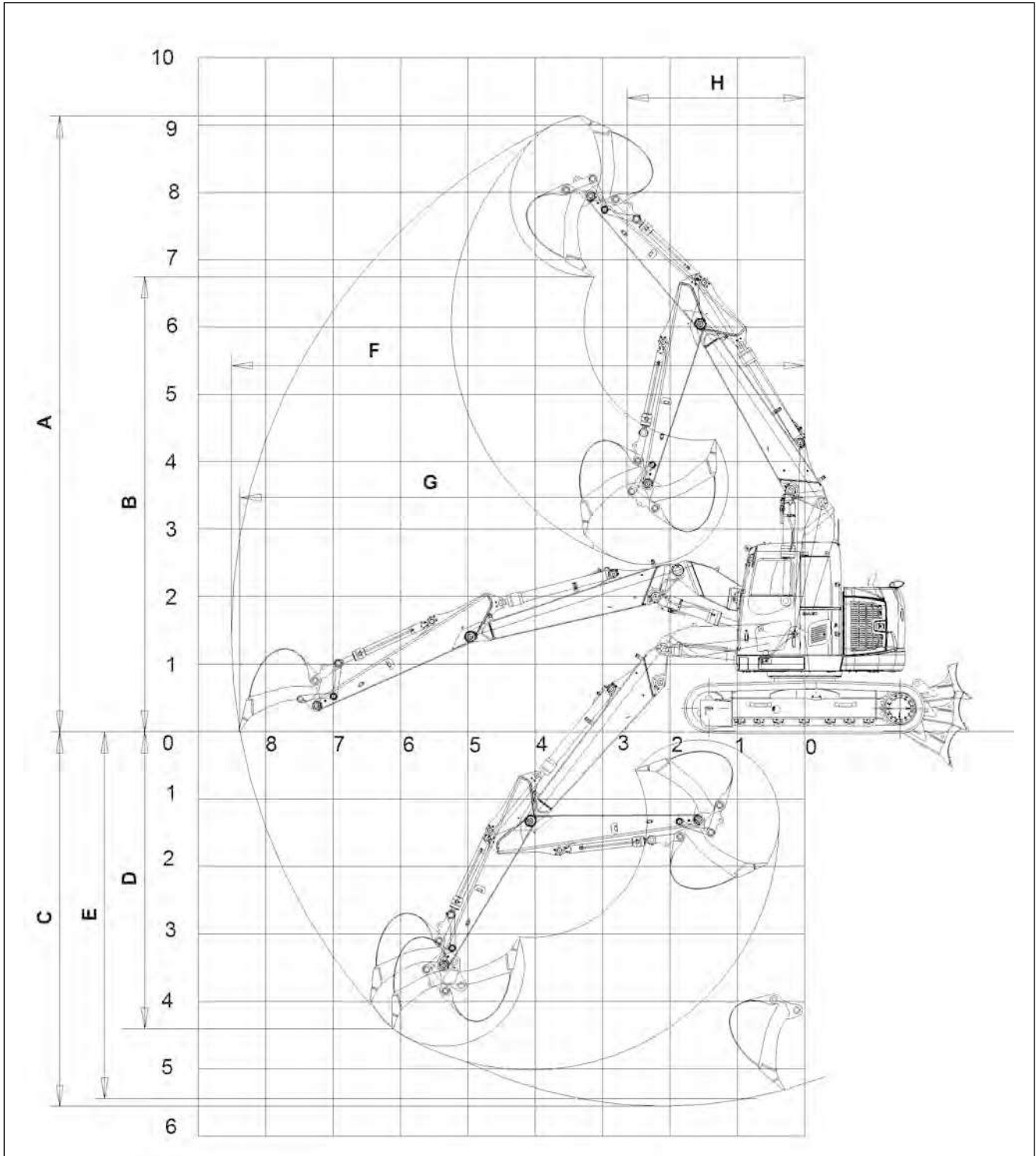


SPECIFICATIONS



RKA60810

	Item	Unit	2500 mm arm specification
A	Overall length	mm	8100
B	Overall height	mm	3050



	Working ranges (mm)	Unit	2500 mm arm specification
A	Max. digging height	mm	9130
B	Max. dumping height	mm	6750
C	Max. digging dept	mm	5680
D	Max. vertical wall digging depth	mm	4440
E	Max. digging depth of cut for 2440 mm level	mm	5570
F	Max. digging reach	mm	8510
G	Max. digging reach at ground level	mm	8380
H	Min. swing radius	mm	2500

EXPLANATION OF LIFT CAPACITY CHART



WARNING

The excavator used in handling operations must conform with current local regulations and be equipped with safety valves and an overload alarm in compliance with EN 474-5.

Legend

A: Reach from swing centre

B: Bucket hook height

(1) Position of lifting point

(2) Arm length

(3) Boom length

(4) Hydraulic pressure: 34.8 MPa

Working conditions

- Bucket: 400 kg
- Width shoe: 500 mm
- With fully extended bucket cylinder.
- On a compact horizontal level ground.
- If object handling is performed with other tool installed, the weight difference of the tool shall be deducted from value of this table.

Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (* load limited by hydraulic capacity rather than tipping).

34.8 MPa

kg

4767

L	A \ B	kg											
		MAX		7.5m		6.0m		4.5m		3.0m		1.5m	
2.5m	7.5m	* 2500	* 2500										
	6.0m	* 2050	* 2050					* 3100	* 3100				
	4.5m	* 1900	1550			2750	2050	* 3350	* 3350				
	3.0m	1800	1300			2700	1950	* 4100	3250	* 5850	* 5850		
	1.5m	1700	1200	1700	1200	2550	1850	4200	3000				
	0.0m	1700	1200	1700	1200	2450	1750	4000	2800				
	-1.5m	1900	1350			2400	1700	3900	2700	* 7500	4800		
	-3.0m	2400	1700			2450	1700	3900	2700	* 7450	5300		
	-4.5m												
	-4.5m												
2.1m	7.5m	* 3200	* 3200										
	6.0m	* 2500	2350					* 3500	* 3500				
	4.5m	* 2350	1700			2700	2000	* 3700	3450				
	3.0m	2000	1450			2650	1950	4350	3200	* 6550	6300		
	1.5m	1850	1350			2550	1850	4150	2950				
	0.0m	1900	1350			2450	1750	3950	2750				
	-1.5m	2150	1500			2450	1750	3900	2700	* 7750	4650		
	-3.0m	2800	2000					3950	2750	* 6850	5400		
	-4.5m												

RKA60820

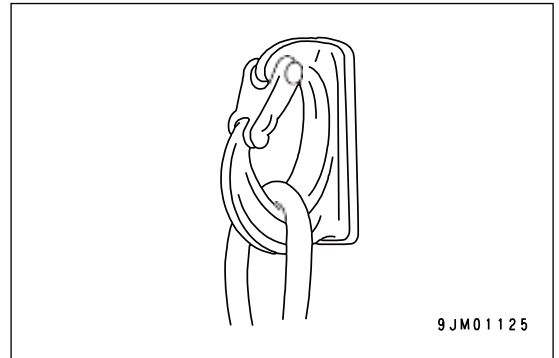
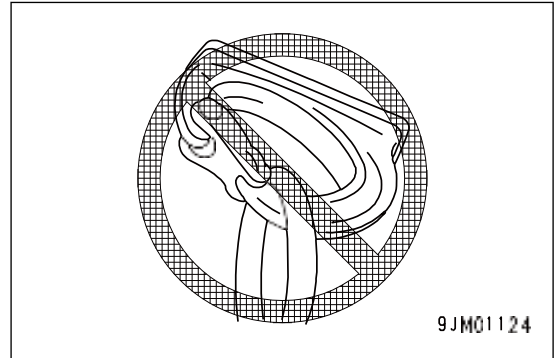
HANDLE BUCKET WITH HOOK

When using the bucket with hook, check that there is no damage to the hook, stopper, or hook mount. If there is any problem, ask your Komatsu distributor.

PRECAUTIONS FOR OPERATION

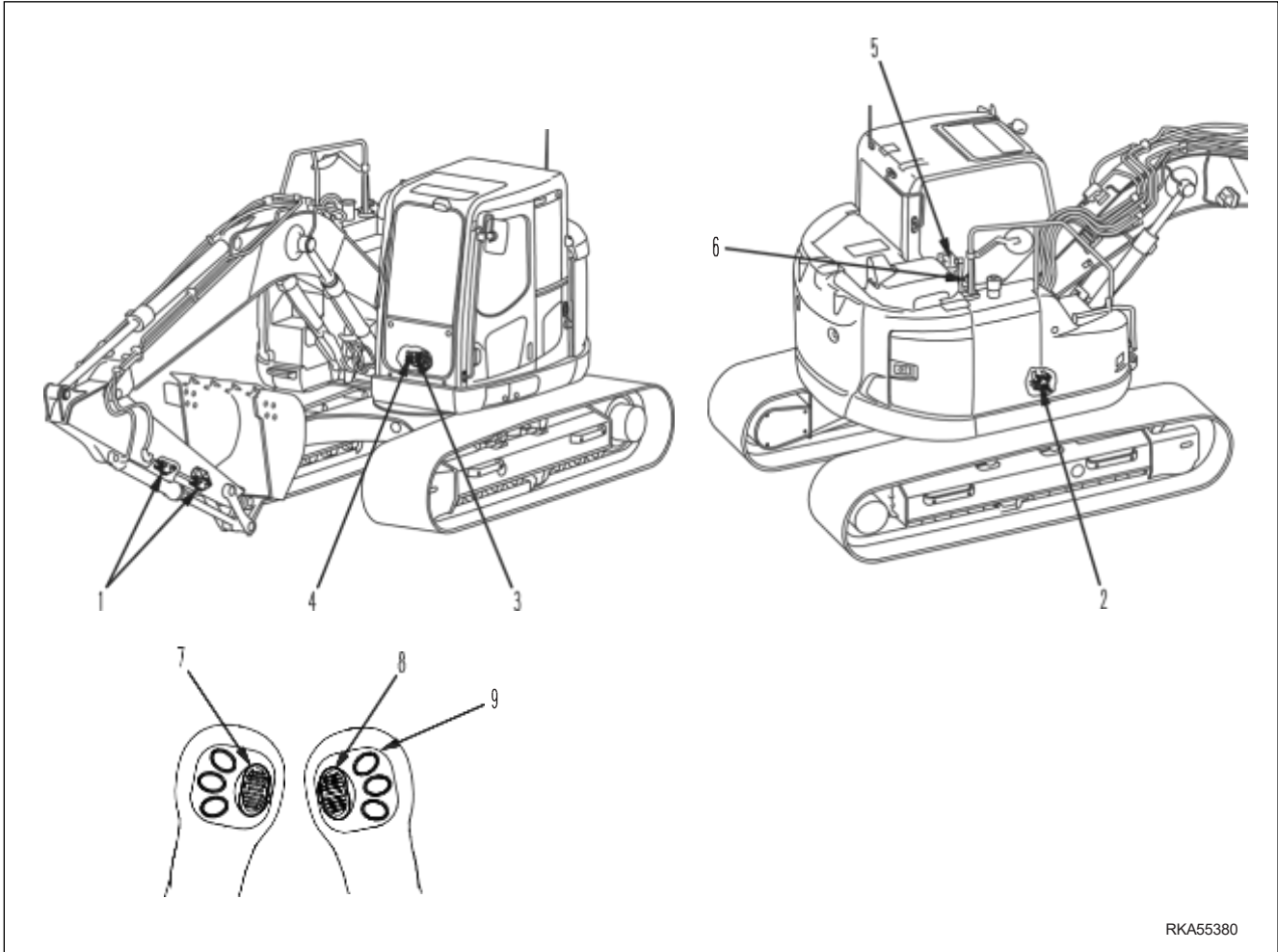
PRECAUTIONS FOR LIFTING OPERATIONS

- During lifting operations, reduce the engine speed and perform the operation in L mode.
- Depending on the posture of the work equipment, there is a danger that the wire or load may slip off the hook. Always be careful to maintain the correct hook angle to prevent the slipping-off.
- Never drive the machine while lifting a load.
- If the bucket with hook is turned 180 deg. and used for operations, it will hit the arm during the bucket DUMP operation. Be careful when using it.
- If you are planning to newly install a hook, ask your Komatsu distributor for installation.



HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT

EXPLANATION OF COMPONENTS



RKA55380

- (1) Stop valve
- (2) Selector valve
- (3) Attachment control pedal
- (4) Lock pin
- (5) Additional filter for breaker
- (6) Accumulator (for low pressure)
- (7) 2nd attachment proportional switch
- (8) 1st attachment proportional switch
- (9) Breaker switch

STOP VALVE

The stop valve stops the flow of the hydraulic oil.

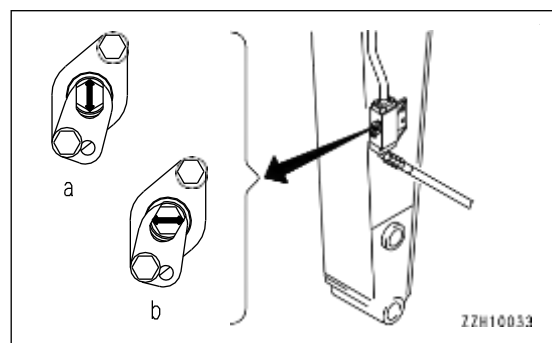
(a) FREE

Hydraulic oil flows.

(b) LOCK

Hydraulic oil stops.

When removing or installing attachments, set this valve to LOCK position.



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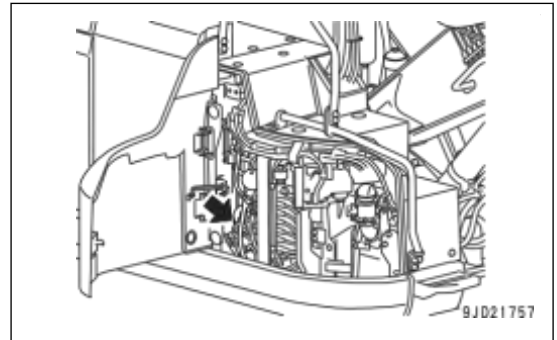
SELECTOR VALVE

The selector valve switches the flow of the hydraulic oil.

It is automatically switched according to the selected working mode. It is necessary to switch the working mode to match the attachment that is installed. When changing the working mode, see "METHOD FOR SWITCHING HYDRAULIC CIRCUIT (6-20)".

NOTICE

If a service circuit from the attachment manufacturer is added, the return circuit may not switch automatically.



ATTACHMENT CONTROL PEDAL

WARNING

If you perform operations with your foot on the pedal, the attachment may suddenly move if you depress the pedal by mistake, and this may lead to serious personal injury or death. Lock the pedal with the lock pin when pedal operation is not necessary.

The attachment control pedal is used to control the attachment.

When the front, center (neutral), and rear of the pedal are depressed, the movement of the attachment is as follows.

Hydraulic breaker

Front of pedal (A)

Actuated

Center of pedal (neutral) (N)

Stop

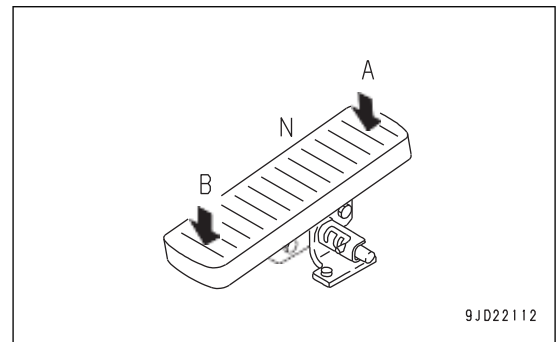
Rear of pedal (B)

Stop

REMARK

Regarding other attachments, discuss with the attachment manufacturer how the pedal and attachment operate at the time of installation before using it.

Before start using the attachment, make sure that the attachment operates normally.



LOCK PIN

The lock pin is used to lock the attachment control pedals.

Position (a)

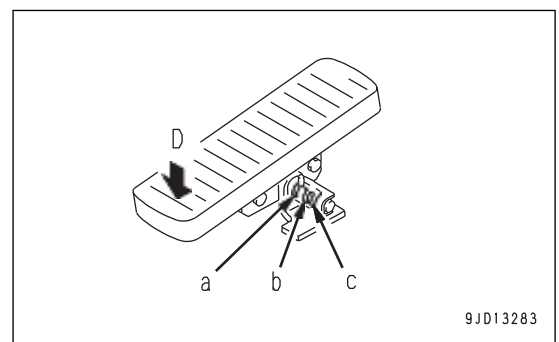
Lock

Position (b)

Only front of pedal can be operated to full travel position (rear is locked)

Position (c)

Both front and rear of pedal can be operated to full travel position



- Set the lock pin to (a) position except when using the attachment.
- When using the breaker, use the working mode selector switch on the monitor switch portion to set the working mode to B mode, and set the lock pin to position (b) when using the pedal.

- When using the crusher, use the working mode selector switch on the monitor switch portion to set the working mode to ATT mode, and set the lock pin to position (c) when using the pedal.

NOTICE

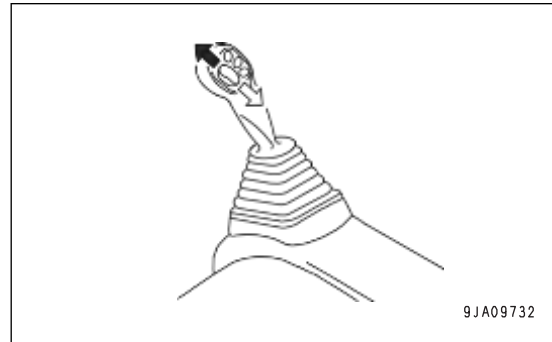
- **When using the breaker, if the lock pin is set to position (c) and the pedal is depressed in direction (D), it will cause damage or defective operation of the breaker. To prevent it, when using the breaker, always set the lock pin to position (b).**
- **Before changing the position of the lock pin, stop the engine.**

ATTACHMENT 1 PROPORTIONAL SWITCH

Operate the 1st-line attachment proportional switch when using general attachments.

You can increase or decrease the flow rate by controlling the switch stroke.

The attachment does not operate unless the attachment mode is set on the machine monitor.

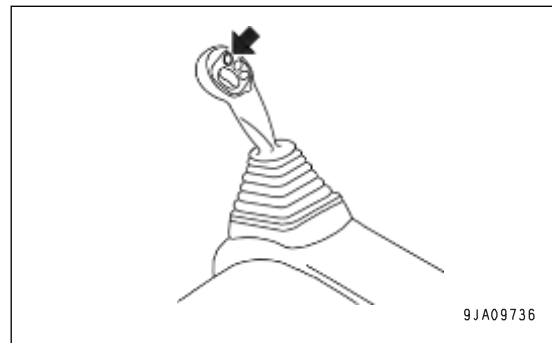


BREAKER OPERATION SWITCH

The breaker operation switch is used to operate the breaker.

If this switch is pushed, the breaker operates.

The breaker does not operate unless the breaker mode is set on the machine monitor.



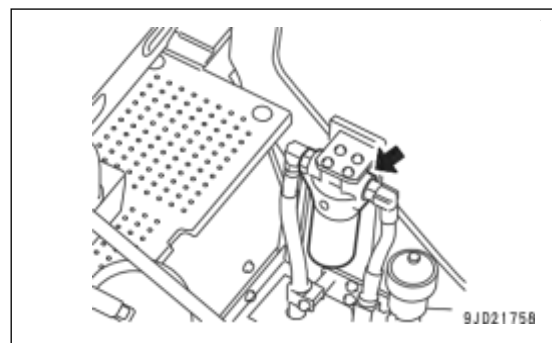
ADDITIONAL FILTER FOR BREAKER

NOTICE

Always install an additional filter in the return circuit on machines equipped with a hydraulic breaker.

The additional filter for breaker prevents deterioration of the hydraulic oil when using a breaker.

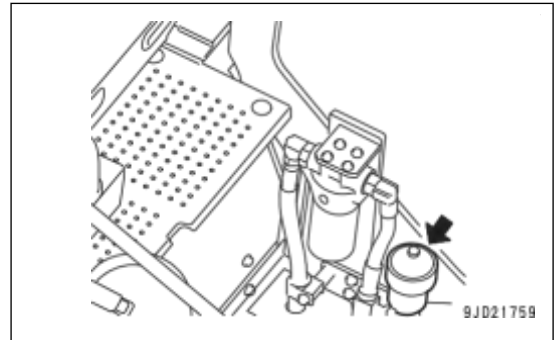
It is automatically switched according to the selected working mode. It is necessary to switch the working mode to match the attachment that is installed. The oil flows only when the selector valve is set in the breaker position.



ACCUMULATOR (FOR LOW PRESSURE)

The accumulator (for low pressure) is installed to protect the oil cooler when the breaker is used.

For necessity of this accumulator, consult the attachment manufacturer.



ATTACHMENT 2 PROPORTIONAL SWITCH

Proportional control rolling switch.

The 2nd-line attachment proportional switch operates the 2nd attachment circuit (e.g. clamshell rotation). The 2nd-line attachment proportional switch is a roller proportional control switch. Rolling the switch up produces rotation in one direction, rolling down produces rotation in the opposite direction. Slight movement of the roller will give slight movement of the clamshell; full movement of the roller will give faster movement of the clamshell.

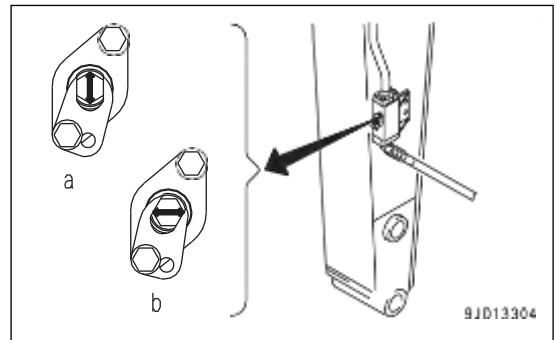


METHOD FOR CHANGING OVER AND CONNECTING HYDRAULIC CIRCUIT OF MACHINES READY FOR INSTALLATION OF ATTACHMENT

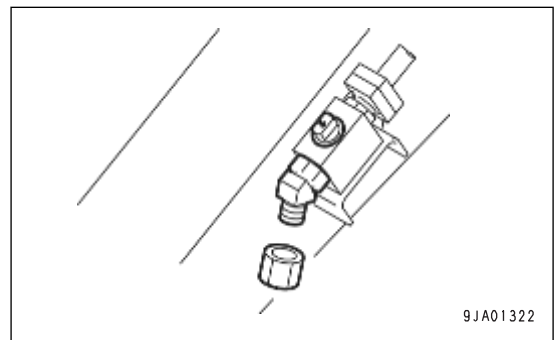
METHOD FOR CONNECTING HYDRAULIC CIRCUIT

When installing the attachment, connect the hydraulic circuit as follows.

1. Check that the rotor of the stop valve installed to the piping for the inlet port and the outlet port on the side face of the arm is at LOCK position (b).
 - (a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)
 - (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)

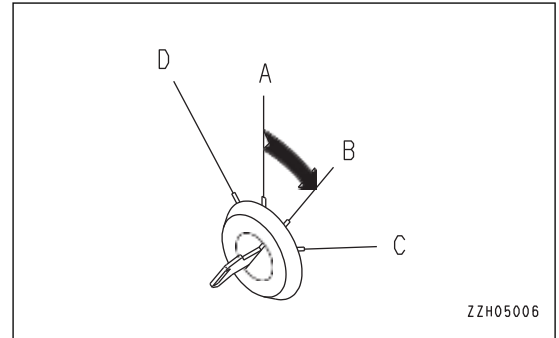


2. Remove the plug from the stop valve.
Be careful not to lose or damage the removed parts.

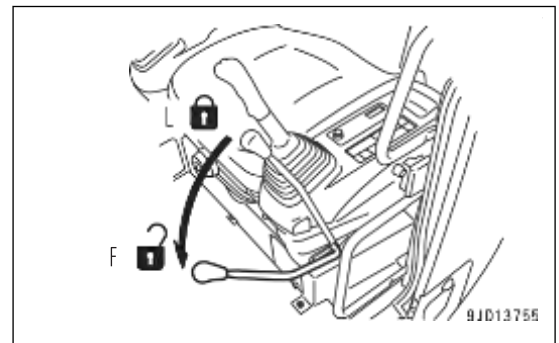


METHOD FOR REMOVING ATTACHMENT

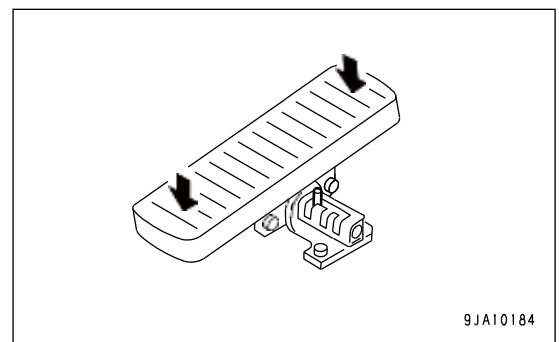
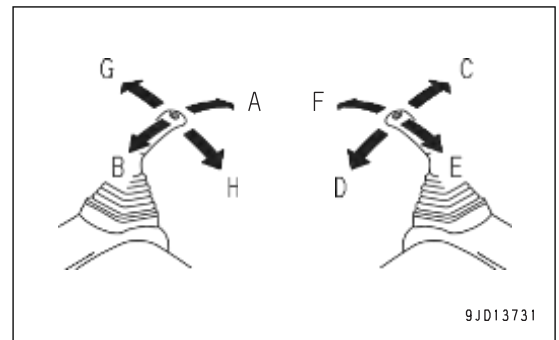
1. Lower the attachment to the ground and stop the engine.
2. Turn the starting switch to ON position (B).



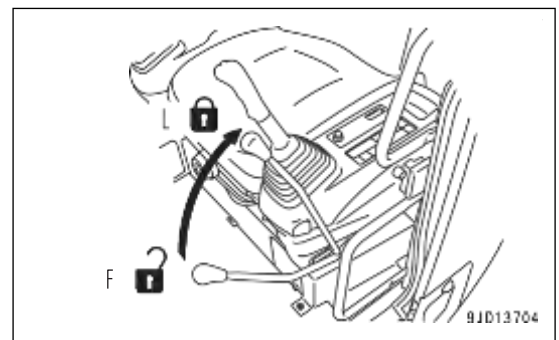
3. Set the lock lever to FREE position (F).



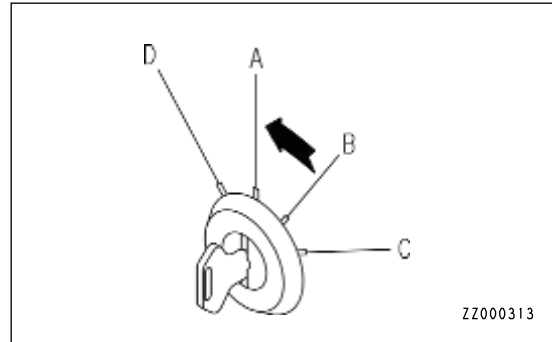
4. Operate each control lever (work equipment, travel) and attachment control pedal fully in each direction within 15 seconds after the engine is stopped to release the internal pressure in the hydraulic circuit.



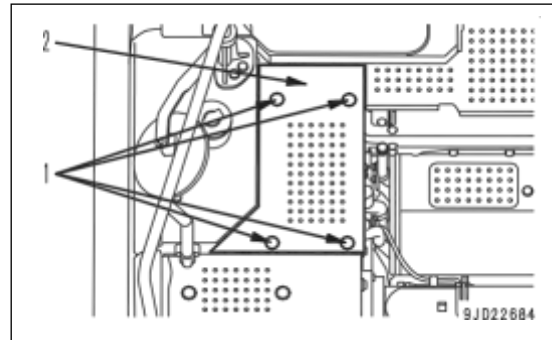
5. Set the lock lever to LOCK position (L).



6. Turn the starting switch to OFF position (A).



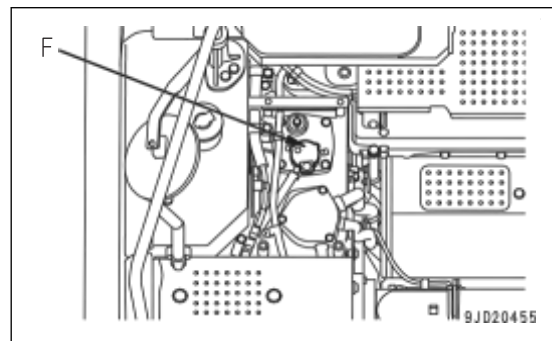
7. Remove the bolts (1) (4 pieces), and open hydraulic tank top cover (2).



8. Remove the cap of oil filler port (F) gradually to release the internal pressure.

9. Remove the cap of oil filler port (F).

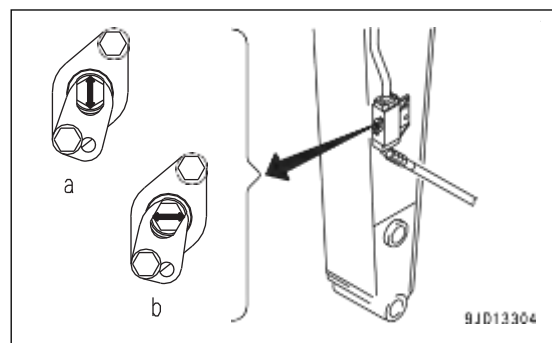
10. Check that the hydraulic oil temperature is low.



11. Set the rotor of the stop valve installed to the piping for the inlet port and the outlet port on the side face of the arm to LOCK position (b).

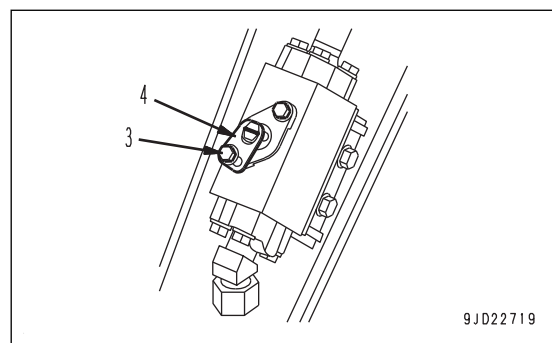
(a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)

(b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)



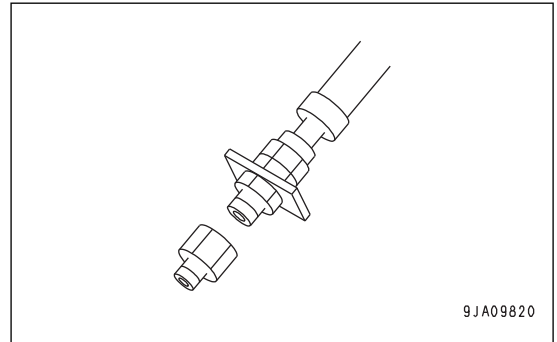
Perform the FREE or LOCK setting of the stop valve rotor according to the following procedure.

- 1) Remove the bolt (3).
- 2) Invert the plate (4), turn the rotor, and set it to FREE or LOCK position.
- 3) Install the plate (4) with bolt (3).



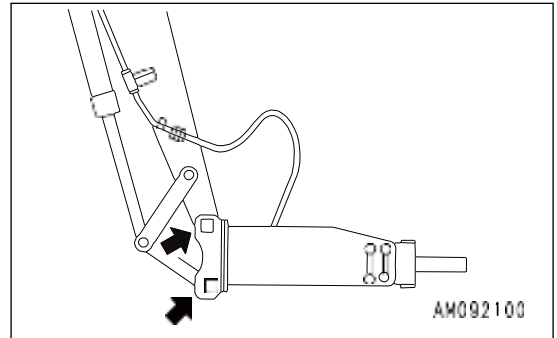
12. Remove the hoses on the attachment side. Install the plugs to outlets (2 places).

The plugs are used to prevent the attachment from making incorrect operation caused by mixing in of foreign matter. After the plugs are correctly installed, store the attachment.



13. Pull out the mounting pins (2 places), remove the attachment, then install the bucket.

For the installation procedure of the bucket, see "METHOD FOR REPLACING AND INVERTING BUCKET (3-189)".

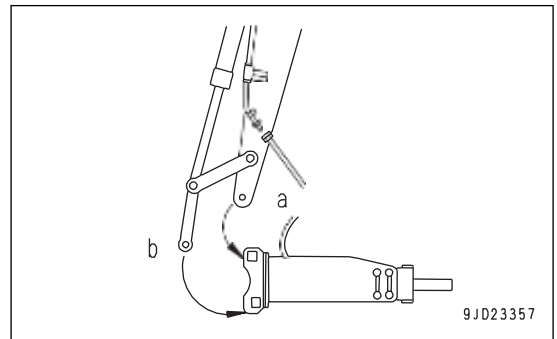


After installing the bucket, check the oil level in the hydraulic tank.

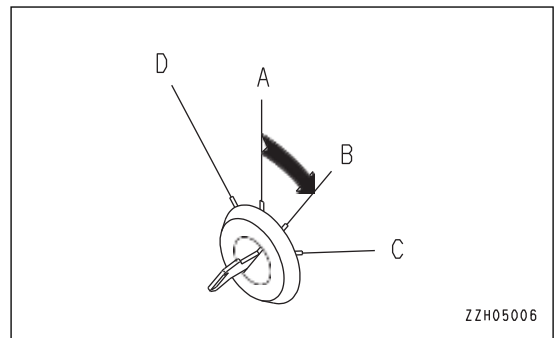
METHOD FOR INSTALLING ATTACHMENT

1. Remove the bucket.

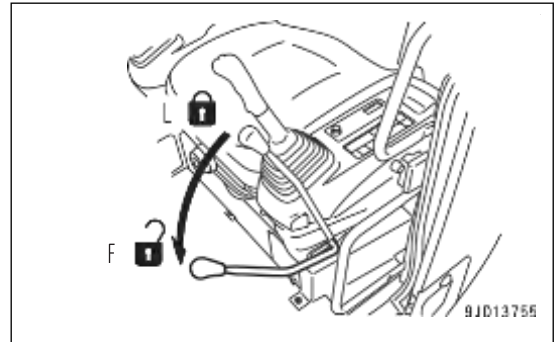
For the removal procedure of the bucket, see "METHOD FOR REPLACING AND INVERTING BUCKET (3-189)".
2. Place the attachment on a horizontal place, install pin (a) and then pin (b) in this order to the arm.
3. Lower the attachment to the ground and stop the engine.



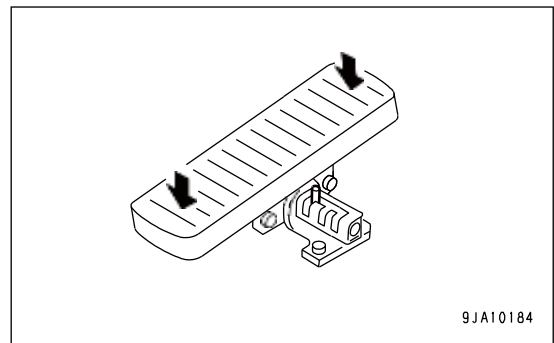
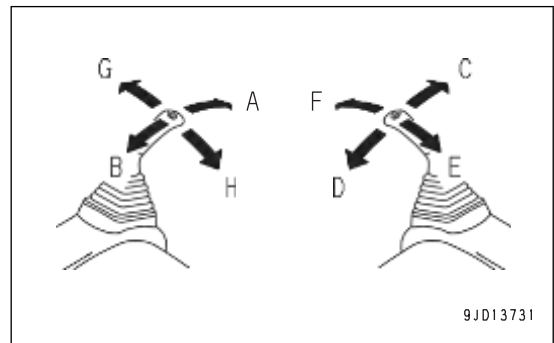
4. Turn the starting switch to ON position (B).



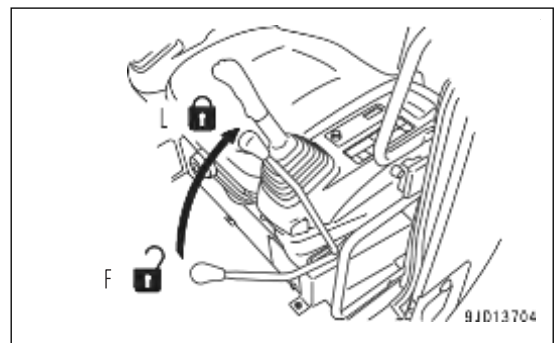
- Set the lock lever to FREE position (F).



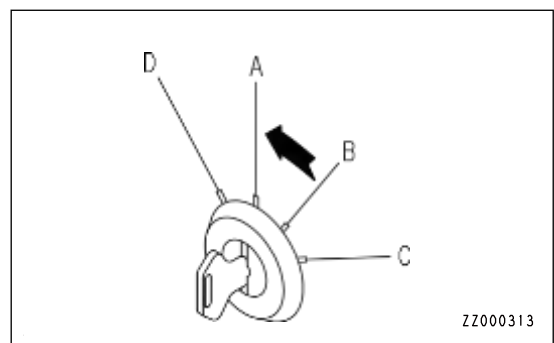
- Operate each control lever (work equipment, travel) and attachment control pedal fully in each direction within 15 seconds after the engine is stopped to release the internal pressure in the hydraulic circuit.



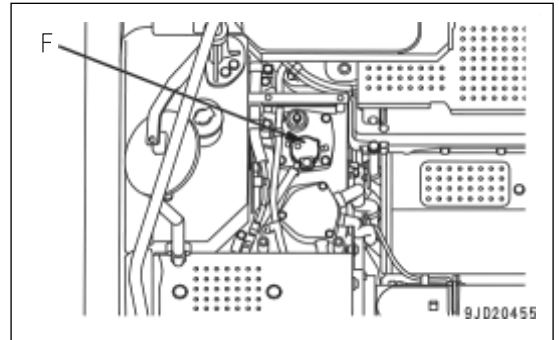
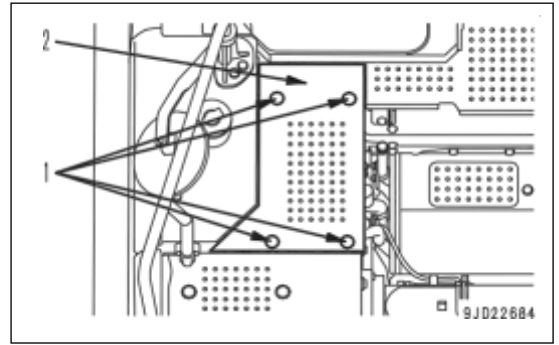
- Set the lock lever to LOCK position (L).



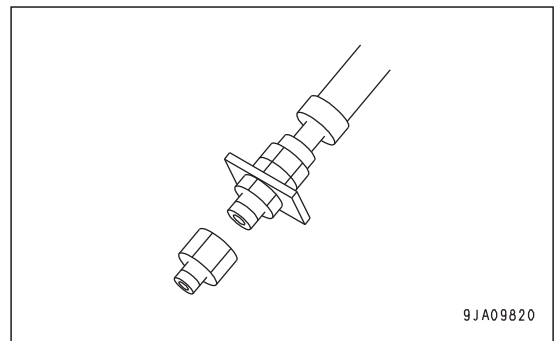
- Turn the starting switch to OFF position (A).



9. Remove the bolts (1) (4 pieces), and open the hydraulic tank top cover (2).
10. Remove the cap of oil filler port (F) gradually to release the internal pressure.
11. Remove the cap of oil filler port (F).
12. Check that the hydraulic oil temperature is low.



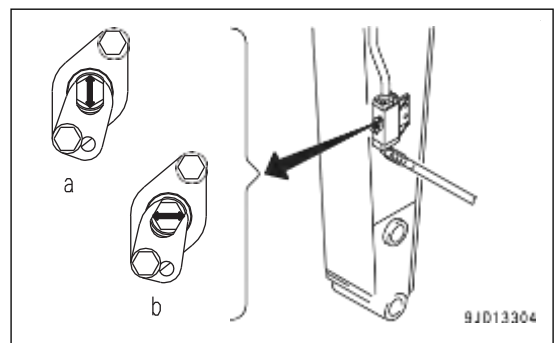
13. Remove the plugs (2 places) at the outlet and inlet.
Be careful not to get any dirt or mud on the hose fitting.
If O-ring is damaged, replace it with a new one.
14. Connect the hose on the attachment side.
Check the direction of flow of the oil and be careful not to make any mistake.



15. Set the rotor of the stop valve installed to the piping for the inlet port and the outlet port on the side face of the arm to FREE position (a).

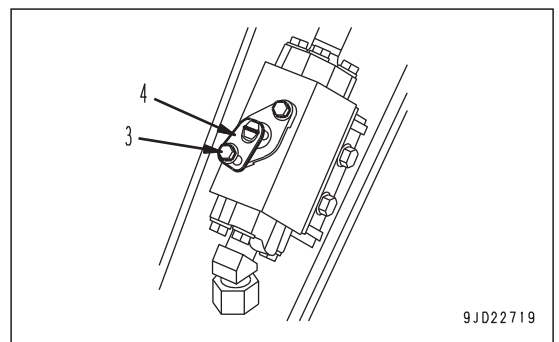
(a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)

(b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)



Perform FREE or LOCK setting of the stop valve rotor according to the following procedure.

- 1) Remove bolt (3).
- 2) Invert the plate (4), turn the rotor, and set it to FREE or LOCK position.
- 3) Install the plate (4) with bolt (3).



After installing the attachment, check the oil level in the hydraulic tank.

METHOD FOR OPERATING ATTACHMENT

WARNING

- If the travel levers or travel pedals are operated when the engine speed is decreased by the auto-deceleration function, the engine speed will suddenly increase. Be careful.
- If you perform operations with your foot on the pedal, the attachment may suddenly move if you depress the pedal by mistake, and this may lead to serious personal injury or death. Do not rest your foot on the pedal except when you operate the pedal.
- When the attachment is not used, set the lock pin of the pedal to LOCK position to prevent the pedal from being operated.

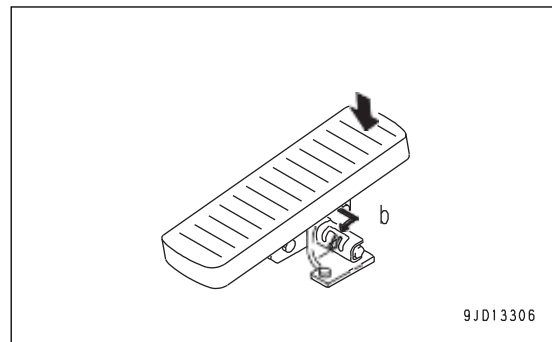
For the change of the flow setting for the breaker mode and attachment mode for the crusher, etc., see “MACHINE SETTINGS (3-66)”.

METHOD FOR OPERATING BREAKER

NOTICE

When performing breaker operations, use the breaker mode. If the breaker is used without using the breaker mode, the breaker may be damaged. Note that you cannot operate the breaker in P, E, and L modes.

1. Set only the front portion of the lock pin to FREE position (b).
2. Depress the front of the attachment control pedal.



The breaker operates.

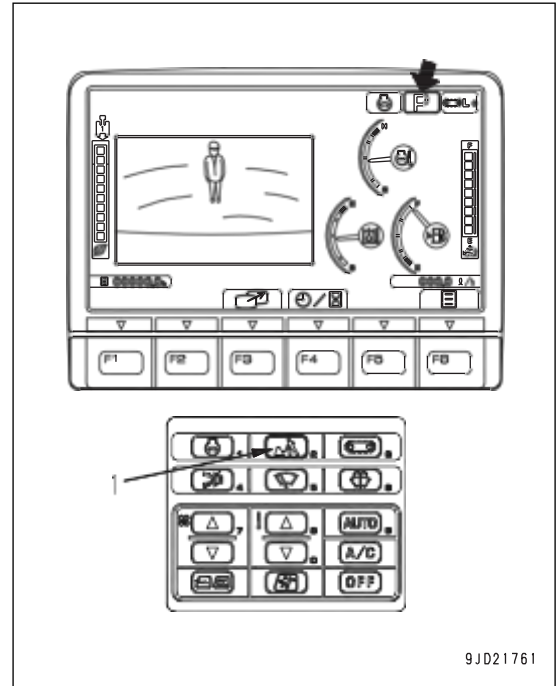
METHOD FOR OPERATING MACHINE WHEN WORKING MODE IS NOT IN BREAKER MODE

WARNING

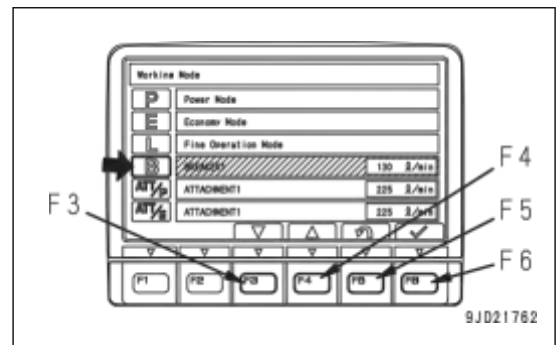
When a special attachment is installed, if the mode is switched to the Breaker Mode by mistake, it may lead to serious danger, such as sudden drop of the work equipment.

If the breaker mode is not indicated as the working mode, enter the breaker mode according to the following procedure.

1. Press working mode selector switch (1).
The screen changes to Working Mode screen.



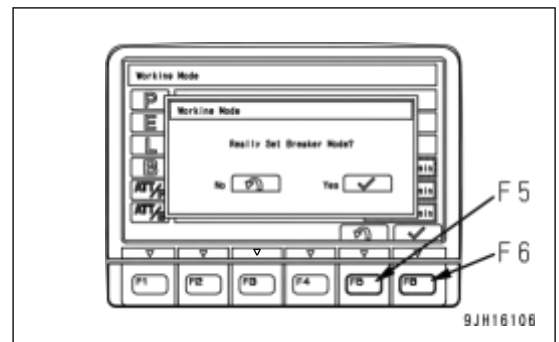
2. Press working mode selector switch (1) or press switches F3 or F4 to select Breaker Mode B.



3. With breaker mode B highlighted in yellow, do one of the following to enter the selection.
 - To keep working mode selector switch (1) pressed
 - To press switch F6.
 - To leave as it is for 5 seconds.

If you enter the selection of the Breaker Mode, the confirmation message is displayed.

4. Press switch F6 to enter the Breaker Mode.



CHECK POINTS WHEN USING BREAKER

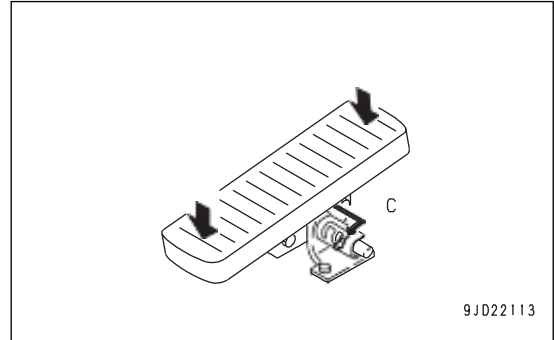
- Is the stop valve in FREE position?
- Is the working mode set to B mode?
- Do you replace the hydraulic oil and its filter element at intervals shorter than the standard?
The deterioration of the hydraulic oil when using the breaker is much faster than in the normal operations, so check the maintenance time with "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-12)".

When considering whether it is necessary to install an accumulator for the attachment circuit, contact the attachment manufacturer and then decide.

When handling the breaker, follow the instruction manual from the breaker manufacturer and use the breaker correctly.

METHOD FOR OPERATING GENERAL ATTACHMENT SUCH AS CRUSHER ETC

1. Set the working mode to ATT/P or ATT/E mode.
2. Set both front and rear lock pins to FREE position (c).
3. Depress the front or rear side of the pedal.

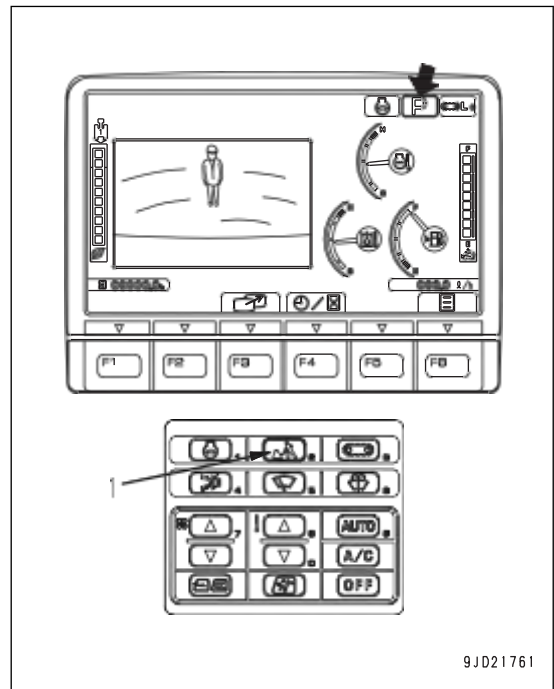


The attachment operates.

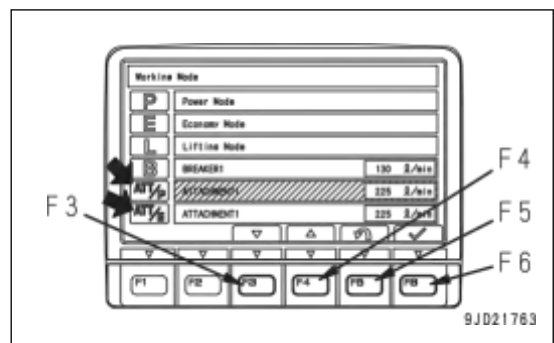
METHOD FOR OPERATING WHEN WORK MODE PILOT DISPLAY DOES NOT SHOW EITHER ATT/P OR ATT/E OF ATTACHMENT MODE

If the attachment mode is not indicated as the working mode, enter the attachment mode according to the following procedure.

1. Press working mode selector switch (1).
The screen changes to Working Mode screen.



2. Press working mode selector switch (1) or switch F3 or F4 to select Attachment Mode ATT/P or ATT/E.
3. With Attachment Mode ATT/P or ATT/E highlighted in yellow, enter the selection by either of the following operations.
 - 1) To keep working mode selector switch (1) pressed.
 - 2) To leave as it is for 5 seconds.
 - 3) To press switch F6.



REMARK

Even if P, E, or L mode is selected, the attachment is not operated.

When using the Attachment Mode, check that the Attachment Mode is active before starting operations.

On Attachment Setting of the user menu, it is possible to make the attachment mode inactive.

CHECK POINTS WHEN USING GENERAL ATTACHMENT SUCH AS CRUSHER ETC

- Is the stop valve in FREE position?
- Is the working mode ATT/P or ATT/E?

When handling the attachment, follow the instruction manual from the manufacturer and use the attachment correctly.

LONG-TERM STORAGE**NOTICE**

If there is no breaker or general attachment installed, operating the pedal may cause overheating and other problems.

If the equipment is not to be used for a long time, do as follows.

- Set the stop valve in LOCK condition.
- Install the plugs to the piping end of the stop valve.
- Set the selector valve to the position for general attachment such as crusher.
- Set the lock pin in LOCK position.

SPECIFICATIONS**Hydraulic specifications**

- Max. flow at merge: 121 x 2 l/min
- Cracking pressure of safety valve of service valve: 24.5 MPa (Other than B mode)
- Cracking pressure of safety valve of service valve: 17.2 MPa (B mode)

ATTACHMENTS AND OPTIONS

WARNING

- Read the instruction manual for the attachment and the sections of this manual related to attachments and options.
- Installing any attachment or optional equipment is related to the safety issue. Contact your Komatsu distributor before installing.
- Installing attachments or optional equipment without consulting your Komatsu distributor may not only cause problems with safety, but may also have an adverse effect on the operation of the machine and the life of the equipment.
- Any personal injuries, product failures, physical loss or damage resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.

INSTALL ATTACHMENT

WARNING

Depending on the type or combination of work equipment, there is a danger that the work equipment may hit the cab or machine body.

When using unfamiliar work equipment for the first time, check before starting if there is any danger of interference, and operate it with care.

Table of the combination of attachments which can be installed to the standard arm and short circuit arm

○: Can be used

△: Can be used only for light duty work

x: Cannot be used

NOTICE

- When the long arm is equipped, if the bucket is drawn to the machine body, the arm interferes with the body. Operate the long arm carefully.
- When the boom is fully lowered during oblique digging, the boom interferes with the undercarriage. Operate the boom carefully.

Categories of use

Select a proper attachment for each use.

For general digging: Digging or loading sand, gravel, clay etc.

For light duty digging: Digging or loading dry and loose earth and sand, mud etc.

For loading: Loading of dry and loose earth

REMARK

For digging or loading hard soil or soft rock, the reinforced bucket having high durability and wear and abrasion resistance is recommended.

Name	Tooth mounting pin	Capacity m ³ SAE/ CECE	Opening width (Body) mm	Opening width (Side cutter) mm	Use	Standard arm specification	Long arm specification	Short arm specification
Narrow bucket	Vertical	0.18 / 0.16	450	570	Narrow digging	○	○	○

Name	Tooth mounting pin	Capacity m ³ SAE/ CECE	Opening width (Body) mm	Opening width (Side cutter) mm	Use	Standard arm specification	Long arm specification	Short arm specification
Narrow bucket	Vertical Horizontal	0.29 / 0.26	600	720	Narrow digging	○	○	○
Narrow bucket	Vertical Horizontal	0.38 / 0.33	700	820	Narrow digging	○	○	○
Standard bucket	Vertical Horizontal	0.45 / 0.40	833	953	General digging	○	x	○
Reinforced bucket	Vertical Horizontal	0.50 / 0.45	859	979	For heavy digging	○	x	○
Light duty bucket	Vertical Horizontal	0.50 / 0.45	859	979	Loading	○	x	△

TRACK SHOES SELECTION

Select the appropriate track shoe to match the operating conditions.

Track shoe selection

1. Check the ground to work in Use column of Classification by use table, and then check Classification column.

Classification by use

Classification	Use	Precautions when using
A	Rocky ground, riverbeds Normal soil	On rough ground with large obstacles such as boulders or fallen trees, travel at Lo speed.
B	Normal soil Soft ground	These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. Travel at high (Hi) speed only on a flat ground. When it is obliged to drive the machine over an obstacle, drive slowly at low speed (Lo).
C	Extremely soft ground (swampy ground)	Use the shoes only in places where the machine sinks and it is impossible to use A or B shoes. These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. Travel at high (Hi) speed only on a flat ground. When it is obliged to drive the machine over an obstacle, drive slowly at low speed (Lo).
D	Paved road	Flat shoes give low gradeability to the machine, so be careful.
E	Paved road	For protection of the road liner always observe "HANDLE ROAD LINERS (3-217)"

2. Check Classification column in List of shoe specifications and select a suitable shoe for the use.

	Specification	Classification
Standard	600 mm Triple	B
Optional	500 mm Triple	A
Optional	500 mm Flat	E

Precaution for track shoe selection

- Since working conditions “B” and “C” are for wide shoe, their use is limited. Check the precautions for use and the using condition, and then use a suitable shoe.
- When selecting the shoe width, choose the narrowest shoes possible to bring the machine within the range where there is no problem regarding the machine flotation and ground contact pressure. If wider shoes than necessary are used, the load on the shoe will increase. It may cause problems such as bending of the shoe, cracking of the link, damage of the pin, and looseness of the shoe bolts.

RECOMMENDED ATTACHMENT OPERATIONS

The following descriptions are the precautions which must be followed when operating the hydraulic excavator equipped with an attachment.

NOTICE

Select the optimum attachment model for the hydraulic excavator body.

The attachments and models ready for installation differ according to the machine body. For details of the selection of the attachments or the models, consult your Komatsu distributor.

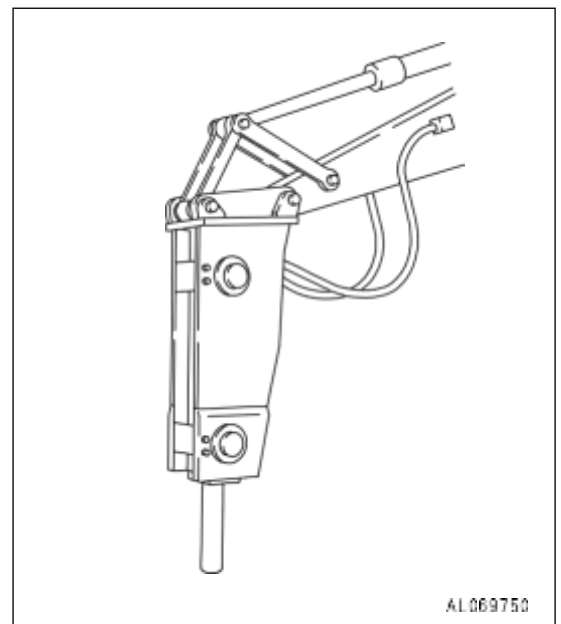
HYDRAULIC BREAKER

Applicable work

Major works suitable to the hydraulic breaker are as follows.

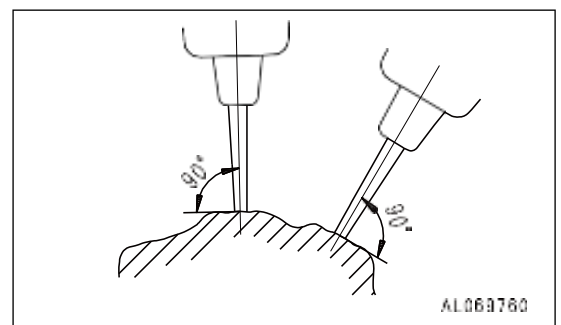
- Crushing rock
- Road construction

This attachment can be used for a wide range of applications including breaking up road surfaces or slag, tunnel work, rock crushing and breaking operations in quarries.

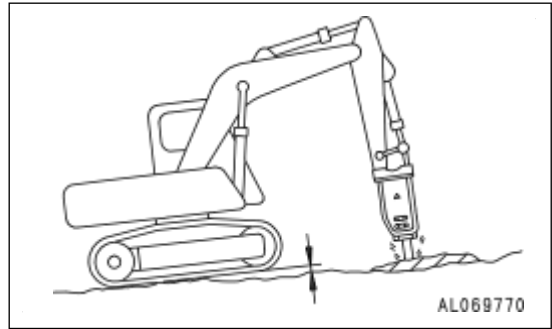


Precautions when performing breaking operations

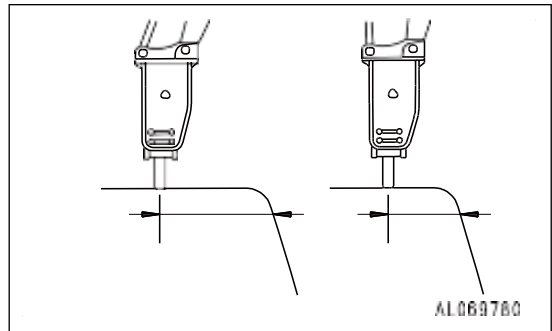
Keep the chisel pushed perpendicularly against the impact surface when performing breaking operations.



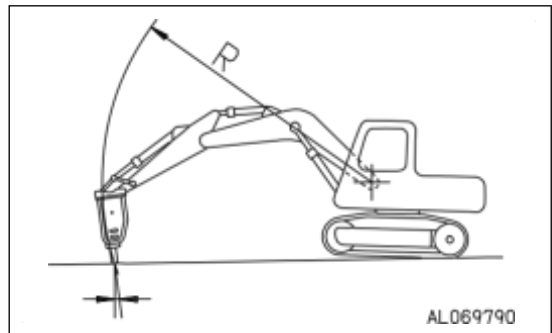
Push the chisel against the impact surface and operate so that the chassis rises approximately 5 cm off the ground. Do not raise it off the ground unnecessarily.



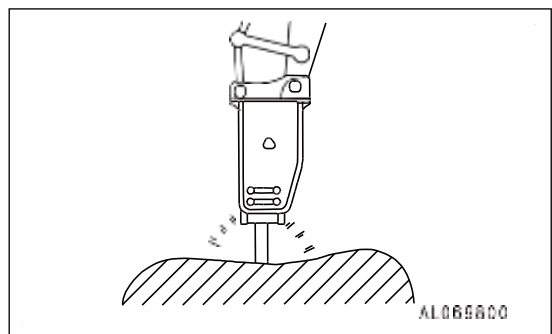
When the chisel does not penetrate or break the surface by continuous impact to the same impact surface for 1 minute, change the point of impact and perform breaking operations by scraping from the edge.



Penetrating direction of the chisel gradually deviates from the direction of the breaker body. Adjust the direction with the bucket cylinder so that it keeps the proper direction.



Always keep the chisel pressed against the impact surface properly not to strike at the air.

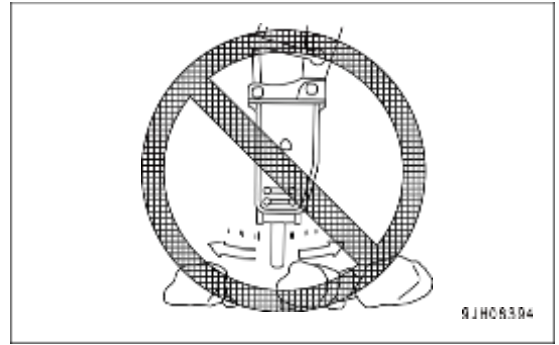


Prohibited operations

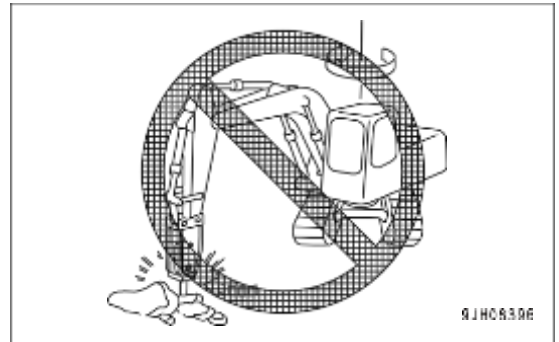
To ensure that the machine has a long life, and to ensure that operations are performed in safety, do not operate the machine in any of the following ways.

Do not operate all cylinders to the end of their strokes. Always leave approximately 5 cm to spare.

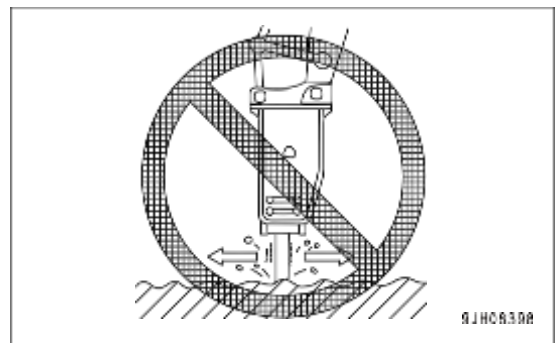
Do not use the mount to gather in pieces of rock.



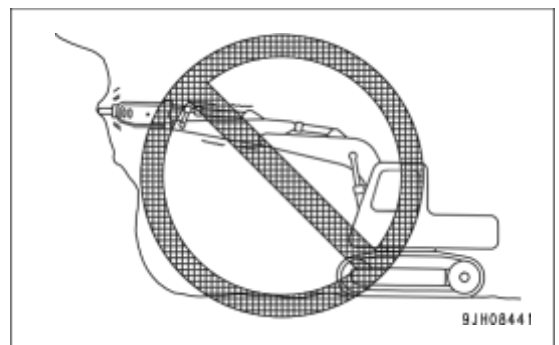
Do not work by using the swing force.



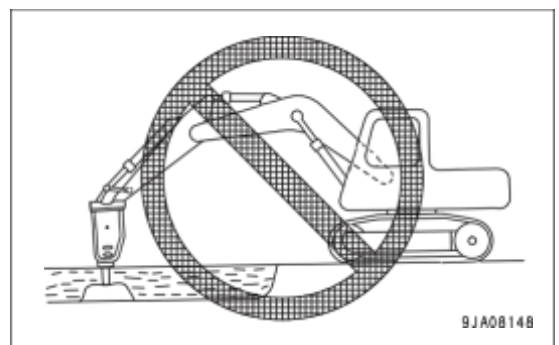
Do not move the chisel while performing breaking operation.



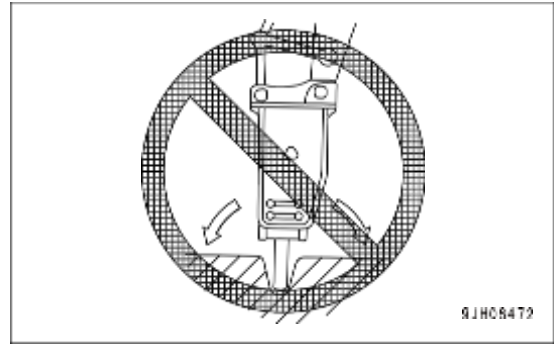
Do not perform breaker operation in horizontal or upward direction.



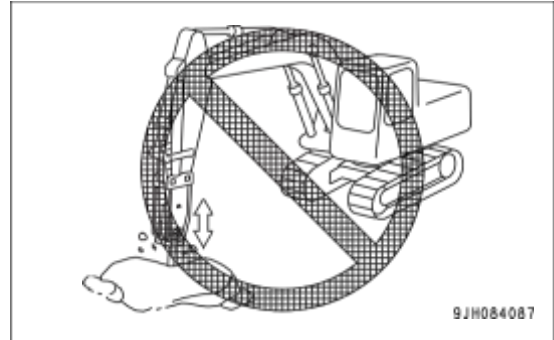
Do not work under water.



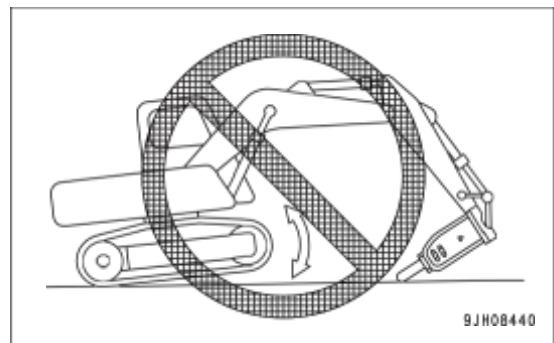
Do not pry the ground or rock with the chisel penetrated.



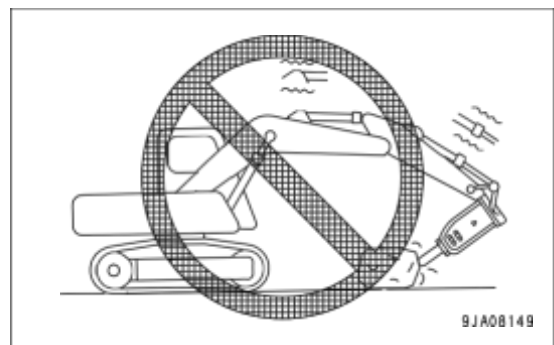
Do not perform pick work.



Do not perform the operation with bucket cylinder rod extended fully to raise the machine off the ground.



Do not perform the breaker work with any cylinder at the stroke end.



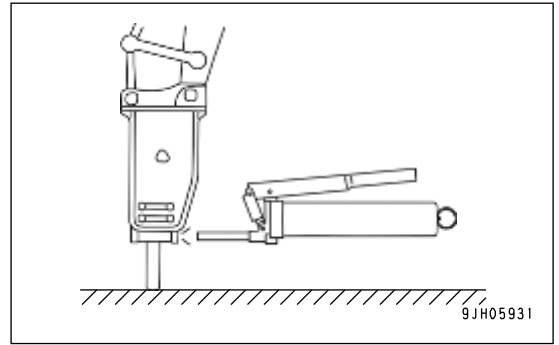
Posture of hydraulic breaker to be greased

NOTICE

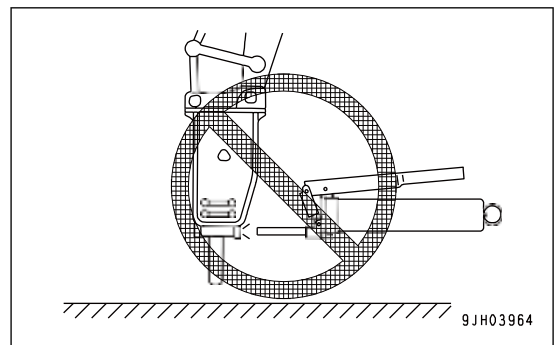
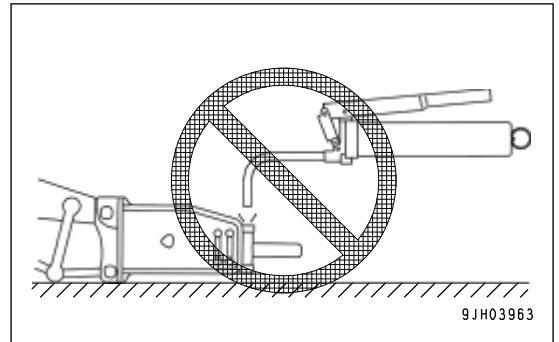
If the breaker is greased in an improper posture, it is filled with more grease than necessary. As a result, dirt will enter the hydraulic circuit and can damage the hydraulic components while the breaker is in use. Be sure to grease the breaker, keeping it in the right posture.

Grease the breaker while holding it in the right posture shown below.

- Lower the chisel perpendicularly to the ground.
- Insert the grease gun perpendicularly to the greasing point.



Wrong posture



KomVision

⚠ WARNING

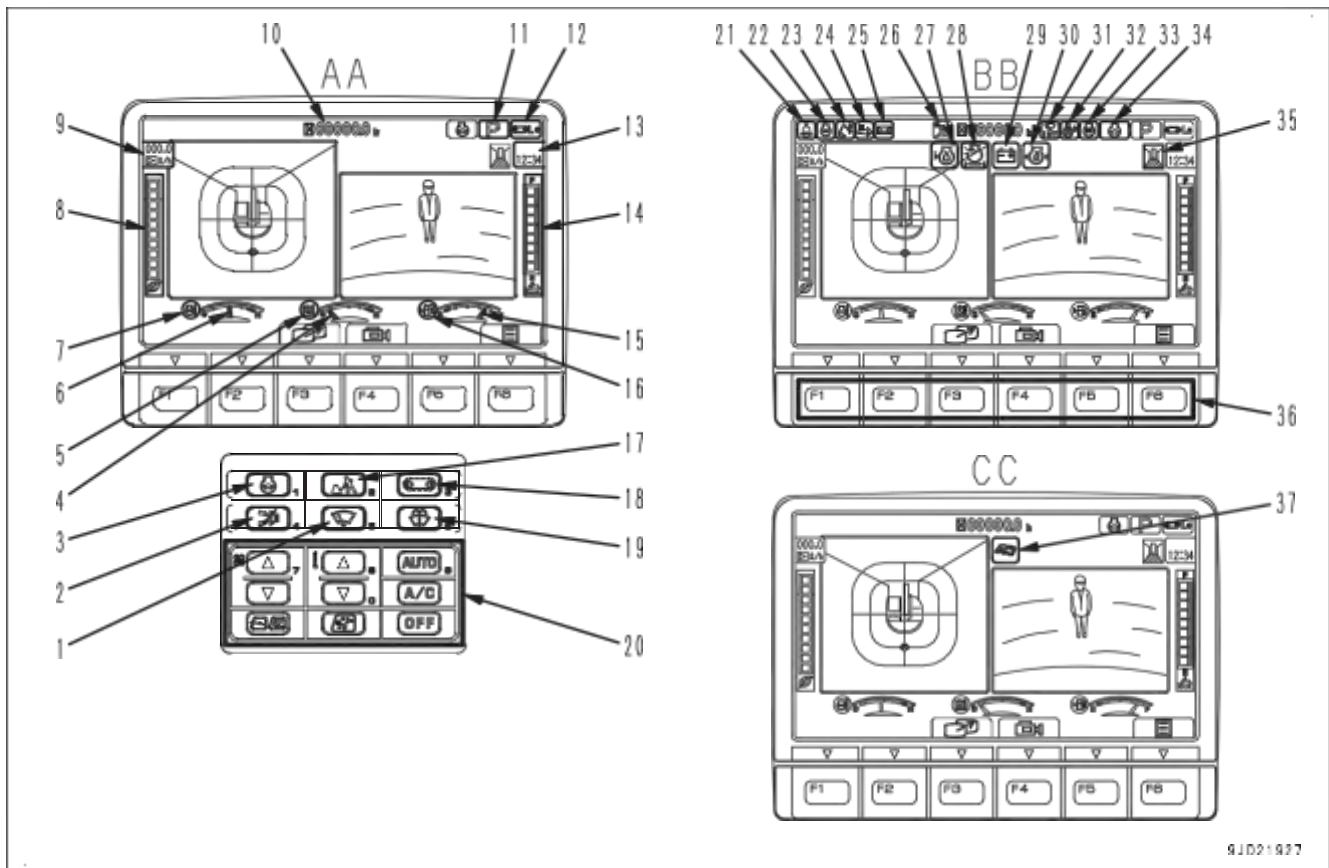
- Physically make sure the adjacent safety around the machine. Do not make sure with just the monitor images.
- The work equipment will always show on the top of the monitor screen, regardless of the direction of the sprocket. Be aware of the direction of the machine.

KomVision is the CCTV system for Komatsu machines.

PRECAUTIONS WHEN USING KomVision

- In these cases, it is necessary for a Komatsu distributor to adjust the monitor screen.
 - When you cannot confirm the normal range of the camera visibility
 - When the blade type or the overall length of the track is changed
- The monitor image may not be visible because of snow, fog, rain, dust, or insufficient light.
- Cameras do not display any obstacles at high position than camera. Do not hit any obstacles at high position than cameras, for example, working equipment of larger machine, or tree branches.
- The reference line is calibrated for flat ground. The distance of the reference line is not correct on slopes or rough ground.

MACHINE MONITOR EQUIPMENT NAME



AA: Standard screen, BB: Check before starting screen, CC: Maintenance time warning screen

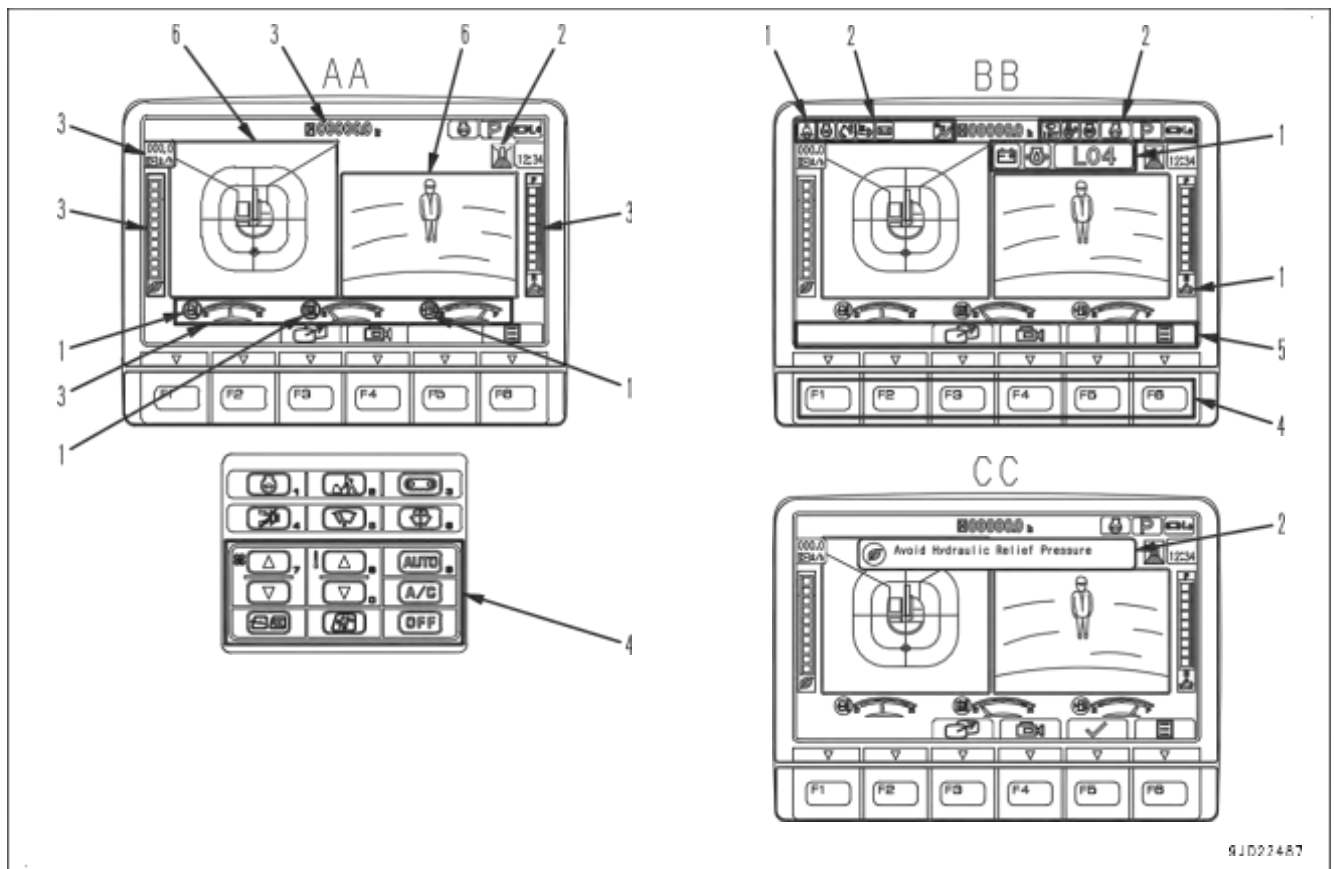
- | | |
|------------------------------|--|
| (1) Wiper switch | (4) Hydraulic oil temperature gauge |
| (2) Buzzer cancel switch | (5) Hydraulic oil temperature caution lamp |
| (3) Auto-deceleration switch | (6) Engine coolant temperature gauge |

- (7)Engine coolant temperature caution lamp
- (8)ECO gauge
- (9)Fuel consumption gauge
- (10)Service meter
- (11)Working mode display
- (12)Travel speed display
- (13)Clock
- (14)DEF level gauge
- (15)Fuel gauge
- (16)Fuel level caution lamp
- (17)Working mode selector switch
- (18)Travel speed selector switch
- (19)Window washer switch
- (20)Air conditioner switch
- (21)Seat belt caution lamp
- (22)Engine stop pilot lamp
- (23)Work equipment lock pilot lamp
- (24)Aftertreatment devices regeneration display
- (25)Message display
- (26)Air conditioner pilot lamp
- (27)Engine oil level caution lamp
- (28)Air cleaner clogging caution lamp
- (29)Charge level caution lamp
- (30)Engine oil pressure caution lamp
- (31)Wiper pilot lamp
- (32)Swing lock pilot lamp
- (33)Preheating pilot lamp
- (34)Auto-deceleration pilot lamp
- (35)Camera switch display
- (36)Function switch (F1 – F6)
- (37) Maintenance time caution lamp

REMARK

The figure does not show all the caution lamp symbols.

EXPLANATION OF MACHINE MONITOR EQUIPMENT



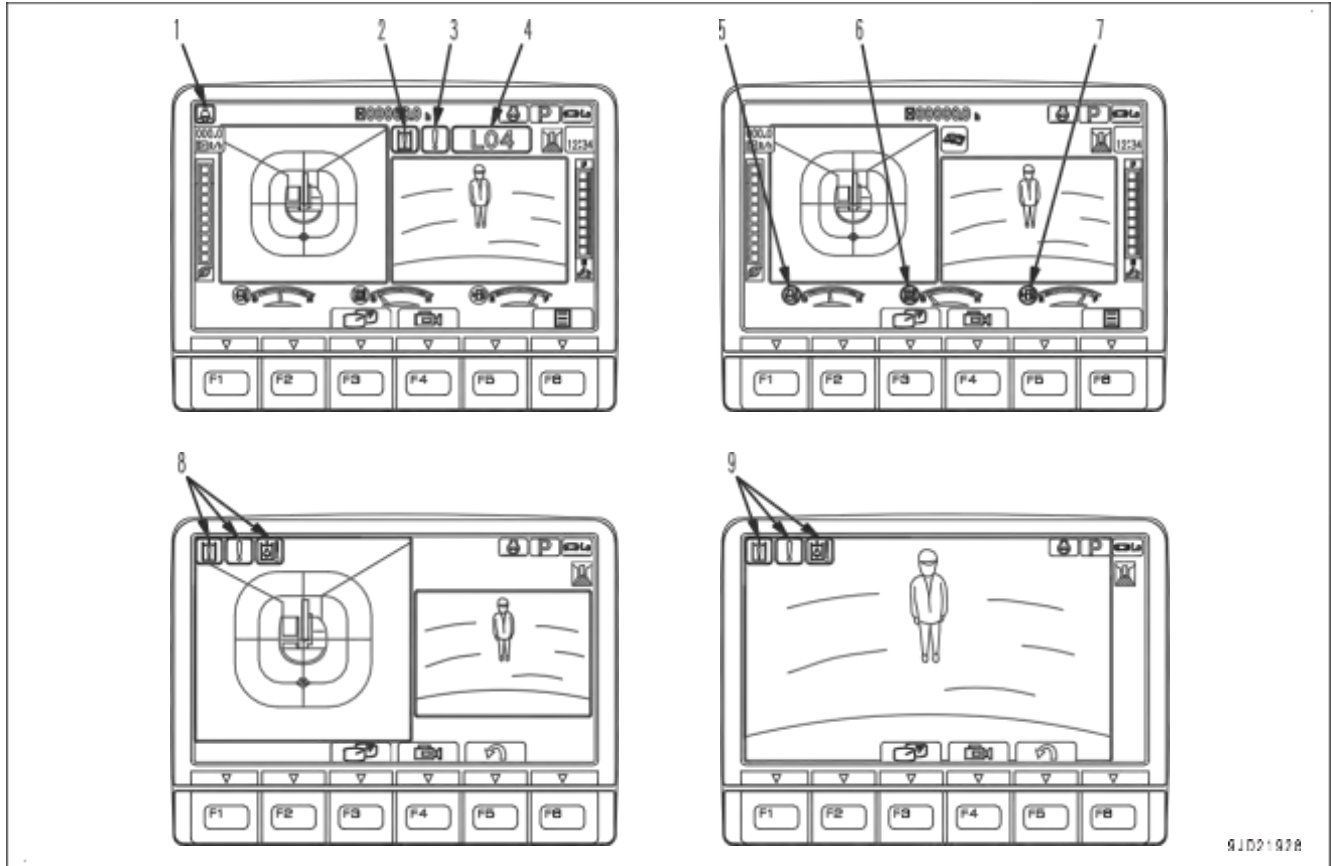
AA: Start screen, BB: Warning and error screen, CC: Guidance screen

- (1) Warning display
- (2) Pilot display
- (3) Meter display
- (4) Monitor switch area
- (5) Guidance icon display
- (6) Camera image display

REMARK

- The liquid crystal panel may show some black spots or bright spots. It is not defect unless there are 10 or more of them.
- When the temperature in the cab is high, the brightness of monitor may reduce automatically to protect the LCD.

WARNING DISPLAY



- (1) Seat belt caution lamp
- (2) Caution lamp
- (3) Caution lamp
- (4) Action level display
- (5) Engine coolant temperature caution lamp
- (6) Hydraulic oil temperature caution lamp
- (7) Fuel level caution lamp
- (8) Caution lamp
- (9) Caution lamp

Caution display on the start screen

When there is one activated warning, it appears in the location of caution lamp (2).

When there are two activated warnings, they appear in the location of caution lamps (2) and (3).

When there are three or more activated warnings, they appear in the location of caution lamps (2) and (3) alternately every two seconds.

Caution display on the screen of the camera image

The activated warnings flash on caution lamp (9).

If multiple warnings are activated, they appear in sequence of occurring.

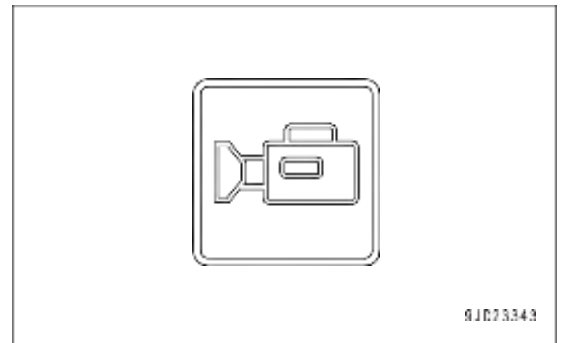
CAMERA SYSTEM CAUTION LAMP

The caution lamp comes on in yellow with action level "L01" when there is an issue with the camera connections. The failures such as loose connectors and disconnected cables are the typical causes.

The machine monitor will not show the image from the defective camera.

Physically make sure the adjacent safety around the machine.

Consult your Komatsu distributor for inspection and maintenance.



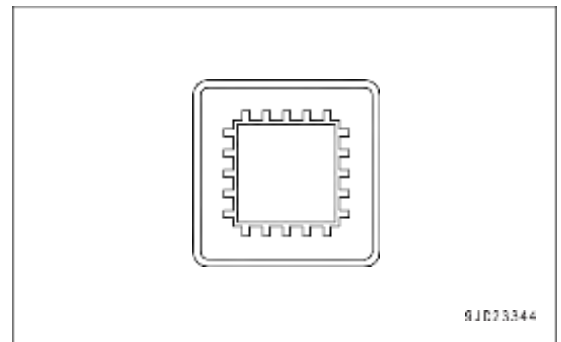
CAMERA CONTROLLER CAUTION LAMP

The caution lamp comes on in yellow with action level "L01" when there is an issue with the controller of KomVision system.

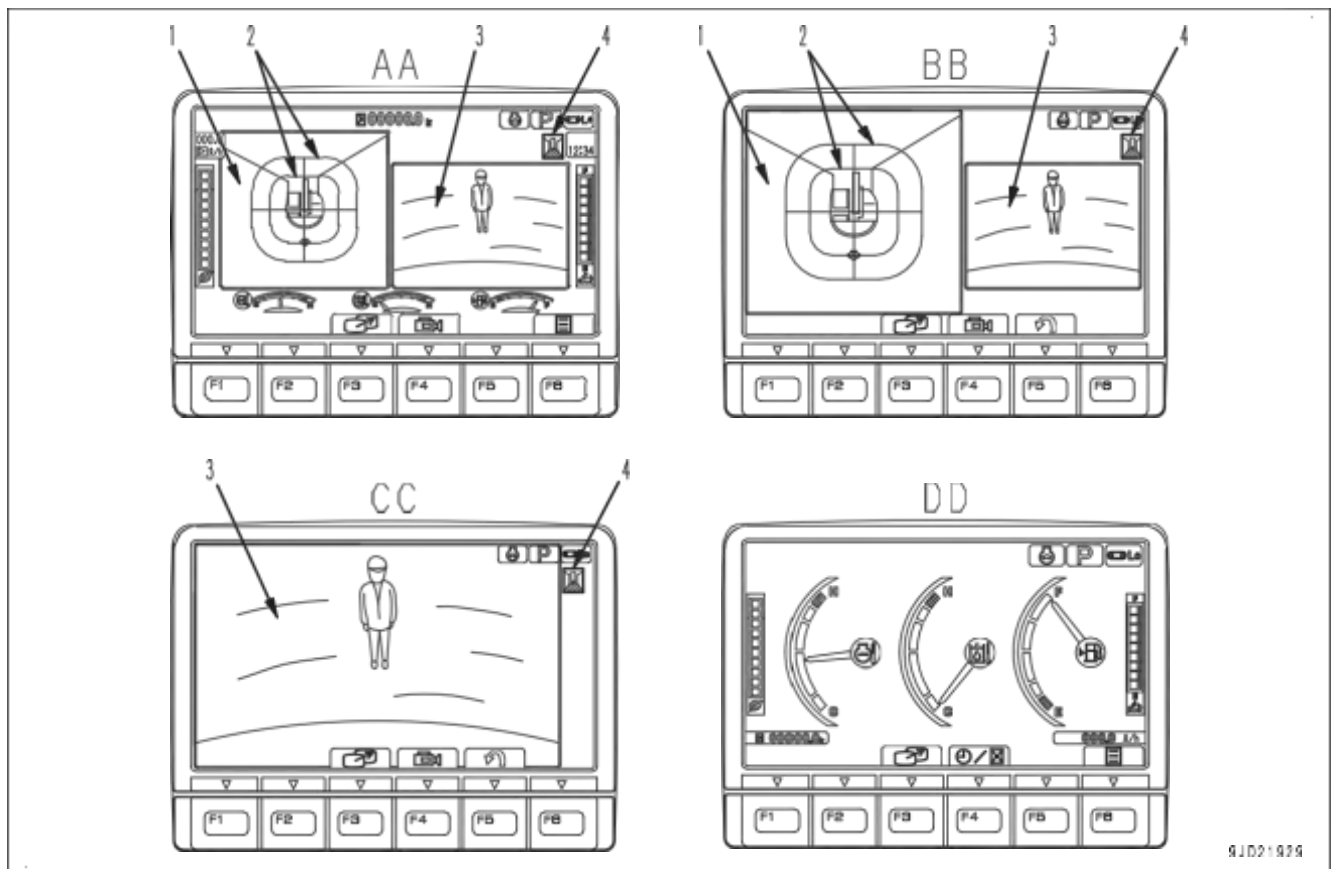
The machine monitor will not show the image from the defective camera.

Physically make sure the adjacent safety around the machine.

Consult your Komatsu distributor for inspection and maintenance.



MONITOR DISPLAY



AA: Start screen, BB: Enlarged screen from above, CC: Camera image screen, DD: Meter display screen

(1) Bird's eye view display

(2) Reference line

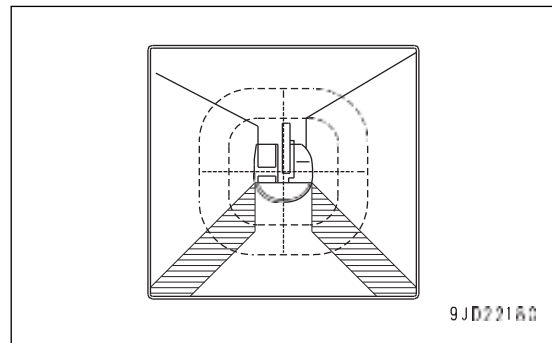
(3) Camera image display

Komvision provides a Bird's eye view display of the machine with composite images from three onboard cameras to create a 240° view of the machine.

Since the image is a composite of three cameras, the shaded areas in the images to the right may be doubled, distorted, or misaligned.

For the camera image display, the image shot by each camera appears.

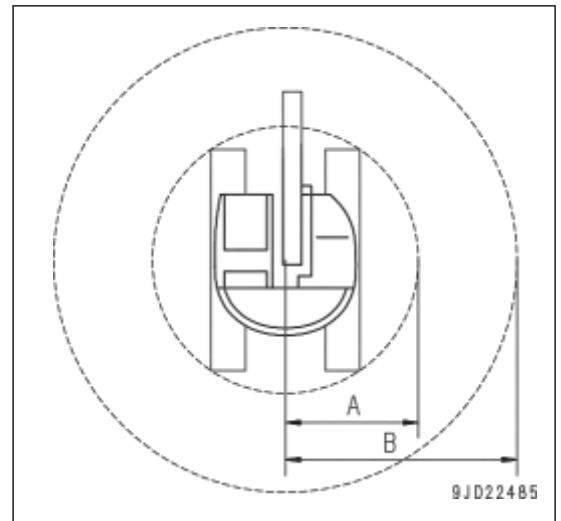
(4) Camera switch display



The reference line appears as follows:

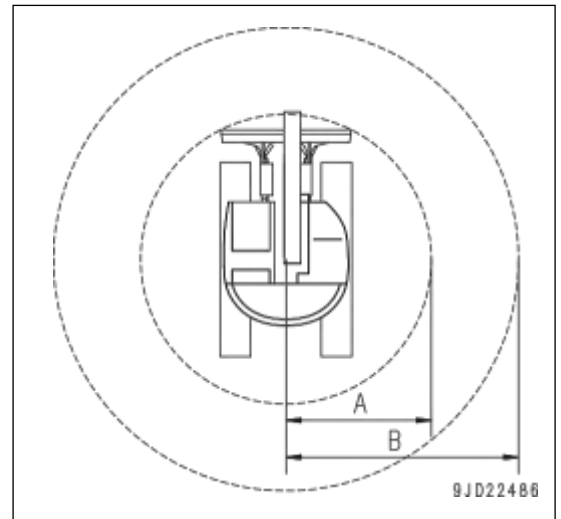
Display area of the reference line of the machine without blade

Display area	Display color
Swing radius of the tip of the track (A)	Red
Swing radius of the tip of the track + 2.0 m (B)	Yellow



Display area of the reference line of the machine with blade

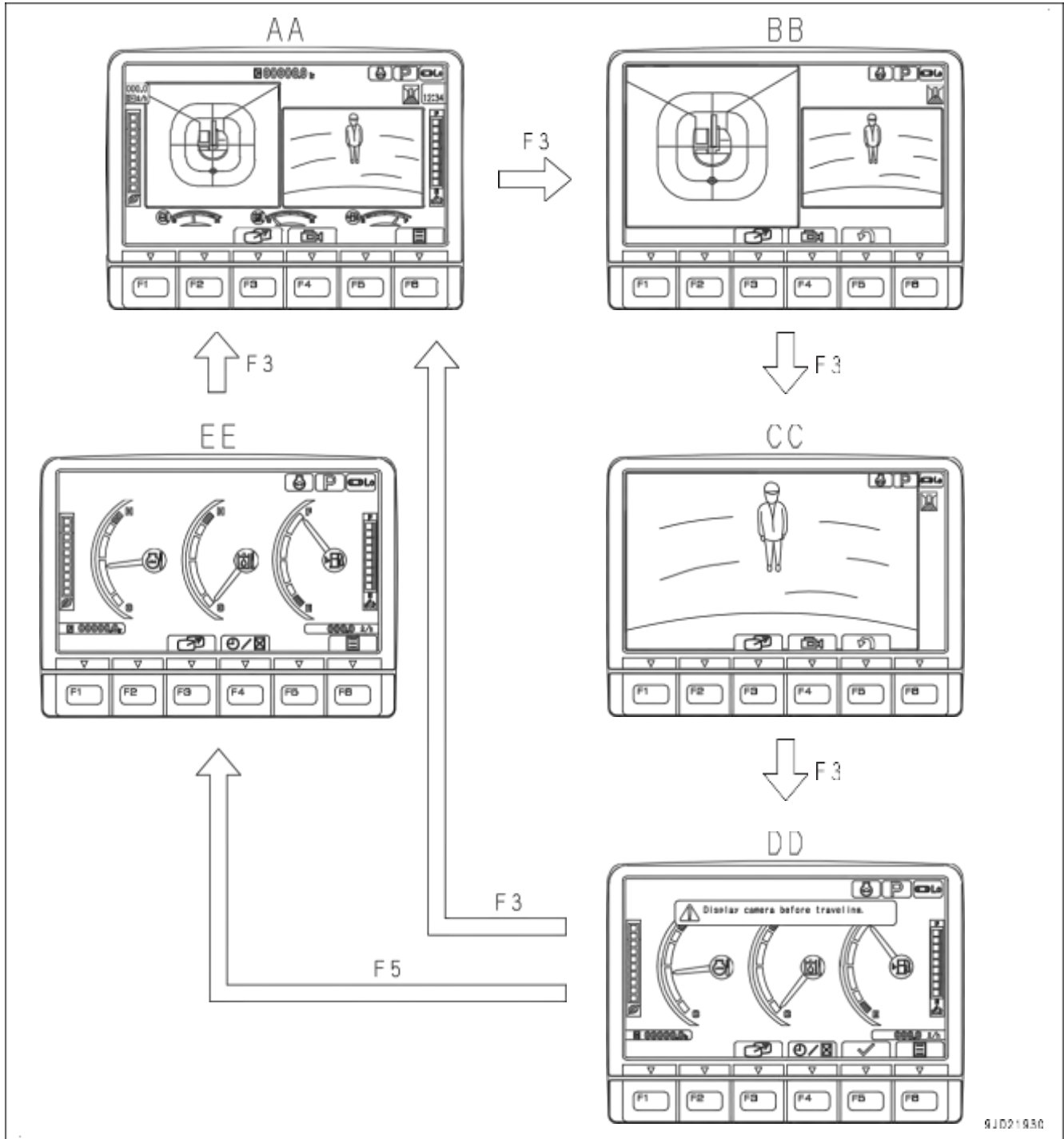
Display area	Display color
Swing radius of the right and left ends of the blade (A)	Red
Swing radius of the right and left ends of the blade + 2.0 m (B)	Yellow



If the blade type or the overall length of the track is changed, consult your Komatsu distributor for adjustment of the camera image display.

MONITOR DISPLAY SELECTOR SWITCH

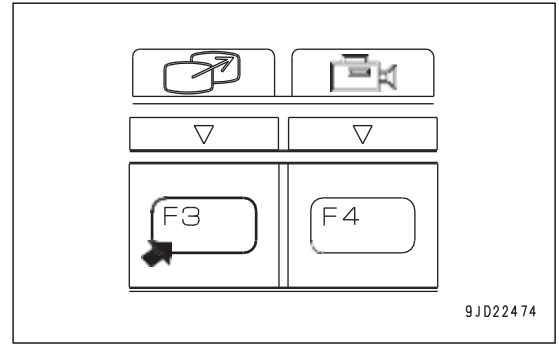
To switch the monitor display screen, perform these operations.



AA: Start screen, BB: Enlarged screen from the top, CC: Camera image screen, DD: Guidance screen, EE: Meter display screen

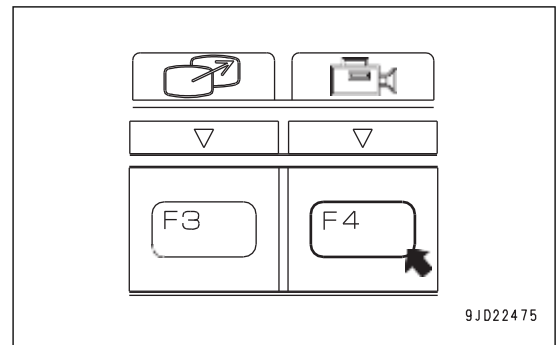
- On the start screen AA, the area around the machine appears on the left side of the monitor. The image of the selected camera appears on the right side of the monitor.

- Press the switch F3 while the start screen AA appears to show the enlarged image from the top.
- Press the switch F3 on the enlarged screen BB from the top to show the screen CC of the camera image.
- Press the switch F3 on the camera image screen CC to show the guidance screen DD.
- Press the switch F3 on the guidance screen DD to show the start screen AA. Also press the switch F5 on the guidance screen DD to show the meter display screen EE.






CAMERA IMAGE SELECTOR SWITCH

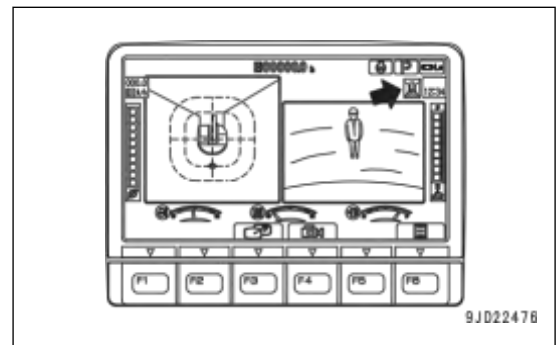
Press the switch F4 to select the image of the right, left and rear side view of the machine.



On the start screen, the camera switch display flashes in the position on the figure.

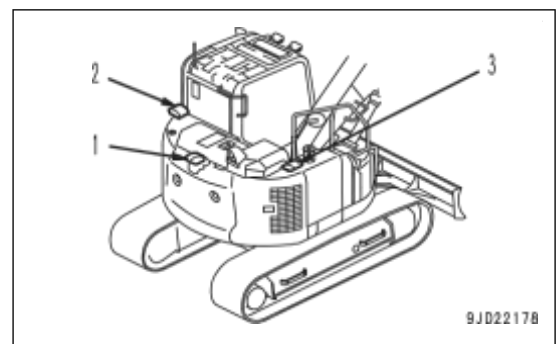
Active camera image comes on in green.

Camera switch display	Displayed camera position
 9JD22411	Rear camera
 9JD22412	Right camera
 9JD22413	Left camera



The direction of the camera is as follows:

- (1) Back of the machine
- (2) Left of the machine
- (3) Right of the machine



METHOD FOR CHECKING BEFORE STARTING

Check the followings before you start the engine on each day.

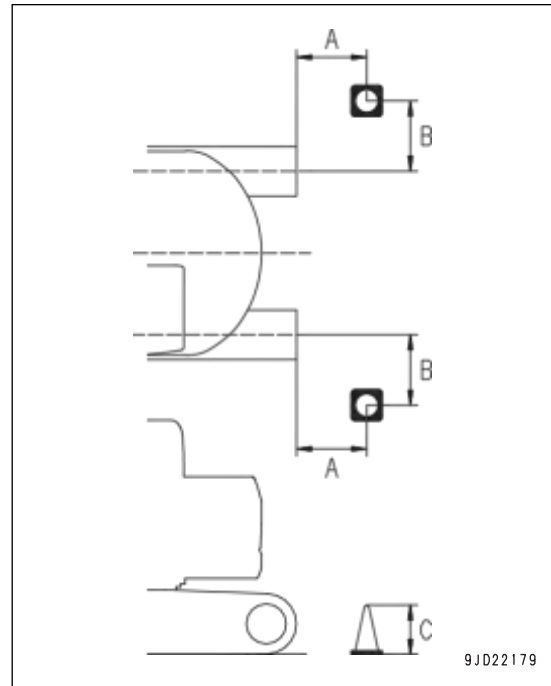
- There are no stains on the camera lens. When any stain appears on the lens, wipe it off with dry and soft cloth.
- Check whether there are any breakages or deformations on the camera mounts which causes incorrect camera direction, or any defects in the camera. When there are any defects, consult your Komatsu distributor.

METHOD FOR CHECKING CAMERA VISIBILITY

The direction of camera may be changed by a shock to the camera. Check the visibility of the camera.

Put the traffic cone of approximately 70 cm height (C) to the position at the rear outside of the machine, where the distance (A) is approximately 1.0 m behind the centerline of a track and also the distance (B) is approximately 1.0 m outside of it.

If the traffic cone can be seen on the monitor screen, it is normal.



If the traffic cone cannot be seen on the monitor screen, ask your Komatsu distributor for adjustment of the camera image.

TROUBLES AND ACTIONS

When the monitor does not respond or displays no camera image, consult your Komatsu distributor.

REPLACEMENT PARTS

PERIODIC REPLACEMENT OF DEFINED LIFE PARTS

For using the machine safely for an extended period of time, you must periodically replace the safety and fire prevention-related parts listed in the table of 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. Retighten 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	Engine lubrication system	Turbocharger lubrication hose Engine oil filter hose	
3	Work equipment hydraulic system	Main pump delivery hose Main pump LS hose Swing line hose Travel line hose	
		External work equipment hose <ul style="list-style-type: none"> • Boom foot connection hose • Boom cylinder hose • Arm connection hose • Arm cylinder hose • Bucket cylinder hose • Line hose for additional attachment • Blade cylinder hose 	
4	Others	PPC accumulator Accumulator for additional attachment	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, so 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	600-211-2111	Cartridge	1	Every 500 hours	
Fuel prefilter	600-319-4110	Cartridge	1		
Hydraulic tank breather	421-60-35170	Element	1	Every 1000 hours	
Hydraulic oil filter	423-60-45461 (07000-12135)	Element (O-ring)	1 (1)		
Fuel main filter	600-319-3881	Cartridge	1		
DEF tank breather	421-60-35170	Element	1		
DEF filter	6540-71-2320	Filter kit	1		
KCCV filter	600-333-3900	Element	1	Every 2000 hours	
Air conditioner RECIRC air filter	22B-979-2860	Filter	1	Every 1 year	
Air conditioner FRESH air filter	17M-911-3530	Element	1		
Electric heater	6204-11-4850	Gasket	1	-	
Air cleaner	600-185-2500	Element assembly	1		
Additional filter for breaker (if equipped)	22B-973-3311	Element assembly	1		
Bucket	Vertical pin type				
	205-70-74272 (205-70-74282) (205-70-74291)	Tooth (Pin) (Pin)	4 (4) (4)		
	Horizontal pin type				
	205-70-19570 (09244-02496)	Tooth (Pin assembly)	4 (4)		
	Side cutter type				
	202-70-63161 202-70-63171 (208-32-11231) (01803-02228)	Side cutter (left) Side cutter (right) (Bolt) (Nut)	1 1 (8) (8)		

RECOMMENDED FUEL, COOLANT, AND LUBRICANT

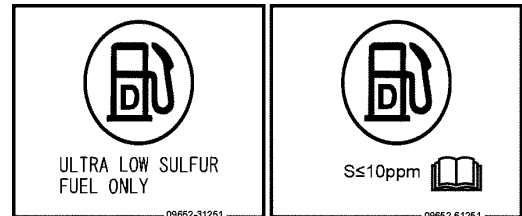
NOTICE

- Komatsu genuine oils are conditioned to maintain the reliability and durability of Komatsu construction equipment and components.
In order to keep your machine in the best condition for long period of time, it is essential to follow the instructions in this Operation and Maintenance Manual.
- Failure to follow these recommendations may result in shortened life or excessive wear of the engine, power train, cooling system, and/or other components.
- Commercially available lubricant additives may be good or bad for the machine. Komatsu does not recommend any commercially available lubricant additive.
- Use the oil according to the ambient temperature as recommended in the chart below.
- When starting the engine in temperatures below 0 °C, be sure to use the recommended multi-grade oil, even if the ambient temperature may become higher during the course of the day.
- If the machine is operated at a temperature of -20 °C or less, separate devices are needed, so consult your Komatsu distributor.

NOTICE

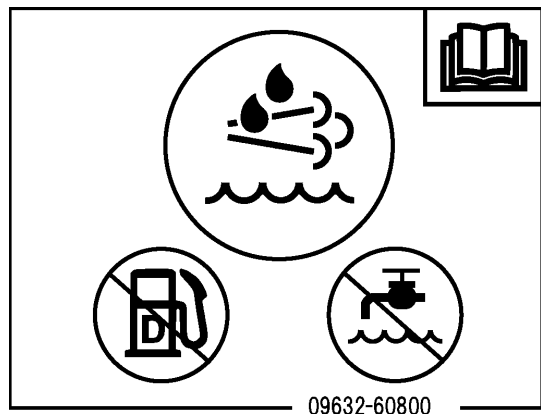
The fuel used must be ultra low-sulfur diesel fuel. (≤10 ppm)

To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device and emission gas control system. Since the high-pressure fuel injection device requires high precision parts and lubrication, if low viscosity fuel with low lubricating ability is used, its durability may drop considerably. Also, using fuel with high sulfur content may deteriorate the engine parts, inducing failures, decrease of the life and degradation in performance.



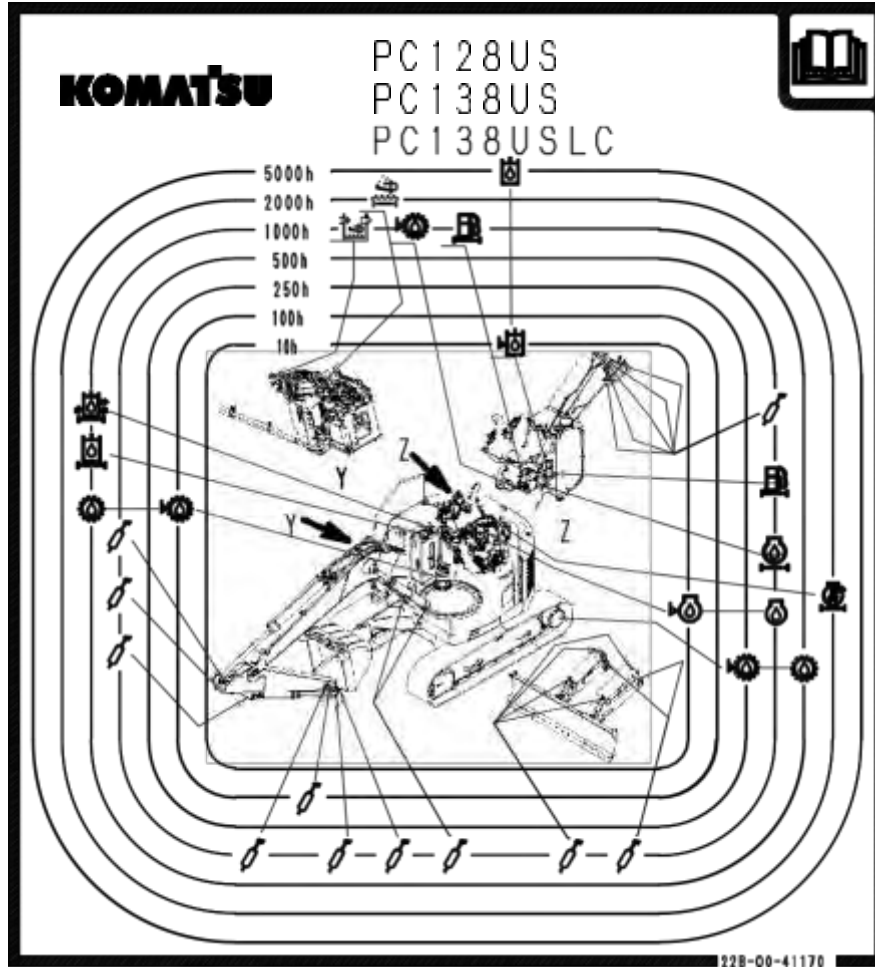
NOTICE

Use DEF as the aqueous urea solution for SCR system. DEF is a colorless transparent 32.5% aqueous urea solution. The quality of DEF is prescribed in ISO22241-1. Always use DEF that conforms to this quality standard.


















LUBRICATION CHART

- The lubrication chart uses symbols to show the lubrication points and types of lubricant by each lubrication interval.
Keep this chart in the magazine box inside the cab so that the people concerned can refer it any time during lubrication.
- 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 (7-6)”.
- For details of lubrication, see “MAINTENANCE SCHEDULE (4-11)”.



The symbols used in the lubrication chart are explained as follows.

Symbol	Meaning of symbol	Symbol	Meaning of symbol
	Read Operation and Maintenance Manual		Supply grease
	Change engine oil		Check engine oil level
	Change hydraulic oil		Check hydraulic oil level
	Change power train oil		Check power train oil level
	Replace engine oil filter		Replace hydraulic oil filter
	Replace hydraulic tank breather element		Replace fuel filter
	Replace KCCV filter		Replace DEF tank breather element
	Replace DEF filter		

METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius		Recommended Komatsu Fluids
		Min	Max	
Engine oil pan	Engine oil for KDPF used in cold terrain (Oil Change interval 250 hours)	-25 °C	35 °C	EOS5W30-LA (KES Diesel Engine Oil) (Note 1)
		-25 °C	40 °C	EOS5W40-LA (KES Diesel Engine Oil) (Note 1)
	Engine oil for KDPF (Oil Change interval 500 hours)	-20 °C	40 °C	EO10W30-LA (KES Diesel Engine Oil)
		-15 °C	50 °C	EO15W40-LA (KES Diesel Engine Oil)
Swing machinery case Final drive case Damper case	Power train oil	-30 °C	50 °C	TO30 (KES) (Note 2)
Hydraulic system	Power train oil	-20 °C	50 °C	TO10 (KES) (Note 5)
	Hydraulic oil	-30 °C	50 °C	HO56-HE (KES)
		-20 °C	50 °C	HO46-HM (KES) (Note 5)
Grease fitting	Hyper grease	-20 °C	50 °C	G2-TE (KES) (Note 3)
	Lithium EP grease	-20 °C	50 °C	G2-LI (KES)
Cooling system	Non-Amine Engine Coolant (AF-NAC)	-30 °C	50 °C	AF-NAC (KES) (Note 4)
Fuel tank	Diesel fuel	-30 °C	20 °C	EN590
		-10 °C	50 °C	
DEF tank	DEF tank	-30 °C	50 °C	DEF (Note 6)

• ASTM: American Society of Testing and Material

Specified capacity	ℓ	Engine oil pan	Swing machinery case	Final drive case (each of right and left)		PTO gear case	Hydraulic oil system	Cooling system	Fuel tank	DEF tank
				Standard	Large capacity final drive (if equipped)					
Specified capacity	ℓ	12.5	2.5	2.1	4.7	0.75	120	17.7	200	21.1
Refill capacity	ℓ	11.5	2.5	2.1	4.7	0.75	69	-	-	-

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 maintenance time of machine monitor, ask your Komatsu distributor to perform.

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

Note 3: When environment preservation is important in river works, marine and shore works, forest works, etc., recommend use of bio hydraulic oil and biogrease. If you use bio hydraulic oil, the fuel economy decreases a little. When using it, consult your Komatsu distributor.

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

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

Note 4: SUPERCOOLANT (AF-NAC)

1) Coolant has the important function of anticorrosion as well as antifreeze.

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

Komatsu machines are supplied with SUPERCOOLANT (AF-NAC). SUPERCOOLANT (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours.

SUPERCOOLANT (AF-NAC) is strongly recommended wherever available.

2) For the SUPERCOOLANT (AF-NAC) density, see "METHOD FOR CLEANING INSIDE OF COOLING SYSTEM (4-18)".

SUPERCOOLANT AF-NAC is supplied in diluted state, so always fill up with diluted coolant. (Never dilute it with water.)

Note 5: If this oil is used for hydraulic system, fuel consumption increases.

We strongly recommend HO56-HE for hydraulic oil.

Note 6: DEF freezes at -11 °C. If thawing is necessary, DEF system is automatically heated and thawed 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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