

# Operation & Maintenance Manual

UENAM01165

## PC290LC-11 PC290NLC-11

### HYDRAULIC EXCAVATOR

#### SERIAL NUMBERS

**PC290LC-11** - K70001 and up

**PC290NLC-11** - K70001 and up

**PC290LC-11** - 35001 and up

**PC290NLC-11** - 35001 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).**

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# READ THIS MANUAL

This manual gives details of the operation and methods of inspection and maintenance for this machine that must be 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.

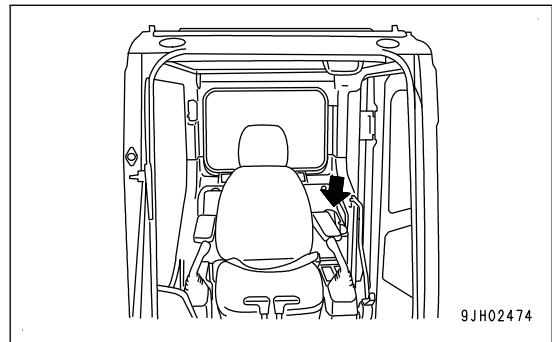
Komatsu cannot predict every circumstance that might involve a potential hazard when the machine is used. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions.

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 indicated location so that all relevant personnel can read it at any time.

Keep it in the magazine box on the left side of the operator's seat.



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

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

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

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

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

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






## SAFETY INFORMATION

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

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

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

 <b>DANGER</b>	This signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	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.

<b>NOTICE</b>	If precautions described are not observed, the machine may be damaged or the service life may be reduced.
<b>REMARK</b>	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.

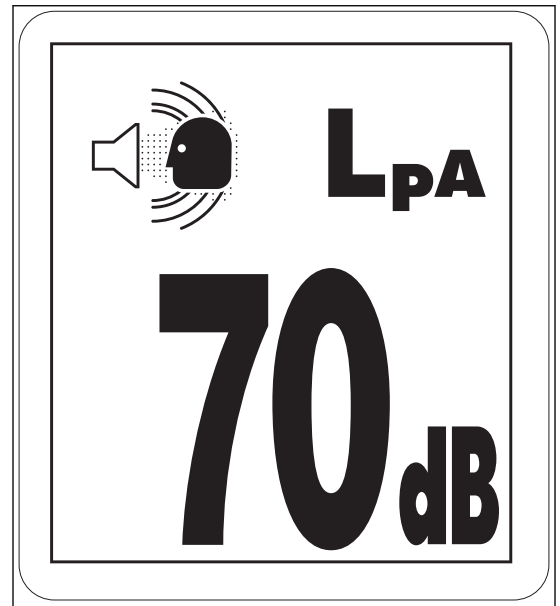


## NOISE

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 0.7 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.

For PC290LC-11, PC290NLC-11

The actual acceleration value for the hands and arms is less than or equal to  $2.5 \text{ m/s}^2$ , the uncertainty for this value is  $0.53 \text{ m/s}^2$  according to EN12096:1997.

The actual acceleration value for the body is less than or equal to  $0.5 \text{ m/s}^2$ , the uncertainty for this value is  $0.28 \text{ m/s}^2$  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 (3-200)”.

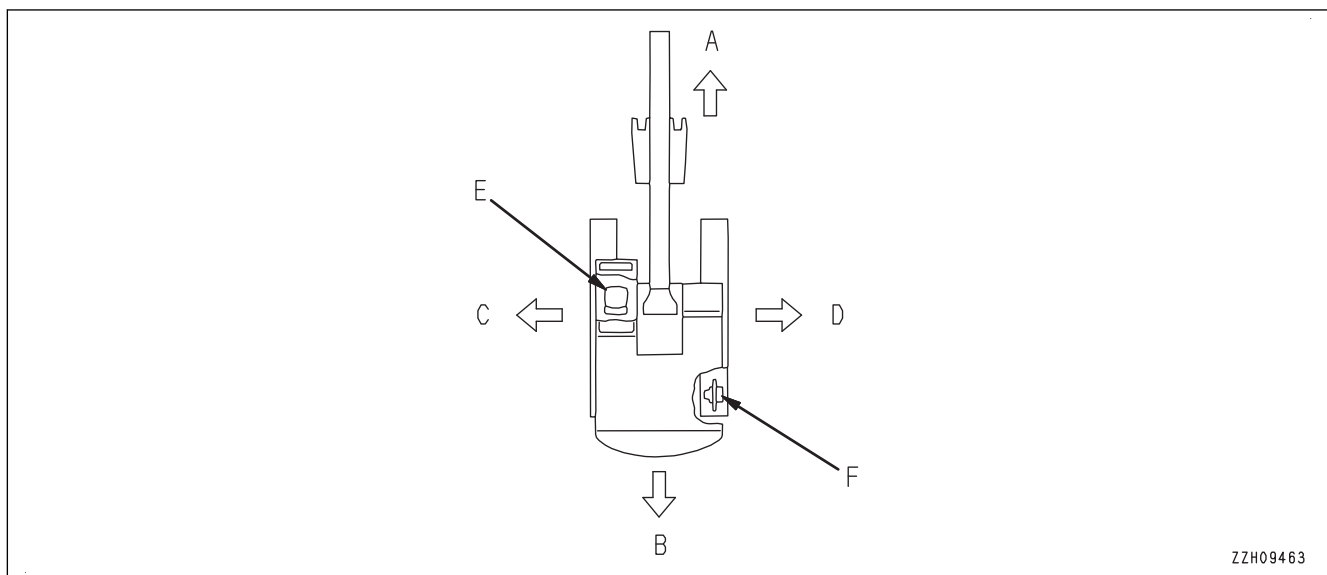
## DEMOLITION WORK

### ⚠ 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



ZZH09463

(A) Front

(B) Rear

(C) Left

(D) Right

(E) Operator's seat

(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**

This machine complies with the visibility standard (ISO 5006).

This machine maintains a proximity visibility of a height of 1.5 m at a point 1 m away from the outside surface of the machine, and a visibility for a radius of 12 m .

## **Protective structures**

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

For the location of the nameplate of the structure to protect the operator (ROPS), see "LOCATION OF SAFETY LABELS (2-5)".

# ENGINE TECHNOLOGY TO CONFORM EXHAUST GAS EMISSION

## About Engine Technology

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

- Komatsu Diesel Particulate Filter (KDPF): A device which captures diesel particular matter or soot in the exhaust gas to purify exhaust gas. If soot is accumulated to a certain level in the filter, a purification process to burn the soot is performed automatically to keep the filtering performance of KDPF high.
- 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).



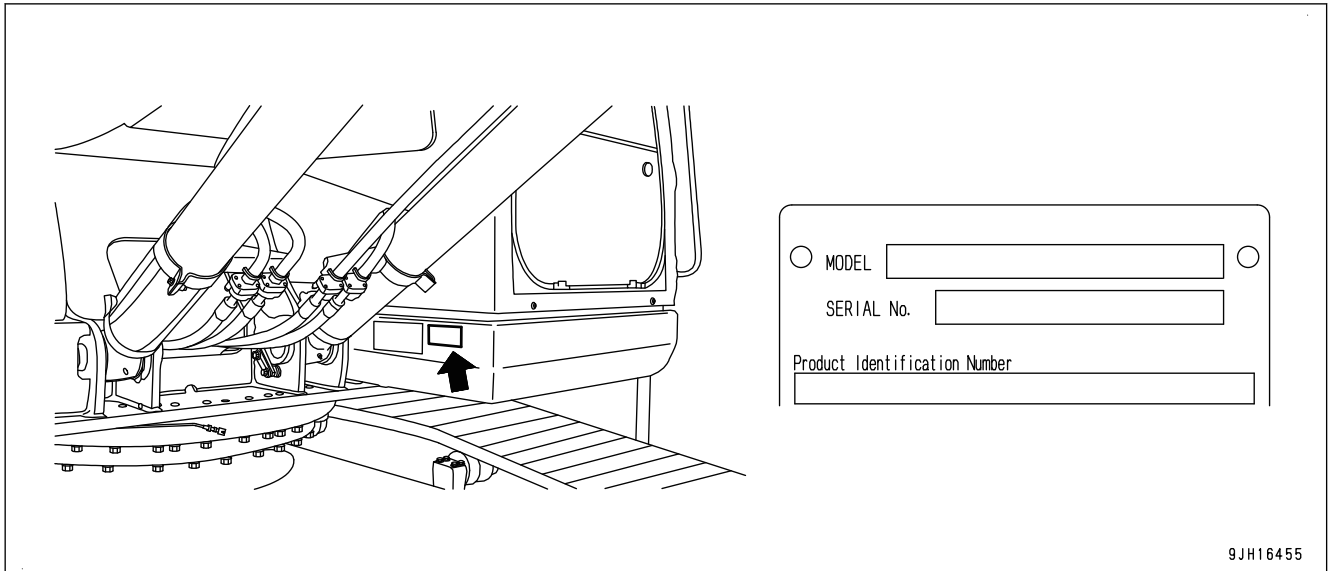
## PRODUCT INFORMATION

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

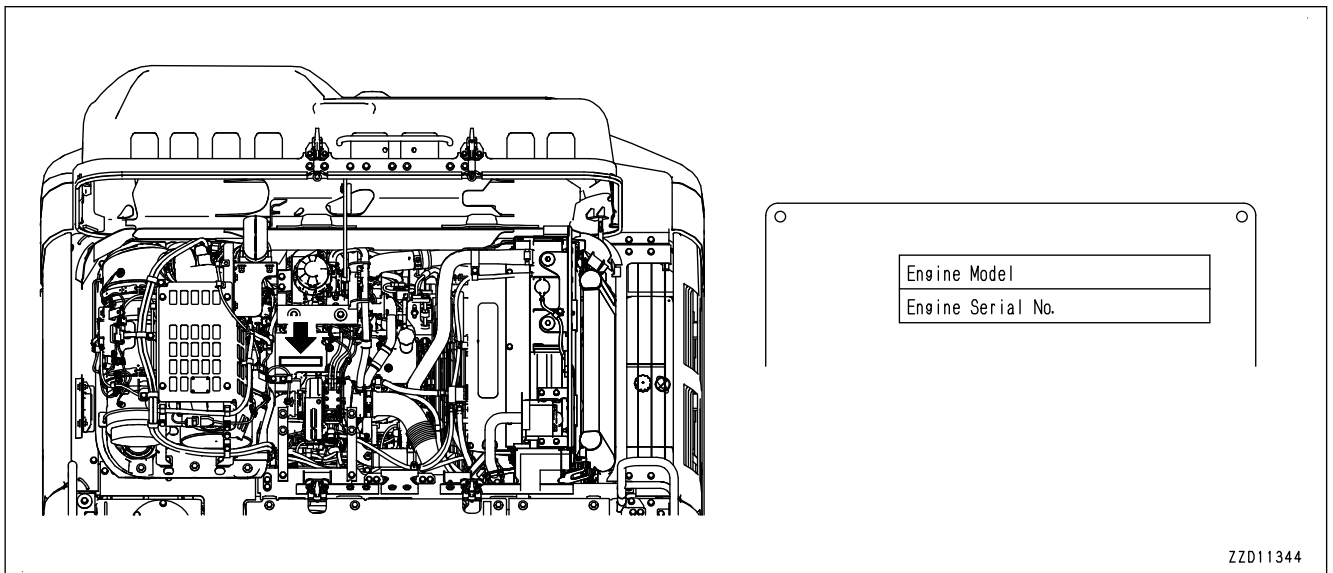
It is located on the right bottom of the operator's cab.

The design of the nameplate differs according to the district.



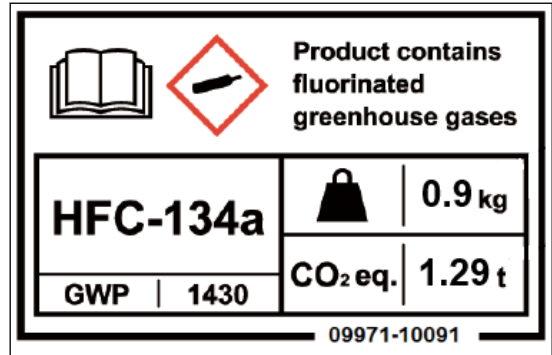
### LOCATION OF ENGINE NUMBER PLATE

It is located on top of the engine cylinder head cover.



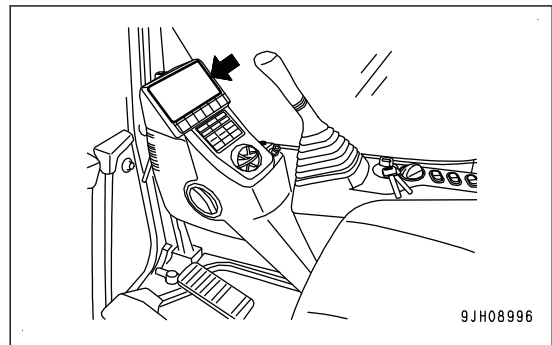
## FLUORINATED GREENHOUSE GASES

Product contains fluorinated greenhouse gases.



## SERVICE METER LOCATION

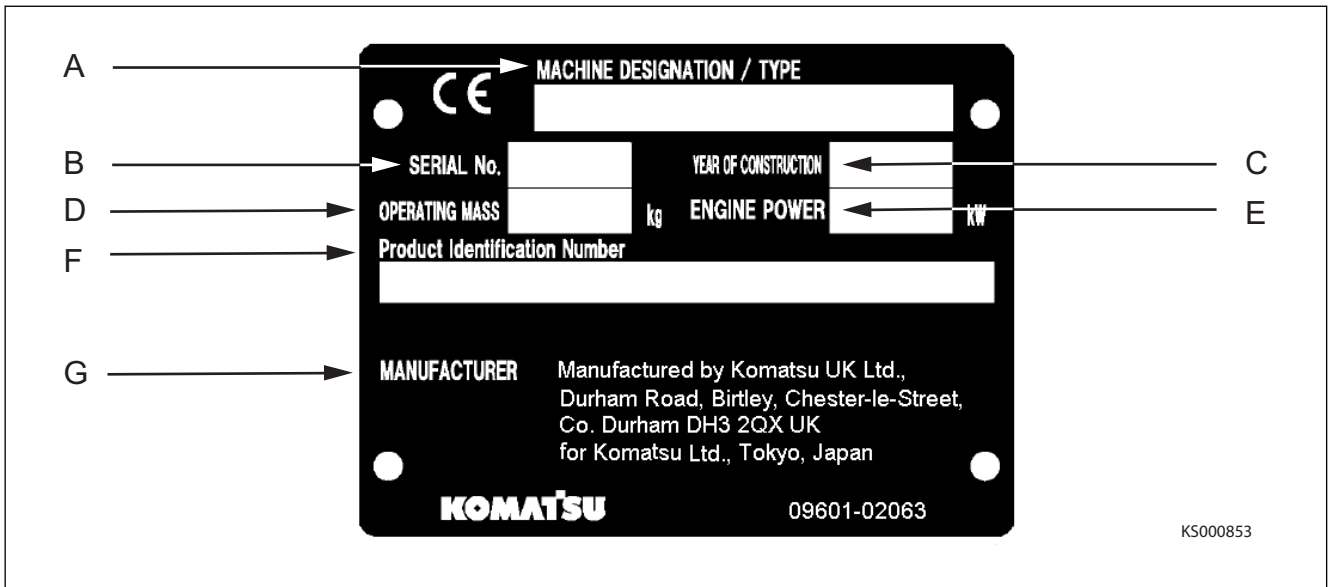
This is displayed on the machine monitor.



## YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR

Machine serial No.	
Engine serial No.	
Product identification number (PIN)	
Manufacturers name: Address:	KOMATSU UK Ltd Durham Road Birtley Chester-le-Street County Durham DH3 2QX United Kingdom
Distributor name	
Address	
Service Personnel	
Phone/Fax	

# SERIAL PLATE



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

# DECLARATION OF CONFORMITY

The manufacturer:

KOMATSU UK Ltd

Durham Road

Birtley

Chester-le-Street

County Durham DH3 2QX

Declares that this machine:

PC290LC-11

PC290NLC-11

Fulfils all the relevant provisions of following EC Directives:

Machine Directive	2006/42/EC
Electro Magnetic Compatibility Directive	2014/30/EU
Outdoor Noise Directive	2000/14/EC amended by 2005/88/EC
Radio Equipment Directive	2014/53/EU

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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.**

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# SAFETY

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## SAFETY LABELS

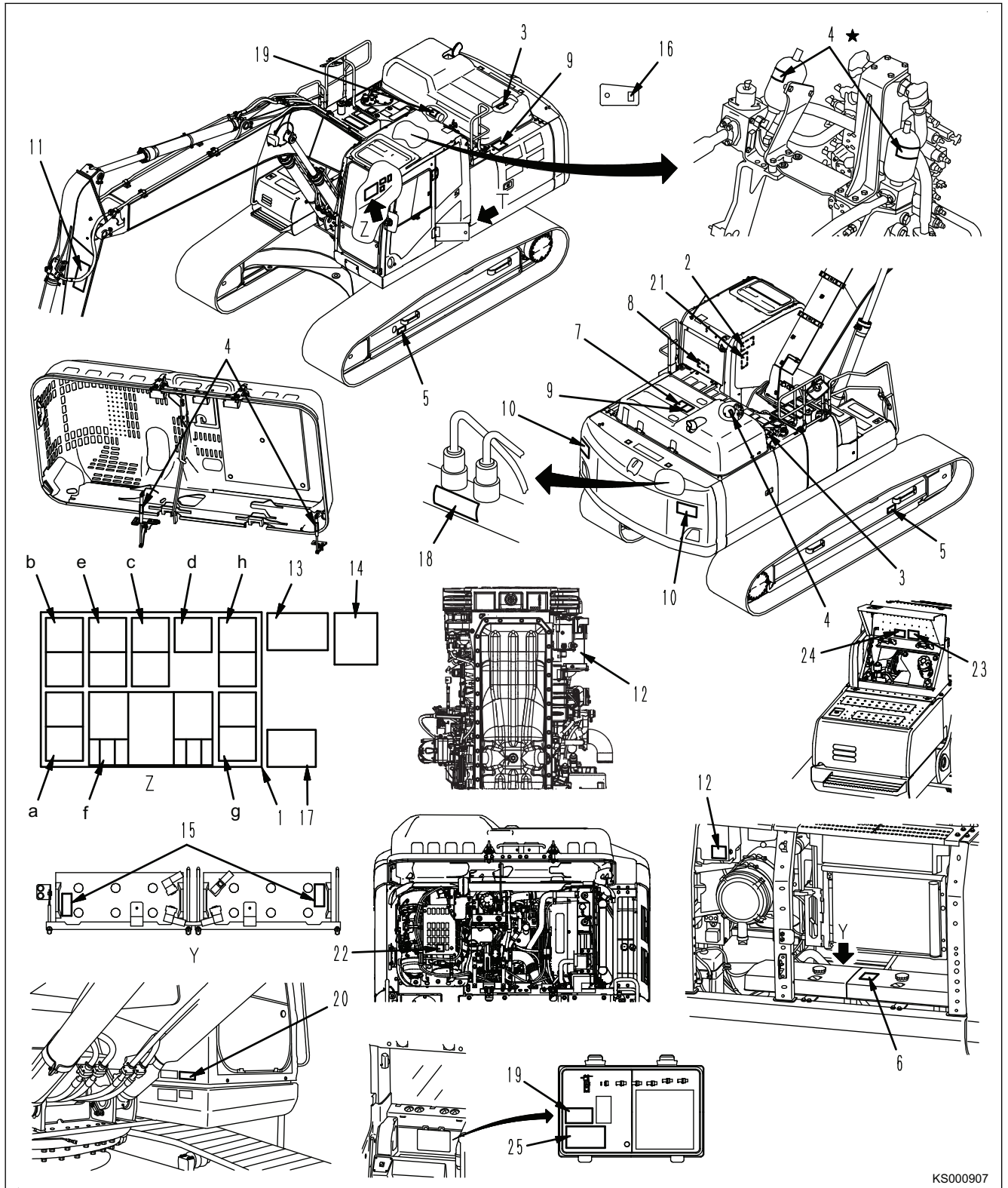
### **WARNING**

**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



KS000907

- 1. Combined safety information label
- (a) Warning for operation, inspection and maintenance
- (b) Warning when leaving the operator's seat
- (c) Warning no passengers
- (d) Warning danger of falling objects

- (e) Warning against high-voltage cables
- (f) Control levers operational function diagram
- (g) Caution when standing in the operator cab
- (h) Warning when reversing
- 2. Caution when stowing front window
- 3. Caution for high temperature coolant and oil
- 4. Caution for handling accumulator and gas spring
- 5. Caution for adjusting track tension
- 6. Caution for handling cable
- 7. Caution stop rotation during inspection and maintenance
- 8. Emergency escape
- 9. Caution against falling
- 10. Danger do not enter within swing range
- 11. Caution against work equipment
- 12. Caution do not start by short-circuiting
- 13. Warning for use of hydraulic quick coupler piping system
- 14. Warning when swinging and travelling in reverse
- 15. Caution for handling batteries
- 16. Caution when replacing fresh air filter
- 17. Caution for blast jobsite
- 18. Caution against high-pressure fuel
- 19. Caution against high temperature
- 20. Warning for handling ROPS
- 21. Caution for overloading machine
- 22. Caution against high temperature
- 23. Caution for handling DEF
- 24. Caution for handling DEF
- 25. Warning for operation, inspection and maintenance
- 26. Caution for high-temperature resistance

**CONTENTS OF SAFETY LABELS**

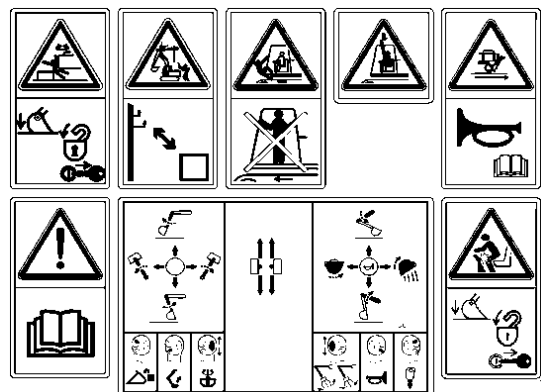
**Combined safety information label**

(1) (2A5-00-21180)

- 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.

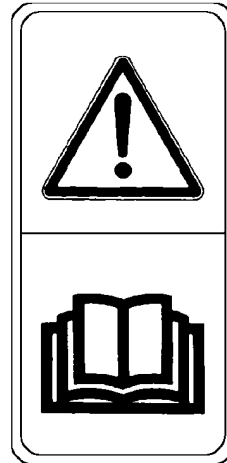
Follow instructions and warnings in manual and in labels on machine.

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



### Warning for operation, inspection and maintenance

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



### Warning when leaving the operator's seat

- b. 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.



### Warning no passengers

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



### Warning danger of falling objects

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

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



**Warning going too close to electric cables.**

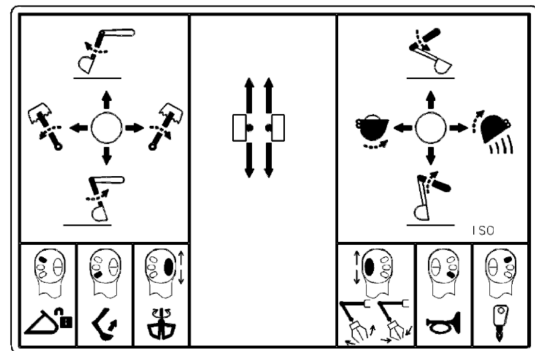
- e. An electrocution hazard if the machine is brought too near to electric power lines.
- Keep a safe distance from electric power lines.



**Control levers operational function diagram**

f. Control levers operating pattern.

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.

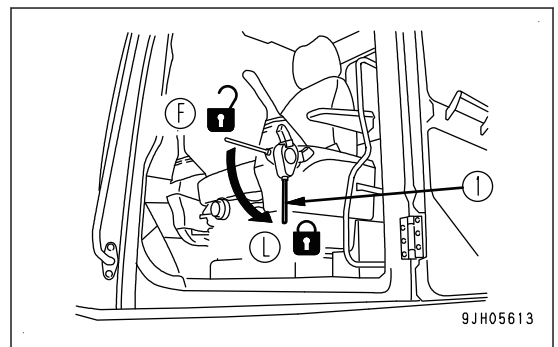


**Caution when standing in operator cab**

- g. 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.



**Warning when reversing**

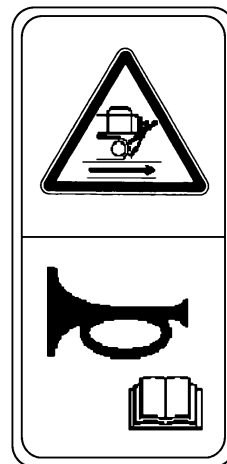
- h. Take care when reversing.

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

- Sound horn to alert people nearby.  
Be sure no one is on or near machine or in swing area.  
Rotate cab for full view of travel path if it can be done safely.  
Use spotter if view is obstructed.  
Follow the above even if machine is equipped with travel alarm, mirrors and rear view camera.

**⚠ WARNING**

To open or close the front or ceiling window, never stand up from the operator's seat before throwing the safety lock lever to the lock position. Inadvertently touching any of the working equipment control levers might cause the machine to start moving all of a sudden, probably resulting in a serious injury.



**Caution when stowing front window**

(2) 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.



**Caution for high temperature coolant and hydraulic oil**

(3) Caution for high temperature coolant and hydraulic oil (09653-A0481).

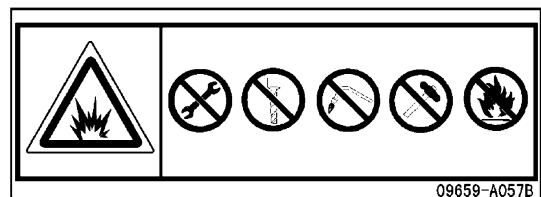
- Never remove the cap when the engine is at operating (high) temperature. Steam or high temperature oil blowing up from the radiator or hydraulic tank will cause personal injury and/or burns.
- Never remove the radiator cap or hydraulic tank oil filler cap when cooling water or hydraulic oil is at high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



**Caution for handling accumulator and gas spring**

(4) Caution for handling accumulator and gas spring (09659-A057B)

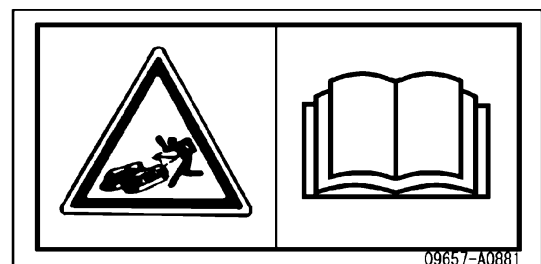
- There is a hazard of explosion causing injury.
- Do not disassemble the accumulator, make holes in it, weld it, cut it, roll it or bring it near a flame.



**Caution for adjusting track tension**

(5) Caution for adjusting track tension (09657-A0881)

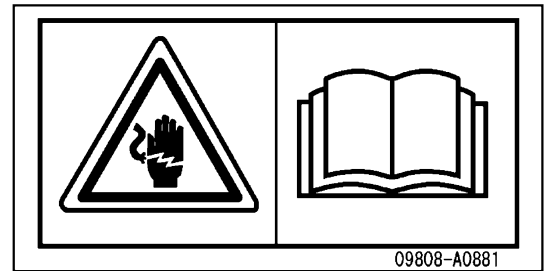
- Sign indicates a hazard of flying plug from track adjuster that could cause injury.
- Read manual regarding adjusting track for safe and proper handling.



### Caution for handling cable

(6) Caution when handling cable (09808-A0881)

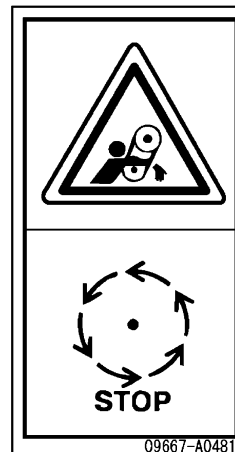
- Sign indicates an electric hazard from handling the cable.
- Read manual for safe and proper handling.



### Caution stop rotation during inspection and maintenance

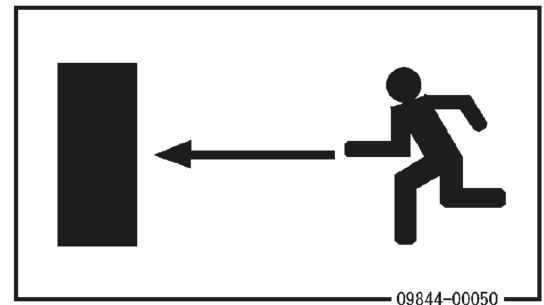
(7) Stopping rotation for inspection and maintenance (09667-A0481)

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



### Emergency escape

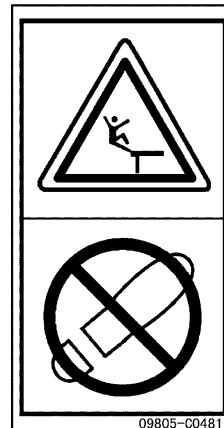
(8) Emergency escape (09844-00050)



## Caution against falling

(9) Caution against falling (09805-C0481)

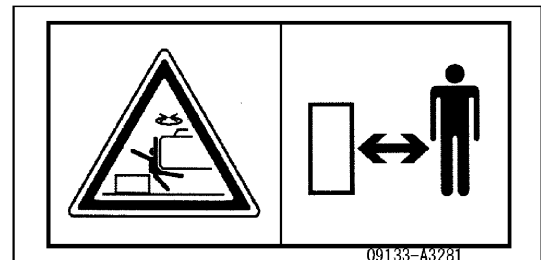
- Sign indicates a hazard of falling.
- Do not stand on the place here.



## Danger do not enter within swing range

(10) Prohibited to enter swing radius (09133-A3281)

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



## Caution for work equipment

(11) Keeping out of working range area (09134-A1681)

- Sign indicates a hazard of being hit by the working device of the machine.
- Keep away from the machine during operation.



**Caution do not start by short-circuiting**

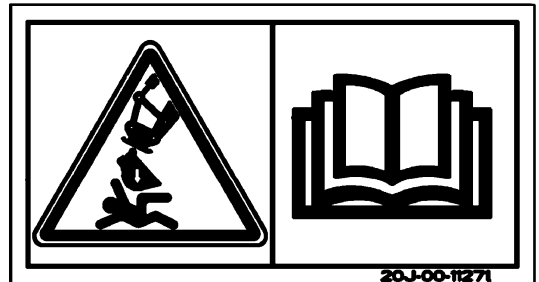
(12) Prohibition of short-circuit start (09842-A0481)



**Warning for quick coupler system**

(13) Warning for use of hydraulic quick coupler piping system (20J-00-11271)

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

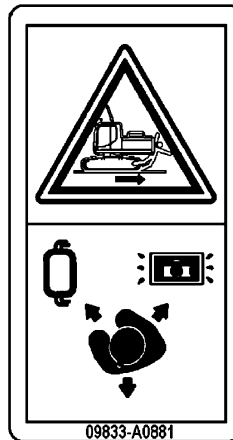


**Warning when swinging or travelling in reverse**

(14) Warning when swinging or travelling in reverse (09833-A0881)

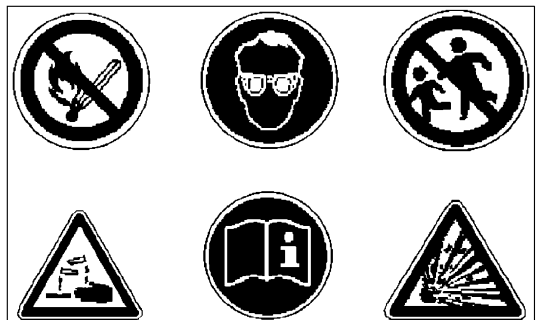
**⚠ WARNING**

- 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.



**Caution for handling battery**

(15) Caution when handling batteries (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.



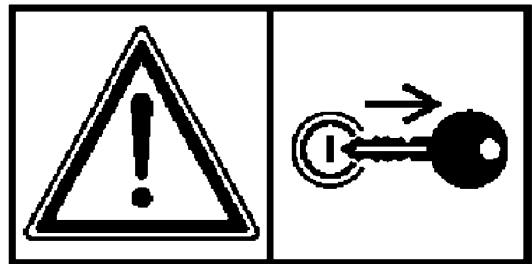
(f) Caution - explosive gases.



### Caution when replacing fresh air filter

(16) Caution when replacing fresh air filter (208-00-71261)

- After replacing fresh air filter, remember to remove key from cover as the key may get damaged when cab door is opened.

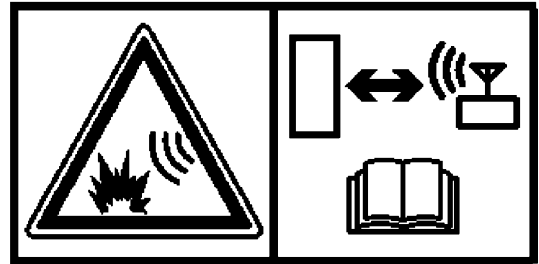


208-00-71261

**Caution for blast jobsite**

(17) Caution of an explosive hazard caused by active radio transmitter at a blast zone (09845-00480).

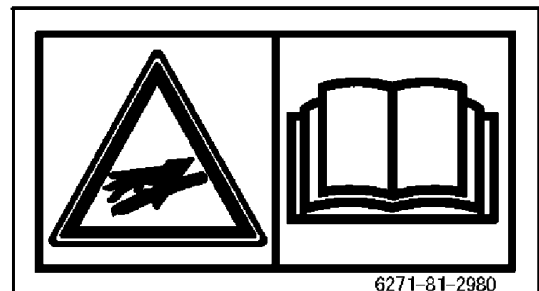
- Keep machine at a safe distance from blast zone and a detonator.



09845-00480

**Caution for high-pressure fuel**

(18) Caution for high-pressure fuel (6271-81-2980).



6271-81-2980

**Caution for high-temperature**

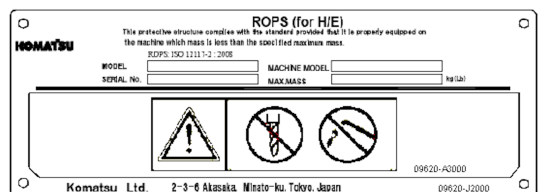
(19) Caution for high-temperature (09817-K064B)



**Warning for handling ROPS**

(20) Caution for machine with ROPS (09620-J2001, 09620-A3001)

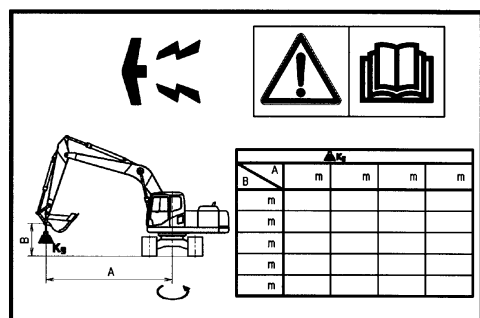
- If any modification is applied to the ROPS, it may affect the strength and may not comply with the standard.
- ROPS may provide less protection if it has been structurally damaged or involved in roll-over.
- Always wear seat belt when moving.



**Caution for overloading machine**

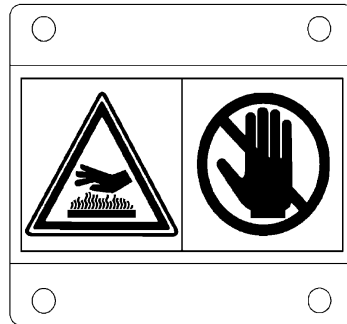
(21) Overload caution

- Do not exceed the safe working loads.



**Caution for high-temperature**

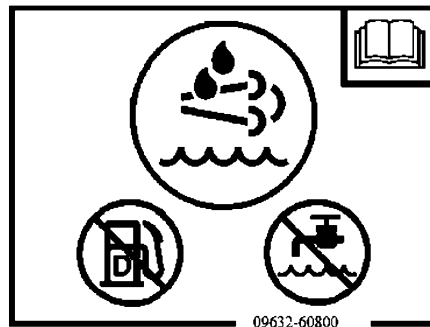
(22) Caution for high-temperature



**Caution for handling DEF**

(23) DEF (Diesel Exhaust Fluid) (09632-60800)

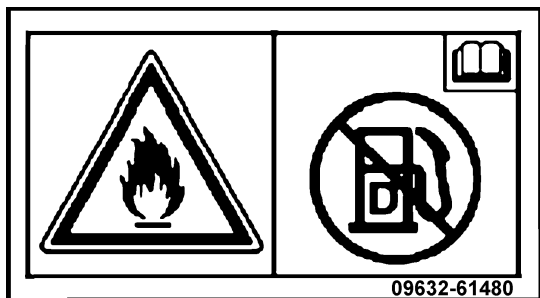
- To avoid engine damage or fire, fill with Diesel Exhaust Fluid (DEF) only.
- Never use diesel fuel.



**Caution for handling DEF**

(24) Caution for handling DEF (09632-61480)

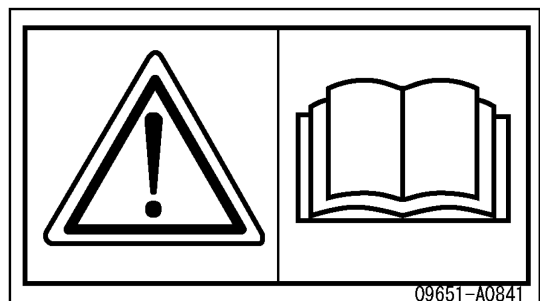
- To avoid engine damage or fire, fill with Diesel Exhaust Fluid (DEF) only.
- Never use diesel fuel.



**Warning for operation, inspection and maintenance**

(25) Warning for operation, inspection and maintenance (09651-A0841)

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





# 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

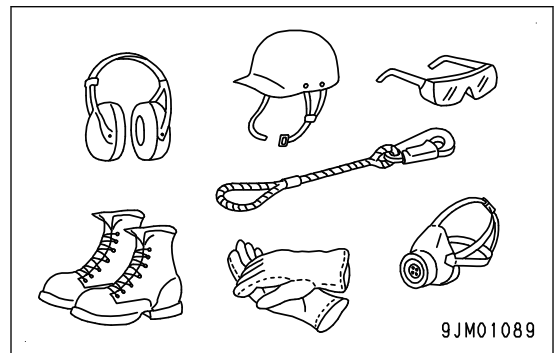
- Be sure that all guards, covers, cameras, and mirrors are in their proper position. Repair them immediately if they are damaged.
- Understand the using method of the safety related devices and use them properly.
- Never remove any safety related devices. Always keep them in good operating condition.

### 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

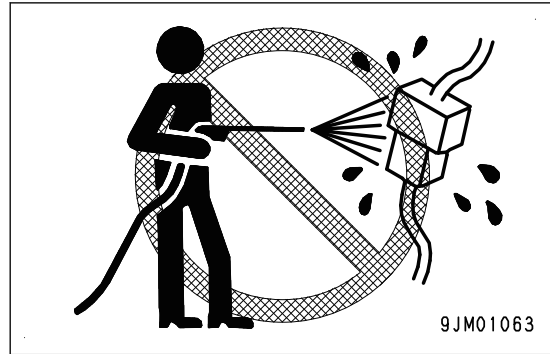
- Do not wear loose clothes or any accessories. If any of these catch the control levers or protruding parts, it may cause the machine to move unexpectedly, it is extremely dangerous.
- Always wear a hard hat and safety shoes. Wear protective eyeglasses, mask, gloves, ear plugs, and safety belt when 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.



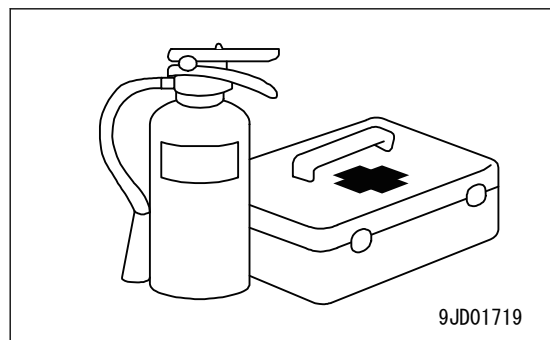
**PRECAUTIONS FOR INSIDE OPERATOR'S COMPARTMENT**

- 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.

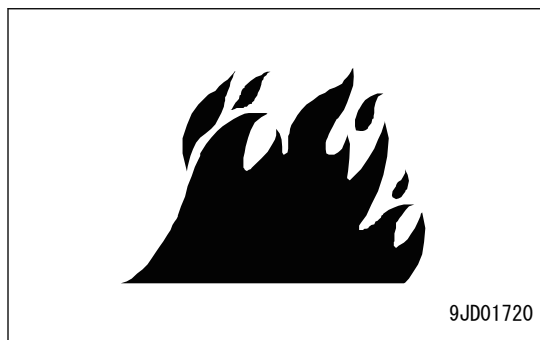
- After a fire, harmful compounds may be left. If it touches your skin, it may have a bad influence on your body.  
Be sure to wear rubber gloves when handle the materials left after the fire.  
The material of the gloves, which is recommended is polychloroprene (Neoprene) or polyvinyl chloride (in the 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 combustible 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 spreading from sparks or burning particles from other fires, remove any combustible materials such as dry leaves, chips, pieces of paper, coal dust, or any other combustible materials accumulated around the cooling system (radiator, oil cooler) or inside the undercover.

### Fire coming from electric wiring

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

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

### Fire caused from piping

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

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

### Fire around the machine due to highly heated exhaust gas

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

KDPF is a device to purify the soot in the exhaust gas. Exhaust gas temperature may increase during the after-treatment devices regeneration. Do not bring any combustible material close to the outlet of the exhaust pipe.

When there are thatched houses, dry leaves or pieces of paper near the job site, set the system to the regeneration disable to prevent fire hazards due to highly heated exhaust gas during the aftertreatment devices regeneration. For setting, see "HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)".

### Explosion caused by lighting equipment

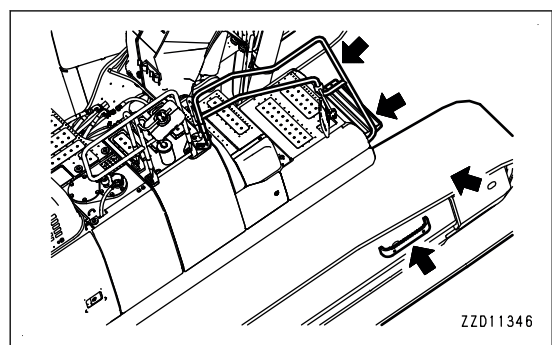
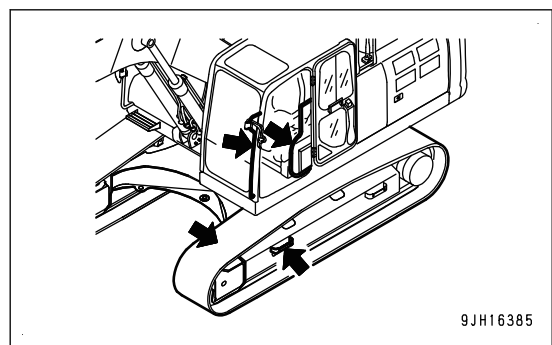
- When checking fuel, oil, battery electrolyte, or coolant, always use lighting with anti-explosion specifications.
- When taking the electrical power for the lighting equipment from the machine, see "POWER SUPPLY OUTLET (3-106)".

## PRECAUTIONS WHEN GETTING ON OR OFF MACHINE

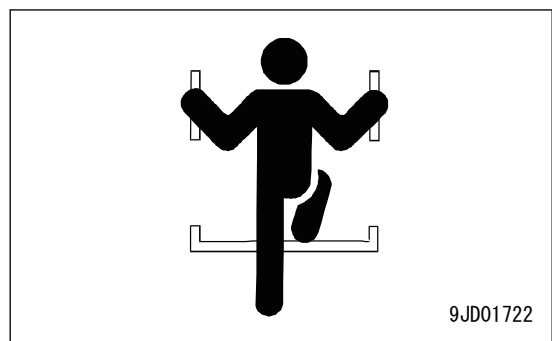
### USE HANDRAILS AND STEPS WHEN GETTING ON OR OFF MACHINE

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.
- Do not climb on the step if it is damaged.
- Damaged steps must be repaired immediately. Please consult your Komatsu distributor and ask for repair or replacement of the step.



- 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.
- Do not grab a foldable mirror as a handrail since it turns.

### 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.

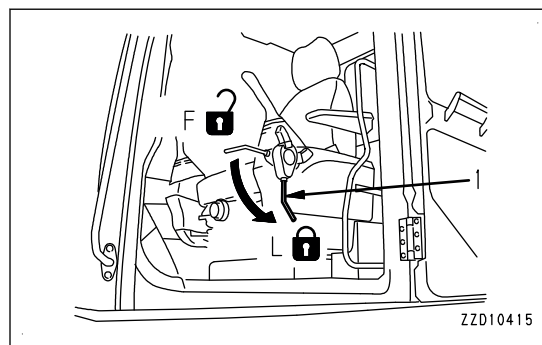
### NO PEOPLE ON ATTACHMENTS

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 to the ground, set lock lever (1) to LOCK position (L), and stop the engine.

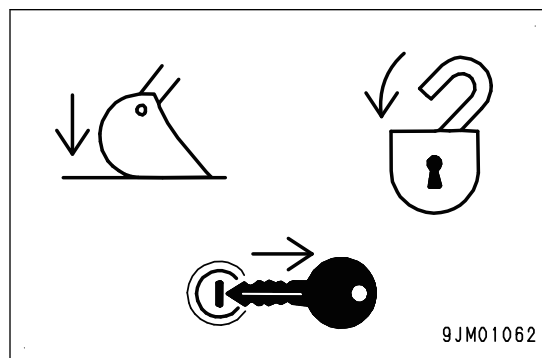
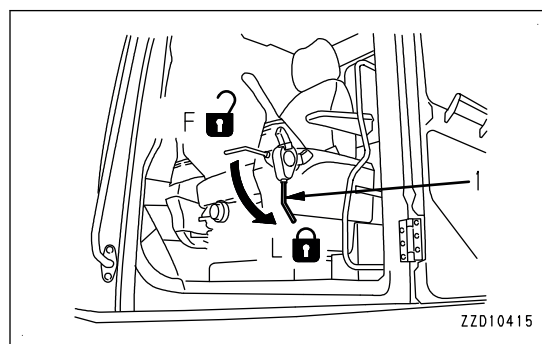
If the control levers are touched by mistake, there is danger that the machine may suddenly move and cause serious personal injury or death.



### 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 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.
- 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.

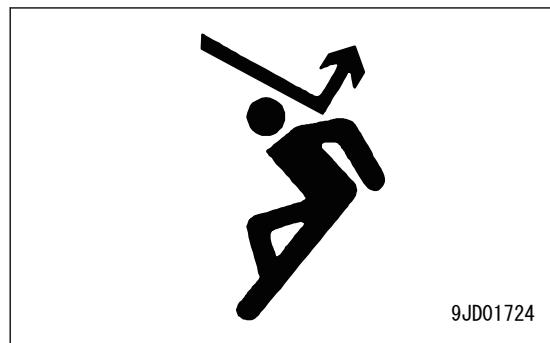
## PRECAUTIONS RELATED TO PROTECTIVE STRUCTURES

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.



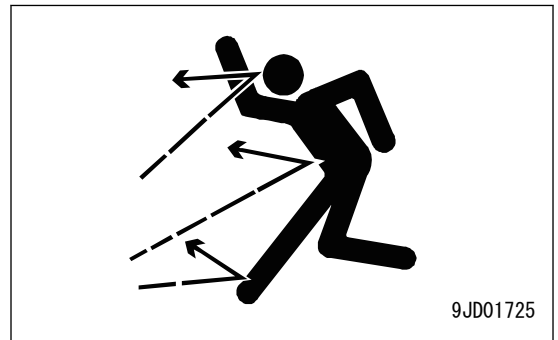
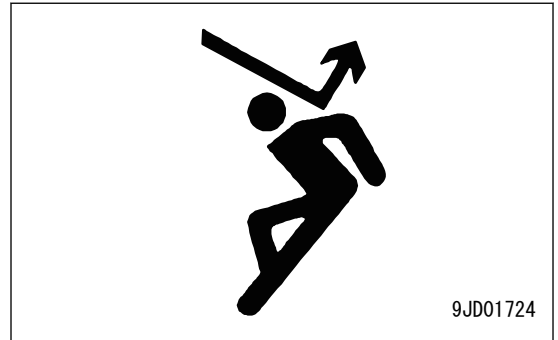
## PROTECTION AGAINST FALLING, FLYING OR INTRUDING OBJECTS

On jobsite where there is a danger of falling objects, scattering fragments, and things which may intrude into operator's cab, install the necessary equipment to protect the operator depending on the working conditions.

- When operating on jobsite, such as mines or quarries where there is a hazard of falling rocks, install falling object protective structure (FOPS) and a front guard, and use a fully transparent laminated coating sheet on the front glass. Keep all the windows and doors closed when operating. In addition, always check that there is no one except the operator in the surrounding area where there is a danger of falling objects, scattering fragments.
- When performing breaker operations, install a front guard and use a fully transparent laminated coating sheet on the front glass. Keep all the windows closed when operating. In addition, always check that there is no one except the operator in the surrounding area where there is a danger of scattering fragments.

Above precautions are developed for the standard jobsite. Depending on the conditions of the jobsite, installation of additional guards is necessary.

Do not operate the machine without the necessary guards. 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)
- Front window guard

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 personal injuries, product failures, physical loss or damage, or influence on the environment resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.
- When installing optional parts or attachments, contact your Komatsu distributor for advice to any potential problems or safety and legal requirements.

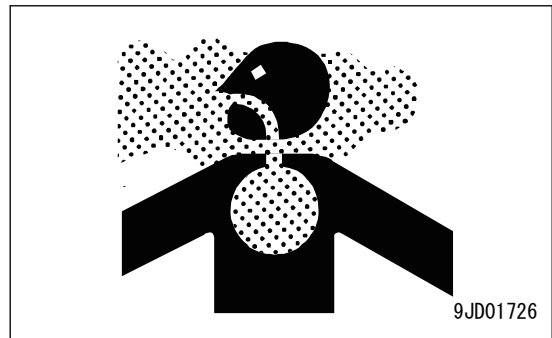
- The machine weight will not exceed ROPS certified value as long as the optional attachments written in the attachment combination table of this manual are installed. When installing optional parts or attachments which are not written in this manual, the machine weight must not exceed ROPS certified 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.





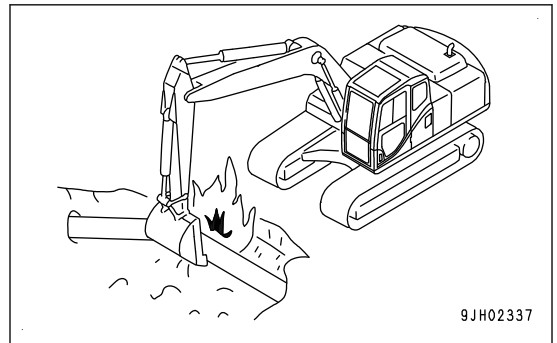
# PRECAUTIONS FOR OPERATION

## 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

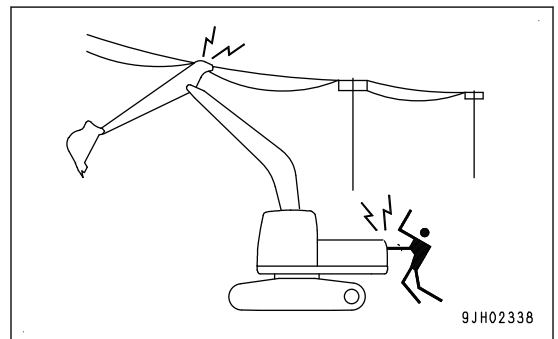
- Avoid driving or operating the machine near the edge of cliffs, road edges, and deep ditches. The ground may be weak in such areas. If the ground should collapse under the weight or vibration of the machine, there is a hazard that the machine may fall or tip over. Remember that the soil is weak in 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.

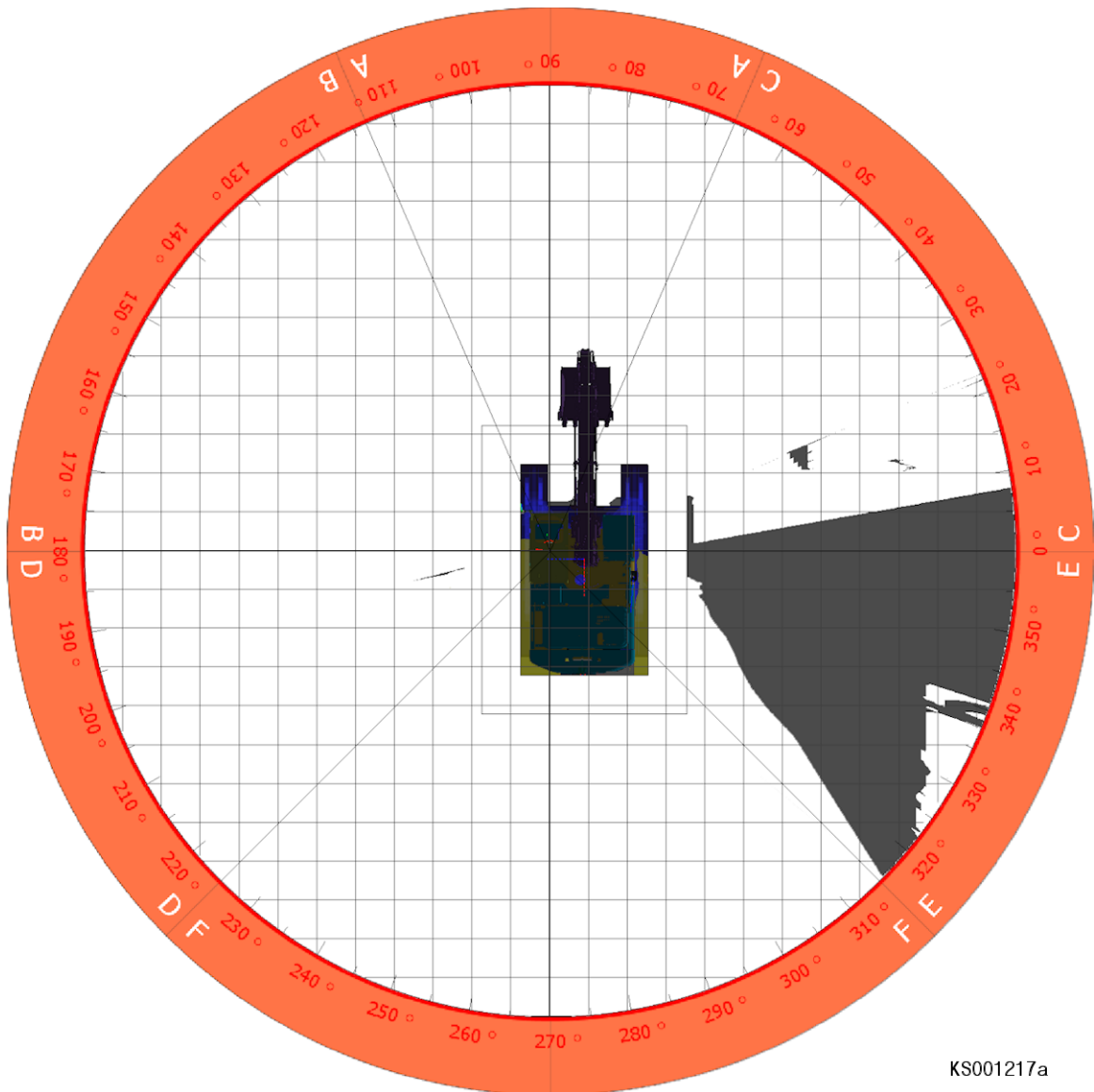
## ENSURE GOOD VISIBILITY

To assist with job site organisation during use of this machine, a visibility map is provided that shows an approximation of any masking to visibility between the 1m rectangular boundary and the 12m test circle.

Based upon the information supplied in the visibility map the site operator may wish to provide additional measures where it is felt necessary or provide additional instruction to personnel.

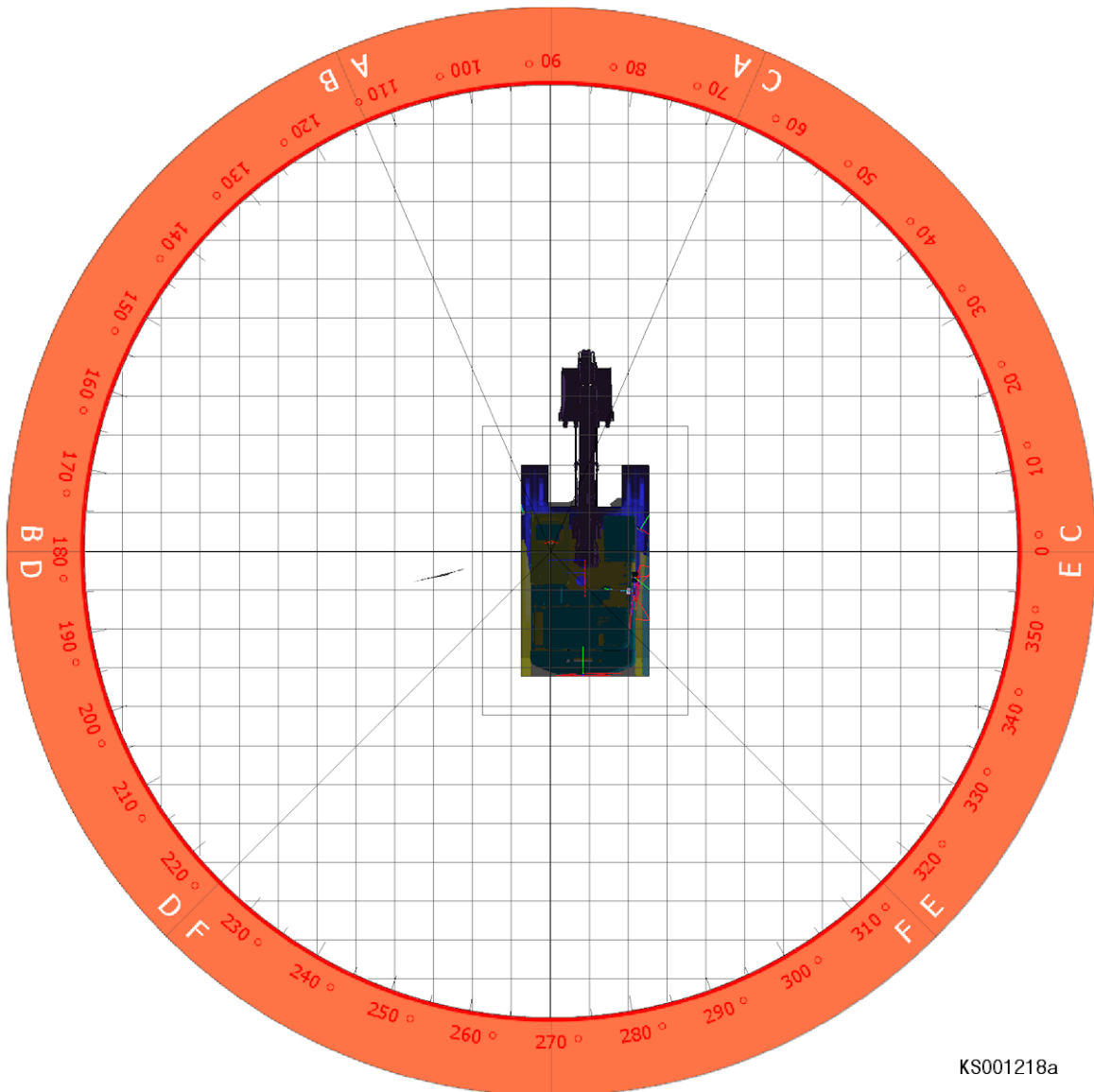
Scale - 1 grid line is equal to 1m

Map with mirror and rear view camera visibility aids fitted



KS001217a

Map with mirror, rear view camera, side view camera visibility aids fitted



KS001218a

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

When 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 headlamps 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.

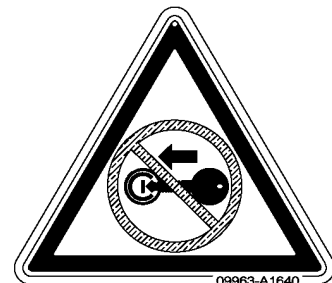
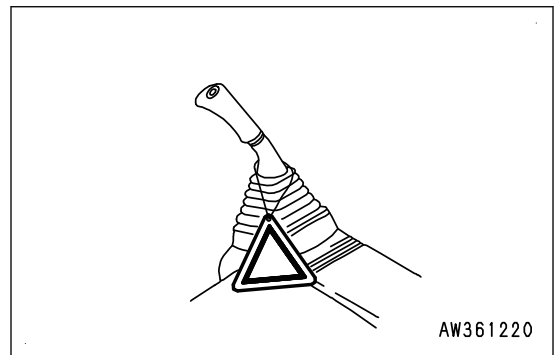
This machine does not contain asbestos, but any part which is not the genuine part, it has risk of containing asbestos. Always use Komatsu genuine parts.



## 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.

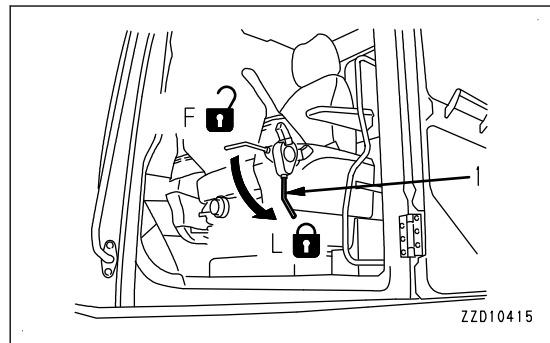


## CHECKS AND ADJUSTMENT BEFORE STARTING ENGINE

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 (3-139)”.
- 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, 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 (3-156)”.
- 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 (3-162)”.
- Adjust the armrest to a position for easier operation, and fix it securely. Operation in an improper position can cause a serious personal injury or death.  
For the adjustment, see “METHOD FOR ADJUSTING OPERATOR'S SEAT (3-152)”.
- Check that there are no persons or obstacles 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.

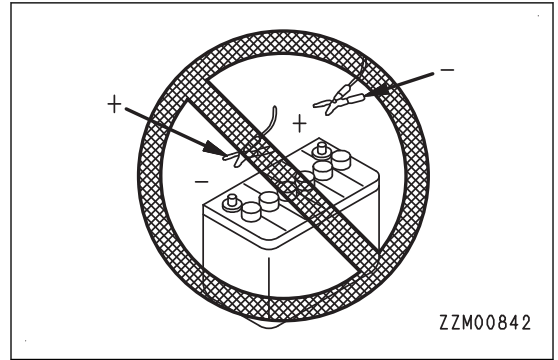
## IN COLD WEATHER

- 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 (3-109)". 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 (3-265)".



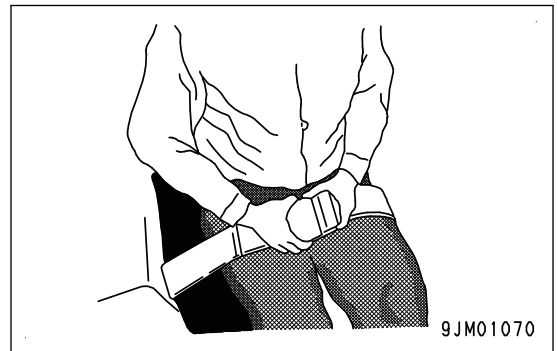
## PRECAUTIONS FOR OPERATION

### 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.

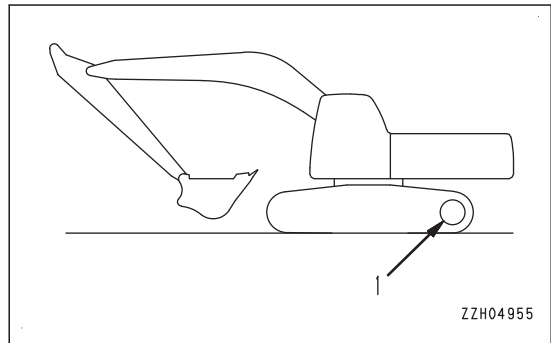
When performing the checks, move the machine to a wide area with no obstructions, and pay careful attention to the surroundings. Prohibit other personnel from coming close to the machine during checks.

- 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.

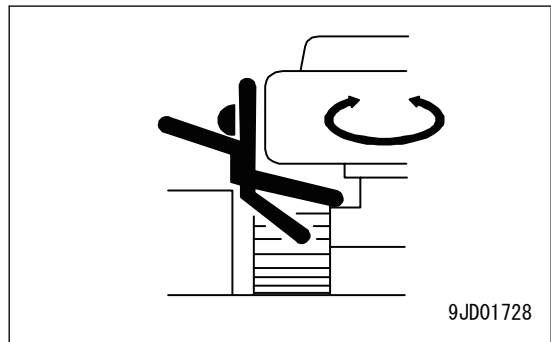
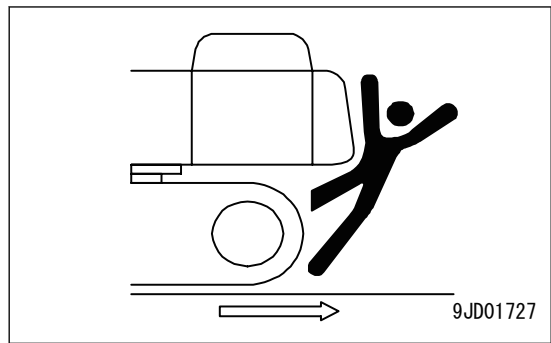


### WHEN TRAVELLING IN FORWARD OR REVERSE AND SWINGING

- 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 are no people or obstacles 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.

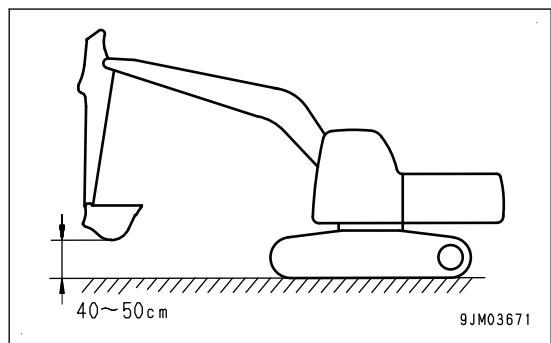


Always be sure to perform the above precautions even when the machine is equipped with mirrors and cameras.

### PRECAUTIONS WHEN TRAVELLING

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

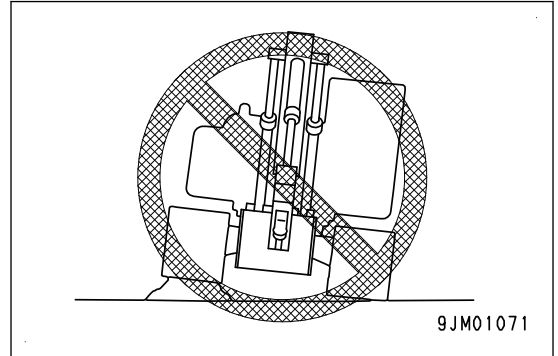
- When driving the machine or performing operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When travelling on a level ground, keep the work equipment approximately 40 to 50 cm above the ground. If that height is not maintained 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.

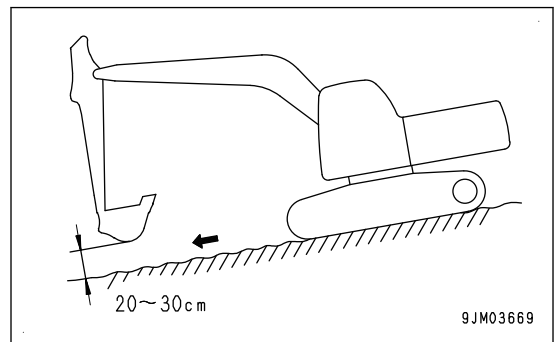
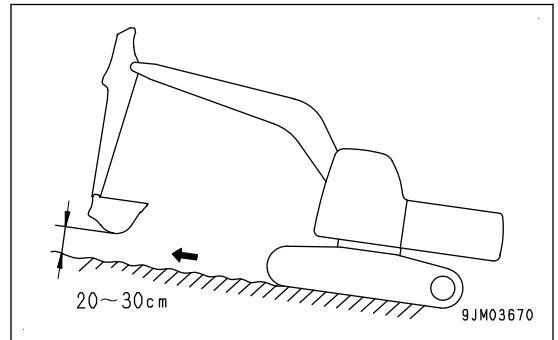
- Try to avoid travelling over obstacles. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. The machine tips over easily to the right or left. Do not drive it over obstacles which make the machine tilt largely to the right or left.
- When 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 passing on a public road, check with authorities concerned and observe their instruction.
- 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.



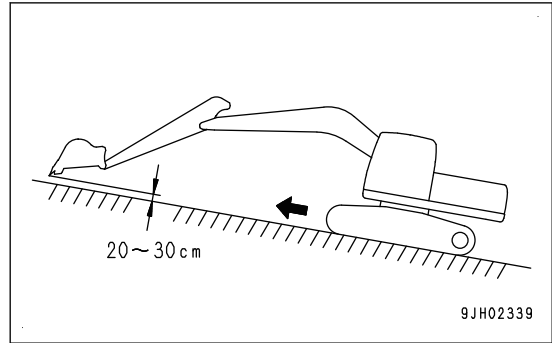
## PRECAUTIONS WHEN TRAVELLING ON SLOPES

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

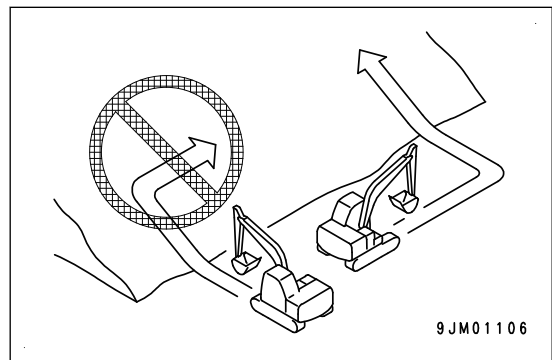
- Keep the work equipment approximately 20 to 30 cm above the ground. In case of emergency, lower the work equipment to the ground immediately to help stop the machine.
- When driving the machine up slopes, set the operator's cab facing uphill, when driving downhill, set the operator's cab facing downhill.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



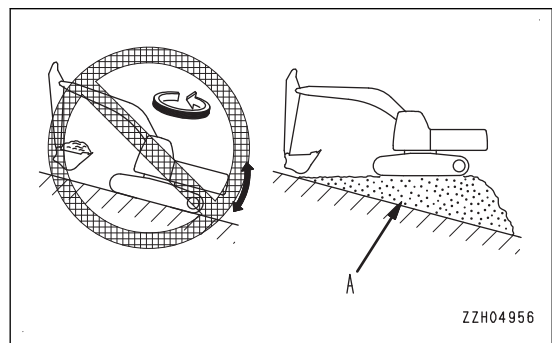
- When driving the machine downhill, lower the engine speed, keep the travel lever close to NEUTRAL position, and drive it at low speed.
- Always drive the machine straight up or down a slope. Driving the machine at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or drive 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.
- Drive the machine at low speed on the grass or fallen leaves. Even with slight slopes, there is a hazard that the machine may slip.
- If the engine 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**

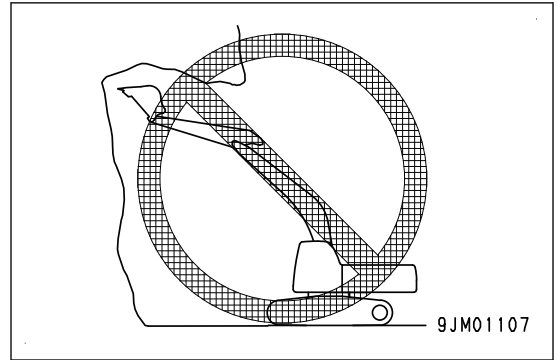
- When working on slopes, there is a hazard that the machine may lose its balance and turn over when performing swing or work equipment operations. This may lead to serious personal injury or death. Always provide a stable place when performing these operations, and operate carefully.
- Do not swing 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.



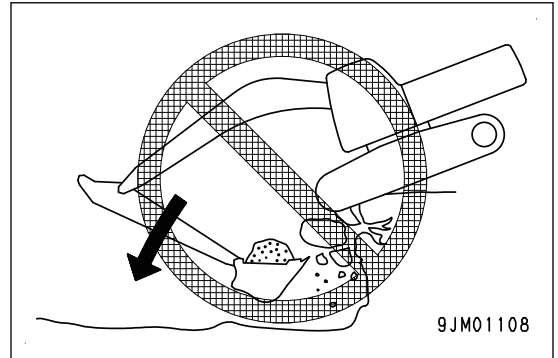
**PROHIBITED OPERATIONS**

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.

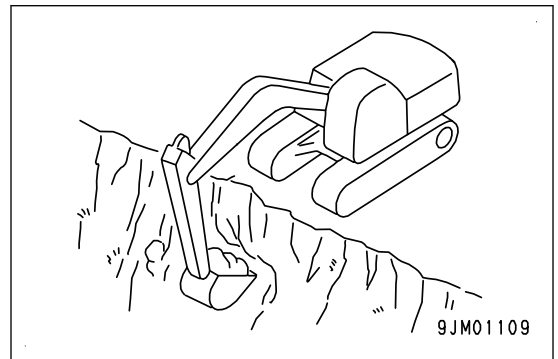
- It is dangerous to work under an overhang. Mudslide or rockfall may occur, or the overhang may collapse. Never perform digging under an overhang.



- Do not excavate too deeply under the front of the machine. The ground under the machine may collapse and cause the machine to fall.

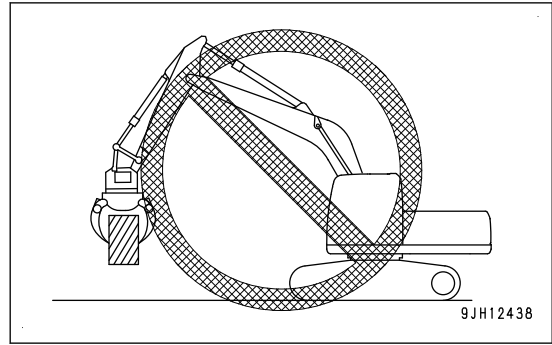


- For a quick escape in an emergency, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when performing operations.



- 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.



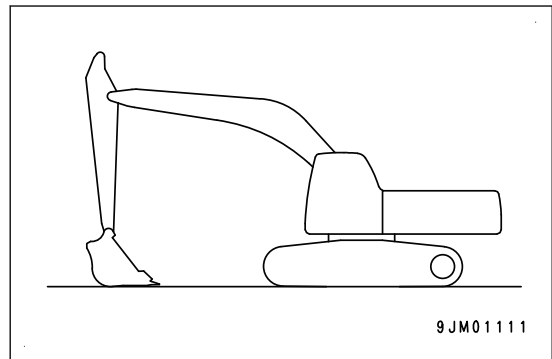
**PRECAUTIONS WHEN OPERATING ON SNOW OR FROZEN SURFACES**

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

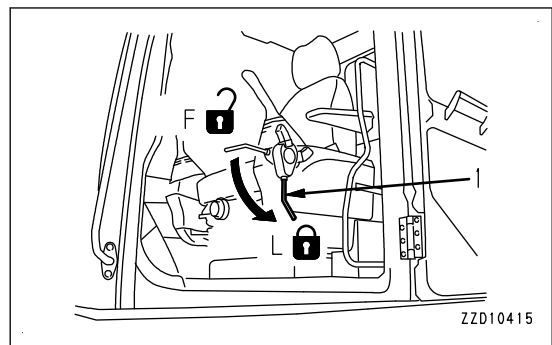
**PRECAUTIONS WHEN PARKING MACHINE**

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

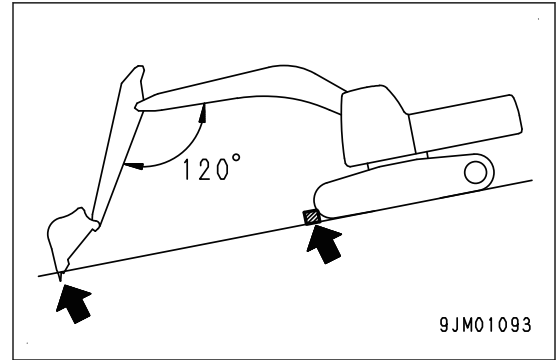
- Park the machine on a firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.
- Lower the work equipment to the ground.



- 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.
- When the machine is transported on a public road, notify the authorities concerned and receive permission of the transportation from them.
- 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.

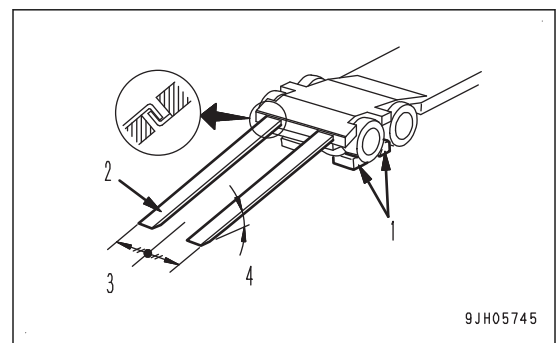
(1) Chocks

(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 (3-156) and “STOW ANTENNA (3-235)”.  
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 (3-236)”.
- 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.

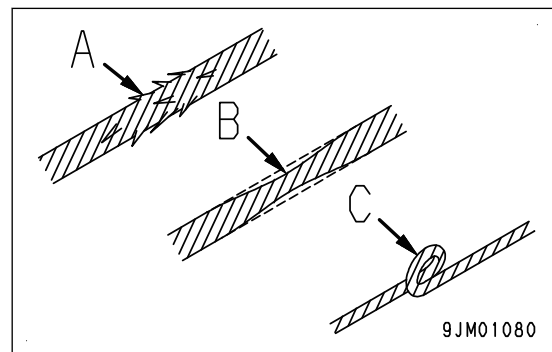
## TOWING AND BEING TOWED

### 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 (3-261)”.

- 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

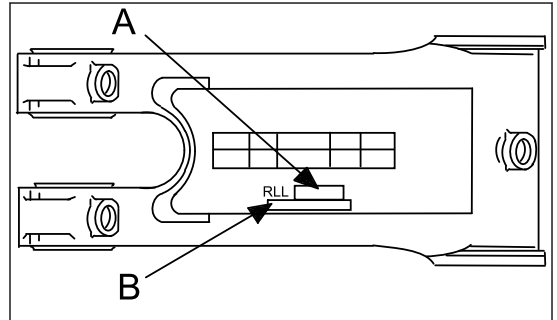
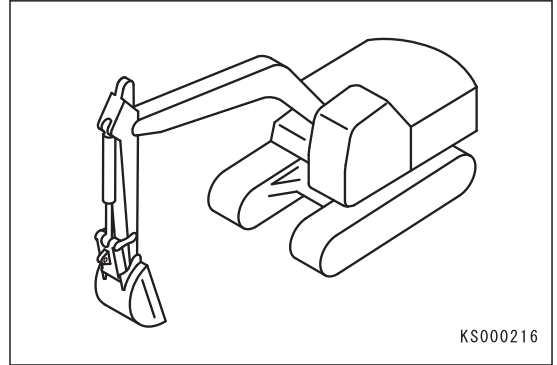
**RLL (Rated Lifting Load) for the link may not be the same as the lifting capacity of the machine. Always be sure to lift within the relevant lifting limits.**

- 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.

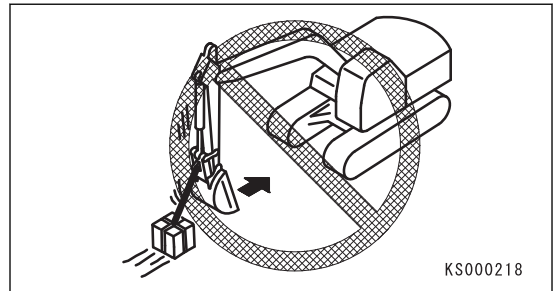
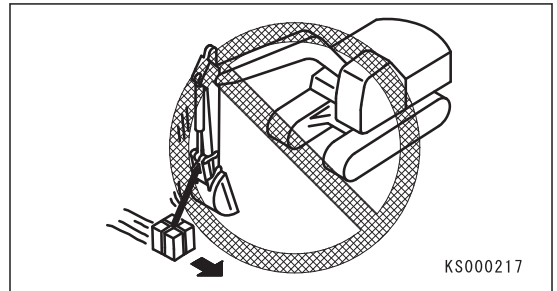
(A) RLL (Rated Lifting Load) number.

(B) Part number.



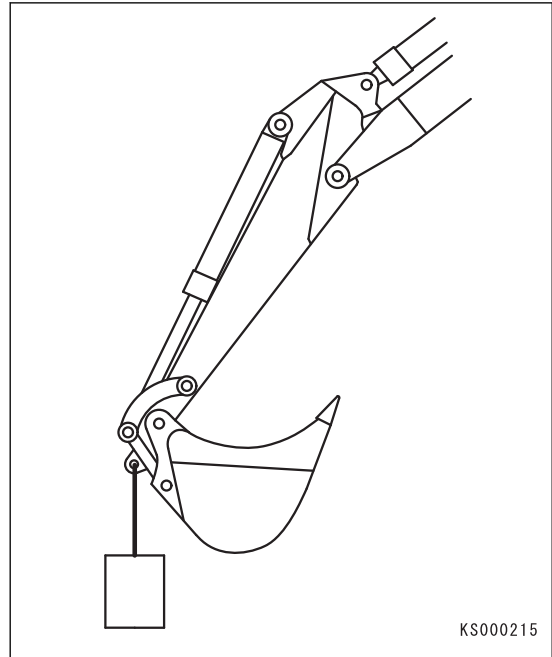
- Do not use the work equipment or swing to pull the load in any direction.

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

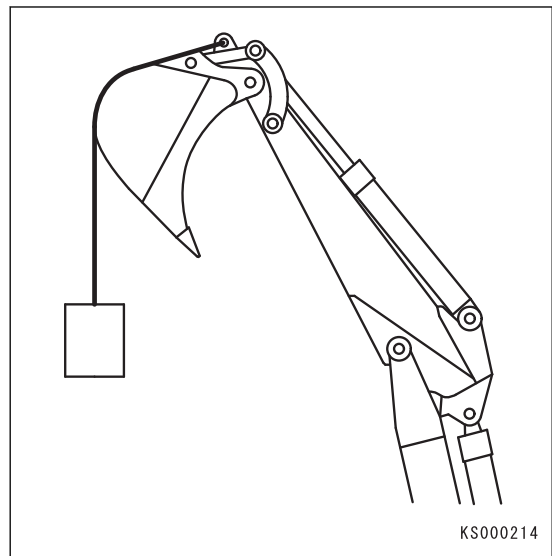


- The operator or person attaching the sling should inspect the bucket link lifting device and all the components in the load line (e.g. chains, shackles etc.) visually for damage or deformation before use to ensure that they are not damaged or worn.

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.**

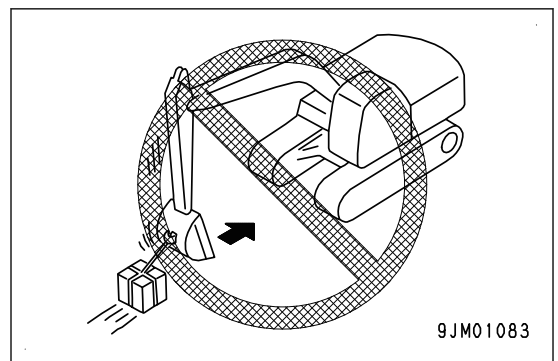
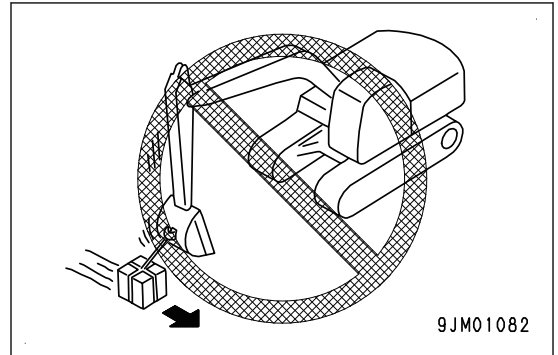
- All components in the load line (eg. chains, shackles etc.) must be rated correctly for the load to be lifted.
- It is dangerous if the raised load hits any person or structure. When swinging or operating the work equipment, check carefully that the surrounding area is safe.



- 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

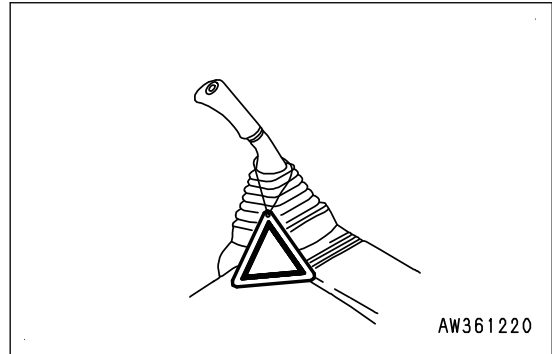
During inspection and maintenance, always display the "DANGER! Do NOT operate!" warning tag.

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.

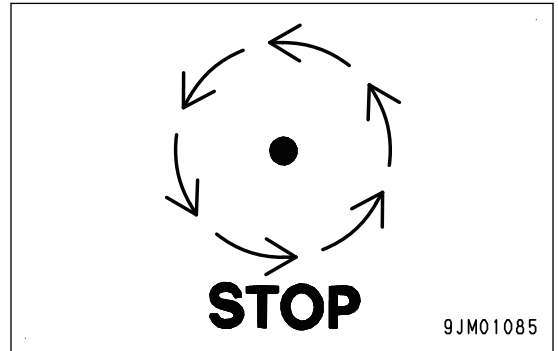
## END OF SERVICE LIFE

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

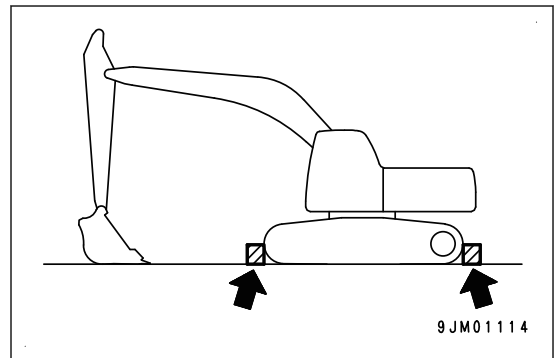
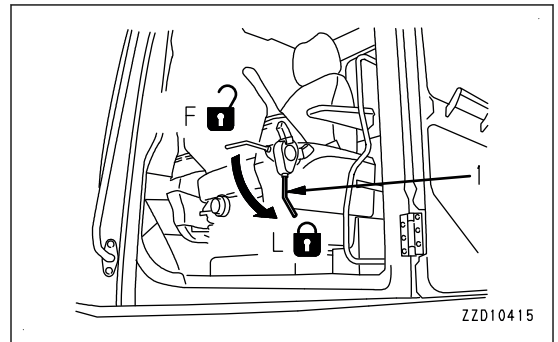
## STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

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.

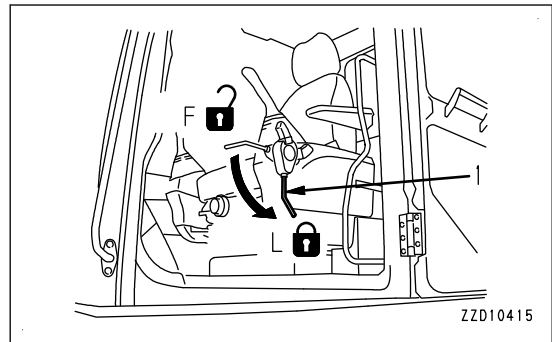
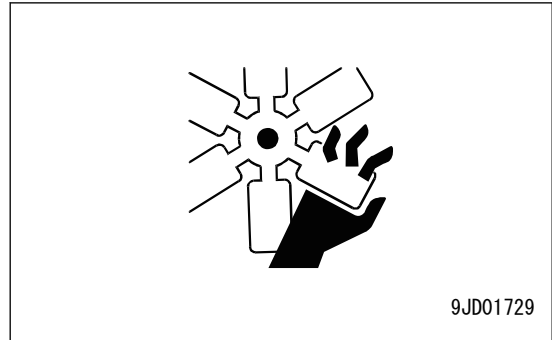


## TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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.

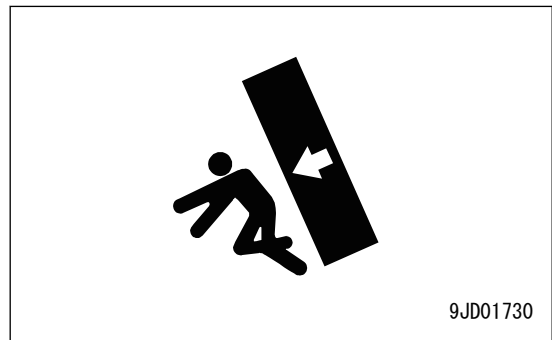
- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.

- 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.
- If the automatic active regeneration of KDPF starts during maintenance work, surroundings of KDPF become high temperature. When performing maintenance work, perform regeneration disable of KDPF according to “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)”.
- 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 CHECKING AND RELEASING NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (FOR CONTROL CIRCUIT) (4-64)”.
- 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.

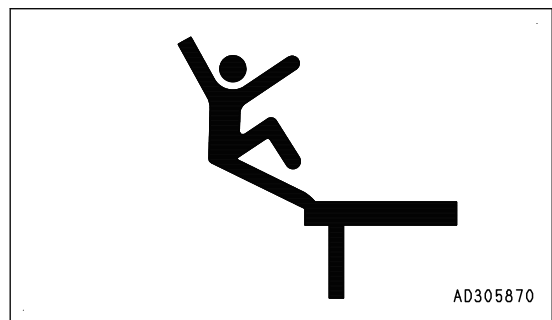


**PRECAUTIONS FOR WORKING AT HIGH PLACES**

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

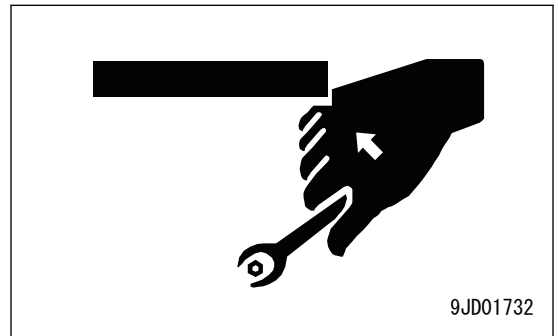
Machine or work equipment may fall, and it is dangerous that serious personal injury or death may occur. Always observe the following.

- 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.

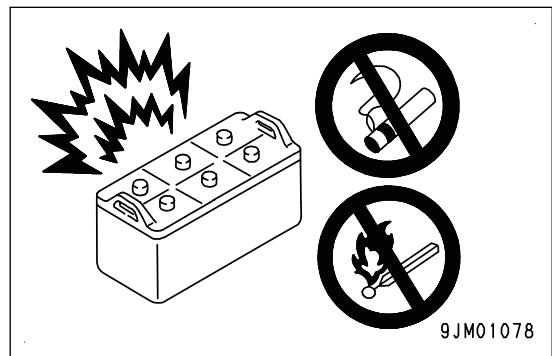
**HANDLE BATTERY**

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.

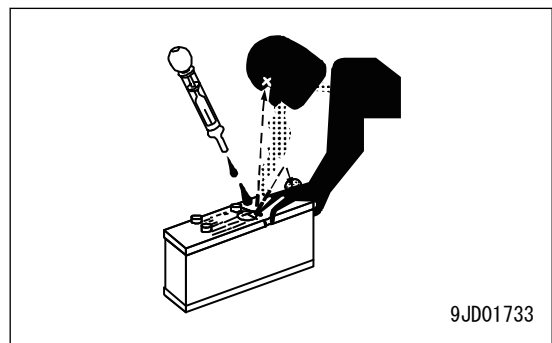
- Do not use or charge the battery if the battery electrolyte is below LOWER LEVEL mark. This may cause an explosion. Always perform periodic inspection of the battery electrolyte level, and add purified water (such as a commercial battery fluid) to UPPER LEVEL mark.
- Do not use a dry wipe to clean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

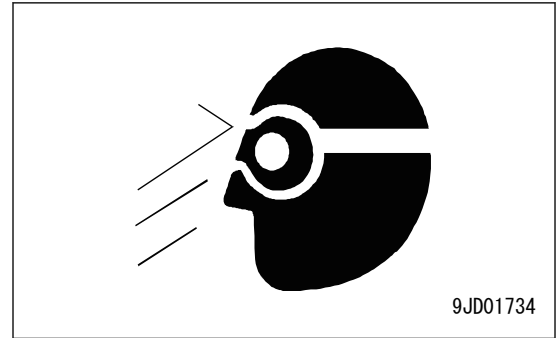
- Do not let tools or other metal objects make any contact between the battery cables. Do not leave tools lying around near the battery.
- When removing the battery cables, turn the starting switch to OFF position and, after checking that the system operating lamp goes out, set the battery disconnect 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.

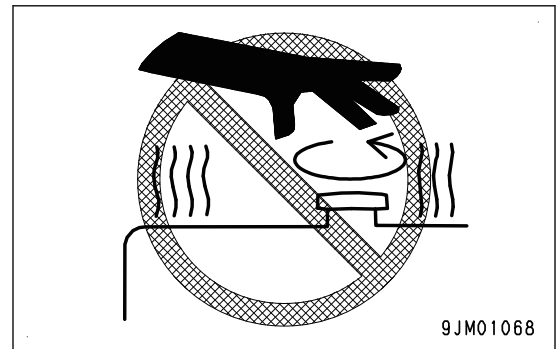
- When hitting pins or bucket teeth, broken pieces may be scattered, and it may cause personal injury to the people in the surrounding area. Always check that there is no one in the surrounding area.

- 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.



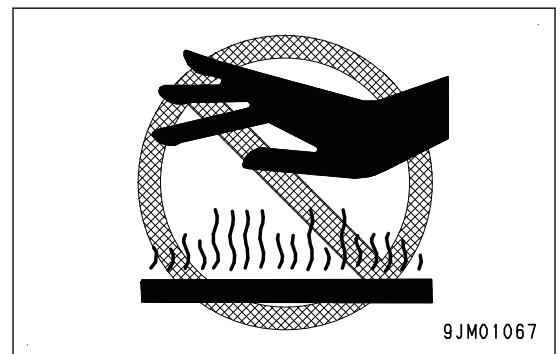
### PRECAUTIONS FOR HIGH-TEMPERATURE COOLANT

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



### PRECAUTIONS FOR HIGH-TEMPERATURE OIL

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



### PRECAUTIONS FOR HIGH-TEMPERATURE PARTS

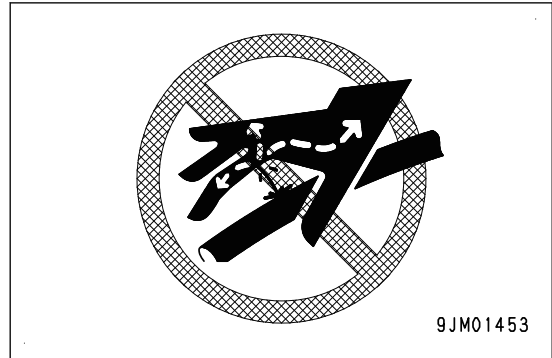
To prevent burns from touching high-temperature parts, when checking or performing maintenance after stopping engine, check the parts have been cooled down to touch with bare hand before checking or maintenance.

### PRECAUTIONS FOR HIGH-PRESSURE OIL

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

- Do not perform inspection or replacement work with the circuit under pressure.
- 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.

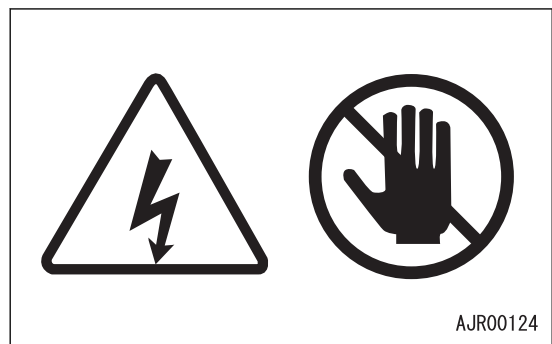
If any damaged or deformed hoses or piping are found, consult your Komatsu distributor.

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

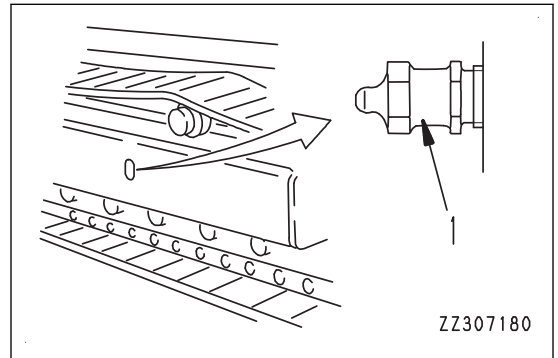
When performing maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.

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



## PRECAUTIONS FOR HIGH-PRESSURE GREASE WHEN ADJUSTING TRACK TENSION

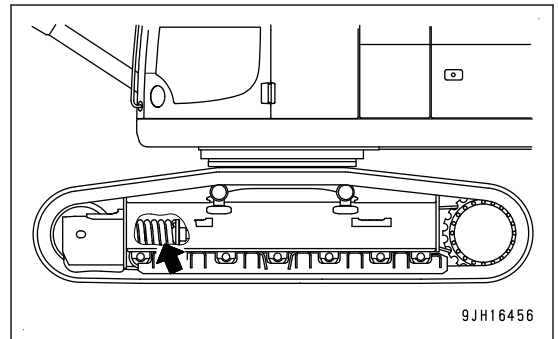
- Grease is pumped into the track tension adjustment system under high pressure. If the specified procedure for maintenance is not followed when making adjustment, grease drain plug (1) may fly out and cause serious injury or death or property damage.
- When loosening grease drain plug (1) to loosen 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.

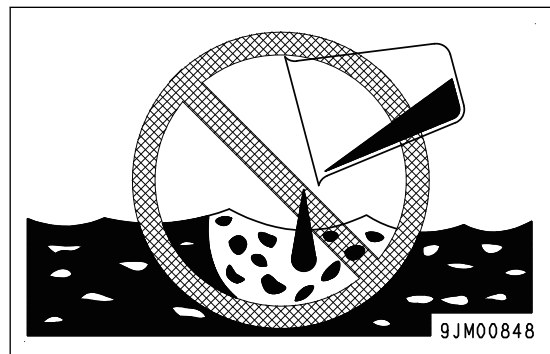
If any doubt exists, contact your Komatsu distributor.

See also “PRECAUTIONS FOR DISPOSING OF WASTE MATERIALS (2-50)” and “MAINTENANCE OF AIR CONDITIONER (2-50)”

**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.

### SAFETY RULES FOR STORAGE

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. For the method of storing, see "STORE DEF (4-8)".

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

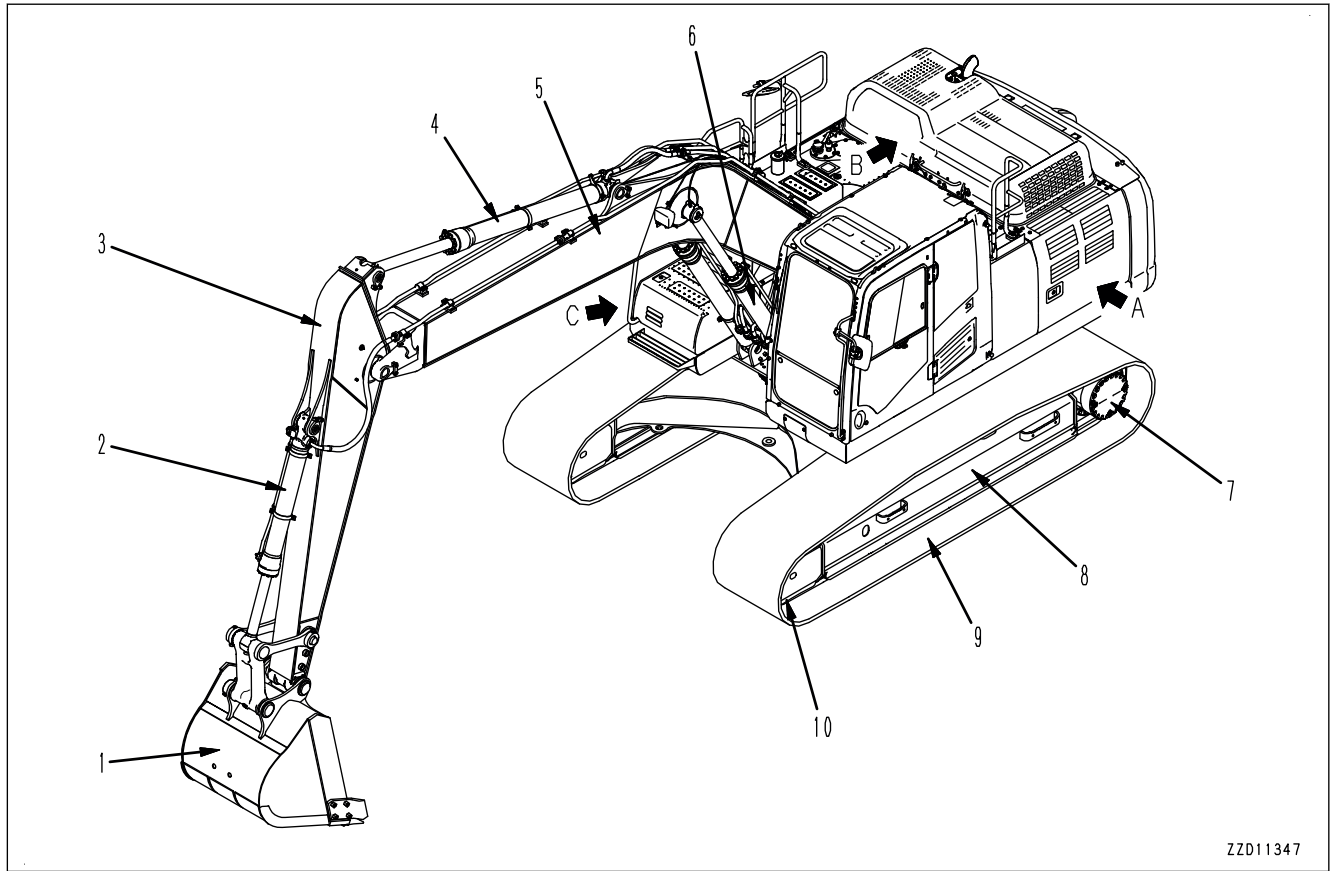
## **WARNING**

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

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# GENERAL VIEW

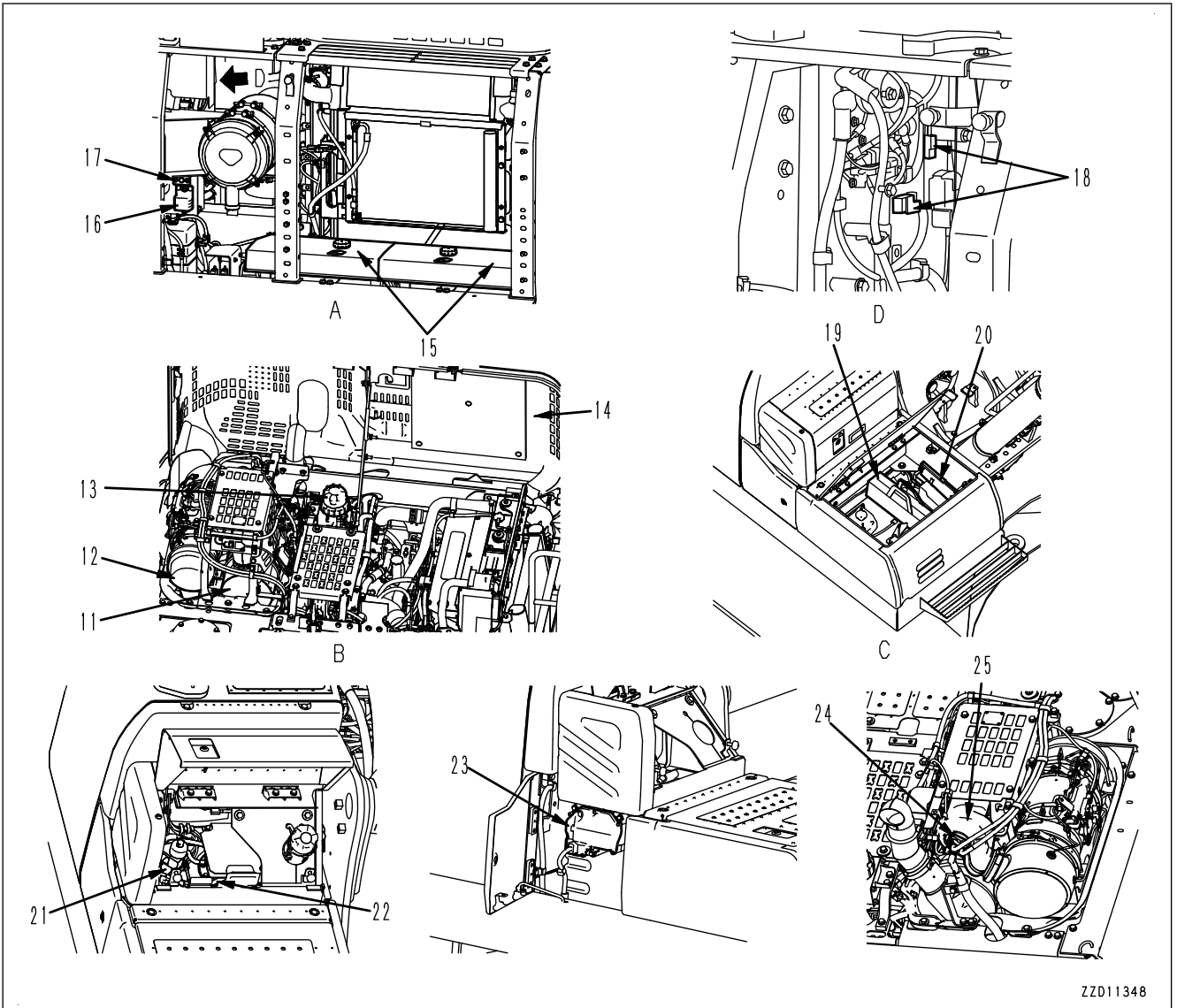
## MACHINE EQUIPMENT NAME



ZZD11347

- |                     |                   |
|---------------------|-------------------|
| (1) Bucket          | (6) Boom cylinder |
| (2) Bucket cylinder | (7) Sprocket      |
| (3) Arm             | (8) Track frame   |
| (4) Arm cylinder    | (9) Track         |
| (5) Boom            | (10) Idler        |

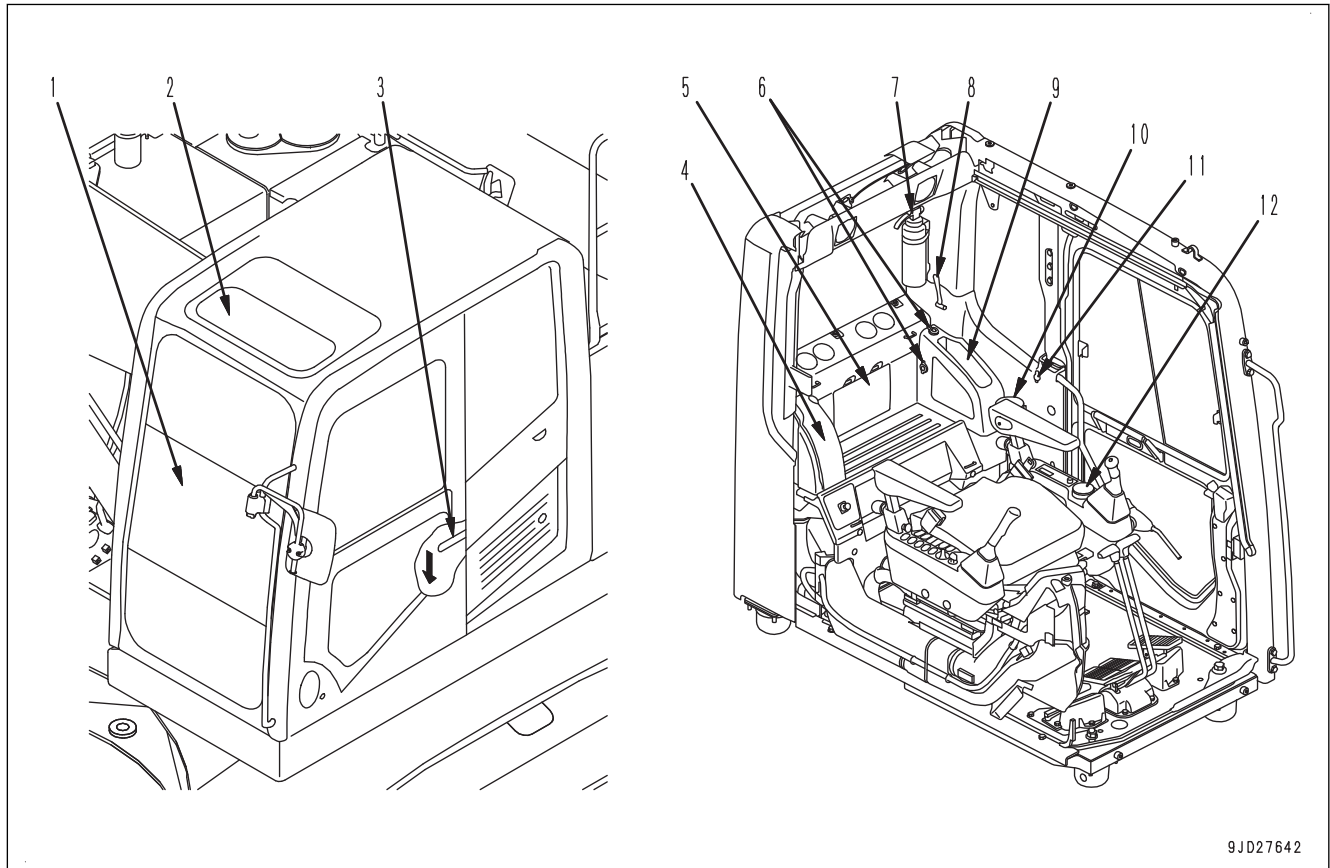
Details of parts A, B, C, D



ZZD11348

- (11) SCR
- (12) KDPF
- (13) Komatsu Closed Crankcase Ventilation (hereafter KCCV) ventilator
- (14) Engine hood
- (15) Battery
- (16) Battery disconnect switch
- (17) System operating lamp
- (18) Fusible link
- (19) Toolbox
- (20) Grease pump holder
- (21) DEF tank
- (22) DEF hose
- (23) DEF pump
- (24) DEF injector
- (25) DEF mixing tube

### CAB EQUIPMENT NAMES

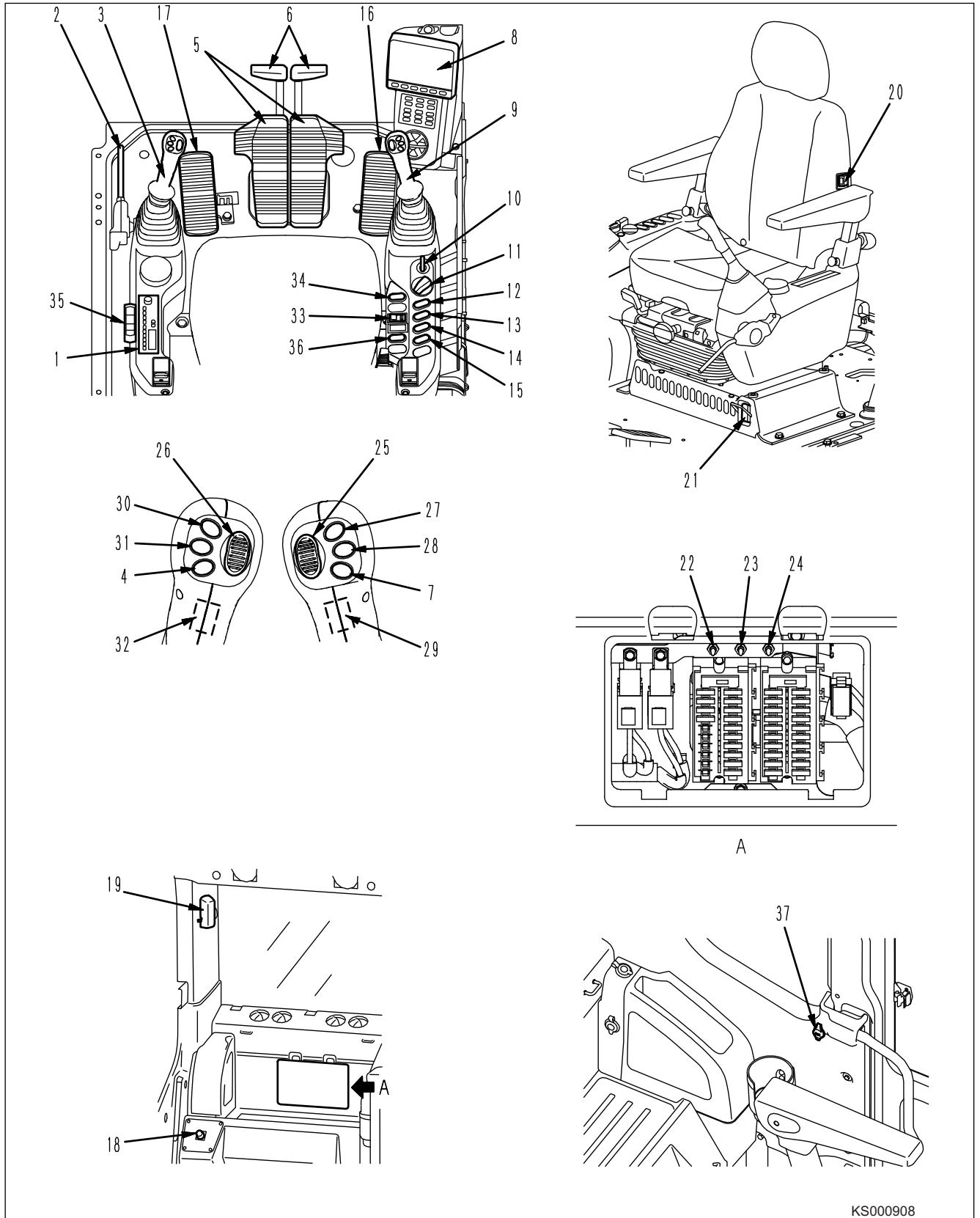


- (1) Front window
- (2) Ceiling window
- (3) Door lock release lever
- (4) Drink box
- (5) Fuse
- (6) Auxiliary electric power (if equipped)

- (7) Fire extinguisher (if equipped)
- (8) Emergency escape hammer
- (9) Magazine box
- (10) Cup holder
- (11) AUX
- (12) Ashtray



**CONTROLS AND GAUGES NAMES**

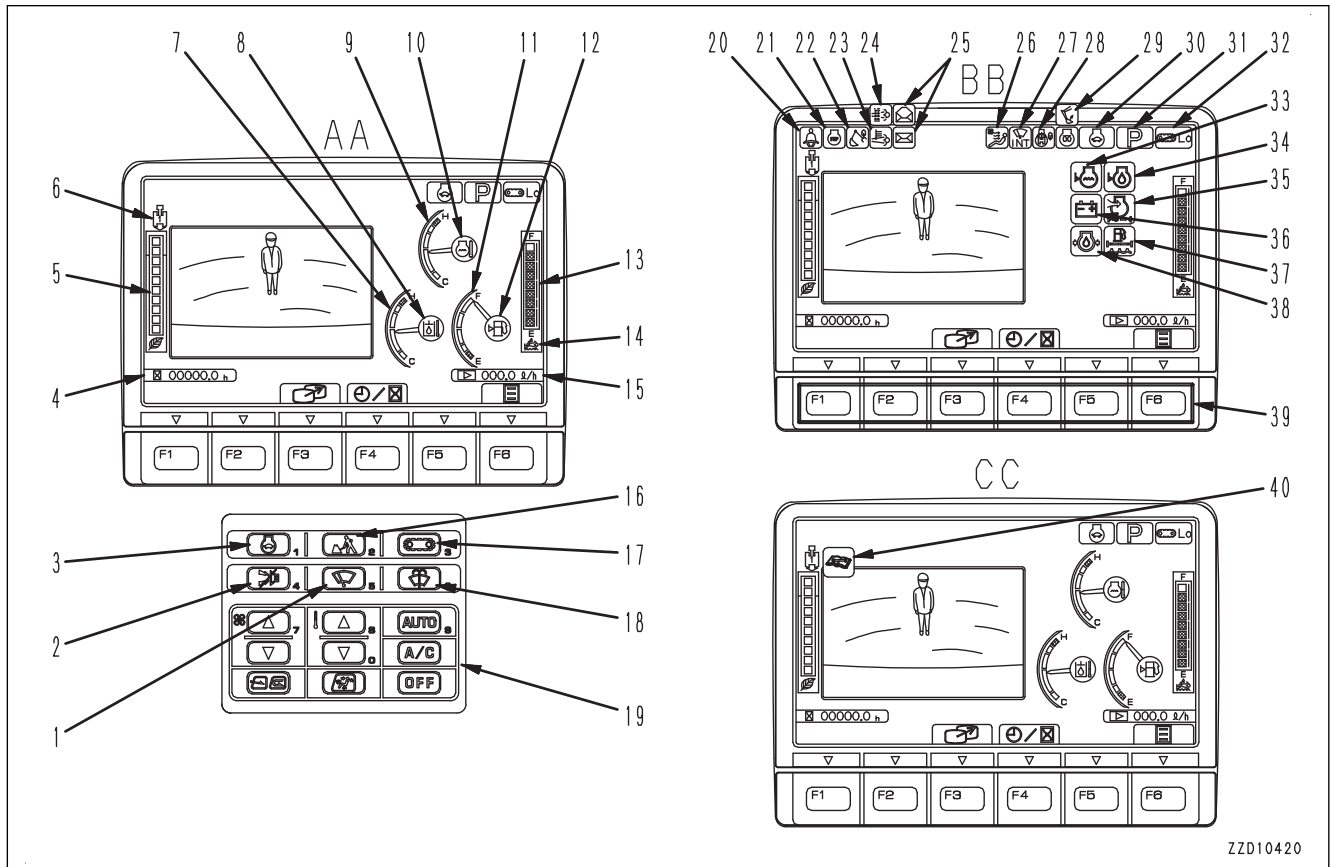


- (1) Radio
- (2) Lock lever
- (3) L.H. work equipment control lever

- (4) One-touch power maximizing switch
- (5) Travel pedal
- (6) Travel lever

- (7) Horn switch
- (8) Machine monitor
- (9) R.H. work equipment control lever
- (10) Starting switch
- (11) Fuel control dial
- (12) Lamp switch
- (13) Swing lock switch
- (14) Revolving lamp switch (if equipped)
- (15) Ceiling window wiper switch (if equipped)
- (16) Attachment control pedal (if equipped)
- (17) Attachment control pedal (if equipped)
- (18) Cigarette lighter
- (19) Room lamp switch
- (20) Seat heater switch
- (21) Engine shutdown secondary switch
- (22) Pump secondary drive switch
- (23) Swing parking brake cancel switch
- (24) Lock lever automatic lock cancel switch
- (25) 1st attachment proportional control switch
- (26) 2nd attachment proportional control switch (if equipped)
- (27) Breaker switch
- (28) Spare switch
- (29) Spare switch
- (30) Quick coupler switch
- (31) Spare switch
- (32) Spare switch
- (33) Quick coupler switch
- (34) Lower wiper switch
- (35) Automatic grease system monitor (if equipped)
- (36) Additional lamps switch (if equipped)
- (37) AUX

**MACHINE MONITOR EQUIPMENT NAME**



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 direction display
- (7) Hydraulic oil temperature gauge
- (8) Hydraulic oil temperature caution lamp
- (9) Engine coolant temperature gauge
- (10) Engine coolant temperature caution lamp

- (11) Fuel gauge
- (12) Fuel level caution lamp
- (13) DEF level gauge
- (14) DEF level caution lamp
- (15) Fuel consumption gauge
- (16) Working mode selector switch
- (17) Travel speed selector switch
- (18) Window washer switch
- (19) Air conditioner control switch
- (20) Seat belt caution lamp
- (21) Engine stop pilot lamp
- (22) Lock lever pilot lamp
- (23) Aftertreatment Devices Regeneration pilot lamp
- (24) Aftertreatment Devices Regeneration disable pilot lamp
- (25) Message display
- (26) Air conditioner pilot lamp
- (27) Wiper pilot lamp
- (28) Swing lock pilot lamp
- (29) Engine preheating pilot lamp or One-touch power maximizing pilot lamp
- (30) Auto-deceleration pilot lamp
- (31) Working mode display
- (32) Travel speed display
- (33) Radiator coolant level caution lamp
- (34) Engine oil level caution lamp
- (35) Air cleaner clogging caution lamp
- (36) Charge level caution lamp
- (37) Water separator caution lamp
- (38) Engine oil pressure caution lamp
- (39) Function switches (F1 to F6)
- (40) Maintenance time caution lamp

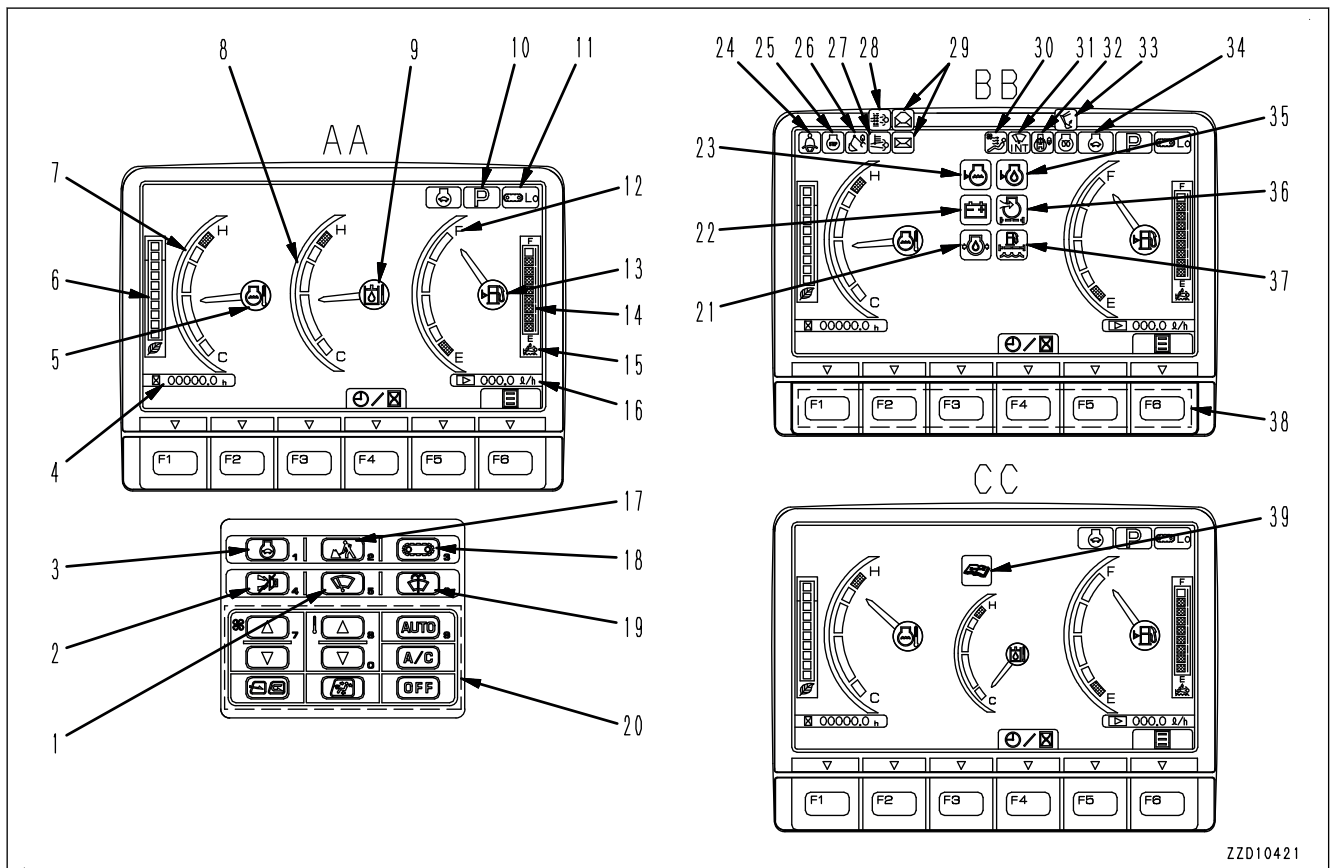
**REMARK**

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 detail, see “CAMERA IMAGE SELECTOR SWITCH (3-52)”.



ZZD10421

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
- (20) Air conditioner control switch
- (21) Engine oil pressure caution lamp
- (22) Charge level caution lamp
- (23) Radiator coolant level caution lamp
- (24) Seat belt caution lamp
- (25) Engine stop pilot lamp
- (26) Lock lever pilot lamp
- (27) Aftertreatment Devices Regeneration pilot lamp
- (28) Aftertreatment Devices Regeneration disable pilot lamp
- (29) Message display
- (30) Air conditioner pilot lamp
- (31) Wiper pilot lamp
- (32) Swing lock pilot lamp
- (33) Engine preheating pilot lamp or One-touch power maximizing pilot lamp
- (34) Auto-deceleration pilot lamp
- (35) Engine oil level caution lamp
- (36) Air cleaner clogging caution lamp
- (37) Water separator caution lamp
- (38) Function switches (F1 to F6)
- (39) Maintenance time caution lamp

**REMARK**

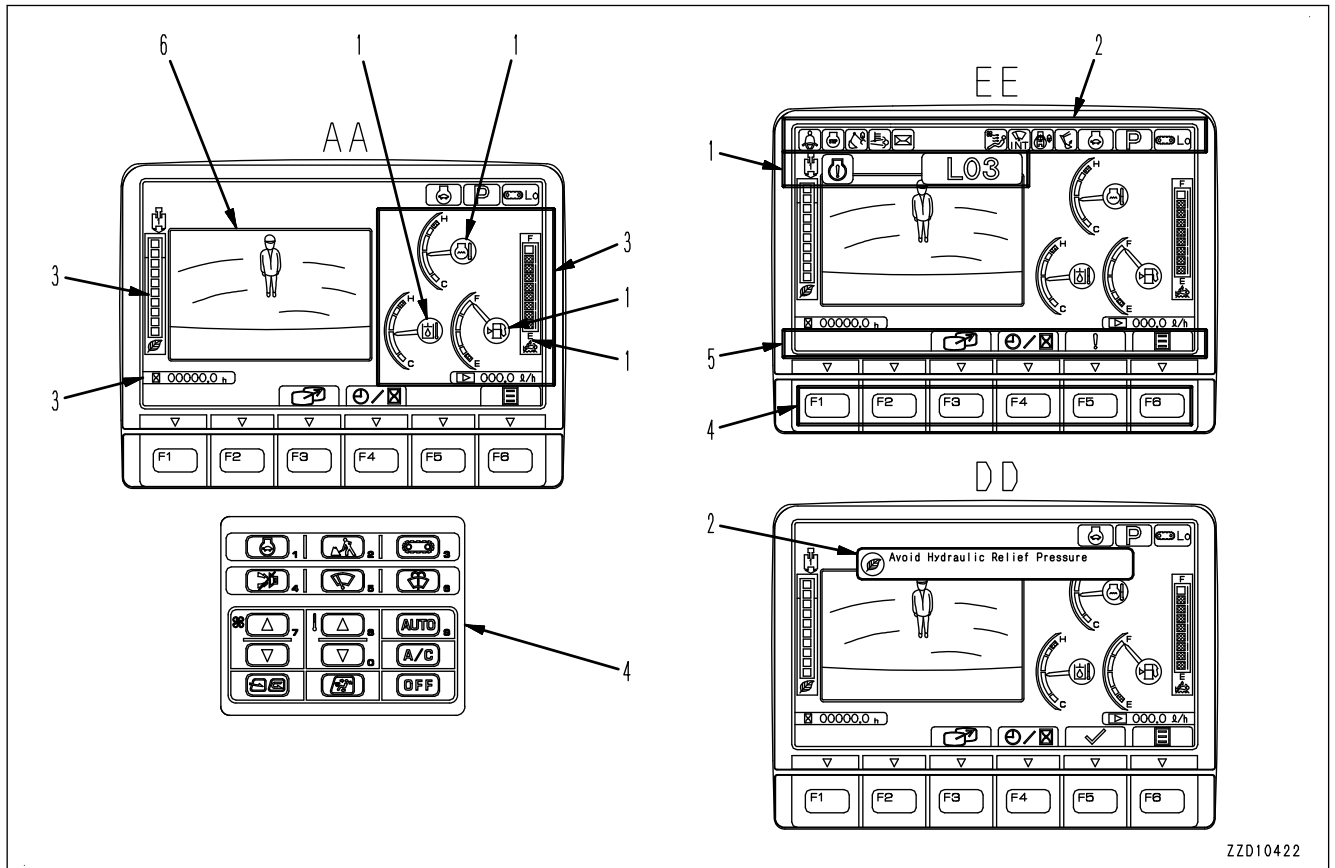
The above figure does not show all of the caution lamp symbols. For details of the caution lamps, see "WARNING DISPLAY (3-17)".

# 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



ZZD10422

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

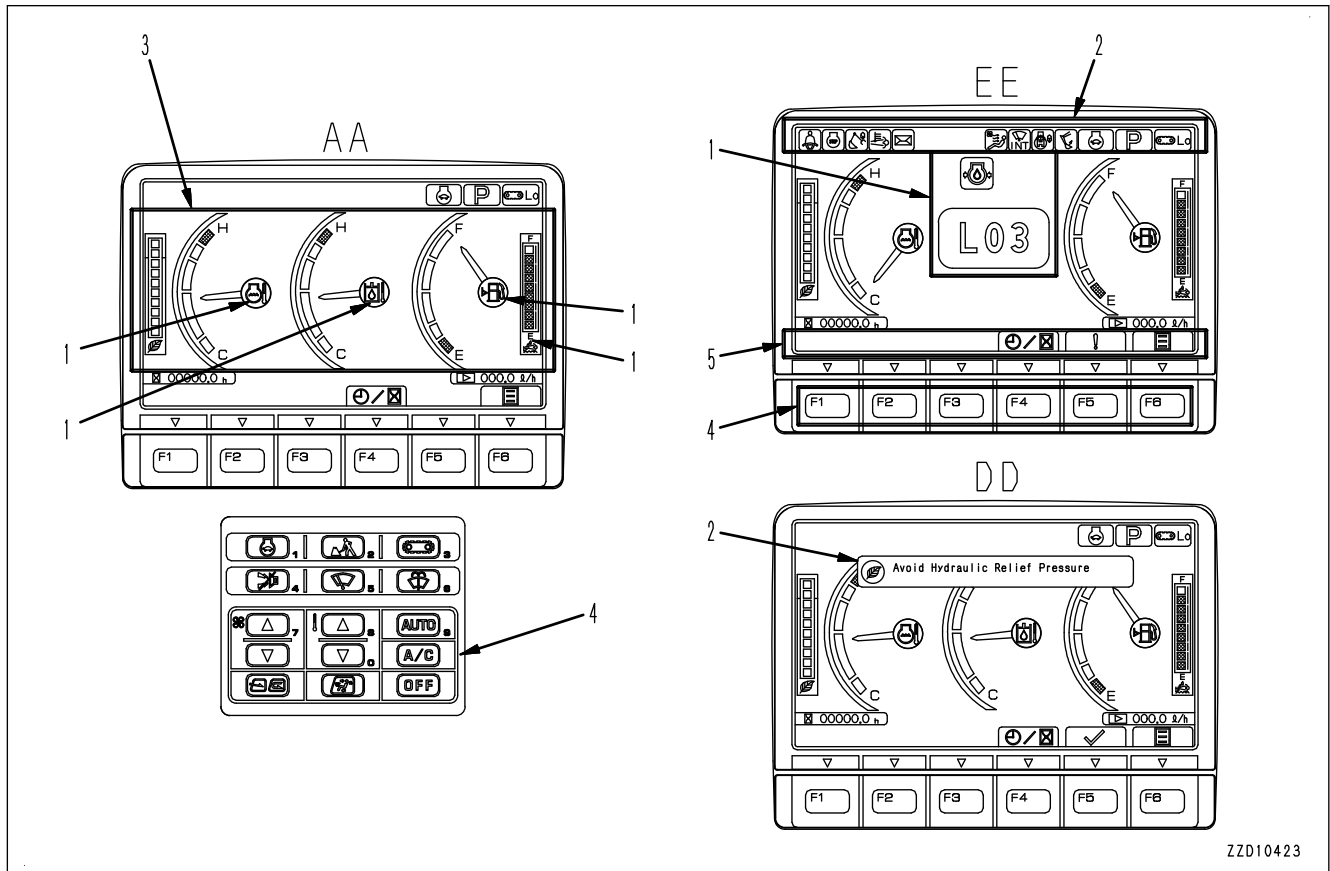
### REMARK

- For the user menu used for setting various items of the machine on the machine monitor, see “USER MENU DISPLAY SWITCH (3-57)”.
- One of the features of liquid crystal display panels is that there may be black spots (spots that do not light up) or white spots (spots that stay lit) on the screen. When there are fewer than 10 black or white spots, this is not a failure or a defect.
- If environmental temperature of the machine monitor is high, brightness may be automatically reduced to protect the liquid crystal. However, it is not abnormal.

### Displaying only meter

On the standard screen (camera display, meter display), press switch F3, and only the meter is displayed.

For detail, see “CAMERA IMAGE SELECTOR SWITCH (3-52)”.



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

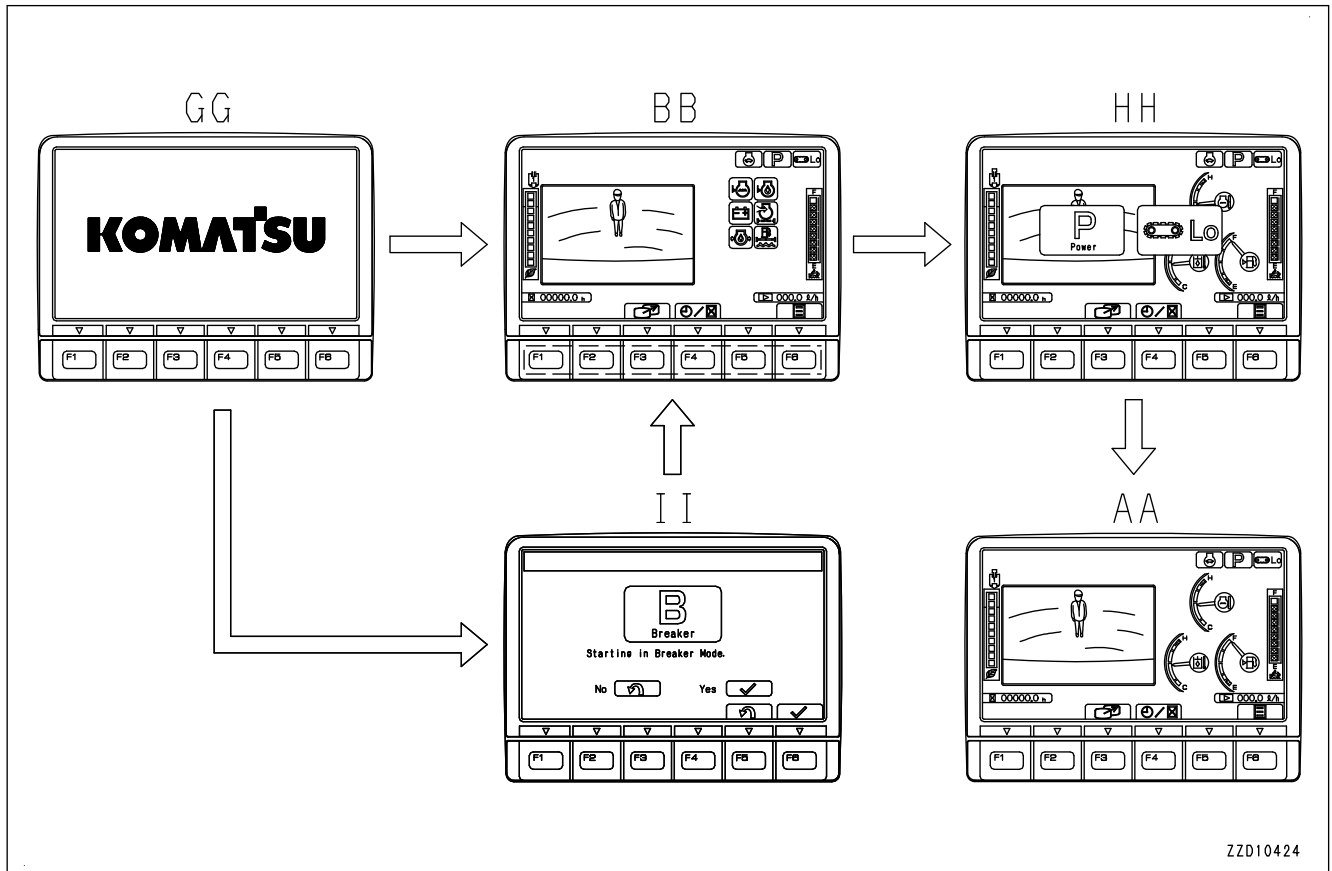
- (1) Warning display
- (2) Pilot display
- (3) Meter display
- (4) Monitor switch area
- (5) Guidance icon display

**REMARK**

- For the user menu used for setting various items of the machine on the machine monitor, see “USER MENU DISPLAY SWITCH (3-57)”.
- One of the features of liquid crystal display panels is that there may be black spots (spots that do not light up) or white spots (spots that stay lit) on the screen. When there are fewer than 10 black or white spots, this is not a failure or a defect.
- If environmental temperature of the machine monitor is high, brightness may be automatically reduced to protect the liquid crystal. However, it is not abnormal.

**BASIC OPERATION OF MACHINE MONITOR**

**BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE IN NORMAL SITUATION**



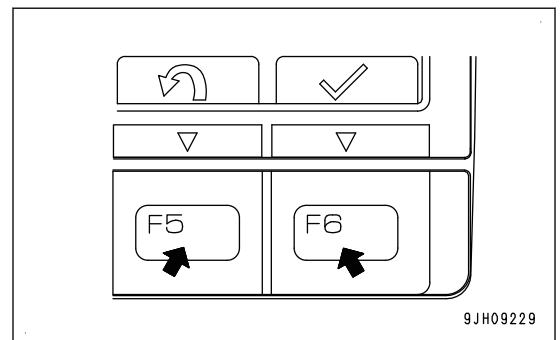
ZZD10424

- When the starting switch is turned to ON position, the opening screen GG is displayed.
- After the opening screen GG is displayed for 2 seconds, the screen switches to the 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.

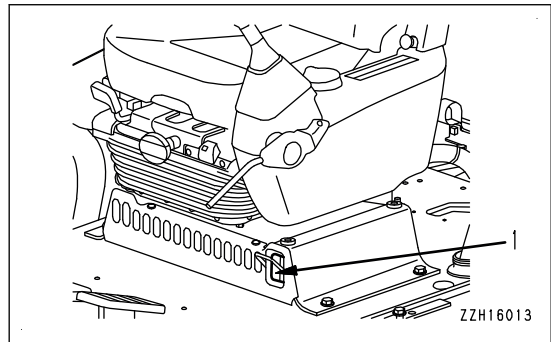
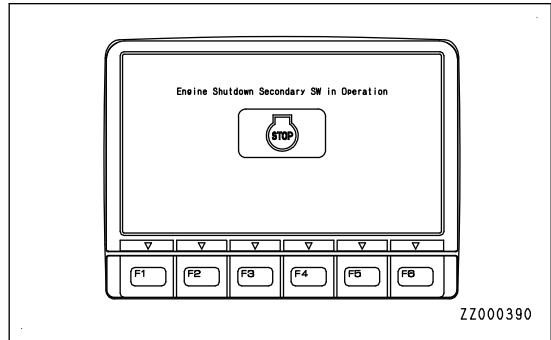


9JH09229

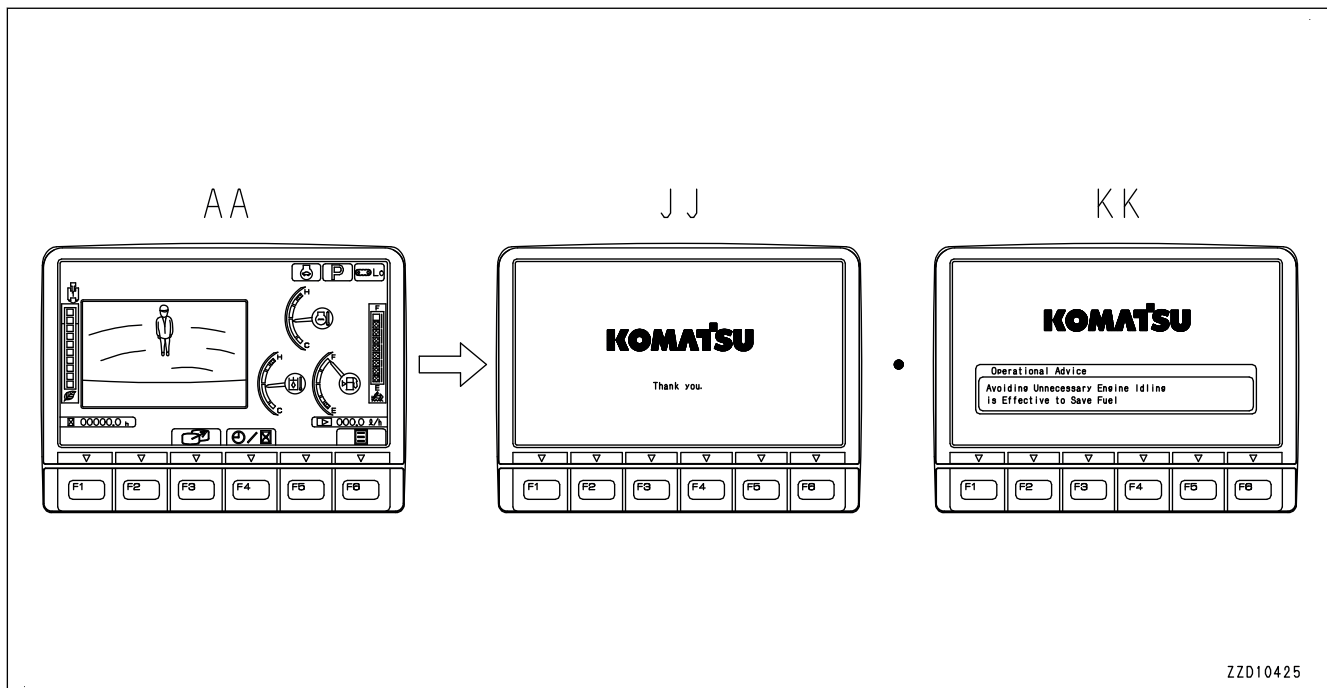
### BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE WHILE ENGINE SHUTDOWN SECONDARY SWITCH IS ON

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 the engine can be started with usual starting switch key operation.



### BASIC OPERATION OF MACHINE MONITOR WHEN STOPPING ENGINE IN NORMAL SITUATION



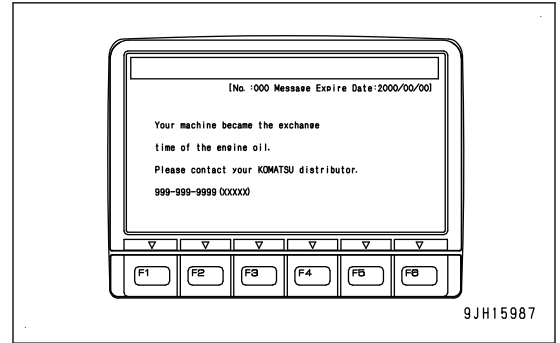
When the starting switch is turned to OFF position, end screen JJ or KK is displayed for 5 seconds, then the display goes out.



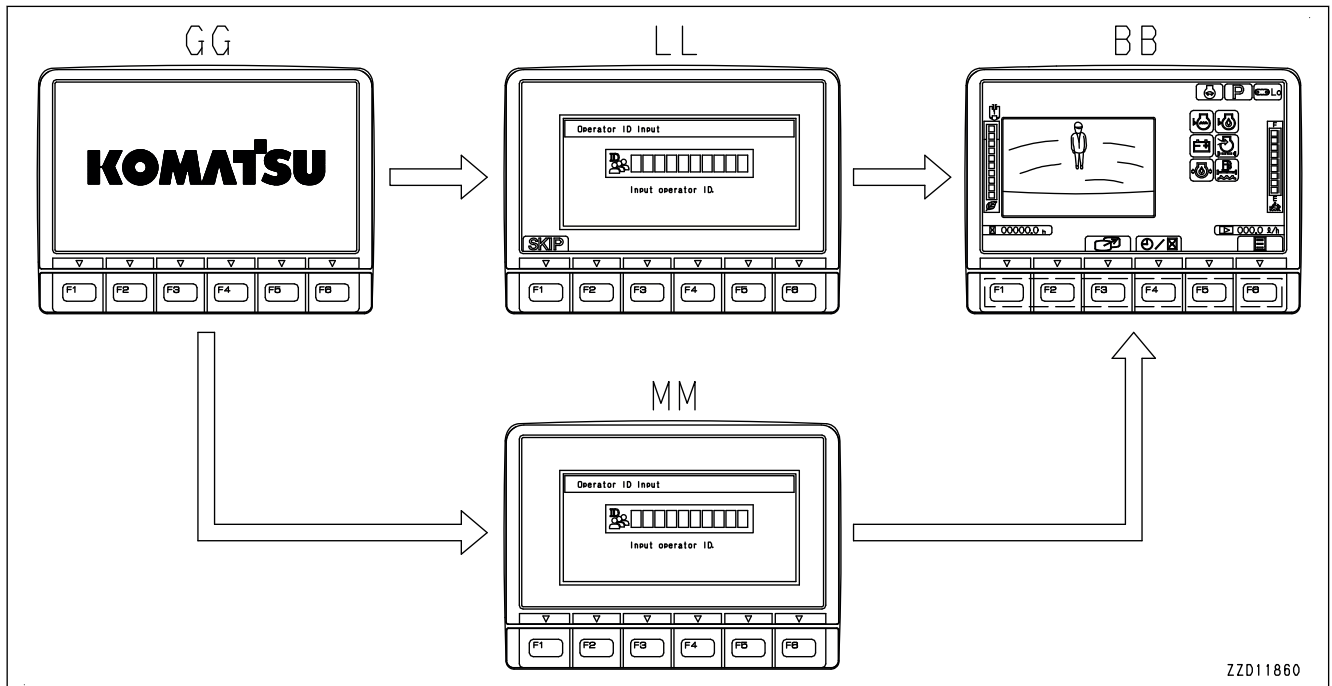
### End screen when any message has been received

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

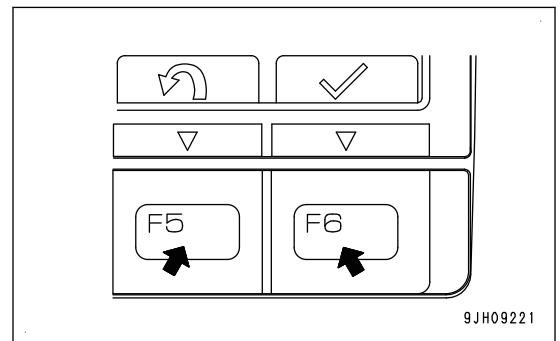
In this case, turn the starting switch to ON position to re-check the message, and if the message is requesting a response, make a reply to it.



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



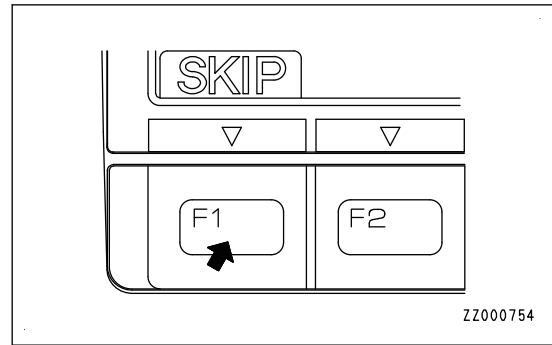
- If inputting ID number for operator identification function (with SKIP) is set, the opening screen GG switches to ID number input screen LL (with SKIP) when the starting switch is turned to ON position.
- If inputting ID number for operator identification function (without SKIP) is set, the opening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



On the ID number input screen LL (with SKIP), press switch F1, and the screen changes to the 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 ID holding time, even if inputting ID number for operator identification function is set, the ID number input screen LL (with SKIP) or MM (without SKIP) may not be displayed while the starting switch is turned to ON position.



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

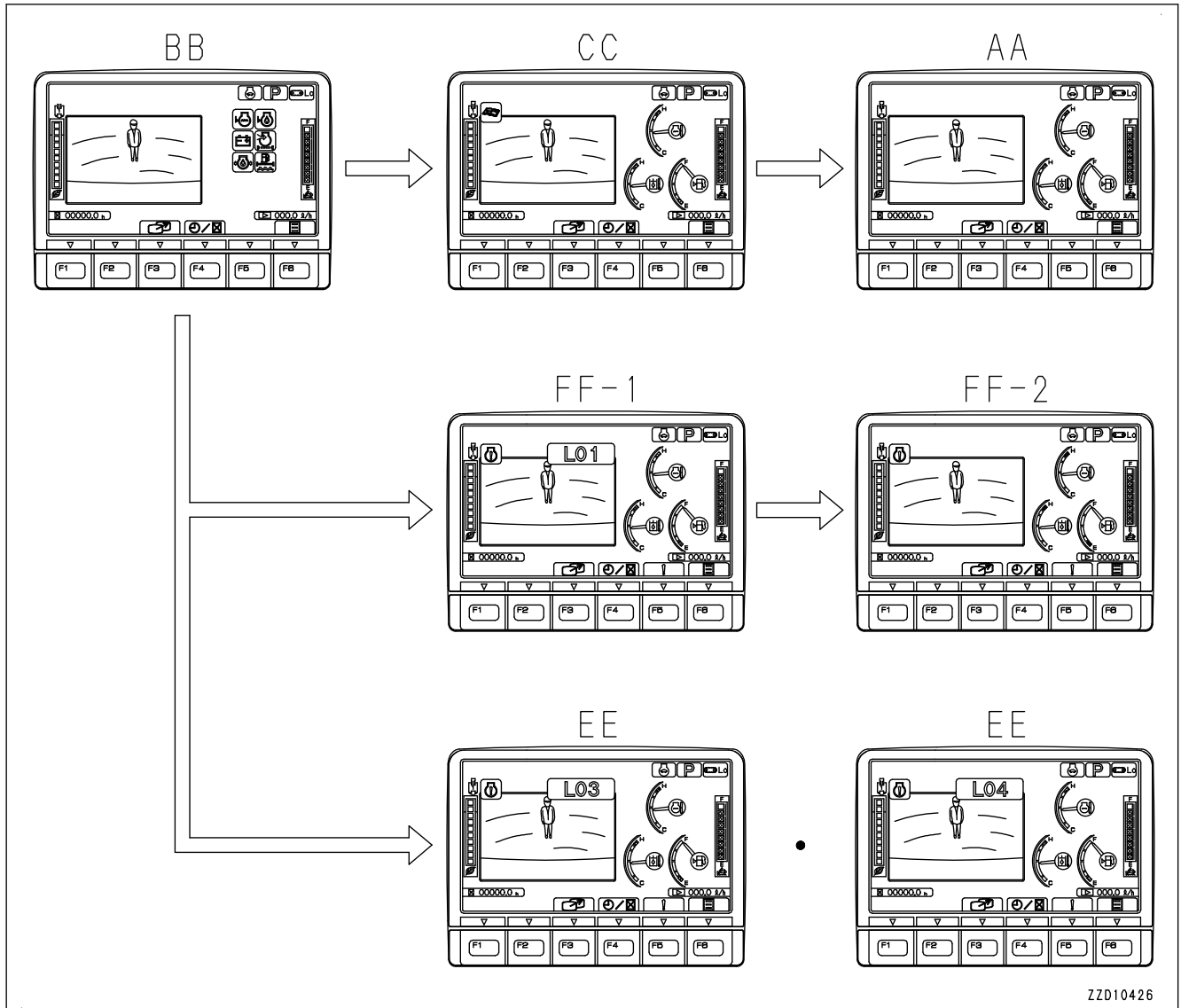
As long as ID number input screen is displayed, the engine cannot be started. If you forget the ID number and cannot start the engine, ask the person in charge of the machine.

**NOTICE**

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

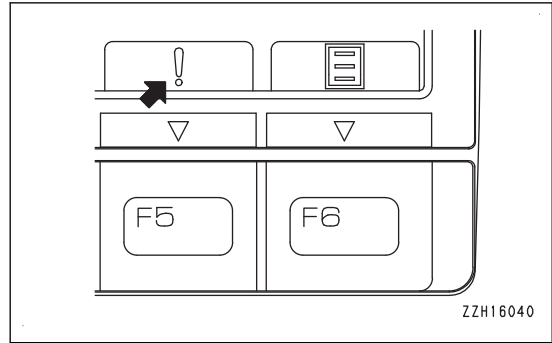
**Komatsu cannot accept any responsibility for any loss or damage resulting from the wrong use of ID or unauthorized use of ID by a third person.**

## BASIC OPERATION OF MACHINE MONITOR WHEN STARTING ENGINE IN ABNORMAL SITUATION

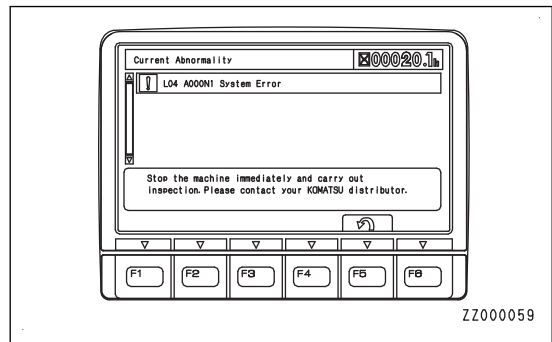
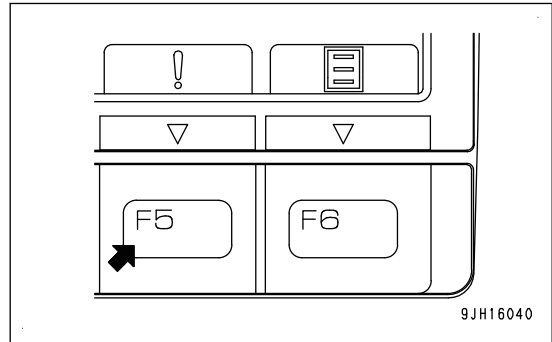


- If there is any abnormality when starting the engine, the check before starting screen BB changes to the maintenance time warning screen CC, warning screen FF, or error screen EE.
- After displaying the check before starting screen BB for 2 seconds, the screen changes to the maintenance time warning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

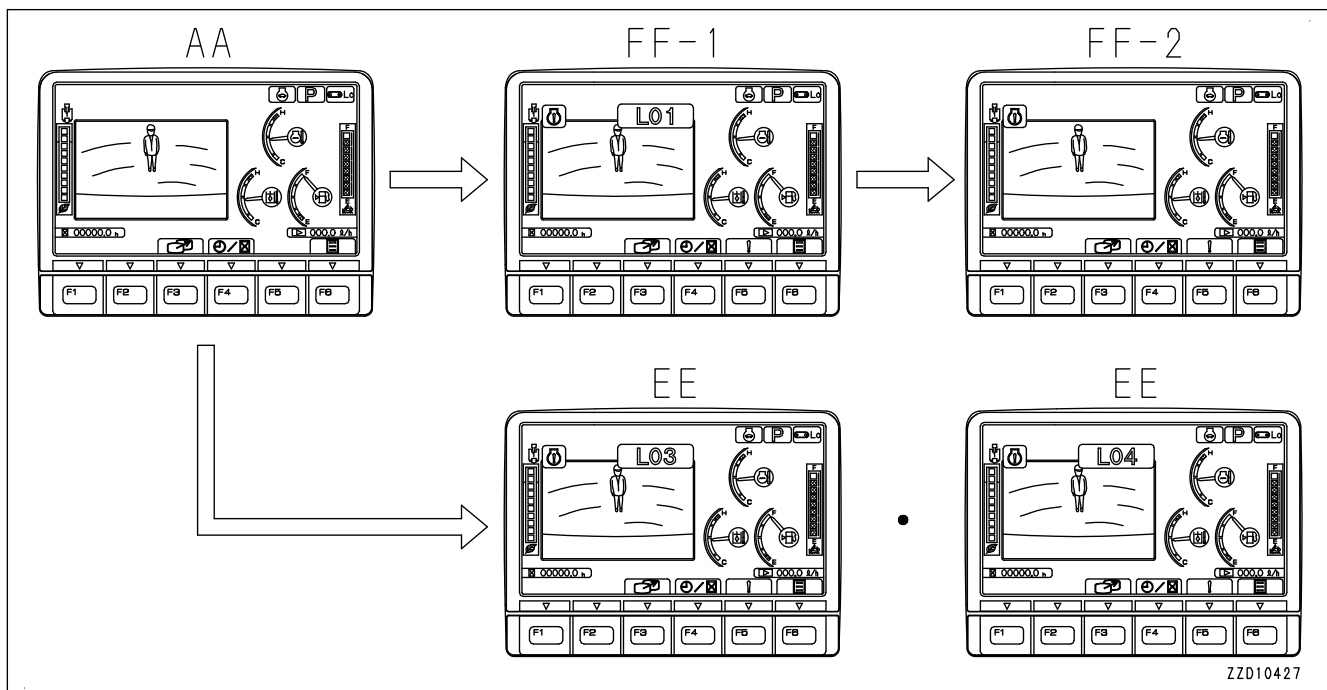
If there is any error existing, “ ! ” is displayed on top of switch F5. switch F5.



Press switch F5 to check the detail of the current abnormality. Current Abnormality screen is displayed.

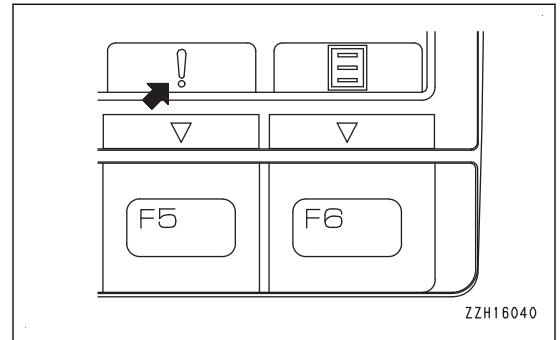


**BASIC OPERATION OF MACHINE MONITOR WHEN TROUBLE OCCURS WHILE OPERATING MACHINE**

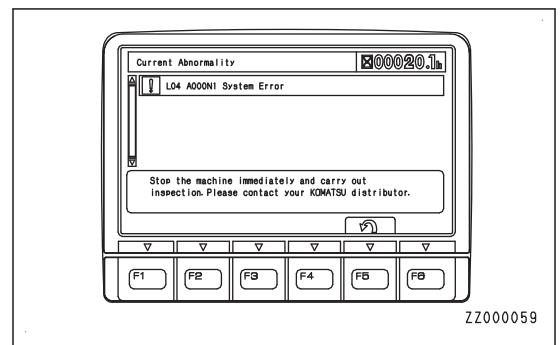
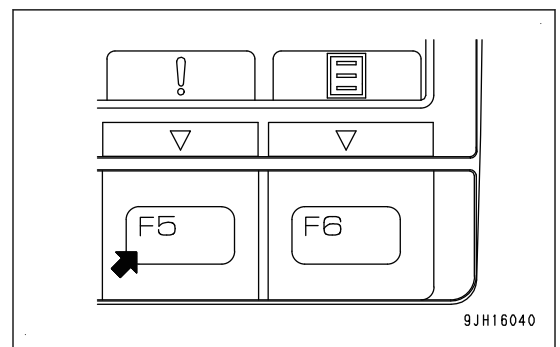


- If any abnormality occurs during operation, the standard screen AA changes to warning screen FF-(1) or the error screen EE.
- After displaying warning screen FF-(1) for 2 seconds, the screen automatically changes to warning screen FF-(2).

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

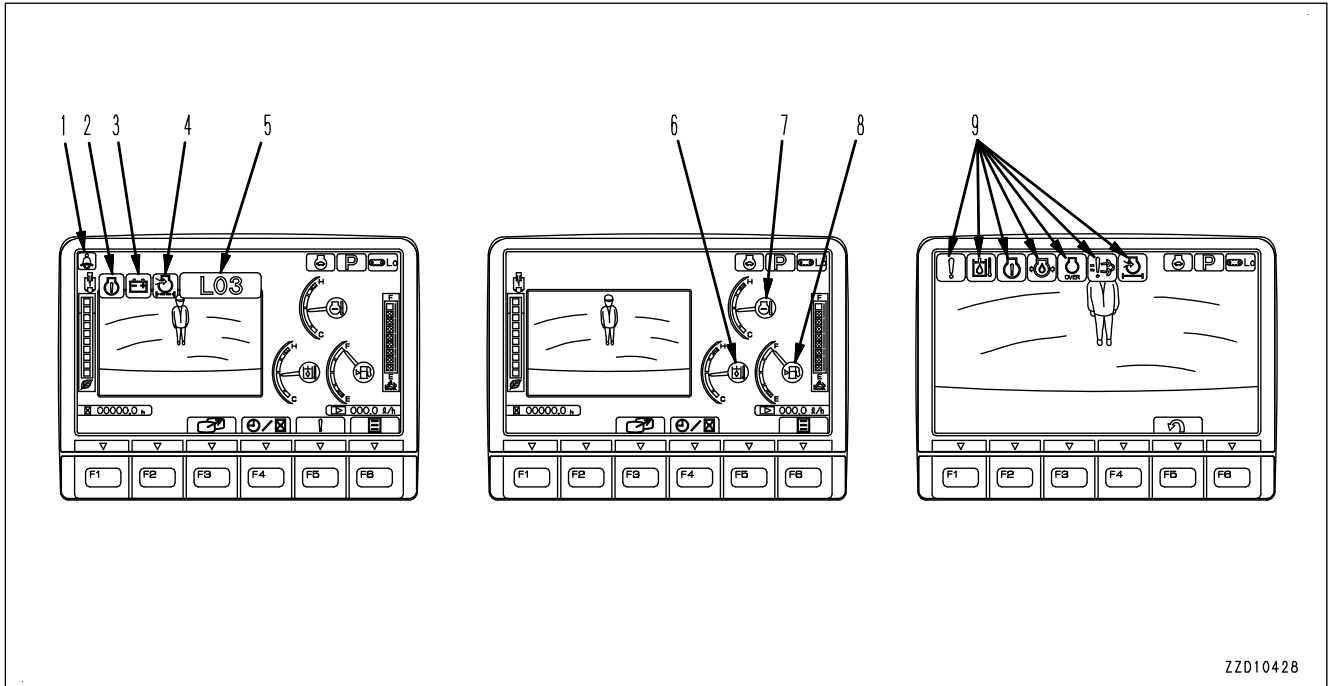
### NOTICE

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

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

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.



ZZD10428

- (1) Seat belt caution lamp
- (2) Caution lamp
- (3) Caution lamp
- (4) Caution lamp
- (5) Action level display
- (6) Engine coolant temperature caution lamp
- (7) Hydraulic oil temperature caution lamp
- (8) Fuel level 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 caution are generated, they are displayed on caution lamps (2) and (3).

When 3 types of caution 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**

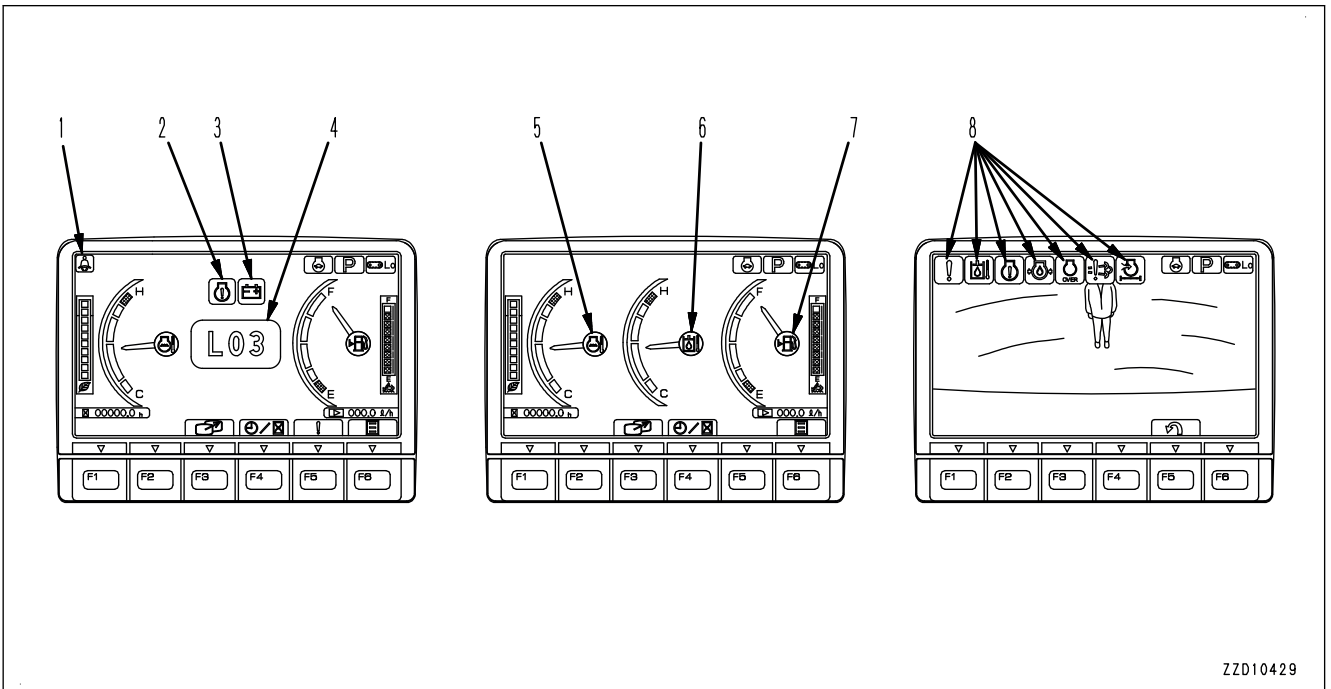
The current cautions are indicated by flashing of caution lamp (9).

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

**When displaying only meter**

On the standard screen (camera display, meter display), press switch F3, and only the meter is displayed.

For detail, see "CAMERA IMAGE SELECTOR SWITCH (3-52)".



ZZD10429

- (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

**Standard screen (only meters are displayed)**

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

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

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

**Whole camera image display screen**

The current cautions are indicated by flashing of caution lamp (8).

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

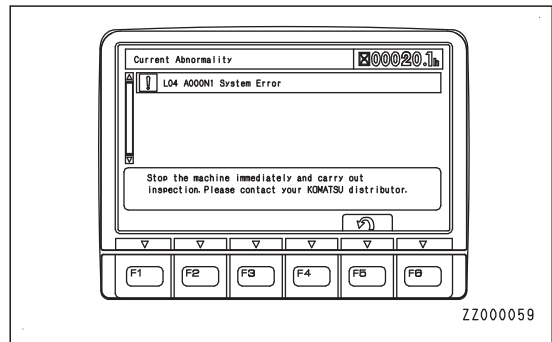
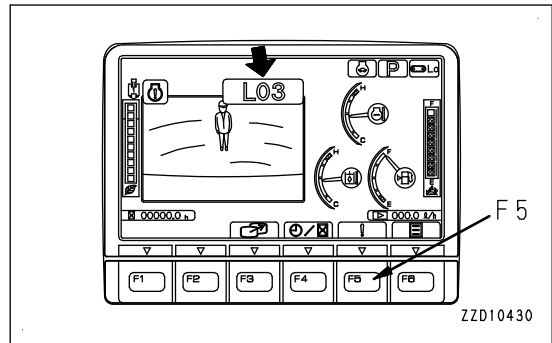
### ACTION LEVEL DISPLAY

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 machine monitor.

When switch F5 is pressed on the standard screen while this monitor is displayed, the list of the current errors are displayed.

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



#### List of action level display and required actions

Degree of urgency	Action level	Buzzer	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 operation and move the machine to a safe place, then ask your Komatsu distributor for inspection and maintenance.
	L02	Sounds intermittently	Lights up in red	Stop the operation, 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.
Low	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 perform the inspection and maintenance. As needed, ask your Komatsu distributor for inspection and maintenance.













### 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
 9JC01159	Engine coolant temperature caution lamp	High temperature (L02)	-	Low temperature	Normal
 9JC01160	Hydraulic oil temperature caution lamp	High temperature (L02)	-	Low temperature	Normal
 9JC01161	Fuel level caution lamp	Low level	-	-	Normal
 9JC01169	System caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9JC01171	Hydraulic system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9JC01172	KDPF system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9JC01173	KDPF soot accumulation caution lamp	Abnormal (L03)	Accumulated (L01)	-	-
 ZZD10997	DEF level caution lamp	Abnormal (L04, L03)	-	Sensing is disabled	-
 ZZD10998	DEF system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 ZZD12071	DEF system high temperature stop caution lamp	-	Engine stopped at high temperature (L01)	-	-
 9JC01170	Engine system caution lamp	Abnormal (L04, L03)	Abnormal (L01)	-	-
 9JC01164	Engine oil pressure caution lamp	Low oil pressure (L03)	-	-	-

Symbol	Type of caution lamp	Display color/Machine condition (Action level)			
		Red	Yellow	White	Blue
 9JC01165	Engine oil level caution lamp	-	Low oil level (L01)	-	-
 9JC01162	Radiator coolant level caution lamp	-	Low coolant level (L01)	-	-
 9JC01163	Charge level caution lamp	Abnormal (L03)	-	-	-
 9JC01167	Water separator caution lamp	Abnormal	-	-	-
 9JC01166	Air cleaner clogging caution lamp	-	Clogged (L01)	-	-
 9JH16433	Overload caution monitor	Overload	-	-	-
 KS001069	Quick coupler caution lamp	Abnormal (L03)	-	-	-
 9JC01175	Air conditioner system caution lamp	-	Abnormal (L01)	-	-
 9JC01168	Maintenance time caution lamp	Due time is over	Notice	-	-
 ZZ000489	Seat belt caution lamp	Seat belt is not fastened	-	-	-
 9JC01174	Engine overspeed	Abnormal (L02)	-	-	-
 A4P14875	Abrupt engine stop by AIS	Excessive frequency (L03)	Excessive frequency (L01)	-	-

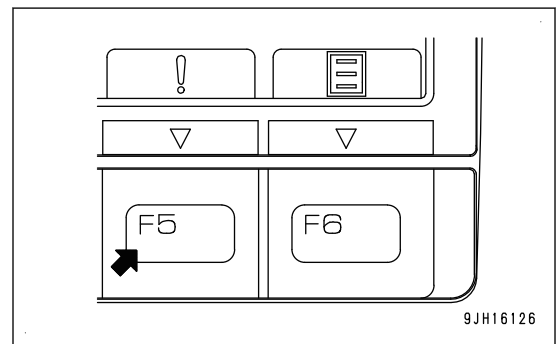
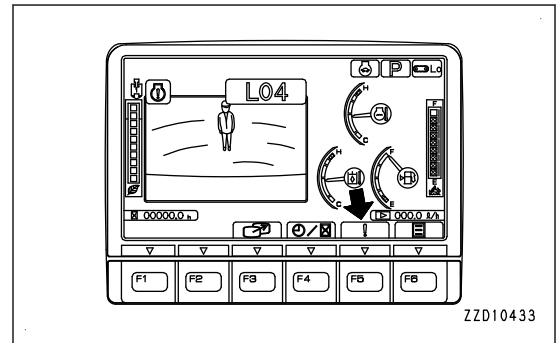
For the meaning of each caution lamp and the action to take for it, see the section of each caution lamp.

### CURRENT ABNORMALITY DISPLAY SWITCH

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

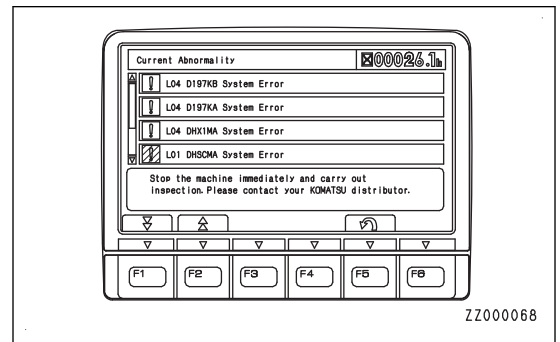
While “!” is displayed, press switch F5 to shift the monitor display screen to the Current Abnormality screen.

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



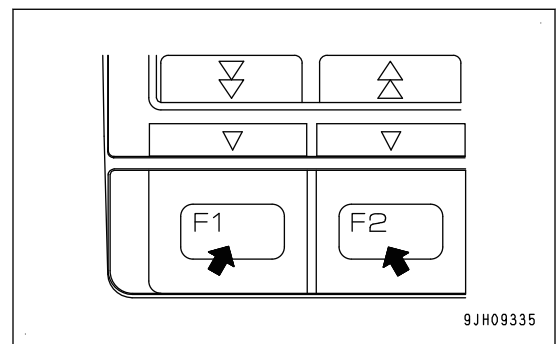
### Operation on the Current Abnormality screen

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

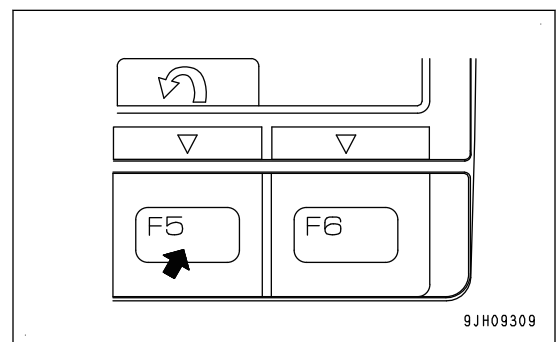


F1: Displays next page. When on the last page, it displays the first page.

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 indicates action level “L02”.

The engine coolant temperature is abnormally high.

While this monitor 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 (blue) at a proper temperature.

**When temperature is low**

The caution lamp lights up in white.

The engine coolant temperature is low.

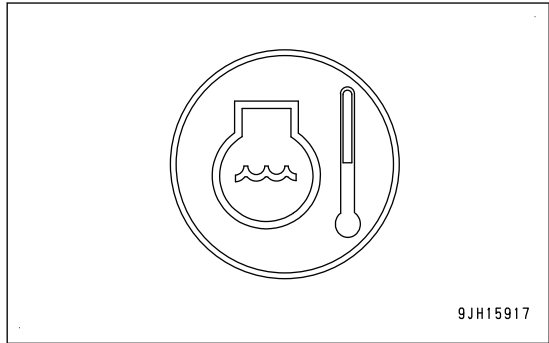
The engine needs to be warmed up.

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

For detail, see “METHOD FOR ENGINE WARM-UP OPERATION (3-173)”.

**When temperature is correct**

The caution lamp lights up in blue.



9JH15917

**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 indicates action level “L02”.

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 (blue) at a proper temperature.

**When temperature is low**

The caution lamp lights up in white.

The hydraulic oil temperature is low.

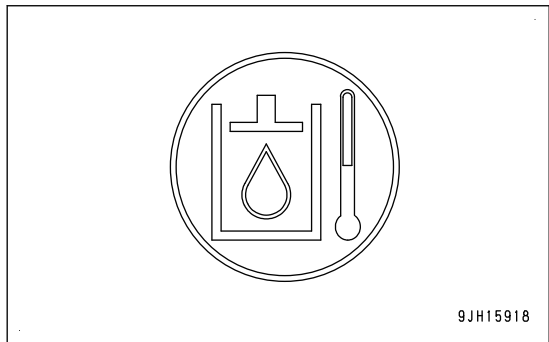
It is necessary to warm up the hydraulic component.

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

For detail, see “METHOD FOR HYDRAULIC SYSTEM WARM-UP OPERATION (3-175)”.

**When temperature is correct**

The caution lamp lights up in blue.



9JH15918

## FUEL LEVEL CAUTION LAMP

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

### When fuel level is low

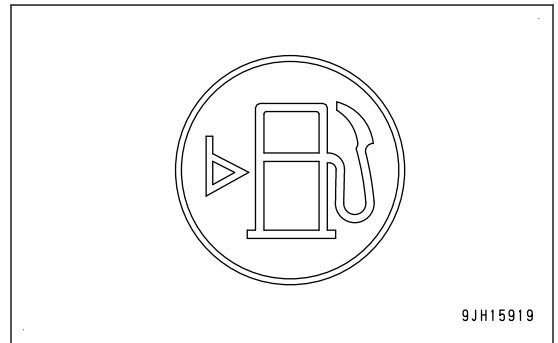
The caution lamp lights up in red.

The remaining fuel amount is approximately 41 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.

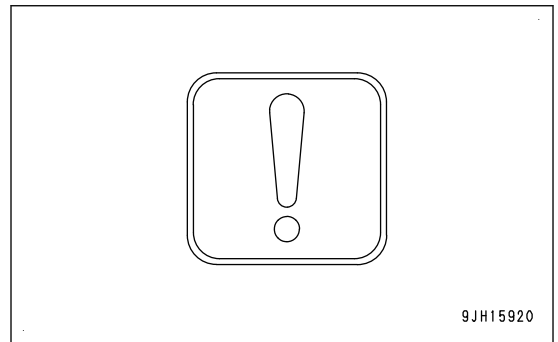
### When action level “L01” is displayed

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.

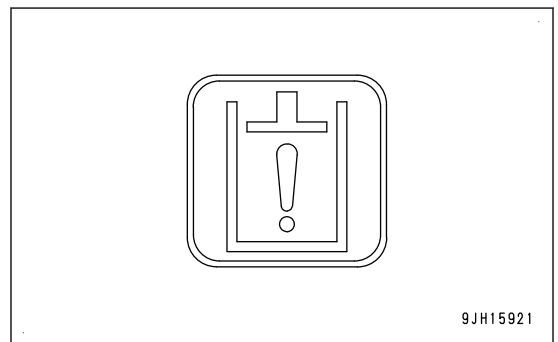
### When action level “L01” is displayed

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.



## KDPF SYSTEM CAUTION LAMP

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

### When action level “L04” is displayed

The caution lamp lights up in red 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 have the inspection and maintenance performed.

As needed, ask your Komatsu distributor for inspection and maintenance.

### REMARK

For details of KDPF, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)”.

## KDPF SOOT ACCUMULATION CAUTION LAMP

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

To cancel the alarm, perform the manual stationary regeneration of KDPF.

### When abnormal

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

The alarm buzzer sounds intermittently.

Large accumulation of soot in KDPF or a system failure such as lowering of the filtering function of KDPF occurred.

Urgent remedy is required.

Move the machine to a safe place immediately and perform the manual stationary regeneration.

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

### When soot is accumulated

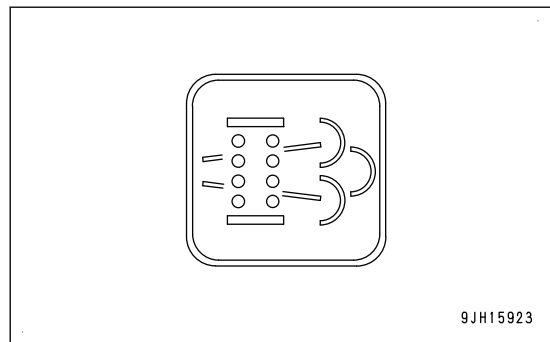
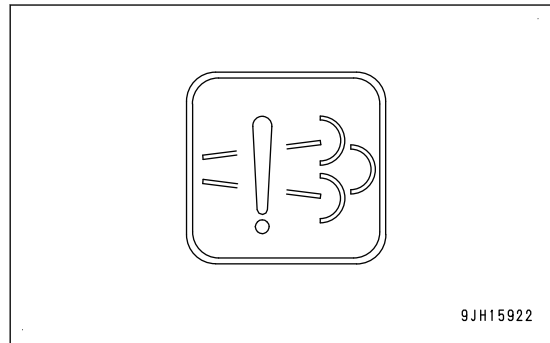
The caution lamp lights up in yellow and indicates action level “L01”.

Much soot is accumulated in KDPF, however, the operation can be performed.

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

### REMARK

For details of the manual stationary regeneration, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)”.



## 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 Lighting in red,

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 "Low level Inducement". Engine power is under deration.

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

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

### When Lighting in white

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

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

When DEF tank level sensor is defective.

### REMARK

For more information about the Inducement strategy, and Inducement status concerning engine power deration, see "HANDLE UREA SCR SYSTEM WARNING (3-121)".

## 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 "Severe Inducement". Engine power is under heavy deration.

With Action level "L03", Inducement status is "Low level Inducement". Engine power is under deration.

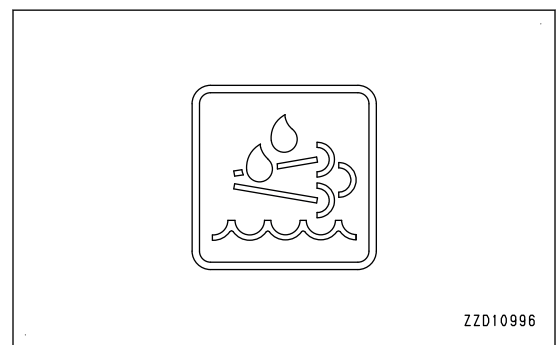
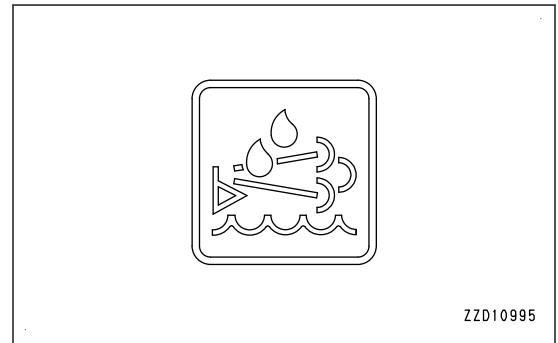
### Lighting in yellow

With Action level "L01", Inducement status is "Warning" or "Continuous Warning".

When "Continuous Warning", If no maintenance, advancing to the next Inducement status. Engine power will be derated.

### REMARK

For more information about the Inducement strategy, and Inducement status concerning engine power deration, see "HANDLE UREA SCR SYSTEM WARNING (3-121)".



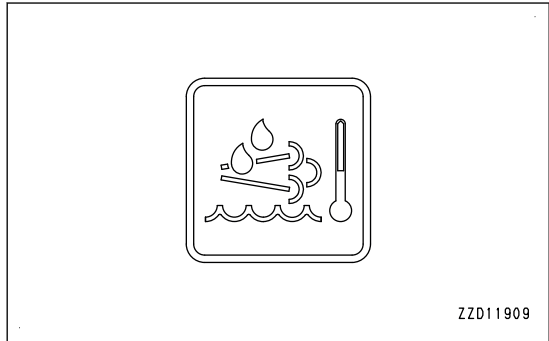
### DEF SYSTEM HIGH TEMPERATURE STOP CAUTION LAMP

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 (3-181)".

When stopping the engine during the aftertreatment devices regeneration, stop the regeneration first according to "PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING (3-117)", then stop the engine after running it at low idle for approximately 5 minutes.



### ENGINE SYSTEM CAUTION LAMP

#### CAUTION

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

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

#### When action level "L04" is displayed

The caution lamp lights up in red 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.

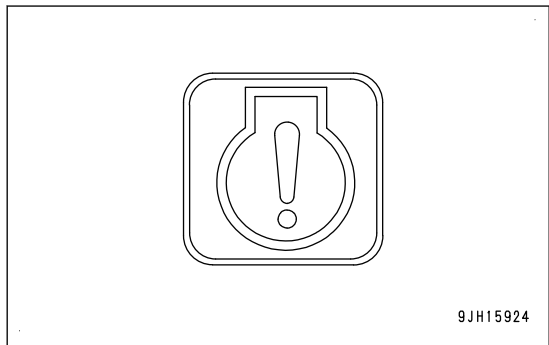
#### When action level "L01" is displayed

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 have the inspection and maintenance performed.

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



### ENGINE OIL PRESSURE CAUTION LAMP

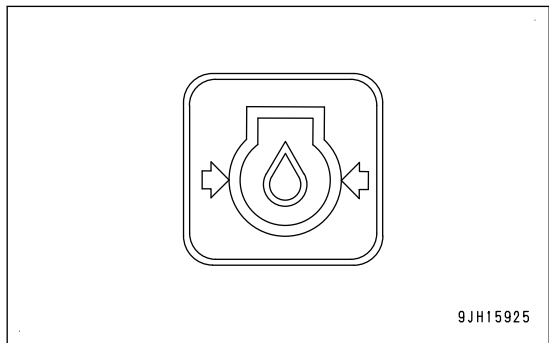
Engine oil pressure caution lamp warns about abnormality of engine lubricating oil pressure.

#### 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".

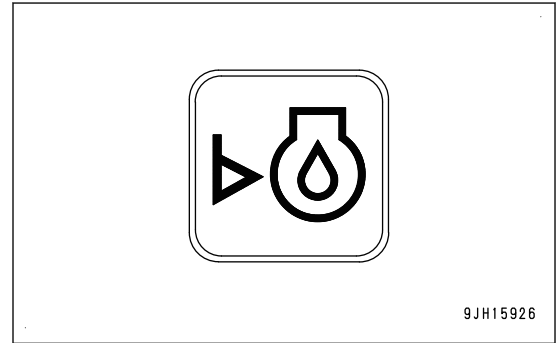
The oil level in the engine oil pan is insufficient.

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 (3-147)".

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.



## RADIATOR COOLANT LEVEL CAUTION LAMP

Radiator coolant level caution lamp warns about drop of radiator coolant level.

### When the coolant level dropped

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

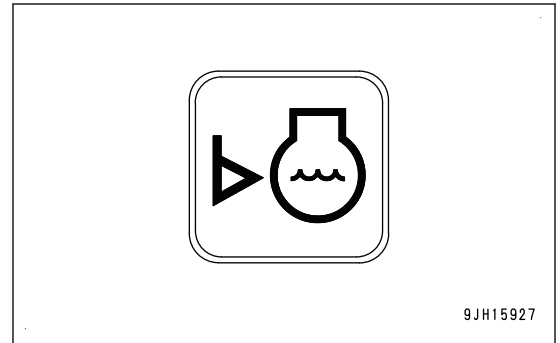
The radiator coolant is insufficient.

Check the coolant level in the sub-tank of the radiator and add coolant.

For detail, see "METHOD FOR CHECKING COOLANT LEVEL, ADDING COOLANT (3-146)".

If the coolant level drops again in a short time, the coolant may be leaking from the radiator.

For the inspection and maintenance, ask your Komatsu distributor.



## CHARGE LEVEL CAUTION LAMP

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

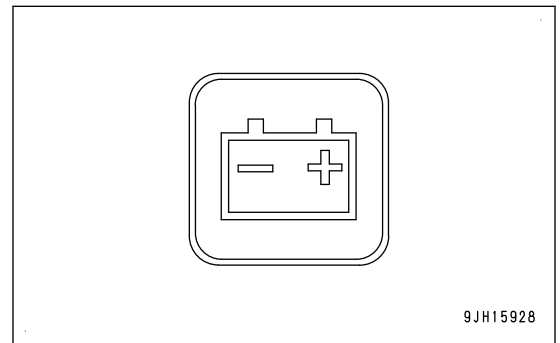
### When abnormal

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.



**WATER SEPARATOR CAUTION LAMP**

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

**When abnormal**

The caution lamp lights up in red.

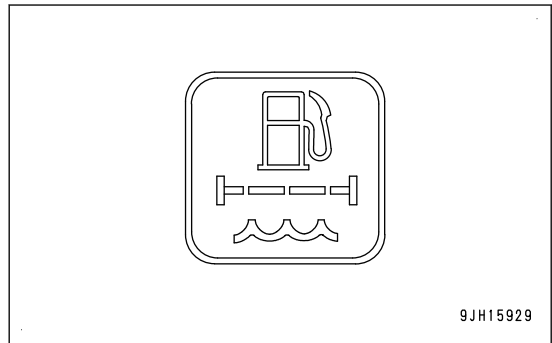
Water is accumulated in the water separator.

Stop the engine and drain the water from water separator.

For detail, see “METHOD FOR CHECKING WATER SEPARATOR, DRAINING WATER AND SEDIMENT (3-143)”.

**REMARK**

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



**AIR CLEANER CLOGGING CAUTION LAMP**

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

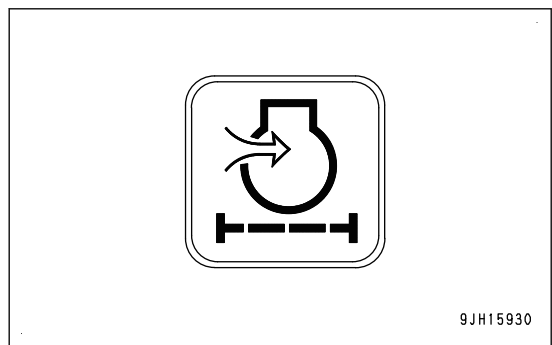
**When clogged**

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**

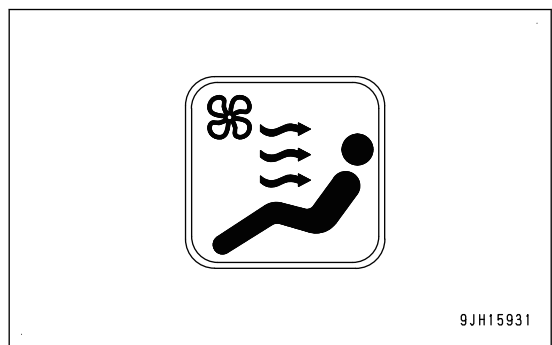
Air conditioner system caution lamp warns about abnormality in air conditioner system.

**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 the “ON” position. It goes out after 30 seconds and the display changes to the standard screen.

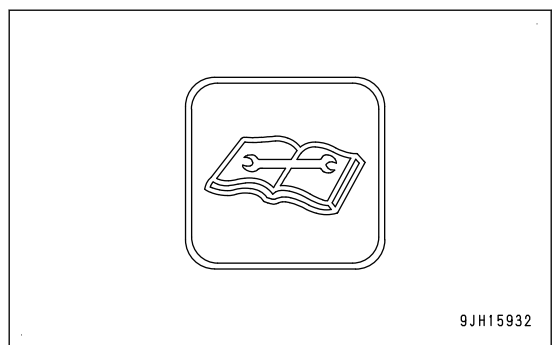
**When the due time is over**

The caution lamp lights up in red.

The maintenance 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**

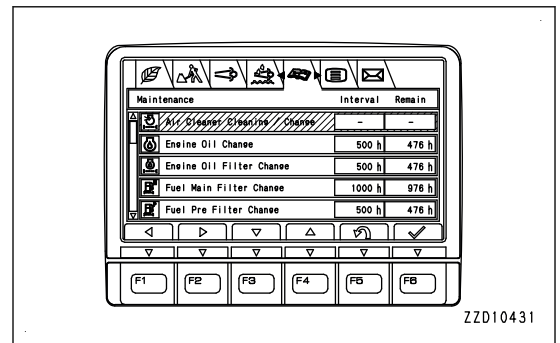
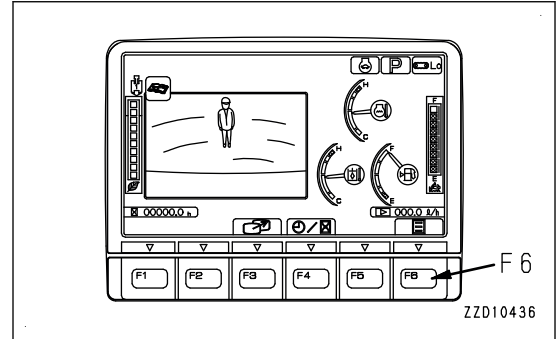
The warning lamp lights up in yellow.

The maintenance time is approaching.

Prepare necessary parts for the maintenance.

**REMARK**

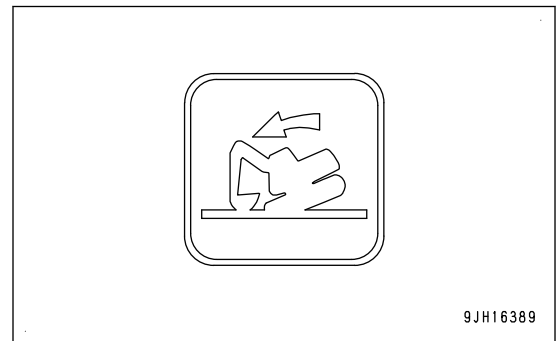
- You can check maintenance items on the maintenance tab screen by pressing switch F6 on the maintenance time warning screen shown in the figure or on the standard screen.
- The lighting time of maintenance time notice (yellow) has been initially set to 30 hours, but it can be changed. To change the setting, ask your Komatsu distributor.
- For operations on the maintenance tab screen, see “MAINTENANCE SCREEN SETTING (3-75)”.



**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.



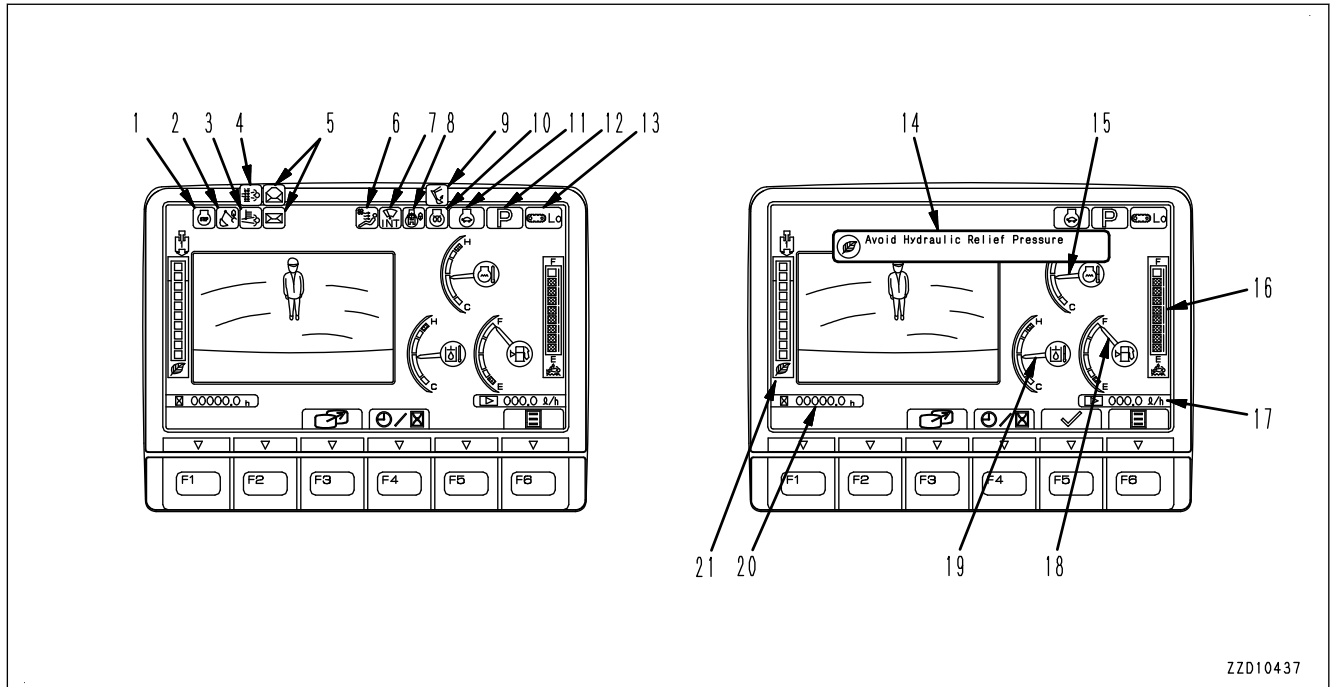
**SEATBELT CAUTION LAMP**

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**



ZZD10437

**Pilot display**

- (1) Engine stop pilot lamp
- (2) Lock lever pilot lamp
- (3) Aftertreatment Devices Regeneration pilot lamp
- (4) Aftertreatment Devices Regeneration disable pilot lamp
- (5) Message display
- (6) Air conditioner pilot lamp
- (7) Wiper pilot lamp

- (8) Swing lock pilot lamp
- (9) One-touch power maximizing pilot lamp
- (10) Preheating pilot lamp
- (11) Auto-deceleration pilot lamp
- (12) Working mode display
- (13) Travel speed display
- (14) ECO guidance

**Meter display**

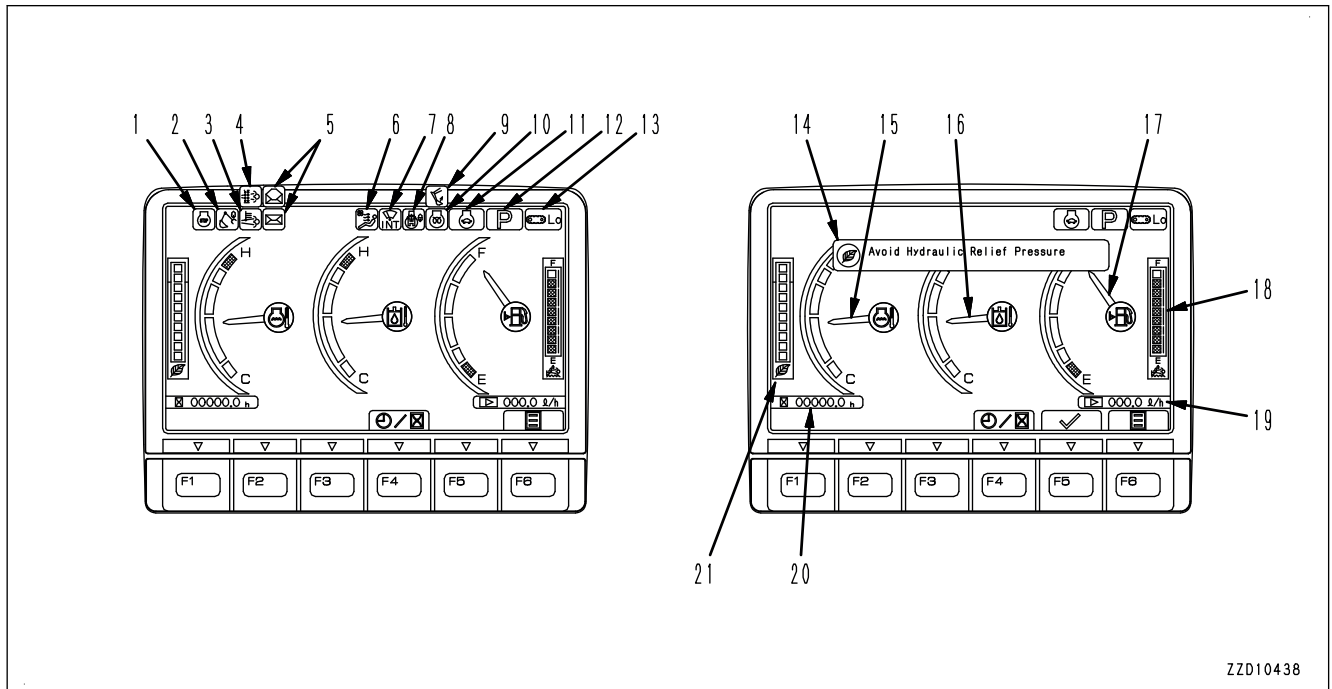
- (15) Engine coolant temperature gauge
- (16) DEF level gauge
- (17) Fuel consumption gauge
- (18) Fuel gauge

- (19) Hydraulic oil temperature gauge
- (20) Service meter/clock
- (21) ECO gauge

**When displaying only meter**

On the standard screen (camera display, meter display), press switch F3, and only the meter is displayed.

For detail, see "CAMERA IMAGE SELECTOR SWITCH (3-52)".



ZZD10438

**Pilot display**

- (1) Engine stop pilot lamp
- (2) Lock lever pilot lamp
- (3) Aftertreatment Devices Regeneration pilot lamp
- (4) Aftertreatment Devices Regeneration disable pilot lamp
- (5) Message display
- (6) Air conditioner pilot lamp
- (7) Wiper pilot lamp
- (8) Swing lock pilot lamp
- (9) One-touch power maximizing pilot lamp
- (10) Preheating pilot lamp
- (11) Auto-deceleration pilot lamp
- (12) Working mode display
- (13) Travel speed display
- (14) ECO guidance
- (15) Engine coolant temperature gauge
- (16) Hydraulic oil temperature gauge
- (17) Fuel gauge
- (18) DEF level gauge
- (19) Fuel consumption gauge
- (20) Service meter/ clock
- (21) ECO gauge

**PILOT DISPLAY**

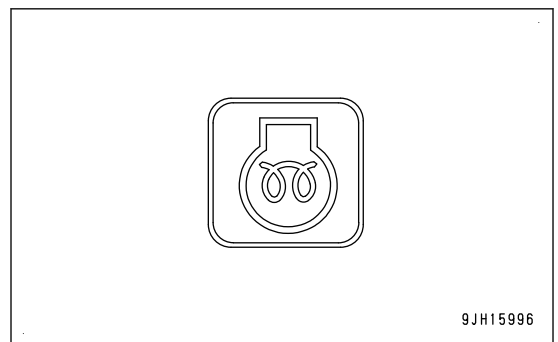
The pilot display at the top of the screen consists of the pilot lamps to check the actuation of each function. When the starting switch is turned on and the display items are functioning, the pilot lamps light up.

**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.



9JH15996

**SWING LOCK PILOT LAMP**

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

Lights up: The swing lock is being actuated.

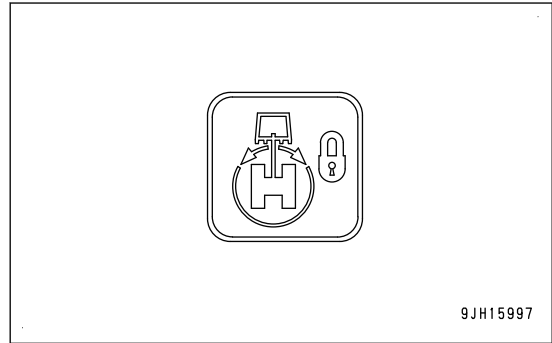
When the swing lock switch is turned ON (LOCK), this lamp lights up.

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

For the positions of the swing lock switch and swing parking brake cancel switch, see “CONTROLS AND GAUGES NAMES (3-5)”.

**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.



**WIPER PILOT LAMP**

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

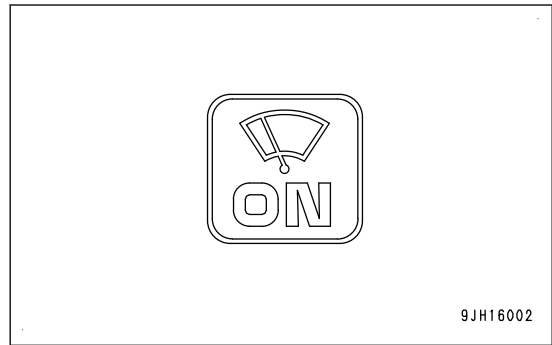
The operation of the wiper switch is indicated by the pilot lamp as follows.

When ON lights up: Windshield wiper operates continuously

When INT lights up: Windshield wiper operates intermittently

When nothing lights up: Wiper stops

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



**AUTO-DECELERATION PILOT LAMP**

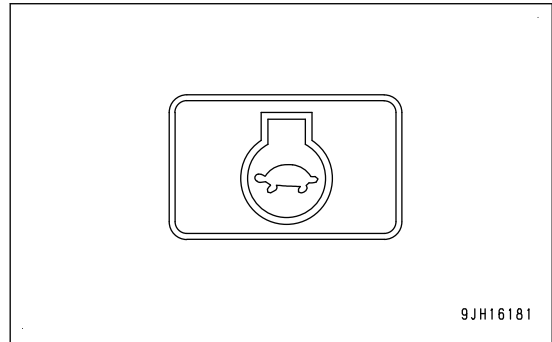
The auto-deceleration pilot lamp shows the setting of the auto-deceleration either ON or OFF.

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

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

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

For the position 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 selector switch is shown as follows.

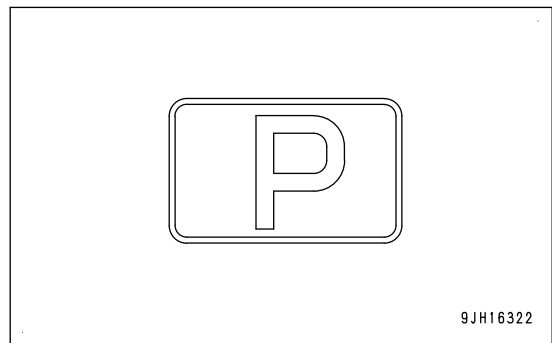
P: P mode (for heavy-load operations)

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

L: L mode (for fine control operations and lifting 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 location of the working mode selector switch, see "MACHINE MONITOR EQUIPMENT NAME (3-6)".

## TRAVEL SPEED DISPLAY

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

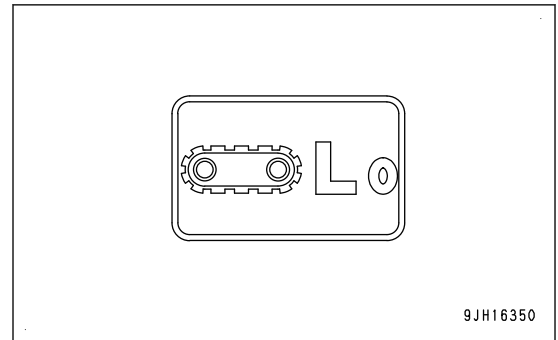
The travel speed is indicated as follows according to the setting of the travel speed selector switch.

Lo: Low-speed travel

Mi: Mid-range speed travel

Hi: High-speed travel

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



## ONE-TOUCH POWER MAXIMIZING PILOT LAMP

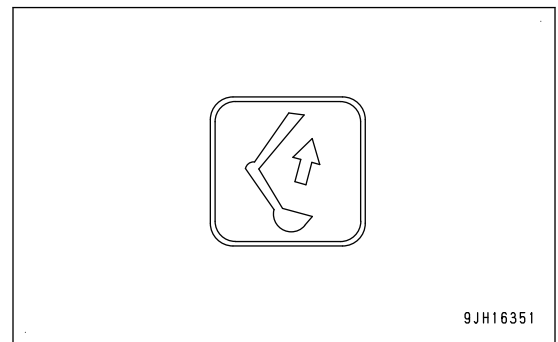
One-touch power maximizing pilot lamp shows if the one-touch power maximizing function is being actuated.

The following pilot lamp is displayed when the knob switch on the L.H. control lever is operated. (The actual pilot lamp display is shown at the position of preheating pilot lamp.)

Pilot lamp lights up: Digging power increases while the knob switch is kept pressed (for a maximum of 8.5 seconds).

Pilot lamp goes out: Power maximizing function stopped

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



### REMARK

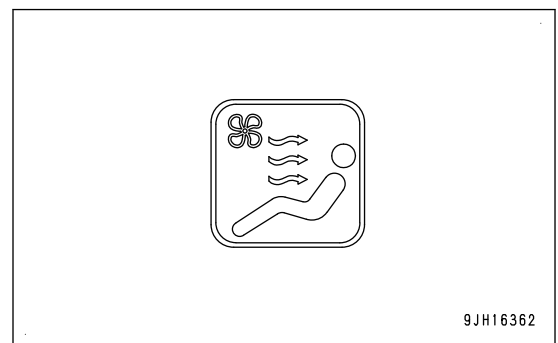
Only when the working mode is P, E, ATT/P, and ATT/E mode, the power is increased while the knob switch is being pressed. Even if the knob switch continues to be pressed, the power increase is finished after 8.5 seconds.

## 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

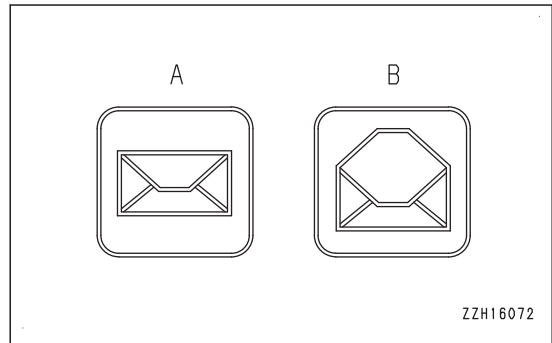
The message display lights up when there is a message from Komatsu.

To read the message, see PILOT DISPLAY, “MESSAGE DISPLAY”.

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

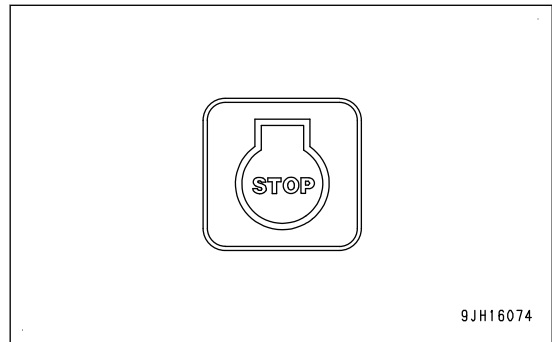
Lights up in blue (B): There is any read message to which no reply is made.

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.

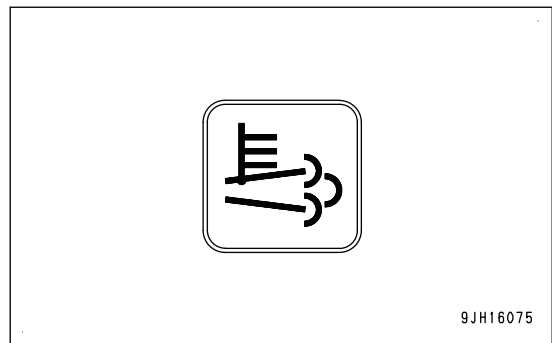


### AFTERTREATMENT DEVICES REGENERATION PILOT LAMP

#### CAUTION

- Exhaust gas temperature may increase higher than the previous models during the aftertreatment devices regeneration. Stay away from the exhaust pipe outlet to prevent yourself from getting burnt. Also, keep combustible materials away from the exhaust pipe outlet to prevent a fire.
- When there are thatched houses, dry leaves or pieces of paper near the job site, set the system to the regeneration disable to prevent fire hazards due to highly heated exhaust gas during the aftertreatment devices regeneration. For details of the setting method, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)”.

The aftertreatment devices regeneration pilot lamp lights up during regeneration of the exhaust gas aftertreatment devices. It goes out when the regeneration is completed.



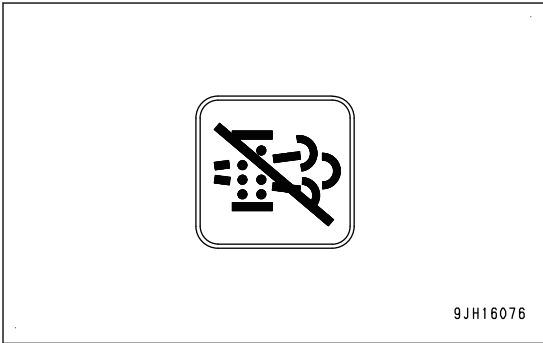


### AFTERTREATMENT DEVICES REGENERATION DISABLE PILOT LAMP

The aftertreatment devices regeneration disable pilot lamp lights up when the exhaust gas aftertreatment devices are set not to be regenerated.

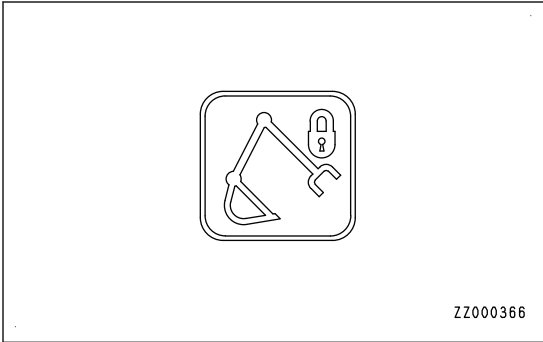
**REMARK**

Even if the aftertreatment devices regeneration is disabled, when the manual stationary regeneration is necessary, KDPF soot accumulation caution lamp lights up. If KDPF soot accumulation caution lamp lights up, cancel the regeneration disable setting and perform manual stationary regeneration. For the procedures of cancellation of the regeneration disable setting, and setting of manual stationary regeneration, see "HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)".



### LOCK LEVER PILOT LAMP

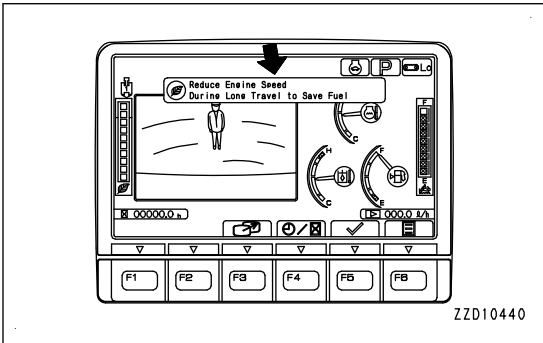
The lock lever pilot lamp lights up when the lock lever is in LOCK position. It goes out when the lock lever is set in FREE position.



### ECO GUIDANCE

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

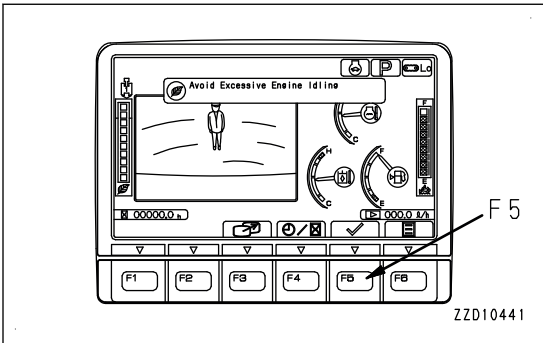
The details of the guidance are as follows:



### 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.

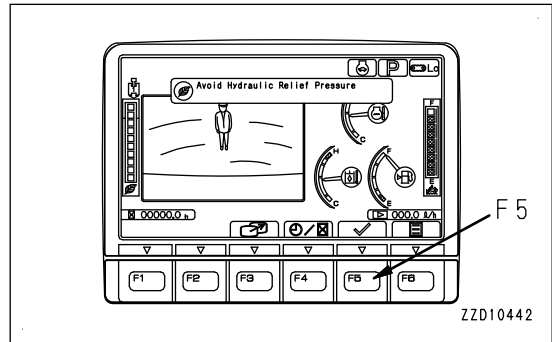
The idling stop message goes out if any lever is operated again or switch F5 is pressed.



### Guidance To Avoid Hydraulic Relief

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

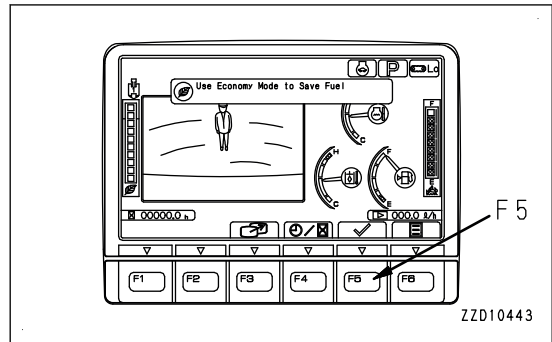
The hydraulic relief deterrence message goes out 10 seconds later or when switch F5 is pressed.



### 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.

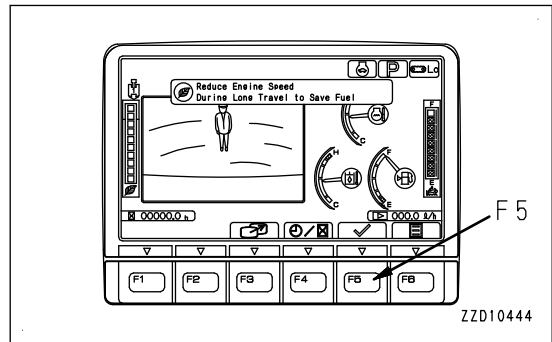
E mode recommendation message goes out more than 10 seconds after or when switch F5 is pressed.



### 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.

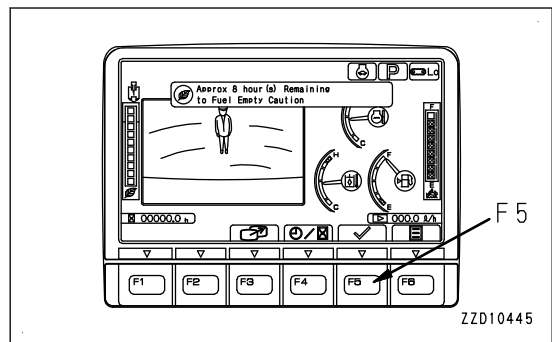
The travel partial mode recommendation message goes out more than 10 seconds after or when switch F5 is pressed.



### 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 roughly.

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

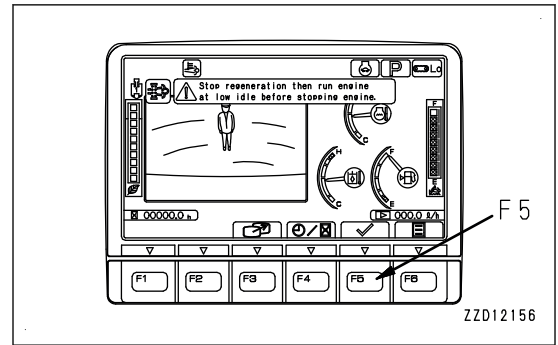


### Engine stop operation during the aftertreatment devices regeneration guidance

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

When stopping the engine during the aftertreatment devices regeneration, stop the regeneration first according to “PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING (3-117)”, then stop the engine after running it at low idle for approximately 5 minutes.

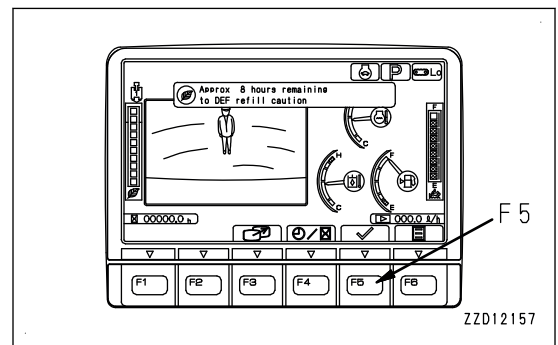
The information about engine stop operation during the aftertreatment devices regeneration goes out 10 seconds later or when switch F5 is pressed.



**DEF low level 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.

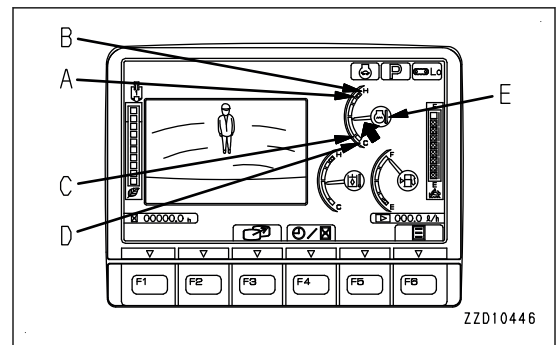
Red range (A) position: Engine coolant temperature caution lamp (E) shows abnormality display.

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 indicator 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.

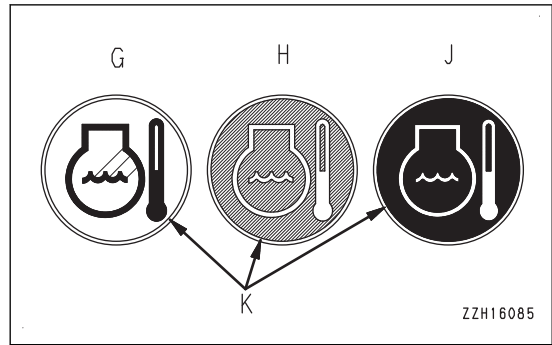
In this case, perform warm-up operation. For details, see “METHOD FOR ENGINE WARM-UP OPERATION (3-173)”.



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

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

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



**HYDRAULIC OIL TEMPERATURE GAUGE**

Hydraulic oil temperature gauge shows the hydraulic oil temperature.

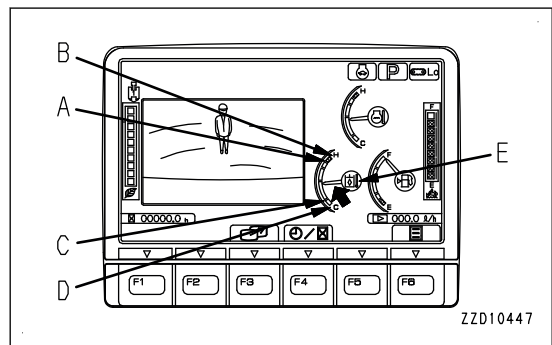
If the indicator is in green range during operations, it is normal.

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

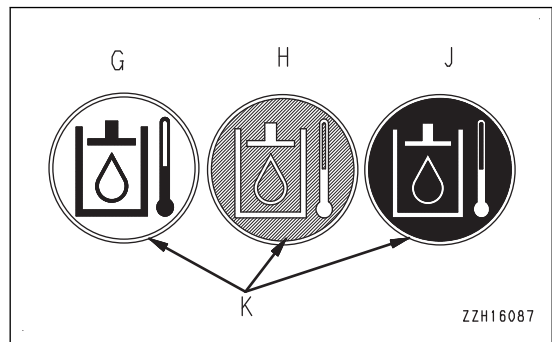
Red range (B) position: 105 °C or more

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 (3-175)".

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

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

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



**FUEL GAUGE**

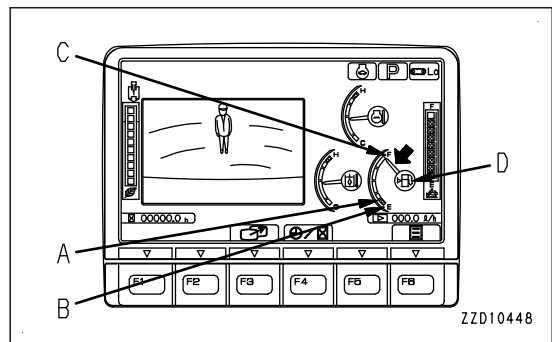
Fuel gauge shows the amount of fuel in the fuel tank.

The indicator should be in the green range during operations.

When the indicator nears red range (A) during operation, the remaining fuel is 60 l or less, so check the fuel level and add it.

(A) to (B): Red range

(A) to (C): Green range



**REMARK**

When the indicator reaches red range (B), the remaining fuel is 41 ℓ or less.

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

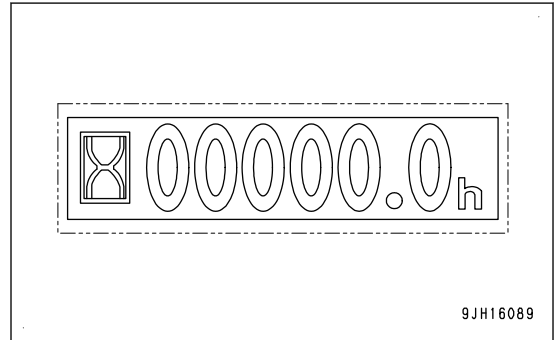
The correct fuel level may not be displayed for a short time after the starting switch is turned to ON position, but this is not abnormal.

**SERVICE METER / CLOCK**

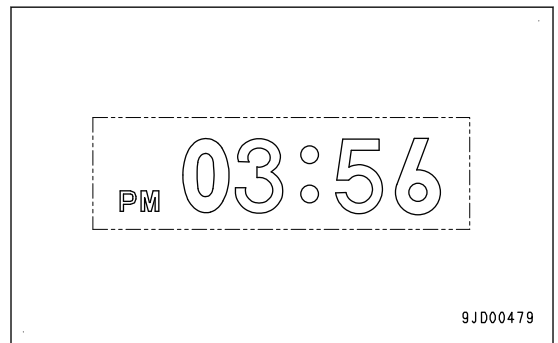
The service meter/clock shows the total hours of operation of the machine or the present time.

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.

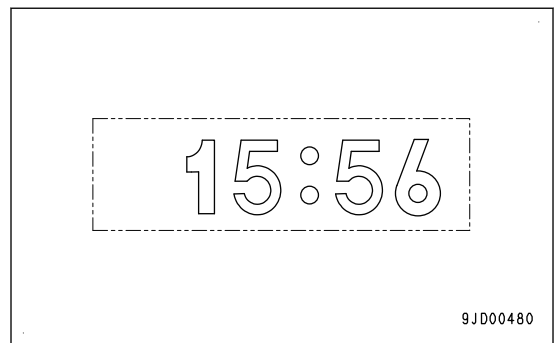
- Service meter display



- Clock display (12-hour display)



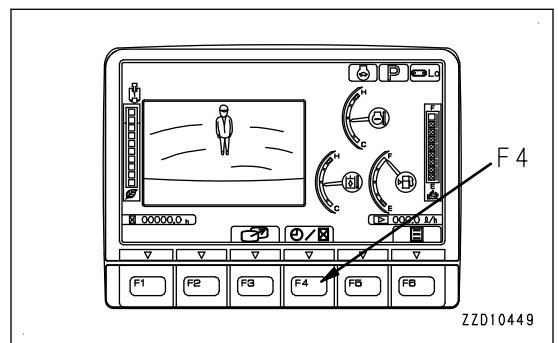
- Clock display (24-hour display)



On the standard screen, when 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”.



**ECO GAUGE**

ECO gauge shows the instantaneous fuel consumption.

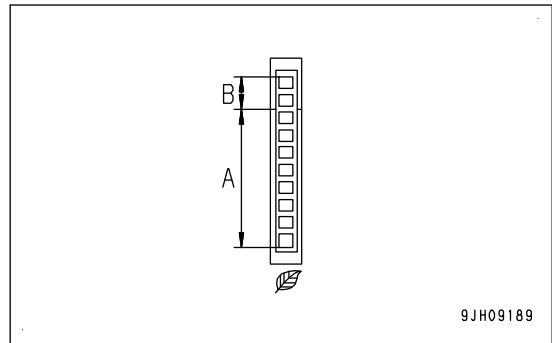
The instantaneous fuel consumption means the fuel consumption rate at each moment, which varies with the work load and engine speed.

When the gauge is in green range A, the instantaneous fuel consumption is at 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, for the conservation of global environment reduce the engine output to a point where there is no adverse effect on the operation. Perform energy saving operations within the green range. Travel less frequently. It also helps energy saving operations. Consider the best way of operation for energy saving.



**FUEL CONSUMPTION GAUGE**

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

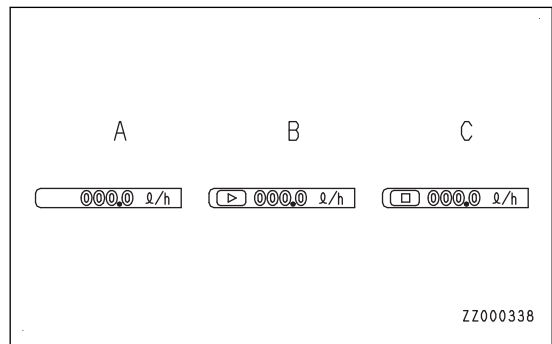
(A): Shows the average fuel consumption of a day (from 0:00 a.m. of the day to 0:00 a.m. of the next day).

(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).



**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.

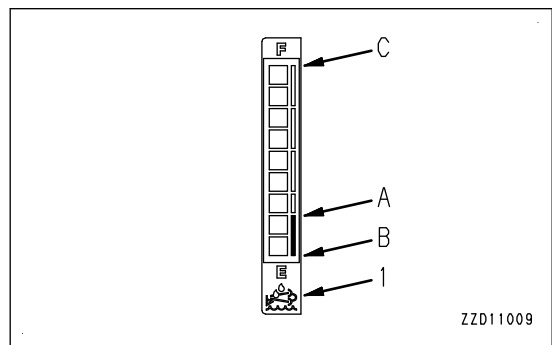
(A) to (B): Red range

(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 monitor lights up in red, the engine power is derated. For detail, see "HANDLE UREA SCR SYSTEM WARNING (3-121)".

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

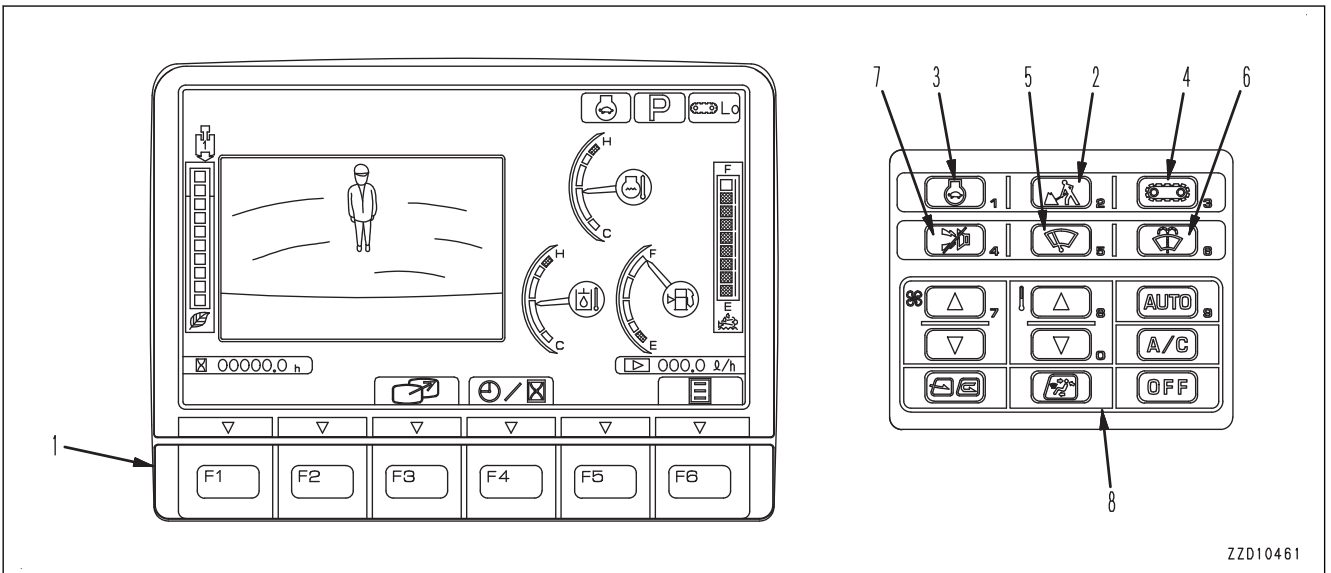


**REMARK**

- 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) does not light up 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

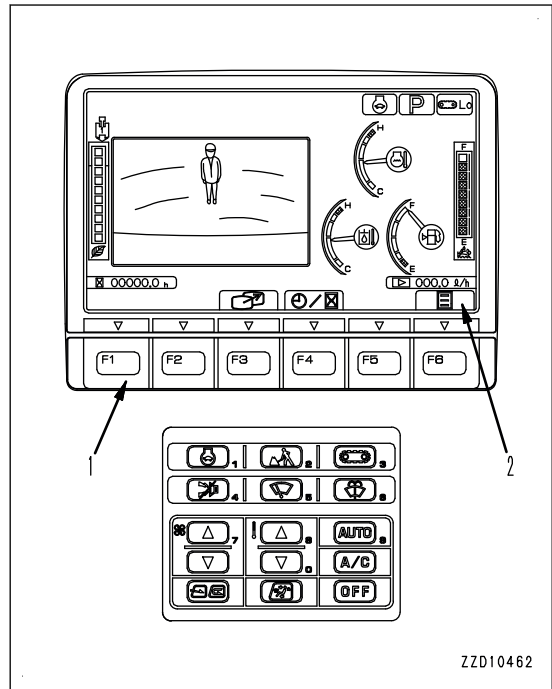
ZZD10461

**FUNCTION SWITCHES AND GUIDANCE ICONS**

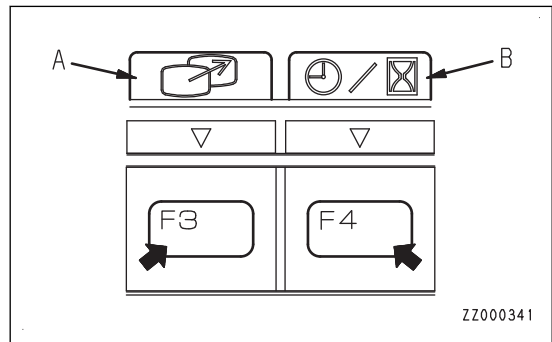
- There are 6 function switches (1) (F1 to F6) at the bottom of the monitor display. The function of each switch differs according to the content of each screen.
- On each screen, you can confirm the function of switches (1) by guidance icons (2) displayed on top of the switch.
- While guidance icon (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:

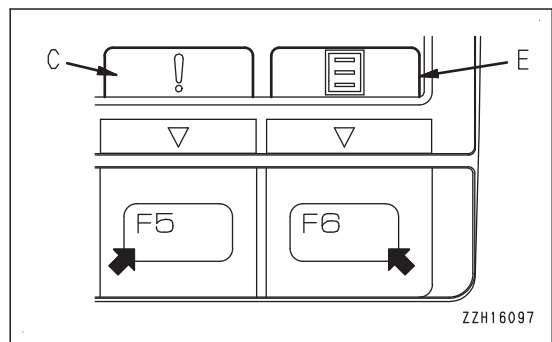
For the details of each function, see the detailed explanation of each item.



- (A) Switch F3: Camera image selector switch.
- (B) Switch F4: Service meter/clock display selector switch



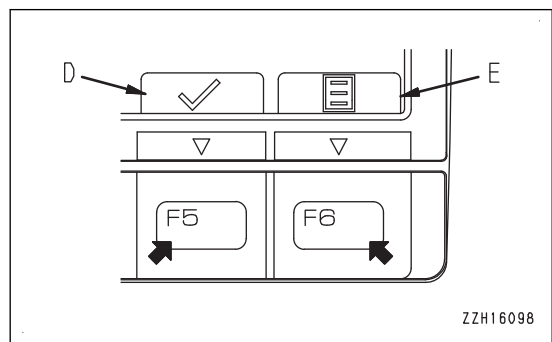
- (C) Switch F5: Current Abnormality display switch  
(Only while caution lamp is lit)



- (D) Switch F5: ECO guidance erase switch  
(While ECO guidance is displayed)

- (E) Switch F6: User menu display switch

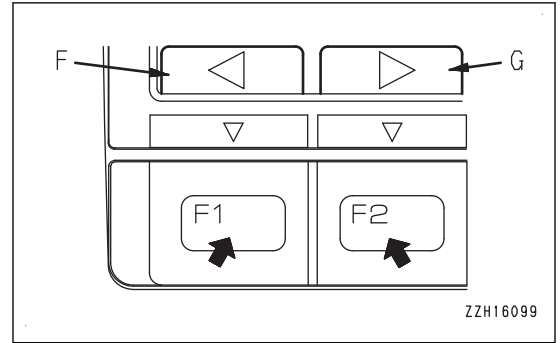
Guidance icons and their functions differ with the contents of the displayed screen, but representative guidance icons frequently used and their functions are as follows:





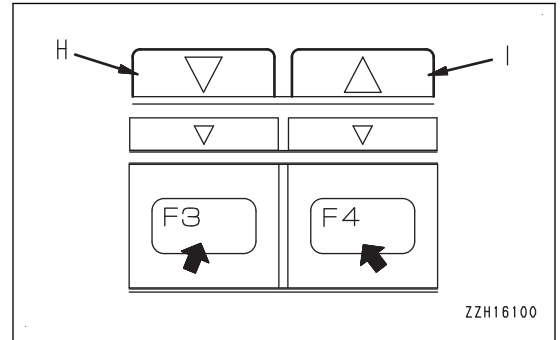
(F) Switch F1: Moves to the left item. (When on the left end, it moves to the right end.)

(G) Switch F2: Moves to the right item. (When on the right end, it moves to the left end.)



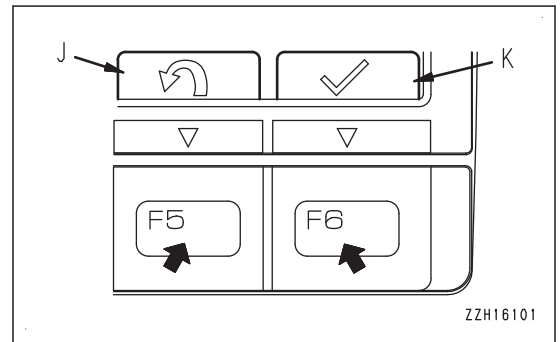
(H) Switch F3: Moves to the item below (forward). (When on the last line, it moves to the first line on the next page.)

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



(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

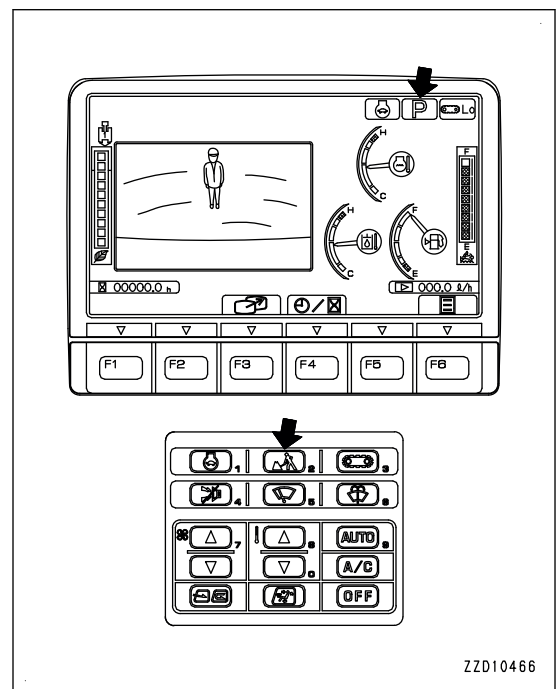
L mode: For fine control operations and lifting operations

B mode: For breaker operations

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

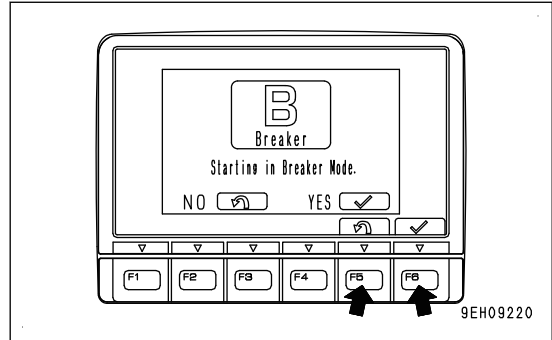
ATT/E mode: For operations emphasizing fuel consumption out of those of 2-way attachments like crusher (machines ready for installation of attachment)

- When the monitor is turned ON, it is automatically set to the mode used when the starting switch was turned to OFF position last.



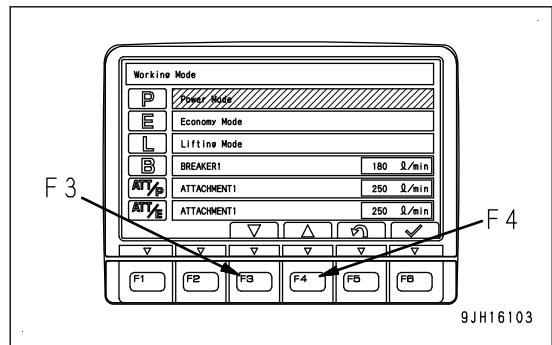
- Press the switch to display the working mode selection screen. For each set mode, P, E, L, B, ATT/P, ATT/E are displayed at the top right of the monitor display.
- For machines ready for installation of attachment, the attachment mode is added to the display. For handling of machines ready for installation of attachment, see “ATTACHMENTS AND OPTIONS (6-1)”.
- 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.
- When starting up and staying in B mode, always press function switch F6 (Yes).  
If you press F5 (No), 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.



**How to use working mode selector switch**

1. When working mode selector switch (2) is pressed, the Working Mode selector screen is displayed on the monitor.

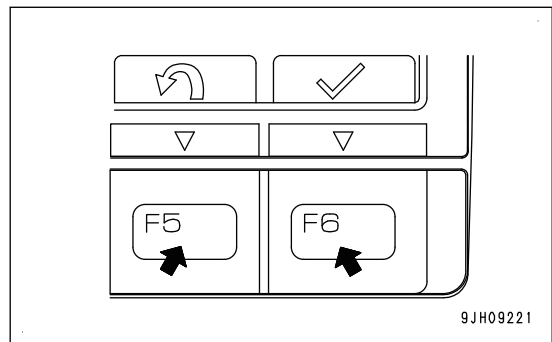


2. Press function switches F3 or F4 at the bottom of the screen or working mode selector switch (2) to change the mode selection one at a time.

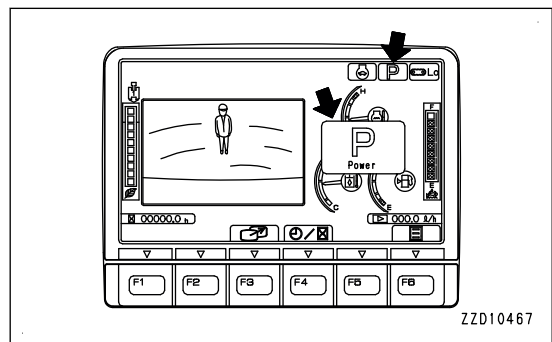
If no switch is touched for more than 5 seconds, the selected working mode is automatically set as the working mode and the screen changes to the one for steps 3 and 4.

**REMARK**

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



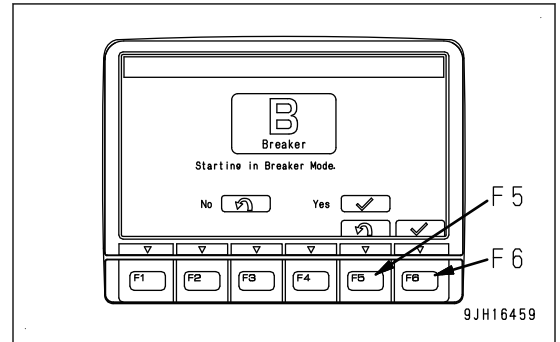
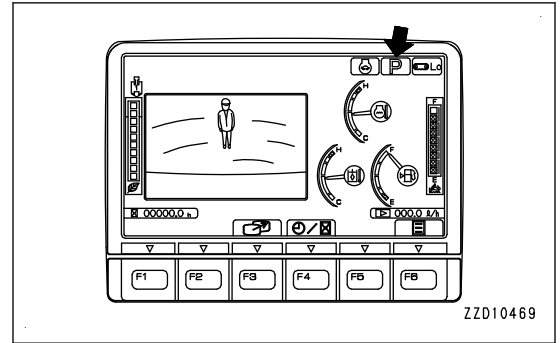
3. After selecting the desired mode, press function switch F6 and the mode is displayed in the center of the monitor display.  
(Example: When the power mode is selected: P)
4. After 2 seconds, the working mode display at the top right of the screen is highlighted in yellow.



- 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. When setting to the breaker mode, always press function switch F6. When function switch F5 is pressed, the breaker mode is not set, and the screen returns to working mode selection screen.



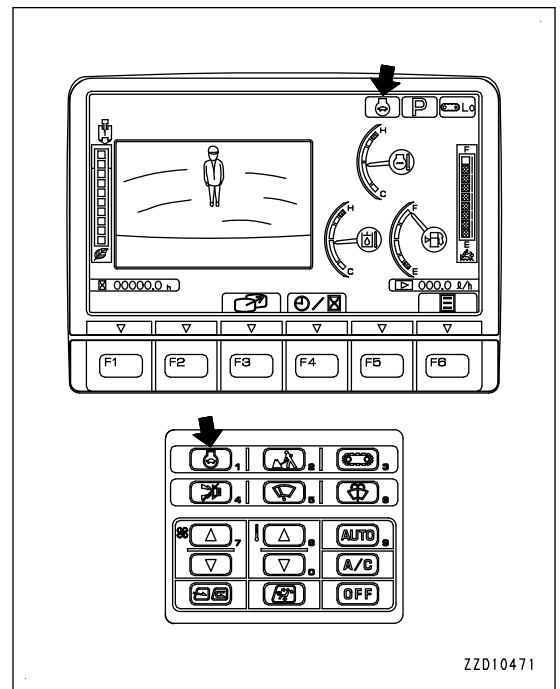
**AUTO-DECELERATION SWITCH**

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 off: Auto-deceleration OFF

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



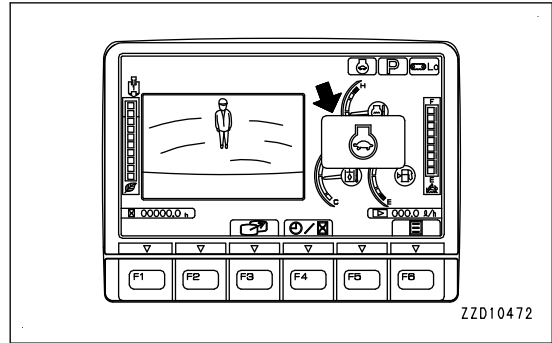
**Function of auto-deceleration**

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.

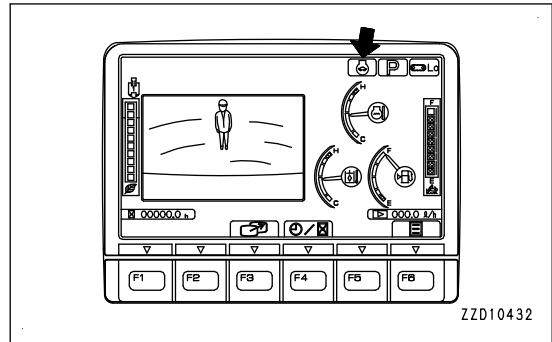
If any lever is operated in this condition, engine speed will return to the previous operating speed, and you can perform the operation.

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.



ZZD10472

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



ZZD10432

### TRAVEL SPEED SELECTOR SWITCH

## ⚠ WARNING

- When loading to or unloading from a trailer, always drive the machine at low speed (set the travel speed selector switch to Lo) and 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.

Travel speed selector switch is used to select the travel speed from 3 stages.

Lo lights up: Low-speed travel

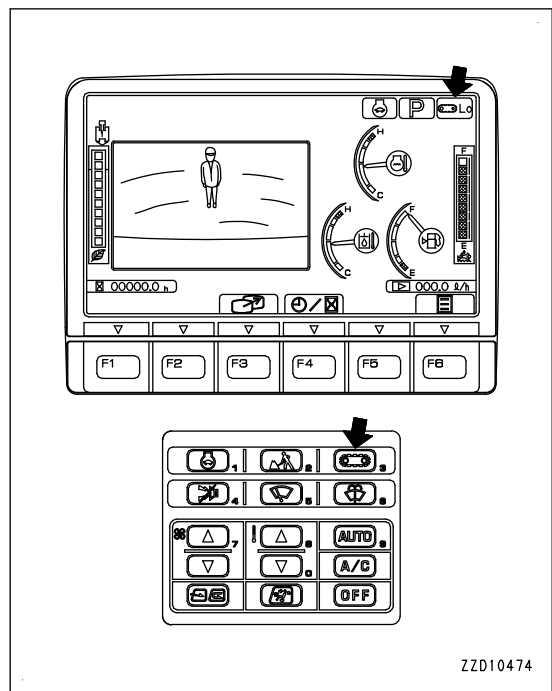
Mi lights up: Mid-range speed travel

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 → Mi → Hi → Lo in turn.

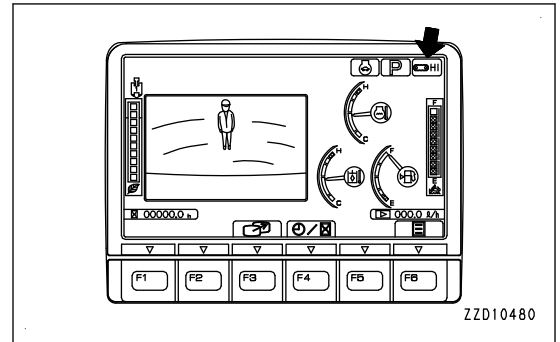
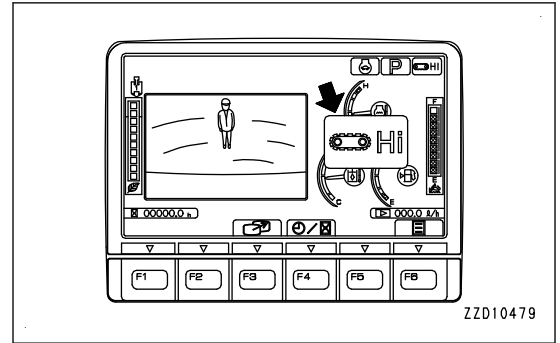
Even if the travel speed is set to high-speed (Hi) or a mid-range speed (Mi), when traveling on soft ground or uphill, and travel power is needed, the system automatically shifts down to low speed travel (Lo). There is no need to operate the switch. In this case, the travel speed on the monitor display stays lit at Hi (high-speed) or Mi (mid-range speed).



ZZD10474

**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**

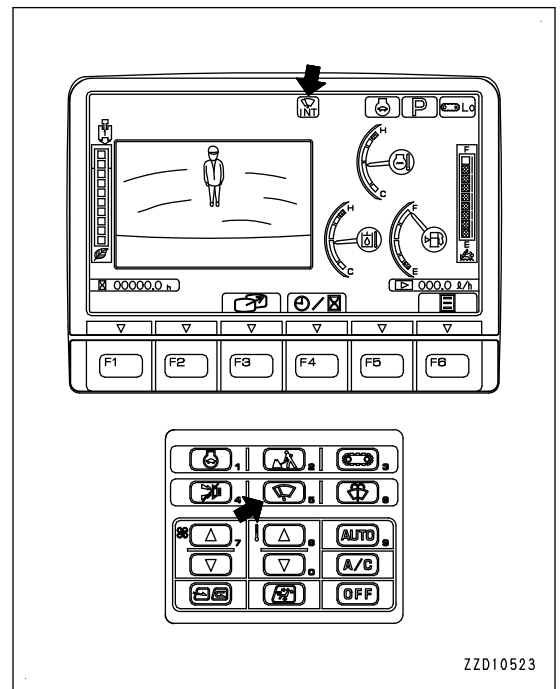
Wiper switch actuates the front window windshield wiper.

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

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

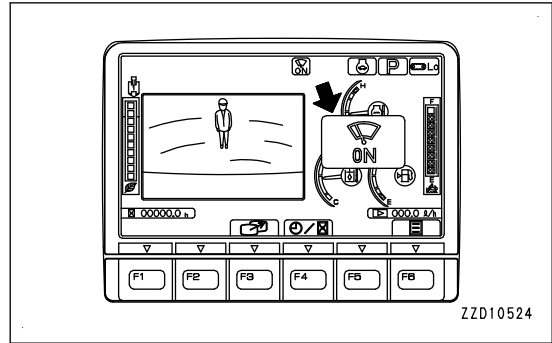
Windshield wiper pilot lamp ON lights up: Windshield wiper operates continuously

Windshield wiper pilot lamp off: Windshield wiper stops

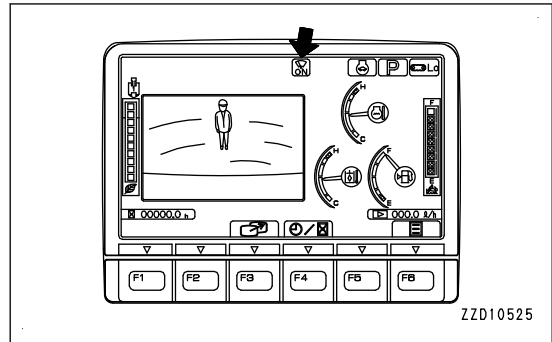


**REMARK**

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 display.



ZZD10524

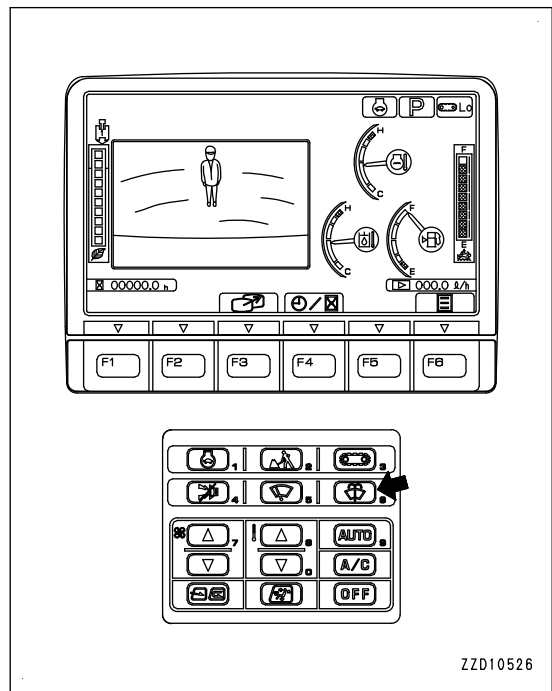


ZZD10525

**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.



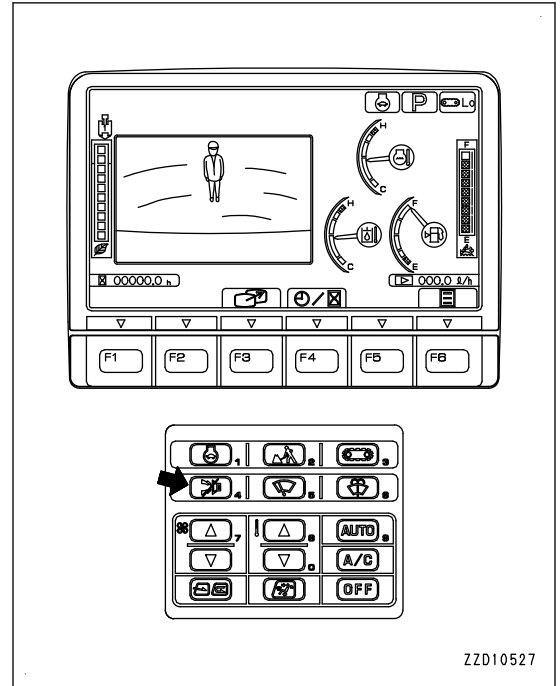
ZZD10526

**BUZZER CANCEL SWITCH**

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

**REMARK**

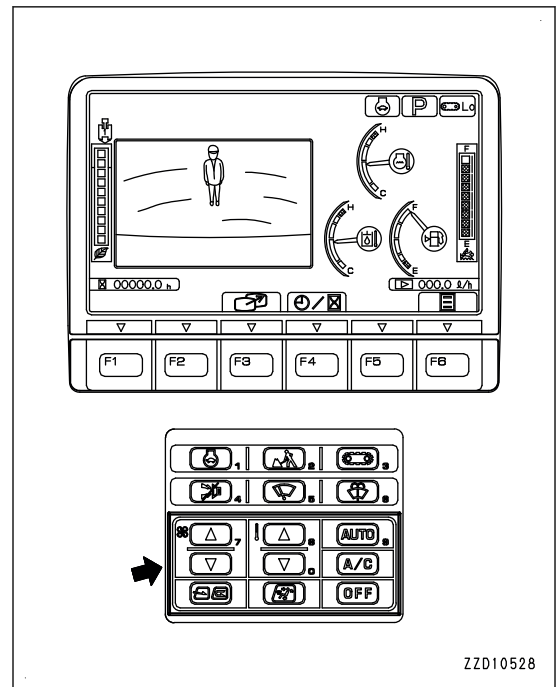
The buzzer cannot be stopped according to the content of the warning.



**AIR CONDITIONER SWITCH**

The air conditioner switch consists of 9 switches.

For explanation of each switch, see "HANDLE AIR CONDITIONER (3-217)".

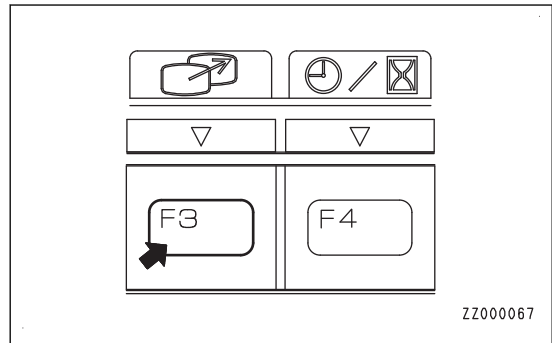


**FUNCTION SWITCHES**

The operation of the function switches in the standard screen

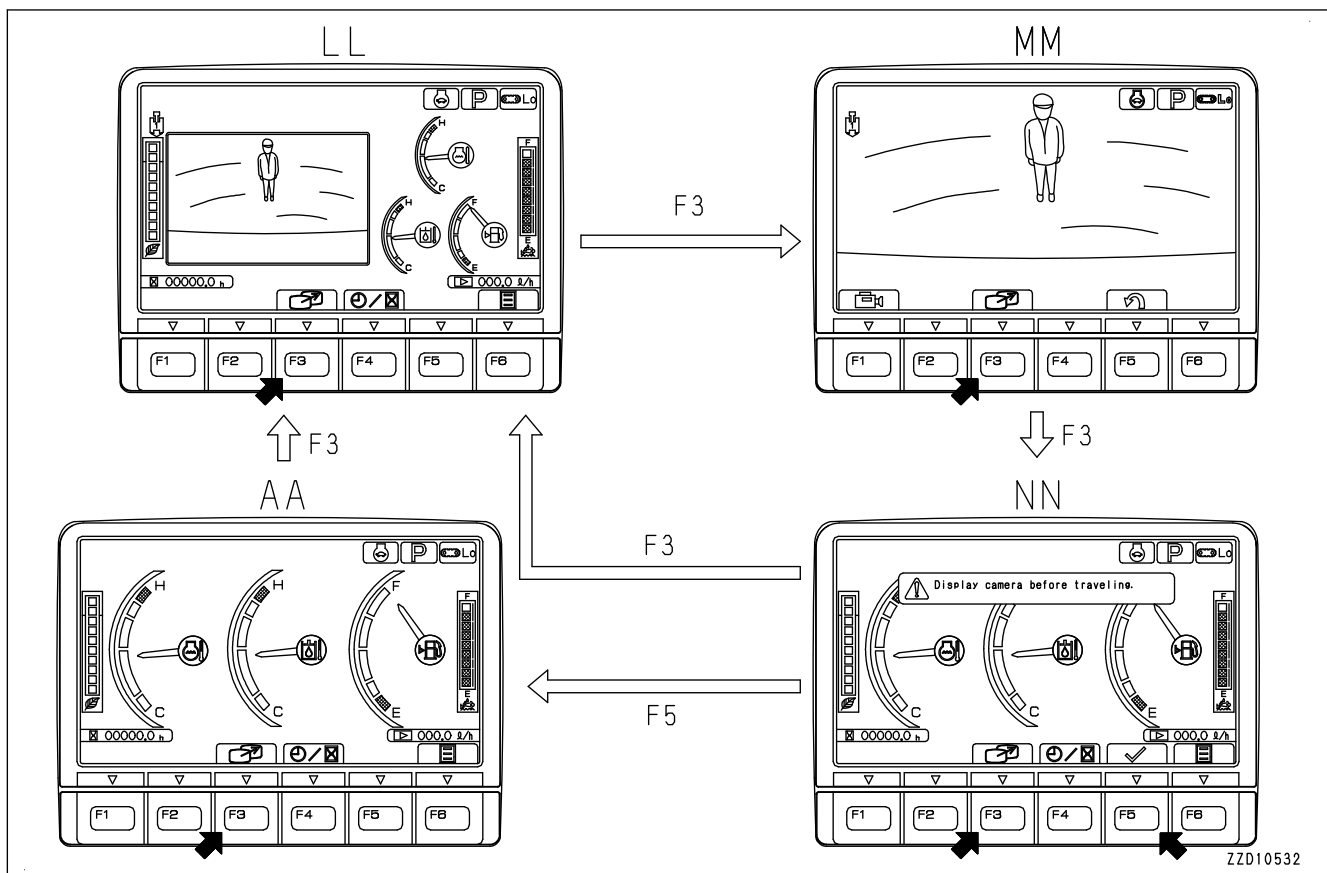
### CAMERA IMAGE SELECTOR SWITCH

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

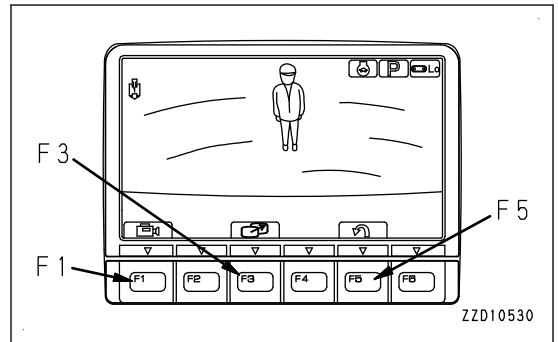
For the safety, display the camera image during travel.



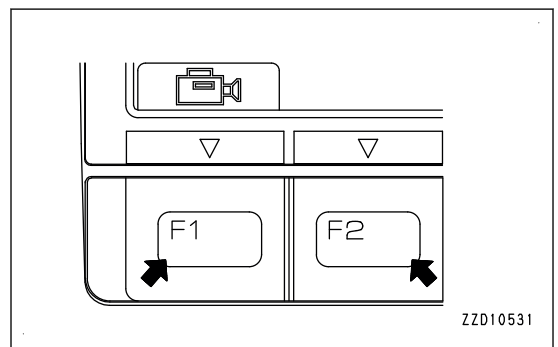
### Operation of one camera image display screen

Operate the following for the method of operation when it is desired to display only one camera image on the monitor.

- On the standard screen, when switch F3 is pressed, No. 1 camera image is displayed in full-screen.



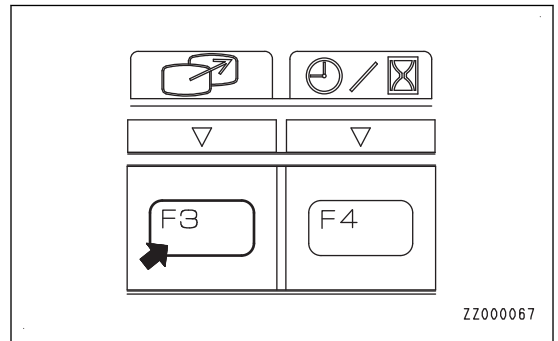
- Display of camera image is changed each time switch F1 is pressed.
  - No. 1 camera image is displayed in full-screen.
  - No. 2 camera image is displayed in full-screen.
  - No. 3 camera image is displayed in full-screen.
  - No. 1 and No. 2 camera images are displayed simultaneously.
- When switch F1 is pressed on the screen that displays No. 1 and No. 2 camera images simultaneously, it returns to the screen that displays No.1 camera image in full-screen.



#### REMARK

If the machine is equipped with No.1 camera only, No. 2 camera image to No.4 camera image are not displayed. No.1 camera image only is displayed in full-screen. If the machine is not equipped with No.3 camera, display is changed each time switch F1 is pressed, but No.3 camera image is not displayed.

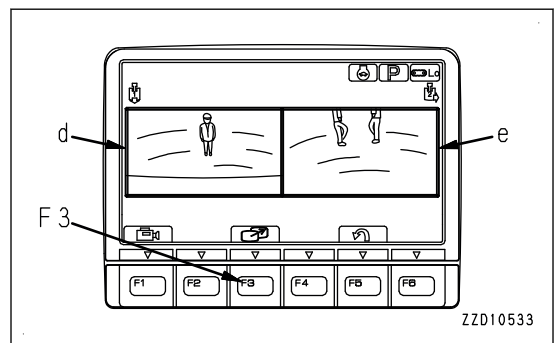
- Press switch F3, and the screen returns to the standard screen.



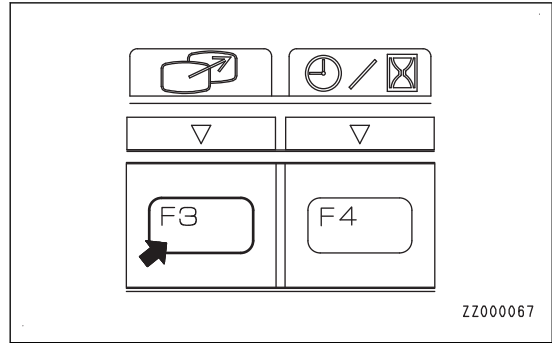
### Operation of image display screen when two camera images are shown simultaneously

On the one camera image display, when switch F4 is pressed, No.1 camera image (d) and No. 2 camera image (e) are displayed simultaneously.

- Even if 3 cameras are installed, only the images from the No. 1 camera and the No. 2 camera can be displayed at the same time.
- When 2 images are displayed at the same time, the display changes more slowly than when only one image is displayed.



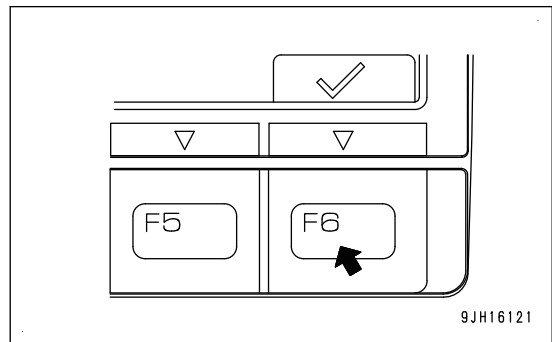
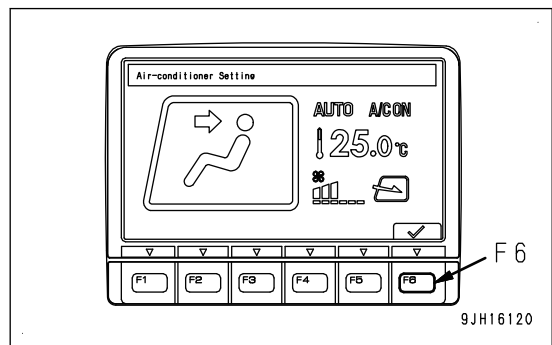
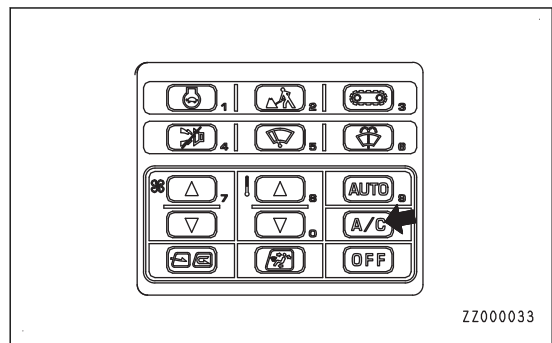
- Press switch F3, and the screen returns to the standard screen.



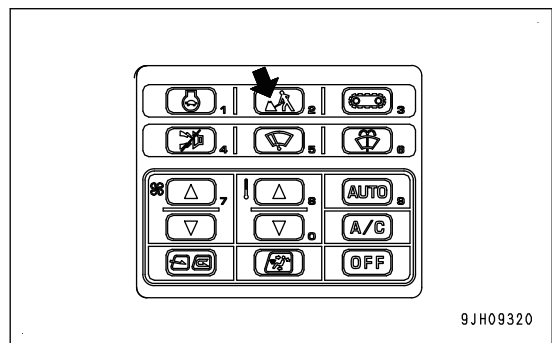
**Other mode operations while camera image is displayed**

Even during 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 control screen. When the screen switches to the air conditioner control 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 control screen, the screen automatically returns to the camera image screen. For details of the air conditioner operation, see “HANDLE AIR CONDITIONER (3-217)”.



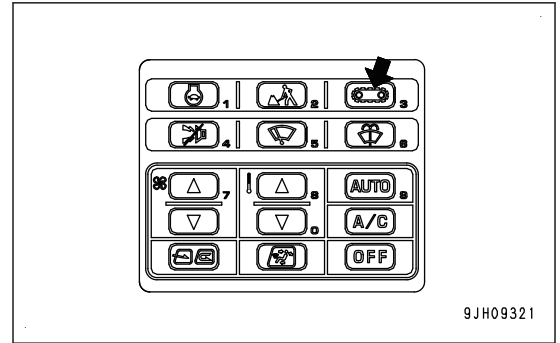
- It is possible to change the working mode by pressing the working mode selector switch.  
 For the working mode selector switch, see “WORKING MODE SELECTOR SWITCH (3-45)”.  
 When the working mode is changed, the screen returns automatically to the camera image screen. At this time, the working mode 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.

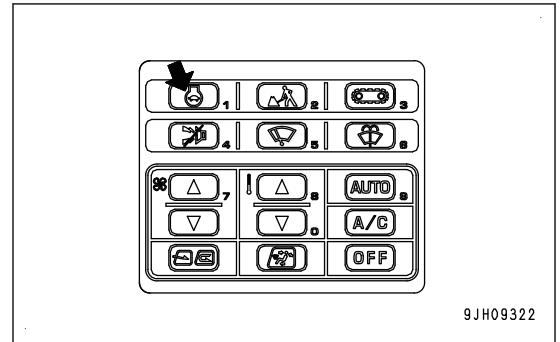
For the travel speed selector switch, see “TRAVEL SPEED SELECTOR SWITCH (3-48)”.

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.

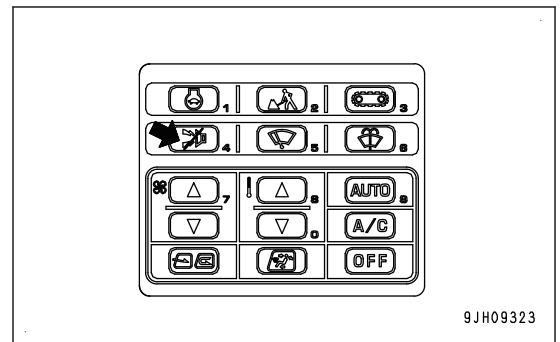
Even if the auto-deceleration switch is pressed, the camera image display screen does not switch to another screen or return to the standard screen display.



- It is possible to stop the alarm buzzer for the warning item where there is an abnormality, by pressing the buzzer cancel switch.

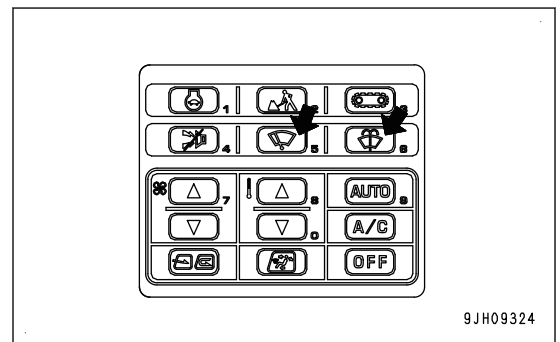
Even if the buzzer cancel switch is pressed, the camera image display screen does not switch to another screen or return to the standard screen.

Depending on the warning, alarm buzzer does not stop sounding by pressing the buzzer cancel switch.



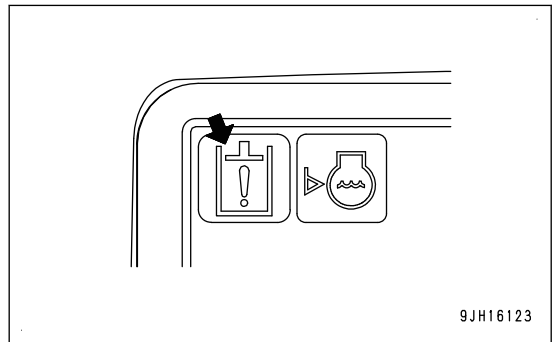
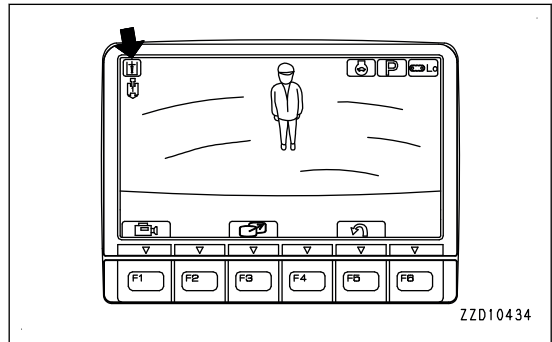
- Press the wiper switch and washer switch to operate the wipers and washer.

Even if the wiper switch or washer switch is pressed, the camera image display screen does not switch to another screen or return to the standard screen display.



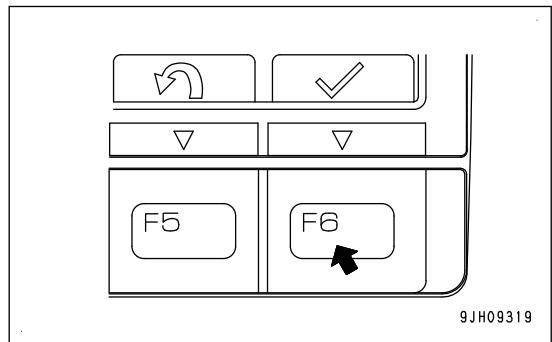
### Actions against warning during camera image display

- 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.



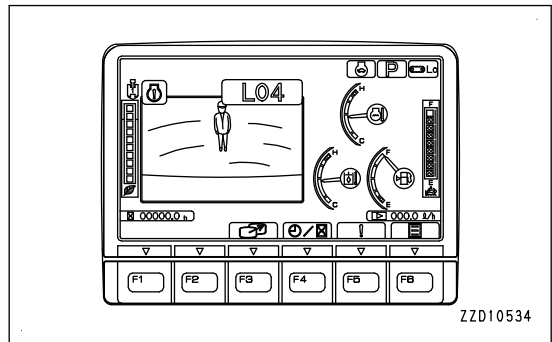
- If the caution lamp is displayed, press switch F6 to return to the standard screen, and check the content of the abnormality or warning display.

While the caution lamp is flashing, if no lever is operated for 10 seconds or more, the screen automatically returns to the standard screen.



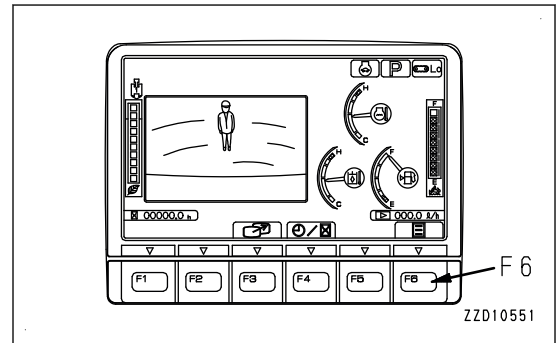
When the screen returns to the standard screen, the caution lamp at the top left of the screen goes out and the caution lamp and action level are displayed on the center of the screen.

- 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 (3-260)”.



### 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.



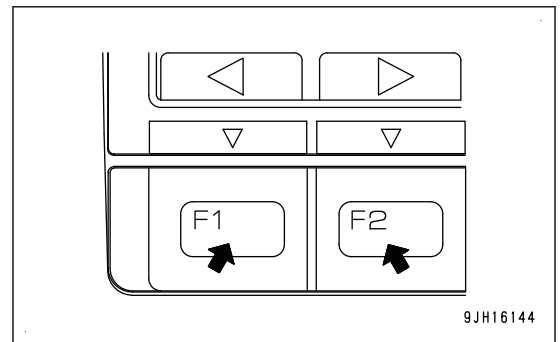
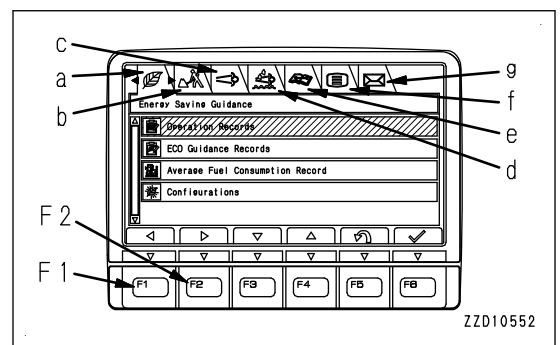
### USER MENU

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

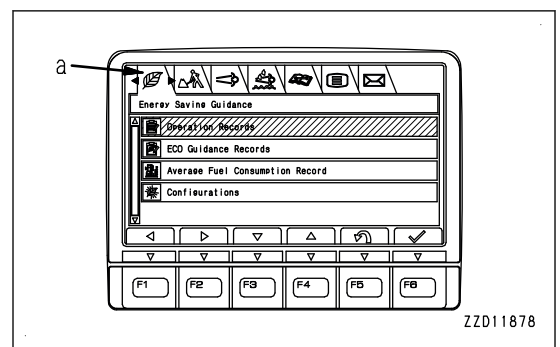
These menus (a) to (g) are for setting and confirming the following items:

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



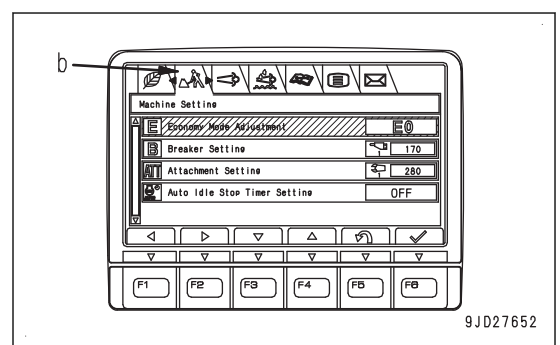
#### (a) "Energy Saving Guidance"

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



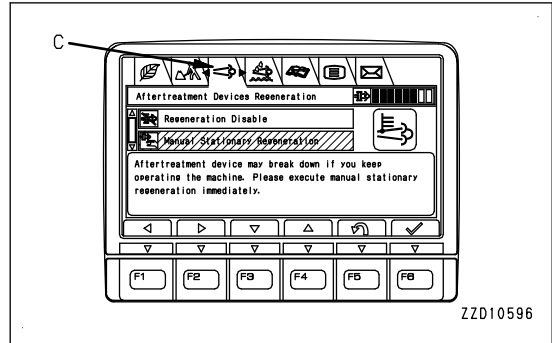
#### (b) "Machine Setting"

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



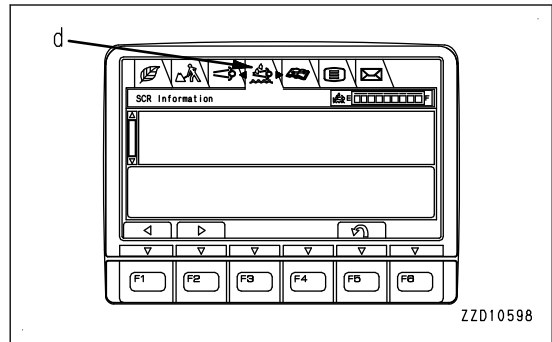
**(c) “Aftertreatment Devices Regeneration”**

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



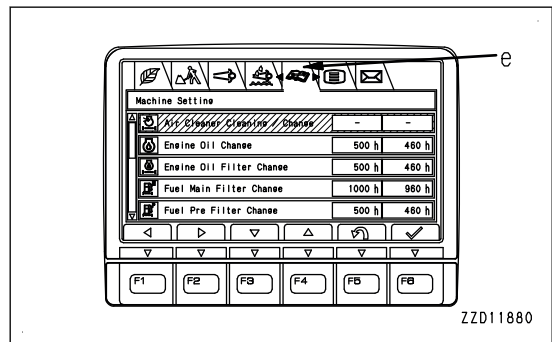
**(d) “SCR Information”**

- Check of DEF level
- Information on DEF system



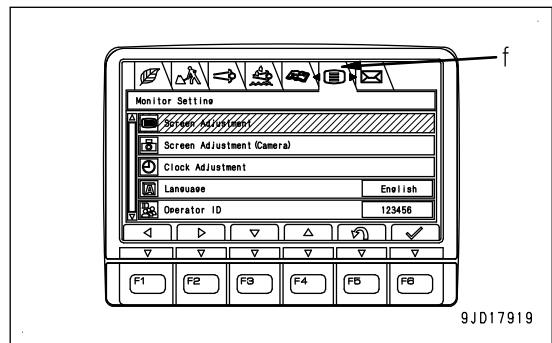
**(e) “Maintenance”**

- Check and reset of various maintenance times



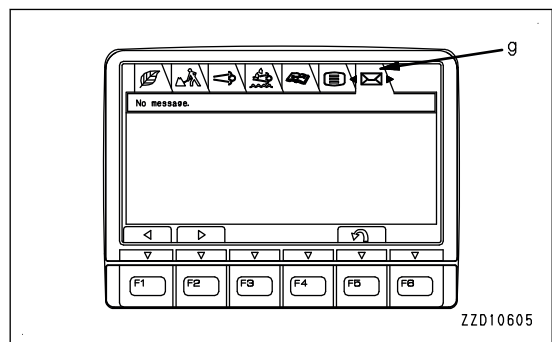
**(f) “Monitor Setting”**

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

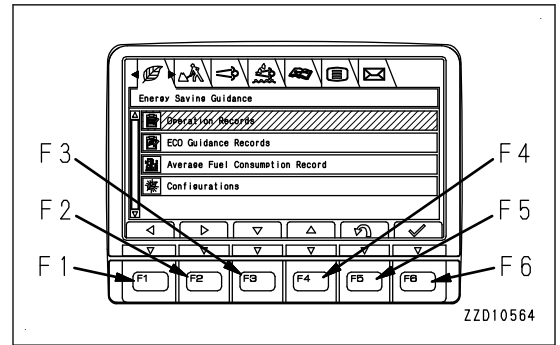


**(g) Mail Check**

- Check of mail contents and reply to mail

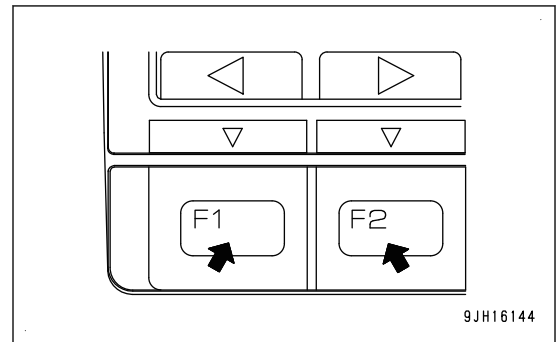


On the user menu screen, it is possible to perform the following operations with switches F1 to F6.



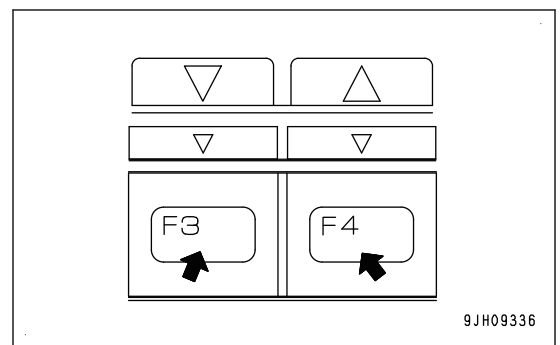
F1: Moves to the left menu. When on the left end menu, it moves to the right end menu.

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

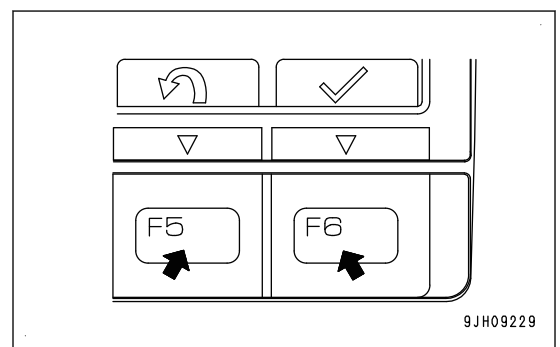
F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.



F5: Returns the screen to the standard screen.

F6: Displays the setting screen for selected item.

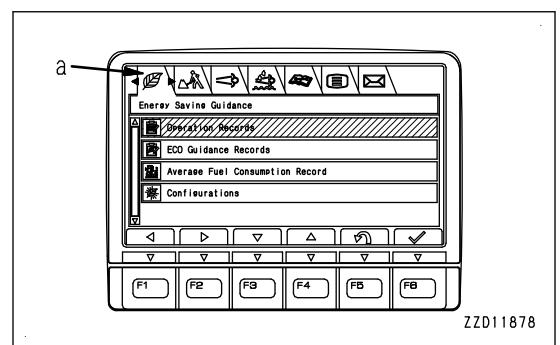
- If no switch is operated for 30 seconds on the user menu screen, the screen automatically returns to the previous screen.



### ENERGY SAVING GUIDANCE

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

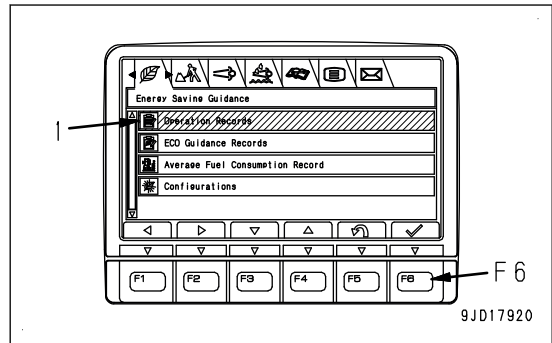
- "Operation Records"
- "Eco Guidance Records"
- "Average Fuel Consumption Record"
- "Configurations"



### CHECK OPERATING RECORD

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

On the Operation Records menu, the 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.



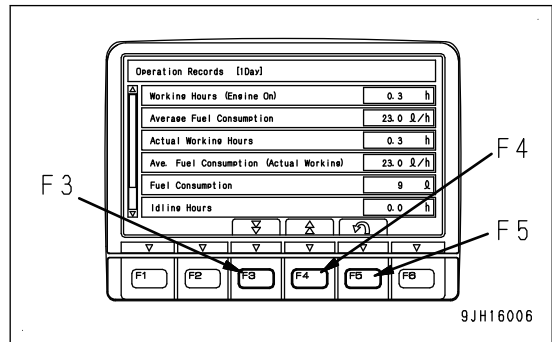
### Operation on the Operation Records screen

On the 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.

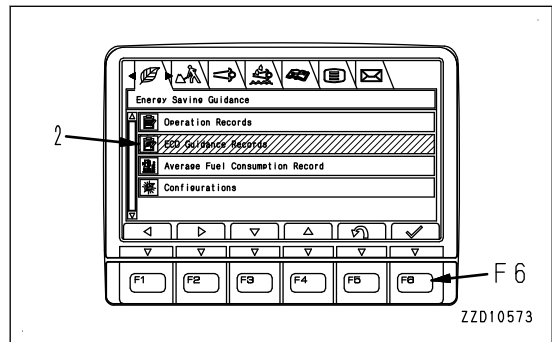
F5: Returns the screen to the Energy Saving Guidance menu screen.



### CHECK ECO GUIDANCE RECORD

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

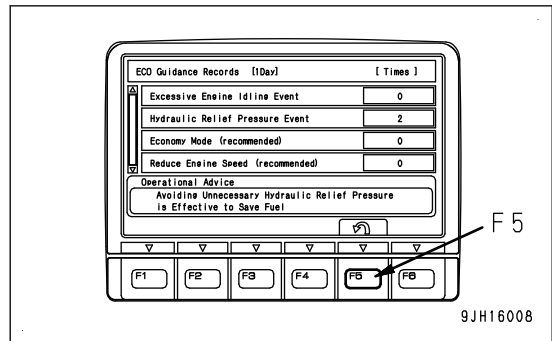
On the ECO Guidance Records menu, display the frequency of display of the ECO guidance on a daily basis or during the split measurement period.



### Operations on ECO Guidance Records screen

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

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

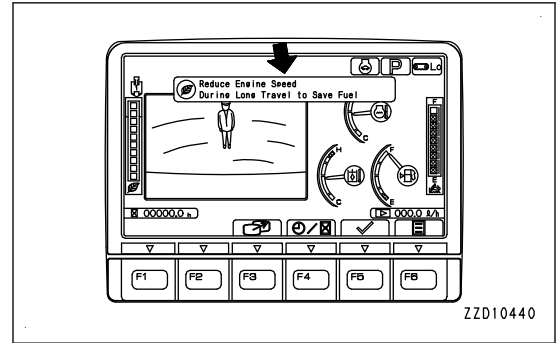




**REMARK**

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

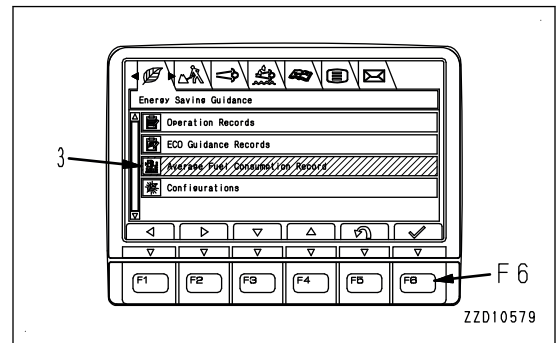
For details, see “ECO GUIDANCE (3-37)”.



**CHECK FUEL CONSUMPTION RECORD**

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

On the Average Fuel Consumption Record menu, display the graph of hourly average fuel consumption during the last 12 hours or the graph of daily fuel consumption during the last 1 week.



**Operation on the Average Fuel Consumption Record screen**

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

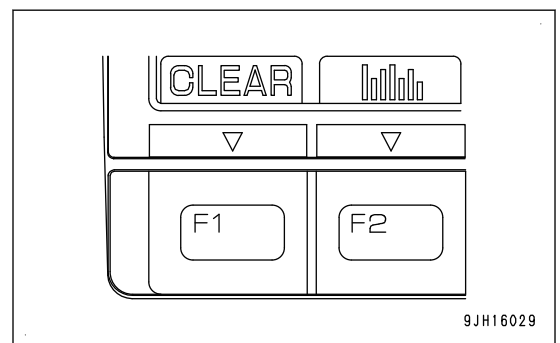
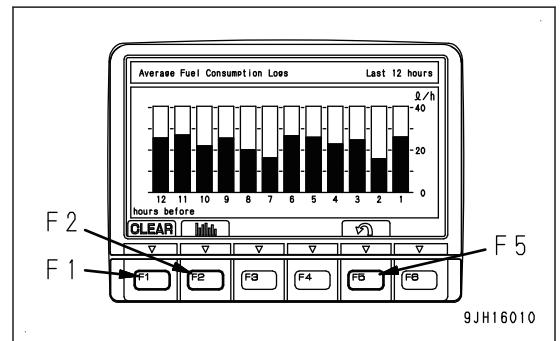
F1: Clears the graph data.

F2: Switches graphical displays of the average fuel consumption.

F5: Returns the screen to the 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.).

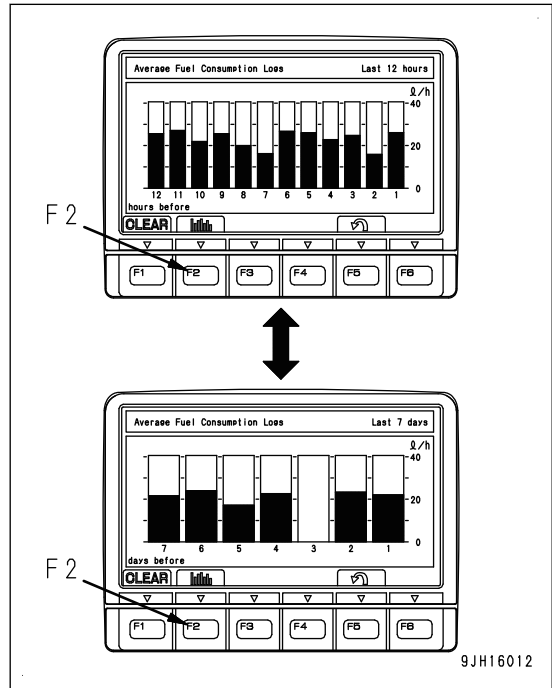


### Switching of displayed graph

Press F2 on the 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 the last 12 hours and the other is daily average fuel consumption during the last 1 week. Switching between them is available.

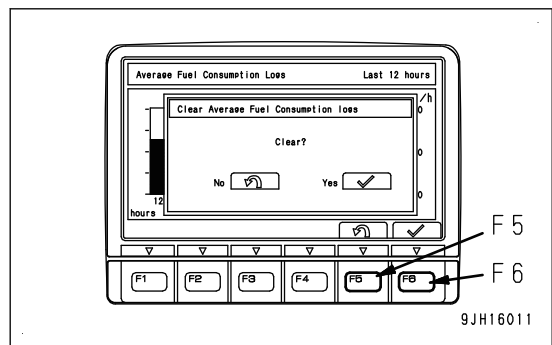
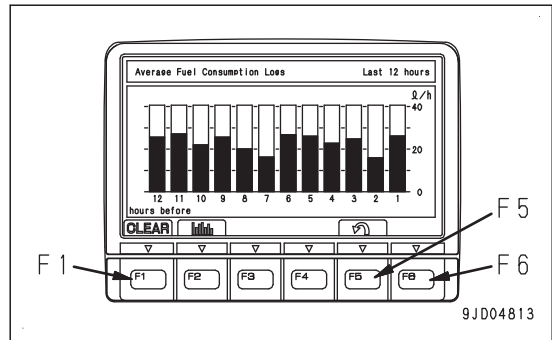


### Deleting the average fuel consumption records

1. When 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 the last 12 hours and the last 1 week are both deleted, and the screen returns to the Average Fuel Consumption Record screen.

**REMARK**

Press switch F5 to cancel the data deletion (clear) operation.

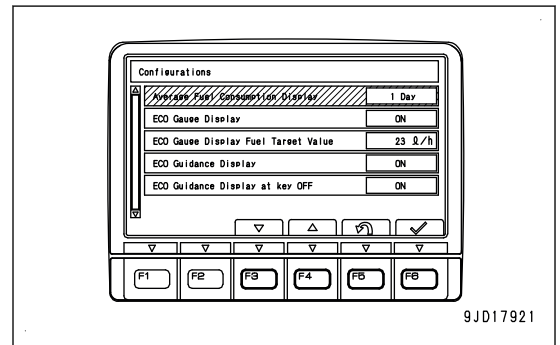
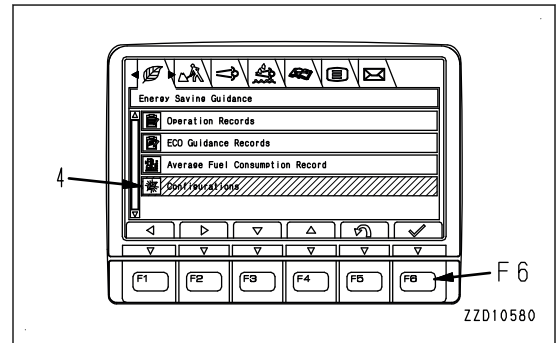


### CHANGE DISPLAY SETTING

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

On the Configurations menu, following operations are available.

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



### Operations on the Configurations screen

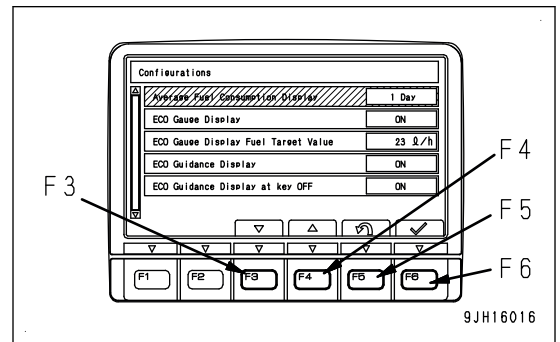
Press switches F3 to F6 to perform the following operations on the Configurations screen.

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.

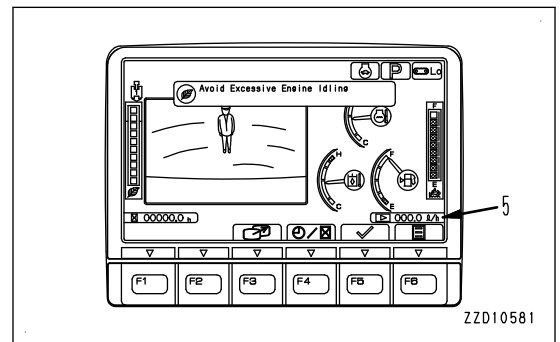
F5: Returns the screen to the Energy Saving Guidance menu screen.

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 the Configurations screen, then press switch F6.

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.

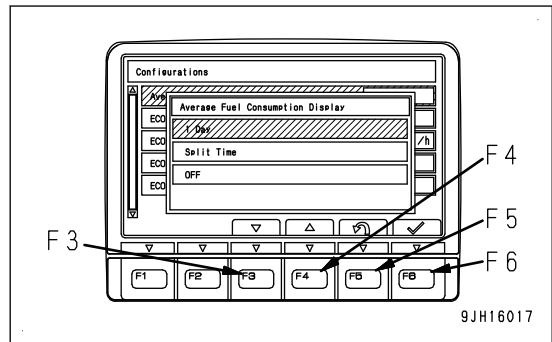
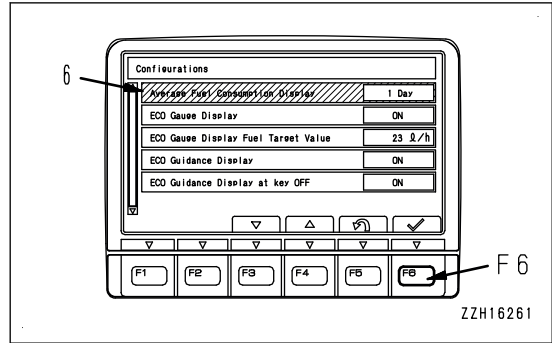
F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line on the previous page.

F5: Cancels the setting and returns to Configurations screen.

F6: Changes the setting and returns to Configurations screen.

2. The Average Fuel Consumption Display screen appears.

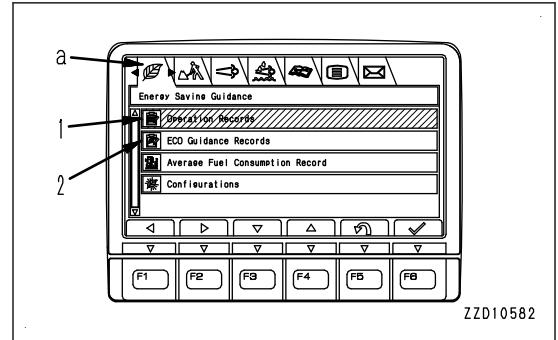
- 1 Day  
Displays the average fuel consumption from 0:00 a.m. of the day to 0:00 a.m. of the next day.
- Split Time  
Displays the average fuel consumption during the split measurement period.  
Select the split to start the automatic measurement of fuel consumption.
- None  
Does not display the fuel consumption gauge.



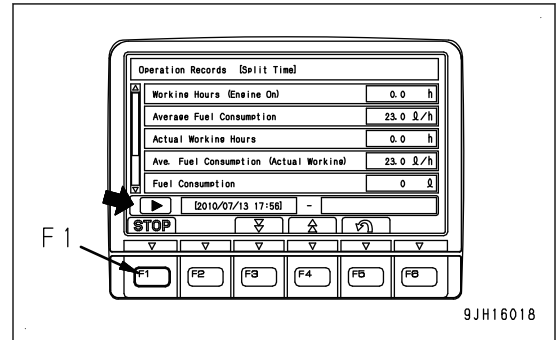
**REMARK**

When you select the split measurement, the measurement stop switch (STOP) is displayed on the Operation Records screen and the ECO Guidance Records screen.

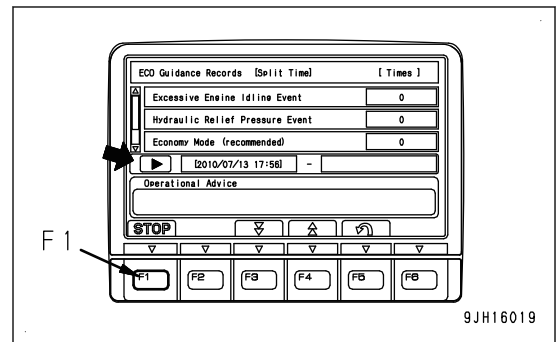
When you stop the measurement, move from Energy Saving Guidance menu (a) screen to the Operation Records (1) screen or ECO Guidance Records (2) screen, then press the measurement stop switch F1 (STOP).



ZZD10582



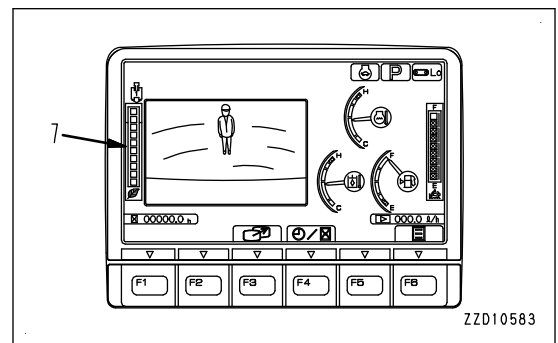
9JH16018



9JH16019

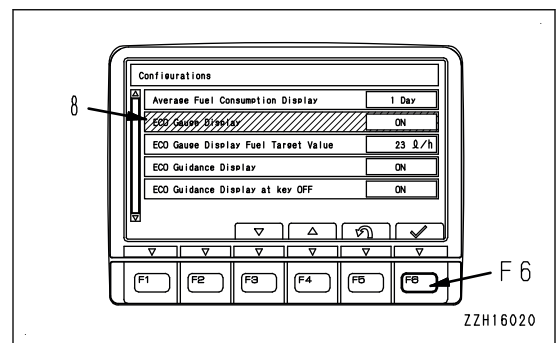
**SWITCH DISPLAY/NON-DISPLAY OF ECO GAUGE**

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



ZZD10583

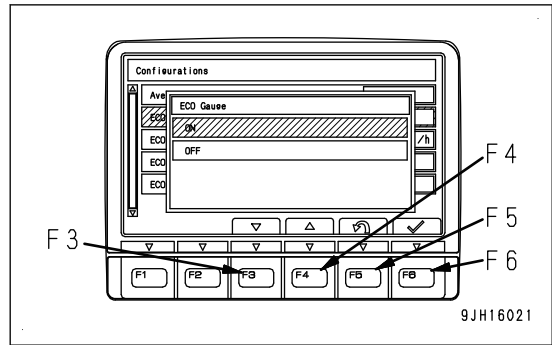
1. Select the ECO Gauge display (8) from the Configurations screen, then press switch F6.
2. ECO Gauge Display setting screen appears.  
 ON: Displays the ECO gauge (7) on the standard screen.  
 OFF: Does not display ECO gauge (7) on the standard screen.



ZZH16020

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

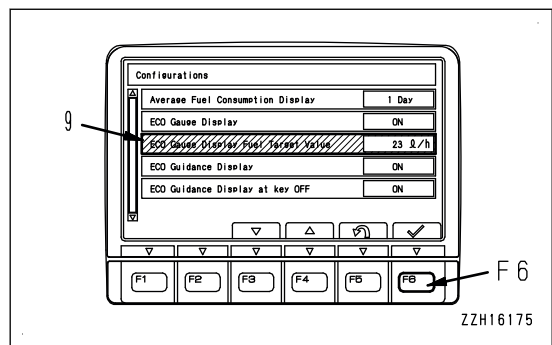
- F3: Moves to the next item (1 line below). When on the last line, it moves to the first line on the next page.
- F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line on the previous page.
- F5: Cancels the setting change and returns to Configurations screen.
- F6: Changes the setting and returns to Configurations screen.



### SET TARGET FUEL CONSUMPTION VALUE DISPLAYED IN ECO GAUGE

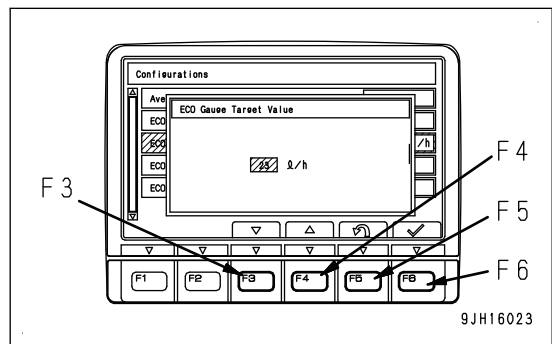
It is possible to change the target fuel consumption value (the upper limit value of the green range) of the ECO gauge .

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



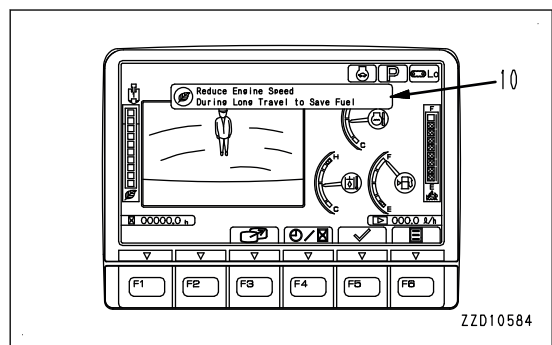
2. ECO Gauge Display Fuel Target Value appears. On this screen, it is possible to perform the following operations with switches F3 to F6.

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

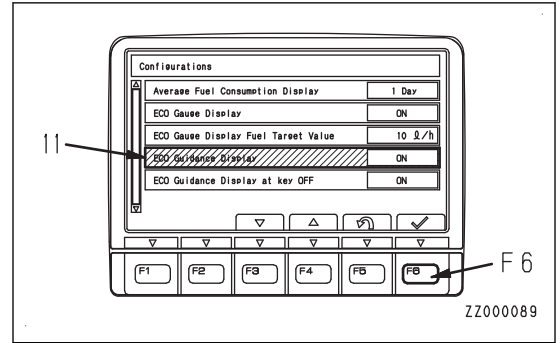


### SWITCH DISPLAY/NON-DISPLAY OF ECO GUIDANCE

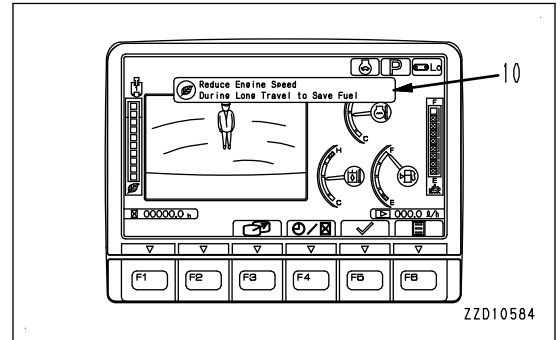
It is possible to change the setting of Display/Non-display of ECO guidance (10).



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

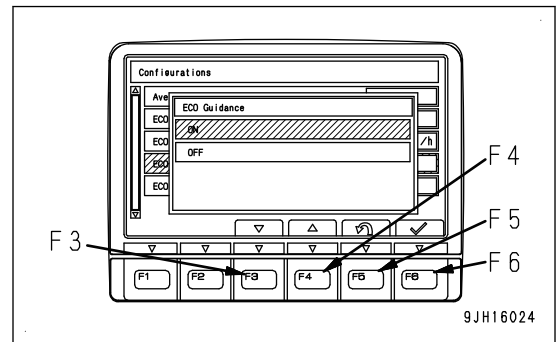


2. ECO Guidance Display setting screen appears.  
 ON: Displays ECO Guidance (10) on the standard screen.  
 OFF: Does not display ECO Guidance (10) on the standard screen.



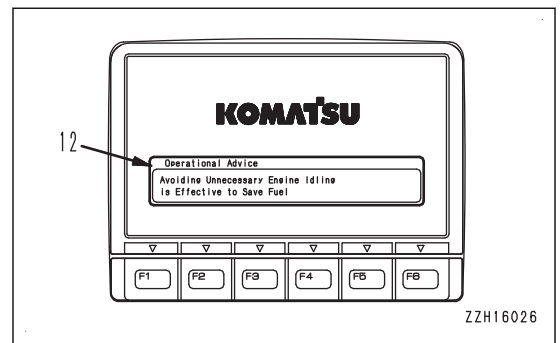
On this screen, it is possible to perform the following operations with switches F3 to F6.

- 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 change and returns to Configurations screen.
- F6: Changes the setting and returns to Configurations screen.

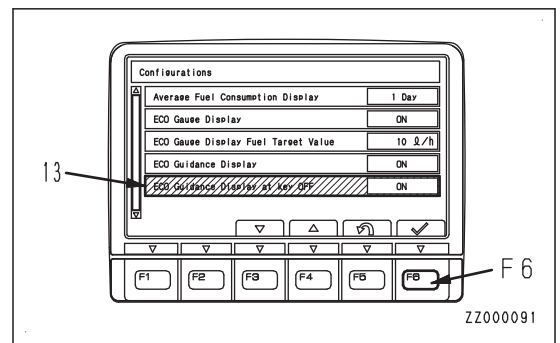


**SWITCH DISPLAY/NON-DISPLAY OF GUIDANCE WHEN KEY IS OFF**

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



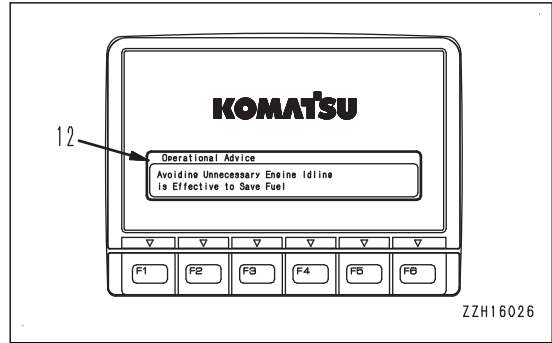
1. Select ECO Guidance at Key OFF (13) from the Configurations screen, then press switch F6.



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

ON: Displays ECO Guidance (12) on the end screen.

OFF: Does not display ECO Guidance (12) on the end screen.



ZZH16026

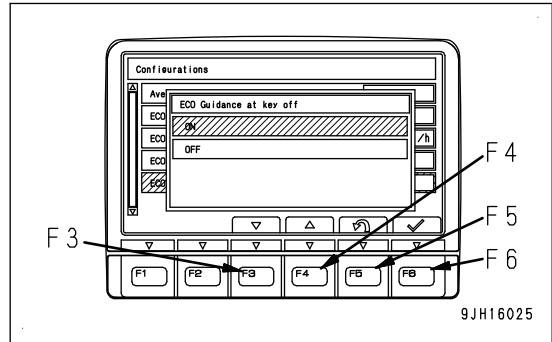
On this screen, it is possible to perform the following operations with switches F3 to F6.

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 change and returns to Configurations screen.

F6: Changes the setting and returns to Configurations screen.

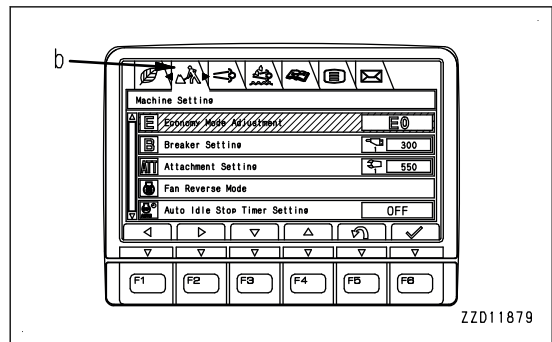


9JH16025

**MACHINE SETTINGS**

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

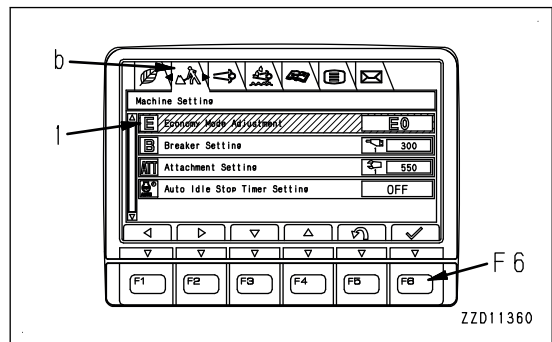
- “Economy Mode Adjustment”
- “Breaker Setting”
- “Attachment Setting”
- “Auto Idle Stop Timer Setting”



ZZD11879

**ADJUST ECONOMY MODE**

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

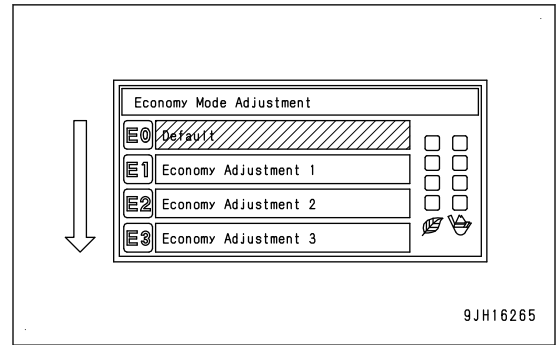


ZZD11360



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

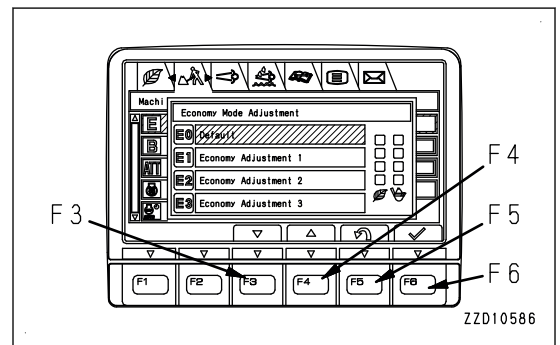
In the Economy Mode, the higher the selected number starting from E0 becomes, the lower the engine output becomes. In the meantime, the better the fuel efficiency becomes.



**Operation on the Economy Mode Adjustment screen**

On the 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 selection and returns the screen to “Machine Setting” menu screen.
- F6: Selects the Adjustment Mode and returns the screen to “Machine Setting” menu screen.

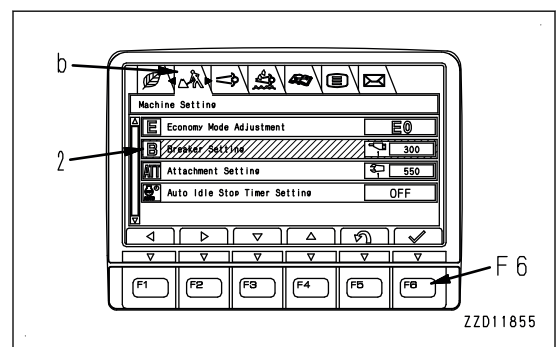


**BREAKER SETTING**

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

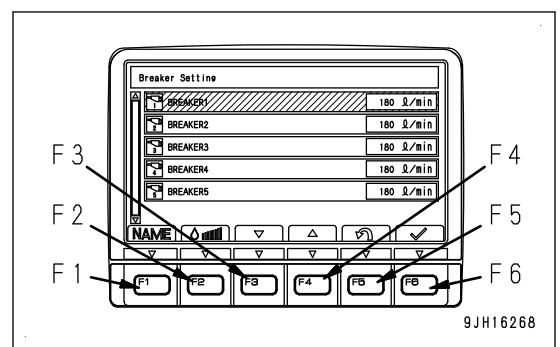
For machines that have no attachment, the “Breaker Setting” menu is not displayed.

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



2. On the “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 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 the “Machine Setting” menu screen.
- F6: Allocates the selected setting to that of B mode.

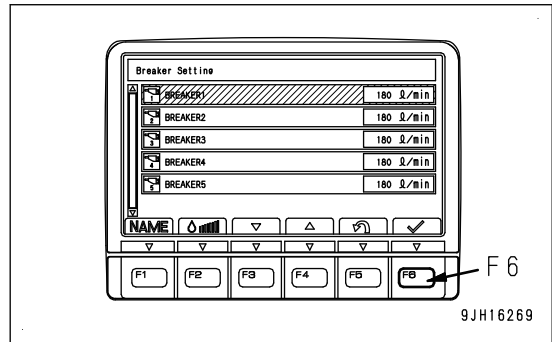


### Changing the “Breaker Setting” name

You can change the Breaker Setting name as you like.

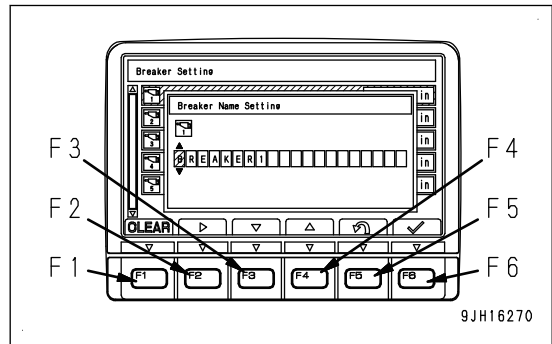
You can use alphabet letters A to Z, Arabic numerals 0 to 9, symbols #, \*, +, -, and /, and the space.

1. On the “Breaker Setting” screen, select a setting to change its name, then press switch F6.



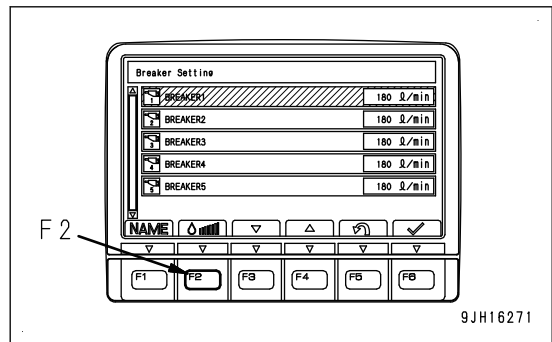
2. The “Breaker Name Setting” screen is displayed. On the “Breaker Name Setting” screen, you can perform the following operations with switches F1 to F6.

- 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.



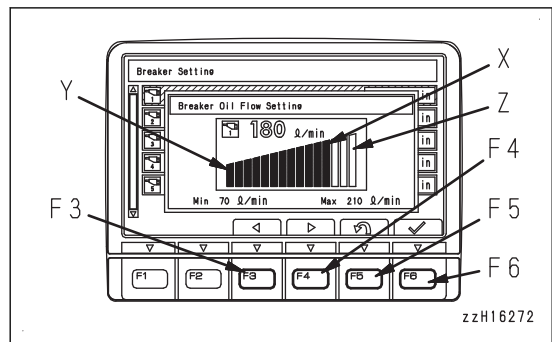
### Changing “Breaker Oil Flow Rate Setting”

1. On the “Breaker Setting” screen, select a setting to change its oil flow, then press switch F2.



2. 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 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

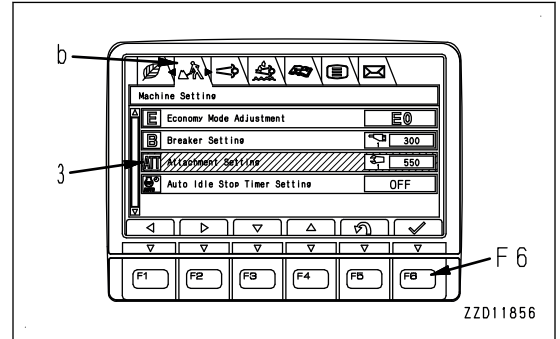


### ATTACHMENT SETTING

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.

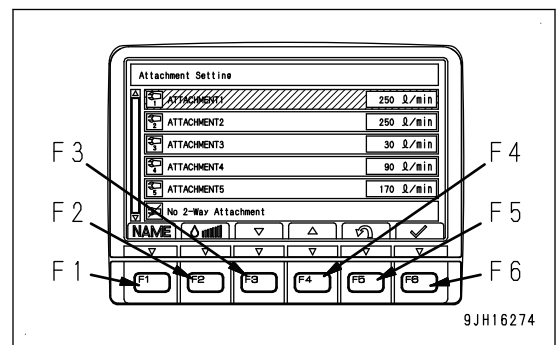
1. Select “Attachment Setting” (3) on the “Machine Setting” menu (b) screen, then press switch F6.



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

On the “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 the “Machine Setting” menu screen.
- F6: Allocates the selected setting to that of ATT/P or ATT/E mode.

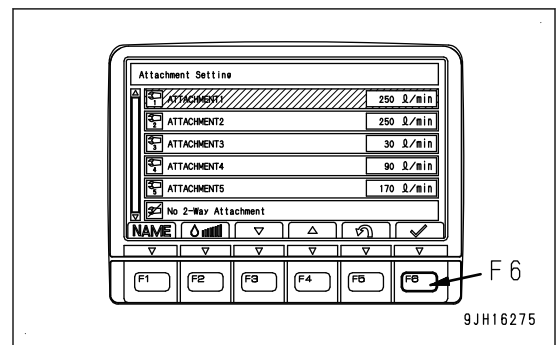


### Changing “Attachment Setting” name

It is possible to change the attachment setting name as you like.

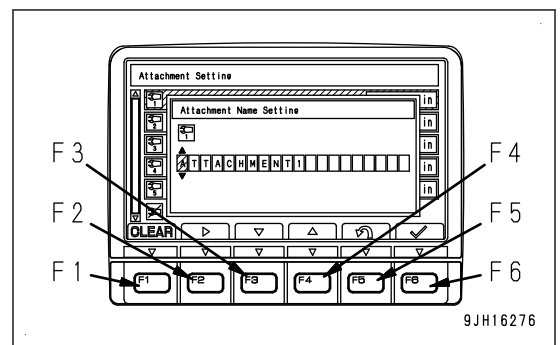
You can use alphabet letters A to Z, Arabic numerals 0 to 9, symbols #, \*, +, -, and /, and the space.

1. Select a setting to change on the “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.



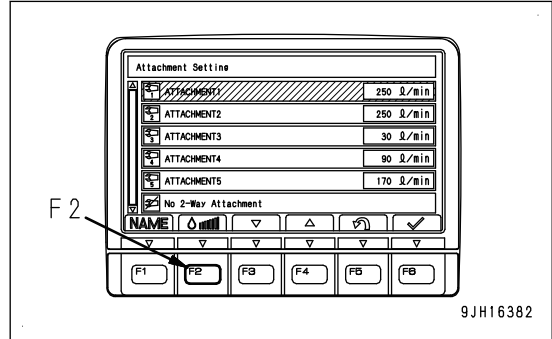
F5: Returns the screen to the Attachment Setting screen without changing the name.

F6: Enters the change and returns to the 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 setting to change its oil flow rate on the "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 flow by 1 level.

F4: Increases the flow by 1 level.

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

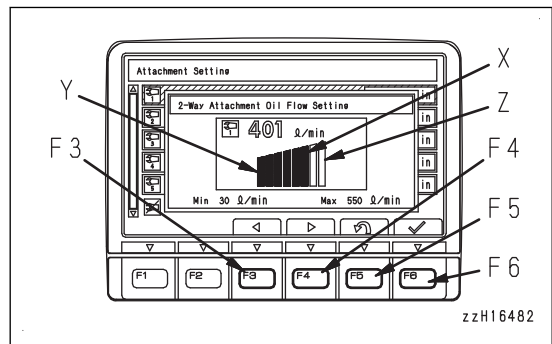
F6: Enters the oil flow setting and returns to the "Attachment Setting" screen.

(X): Present oil flow setting

(Y): Min. adjusted oil flow

(Z): Max. adjusted oil flow

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



### AUTO IDLE STOP TIMER SETTING

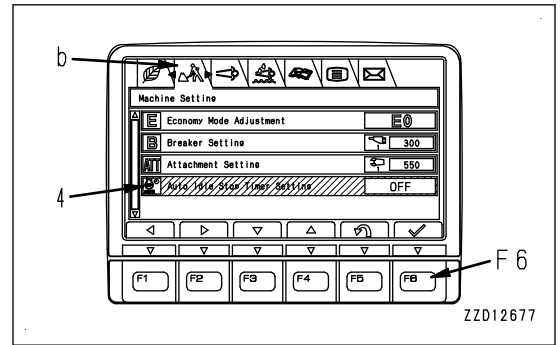
The auto idle stop function stops the engine automatically when the engine is operated continuously at idle with the lock lever in LOCK position for a set time.

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 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 screen.

1. Select "Auto Idle Stop Timer Setting" (4) 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.

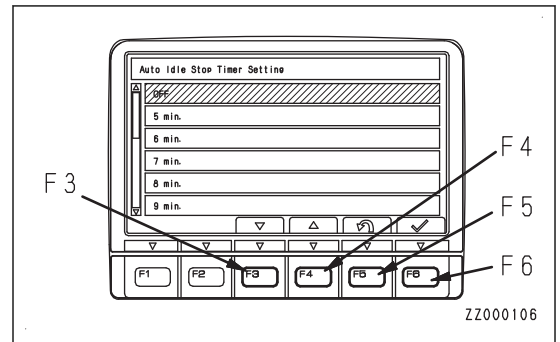
On the "Auto Idle Stop Timer Setting" screen shown in the figure, you can perform the following operations with switches F3 to F6.

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 the "Machine Setting" menu screen.

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

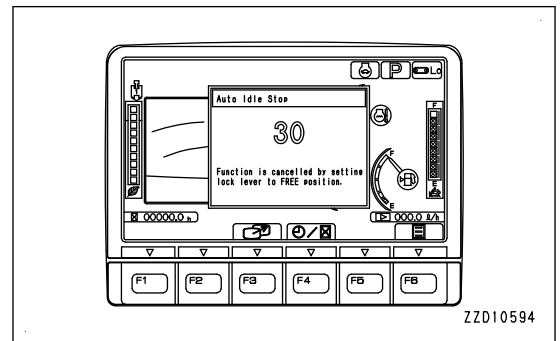


**REMARK**

- 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.



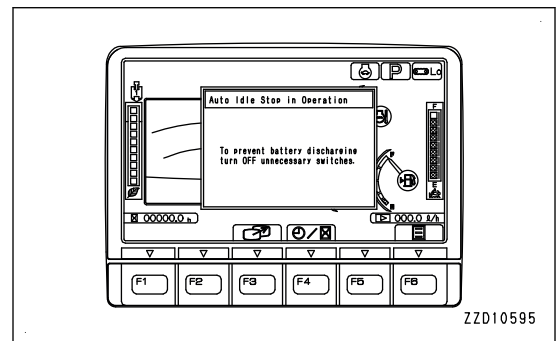
4. When countdown reaches 0, the engine stops and the screen changes to the "Auto Idle Stop in Operation" screen.

5. To prevent battery discharging, turn off unnecessary switches.

**REMARK**

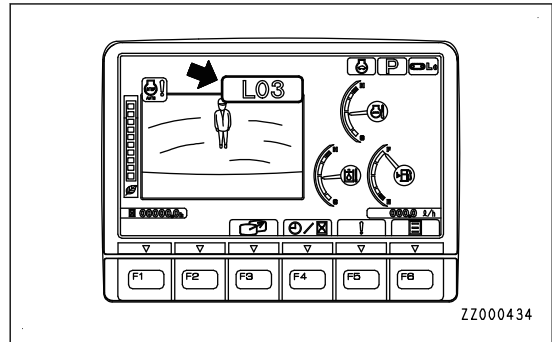
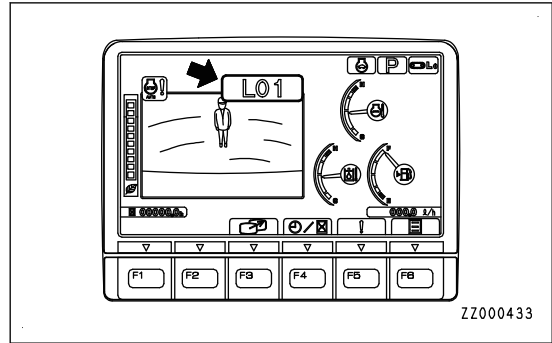
While the auto idle stop is activated, only the engine is stopped and the machine monitor, inverter, etc., as well as the electrical components including the air conditioner, radio, lamps, and wipers keep their states before the engine is stopped.

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



**REMARK**

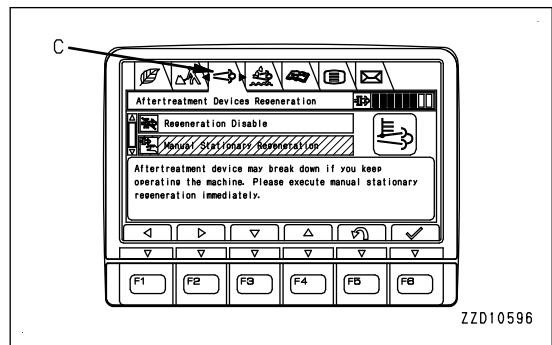
While the auto idle stop function is ON, the number of the times that the engine was stopped when it was not at low idle (the engine speed is 1400 rpm or higher) is displayed as “L01” at and after 1000 and as “L03” at and after 2000 on the monitor.



**AFTERTREATMENT DEVICES REGENERATION**

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

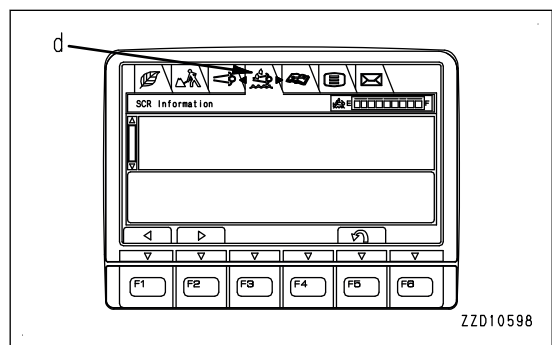
For details of the aftertreatment devices regeneration, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)”.



**SCR INFORMATION**

Each item of SCR information menu (d) is for displaying information related to SCR and DEF.

For details of SCR information, see “HANDLE UREA SCR SYSTEM WARNING (3-121)”.



### 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 the maintenance display are as follows.

a	b
Air Cleaner Clean and Change	-
Coolant Change	-
Hydraulic Oil Additional Filter Change	-
Hydraulic Oil Pilot Filter Change	-
Engine Oil Change (*1)	500
Engine Oil Filter Change (*1)	500
Fuel Prefilter Change	500
Fuel Main Filter Change	1000
Hydraulic Tank Breather Change	1000
Hydraulic Oil Filter Change	1000
Damper Case Oil Check and Add	1000
Swing Machinery Oil Change	1000
DEF Breather Change	1000
Final Drive Oil Change	2000
KCCV Filter Change	2000
DEF Filter Change	2000
DEF Tank Cleaning	4500
KDPF Filter Cleaning	4500
Hydraulic Oil Change	5000

a: Maintenance items

b: Default maintenance interval settings (h)

c: Time remaining until 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 (7-5)”.

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

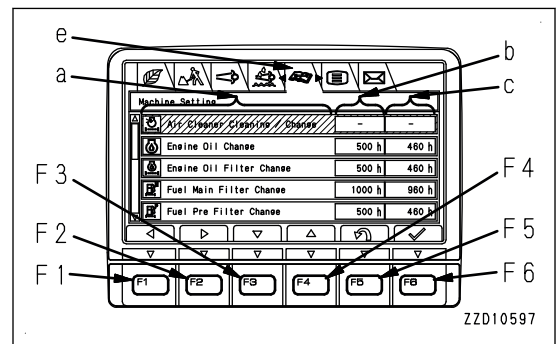
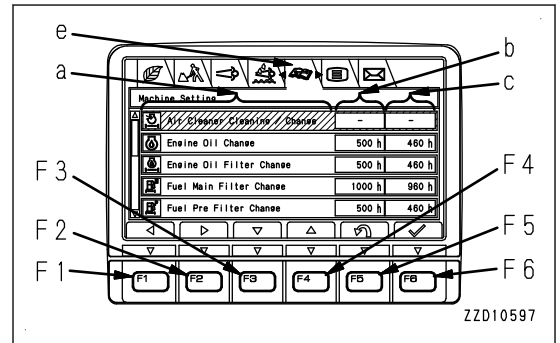
F1, F2: Moves to the right and left menus.

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.

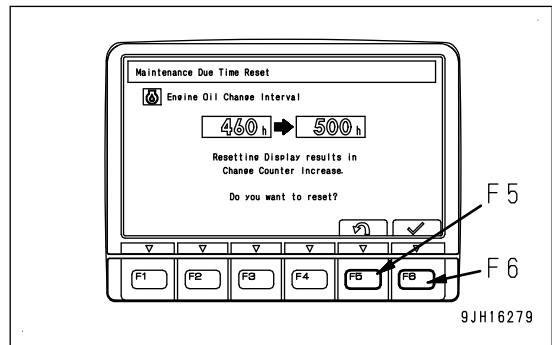
- If no switch is operated for 30 seconds on the “Maintenance” menu screen, the screen automatically returns to the standard screen.
- When the maintenance time caution lamp is lit on the standard screen, press F6 on the standard screen and the screen automatically displays the “Maintenance” menu screen.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

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

Reset the remaining time to the maintenance on this screen.

1. Press switch F6 when the “Maintenance Due Time Reset” screen is in the condition shown in the figure. The screen switches to the reconfirmation screen.

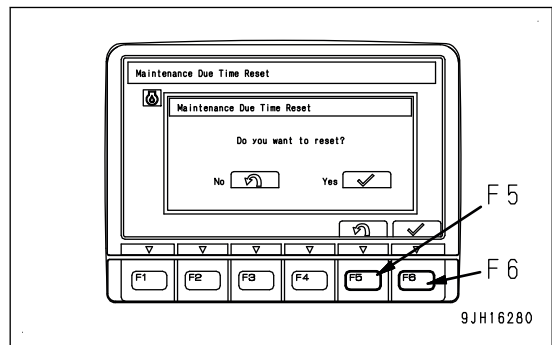


**REMARK**

- When canceling the reset, press switch F5. The screen returns to the “Maintenance” menu 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 returns to the “Maintenance” menu screen.

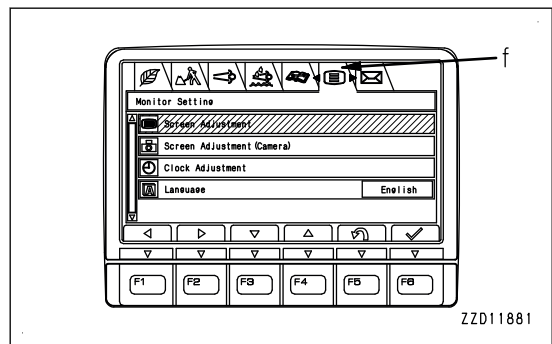


**REMARK**

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

**MONITOR SETTINGS**

Each item of “Monitor Setting” menu (f) is to make settings for the monitor.

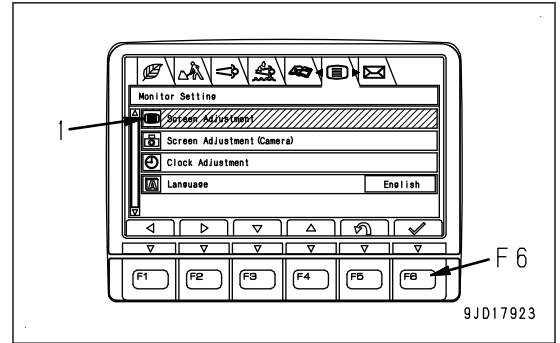


**SCREEN ADJUSTMENT**

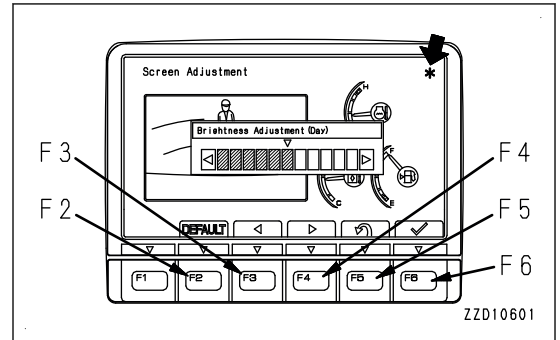
Use “Screen Adjustment” menu to adjust brightness of the monitor screen.



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

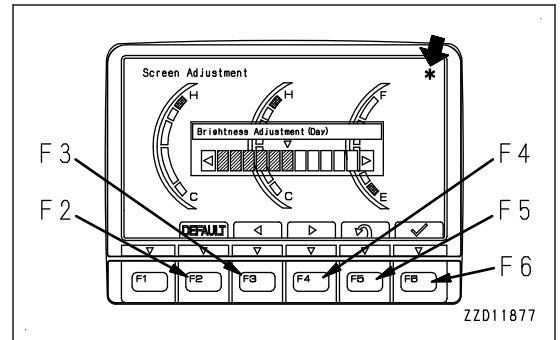


2. Use switches F2 to F6 to adjust brightness of the screen.
  - F2: Resets an adjusted value to default value.
  - F3: Moves the indicator to the left by one notch.
  - F4: Moves the indicator to the right by one notch.
  - F5: Cancels the change and returns the screen to the monitor setting menu screen.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



**REMARK**

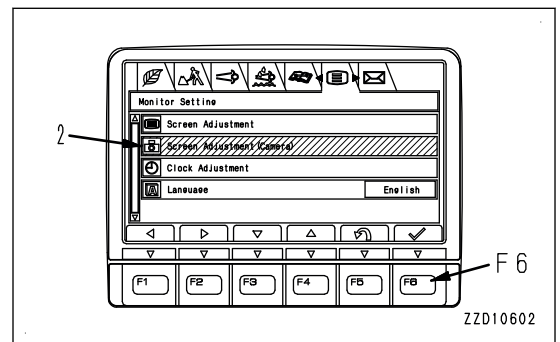
- If the light switch is at night mode ON, and the screen is adjusted, it is possible to adjust the brightness of the monitor screen (night mode).
- If the light switch is at day mode ON, and the screen is adjusted, it is possible to adjust the brightness of the monitor screen (day mode).
- As long as "\*" 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.

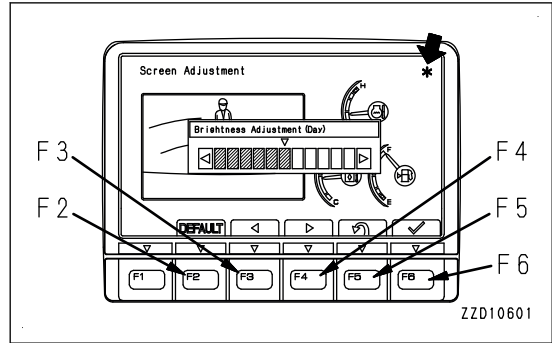
1. Select screen adjustment (camera) (2) on the "Monitor Setting" menu screen, then press switch F6.



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 notch.
  - F4: Moves the indicator to the right by one notch.
  - F5: Cancels the change and returns the screen to "Monitor Setting" menu screen.
  - F6: Accepts the change and returns the screen to "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 the selection menu for the clock adjustment.

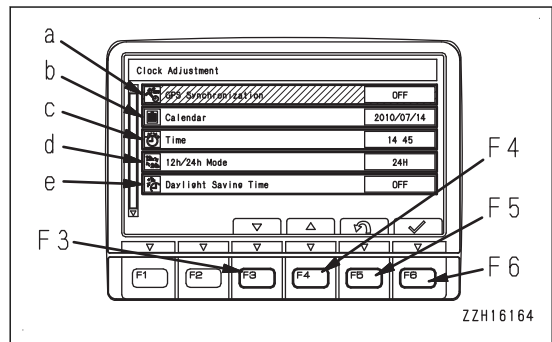
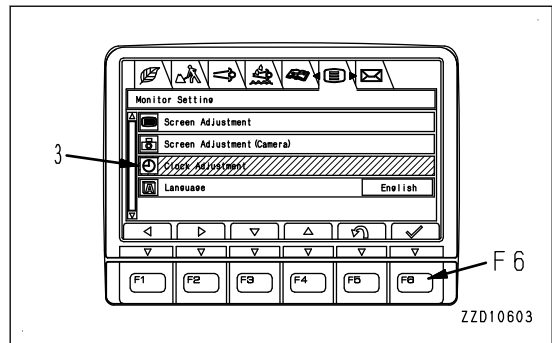
The following 5 items can be changed.

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

**REMARK**

- (b) "Calendar" and (c) "Time" need to be readjusted since they are reset after a long-term storage.
- When the "GPS Synchronization" is set to ON, they can be automatically readjusted.

2. Perform the following setup procedure by operating switches F3 to F6 on the "Clock Adjustment" screen for selecting a menu.



**GPS SYNCHRONIZATION SETTING**

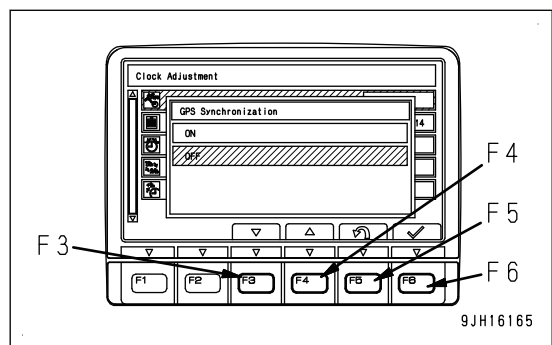
On machines equipped with KOMTRAX, turning on "GPS Synchronization" menu enables automatic setting of the monitor's date and time in accordance with the clock of GPS.

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.

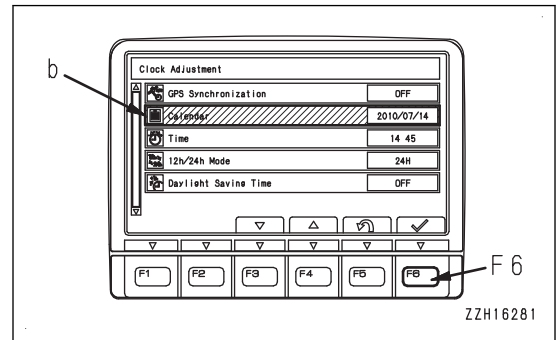
**CALENDAR SETTING**

Adjust the date of the monitor.

**REMARK**

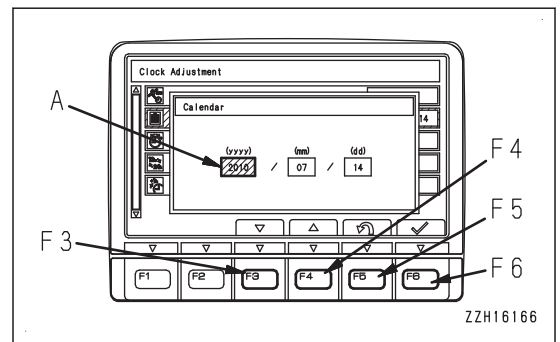
As long as “GPS Synchronization” menu is turned on, “Calendar” menu is not selectable.

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



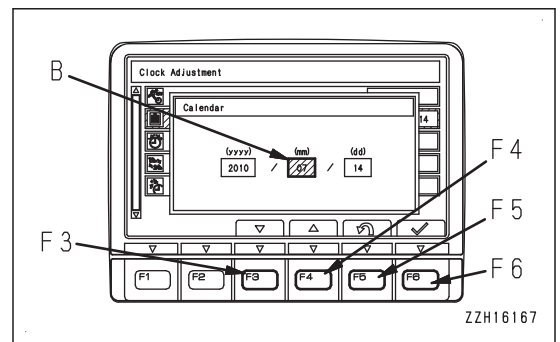
2. The “Calendar” screen is displayed.  
When year display (A) is highlighted in yellow, operate the switches as follows to change year display (A). If it is not necessary to change the year setting, press switch F6.

- 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



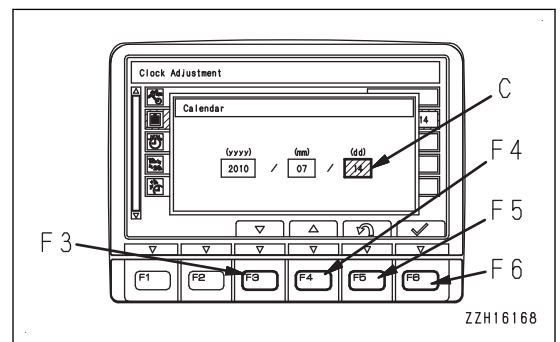
3. When month display (B) is highlighted in yellow, operate the switches as follows to change month display (B). If it is not necessary to change the month, press switch F6.

- 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.



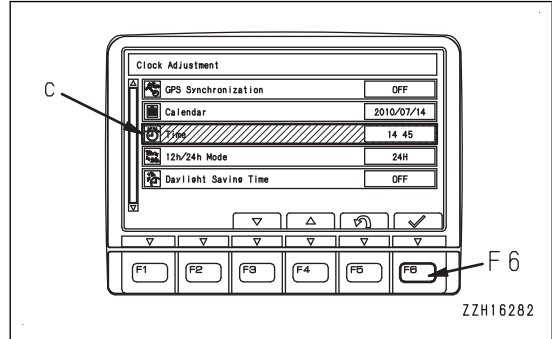
### TIME SETTING

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.

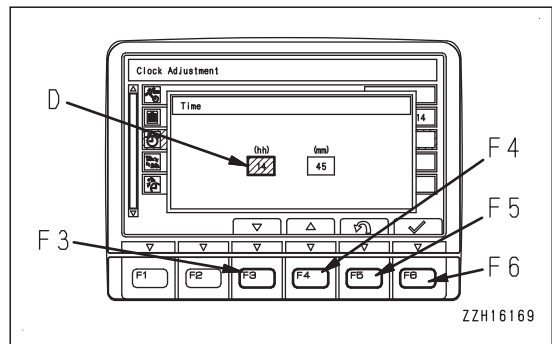
When the hour display (D) is highlighted in yellow, operate the switches as follows to change hour display (D). If it is not necessary to change the hour setting, press switch F6.

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.



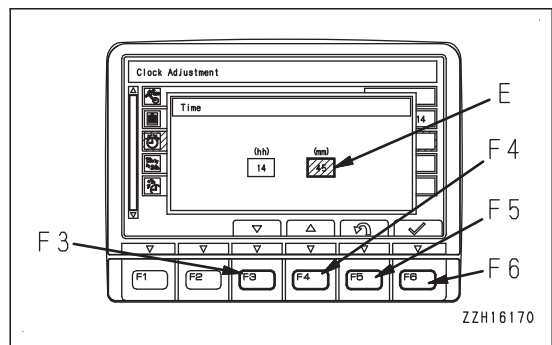
3. When minute display (E) is highlighted in yellow, operate the switches as follows to change minute display (E). If it is not necessary to change the minute, press switch F6.

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.

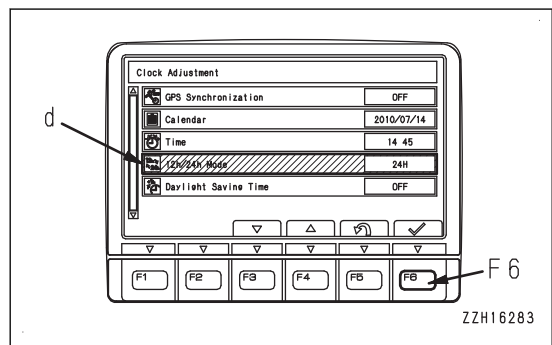


### SWITCH 12H/24H DISPLAY MODE

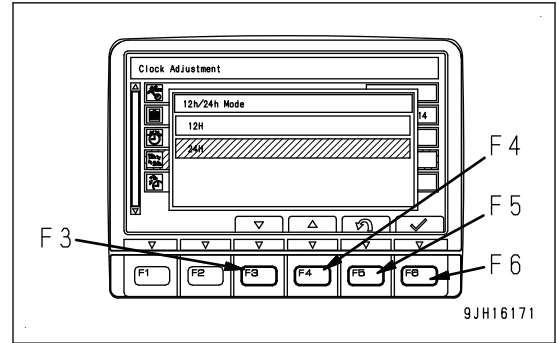
Choose either a 12-hour display (am/pm) or a 24-hour display.

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

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



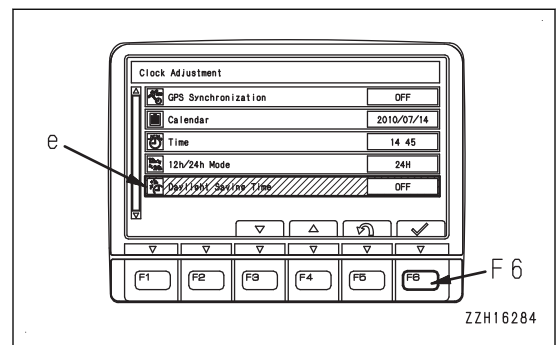
2. "12h/24h Mode" screen appears.
  - F3: Moves to the next item (1 line below). Moves to the top line when it is on the bottom line.
  - F4: Moves to the previous item (1 line above). Moves to the bottom line when it is on the top line.
  - F5: Cancels the change and returns the screen to "Clock Adjustment"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



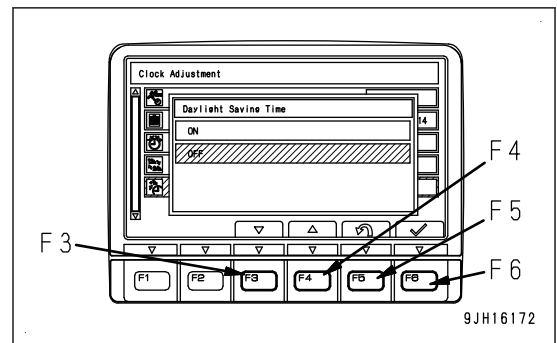
**DAYLIGHT SAVING TIME (SUMMER TIME) SETTING**

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.

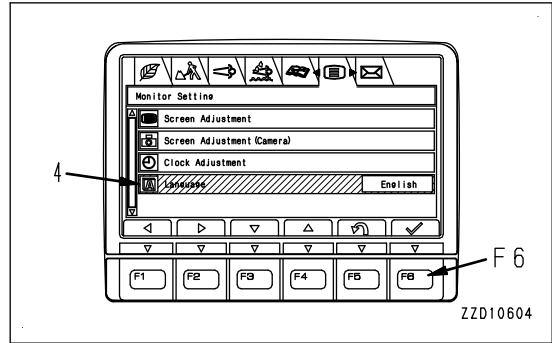
**LANGUAGE SETTINGS**

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

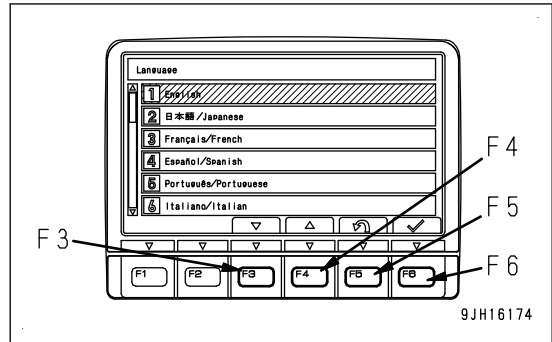
1. Select "Language" (4) on the "Monitor Setting" menu, then press switch F6.



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



**OPERATOR ID**

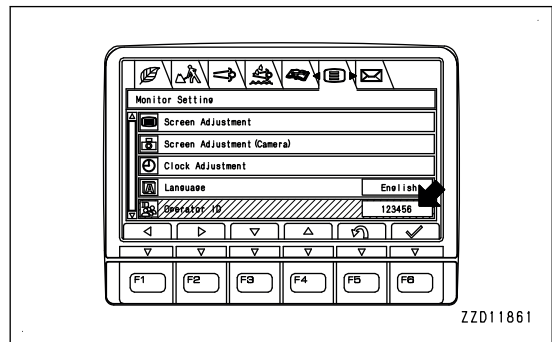
You can check and change the "Operator ID" which is under identification on the "Operator ID" menu. The "Operator ID" menu is not displayed when the operator identification function is disabled.

**REMARK**

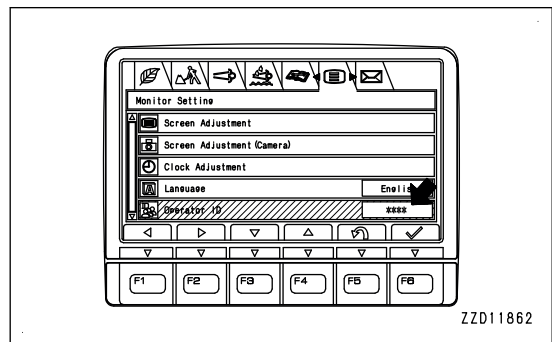
Contact your Komatsu distributor for details of the method of setting, changing, or canceling the operator identification function.

**WHEN OPERATOR IDENTIFICATION FUNCTION IS AVAILABLE WITH SKIP**

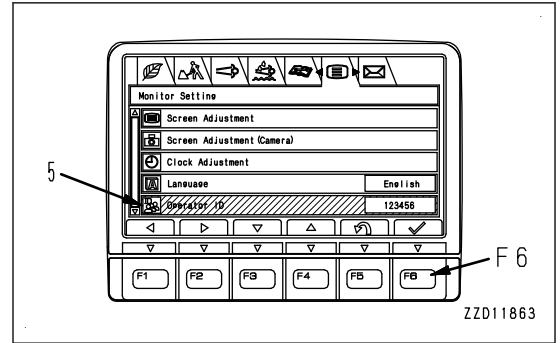
When the starting switch is ON and ID is inputted, the identified ID is displayed in the column of "Operator ID" on the "Monitor Setting" menu screen.



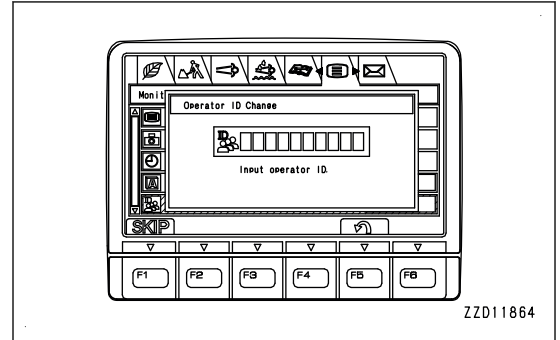
When the starting switch is ON and "SKIP" is selected, "\*\*\*\*" is displayed in the column of "Operator ID" on the "Monitor Setting" menu screen.



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



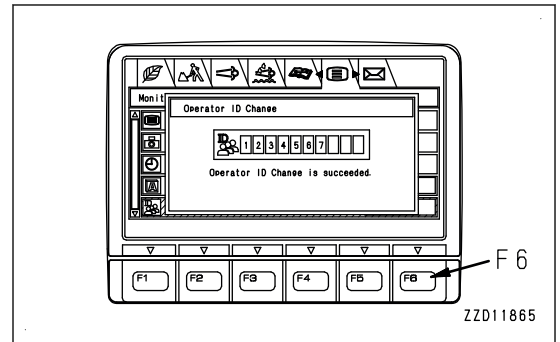
2. The "Operator ID Change" screen is displayed.



- 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.

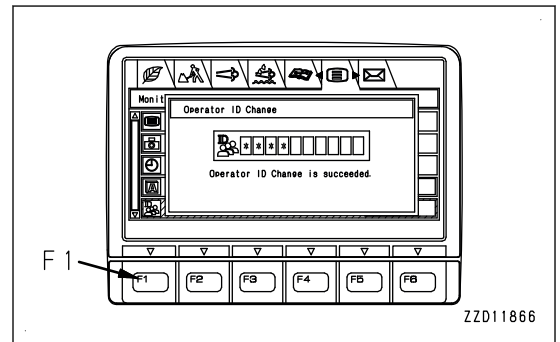
On the "Monitor Setting" menu screen, the inputted ID is displayed in the column of "Operator ID".



- 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.

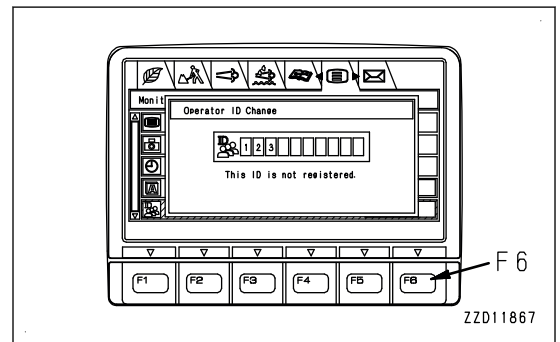


- When you press switch F6 after inputting the ID which is not registered to the "Operator ID Change" screen, a message is displayed below and the screen returns to the "Monitor Setting" menu screen.

In this case, the identified ID is not changed.

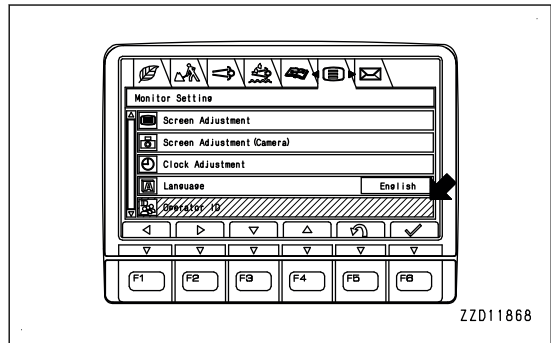
- On the "Operator ID Change" screen, if no switch is operated for more than 30 seconds, the screen automatically changes to the "Monitor Setting" menu screen.

In this case, the identified ID is not changed.

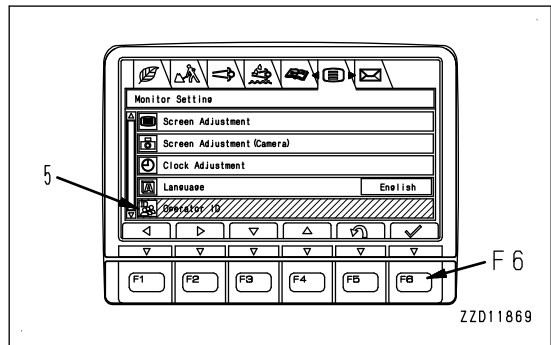


### WHEN OPERATOR IDENTIFICATION FUNCTION IS AVAILABLE WITHOUT SKIP

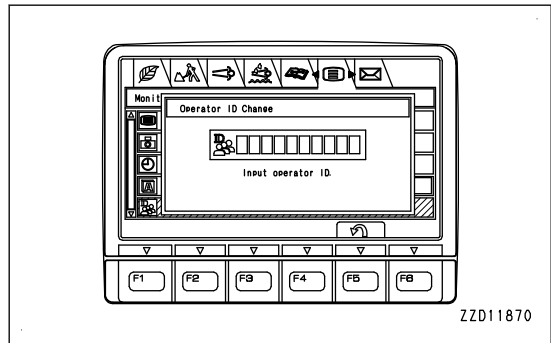
When the operator identification function is available without SKIP, the identified ID number is not displayed in the “Operator ID” column of “Monitor Setting” screen.



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

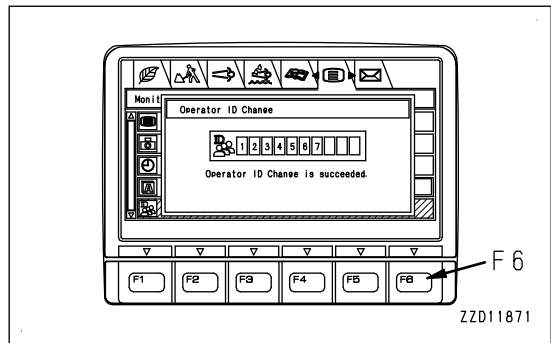


2. The “Operator ID Change” screen is displayed.



- 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.

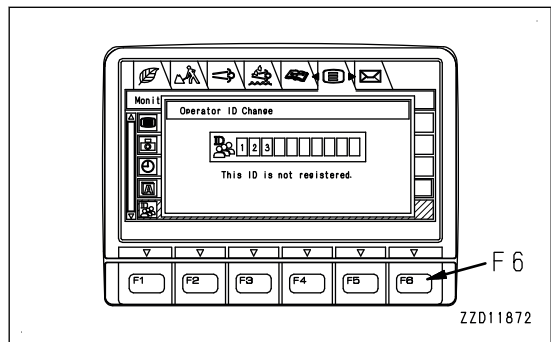


- When you press switch F6 after inputting the ID which is not registered to the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.

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 message display menu (g). When there is any message, the message display at the left end of the standard screen lights up.

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

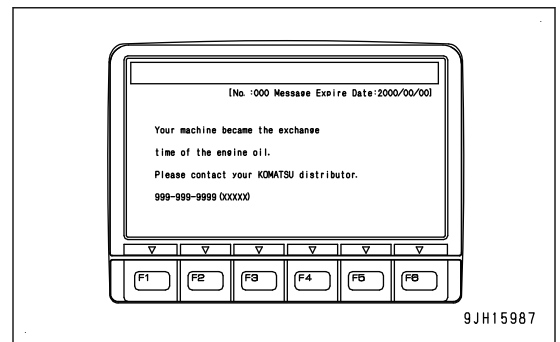
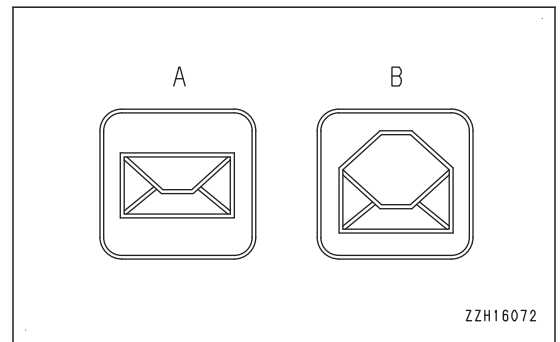
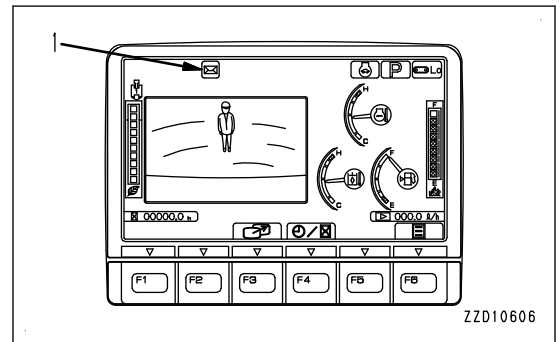
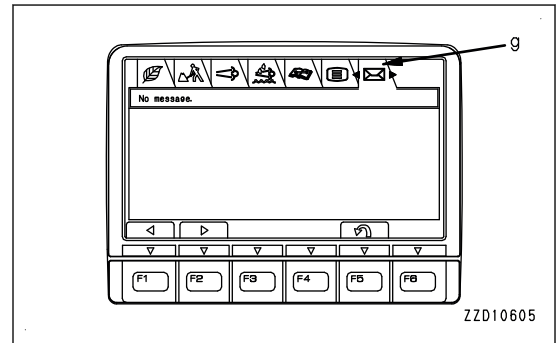
Lights up in green (A): There is unread message.

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 according to 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 reaches.



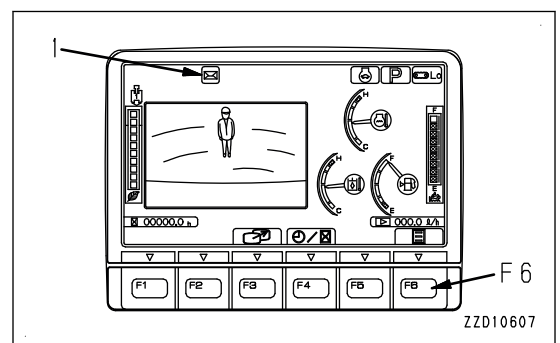
### CHECK MESSAGE

1. Press switch F6 on the standard screen.

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.

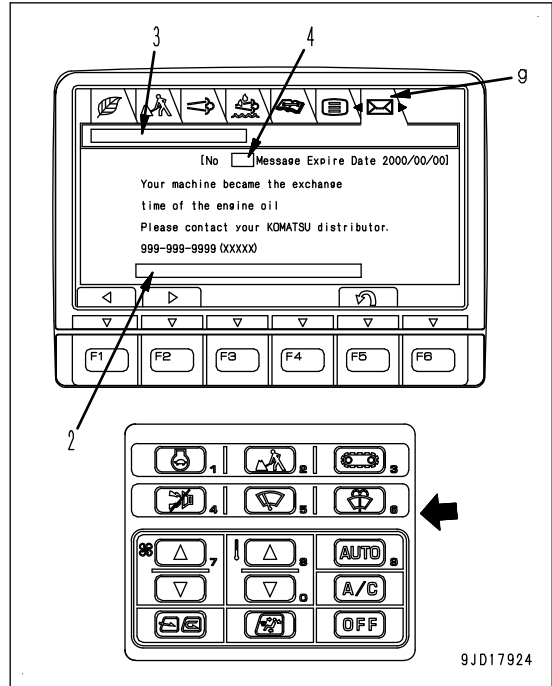
Select the mail confirmation menu (g), and you can read the received message.



- In case of a message requesting for reply, the column of "Numeric Input: []" is displayed in place (2) of the mail confirmation menu. Make a reply to the message.

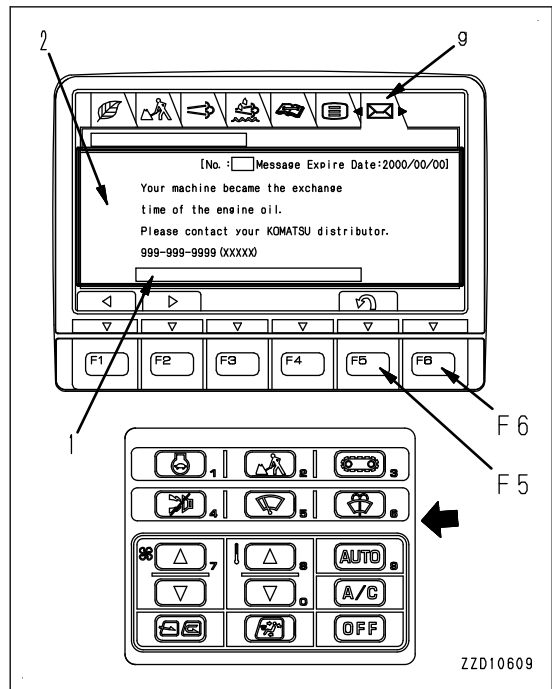
**REMARK**

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

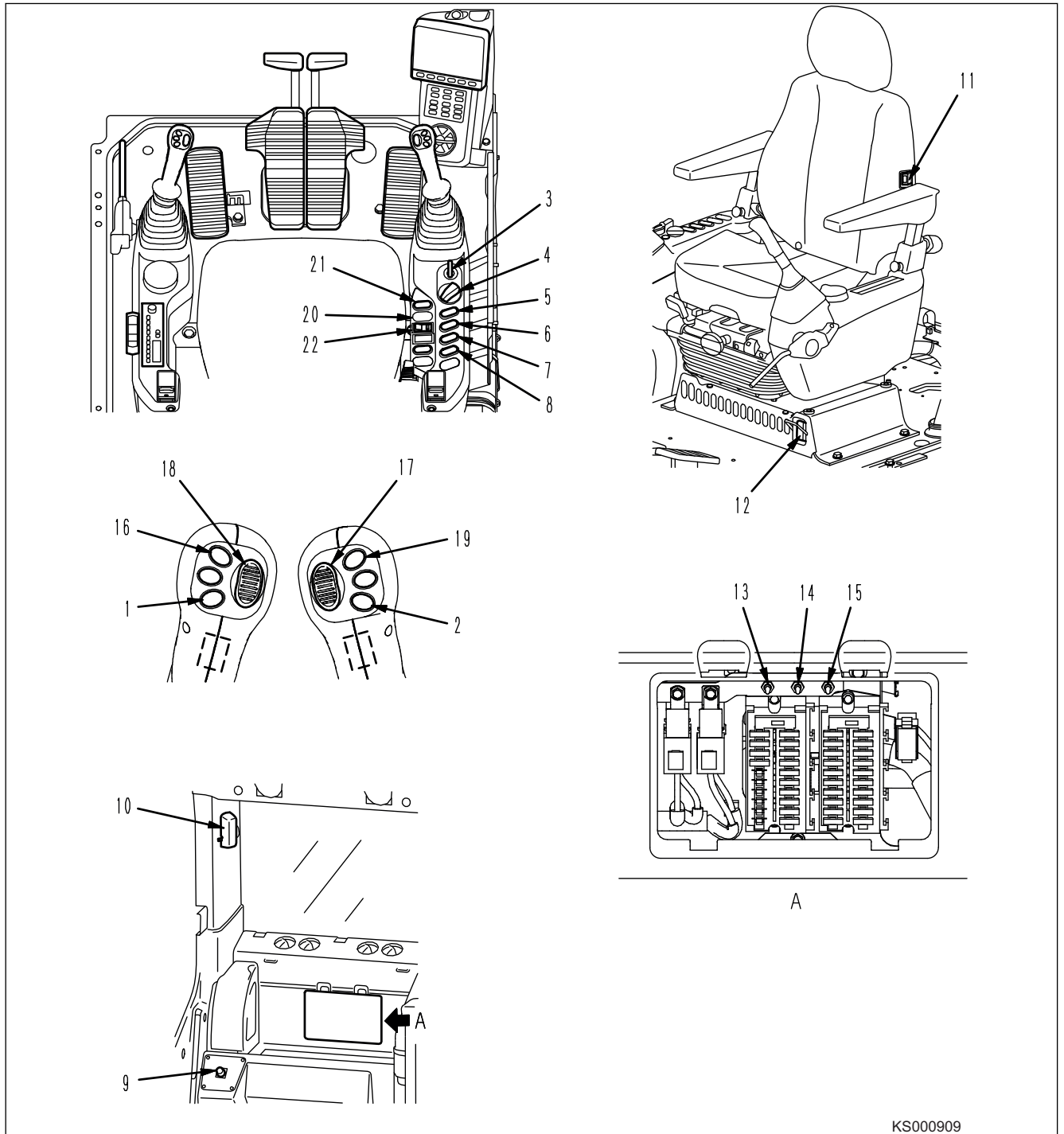


**REPLY TO MESSAGE**

- 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 monitor switch. Each switch corresponds to the value shown on the right side below 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 column (1) of the mail confirmation menu screen, press switch F6 again. The input value will be sent out. When the message "Do you send Numeric Input?" is displayed, if you press switch F5, the screen returns to the screen for replying to message. At this time, the previous input value will be cleared.



SWITCHES



KS000909

- |   |   |
|---|---|
| (1) One-touch power maximizing switch         | (10) Room lamp switch                           |
| (2) Horn switch                               | (11) Seat heater switch (if equipped)           |
| (3) Starting switch                           | (12) Engine shutdown secondary switch           |
| (4) Fuel control dial                         | (13) Pump secondary drive switch                |
| (5) Lamp switch                               | (14) Swing parking brake cancel switch          |
| (6) Swing lock switch                         | (15) Lock lever automatic lock cancel switch    |
| (7) Revolving lamp switch (if equipped)       | (16) Quick coupler switch                       |
| (8) Ceiling window wiper switch (if equipped) | (17) 1st attachment proportional control switch |
| (9) Cigarette lighter                         |   |

- (18) 2nd attachment proportional control switch (if equipped)
- (19) Breaker switch
- (20) Additional lamps switch (if equipped)

- (21) Lower wiper switch (if equipped)
- (22) Quick coupler 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.

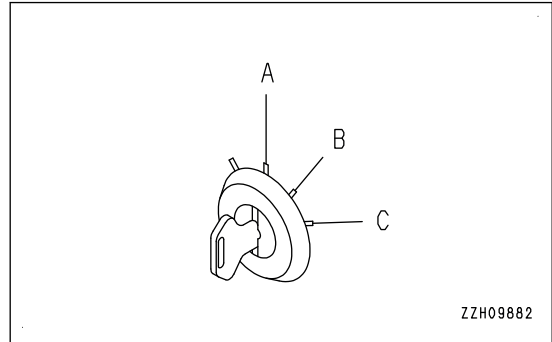
#### (B): ON position

Electric current flows through the charging and lamp circuits. Keep the switch 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 and release it immediately after the engine starts.

The key will automatically return to ON position (B).



### FUEL CONTROL DIAL

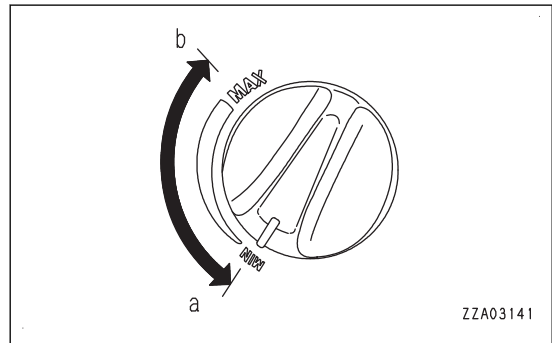
Fuel control dial is used to control the engine speed and output.

#### (a) Low idle (MIN)

The position where the dial is turned fully to the left.

#### (b) High idle (MAX)

The position where the dial is turned fully to the right.



### CIGARETTE LIGHTER

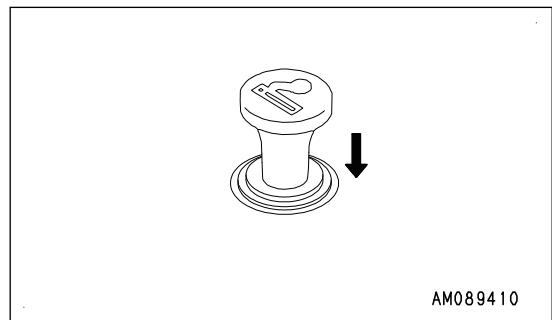
The cigarette lighter is used to light cigarettes.

When the cigarette lighter is pushed in, it will return to its original position after a few seconds, so pull it out to use it.

If the cigarette lighter is removed, the socket can be used as an 85 W (24 V x 3.5 A) power source.

#### NOTICE

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



### 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.

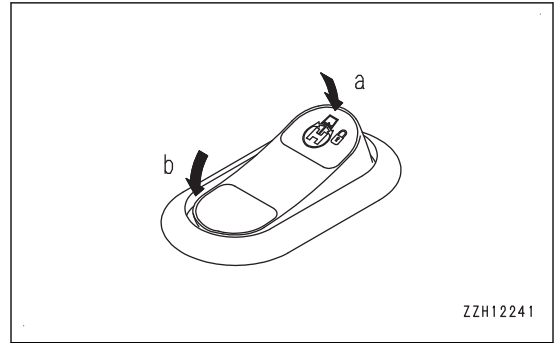
Swing lock switch is used to lock the upper structure so that it cannot swing.

**(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.



ZZH12241

**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.

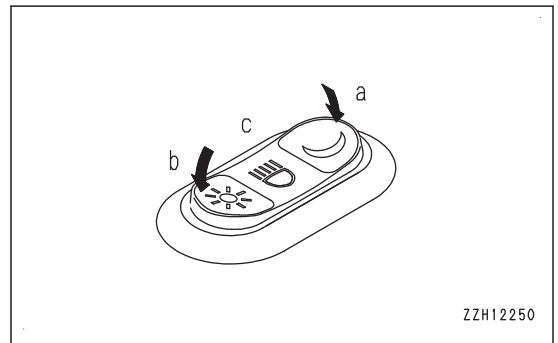
**(b) Day position**

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.)

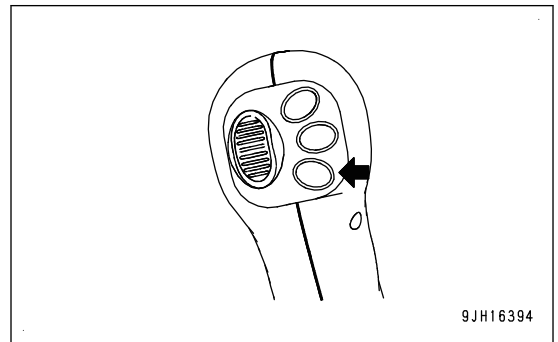


ZZH12250

**HORN SWITCH**

Horn switch is located on R.H. work equipment control lever.

When switch is pressed, the horn sounds.

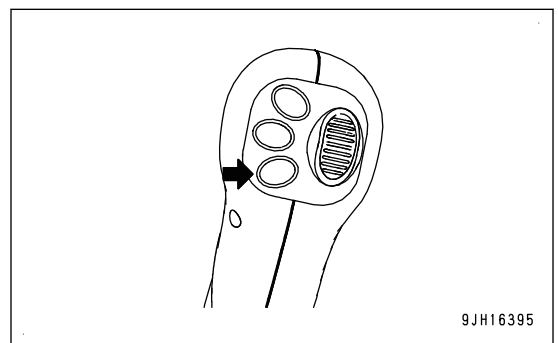


9JH16394

**ONE-TOUCH POWER MAXIMIZING SWITCH**

One-touch power maximizing switch is used to actuate the one-touch power maximizing function.

Press once (single click) and keep the switch pressed. The one-touch power maximizing function is actuated for a maximum of 8.5 seconds when the working mode is in P, E, ATT/P, and ATT/E modes.



9JH16395

**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.

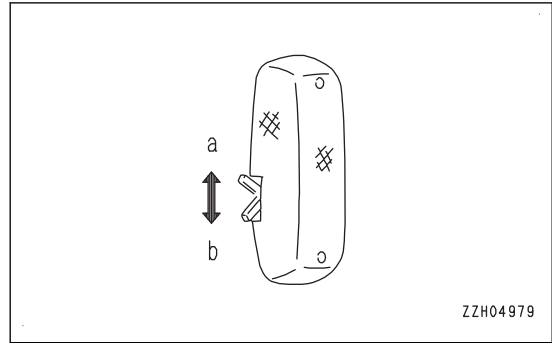
**(a) ON position**

Lights up

**(b) OFF position**

OFF

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



ZZH04979

**PUMP SECONDARY DRIVE SWITCH**

**CAUTION**

When pump secondary drive switch (1) is being used or immediately after it is used, the temperature of resistor (2) under the fuse may become high. When operating the switch or replacing the fuse, take care not to touch resistor (2).

**NOTICE**

- The pump secondary drive switch enables you to perform operation 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, “L03” appears in the display. If “L03” 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” or “DXA8KA”. Then make sure this switch is set to “Normal” position.

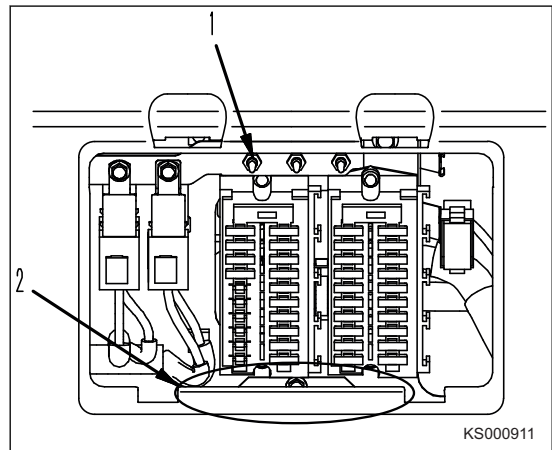
The pump secondary drive switch enables you to perform operation temporarily when any problem occurs on the pump control system.

**(a) Emergency**

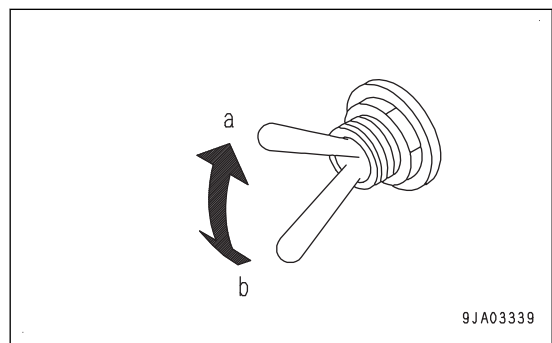
When abnormal (switch is set to upper position)

**(b) Normal**

When normal (switch is set to lower position)

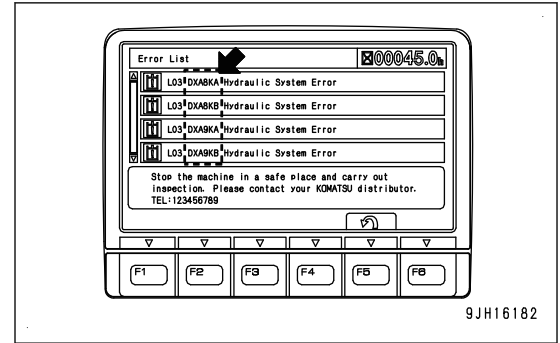


KS000911



9JA03339

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 display does not show "L03").

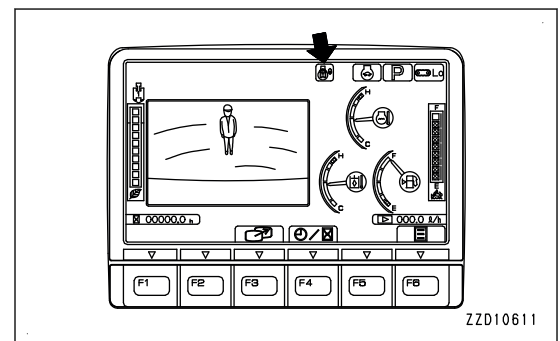
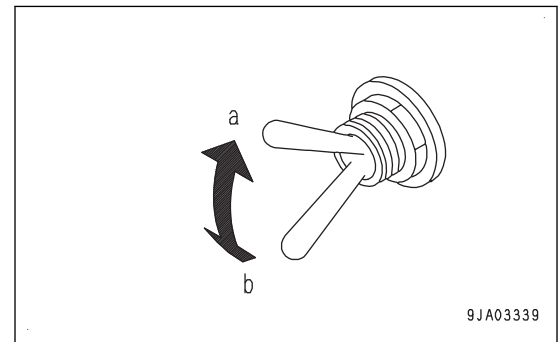
#### (a) Cancel

When abnormal (switch is set up)

#### (b) Normal

When normal (switch is pushed down)

- When the upper structure does not swing but the display 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 (3-96)".

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).

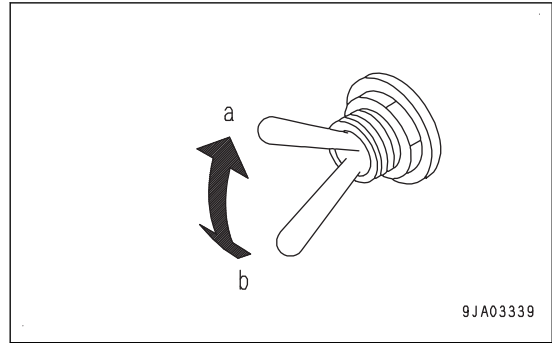
**(a) Cancel**

When abnormal (switch is set up)

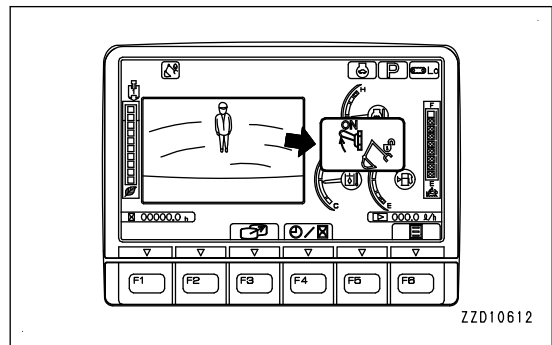
**(b) Normal**

When normal (switch is pushed down)

- 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



ZZD10612

**REVOLVING LAMP SWITCH**

(if equipped)

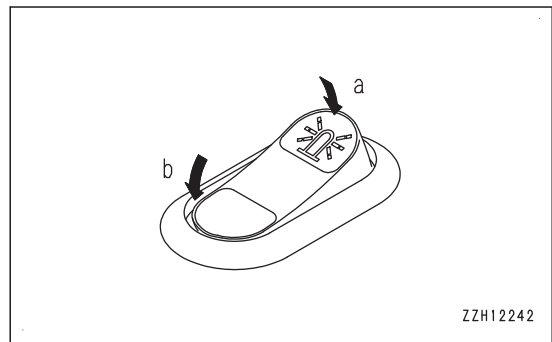
Revolving lamp switch is used to light up the yellow revolving lamp on top of the cab.

**(a) ON**

Lights up

**(b) OFF**

OFF



ZZH12242

**ROOF WIPER SWITCH**

(if equipped)

The roof wiper switch is used to actuate the roof window wiper and spray the washing water.

**(a) Wiper position**

To actuate the roof window wiper

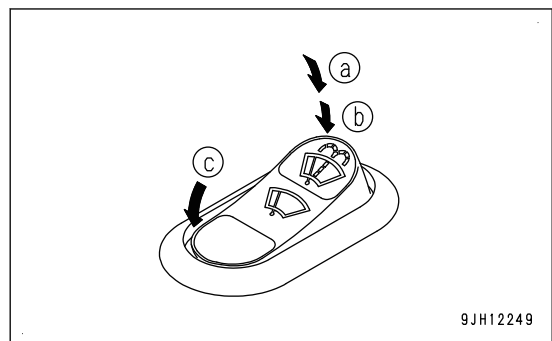
**(b) Washer position**

While depressing the switch, the washing water for the roof window is sprayed and wiper actuates at the same time.

By finger off the switch, it returns to (a) position, washing water stops, and only roof window wiper actuates.

**(c) Stop position**

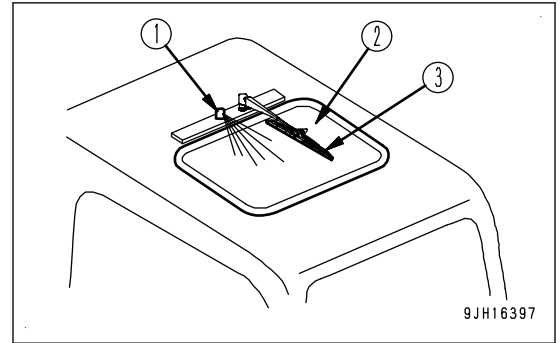
The roof window wiper stops.



9JH12249



- (1) nozzle
- (2) roof window
- (3) roof window wiper



## LOWER WIPER SWITCH

(if equipped)

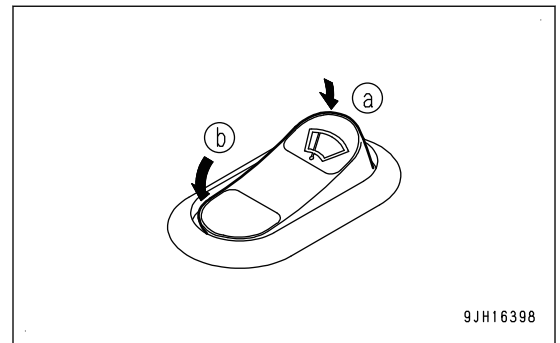
When the lower wiper switch is pressed, the lower wiper is turned on.

### (a) ON

Lower wiper operates.

### (b) OFF

Lower wiper stops.



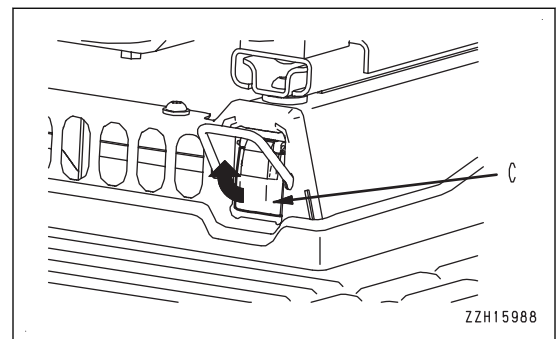
## ENGINE SHUTDOWN SECONDARY SWITCH

### 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 the "stop engine" position by mistake while the machine is operating normally, "Engine Shutdown Secondary SW In Operation" is displayed on the machine monitor. If "Engine Shutdown Secondary SW In Operation" is displayed on the machine monitor, check that the switch cover is closed and the switch is in the "normal" position. If not, set it to the "normal" position.

1. Raise cover (C) and open it.



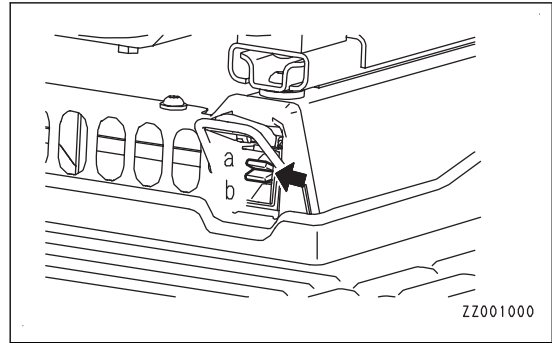
2. Turn the engine shutdown secondary switch to upper position (a) and the engine stops.

**(a) Engine stopped**

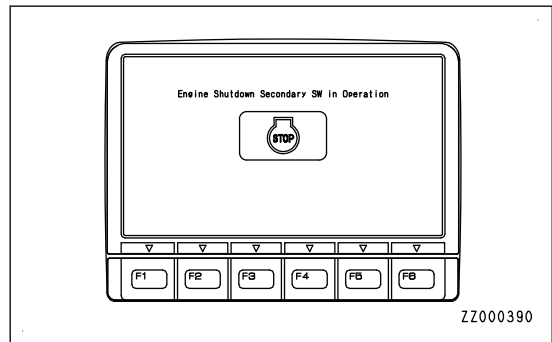
When abnormal (switch is set to upper position)

**(b) Normal**

When normal (switch is set to lower position)



- When cover (C) is closed, the engine shutdown secondary switch automatically returns to the normal position (b).
- When the starting switch is turned to ON position while the engine shutdown secondary switch is in the engine stopped 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 the normal position (b).



**SEAT HEATER SWITCH**

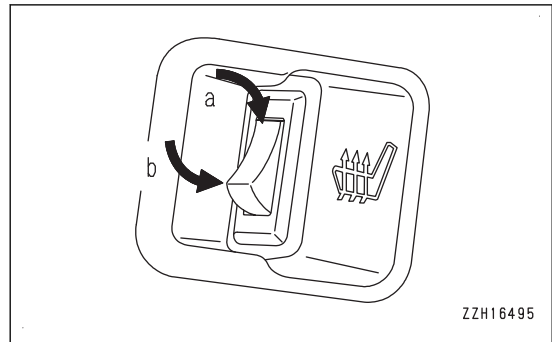
This seat heater switch is used to warm the seat.

**(a) OFF**

Stops the seat heating.

**(b) ON**

Start the seat heating and the seat becomes warm.



**QUICK COUPLER SWITCHES**

To operate the quick coupler circuit switches (23) on RHS console (17) on LH PPC lever must be operated together.

Refer to "PRECAUTIONS FOR USING ATTACHMENT AND OPTIONS (6-2)" for an explanation of these switches operation.

**1ST ATTACHMENT PROPORTIONAL CONTROL SWITCH**

The 1st attachment proportional control switch is a roller proportional control switch used to operate the 1st attachment circuit (for example: crusher, clamshell open/close).

Refer to "1ST-LINE ATTACHMENT PROPORTIONAL SWITCH (6-17)" for warnings and explanation of operation.

**2ND ATTACHMENT PROPORTIONAL CONTROL SWITCH**

The 2nd attachment proportional control switch is a roller proportional control switch used to operate the 2nd attachment circuit (for example: clamshell rotation).

Refer to "2ND-LINE ATTACHMENT PROPORTIONAL SWITCH (6-17)" for warnings and explanation of operation.

## BREAKER SWITCH

The breaker switch operates the breaker.

Refer to "BREAKER MODE SWITCH (6-18)" for warnings and explanation of operation.

## ADDITIONAL LAMPS SWITCH

(if equipped)

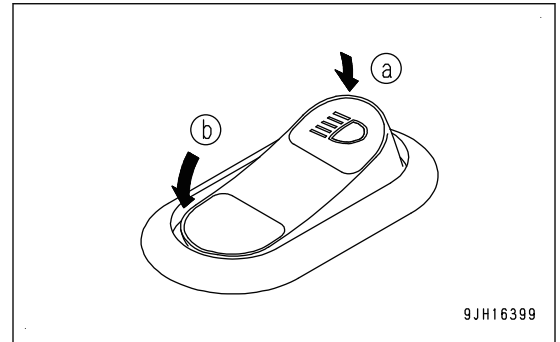
The additional lamps switch is used to turn on the cab front lamps, cab rear lamps and extra boom lamps (If fitted by customer)

### (a) ON

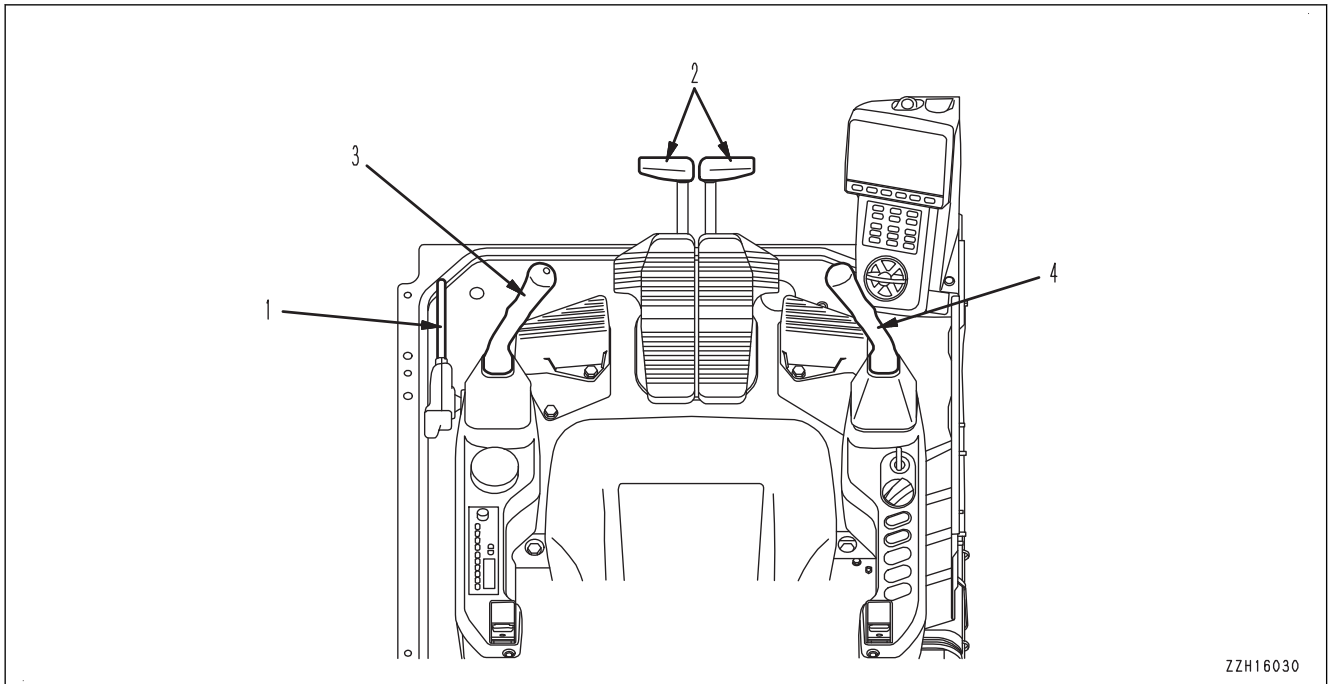
Lamps light up.

### (b) OFF

Lamps go out.



## CONTROL LEVERS AND PEDALS



(1) Lock lever

(2) Travel levers (with pedal and auto-deceleration system)

(3) L.H. work equipment control lever (with auto-deceleration system)

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

## 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 pedals 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 control 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 (if equipped).

#### (L) LOCK position

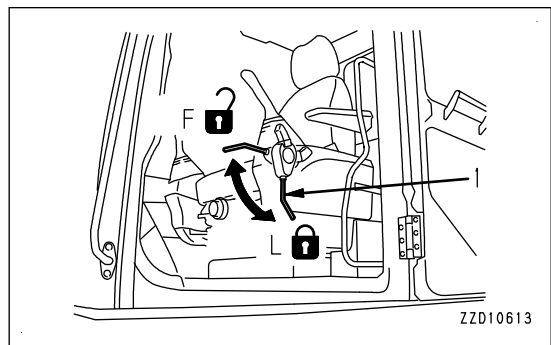
Even when levers or attachment control pedal (if equipped) are operated, machine does not move

#### (F) FREE position

Machine moves according to operation of levers or attachment control pedal (if equipped).

#### REMARK

The lock lever is of hydraulic lock type. Accordingly, when it is in **LOCK** position (L), the control levers or control pedals 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 warning lamp indicates low temperature)
  - When the viscosity of the hydraulic oil used is higher than that of the genuine hydraulic oils which Komatsu recommends
- Before setting the lock lever to **FREE** position, make sure that all control 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.

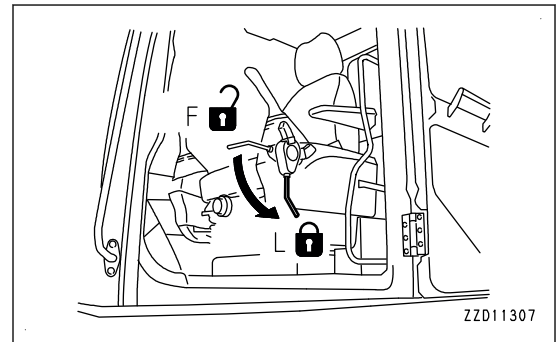
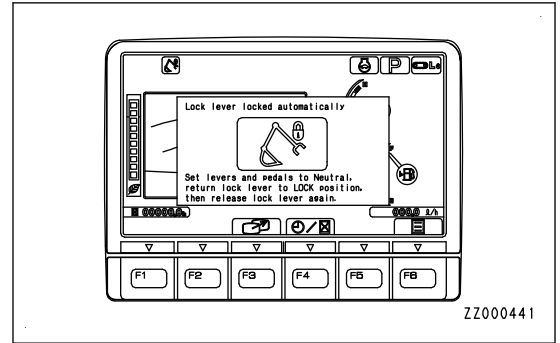
The lock lever automatic lock function prevents the work equipment or machine from operating unintendedly when the lock lever is released while the work equipment control lever or travel lever is operated. The lock lever is set in the same state as when locked automatically.

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.

For the genuine hydraulic oils which Komatsu recommends, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-5)".



**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. (If the sprocket 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**

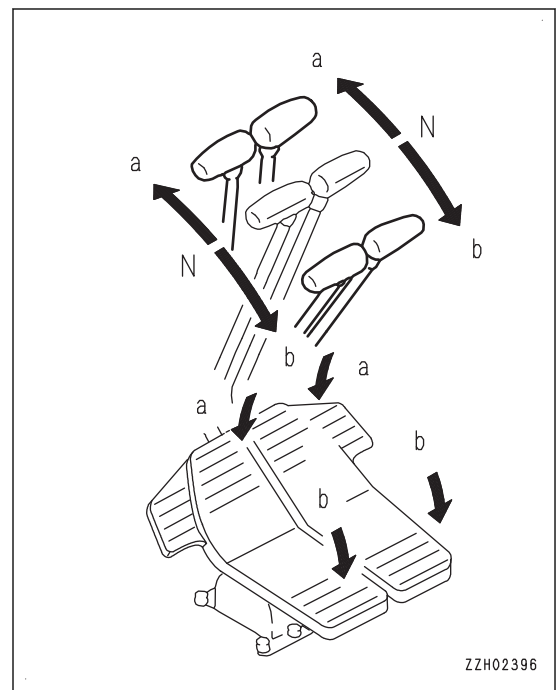
The lever is pulled back  
(Depress the rear side of pedal.)

**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.



## WORK EQUIPMENT CONTROL LEVER

The L.H. work equipment control lever is used to operate the arm and upper structure.

### Arm control

(a): Arm OUT

(b): Arm IN

### Swing control

(c): Swing RIGHT

(d): Swing LEFT

### 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

(a): Boom RAISE

(b): Boom LOWER

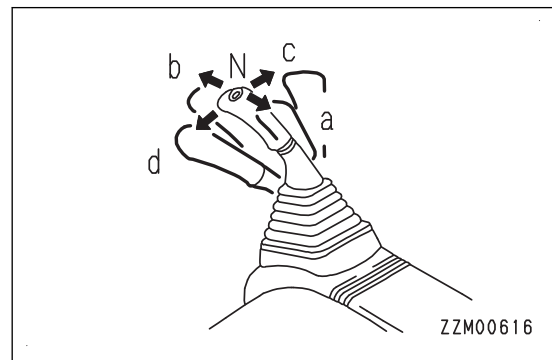
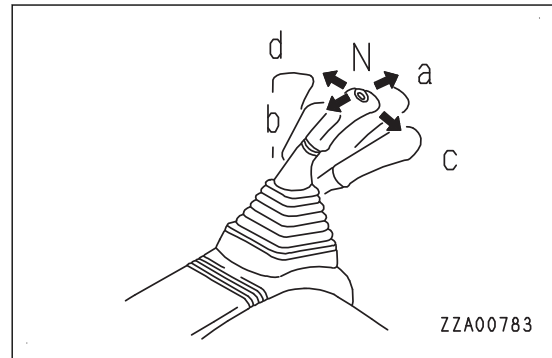
### Bucket control

(c): Bucket DUMP

(d): Bucket CURL

### N (NEUTRAL)

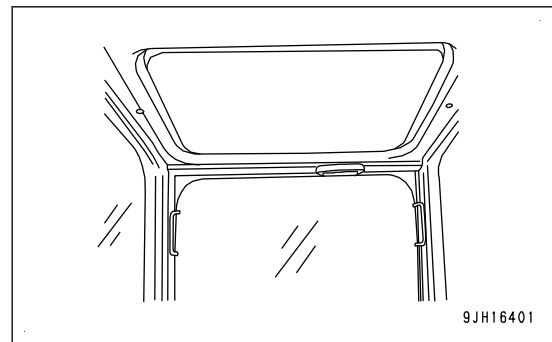
The boom and bucket are held in position and do not move.



## ROOF WINDOW

The operator cab is provided with a fixed clear roof window for improved visibility.

An optional guard can be provided for working in areas at risk from falling objects.



## OTHER EQUIPMENT

### METHOD FOR OPENING AND CLOSING CAB FRONT WINDOW

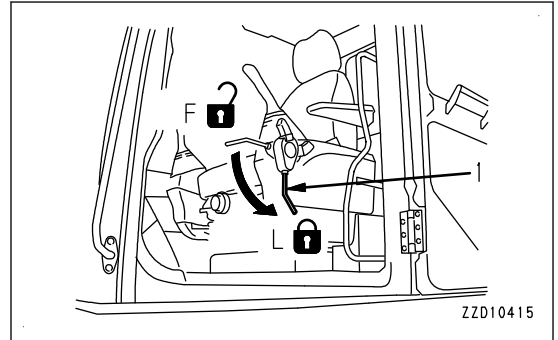
#### **⚠ WARNING**

- When opening or closing the front window, bottom window, or door, always set the lock lever to LOCK position.  
If the control lever or control pedal is touched by mistake when the lock lever is in FREE position, 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, then perform the operation.
- 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 automatic 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.

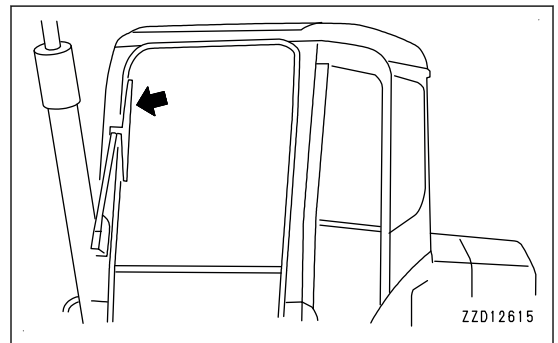
It is possible to stow the front window (upper side) in the roof of the operator's compartment.

### When opening

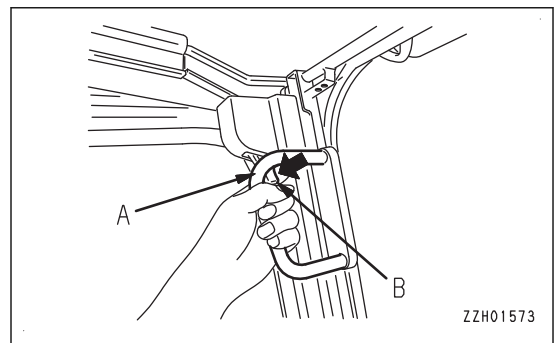
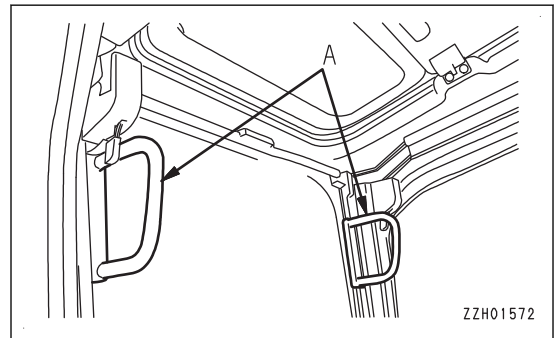
1. Stop the machine on a level ground, lower the work equipment to the ground, then stop the engine.  
Set lock lever (1) securely to LOCK position (L).



2. Check that the wiper blade is stowed in the right stay.



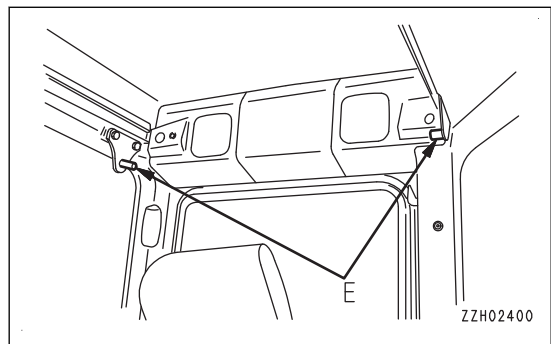
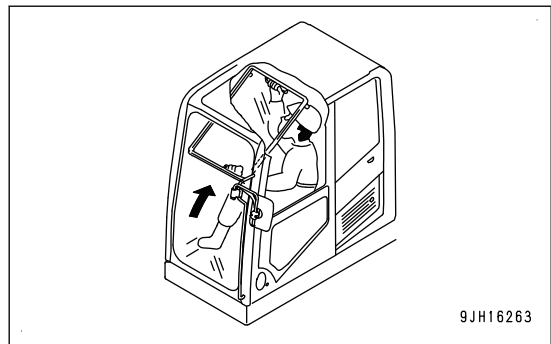
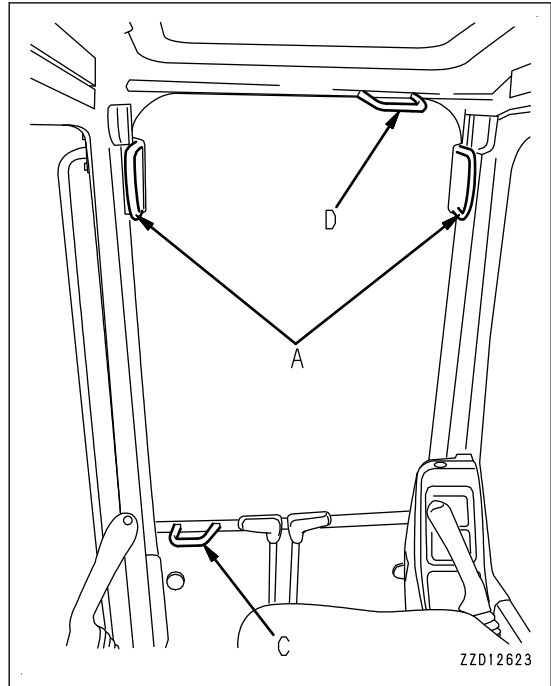
3. Hold handles (A) (2 places) on the right and left top sides of the front window, and pull levers (B) (2 places) to release the locks at the top of the front window. The top of the front window will come out.



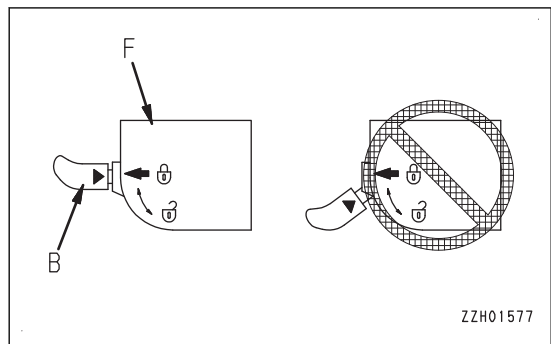
4. Hold lower handle (C) with your left hand from inside the operator's cab, and with your right hand, grip top handle (D), pull it up, and push it against lock catch (E) at the rear of the cab securely to lock the window.

**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).



5. Check that lever (B) is securely at 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.



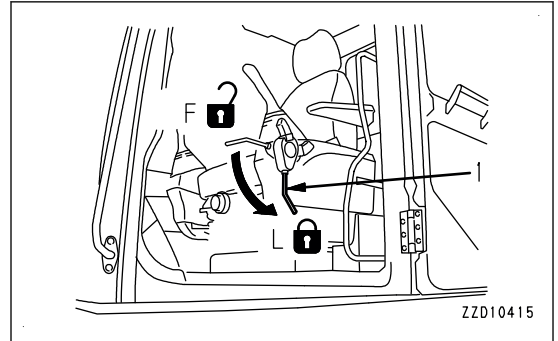


## When closing

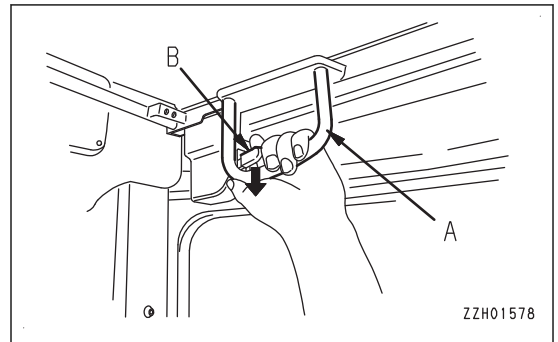
### CAUTION

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.  
Set lock lever (1) securely to LOCK position (L).



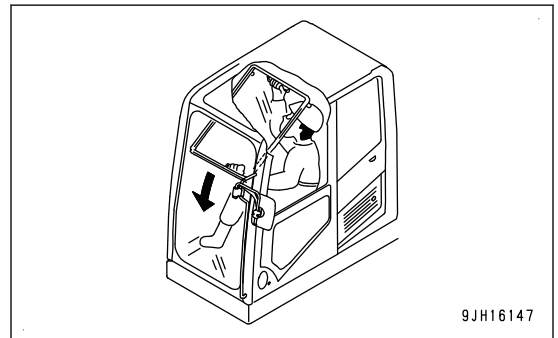
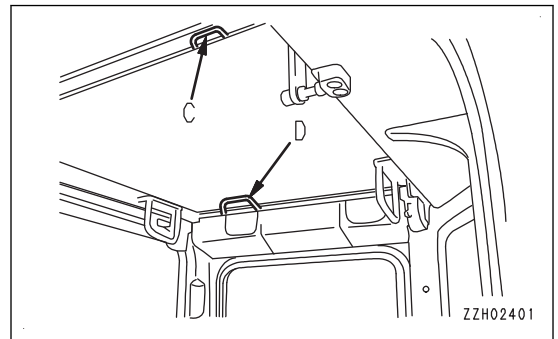
2. Grip right and left handles (A), and pull down lever (B) to release the lock.



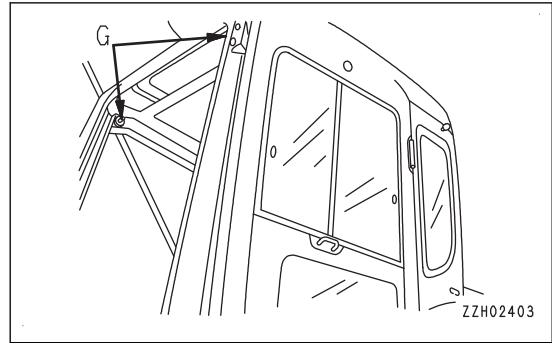
3. Grip the handle (C) at the bottom of the front window with your left hand and the handle (D) at the top with your right hand, push the window to the front, then lower it slowly.

#### REMARK

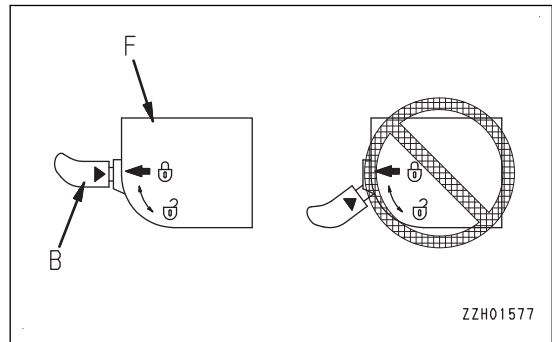
The handles (A) on the right and left top sides of the front window are not for pulling up and down the window. Do not pull down the front window with the handles (A).



4. 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.

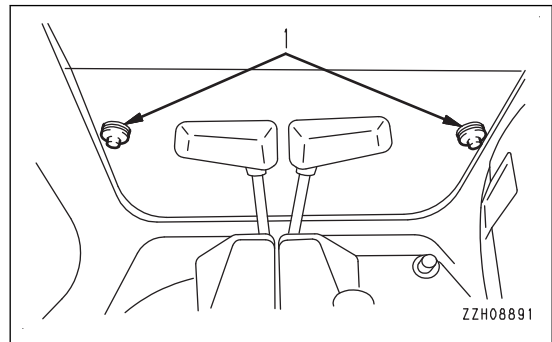


5. Check that lever (B) is securely at LOCK position.
  - If the arrow on lock case (F) matches the position of the arrow on lever (B), the lock is engaged. Check visually.
  - If the arrow on lock case (F) does not match the position of the arrow on lever (B), the lock is not engaged. Repeat the operation in step 5 to engage the lock.



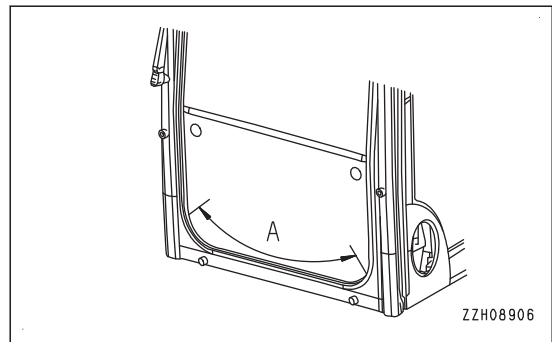
**Removal of front window (lower side)**

1. Open the front window (upper side), then hold grip (1), pull it up, and remove the lower side window.

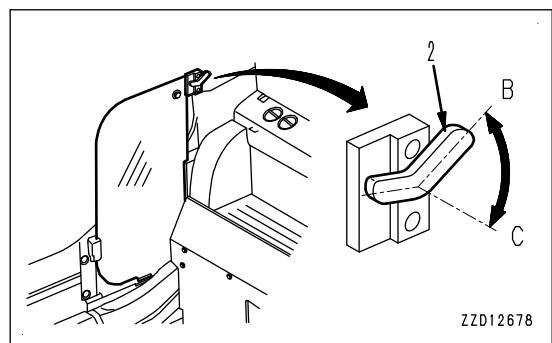


**REMARK**

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 lower side window, store it at the right rear of the operator's cab, and set lever (2) to lock position (B) to hold it securely in position.
3. When removing it, set lever (2) to release position (C), hold the glass with both hands, and pull it up.

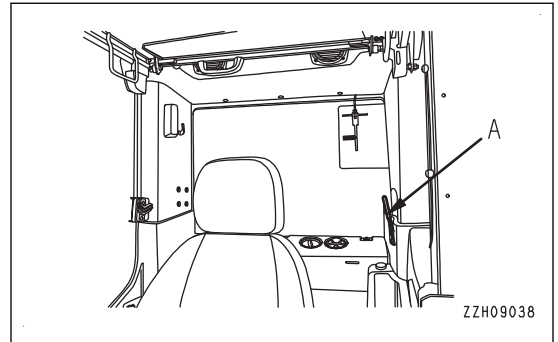


## EMERGENCY ESCAPE HAMMER

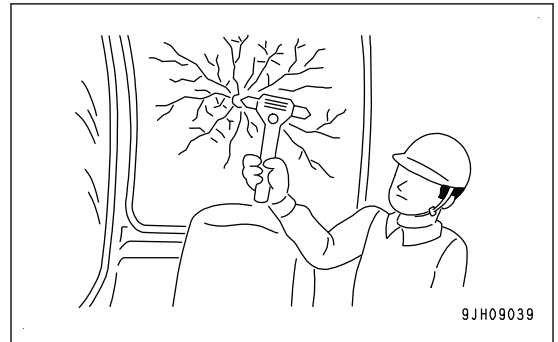
### CAUTION

- 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 the hammer (A) to escape.



To escape from the operator's cab, use the hammer (A) to break the glass and escape through the window.

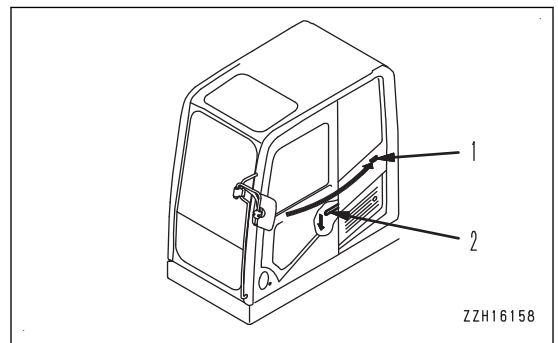


## METHOD FOR USING DOOR LOCK

### WARNING

- Before releasing the door lock, always place the machine on a level ground.
- Never release the door lock on a slope. The door may suddenly close and cause injury.
- When releasing the door lock, do not extend your body or hands outside the machine or do not put your hands on the door frame. The door may suddenly close and cause injury.

1. Use the door lock to keep and fix the door opened.
2. Push the door against catch (1) to lock it in position. When closing the door, push down lever (2) on the left side of the operator's seat, and the catch is released.
3. When keeping the door open, fix it securely to the catch.

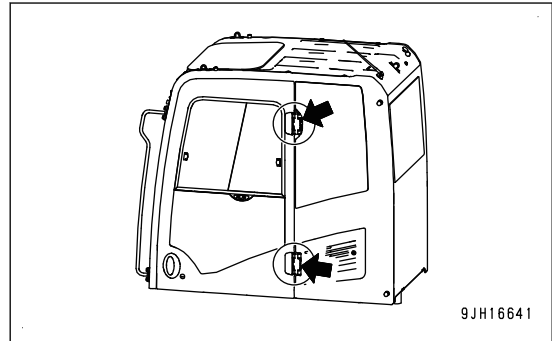


### CAB DOOR HINGE

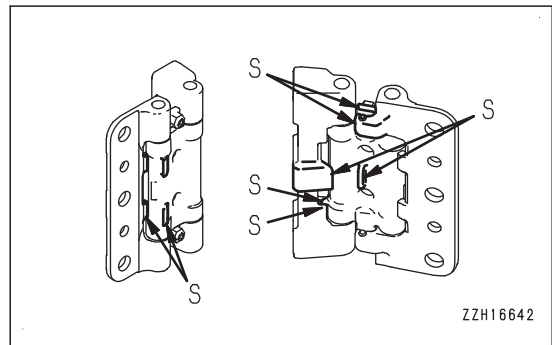
The cab door hinge has 2 rotation axes with stoppers (S).

#### REMARK

When opening and closing the cab door, hitting sound of stopper (S) is heard, but this is not a failure.



9JH16641

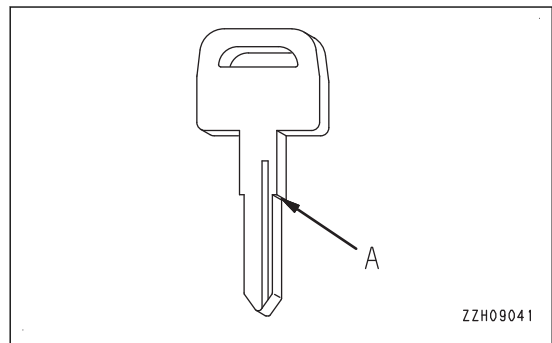


ZZH16642

### CAP AND COVER WITH LOCK

Use the starting switch key to open and close the locks on the caps and covers.

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.

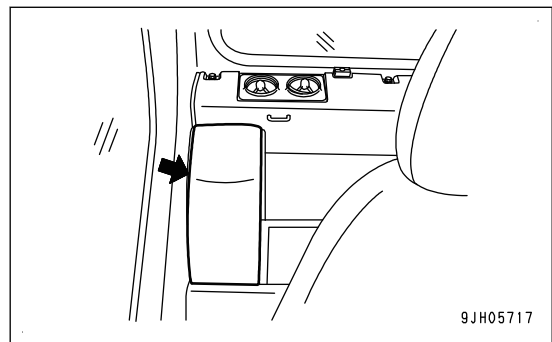


ZZH09041

### DRINK BOX

It is provided on the rear right side of the operator's seat to store drinks.

Air according to the setting of the air conditioner blows into the drink box.

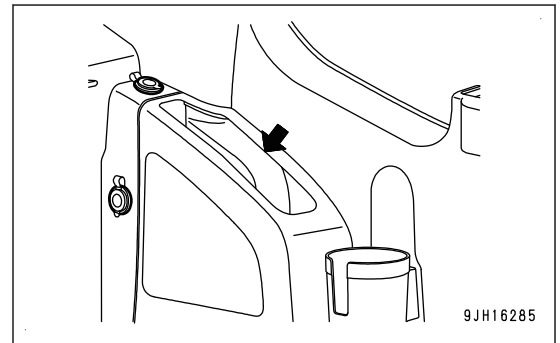


9JH05717

## MAGAZINE BOX

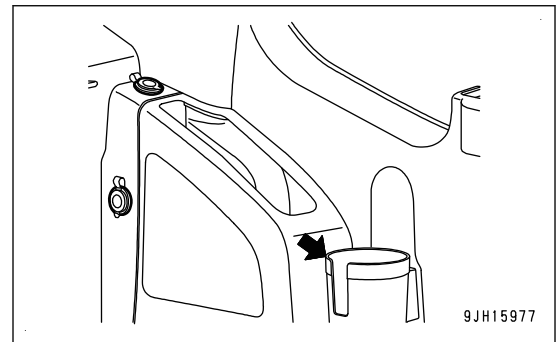
Located on the left side of the operator's seat.

Keep Operation and Maintenance Manual in this box so that it can be taken out and read whenever necessary.



## CUP HOLDER

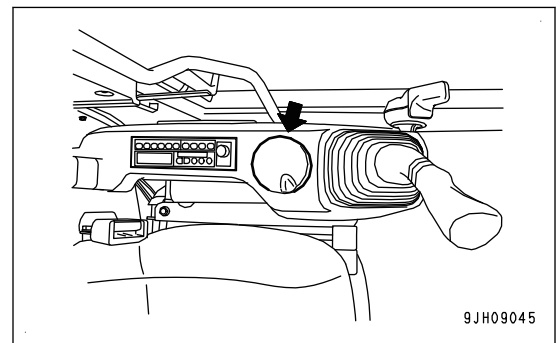
The cup holder is located on the left side of the operator's seat.



## ASHTRAY

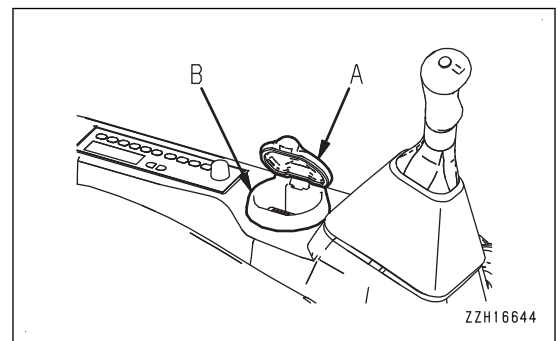
This is on top of the console box on the left side of the operator's seat.

Always extinguish your cigarette before putting it in the ashtray and be sure to close the lid.



## NOTICE

**While removing the ashtray, if it is stuck in the console cover and hard to be removed, open lid (A) of ashtray, then hold the ashtray body (B) and twist it to remove. If you hold lid (A) of ashtray and twist it, the ashtray may break.**



**POWER SUPPLY OUTLET**

**24 V power source**

**NOTICE**

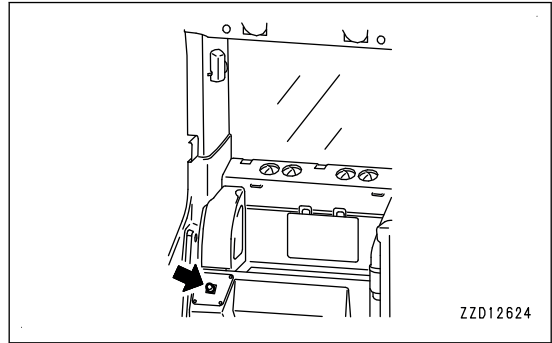
**Do not use it as a power supply for 12 V equipment. This will cause failure of the equipment.**

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 24 V power source while engine is running.



**12 V power source**

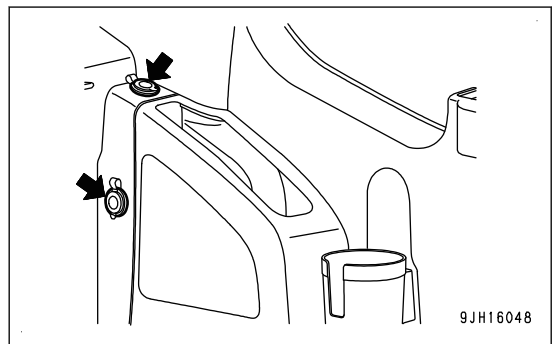
This power source can be used up to a capacity of 144 W (12 V x 12 A).

When it is used at 1 place: 144 W (12 V x 12 A)

When it is used at 2 places: 144 W in total

**REMARK**

Use 12 V power source while engine is running.

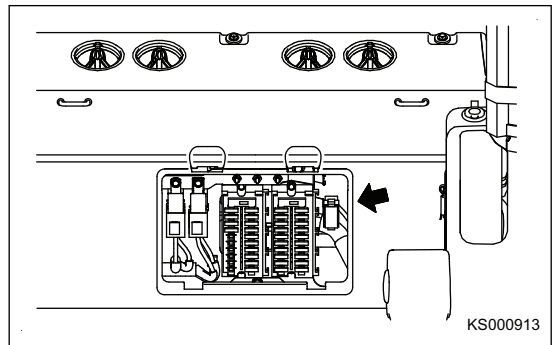


**FUSE**

**NOTICE**

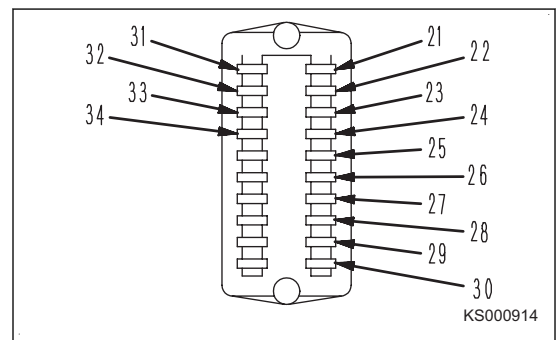
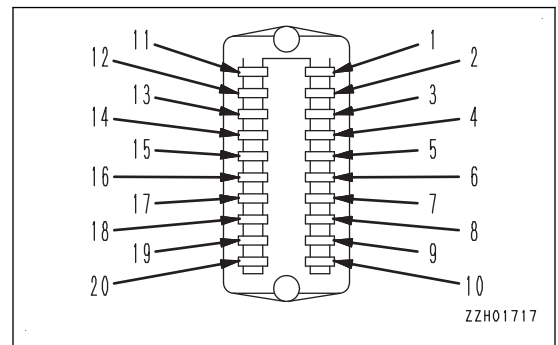
**Before replacing a fuse, be sure to turn the starting switch to OFF position, then turn the battery disconnect switch to OFF position.**

- The fuse holder is at the rear of the operator's seat.
- It is provided to 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.



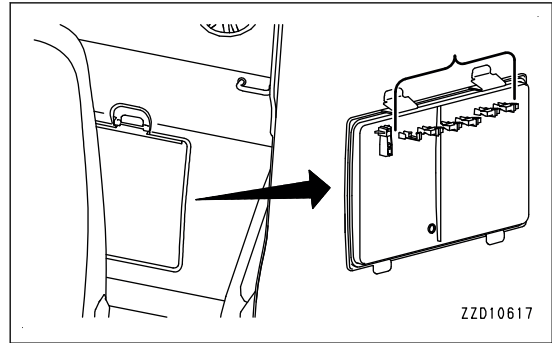
**Fuse capacities and circuit names**

No.	Fuse capacity	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, Right knob switch
(6)	5 A	Auto preheater relay
(7)	10 A	Revolving lamp
(8)	10 A	Radio, Speaker, Left knob switch
(9)	10 A	Rear working lamp relay, Head lamp
(10)	20 A	Air conditioner unit
(11)	10 A	Optional power source (1)
(12)	30 A	Optional power source (2), 12 V power source and air suspension seat with heater
(13)	5 A	Air conditioner ECU power source
(14)	5 A	Key ACC signal
(15)	20 A	Working lamp
(16)	10 A	Radio backup, room lamp, system operating lamp
(17)	20 A	Monitor, Pump controller
(18)	30 A	Engine controller
(19)	5 A	Air conditioner ECU backup
(20)	10 A	Optional power source (continuous power supply)
(21)	10 A	CAB headlamp (1)
(22)	10 A	CAB Rear lamp
(23)	10 A	Lower window wiper
(24)	10 A	Quick coupler
(25)	15 A	Refuelling pump
(26)	10 A	CAB headlamp (2)
(27)	10 A	OPT lamp
(28)	20 A	Auto-greasing
(29)	30 A	OPT heater
(30)	10 A	Spare
(31)	20 A	Sensor power source relay (1)
(32)	10 A	Sensor power source relay (2)
(33)	10 A	DEF line heater relay (1)
(34)	20 A	DEF line heater relay (2)



**REMARK**

- Spare fuses are installed in the back of the fuse holder lid at the rear right 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.



ZZD10617

**FUSIBLE LINK**

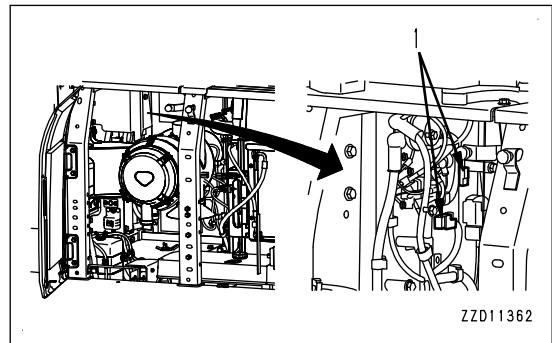
**NOTICE**

**Before replacing a fusible link, be sure to turn the starting switch to OFF position and check that the system operating lamp is off., then turn the battery disconnect switch key to OFF position.**

If the engine starting motor does not operate even when the engine starting switch key is turned to START position, fusible link (1) (2 places) may be broken. Open the cover on the left side of the machine to check the fusible links, and replace them.

**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.

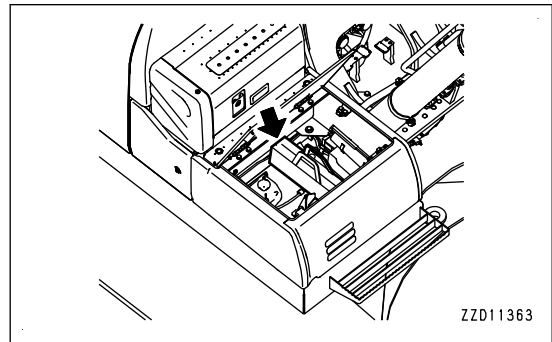


ZZD11362

**TOOL BOX**

Store the tools in it.

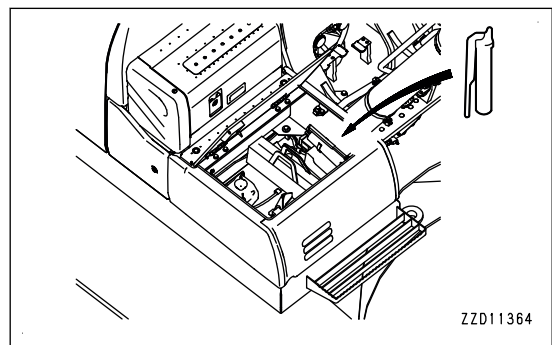
This is installed in the tool case at the right of the machine.



ZZD11363

**GREASE PUMP HOLDER**

This is installed in the tool case at front right of the machine. Keep the grease pump hooked on this holder while it is not used.



ZZD11364

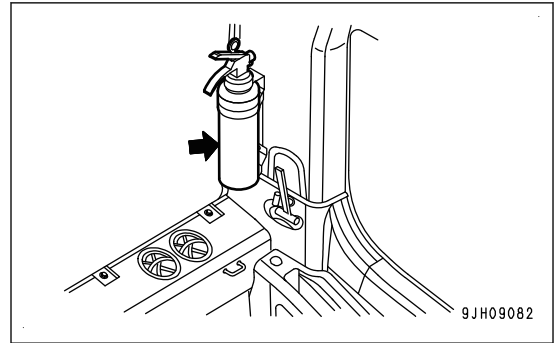
**FIRE EXTINGUISHER**

(if equipped)



A fire extinguisher is provided at the rear part inside the operator's cab.

The directions are described on the nameplate affixed to the fire extinguisher. Carefully read and understand them beforehand for emergencies.



## BATTERY DISCONNECT SWITCH

### CAUTION

- Do not operate the battery disconnect switch while the engine is running. The large current generated by the alternator may burn the electric parts and cause a fire. When operating the battery disconnect switch, always stop the engine.
- If the battery disconnect switch is turned to OFF position, always remove the switch key. If someone turns the key to ON position carelessly, this is extremely dangerous.

### NOTICE

- Keep battery disconnect switch in ON position except the following cases.
  - When the machine is stored for a long time (more than a month)
  - When repairing the electrical system
  - When performing electric welding
  - When handling the battery
  - When replacing fuse, etc.
- Do not turn battery disconnect switch to OFF position while the system operating lamp is lit. If it 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 (3-78)" and "HANDLE RADIO (3-230)".

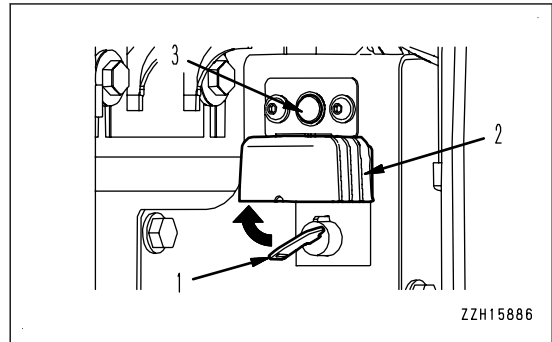
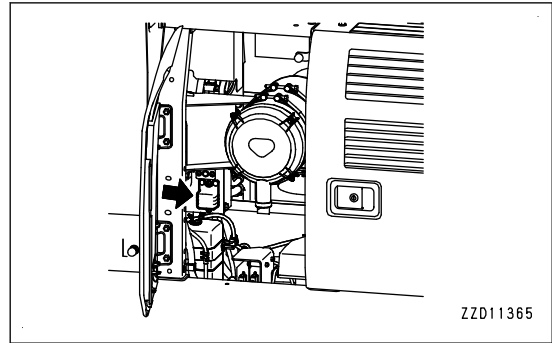
Battery disconnect switch (1) is used for cutting out the electricity from the battery.

This switch is installed inside the cover on the left side of the machine.

Raise rubber cover (2), and the switch is seen.

**REMARK**

Operate this switch while system operating lamp (3) is OFF.



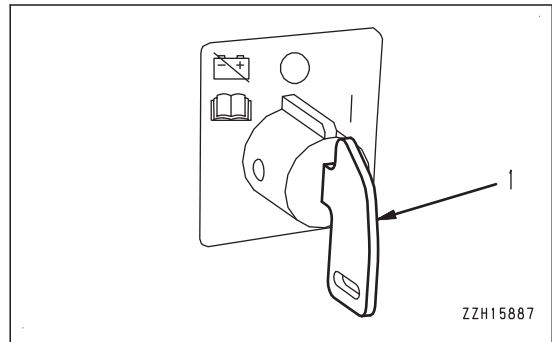
**(O): OFF position**

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 1 to 5 minutes after the starting switch is turned to OFF position.

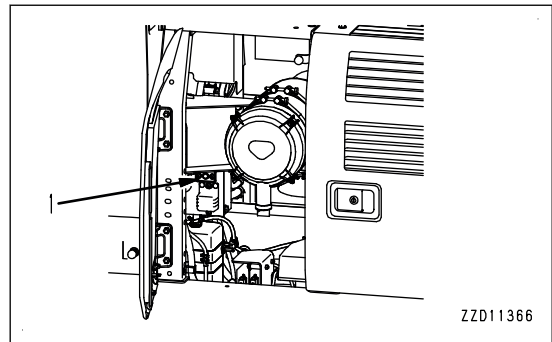
Before operating the battery disconnect switch, check that system operating lamp (1) is turned OFF.

**NOTICE**

**If the battery disconnect switch is turned OFF while this 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 lamp lights up in this case, but it does not indicate abnormality.
- 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.



## HANDLE Komatsu Diesel Particulate Filter (KDPF)

### ⚠ CAUTION

- Exhaust gas temperature may increase during the aftertreatment devices regeneration and the high temperature may last after the completion of regeneration. Avoid getting near the exhaust pipe outlet and around the aftertreatment devices to prevent being burnt. Also, keep combustible materials away from the exhaust pipe outlet and around the aftertreatment devices to prevent a fire.
- When there are thatched houses, dry leaves or pieces of paper near the job site, set the system to the regeneration disable to prevent fire hazards due to highly heated exhaust gas during the aftertreatment devices regeneration. For the setting procedure, see “PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING (3-117)”.

KDPF is a device to capture soot in the exhaust gas to purify the exhaust gas.

If soot is accumulated to a certain level in the filter, a purification process to burn the soot is performed automatically to keep the filtering performance of KDPF high.

This purification process is called the “regeneration”.

If operations which lower the purification function of KDPF continues for long hours, the regeneration is performed to protect the KDPF system, regardless of the quantity of the accumulated soot.

During the KDPF regeneration, the aftertreatment devices regeneration pilot lamp (1) stays lit on the machine monitor.

#### REMARK

Even if aftertreatment devices regeneration pilot lamp (1) lights up, the machine does not need to be stopped and the work can be continued, unless the caution lamp is displayed at the center of the monitor.

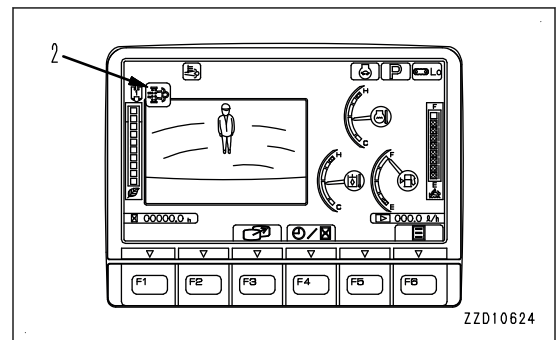
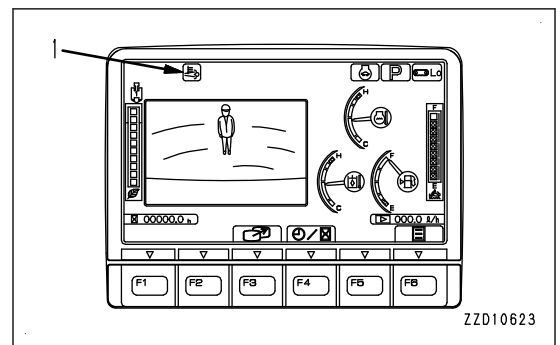
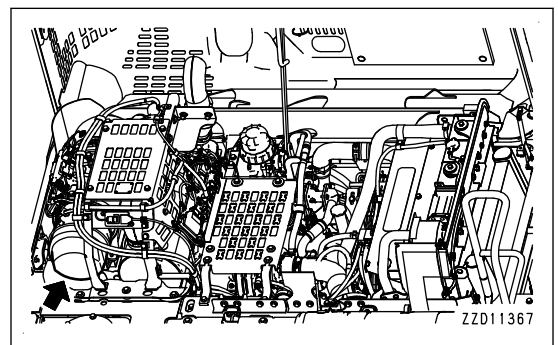
The KDPF regeneration is performed automatically. However, the accumulated soot may not be burnt sufficiently and the filtering function may not be improved under certain operating conditions.

In that case, KDPF soot accumulation caution lamp (2) lights up. If this lamp lights up, stop the machine in a safe place and perform the manual stationary regeneration.

For details of the procedure, see “PROCEDURE FOR MANUAL STATIONARY REGENERATION (3-114)”.

Two types of monitor display require the manual stationary regeneration, depending on the level of urgency.

If the lock lever is in LOCK position, the manual stationary regeneration may start automatically to protect the KDPF.



#### NOTICE

**Do not stop engine when the aftertreatment devices regeneration is activated.**

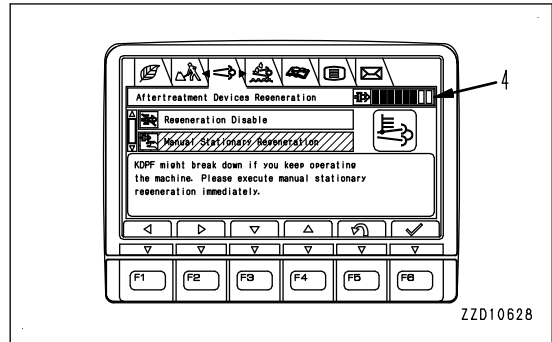
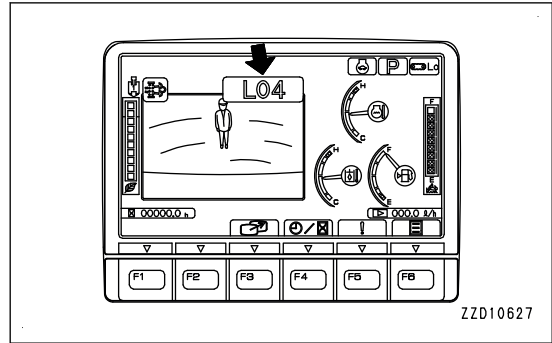
**When stopping the engine, stop the Aftertreatment Devices Regeneration first according to “PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING (3-117)”, then keep engine running at low idle for approximately 5 minutes, and stop engine.**

When the Action level “L03” lights up in red, and the KDPF soot accumulation caution lamp (2) lights up in red, engine power deration is activated. To restore engine power, it is necessary to perform “PROCEDURE FOR MANUAL STATIONARY REGENERATION”.

If soot accumulated in the KDPF exceed the defined level without performing “PROCEDURE FOR MANUAL STATIONARY REGENERATION”, the Action level “L04” lights up in red. Stop the machine immediately and ask your Komatsu distributor.

**REMARK**

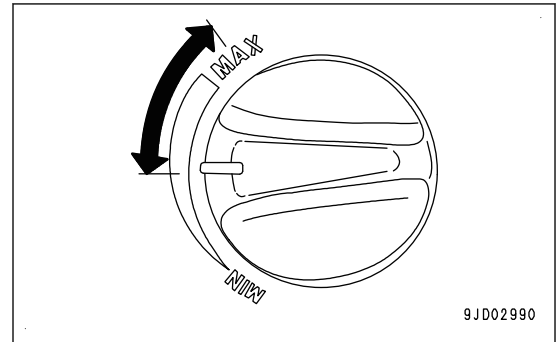
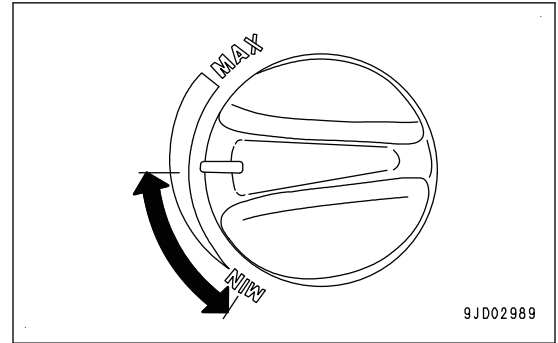
- Soot accumulation level (4) can be checked with the “Aftertreatment Devices Regeneration” screen. Press function switch F6 on the standard screen to display “Aftertreatment Devices Regeneration” screen of the user menu.
- Since the soot in the filter of KDPF can be burnt by the high-performance catalyst and high-temperature exhaust heat, the soot accumulation quantity may decrease even if the regeneration is not performed, depending on the operating condition.
- Even when the soot accumulation level is low, the automatic regeneration may be performed and the manual stationary regeneration may be requested to protect the system. In particular, if engine is kept running with no load, the regeneration frequency may increase, but this is not a failure.
- Even just after the regeneration is completed, the soot accumulation level may not be “0”. This is caused by the accumulated noncombustible material in the exhaust gas and is not a failure.
- Since noncombustible matter which cannot be burnt by the regeneration is accumulated in the filter of KDPF, the filter needs to be cleaned or replaced at regular intervals. For details, see “METHOD FOR CLEANING KDPF (4-76)”.
- The engine speed or engine sound may change during or after the regeneration. This is caused by the control for better regeneration and this is not a failure.
- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filtering function.
- White smoke may be discharged for a short time just after the engine is started or during the regeneration in the cold season, but this is not a failure.
- Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure. In addition, the regeneration interval may be shortened and the fuel consumption may increase. For details of the genuine oil, see “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)”.



**REMARK**

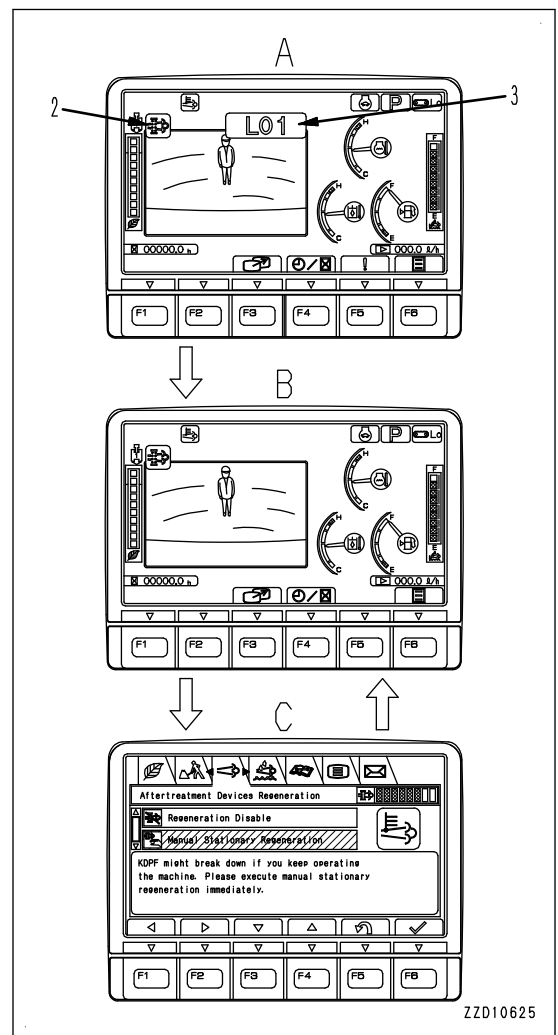
If heavy-duty operation is performed for more than 30 minutes with the fuel control dial between Low idle (MIN) position and High idle (MAX) position, soot is accumulated much and action level monitor "L03" may be displayed. However, this does not indicate abnormality.

After performing manual stationary regeneration, turn the fuel control dial to a point above the midpoint between Low idle (MIN) position and High idle (MAX) position to continue the operation.



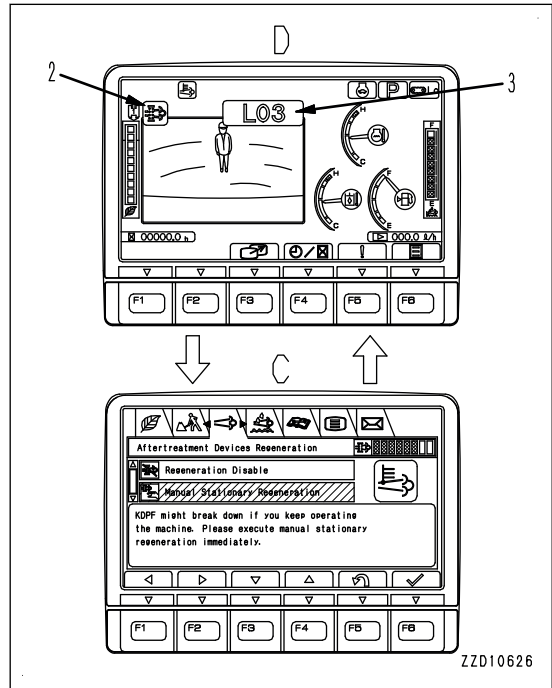
**When the degree of emergency is low**

- If KDPF soot accumulation caution lamp (2) lights up in yellow (action level (3): "L01"), screen (A) is displayed first.
- The action level goes out 2 seconds after and the screen changes to standard screen (B).
- If the lock lever is set to LOCK position or all the work equipment control levers are set in NEUTRAL, the screen changes to "Aftertreatment Devices Regeneration" screen (C) after 3 seconds only the first time. If the manual stationary regeneration is not performed, the screen returns to standard screen (B) after 30 seconds. Then, if the accumulated soot does not decrease, "After-treatment Devices Regeneration" screen (C) is displayed for 30 seconds every 2 hours.
- If KDPF soot accumulation caution lamp (2) lights up in yellow, stop the machine in a safe place after finishing the work and perform the manual stationary regeneration.



**When the degree of emergency is high**

- KDPF soot accumulation caution lamp (2) lights up in red and the action level “L03” lights up in red (3).
- If the lock lever is set to LOCK position or all the work equipment control levers are set in NEUTRAL, the screen changes to “Aftertreatment Devices Regeneration” screen (C) after 3 seconds. Then, the “Aftertreatment Devices Regeneration” screen (C) and standard screen (D) are automatically displayed alternately according to the lever operation, until the manual stationary regeneration is performed.
- If KDPF soot accumulation caution lamp (2) lights up in red, immediately stop the machine in a safe place and perform the manual stationary regeneration.



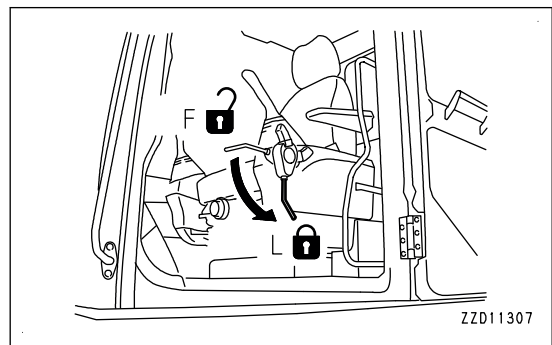
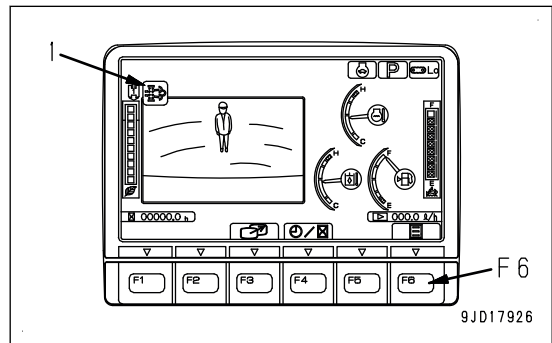
**PROCEDURE FOR MANUAL STATIONARY REGENERATION**

**CAUTION**

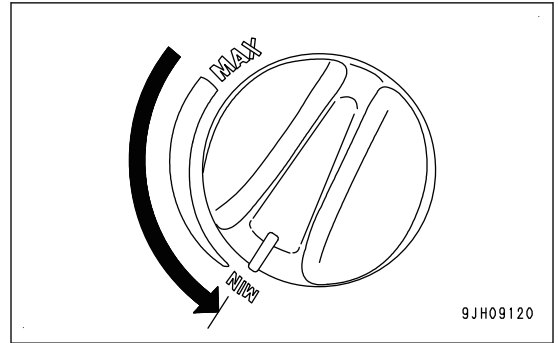
Exhaust gas temperature may increase higher than the previous models during the aftertreatment devices regeneration. Avoid getting near the exhaust pipe outlet and around the Aftertreatment devices to prevent being burnt. Also, keep combustible materials away from the exhaust pipe outlet and around the Aftertreatment devices to prevent a fire.

The manual stationary regeneration can be performed while KDPF soot accumulation caution lamp (1) is lit.

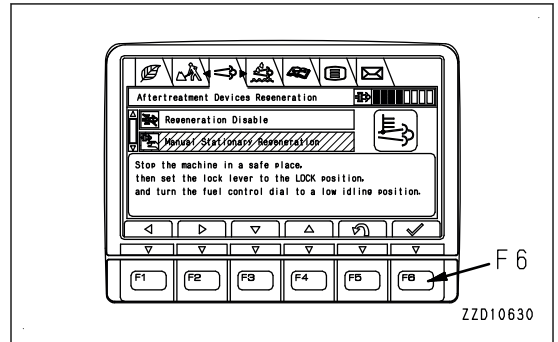
1. Move the machine to a safe place and stop it with engine running.
2. Check that there is no person or combustible matter around the machine (particularly in the direction of the exhaust gas flow).
3. Set the lock lever to LOCK position (L).



- Set the fuel control dial to Low idle (MIN) position.



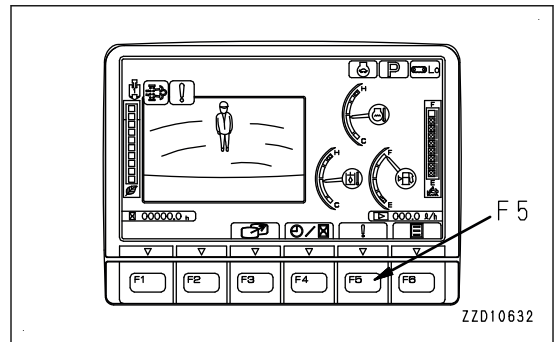
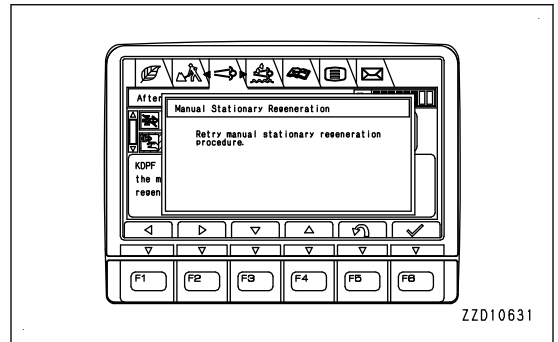
- Press switch F6 to display the “Aftertreatment Devices Regeneration” screen.



- Select manual stationary regeneration, check again that there is no person or combustible material around the machine, then press switch F6. If the machine needs to be moved again to secure safety, move it to a safe place and repeat the procedure from step 1.

**REMARK**

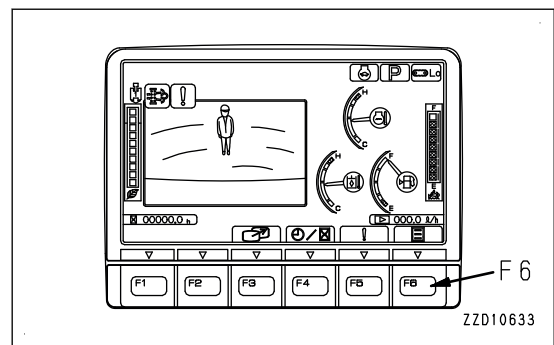
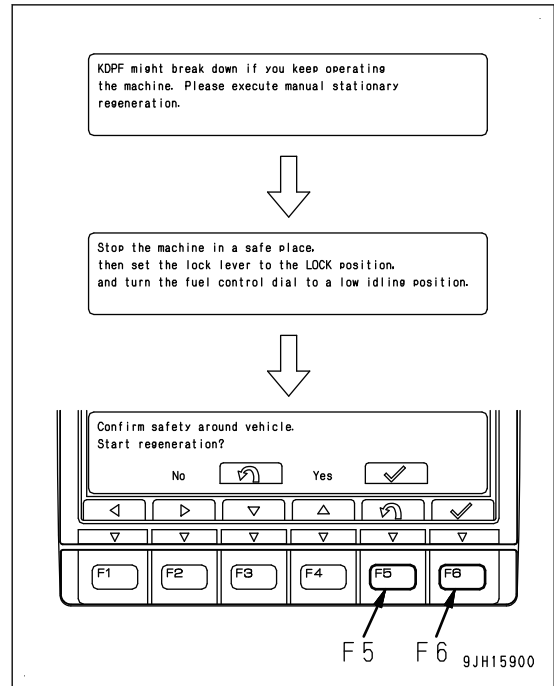
After switch F6 is pressed in step 6, the screen shown in the figure may be displayed. This indicates that the operations in steps 1 to 4 were not performed correctly or there is trouble other than KDPF soot accumulation abnormality. Check that the engine is running normal, the lock lever is in LOCK position (L), and the fuel control dial is in Low idle (MIN) position, then repeat the procedure from step 6. If the manual stationary regeneration still cannot be performed, return to the standard screen, press switch F5 to check the contents of other occurring troubles, stop the work and perform inspection and maintenance.



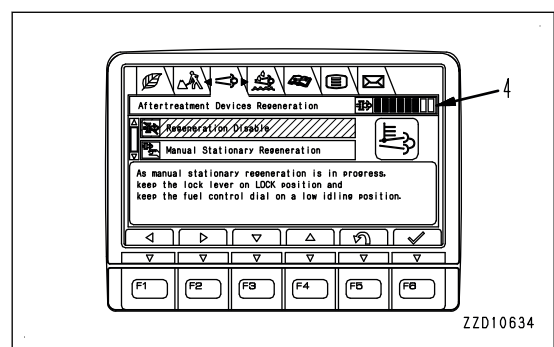


**REMARK**

- The explanation of the manual stationary regeneration is displayed in 3 parts on the monitor panel. When switch F6 is pressed, the regeneration can be started immediately, regardless of which part is displayed. When switch F5 is pressed, the screen returns to the standard screen.
- If no monitor switch is operated for 30 seconds, the explanation of the manual stationary regeneration disappears and the screen returns to the standard screen. At this time, to display the explanation of the manual stationary regeneration again, press switch F6 on the standard screen to display the “Aftertreatment Devices Regeneration” screen.



7. This screen is displayed during the manual stationary regeneration. It may take more than 40 minutes to complete the manual stationary regeneration. Do not touch any switch on the screen or operate fuel control dial until the regeneration is completed and the standard screen appears again.





**REMARK**

- The progress of the manual stationary regeneration performed when soot is accumulated can be checked by the number of lighting lamps of soot accumulation level (4). The manual stationary regeneration starts at soot accumulation level “4” or higher and finishes when all the level lamps go out.
- The time required for the manual stationary regeneration depends on the soot deposition level or the ambient temperature when it is started. If the regeneration starts at soot accumulation level “6” or higher, it may take approximately 2 hours to finish.
- The manual stationary regeneration for protection of the system may start even when the soot accumulation level is “0” to “3”. In this case, the soot accumulation level may not decrease, but this is not trouble. The progress is not displayed on the monitor during this regeneration. It is completed in approximately 10 minutes.
- If the lock lever or fuel control dial is operated during the manual stationary regeneration, the regeneration is stopped automatically. Return the lock lever to LOCK position (L) and return the fuel control dial to Low idle (MIN) position, then repeat the procedure from step 6.
- If the machine needs to be moved during the manual stationary regeneration, stop the regeneration temporarily and move the machine, referring to the after-treatment devices regeneration disable and cancel procedures described below.  
When restarting the manual stationary regeneration, secure the safety of the machine and around it, then cancel the regeneration disable.

8. After the manual stationary regeneration is completed, the screen automatically returns to the standard screen.

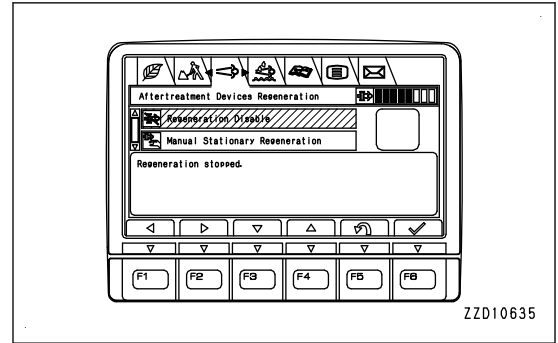
**PROCEDURE FOR AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING**

If there is combustible material around the machine and the active regeneration that increases the exhaust temperature must not be performed, the automatic active aftertreatment regeneration can be disabled. Also, the regeneration in progress can be stopped.

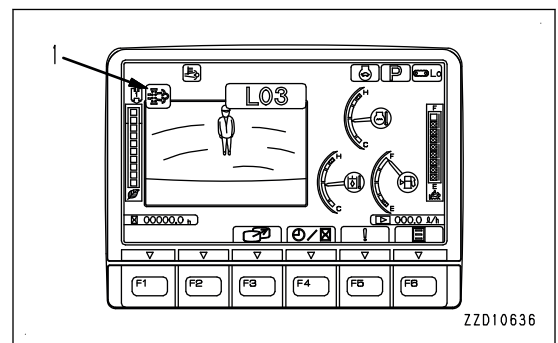
**NOTICE**

Even if the regeneration is disabled, KDPF soot accumulation caution lamp (1) lights up if soot is accumulated and the manual stationary regeneration is required. If KDPF soot accumulation caution lamp lights up, move the machine to a safe place and perform manual stationary regeneration.

If the operation is continued without performing the manual stationary regeneration, it may cause the failure of KDPF or the engine.



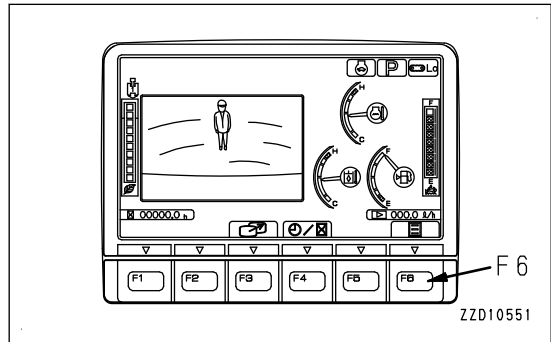
ZZD10635



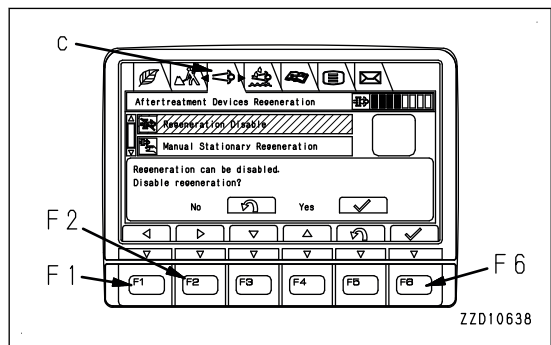
ZZD10636

### While regeneration is not being performed: Setting for the regeneration disable

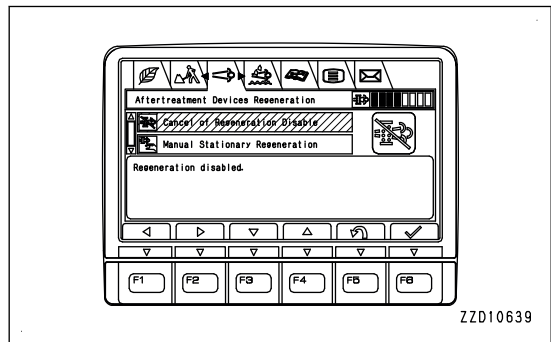
1. (When the aftertreatment devices regeneration pilot lamp is not displayed on the standard screen)  
Press switch F6 on the standard screen.



2. Operate switches F1 and F2 to select "Aftertreatment Devices Regeneration" menu (C) to display "Aftertreatment Devices Regeneration" screen.

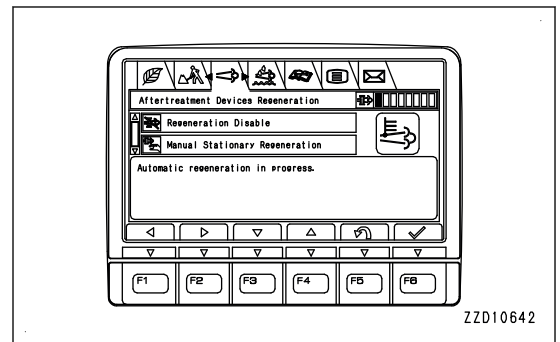
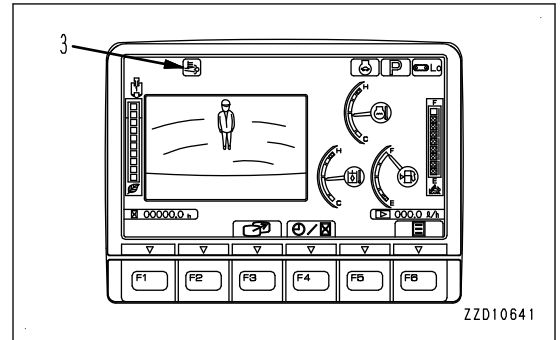
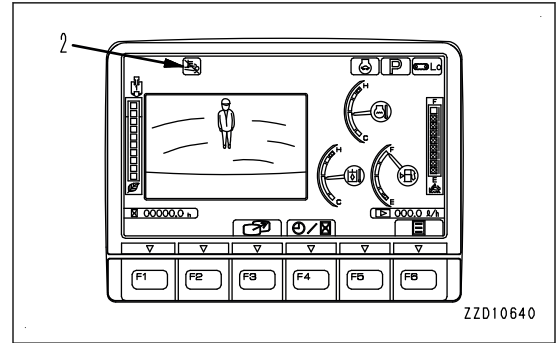


3. Select the regeneration disable and press switch F6, then the regeneration function is disabled and the regeneration cannot be performed.



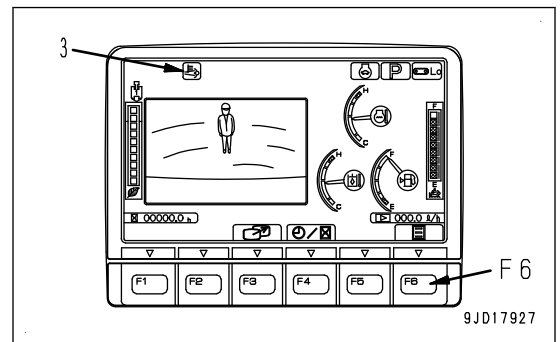
**REMARK**

- When the regeneration is disabled, the aftertreatment devices regeneration disable pilot lamp (2) is displayed with hatch on the standard screen.
- The setting of the regeneration disable is canceled by turning starting switch to OFF position. When the automatic regeneration needs to be kept disabled, perform the above procedure each time you start the engine.
- During the regeneration to protect the system, even if the regeneration disable is set, the regeneration pilot lamp (3) may light up, but this does not indicate abnormality. Also, during the regeneration to protect the system, the regeneration disable cannot be operated.
- When the regeneration is performed to protect the system, the exhaust temperature is lower than that of when the regeneration is performed to burn soot, and is almost the same level as the normal exhaust gas temperature.



**While regeneration is being performed: Regeneration is disabled**

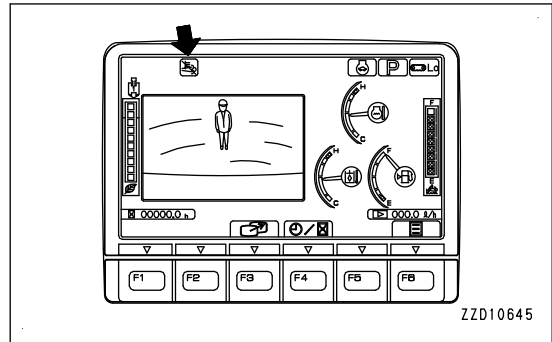
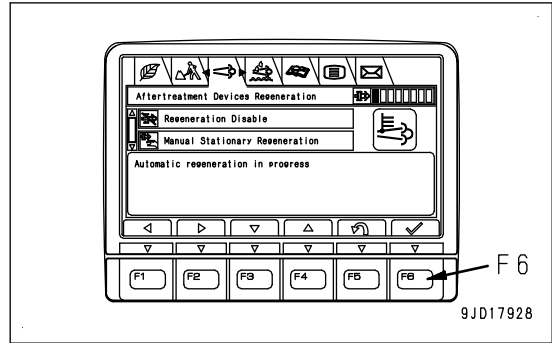
1. (When the aftertreatment devices regeneration pilot lamp (3) is lit on the standard screen)  
When switch F6 is pressed on the standard screen, "Aftertreatment Devices Regeneration" screen is displayed.



- Select the regeneration disable, press switch F6, and the regeneration stops.

**REMARK**

The regeneration performed to protect the system may not be stopped, but this is not a failure.

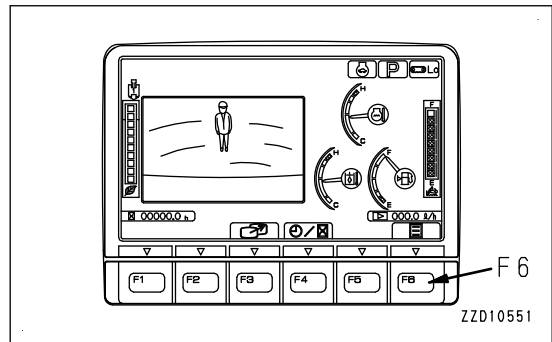


**PROCEDURE FOR CANCEL OF AFTERTREATMENT DEVICES REGENERATION DISABLE SETTING**

**CAUTION**

When canceling the regeneration disable, move the machine to a safe place and check that there is no person or combustibile matter around the machine, and start the cancel operation.

- When switch F6 is pressed on the standard screen, "Aftertreatment Devices Regeneration" screen is displayed.  
(If the screen is not displayed, operate switches F1 and F2 to display "Aftertreatment Devices Regeneration" screen.)

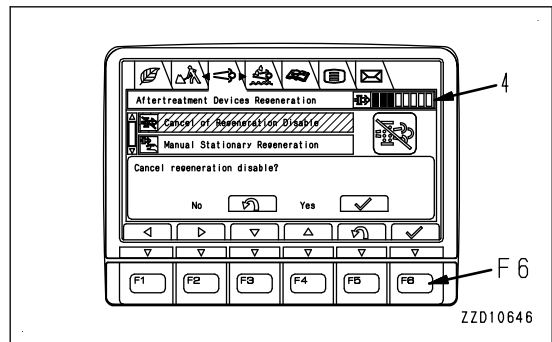


- Select Cancel of the regeneration disable and press switch F6, and the regeneration disable is canceled.

If soot accumulation level (4) is lit 3 or more, the regeneration is started automatically.

**REMARK**

- When canceling the regeneration disable, set the lock lever to LOCK position and set the fuel control dial to Low idle (MIN) position, then cancel the regeneration disable.
- The regeneration disable setting is also canceled by turning the starting switch to OFF position to stop the engine.

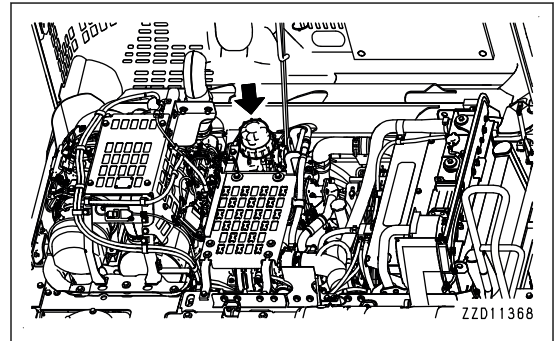


## Komatsu Closed Crankcase Ventilation (KCCV)

KCCV is a device to clean the gas discharged from the engine crankcase 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 replacement, see “METHOD FOR REPLACING KCCV FILTER ELEMENT (4-67)”.
- If the engine is operated without KCCV filter element or if a filter element other than the Komatsu genuine element 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 cleaned. 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

Urea SCR system is a device which converts toxic nitrogen oxides (NOx) in the exhaust gas into harmless nitrogen and water. By spraying DEF into the exhaust gas, it decomposes and hydrolyzes to form ammonia (NH<sub>3</sub>) and the ammonia selectively reacts with nitrogen oxides for the conversion to nitrogen and water.

The Komatsu Urea SCR System continuously monitors its operation conditions and stores information on inappropriate operations including malfunctions. The information is used for system diagnostics and also for Inducement required by the authorities on engine systems that use Urea SCR systems. Inducement is intended for the operator to take prompt actions to maintain and correct inappropriate behaviors of Urea SCR systems by utilizing visible and audible alerts, and engine power derate in addition. Alerts in Inducement of the Komatsu Urea SCR System progresses step by step starting from visual indications on the machine monitor and audible sounds to engine power derate to avoid getting into unsafe conditions.

The Komatsu Urea System also monitors recurrences of abnormalities of the system. Inducement in the recurrences is activated when another abnormality occurs within 40 hours after the first abnormality is fixed.

The Komatsu's Urea is composed of two major systems, which are the DEF system and the SCR catalyst Ass'y.

DEF is supplied from DEF system into the exhaust system. DEF system consist of DEF tank (1), DEF hose (2), DEF pump (3), and DEF injector (4). SCR Ass'y is indicated by (5).

In the event that indications of potential degradation of nitrogen oxides conversion efficiency are detected, the active regeneration is triggered to rejuvenate Urea SCR system even if the amount of soot accumulated in the KDPF has not reached to the regeneration thresholds.

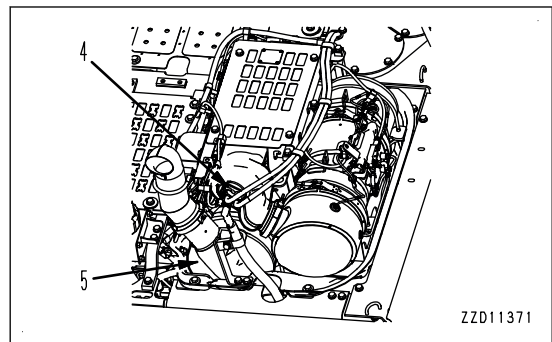
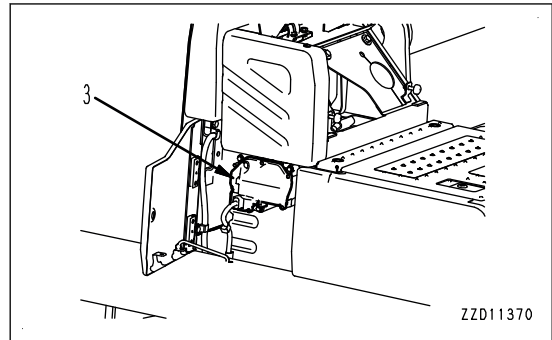
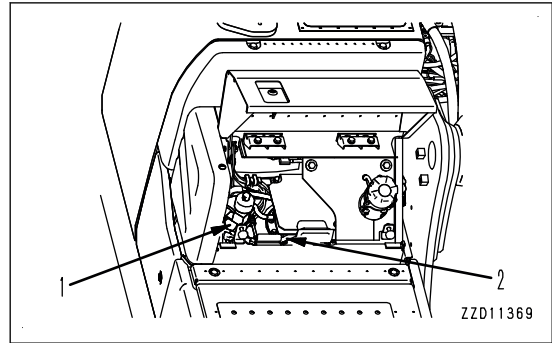
For details of Aftertreatment Devices Regeneration, see "HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-111)".

### **⚠ WARNING**

**Fill ONLY DEF into DEF tank. Foreign material in the DEF system or urea deposits caused by evaporation may hinder operation of the devices.**

### **NOTICE**

- Foreign materials in the DEF system or urea deposits caused by precipitation of urea may hinder operation of the devices.
- Do not disassemble any devices of the DEF System other than the filter for change. Do not modify any devices of the DEF System.
- Paint may cause deterioration of the devices. When painting the surrounding areas, take care not to get any paint on the injector and the supply pump.
- Always use DEF that conforms to the quality standard. If any additional additive agents or water is mixed in DEF and that mixture is used, the devices will not function properly, and conformance to the exhaust gas regulations will be lost. In addition, it may cause failures in the engine system. If DEF out of the standard is filled or used by mistake, contact your Komatsu distributor.



## **About the operation of Urea SCR system**

The Urea SCR System automatically starts operating as soon as the engine is started.

Even after the engine starting switch is turned to the OFF position, the devices will still be in operation for several minutes to purge any DEF in the lines, the injector and the supply pump back to the DEF tank. It does not indicate any abnormality. When DEF has been returned to the tank, the devices stop.

Do not turn OFF the battery disconnect switch while the devices are still in operation. When the devices complete their shutdown process, the system operating lamp will go out, and the battery disconnect switch may be disconnected.

## **About the operation in cold weather**

DEF freezes at  $-11^{\circ}\text{C}$ .

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 fluid 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 progresses in 4 levels from Warning, Continuous Warning, Low level Inducement and Severe 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 (Low level Inducement)” and “L04 (Severe Inducement)” engine power will be derated. When Action Level “03” or “04” is displayed, move the machine to a safe place and add DEF.

The content of the warning can be checked on the “SCR Information” screen of the user menu.

Perform the following procedure.

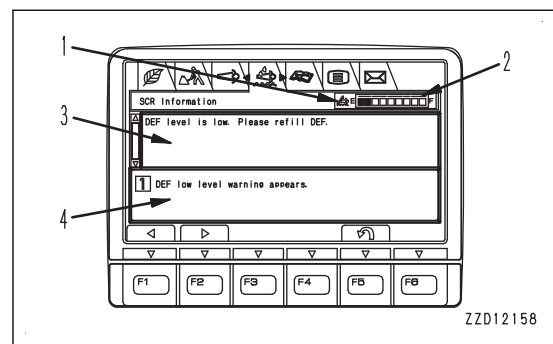
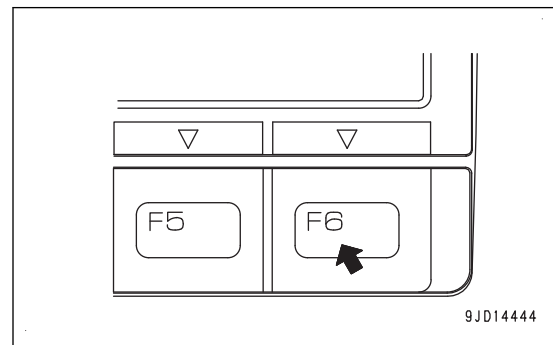
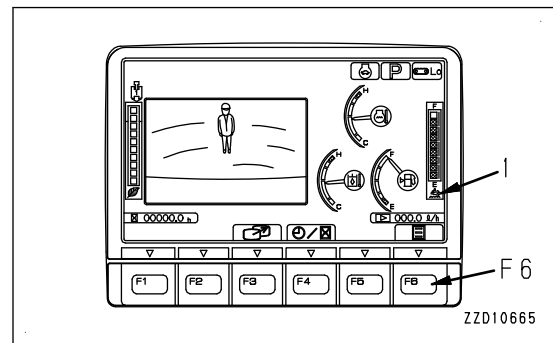
Press F6 on the standard screen to display the “SCR Information” screen of the user menu.

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).

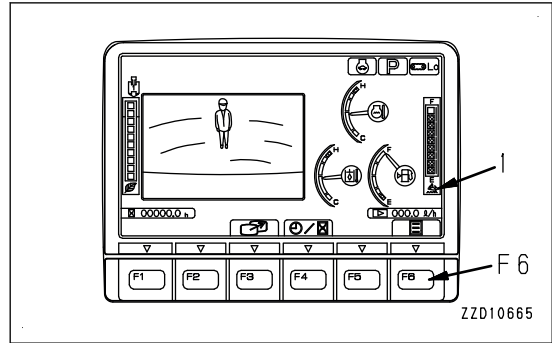
If Inducement starts, stop the machine in a safe place and add DEF.

Once the audible alert starts, “The buzzer cancel switch” does not work unless DEF is added.

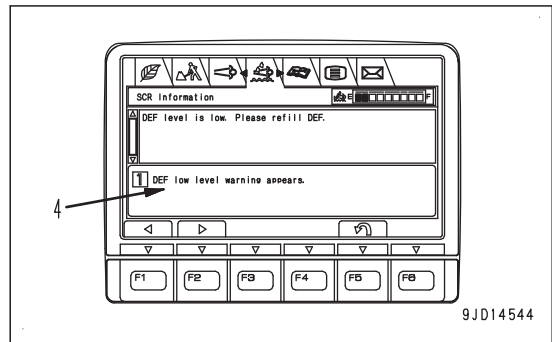




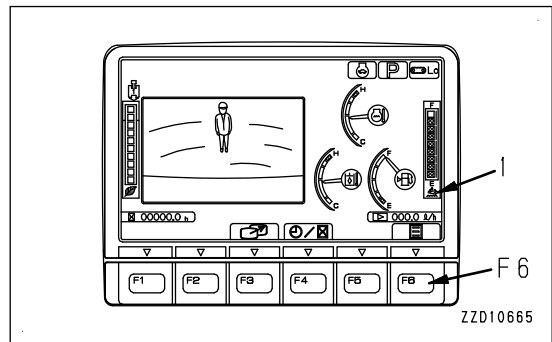
- Warning:
  - 2 gradations of the DEF level gauge light up in the red range.
  - The DEF level caution lamp (1) lights up in red.
  - No audible alert.
  - No Action level is displayed.
  - Press F6 to display the "SCR Information" screen.



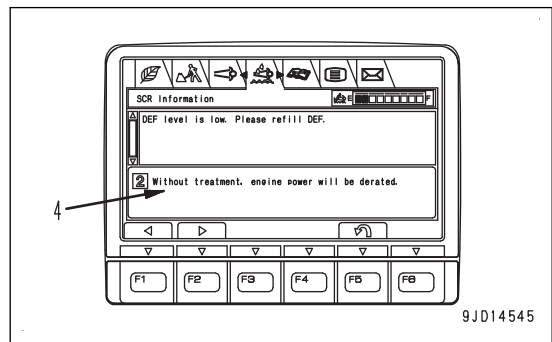
Inducement status (4): "1 DEF low level warning appears."  
 Add DEF to the DEF tank immediately.



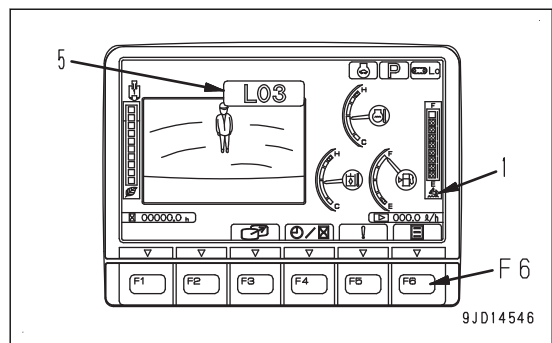
- Continuous Warning:
  - The audible alert sounds in repetition of "three beeps and a pause".
  - 2 gradations of the DEF level gauge light up in the red range.
  - DEF level caution lamp (1) lights up in red.
  - No Action level is displayed.
  - Press F6 to display the "SCR Information" screen.



Inducement status (4): "2 Without treatment, engine power will be derated."  
 Add DEF to the DEF tank immediately.

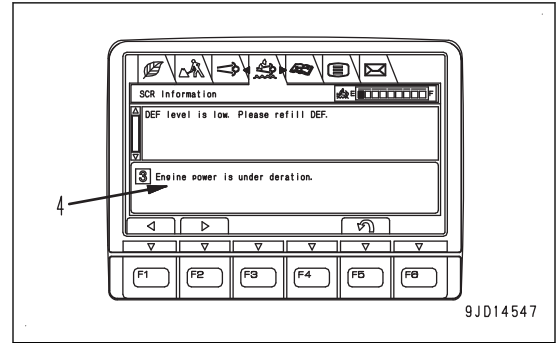


- Low level Inducement:
  - The audible alert sounds in short and sharp beeps.
  - 1 gradation of the DEF level gauge light up in red.
  - The DEF level caution lamp (1) lights up in red.
  - Action Level "L03" is displayed in red (5).
  - Press F6 to display the "SCR Information" screen.

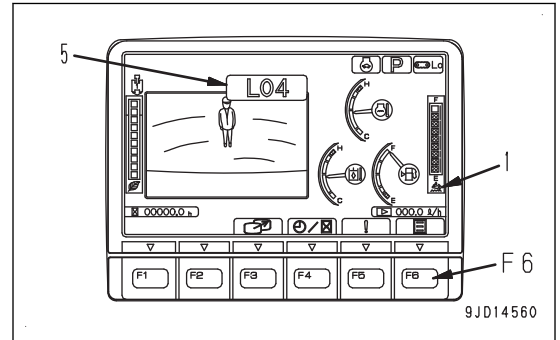




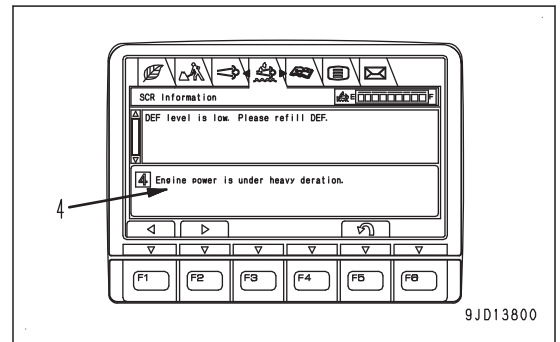
Inducement status (4): "3 Engine power is under deration."  
 Add DEF to the DEF tank immediately.



- 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.



Inducement status (4): "4 Engine power is under heavy deration."

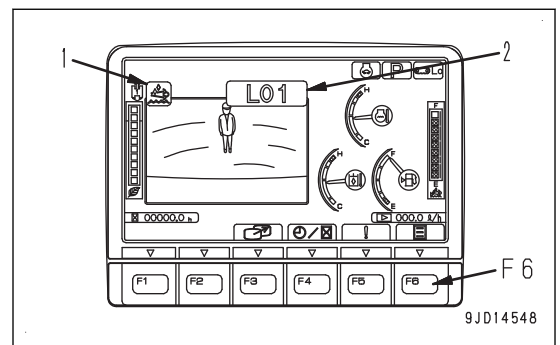


Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is "Severe Inducement" and relieves back temporarily to the power deration of the "Low level Inducement". The operator can restore engine power through the machine monitor. 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.

**Inducement strategy when abnormalities are detected in the Urea SCR System devices (Except abnormalities in the KDPF and the EGR system)**

If any abnormality is detected in the DEF quality or in the Urea SCR system, the Inducement strategy is activated.

The inducement strategy progresses in 4 levels, "Warning", "Continuous Warning", "Low level Inducement" and "Severe Inducement". The Inducement strategy includes visual alert by the DEF caution lamp, the KDPF system caution lamp or the Engine system caution lamp (1), and Action Level displayed on the machine monitor (2), and the audible alert by a buzzer and stepwise engine power deration that advances to speed limitation to low idle. Engine power deration starts with Action Level "L03 (Low level Inducement)" and advances to further deration when "L04 (Severe Inducement)" is displayed. If "L03" is displayed, move the machine to a safe place and contact your Komatsu distributor.

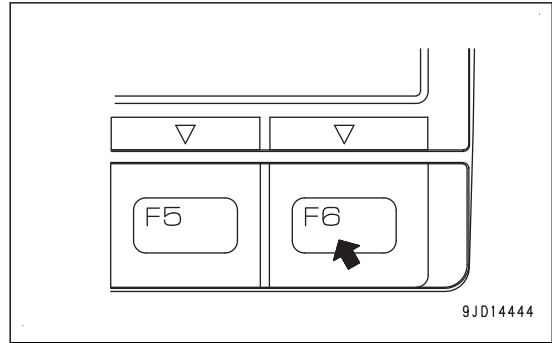


The content of the warning can be checked on the "SCR Information" screen of the user menu.

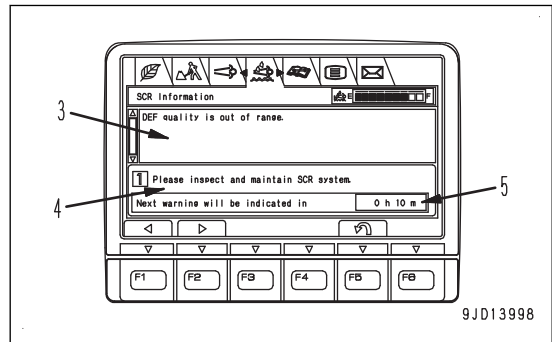
Perform the following procedure.

Press F6 on the standard screen to display the “SCR Information” screen of the user menu.

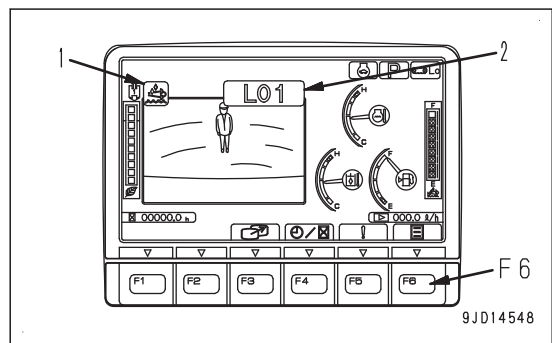
If either the lock lever is set to LOCK position or the travel lever are in NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



“SCR Information” screen displays remaining time to the next Inducement status in the column (5), and information on the Urea SCR System condition (3), and the current status of Inducement (4).



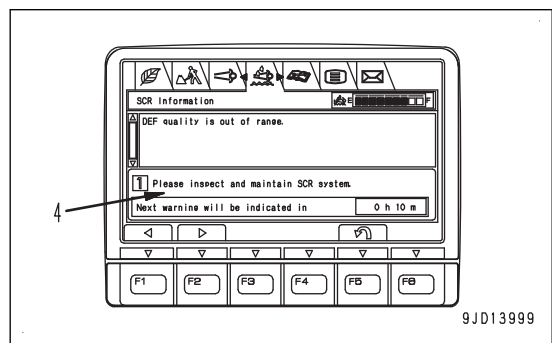
- Warning:
  - No audible alert.
  - The DEF system caution lamp (1) lights up in yellow.
  - Note: Action Level “L01” once shows up in yellow on the machine monitor (2) for two seconds and goes out.
  - Press F6 to display the “SCR Information” screen.



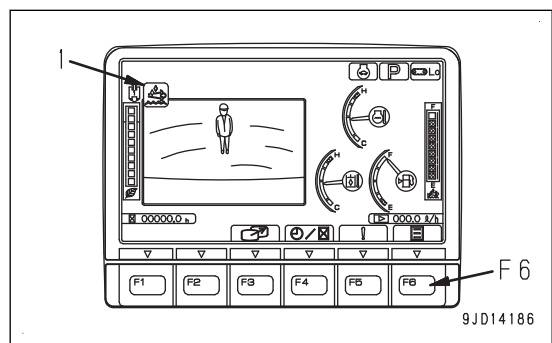
“SCR Information” screen message (4): “1 Please inspect and maintain SCR system.”

Move the machine to the safe place and contact your Komatsu Distributor.

If operation continues for 5 hours after “Warning” started without taking any actions instructed by the Action Level table, Inducement advances to “Continuous Warning”.



- Continuous 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 5 hour after “Warning” started without taking any actions instructed by the Action Level table, Inducement advances to “Continuous Warning”.
  - Press F6 to display the “SCR Information” screen.



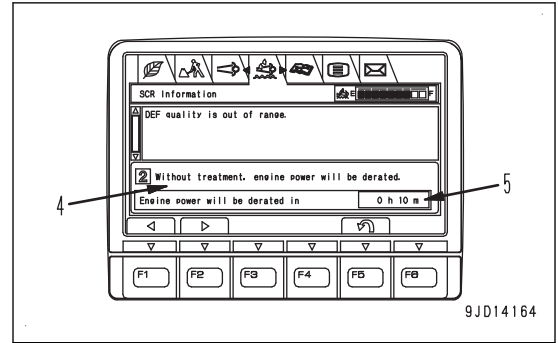
“SCR Information” screen message (4): “2 Without treatment, engine power will be derated.”

Move the machine to the safe place and contact your Komatsu Distributor.

The duration of “Continuous Warning” is 5 hours. The remaining time (Hours and Minutes) to “Low level Inducement” is displayed in the column (5) of the “SCR Information” screen.

In “Low level Inducement”, engine performance will be derated.

- Low level 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.”

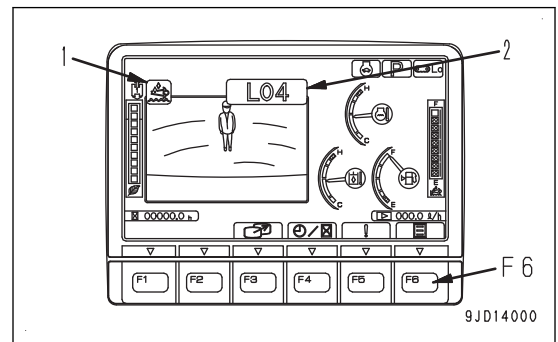
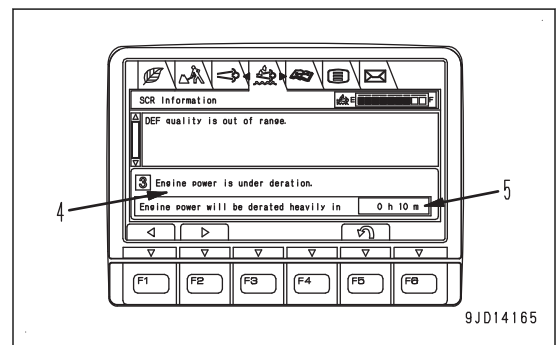
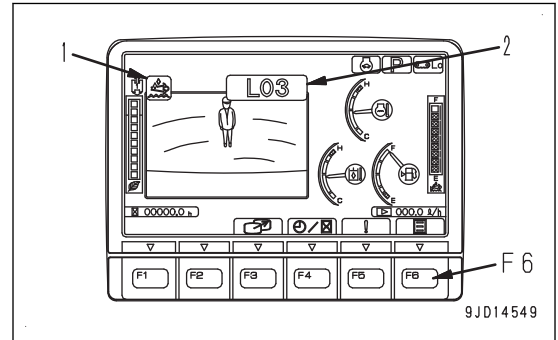
Due to the engine power deration, capability of the machine will be limited.

Move the machine to the safe place and contact your Komatsu Distributor.

The duration of “Low level Inducement” is 10 hours. The remaining time (Hours and Minutes) to “Severe Inducement” is displayed in the column (5) of the “SCR Information” screen.

In “Severe Inducement”, engine power will be derated further.

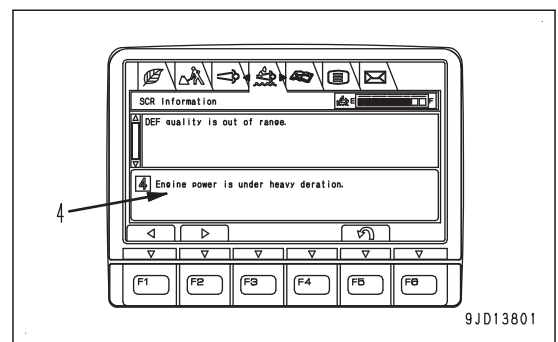
- Severe Inducement:  
The audible alert sounds in continuous beep.  
The DEF system caution lamp (1) lights up in red.  
Action level “L04” lights up in red (2).  
Press F6 to display the “SCR Information” screen.



“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.

“Severe Inducement” is the final status of Inducement. Unless all the “SCR system” abnormalities are corrected, engine performance will be kept derated.

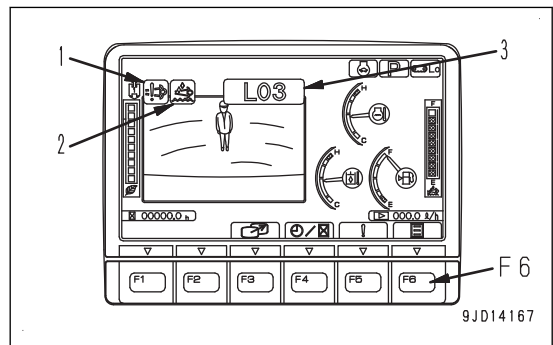


Engine power can be restored temporarily from power derate. If Inducement advances to “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe place and contact your Komatsu distributor. This engine power restoration works only when the Inducement status is “Severe Inducement” and relieves back temporarily to the power deration of “Low level 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.

### Inducement strategy when abnormality is found in the KDPF System by the Urea SCR system

If any abnormality is detected in the KDPF System through the Urea SCR system, the Inducement strategy is activated.

The inducement strategy progresses in 4 levels, “Warning”, “Continuous Warning”, “Low level Inducement”, and “Severe Inducement”. The Inducement strategy includes visual alert by the KDPF System caution lamp (1), DEF system caution lamp (2), and Action Level displayed on the machine monitor (3), audible alert by a buzzer and stepwise engine power deration that advances to speed limitation to low idle. Engine power deration starts with Action Level “L03 (Warning, Continuous Warning and Low level Inducement)” and advances to further deration when “L04 (Severe Inducement)” is displayed. Once the system advances to “Severe Inducement”, the engine power will be further derated. If “L03” is displayed, move the machine to a safe place and contact your Komatsu distributor.

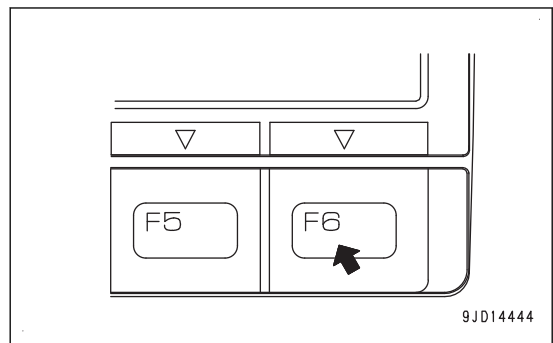


The content of the warning can be checked on the “SCR Information” screen of the user menu.

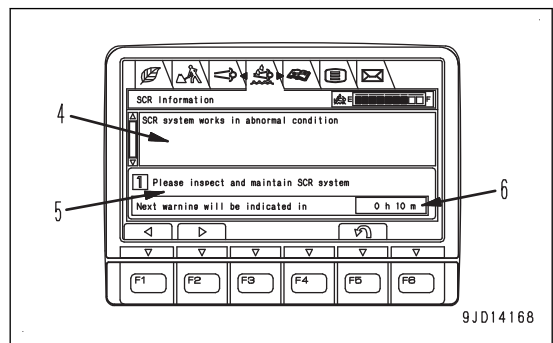
Perform the following procedure.

Press F6 on the standard screen to display the “SCR Information” screen of the user menu.

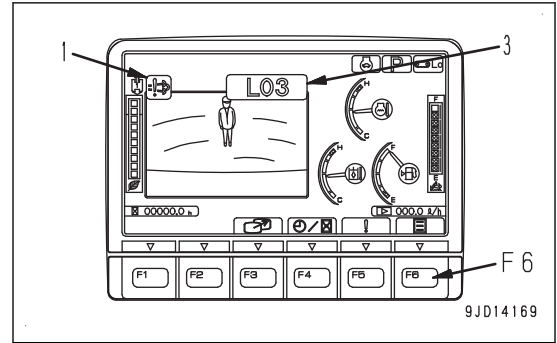
If either the lock lever is set to LOCK position or the travel lever and control levers are in NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



“SCR Information” screen displays remaining time to the next Inducement status in the column (6), and information on the Urea SCR System condition (4), and the current status of Inducement (5).

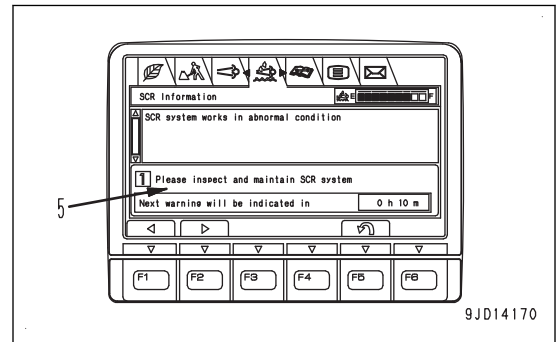


- Warning:  
 The audible alert sounds in short and sharp beeps.  
 The KDPF system caution lamp (1) lights up in red.  
 The action level "L03" lights up in red at action level display (3).  
 Press F6 to display the "SCR Information" screen.

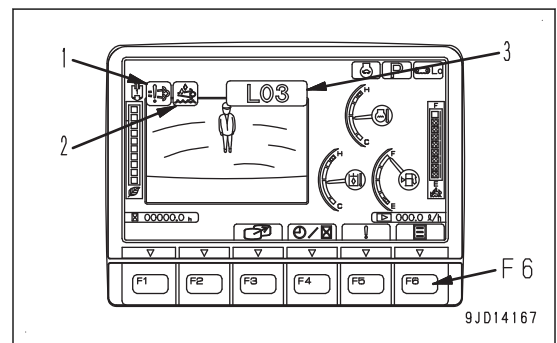


"SCR Information" screen message (5): "1 Please inspect and maintain SCR system."

Engine power is derated.  
 Move the machine to the safe place and contact your Komatsu Distributor.  
 If operation continues for 5 hour after "Warning" started without taking any actions instructed by the Action Level table, Inducement advances to "Continuous Warning".

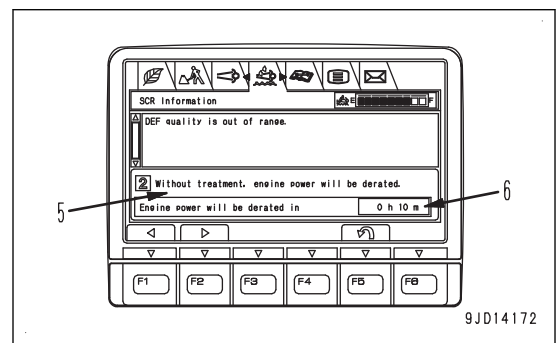


- Continuous Warning:  
 The audible alert sounds in repetition of "three beeps and a pause".  
 The KDPF system caution lamp (1) lights up in red.  
 The DEF system caution lamp (2) lights up in yellow.  
 The action level "L03" lights up in red at action level display (3).  
 Press F6 to display the "SCR Information" screen.

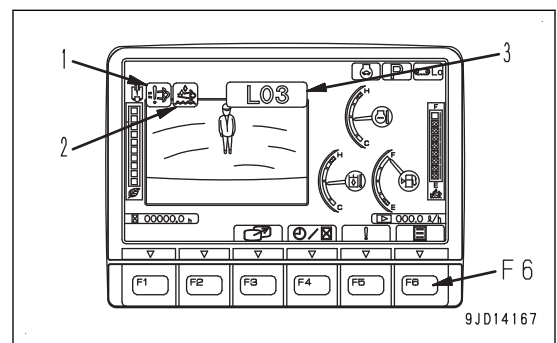


"SCR Information" screen message (5): "2 Without treatment, engine power will be derated."

Move the machine to the safe place and contact your Komatsu Distributor.  
 The duration time of "Continuous Warning" is 5 hour. The remaining time (Minutes) till the next Inducement status of "Low level Inducement" is displayed in the column (6) of "SCR Information" screen.  
 In "Low level Inducement", engine power will be derated.



- Low level Inducement:  
 The audible alert sounds in short and sharp beeps.  
 The KDPF system caution lamp (1) lights up in red.  
 DEF system caution lamp (2) lights up in red.  
 The action level "L03" lights up in red at action level display (3).  
 Press F6 to display the "SCR Information" screen.



“SCR Information” screen message (5): “3 Engine power is under deration.”

Due to the reduction of engine power, the machine normal operation will be limited.

The duration time of “Low level Inducement” is 10 hour. The remaining time (Minutes) to “Severe Inducement” is displayed in the column (6) of “SCR Information” screen.

In “Severe Inducement”, engine power will be derated further.

Move the machine to the safe place and contact your Komatsu Distributor.

• Severe Inducement:

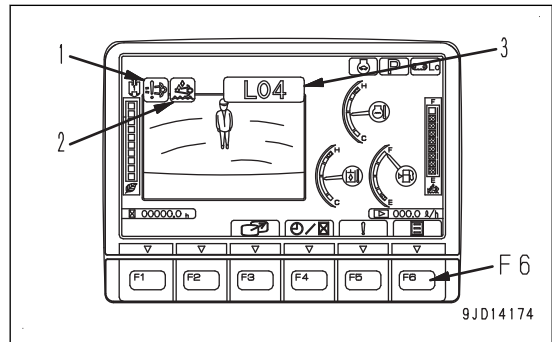
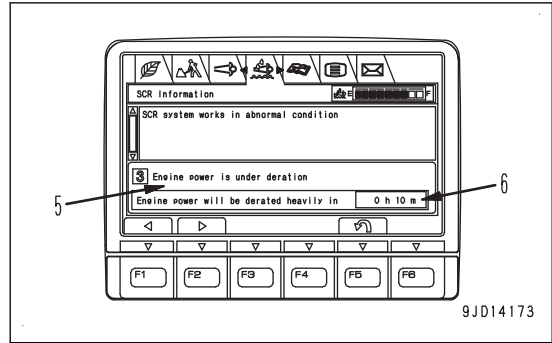
The audible alert sounds in continuous beep.

The KDPF system caution lamp (1) lights up in red.

DEF system caution lamp (2) lights up in red.

Action level “L04” lights up in red at action level display (3).

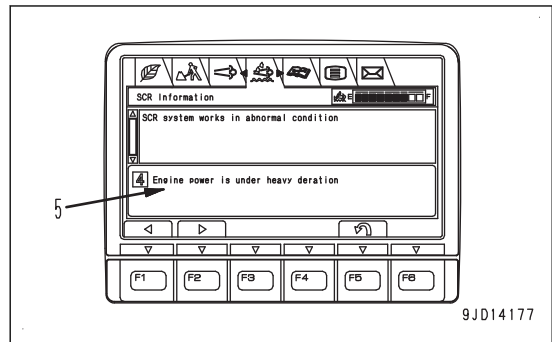
Press F6 to display the “SCR Information” screen.



“SCR Information” screen message (5): “4 Engine power is under heavy deration.”

Due to the further deration of engine power, capability the machine will be limited further.

If the restoration of the KDPF system abnormality is not performed, engine performance will kept be derated.

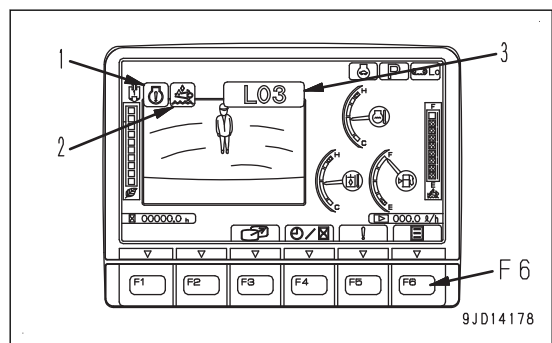


Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” and Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” and relieves back temporarily to the power deration of “Low level Inducement”. The operator can restore engine power through the machine monitor. For the engine power restoration procedure, refer to the section of “Temporary Restoration from Inducement” in this manual. If Inducement advances to “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe place and contact your Komatsu distributor.

**Inducement strategy when abnormality is found in the EGR Valve System by the Urea SCR system**

If any abnormality is detected in the EGR Valve System through the Urea SCR system, the Inducement strategy is activated.

The inducement strategy progresses in 4 levels, “Warning”, “Continuous Warning”, “Low level Inducement”, and “Severe Inducement”. The Inducement strategy includes visual alert by the Engine system caution lamp (1), DEF system caution lamp (2), and Action Level displayed on the machine monitor (3), audible alert by a buzzer and stepwise engine power deration that advances to speed limitation to low idle. Engine power deration starts with Action Level “L03 (Warning, Continuous Warning and Low level Inducement)” and advances to further deration when “L04 (Severe Inducement)” is displayed. Once the





system advances to “Severe Inducement”, the engine power will be further derated. If “L03” is displayed, move the machine to a safe place and contact your Komatsu distributor.

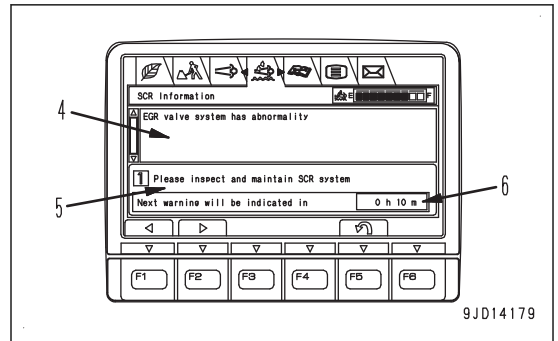
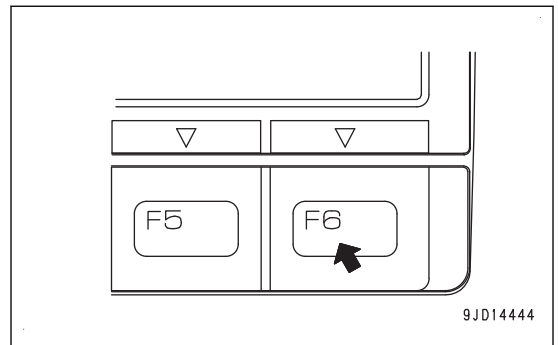
The content of the warning can be checked on the “SCR Information” screen of the user menu.

Perform the following procedure.

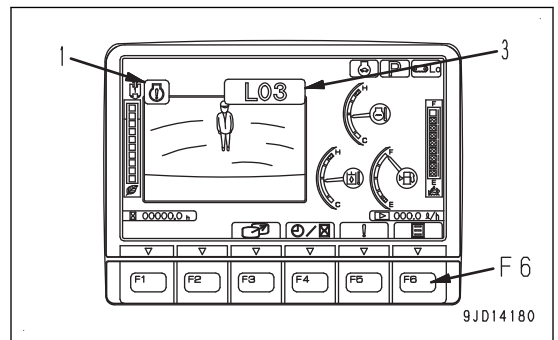
Press F6 on the standard screen to display the “SCR Information” screen of the user menu.

If either the 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 remaining time to the next Inducement status in the column (6), and information on the Urea SCR System condition (4), and the current status of Inducement (5).

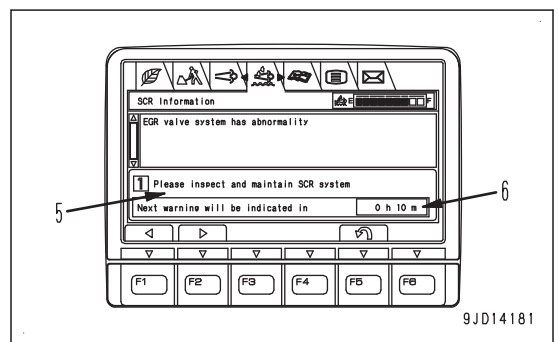


- **Warning:**  
 The audible alert sounds in short and sharp beeps.  
 The Engine system caution lamp (1) lights up in red.  
 The action level “L03” lights up in red at action level display (3).  
 Press F6 to display the “SCR Information” screen.

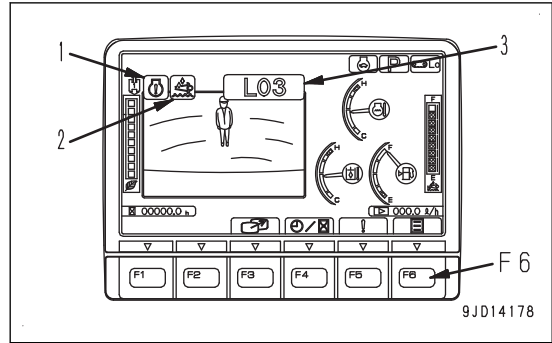


“SCR Information” screen message (5): “1 Please inspect and maintain SCR system.”

Engine power is derated.  
 Move the machine to the safe place and contact your Komatsu Distributor.  
 If operation continues for 5 hour after “Warning” started without taking any actions instructed by the Action Level table, Inducement advances to “Continuous Warning”.

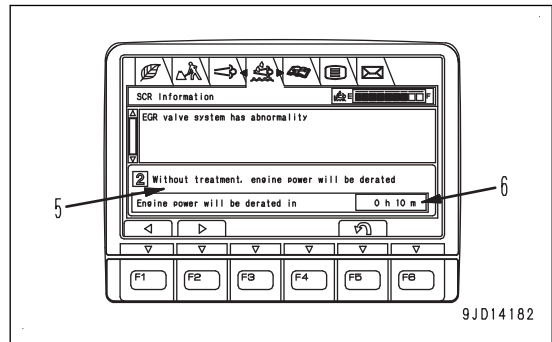


- Continuous Warning:**  
 The audible alert sounds in repetition of “three beeps and a pause”.  
 The Engine system caution lamp (1) lights up in red.  
 The DEF system caution lamp (2) lights up in yellow.  
 The action level “L03” lights up in red at action level display (3).  
 Press F6 to display the “SCR Information” screen.

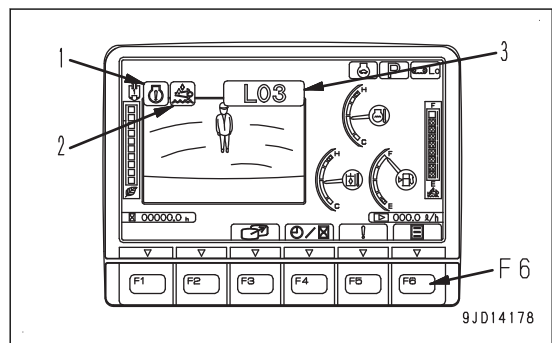


“SCR Information” screen message (5): “2 Without treatment, engine power will be derated.”

Move the machine to the safe place and contact your Komatsu Distributor.  
 The duration time of “Continuous Warning” is 5 hour. The remaining time (Minutes) till the next Inducement status of “Low level Inducement” is displayed in the column (6) of “SCR Information” screen.  
 In “Low level Inducement”, engine power will be derated.

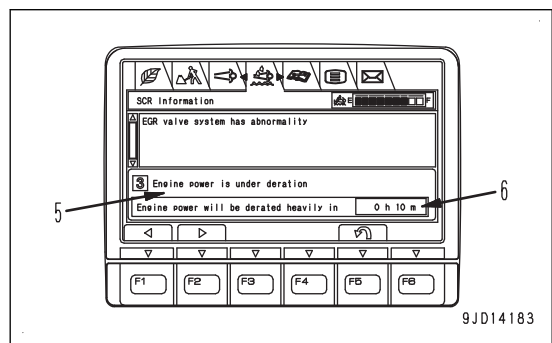


- Low level Inducement:**  
 The audible alert sounds in short and sharp beeps.  
 The Engine system caution lamp (1) lights up in red.  
 DEF system caution lamp (2) lights up in red.  
 The action level “L03” lights up in red at action level display (3).  
 Press F6 to display the “SCR Information” screen.

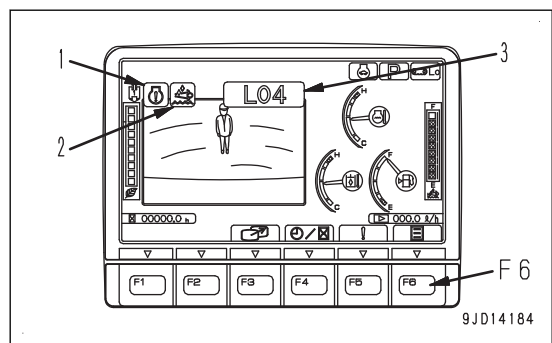


“SCR Information” screen message (5): “3 Engine power is under deration.”

Due to the reduction of engine power, the machine normal operation will be limited.  
 The duration time of “Low level Inducement” is 10 hour. The remaining time (Minutes) to “Severe Inducement” is displayed in the column (6) of “SCR Information” screen.  
 In “Severe Inducement”, engine power will be derated further.  
 Move the machine to the safe place and contact your Komatsu Distributor.



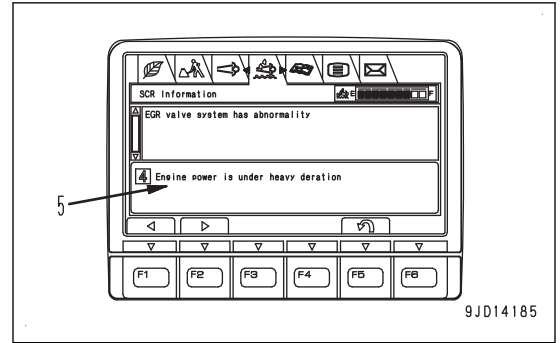
- Severe Inducement:**  
 The audible alert sounds in continuous beep.  
 The Engine system caution lamp (1) lights up in red.  
 DEF system caution lamp (2) lights up in red.  
 Action level “L04” lights up in red at action level display (3).  
 Press F6 to display the “SCR Information” screen.





“SCR Information” screen message (5): “4 Engine power is under heavy deration.”

Due to the further deration of engine power, capability the machine will be limited further. If the restoration of the KDPF system abnormality is not performed, engine performance will kept be derated.



Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” and 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 “Low level Inducement”. The operator can restore engine power through the machine monitor. For the engine power restoration procedure, refer to the section of “Temporary Restoration from Inducement” in this manual. If Inducement advances to “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe place and contact your Komatsu distributor.

### Temporary Restoration from Inducement

Temporary Restoration from Inducement is the one of the Inducement strategies allowed to be included in Urea SCR systems.

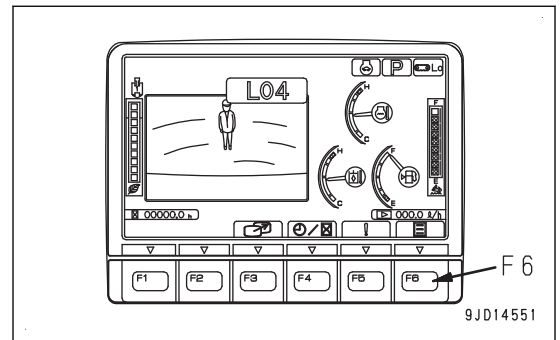
In case the Urea SCR system advances to “Severe Inducement”, engine power is derated heavily. This may cause difficulties of moving the machine to a safe place for adding DEF or troubleshooting and correcting abnormalities of the Urea SCR system. For temporary remedies from these difficulties the operator can restore engine power for a short time to the deration of “Low level 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 only 3 operations are allowed unless all the abnormalities of the Urea SCR system are corrected.

If the system advances to “Severe Inducement”, utilize “Temporary Restoration from Inducement” immediately.

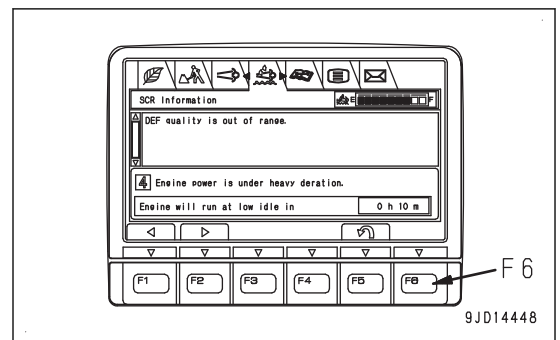
Procedure to activate “Temporary Restoration from Inducement”.

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”.



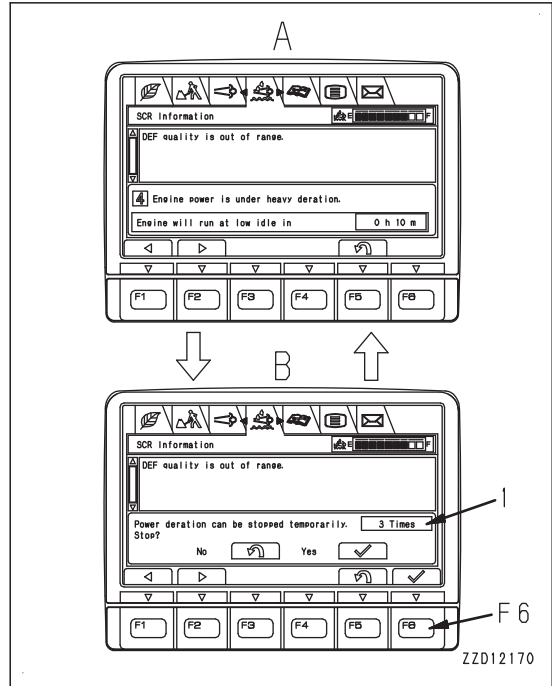
2. Press F6 to display the menu windows popping up in the bottom half of the “SCR Information”.

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.



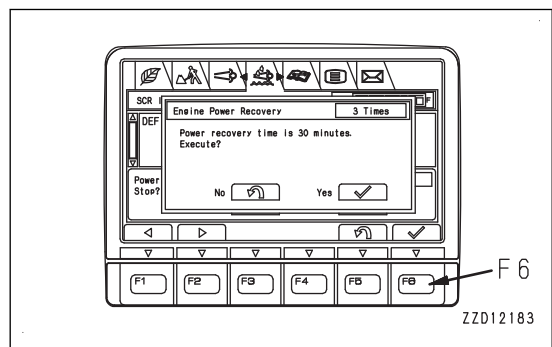
- Press F6 while the pop-up menu screen B is displayed.

The “Engine power Recovery” window pops up.  
 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.

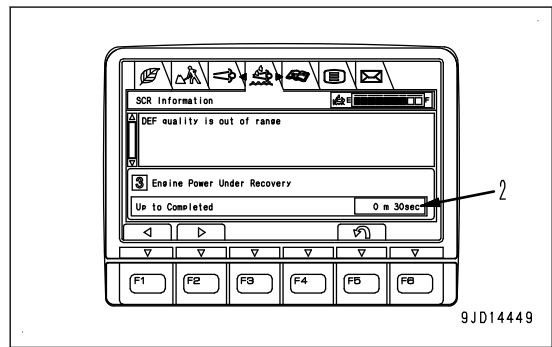


- Press F6 while the “Engine power Recovery” window is displayed.

Temporary Restoration from Inducement is activated and engine power deration is relieved to the deration of “Low level Inducement” for the maximum of 30 minutes.



The remaining time (minutes/seconds) of “Temporary Restoration from Inducement” is displayed in the column (2) on the “SCR Information” screen.

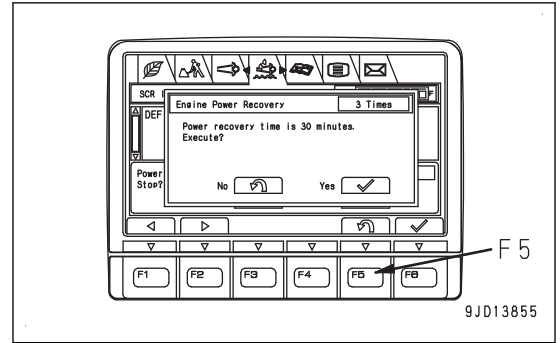


If it is decided NOT to activate “Temporary Restoration from Inducement” after having progressed to the “Engine Power Recovery” window, follow the steps explained in this section.

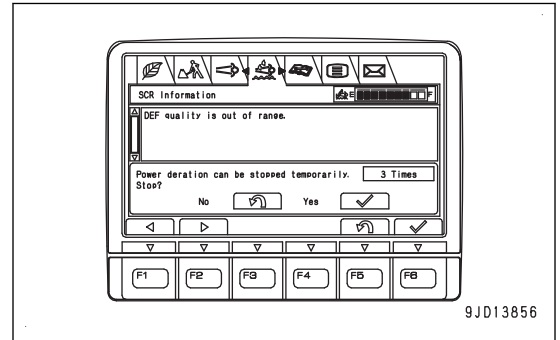
To deactivate “Temporary Restoration from Inducement” function.

1. Press F5 while the “Engine Power Recovery” window is displayed.

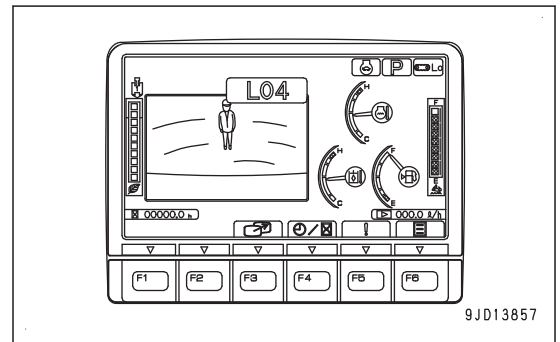
This procedure is split from procedure 4 in “Temporary Restoration from Inducement”.



“SCR Information” screen is displayed.



2. Move any operating lever to display “Standard Screen”.  
“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 authorities. 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.

Inducement in the recurrence resumes counting time at the time when the previous abnormalities were corrected if the previous Inducement is in “Warning” or “Continuous Warning” or “Low level Inducement”. The alerts resume the previous Inducement.

If this occurs, utilize “Temporary Restoration from Inducement” and move to the machine to a safe place, and contact your Komatsu distributor.

The maximum duration of power restoration is 30 minutes and 3 operations are allowed.

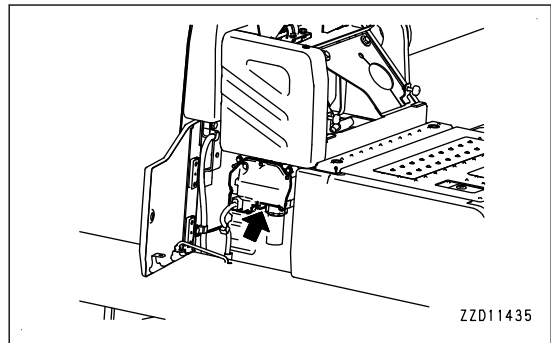
To activate “Temporary Restoration from Inducement”, refer to the “Temporary Restoration from Inducement” section in this manual.

## 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.
- 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

KOMTRAX equipment may not be mounted on machines for some countries or regions.

### OUTLINE OF KOMTRAX

KOMTRAX is a system that remote-controls machines equipped with the KOMTRAX device by using satellite communication or portable radio communication.

Each customer can check the machine information of various types (machine position information, etc.) in the web screen of a personal computer

The machine information you can check with KOMTRAX includes the following; "Machine position", "service meter", "working hours", "fuel consumption".

Your Komatsu distributor uses the above machine information for supply of service to the customers, improvement of our products and service, etc.

If you want to use KOMTRAX, you are required to register to your Komatsu distributor.

## **WARNING**

- **Never disassemble, repair, modify, or move the communications terminal, antenna, or cables. This may cause failure or fire on the KOMTRAX equipment or the machine itself. (Your Komatsu distributor will perform removal and installation of KOMTRAX.)**
- **For anyone wearing a pacemaker, make sure that the communications antenna is at least 22 cm from the pacemaker. The radio waves may have an adverse effect on the operation of the pacemaker.**
- **Near the blasting jobsite, there may be a danger of unexpected explosion due to use of interactive wireless communication device of KOMTRAX and resulting serious personal injury or death. Make sure to operate the machine away from the blasting jobsite.  
If you have to operate the machine within 12 m from the blasting jobsite or the remote-controlled blasting device, the power supply cable of KOMTRAX must be disconnected in advance. If you want to do this, ask your Komatsu distributor for disconnecting power supply cable of KOMTRAX.**

**Also, if there are any requirements or regulations of the territory or country where the machine equipped with this device is used, such requirements or regulations have a priority than this warning.**

**When checking for compliance with regulations, refer to the following KOMTRAX equipment satellite communication specifications.**

**Rated transmit power: 5 to 10 W**

**Transmit frequency: 148 to 150 MHz**

## **PRECAUTIONS FOR USING 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 (3-258)".
- When using the battery disconnect switch, turn the starting switch to OFF position and turn the battery disconnect switch key to OFF position. Then, remove the key.  
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 (3-109)".
- Contact your Komatsu distributor before installing a top guard or other attachment that covers the cab roof.

### **REMARK**

The KOMTRAX device uses wireless communications, so it cannot be used inside tunnels, underground, inside buildings, or in mountain areas where radio waves cannot be received. Even when the machine is outside, it cannot be used in areas where the radio signal is weak or in areas outside the wireless communication service area.

## **OBSERVANCE OF THE APPLICABLE LAWS AND REGULATIONS, EXEMPTION**

The KOMTRAX equipment is a wireless device using radio waves, so it is necessary to obtain authorization and conform to the laws of the country or territory where the machine equipped with KOMTRAX is being used. Observe the applicable laws and regulations of the country or region in which the machine is used.

Always contact your Komatsu distributor before exporting this machine equipped with KOMTRAX or using it in a foreign country.

The KOMTRAX may already have been registered and used if the machine is purchased as second-hand. For the registration and usage records of KOMTRAX, consult your Komatsu distributor.

If the machine has been lent out by the customer, the borrower or another third party may have been using the KOMTRAX. Confirm with the lessor about using condition of KOMTRAX.

Komatsu may suspend KOMTRAX communication in the following cases.

- When Komatsu judges that KOMTRAX is used by an unregistered customer.
- When Komatsu judges that KOMTRAX is used in a country or region where its use is not authorized.

- In other cases that Komatsu or Komatsu distributor judges that it is necessary to suspend KOMTRAX communication.

If you do not observe the above rules, neither Komatsu nor your Komatsu distributor shall be held liable for any resulting impacts or damages.

# 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 (4-50)".
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 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.

12. 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.

13. Check and clean the camera

Check the camera for any abnormality. If any problem is found, ask your Komatsu distributor for repair.

14. 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.

15. Check around the aftertreatment devices for exhaust gas leakage.

Check the pipe connecting the turbocharger to the aftertreatment devices and also KDPF connections for leakage of exhaust gas (and deposition of soot). If any problem is found, ask your Komatsu distributor for repair.

16. Check around SCR for exhaust gas leakage.

Check the pipe between the KDPF and SCR and also the SCR connections for leakage of exhaust gas (and urea deposit). If any problem is found, ask your Komatsu distributor for repair.

**METHOD FOR CHECKING BEFORE STARTING**

Always check the items in this section before starting the engine each day.

**REFUELLING PUMP**** WARNING**

**When adding fuel, never spill the fuel or let it overflow. It will cause a fire.**

**If any fuel has spilled, wipe it up completely. If the fuel has spilled over soil or sand, remove that soil or sand.**

**Fuel is highly flammable and dangerous. Never bring flames near fuel.**

** CAUTION**

**Ensure that the machine is parked on level ground during refuelling operation.**

**Do not leave machine unattended during refuelling and monitor.**

**Following any over filling or spillage of fuel, inspect machine to ensure no fuel remains near electrical or high temperature components.**

**Do not run refuel pump dry. Monitor fuel level in barrel during refuelling to prevent pump running dry.**

**The fuel pump is protected by an in-line blade fuse. If the pump fails to function - check the fuse.**

**Ensure the strainer on the hose end is clean.**

**When not in use, fully close the hose strainer valve cap to prevent leakage or spillage.**

**If there is any malfunction of the refuel automatic shut-off system, consult your Komatsu distributor and do not use the system until the problem is rectified.**



## PROCEDURE FOR REFUELLING PUMP

1. When the machine is operated on sites with no fuel container and pump, the machine may be refuelled from fuel barrels.

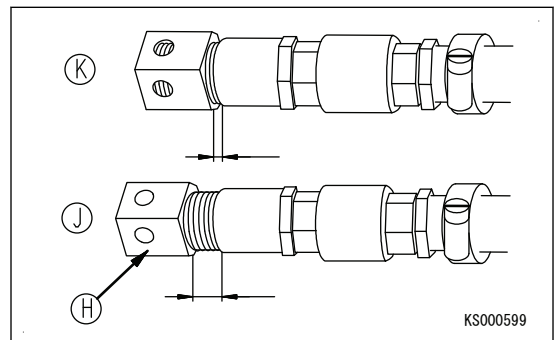
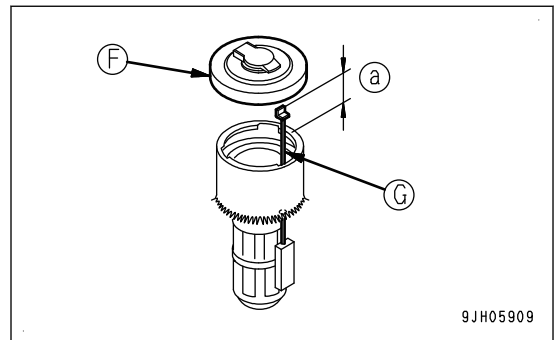
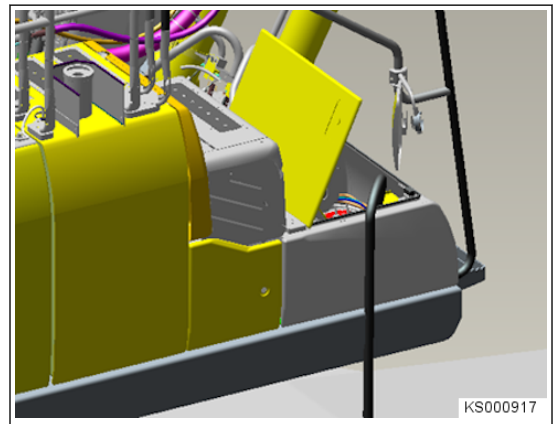
The refuelling pump is located in the right hand tool case of the machine.

2. Remove the refuel hose which is stored in tool case (3) from the machine.

Unscrew the strainer valve cap (H) to open position (J).

Place the fuel hose (2) into the fuel barrel placed next to the machine.

Remove the fuel cap (F).

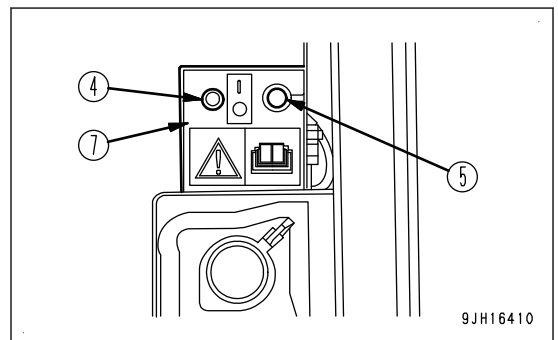


3. Refuel Pump with Auto Shut-off Refuel System

Refuel switch box (1) is located in the tool case at the front right of the machine

Switch ON the master switch of the refuel system (4) on the refuel switch box.

To start refuelling press switch (5) once.



Refuelling will continue automatically until the tank has reached capacity (float switch (6) 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 (4).

If more fuel is needed in the fuel tank after the float switch has stopped the pump, press and hold switch (5).

When switch (5) is pressed and held, the refuel pump will fill tank.

Releasing switch (5) will stop the refuel pump in this override condition.

When using this override, the level of the tank must be monitored to prevent overflowing and fuel spillage.

If fuel is allowed to overflow, stop refuelling immediately by turning off the master switch (4).

After finishing refuelling make sure the master switch (4) is returned to the OFF position.

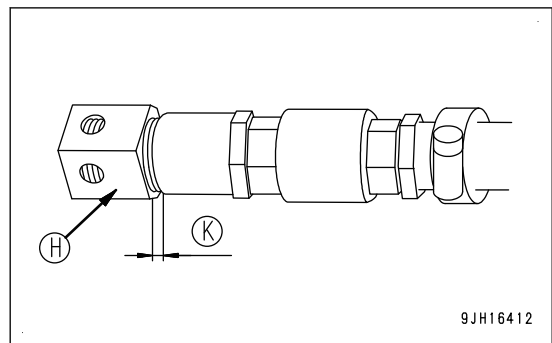
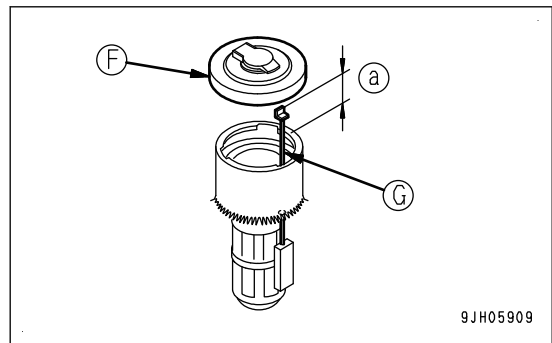
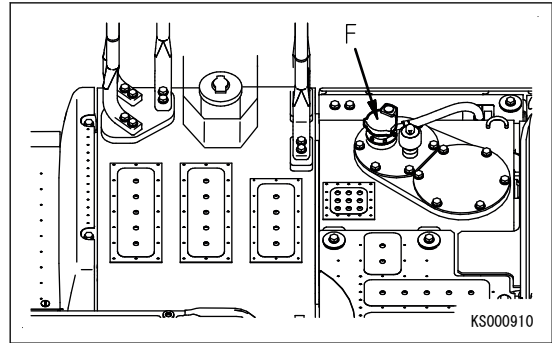
A float gauge (G) will rise out of the filler neck of the tank when it is nearing full capacity. Position of tip (a) of the float gauge when the tank is full : 50 mm

4. After refuelling is complete:

(a) Push float gauge (G) straight down with fuel filler cap (F), be careful not to get the float gauge (G) caught in the tab of the fuel filler cap (F) and tighten fuel filler cap (F) securely.

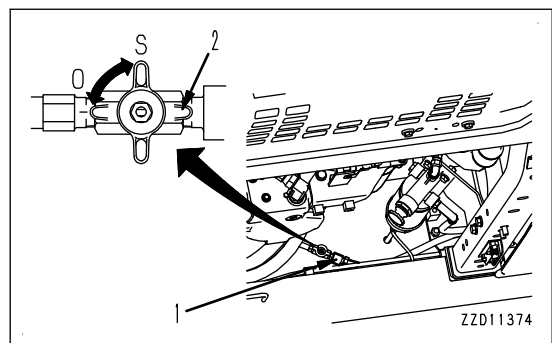
(b) Tighten strainer valve cap (H) to the closed position (K) to prevent leakage of fuel left in the hose.

(c) Replace the fuel hose in the tool case (3).



**METHOD FOR DRAINING WATER AND SEDIMENT FROM FUEL TANK**

1. Open the right side door of the machine.
2. Prepare a container under drain hose (1) to receive fuel.
3. Turn drain valve (2) to OPEN position (O) to drain all the sediment and water accumulated at the bottom together with fuel.
4. When only the clean fuel flows out, turn drain valve (2) to CLOSE position (S).
5. Close the door.



## METHOD FOR CHECKING WATER SEPARATOR, DRAINING WATER AND SEDIMENT

1. Open the pump room door on the right side of the machine.
2. Check for water and sediment.

It is possible to judge the water level and amount of sediment by looking through transparent cup (2).

### NOTICE

**If the water inside transparent cup (2) freezes, check that the frozen water has melted completely, then follow the procedure to drain the water.**

3. Put a container to receive the water under drain hose (3).
4. Loosen drain valve (4) and drain the water.
5. When fuel starts to drain from drain hose (3), tighten drain valve (4) immediately.

On this machine, a sensor is installed to detect if water is accumulated in transparent cup (2).

When the water separator caution lamp (5) lights up in red on the machine monitor, it indicates that water is accumulated in transparent cup (2).

In this case also, use the procedure above to drain the water.

### REMARK

When only the water separator caution lamp lights up, it lights up in the position shown in the figure. If other caution lamps also light up at the same time, the water separator caution lamp lights up at a different position.

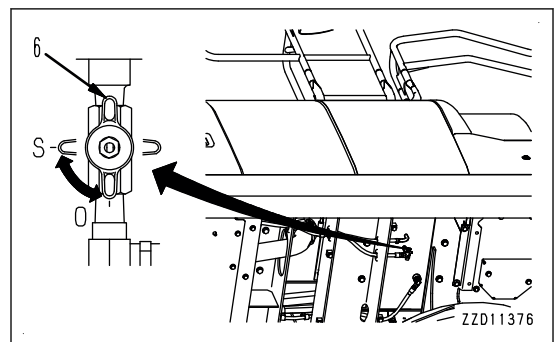
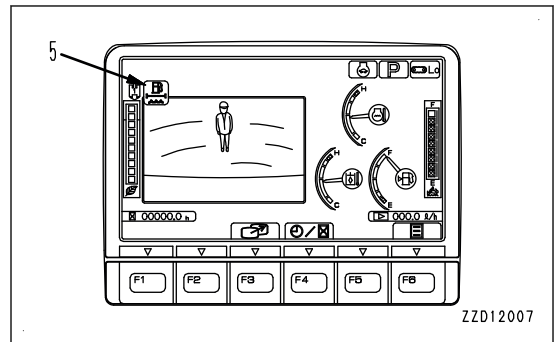
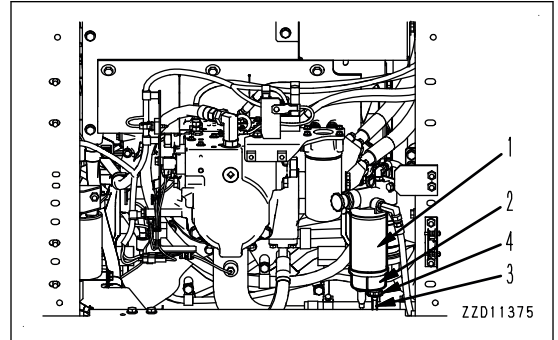
### NOTICE

**If the water accumulated in transparent cup (2) freezes, the water separator caution lamp may not light up. After the engine is started, as the temperature around fuel prefilter (1) increases, the frozen water will melt and the water separator caution lamp may suddenly light up. In cold season, even if the water separator caution lamp is not lit, drain the water frequently.**

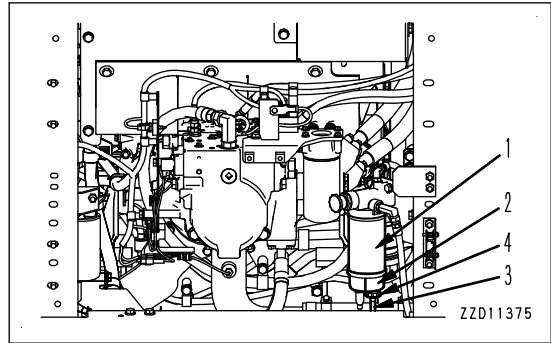
If drain valve (4) is hard to move, adjust it so that it moves smoothly. For details, see "METHOD FOR ADJUSTING DRAIN VALVE (3-143)".

## METHOD FOR ADJUSTING DRAIN VALVE

1. Turn valve (6) at the bottom of the fuel tank to CLOSE position (S).
2. Place a container under the fuel prefilter cartridge to receive the fuel.



- 3. Loosen drain valve (4) and drain water and sediments from transparent cup (2), and also drain all the fuel from fuel prefilter cartridge (1).
- 4. Check that nothing more comes out from drain hose (3), then remove drain valve (4).

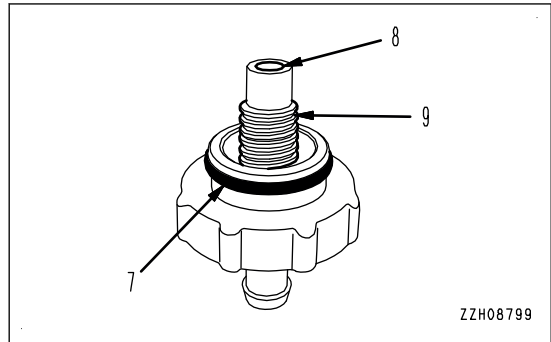


- 5. Apply a suitable amount of grease to O-ring (7).

**REMARK**

When applying grease, be careful not to allow the grease to adhere to water drain port (8) and threaded part (9) of the drain valve.

- 6. Tighten drain valve (4) by hand until it contacts the bottom of transparent cup (2).
- 7. Remove the fuel container.
- 8. Turn valve (6) at the bottom of the fuel tank to OPEN position (O).
- 9. Bleed air from the fuel system.



**REMARK**

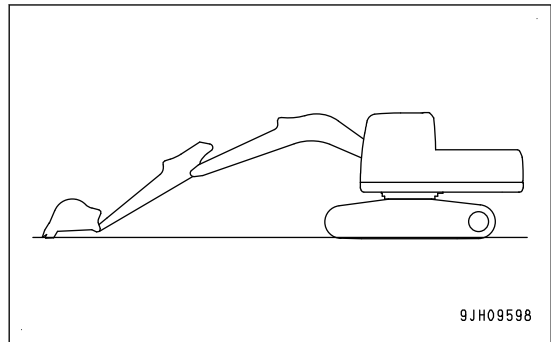
When bleeding air, see "METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE (4-47)" or "METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE (4-59)".

**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. Accordingly, wait until they have cooled down before starting the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.

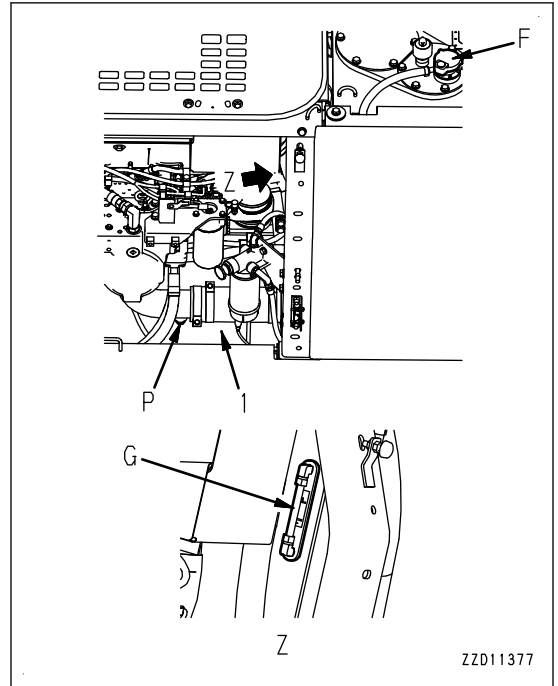
- 1. Set the machine in the posture shown in the figure.  
If the machine is not set as shown in the figure, set it according to the following procedure.
  - 1) Start the engine, and run it at low speed.
  - 2) Retract the arm and bucket cylinder rods to the end.
  - 3) Lower the boom to lower the bucket 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.



- Open the door on the right side of the machine and check sight gauge (G).

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.



- Add oil through oil filler port (F) until the oil level comes between levels H and L of sight gauge (G).

**NOTICE**

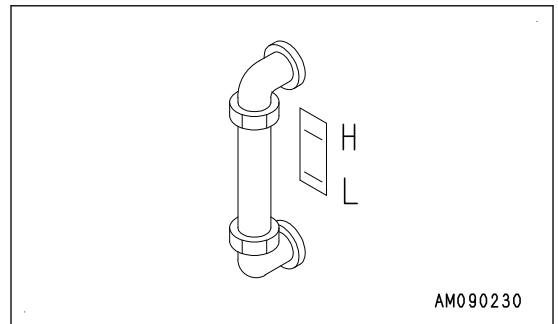
**Do not add oil above H line. It may damage the oil circuit and cause the oil to spurt out.**

**If oil has been refilled exceeding H level, swing the upper structure until drain plug (P) under the suction tube 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 vary with the oil temperature. Accordingly, use the followings as a guide:

- 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)



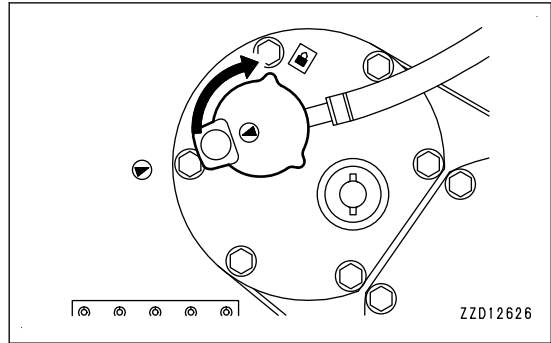
**METHOD FOR INSTALLING HYDRAULIC TANK OIL FILLER CAP**

**⚠ CAUTION**

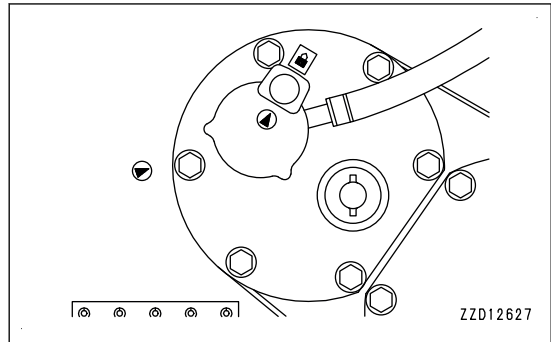
**If the oil filler cap is inserted in reverse, it only rotates by approximately 1/4 turns and cannot be locked.**

Install the oil filler cap according to the following procedure.

1. Match the ▲ marks 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 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 the sub-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 door on the rear left side of the machine.

**NOTICE**

If the sub-tank is empty, leakage of coolant should be suspected. After checking, repair any abnormality immediately.

**REMARK**

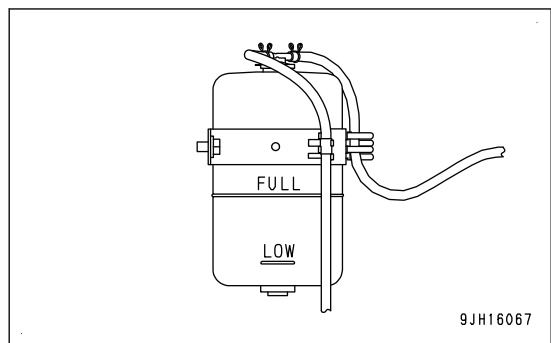
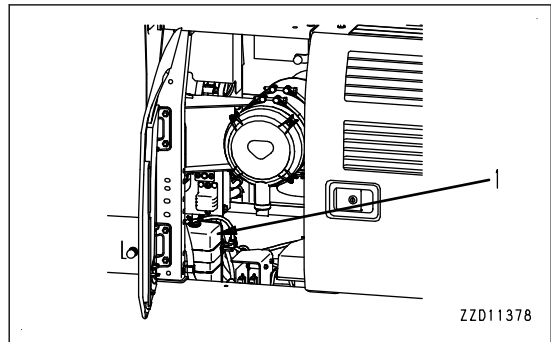
If the inside of sub-tank is so dirty that you cannot check the coolant level, see "METHOD FOR CLEANING INSIDE OF COOLING SYSTEM (4-20)".

2. Check sub-tank (1).

If the coolant level is within the range between FULL and LOW, the coolant amount is at a proper level.

If the coolant level is below LOW, add coolant to FULL level through the filler port of sub-tank (1).

3. After refilling with coolant, tighten the cap securely.
4. Check the coolant level in the radiator. If the coolant level is low, add Non-Amine Engine Coolant (AF-NAC) of the same density as Non-Amine Engine Coolant (AF-NAC) in the radiator, and then add it to the sub-tank.

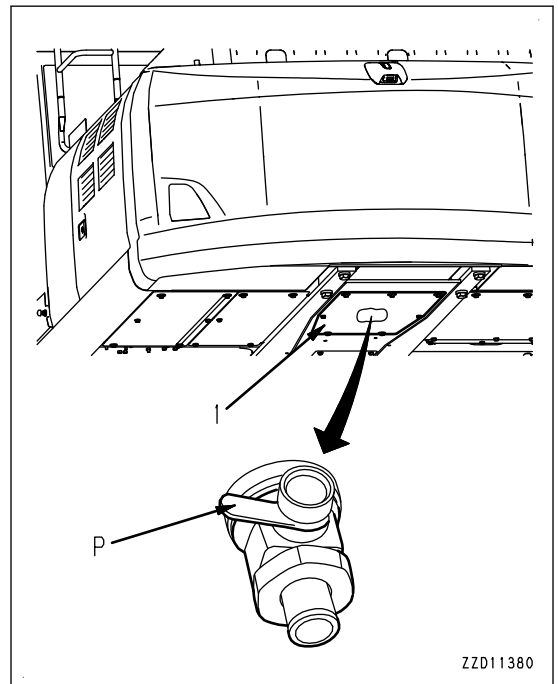
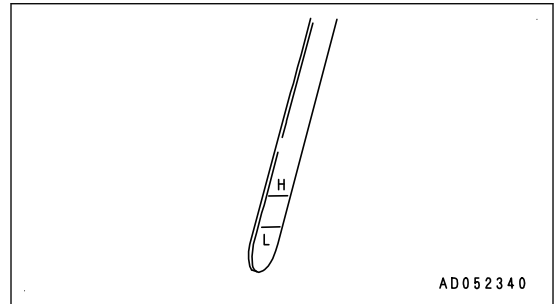
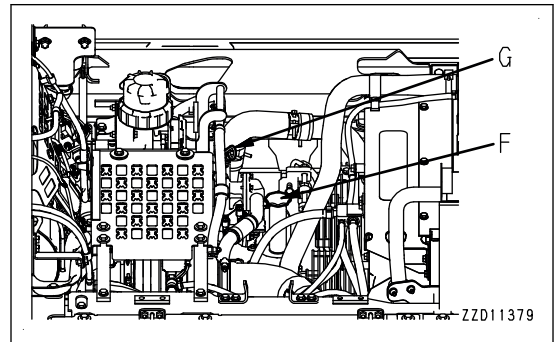


## METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL

### WARNING

Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.

- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking. If the machine is inclining, make it level before checking.
  - When the ambient temperature is low, water or emulsified matter may stick to the dipstick, fuel filler cap, etc. or the drained oil may be milky white because of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem.
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.  
If the oil level is below the L mark, add oil through oil filler port (F).
5. If the oil level is higher than H, decrease it to a proper level according to the following procedure.
    - 1) Remove cover (1).
    - 2) Drain excessive engine oil through drain valve (P) at the bottom of the engine oil pan.  
When draining, put a container to receive the oil under the drain plug.
    - 3) Check the oil level again.
  6. If the oil is at the correct level, tighten the oil filler cap securely and close the engine hood.



## METHOD FOR CHECKING ELECTRIC WIRING

### ⚠ CAUTION

- If fuses are frequently blown or if there are traces of short-circuiting on the electrical wiring, promptly ask your Komatsu distributor to locate the cause of it and to perform the repair.
- Keep the top surface of the battery clean and check the vent hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap with water to clear the vent hole.

### NOTICE

In particular, inspect the wiring of “battery”, “starting motor”, and “alternator” with care.

Perform the following inspection.

- Perform inspection to confirm that the fuses have no defect and their capacity is proper.
- Perform inspection to confirm that there is no disconnection or trace of short-circuiting in the electric wiring and no damage to the coating.
- Perform inspection to confirm that there is no loose terminals, and tighten any loose parts if found.
- Always check if there is any accumulation of combustible material around the battery, and remove such combustible material.

## METHOD FOR CHECKING FUEL LEVEL, ADDING FUEL

### ⚠ WARNING

When adding fuel, never spill the fuel or let it overflow. It 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.

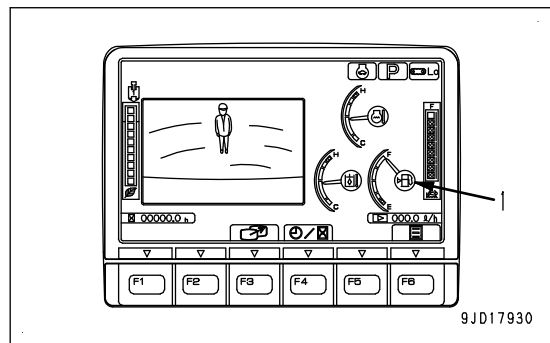
Fuel is highly flammable and dangerous. Do not bring any open flame close.

1. Turn the starting switch to ON position. When the fuel level caution lamp lights up in red, check the fuel level with fuel level gauge (1) on the monitor panel.

When the fuel gauge pointer reads the red range, the fuel quantity is 41 ℓ or less.

Since the fuel level is low, add fuel.

2. After checking, turn the starting switch back to OFF position.

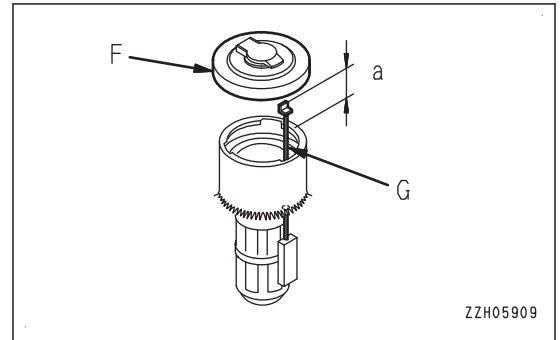
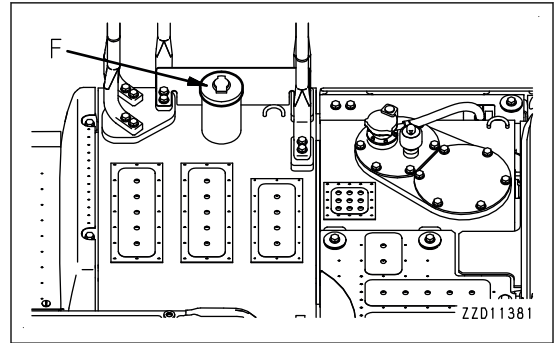




3. Open fuel filler cap (F) on the fuel tank and add fuel through the filler port until float gauge (G) comes up to the highest point.

Fuel tank capacity: 400 ℓ

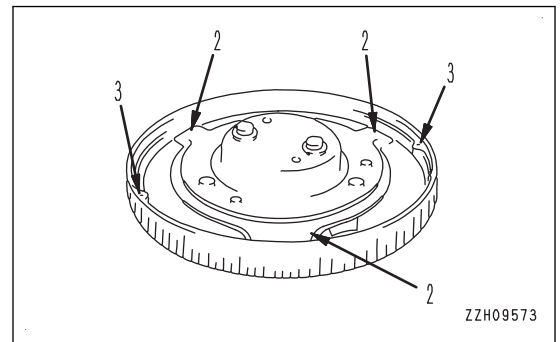
Position of tip (a) of float gauge (G) when fuel tank is full:  
Approximately 50 mm



#### REMARK

If breather hole (3) 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.

4. 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 (2) of fuel filler cap (F), and tighten fuel filler cap (F) securely.



### METHOD FOR CHECKING DEF LEVEL, ADDING DEF

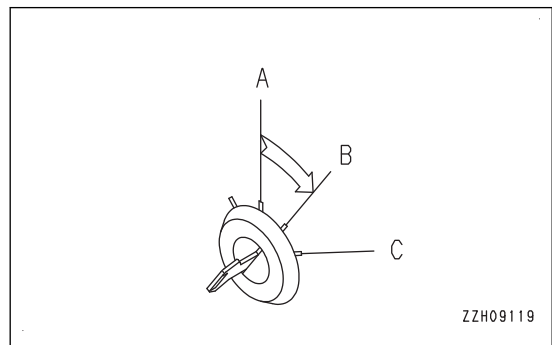
#### ⚠ WARNING

- Do not put fluid other than DEF into DEF tank.
- When opening the cap of DEF tank of the machine, the ammonia vapour 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.

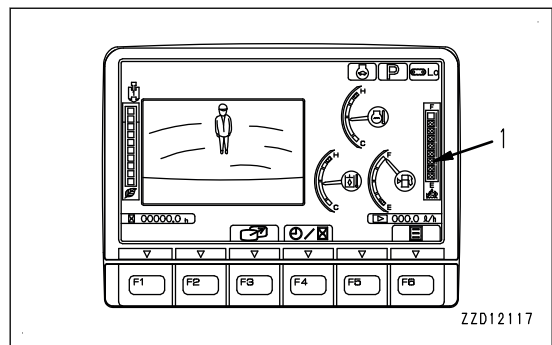
NOTICE

- Do not add DEF more than line F of sight gauge (4). DEF may leak through the breather. When the ambient temperature is low and DEF may freeze, do not add it more than line (9) of sight gauge (4).  
Be careful of the DEF line to be added when performing operations on a slope or travelling 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.

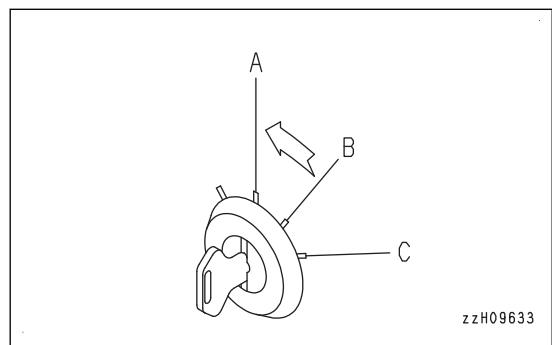
1. Turn the starting switch to ON position (B).



2. Check the DEF level gauge (1) on the machine monitor.



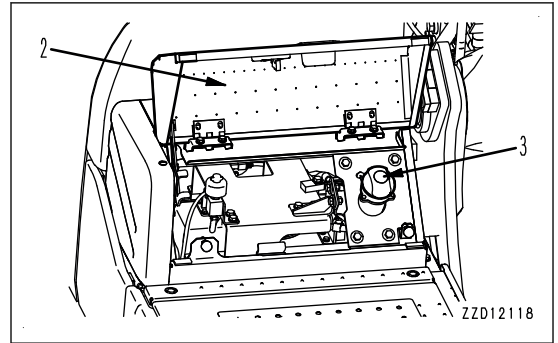
3. After checking, turn the starting switch back to OFF position (A).



4. Open up cover (2) at the right side of the machine, clean blue DEF tank filler cap (3) and surrounding area.

Turn the cap (3) counterclockwise.

The caps of DEF tanks are blue, as required by emission regulations.

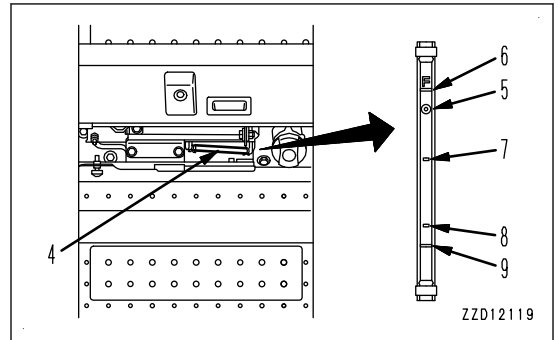


5. By sight gauge (4), add DEF through the filler port until float (5) reaches line F (6).

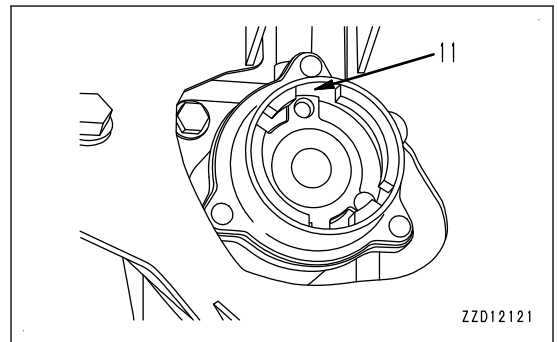
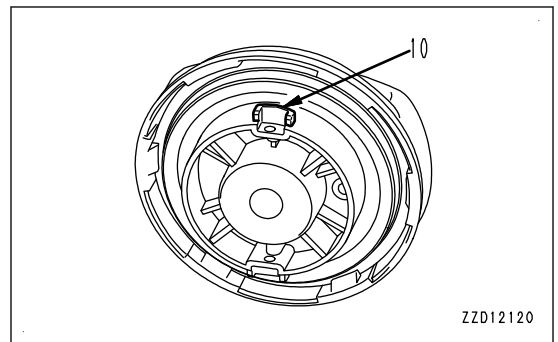
Refill capacity of DEF tank: 23.1 ℓ

Line (7) in the sight gauge indicates approximately 5 ℓ below line F, and line (8) indicates approximately 10 ℓ.

Line (9) is the max adding line when DEF may freeze in cold weather.



6. After adding, align claw (10) of the cap with groove (11) of the filler port and close the cap securely by turning it clockwise by 90 °.



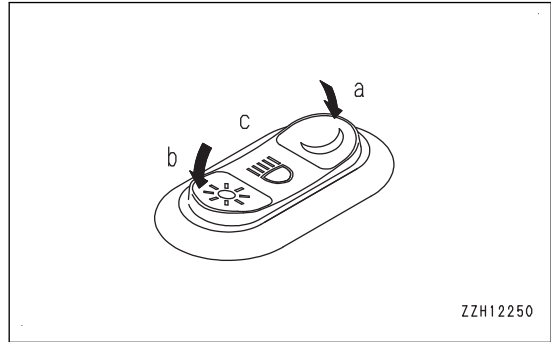
#### REMARK

- 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.

#### 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.

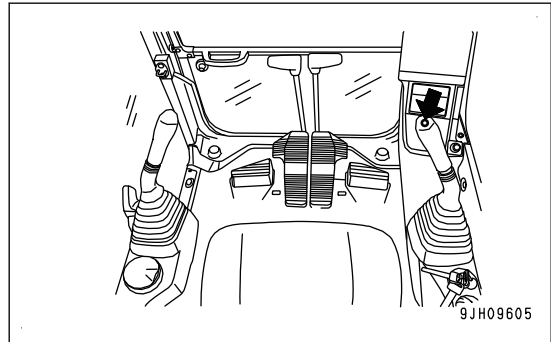
1. Turn the starting switch to ON position.
2. Check that the working lamp lights up properly when the lamp switch is at night mode (a) and at day mode (b).
3. After inspection, turn the lamp switch to OFF position (c), and the working lamp goes out.
4. After checking, turn the starting switch back to 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.

**NOTICE**

If the seat position is adjusted while the parts, tools, or empty cans are left around the operator's seat, the peripheral parts or operator's seat may be damaged.

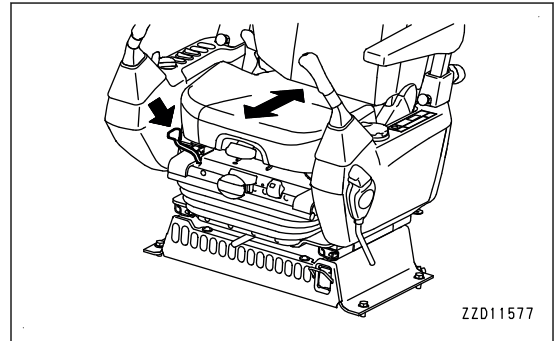
Check that there is no parts etc., around the operator's seat, and adjust the seat position.

- 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 the fore-aft adjustment lever, set the seat to the desired position, then release the lever.

Fore-and-aft adjustment: 160 mm (16 stages)



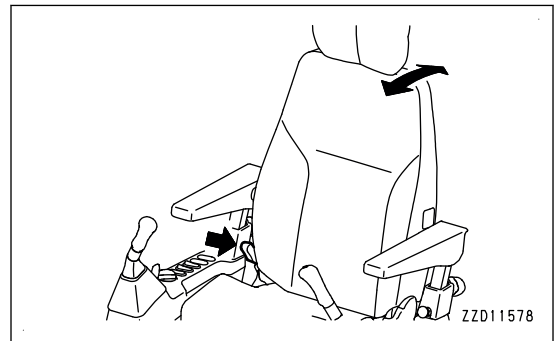
## METHOD FOR RECLINING SEAT

The reclining of the seat becomes large when the seat is moved forward, and it becomes smaller as the seat is moved backward. When moving the seat backward, return the reclined seat back to the original position.

Pull up the reclining adjustment lever and set the seat back to a position which is comfortable for operation, then release the lever.

### REMARK

Sit with your back against the backrest when adjusting. If your back is not touching the backrest, the backrest may suddenly move forward.

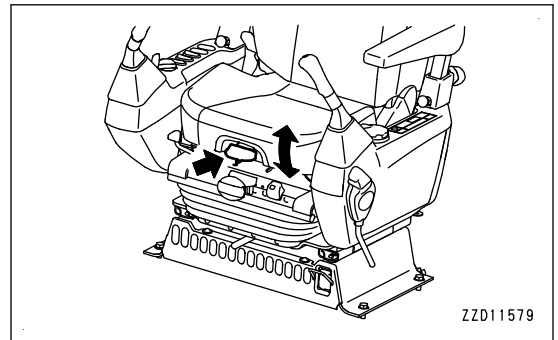


## METHOD FOR TILTING SEAT

Pull up the tilt adjustment lever and adjust the front angle of the seat.

- To raise the front of the seat, apply your weight to the rear of the seat, while pulling up lever.
- To lower the front of the seat, apply your weight to the front of the seat, while pulling up lever.

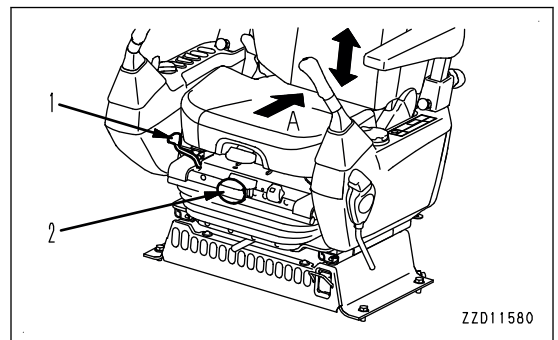
Tilt adjustment: Up 5° , down 5° (3 stages)



## METHOD FOR ADJUSTING SEAT HEIGHT

Pull up the height adjustment lever (1) to move the seat backward (A), then turn handle (2) to adjust the height.

Height adjustment: 75 mm

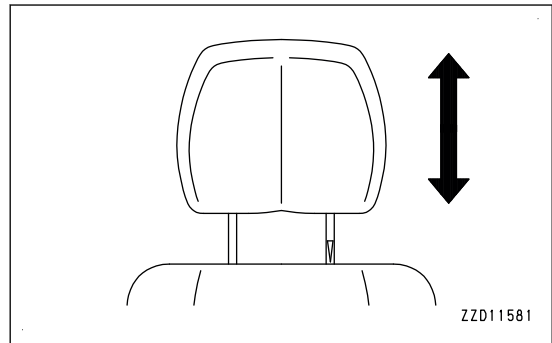


**METHOD FOR ADJUSTING HEADREST IN VERTICAL DIRECTION**

Move the headrest up or down to the desired height.  
Amount of adjustment: 60 mm (2 stages)

**NOTICE**

When adjusting the headrest height, operate it so that the shaft of the headrest becomes straight. If it is forcibly twisted, the installation part may be broken.



**METHOD FOR ADJUSTING ARMREST HEIGHT**

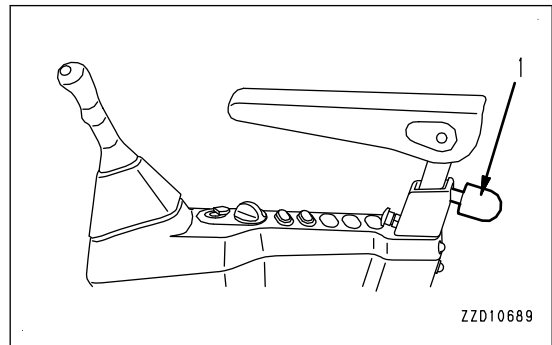
**CAUTION**

Firmly tighten the knob. If it is found loosened, tighten it further.

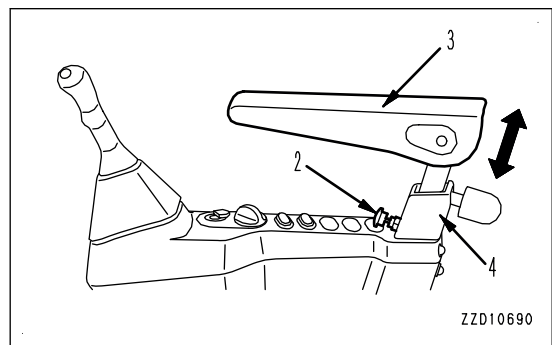
Height of the armrest can be adjusted up or down by using the knob at the rear of the armrest.

Armrest height adjustment: 43 mm

1. Loosen knob (1) at the rear of the armrest.
2. Pull plunger (2).



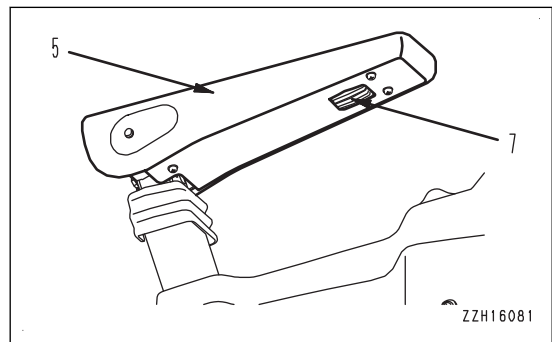
3. Adjust the height of armrest (3) while pulling plunger (2).
4. Push back plunger (2) after aligning it to the height adjustment hole of armrest (3).
5. Tighten knob (1) at the rear of the armrest.



**METHOD FOR ADJUSTING ARMREST ANGLE**

Angle of the armrest can be adjusted vertically by turning adjustment dial (7) at the bottom of the armrest (5).

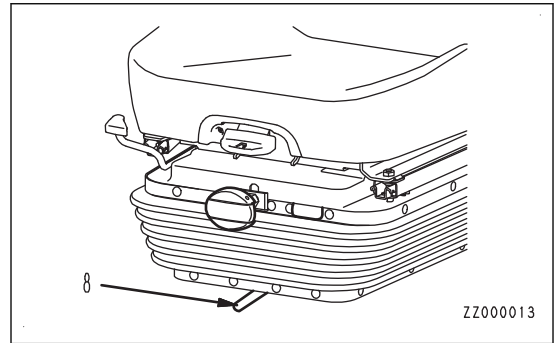
Angle adjustment: 9 ° in lower direction, 4 ° in upper direction



## METHOD FOR ADJUSTING SEAT UNIT IN FORE-AND-AFT DIRECTION

Pull the fore-aft adjustment lever to the right, set the seat to the desired position, then release the lever. The operator's seat, right and left control levers, and lock lever move together.

Fore-and-aft adjustment: 180 mm (9 stages)



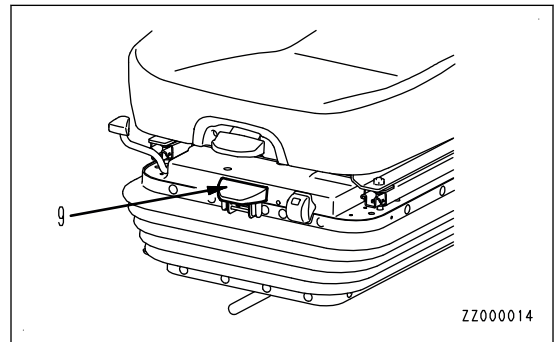
## METHOD FOR ADJUSTING AIR SUSPENSION SEAT HARDNESS

Air suspension seat (if equipped)

Operate the suspension switch to adjust the hardness of the suspension.

- If you press the suspension switch, the suspension becomes hard.
- If you pull the suspension switch, the suspension becomes soft. (Air release sound is heard.)

Weight adjustment range: 60 to 150 kg



## METHOD FOR HEATING SEAT

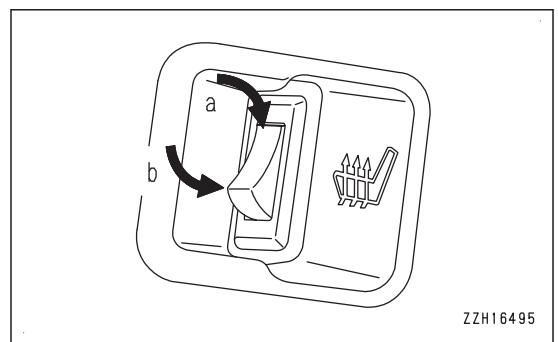
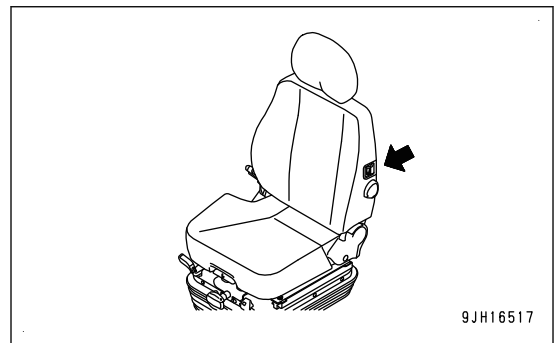
Heated seat (if equipped)

Turn the seat heater switch ON.

(a): OFF position

(b): ON position

The seat cushion and backrest become warm.



### METHOD FOR REMOVING AND INSTALLING HEADREST

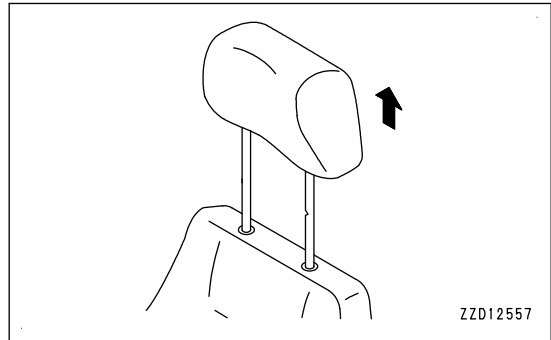
#### METHOD FOR REMOVING HEADREST

When the headrest is not necessary, remove it according to the following procedure.

1. Pull up the headrest 80 mm or more.
2. The headrest is pulled out.

**NOTICE**

When removing the headrest, operate it so that the shaft of the headrest becomes straight. If it is forcibly twisted, the installation part may be broken.

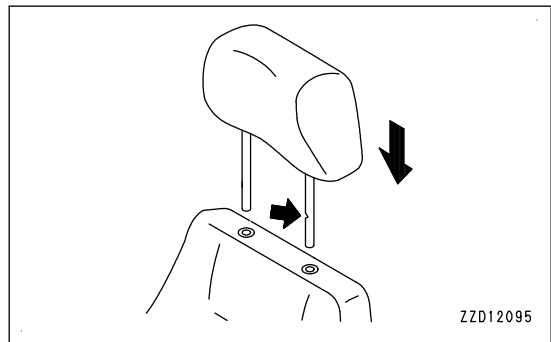


#### METHOD FOR INSTALLING HEADREST

1. Insert the headrest into the hole at the seat back.  
When installing, turn the notch of the shaft toward the front of the machine.
2. Push down the headrest.

**NOTICE**

When installing the headrest, operate it so that the shaft of the headrest becomes straight. If it is forcibly twisted, the installation part may be broken.



#### METHOD FOR ADJUSTING MIRRORS

### ⚠ WARNING

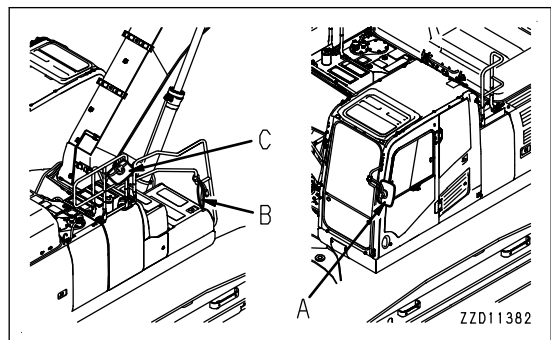
Be sure to adjust the mirrors before starting work. If they are not adjusted properly, you cannot secure the visibility and may be injured or may lead to a serious personal injury or death.

### ⚠ CAUTION

To prevent the machine from moving during the work, make sure that the following conditions are met before starting the work.

- The machine is placed on a firm, level ground.
- The work equipment is lowered to the ground in secure posture.
- The lock lever is in LOCK position.
- The engine is stopped.

- Mirror (A): Machine L.H. front mirror
- Mirror (B): Machine R.H. front mirror
- Mirror (C): Machine R.H. side mirror





## PROCEDURE FOR ADJUSTING MACHINE LEFT FRONT MIRROR (A)

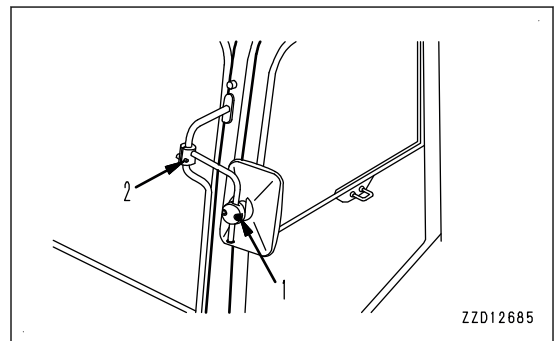
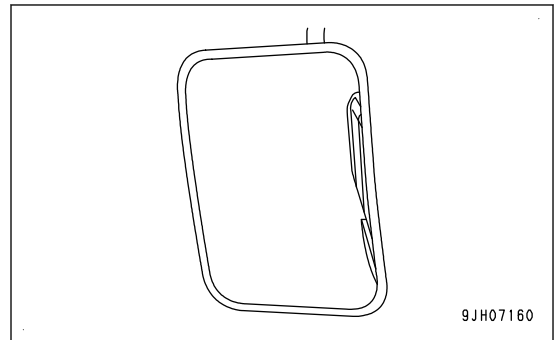
### CAUTION

To prevent the machine from moving during the work, make sure that the following conditions are met before starting the work.

- The machine is placed on a firm, level ground.
- The work equipment is lowered to the ground in secure posture.
- The lock lever is in LOCK position.
- The engine is stopped.

Adjust the mirror so that the operator can see a person at the rear left of the machine.

1. Adjust the mirror so that the side of the machine is reflected in the mirror as shown in the figure.
2. Check that you can see a person at the rear left end of the machine.
3. If you cannot adjust, loosen mounting bolts (1) and (2) of the mirror and stay, and adjust the angles.



If the mirror is adjusted by loosening the mounting bolts, be sure to adjust the mirror to its regular position. For the adjustment method, see "PROCEDURE FOR ADJUSTING REGULAR POSITION OF MACHINE LEFT FRONT MIRROR (A) (3-157)".

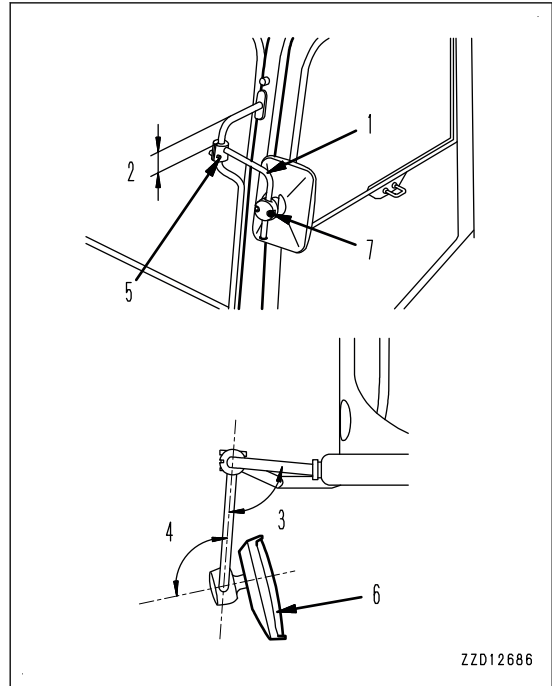
## PROCEDURE FOR ADJUSTING REGULAR POSITION OF MACHINE LEFT FRONT MIRROR (A)

### CAUTION

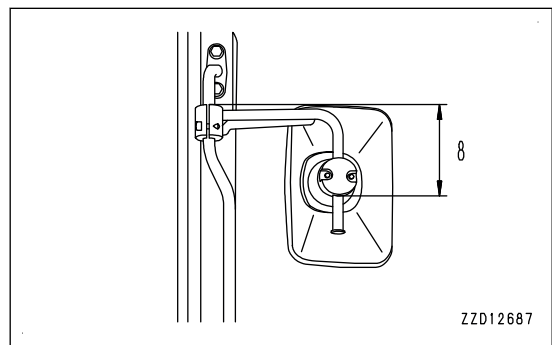
To prevent the machine from moving during the work, make sure that the following conditions are met before starting the work.

- The machine is placed on a firm, level ground.
- The work equipment is lowered to the ground in secure posture.
- The lock lever is in LOCK position.
- The engine is stopped.

When returning the mirror to its regular position, perform the following adjustment.

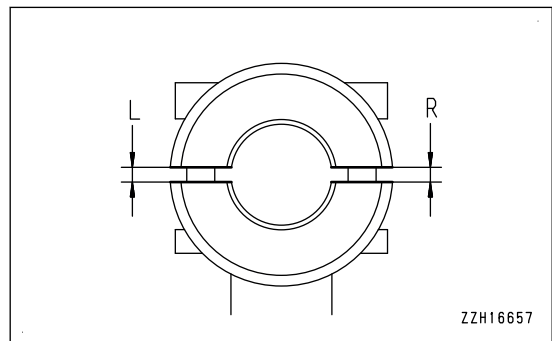


1. Adjust stay (1).  
 Mounting position (2): 71 mm  
 Mounting angle (3): 89 °  
 Mounting angle (4): 107 °  
 Tightening torque of mounting bolt (5): 6.0 to 7.0 Nm {0.61 to 0.71 kgm}
2. Adjust mirror (6).  
 Tightening torque of mounting bolt (6): 6.0 to 7.0 Nm {0.61 to 0.71 kgm}  
 Mounting position (7): 172 mm

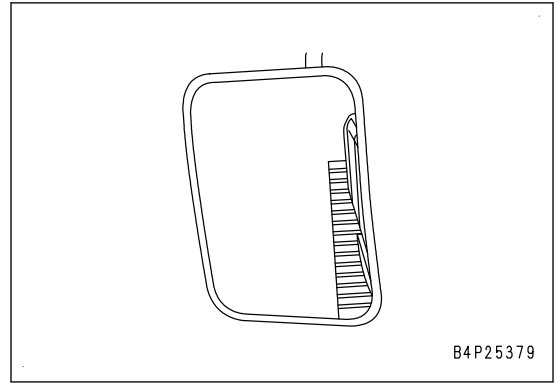


**NOTICE**

- Tighten the right and left bolts of each bracket alternately so that their right and left clearances (R) and (L) become equal.
- If the mirror and stay mounting bolts are tightened excessively, the bracket may be damaged. Be sure to tighten bolts to the specified torque.



Adjust the mirror so that the side of the machine is reflected in the mirror as shown in the figure.



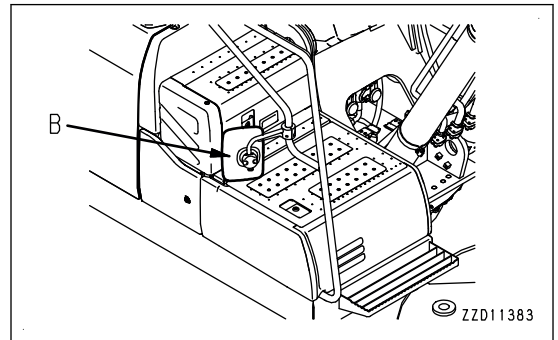
## PROCEDURE FOR ADJUSTING MACHINE RIGHT FRONT MIRROR (B)

### ⚠ CAUTION

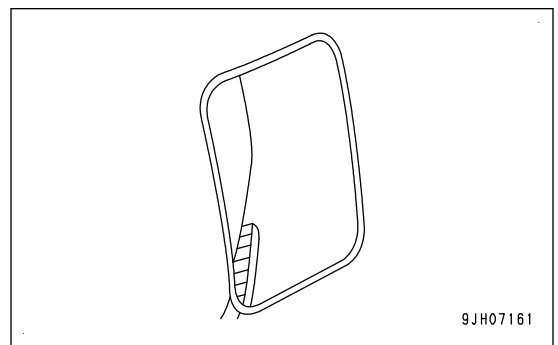
To prevent the machine from moving during the work, make sure that the following conditions are met before starting the work.

- The machine is placed on a firm, level ground.
- The work equipment is lowered to the ground in secure posture.
- The lock lever is in LOCK position.
- The engine is stopped.

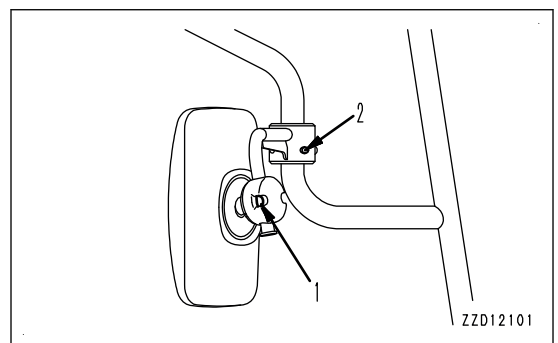
Adjust the mirror so that you can see a person at the rear right of the machine.



1. Adjust the mirror with your hand so that the side of the machine is reflected in the mirror as shown in the figure.
2. Check that you can see a person at the rear right of the machine.



3. If you cannot adjust, loosen mounting bolts (1) and (2) of the mirror and stay, and adjust the angles.



If the mirror is adjusted by loosening the mounting bolts, be sure to adjust the mirror to its regular position. For the adjustment method, see “PROCEDURE FOR ADJUSTING REGULAR POSITION OF MACHINE RIGHT FRONT MIRROR (B) (3-160)”.

### PROCEDURE FOR ADJUSTING REGULAR POSITION OF MACHINE RIGHT FRONT MIRROR (B)

#### ⚠ CAUTION

To prevent the machine from moving during the work, make sure that the following conditions are met before starting the work.

- The machine is placed on a firm, level ground.
- The work equipment is lowered to the ground in secure posture.
- The lock lever is in LOCK position.
- The engine is stopped.

When returning the mirror to its regular position, perform the following adjustment.

Adjust mirror (1).

Tightening torque of mounting bolt (2): 6.0 to 7.0 Nm 0.61 to 0.71 kgm

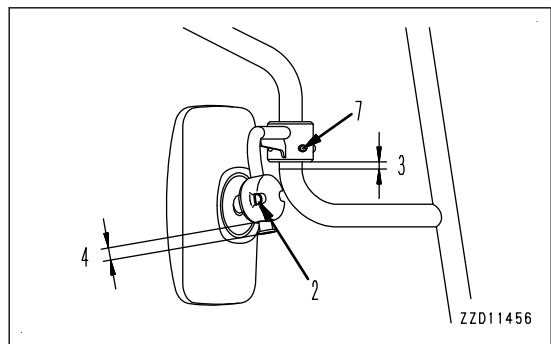
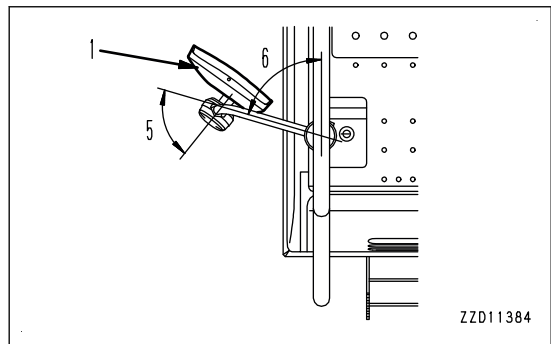
Mounting position (3): 10 mm

Mounting position (4): 16 mm

Mounting angle (5): 71 °

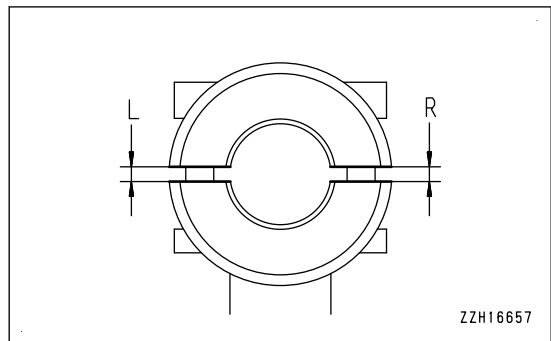
Mounting angle (6): 74 °

Tightening torque of mounting bolt (7): 6.0 to 7.0 Nm 0.61 to 0.71 kgm

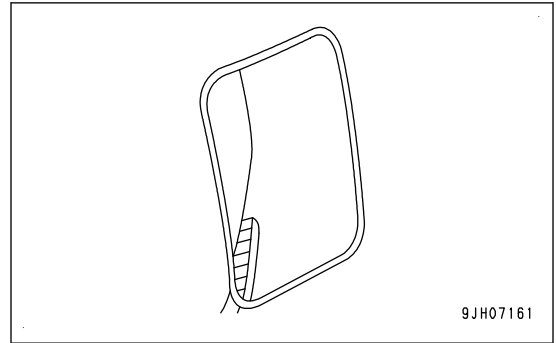


#### NOTICE

- Tighten the right and left bolts of each bracket alternately so that their right and left clearances (R) and (L) become equal.
- If the mirror and stay mounting bolts are tightened excessively, the bracket may be damaged. Be sure to tighten bolts to the specified torque.



Adjust the mirror so that the side of the machine is reflected in the mirror as shown in the figure.



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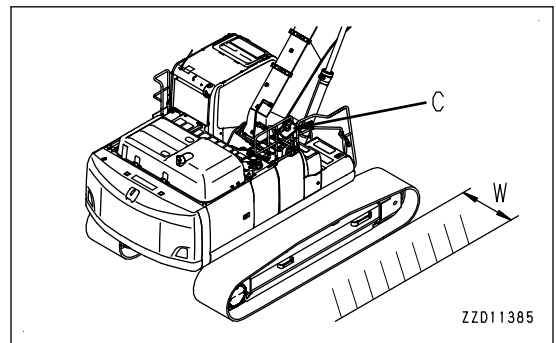
## PROCEDURE FOR ADJUSTING MACHINE RIGHT SIDE MIRROR (C)

### CAUTION

To prevent the machine from moving during the work, make sure that the following conditions are met before starting the work.

- The machine is placed on a firm, level ground.
- The work equipment is lowered to the ground in secure posture.
- The lock lever is in LOCK position.
- The engine is stopped.

- Adjust it so that people within 1 m around the machine can be seen from the operator's seat.  
(W): 1 m



ZZD11385

- The regular position of the mirror is as follows:

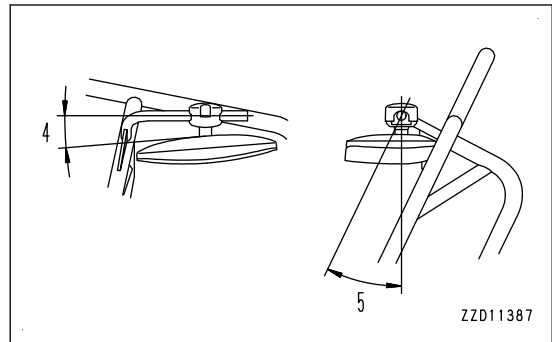
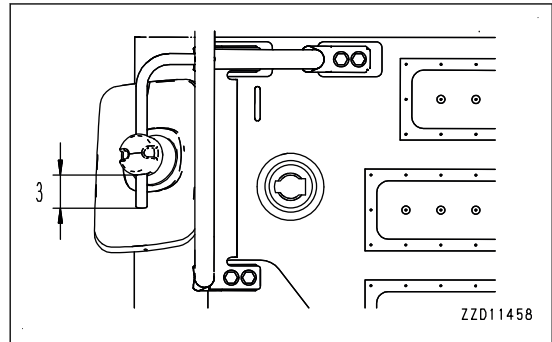
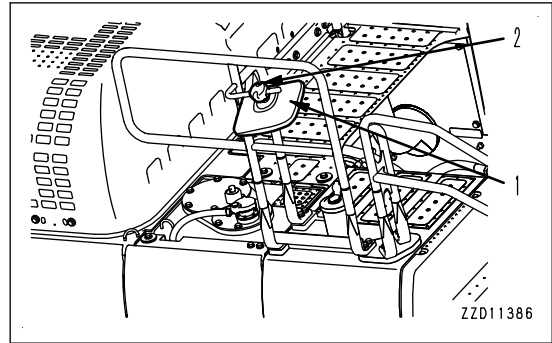
Adjust mirror (1).

Tightening torque of mounting bolt (2): 6.0 to 7.0 Nm {0.61 to 0.71 kgm}

Mounting position (3): 55 mm

Mounting angle (4): 5 °

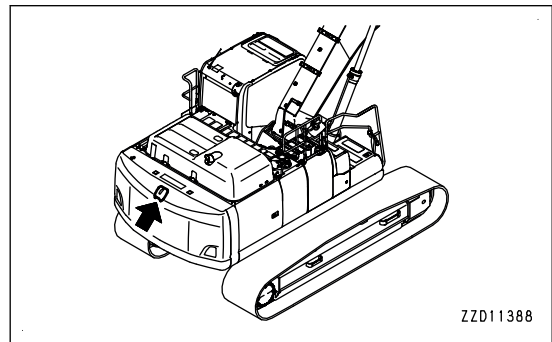
Mounting angle (5): 27 °



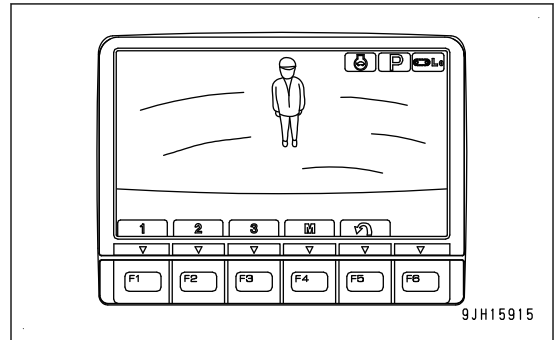
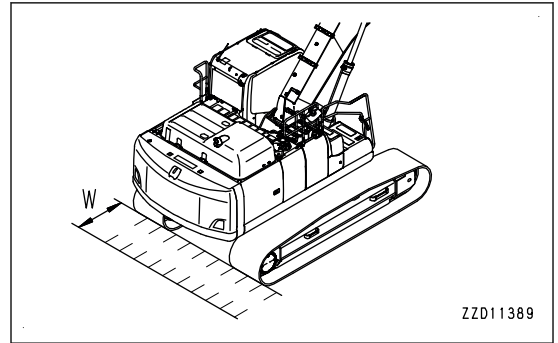
**METHOD FOR ADJUSTING REAR VIEW CAMERA ANGLE**

**⚠ WARNING**

- Always adjust the camera before starting work. 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.

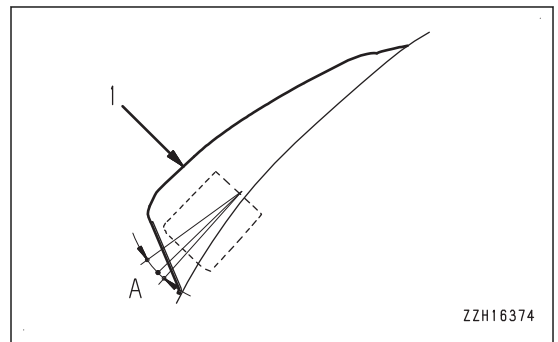


Adjust the angle of the rearview camera so that people within 1 m away from the machine's rear part (W) can be seen in the machine monitor at the operator's seat.

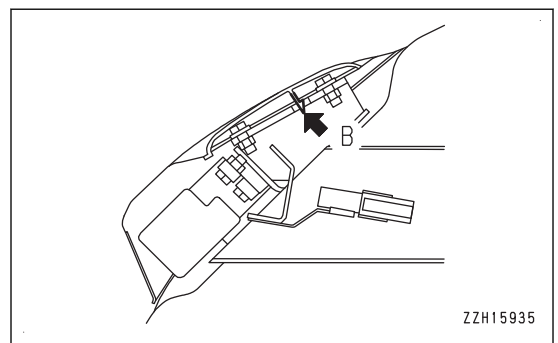
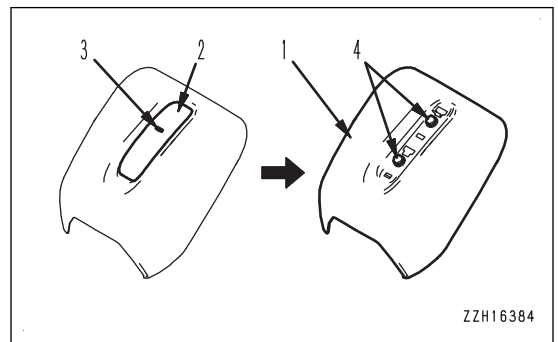


If the image on the monitor is not aligned correctly, adjust mounting angle (A) of the rearview camera in the following procedure.

Angle (A) can be adjusted within the range from 32 to 53 °.



1. Insert a flat-head screwdriver or the like into hole (3) of cover (2) and push inside tooth (B) to remove the cover.
2. Remove bolts (4) (2 places).

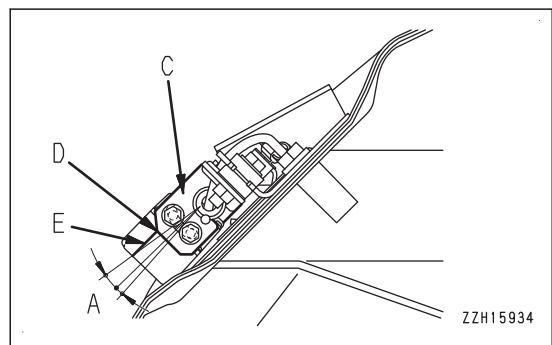
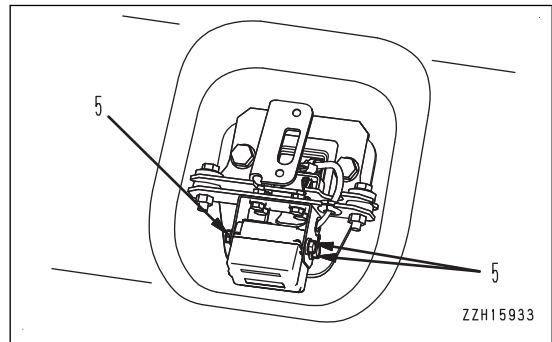
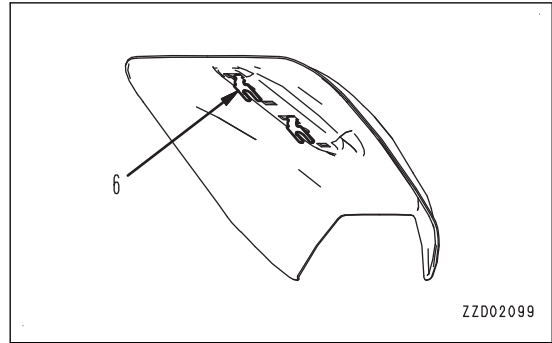


3. Remove cover (1).

**REMARK**

- Shim (6) may be inserted in the cover mounting bolts to adjust the clearance in the rim of the cover. When removing cover (1), record the places and quantities of the shims. When installing the cover, insert the shims according to the record.
- Take care of shim (6), since it comes off together with cover (1).

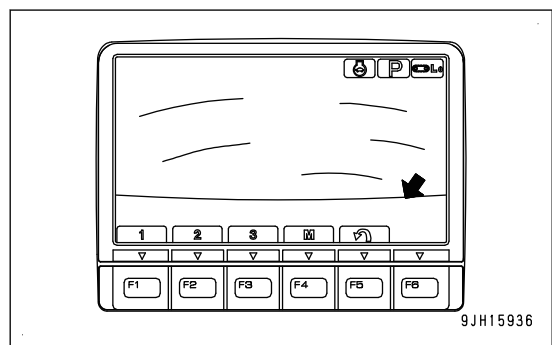
4. Loosen camera mounting bolts (5) (3 places) and adjust camera mounting angle (A) so that corner (D) of mounting bracket (C) is aligned with horizontal line (E).



5. After adjusting, tighten bolts (5).  
Tightening torque: 11.8 to 14.7 Nm {1.2 to 1.5 kgm}

**REMARK**

A part of the machine is shown on the monitor screen.





## METHOD FOR FASTENING AND UNFASTENING SEAT BELT

### ⚠ WARNING

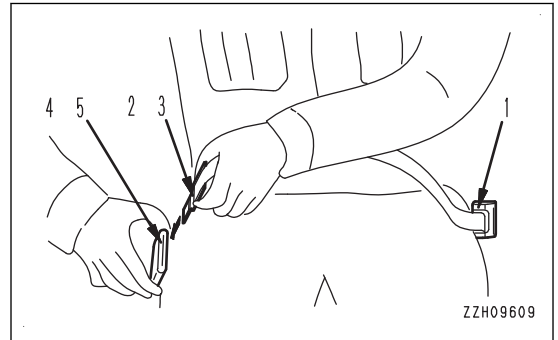
- Before fastening the seat belt, check that there is no problem in the belt mounting bracket or belt. If it is worn or damaged, replace it.
- Even if no problem can be seen in the belt, replace the seat belt every 3 years from starting usage or 5 years after manufacture whichever comes sooner.
- Be 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.

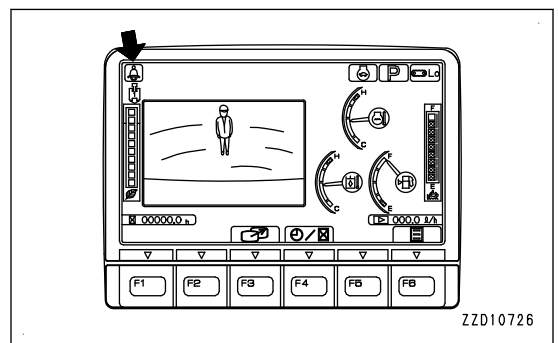


### METHOD FOR UNFASTENING SEAT BELT

Press button (5) in buckle (4) and remove tongue (3) from buckle (4). The belt is automatically wound in, hold grip (2) and return the belt slowly to retractable device (1).

### REMARK

If the tongue is not inserted in the buckle of the seat belt, the seat belt caution lamp is displayed at the left top of the machine monitor. Fasten the seat belt.



**METHOD FOR OPERATIONS AND CHECKS BEFORE STARTING ENGINE**

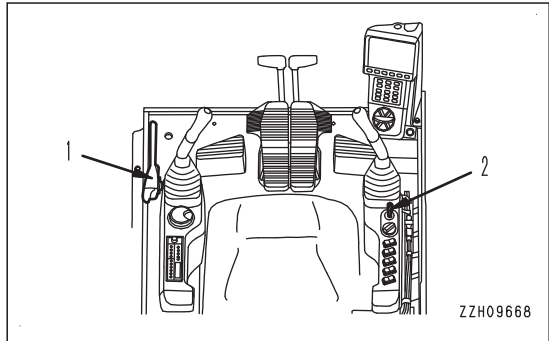
**⚠ WARNING**

When starting the engine, check that the lock lever is securely at LOCK position.

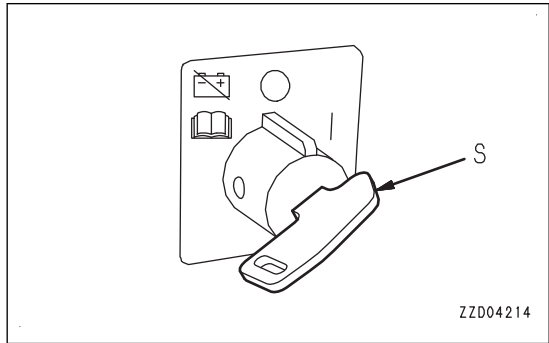
Perform the check before starting the engine according to the following procedure.

1. Check that battery disconnect switch (S) is in ON position (I).
2. Check that lock lever (1) is at LOCK position (L).
3. Check that all control levers and control pedals are at NEUTRAL position.

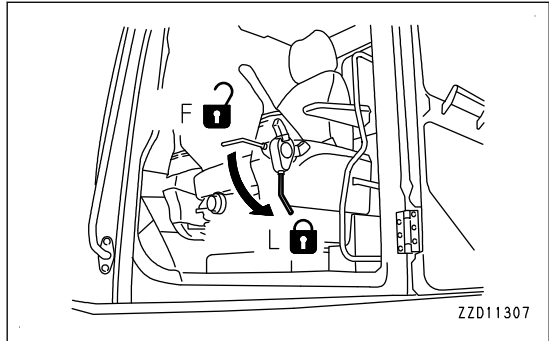
If the control levers and control pedals are released, they return to NEUTRAL position.



ZZH09668



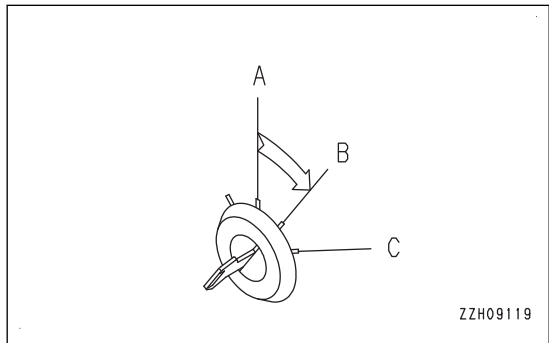
ZZD04214



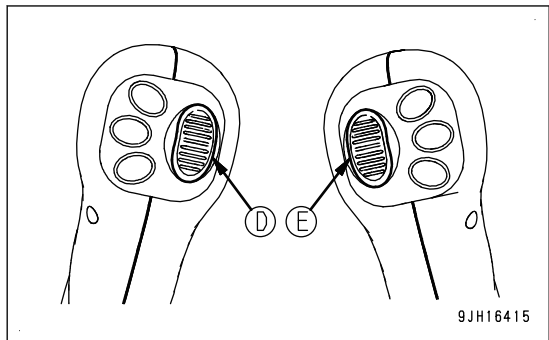
ZZD11307

4. Insert the key into starting switch (2) and turn it to ON position (B) - DO NOT touch the left (D) or right (E) proportional control slide switches, otherwise the Neutral Detection System will recognise the wrong position as Neutral and this may result in unexpected movement of the Attachment.

Next carry out the following checks:



ZZH09119

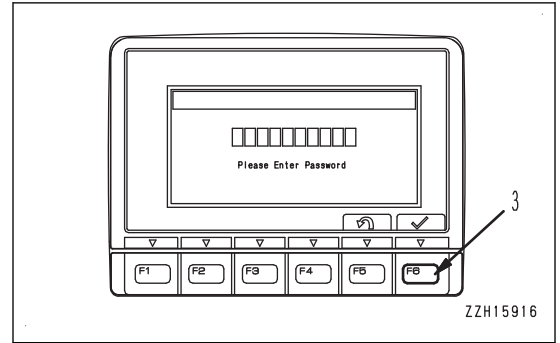


9JH16415

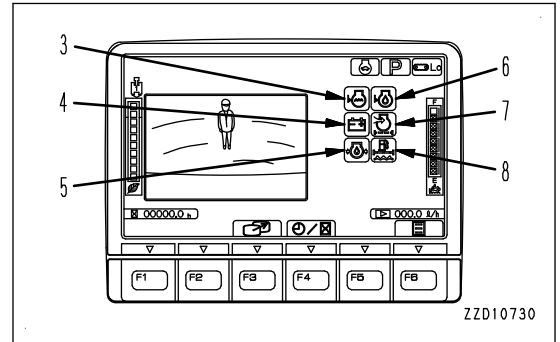
5. On the input display screen displayed on the monitor, input the password and push input confirmation switch F6 (3).  
If a password is set, the input display screen will be indicated on the monitor screen.

**REMARK**

Contact your Komatsu distributor for details of the method of setting, changing, or canceling the password.

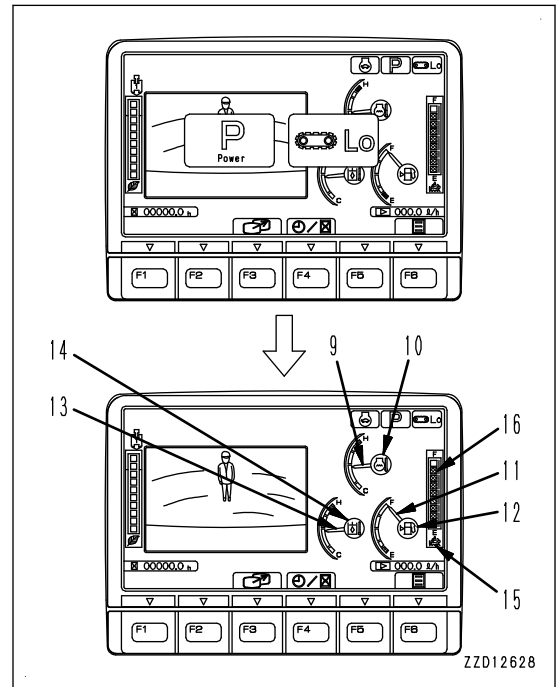


6. Perform the following inspection on the machine monitor.
  - 1) The buzzer sounds for approximately 2 seconds, then the following caution lamp or meters light up for approximately 2 seconds.
    - Radiator coolant level caution lamp (4)
    - Charge level caution lamp (5)
    - Engine oil pressure caution lamp (6)
    - Engine oil level caution lamp (7)
    - Air cleaner clogging caution lamp (8)
    - Water separator caution lamp (9)



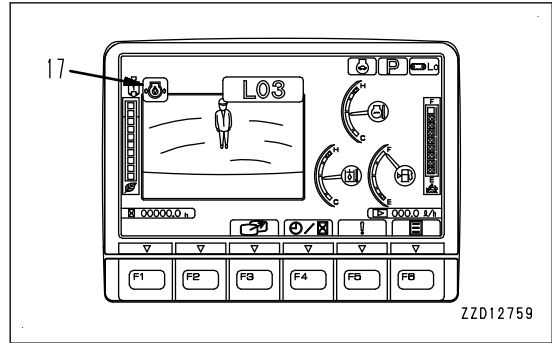
If any caution lamp does not light up or the buzzer does not sound, there is probably a failure in the caution lamp, so ask your Komatsu distributor for repair.

- 2) After approximately 2 seconds, the screen changes to the working mode/travel speed display. Then, it will switch to the standard screen.
  - Engine coolant temperature gauge (10)
  - Engine coolant temperature caution lamp (11)
  - Fuel gauge (12)
  - Fuel level caution lamp (13)
  - Hydraulic oil temperature gauge (14)
  - Hydraulic oil temperature caution lamp (15)
  - DEF system caution lamp (16)
  - DEF level gauge (17)



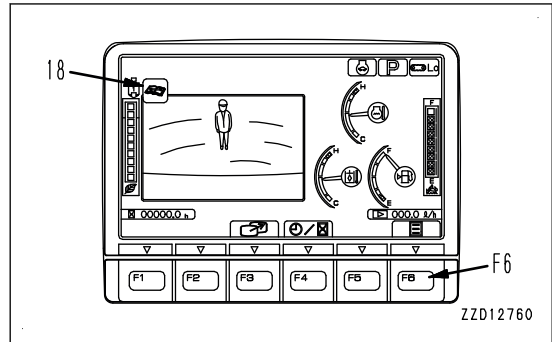
- 3) If the caution lamp (18) stays lit in red, immediately check the item lit in red.

For details of contents and check methods for caution lamp, see "WARNING DISPLAY (3-17)".



- 7. If the maintenance due time has passed for certain items, maintenance time caution lamp (19) is lit in red for 30 seconds. Press switch F6 (20) to check the item, and perform maintenance immediately.

For details of the method of checking the maintenance interval, see "MAINTENANCE SCREEN SETTING (3-75)" in EXPLANATION OF COMPONENTS.



### AUTOMATIC GREASE SYSTEM

Check Automatic Grease System is normal.

Refer to "AUTOMATIC GREASE SYSTEM (6-7)"

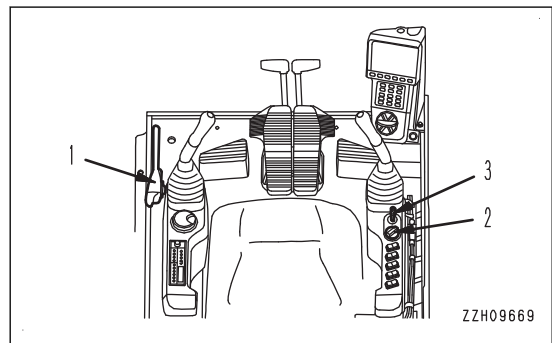
### METHOD FOR STARTING ENGINE

#### ⚠ WARNING

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

#### NOTICE

- Before starting the engine, check that fuel control dial (2) is at Low idle (MIN) position. If the fuel control dial is at High idle (MAX) position, the engine will accelerate suddenly and cause damage to the engine parts.
- Do not keep the key in starting switch (3) at the START position continuously for more than 20 seconds. If the engine does not start, wait for at least 2 minutes, then start again from the beginning.
- 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 monitor is lit.

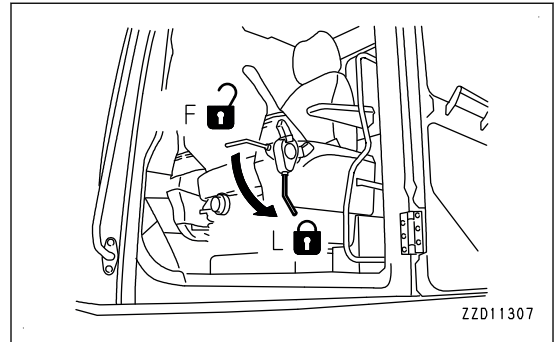


This machine is equipped with an engine automatic preheating device that functions to start the engine preheating automatically.

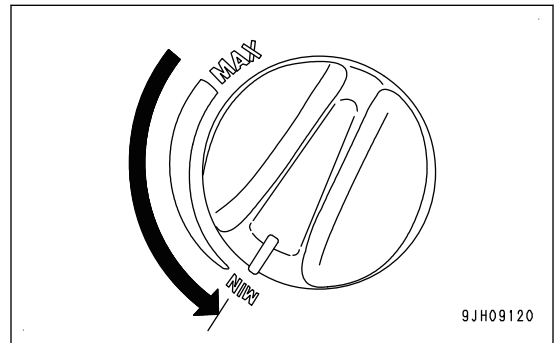
When the ambient temperature is low, the preheating pilot lamp lights up when the key in starting switch (3) is turned to ON position to inform the operator that preheating has been started automatically.

Start the engine according to the following procedure.

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 (2) to Low idle (MIN) position.

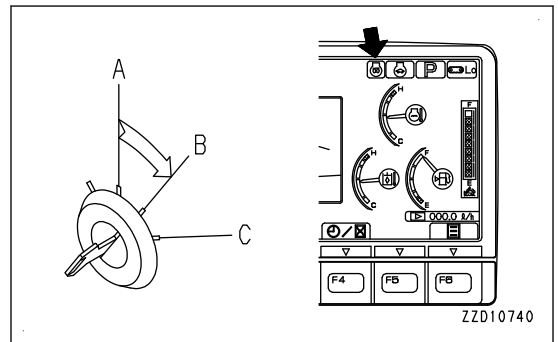


3. Turn the key in starting switch (3) to ON position (B).

**REMARK**

If the ambient temperature is low, the preheating pilot lamp lights up and automatic preheating is performed. Keep the key in starting switch (3) at ON position (B) until the preheating pilot lamp goes out. The time that the preheating pilot lamp stays lit depends on the ambient temperature as shown in the table.

Ambient temperature	Lighting time
-4 °C {24.8 °F} to -20 °C {-4 °F}	5 seconds to 40 seconds
-20 °C {-4 °F} and below	40 seconds



If a password has been set, the input display screen will be indicated on the monitor screen, but the preheating pilot lamp also operates as in the standard screen.

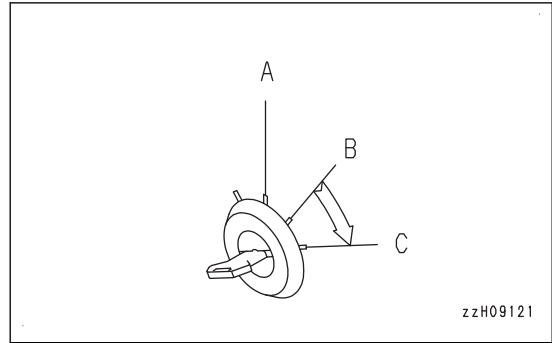
4. If the preheating pilot lamp does not light up, or it lights up and then goes out to inform that the engine preheating has been completed, turn the key in starting switch (3) to START position (C).  
The engine starts.

**REMARK**

If the ambient temperature is low, the engine may not start even when the key in starting switch (3) is kept at START position (C) for 20 seconds.

If this happens, wait for at least 2 minutes, then start again from the beginning.

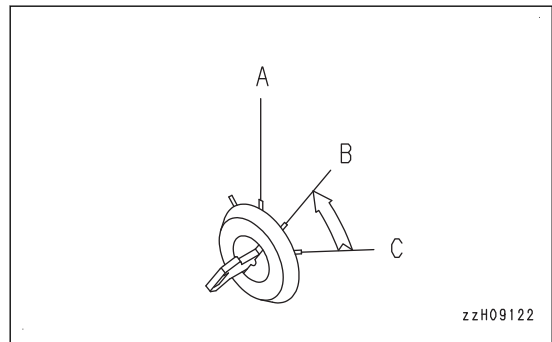
To preheat the engine forcibly when the automatic preheating does not start, see "METHOD FOR MANUAL PREHEATING WHEN STARTING ENGINE".



- 5. When the engine starts, release the starting switch key (3). 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.



- 6. 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.

**NOTICE**

**If the engine oil pressure caution lamp does not go out in 4 to 5 seconds, stop the engine immediately. Check the oil level, oil leakage, etc. and take proper measures.**

**REMARK**

White smoke may be discharged for a short time immediately after the engine is started or during the aftertreatment devices regeneration in the cold season, but this is not a failure.

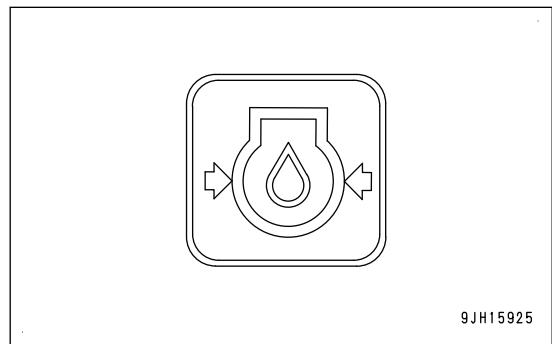
**REMARK**

Urea SCR system has the function of heating and keeping itself warm to prevent freezing of DEF.

If DEF is frozen, DEF system is heated and thawed automatically after the engine starts. The devices do not operate until DEF is thawed and supplied, but this does not indicate any abnormality.

When the ambient temperature decreases so much that DEF may freeze while the machine is in operation, DEF system is warmed automatically to prevent freezing. When the ambient temperature decreases so much that freezing of DEF is not preventable, the devices stop automatically, but this does not indicate any abnormality.

If DEF freezes, thawing operation is performed automatically. Never heat DEF. Harmful ammonia gas may be generated.

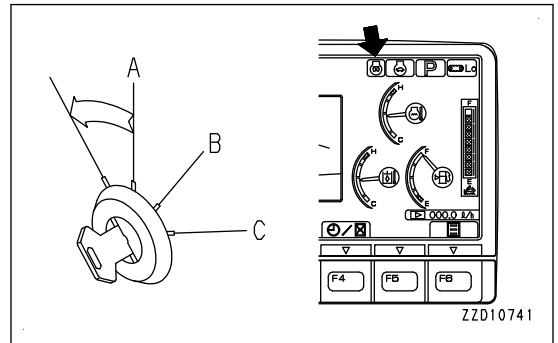


**METHOD FOR MANUAL PREHEATING WHEN STARTING ENGINE**

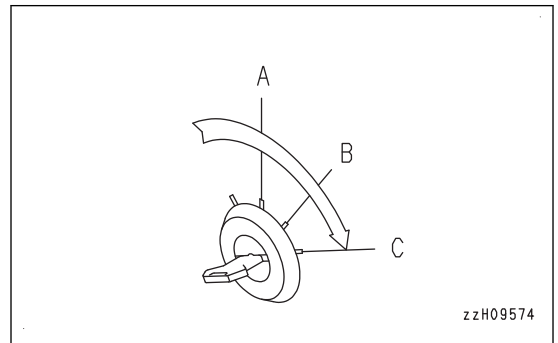
Regardless of the ambient temperature, it is possible to start the engine preheating manually.

1. Turn the key in starting switch (3) counterclockwise from OFF position (A). The preheating pilot lamp lights up and preheating of the engine starts. (Preheating continues while the key in starting switch (3) is held counterclockwise.)

The preheating pilot lamp starts flashing approximately 30 seconds after preheating starts and then goes out in approximately 10 seconds.



2. After the preheating pilot lamp goes out, turn the key of starting switch (3) to START position (C). The engine starts.



If the engine cannot be started with the above procedure, wait for approximately 2 minutes, then start again from step 1.

## TURBOCHARGER PROTECTION FUNCTION

The turbo protect function protects the turbocharger by keeping the engine speed at approximately 1000 rpm or less immediately after the engine is started.

- When the turbo protect function is actuated, the engine speed is held at approximately 1000 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 1000 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.

### REMARK

White smoke may be discharged for a short time immediately after the engine is started or during the Aftertreatment Devices Regeneration in the cold season, but this is not a failure.

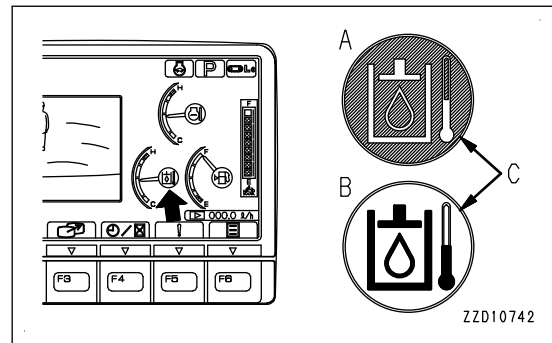
## AMBIENT TEMPERATURE RANGE FOR OPERATION AND STORAGE

- 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 (3-255)" for details of precautions.

## METHOD FOR OPERATIONS AND CHECKS AFTER STARTING ENGINE

### WARNING

- If there has been any emergency stop, abnormal actuation or trouble, 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 correct: Caution lamp background (C) is blue.
  - Display (B) when temperature is low: Caution lamp background (C) is white.
- If the warm-up operation for the hydraulic equipment is not performed thoroughly, and the machine is moved, the reaction of the machine to the operation of the control levers and pedals will be slow and the movement of the machine may not be what the operator intended. Particularly in a cold weather, be sure the warm-up operation is completed.
- 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 equipment. 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 equipment is not warmed by simply performing engine warm-up operation. Perform the warm-up operations for the hydraulic equipment and engine separately. Warm-up of the hydraulic equipment thoroughly ensures that the hydraulic oil is warmed up and that warm hydraulic oil 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

### CAUTION

- 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.



- 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.

**REMARK**

- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filtering function.
- White smoke may be discharged for a short time immediately after the engine is started or during the after-treatment devices regeneration in the cold season, but this is not a failure.
- When the hydraulic oil temperature is low, the engine speed and engine output at high idle are set to low to protect the components. When the hydraulic oil temperature becomes proper level, the engine speed and engine output at high idle are raised and the machine operates normally.

**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 the engine is started.
- Avoid operation with heavy loads or at high speeds.
- Immediately after starting the engine, avoid sudden starts, sudden acceleration, unnecessary sudden stops, and sudden changes in direction of the machine.

**METHOD FOR 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.

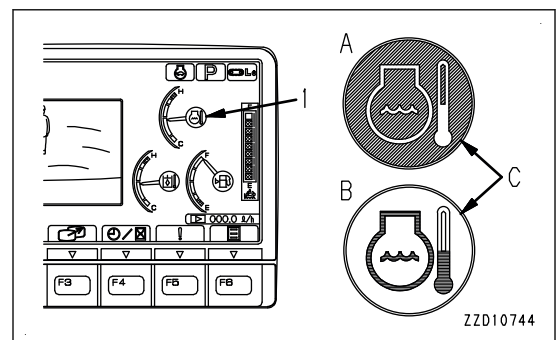
If the engine coolant temperature goes 30 °C or more or if the warm-up operation is continued for more than 10 minutes, the automatic warm-up operation is canceled and the engine speed drops to the normal speed at low idle.

Do not start operating the machine immediately. First, perform the following operations and checks.

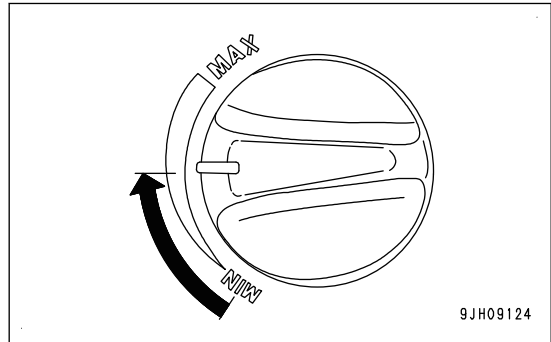
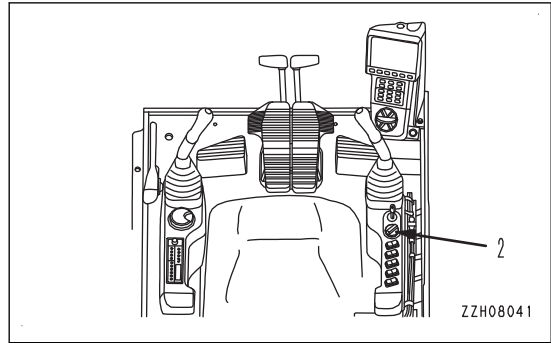
1. Check that engine coolant temperature caution lamp (1) displays the proper temperature.

If it displays low temperature, perform additional warm-up of the engine according to step 2 until it displays the 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. 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 proper temperature.

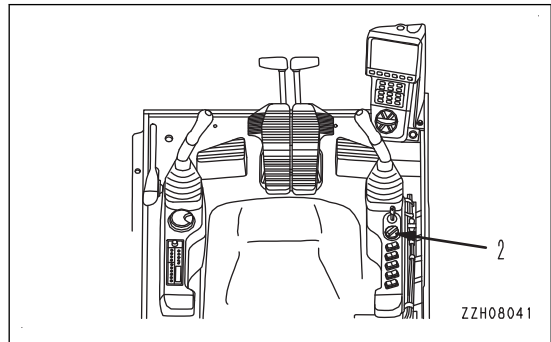
- Display (A) when temperature is proper: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

If the engine coolant temperature caution lamp displays the proper temperature, the engine warm-up operation is completed.

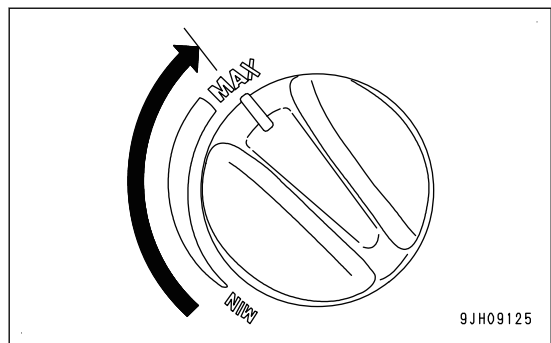
Then, perform the warm-up operation for the hydraulic components.

### METHOD FOR CANCELLING AUTOMATIC WARM-UP OPERATION

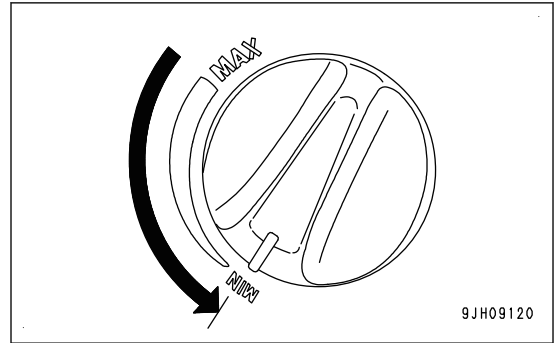
If it becomes necessary in an emergency to cancel the automatic warm-up operation or to lower the engine speed to low idle, do as follows.



- 1. Turn fuel control dial (2) to High idle (MAX) position and hold it for 3 seconds or more.



- Turn fuel control dial (2) to Low idle (MIN) position.  
The engine automatic warm-up is cancelled, and the engine speed is lowered.



### REMARK

Turbo protect function takes priority over the engine automatic warm-up.

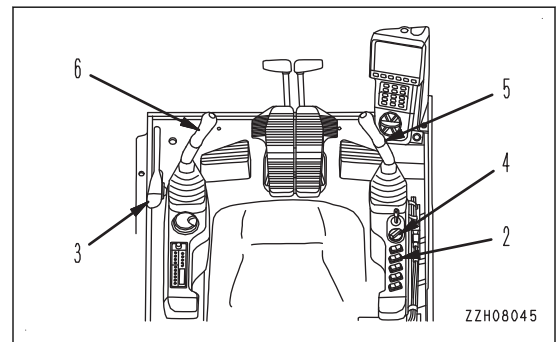
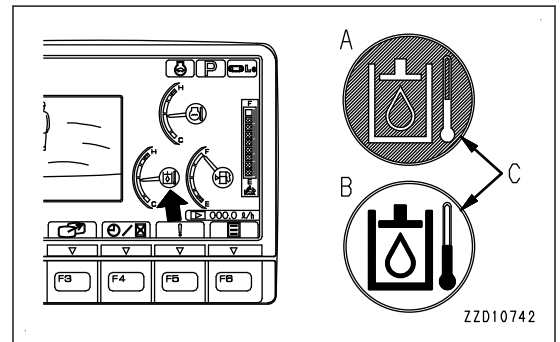
When the turbo protect function activates, run the engine at low idle even the engine coolant temperature is 30 °C or less. Then the engine automatic warm-up starts automatically to increase the engine speed.

For details of the turbocharger protect function, see “TURBOCHARGER PROTECTION FUNCTION (3-171)”.

### METHOD FOR HYDRAULIC SYSTEM WARM-UP OPERATION

#### **⚠ WARNING**

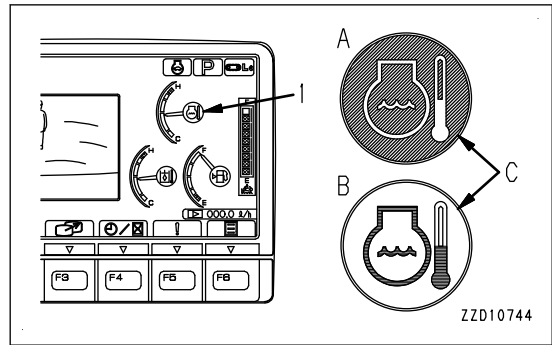
- Before performing the warm-up operation for the hydraulic equipment, set the swing lock switch on, check on the monitor that the swing lock is actuated, then start the warm-up operation.
- When warming up the hydraulic equipment, check that there is no person or obstacle in the surrounding area, then 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 proper 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.)
- 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.



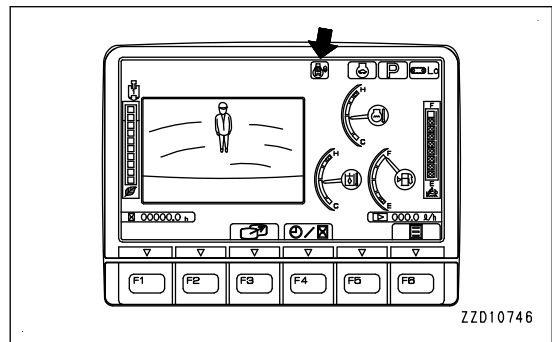
1. Check that engine coolant temperature caution lamp (1) displays the proper temperature.

- Display (A) when temperature is proper: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

If it displays low temperature, perform additional warm up of the engine until engine coolant temperature caution lamp (1) displays the proper temperature. For detail, see "METHOD FOR ENGINE WARM-UP OPERATION (3-173)".



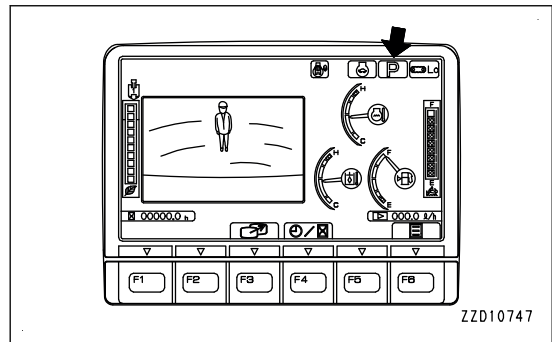
2. Set swing lock switch (2) to ON position and check that the swing lock pilot lamp is lit.



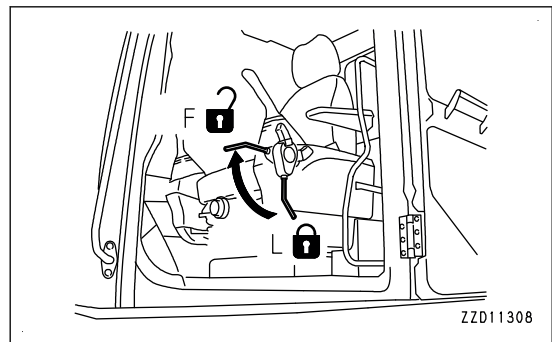
3. Set the working mode to P mode (heavy-duty operation mode).

The hydraulic component is warmed up quickly.

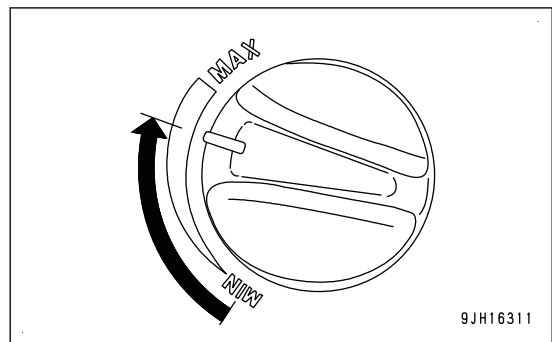
For the details of the working mode setting procedure, see "WORKING MODE SELECTOR SWITCH (3-45)".



4. Move lock lever (3) slowly to FREE position (F), then raise the bucket from the ground.



5. Turn fuel control dial (4) to a 2/3 position between Low idle (MIN) position and High idle (MAX) position.

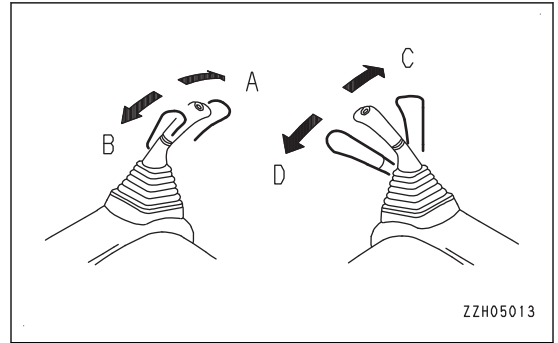


- Operate the work equipment to warm up the hydraulic components.

**NOTICE**

**When the work equipment is operated, take care that it does not interfere with the machine or ground.**

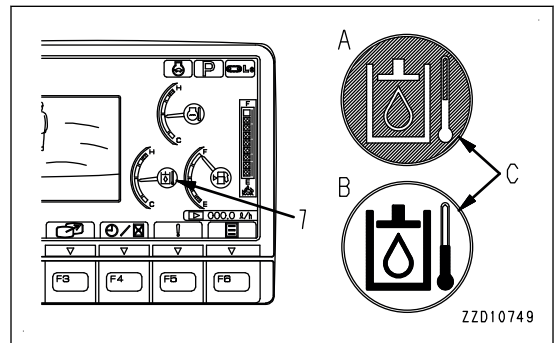
- Move R.H. work equipment control lever (5) slowly in the direction of bucket CURL position (D). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
- Move R.H. work equipment control lever (5) slowly in the direction bucket DUMP position (C). Operate the lever to 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 6 for 5 minutes.
- Check that hydraulic oil temperature caution lamp (7) displays proper temperature.

If the hydraulic oil temperature caution lamp is not displaying the proper temperature (it is displaying low temperature), repeat steps 6 to 7 until the monitor displays the proper temperature.

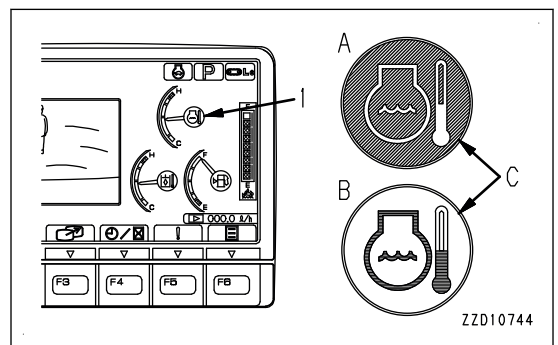
- Display (A) when temperature is proper: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.



- Check that engine coolant temperature caution lamp (1) displays the 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.

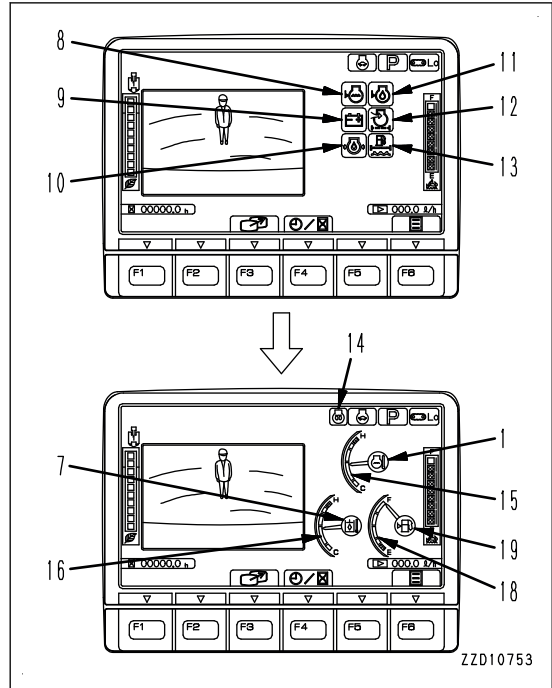
If it displays low temperature, perform additional warm up of the engine until engine coolant temperature caution lamp (1) displays the proper temperature.

For detail, see "METHOD FOR ENGINE WARM-UP OPERATION (3-173)".



- Check that the hydraulic oil temperature caution lamp and engine coolant temperature caution lamp display the proper temperature, then check that all the instruments, caution lamps, and pilot lamps on the machine monitor are in the following conditions.

- Radiator coolant level caution lamp (8): OFF
- Charge level caution lamp (9): OFF
- Engine oil pressure caution lamp (10): OFF
- Engine oil level caution lamp (11): OFF
- Air cleaner clogging caution lamp (12): OFF
- Water separator caution lamp (13): OFF
- Engine preheating pilot lamp (14): OFF
- Engine coolant temperature gauge (15): Indicator in green range
- Engine coolant temperature caution lamp (1): Displays proper temperature
- Hydraulic oil temperature gauge (16): Indicator in green range
- Hydraulic oil temperature caution lamp (7): Displays proper temperature
- Fuel gauge (17): Indicator in green range
- Fuel level caution lamp (18): Displays appropriate level

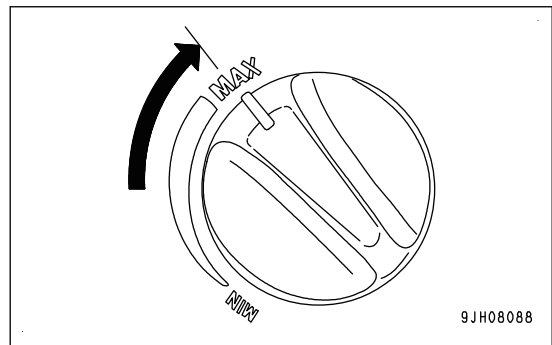


11. Check for abnormal exhaust gas color, noise, or vibration.  
If any problem is found, contact your Komatsu distributor.

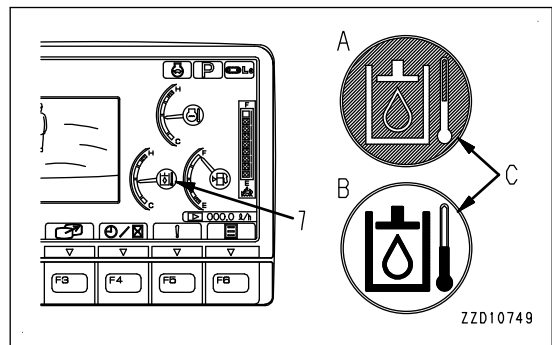
**NOTICE**

**In cold temperatures (ambient temperature below 0 °C), even when the hydraulic oil temperature caution lamp displays the proper temperature, perform the "Hydraulic system warm-up operation in cold weather" to warm up all the hydraulic equipment.**

12. Hydraulic system warm-up operation in cold weather
  - 1) Turn fuel control dial (4) to High idle (MAX) position.
  - 2) Repeat the work equipment operation of step 6 for 3 to 5 minutes.
    - Display (A) when temperature is proper: Caution lamp background (C) is blue.
    - Display (B) when temperature is low: Caution lamp background (C) is white.

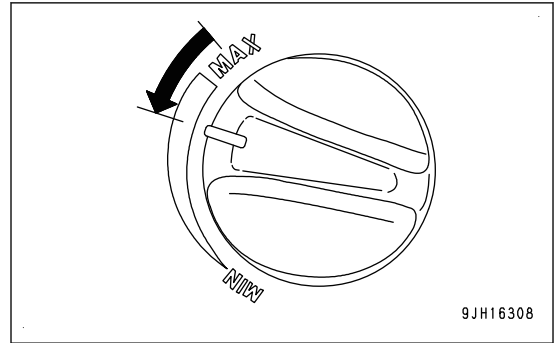


- 3) Check that the hydraulic oil temperature caution lamp displays proper temperature.  
If it is not displaying the proper temperature, repeat step 2) until hydraulic oil temperature caution lamp (7) displays the proper temperature.



13. 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 a 2/3 position, set it to the 2/3 position and run the engine at 2/3 speed between MIN and MAX before operating.

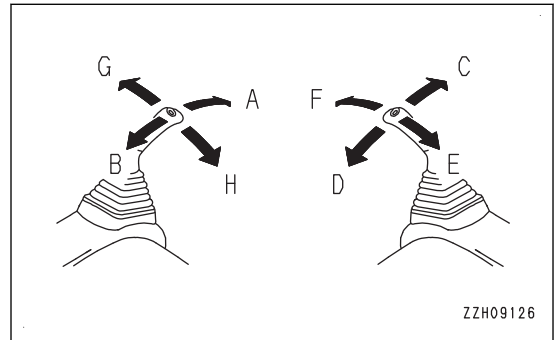


9JH16308

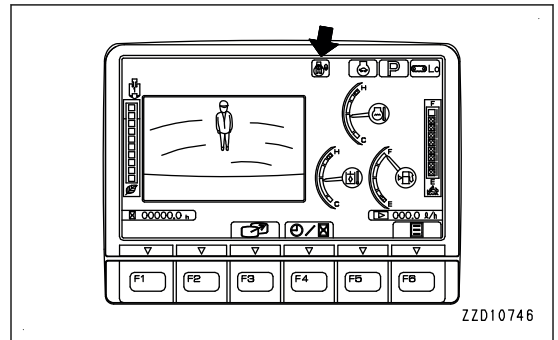
14. Before starting actual work, repeat the following operation 3 to 5 times.

Circulate warm hydraulic oil through all control circuits.

- Boom operation: RAISE (E) ↔ LOWER (F)
  - Arm operation: IN (B) ↔ OUT (A)
  - Bucket operation: CURL (D) ↔ DUMP (C)
  - Swing operation: 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.

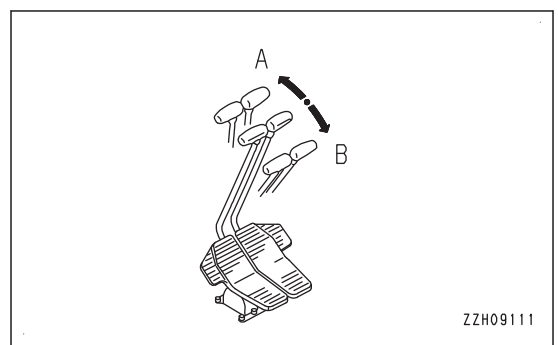


ZZH09126



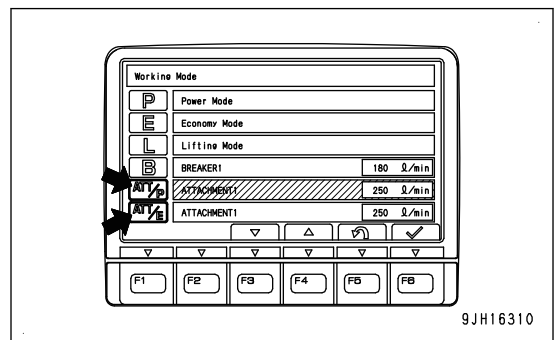
ZZD10746

- Travel (Lo) operation: FORWARD (A) ↔ REVERSE (B)



ZZH09111

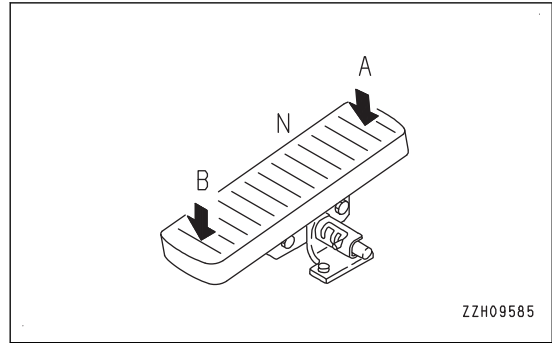
- For attachment operations (if equipped), change the working mode to the attachment mode.



9JH16310



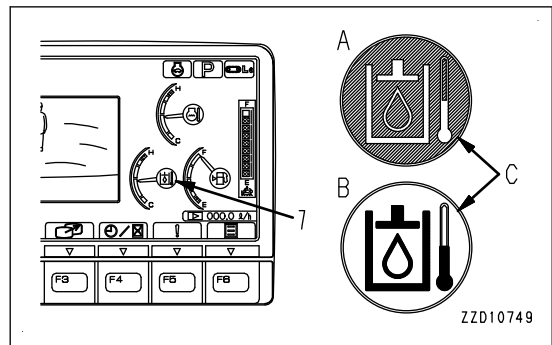
Attachment operation: One way (A) ↔ Other way (B)



15. Check that hydraulic oil temperature caution lamp (7) displays proper temperature.

If the hydraulic oil temperature caution lamp is not displaying the proper temperature (it is displaying low temperature), repeat steps 6 to 7 until the monitor displays the 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.



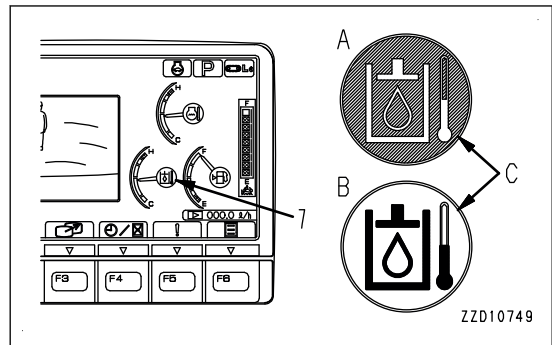
If the hydraulic oil temperature caution lamp displays the proper temperature, the hydraulic equipment warm-up operation is completed.

After checking that the hydraulic oil temperature caution lamp displays the proper temperature, perform the operation after completion of the warm-up operation.

**METHOD FOR OPERATION AFTER COMPLETION OF WARM-UP OPERATION**

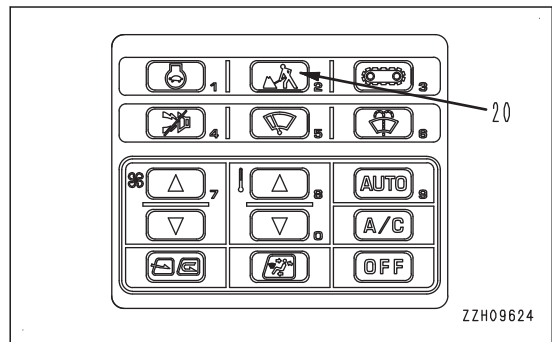
1. Check that hydraulic oil temperature caution lamp displays proper temperature.

- Display (A) when temperature is proper: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.



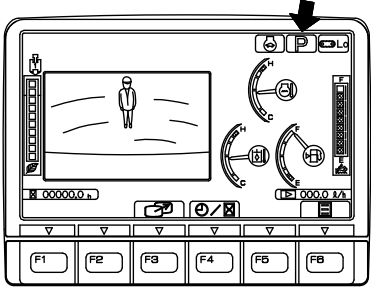
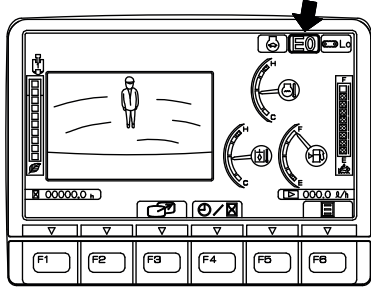
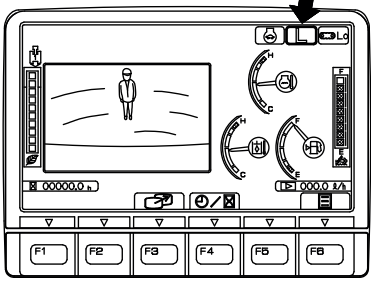
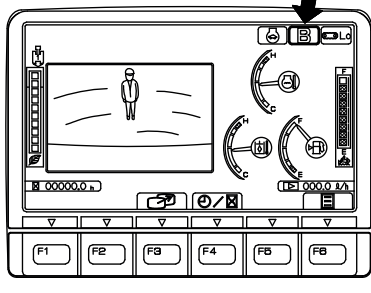
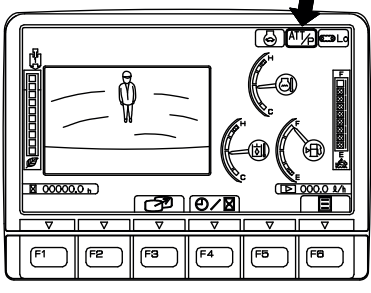
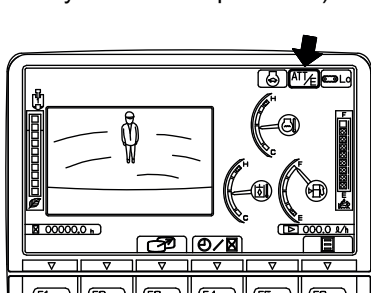
2. Press working mode selector switch (20) of the machine monitor to select the working mode to be used.

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 style="text-align: right;">ZZD10757</p>	<p>E mode For fuel economy conscious operations</p>  <p style="text-align: right;">ZZD10758</p>
<p>L mode For operations requiring fine control and lifting operations</p>  <p style="text-align: right;">ZZD10759</p>	<p>B mode For breaker operations</p>  <p style="text-align: right;">ZZD10760</p>
<p>ATT/P mode For operations of 2-way attachments like crusher</p>  <p style="text-align: right;">ZZD10761</p>	<p>ATT/E mode For operations of 2-way attachments like crusher (fuel economy conscious operations)</p>  <p style="text-align: right;">ZZD10762</p>

METHOD FOR STOPPING ENGINE

**⚠ WARNING**

Keep away from the exhaust pipe immediately after stopping the engine.

**NOTICE**

If the engine is stopped abruptly, the service lives of component parts of the engine may be considerably reduced. Do not stop the engine abruptly except in an emergency.

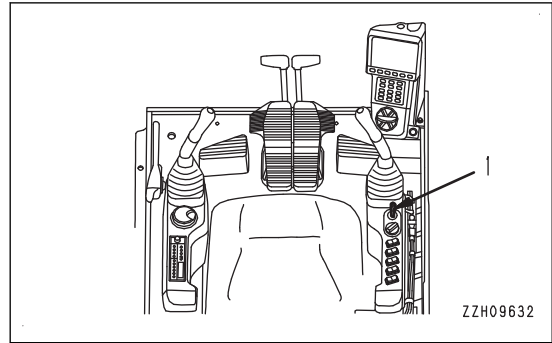
Do not stop the engine abruptly except the case in an emergency. If the engine is overheated, do not try to stop it abruptly but run it at medium speed to allow it to cool down gradually, and then stop it.

If the engine is stopped during the aftertreatment devices regeneration, the components may be damaged.

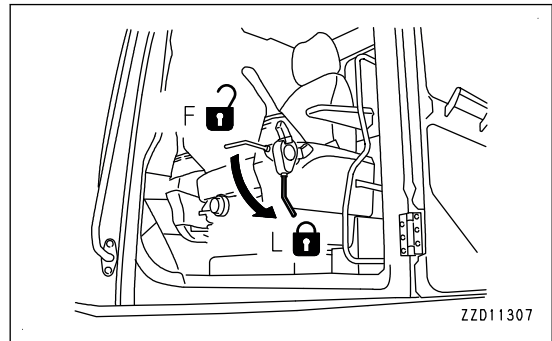
When stopping the engine, stop the aftertreatment devices regeneration first according to "PROCEDURE FOR AFTER-TREATMENT DEVICES REGENERATION DISABLE SETTING (3-117)", then stop the engine after running it at low idle for approximately 5 minutes. Then stop the engine.

Stop the engine according to the following procedure.

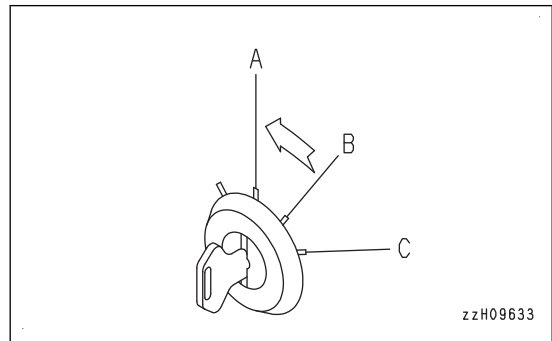
1. Set the lock lever to LOCK position (L).
2. Run the engine at low idle for approximately 5 minutes to cool down gradually.



3. Turn the starting switch to OFF position (A), and stop the engine.

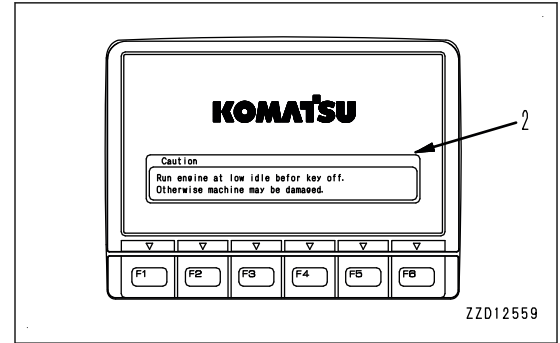


4. Remove the key from starting switch (1).



**REMARK**

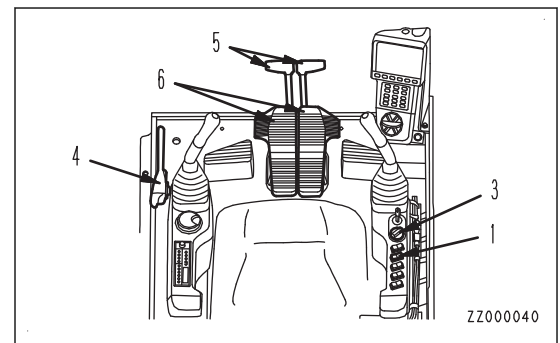
- When engine starting switch (1) is turned to OFF (A) position, the engine stops, but the machine's main power supply is not turned off immediately. This is a time lag provided for the controller to memorize the operation status and then terminate the system. While this process continues, the main power is maintained. The power holding time varies depending on the operation condition.
- If the starting switch key is turned to OFF (A) position 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. For this reason, the device operates for a few minutes even after the starting switch key is turned off, but this is not an abnormality. Do not turn OFF the battery disconnect switch while the devices are operating to purge. After the purge is completed, the devices stop automatically.



## METHOD FOR STARTING MACHINE (TRAVEL FORWARD AND REVERSE) AND STOPPING MACHINE

### **⚠ WARNING**

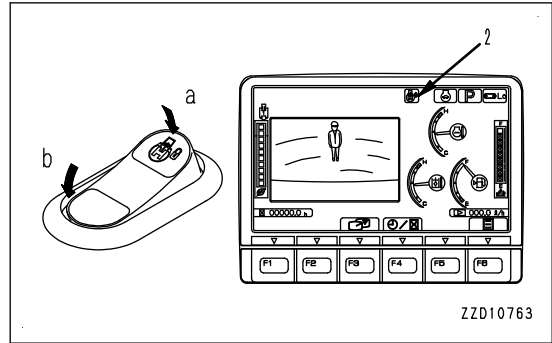
- Before operating the travel levers or travel pedals, check the direction of the track frame. If the track frame is facing the rear (if the sprocket is at the front), the machine moves in the opposite direction to the direction of the operation of the travel levers or travel pedals (front and rear travel 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 operation.
- 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.
- 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. Operate the levers carefully.
- When traveling, check that the alarm sounds normally.



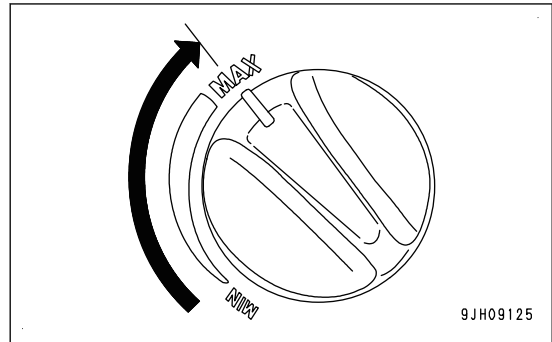
## PREPARATIONS FOR MOVING MACHINE

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

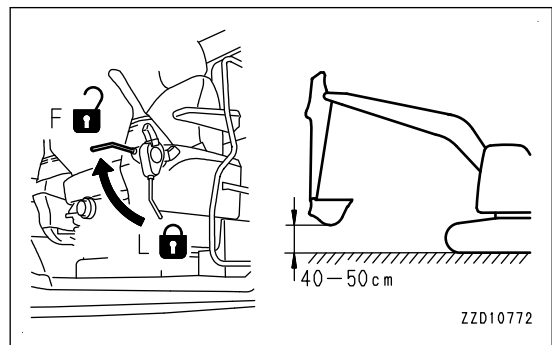


2. Turn fuel control dial (3) to High idle (MAX) position. Increase the engine speed.

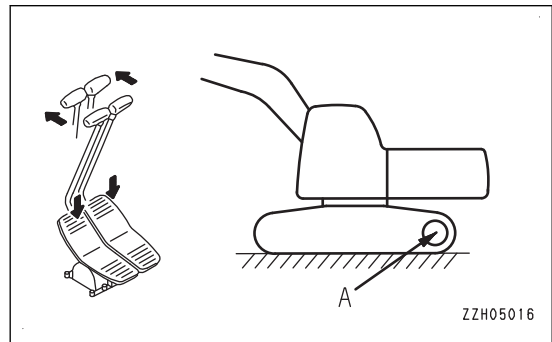


**METHOD FOR TRAVELLING FORWARD**

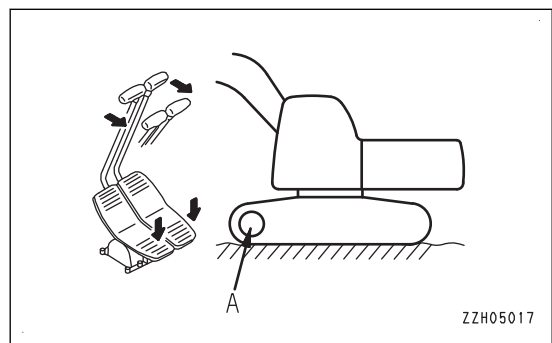
1. Set lock lever (4) to FREE position (F).  
 Set the work equipment in the travel posture and raise it to 40 to 50 cm .
  - If the work equipment blocks the view and it is difficult to travel safely, raise the work equipment further.
2. Operate right and left travel levers (5) or right and left travel pedals (6) as follows:
3. Check the position of the sprocket.



- When sprocket (A) is at the rear of the machine:  
 Start the machine either by pushing levers (5) forward slowly or by depressing the front parts of pedals (6) slowly.



- When sprocket (A) is at the front of the machine:  
 Start the machine either by pulling levers (5) backward slowly or by depressing the rear parts of pedals (6) slowly.



4. When travelling, check that the alarm sounds normally.

If the travel alarm does not sound, ask 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.

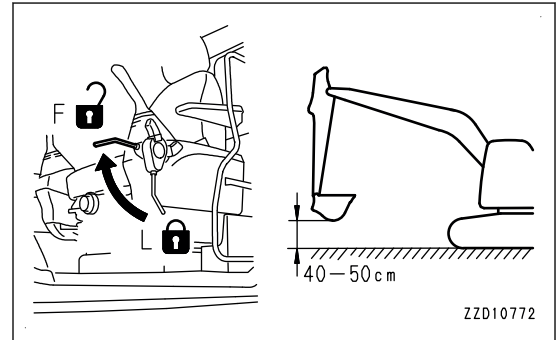
### METHOD FOR TRAVELLING REVERSE

1. Set lock lever (4) to FREE position (F).

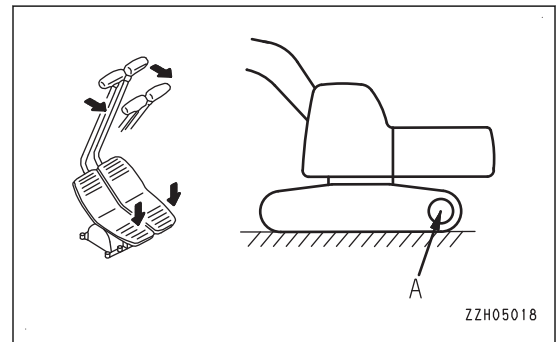
Set the work equipment in the travel posture and raise it to 40 to 50 cm above the ground.

- If the work equipment blocks the view and it is difficult to travel safely, raise the work equipment further.

2. Operate right and left travel levers (5) or right and left travel pedals (6) as follows:
3. Check the position of the sprocket.

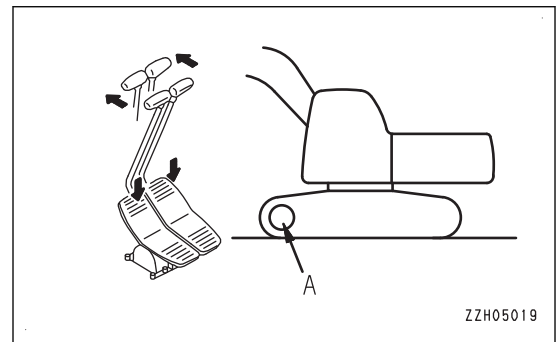


- When sprocket (A) is at the rear of the machine:  
Start the machine either by pulling levers (5) backward slowly or by depressing the rear parts of pedals (6) slowly.



- 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.

4. When travelling, check that the alarm sounds normally.  
If the travel alarm does not sound, contact your Komatsu distributor for repair.



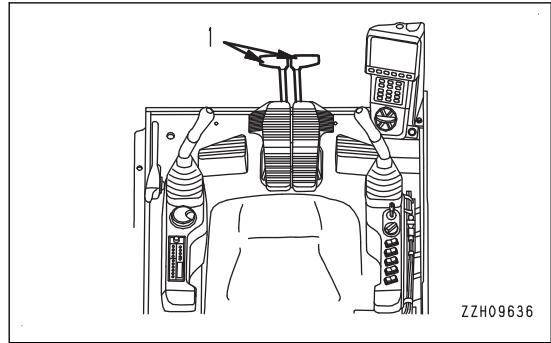
### REMARK

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.

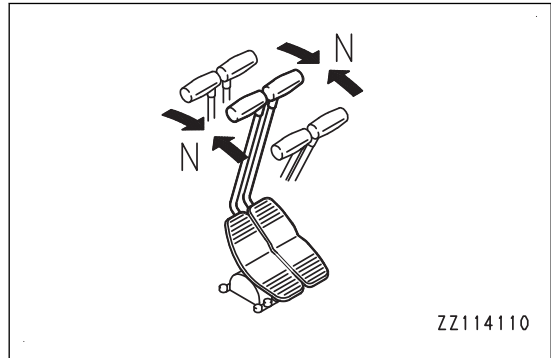
### METHOD FOR STOPPING MACHINE

Avoid a sudden stop. Stop the machine gradually.

Set right and left travel levers (1) in NEUTRAL position (N).  
The machine stops.



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### METHOD FOR STEERING MACHINE

### METHOD FOR STEERING (CHANGE THE DIRECTION) MACHINE

## ⚠ WARNING

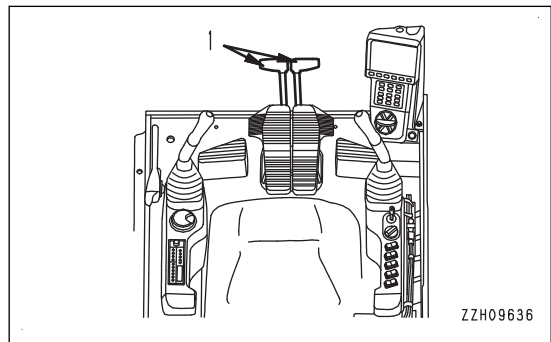
Before operating the travel levers or travel pedals, check the direction that the track frame is facing (the position of the sprocket).

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.



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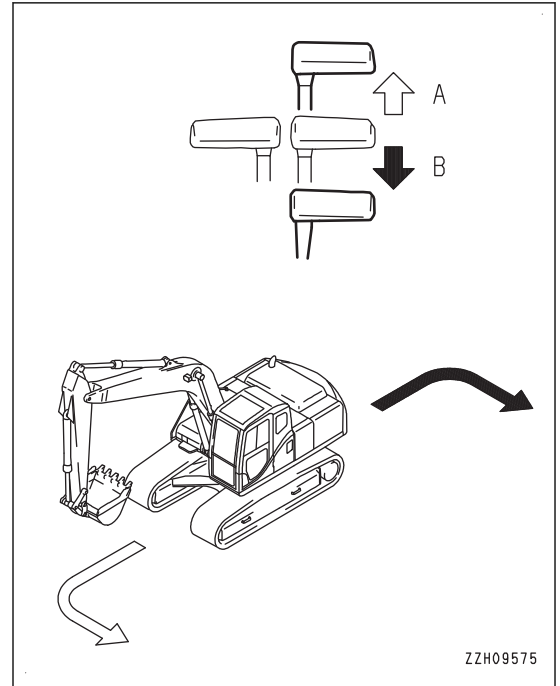
### PIVOT TURN

When turning LEFT

- (A): Turning FORWARD LEFT  
Push the right travel lever forward.  
The machine turns forward LEFT.
- (B): Turning REVERSE LEFT  
Push the right travel lever backward.  
The machine turns in reverse LEFT.

**REMARK**

When turning to the RIGHT, read the preceding procedure by replacing the word "LEFT" with "RIGHT", then operate the left travel lever.



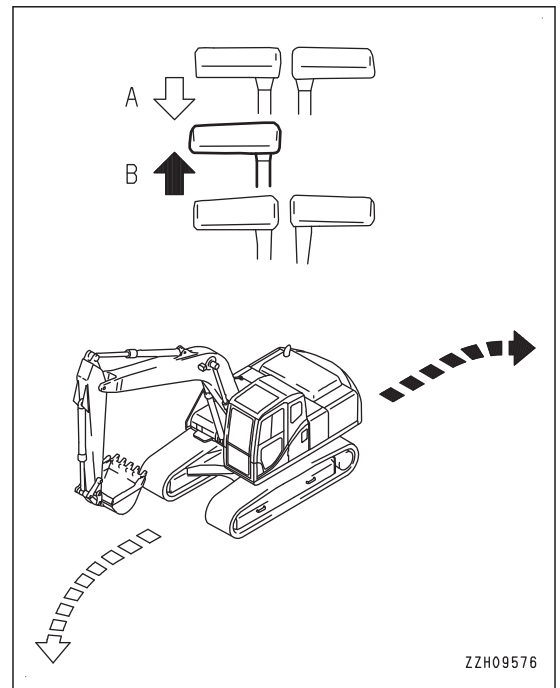
**CHANGE DIRECTION OF MACHINE**

When turning LEFT during straight travel

- (A): Forward left turn  
Return the left travel lever from FORWARD to NEUTRAL position.  
The machine turns forward LEFT.
- (B): Reverse left turn  
Return the left travel lever from REVERSE to NEUTRAL position.  
The machine turns in reverse LEFT.

**REMARK**

When turning to the forward RIGHT, return the right travel lever from FORWARD to NEUTRAL position. When turning to the reverse RIGHT, return the right travel lever from REVERSE to NEUTRAL position.

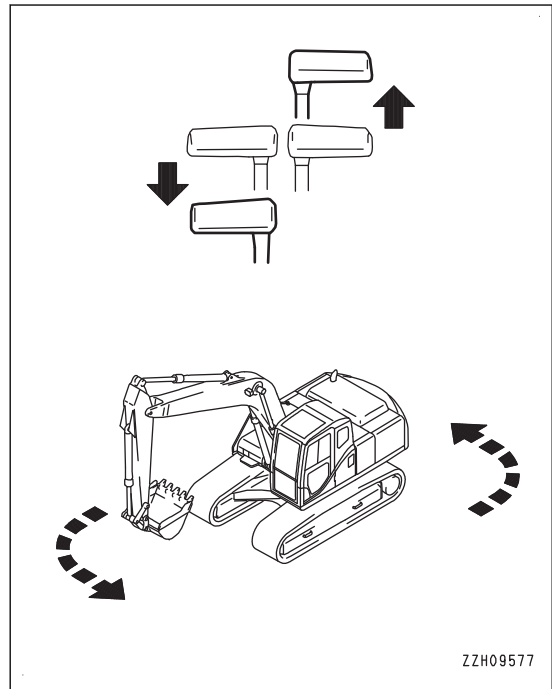


### COUNTER-ROTATION TURN

- Counter-rotation turn to left
  1. Pull the left travel lever toward you.
  2. Push the right travel lever forward.

The machine make a counter-rotation turn to the left.
- Counter-rotation turn to right
  1. Pull the right travel lever toward you.
  2. Push the left travel lever forward.

The machine make a counter-rotation turn to the right.



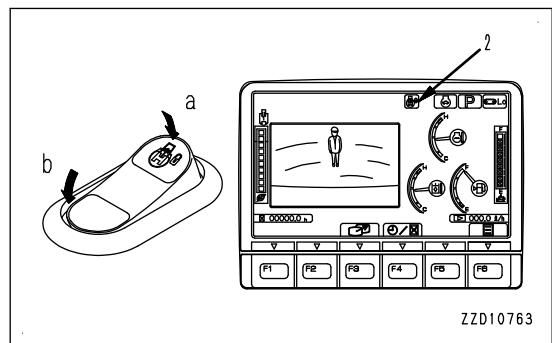
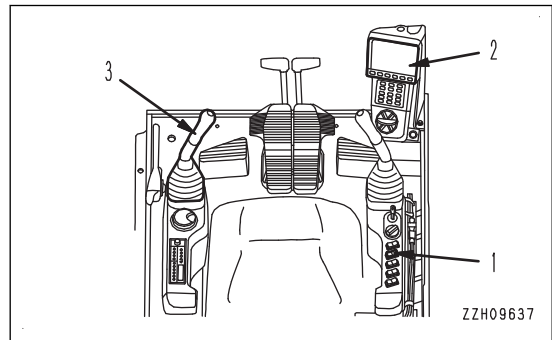
### METHOD FOR SWINGING MACHINE

#### **⚠ 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.

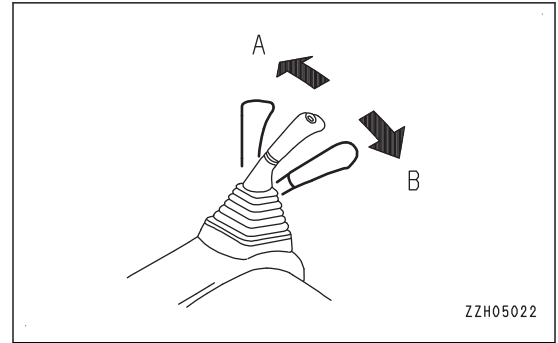




3. Operate L.H. work equipment control lever (3) to swing the upper structure.

(A): Swing LEFT

(B): Swing RIGHT

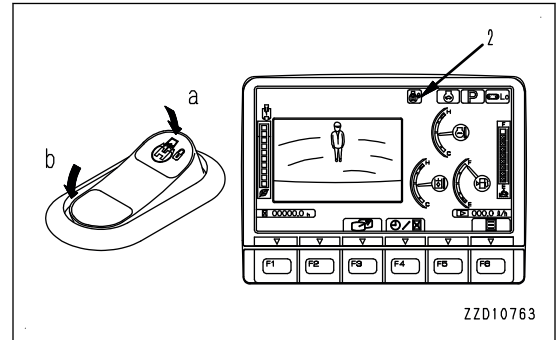


4. When not performing the swing, turn swing lock switch (1) ON (activated).

(a): ON position

(b): OFF position

5. Check that swing lock pilot lamp (2) is lit.



## METHOD FOR OPERATING WORK EQUIPMENT

### **⚠ WARNING**

If the levers are operated when the engine speed is decreased by the auto-deceleration function, the engine speed will suddenly increase. Operate the levers carefully.

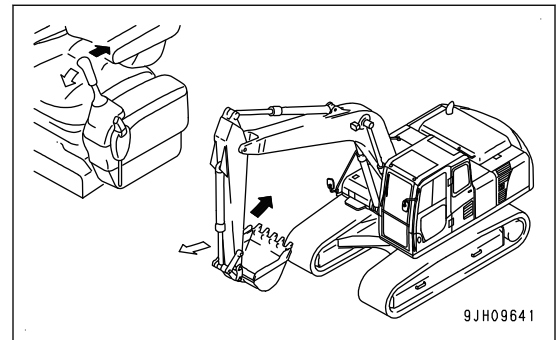
Use the R.H. and L.H. work equipment control levers to operate the work equipment.

When the levers are released, they return to NEUTRAL position and the work equipment is held in that position.

- Arm control

Move the L.H. work equipment control lever back and forth.

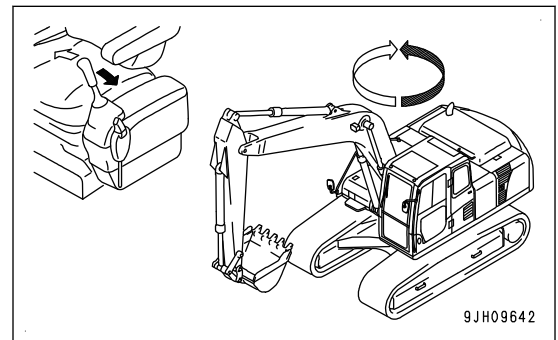
You can operate the arm.



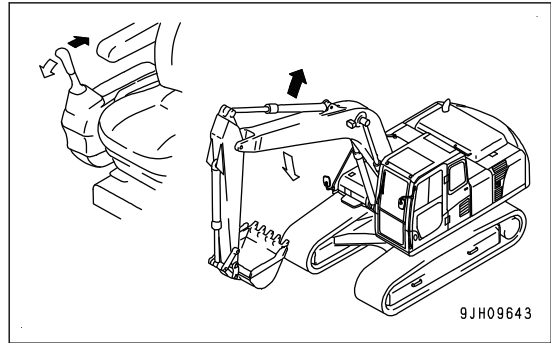
- Swing control

Move the L.H. work equipment control lever to the right and left.

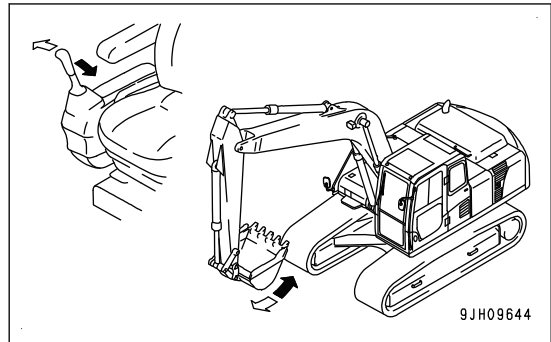
The upper structure swings.



- Boom control  
Move the R.H. work equipment control lever back and forth.  
You can operate the boom.



- Bucket control  
Move the R.H. work equipment control lever to the right and left.  
You can operate the bucket.



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**

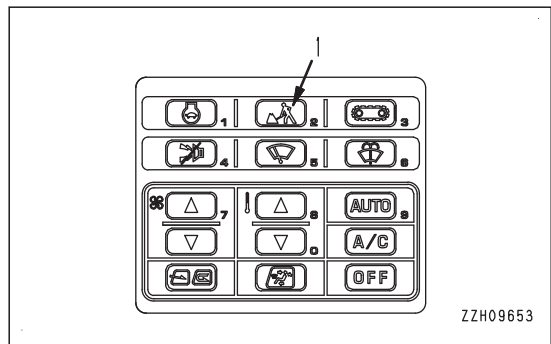
**METHOD FOR SELECTING WORKING MODE**

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.

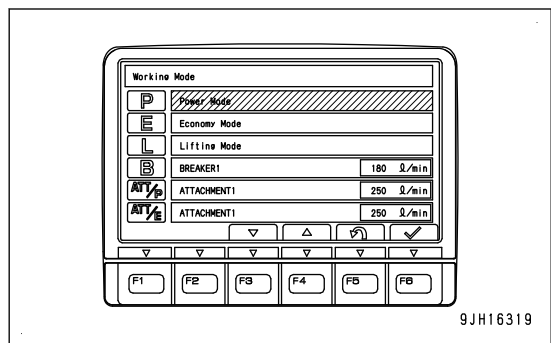
Use the following procedure to select the most efficient working mode.

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	Aligning position (fine control operations and lifting operations)



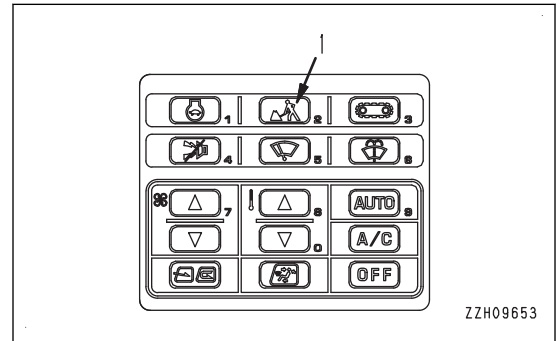
Working mode	Applicable operations
B mode	Breaker operations
ATT/P mode	Operations of double-acting attachment on crusher (production conscious operation)
ATT/E mode	Operations of double-acting attachment on crusher (fuel consumption conscious operation)

**NOTICE**

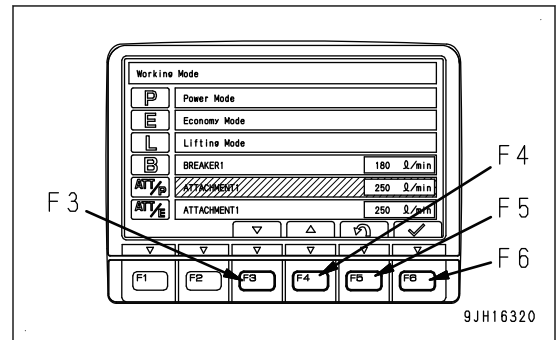
**If breaker operations are performed in a mode other than the breaker mode, there is danger of breakage of the hydraulic equipment. Do not perform breaker operations in any mode except the breaker mode.**

Set the working mode according to the following procedure.

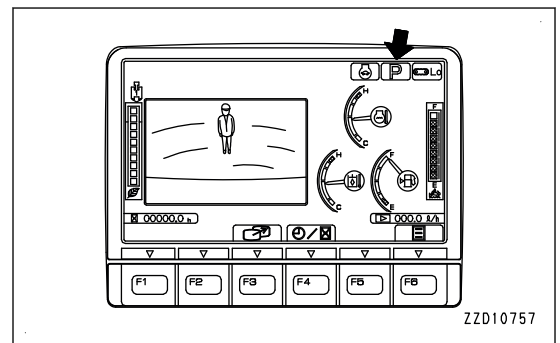
1. Press working mode selector switch (1).  
The screen changes to the working mode selection screen.



2. Press working mode selector switch (1) or function switch F3 or F4 to select the appropriate mode.



3. After selecting the desired mode, press function switch F6 to accept the change. The screen returns to the standard screen.  
If function switch F5 is pressed, the screen returns to the standard screen without changing the mode.

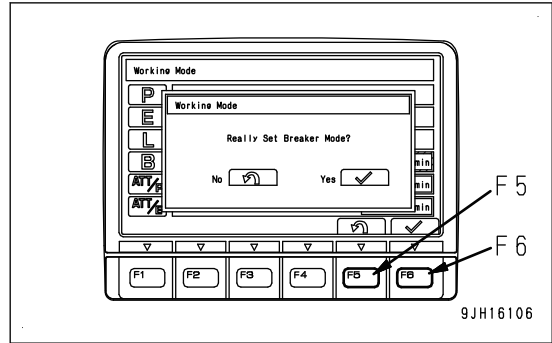


- If a working mode is selected, and nothing is done for 5 seconds, the selected working mode is automatically accepted and the screen returns to the standard screen.
- If a working mode is selected and working mode selector switch (1) is kept pressed, the selected mode is accepted and the screen returns 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.



### METHOD FOR USING ONE-TOUCH POWER MAXIMIZING FUNCTION

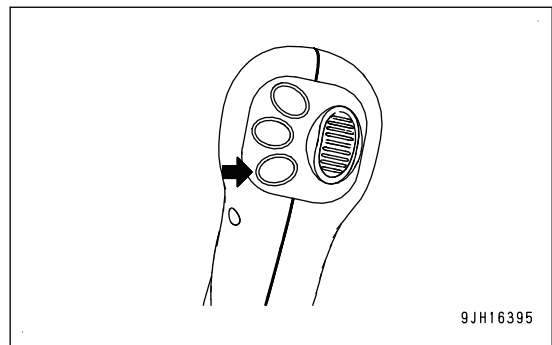
The operating power can be increased by a single touch during operation. Make effective use of this function whenever necessary in combination with the working mode.

Press the L.H. knob switch once and keep it pressed. The operating power increases as long as the switch is pressed.

**REMARK**

However, the increased power is automatically stopped after 8.5 seconds.

This function is not actuated when the working mode is set to L mode or B mode.



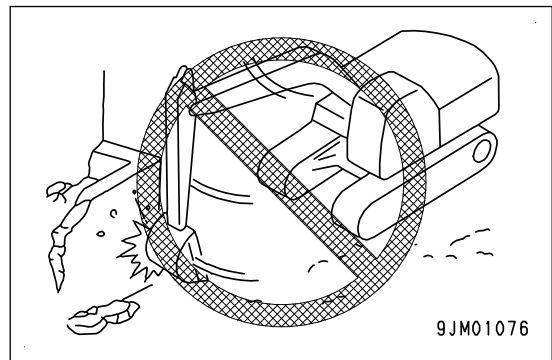
### PROHIBITED OPERATIONS

#### ⚠ 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.

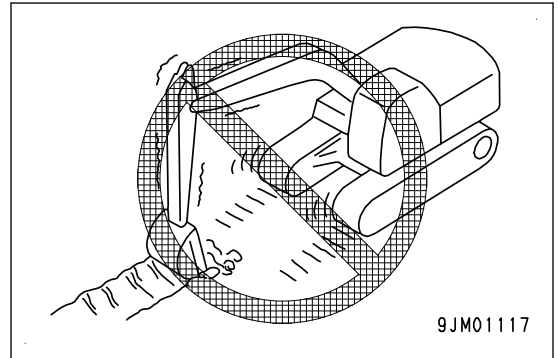
### PROHIBITION OF OPERATIONS USING SWING FORCE

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

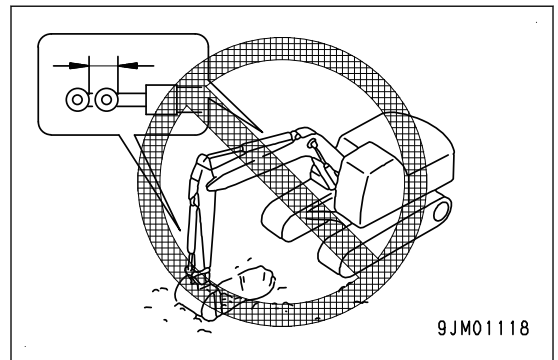
Do not use the travel force to perform excavation by digging the bucket into the ground. This damages the machine or work equipment.



9JM01117

### PROHIBITION OF OPERATIONS USING HYDRAULIC CYLINDERS TO STROKE END

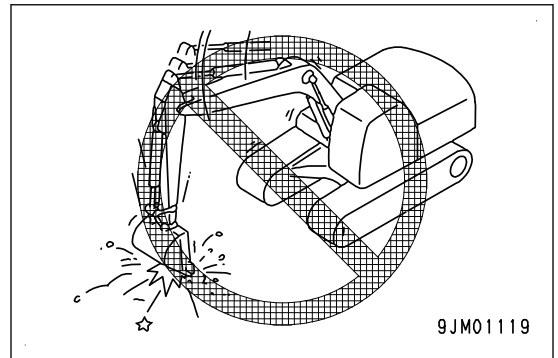
If the work equipment is used with the cylinder rod operated to its stroke end, and given impact by some external force, the hydraulic cylinders may be damaged, causing personal injury. Do not perform operations with the hydraulic cylinder fully retracted or fully extended.



9JM01118

### 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.

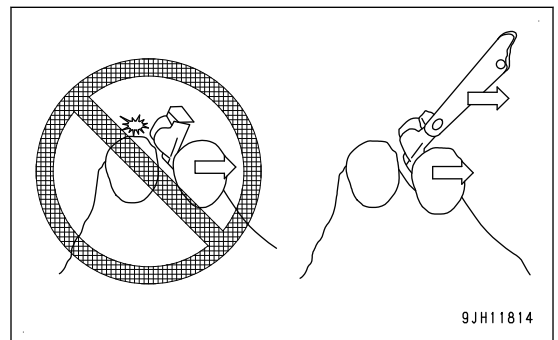


9JM01119

### 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.

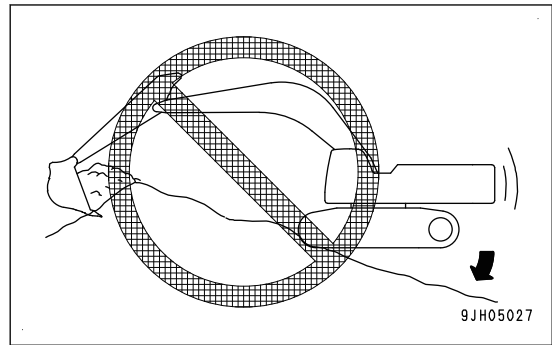
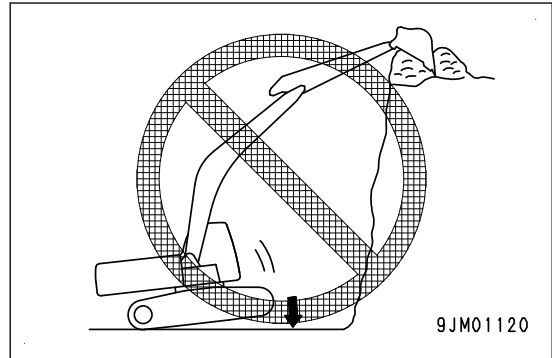
In this case, dig by using only the force of the arm or bucket. If an excessive force is applied, the safety valve of the hydraulic system controls it into a proper range to prevent breakage of the machine.



9JH11814

### PROHIBITION OF OPERATIONS USING MACHINE DROPPING FORCE

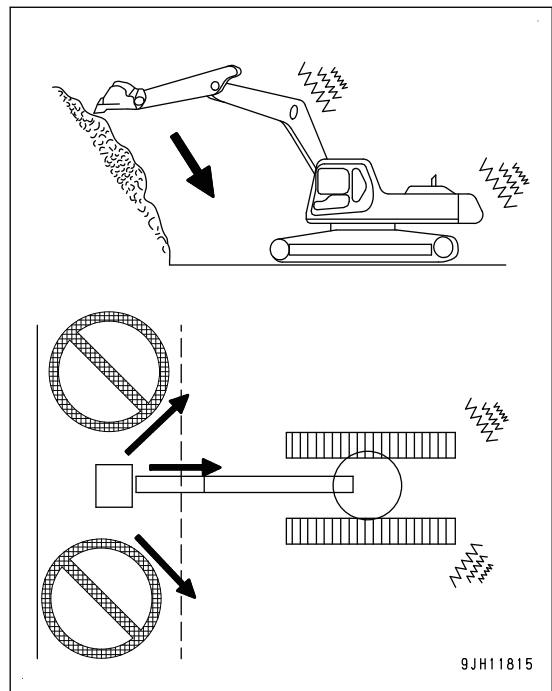
Do not use the dropping force of the machine for digging.



### 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.

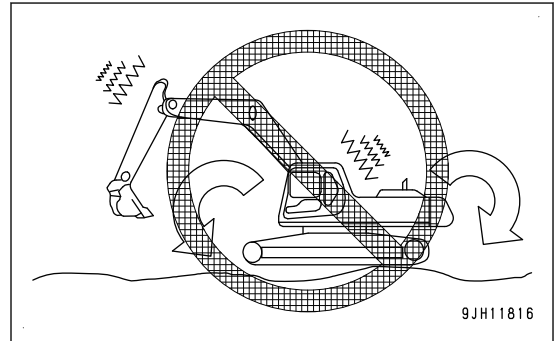


### PROHIBITION OF DIGGING OPERATION ON HARD ROCKY GROUND

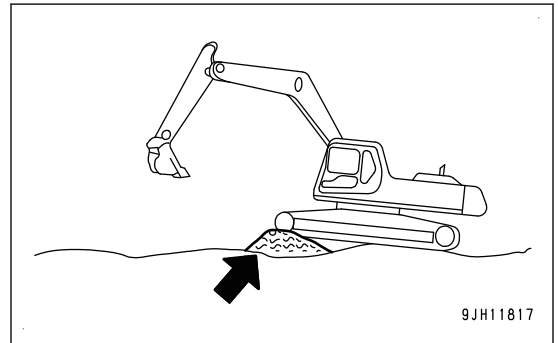
Do not attempt to directly excavate hard rocky ground with the work equipment. It is better to excavate it after breaking up by some other means. This will not only save the machine from damage but will make for better economy.

## 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.



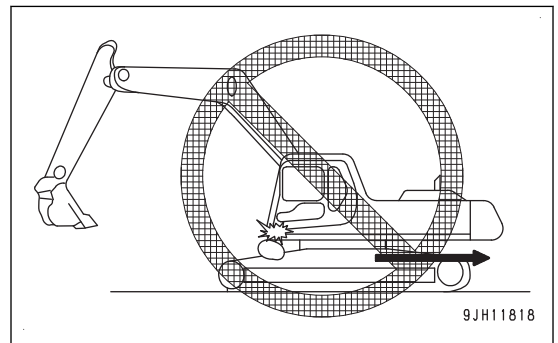
In this case, prepare an embankment, etc. in front of the track to stabilize the machine.



## PROHIBITION OF SWINGING OR TRAVELLING WHEN ROCK IS ON TOP OF TRACK ASSEMBLY

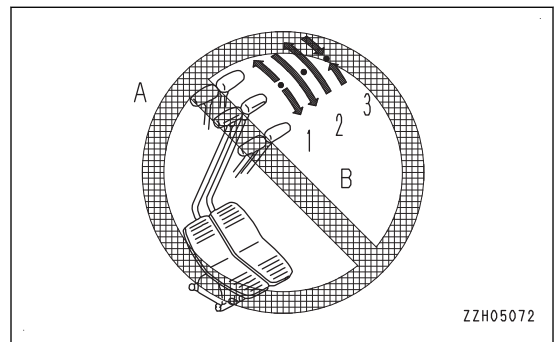
If the machine travels or swings with crushed stones, soil, or sand on the track, they hit and damage the undercover and frame. In the worst case, the hydraulic components are damaged and a serious accident can result.

During operation, keep checking the track top for crushed stones, soil, and sand.



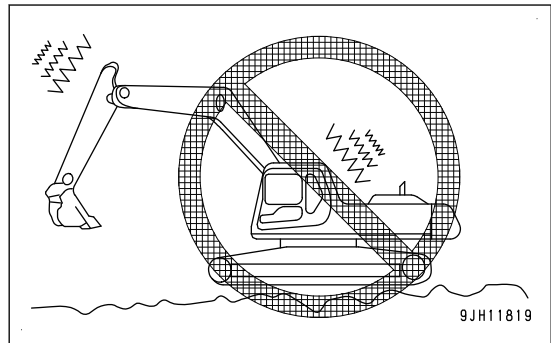
## PROHIBITION OF SUDDEN LEVER OR PEDAL SHIFT DURING HIGH SPEED TRAVEL

- (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.

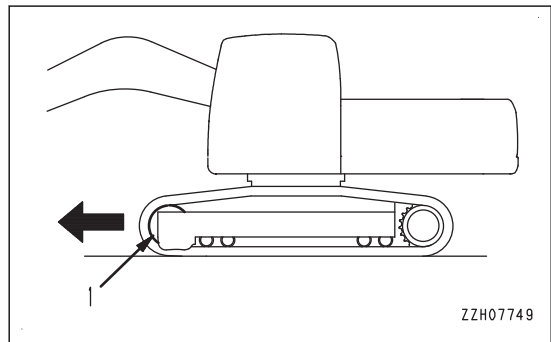


**PROHIBITION OF HIGH-SPEED TRAVEL OPERATIONS ON ROUGH GROUND**

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.



**DO NOT TRAVEL LONG -TIME CONTINUOUSLY**

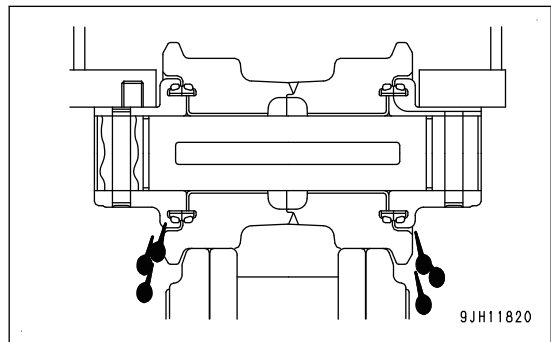
If the machine travels continuously at high speed for 1.5 hours or more, the temperature of lubricating oil inside the track rollers and final drive will rise up. This may cause breakage to the oil seal or leakage of oil.

When traveling continuously for a long time, stop the machine for 30 minutes every 1.5 hours for the lubricating oil inside the track rollers and final drive to cool down.

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 AND ADJUSTING TRACK TENSION (4-25)".

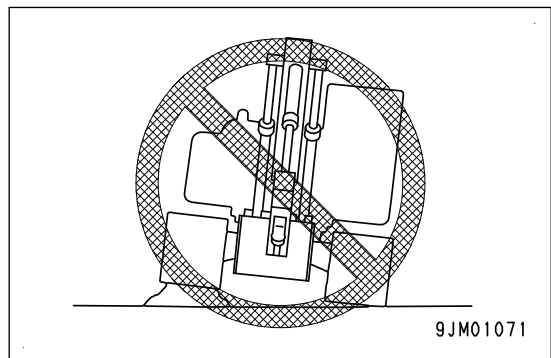


**PRECAUTIONS FOR OPERATION**

**PRECAUTIONS FOR TRAVELLING**

Travelling 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 travelling over such obstacles as far as possible.

If there is no way to avoid travelling over an obstacle, reduce the travel speed, keep the work equipment close to the ground, and try to drive the machine so that the centre of the track passes over the obstacle.

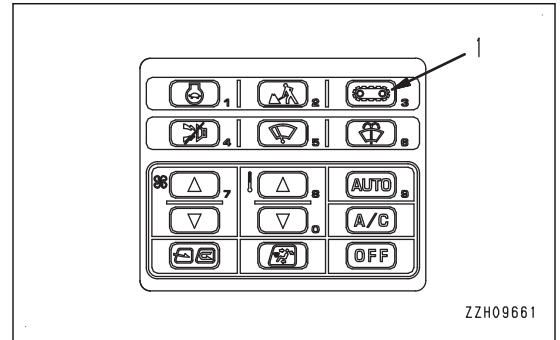




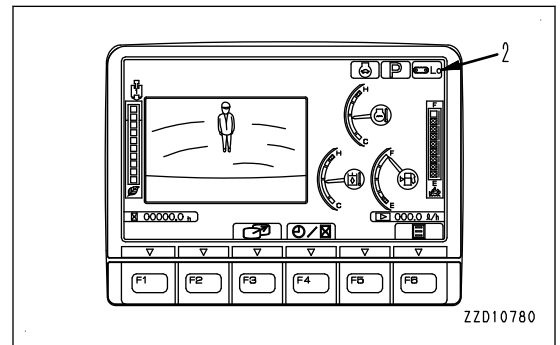
**PRECAUTIONS FOR HIGH SPEED TRAVEL**

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, set the idler in the forward direction.

- Each time travel speed selector switch (1) is pushed, travel speed changes repeatedly as Lo → Mi → Hi → Lo. The travel speed (Lo, Mi, Hi) is displayed on travel speed display (2).



ZZH09661

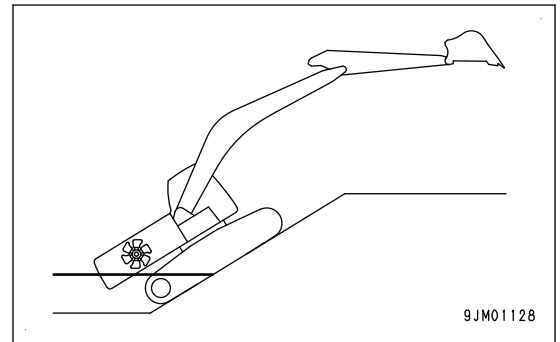


ZZD10780

**PERMISSIBLE DEPTH OF WATER, SOIL AND DIRT**

**NOTICE**

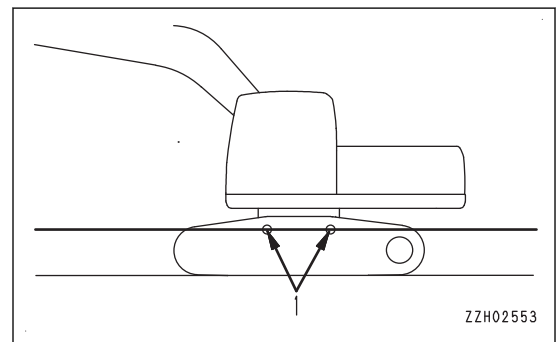
When driving the machine out of water, if the angle of the machine exceeds 15°, the rear of the upper structure will go under water, and water will be thrown up by the cooling fan. This may cause the fan to break. Be extremely careful when driving the machine out of water.



9JM01128

Do not drive the machine in water or soil or sand deeper than the center of upper 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)

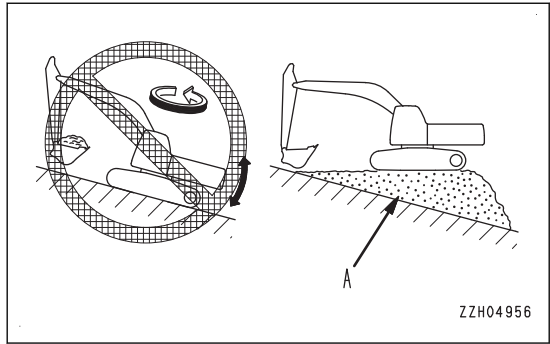


ZZH02553

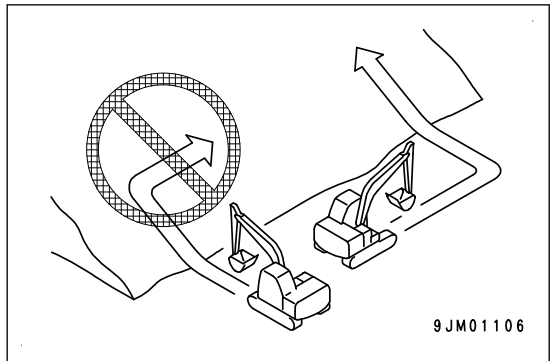
**PRECAUTIONS FOR WORKING ON SLOPE**

**⚠ WARNING**

- **Swinging operations or operating the work equipment on slopes machine may lose its balance and turn over. Avoid such operations as much as possible. It is particularly dangerous to swing downhill when the bucket is loaded. It is unavoidable to perform such operations, pile soil to make a platform (A) on the slope so that the machine can be 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 travelling, 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. Always go down to a flat place to perform these operations. It may be a longer way, but it will ensure safety.**
- **Always operate or travel in such a way that it is possible to stop safely at any time if the machine slips or becomes unstable.**
- **When travelling 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, don't travel uphill with this method.**
- **Never perform swing operation on a slope by using the left work equipment control lever if the engine stops. The upper structure will swing under its own weight.**
- **Do not open or close the door when the machine is on a slope. The operating effort may suddenly change. Always lock the doors of the operator's compartment in position regardless of whether it is open or closed.**

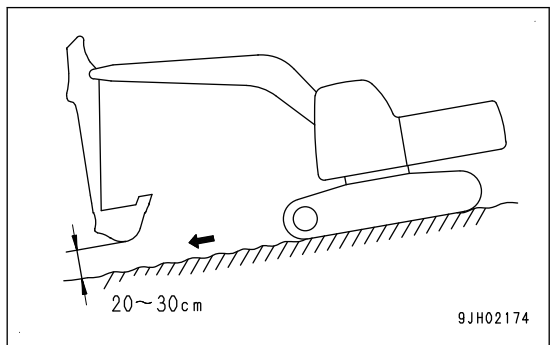


ZZH04956



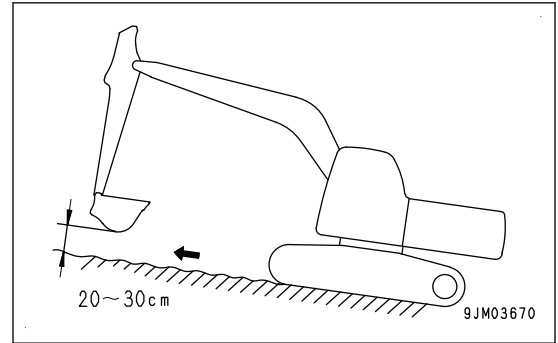
9JM01106

1. When travelling down steep hills, use the travel lever and fuel control dial to keep the travel speed low. When travelling down a steep hill of more than 15°, set the work equipment to the posture shown in the figure, and travel at low engine speed.

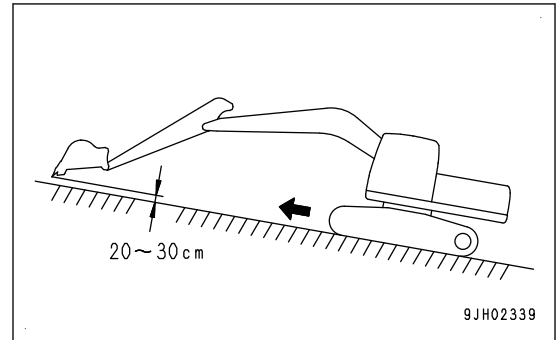


9JH02174

2. When travelling up a steep hill of more than 15°, set the work equipment to the posture shown in the figure.



When travelling 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 travel at low speed.



### Braking on downhill slope

Put the travel lever in NEUTRAL position. This will cause the brake to be automatically applied.

### If engine stops on slope

If the engine stops when travelling uphill, move the travel levers to NEUTRAL position, lower the bucket to the ground, stop the machine, then start the engine again.

### Pay attention to DEF level

Before working on a slope or travelling 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.

### Track on one side stuck

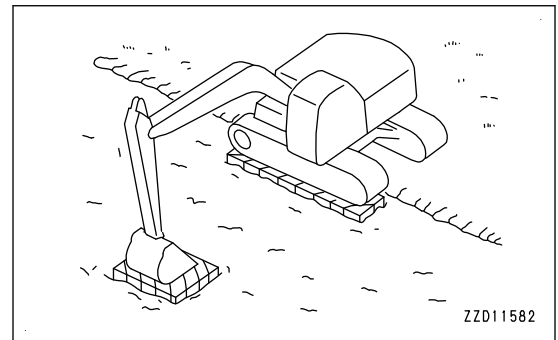
#### NOTICE

**When using the boom or arm to raise the machine, push the ground by using the bottom of the bucket.**

**At this time, set the angle between the boom and arm to 90 to 110°.**

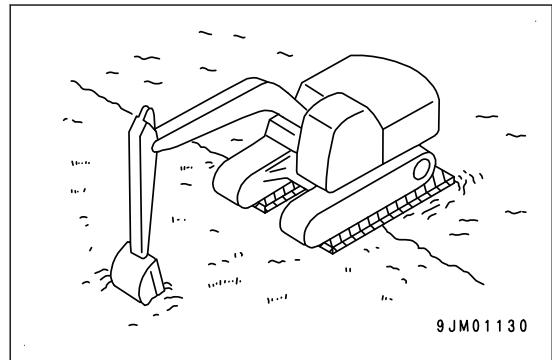
**The same applies when using the bucket installed in the reverse direction.**

When only one side is stuck in mud, raise the track by lowering the bucket to the ground on the stuck side. Lay boards or logs under the raised track. Then raise the bucket and drive the machine out.



**Tracks on both sides stuck**

When the tracks on both sides get stuck and slip, lay logs, wooden blocks, etc. according to the preceding procedure. Stick the bucket into the front ground, pull in the arm as in digging operation, and set the travel lever to FORWARD position to drive the machine out.



**RECOMMENDED APPLICATIONS**

In addition to the following, it is possible to further increase the range of applications by using various attachments.

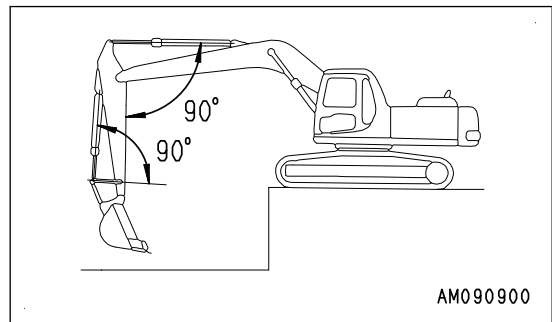
**DIGGING WORK**

**BACKHOE WORK**

It is suitable for excavating areas that are lower than the machine.

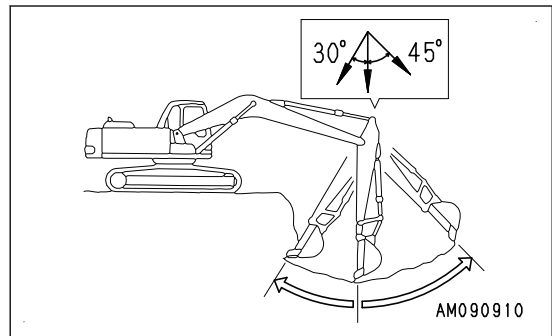
When the condition of the machine is as shown in the figure (angle between bucket cylinder and link, and between arm cylinder and arm is 90°), the maximum excavation force is obtained from the pushing force of each cylinder.

When excavating, you can optimize your working efficiency by using this angle effectively.



The range for excavating with the arm is from a 45° angle away from the machine to a 30° angle towards the machine.

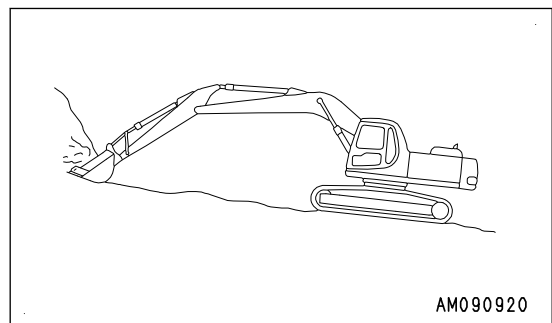
There may be some differences depending on the excavation depth, but try to stay within the above range rather than operating the cylinder to the end of its stroke.



**SHOVEL WORK**

This is suitable for excavating at a position higher than the machine.

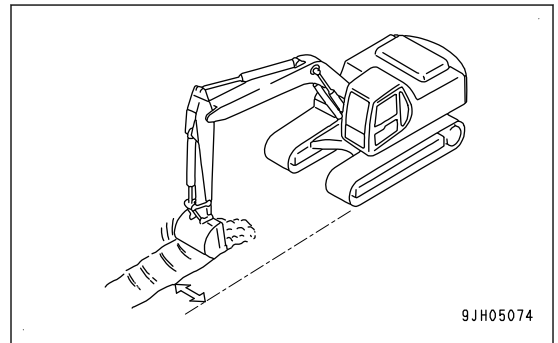
Shovel work is performed by attaching the bucket in the reverse direction.



## 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.

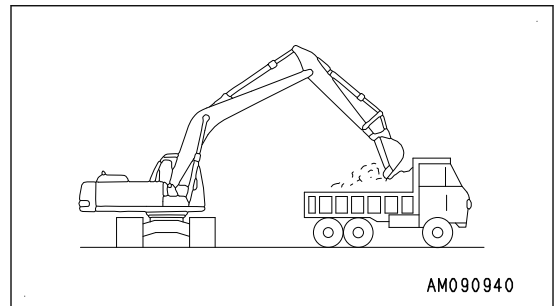
To excavate a wide ditch, first dig both sides and then finally remove the center portion.



## 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 greater if you begin from the rear of the dump truck body than if loading is done from the side.



## EFFECTIVE USE OF HYDRAULIC EXCAVATOR

### Operation for reducing fuel consumption

(Carbon dioxide emissions reducing operation)

The operating methods for reducing fuel consumption are as follows.

- Avoiding unnecessary engine idle running
- Avoiding hydraulic relief
- Running at low engine speed
- Reducing excavation at high position
- Operation at minimum swing angle
- Traveling at low engine speed

We can provide our users the training for operating methods to increase the productivity and to reduce the fuel consumption. Contact your Komatsu distributor for details.

## 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

Replace the bucket according to the following procedure.

1. Lower the bucket to the flat surface of the ground.

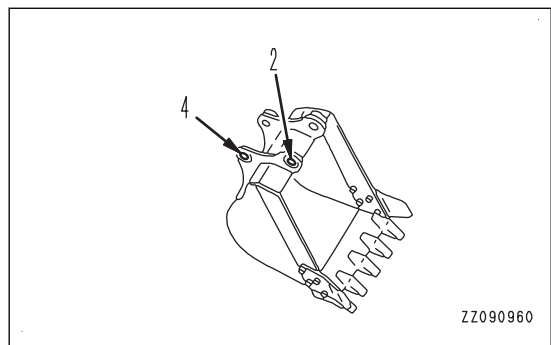
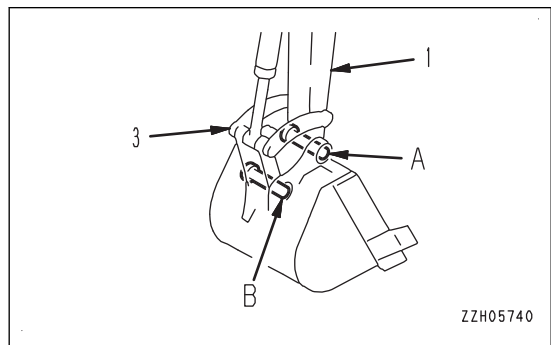
### NOTICE

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.

### 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.

2. Remove the double nuts on the stopper bolt for arm pin (A) and link pin (B), remove the bolt, pull out arm pin (A) and link pin (B), and then remove the bucket.



3. Align the pin hole of arm (1) with replacement bucket hole (2), then align the pin hole of link (3) with hole (4), and install pins (A) and (B) which are coated with grease.

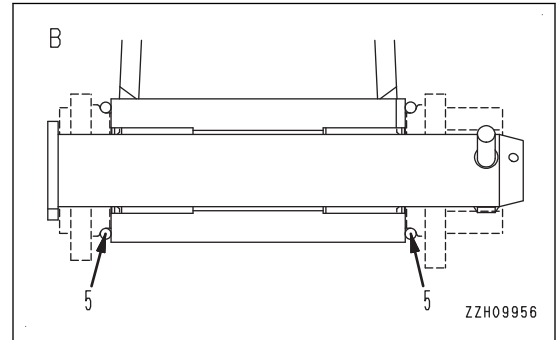
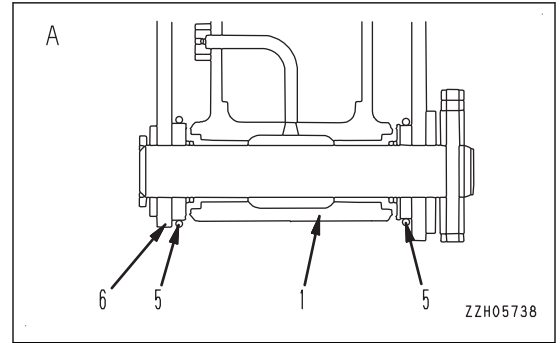
**REMARK**

When installing the bucket, for arm pin part (A), fit O-ring (5) to bucket (6) in the position shown in the figure. After inserting the pin, fit it in the regular groove. For link pin part (B), install the bucket with O-ring (5) fitted in the regular groove.

4. Install the stopper bolts and nuts for each pin, then grease the pins.

**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**

Invert the bucket according to the following procedure.

1. Lower the bucket to the flat ground.

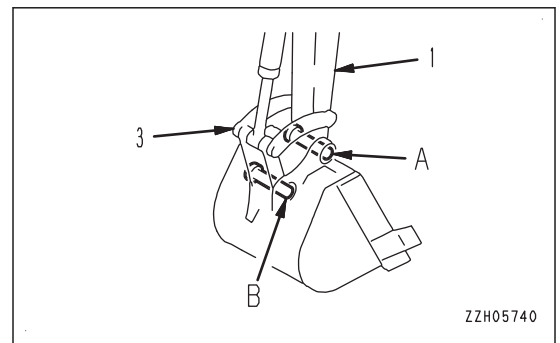
**REMARK**

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.

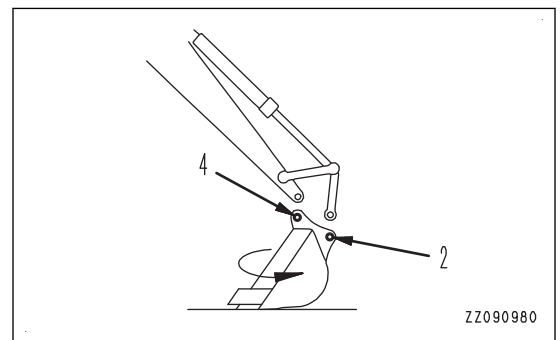
**NOTICE**

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.

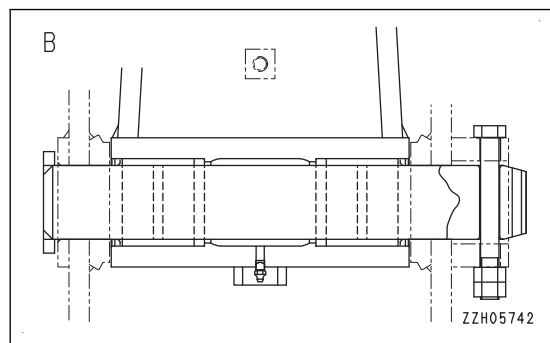
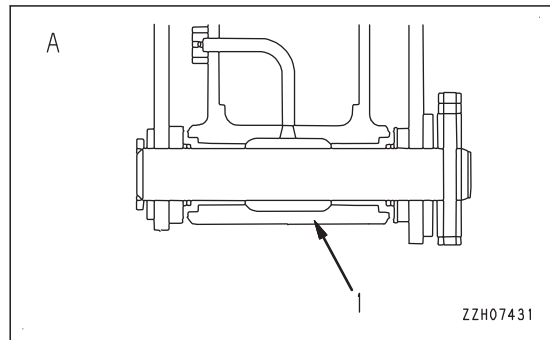
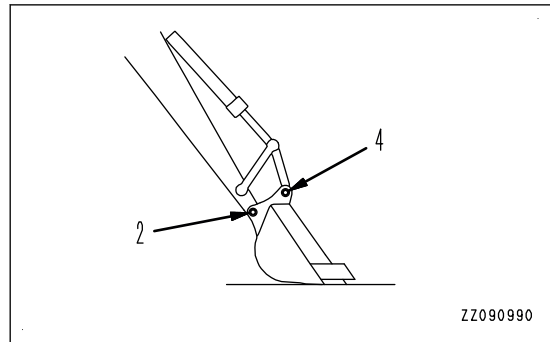
2. Remove the double nut of stopper bolt at arm pin (A) and link pin (B), then pull out the bolts.
3. Pull out arm pin (A) and link pin (B), then remove the bucket.



4. Invert the removed bucket.



5. Align the pin hole of arm (1) with replacement bucket hole (2), then align the pin hole of link (3) with hole (4), and install pins (A) and (B) which are coated with grease.



#### REMARK

**When inverting, do not install O-rings. Keep them until the next use.**

6. Install the stopper bolts and nuts for each pin, then grease the pins.

#### REMARK

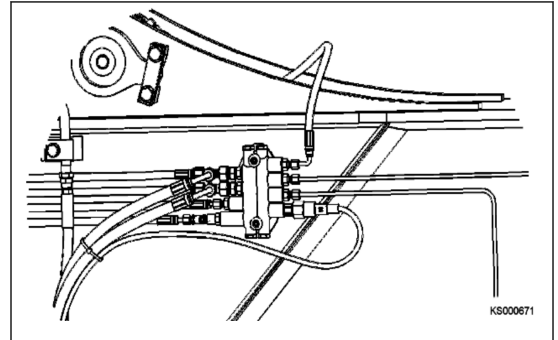
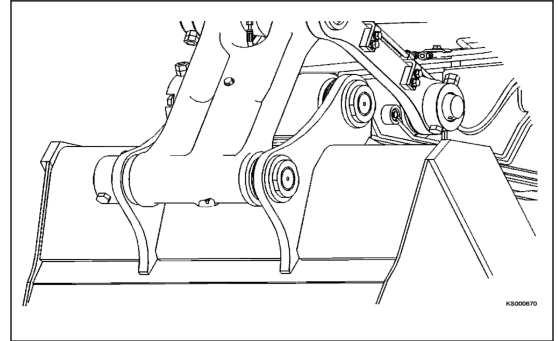
- Lubricate with grease thoroughly until the grease comes out from the end faces.
- When replacing the bucket, replace the dust seal with a new one if it is damaged. If a damaged one is used without being replaced, sand and dirt may enter the part of pin and cause abnormal wear of the pin.



**REMARK**

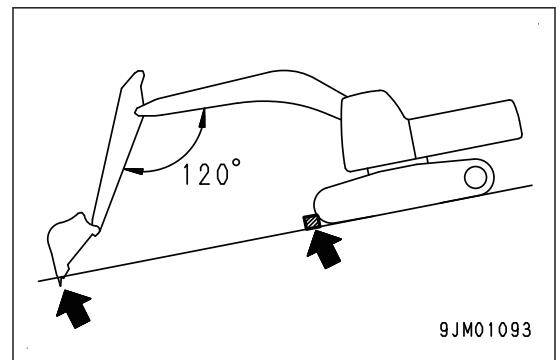
- Machines with Automatic Grease System require one time lubrication each time the bucket is changed. Lubricate at the bucket linkage and at the grease metering valve as indicated until grease comes out from the end faces. It will be necessary to replace the plug at the grease metering valve with a grease nipple during lubrication. The plug must be replaced after lubrication.

Grease metering valve for standard machines.

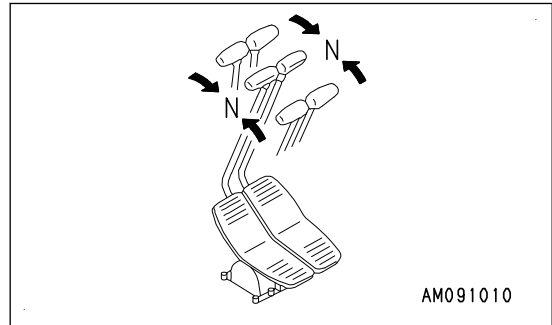
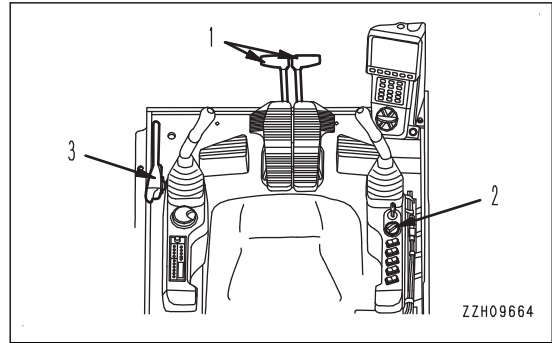
**METHOD FOR PARKING MACHINE**

**⚠ WARNING**

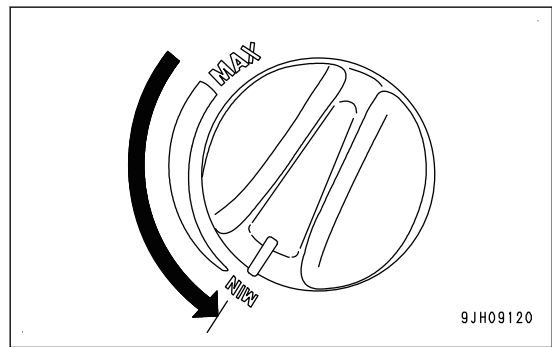
- Avoid a sudden stop. Stop the machine gradually.
- Place the machine on a firm and level place. Do not park the machine on a slope. If it is unavoidably necessary to park the machine on a slope, block the tracks from movement. As an additional safety measure, thrust the work equipment into the ground.
- If the control lever is touched by accident, the machine may move suddenly, and this may lead to a serious personal injury or death. Always set the lock lever securely to LOCK position before leaving the operator's seat.



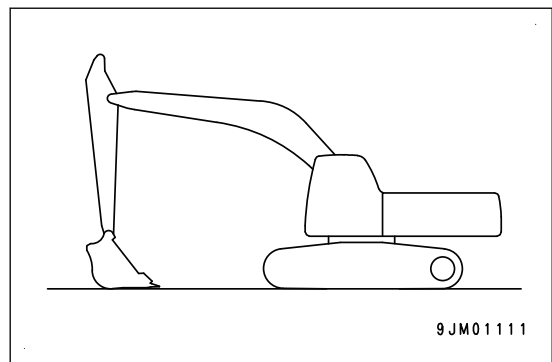
- Put right and left travel levers (1) in NEUTRAL position.  
The machine stops.



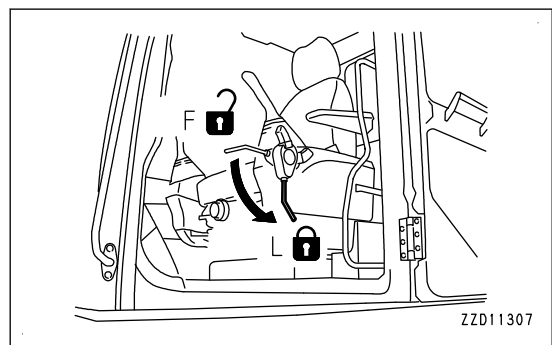
- Turn fuel control dial (2) to Low idle (MIN) position and lower the engine speed.



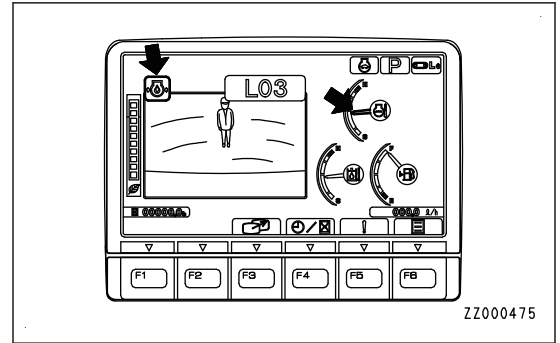
- Lower the bucket horizontally until the bottom touches the ground.



- Set lock lever (3) in LOCK position (L).



5. 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 (3-260)”.
  - If the engine oil pressure caution lamp is lit, stop the engine immediately. Then, inspect and take necessary remedy according to “TROUBLES AND ACTIONS (3-260)”.



6. Stop the engine.

For the stopping procedure of the engine, see “METHOD FOR STOPPING ENGINE (3-181)”.

## METHOD FOR CHECKING AFTER FINISHING WORK

After finishing the work, always perform the following check and cleaning.

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 mud, etc. from the undercarriage, if any.

## LOCK

### Lock position

Always lock the following places.

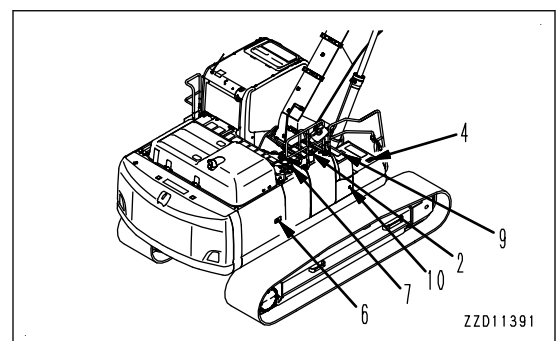
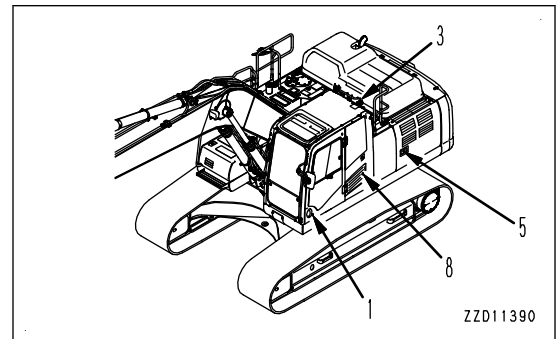
- (1) Operator's cab door

Always close the window.

- (2) Fuel tank filler cap
- (3) Engine hood
- (4) Tool case cover
- (5) Left side cover of the machine
- (6) Right side cover of the machine
- (7) Hydraulic tank oil filler cap
- (8) Air conditioner FRESH air filter intake port
- (9) DEF tank filler cap cover
- (10) DEF pump cover

### REMARK

Use the starting switch key to lock and unlock all these places.



## METHOD FOR OPENING AND CLOSING CAP WITH LOCK

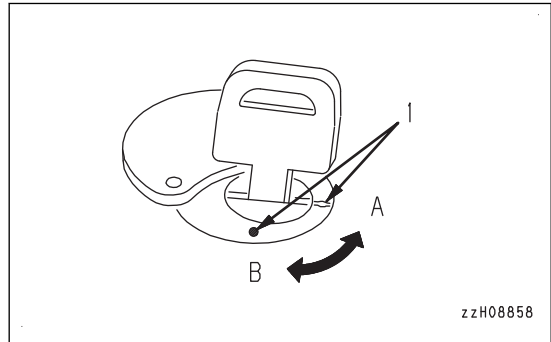
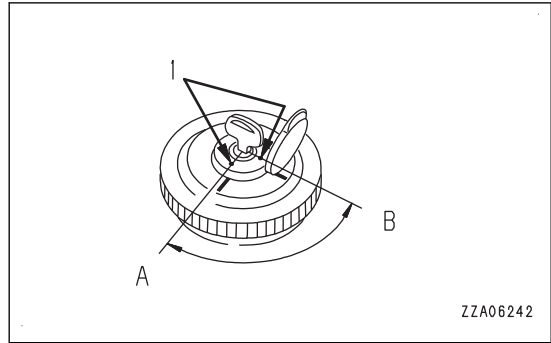
### PROCEDURE FOR OPENING CAP WITH LOCK

1. Insert the key into the key slot.

- 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**

- Screw in the cap until it becomes tight, then insert the key into the key slot.
- Turn the starting switch key to CLOSE position (B), then remove the key.

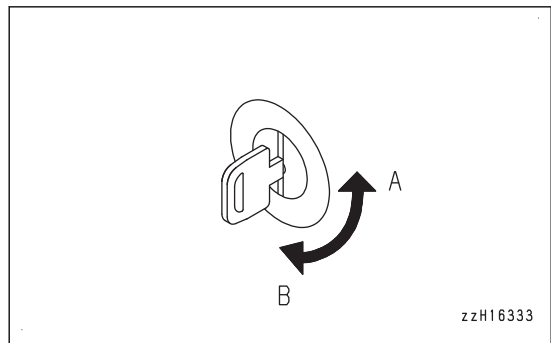
**METHOD FOR OPENING AND CLOSING COVER WITH LOCK**

**METHOD FOR OPENING COVER WITH LOCK**

- Insert the key into the key slot.
- Turn the key counterclockwise and open the cover by pulling the cover handle.

Position (A): OPEN

Position (B): LOCK



**METHOD FOR LOCKING COVER WITH LOCK**

- Close the cover and insert the key into the key slot.
- Turn the starting switch key to CLOSE position (B), then remove the key.

## METHOD FOR OPENING AND CLOSING ENGINE HOOD

### ⚠ CAUTION

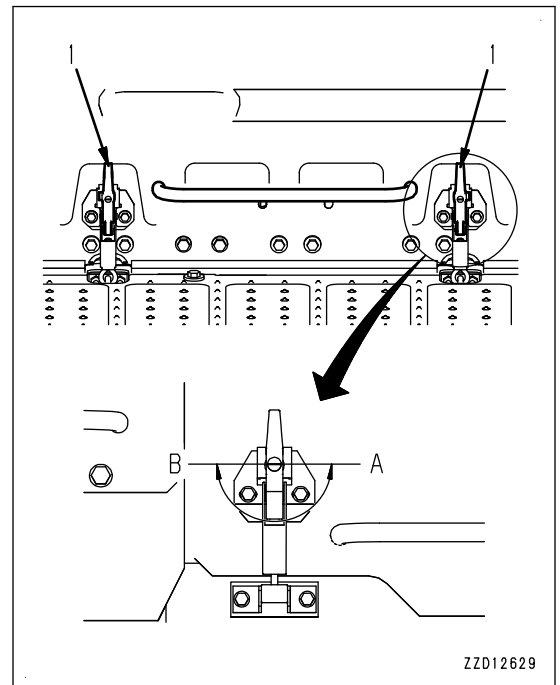
- When opening or closing the engine hood, place the machine on a level ground, lower the work equipment to the ground, stop the engine, then perform the operation.
- When opening the engine hood, do not release the handle until the stay is set in the lock position securely.
- When closing the engine hood, hold the handle securely since the engine hood may move down because of its 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 and aftertreatment devices are still hot. Accordingly wait until they have cooled down before opening or closing the engine hood.

## METHOD FOR OPENING ENGINE HOOD

1. Stop the machine on a level ground, lower the work equipment to the ground, then stop the engine.
2. Insert the key into the key slot.
3. Turn the key counterclockwise (A) and remove it.

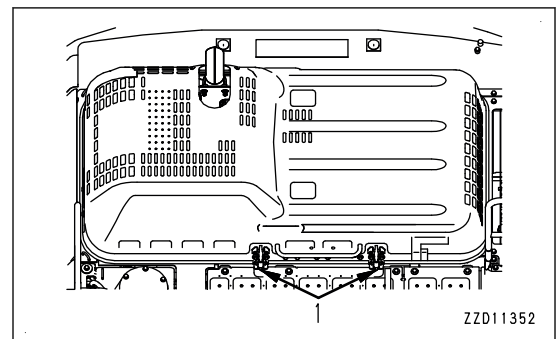
Position (A): OPEN

Position (B): CLOSE (LOCK)



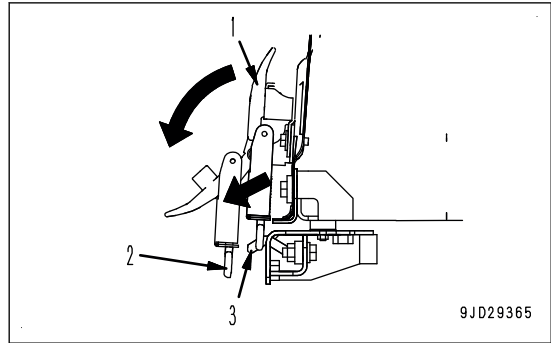
ZZD12629

4. Pull R.H. and L.H. levers (1) toward you.



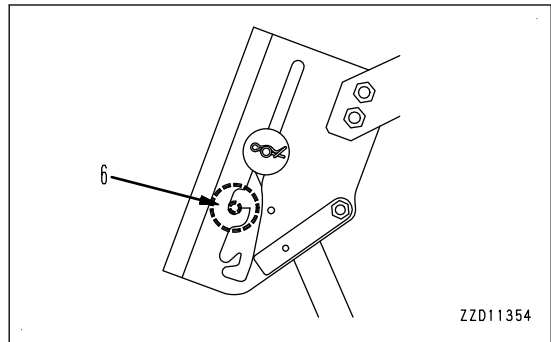
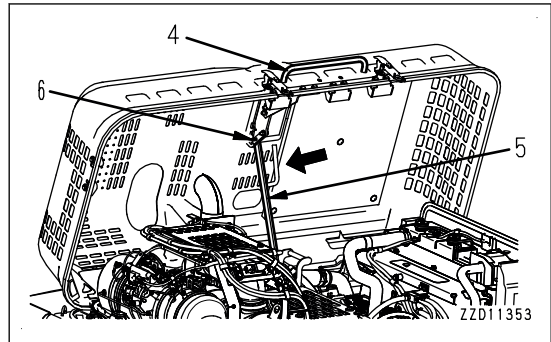
ZZD11352

5. Take off hoop portion (2) from hook (3).



6. Hold knob (4) and pull up the engine hood.  
7. Push stay (5) in the direction of the arrow and set it in intermediate LOCK position (6) securely.

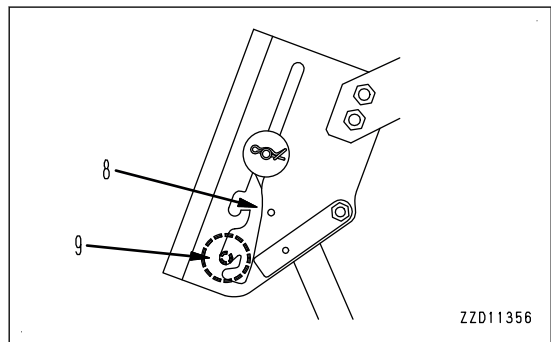
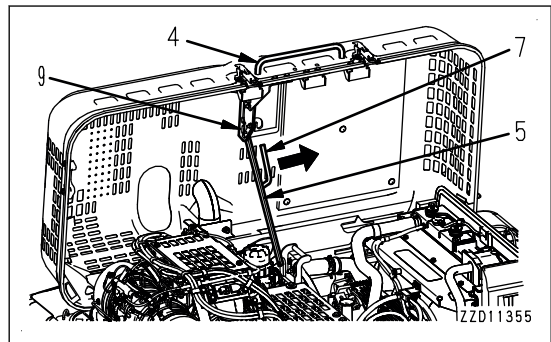
The engine hood can be locked at 2 different opening angles. However, lock it to intermediate LOCK position (6) usually for inspection etc.



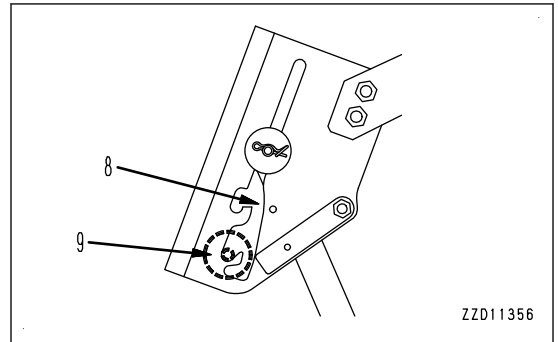
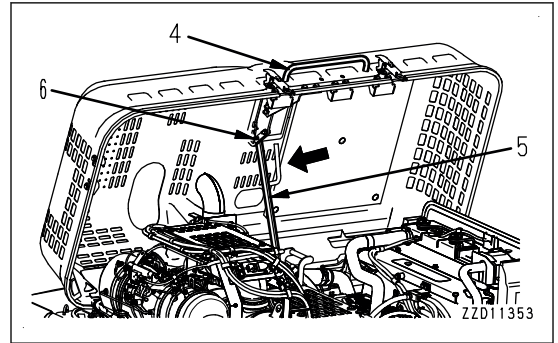
8. To open the engine hood fully, perform the following procedure.

- 1) Hold knob (4) and pull down the engine hood.
- 2) Hold knob (7) and pull stay (5) in the direction of the arrow.

Stay (5) stops first at branch portion (8) of the guide groove.

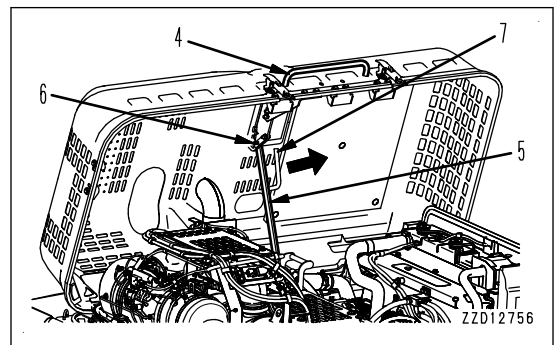


- 3) While pushing stay (5) in the direction of the arrow, open the engine hood.
- 4) Set stay (5) in LOCK position (9).



**METHOD FOR LOCKING ENGINE HOOD**

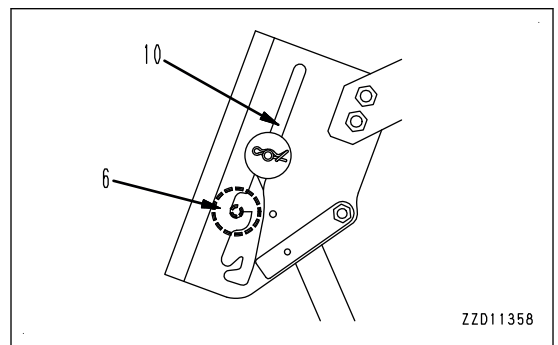
1. Hold knob (4) and support the engine hood.
2. Hold knob (7), pull stay (5) in the direction of the arrow, and remove stay (5) from intermediate LOCK position (6).



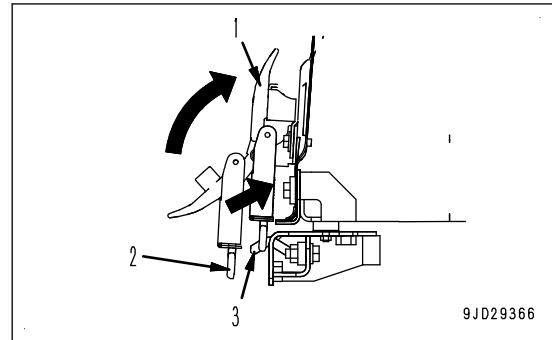
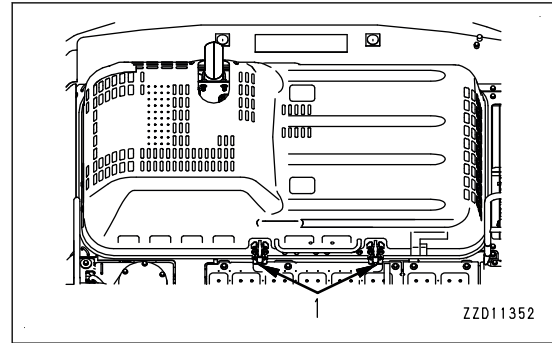
3. Check that stay (5) is set in guide groove (10), and then lower the engine hood.

**CAUTION**

Do not lower the engine hood forcibly while stay (5) is not set in guide groove (10). If you do so, stay (5) may be deformed.  
Do not release knob (4) until the engine hood is lowered fully.



4. Hitch hoops (2) of R.H. and L.H. levers (1) to hooks (3).
5. Pull up levers (1) and lock them.



## METHOD FOR OPENING AND CLOSING DEF TANK FILLER CAP COVER

### CAUTION

- When opening or closing the DEF tank filler cap cover, place the machine on a level place, lower the work equipment to the ground, stop the engine, then perform the operation.
- When opening it, do not release the handle until the stay is set in the lock position securely.
- When closing it, hold the handle securely since the DEF tank filler cap cover may move down because of its own weight.  
If it is not locked, it may close suddenly because of wind, etc.

## METHOD FOR OPENING DEF TANK FILLER CAP COVER

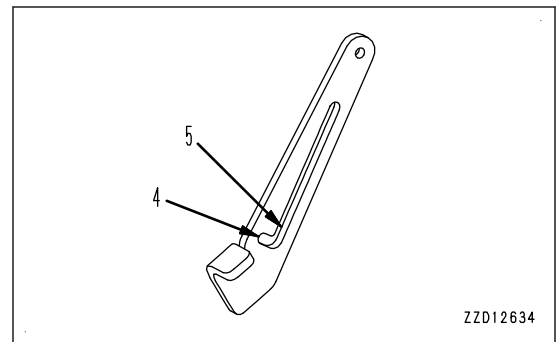
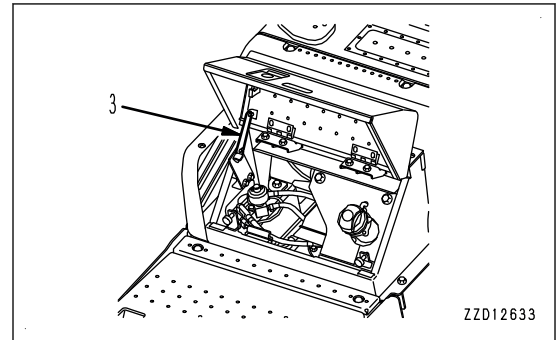
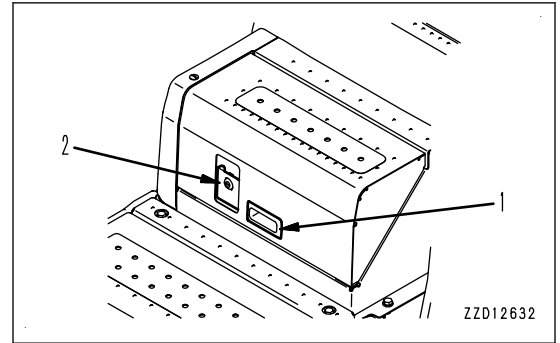
1. Stop the machine on a level ground, lower the work equipment to the ground, then stop the engine.
2. Insert the key into the key slot.
3. Turn the key counterclockwise and remove it.

Position (A): OPEN

Position (B): CLOSE (LOCK)



4. Hold grip (1), unlock lock (2), and pull up the cover.
5. Set stay (3) securely in position (4) to lock it.

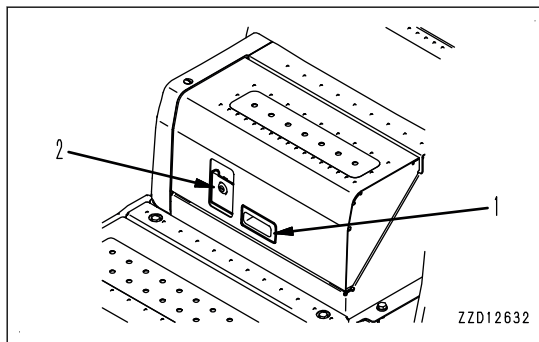
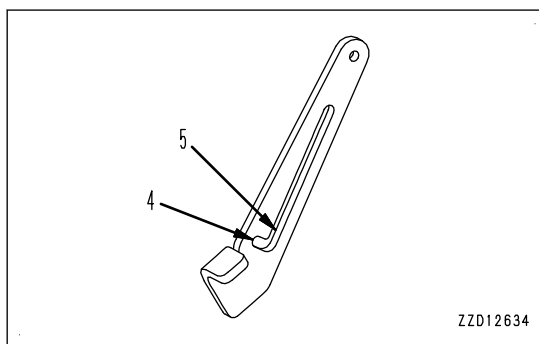
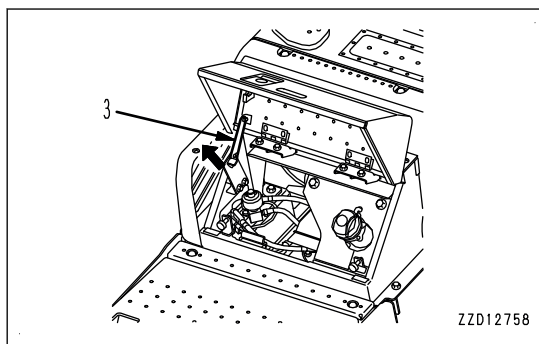


**METHOD FOR LOCKING DEF TANK FILLER CAP COVER**

1. Hold handle (1), and pull up stay (3) to the direction of the arrow while supporting the cover.
2. Remove stay (3) from lock position (4).
3. Check that stay (3) is set in guide groove (5), and then lower the cover.  
Check that lock (2) is applied.
4. Turn the key clockwise to lock, and remove it.

Position (A): OPEN

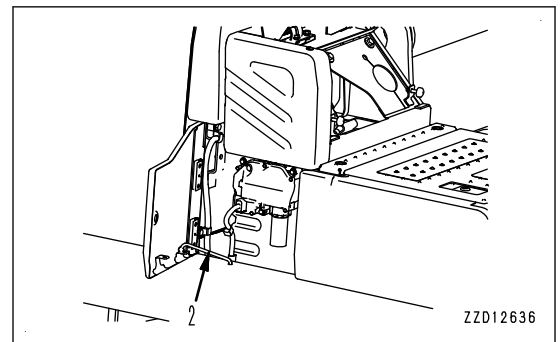
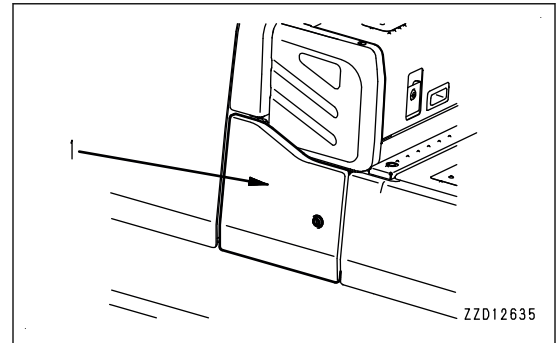
Position (B): CLOSE (LOCK)



## METHOD FOR OPENING AND CLOSING DEF PUMP COVER

### METHOD FOR OPENING DEF PUMP COVER

1. Unlock cover (1) at the right front of the machine with the starting switch key.
2. Open cover (1) with your hand, and latch lock stay (2).



### METHOD FOR LOCKING DEF PUMP COVER

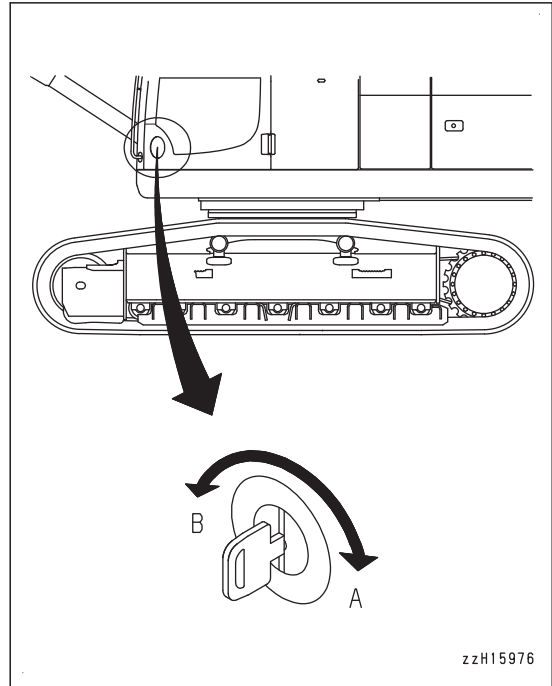
1. Unlatch lock stay (2) and close cover (1).
2. Lock cover (1) with the starting switch key.  
Do not forget to pull the starting switch key out.

## METHOD FOR OPENING AND CLOSING CAB DOOR

### When opening the door (locked door)

1. Insert the key into the key slot.
2. Turn the key clockwise to unlock the key, then open the door handle.  
Position (A): OPEN

Position (B): CLOSE (LOCK)



### When locking the door

1. Close the door and insert the key into the key slot.
2. Turn the starting switch key to CLOSE position (B), then remove the key.

# HANDLE AIR CONDITIONER

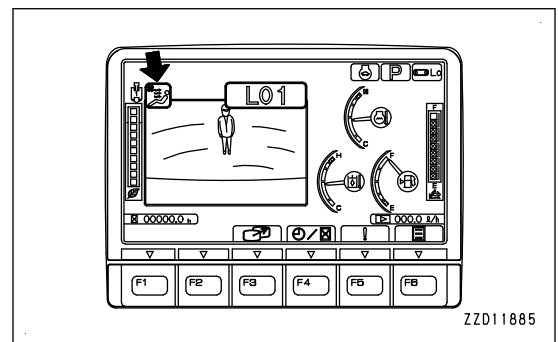
## NOTICE

- When performing running-in of 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 failure. Take care not to let water get on them. In addition, never bring any open flame near them.
- For the auto function of the air conditioner to work properly, always keep the sunlight sensor clean. Do not leave anything around the sunlight sensor that may interfere with its sensor function.

When the air conditioner is not used every day, to prevent loss of the film of oil at various parts, run the air conditioner with the engine at low speed from time to time and perform cooling or dry heating for several minutes.

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

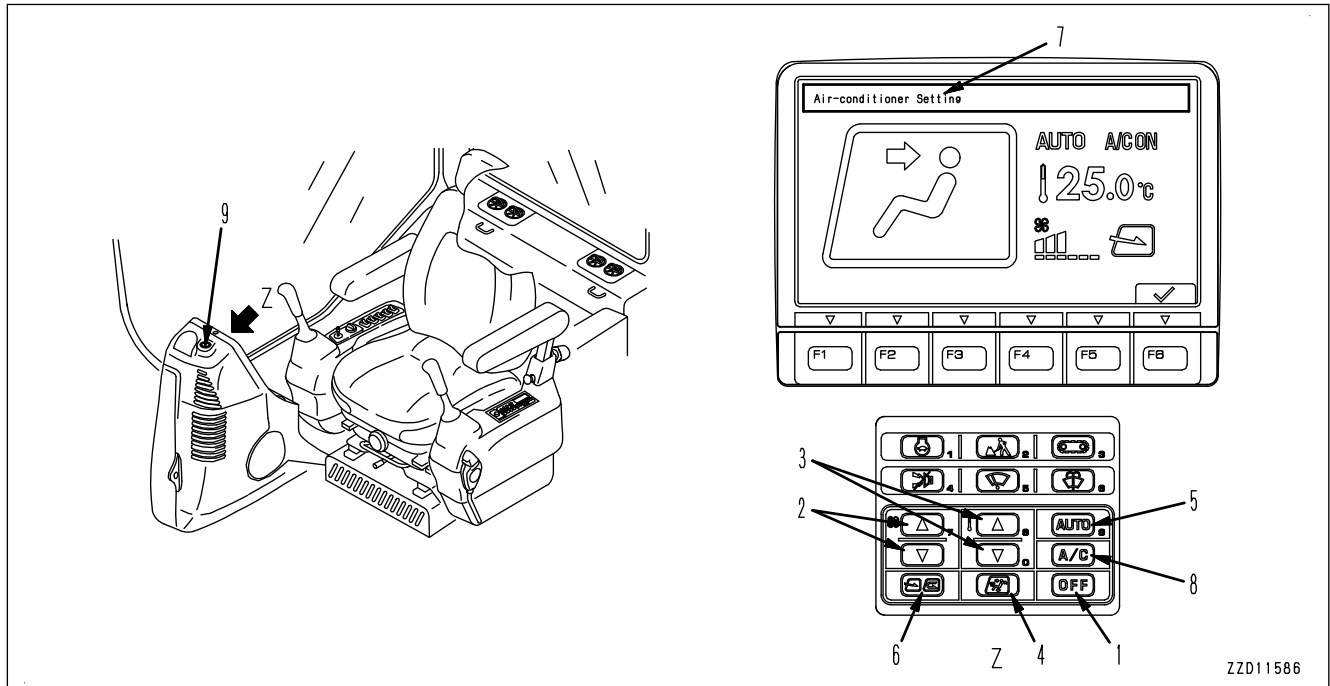
- When running the air conditioner for a long time, turn the lever to FRESH position once an hour to perform ventilation and cooling.
- If you smoke when the air conditioner is on, the smoke may hurt your eyes. In such case, open the window and turn the lever to FRESH for a while for ventilation and driving smoke out.

## Temperature control

For reasons of health, it is said that the optimum setting for cooling is the temperature when it feels slightly cool (5 to 6 °C {9 to 10.8 °F} lower than the ambient temperature) when you enter the cab.

Be careful to select the appropriate temperature.

### EXPLANATION OF AIR CONDITIONER EQUIPMENT



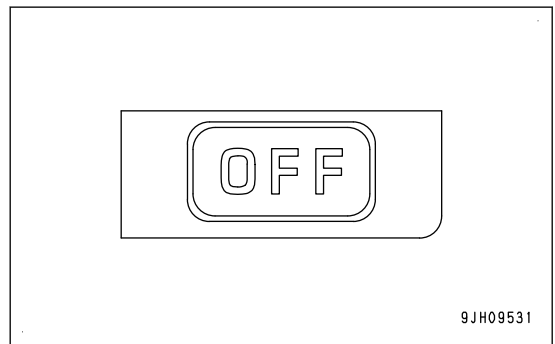
- (1) OFF switch
- (2) Fan switch
- (3) Temperature control switch
- (4) Vent selector switch
- (5) Auto switch
- (6) FRESH/RECIRC air selector switch
- (7) Display monitor
- (8) Air conditioner switch
- (9) Sunlight sensor

#### 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.



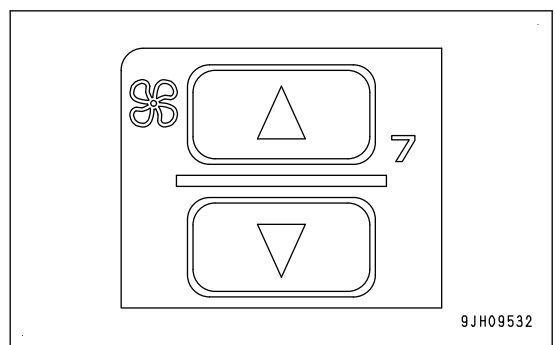
9JH09531

#### 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.



9JH09532

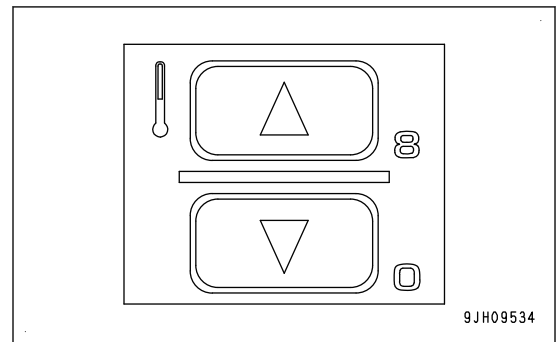
**Monitor display and air flow**

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  $\Delta$  switch to raise the set temperature; press the  $\nabla$  switch to lower the set temperature.
- 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

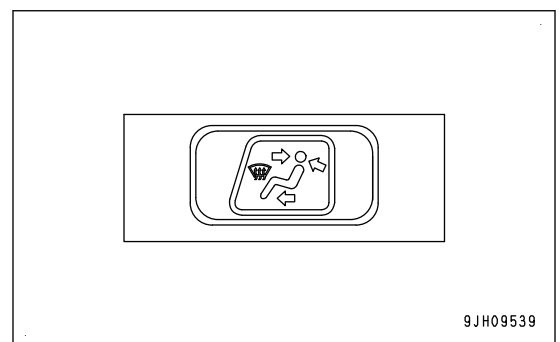
**REMARK**

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.

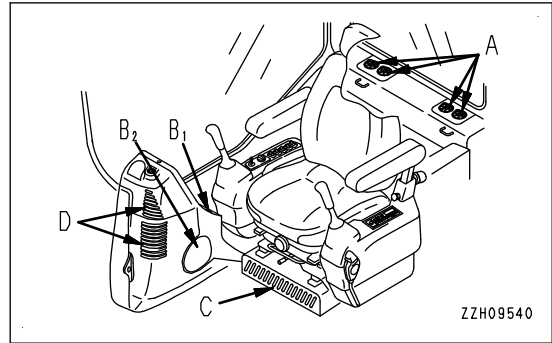
**VENT SELECTOR SWITCH**

The vent selector switch is used to select the vents.

- When vent selector switch is pressed, the LC display on the monitor display switches and air blows out from the vents displayed.
- During automatic operation, the vents are automatically selected.



- (A): Rear vent (4 places)
  - (B1): Face vent (1 place)
  - (C): Foot vent (1 place)
  - (D): Front window glass vent (2 places)
  - (B2): Front window glass vent (1 place)
- Air blows out from the vents marked with ○.

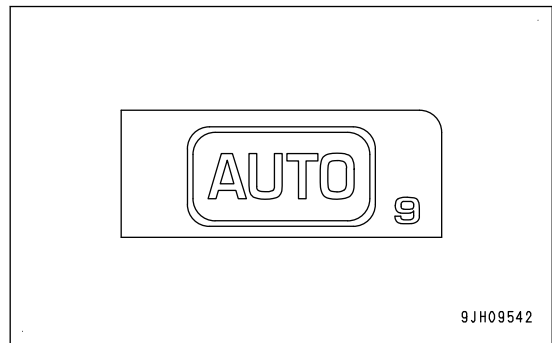


LCD display	Air vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Front vent		○			Not selected in auto mode
	Front and rear vents	○	○			-
	Front, rear, and foot vents	○	○	○		-
	Foot vent			○		-
	Foot vent Defroster vent			○	○	Not selected in auto mode
	Defroster vent				○	Not selected in auto mode

**AUTO SWITCH**

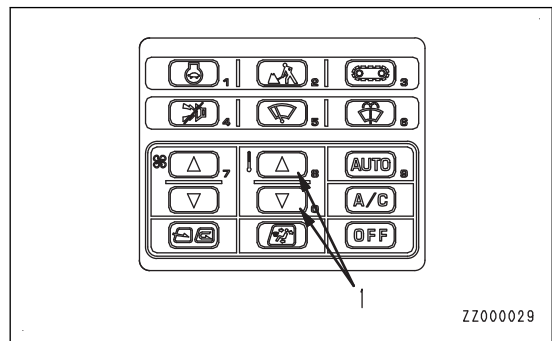
Use the auto switch for automatic selection of the air flow, vents, and air source (FRESH/RECIRC) according to the set temperature.

- 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.





### 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.

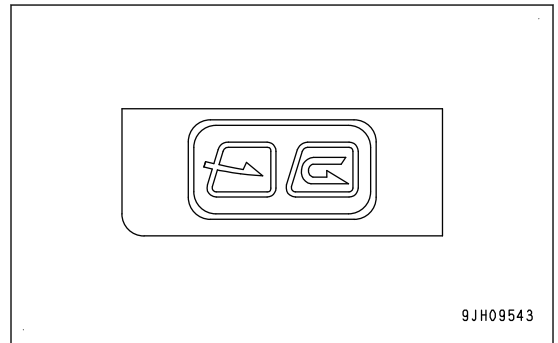
During automatic operation, the selection of inside air (RECIRC) and outside air (FRESH) is performed automatically.

#### 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.

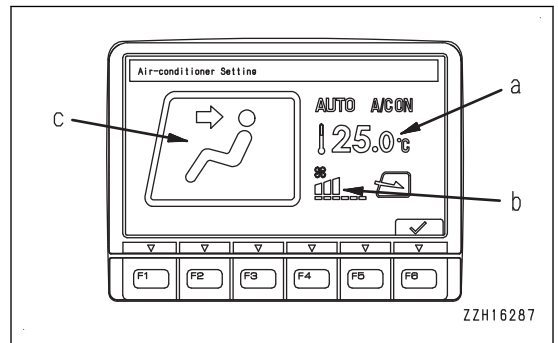
#### FRESH

Outside air is taken into the cab. Use this setting to take in fresh air or to demist the window glass.

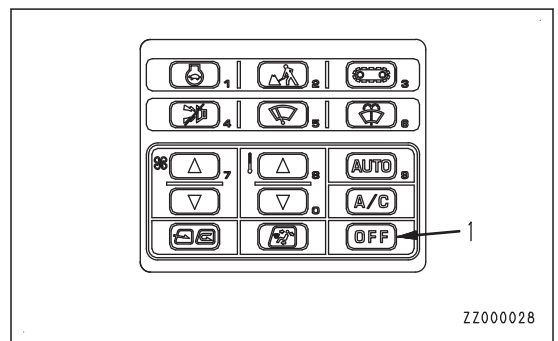


### DISPLAY MONITOR

This monitor display indicates the status of temperature setting (a), air flow rate (b), and vents (c).



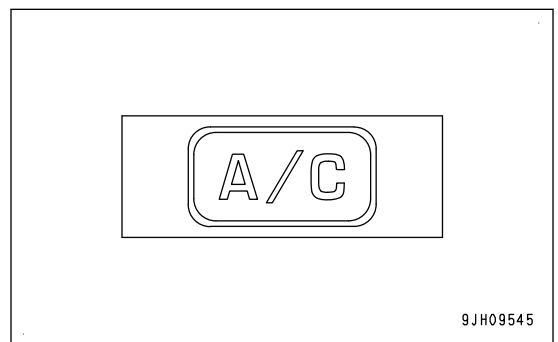
When OFF switch (1) is pressed, the display of temperature setting (a) and air flow rate (b) go out, and operation stops.



### AIR CONDITIONER SWITCH

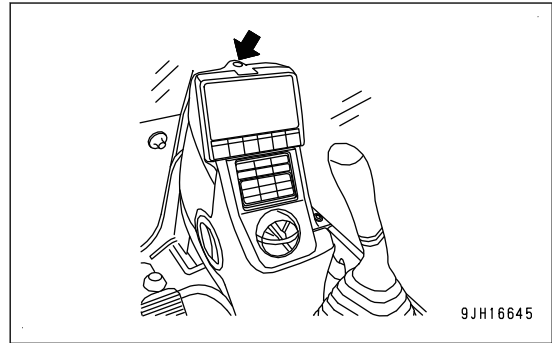
Use air conditioner switch for turning the air conditioner (cooling, dry heating) ON or OFF.

- 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.

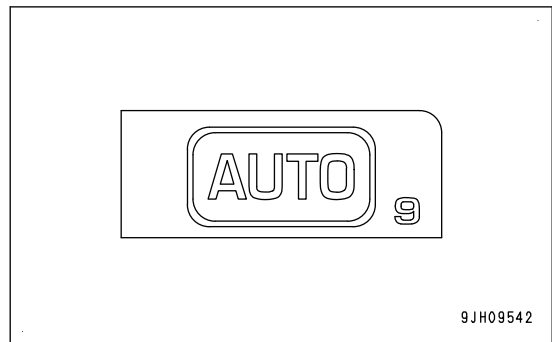
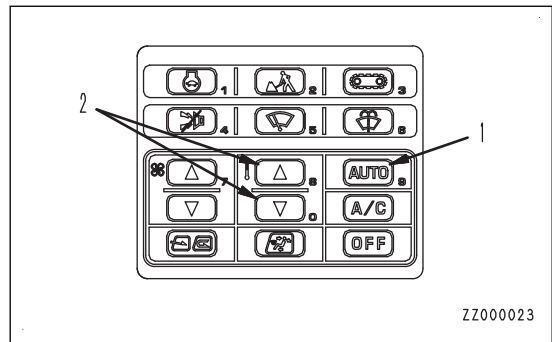


### METHOD FOR OPERATING AIR CONDITIONER

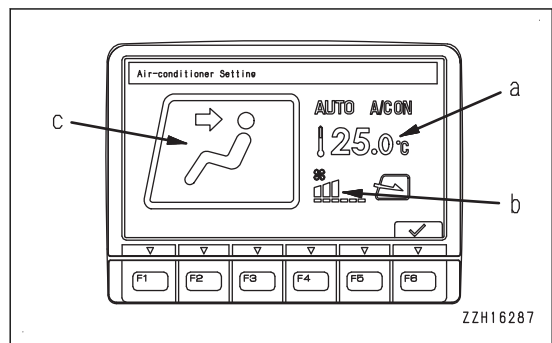
The air conditioner can be operated automatically or manually. Select the method of operation as desired.

#### METHOD FOR AUTOMATIC OPERATION

- 1. Turn auto switch (1) ON.

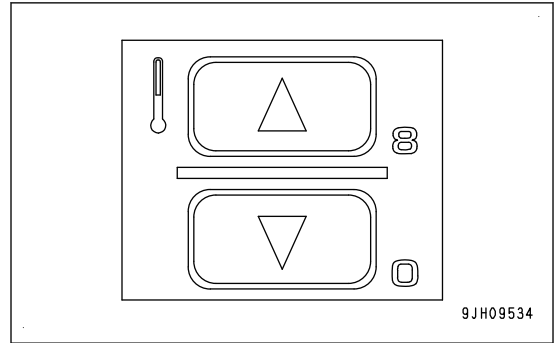


Set temperature (a) and air flow (b) are displayed.



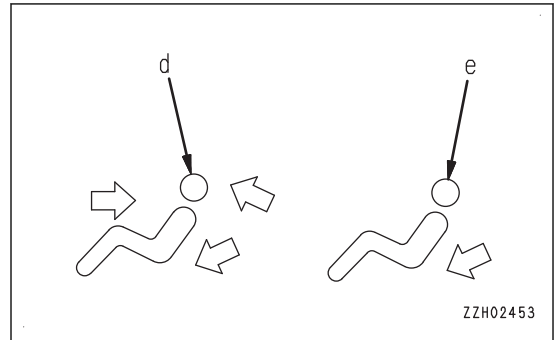
- Use temperature control switch (2) to set to the desired temperature.

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.



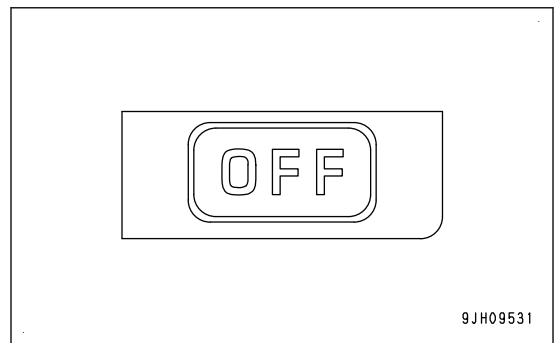
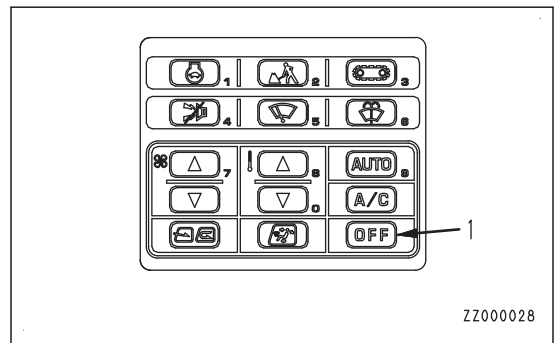
**REMARK**

When vent monitor (c) displays (d) or (e), and engine coolant temperature is low, the air flow is automatically limited to prevent cold air from blowing out.



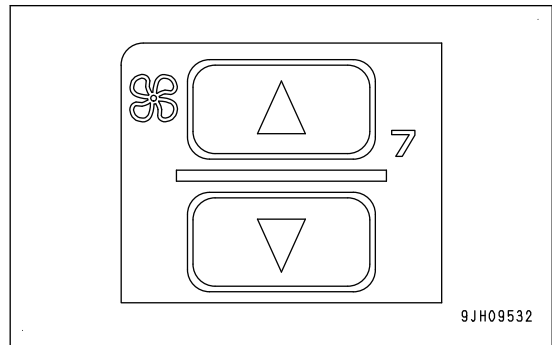
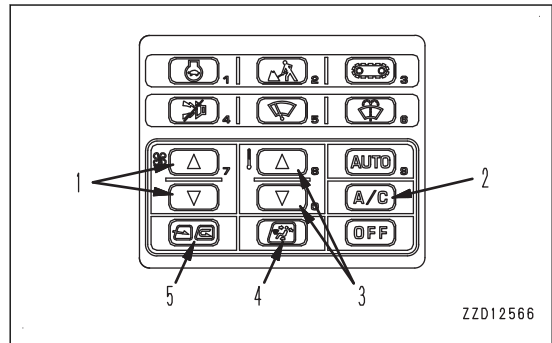
**METHOD FOR STOPPING AUTOMATIC OPERATION**

Press OFF switch (1).  
The air conditioner stops.

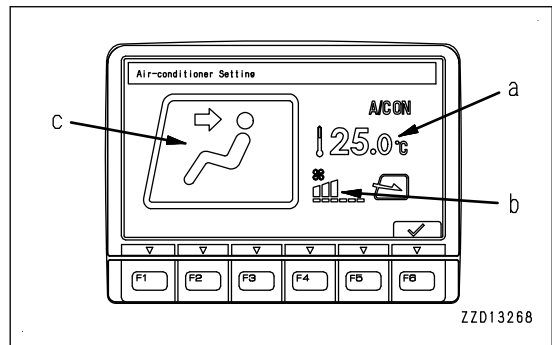


### METHOD FOR MANUAL OPERATION

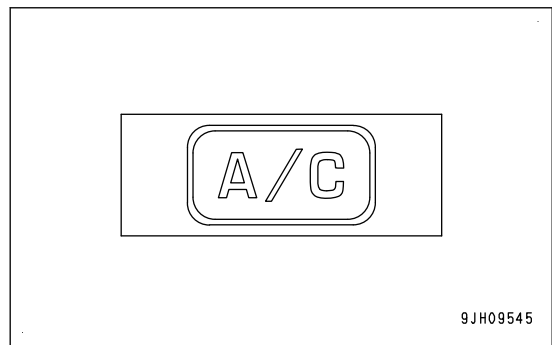
1. Press fan switch (1) and adjust the air flow.



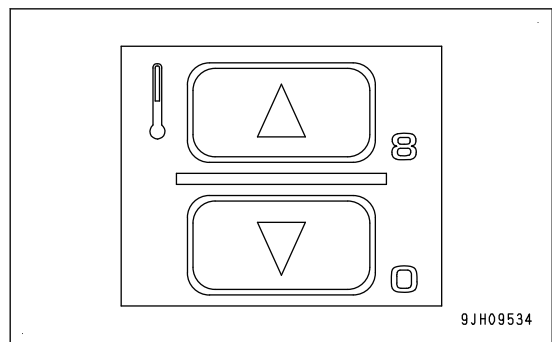
When doing this, check that temperature setting (a) and air flow (b) are displayed on the monitor.



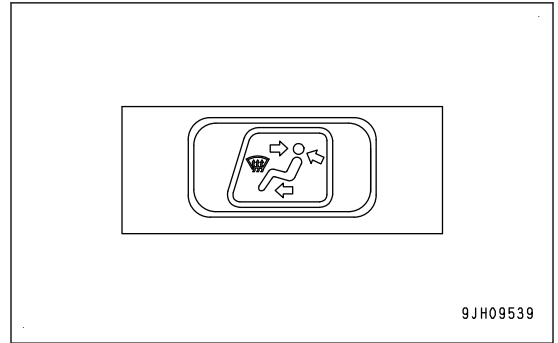
2. Turn air conditioner switch (2) ON.



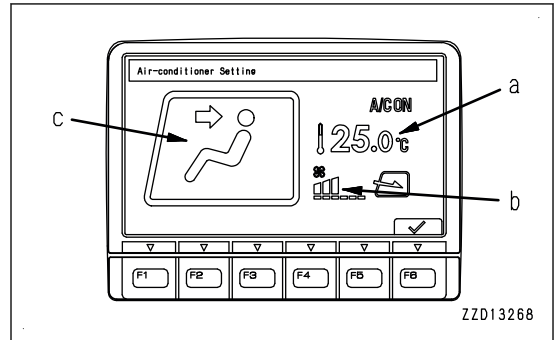
3. Use temperature control switch (3) to set to the desired temperature.



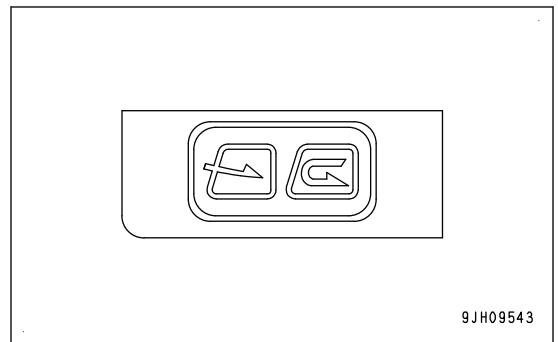
- Press vent selector switch (4) and select the desired vents.



When this is done, the display for vent (c) of the monitor changes according to the selection.

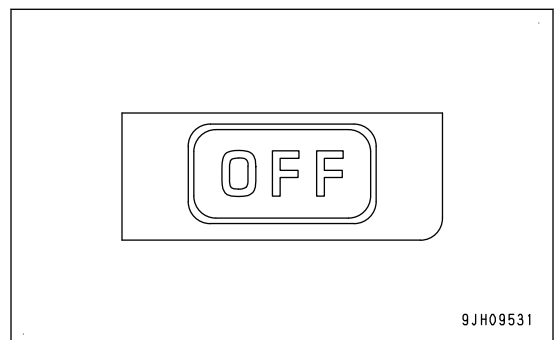
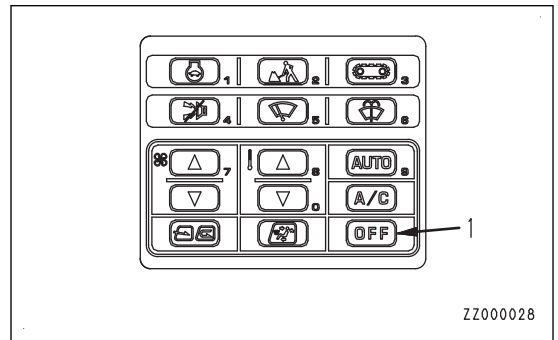


- Press FRESH/RECIRC air selector switch (5) and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).



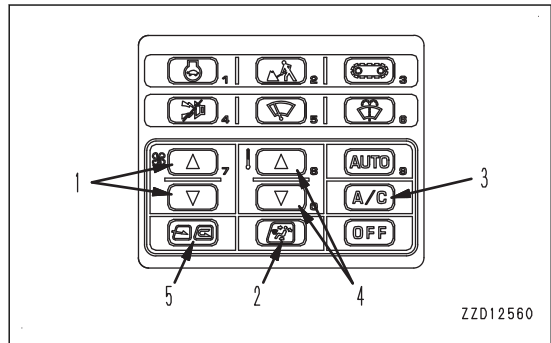
### METHOD FOR STOPPING MANUAL OPERATION

Press OFF switch (1).  
The air conditioner stops.

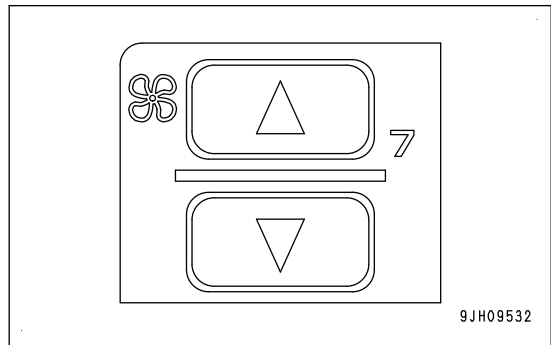


### METHOD FOR OPERATING WITH COLD AIR TO FACE AND WARM AIR TO FEET

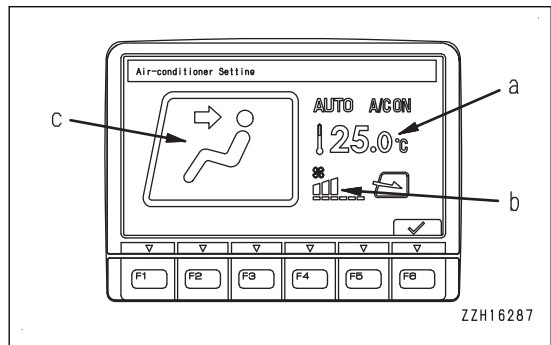
To operate with cold air blowing to the face and warm air blowing to the feet, set as follows.



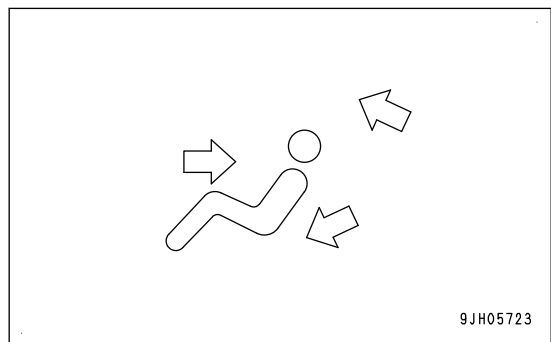
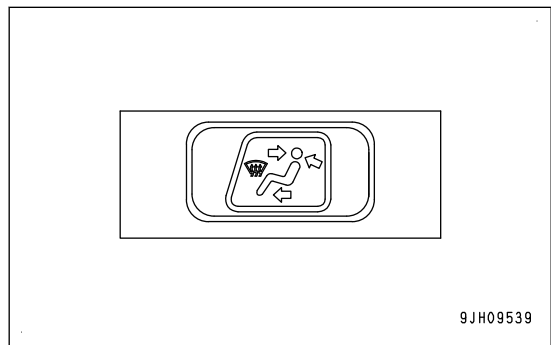
1. Press fan switch (1) and adjust the air flow.



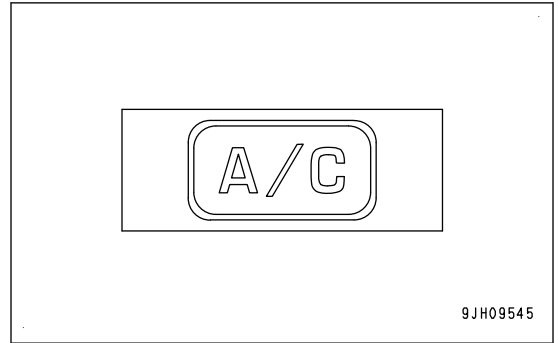
When doing this, check that temperature setting (a) and air flow (b) are displayed on the monitor.



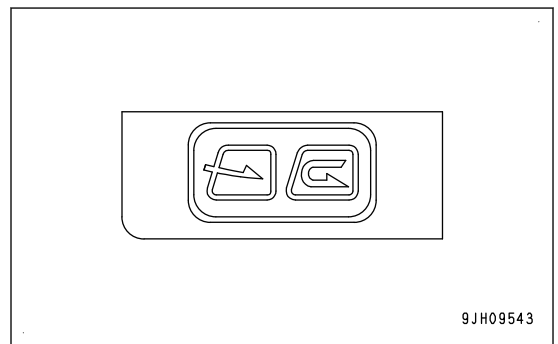
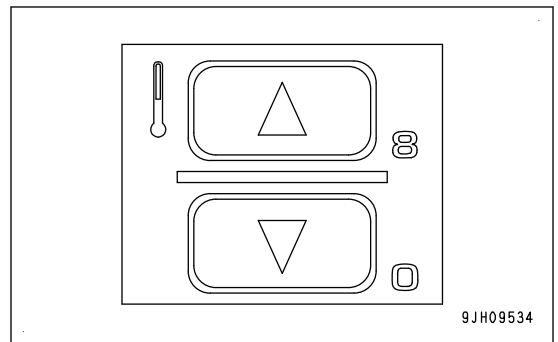
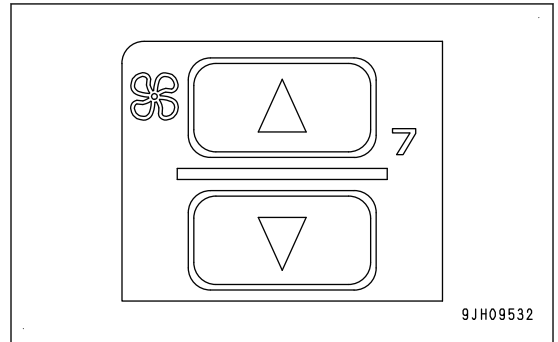
2. Press vent selector switch (2) and set the vent display on the monitor to the display shown in the figure.



- 3. Turn on the air conditioner switch (3).

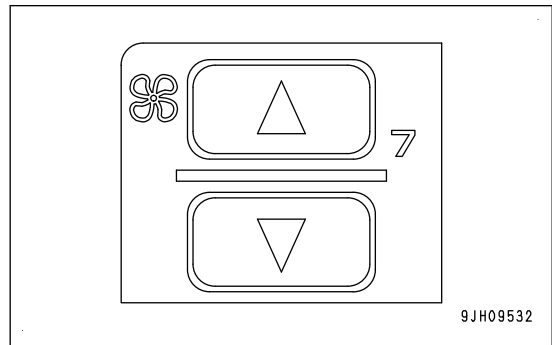
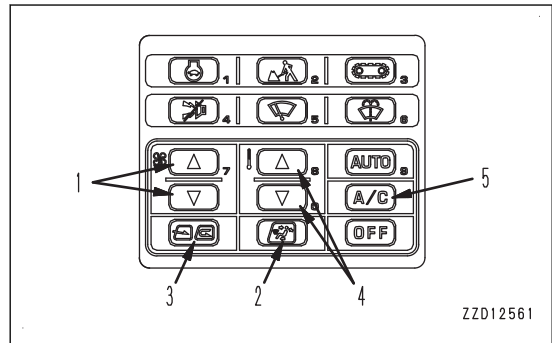


- 4. Adjust fan switch (1), temperature control switch (4) and FRESH/RECIRC selector switch (5) to the desired positions.

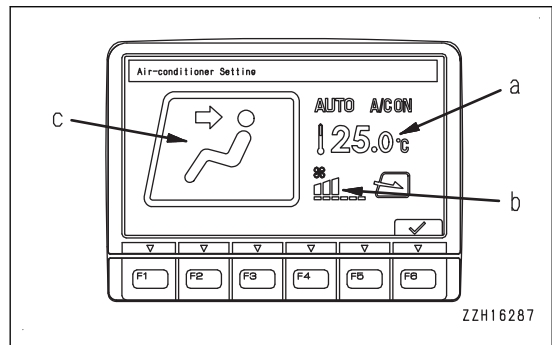


### METHOD FOR OPERATING DEFROSTER

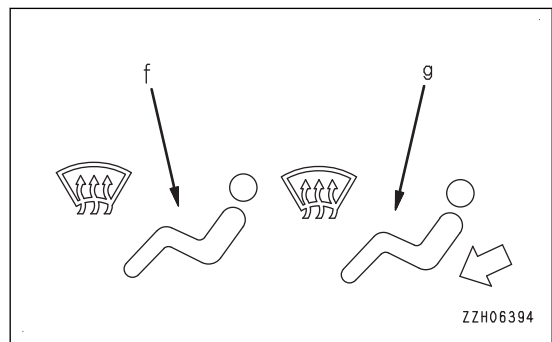
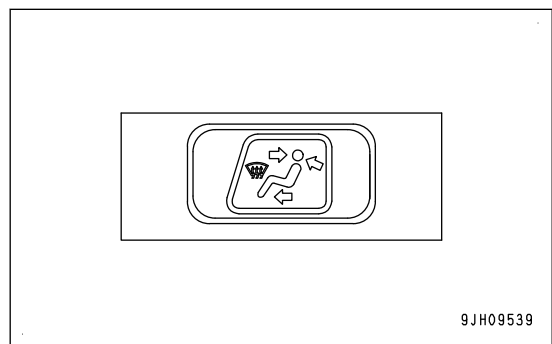
1. Press fan switch (1) and adjust the air flow.



When doing this, check that temperature setting (a) and air flow (b) are displayed on the monitor.

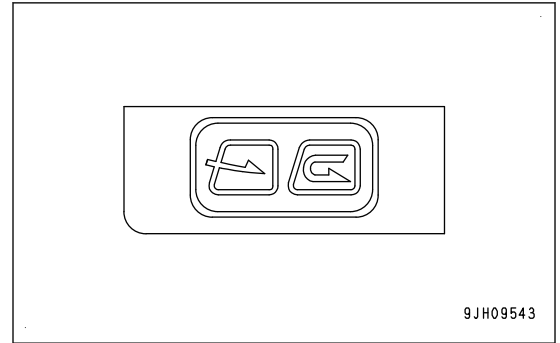


2. Press vent selector switch (2) and set vent display on the monitor to (f) or (g) as shown in drawing.

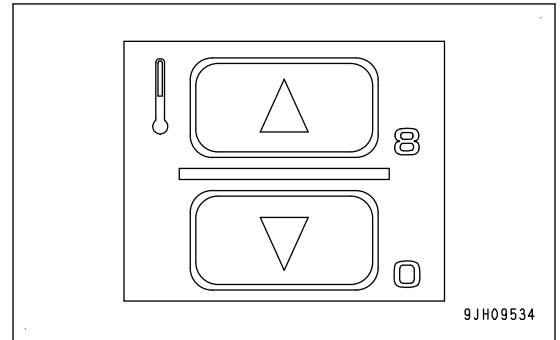




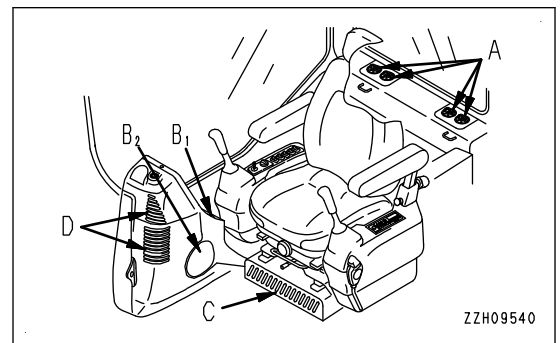
3. Press FRESH/RECIRC selector switch (3) and set it to FRESH mode.



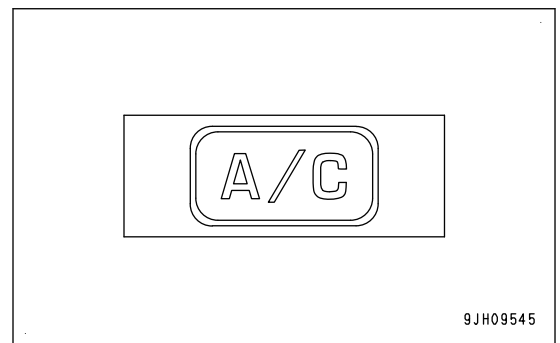
4. Press temperature control switch (4) and set temperature on the monitor to 32.0 of maximum heating.



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.)



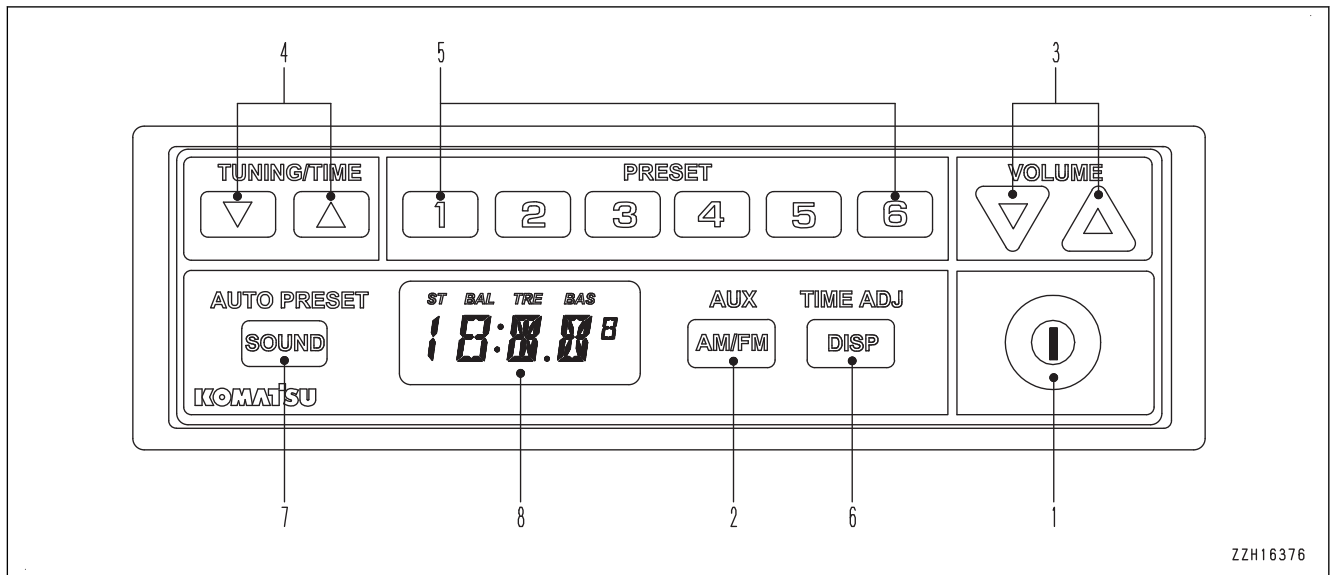
6. When operating in the rainy season or when it is desired to remove the mist from the window glass or to dehumidify the air, turn on the air conditioner switch (5).



# HANDLE RADIO

- To ensure safety, always keep the volume to a level where you can hear the outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to failure. Take care not to let water get on them.
- Do not wipe the display or buttons with solvent such as benzene or thinner. Wipe with a dry soft cloth.
- When the battery disconnect switch is turned to OFF position or the power for the machine is turned off for the replacement of the battery, the clock may be initialized. In such a case, set it again.  
For handling of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-109)".

## EXPLANATION OF RADIO EQUIPMENT



ZZH16376

- |                                   |                             |
|-----------------------------------|-----------------------------|
| (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.  
For the adjusting method, see "METHOD FOR CONTROLLING RADIO (3-232)".

## 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.

For the presetting method, see "METHOD FOR CONTROLLING RADIO (3-232)".

## 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.

For the sound adjusting method, see "METHOD FOR CONTROLLING RADIO (3-232)".

## DISPLAY

(A): Band name, "AUX", frequency, clock and other character/numeric information are displayed.

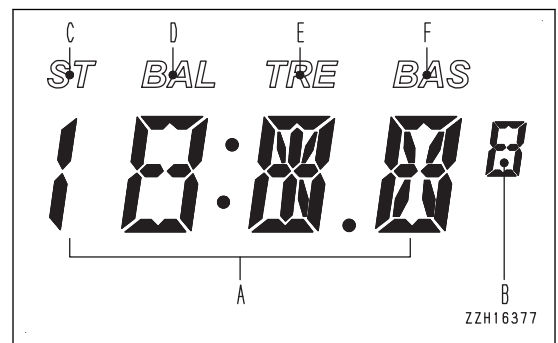
(B): Frequencies are displayed at steps of 50 kHz in certain areas.

(C): Lights up when a stereo broadcasting is heard while a FM station is selected.

(D): Lights up at the time of balance adjustment in the sound adjusting condition.

(E): Lights up at the time of treble adjustment in the sound adjusting condition.

(F): Lights up at the time of bass adjustment in the sound adjusting condition.



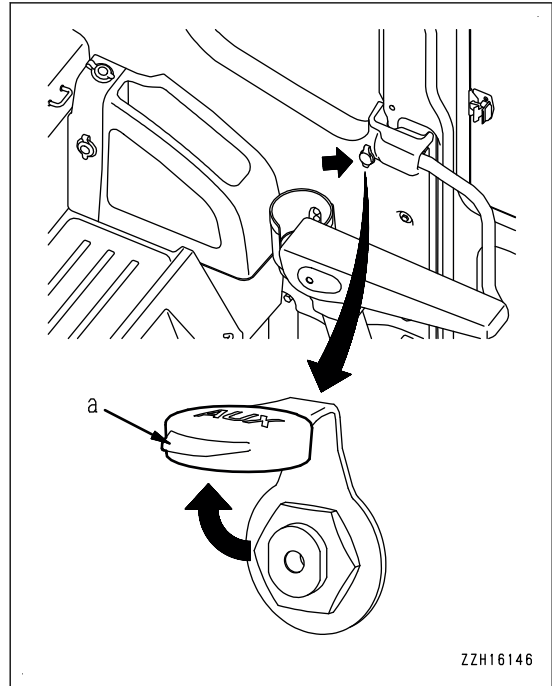
## AUX

### NOTICE

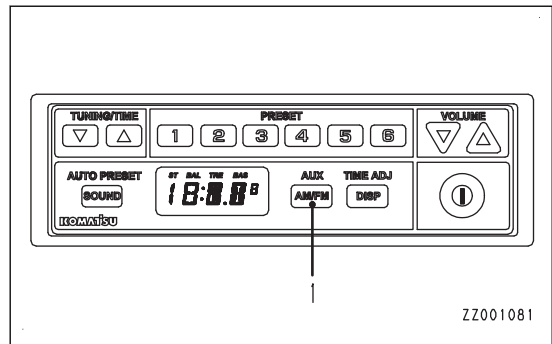
- **A stereo miniature plug can be connected.**
- **As a power source for the equipment to connect, use the battery attached to that equipment. If you use an electric power supply installed to the machine, the noise may occur.**
- **The noise may occur if you pull out the input plug when AUX is selected, or if you push in or pull out the plugs of the equipment to connect.**

You can hear the sound through the speaker of the machine when you connect a commercially available portable audio equipment to the machine.

1. Open cap (a).
2. Connect a portable audio equipment by using a commercially available audio cable.



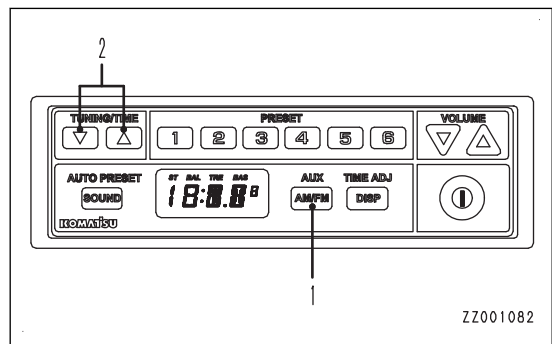
3. Press band/AUX selector button (1) to select "AUX".



**METHOD FOR CONTROLLING RADIO**  
**METHOD FOR ADJUSTING FREQUENCY**

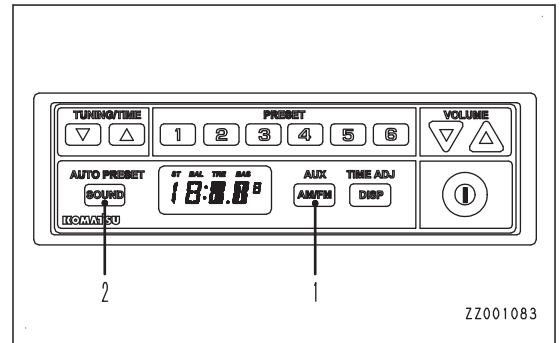
1. Press band/AUX selector button (1) and select FM or AM.
2. Press tuning/time adjustment button (2) to adjust the frequency.

- Press the  $\Delta$  button, and the frequency increases; press the  $\nabla$  button, and the frequency decreases.
- Hold down the  $\Delta$  button, and the frequency increases continuously; hold down the  $\nabla$  button, and the frequency decreases continuously.
- Hold down the  $\Delta$  button and release it, then the frequency increases continuously. Hold down the  $\nabla$  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)

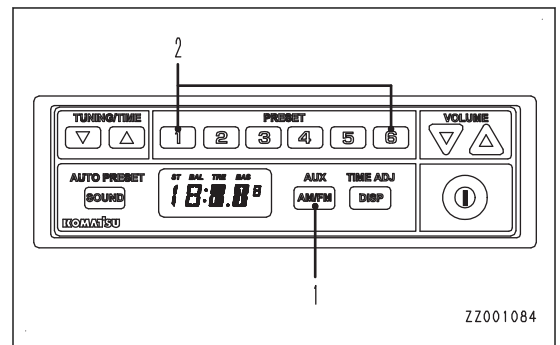
1. Press band/AUX selector button (1) and select FM or AM.
2. Hold down sound control button (2).



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.

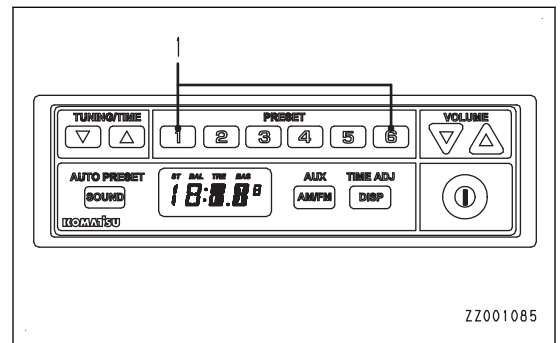
“Example”

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.

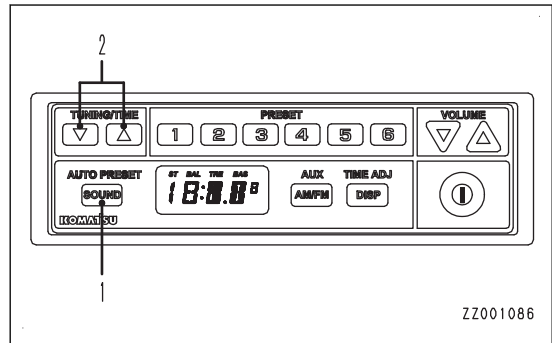
“Example”

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”.

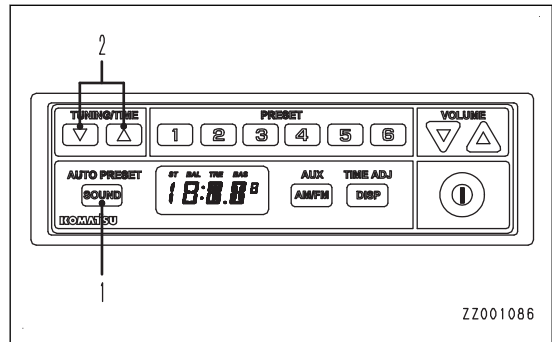
## METHOD FOR ADJUSTING SOUND BALANCE

- Press sound control button (1) to light up “BAL” on the display.  
You can adjust the sound (balance).
- Press tuning/time adjustment button (2) to adjust the sound (balance).
  - Press the  $\Delta$  button, and the speaker output on the R side increases by 1. (R1 to R7)
  - Press the  $\nabla$  button, and the speaker output on the L side increases by 1. (L1 to L7)



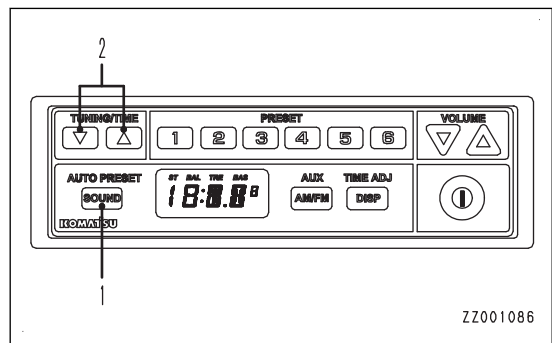
## METHOD FOR ADJUSTING HIGH REGISTER RANGE (TREBLE)

- Press sound control button (1) to light up “TRE” on the display.  
You can adjust the high register range (treble) of the sound.
- Press tuning/time adjustment button (2) to adjust the high register range (treble).
  - Press the  $\Delta$  button, and the high register range (treble) level increases by 1. (Maximum + 7)
  - Press the  $\nabla$  button, and the high register range (treble) level decreases by 1. (Minimum - 7)



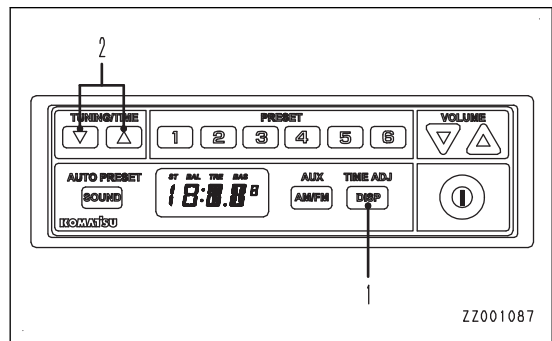
## METHOD FOR ADJUSTING LOW REGISTER RANGE (BASS)

- Press sound control button (1) to light up “BAS” on the display.  
You can adjust the low register range (bass) of the sound.
- Press tuning/time adjustment button (2) to adjust the low register range (bass).
  - Press the  $\Delta$  button, and the low register range (bass) level increases by 1. (Maximum + 7)
  - Press the  $\nabla$  button, and the low register range (bass) level decreases by 1. (Minimum - 7)



## METHOD FOR ADJUSTING CLOCK

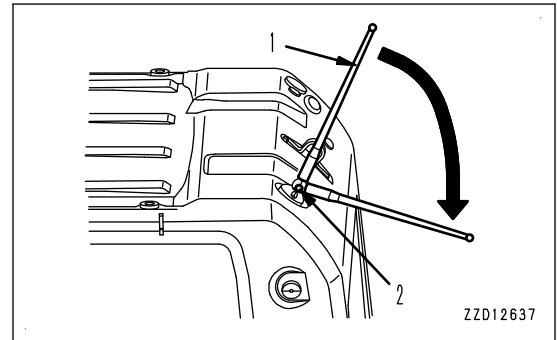
- Press display selector button (1) to display the clock.
- Hold down display selector button (1) to flash the “HOUR” display portion.  
You can adjust the hour.
- Press tuning/time adjustment button (2) to adjust the hour.
  - If you press  $\Delta$  button, “HOUR” display increases by 1.
  - If you press  $\nabla$  button, “HOUR” display decreases by 1.
- Press display selector button (1) to flash the “MINUTE” display portion.  
You can adjust the minute.
- Press tuning/time adjustment button (2) to adjust the minute.
  - If you press  $\Delta$  button, “MINUTE” display increases by 1.
  - If you press  $\nabla$  button, “MINUTE” display decreases by 1.



- Press display selector button (1) to cancel time adjustment.  
The screen returns to clock display.

## STOW ANTENNA

Before transporting the machine or putting it inside a building, stow the antenna (1) to prevent any interference.



- Loosen mounting bolt (2) of antenna (1), and stow the antenna (1) to the bottom part.
- After stowing the antenna (1), tighten the bolt (2) to fix it.

## SPACE FOR RADIO CASSETTE

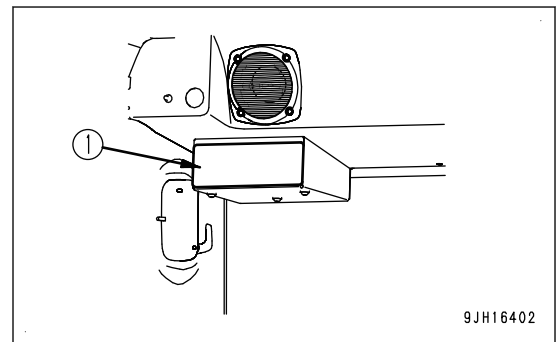
The radio cassette is not factory fitted. If fitment is required:

- Remove front cover (1) .
- Connect speakers and aerial to radio cassette.

Please contact your Komatsu distributor for a fitting instruction.

### REMARK

If radio is fitted in this location, do not operate radio in LH console.



# TRANSPORTATION

## PRECAUTIONS FOR TRANSPORTING MACHINE

### SELECT TRANSPORTATION METHOD

- When transporting the machine, choose the transportation method in reference to the weight and dimensions shown in "SPECIFICATIONS (5-1)".  
Note that the weight and dimension given in SPECIFICATIONS (weight and dimension) may differ according to the type of track shoe or arm, or other attachments.
- Consult your Komatsu distributor for details of the procedure for transporting machines with a protective guard installed for the operator's cab.
- Consult your Komatsu distributor for handling of the handrails when transporting the machine.



## LOADING AND UNLOADING WITH TRAILER

### PRECAUTIONS FOR LOADING AND UNLOADING WITH TRAILER

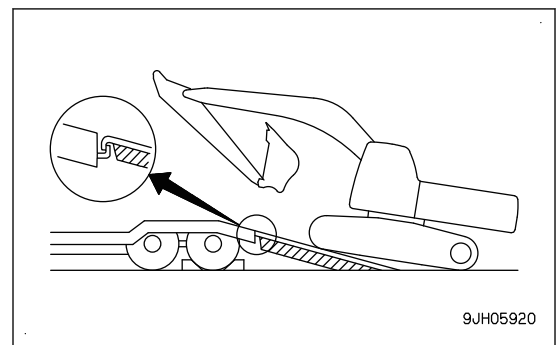
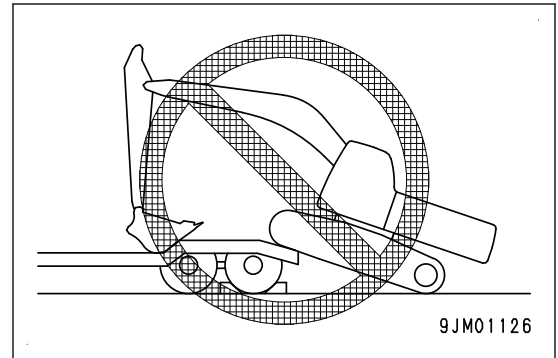
#### WARNING

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 warm-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, operate only the travel lever. Do not operate any other 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 upper structure 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 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°.  
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.



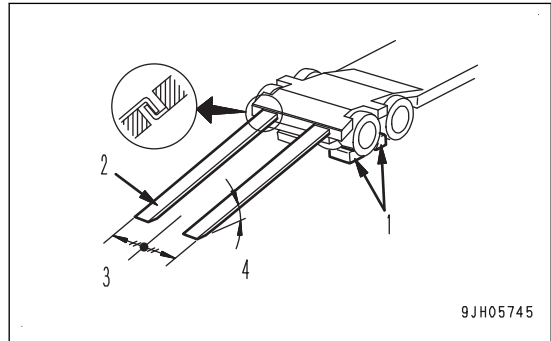
### PROCEDURES FOR LOADING MACHINE

Load on a firm and level ground.

Maintain a safe distance from the road shoulder

1. Apply the brake of the trailer securely.
2. Set chocks (1) to the wheels to secure the trailer.
3. Set right and left ramps (2) parallel to each other and equally spaced to the right and left of center (3) of the trailer. Make angle of installation (4) a maximum of 15 °.

If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.



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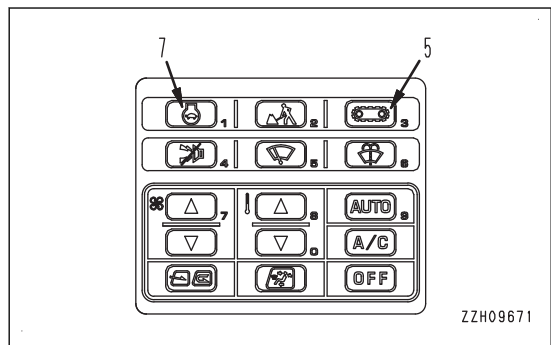
4. Push travel speed selector switch (5) to set the travel speed to low (Lo lights up).

The travel speed (Lo, Mi, Hi) is displayed on travel speed display (6).

5. 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.

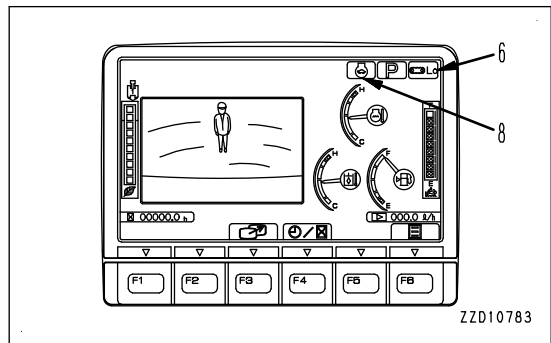


ZZH09671

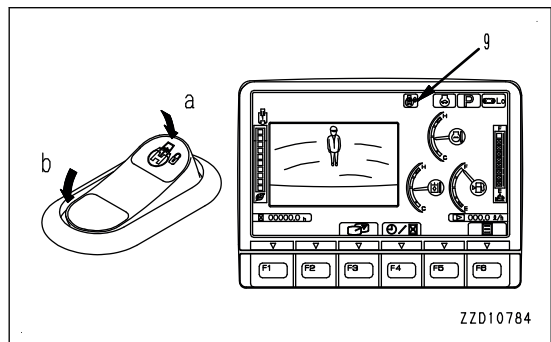
6. Turn the swing lock switch ON to apply the swing lock.

When the swing lock switch is turned to ON position, swing lock pilot lamp (9) lights up.

- (a): ON position
- (b): OFF position



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- 7. 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.

- 8. Before moving the machine onto the ramps, make sure that the machine is positioned in a straight line with the ramps and that the centerline of the machine matches that of the trailer.

- 9. 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.

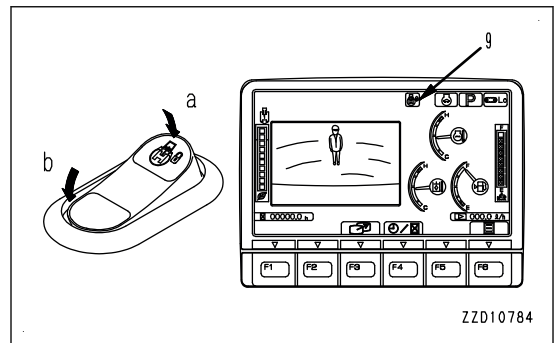
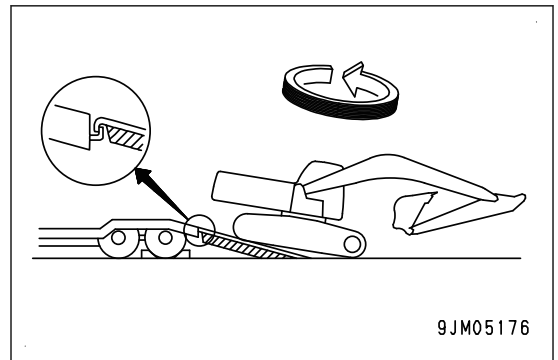
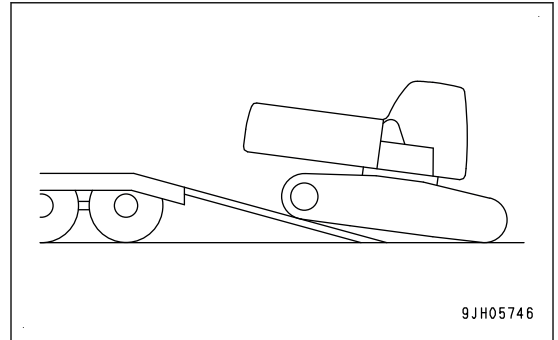
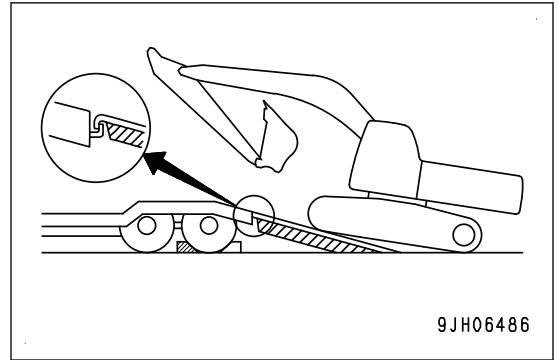
- 10. When loading a machine with the work equipment installed, at the point where the tracks are on both the ramps and the ground surface, turn the swing lock switch OFF.

- 11. Swing the upper structure slowly 180 °.

- 12. 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.

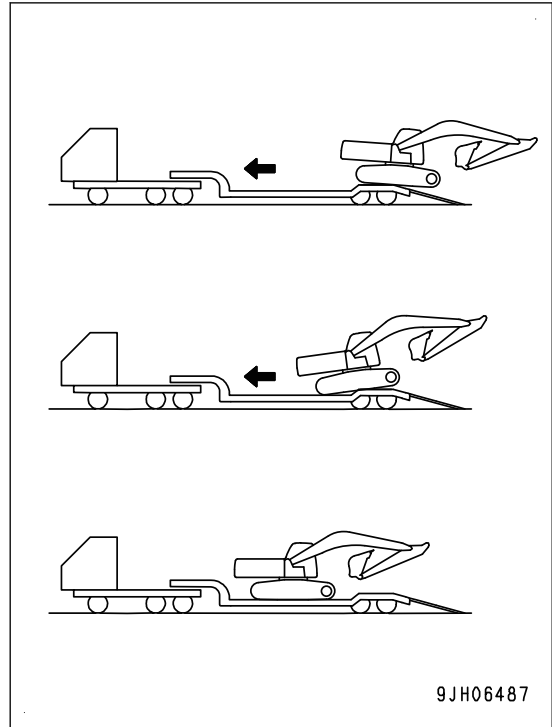
- (a): ON position
- (b): OFF position



- 13. 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.



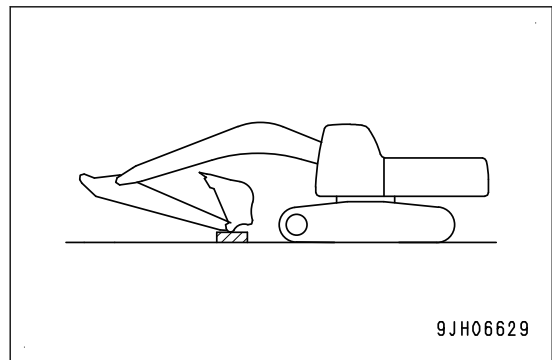
### METHOD FOR SECURING MACHINE

#### NOTICE

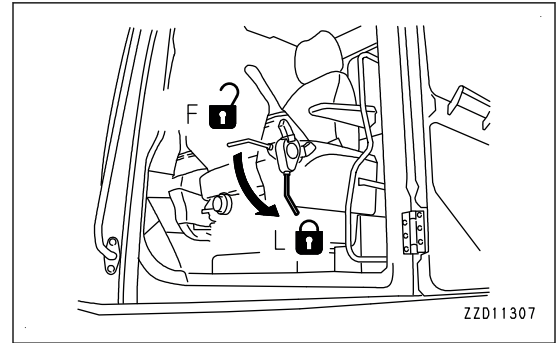
- **Stow the radio antenna. Retract the mirrors so that they are within the width of the machine.**  
For stowing radio antenna, see “STOW ANTENNA (3-235)”. For stowing mirror, see “PROCEDURE FOR ADJUSTING MACHINE LEFT FRONT MIRROR (A) (3-157)”.
- **To prevent damage to the bucket cylinder during transportation, put a wooden block under the tip of the bucket link to prevent the bucket cylinder from touching the floor.**
- **Check that the engine hood catcher is locked. Hold the handle of the engine hood and raise it slightly. If it does not open, the catcher is locked.**  
If the engine hood catcher is not locked, there is a danger that the engine hood may open during transportation.

After loading the machine onto a trailer, secure the machine as follows.

- 1. Extend the bucket and arm cylinders fully, then lower the boom slowly.



2. Set the lock lever securely to LOCK position (L).
3. Stop the engine, then remove the key from the starting switch.
4. Close all of the doors, windows, and covers.
5. Lock the lockable doors, covers, and caps.



Select the way of secure the machine according to the transportation form of each territory from the following.

### METHOD FOR SECURING MACHINE WITH TIE-DOWN POINT

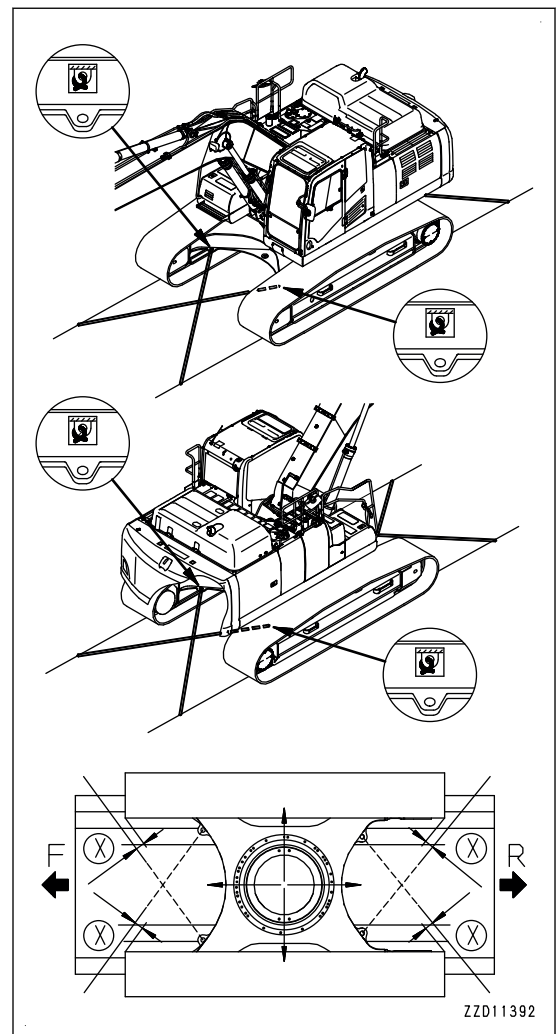
Tie one end of each chain or wire rope of appropriate strength to the tie-down holes on the track frame.

X: 50 to 100 mm

(Keep the chains off the track frame.)

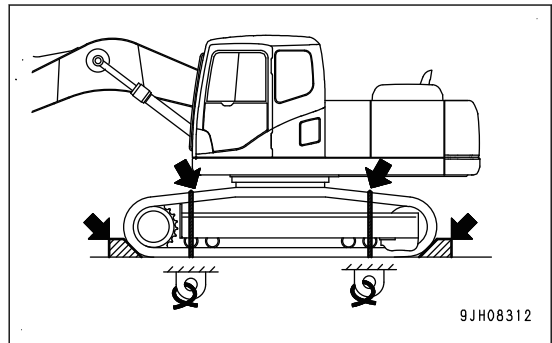
F: Forward travel direction

R: Reverse travel direction



**METHOD FOR SECURING MACHINE WITHOUT TIE-DOWN POINT**

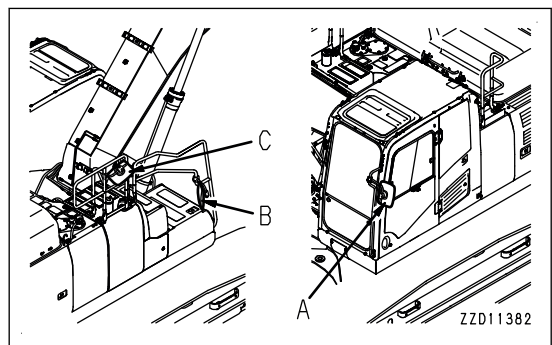
Place blocks under both ends of the tracks to prevent the machine from moving during transportation, and secure the machine with chains or wire ropes of appropriate strength. In particular, fix the machine securely to prevent it from slipping sideways.



**METHOD FOR REMOVING AND INSTALLING MIRROR**

If they are to be removed for shipment, or are to be installed again, perform the following procedure.

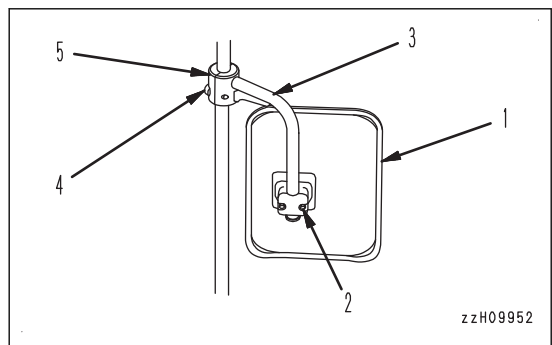
After installation of mirror, always adjust it. For details, see "METHOD FOR ADJUSTING MIRRORS (3-156)".



**METHOD FOR REMOVING MIRROR**

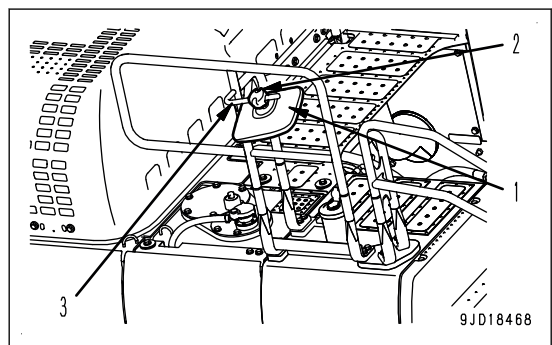
**Mirrors (A), (B)**

1. Loosen mounting bolt (2), then remove mirror (1) from support (3).
2. Loosen bolt (4) and remove support (3) and clamp (5) from the handrail.



**Mirror (C)**

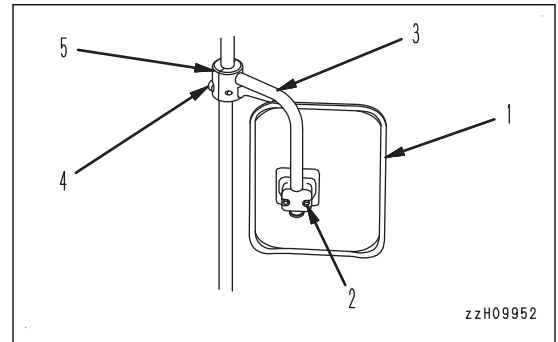
3. Loosen mounting bolt (2), then remove mirror (1) from support (3).



## METHOD FOR INSTALLING MIRROR

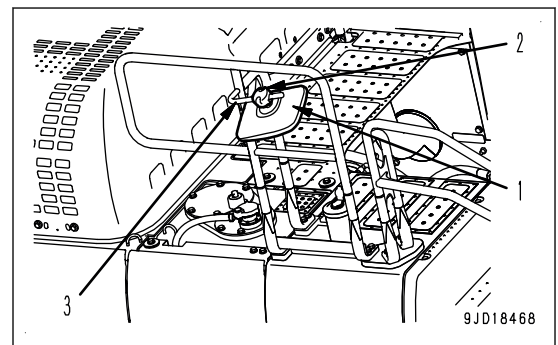
### Mirrors (A), (B)

1. Install support (3) and clamp (5) to the handrail, then tighten them with bolt (4).
2. Install mirror (1) to support (3), then tighten it with lock bolt (2).



### Mirror (C)

3. Install mirror (1) to support (3), then tighten it with lock bolt (2).



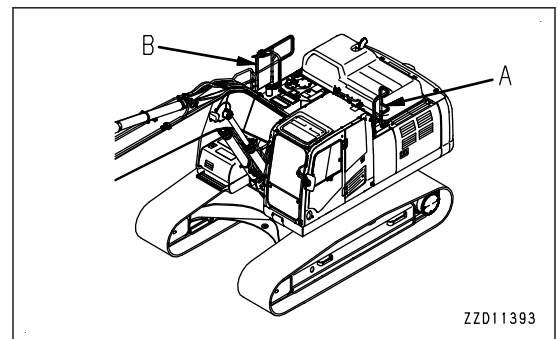
## METHOD FOR REMOVING AND INSTALLING HANDRAIL

### ⚠ WARNING

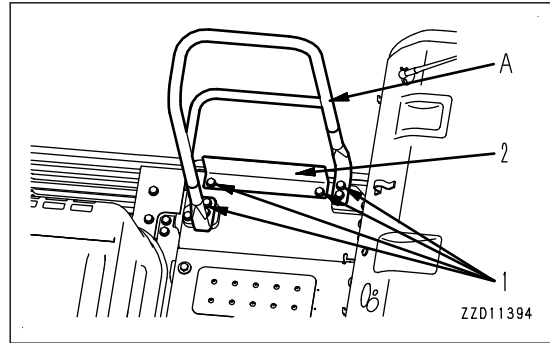
- After transported the machine, be sure to install the handrails before inspection and maintenance.
- Use the crane etc. for carrying the handrails.  
There is a danger of rolling over or falling from high place that can lead to serious personal injury or death. Check the scaffolding and ensure your safety before starting the work.
- If installation or removal work of the handrail is improper, there is a hazard that someone may fall from the machine during the installation or removal work.  
Follow the procedure below during the installation or removal work.

## METHOD FOR REMOVING HANDRAIL

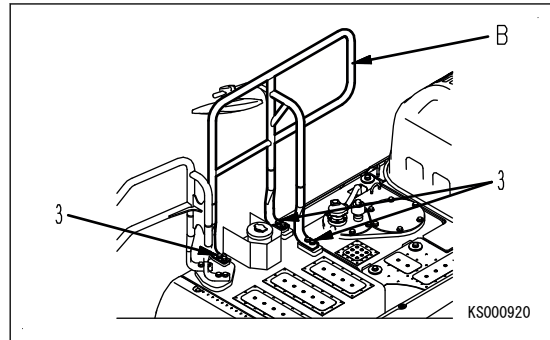
Remove handrail (A) first, then remove (B).



1. Remove bolts (1), and remove handrail (A) and cover (2).



2. Remove bolts (3), and remove handrail (B).



## METHOD FOR INSTALLING HANDRAIL

Install handrail (B) first, then install (A).

1. Install handrail (B) and cover (4), then tighten them with bolts (3).
2. Install handrail (A) and cover (2), then tighten them with bolts (1).

Tightening torque: 98 to 123 Nm {10.0 to 12.5 kgm}

## METHOD FOR REMOVING AND INSTALLING REVOLVING WARNING LAMP

## METHOD FOR REMOVING AND INSTALLING CAB PARTS

## METHOD FOR REMOVING CAB PARTS

### NOTICE

If the door is opened completely while door stoppers are removed, there is a danger that the door may be damaged by hitting the cab.

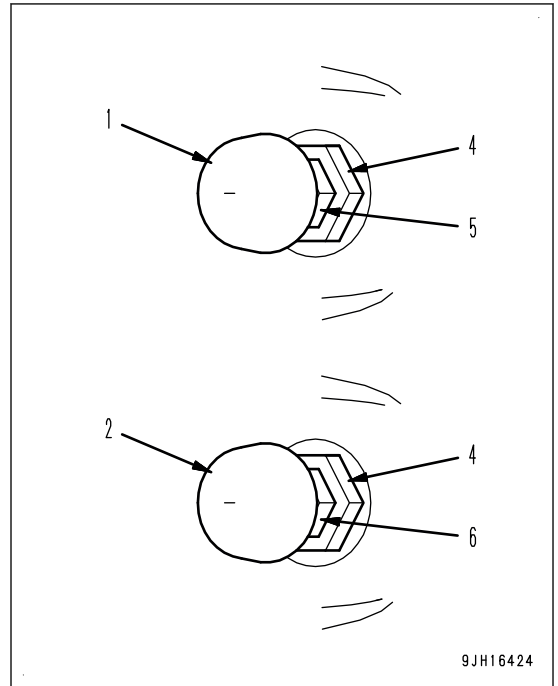
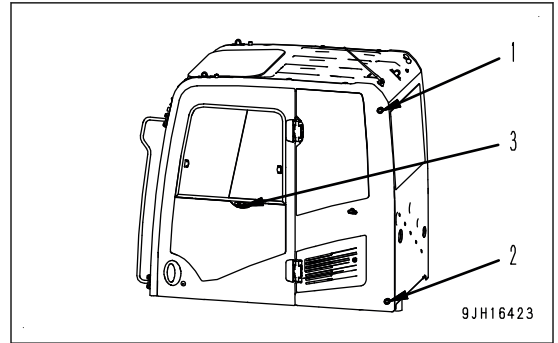
Do not open the door completely while the door stopper is removed.

1. Removal of stoppers



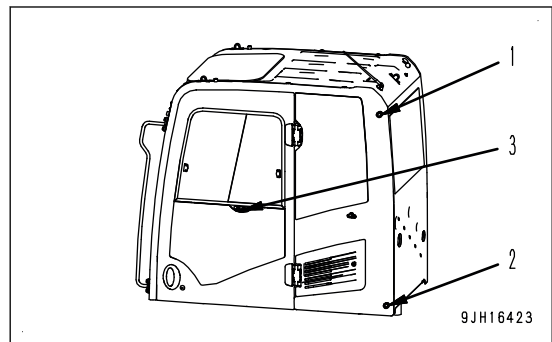
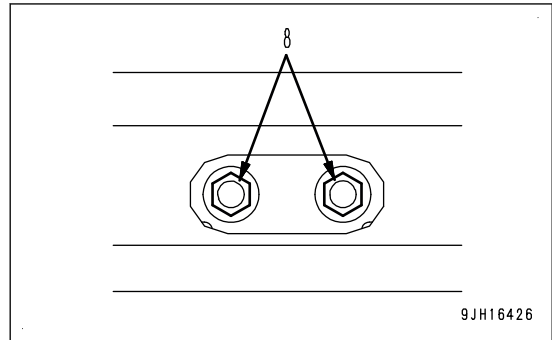
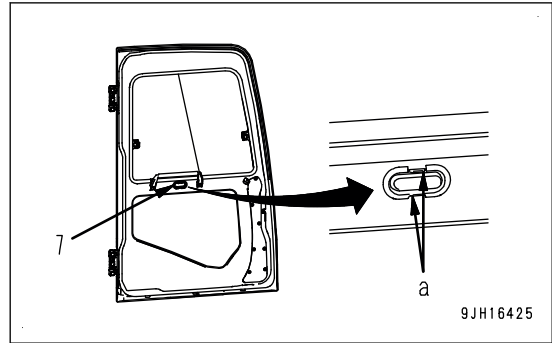
Loosen adaptor (4) to remove stoppers (1) and (2).

- Do not loosen nut (5) (silver) of stopper (1) and nut (6) (black) of stopper (2). There is a danger that the door may be damaged.



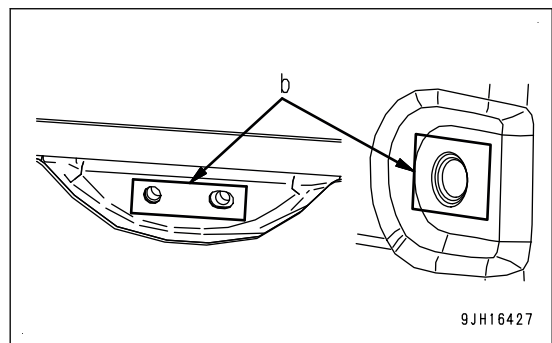
## 2. Removal of striker

- 1) Remove cap (7) from inside the door by picking the protrusion (a) of cap (7) with fingers.
- 2) Loosen the inside nuts (8) (2 places) to remove striker (3).
  - Keep the removed parts and removal procedure manual in the magazine box.



3. Covering stoppers and striker
 

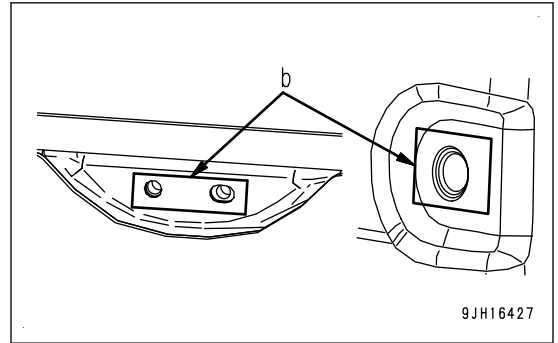
Cover the mounting holes of stoppers and striker with tape (b) etc. to prevent dust from entering the holes.



**METHOD FOR INSTALLING CAB PARTS**

1. Removal of covering of stoppers and striker

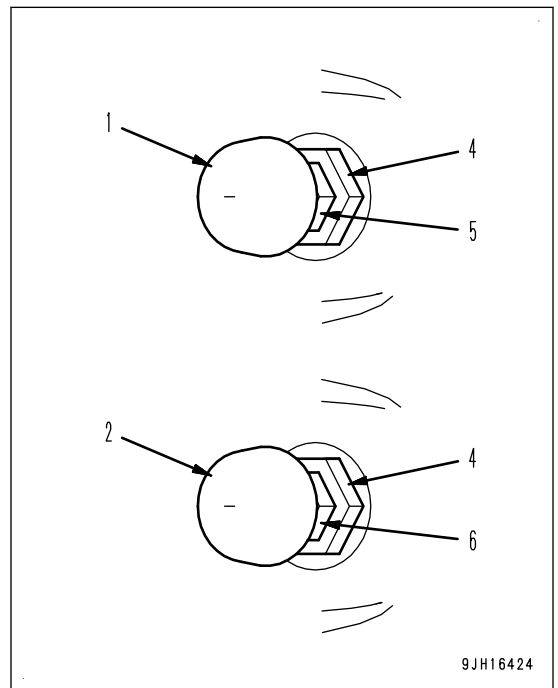
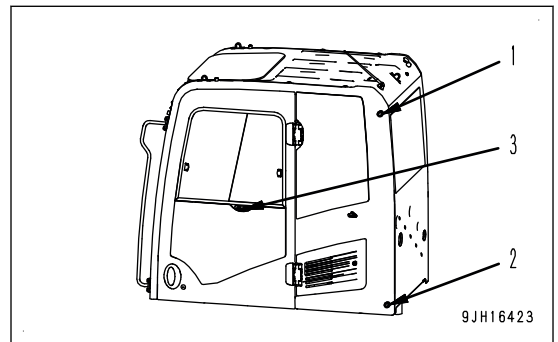
Completely remove the covering tapes (b) for mounting holes of stoppers and striker.



2. Installation of stoppers

Tighten adaptor (4) to install stoppers (1) and (2).

Tightening torque for adaptor (4) : 59 to 98 Nm {6.0 to 10.0 kgm}

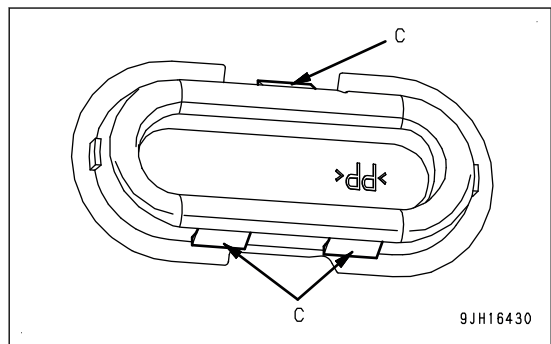
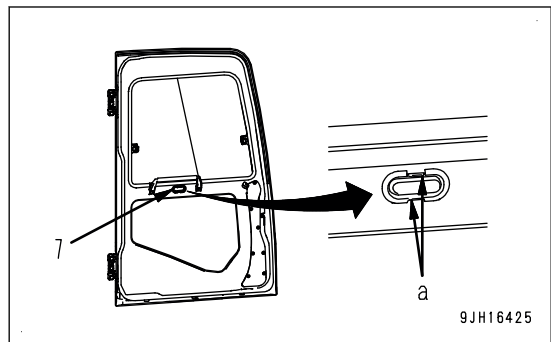
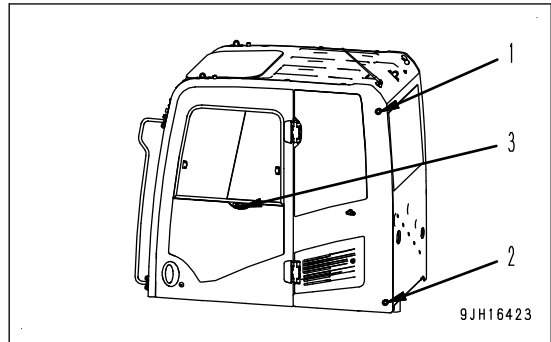
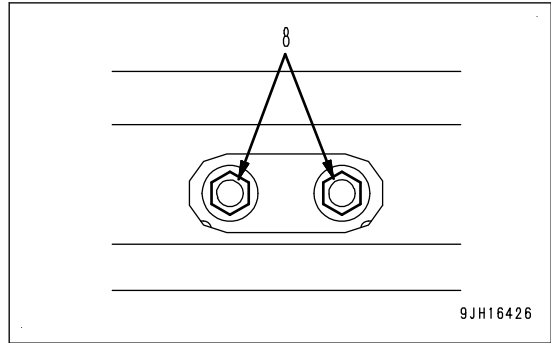


3. Installation of striker

1) Tighten nuts (8) (2 places) to install striker (3).

2) Install cap (7) to inside the door picking protrusion (a) of cap (7) with fingers.

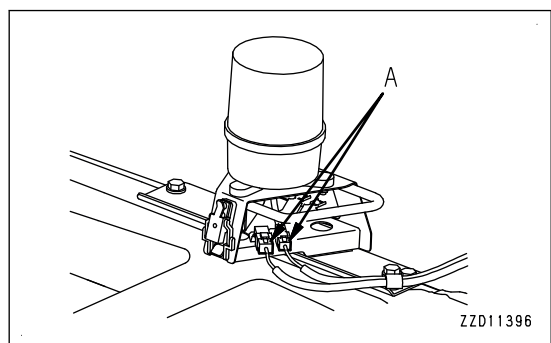
- Be careful to install cap (7) so that the part which has one claw (c) comes upside.



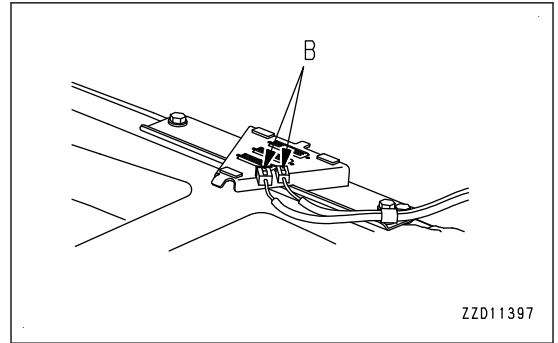
**METHOD FOR REMOVING REVOLVING LAMP**

Remove the revolving lamp according to the following procedure.

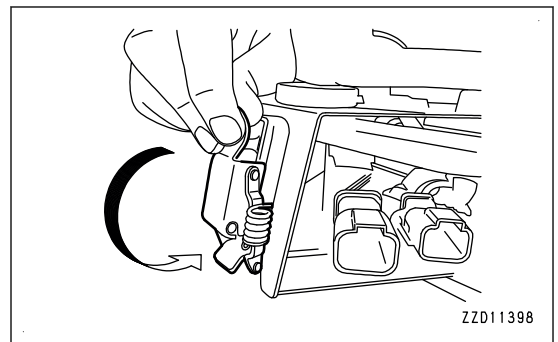
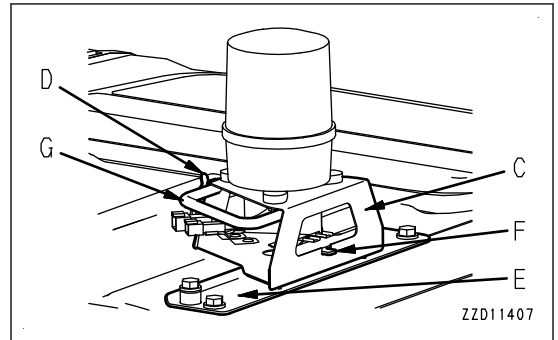
1. Remove connector (A) of the revolving lamp.  
When removing the connector, pull it out while pressing the claw in the center of the connector.



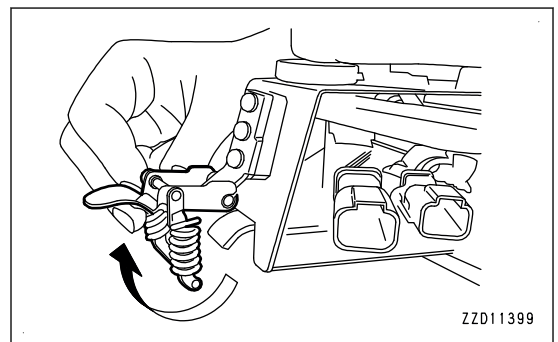
- Place the connector for wiring (B) in a clean vinyl bag or the like to protect it from water, etc. during transportation and fix it to the operator's cab with sealing tape or the like.



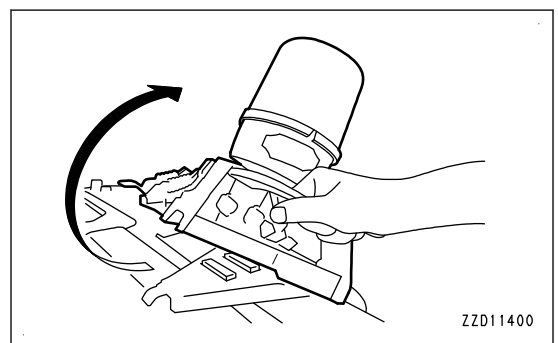
- Tilt down lock (D) of revolving lamp bracket (C).



- Remove the hook of lock (D) from the claw of base bracket (E).
- Hold grip (G) and turn it clockwise, seeing it from the rear of the machine.



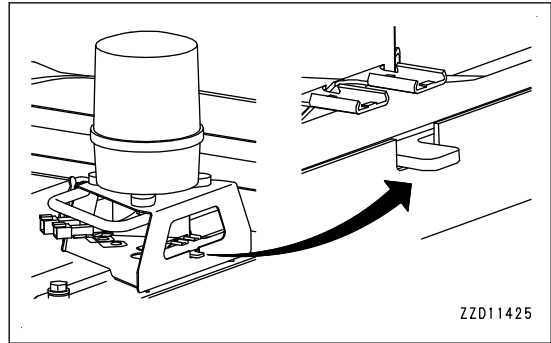
- Remove revolving lamp bracket (C) from the claw of base bracket (E).



**⚠ CAUTION**

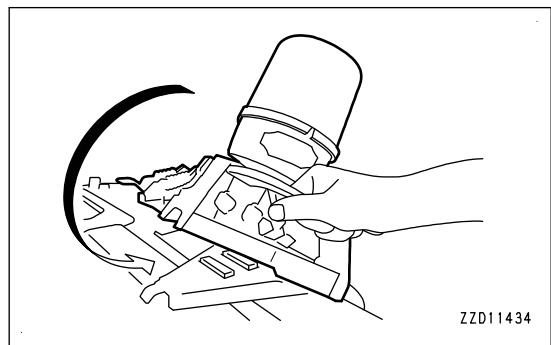
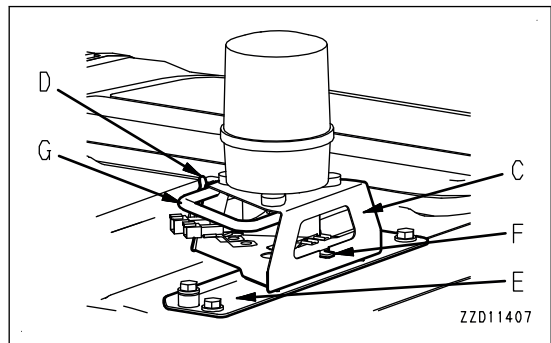
When removing and installing the revolving lamp, be sure to hold grip (G) instead of lamp itself to prevent damage.

- Remove revolving lamp bracket (C) from fixing claw (F) of base bracket (E).

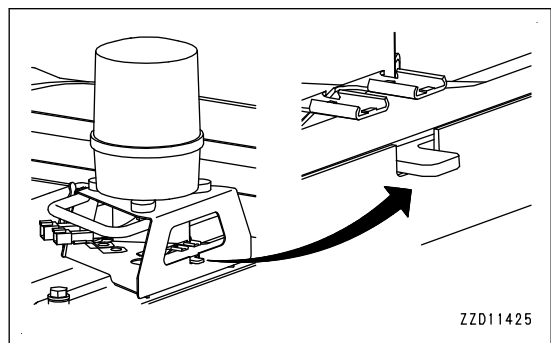


**METHOD FOR INSTALLING REVOLVING LAMP**

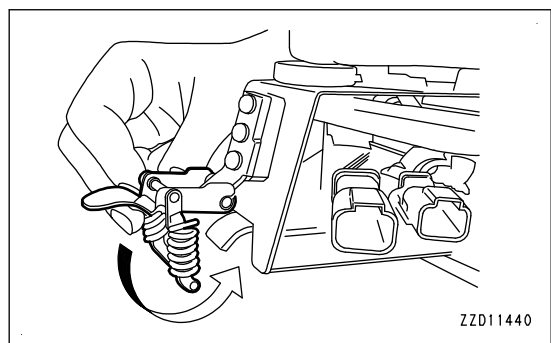
- Hold grip (G) and turn it counterclockwise, seeing it from the rear of the machine.



At this time, insert revolving lamp bracket (C) into the revolving lamp fixing claw side of base bracket (E), and install it.



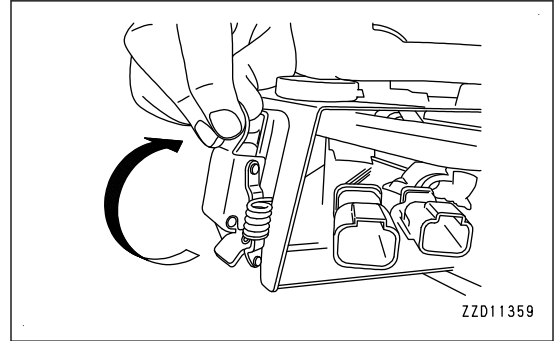
- Install the hook of lock (D) to base bracket (E).



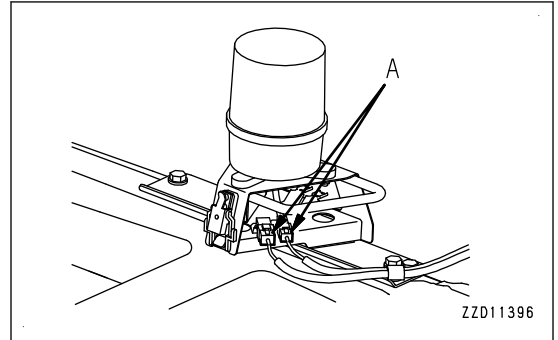
3. Raise the lever of lock (D).

**REMARK**

If the reaction force of lock (D) is large, try it again by shifting bracket (C).



4. Insert connector (A).  
Securely insert the connector until it clicks.



**PROCEDURES FOR UNLOADING MACHINE**

Perform unloading of the machine on a firm, level ground.

Maintain a safe distance from the road shoulder

1. Apply the brake of the trailer securely.
2. Set chocks (1) to the wheels to secure the trailer.
3. Set right and left ramps (2) parallel to each other and equally spaced to the right and left of center (3) of the trailer. Make angle of installation (4) a maximum of 15°.

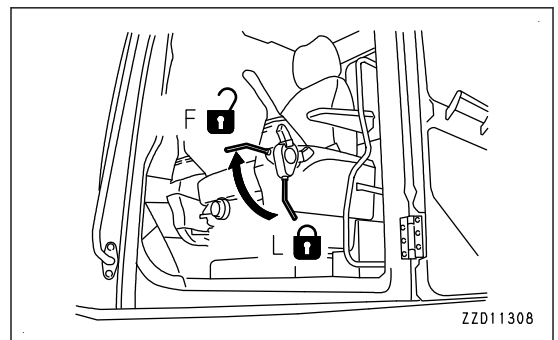
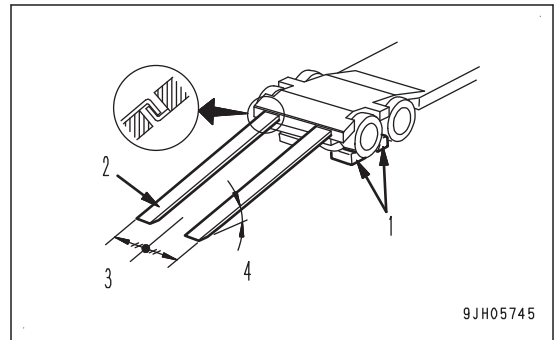
If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.

4. Remove the chains and wire ropes fastening the machine.
5. Start the engine.

Warm the engine up fully in cold weather.

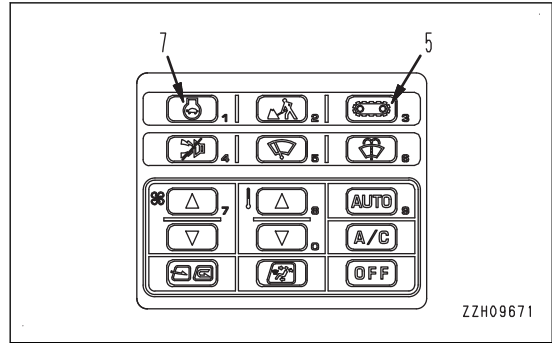
6. Set the lock lever to FREE position (F).
7. Push travel speed selector switch (5) to set the travel speed to low (Lo lights up).

The travel speed (Lo, Mi, Hi) is displayed on travel speed display (6).

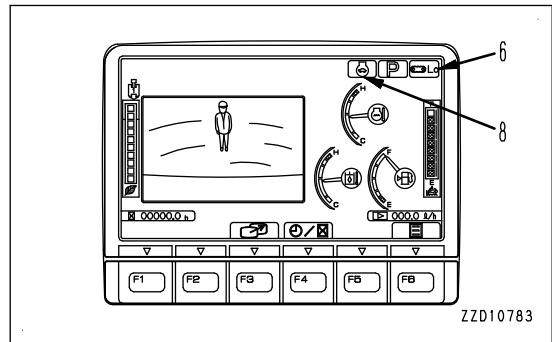


8. Turn auto-deceleration switch (7) OFF and operate the fuel control dial to set the engine to low speed.

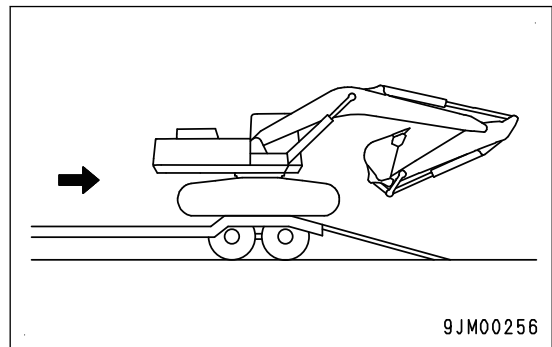
Each time auto-deceleration switch (7) is pressed, it switches OFF to ON to OFF in turn.



When auto-deceleration switch (7) is turned OFF, the auto-deceleration pilot lamp (8) goes out.



9. Raise the work equipment and move slowly.
10. When the machine is horizontal on the top of the rear end of the trailer, stop the machine.

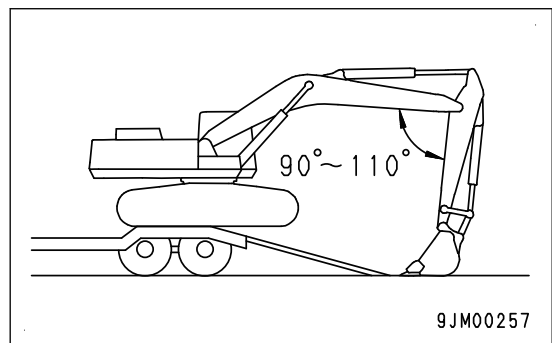


11. Set the angle between the arm and boom to 90 to 110 °.

**NOTICE**

**When unloading the machine, always set the angle between the arm and boom to 90 to 110 °.**

**If the machine is unloaded while the arm is IN, it will cause damage to the machine.**

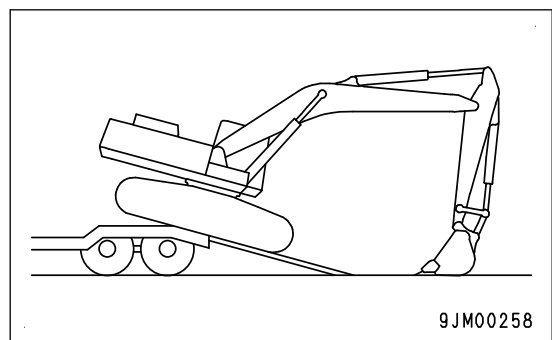


12. Lower the bucket to the ground.

**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.
- Never perform lifting operation if any person is on the machine being lifted.
- Always use a wire rope that has ample strength for the weight of the machine being lifted.
- 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 other posture or by using any other lifting equipment than those given in the following procedures.

There is a danger of the machine losing its balance.

### NOTICE

This method of lifting applies to the standard specification machine.

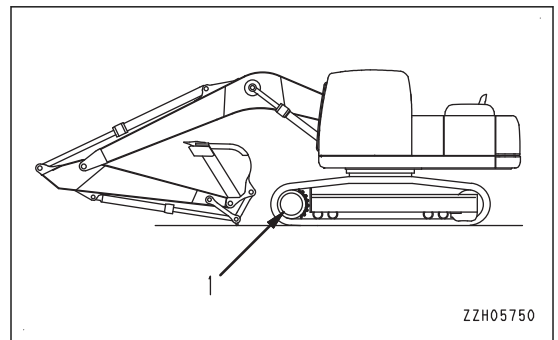
The method of lifting differs depending on the attachments and options installed.

For details of the procedure for machines other than the standard specification machine, consult your Komatsu distributor.

For the weight, see "SPECIFICATIONS (5-1)".

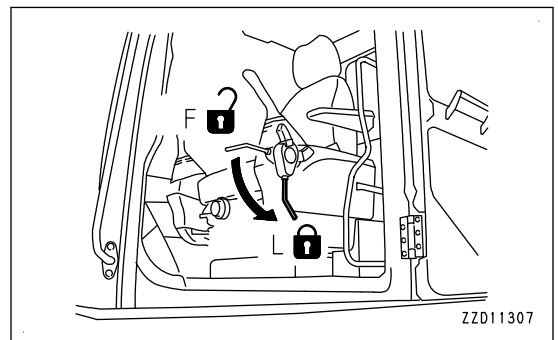
When lifting the machine, perform the operation on flat ground as follows.

1. Start the engine.
2. Swing the upper structure so that the work equipment is on the sprocket (1) side.
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. Set the lock lever securely to LOCK position (L).
5. Stop the engine.
6. Check that there is nothing around the operator's seat, and then get off the machine.

Close the cab door and front window securely.

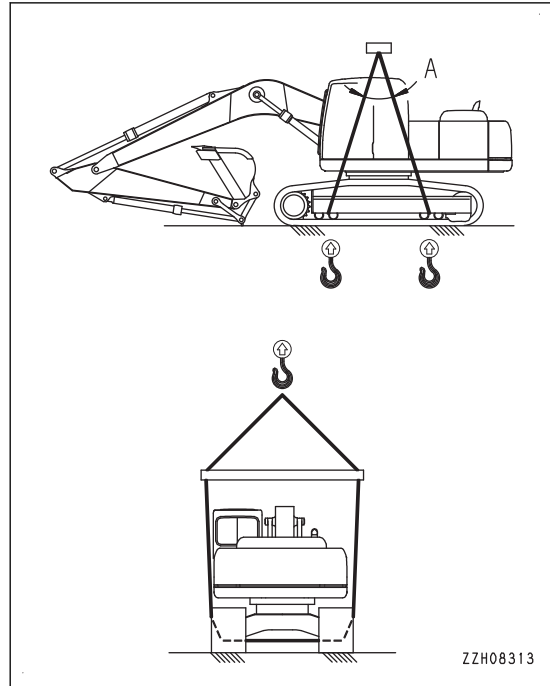


7. Pass wire ropes between the 1st and 2nd track rollers from the front and between the 1st and 2nd track rollers from the rear.

However, for machines equipped with full roller guards for the track rollers, pass the wire ropes under the tracks.

When the wire rope contacts with the edge of the machine, put wooden block or backing metal between them.

8. Set the lifting angle (A) of the wire rope to 30 to 40 °, then sling the machine slowly.
9. After the machine comes off the ground, check the hook condition and the lifting posture, and then sling the machine upward 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 details of specified viscosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-5)".

### 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 amounts of fresh water and see a doctor immediately.
- When handling the cooling water containing coolant that has been drained during changing the coolant or repair of radiator, contact your Komatsu distributor or request a qualified company to perform the operation. Coolant is toxic, so never pour it into drainage ditches or drain it onto the ground surface.

### NOTICE

Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC) for the coolant.

Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water, so it is not flammable.

For details on the coolant change interval and the density of Non-Amine Engine Coolant (AF-NAC), see "METHOD FOR CLEANING INSIDE OF COOLING SYSTEM (4-20)".

### DEF

#### NOTICE

- DEF freezes at  $-11\text{ }^{\circ}\text{C}$ .  
If DEF in DEF tank freezes, it may expand to break the devices in the tank. The parts inside the tank may be affected. Add DEF to the specified amount for cold weather (below the level of when DEF may freeze).  
For the specified amount of DEF, see "METHOD FOR CHECKING DEF LEVEL, ADDING DEF (3-149)".
- If DEF or the machine equipped with DEF system cannot be stored at the outside temperature is lower than  $-11\text{ }^{\circ}\text{C}$ , 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 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.
- 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**

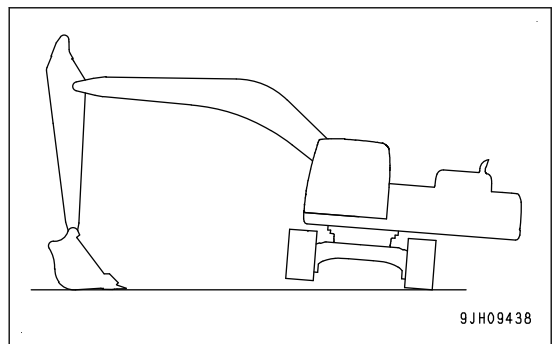
**Performing idling of the tracks is dangerous, stay well away from the tracks.**

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 as described below to extend undercarriage service life.

Swing 90 ° with engine at low idle and bring the work equipment to the side of the track.

Slowly push up the machine until the track is raised slightly from the ground. Perform idle rotation of track. Perform this procedure on the right and left sides alternately.



**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 (7-5)”.

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.

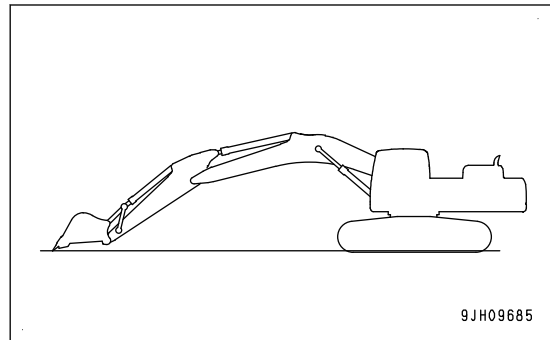
# PRECAUTIONS FOR LONG-TERM STORAGE

## 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 (3-109)".
- 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 (6-21)".
- 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 (3-109)”.
- 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 the information again. For detail, see “CLOCK ADJUSTMENT (3-78)” and “HANDLE RADIO (3-230)”.
- When starting the engine, warm it up sufficiently according to the procedure in “METHOD FOR ENGINE WARM-UP OPERATION (3-173)”.

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 (4-70)”.
- Start the engine and check that SCR system is free from abnormality.  
If SCR system has any abnormality, warning is displayed on the monitor screen and the buzzer 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.

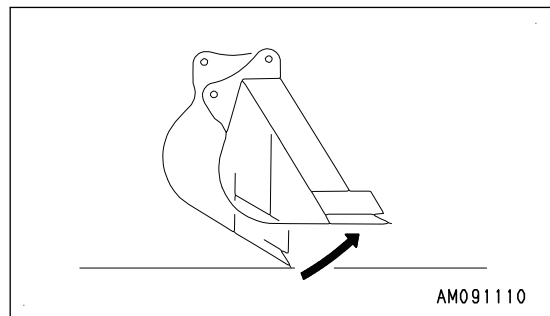
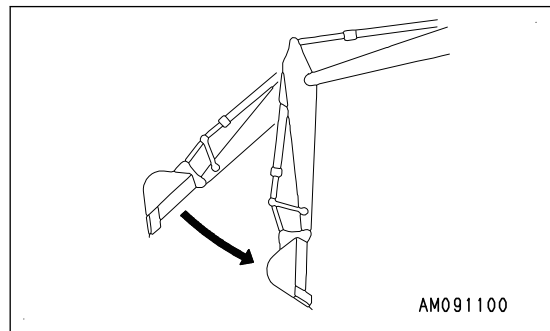
Always check the fuel level to prevent running out of fuel.

For the method of bleeding air, see "METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE (4-47)" and "METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE (4-59)".

### 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.



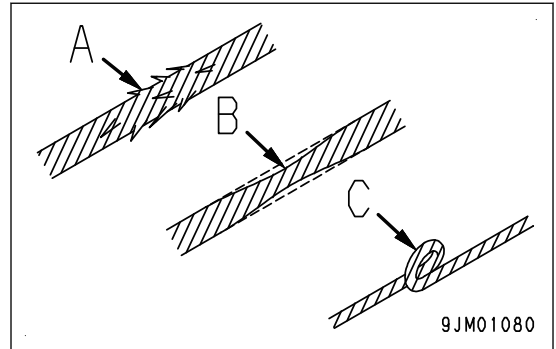


## PRECAUTIONS FOR TOWING MACHINE

### 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.
- A wire rope having cut strands (A), reduced diameter (B), or kinks (C) may break. Never use it.
- 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 towed machine.
- Move 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.



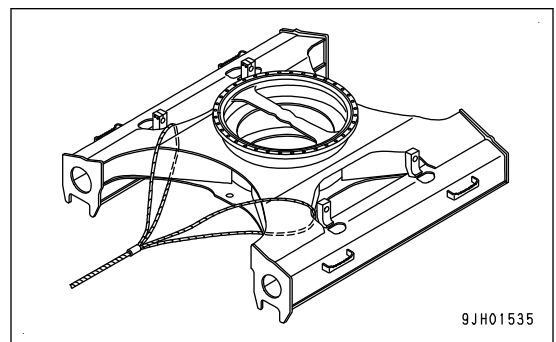
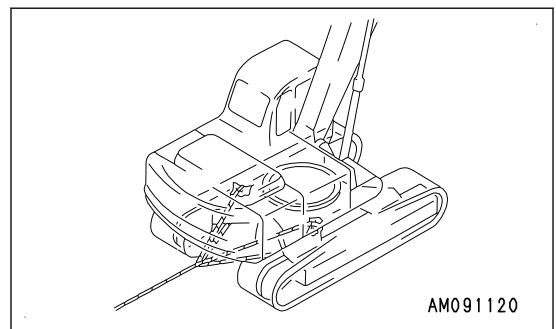
### NOTICE

The maximum towing capacity for this machine is 16800 N {17100 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.

Perform this only in an emergency.



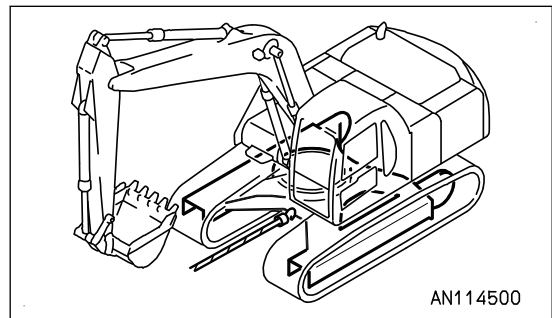
## PRECAUTIONS FOR USING LIGHTWEIGHT TOWING HOLE

### 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.
- The shackle must always be used.
- 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: Max. 78400 N {8000 kg}



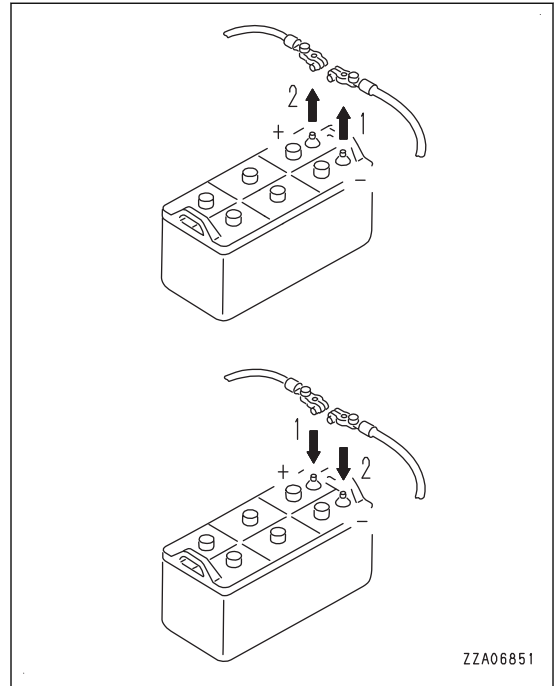
## PRECAUTIONS FOR SEVERE JOB CONDITION

- 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 and bucket 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 open flame such as lighted cigarettes near the battery, or do nothing that will cause sparks.
- Battery electrolyte is dilute sulfuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, immediately wash it off with a large amount of clean water.  
If it gets in your eyes, wash the eyes immediately with clean water, then consult a doctor for medical treatment.
- When handling batteries, always wear protective eye-glasses and rubber gloves.
- When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, first connect the cable to the positive (+) terminal.  
If a tool touches the positive terminal and the chassis, it is dangerous that it may cause a spark. Be extremely careful.
- If the terminals are loose, it is dangerous that the defective contact may generate sparks, and it may cause an explosion.  
Install the cable terminals securely.
- When removing or installing the cable terminals, check which is the positive (+) terminal and which is the negative (-) terminal.

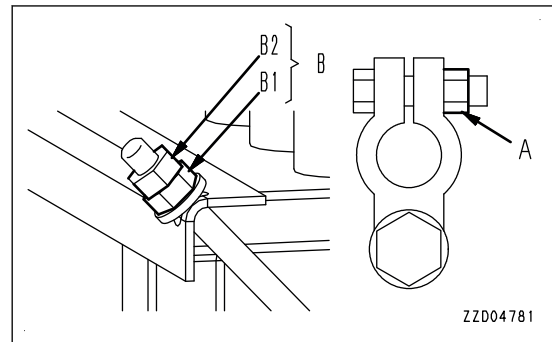
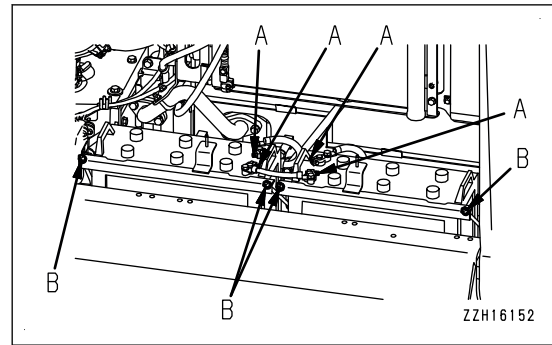


## METHOD FOR REMOVING AND INSTALLING BATTERY

### CAUTION

- Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal).  
If any tool touches between the positive (+) terminal and the chassis, there is a hazard of sparks being generated.
- When installing the battery, connect the ground cable last.

- Tightening torque of battery terminal fixing nut (A): 9.8 to 11.8 Nm {1.0 to 1.2 kgm}
- When replacing the battery, secure it with the battery hold-down fittings.  
Tightening torque of mounting bolt (B):  
(B1) (lower side) 1.47 to 1.96 Nm {1.47 to 1.96 kgm}  
(B2) (upper side) 11.8 to 19.6 Nm {11.8 to 19.6 kgm}

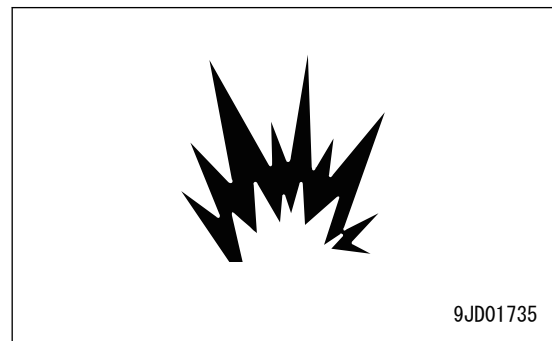


## PRECAUTIONS FOR CHARGING BATTERY

### **⚠ WARNING**

When charging the battery, if the battery is not handled correctly, it is dangerous that the battery may explode. Always follow the instruction manual accompanying the charger, and observe the following.

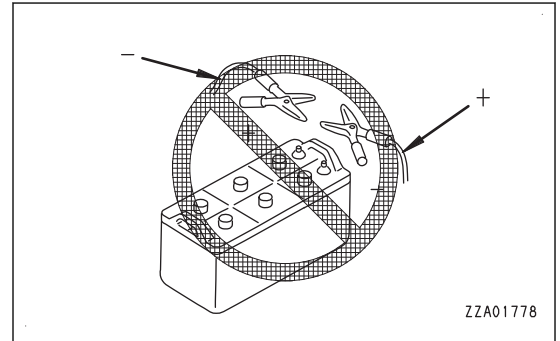
- Set the voltage of the charger to match the voltage of the battery to be charged. If the correct voltage is not selected, the charger may overheat and cause an explosion.
- Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to attach the clips securely.
- Set the charging current to 1/10 of the value of the rated battery capacity; when performing rapid charging, set it to less than the rated battery capacity.  
If the charger current is too high, the electrolyte will leak or the battery cells will dry up, and this may cause the battery to catch fire and explode.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. It is dangerous that this may ignite the battery electrolyte and cause the battery to explode.
- Do not use or charge the battery if the battery electrolyte level is below LOWER LEVEL line. This may cause an explosion. Check the battery electrolyte level periodically and add the purified water (such as a commercial battery fluid) to bring the electrolyte level to UPPER LEVEL line.



## START ENGINE WITH JUMPER CABLES

### WARNING

- When connecting the cables, never contact the positive (+) and negative (-) terminals.
- Always wear protective eyeglasses and rubber gloves when starting the engine by using the jumper cable.
- Be careful not to let the normal machine and failed machine contact each other.  
The sparks caused near the battery could ignite the hydrogen gas generated from the battery, so be careful not to let it happen.
- Make sure that there is no mistake in the jumper cable connections. In the last connection (to the upper structure frame), a spark will be caused, connect the cable to a spot as far away from the battery as possible. (However, do not connect to the work equipment since the current does not flow well through it.)
- When disconnecting the jumper cable, take care not to bring the clips in contact with each other or with the machine.



### NOTICE

- The starting system for this machine uses 24 V. Accordingly, the normal machine must be equipped with a 24 V battery.
- 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, and then turn the battery disconnect switch key to OFF position before connecting the jumper cables. For the operating method of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-109)".

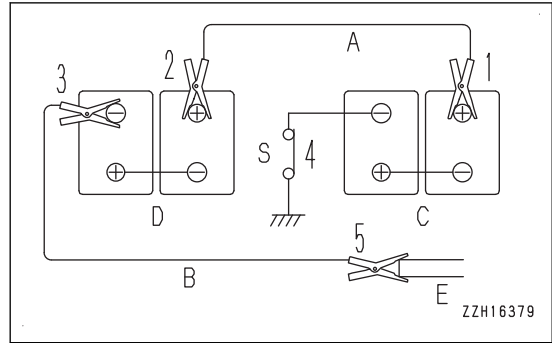
### REMARK

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. For detail, see "HANDLE RADIO (3-230)".

## 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.



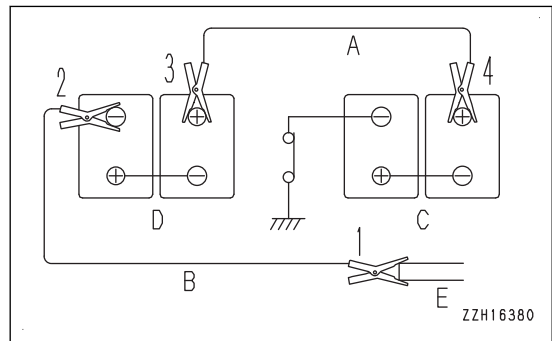
**METHOD FOR STARTING ENGINE**

1. 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.
2. Make sure the clips are firmly connected to the battery terminals.
3. Start the engine of the normal machine and run it at high idle (max. speed).
4. Turn the starting switch of the failed machine to START position and start the engine. If the engine does not start, try again after at least 2 minutes.

**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 is turned OFF	Turn ON.
	Engine shutdown secondary switch is at "STOP ENGINE" position	Set it "NORMAL" position. Install cover.
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 or 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 oil pressure caution 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. (*)
	Fuse of the heater is blown.	Replace. (*)
Engine does not start. ("L04" lights up on monitor.)	Damaged data in the controller	Check, repair. (*)
	Other system troubles	Check, repair. (*)

## PHENOMENA AND ACTIONS FOR CHASSIS

- For the remedies indicated with (\*) in the remedy column, always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
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.

Problem	Main causes	Remedy
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 it to specified oil 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. (*)



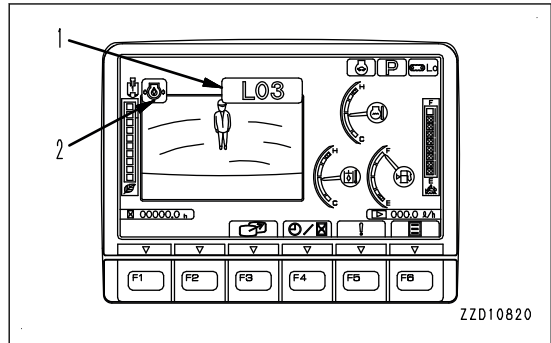
Problem	Main causes	Remedy
Steam spurts out from top of radiator (pressure valve).	Lowered coolant level, leakage of coolant	Check, add coolant, repair. See CHECKS BEFORE STARTING.
	Accumulation of dirt or scale in cooling system	Change coolant, flush inside of cooling system. See WHEN REQUIRED.
	Clogged 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 coolant level sensor	Replace sensor. (*)
	Defective monitor	Replace monitor. (*)
Radiator coolant level caution lamp lights up.	Lowered coolant level, leakage of coolant	Check, add coolant, repair. See CHECKS BEFORE STARTING.
	Accumulation of dirt or scale 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 coolant level sensor	Replace sensor. (*)
	Defective monitor	Replace monitor. (*)
Starting motor turns 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 ELECTRICAL SYSTEM.
	Preheating pilot lamp does not light up.	See ELECTRICAL SYSTEM.
	Defective compression (Defective valve clearance)	Adjust valve clearance. (*)
Exhaust gas color is white or bluish.	Water entry in KDPF	Check, repair. (*)
	Broken KDPF	Replace KDPF. (*)
	Excessive oil in oil pan	Set it to specified oil level. See CHECKS BEFORE STARTING.
	Improper fuel	Replace with specified fuel.
Exhaust gas turns black from time to time.	Broken KDPF	Replace KDPF. (*)
Combustion makes breathing sound from time to time.	Defective nozzle	Replace nozzle. (*)

Problem	Main causes	Remedy
Abnormal noise is generated. (combustion or mechanical)	Low grade fuel being used	Replace with specified fuel.
	Overheating	Refer to “Radiator coolant level caution lamp lights up” above.
	KDPF broken internally	Replace KDPF. (*)
	Excessive valve clearance	Adjust valve clearance. (*)

**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)”.



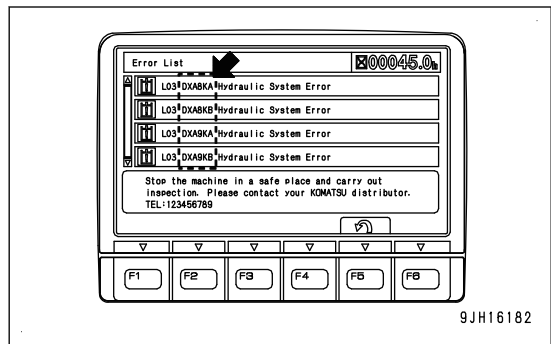
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- When “DXA8KA”, “DXA8KB”, “DXA9KA”, or “DXA9KB” is on the Current Abnormality screen, you can make it possible to perform operations temporarily by turning the pump secondary drive switch to upper (emergency) position. For details of the switch, see “PUMP SECONDARY DRIVE SWITCH (3-90)”.

After that, immediately ask your Komatsu distributor for inspection and repair.

- When the machine has not run out of fuel, if “CA2249” or “CA559” appears on the Current Abnormality screen, replace both fuel main filter and fuel prefilter immediately. For details of replacement, see “METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE (4-47)” and “METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE (4-59)”.

If “CA2249” or “CA559” does not disappear even after the replacement, ask your Komatsu distributor for inspection immediately, even though the machine can perform normal operation.



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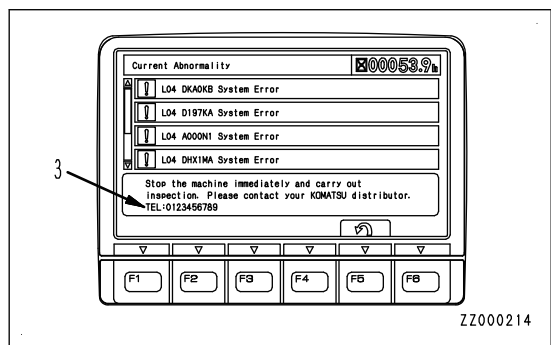
**Telephone number for the point of contact if an error occurs**

When an error screen is displayed on the monitor, press 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.



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# MAINTENANCE

## **WARNING**

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

---

## PRECAUTIONS FOR MAINTENANCE

Do not perform any inspection and maintenance operation that are not found in this manual.

### CHECK SERVICE METER READING

Check the service meter reading every day to see if the maintenance time has come for any necessary maintenance item to be performed.

### KOMATSU GENUINE REPLACEMENT PARTS

Komatsu recommends using Komatsu genuine parts specified in Parts Book as replacement parts.

### KOMATSU GENUINE LUBRICANTS

For lubrication of the machine, Komatsu recommends using Komatsu genuine lubricants. Moreover use oil of the specified viscosity according to the ambient temperature.

### ALWAYS USE CLEAN WASHER FLUID

Use automobile window washer fluid, and be careful not to let any dirt get into it.

### FRESH AND CLEAN LUBRICANTS

Use clean oil and grease. Also, keep the containers of the oil and grease clean. Keep foreign materials away from oil and grease.

### CHECK DRAINED OIL AND USED FILTER

At the replacement of the filters when oil is changed, check the old oil and filters for metal particles and foreign materials. If large quantity of metal particles or foreign materials are found, always report to the person in charge, and perform suitable action.

### PRECAUTIONS FOR REFILLING OIL OR FUEL

If your machine is equipped with a strainer, do not remove it while filling oil or fuel.

### PRECAUTIONS FOR ADDING DEF

Do not remove the strainer while adding DEF.

### WELDING INSTRUCTIONS

- When performing welding, turn the starting switch to OFF position, check that the system operating lamp is not lit. Turn the battery disconnect switch to OFF position, and remove the key.
- 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.

### PRECAUTIONS FOR KDPF

When performing inspection and maintenance during or just after regeneration, take care of the high temperature parts.

Even after the engine stops the parts around KDPF may be at high temperature.

## PRECAUTIONS FOR SCR ASSEMBLY

Be careful for the high temperature parts when performing inspection and maintenance. Even after the engine stops the parts around SCR device may be at high temperature.

## DUSTY JOBSITES

When working at dusty jobsites, observe the following.

- Clean the radiator fins and other parts of the heat exchange equipment more frequently, and take care not to let the fins become clogged.
- Replace the fuel filter more frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
- When checking and replacing the oil or filters, move the machine to a place where there is no dust and take care to prevent dust from entering the system.

## AVOID MIXING OIL

Never mix different brand or grade of oil. If a different brand or grade of oil has to be added, drain the old oil and replace all the oil with the new brand or grade of oil.

## LOCK INSPECTION COVERS

Lock inspection cover securely into position with the lock bar, etc. If inspection or maintenance is performed with inspection cover not locked in position, there is a danger that it may be suddenly shut by the wind and cause personal injury.

## BLEED AIR FROM HYDRAULIC CIRCUIT

When hydraulic equipment is repaired or replaced, or the hydraulic piping is disconnected, the air must be bled from the circuit.

## 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 (2-43)" 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 (7-5)".

**CLOSE ENGINE HOOD SECURELY**

When closing the engine hood after inspection or maintenance, make sure that the catch is securely locked. If the engine hood catch is not locked, there is a danger that the engine hood may open.

# OUTLINE OF MAINTENANCE

- Komatsu recommends using Komatsu genuine parts for replacement parts, grease or oil.
- When changing the oil or adding oil, do not mix different types of oil. When changing the type of oil, drain all the old oil and fill completely with the new oil. Always replace the filter at the same time. (There is no problem if the small amount of oil remaining in the piping mixes with the new oil.)
- Unless otherwise specified, when the machine is shipped from the plant, it is filled with the oil and coolant listed in the table below.

Item	Type
Engine oil pan	Engine oil EO15W40-LA (Komatsu genuine)
Damper case	Power train oil TO30 (Komatsu genuine)
Swing machinery case	
Final drive case	
Hydraulic oil system	Hydraulic oil HO56-HE (Komatsu genuine) or Bio-oil Panolin HLP46*
Radiator	Non-Amine Engine Coolant (AF-NAC) (Komatsu genuine) (density: 30% or above)

\* Please check oil type before refilling. Contact your local Komatsu distributor for information.

## HANDLE OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

### OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.  
Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in Operation and Maintenance Manual.  
Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.  
The majority of failures with the machine are caused by the entry of such impurities.  
Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.  
Having too much oil or too little oil are both causes of failures.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, consult your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend that you have an oil analysis periodically to check the condition of the machine. For those who wish to use this service, consult your Komatsu distributor.
- When using commercially available oil, it may be necessary to reduce the oil change interval. We recommend that you use the Komatsu oil clinic to check the characteristics of the oil in detail.

### NOTICE

**Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure, shortening of the machine life, lowering of performance and increase of fuel consumption.**

### FUEL

- To prevent 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

**The fuel used must be ultra low-sulfur diesel fuel ( $\leq 10$  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 (KDPF). 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. And using fuel with high sulfur content can deteriorate the engine parts and KDPF catalyzer, inducing failures, decrease of the life and degradation in performance.**

## 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 (4-20)". Even in areas where it is not considered necessary to prevent freezing, always use Non-Amine Engine Coolant (AF-NAC) with a density of over 30 % in order to prevent corrosion of the cooling system. Non-Amine Engine Coolant (AF-NAC) is diluted with distilled water that does not contain any ions or water-hardening substances. Never dilute with water.
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating, and will also cause problems with corrosion due to air entering the coolant.

## DEF

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



- When opening the cap of DEF tank of the machine, the ammonia vapor may escape. Keep your face away from the filler port.
- Do not put fluid other than DEF into DEF tank. If diesel fuel or gasoline is added into the tank, it can cause a fire. Some fluids or agents added can create and emit a toxic gas.
- DEF is non-flammable; however, in the case of a fire it may generate an ammonia gas.
- If DEF is spilled, immediately wash and clean the area with water. If spilled DEF is left unattended and the area is not washed and cleaned, it can cause corrosion to the contaminated area and emit toxic gas.
- When disposing of DEF, treat it as an industrial waste. The container for DEF is an industrial waste as well. It should be treated in the same way.
- Never use an iron or aluminum container when disposing DEF, because toxic gas may develop and a chemical reaction may corrode the container. Use a container made of resin (PP, PE) or stainless steel when handling the fluid waste of DEF.

### NOTICE

**If you add any additional additive agents or water to DEF, the devices in the Urea SCR system may be defective, and conformance to the exhaust gas regulations will be lost.**

### GREASE

- Grease is used to prevent seizure and noises at the joints.
- This construction equipment is used under heavy-duty conditions. Komatsu recommends using the recommended grease and follow the replacement intervals and recommended ambient temperatures given in this Operation and Maintenance Manual.
- Grease fittings not included in the periodic maintenance section are the grease fittings for overhaul, so they do not need grease.  
If any part becomes stiff after being used for long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing.  
Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

### PERFORM KOWA (Komatsu Oil Wear Analysis)

KOWA is a maintenance service that makes it possible to prevent machine failures and downtime. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other problems.

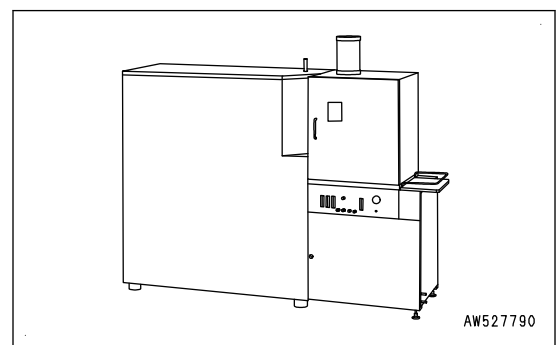
Thanks to long term experience and ample data accumulated, we can grasp condition of your machine accurately and provide proper recommendation.

We strongly recommend you to use this service. The oil analysis is performed at actual cost, so the cost is low, and results of the analysis and recommendations are reported promptly.

### KOWA analysis items

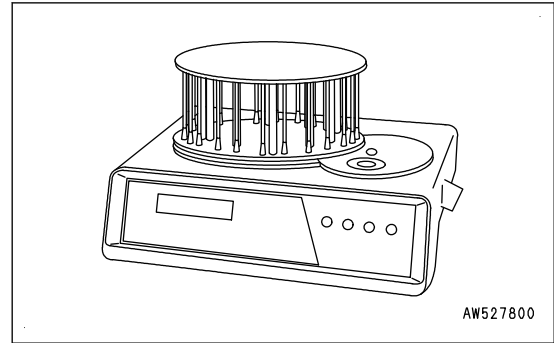
Measurement of metallic powder concentration

An ICP (Inductively Coupled Plasma) analyzer is used for measuring the concentration of iron, copper, and other metal powder in the oil.



Measurement of quantity of iron particles

A PQI (Particle Quantifier Index) measuring instrument is used for measuring the quantity of iron particles of 5 μm or more, enabling early detection of failures.



Others

Measurements are made of items such as the ratio of water, coolant, and fuel in the oil, and dynamic viscosity, if necessary, to enable a highly precise diagnosis of the machine and the components' condition.

**Oil sampling interval**

500 hours

**Precautions when sampling**

- Make sure that the oil is well mixed before sampling.
- Perform sampling at regular fixed intervals.
- Do not perform sampling on rainy or windy days when water or dust can get into the oil.

For further details of KOWA, contact your Komatsu distributor.

**STORE OIL AND FUEL**

- Keep oil and fuel indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, lay the drums so that the filler ports of the drums are located in the lower part of the side to prevent moisture from being sucked in. If drums have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

**STORE DEF**

- Completely seal up its container for storage. Only open containers in a well-ventilated area.
- When storing DEF, avoid direct sunlight. Always use the original container. Make sure that transfer equipment and tank must meet DEF compatible material specification. If DEF is stored in an iron or aluminum container, toxic gas may develop and a chemical reaction may corrode the container.
- The relationship between the upper limit of storage temperature and the storage period of DEF is shown in the table.

Temperature of storage area	Storage period
Max.10 °C	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.

**Handling DEF in cold weather**

- DEF freezes at -11°C. DEF may freeze and expand to break the devices and parts in the tank. The parts inside the tank may be affected. Add DEF to the specified amount for cold weather (below the level of when DEF may freeze).
- In cold weather, keep DEF or the machine installed with DEF indoors where the temperature is at -11°C or higher to prevent DEF in the tank from freezing.

If DEF or the machine installed with DEF cannot be stored indoors where the temperature is at -11°C or higher (if they are left outdoors in cold weather), DEF in the tank may freeze.

Drain DEF to prevent it from freezing.

## 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 (3-109)”.**
- **It is extremely dangerous if the electrical component becomes wet or the covering of the wiring is damaged. This will cause an electrical leakage and may lead to malfunction of the machine. Do not wash the inside of the operator's cab with water. When washing the machine, be careful not to let water get into the electrical components.**

- When removing the connectors of electrical components after washing the machine or in the rain, wipe off the water drop stuck around connectors before removing the connectors and keep the water drop away from inside of the connectors.
- Checking and maintenance items are checking fan belt tension, checking damage of the fan belt and checking battery fluid level.
- Never install any electrical components other than those specified by Komatsu.
- External electro-magnetic interference may cause malfunction of the control system controller. Accordingly, consult your Komatsu distributor before installing a radio receiver or other wireless equipment to the machine.
- When working at the seashore, carefully clean the electric system 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

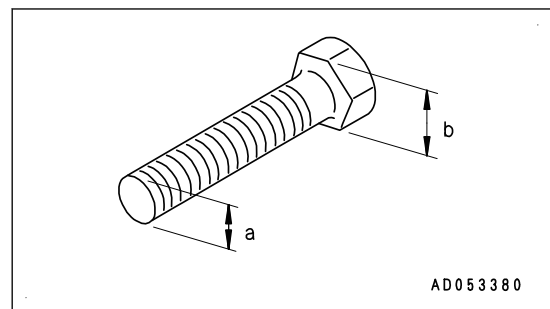
## Tightening torque list

### ⚠ 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.

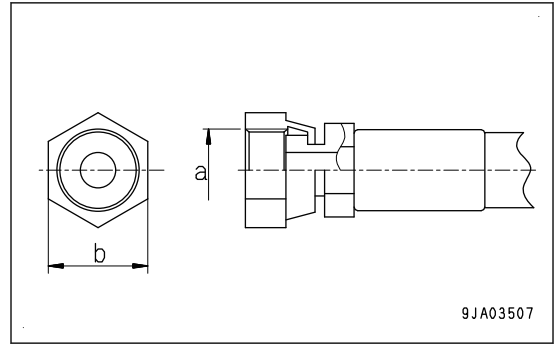
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.

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

Tighten the hoses by the following torque shown in the table.



Nominal No. of hose	Width across flats "b" (mm)	Tightening torque			
		Target value		Allowable range	
		Nm	kgm	Nm	kgm
02	19	44	4.5	35 to 54	3.5 to 5.5
03	22	74	7.5	54 to 93	5.5 to 9.5
04	27	103	10.5	84 to 132	8.5 to 13.5
05	32	157	16.0	128 to 186	13.0 to 19.0
06	36	216	22.0	177 to 245	18.0 to 25.0
10	41	215	22.0	176 to 234	18.0 to 24.0

## Maintenance schedule

- If the machine is equipped with a hydraulic breaker, the maintenance interval for some parts are different. Check the maintenance interval and perform maintenance. For detail, see “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-13)”.
- 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 “USE OF FUEL, COOLANT AND LUBRICANTS TO ACCORDING TO AMBIENT TEMPERATURE (7-6)”.
- Contact your Komatsu distributor for changing the maintenance interval of the machine monitor.

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**MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER**

On the machine equipped with a hydraulic breaker, the hydraulic oil and grease deteriorate faster than in 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 on the right.

**Change of oil in hydraulic tank**

Change the oil according to the table.

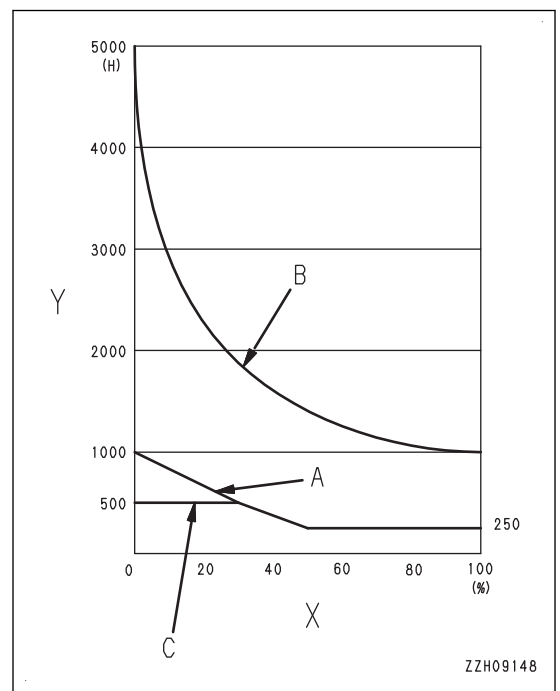
**Replace additional filter element for breaker (if equipped)**

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.

For detail, see "METHOD FOR REPLACING ADDITIONAL FILTER ELEMENT FOR BREAKER (6-31)".

**Replace pilot filter element (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.



For detail, see "METHOD FOR REPLACING ADDITIONAL PILOT FILTER ELEMENT FOR BREAKER (6-32)".

X: Breaker operating ratio (%)

Y: Replacement interval (H)

(A):Hydraulic tank element, pilot filter element

(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

#### **Lubrication**

When the hydraulic breaker is equipped, lubricate the machine on 100-hour intervals. For detail, see "METHOD FOR LUBRICATING (4-45)".



# MAINTENANCE PROCEDURE

## WHEN REQUIRED

### METHOD FOR CHECKING, CLEANING AND REPLACING AIR CLEANER

#### ⚠ WARNING

- When using compressed air, there is a danger that dirt may scatter and cause personal injury. Always wear protective eyeglasses, dust mask, or other protective equipment.
- When removing the outer element from the air cleaner body, it is dangerous to pull it out by force. When working in high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

#### NOTICE

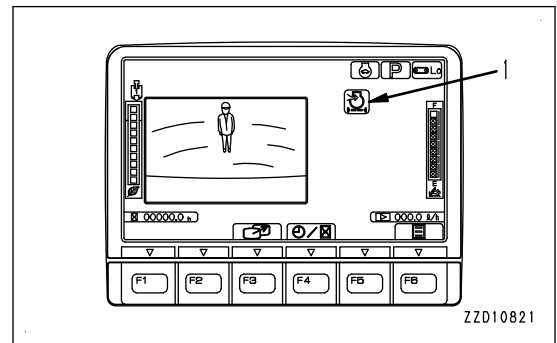
- Do not clean the air cleaner element until the air cleaner clogging caution lamp on the machine monitor lights up. If the element is cleaned frequently before the air cleaner clogging caution lamp on the machine monitor lights up, the air cleaner will not be able to display its performance fully, and the cleaning efficiency will also go down. In addition, during the cleaning operation, more dirt stuck to the element will fall inside the inner element.
- If any dirt enters the engine, it can damage the engine. Be sure to stop the engine before checking, cleaning, or servicing the air cleaner. Do not check, clean, or service the air cleaner when strong wind is blowing or in a dusty place. When replacing the inner element, take extreme care.
- Replace the outer element if it is cleaned 6 times repeatedly or used throughout a year. Replace the inner element as well at the same time.

### METHOD FOR CHECKING AIR CLEANER

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 lights up, clean the air cleaner element.



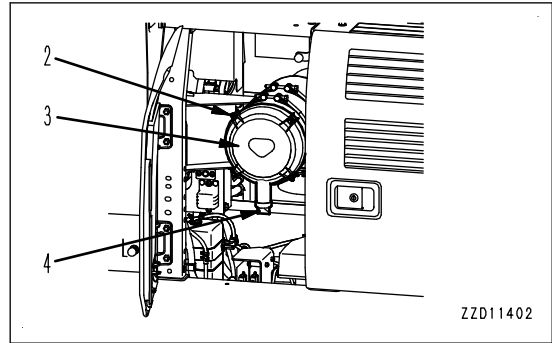
### METHOD FOR CLEANING AIR CLEANER OUTER ELEMENT

#### 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 door at the rear left side of the machine and remove hooks (2) (4 places) to remove cover (3).

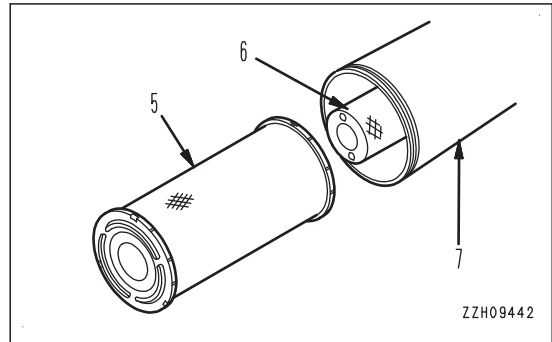


2. Hold outer element (5), rock it lightly up and down and to the right and left, and twist it clockwise and counterclockwise, and pull it out.

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.

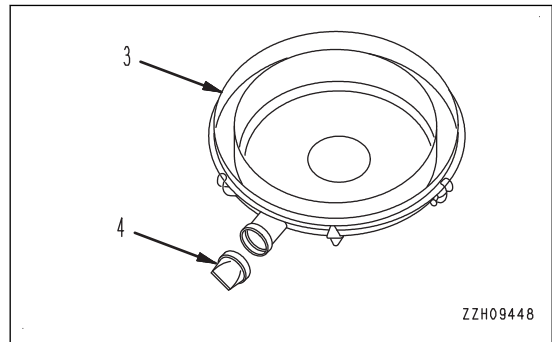


5. Clean dusts in inside and on cover (3) of air cleaner body (7) by using a clean cloth or brush.

6. If any dust is attached to vacuumator valve (4) installed to cover (3), remove it.

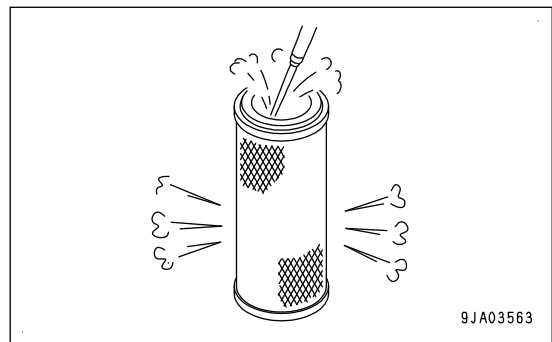
7. When the outer element has been cleaned 6 times or used for 1 year, replace it.

- 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.

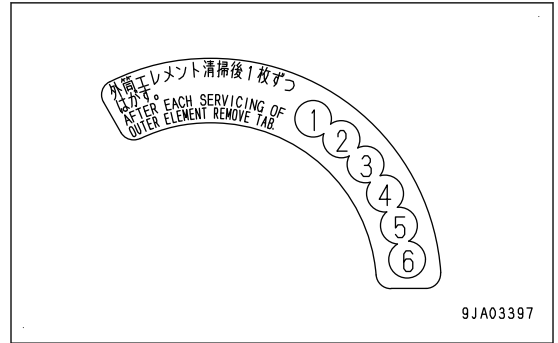


8. Blow dry compressed air (Max. 0.2 MPa{2.1 kg/cm<sup>2</sup>}) from the inside of the outer element along the pleats.

9. Blow along the pleats from the outside, then blow again from the inside.



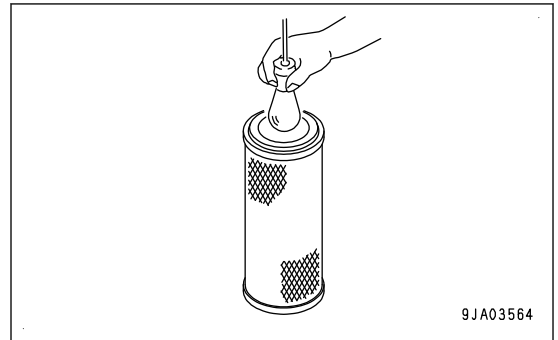
10. Peel off a seal after cleaning the element each time.



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).



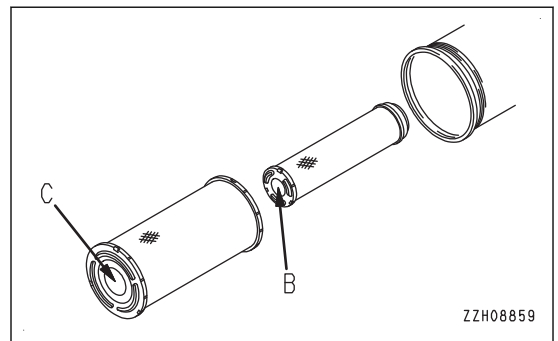
**NOTICE**

- 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 outer element (4) 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.

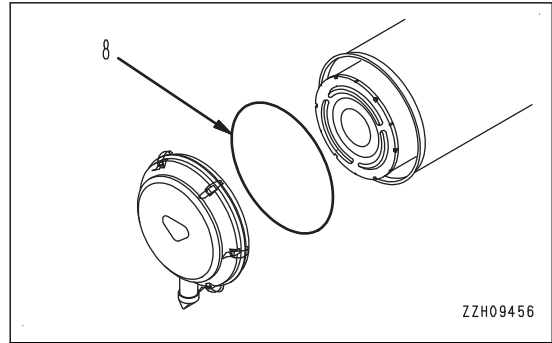


14. Push the outer element in straight with your hand when installing it to the air cleaner body.

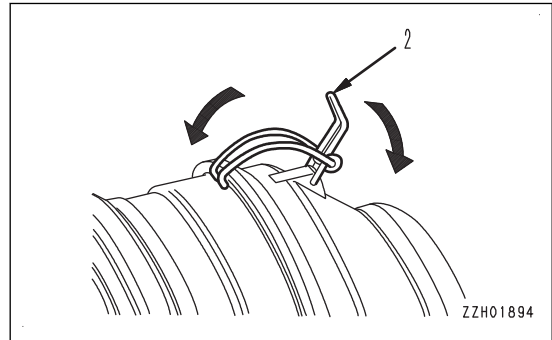
Hold the outer element, and rock it lightly up and down and to the right and left while pushing it in, the outer element can be inserted easily.

15. Install cover (3) according to the following procedure.

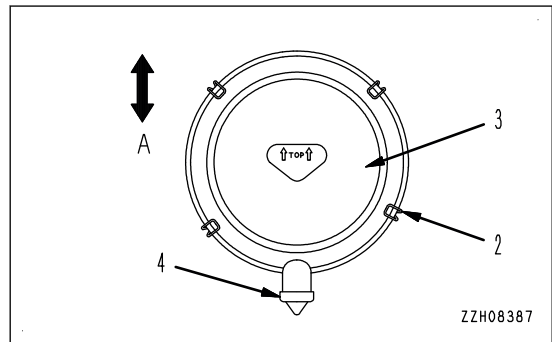
- 1) Check that O-ring (8) is fitted to cover (3).
- 2) Align cover (3) with the element.



- 3) Lock the tip of hook (2) on the protrusion of the air cleaner body.
- 4) Lock hooks (2) diagonally, (top and bottom, right and left) in the same way as when tightening the bolts.



- 5) Always install cover (3) so that vacuator (4) faces the ground (A).
- 6) 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 that air cleaner clogging caution lamp (1) on the monitor panel.  
If it light up just after cleaning of the elements has been finished, replace the inner and outer elements.

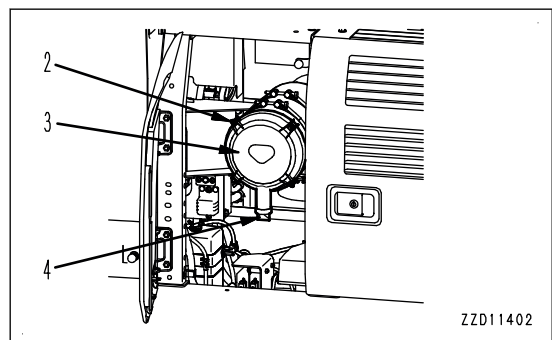
### METHOD FOR CHANGING AIR CLEANER ELEMENT

#### 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 door at the rear left side of the machine and remove hooks (2) (4 places) to remove cover (3).

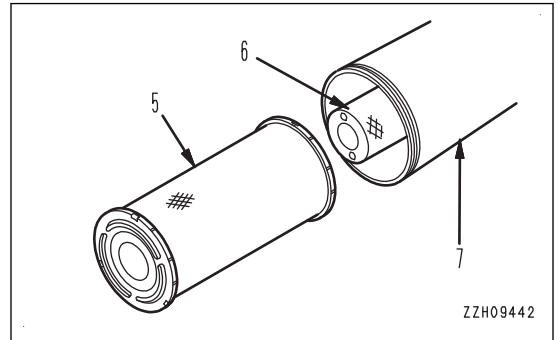


2. Hold outer element (5), rock it lightly up and down and to the right and left, and twist it clockwise and counterclockwise, and pull it out.

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 dusts in inside and on cover (3) of air cleaner body (7) by using a clean cloth or brush.

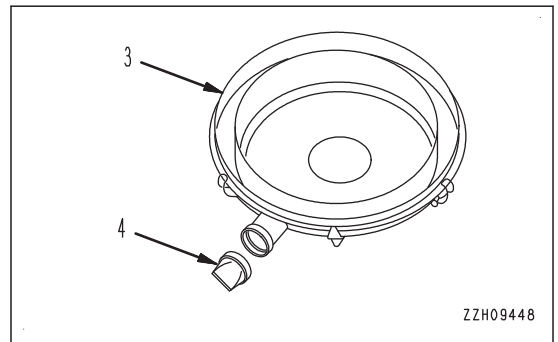
5. If any dust is attached to vacuator valve (4) installed to cover (3), remove it.

6. Remove 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.

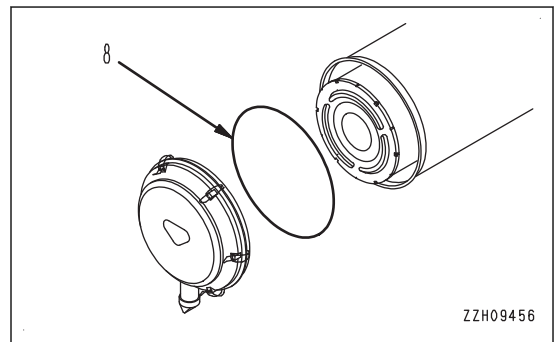
Hold the element, and rock it lightly up and down and to the right and left while pushing it in, the element can be inserted easily.



8. Install cover (3) according to the following procedure.

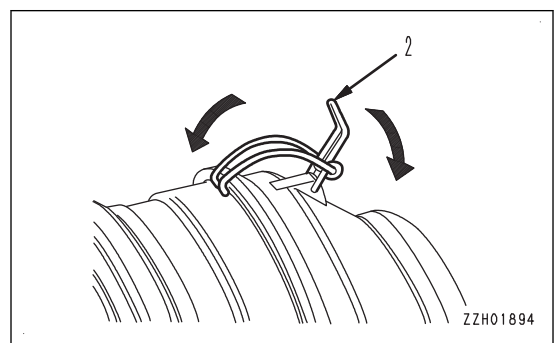
- 1) Check that O-ring (8) is fitted to cover (3).

- 2) Align cover (3) with the element.

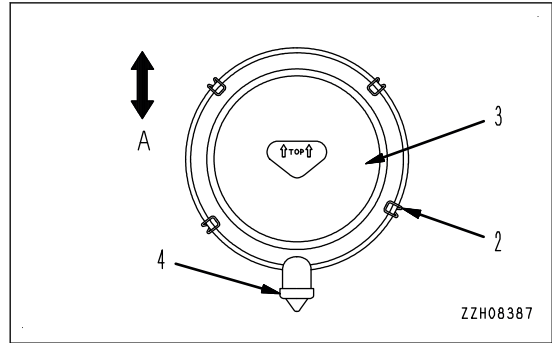


- 3) Lock the tip of hook (2) on the protrusion of the air cleaner body.

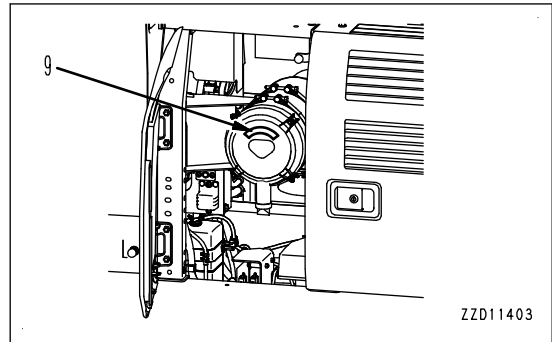
- 4) Lock hooks (2) diagonally, (top and bottom, right and left) in the same way as when tightening the bolts.



- 5) Always install cover (3) so that vacuator (4) faces right below (A).
- 6) 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 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. Accordingly, wait until the coolant temperature drops, then turn the cap slowly to release the pressure.
- When starting the engine while cleaning the machine, set the lock lever in LOCK position to prevent the machine from moving.
- When the undercover is removed, there is a danger of touching the fan. Never enter in the rear part of the machine when the engine is running.

Place the machine on a level ground when cleaning or changing the coolant.  
Clean the inside of the cooling system, change the coolant according to the table.

Coolant	Cleaning of inside of cooling system and replacement of coolant
Non-Amine Engine Coolant (AF-NAC)	Every 2 year or 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 anticorrosion, 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 anti-corrosion properties of Non-Amine Engine Coolant (AF-NAC), always keep the density of Non-Amine Engine Coolant between 30 % and 64 %.

Non-Amine Engine Coolant (AF-NAC) is already diluted with distilled water. When using coolant, investigate the lowest temperature in the past and decide the density for the coolant from the coolant density table below.

When deciding the density for the coolant, set it for a temperature 10 °C below the actual lowest temperature in the working area.

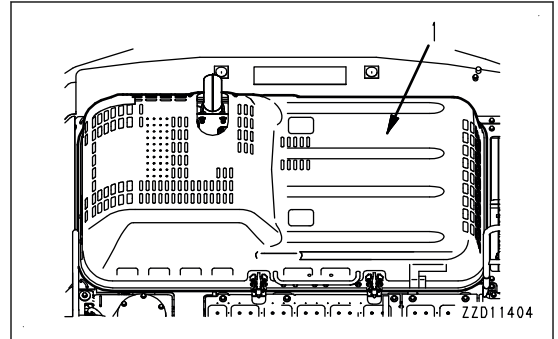
The coolant density varies according to the ambient temperature, but it must be over 30 % at least.

**Coolant density table**

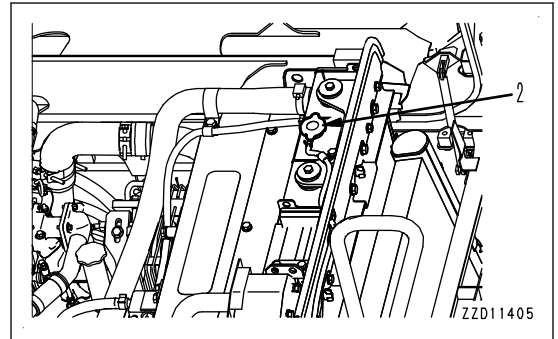
Min. atmospheric temperature (C)	°C	Min. -10	-15	-20	-25	-30	-35	-40	-45	-50
Density (%)		30	36	41	46	50	54	58	61	64

Clean the inside of the cooling system according to the following procedure.

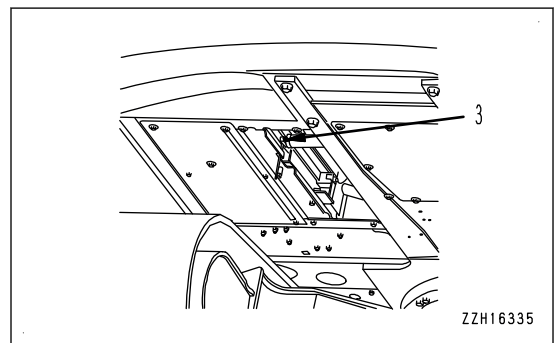
1. Place the machine on a level ground, then stop the engine.
2. Open engine hood (1).



3. Check that the coolant temperature is low enough to make it possible to touch the radiator cap surface by bare hand, turn radiator cap (2) slowly until it hits the stopper, and release the pressure.
4. While pushing radiator cap (2), turn it until it touches to the stopper, then remove it.

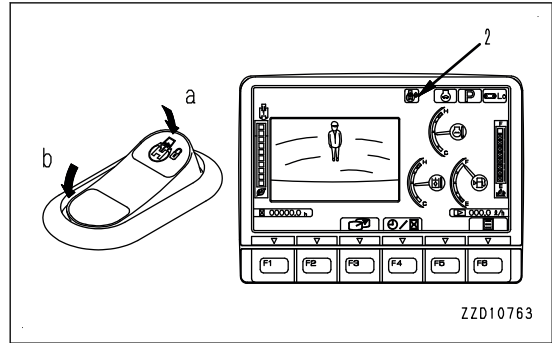


5. Remove the undercover, then place the container under drain valve (3) to receive the coolant.
6. Open drain valve (3) to drain the coolant.
7. After draining the coolant, close drain valves (5) and (6) and fill with city water.  
Pour water until it fills the radiator.

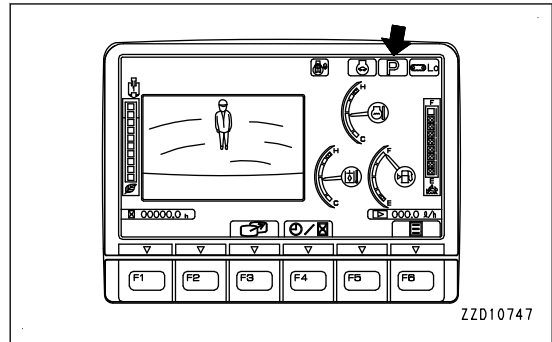


8. Start the engine.  
For details of starting the engine, see OPERATION, "METHOD FOR OPERATIONS AND CHECKS BEFORE STARTING ENGINE (3-166)" and "METHOD FOR STARTING ENGINE (3-168)".
9. Run at low idle for approximately 10 minutes.

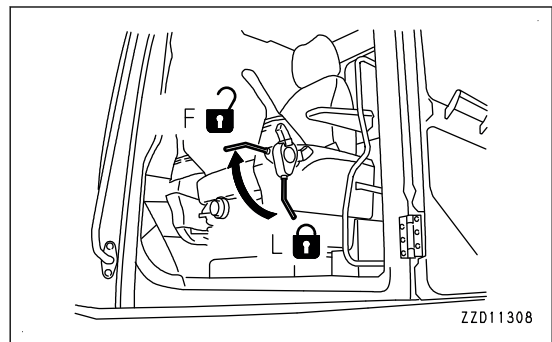
10. Set the swing lock switch to ON position (a) and check that the swing lock pilot lamp is lit.



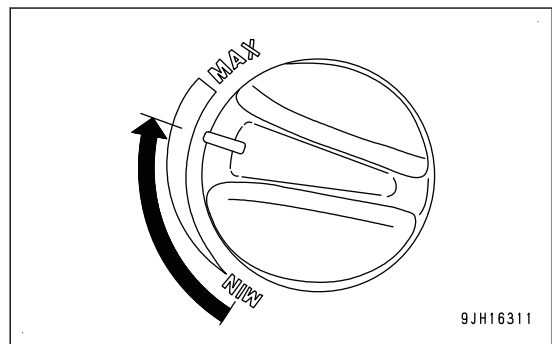
11. To complete the warm-up operation of the hydraulic equipment more quickly, set the working mode to P mode (heavy-duty mode).  
For the details of the working mode setting procedure, see "METHOD FOR SELECTING WORKING MODE (3-190)".



12. Move the lock lever slowly and steadily to FREE position (F), then raise the bucket from the ground.



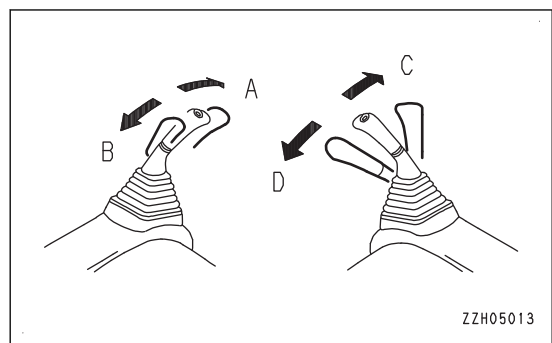
13. Turn the fuel control dial to a point of 2/3 between Low idle (MIN) position and High idle (MAX) position.



**NOTICE**

**When the work equipment is operated, take care that it does not interfere with the machine or ground.**

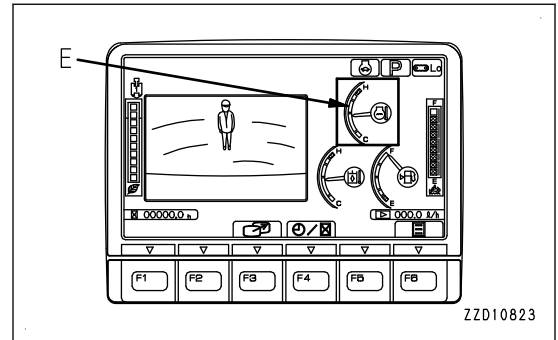
14. Operate the work equipment control levers according to the following procedure.
  - 1) Move the R.H. work equipment control lever slowly in the direction to the bucket CURL side (D). Operate the lever to the end of its travel and hold it in position for 30 seconds.
  - 2) Move the R.H. work equipment 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.



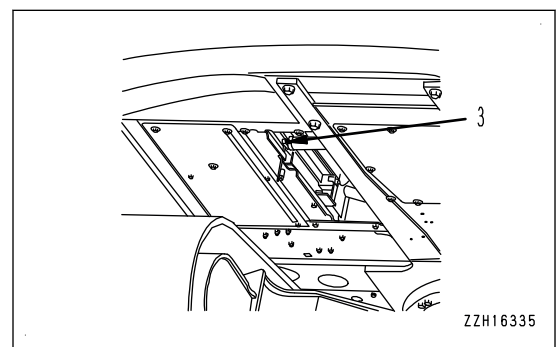


- 3) Move the L.H. work equipment control lever slowly in the direction to the arm IN side (B). Operate the lever to the end of its travel and hold it in position for 30 seconds.
- 4) Move the L.H. work equipment control lever slowly in the direction to the arm OUT side (A). Operate the lever to the end of its travel and hold it in position for 30 seconds.

When the operations of steps 1) to 4) are repeated, the pointer of the engine coolant temperature gauge rises. The pointer of the engine coolant temperature gauge moves down temporarily around the center of scale (E). Then, continue the operation for approximately 10 minutes.



15. Stop the engine and open drain valve (3) to drain the coolant.



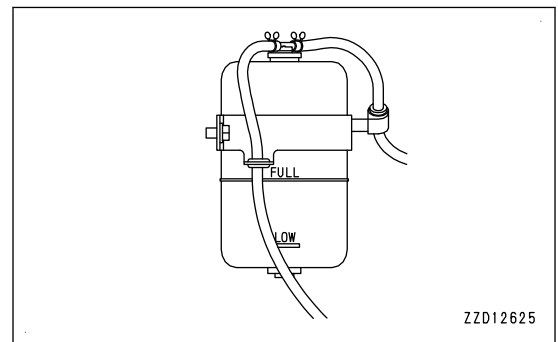
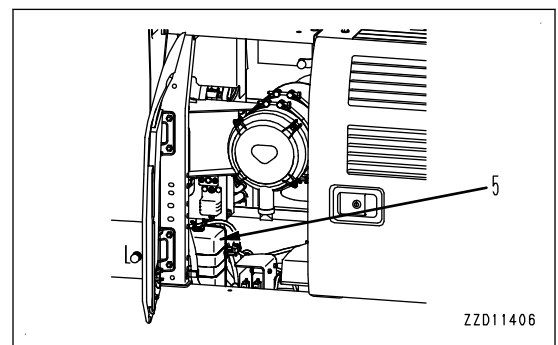
16. Open the door at the rear left of the machine, drain the coolant from sub-tank (5), clean the inside of the sub-tank, then fill with coolant up to the middle between FULL and LOW marks.

**NOTICE**

**If the sub-tank is extremely dirty and it is difficult to clean, replace it with a new one.**

17. After draining the coolant, clean it with coolant.
18. Close drain valve (3).
19. Install the undercover.
20. Fill with coolant through the coolant filler port up to the mouth of the port.

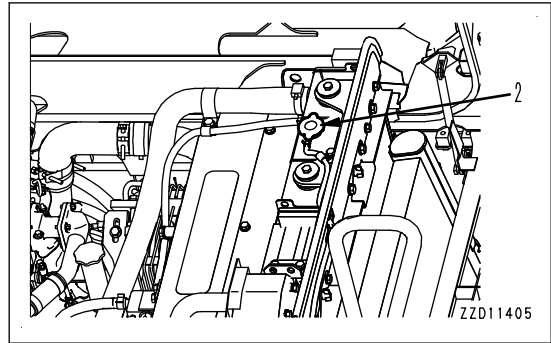
For details of the coolant density, see "coolant density table".



21. 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 radiator cap (2) removed during the above operations.

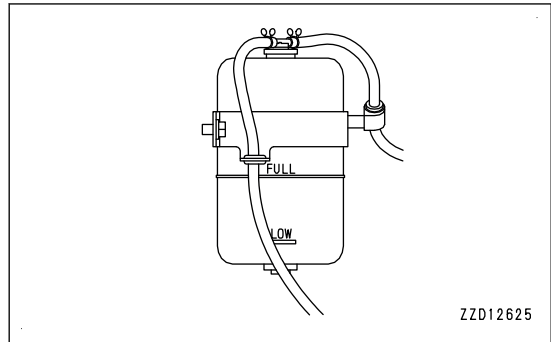
- 22. Stop the engine, wait for approximately 3 minutes, add coolant up to the mouth of the filler port, and tighten the radiator cap (2).



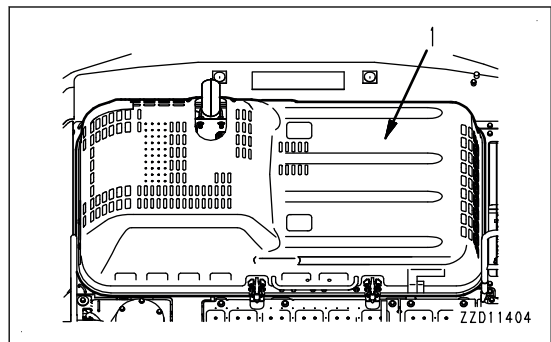
- 23. Check the coolant level in sub-tank.

If the coolant level is between FULL and LOW marks, it is proper.

If it is insufficient, fill with Non-Amine Engine Coolant to the middle between FULL and LOW marks.



- 24. Close engine hood (1).

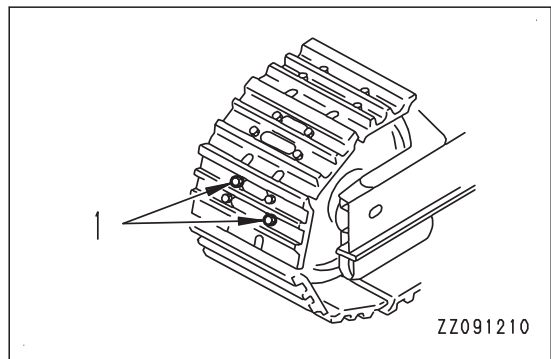


### METHOD FOR CHECKING LOOSENESS AND TIGHTENING TRACK SHOE BOLTS

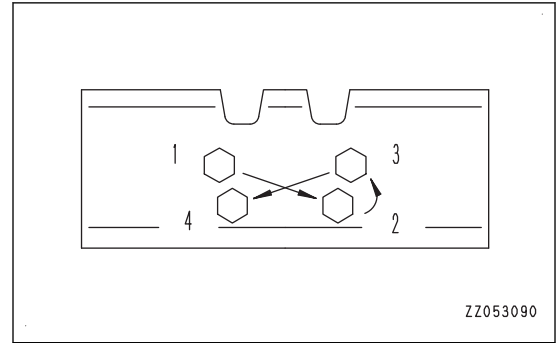
#### NOTICE

If the machine is used with track shoe bolts loose, they will break. If any looseness of the shoe bolt is found, retighten it.

- 1. Check for looseness of the shoe bolt (1).

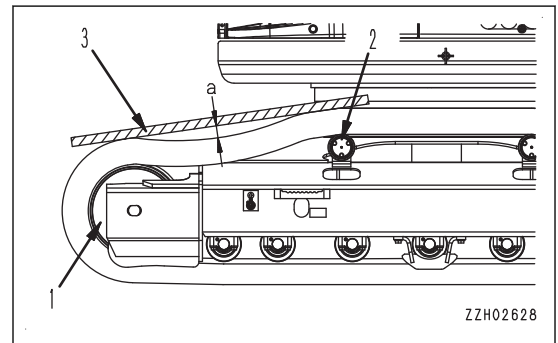


2. If any looseness of the bolt is found, tighten it in order shown in the figure.  
Tightening torque: 441 to 539 Nm{45 to 55 kgm }
3. Check that the nut and shoe are in close contact with the link contact surface.
4. After checking, tighten a further 110 to 130 °.



### METHOD FOR CHECKING AND ADJUSTING 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.



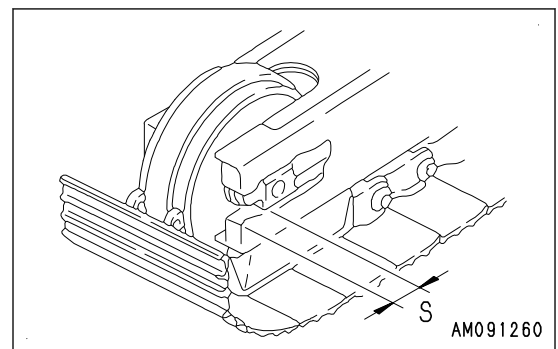
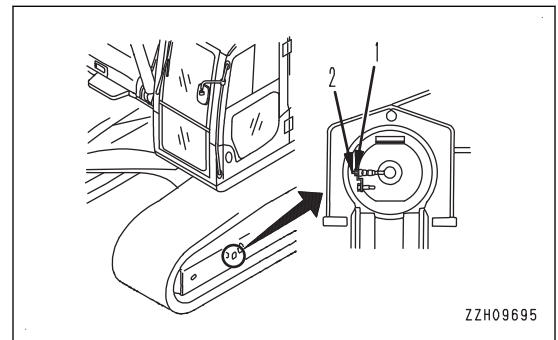
If the deflection is out of the standard value range, adjust it into the standard value range.

### METHOD FOR INCREASING TRACK TENSION

Items to be prepared

Grease pump

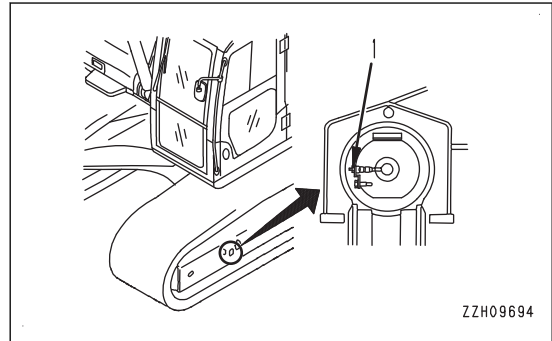
1. Pump in grease through grease fitting (2) by using a grease pump.  
Grease fitting (2) forms one part with plug (1).
2. To check if the tension is correct, run the engine at low idle, move the machine slowly forward (by an amount equal to the length of track on ground), then stop the machine.
3. Check the track tension again, and if the tension is not correct, adjust it again.
4. Grease can be pumped in until dimension (S) becomes 0 mm. If the track tension is still loose, the pins and bushings are excessively worn. The pins and bushings must be inverted or replaced. Ask your Komatsu distributor for repair.



**METHOD FOR DECREASING TRACK TENSION**

**⚠ WARNING**

Never loosen plug (1) more than 1 turn.  
 If it is loosened more than 1 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 (1). Never put your face in the mounting direction of plug (1).



1. Loosen plug (1) gradually to release the grease.
  2. If the grease does not come out smoothly, move the machine forward and backward a short distance.
  3. Tighten plug (1).
  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 the ground), then stop the machine.
  5. Check the track tension again, and if the tension is not correct, adjust it again.
- If the track tension cannot be decreased by the above procedure, ask your Komatsu distributor for repair.

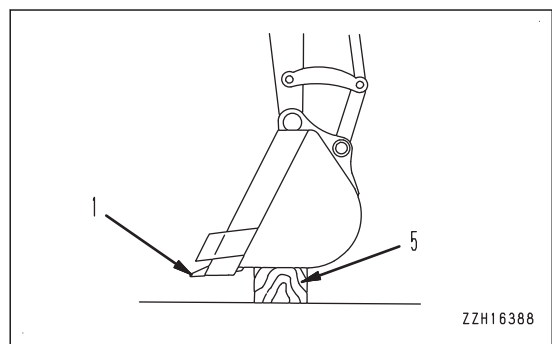
**METHOD FOR REPLACING BUCKET TEETH (VERTICAL PIN TYPE)**

Replace the bucket teeth before the adapter starts to wear.

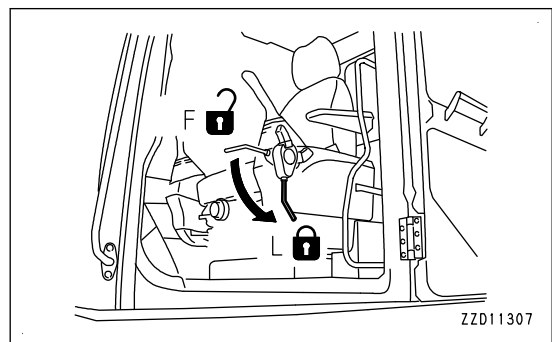
**⚠ WARNING**

- 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 surrounding area.
- Broken pieces may fly during the replacement work, so always wear the protective equipment such as protective eyeglasses and gloves.

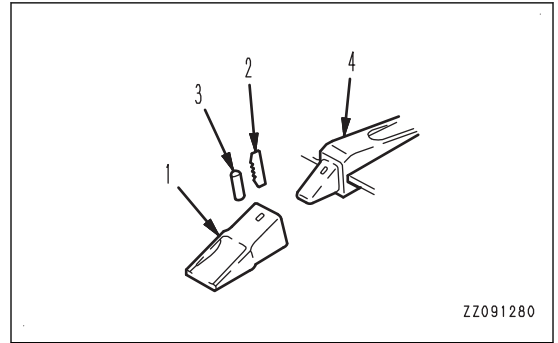
1. To make it possible to drive out a pin of tooth (1), put block (5) under the bottom of the bucket, and make the bottom of the bucket horizontal.



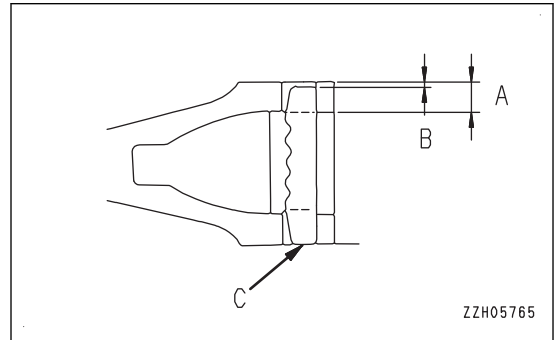
2. Check that the work equipment is in a stable condition, then set the lock lever to LOCK position (L).



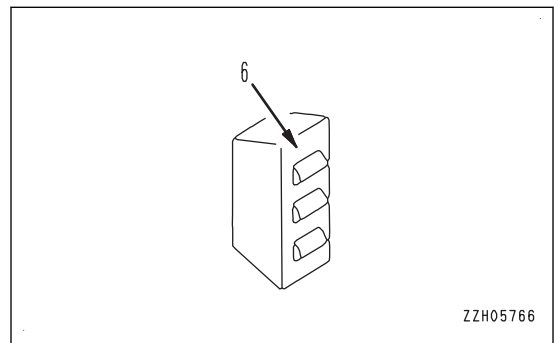
3. Use a hammer and drift to knock out lock pin (2).  
If the drift is set against rubber pin lock (3) when it is hit, the rubber pin lock may break. Set it against the back of the pin.
4. After removing lock pin (2) and rubber pin lock (3), check them.
5. If lock pin (2) and rubber pin lock (3) are 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).

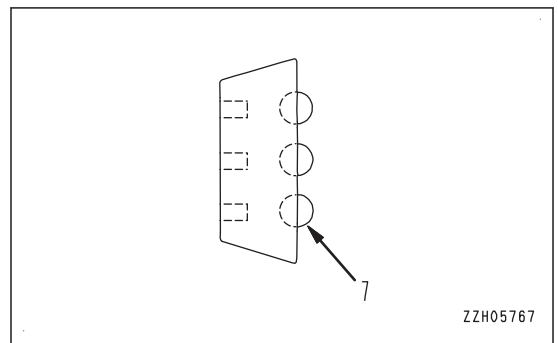


- The steel ball is about to come off.  
Rubber (6) of the rubber pin lock is broken.



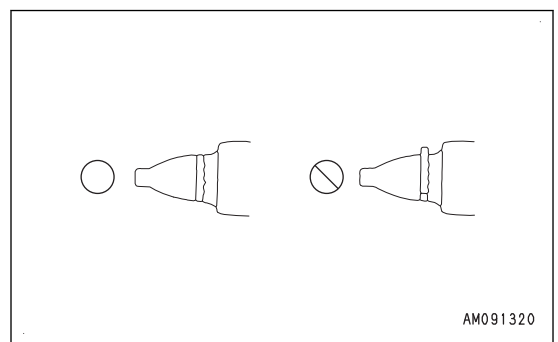
- The steel ball sinks.  
The rubber of the rubber pin lock is deteriorated and steel ball (7) sinks into it when you press it.

6. Remove the soil stuck to adapter (4) by using a knife.



7. 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.

8. Clean the inside of teeth (1), then install it to adapter (4).  
If there is mud affixed to it or if there are protrusions, the teeth (1) will not enter adapter (4) properly, and there will not be proper contact at the mating portion.

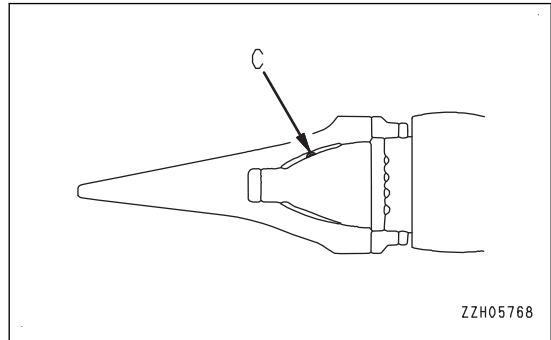


9. Fit tooth (1) to adapter (4), and check that when tooth (1) is pressed strongly, the rear face of the hole for the pin of teeth (1) is at the same level as the rear face of the hole for the pin of adapter (4).

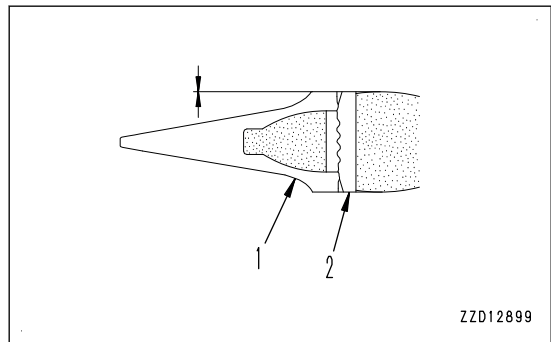
If the rear face of the pin hole of tooth (1) protrudes in front of the rear face of the pin hole of adapter (4), do not knock the pin in.

There is sticking matter (C) which prevents tooth (1) from fitting into adapter (4) perfectly.

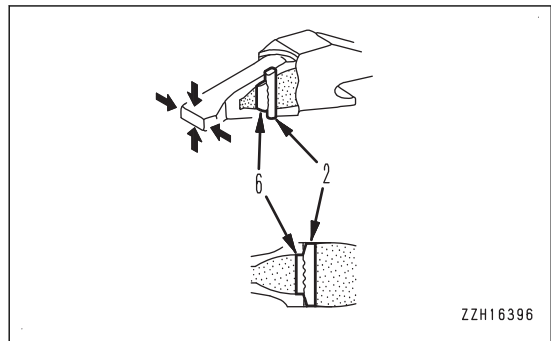
Find out the sticking matter and remove it. Fit tooth (1) into adapter (4) sufficiently, and then knock in lock pin (2).



10. Insert lock pin (2) in the pin hole in tooth (1), and knock it in so that the top surface of lock pin (2) is the same height as the surface of tooth (1).



11. After replacing a bucket tooth, always check the following.
  - After the lock pin (2) is driven in completely, its tip surface is flush with the surface of tooth (1).
  - 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.
  - Confirm that rubber pin lock (6) and lock pin (2) are set as shown in the right figure.



**REMARK**

If the tooth is turned, the wear will become uniform. This will extend the service life of the tooth and reduce the frequency of replacement.

When replacing the tooth, replace the rubber pin lock and lock pin with new parts at the same time. This will prevent the tooth from falling out.

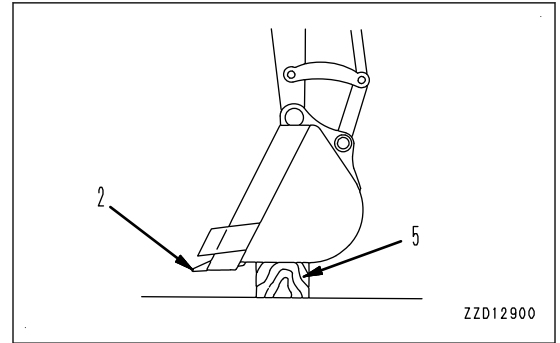
**METHOD FOR REPLACING BUCKET TEETH (HORIZONTAL PIN TYPE)**

Replace the bucket teeth before the adapter starts to wear.

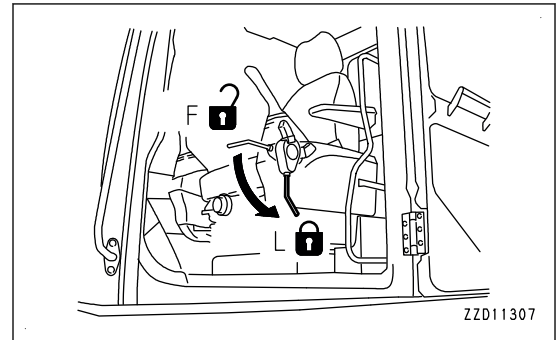
**⚠ WARNING**

- 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 surrounding area.
- Broken pieces may fly during the replacement work, so always wear the protective equipment such as protective eyeglasses and gloves.

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.



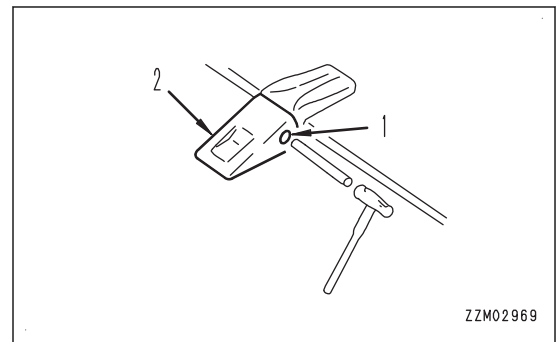
2. Check that the work equipment is in a stable condition, then set the lock lever to LOCK position (L).



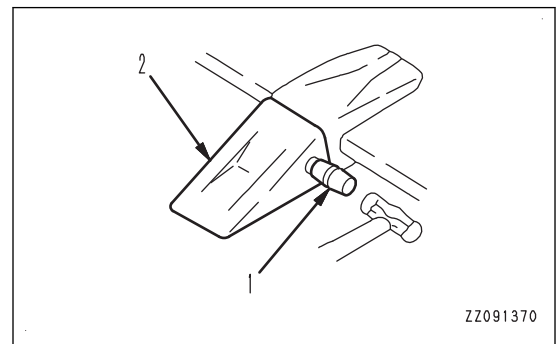
3. Place a bar on the head of pin (1), hit the bar with a hammer to knock out the pin, then remove tooth (2).

**REMARK**

If it cannot be removed by this method, ask your Komatsu distributor to have the replacement performed.



4. Clean the mounting face. Fit a new tooth (2) in the adapter, push in pin (1) partially by hand, then lock it with a hammer to install the tooth to the bucket.

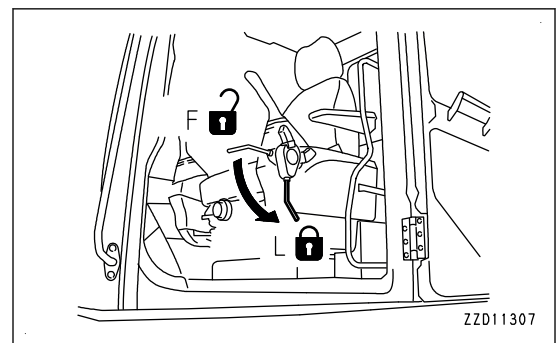


**METHOD FOR ADJUSTING BUCKET CLEARANCE**

**⚠ WARNING**

It is dangerous if the work equipment moves by mistake when adjusting the bucket clearance.

Lower the work equipment to the ground, set it in a stable condition, stop the engine, and set the lock lever securely to LOCK position (L).



1. Set the work equipment in the position shown in the figure, then stop the engine and set the lock lever to LOCK position (L).

2. Shift O-ring (1) and measure the amount of play "a".

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 plate mounting bolts (2) (4 pieces) and loosen plate (3).

The shim is a split type, so the work can be performed without removing the bolts.

4. Remove shim (4) corresponding to the amount of play "a".

For shim (4), 2 types of 1.0 mm and 0.5 mm are installed.

When play "a" is smaller than 1 shim, do not adjust it.

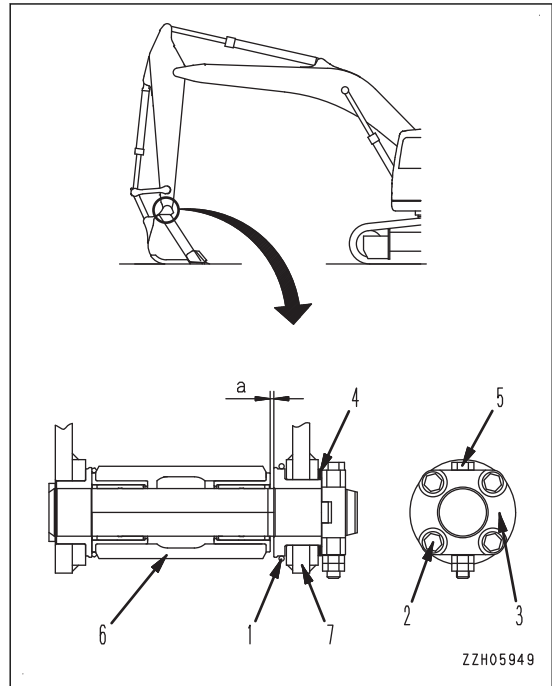
5. Tighten bolts (2) (4 pieces).

If bolts (2) are too stiff to tighten, pull out pin stopper bolt (5) for easier tightening.

(6) Arm

(7) Bucket

[Example] In the case of play of 3 mm, remove 1.0 mm (2 pieces) shims and 0.5 mm (1 piece) shim. Play becomes 0.5 mm.

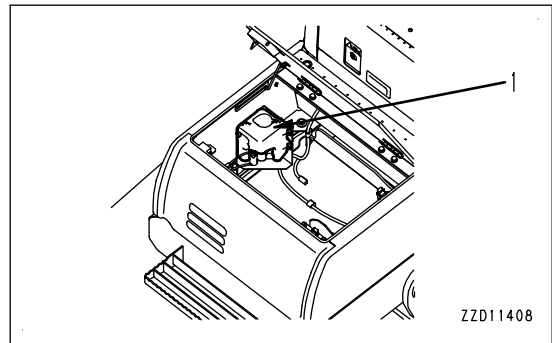


**METHOD FOR CHECKING WINDOW WASHER FLUID LEVEL, ADDING FLUID**

1. If air is in the window washer fluid, check the fluid level in window washer tank (1).

2. If the level is low, add window washer fluid for automobile.

Be careful not to let dirt or dust get in when adding fluid.



**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 of -10 °C (for general use) and -30 °C (for cold district). Use them properly 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, maintenance item	Content of check, 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 (4-50)"
Compressor	Operating condition	Every 4000 hours
V-belt	Damage, tension	Every 250 hours "METHOD FOR CHECKING AIR CONDITIONER COMPRESSOR BELT (4-43)"
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.

### CHECK LEVEL OF REFRIGERANT (GAS)

#### WARNING

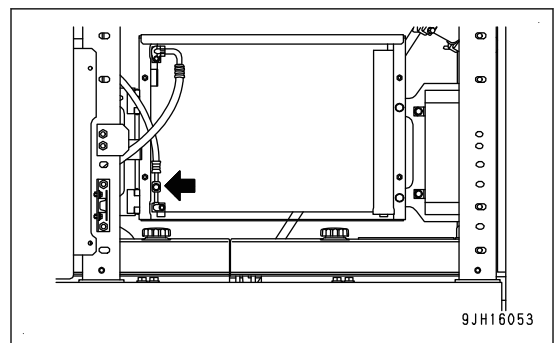
If the refrigerant used in the air conditioner gets into your eyes or is splashed on your hands, it may cause loss of sight or frostbite. Never touch the refrigerant.

Do not loosen any part of the refrigerant circuit.

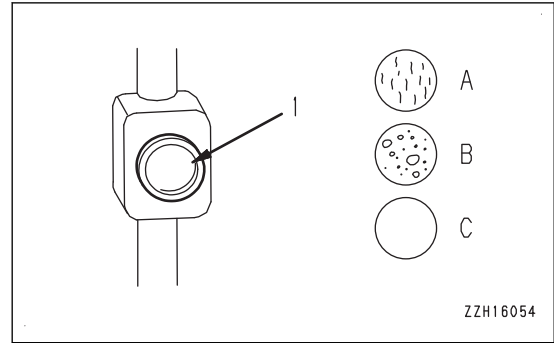
Do not bring any open flame close to any point where the refrigerant gas is leaking.

If the level of the refrigerant (gas) is low, the cooling effect will be reduced. Perform the check while running the engine at full throttle and operating the air conditioner at high speed.

Check the condition of the refrigerant gas (chlorofluorocarbon 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: In sufficient (bubbles pass continuously)
- (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 WASHING WASHABLE FLOOR**

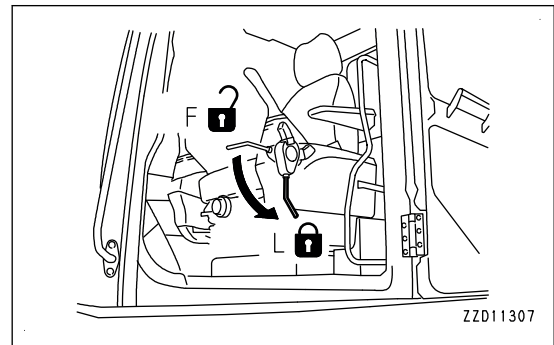
On the washable cab floor, it is possible to flush out the dirt directly with water.

**⚠ WARNING**

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.

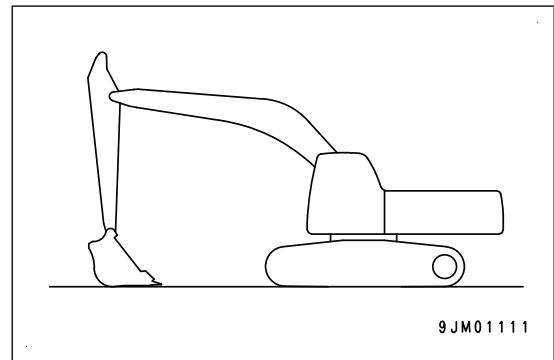
Select a firm flat place for work.

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.



**METHOD FOR CLEANING WASHABLE FLOOR MAT**

1. Stop the machine on a level ground, lower the bucket to the ground, stop the engine, and then perform the cleaning
2. When washing the floor mat, use a brush to remove the dust, or directly water the mat to wash it with a brush.

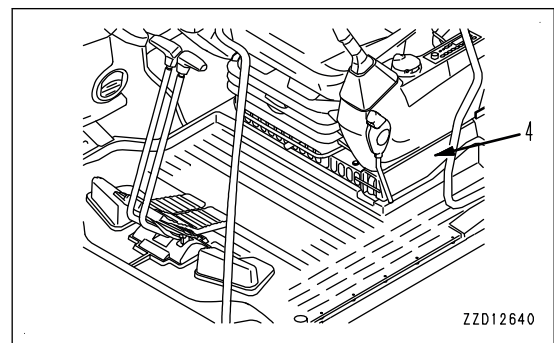


**METHOD FOR CLEANING CAB FLOOR**

**NOTICE**

When performing this work, be careful not to splash water onto the monitor and connectors inside the operator's cab. Never splash water on the things above the pedestal of the operator's seat (4).

If any water splashes on the surrounding equipment, be sure to wipe it off.

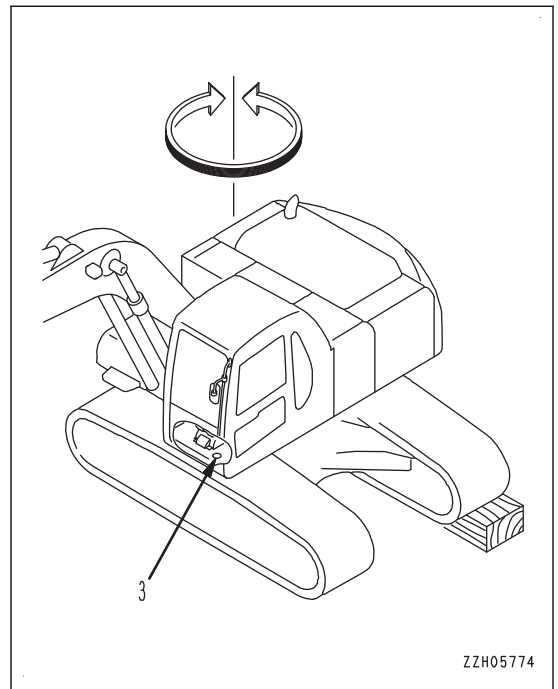


1. Set the machine at angle.

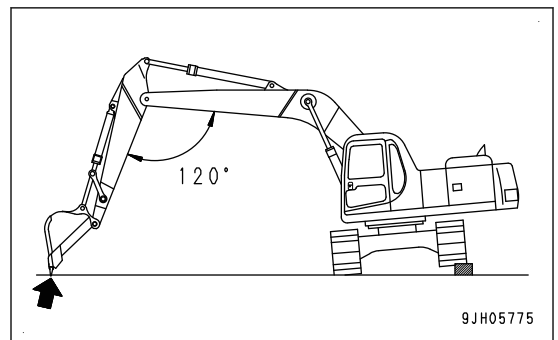
Referring to “METHOD FOR SETTING MACHINE AT ANGLE”, select a safe method, depending on the state of the machine.

In this example, the machine is set at angle by using blocks.

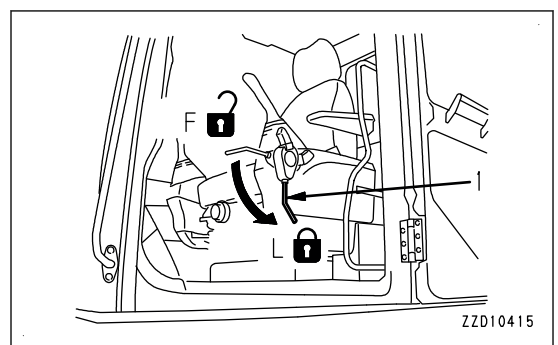
2. Swing the upper structure slowly so that water drain holes (3) in the cab floor are at a low position.



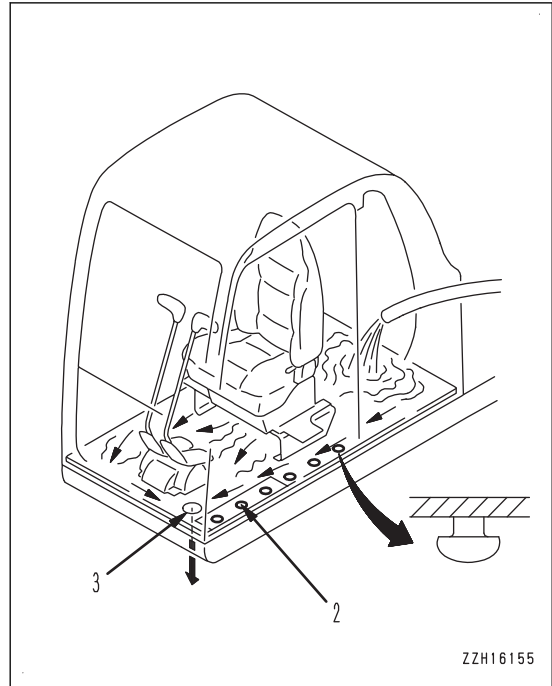
3. Lower the work equipment to the ground and set the machine in a stable condition.



4. Set lock lever (1) to LOCK position (L) and stop the engine.

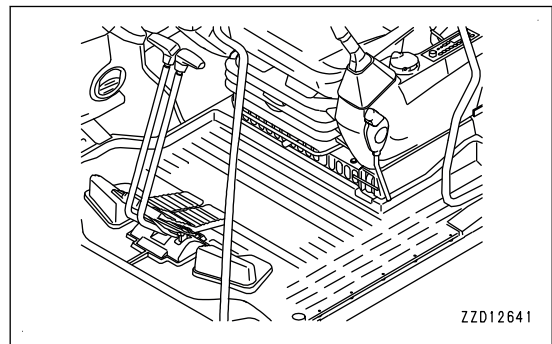


5. Pull out projections (2) (6 places) on the back of the floor mat and remove the floor mat.
6. Remove the cap from water drain hole (3).
7. Flush out the dirt on the floor directly with water through water drain hole (3).
8. After completing the washing work, install the cap in water drain hole (3).



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9. Fit the floor mat and secure it by inserting projections (2) into the holes.



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**METHOD FOR SETTING MACHINE AT ANGLE**

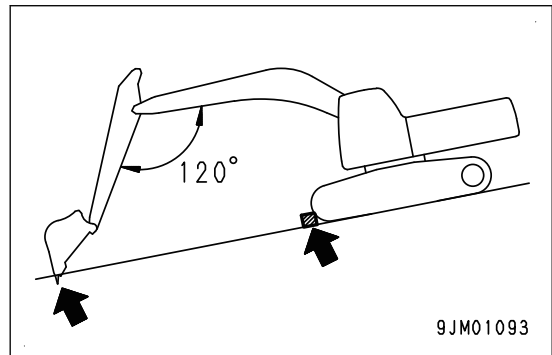
You can set the machine at an angle by using a slope or blocks. Consider the condition of the machine and select the safe method.

**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.

1. Stop the machine with the work equipment on the downhill side on a slope.
2. Block the tracks from movement and thrust the work equipment into the ground.



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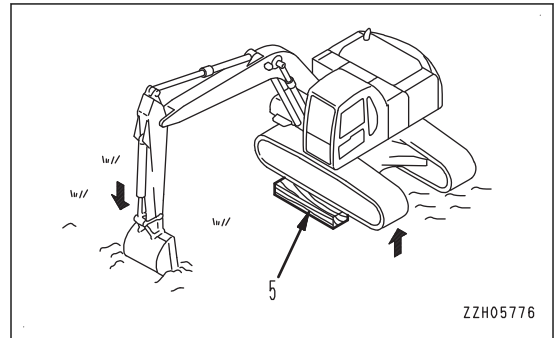
## METHOD FOR USING BLOCK

### WARNING

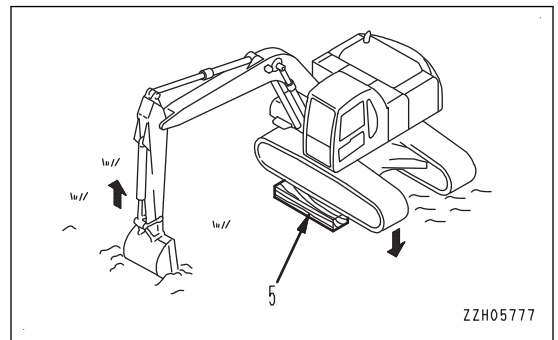
Select a firm flat place.

Put strong blocks (5) 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 (5) under the raised track and make sure that the machine is stable.



3. Operate the boom slowly and lower the machine.  
When doing this, check that the machine is always stable.



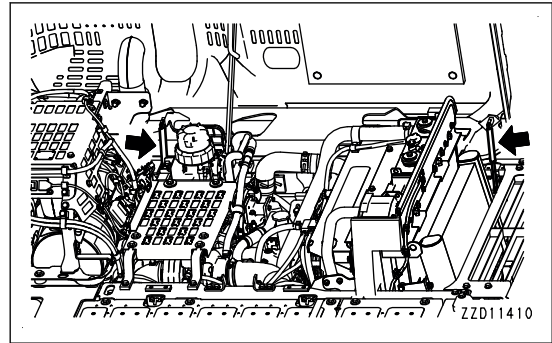
## METHOD FOR CHECKING GAS SPRING

### 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 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.

The gas springs are located at the engine hood (2 places on right and left sides).



In the following cases, ask your Komatsu distributor for inspection, repair, and replacement.

- The engine hood is heavy to open.
- Oil or gas is leaking from the gas spring.

**METHOD FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT**

**METHOD FOR BLEEDING AIR FROM PUMP**

**NOTICE**

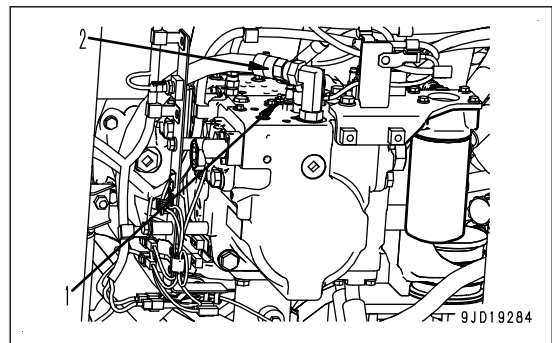
**If the drain hose is installed first, oil will spurt out from bleeder (1) hole.**

**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.**

1. Loosen air bleeders (1) and check that oil oozes out from the air bleeder.
2. If the oil does not ooze out, remove drain hose (2) from the hydraulic pump case and fill the pump case completely with hydraulic oil through drain port.

Oil will come out when the drain hose is removed, so secure the hose fitting at a position higher than the level of the oil in the hydraulic tank.

3. After completing the air bleed operation, tighten air bleeder (1) and install the drain hose.



**METHOD FOR STARTING ENGINE**

Start the engine according to OPERATION, "METHOD FOR STARTING ENGINE" and run it at low idle for 10 minutes, and then start the following work.

**METHOD FOR BLEEDING AIR FROM CYLINDER**

**NOTICE**

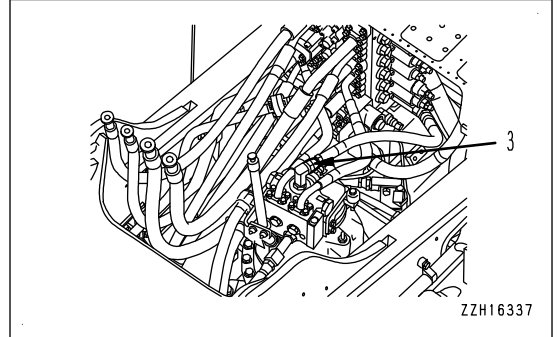
**If the engine runs at high speed immediately after startup or a cylinder is operated to its stroke end, air taken inside the cylinder may cause damage to the piston packing.**

1. Start the engine.
2. Turn the fuel control dial to Low idle (MIN) position.
3. Move each cylinder to approximately 100 mm before the stroke end, and repeat the operation 4 to 5 times.  
Take care not to move the cylinder to the stroke end.
4. Turn the fuel control dial to High idle (MAX) position.
5. Move each cylinder to approximately 100 mm before the stroke end, and repeat the operation 4 to 5 times.  
Take care not to move the cylinder to the stroke end.
6. Turn the fuel control dial to Low idle (MIN) position.
7. Operate each cylinder 4 to 5 times to the end of its stroke to completely remove the air.

## METHOD FOR BLEEDING AIR FROM SWING MOTOR

### NOTICE

- When bleeding air, do not operate the swing.
  - If the air is not bled from the swing motor, the motor bearings may be damaged.
1. Run the engine at low idle, loosen hose (3) at port S, and check that oil oozes out from port S hose (3).
  2. If oil does not ooze out, stop the engine, remove port S hose (3), and fill the motor case with hydraulic oil.
  3. After completely bleeding the air from the swing motor, tighten port S hose (3).
  4. Run the engine at low idle.
  5. Swing evenly and slowly at least 2 turns each clockwise and counterclockwise.



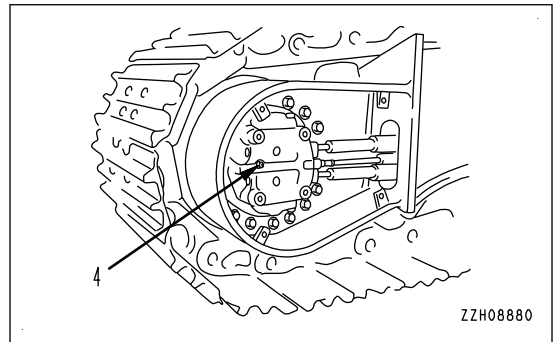
This will automatically bleed the air from the swing circuit.

When replacing the swing motor safety valve, ask your Komatsu distributor for the replacement and the air bleeding.

## METHOD FOR BLEEDING AIR FROM TRAVEL MOTOR

Bleed air only when the oil inside the travel motor case is drained.

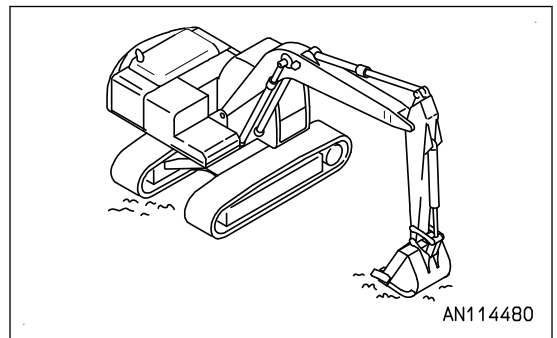
1. Run the engine at low idle, loosen air bleeder (4), and tighten it when oil flows out.
2. Run the engine at low idle and swing the upper structure 90 ° to bring the work equipment to the side of the track.



3. 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.

### REMARK

When rotating the track at idle, rotate equally both forward and in reverse.



## METHOD FOR BLEEDING AIR FROM ATTACHMENT (WHEN ATTACHMENT IS EQUIPPED)

### NOTICE

- If the method of air bleeding from the attachment is specified by the manufacturer, bleed the air according to the specified procedure.
- After completing the air bleeding operation, stop the engine, and leave the machine for 5 minutes before starting operations. This will remove the air bubbles in the oil inside the hydraulic tank.

If a breaker or other attachment is installed, perform the air bleeding procedure until the air is completely bled from the attachment circuit.

1. Turn the fuel control dial to Low idle (MIN) position.
2. Repeat operating the attachment approximately 10 times to bleed air.
3. Check that there is no leakage of oil and wipe off any oil that is spilled.
4. After completing the air bleeding operation, check the oil level, and if the oil level is low, add oil.

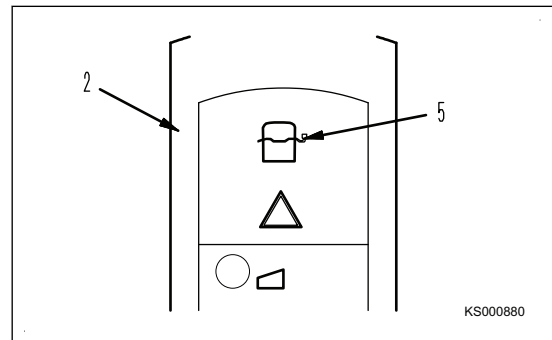
## CHECK AUTOMATIC GREASE SYSTEM

### PERIODIC CHECKS

1. Check the grease level in the reservoir, but do not refill the reservoir before minimum level is reached.
2. Check the in-cab display is functioning.
3. Check if the selected interval time is correct for the working conditions of the machine.
4. Check the pump for damage and leakage.
5. Check the grease pipes for damage and leakage.
6. Check the condition of the grease points served by the system. Sufficient fresh grease should be visible.
7. Check the operation of the system. Perform a cycle test.
8. Check the pump unit and its surroundings. Attention - avoid using high pressure wash directly on the pump.
9. Replace or clean the pump filler filter (behind the connector on the reservoir) every 500 hours.

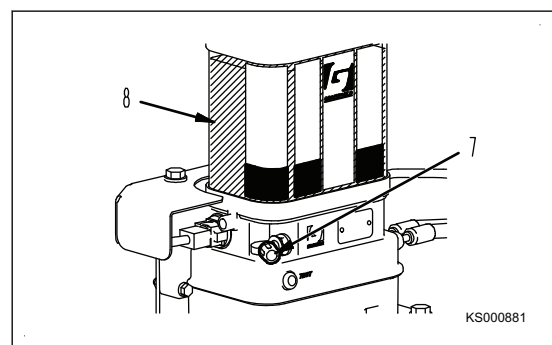
### REFILLING GREASE

If the yellow lamp (5) on the in-cab display (2) illuminates, the minimum grease level in the reservoir has been reached. The grease reservoir must be refilled as soon as possible.



### GREASING PROCEDURE

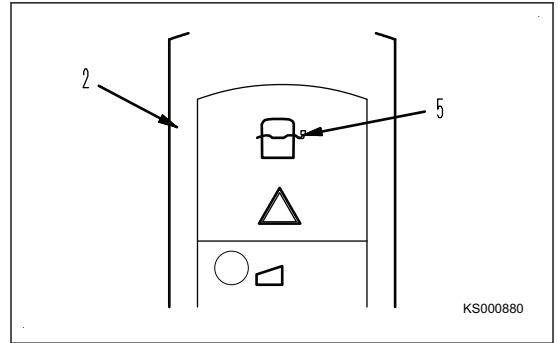
1. Remove the dust cap from the filler coupling (7).
2. Carefully clean the filter coupling (7) and the filler coupling on the filler hose.
3. Fix the filler hose onto the filler coupling (7).
4. Fill the reservoir up to the maximum level indicated on the reservoir (8).
5. Remove the filler hose and fit the dust cap.
6. Fix the filler hose onto the filler coupling of the filler pump so that filler hose stays clean.





**REMARK**

Do not fill the reservoir before you have a low level indication (5) on the in-cab display.

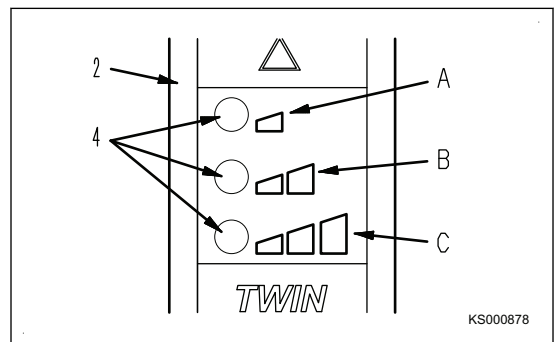
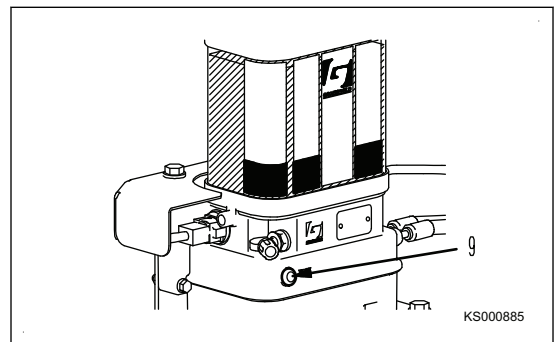
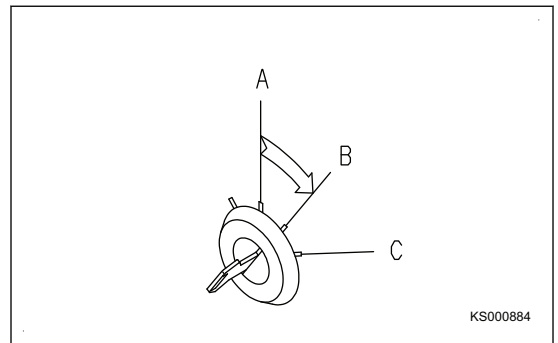


**SYSTEM TEST**

In order to check the system a single lubrication cycle can be performed as follows:

1. Move the starter switch to the ON position (B).
2. Depress the test button (9) on the pump for three to five seconds.

The system will run a run a single test. During this test the green LED (4) of the selected interval on the in-cab display (2) will flash (2 sec. on/ 2 sec. off).



In order to provide additional grease to all grease points (i.e. after cleaning the machine) or to vent the system a continuous lubrication cycle run can be performed.

1. Move the starter switch to the ON position (B).
2. Depress the test button (9) on the pump for more than six seconds. The system will perform a continuous lubrication test. During this run the green LED (4) of the selected interval on the in-cab display (2) will flash (0.2 sec. on/ 0.2 sec. off).
3. The continuous test cycle ends after the starter switch is moved to the OFF position (A).

A test cycle can only be started when the system is not in the pump phase of a current greasing cycle. If the system is busy with a pump cycle, it will not react to the test push button.

**NOTICE**

Only use grease tests cycles if necessary. Every time a test cycle is carried out grease is added to the grease points. This will increase grease usage and can cause excessive greasing of the grease points.

**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 abnormal noise is generated from any greasing point, perform greasing regardless of the greasing interval.

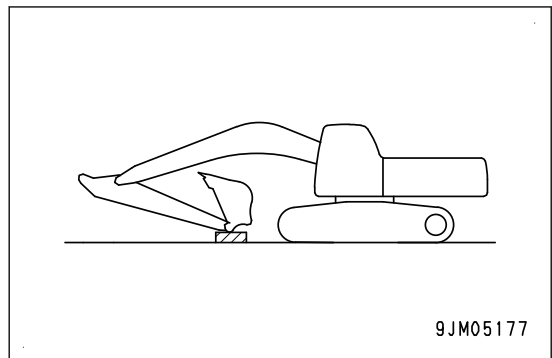
Perform greasing every 10 hours for the first 50 hours operation on a new machine.

After the machine is subjected to digging work in the water, be sure to grease the wet pins.

Items to be prepared

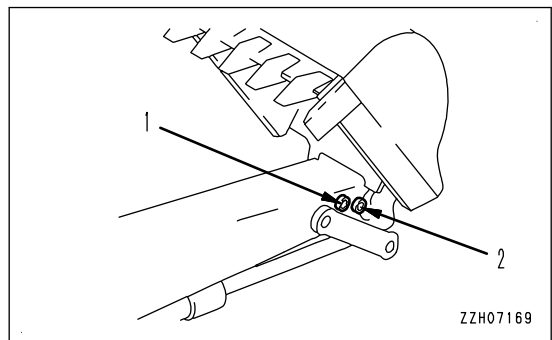
Grease pump

1. Park the machine on a level and firm ground, lower the work equipment to the ground in the posture shown in the figure, and stop the engine.

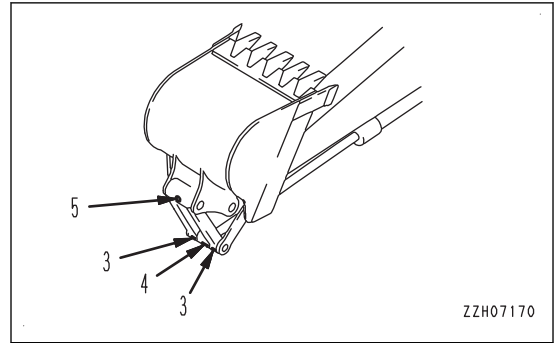


2. By using a grease pump, pump in grease through the grease fittings shown by arrows.

- (1) Arm-Link connection pin (1 place)
- (2) Arm-Bucket connection pin (1 place)



- (3) Link connection pin (2 places)
- (4) Bucket cylinder rod end (1 place)
- (5) Bucket-Link connection pin (1 place)



3. After greasing, wipe off any old grease that is pushed out.

## EVERY 250 HOURS MAINTENANCE

### METHOD FOR CHECKING BATTERY ELECTROLYTE LEVEL

Perform this procedure before operating the machine.

Inspect the battery electrolyte level according to the standard at least once a month.

## ⚠ WARNING

Do not use the battery if the battery electrolyte level is below LOWER LEVEL line. If you do so, it will reduce the service life of the battery. In addition, it may cause an explosion.

The battery generates 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.

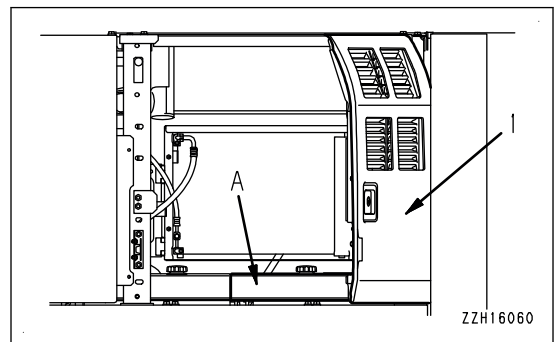
Do not use a dry wipe to clean the battery. A wet wipe will prevent fire or explosion from static electricity.

### 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.

If there is a fear that the battery water may freeze after refilling with purified water (such as a commercial battery fluid), do the replenishment before the day's work on the next day.

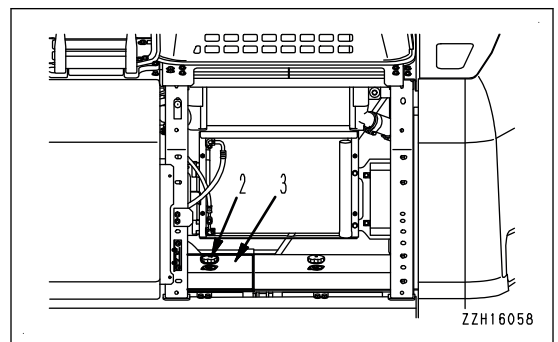
Open cover (1) at the rear left of the machine, and the battery is installed at portion (A).



Remove nuts (2) (2 places) on the battery top surface, and remove covers (3) (2 place).

### REMARK

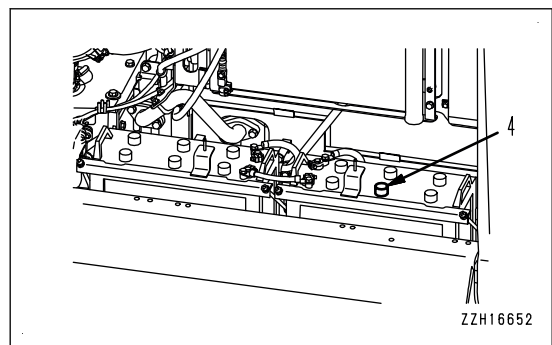
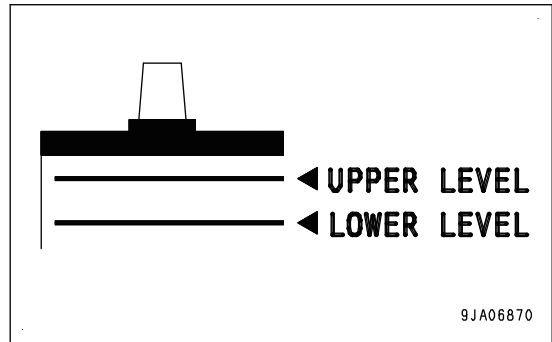
The threaded part of nut (2) is made of resin, and the thread face returns to the original condition even if the nut is tightened repeatedly. The tightening force remains unchanged all the time and does not become light. This is not an abnormal condition.



### 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. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines.
2. If the electrolyte level is below the middle between UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines, immediately remove cap (4) and add purified water (e.g. commercially available replenishment water for a battery) to U.L. line.
3. After adding the purified water, tighten cap (4) securely.



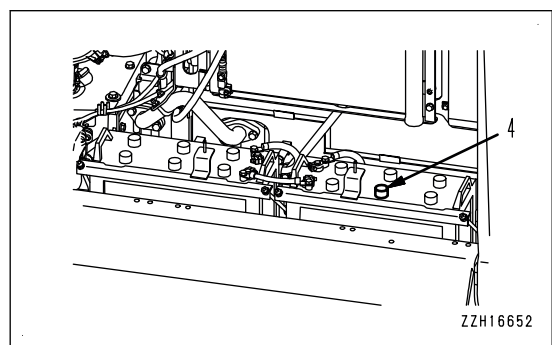
#### REMARK

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 electrolyte 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 as follows.

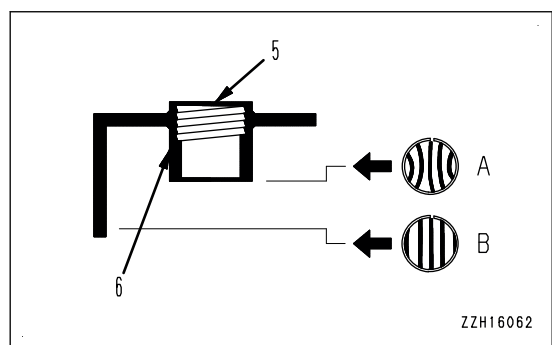
1. Remove cap (4) at the top of the battery and check the electrolyte level through electrolyte filler port (5).



2. If the electrolyte does not reach the sleeve (6), always add the purified water (e.g. commercially available replenishment water for a battery) so that the level reaches the bottom of the sleeve (UPPER LEVEL line).

(A) Correct level: Electrolyte level is up to bottom of sleeve, so surface tension causes electrolyte surface to bulge and pole plate appears to be warped.

(B) Low level: Electrolyte level does not reach the bottom of sleeve, so pole plate appears straight and not to be warped.



3. After adding the purified water, tighten cap (4) securely.

**REMARK**

If purified water is added to above the bottom tip of the sleeve, use a syringe to remove electrolyte. Neutralize the removed electrolyte 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**

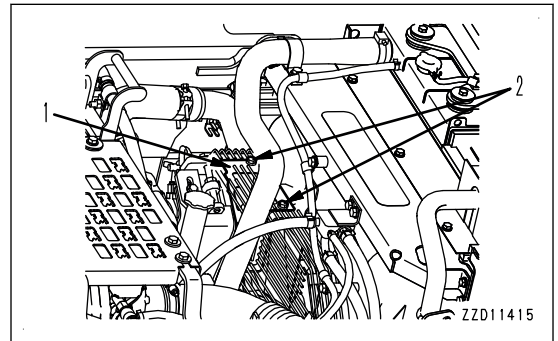
If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

**METHOD FOR CHECKING AND ADJUSTING AIR CONDITIONER COMPRESSOR BELT TENSION**

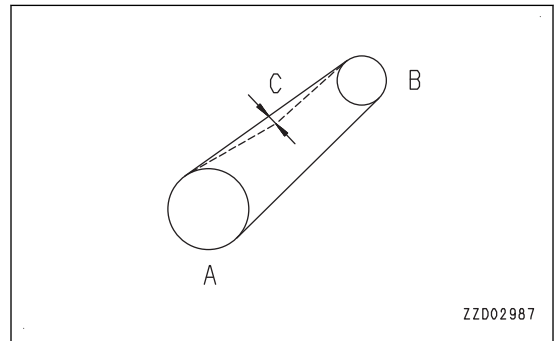
The followings are the periodic maintenance items for the air conditioner. Perform inspection and maintenance to use the air conditioner effectively.

**METHOD FOR CHECKING AIR CONDITIONER COMPRESSOR BELT**

1. Remove bolts (2) (2 pieces).
2. Remove guard (1).

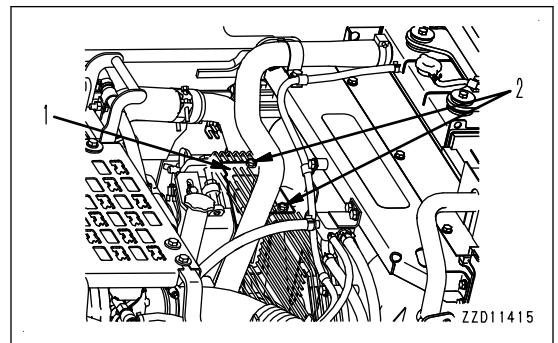


3. Press the center between drive pulley (A) and compressor pulley (B) with a finger (approximately 60 N {6.1 kg} ).  
 If deflection (C) is 6.3 to 8.7 mm, the belt tension is normal.  
 If the deflection is out of the standard, adjust it to the standard value.

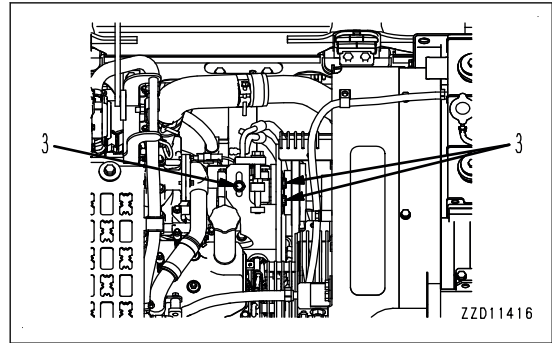


**METHOD FOR ADJUSTING AIR CONDITIONER COMPRESSOR BELT**

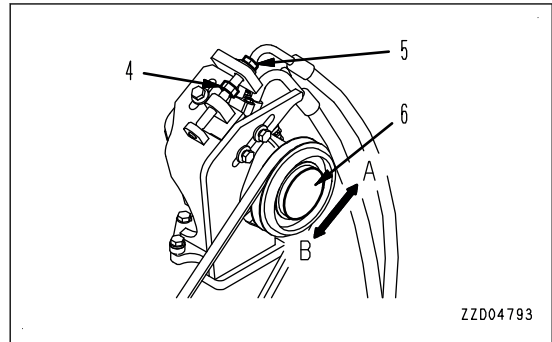
1. Remove bolts (2) (2 pieces).
2. Remove guard (1).



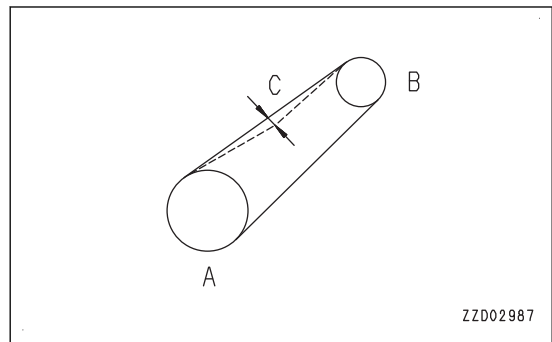
- 3. Loosen bolts (3) (3 pieces).  
There is no need of removing bolt (3). Also, take care not to loosen too much.



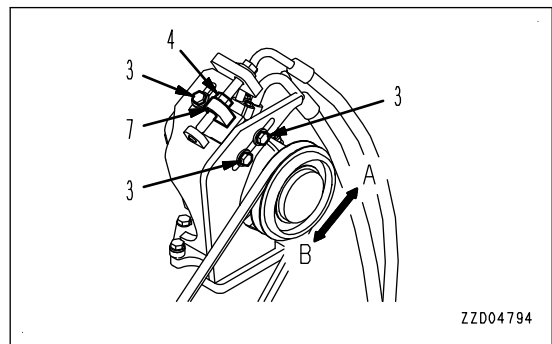
- 4. Loosen nut (4) in direction (A).  
Nut (4) is provided to prevent loosening of jack bolt (5).
- 5. Tighten jack bolt (5).  
Compressor (6) moves in direction (A), and the compressor belt is tensed.



- 6. Press the center between drive pulley (A) and compressor pulley (B) with a finger (approximately 60 N {6.1 kg}).  
If deflection (C) is 6.3 to 8.7 mm, the belt tension is normal.  
If the deflection is out of the standard, adjust it to the standard value by repeating steps 4 and 6.



- 7. When the belt tension becomes appropriate, tighten bolts (3) (3 pieces) and fix it.  
Tightening torque: 59 to 74 Nm{6.0 to 7.5 kgm}
- 8. After tightening nut (4) until it touches boss (7), then tighten it further in direction (B) to prevent it from loosening.  
Tightening torque 108 to 132 Nm{11.0 to 13.5 kgm}
- 9. After fixing, check again that the belt tension is proper.  
Adjust it again if the tension is not within the proper range.
- 10. 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.
- 11. 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**

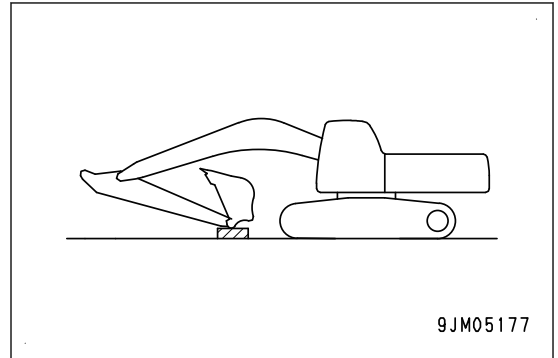
Maintenance for every 100 and 250 hours should be performed at the same time.

## METHOD FOR LUBRICATING

### NOTICE

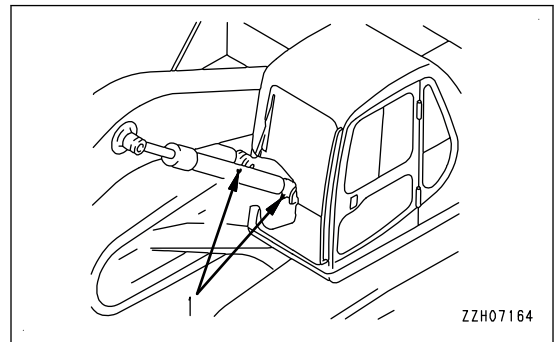
- If any unusual noise is generated from any greasing point, perform greasing regardless of the greasing interval.
- Perform greasing every 10 hours for the first 50 hours of operation on a new machine.
- After the machine is subjected to digging work in the water, be sure to grease the wet pins.
- When performing heavy-duty operations, such as hydraulic breaker operations, perform the greasing every 100 hours.

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. By using a grease pump, pump in grease through the grease fittings shown by arrows.

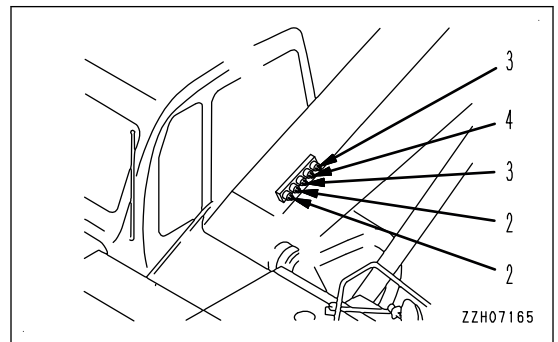
(1) Boom cylinder foot pin (2 places)



(2) Boom foot pin (2 places)

(3) Boom cylinder rod end (2 places)

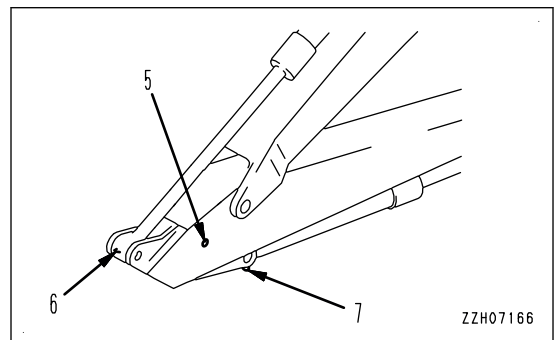
(4) Arm cylinder foot pin (1 place)



(5) Boom and arm connection pin (1 place)

(6) Arm cylinder rod end (1 place)

(7) Bucket cylinder foot pin (1 place)



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

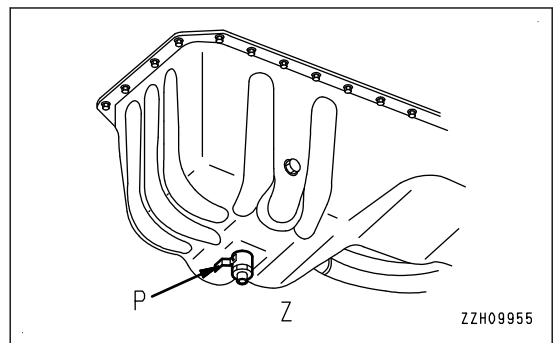
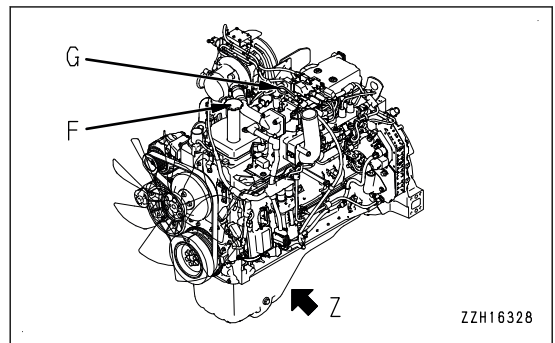
### ⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.

Refill capacity of oil pan: 23.1 ℓ

Items to be prepared

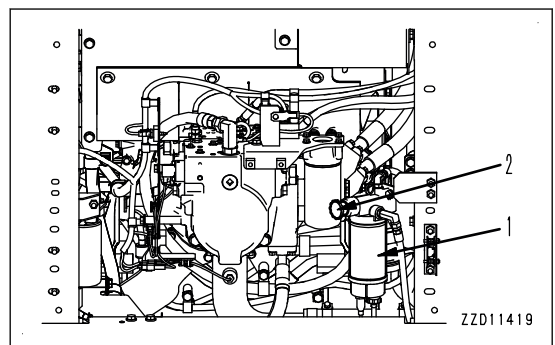
- Container to receive drained oil
  - Filter wrench
1. Remove the undercover just under the engine of the machine and put a container under drain valve (P) to receive the drained oil.
  2. To prevent getting oil on yourself, lower the lever of drain valve (P) slowly, drain the oil, then raise the lever to close the valve.



3. Open the rear right cover.
4. Turn filter cartridge (1) counterclockwise by using the filter wrench, and remove it.
5. Clean the filter head (2), fill the new filter cartridge with clean engine oil, coat the thread and packing surface of the new filter cartridge with clean engine oil (or thinly apply the grease), then install it to the filter holder.

**REMARK**

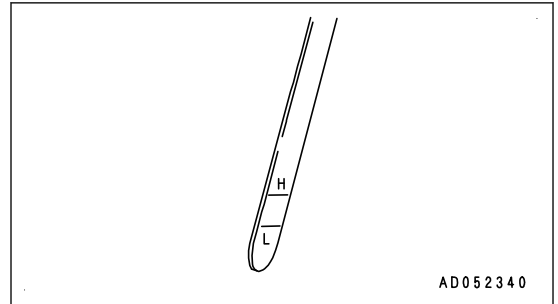
Check that there is no old packing stuck to filter head (2). If any old packing is stuck, it will cause oil leakage.



6. When installing, tighten until the packing surface contacts the seal surface of filter holder (2), then tighten it a further 3/4 to 1 turn.



7. After replacing the filter cartridge, open the engine hood and fill with engine oil through oil filler port (F) to the mid-point between H and L marks on dipstick (G).
8. Run the engine at idle for a time, then stop the engine and check that the oil level is between H and L marks on the dipstick. For details, see "METHOD FOR CHECKING OIL LEVEL IN ENGINE OIL PAN, ADDING OIL (3-147)".
9. Install undercover.



**REMARK**

When the ambient temperature is low, water or emulsified matter may stick to the dipstick, oil filler cap, etc. or the drained oil may be milky white because of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem.

There is no problem even if the emulsified matter cannot be removed completely after changing oil.

**METHOD FOR REPLACING FUEL PREFILTER CARTRIDGE**

**⚠ WARNING**

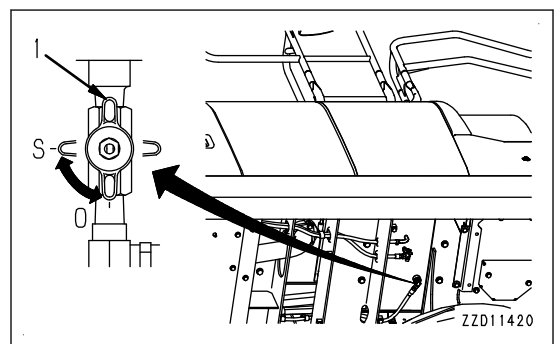
- After the engine stops, all parts are still very hot, so do not replace the filter immediately. Wait until all of parts cool down before starting the work.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any open flame close.

**NOTICE**

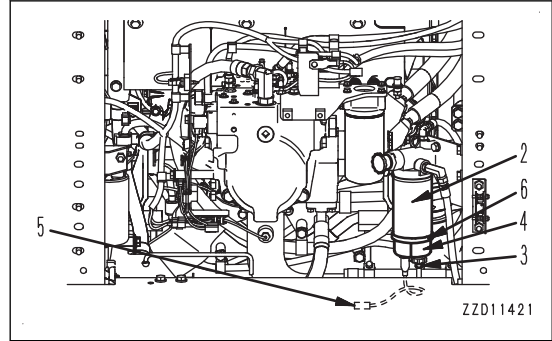
- Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing parts, Komatsu recommends using Komatsu genuine parts.
- The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection 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

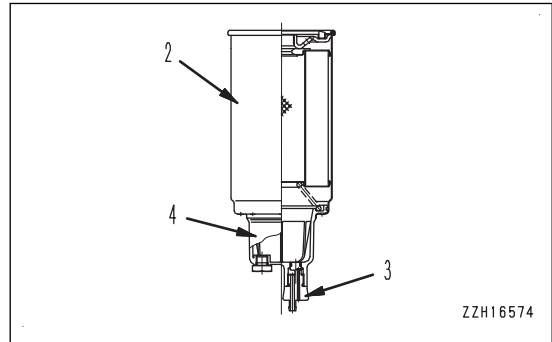
- Container to catch drained oil
  - Filter wrench
1. Turn valve (1) at the bottom of the fuel tank to CLOSE position (S).
  2. Open the door on the right side of the machine.



3. Place a container under fuel prefilter cartridge (2) to receive the fuel.
4. Loosen drain valve (3) and drain water and sediments from transparent cup (4), and also drain all the fuel from filter cartridge (2).
5. Remove connector (5). Wrap the removed connector with a vinyl bag to prevent fuel, oil or water from being splashed on it.



6. Turn transparent cup (4) counterclockwise to remove it by using the filter wrench. This transparent cup is used again.
  7. Turn filter cartridge (2) counterclockwise by using the filter wrench, and remove it.
  8. Install currently removed transparent cup (4) to the bottom of the new filter cartridge.
- At this time, be sure to replace O-ring (6) with a new one.
9. Make sure that drain valve (3), which is provided in the lower part of transparent cup (4) of the new filter cartridge, is firmly tightened.

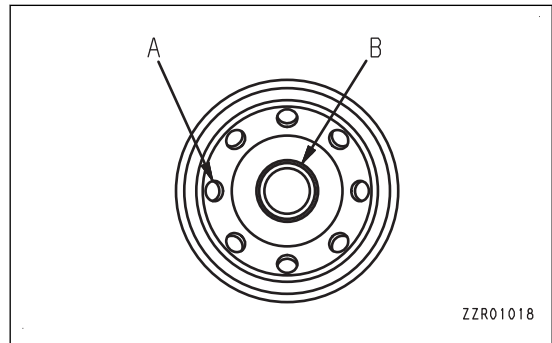


Tightening torque: 2.5 to 3.4 Nm {0.25 to 0.35 kgm}

10. Clean the filter head, 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.**



11. When installing the cartridge, tighten it until the packing surface contacts the sealing surface of the filter head, then tighten it 1/4 to 1/2 turn.

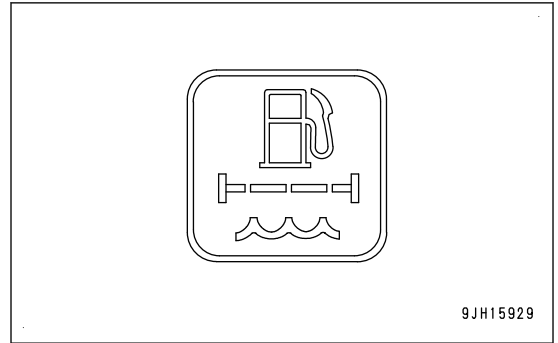
**REMARK**

If the filter cartridge is fastened too much, the packing will be damaged and this leads to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing. Therefore, be sure to observe the tightening angle.  
When tightening with a filter wrench, be extremely careful not to dent or damage the filter.

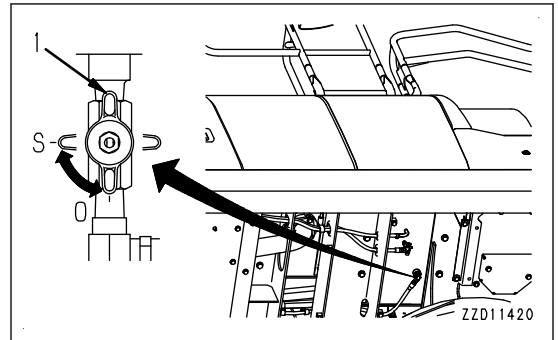
12. Check that drain valve (2) is closed securely.
13. Remove the vinyl bag wrapping connector (5), then connect connector (5).

**REMARK**

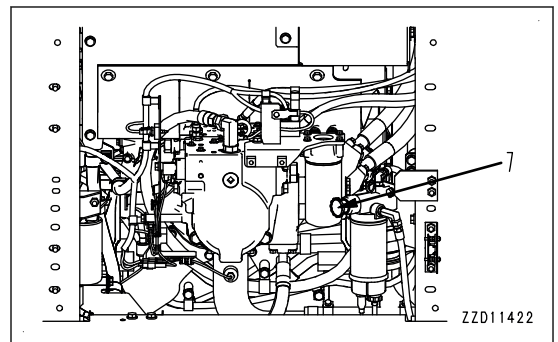
- If water gets on connector (5), the sensor may malfunction and the water separator caution lamp may light up. When removing connector (5), be extremely careful not to let water attach to the connector.
- If water sticks to connector (5), dry it completely before connecting it.



14. Turn valve (1) at the bottom of the fuel tank to OPEN position (O).
15. Install drain hose.
16. Fill up the fuel tank with fuel (to the level where the float is at the highest position).



17. Loosen the knob of feed pump (7), pull it out, then pump it in and out until the movement becomes heavy.  
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 (7) and bleed the air.
18. After bleeding air, push in the knob of feed pump (7).
19. After replacing the filter cartridge, start the engine and run it at low idle for 10 minutes.
20. 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 1 to 6 and remove the filter cartridge. If any damage or pinched foreign material on the packing surface is found, replace it with a new cartridge, and repeat steps 7 to 12 to install it.

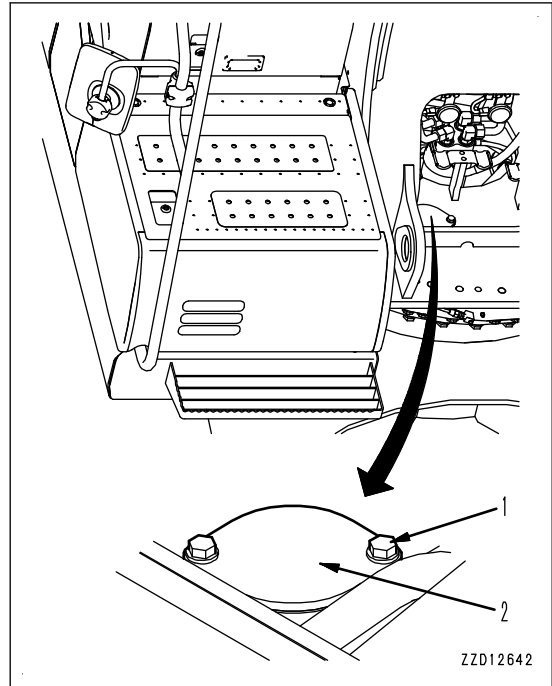
**METHOD FOR CHECKING SWING PINION GREASE LEVEL, ADD GREASE**

Items to be prepared

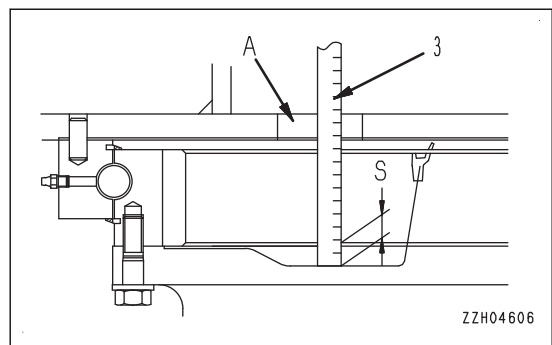
Scale

1. Swing 3 times each to the right and left, and stop the machine.

- 2. Remove bolts (1) (2 pieces) on the top of the revolving frame, and remove cover (2).



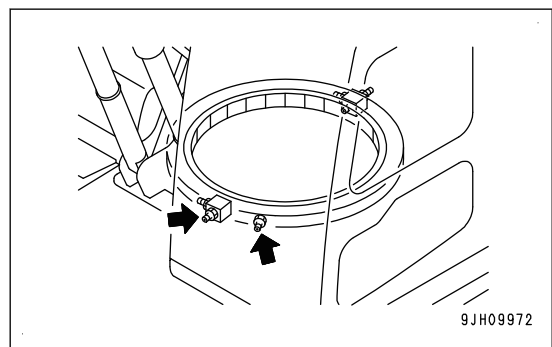
- 3. Insert ruler (3) into the grease through inspection and adjustment hole (A). Check that the height of grease (S) in the area where the pinion passes is at least 32 mm.  
Add grease if the grease amount (S) is less than 32 mm.
- 4. Check that the grease is not milky white.  
Total amount of grease: 33 ℓ  
If the grease is milky white, it needs to be replaced. Ask your Komatsu distributor to replace it.
- 5. Install cover (2) with bolt (1).



**METHOD FOR LUBRICATING SWING CIRCLE**

Lower the work equipment to the ground.

- 1. By using a grease pump, pump in grease through the grease fittings shown by arrows. (2 places)
- 2. 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**

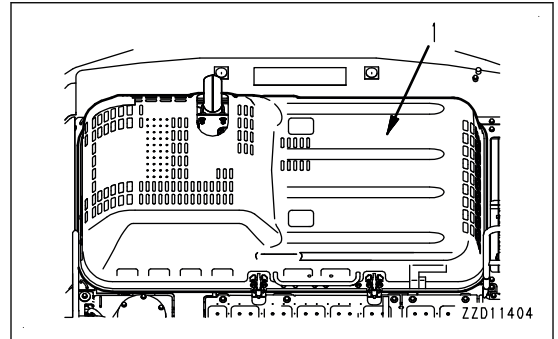
**⚠ WARNING**

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. Always wear protective equipment such as protective eyeglasses and dust mask.

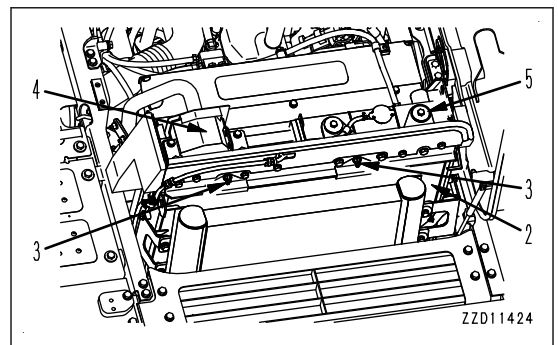
**NOTICE**

When using compressed air for cleaning, blow it keeping some distance 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.

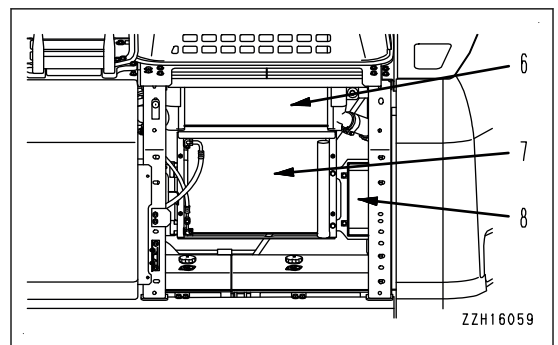
1. Open cover (1).



2. Loosen screws (3) (2 places) and pull up net (2).
3. Clean net (2) that you pulled up.



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**

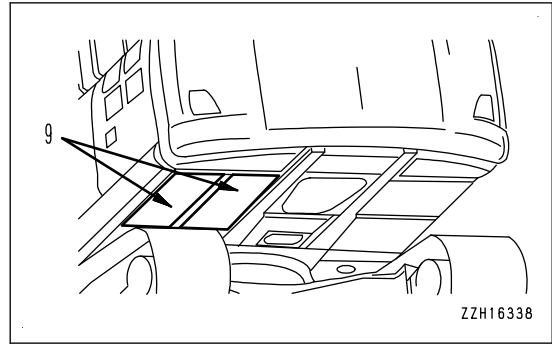
Steam or water may be used instead of the compressed air. However, when performing powerful steam cleaning (high-pressure machine wash) of the heat exchange equipment (oil cooler, radiator, aftercooler, air conditioner condenser, or fuel cooler), maintain sufficient distance from the machine when performing 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 clogging and breakage of the equipment.

5. Visually check the rubber hose connected to the heat exchange equipment. Check the hose clamp for looseness as well.

If the rubber hose is cracked or become fragile, ask your Komatsu distributor for replacement.

If the hose clamp is loose, tighten it.

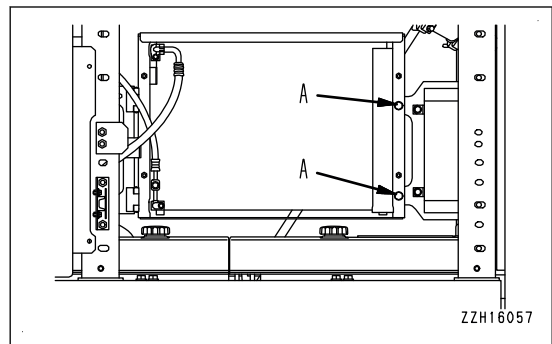
6. Remove undercover (9) and blow out the mud, dirt, and leaves to the outside.
7. Push in cleaned net (3) back to the original place and install it with screw (2).
8. Install bracket (5) with bolt (4).
9. Install cover (1) and undercover (9).



**Opening and closing condenser**

10. Open the rear door on the left side of the machine and remove bolts (A) (at 2 places) on the right end of the condenser.
11. Pull the condenser forward to open it.
12. After cleaning the condenser, close and install it with bolts (A) (at 2 places).

Tightening torque: 59 to 74 Nm {6.0 to 7.5 kgm}



**METHOD FOR CLEANING AIR CONDITIONER FRESH/RECIRC 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.

**NOTICE**

The cleaning interval of 500 hours is a rough standard. Clean at shorter intervals in dusty jobsites.

**REMARK**

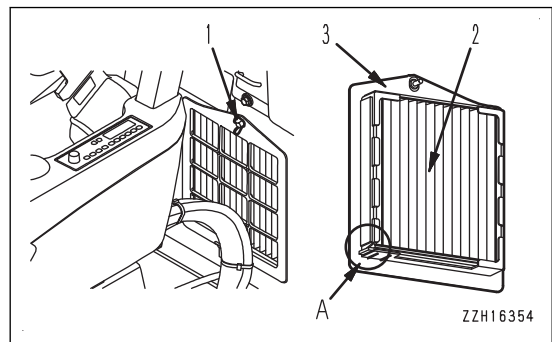
If the element becomes clogged, the air flow will be reduced, and there will be a rumbling sound from the air conditioner unit.

**METHOD FOR CLEANING RECIRCULATION AIR FILTER**

1. Remove wing bolts (1) from the inspection window at the bottom rear left inside the operator's cab.
2. Take out the recirculation air filter.
3. Clean the filter 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.

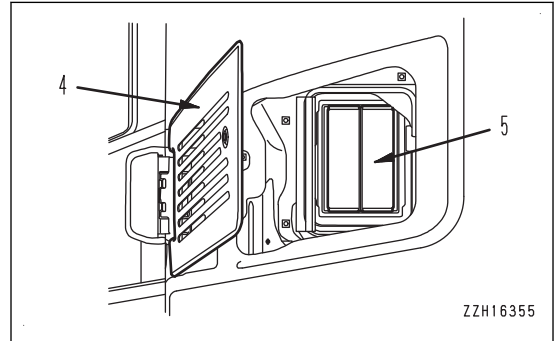


**REMARK**

- The recirculation air filter must be installed in the correct direction.
  - Install the filter so that protrusion (A) of filter (2) matches the groove of holder (3).
4. Install the recirculation air filter.

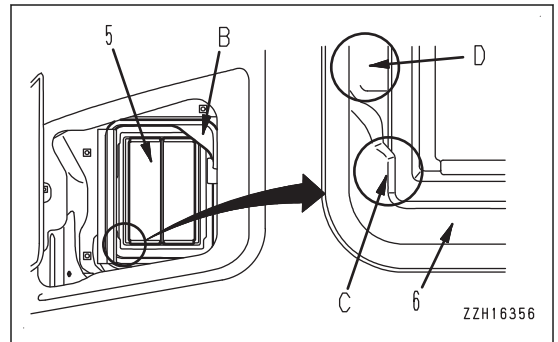
**METHOD FOR CLEANING FRESH AIR FILTER**

1. Unlock cover (4) at the rear left of the operator's cab with the starting switch key.
2. While holding cover (4) open, remove filter (5) inside it.

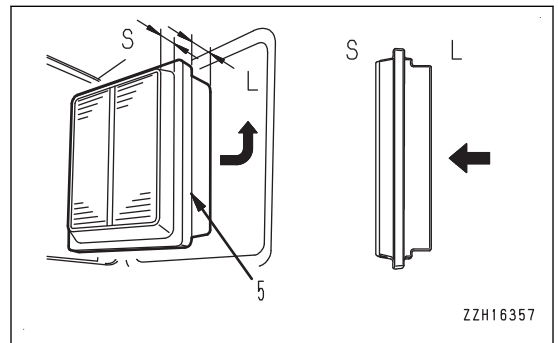


**REMARK**

- When removing, insert your finger into dent (D) of duct and pull it toward you. If you grasp the filter with excessive force, it may be deformed or damaged.
- If the filter is damaged or deformed, replace it with new one.



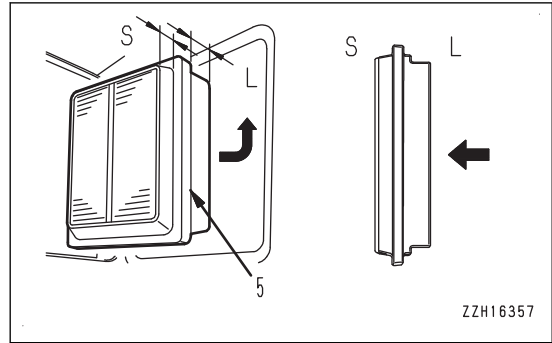
3. Clean the filter with compressed air. Set the compressed air pressure below 0.49 MPa {5 kg/cm<sup>2</sup>} and blow it in the arrow direction. If there is oil on the filter, or if the filter is extremely dirty, wash it in a neutral detergent. After rinsing it in water, dry it thoroughly before using 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. If the filter is damaged or deformed, replace it with new one.
4. After cleaning, return filter (5).



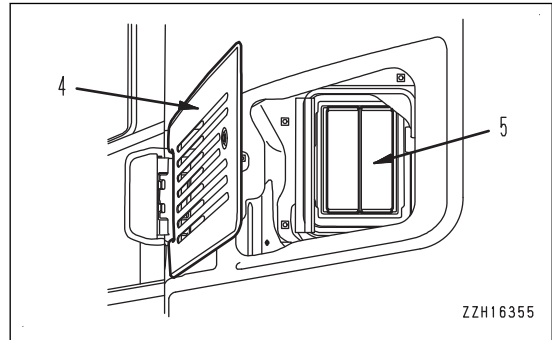
**REMARK**

- The fresh air filter must be installed facing it in the correct direction.
- When installing, insert long end (L) of filter (5) into duct (6) first. If short end (S) is inserted first, filter (5) will get stuck with protrusion (B) of the sheet metal
- Keep the filter away from protrusion (B) of the sheet metal and insert it from the top first.  
If the insertion is not enough or the filter is forcibly inserted from bottom, it may be deformed or broken.  
After inserting it, pull it to the inside of protrusion (C) of duct (6).

5. Close the cover and lock with the starting switch key.  
Do not forget to remove the starting switch key after locking.



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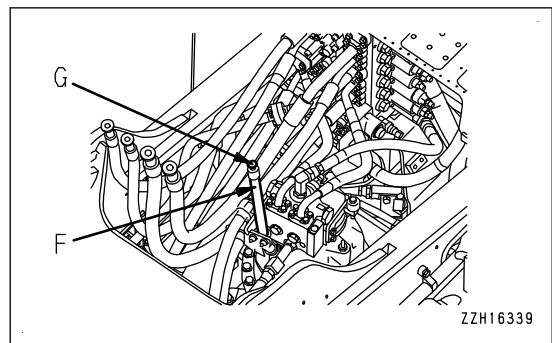
ZZH16355

**METHOD FOR CHECKING OIL LEVEL IN SWING MACHINERY CASE, ADDING OIL**

**⚠ WARNING**

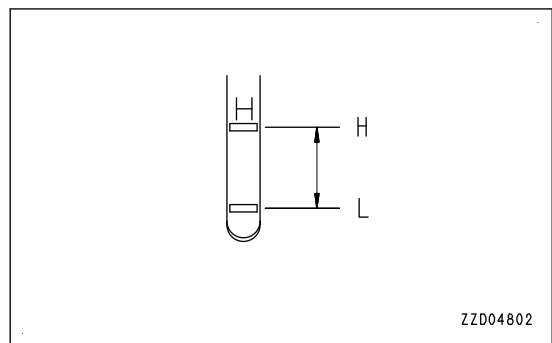
Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.

1. Remove dipstick (G) and wipe off oil on it with a cloth.
2. Insert dipstick (G) fully into guide (F).



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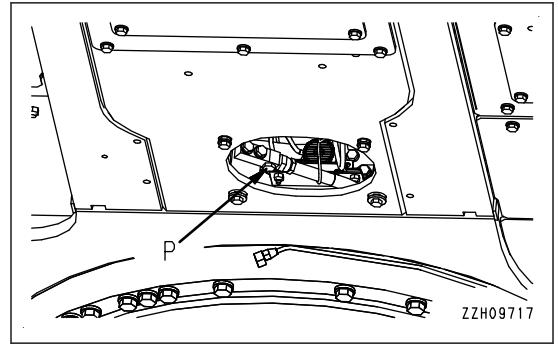
3. Pull out dipstick (G) and check that the oil level is between the (H) and (L) marks on the dipstick.
4. If the oil level does not reach (L) mark on dipstick (G), add oil through oil filler port (F).



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5. If the oil level is above line (H) of dipstick (G), loosen drain valve (P) to drain the excessive oil.  
Set a container to receive the oil under drain valve (P) before draining the oil.
6. After checking oil level or adding oil, insert the cap of dipstick (G) into the hole.



**METHOD FOR CHECKING OIL LEVEL IN FINAL DRIVE CASE, ADDING OIL**

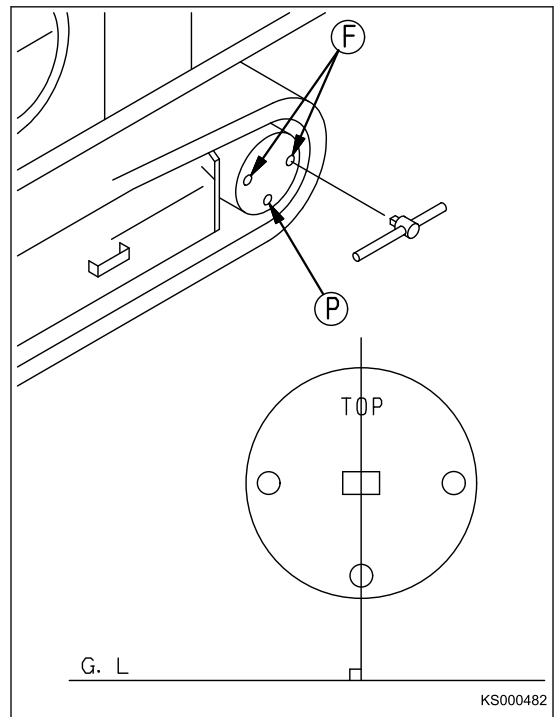
**⚠ WARNING**

- 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

Sliding T-handle (with 1/2" square drive).

1. Set the TOP mark at the top with the line running on TOP mark and plug (P) perpendicular to the ground surface.
2. Remove plug (F) by using the handle.  
When the oil level reaches a point 10 mm below the bottom of the plug hole, the oil level is appropriate.  
If the oil level is low, check it again according to the following procedure.
  - 1) Install plug (F).
  - 2) Operate the travel lever to move the machine forward or reverse and rotate the sprocket by 1 turn.
  - 3) Then repeat Step 2 to check again.
3. If the oil is insufficient, add oil through plug (F) hole.  
Add oil until oil overflows from the hole of plug (F).
4. After the inspection, install plug (F).  
Tightening torque of plugs (P) and (F):  $68.6 \pm 9.8 \text{ Nm} \{7 \pm 1 \text{ kgm}\}$



**REMARK**

Plug (F) is installed at 2 places. Add oil through the one with which it is easier to add oil and through which no internal gears are seen.

**EVERY 1000 HOURS MAINTENANCE**

Maintenance for every 100, 250 and 500 hours should be performed at the same time.

**CHECK STRUCTURES FOR CRACKS**

Before checking, be sure to remove any excessive dirt (e.g. from undercarriage) and excessive grease (e.g. around area of articulating joint/pins) from areas of the machine to be checked.

Check structures for cracks. If any cracks are found contact your Komatsu distributor.

If the structure is welded, or holes are drilled in it, or it is repaired in any other way, its strength may be reduced. Consult your Komatsu distributor before carrying out any repairs.

**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. Accordingly, wait until they have cooled down before starting the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.

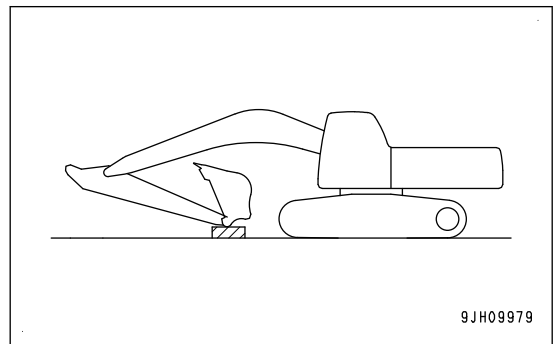
**NOTICE**

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 (4-13)”.

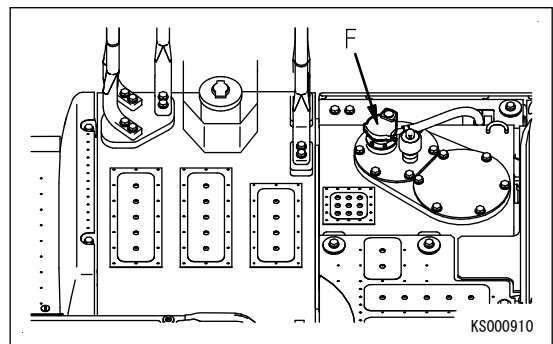
Items to be prepared

Container to catch drained oil

1. Set the work equipment on the hard and flat ground in the maintenance posture as shown in the figure, then lower it to the ground and stop the engine.



2. Remove the cap for oil filler (F), and release the internal pressure.



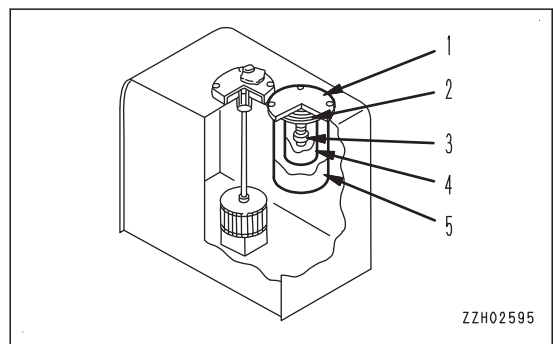
3. Loosen the bolts (6 pieces) and remove cover (1).  
The cover may be jumped out by spring (2). While pressing down the cover, remove the bolts.

**REMARK**

If cover (1) is left approximately 5 minutes with the mounting bolts loosened, the internal pressure of the case is released and the oil in the element is drained, and accordingly less oil drips when the element is removed.

4. After removing spring (2), valve (3) and strainer (4), take out element (5).
5. Check the bottom of the filter case for dirt or other material, and remove any if found.

Take extreme care that the dirt does not fall into the hydraulic tank.



6. Clean the removed parts by using cleaning oil.

7. Install the new element in the place where old element (5) was installed.
8. Place strainer (4), valve (3) and spring (2) onto the element.
9. Set cover (1) in position, press it down by hand, and install the cover with the mounting bolts.
10. Install the oil filler cap.
11. Start the engine and run it at low idle for 10 minutes to bleed air. For details, see "METHOD FOR STARTING ENGINE (3-168)".
12. 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.

13. 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**

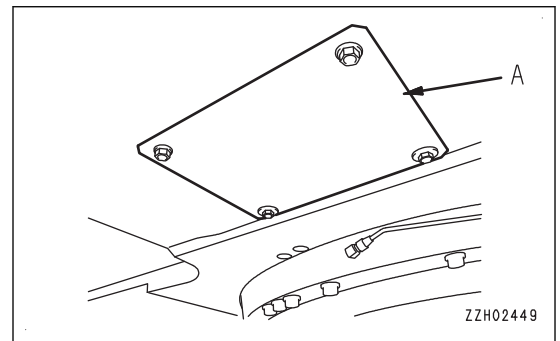
**Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.**

Refill capacity: 7.2 ℓ

Items to be prepared

Container to receive drained oil

1. Remove cover (A) of the inspection hole.
2. Place a container under drain plug (P) on the underside of the machine to receive the oil.

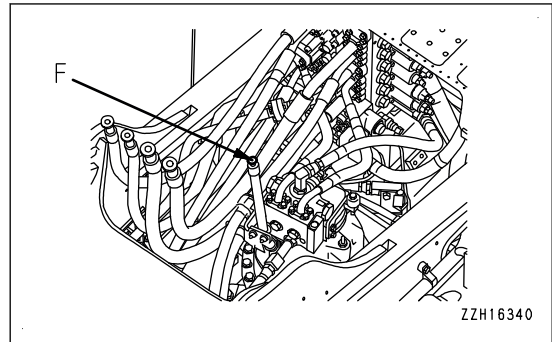
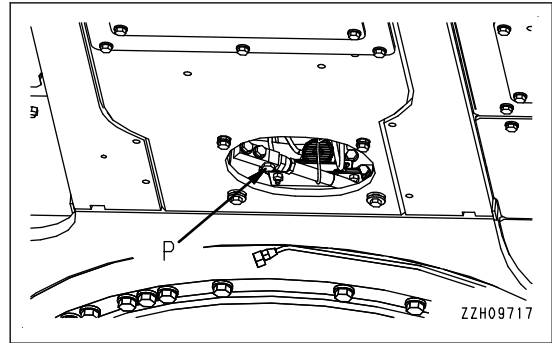


3. Loosen drain valve (P) under the machine, drain the oil, then tighten the drain valve again.

**REMARK**

- If the oil becomes thin thread condition, there is no problem in stopping the draining operation.
- In low temperatures, swing the upper structure to raise the oil temperature slightly before starting the oil draining operation. However, never swing the upper structure during the draining operation. This will cause breakage of the swing machinery.

4. Remove the cap of oil filler port (F).
5. Add oil by the refill capacity.
6. Check the oil level. For the procedure, see “METHOD FOR CHECKING OIL LEVEL IN SWING MACHINERY CASE, ADDING OIL (4-54)”.



**METHOD FOR CHECKING AND ADDING OIL IN DAMPER 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.

**NOTICE**

Park the machine on flat ground and stop the engine. When more than 30 minutes elapse after stopping the engine, check the oil level.

1. Open the door on the right side of the machine.
2. Remove plug (G).

If the oil is insufficient, add it according to the following procedure.

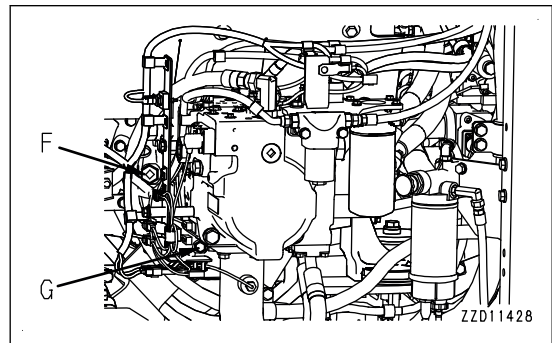
- 1) Remove plug (F).
- 2) Add oil through oil filler port until it reaches to the lower edge of the hole of plug (G).

**NOTICE**

If excess oil is supplied, drain it to the specified amount. It will cause overheat.

If the oil level is near the lower edge of the hole of plug (P), the oil amount is proper.

3. Install plugs (G) and (F).
4. Close the door.



**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 until all of the 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.
- When opening the air bleeding plug of the fuel filter head, take care. There may be remaining pressure and fuel may spout out.

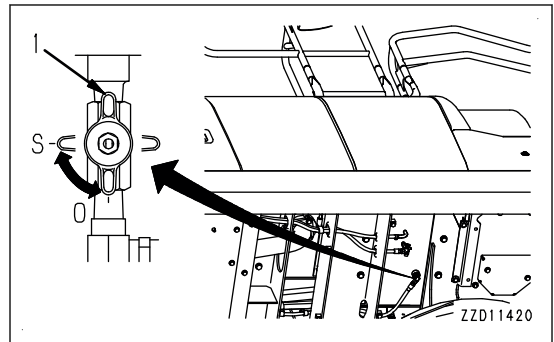
**NOTICE**

- 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

- Container to catch drained oil
- Filter wrench

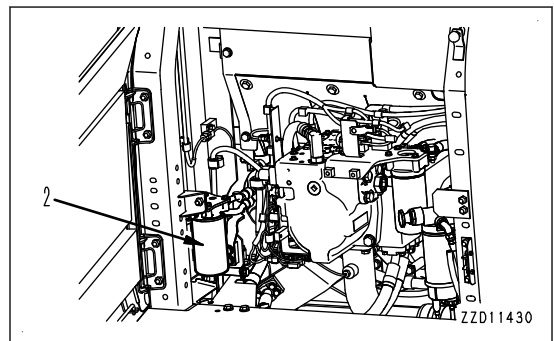
1. Turn valve (1) at the bottom of the fuel tank to CLOSE position (S).
2. Open the door on the right side of the machine.
3. Place a container under fuel prefilter cartridge (2) to receive the fuel.



4. Turn filter cartridge (2) counterclockwise by using the filter wrench, and remove it.

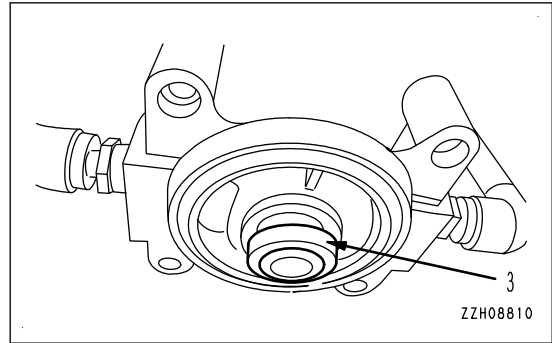
After removing the filter cartridge, fuel drops fall down from the filter head.

In order to prevent flow out of the fuel, be sure not to leave the machine without the filter cartridge.



- 5. Clean the filter head. Thinly apply oil to the packing of the new filter cartridge and install the cartridge to the filter head.

Replace inner seal (3) with a new one.



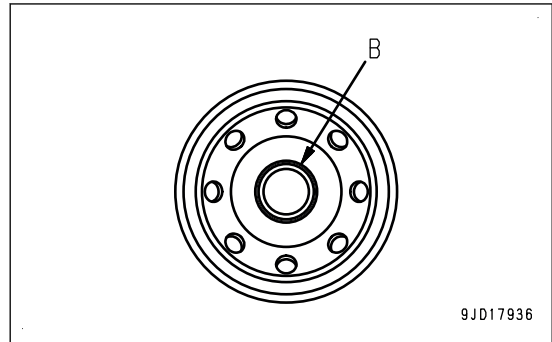
**NOTICE**

- Do not fill the new filter cartridge with fuel.
- Remove cap (B) at center and install the filter cartridge.

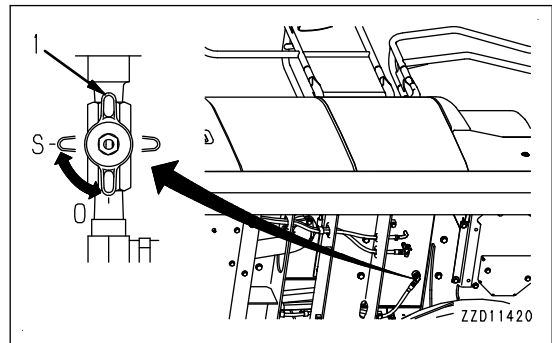
- 6. When installing the cartridge, tighten it until the packing surface contacts the sealing surface of the filter head, then tighten it 3/4 of a turn.

If the filter cartridge is fastened too much, the packing will be damaged and this leads to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing. Therefore, be sure to observe the tightening angle.

When tightening with a filter wrench, be extremely careful not to dent or damage the filter.



- 7. Turn valve (1) at the bottom of the fuel tank to OPEN position (O).
- 8. After completing the replacement of filter cartridge (2), bleed air from the circuit.



**METHOD FOR STARTING ENGINE USING FUEL FEED PUMP**

- 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 (4), pull it out, then pump it in and out until the movement becomes heavy.
- 3. Push in and tighten the knob of feed pump (4).
- 4. After replacing the filter cartridge, start the engine and run it at low idle for 10 minutes.

If the engine does not start, repeat steps 2 and 3.

Keep away from the engine while it is being started and running.

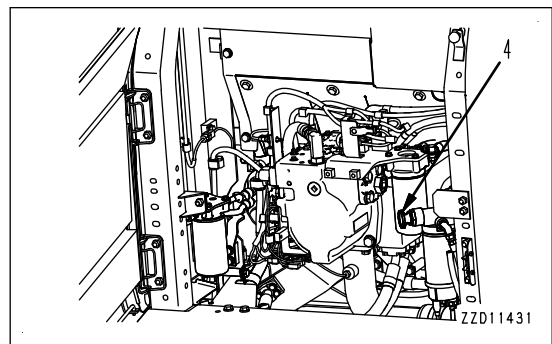
- 5. Check the filter seal surface for fuel leakage. If the leakage is noticed, check the filter cartridge for its tightening condition.

If oil still leaks, remove the filter cartridge.

If foreign material is caught, replace the cartridge with a brand new one.

For details, see "METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE (4-59)".

- 6. After the engine starts, run it for approximately 5 minutes to bleed all air from the fuel circuit.
- 7. After approximately 5 minutes, stop the engine. Then, start the engine as usual.



**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 CHECKING AND RELEASING NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (FOR BREAKER)**

(if equipped)

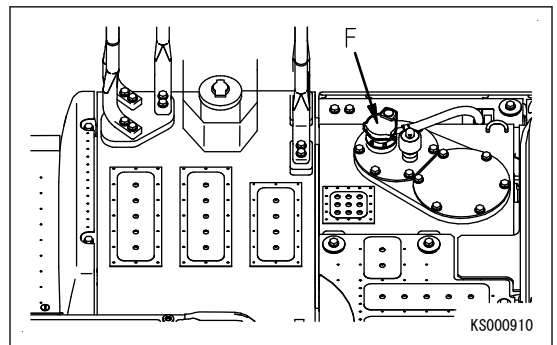
A special tool is needed for checking and charging of nitrogen gas. Ask your Komatsu distributor to perform this work.

**METHOD FOR REPLACING HYDRAULIC TANK BREATHER ELEMENT**

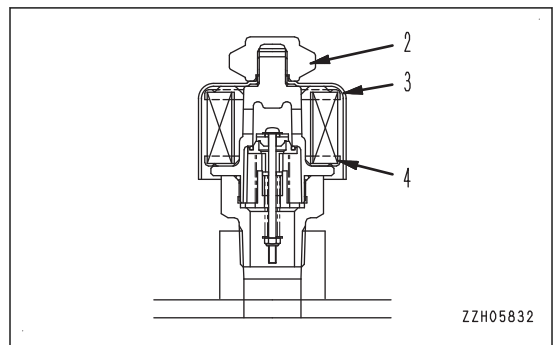
**⚠ WARNING**

- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.

1. Remove nut (2) of breather assembly (1) at the top of the hydraulic tank.



2. Remove cover (3).
3. Replace filter element (4) with a new one.
4. Replace element (1) inside the cap.
5. Install cover (3) and nut (2).



**METHOD FOR REPLACING DEF TANK BREATHER ELEMENT**

**⚠ WARNING**

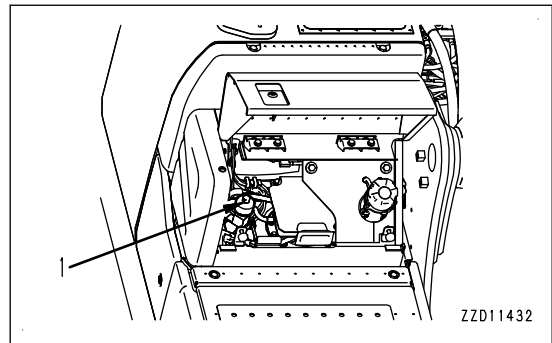
Do not replace the element immediately after engine is stopped.



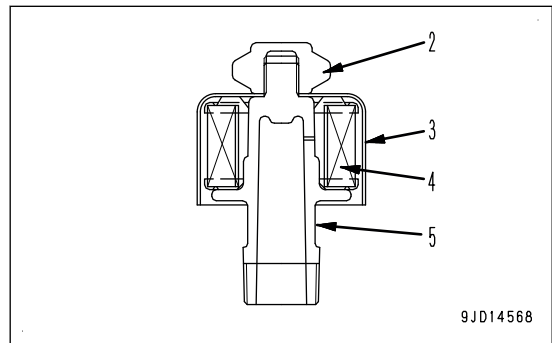
**NOTICE**

- **Komatsu recommends using Komatsu genuine parts for replacement parts.**
- **If the machine is operated without DEF tank breather element attached, or with the element other than Komatsu genuine parts, foreign materials may enter into DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without DEF tank breather element attached, nor use the element other than Komatsu genuine parts.**
- **Do not flush DEF tank breather element. Flushing or regenerating of it will degrade the performance of element, and will cause the breakage of DEF tank. Never reuse the DEF element.**
- **Always stop the engine and clean around DEF tank before replacing.**
- **After the engine is stopped, DEF system devices automatically purge DEF in DEF injector and DEF pump and return it to DEF tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.**  
**After the engine is stopped, the devices are operated for a few minutes. Replace the element after DEF system devices stop.**
- **Improper assembly of DEF tank breather element may cause leakage of DEF. Replace the element in the correct procedure.**

1. Open DEF tank cover at the right of the machine upward.



2. Remove nut (2) of breather assembly (1) at the top of DEF tank, then remove cover (3).
3. Replace breather (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 breather assembly (1) is removed for replacement, apply a tool to bolt (5) and tighten it.**  
**Tightening torque: 6.5 to 8.5 Nm{0.66 to 0.87 kgm}**

5. Close DEF tank cover at the right of the machine.

**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 CHANGING OIL IN FINAL DRIVE CASE

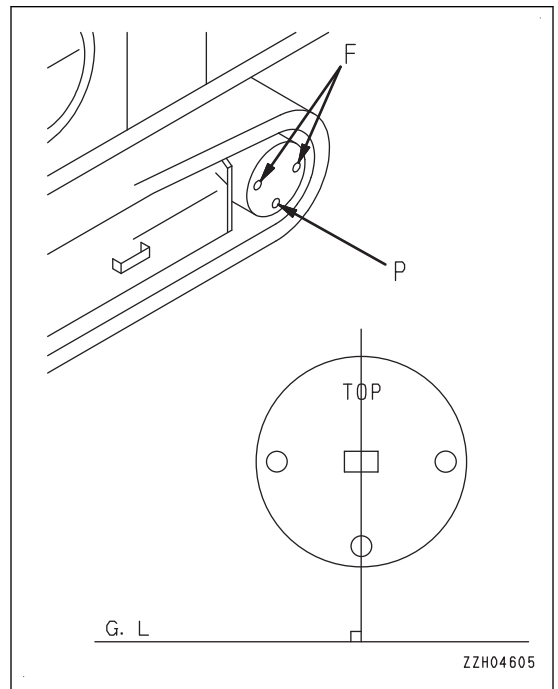
**⚠ WARNING**

- 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 8 ℓ

Items to be prepared

- Container to receive drained oil
  - Handle
1. Set the TOP mark at the top with the line running on TOP mark and plug (P) perpendicular to the ground surface.
  2. Place the oil container to receive oil under plug (P).
  3. Remove plugs (P) and (F) by using the handle, and drain oil.  
Check O-rings attached to the plugs for damage. If necessary, replace them with new ones.
  4. Tighten plug (P).
  5. Refill oil through plug (F) hole.  
Plug (F) is installed at 2 places. Add oil through the one with which it is easier to add oil and through which no internal gears are seen.
  6. When oil begins to overflow from the plug (F) hole, install plug (F).  
Tightening torque for plugs (P) and (F) : 58.8 to 78.4 Nm {6 to 8 kgm}

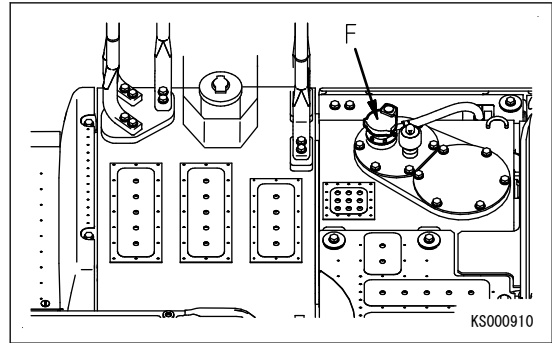


### METHOD FOR CLEANING HYDRAULIC TANK STRAINER

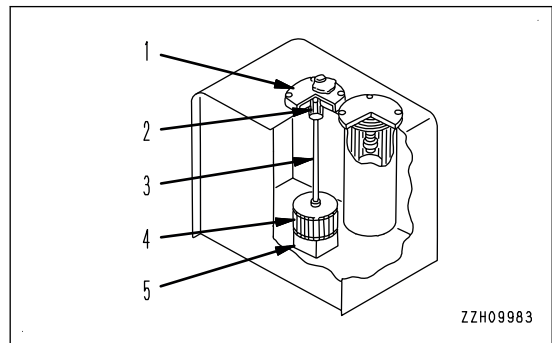
**⚠ WARNING**

- Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Accordingly, wait until they have cooled down before starting the work.
- When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.

1. Remove the cap for oil filler (F), and release the internal pressure.



2. Remove the bolts (6 pieces), and remove cover (1).  
The cover (1) may be jumped out by spring (2). While pressing down the cover, remove the bolts.
3. Hold the top of rod (3), pull it up, and remove spring (2) and strainer (4).
4. Remove any dirt stuck to strainer (4), then wash it in flushing oil. If strainer (4) is damaged, replace it with a new one.
5. Insert and set strainer (4) in projected portion (5) of the tank.
6. Install cover (1) so that the protruding part at the bottom of cover (1) holds spring (2), then fasten the cover with the bolts.



**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 PPC CIRCUIT ACCUMULATOR**

This accumulator (for PPC circuit) is installed to the solenoid valve. Even if the engine is stopped while the work equipment is raised, pilot oil pressure can be supplied to the work equipment control valve with the pressure of the compressed nitrogen gas in the accumulator to operate the spool and lower the work equipment by its own weight.

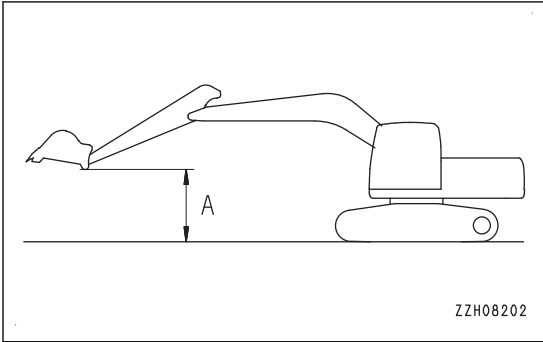
**METHOD FOR CHECKING ACCUMULATOR FUNCTION**

**⚠ CAUTION**

**When performing the inspection, check first that there is no person or obstacle in the surrounding area.**

Check the nitrogen gas charge pressure as follows.

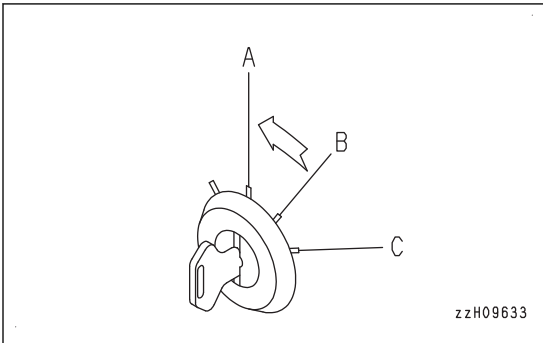
1. Place the machine on a flat ground.
2. Hold the work equipment in the maximum reach posture (arm fully OUT, bucket fully DUMP) at height (A) 1.5 m from the ground.



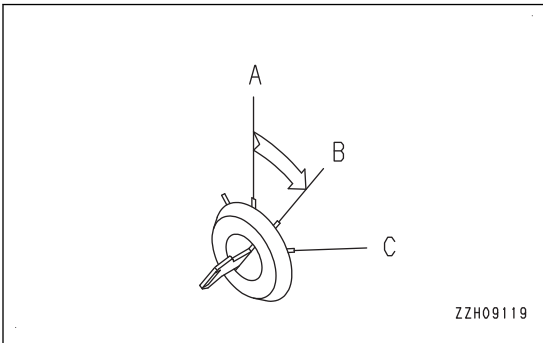
3. Perform the following procedure within 15 seconds.

After the engine stops, the accumulator pressure decreases gradually. You can check only just after the engine stops.

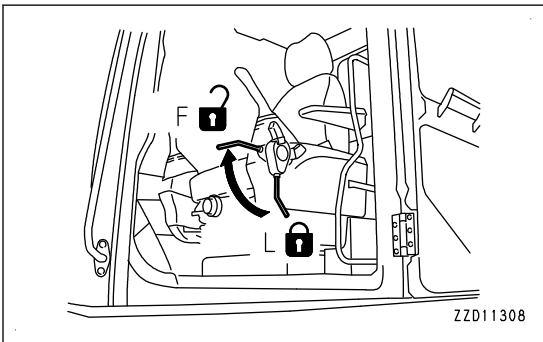
- 1) Keep the work equipment at the maximum reach posture, turn the starting switch to OFF position (A), and stop the engine.



- 2) Turn the starting switch to ON position (B).

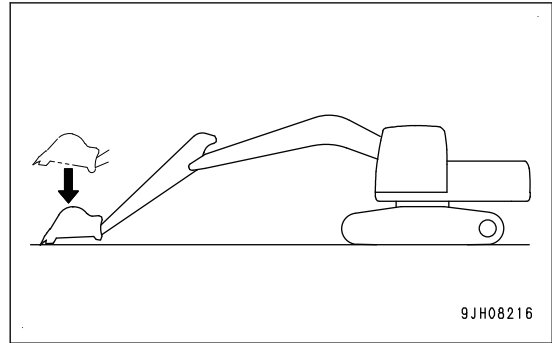


- 3) With the lock lever at FREE position (F), operate the work equipment control levers fully in LOWER direction and check that the work equipment is lowered to the ground.



If the work equipment goes down under its own weight and contacts the ground, the accumulator is normal.

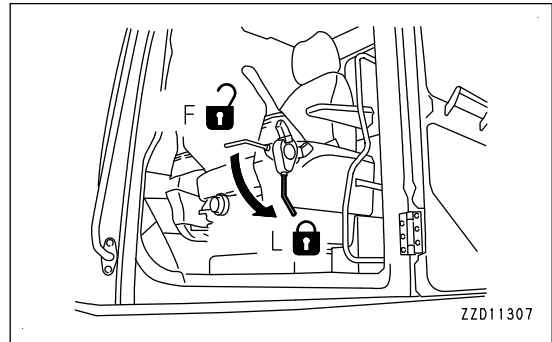
If the work equipment does not go down or stops in midway, the charged pressure of the gas in the accumulator for the hydraulic circuit has probably dropped. Ask your Komatsu distributor for inspection.



This completes the inspection. After completion of the inspection, set the lock lever to LOCK position and turn the starting switch to OFF position.

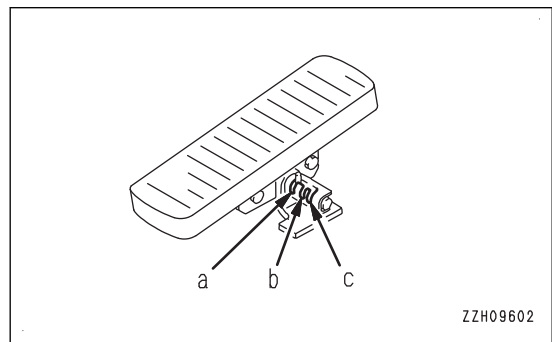
### METHOD FOR RELEASING PRESSURE IN ACCUMULATOR

1. Lower the work equipment to the ground.  
Keep the crusher attachment jaws, etc. closed.
2. Set the lock lever to LOCK position (L).

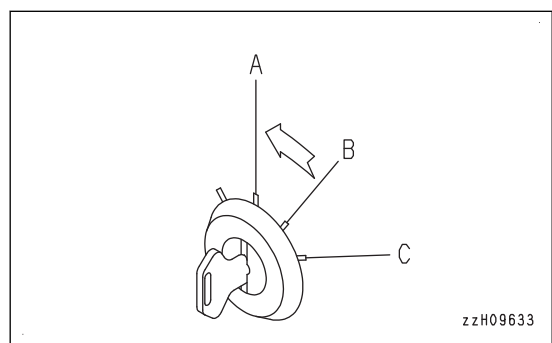


If an attachment is installed, set the lock pin of the attachment control pedal to position (c) where you can operate the pedal.

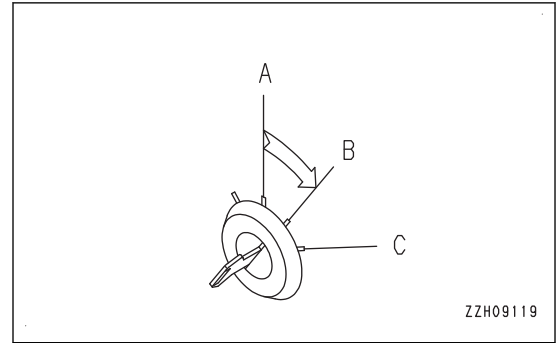
3. Perform the following procedure within 15 seconds.  
After the engine stops, the accumulator pressure decreases gradually. You can check only just after the engine stops.



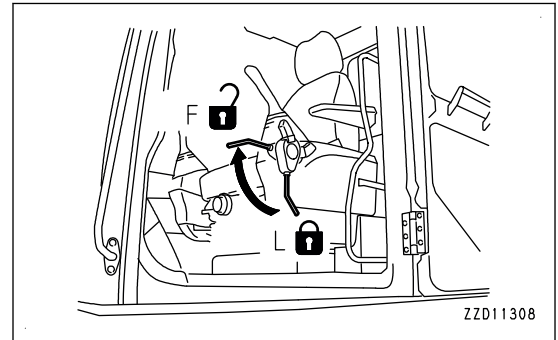
- 1) Turn the starting switch to OFF position (A), and then stop the engine.



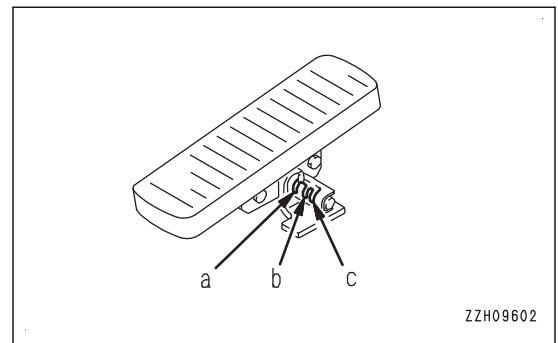
- 2) Turn the starting switch to ON position (B).



- 3) Set lock lever to FREE position (F), then operate the work equipment control levers and the attachment control pedal (if equipped) fully to forward, backward, right, and left to release the pressure in the control circuit.



4. Set the lock lever to LOCK position, then turn the starting switch to OFF position.  
If an attachment is installed, set the lock pin to position (a) so that you cannot operate the attachment control pedal.



### METHOD FOR CHECKING ALTERNATOR

Ask your Komatsu distributor to have the alternator checked.

If the engine is started frequently, have this inspection performed every 1000 hours.

### METHOD FOR CHECKING AND ADJUSTING ENGINE VALVE CLEARANCE

Special tools are necessary for inspection and maintenance. Ask your Komatsu distributor to perform this work.

### METHOD FOR REPLACING KCCV FILTER ELEMENT

## ⚠ WARNING

**After the engine has been operated, all of the parts are still very hot. Do not replace the filter element immediately. Wait until all of parts cool down before starting the work.**

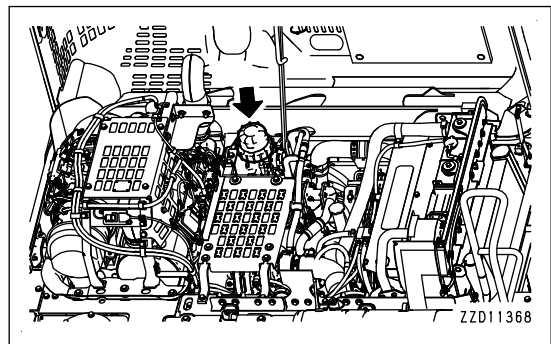
NOTICE

- 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. Flushing or regenerating of the filter element will degrade performance of the filter. As a result, the turbocharger and aftercooler become dirty and the performance lowers or the crankcase pressure increases. Never reuse the filter element since it can cause an engine failure.
- After the filter element is replaced, if KCCV is not assembled correctly, oil or blowby gas may leak. Replace the filter element in the correct procedure.

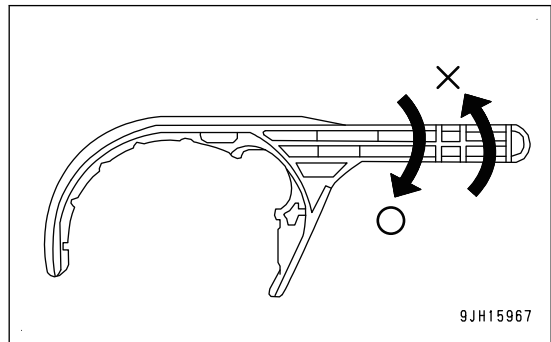
Items to be prepared

- Container to catch drained oil
- Special wrench for KCCV

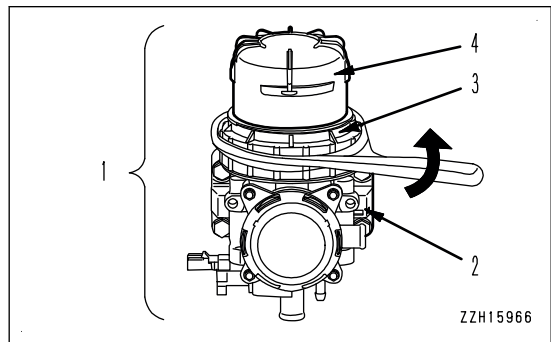
The KCCV ventilator is located in the positions shown in the figure.



For the use of the special wrench, see the figure.



1. By using the special wrench, loosen ring (3) of KCCV ventilator (1).

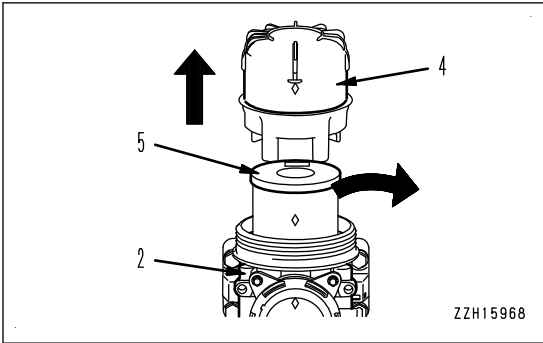


2. After ring (3) comes off, remove case (4) from body (2) and remove element (5).

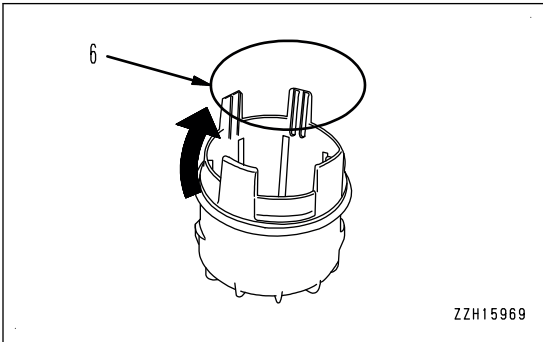
There may be oil accumulated or sticking in the case and element. Take care not to spill the oil when replacing the element.

**REMARK**

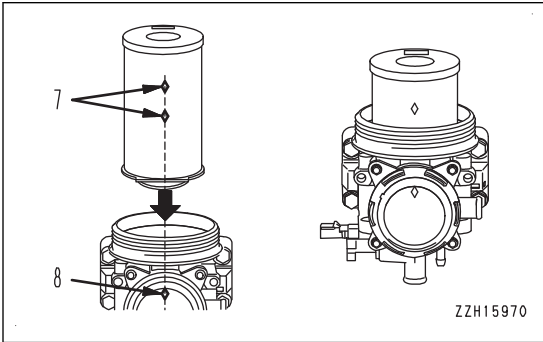
When the ambient temperature is low, water or emulsified matter may stick to the inside of KCCV because of condensation of water vapor in the blowby gas. However, if the coolant level is normal, it is not a problem.



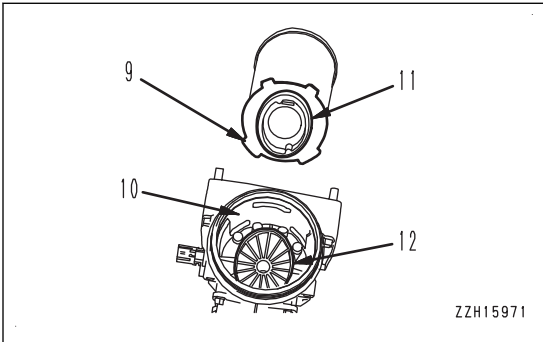
- Remove used O-ring (6) sticking to case (4) and install a new O-ring contained in the service kit. Apply engine oil to the new O-ring.



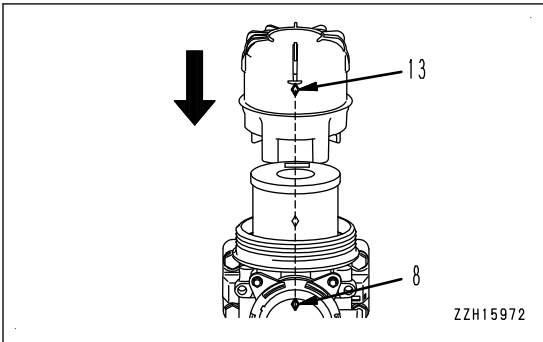
- While matching  $\diamond$  marks (7) of the new element with  $\diamond$  mark (8) of the body label, insert the element firmly into the end of the body.



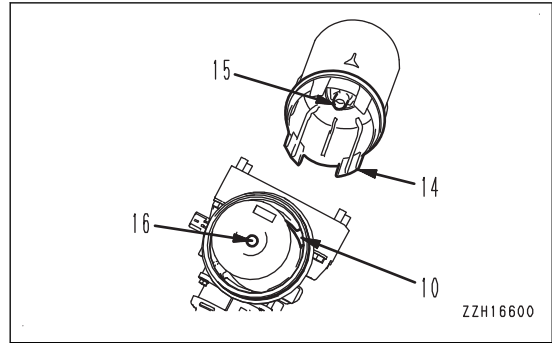
The element can be installed only when its claws (9) are correctly inserted in grooves (10) of the filter body. Bases (11) and (12) are oval. When inserting, take extreme care so that those bases are matched with each other.



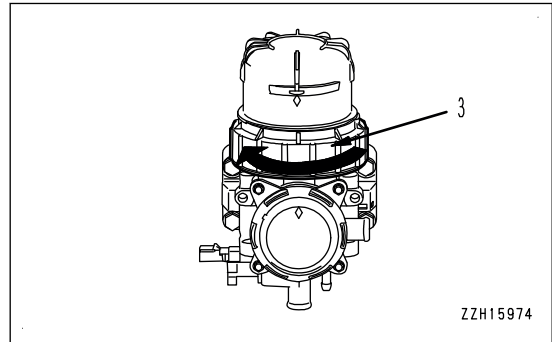
- Align the position of  $\diamond$  mark (13) on the case with that of  $\diamond$  mark (8) of the filter body label, then install the case to the filter body.



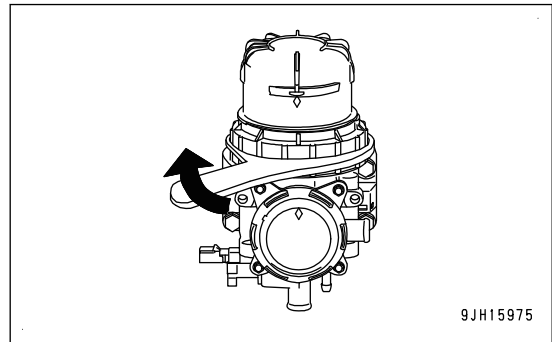
The case can be installed only when its claws (14) are correctly inserted in grooves (10) of the filter body. When inserting, take extreme care so that protrusion (15) in the case is joined together with rubber lip (16) of the element.



6. Fit ring (3) to the threaded part of the body and tighten it with the hand firmly until it stops.



7. By using the special wrench, further tighten the ring 1/15 to 2/15 turns (1 to 2 ridges of the ring).  
If the engine is operated with the ring tightened insufficiently, oil and blowby gas may leak.



Check the KCCV hose for leakage, crack, and loose clamp, and replace it if necessary.

### METHOD FOR REPLACING DEF FILTER

## ⚠ WARNING

Immediately after the engine is stopped, the parts are still very hot. Do not replace the filter immediately. Wait until all of parts cool down before starting the work.

### NOTICE

- Komatsu recommends using Komatsu genuine parts for replacement parts.
- If the machine is operated without DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials may enter into DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without DEF filter attached, nor use the filter other than Komatsu genuine parts.
- DEF filter cannot be flushed. Flushing or regenerating of it will degrade the performance of filter, and will cause the breakage of DEF tank. Never reuse the DEF element.
- Improper assembly of DEF filter may cause leakage of DEF. Replace the DEF filter in the correct procedure.
- DEF freezes at -11 °C. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around DEF pump is higher than -11 °C, and in the condition that DEF is not frozen.



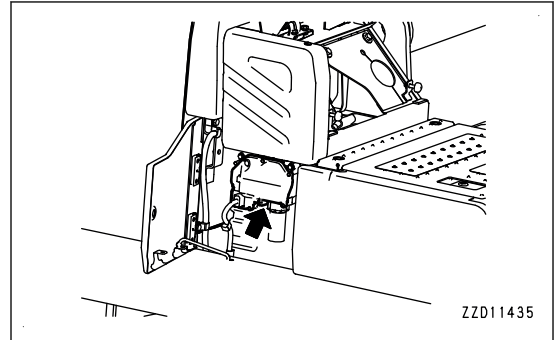
After the engine is stopped, DEF system devices automatically purge DEF in DEF injector and DEF pump and return it to DEF tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.

After the engine is stopped, the devices are operated for a few minutes. Before replacing the filter, clean around the DEF pump first after DEF system devices stop.

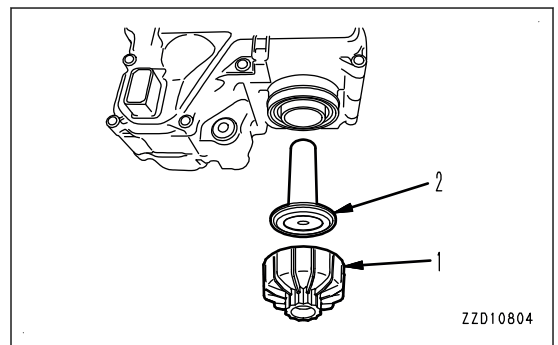
Items to be prepared

- DEF filter removal tool

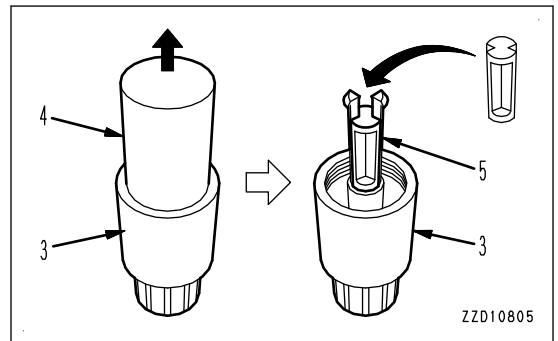
The DEF filter is located at the positions shown in the figure on the right.



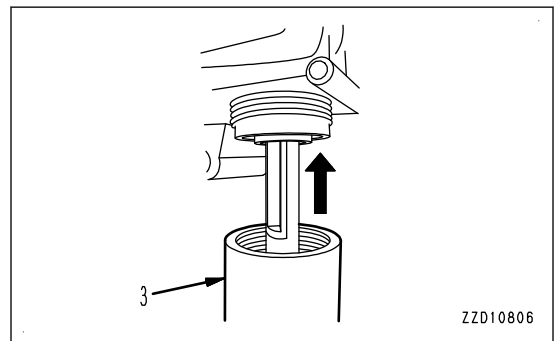
1. Remove filter cap (1) at the bottom of DEF pump, and remove equalizing element (2).



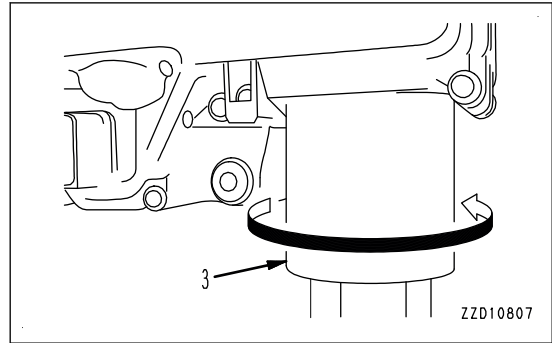
2. Turn cap (4) of filter removal tool (3) and remove it.
3. Check the installation of spacer (5).



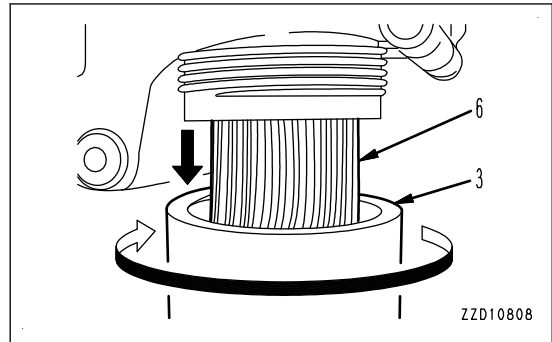
4. Insert filter removal tool (3) into the bottom of the DEF pump and thrust in with hand.



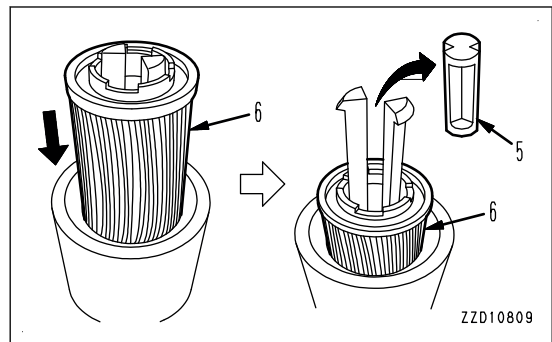
- 5. Check that filter removal tool (3) is fully inserted to the end. Insert the filter to the end where you cannot thrust it in any further.



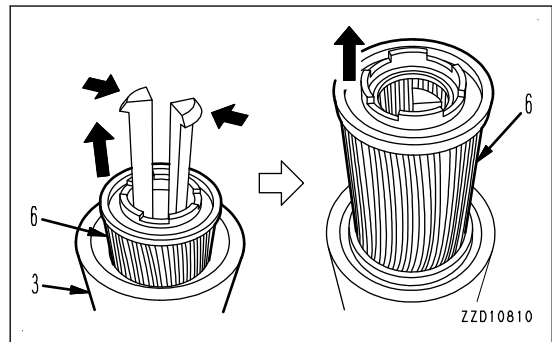
- 6. Turn filter removal tool (3) in reverse, and remove filter (6). Filter (6) is removed and you can take it out together with filter removal tool (3).  
If filter (6) cannot be removed from DEF pump, grip filter removal tool (3), pull it down, then it will be removed.



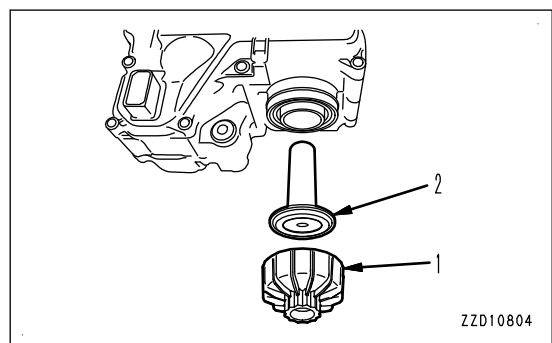
- 7. Slide filter (6) down, and remove spacer (5) from filter removal tool (3).



- 8. Pull 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 DEF pump, and lightly tighten them with hand.



- 11. Tighten filter cap (1).  
Tightening torque: 20 to 25 Nm {2.0 to 2.5 kgm}



**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**

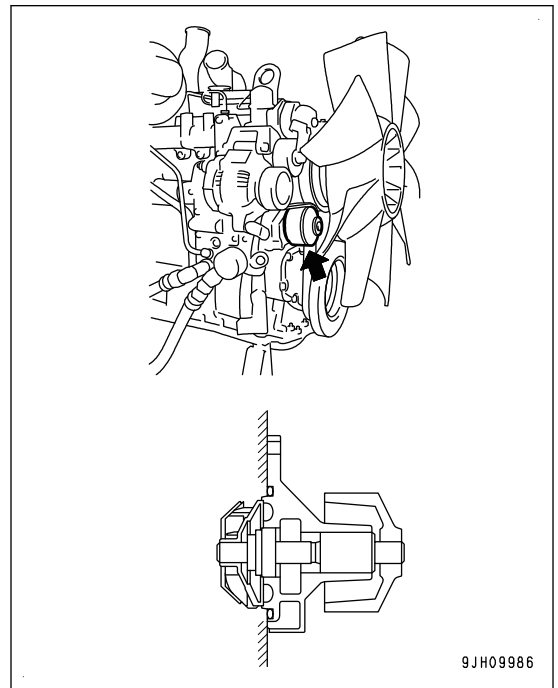
Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. Replace them every 2 years or every 4000 hours, whichever comes sooner.

**DEFINED LIFE PARTS LIST**

No.	Parts for periodic replacement		Replacement interval
1	Fuel system	Fuel hose	Ask your Komatsu distributor for replacement.
2	Engine lubrication system	Turbocharger lubrication hose Engine oil filter hose	
3	Work equipment hydraulic system	Main pump delivery hose Pump delivery hose	
		Pump branch hose Main pump LS hose Swing line hose Main suction hose	
4	Others	External work equipment hose <ul style="list-style-type: none"> <li>• Boom foot connection hose</li> <li>• Boom cylinder hose</li> <li>• Arm connection hose</li> <li>• Arm cylinder hose</li> <li>• Bucket cylinder hose</li> <li>• Line hose for additional attachment</li> </ul>	
		PPC accumulator Accumulator for additional attachment	

**METHOD FOR CHECKING WATER PUMP**

Check around the water pump for oil leakage and water leakage. If any problem is found, contact your Komatsu distributor to have the parts disassembled, repaired, or replaced.



**METHOD FOR CHECKING VIBRATION DAMPER**

Ask your Komatsu distributor for inspection of the vibration damper.

**METHOD FOR CHECKING STARTING MOTOR**

Ask your Komatsu distributor to have the starting motor checked.

If the engine is started frequently, have this inspection performed every 1000 hours.

**METHOD FOR REPLACING 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.

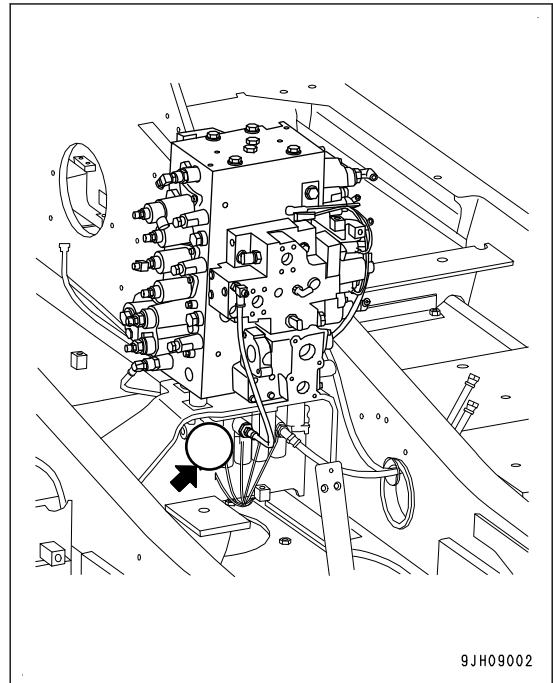
- The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when performing the operation. In addition, loosen the bolts slowly when performing the work.
- Do not disassemble.
- Do not bring open flame 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.

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.



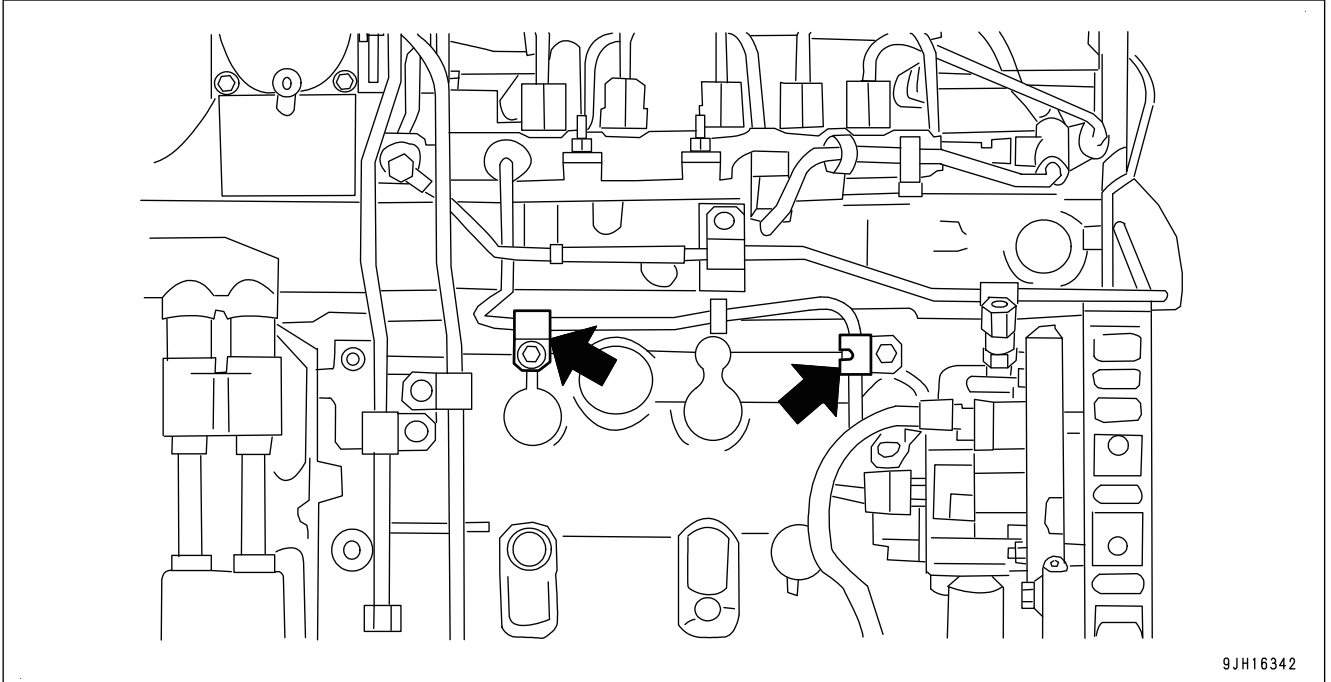
**METHOD FOR CHECKING AIR CONDITIONER COMPRESSOR OPERATION**

Check the following 2 items.

- 1) When the air conditioner switch is turned ON-OFF, do the air conditioner compressor and the magnet clutch also turn ON-OFF?
- 2) Is any abnormal noise generated by the magnet clutch or the air conditioner compressor body?

If any abnormality is found, ask your Komatsu distributor to have the parts disassembled, repaired, or replaced.

**METHOD FOR CHECKING FOR LOOSENESS OF ENGINE HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER**



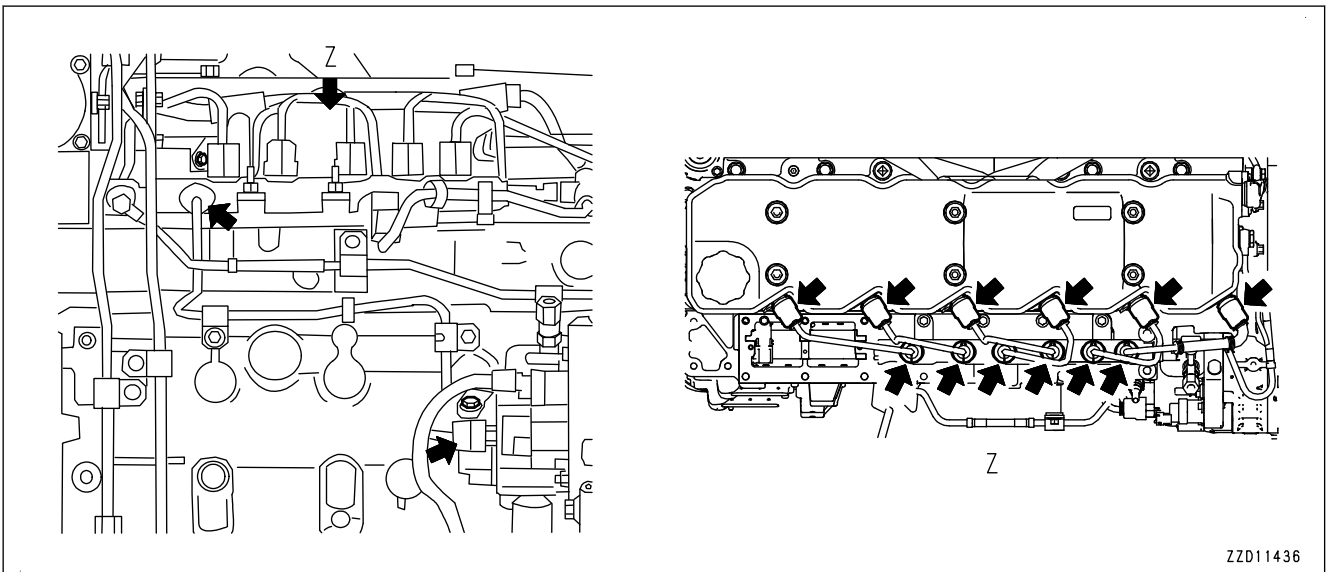
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Check visually and touch by hand to check that there is no hardening of the rubber and no loose bolts of the mounting clamps (2 places) for the high-pressure piping between the supply pump and the common rail. Replacement of the high-pressure piping must be made as an assembly.

If there are any problems, the parts must be replaced. Ask your Komatsu distributor for replacement.

**METHOD FOR CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER**

The fuel spray prevention caps on the fuel injection piping and both ends of the high-pressure piping act to prevent the fuel from coming into contact with high-temperature parts of the engine and causing a fire if the fuel should leak or spray out.



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Check fuel spray prevention caps (14 places) visually or with a finger to see if any of them has fell off, or the rubber portion is hardened.

If there are any problems, the related parts must be replaced. Ask your Komatsu distributor for replacement.

**EVERY 4500 HOURS MAINTENANCE**

Maintenance for every 100, 250 and 500 hours should be performed at the same time.

**METHOD FOR CLEANING KDPF**

Contact your Komatsu distributor for cleaning of the KDPF.

**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. Accordingly, wait until they have cooled down before starting the work.
- When removing the oil filler cap, the oil may spurt out. Rotate it slowly to release the internal pressure, then remove it with care.

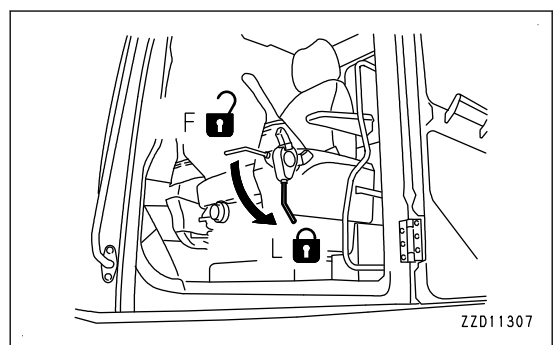
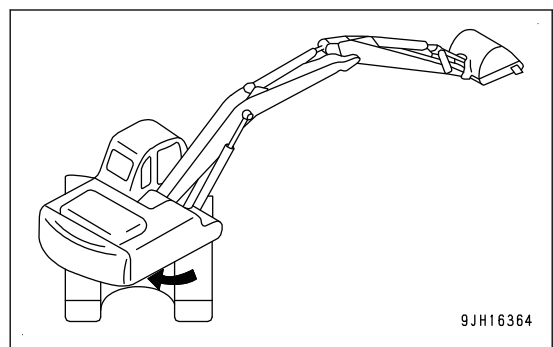
**NOTICE**

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 (4-13)”.

Refill capacity: 132 ℓ

Items to be prepared

- Container to receive drained oil
  - Socket wrench handle
1. Swing the upper structure so that the drain plug (P) on the lower side of the suction tube comes to the middle of the right and left tracks.
  2. Retract the arm and bucket cylinder rods, then lower the boom to lower the tooth to the ground.
  3. Set the lock lever to LOCK position (L) and stop the engine.



4. Remove the cap of oil filler port (F).
5. Remove undercovers (1).
6. Place the oil container to receive oil under drain plug (P) under the suction tube.

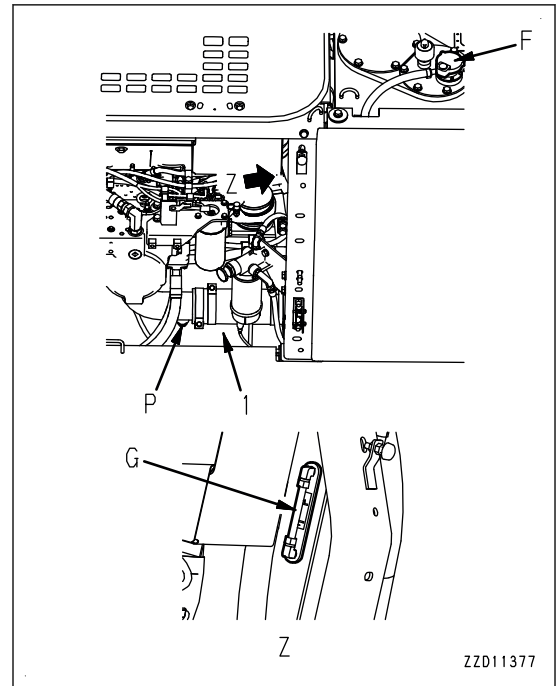
When removing drain plug (P), be careful not to get oil on yourself.

7. Remove drain plug (P), and drain the oil.  
Check the installed O-ring for damage. Replace O-ring with a new one if necessary.
8. After draining the oil, tighten drain plug (P).  
Tightening torque: 58.8 to 78.4 Nm{6 to 8 kgm}
9. Add the refill capacity of oil through oil filler port (F).
10. Check that the oil level is between H and L lines on sight gauge (G).

For applicable oils, see "USE OF FUEL, COOLANT AND LUBRICANTS TO ACCORDING TO AMBIENT TEMPERATURE (7-6)".

For the method of checking the oil level, see "METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (3-144)".

11. Bleed air from the hydraulic circuit.  
For the air bleeding procedure of hydraulic circuit, see "METHOD FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT (4-36)".
12. Install undercover (1).



### 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 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.

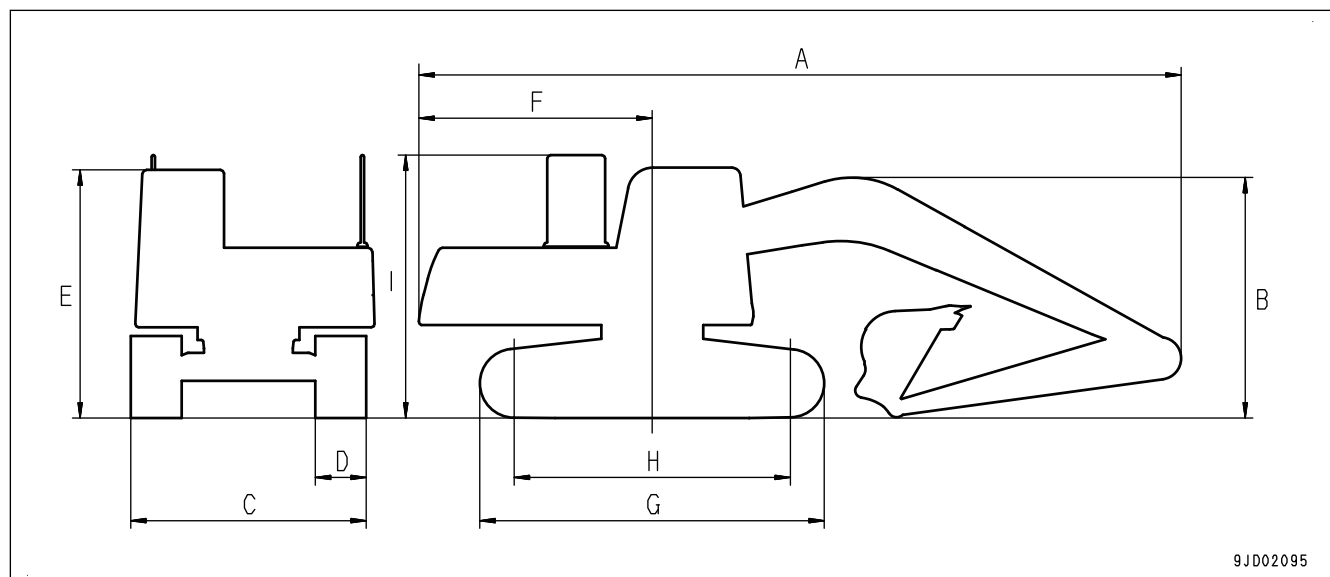




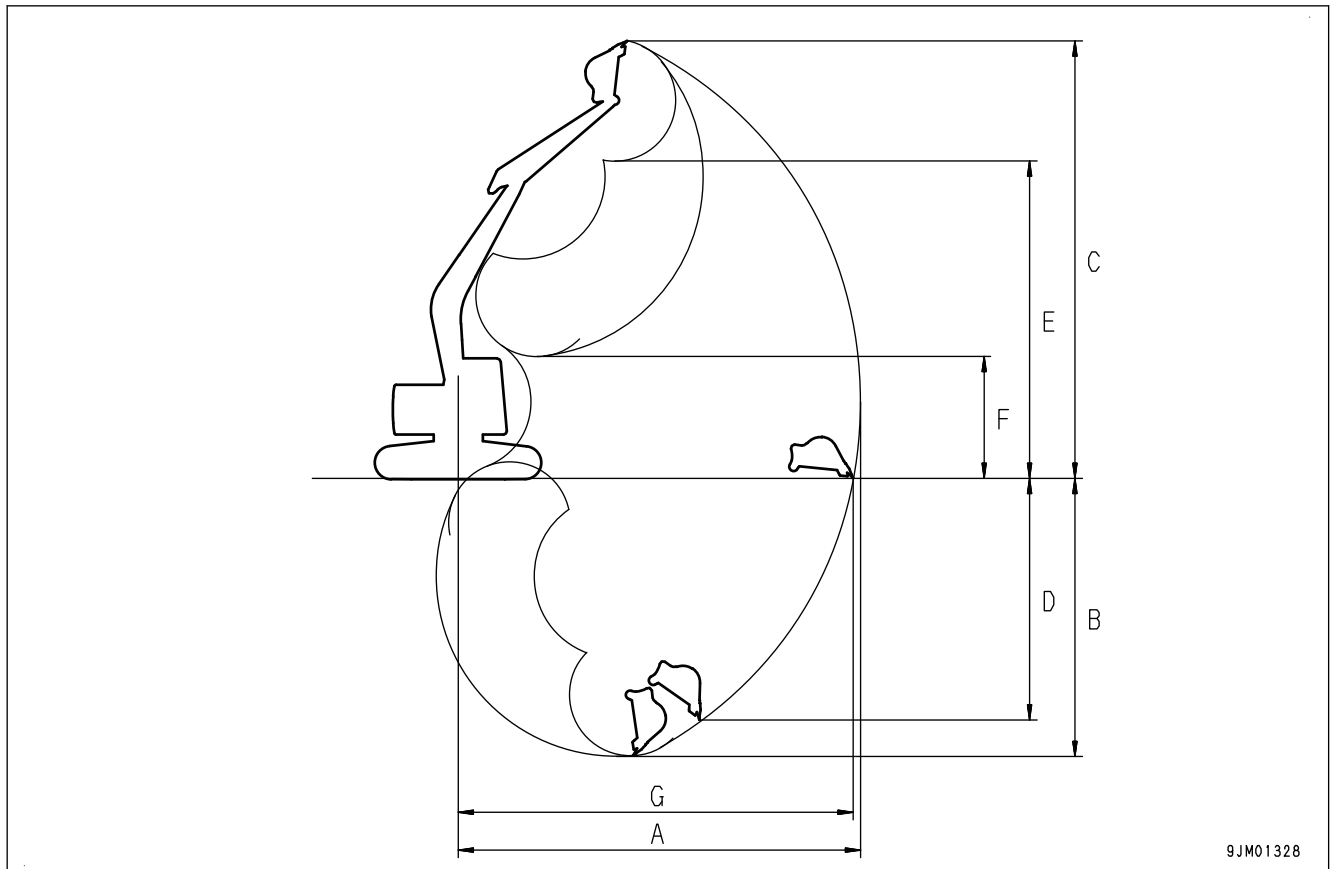
# **SPECIFICATIONS**

# SPECIFICATIONS

Item	Unit	PC290LC-11	PC290NLC-11
Operating weight	kg	30350	28950
Bucket capacity	m <sup>3</sup>	1.26	
Engine model	—	KOMATSU SAA6D107E-3 diesel engine	
Engine power	kW / rpm	159 / 2050 (ISO 14396)	
		147 / 2050 (ISO 9249)	
A Overall length	mm	9940	
B Overall height (work equipment)	mm	3205	
C Overall width	mm	3290	2990
D Shoe width	mm	700	600
E Cab height	mm	3180	
F Tail swing radius	mm	3020	
G Overall length of track	mm	4955	
H Distance between tumbler centres	mm	4030	
I Height of handrail	mm	3270	
Min. ground clearance	mm	498	
Travel speed (Lo/Mi/Hi)	km/h	3.0 / 4.1 / 5.5	
Swing speed	rpm	10.5	



	Working ranges	Unit	PC290LC-11, PC290NLC-11
A	Max. digging reach	mm	10635
B	Max. digging depth	mm	6915
C	Max. digging height	mm}	10345
D	Max. vertical wall digging depth	mm	6135
E	Max. dumping height	mm	7370
F	Min. dumping height	mm	2635
G	Max. reach at ground level	mm	10455



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### EXPLANATION OF LIFT CAPACITY CHART (1-PIECE BOOM)

1-Piece Boom - PC290LC-11, PC290NLC-11

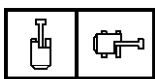
**LEGEND**

A: Reach from swing centre

B: Bucket hook height

OF: Lifting capacity (rating overfront)

OS: Lifting capacity (rating overside)



OF OS

**LEGEND**

(1) Position of lifting point

(2) Arm length

(3) Boom length

(4) Hydraulic pressure

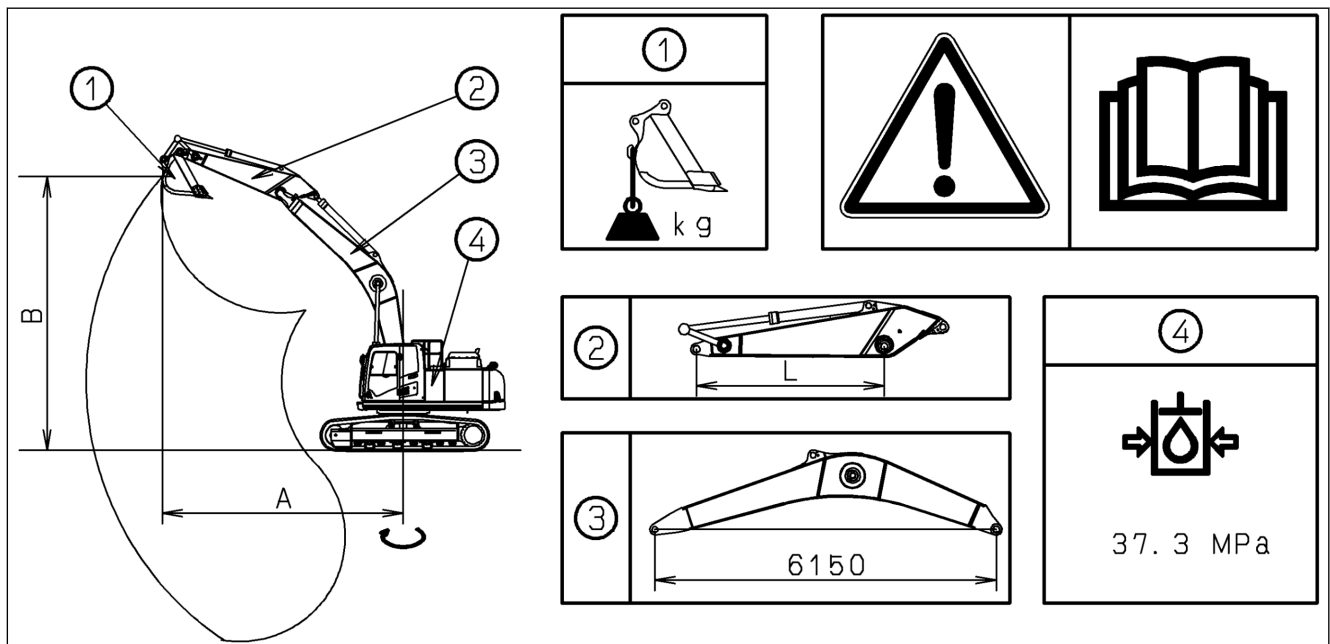
WORKING CONDITIONS:

- WITH BUCKET 800 kg
- IF OBJECT HANDLING IS PERFORMED WITH OTHER TOOL INSTALLED, THE WEIGHT DIFFERENCE OF THE TOOL SHALL BE DEDUCTED FROM THE VALUES OF THIS TABLE.
- WITH FULLY EXTENDED BUCKET CYLINDER.
- ON A COMPACT HORIZONTAL LEVEL GROUND













PC290LC-11 WITH 700 mm WIDTH SHOE.

PC290NLC-11 WITH 600 mm WIDTH SHOE













Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (\* load limited by hydraulic capacity rather than tipping).



PC290LC-11

L	A B	kg												
		MAX		7.5m		6.0m		4.5m		3.0m		1.5m		
														
3.5m	6.0m	* 3100	* 3100	* 5400	* 5400									
	4.5m	* 3150	* 3150	* 6100	* 5300	* 6800	* 6800							
	3.0m	* 3350	* 3350	* 6900	* 5100	* 8050	* 7350	* 10450	* 10450	* 8450	* 8450			
	1.5m	* 3650	3350	* 7650	4900	* 9450	6900	* 13300	10700	* 7400	* 7400			
	0.0m	* 4150	3350	7550	4700	* 10550	6600	* 14850	10150	* 8750	* 8750			
	-1.5m	* 5000	3600	7450	4550	10600	6400	* 15200	9900	* 9800	* 9800	* 5650	* 5650	
	-3.0m	* 6650	4150	7400	4550	10550	6350	* 14750	9900	* 15600	* 15600	* 10150	* 10150	
	-4.5m	* 8000	5350			* 9800	6450	* 13300	10100	* 18750	* 18750			
	3.2m	6.0m	* 3400	* 3400	* 5600	5400								
		4.5m	* 3450	* 3450	* 6350	5300	* 7150	* 7150						
		3.0m	* 3650	3600	* 7150	5050	* 8400	7250	* 11100	* 11100	* 8850	* 8850		
		1.5m	* 3950	3450	7750	4850	* 9750	6850	* 13800	10600				
0.0m		* 4550	3500	7550	4700	* 10750	6550	* 15100	10100	* 8150	* 8150			
-1.5m		* 5500	3800	7450	4600	10600	6400	* 15250	9950	* 9700	* 9700	* 8250	* 8250	
-3.0m		7100	4400	7450	4600	10600	6400	* 14600	10000	* 16500	* 16500	* 10700	* 10700	
-4.5m	* 8100	5750			* 9450	6500	* 12850	10200	* 17800	* 17800				
2.65m	6.0m	* 5400	5200	* 6000	5300	* 6750	* 6750							
	4.5m	* 5500	4400	* 6850	5200	* 7800	7550	* 9350	* 9350					
	3.0m	* 5850	4000	* 7550	5000	* 8950	7100	* 12250	11150					
	1.5m	6200	3850	7700	4800	* 10200	6750	* 14250	10400					
	0.0m	6350	3950	7550	4650	10700	6500	* 15300	10000					
	-1.5m	6950	4300	7450	4600	10600	6400	* 15100	9950	* 13050	* 13050			
	-3.0m	8350	5100			* 10500	6450	* 14050	10050	* 18100	* 18100			
-4.5m	* 8750	7250			* 8400	6650	* 11750	10350	* 15800	* 15800				
2.0m	6.0m	* 5900	* 5900			* 7600	* 7600							
	4.5m	* 6050	4950	* 7550	5150	* 8600	7450	* 10650	* 10650					
	3.0m	* 6450	4450	7900	5000	* 9700	7050	* 13250	10900					
	1.5m	6850	4300	7750	4850	* 10750	6750	* 11200	9950					
	0.0m	7100	4450	7600	4750	10800	6550	* 15400	10100					
	-1.5m	7900	4900	7600	4750	10700	6500	* 14750	10150	* 14600	* 14600			
	-3.0m	* 9000	6050			* 10050	6600	* 13300	10300	* 16850	* 16850			
-4.5m							* 10200	* 10200						

PC290NLC-11

L	A B	kg											
		MAX		7.5m		6.0m		4.5m		3.0m		1.5m	
													
PC290NLC	3.5m	6.0m	* 3100	* 3100	* 5400	4850							
		4.5m	* 3150	* 3150	* 6100	4750	* 6800	* 6800					
		3.0m	* 3350	3000	* 6900	4500	* 8050	6500	* 10450	10250	* 8450	* 8450	
		1.5m	* 3650	2900	7550	4300	* 9450	6100	* 13300	9400	* 7400	* 7400	
		0.0m	* 4150	2950	7300	4100	10450	5750	* 14850	8850	* 8750	* 8750	
		-1.5m	* 5000	3150	7200	4000	10250	5600	* 15200	8600	* 9800	* 9800	* 5650
	-3.0m	6550	3600	7150	3950	10200	5550	* 14750	8600	* 15600	* 15600	* 10150	* 10150
	-4.5m	* 8000	4650			* 9800	5650	* 13300	8800	* 18750	17750		
	3.2m	6.0m	* 3400	* 3400	* 5600	4800							
		4.5m	* 3150	* 3150	* 6350	4700	* 7150	6850					
		3.0m	* 3650	3150	* 7150	4500	* 8400	6450	* 11100	10100	* 8850	* 8850	
		1.5m	* 3950	3000	7500	4250	* 9750	6050	* 13800	9300			
0.0m		* 4550	3050	7300	4100	10450	5750	* 15100	8800	* 8150	* 8150		
-1.5m		* 5500	3300	7200	4000	10250	5600	* 15250	8650	* 9700	* 9700	* 8250	* 8250
-3.0m	6900	3850	7200	4000	10250	5550	* 14600	8700	* 16500	* 16500	* 10700	* 10700	
-4.5m	* 8100	5050			* 9450	5700	* 12850	8900	* 17800	* 17800			
2.65m	6.0m	* 5400	4600	* 6000	4700	* 6750	* 6750						
	4.5m	* 5500	3900	* 6850	4600	* 7800	6700	* 9350	* 9350				
	3.0m	* 5850	3500	* 7550	4400	* 8950	6300	* 12250	9800				
	1.5m	6000	3350	7450	4200	* 10200	5950	* 14250	9050				
	0.0m	6150	3450	7300	4100	10400	5700	* 15300	8750				
	-1.5m	6700	3750	7200	4000	10250	5600	* 15100	8650	* 13050	* 13050		
-3.0m	8050	4500			10300	5600	* 14050	8750	* 18100	17800			
-4.5m	* 8750	6350			* 8400	5850	* 11750	9000	* 15800	* 15800			
2.0m	6.0m	* 5900	5250			* 7600	6900						
	4.5m	* 6050	4350	* 7550	4550	* 8600	6600	* 10650	10400				
	3.0m	* 6450	3950	7650	4400	* 9700	6250	* 13250	9550				
	1.5m	6650	3800	7500	4250	10650	5950	* 11200	8800				
	0.0m	6850	3900	7350	4150	10450	5750	* 15400	8800				
	-1.5m	7650	4300	7350	4150	10400	5700	* 14750	8850	* 14600	* 14600		
-3.0m	* 9000	5300			* 10050	5800	* 13300	9000	* 16850	* 16850			
-4.5m							* 10200	9300					

# 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 (1-PIECE BOOM) (5-3)”, 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

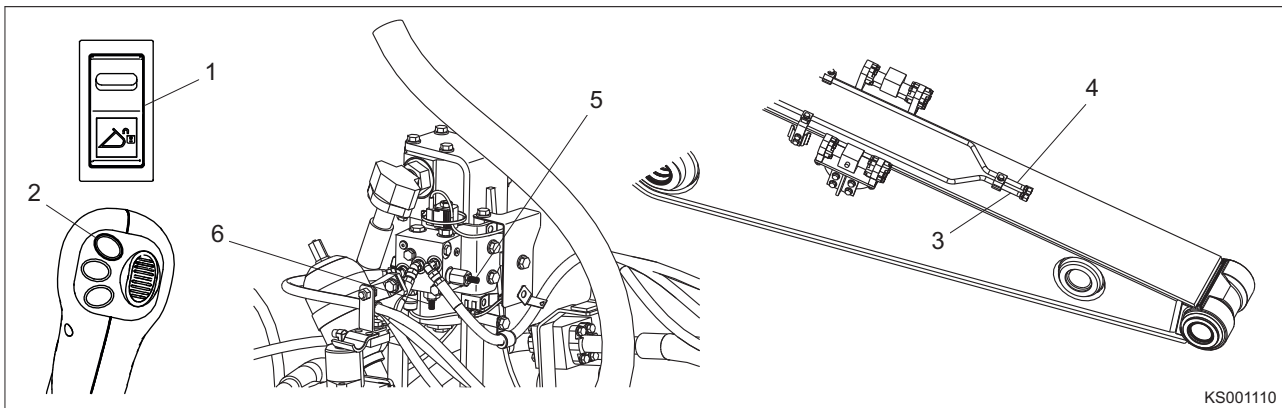
## HANDLING QUICK COUPLER

### ! 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 valves (5) and (6) allow the attachment pressure and the release pressure for the quick coupler to be limited according to the coupler manufacturer's recommendation respectively. Maximum circuit pressure 34.3 MPa (350 kgf/cm<sup>2</sup>)
- Ensure that the quick coupler is installed by a suitably qualified technician. If in doubt contact your Komatsu dealer.
- After assembly of a hydraulic quick coupler and before first use of such quick coupler, ensure that the setting in machine control system setting is correct. Please contact your Komatsu distributor.

### LOCATIONS



- |   |  |
|---|--|
| (1) Switch - Quick coupler                | (4) Piping (quick coupler release direction)       |
| (2) Button - Quick coupler                | (5) Adjustable pressure regulating valve (Attach)  |
| (3) Piping (quick coupler lock direction) | (6) Adjustable pressure regulating valve (Release) |

## OPERATION OF QUICK COUPLER

### 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.

1. 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.

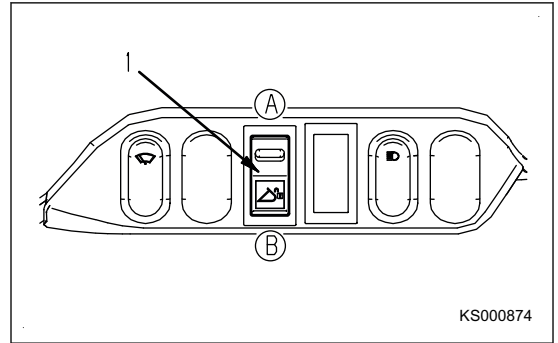
**NOTICE**

**Operation will only take place if button (2) is also pressed.**

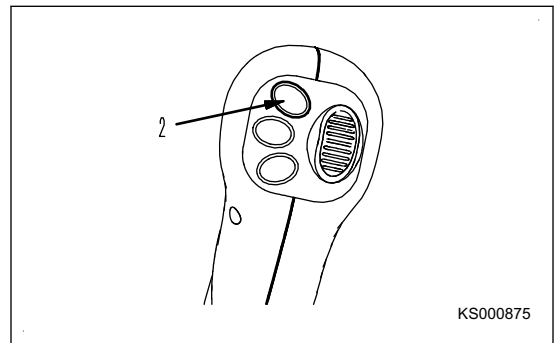
(A) : When depressed at this point quick coupler deactivated. (Lock bucket/attachment)

(B) : When depressed at this point quick coupler is ready to be activated. (Release bucket/attachment)

2. With switch (1) in position "B" press and hold button (2) on the left hand lever to activate quick coupler.



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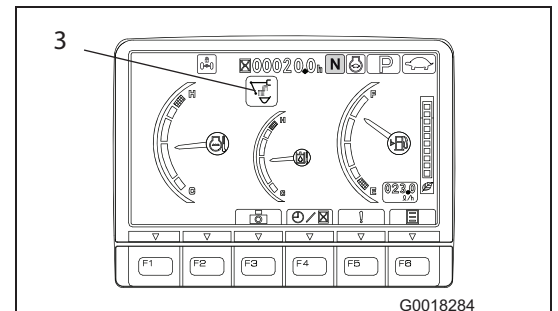


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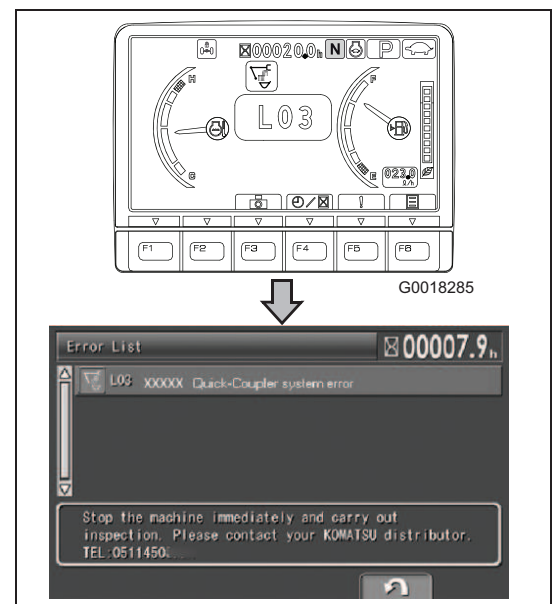
**REMARK**

When switch (1) and switch (2) are operated together a warning (3) on monitor appears to inform that the quick coupler system is activated.

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. If using the swing function activate the Swing Lock first. Refer to "SWING LOCK SWITCH (3-88)"



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The quick coupler will now release the attachment/bucket.

**REMARK**

When during the operation decrease oil pressure in the quick coupler system a warning buzzer will sound intermittently. Action level L03 and an error message appears on monitor display. In this case stop the machine immediately and ask your Komatsu distributor for inspection and maintenance.

**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.

1. 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.

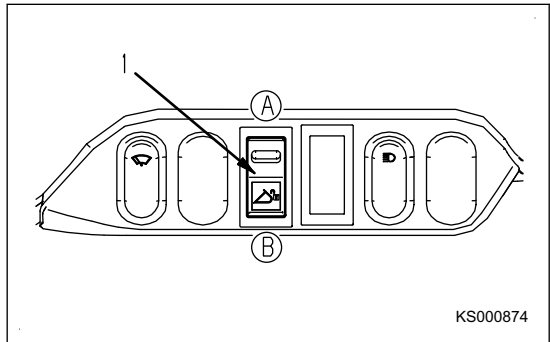
3. Depending on the design of the quick coupler it may be necessary to operate one of the hydraulic functions of the machine (bucket, boom, arm or swing) to raise the pressure in the hydraulic system. If using the swing function activate the Swing Lock first. Refer to "SWING LOCK SWITCH (3-88)". The 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.

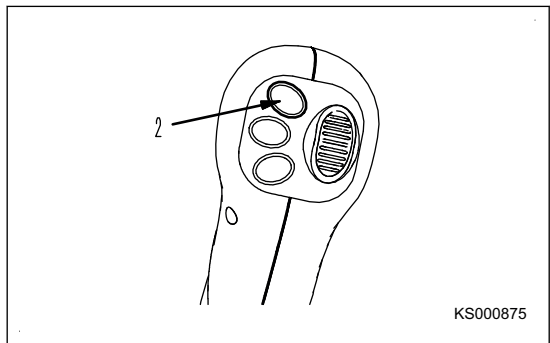
5. Release button (2).

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.



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**! 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.

# AUTOMATIC GREASE SYSTEM

## HANDLING AUTOMATIC GREASE SYSTEM

The machine may be equipped with an automatic greasing system. The system will automatically lubricate all points connected to the system on a timed cycle, with the correct quantity of grease.

### NOTICE

Your automatic grease system has been set up before shipping from the factory. Changing the grease settings could adversely change the performance of the machine. If in doubt please consult your Komatsu distributor.

Komatsu genuine grease is provided to maintain reliability and durability of Komatsu construction equipment and components.

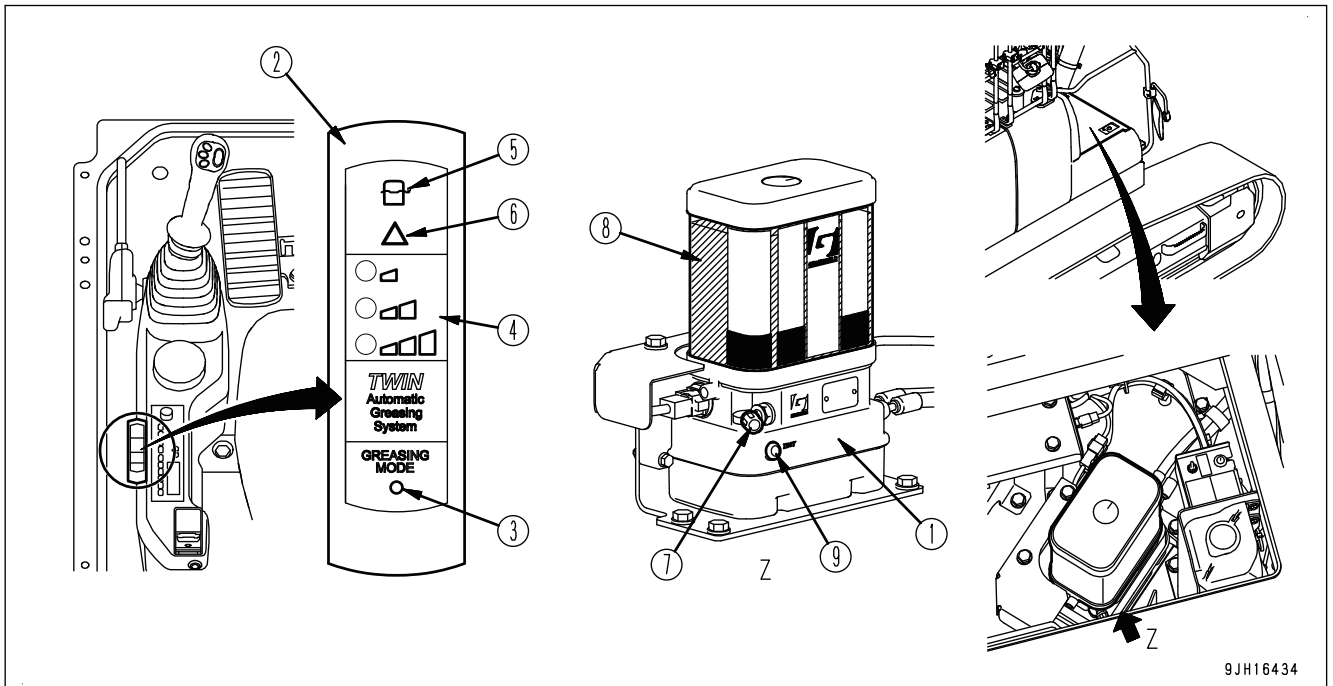
In order to keep your machine in the best condition for long periods of time, it is essential to follow the instructions in this Operation and Maintenance Manual.

Commercially available grease additives may be good for the machine, but they may also cause harm. Komatsu does not recommend any commercially available grease additive.

Refer also to section "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-5)"

The automatic grease system consists of:

- Grease pump (1) with integrated control unit.
- Distribution blocks with grease metering units.
- In-cab display (2).



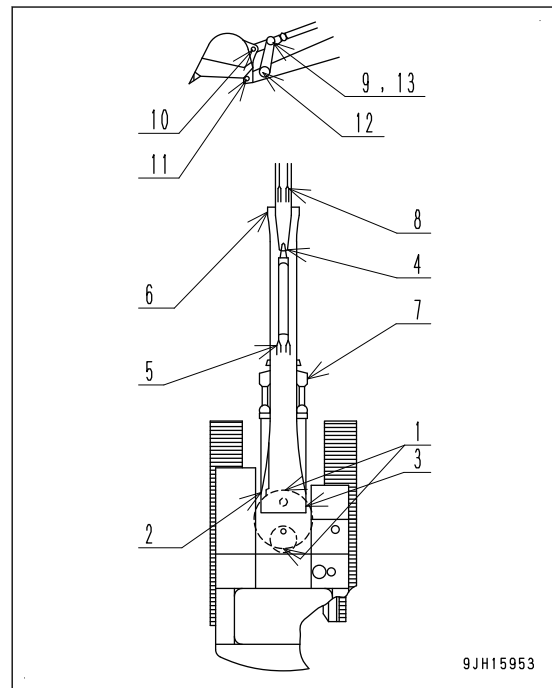
- (1) Automatic greasing pump, Control unit
- (2) Automatic greasing system monitor
- (3) Greasing mode selector switch
- (4) Greasing mode display lamp
- (5) Greasing pump
- (6) System error lamp
- (7) Coupling for greasing
- (8) Grease tank
- (9) Test button

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## DIAGRAM OF AUTOMATIC GREASING POINTS

### DIAGRAM OF AUTOMATIC GREASING POINTS

No.	Part/Location
1	Swing circle
2	Boom cylinder foot pin
3	Boom foot pin
4	Boom cylinder rod end
5	Arm cylinder foot pin
6	Boom arm coupling
7	Arm cylinder rod end
8	Bucket cylinder foot pin
9	Bucket cylinder rod end (may not be available with some specifications)
10	Bucket - link coupling pin (may not be available with some specifications)
11	Arm-bucket coupling pin
12	Arm-link coupling pin
13	Link coupling pin (may not be available with some specifications)

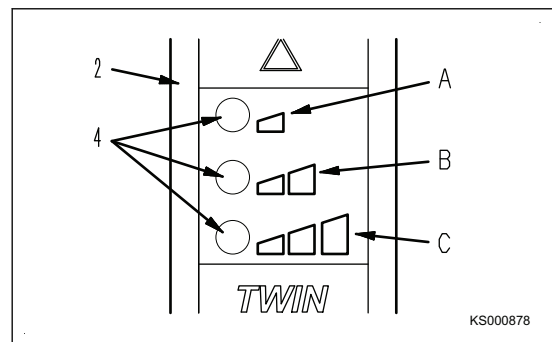


## SYSTEM OPERATION

The system performs all operations automatically. When the starting switch is in the ON position the grease pump will, at pre-defined intervals, supply measured quantities of grease to all the points connected to the system.

Within 60 seconds after switching the starting switch to the ON position the in-cab display (2) shows the selected greasing interval by flashing green lamp (4).

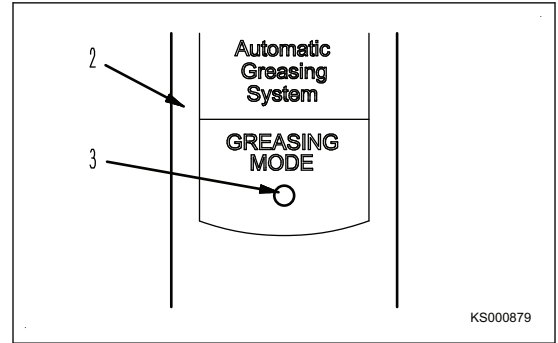
- (A): Light Duty greasing interval
- (B): Normal Duty greasing interval
- (C): Heavy Duty greasing interval








## CHANGING THE GREASE INTERVAL WITH THE IN-CAB DISPLAY

1. Make sure the ignition is switched ON.

- Select the interval by pushing button (3) on the in-cab display (2).



**INDICATION ON THE IN-CAB DISPLAY**

Indication	Meaning
The red lamp (6) flashes as soon as the ignition has been switched on.	<ol style="list-style-type: none"> <li>The pump is not powered. Check fuses and connections to earth. Immediate action required.</li> <li>The connection between the in-cab display and pump is defective, replace if necessary.</li> </ol>
No lamp illuminates when the starting switch is in the ON position.	<ol style="list-style-type: none"> <li>The system is not powered. Check fuses and connections to earth. Immediate action is required.</li> <li>The display or wiring of the in-cab display is defective. Check in-cab display and wiring and replace if necessary.</li> </ol>
Yellow lamp (5) flashing 	Minimum level in the reservoir has been reached. Reset by filling the reservoir.
Red lamp (6) flashing 	<p>System out of order. Immediate action required.</p> <p>Possible causes:</p> <p>Insufficient grease pressure during 10 consecutive cycles (or 10 consecutive times in the same main line). Check for cause and reset by depressing the test button at the pump for at least one second while the ignition is switched on.</p> <p>Reservoir empty; reset by refilling the reservoir and after that depressing the test button for at least one second while the ignition is switched on.</p>
Green lamp (4) flashing 	Low duty
Green lamp (4) flashing 	Normal duty
Green lamp (4) flashing 	Heavy duty
A green lamp is flashing during one complete cycle (2.0 sec. on/2.0 sec. off)	Single test run being executed

A green lamp is flashing continuously (0.2 sec. on/0.2 sec. off)

Continuous test run being executed (see System Test).

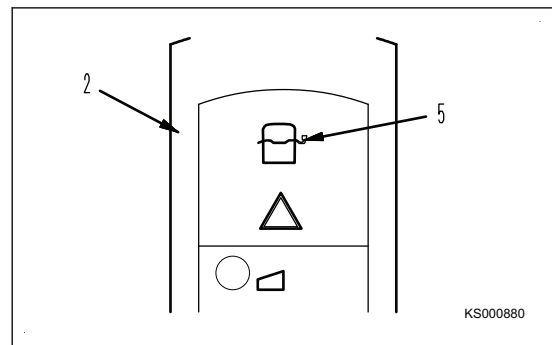
## CHECK AUTOMATIC GREASE SYSTEM

### PERIODIC CHECKS

1. Check the grease level in the reservoir, but do not refill the reservoir before minimum level is reached.
2. Check the in-cab display is functioning.
3. Check if the selected interval time is correct for the working conditions of the machine.
4. Check the pump for damage and leakage.
5. Check the grease pipes for damage and leakage.
6. Check the condition of the grease points served by the system. Sufficient fresh grease should be visible.
7. Check the operation of the system. Perform a cycle test.
8. Check the pump unit and its surroundings. Attention - avoid using high pressure wash directly on the pump.
9. Replace or clean the pump filler filter (behind the connector on the reservoir) every 500 hours.

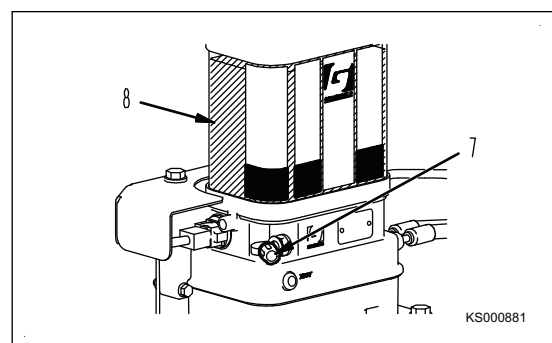
### REFILLING GREASE

If the yellow lamp (5) on the in-cab display (2) illuminates, the minimum grease level in the reservoir has been reached. The grease reservoir must be refilled as soon as possible.



### GREASING PROCEDURE

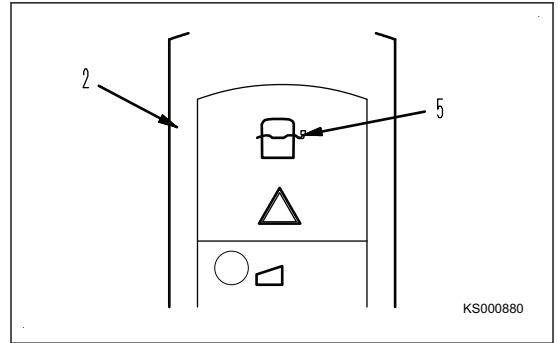
1. Remove the dust cap from the filler coupling (7).
2. Carefully clean the filter coupling (7) and the filler coupling on the filler hose.
3. Fix the filler hose onto the filler coupling (7).
4. Fill the reservoir up to the maximum level indicated on the reservoir (8).
5. Remove the filler hose and fit the dust cap.
6. Fix the filler hose onto the filler coupling of the filler pump so that filler hose stays clean.





**REMARK**

Do not fill the reservoir before you have a low level indication (5) on the in-cab display.

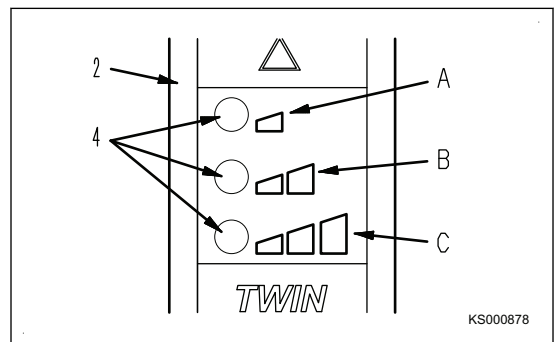
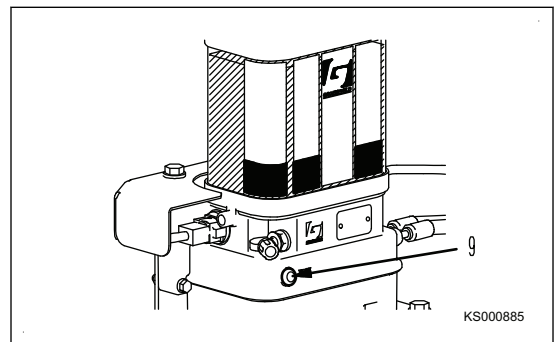
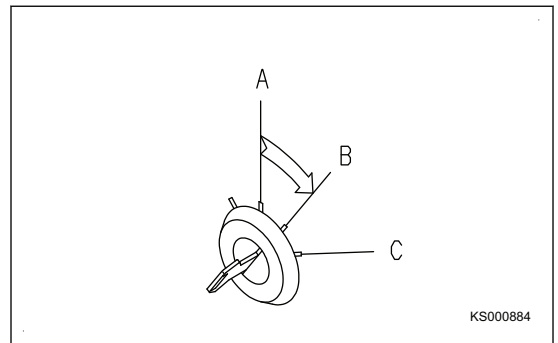


**SYSTEM TEST**

In order to check the system a single lubrication cycle can be performed as follows:

1. Move the starter switch to the ON position (B).
2. Depress the test button (9) on the pump for three to five seconds.

The system will run a run a single test. During this test the green LED (4) of the selected interval on the in-cab display (2) will flash (2 sec. on/ 2 sec. off).



In order to provide additional grease to all grease points (i.e. after cleaning the machine) or to vent the system a continuous lubrication cycle run can be performed.

1. Move the starter switch to the ON position (B).
2. Depress the test button (9) on the pump for more than six seconds. The system will perform a continuous lubrication test. During this run the green LED (4) of the selected interval on the in-cab display (2) will flash (0.2 sec. on/ 0.2 sec. off).
3. The continuous test cycle ends after the starter switch is moved to the OFF position (A).

A test cycle can only be started when the system is not in the pump phase of a current greasing cycle. If the system is busy with a pump cycle, it will not react to the test push button.

**NOTICE**

Only use grease tests cycles if necessary. Every time a test cycle is carried out grease is added to the grease points. This will increase grease usage and can cause excessive greasing of the grease points.

## 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

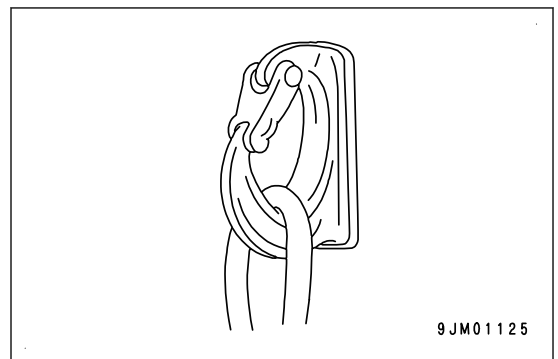
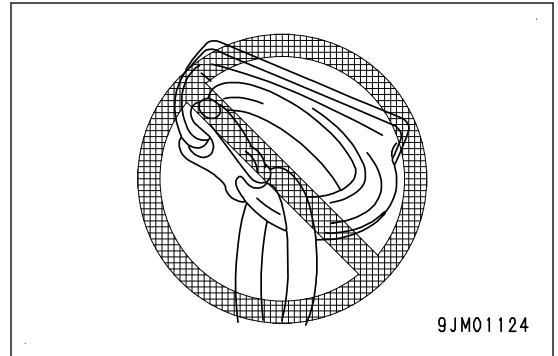
If lifted load largely swings, it is dangerous. During lifting operations, reduce the engine speed and perform the operation in L mode.

The wire or sling may come off the hook, depending on the working posture. Pay sufficient attention to the hook angle so that the sling does not come off.

Never drive the machine while lifting a load.

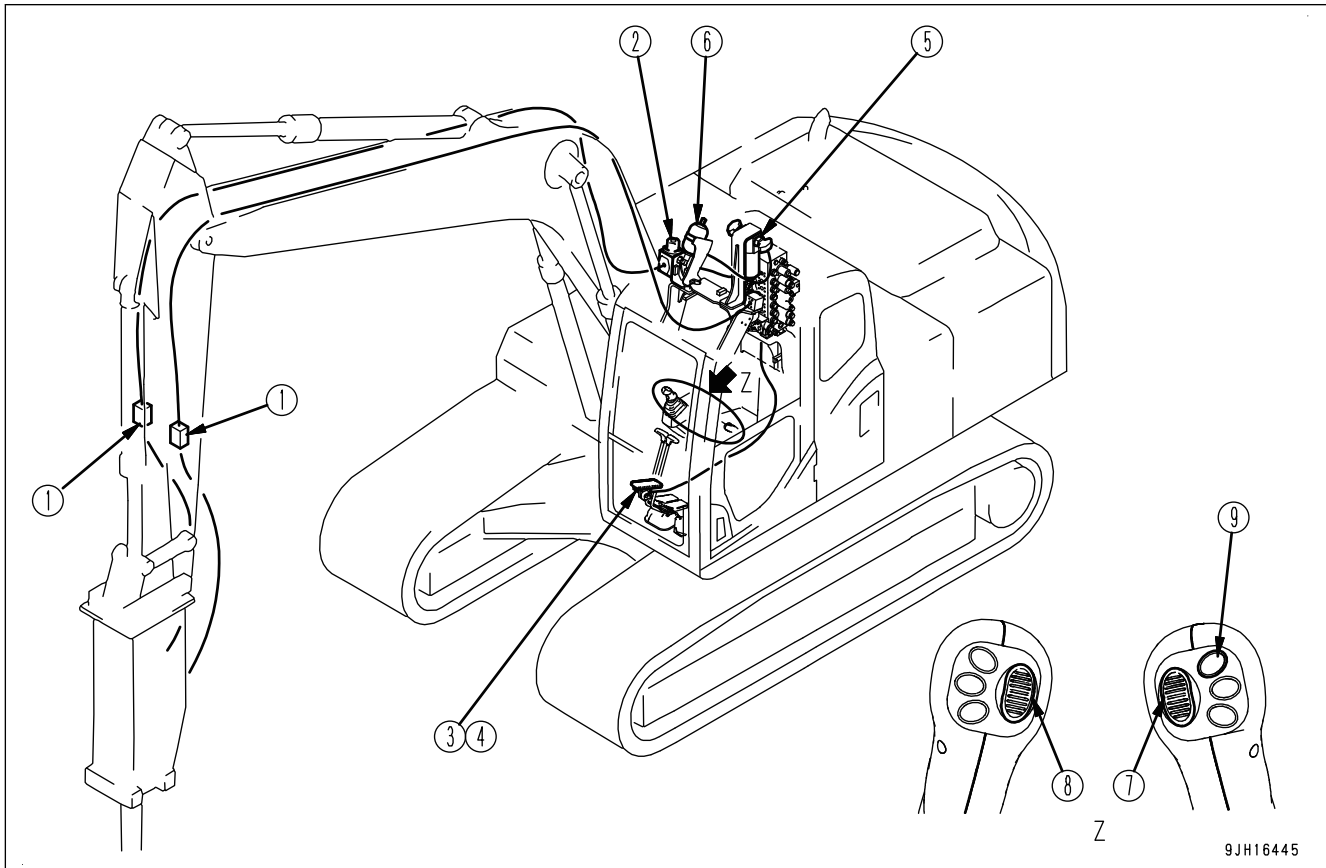
If the bucket with hook is turned 180 ° and used for operations, it will hit the arm during the bucket DUMP operation. Be careful when using it.

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 ON MACHINE EQUIPPED WITH ATTACHMENT



- |                                   |   |
|-----------------------------------|---|
| (1) Stop valve                    | (6) Accumulator (for low pressure)                        |
| (2) Selector valve                | (7) 1st-line attachment proportional switch               |
| (3) Attachment control pedal      | (8) 2nd-line attachment proportional switch (if equipped) |
| (4) Lock pin                      | (9) Breaker mode switch                                   |
| (5) Additional filter for breaker |   |

### STOP VALVE

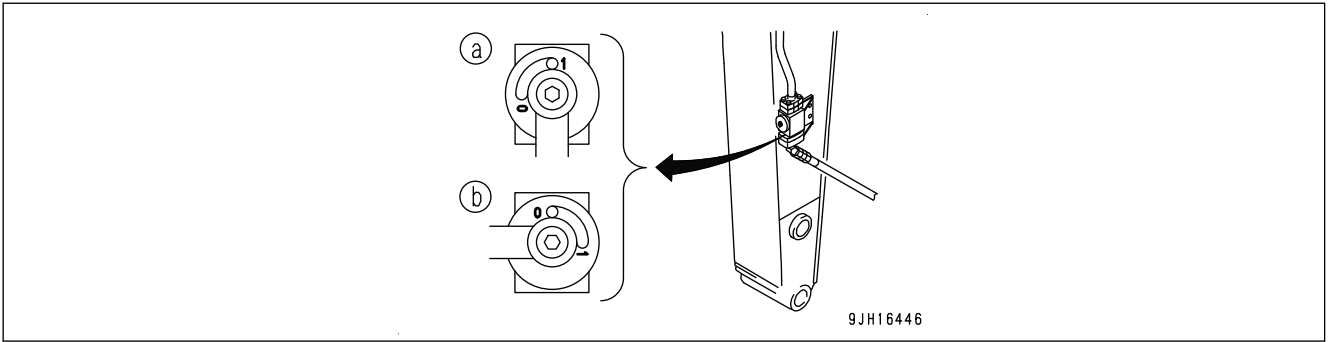
The stop valve stops the flow of the hydraulic oil.

#### (a) FREE

Hydraulic oil flows.

#### (b) LOCK

Hydraulic oil stops.



When removing or installing attachments, set this valve to LOCK position.

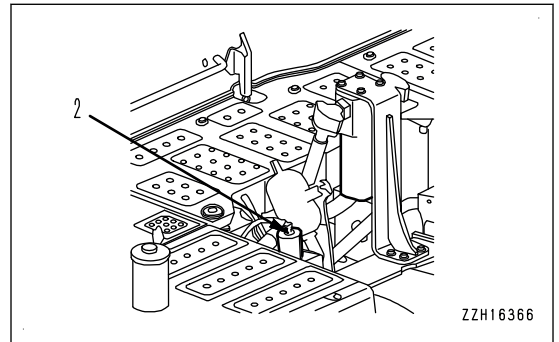
## SELECTOR VALVE

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 CHANGE-OVER AND CONNECT HYDRAULIC CIRCUIT FOR MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-18)".

### NOTICE

If a service circuit from the attachment manufacturer is added, the return circuit may not switch automatically.



## 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.

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 (N)**

Stop

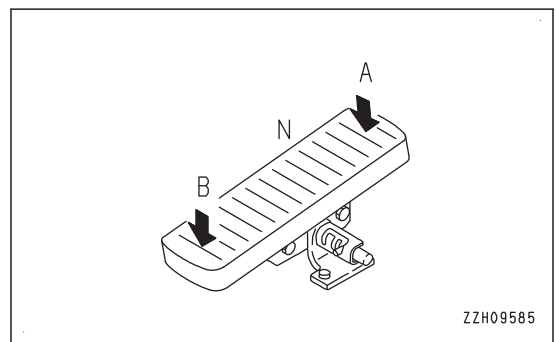
**Rear of pedal (B)**

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

### NOTICE

Before changing the position of the lock pin, stop the engine.

If you depress the pedal to (D) side with lock pin at (c) position when using the breaker, it may cause malfunction and breakage of breaker. Always put the lock pin at (b) position when using the breaker.

The lock pin locks the control pedal.

### Position (a)

Lock

### Position (b)

Only front of pedal can be operated fully (rear is locked)

### Position (c)

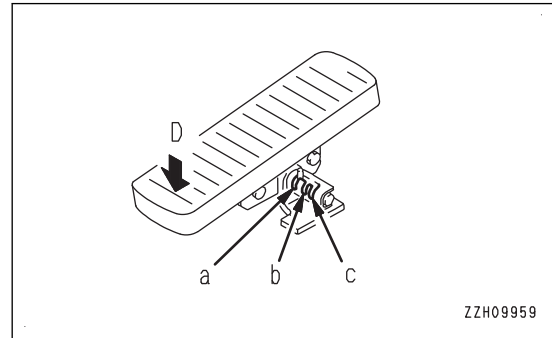
Both front and rear of pedal can be operated fully

### REMARK

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.



## ADDITIONAL FILTER FOR BREAKER

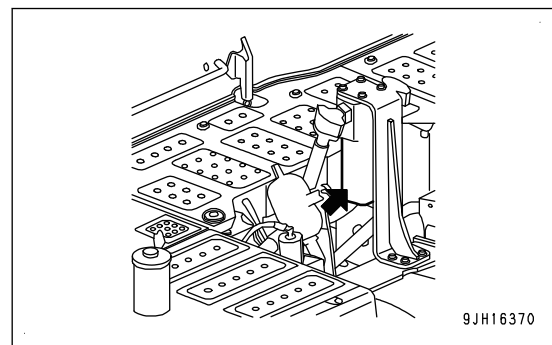
### NOTICE

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.

### REMARK

Oil flows only when B mode is selected on the monitor.



## ACCUMULATOR

### **⚠ 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.

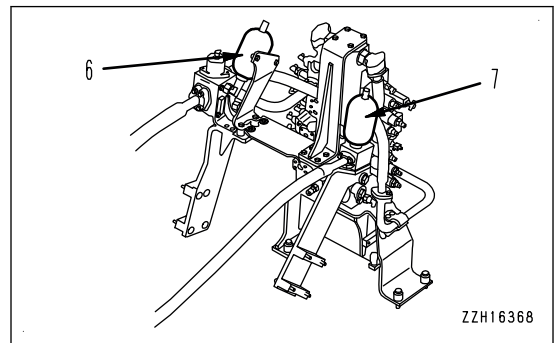
- The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when performing the operation. In addition, loosen the bolts slowly when performing the work.
- Do not disassemble.
- Do not bring open flame 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

To the machine equipped with a breaker you need to install an accumulator whose model number matches to that of the breaker manufacturer to the breaker piping. If breaker operation is performed without having an accumulator installed, the service life of the machine will be reduced. Contact your Komatsu distributor for further information regarding the breaker.

These accumulators (6) and (7) are installed to reduce the peak pressure in the hydraulic circuit when the breaker is being used. Do not touch it usually.

When inspecting the accumulator, see "METHOD FOR CHECKING AND RELEASING NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR (FOR BREAKER) (4-61)".



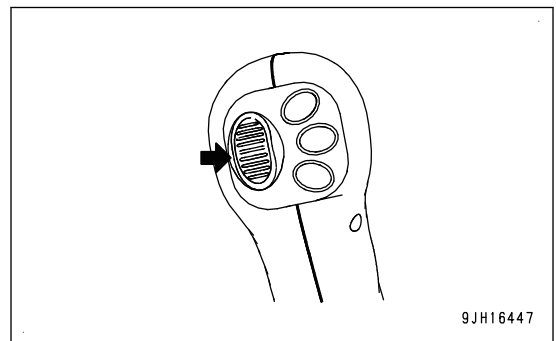
## 1ST-LINE ATTACHMENT PROPORTIONAL SWITCH

### **⚠ WARNING**

When operating attachment using rolling switch, lock the pedal with the lock pin to avoid accidental operation.

The 1st-line attachment proportional switch operates the 1st attachment circuit (e.g. crusher).

The 1st-line attachment proportional switch is a roller proportional control switch. Rolling the switch up produces movement of the attachment, rolling down produces opposite movement. Slight movement of the roller will give slight movement of the attachment; full movement of the roller will give faster movement of the attachment.



## 2ND-LINE ATTACHMENT PROPORTIONAL SWITCH

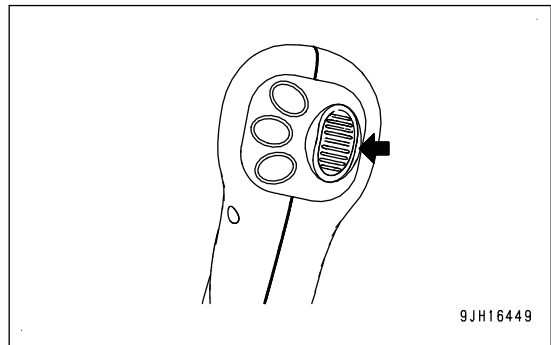
(if equipped)

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.

**REMARK**

If installing 2nd attachment as a field kit, ask the distributor to change monitor setting to allow 2 attachment mode.



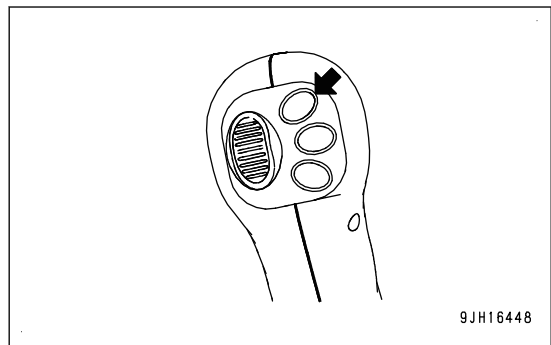
**BREAKER MODE SWITCH**

**⚠ WARNING**

When operating breaker using breaker switch, lock the pedal with the lock pin to avoid accidental operation.

The breaker mode switch operates the breaker.

Press the breaker mode switch to operate breaker and release to stop.



**METHOD FOR CHANGE-OVER AND CONNECT HYDRAULIC CIRCUIT FOR MACHINE READY FOR INSTALLATION OF ATTACHMENT**

**NOTICE**

- The return circuit when a breaker is installed must return directly to the return filter, so do not use it in the mode other than B mode.
- The standard set pressure of the safety valve of the service valve is 20.6 MPa {210 kg/cm<sup>2</sup>} if you select B mode set at the shipment from the plant and it becomes 27.4 MPa {280 kg/cm<sup>2</sup>} when ATT/P or ATT/E mode is selected. Depending on the attachment, it may be necessary to adjust the pressure. Ask your Komatsu distributor for the adjustment.

**SWITCHING THE HYDRAULIC CIRCUIT**

- Depending on the type of attachment, set the working mode on the monitor as follows.
- The hydraulic circuit and the set pressure of the safety valve in the service valve switch according to the working mode selected.

Attachment	Working mode	Hydraulic circuit	Set pressure of safety valve of service valve
Breaker or attachment with one-way circuit	B mode	Return circuit automatically becomes the circuit that does not pass through control valve	When shipped from factory: 20.6 MPa {210 kg/cm <sup>2</sup> }



Crusher or other attachment with two-way circuit	ATT/P or ATT/E mode	Return circuit automatically becomes the circuit that does not pass through control valve	When shipped from factory: 27.4 MPa {280 kg/cm <sup>2</sup> }
--	---------------------	---	---

Depending on the attachment, it is necessary to change the oil flow in the service circuit.

For details of setting the oil flow, see "METHOD FOR OPERATING ATTACHMENT (6-25)"

#### SWITCHING OF BREAKER AND GENERAL ATTACHMENT

- When optional attachment is installed and working mode is set to B mode
1. Breaker circuit (one-way circuit) is formed.
  2. Hydraulic oil flowing through breaker circuit passes through additional filter for breaker.
  3. Relief valve is set to low pressure.

When shipped from the factory: 20.6 MPa (210kg/cm<sup>2</sup>)

4. Maximum oil flow can be adjusted in user mode.
  - If ATT/P or ATT/E mode is turned on when the optional attachment is installed
1. Crusher circuit (2-way circuit) is formed.
2. Hydraulic oil flowing through crusher circuit does not pass through additional filter for breaker.
3. Relief valve is set to high pressure.

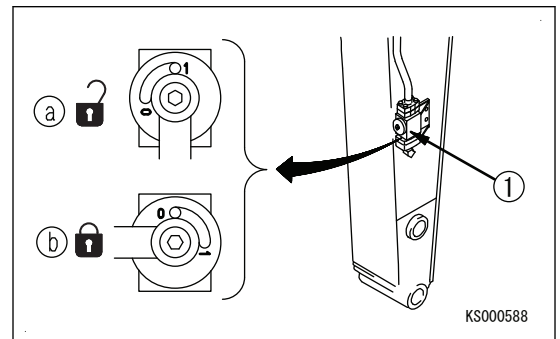
When shipped from factory: 27.4 MPa (280 kg/cm<sup>2</sup>)

4. Maximum oil flow can be adjusted in user mode.

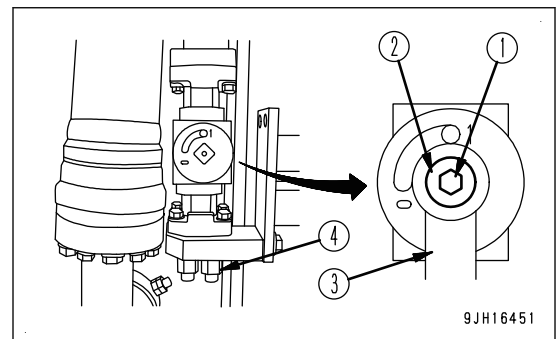
#### METHOD FOR CONNECTING HYDRAULIC CIRCUIT

When installing the attachment, connect the hydraulic circuit as follows.

1. Check that stop valve (1) is located 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)



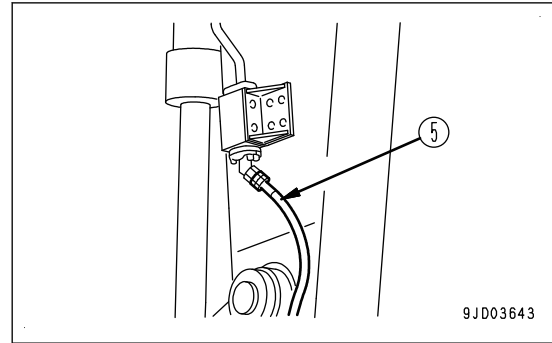
- When setting the FREE or LOCK position of the stop valve, remove bolt (1) and washer (2) fit lever (3) and refit bolt (1) and washer (2) rotate valve to furthest position clockwise or anti-clockwise. After setting remove lever (3) and refit bolt (1) and washer (2).
2. Remove plate (4) at the tip of the stop valve piping. (Right and left, 2 places).  
Be careful not to lose or damage the removed parts.



3. After removing plug, connect the attachment piping (5) which is provided by the attachment manufacturer.

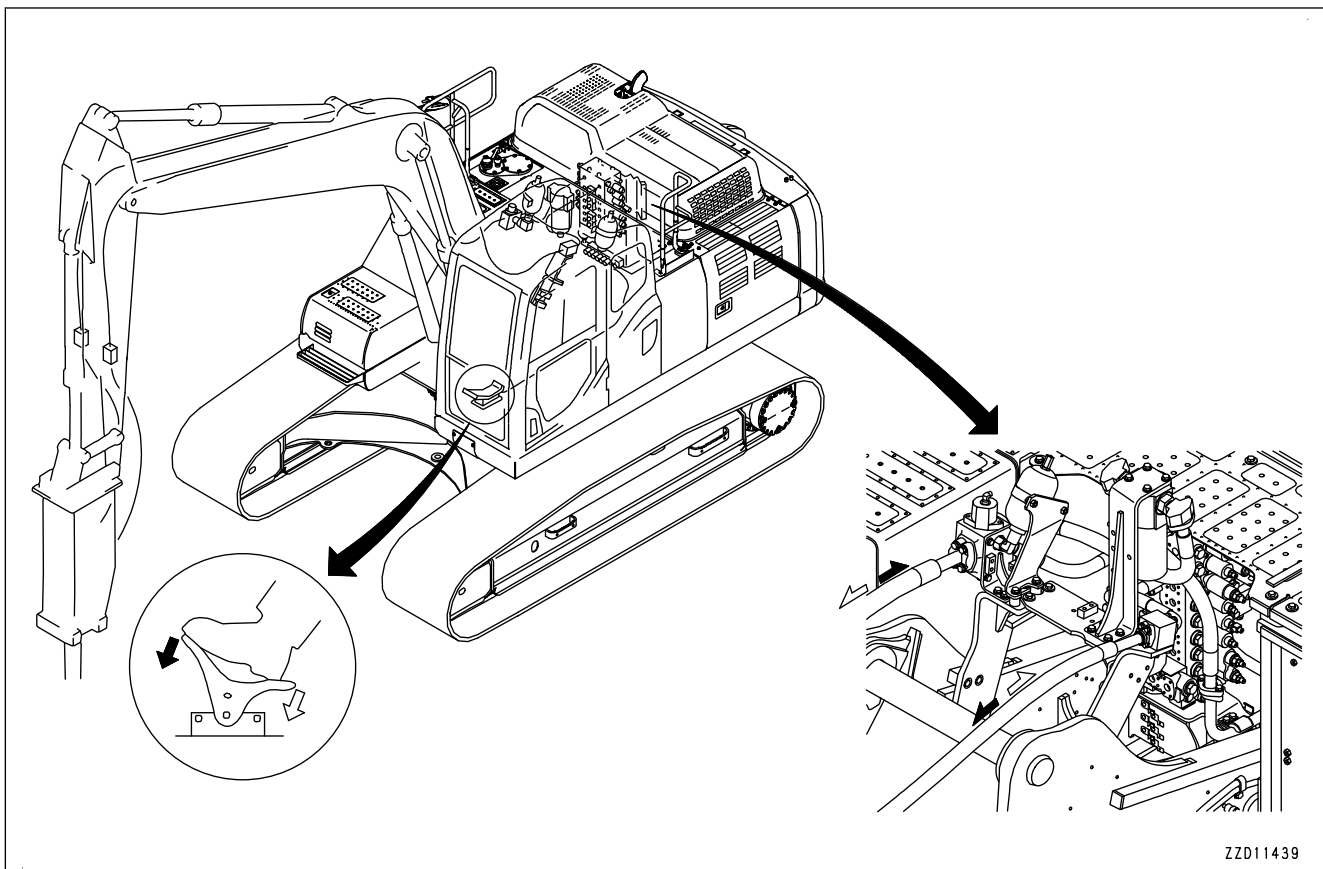
**REMARK**

For the fitting size and accumulator add-on, the action to take differs according to the attachment manufacturer, so consult your Komatsu distributor.



## PEDAL OPERATION AND OIL FLOW OF MACHINE EQUIPPED WITH ATTACHMENT

The direction of operation of the pedal and the path of the oil flow is as shown in the figure.



- Depress the front side of pedal.  
The oil flows into piping of the left side of the work equipment.
- Depress the rear side of pedal.  
The oil flows into piping of the right side of the work equipment.

**REMARK**

When a breaker is installed, depress only the front side of pedal.

## METHOD FOR SWITCHING HYDRAULIC CIRCUIT

Depending on the type of attachment, set the working mode on the monitor as follows.

The hydraulic circuit and the set pressure of the safety valve in the service valve switch according to the working mode selected.

Depending on the attachment, it is necessary to change the oil flow in the service circuit.

For setting of the flow, see "MACHINE SETTINGS (3-68)".

## Switching method of breaker and general attachment

Install an optional attachment and set the working mode to B mode.

Breaker circuit (one-way circuit) is formed.

Hydraulic oil flowing through breaker circuit passes through additional filter for breaker. Relief valve is set to low pressure. Maximum oil flow can be adjusted in user mode.

Set pressure of safety valve of service valve (when shipped from plant):20.6 MPa{210 kg/cm<sup>2</sup>}

## Crusher or other attachment with 2-way circuit

Install an optional attachment and set the working mode to ATT/P or ATT/E mode.

Crusher circuit (2-way circuit) is formed.

Hydraulic oil flowing through crusher circuit does not pass through additional filter for breaker. Relief valve is set to high pressure. Maximum oil flow can be adjusted in user mode.

Set pressure of safety valve of service valve (when shipped from plant):27.4 MPa{280 kg/cm<sup>2</sup>}

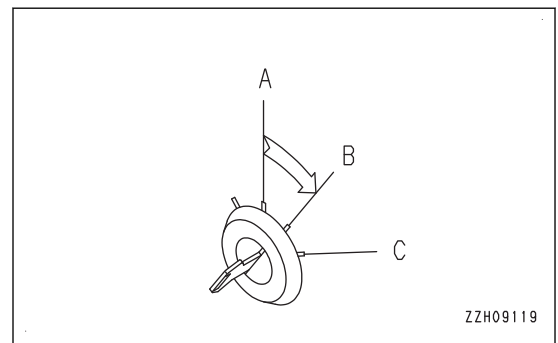
## METHOD FOR REMOVING AND INSTALLING ATTACHMENT

### WARNING

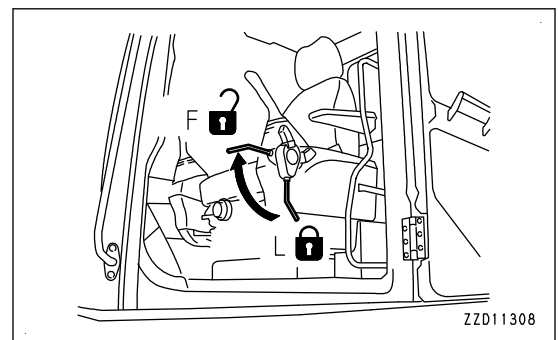
Lower the attachment to the ground and stop the engine.

## METHOD FOR REMOVING ATTACHMENT

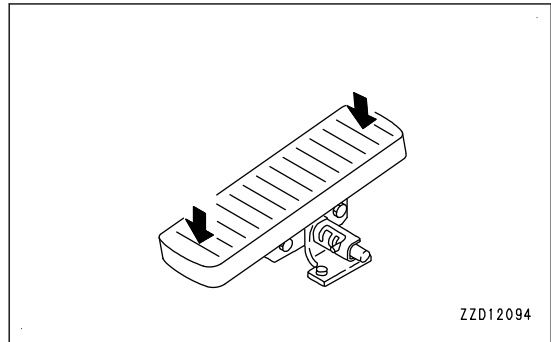
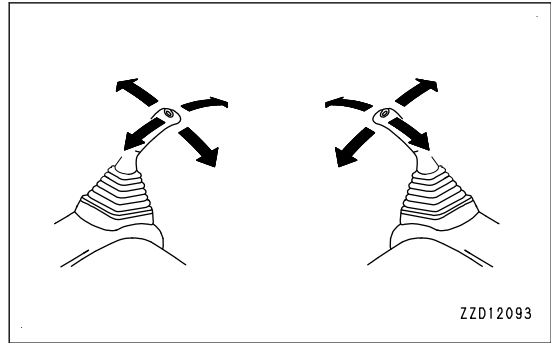
1. Turn the starting switch to ON (B) position.



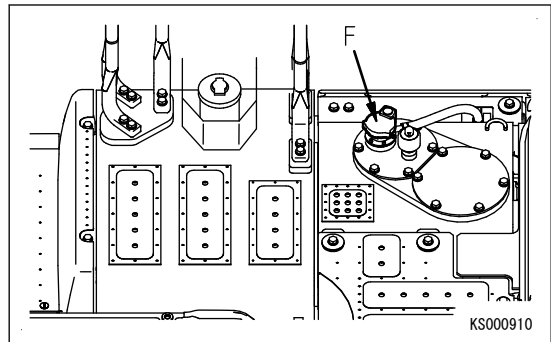
2. Set the lock lever to FREE position (F).



3. Operate each work equipment control lever and attachment control pedal fully to the front, rear, right, and left a few times within 15 seconds to release the internal pressure in the hydraulic circuit.



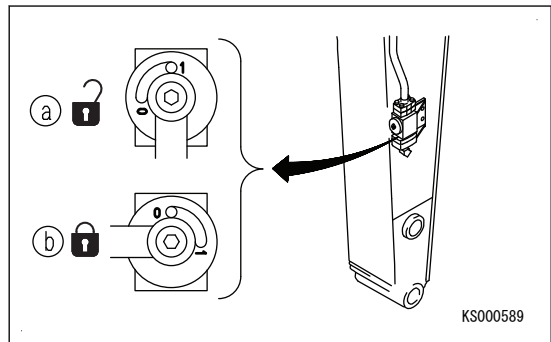
4. Loosen oil filler cap (F) slowly on the top of the hydraulic tank to release the internal pressure in the hydraulic tank.  
 5. Check that the hydraulic oil temperature is low.



6. After checking that the oil temperature is low, set the rotor of the stop valve installed to the inlet port on the side face of the arm and the outlet port piping to LOCK position (b).

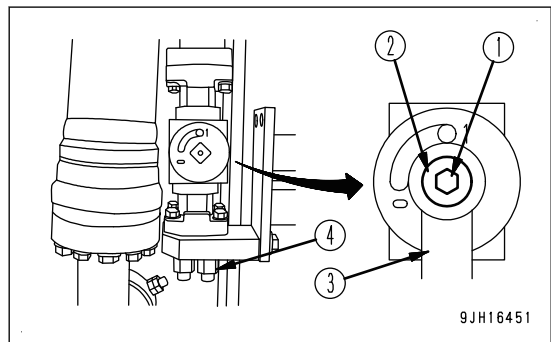
- (a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)
- (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)

- When setting FREE or LOCK position of the stop valve, remove bolt (1), and washer (2) fit lever (3) and refit bolt (1) and washer (2) rotate valve to furthest position clockwise or anti-clockwise. After setting, remove lever (3) and refit bolt (1) and washer (2).



7. Remove the hoses on the attachment side. Install the plate (4) to the two outlets.

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.

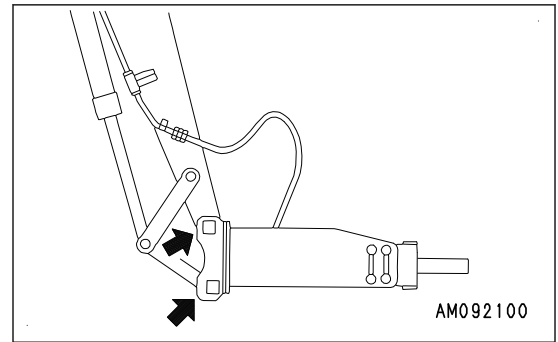


8. Pull out the mounting pins (2 places), remove the attachment, then install the bucket.

For the installation procedure of the bucket, see "METHOD FOR INVERTING BUCKET (3-203)".

9. Check the oil level in the hydraulic tank.

For detail, see "METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (3-144)".

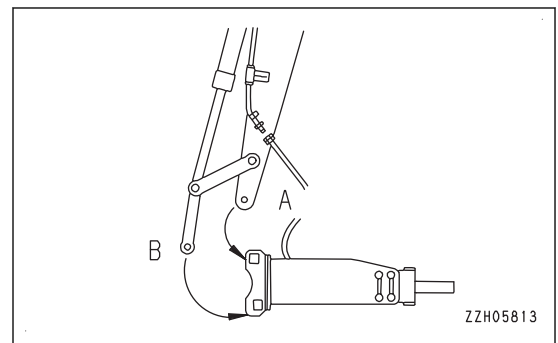


## METHOD FOR INSTALLING ATTACHMENT

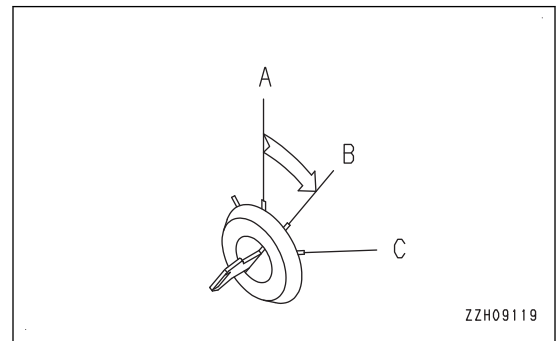
1. Remove the bucket.

For the removal procedure of the bucket, see "METHOD FOR INVERTING BUCKET (3-203)".

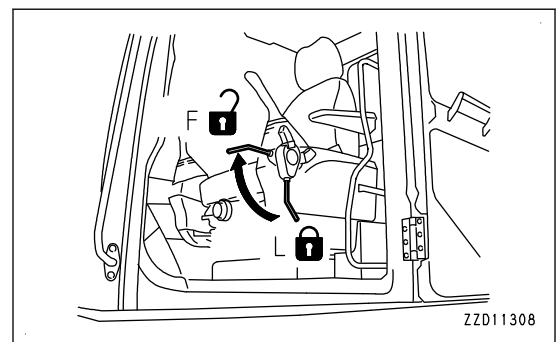
2. Place the attachment on a horizontal place, install pin (A) and then pin (B) in this order to the arm.
3. Lower the attachment to the ground and stop the engine.



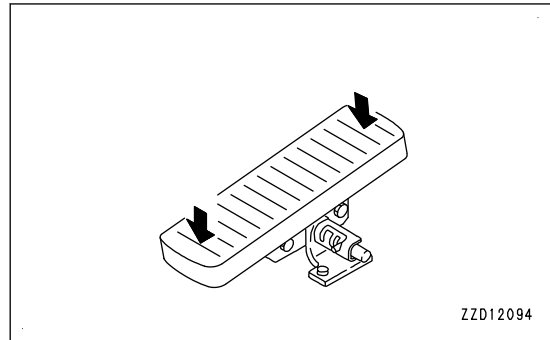
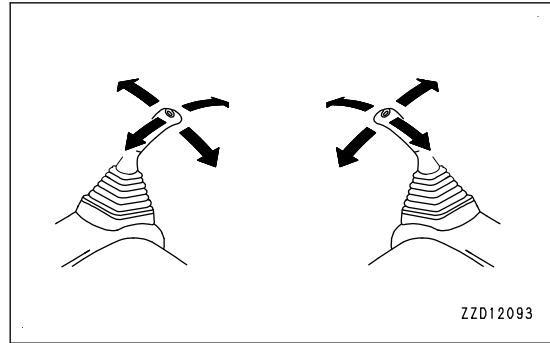
4. Turn the starting switch to ON (B) position.



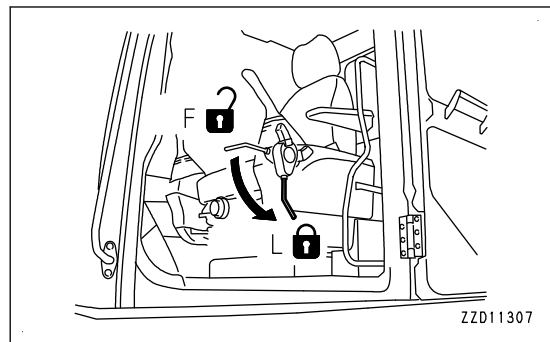
5. Set the lock lever to FREE position (F).



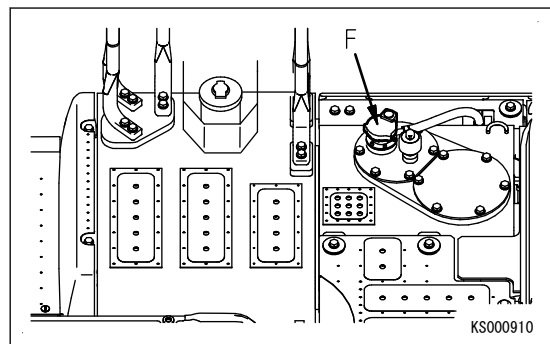
6. Operate each work equipment control lever and attachment control pedal fully to the front, rear, right, and left a few times within 15 seconds to release the internal pressure in the hydraulic circuit.



7. Set the lock lever to LOCK position (L).



8. Loosen oil filler cap (F) slowly on the top of the hydraulic tank to release the internal pressure in the hydraulic tank.
9. Check that the hydraulic oil temperature is low.
10. Remove the plugs (2 places) at the outlet and inlet.  
Be careful not to get any dirt or mud on the hose fitting.  
If an O-ring is damaged, replace it with a new one.
11. Connect the hose on the attachment side.  
Check the direction of flow of the oil and be careful not to make any mistake.



12. Set the rotor of the stop valve installed to the inlet port on the side face of the arm and the outlet piping to FREE position (a).

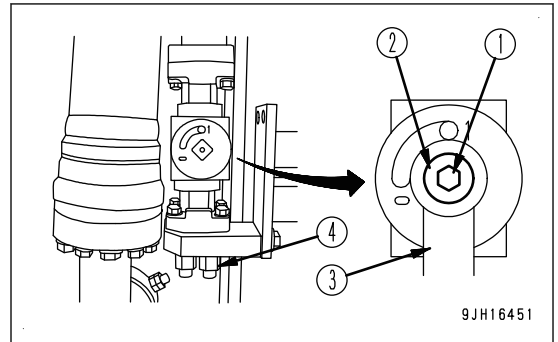
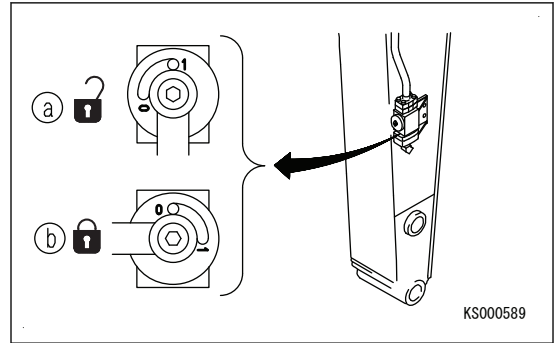
(a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)

(b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)

When setting FREE or LOCK position of the stop valve, remove bolt (1), and washer (2), fit lever (3) and refit bolt (1) and washer (2), rotate valve to furthest position clockwise or anti-clockwise. After setting, remove lever (3) and refit bolt (1) and washer (2).

13. After installing the attachment, check the oil level in the hydraulic tank.

For detail, see "METHOD FOR CHECKING OIL LEVEL IN HYDRAULIC TANK, ADDING OIL (3-144)".



## 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.

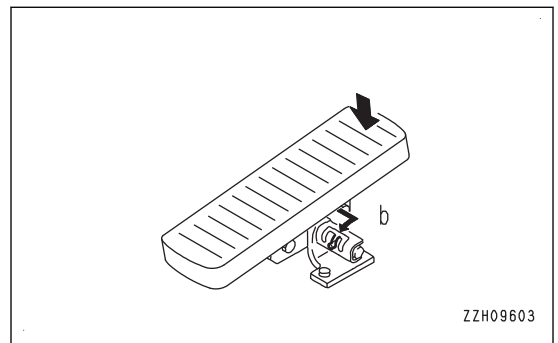
For the change of the flow setting for the breaker mode and attachment mode for the crusher, etc., see "MACHINE SETTINGS (3-68)".

## METHOD FOR OPERATING BREAKER

### NOTICE

When performing breaker operations, use the breaker mode. If the breaker mode is not used, the breaker may be damaged.

1. Set the working mode to B mode
2. Set only the front portion of the lock pin to FREE position (b).
3. Depress the front portion of the pedal.

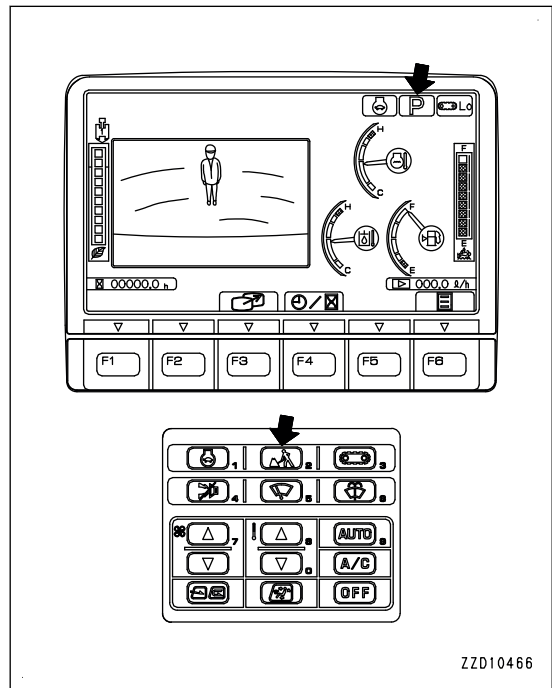


The breaker operates.

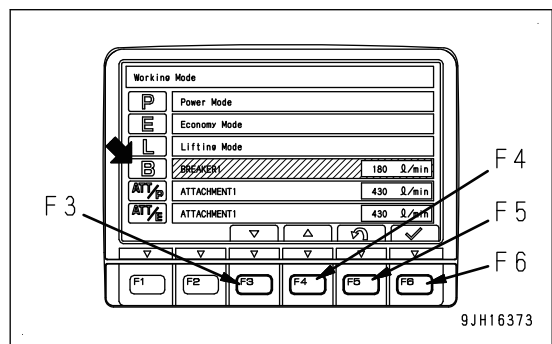
### METHOD FOR OPERATING MACHINE WHEN WORKING MODE IS NOT IN BREAKER MODE

Change the working mode and enter the Breaker Mode.

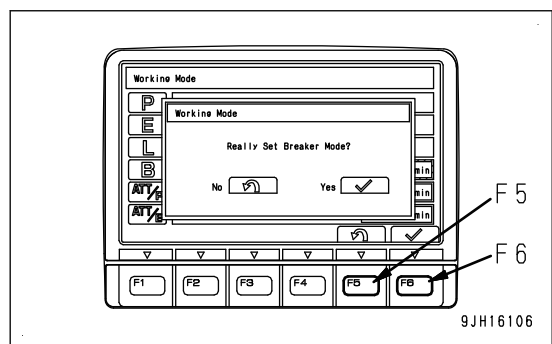
1. Press working mode selector switch (1).  
The screen changes to the working mode selection screen.



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 followings to enter the selection.
  - 1) To keep working mode selector switch (1) pressed.
  - 2) To press switch F6.
  - 3) To leave as it is for 5 seconds.



If you enter the selection of the Breaker Mode, the confirmation message is displayed.



## ⚠ 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.

4. Press switch F6 to enter the Breaker Mode.

### CHECK POINTS WHEN USING BREAKER

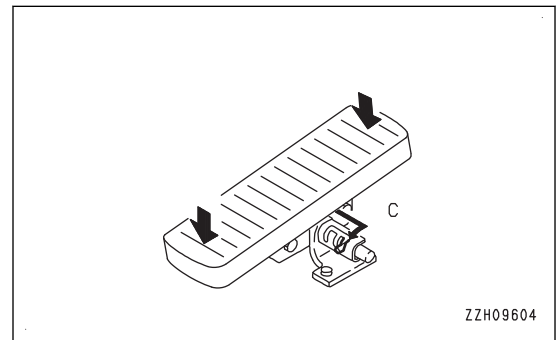
- Is the stop valve in FREE position?



- Is the working mode set to B mode?  
For the oil passage route, see “METHOD FOR CHANGE-OVER AND CONNECT HYDRAULIC CIRCUIT FOR MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-18)”.
- 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 (4-13)”.  
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.

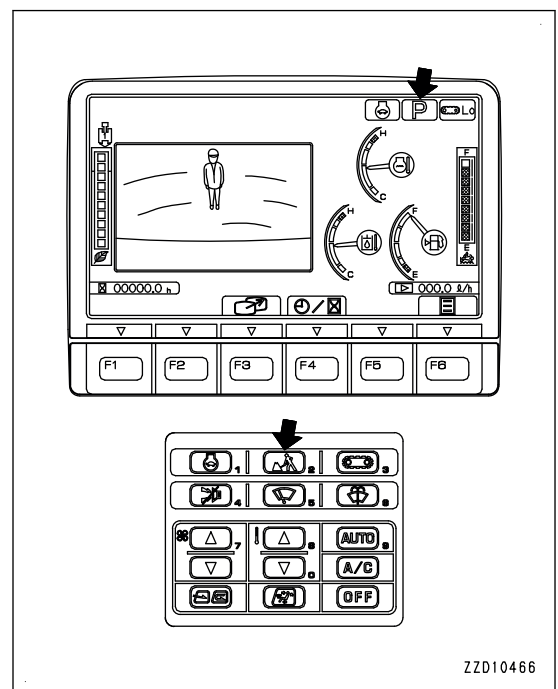


The attachment operates.

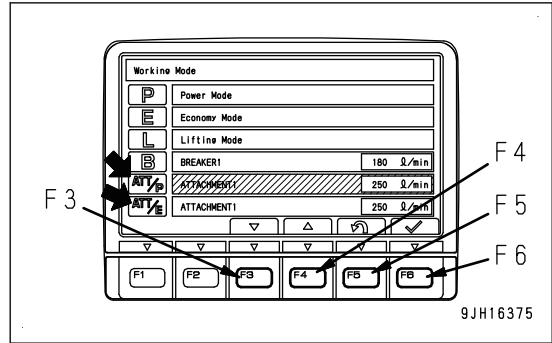
## METHOD FOR OPERATING WHEN WORK MODE PILOT DISPLAY DOES NOT SHOW EITHER ATT/P OR ATT/E OF ATTACHMENT MODE

Change the working mode and enter the Attachment Mode.

1. Press working mode selector switch (1).  
The screen changes to the working mode selection 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 the 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?  
 For the oil passage route, see “METHOD FOR CHANGE-OVER AND CONNECT HYDRAULIC CIRCUIT FOR MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-18)”.
- When handling the attachment, follow the instruction manual from the manufacturer and use the attachment correctly.

**METHOD FOR OPERATION WHEN USING GENERAL ATTACHMENT 1 (E.G. CRUSHER)**

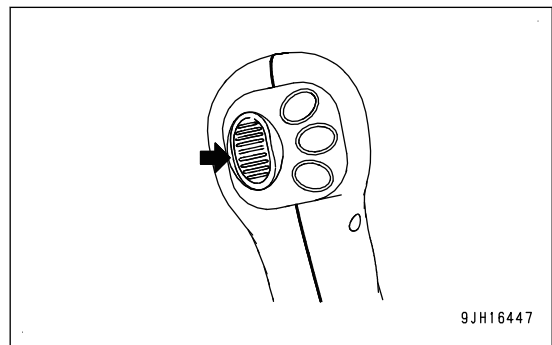
**⚠ WARNING**

**When operating the attachment using rolling switch, lock the pedal with the lock pin to avoid accidental operation.**

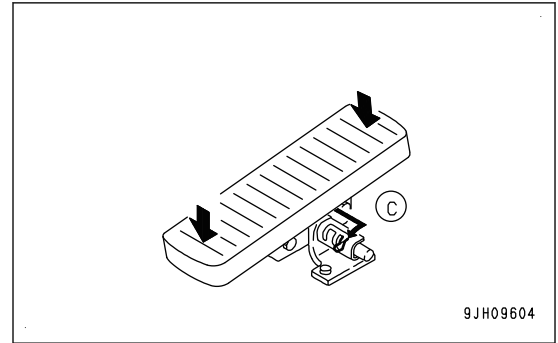
**1. Proportional Control Rolling Switch**

With the working mode set to ATT/P or ATT/E mode, rolling the switch up produces movement of the attachment, rolling down produces opposite movement of the attachment. Slight movement of the roller will give slight movement of the attachment; full movement of the roller will give faster movement of the attachment.

**2. Attachment Control Pedal**



With the working mode set at ATT mode, insert the lock pin in FREE position (c) for both front and rear. Depress the front or rear of the pedal to operate the attachment.



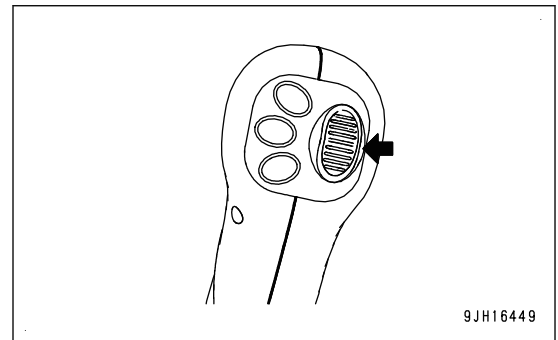
## METHOD FOR OPERATION WHEN USING GENERAL ATTACHMENT 2 (E.G. CLAMSHELL ROTATION, CRUSHER ROTATION)

### REMARK

If installing 2nd attachment line as a field kit, ask distributor to change monitor setting to allow 2 attachments.

The switch on left lever 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 attachment; full movement of the roller will give faster movement of the attachment.

If the working mode pilot monitor does not display ATT/P or ATT/E for the attachment mode, follow the instructions, see “WHEN USING GENERAL ATTACHMENTS SUCH AS CRUSHER”



## 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 lock pin in LOCK position.

## MAINTENANCE OF ADDITIONAL FILTER FOR BREAKER

### **⚠ 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.**
- **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.**

### NOTICE

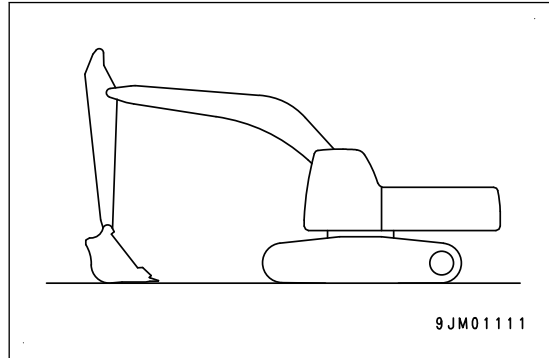
For the element replacement interval, see “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-13)”.

Items to be prepared

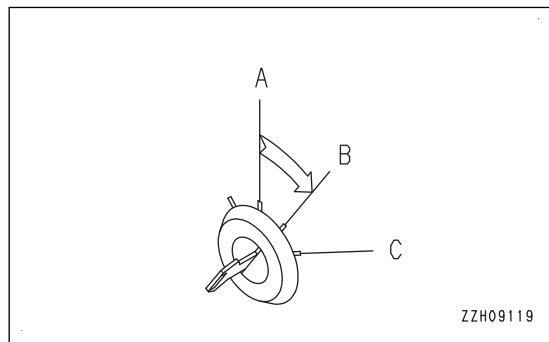
Container to receive drained oil

Prepare for the maintenance so that it can be performed as follows.

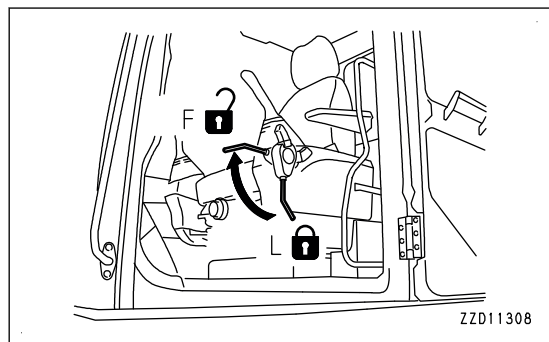
1. Lower the work equipment to the ground and stop the engine.



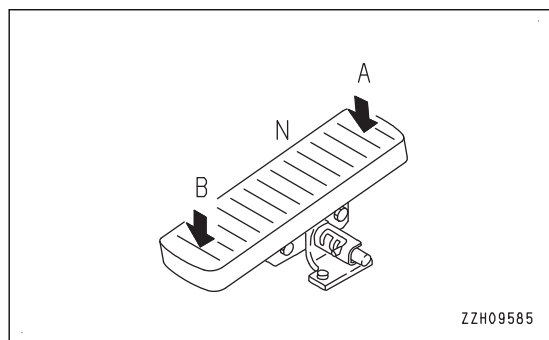
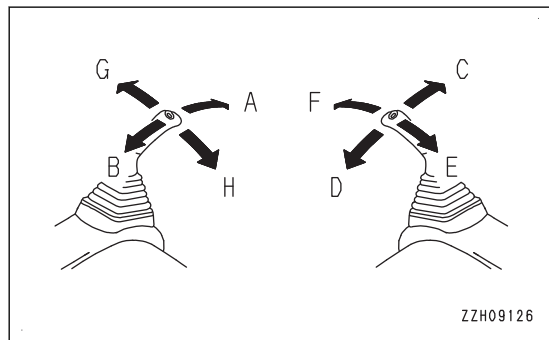
2. Turn the starting switch to ON (B) position.



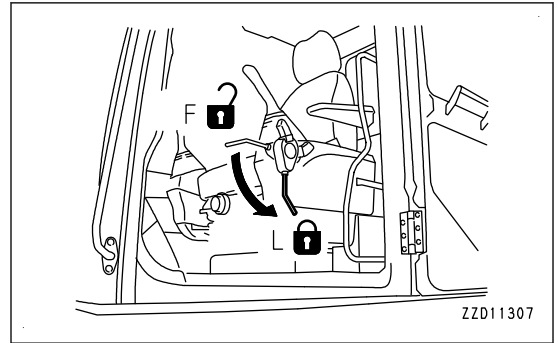
3. Set the lock lever to FREE position (F).



4. Operate each work equipment control lever and attachment control pedal fully to the front, rear, right, and left a few times within 15 seconds to release the internal pressure in the hydraulic circuit.



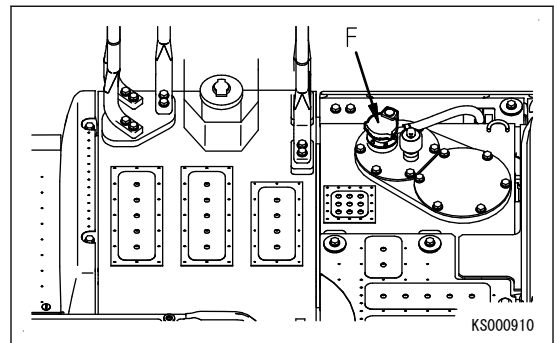
- Set the lock lever to LOCK position (L).



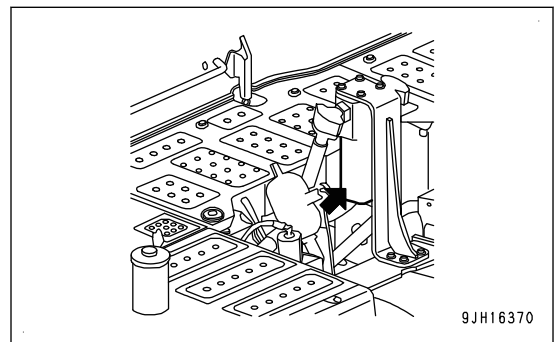
After preparation is completed, replace the additional filter for breaker according to the following procedure.

### METHOD FOR REPLACING ADDITIONAL FILTER ELEMENT FOR BREAKER

- Loosen oil filler cap (F) slowly on the top of the hydraulic tank to release the internal pressure in the hydraulic tank.



- Set a container to receive the oil under the additional filter at the position pointed with the arrow.



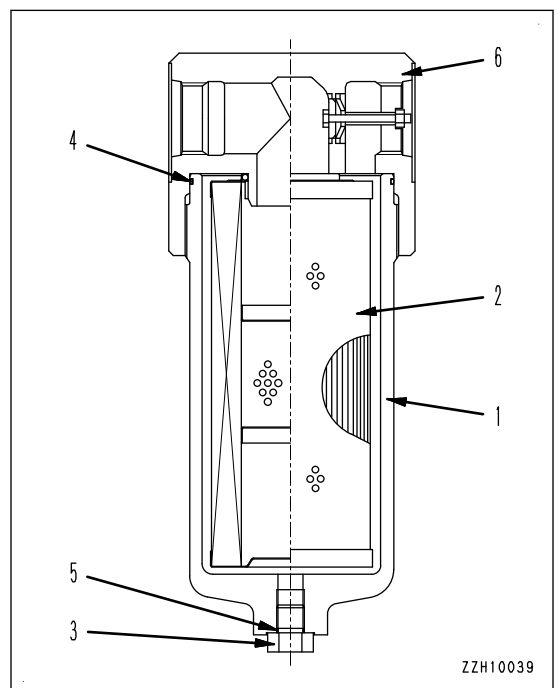
- Remove plug (1) and drain the hydraulic oil accumulated in filter case (2) into the prepared oil container.
- After checking that the hydraulic oil temperature has dropped, turn filter case (2) counterclockwise, remove it, then remove element (3).
- Clean the removed parts, then install new element (3).

#### REMARK

Element (3) must be installed facing in the correct direction. Set direction (Y) with the holes in it up, and fit the hole in element (3) on the protruding part inside filter head (4).

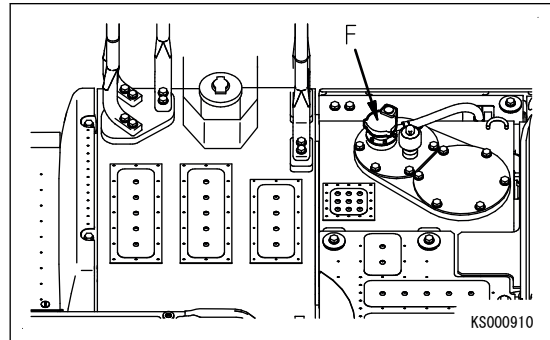
- Fit new O-ring (5) to filter case (2) and screw filter case (2) into filter head (4).
- After the top of filter case (2) touches the filter head, tighten it further at least 1/2 turn.
- Clean removed plug (1) and fit brand new O-ring (6) to plug (1).
- Install plug (1) to filter case (2).

Tightening torque: 27.4 to 58.8 Nm {2.8 to 6.0 kgm}

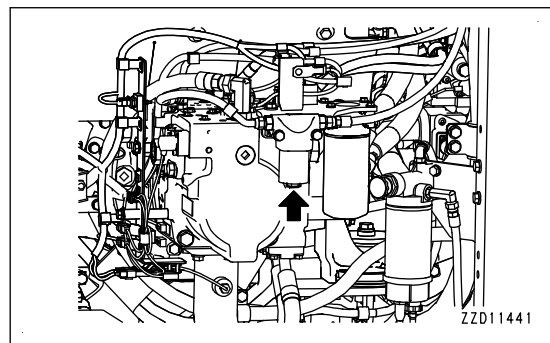


## METHOD FOR REPLACING ADDITIONAL PILOT FILTER ELEMENT FOR BREAKER

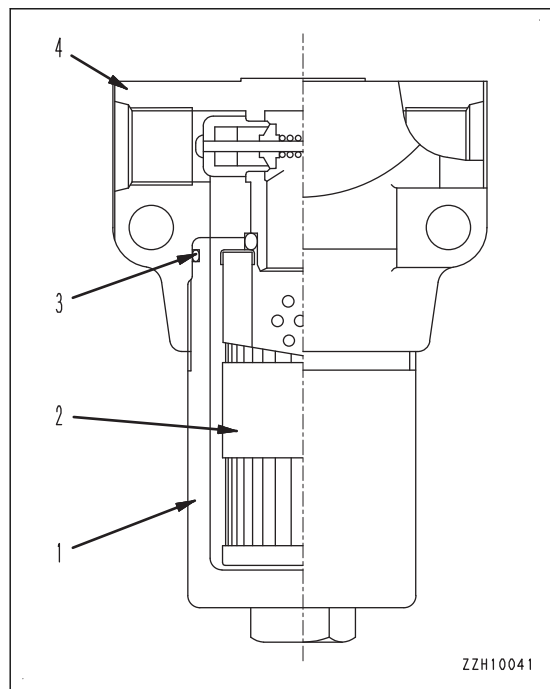
1. Loosen oil filler cap (F) slowly on the top of the hydraulic tank to release the internal pressure in the hydraulic tank.



2. Set a container to receive the oil under the additional pilot filter at the position pointed with the arrow.



3. After checking that the hydraulic oil temperature has dropped, turn filter case (1) counterclockwise, remove it, then remove element (2).



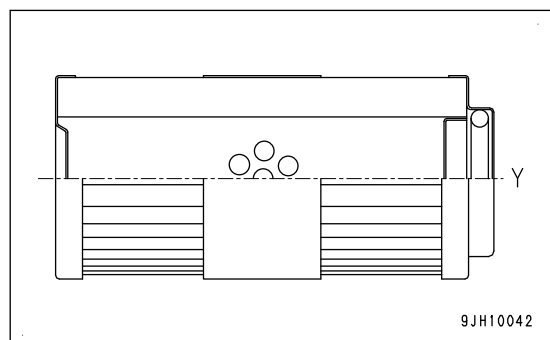
4. Clean the removed parts, then install new element (2).

### REMARK

Element (2) must be installed facing in the correct direction. Set direction (Y) with the holes in it up, and fit the hole in element (2) on the protruding part inside filter head (4).

5. Install a new O-ring (3) to filter case (1), then tighten filter case (1).

Tightening torque: 25 to 35 Nm {2.6 to 3.6 kgm}



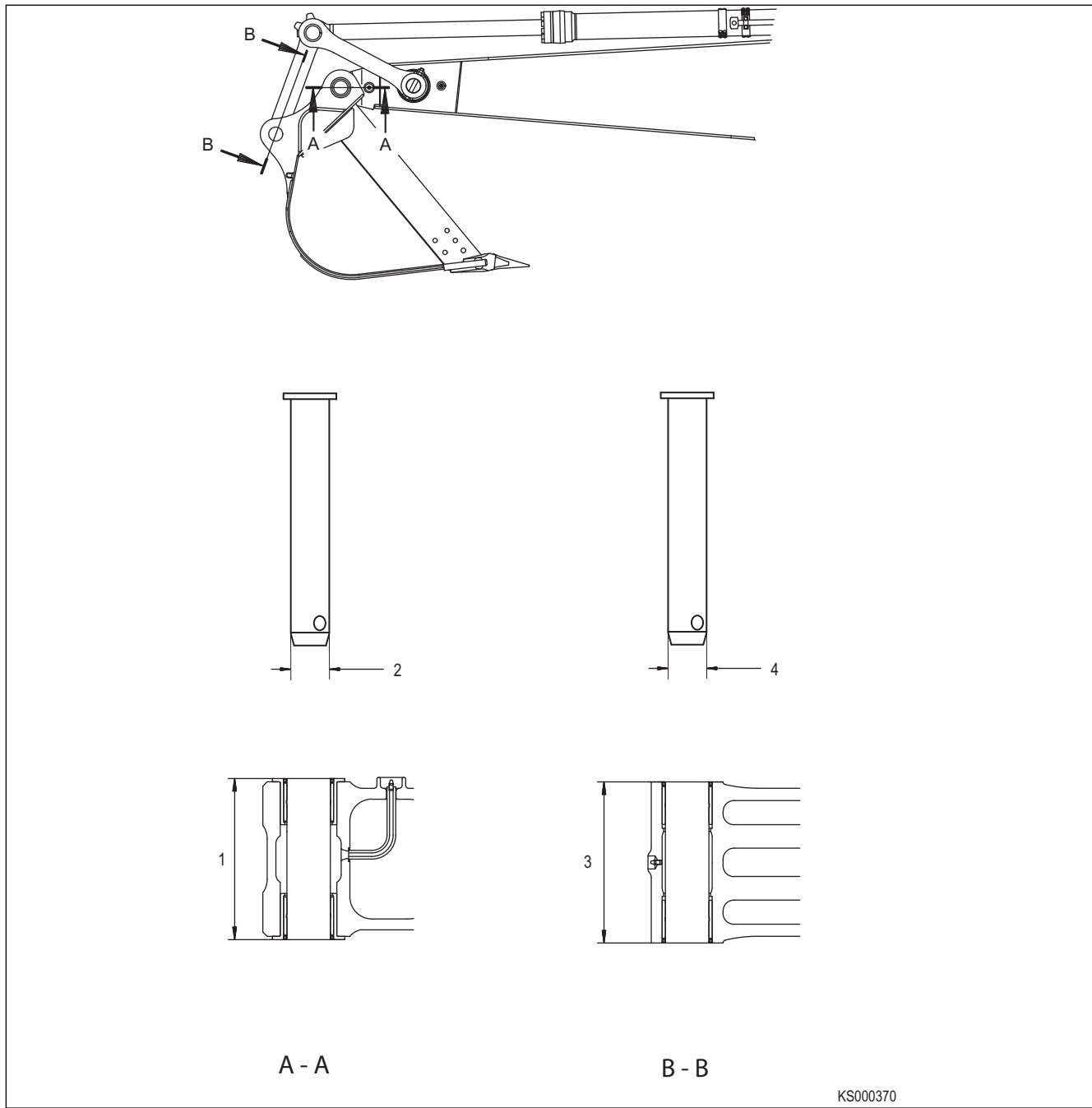
## SPECIFICATIONS

### Hydraulic specifications

- Max. flow at merge: 214×2 l/min
- Safety valve relief set pressure of service valve: 29.9 MPa{305 kg/cm<sup>2</sup>} (other than B mode)
- Cracking pressure of safety valve of service valve: 24.5 MPa{250 kg/cm<sup>2</sup>} (Other than B mode)
- Safety valve relief set pressure of service valve: 24.5 MPa{250 kg/cm<sup>2</sup>} (B mode)
- Cracking pressure of safety valve of service valve: 20.1 MPa{205 kg/cm<sup>2</sup>} (B mode)

In addition, safety valve relief set pressure: 20.6 MPa{210 kg/cm<sup>2</sup>} and cracking pressure of safety valve: 15.2 MPa{155 kg/cm<sup>2</sup>} are available. In such cases, consult your Komatsu distributor.

# ARM/PIN INFORMATION



KS000370

PC290LC/ NLC-11	1	325 mm	+0 -0.5	3	325 mm	+0.5 -0.5
	2	80 mm	-0.030 -0.075	4	80 mm	-0.030 -0.075



# 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.

When the boom is fully lowered during the oblique digging, the boom interferes with the undercarriage. Operate the boom carefully.

### Categories of use

Select a proper attachment for each use.

#### General digging

Digging or loading sand, gravel, clay etc.

#### Light duty digging

Digging and loading dry and loose sandy soil, or muddy soil.

#### Loading

Loading of dry and loose earth.

#### REMARK

For digging or loading hard soil or soft rock, it is recommended that the strengthened bucket with high durability and high wear resistance be employed.

### Combination of attachments

#### NOTICE

1. Bucket size based on ISO 7451, heaped material with a 1:1 angle of repose.
2. Max Bucket Volume/Weight are for reference only and are not necessarily available from the factory.
3. Table is based on General Purpose buckets and both conditions of Volume (m<sup>3</sup>) and Weight (kg) must not be exceeded.
4. Please consult with your distributor for the correct selection of buckets and attachments to suit the application. The recommendations are given as a guide only, based on typical conditions.

		PC290LC-11			
		1-Piece Boom			
Max Bucket Volume/ Weight ISO		2.0 m	2.65 m	3.2 m	3.5 m

Bucket 1.2 t/m <sup>3</sup>	m <sup>3</sup> / kg	2.02 / 1400	2.02 / 1400	2.02 / 1400	2.02 / 1400
Bucket 1.5 t/m <sup>3</sup>	m <sup>3</sup> / kg	2.02 / 1400	1.98 / 1375	1.78 / 1300	1.72 / 1275
Bucket 1.8 t/m <sup>3</sup>	m <sup>3</sup> / kg	1.93 / 1350	1.71 / 1275	1.50 / 1200	1.49 / 1175

		PC290NLC-11			
		1-Piece Boom			
Max Bucket Volume/ Weight ISO		2.0 m	2.65 m	3.2 m	3.5 m
Bucket 1.2 t/m <sup>3</sup>	m <sup>3</sup> / kg	2.02 / 1400	2.02 / 1400	1.88 / 1350	1.82 / 1300
Bucket 1.5 t/m <sup>3</sup>	m <sup>3</sup> / kg	2.00 / 1400	1.77 / 1300	1.59 / 1200	1.54 / 1200
Bucket 1.8 t/m <sup>3</sup>	m <sup>3</sup> / kg	1.73 / 1275	1.53 / 1175	1.30 / 1125	1.33 / 1100

Values shown are in accordance with EN474-5:2006+A1:2009 (E)

## TOOL CONTROL SYSTEM

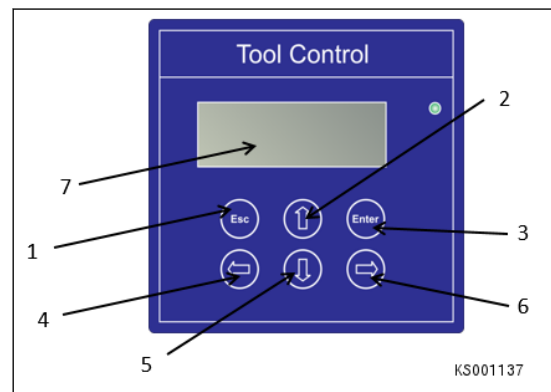
### SYSTEM OVERVIEW

The machine may be equipped with a tool control system, the system limits 1st attachment line flow and pressure and 2nd attachment line flow.

The system can store settings for up to 16 different attachments, to adjust attachment settings please contact your Komatsu distributor.

The tool control system monitor is located in the operator cab on the door pillar.

- (1) Esc button (return/cancel)
- (2) Navigation button up
- (3) Enter button
- (4) Navigation button left
- (5) Navigation button down
- (6) Navigation button right
- (7) Monitor display screen

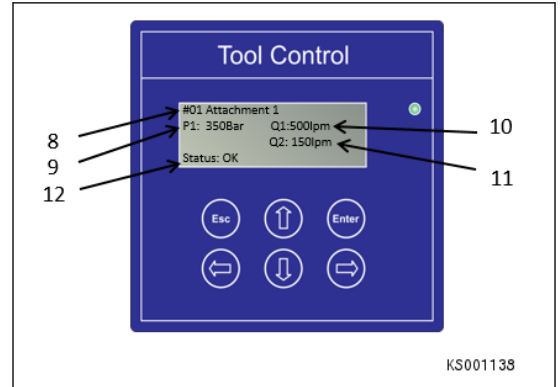


### SYSTEM OPERATION

The system is automatically activated when the ignition key is turned to ON position. On startup the tool control system monitor screen displays the following information:

- (8) Current selected tool (at last key off)
- (9) Pre-set 1st Attachment line pressure limit (Bar)
- (10) Pre-set 1st Attachment line flow rate (l/min)
- (11) Pre-set 2nd Attachment line flow rate (l/min)

(12) Monitor status

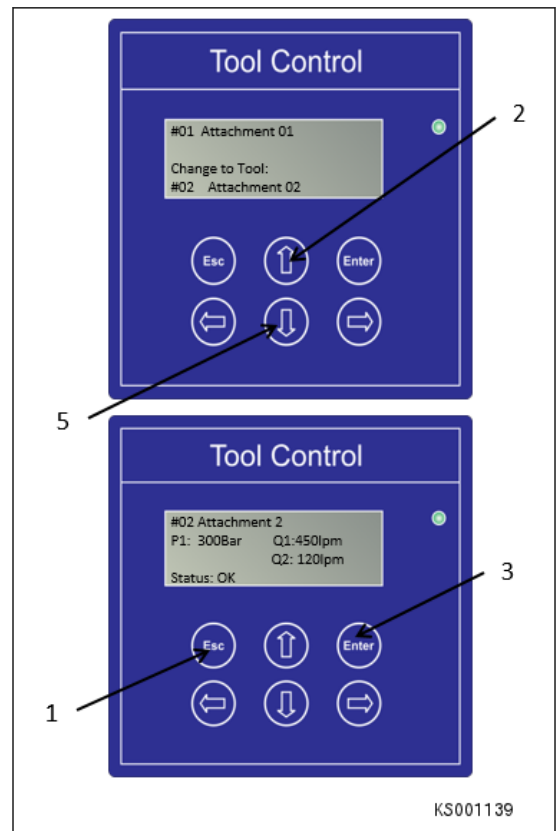


**CHANGING ATTACHMENT PRE-SET**

- Using buttons (2) and (5) scroll to the required attachment pre-set.  
Note: 1 button = 1 menu movement
- Once the required attachment pre-set is selected press button (3) Enter to confirm selection or press button (1) Esc to return to the current pre-set attachment.

**CAUTION**

If the breaker operations are performed in a mode other than the breaker mode, there is a danger of breakage of the hydraulic equipment. Do not perform operations in any mode except the breaker mode see METHOD FOR SELECTING WORKING MODE (3-190)

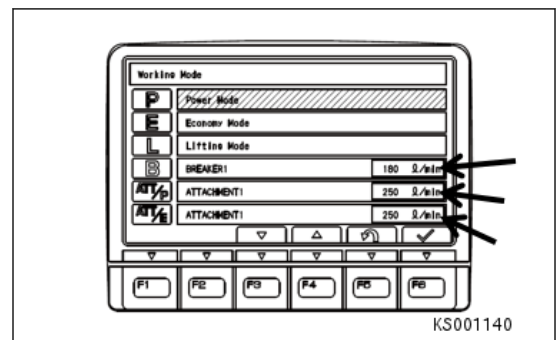


**NOTICE**

When this tool control system is fitted the factory flow setting on the machine will be set to minimum, do not adjust this value as doing so will have no effect on the attachment performance.

**NOTICE**

When operating in P, E or L mode select ATTACHMENT 16 OFF as the attachment pre-set, this will deactivate the attachment controls for standard digging or lifting operations.



**SYSTEM ERRORS**

The system automatically monitors for system abnormalities, in the event of an error the monitor display screen (7) will display ERR and an audible intermittent buzzer will sound. In the event of a system error, stop work immediately, move the machine to a safe place and contact your Komatsu distributor for support.

## 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	<ul style="list-style-type: none"> <li>• On rough ground with large obstacles such as boulders or fallen trees, travel at Lo speed.</li> </ul>
B	Normal soil Soft ground	<ul style="list-style-type: none"> <li>• These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees.</li> <li>• Travel at Hi or Mi speed only on flat ground, and if it is impossible to avoid traveling over obstacles, shift down and travel at half speed in Lo.</li> </ul>
C	Extremely soft ground (swampy ground)	<ul style="list-style-type: none"> <li>• Use the shoes only in places where the machine sinks and it is impossible to use A or B shoes.</li> <li>• These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees.</li> <li>• Travel at Hi or Mi speed only on flat ground, and if it is impossible to avoid traveling over obstacles, shift down and travel at half speed in Lo.</li> </ul>

2. Check Classification column in List of shoe specifications and select a suitable shoe for the use.

	PC290LC-11			PC290NLC-11	
	Specifications	Category		Specifications	Category
Option	600 mm Triple grousers	A	Standard	600 mm Triple grousers	A
Standard	700 mm Triple grousers	B	Option	700 mm Triple grousers	B
Option	800 mm Triple grousers	C	Option	800 mm Triple grousers	C
Option	850 mm Triple grousers	C	Option	850 mm Triple grousers	C

### 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.

## BUCKET TEETH SELECTION

Depending on the working conditions, there is a danger that an adapter and tooth may be lost. Select either one from the vertical pin type of tooth or horizontal pin type of tooth that is suitable for the purpose.

While the standard teeth of both vertical and horizontal pin types may be used widely, the following kinds of teeth are recommended depending on the working conditions.

### METHOD FOR SELECTING TEETH

#### VERTICAL PIN TYPE TOOTH

General digging: Digging and loading normal soil, such as sand, gravel, clay, etc.

Light-duty digging: Digging and loading dry and loose sandy soil, or muddy soil.

Loading: Loading of dry and loose earth.

**HORIZONTAL PIN TYPE TOOTH**

Heavy-duty digging: Digging and hammering work on hard soil, soil with rocks, scraping or other heavy-duty work

- The heavy-duty bucket is of a horizontal pin type and as such, use it for heavy duty-digging.

**LONG-LIFE TOOTH**

- Jobsites where long wear life is required, such as when loading hard rocks.
- Jobsites where no penetration is needed, such as when working with crushed rocks after blasting or ripping.
- Jobsites where heavy-duty operations are performed, such as hitting or pulling up rocks with the tips of the teeth.

**SELF-SHARPENING TOOTH (HORIZONTAL PIN TYPE, VERTICAL PIN TYPE)**

- Jobsites requiring penetration such as digging and loading sandy or clayey soil.

**SELECTION GUIDE FOR VERTICAL OR HORIZONTAL PIN TYPE TOOTH**

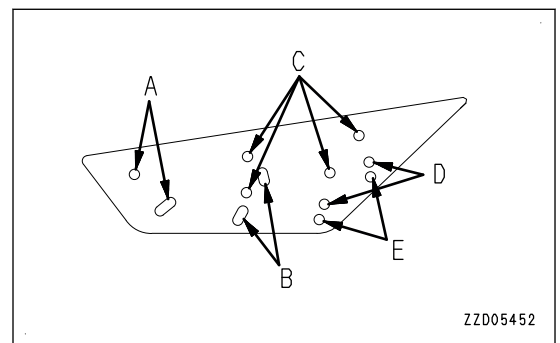
			Applicable work site			
			Rock	Crushed stone	Clayey soil, De-compressed granite soil	Sand
Type of operation	Heavy ↑	Digging with hammering work	Horizontal pin type teeth		Vertical pin type teeth	
		Scraping down	Horizontal pin type teeth		Vertical pin type teeth	
	Light ↓	General excavation	Vertical pin type teeth			
		Loading	Vertical pin type teeth			

**HANDLE TRAPEZOIDAL BUCKET**

Use the trapezoidal bucket when digging trapezoidal ditches in fields. By installing the angle plate with different angle, it is possible to excavate 3 angles of ditch slope face (45°, 40°, and 38°).

- The position of installation of the angle plate is different for each ditch slope face angle (45°, 40°, and 38°).

Ditch slope face angle	Installation hole				
	(A)	(B)	(C)	(D)	(E)
45°	○	—	○	—	—
40°	○	○	○	○	—
38°	○	○	—	○	○

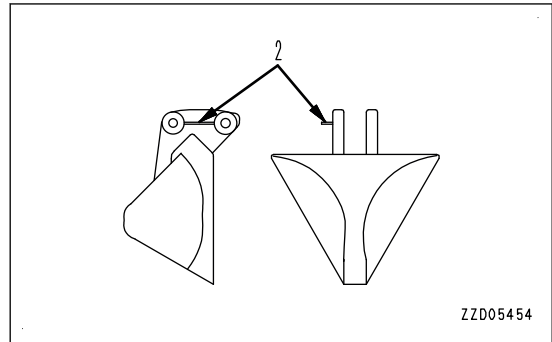
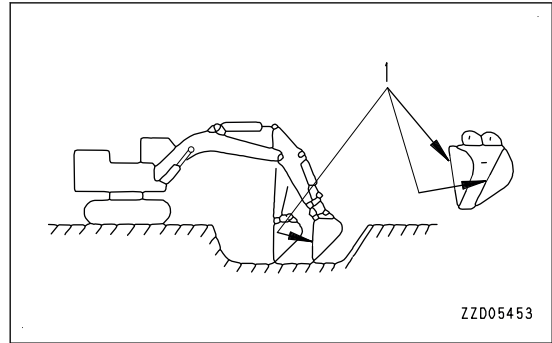


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**Digging Work**

Operate the boom, arm, and bucket so that line A of the side plate of the bucket is always perpendicular to the ground face, then perform digging.

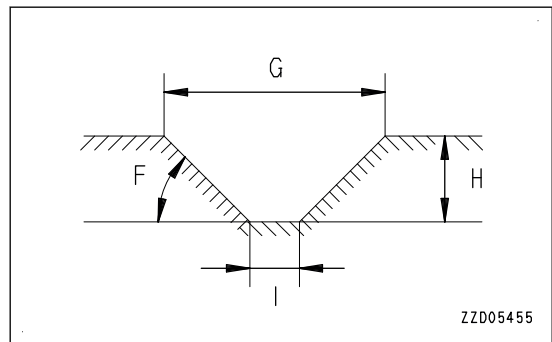
Horizontal indexing plate B is welded to the bucket pin hole portion, so when digging, operate so that the plate is horizontal during the digging operation.



**Ditch slope face angle 45 °.**

Use the bucket only or install the angle plate using the ditch slope angle holes, and use the method above for digging.

Item	Ditch slope face angle (F)	
	45 °	
Digging width (upper face) (G)	3165 mm	
Digging depth (H)	1385 mm	
Digging width (bottom face) (I)	400 mm	

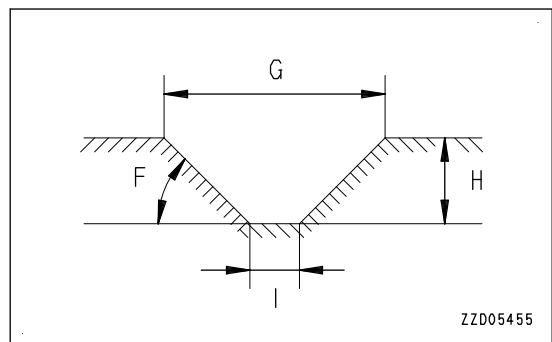


**Ditch slope face angle 40 ° and 38 °**

Install the angle plate using the respective ditch slope angle holes, and use the method above for digging.

Even when the angle plate is fitted, keep the line on the bucket side plate perpendicular to the ground face during the digging operation.

Item	Ditch slope face angle (F)	
	40 °	38 °
Digging width (upper face) (G)	3280 mm	3310 mm
Digging depth (H)	1230 mm	1165 mm
Digging width (bottom face) (I)	350 mm	330 mm

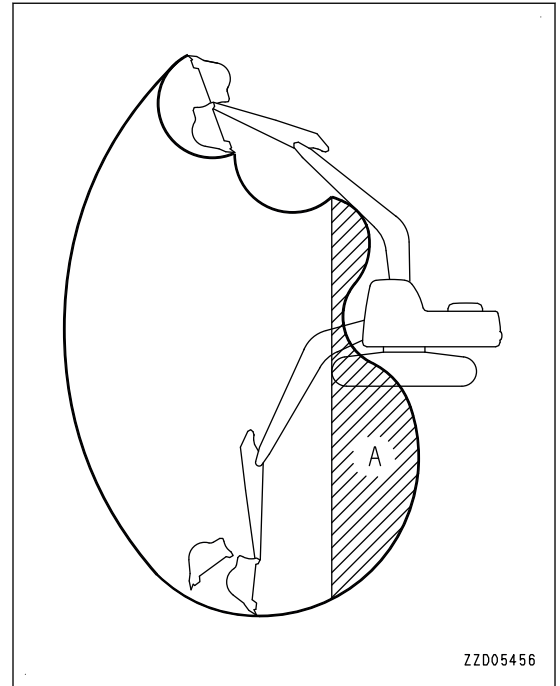


## HANDLE EXTENSION ARM

When an extension arm is installed, the bucket will hit the boom cylinder foot and revolving frame when the arm is pulled in, so be extremely careful during operations and when transporting the machine.

(A): Range of prohibited use

- When an extension arm is installed, use a narrow bucket (width: 750 mm, 560 mm without side cutters).  
If the standard bucket is used, the stability is poor, and the bucket will also hit the operator's cab when the arm is pulled in, so do not install the standard bucket.
- For operations on hard soil or rock, do not use the extension arm. The service life of the extension arm, boom, and arm will be reduced.



## 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.

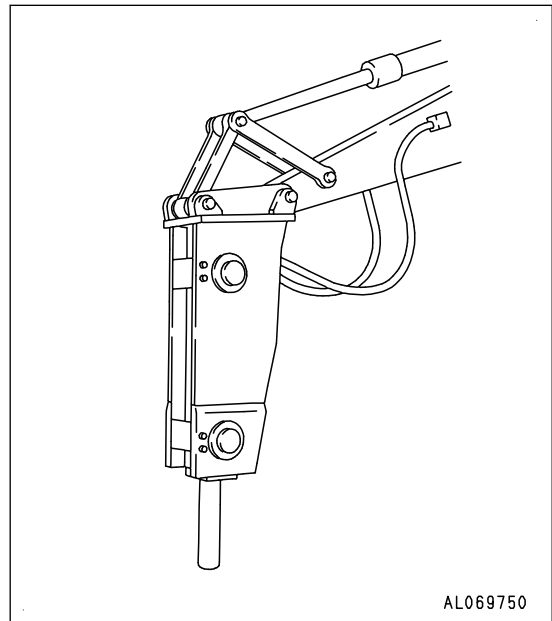
## HYDRAULIC BREAKER

### Applicable work

Major works suitable to the hydraulic breaker are as follows.

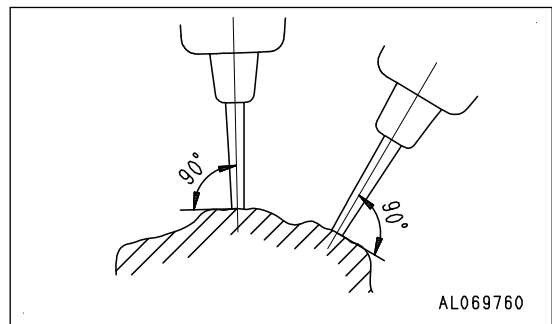
- Crushing rock
- Road construction

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.



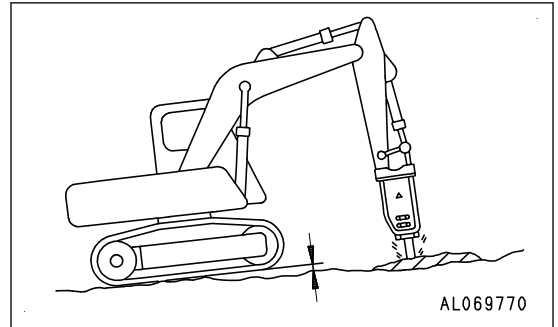
### Precautions when performing breaking operations

Keep the chisel pushed perpendicularly against the impact surface when performing breaking operations.

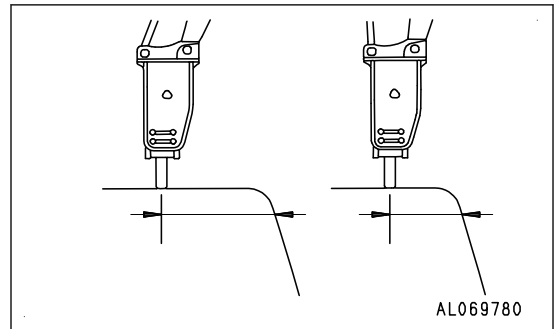




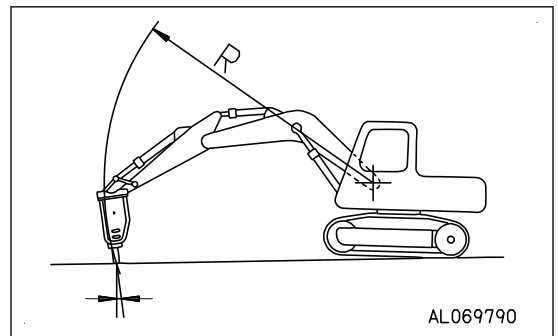
Push the chisel against the impact surface and operate so that the chassis rises approximately 5 cm off the ground. Do not raise it off the ground unnecessarily.



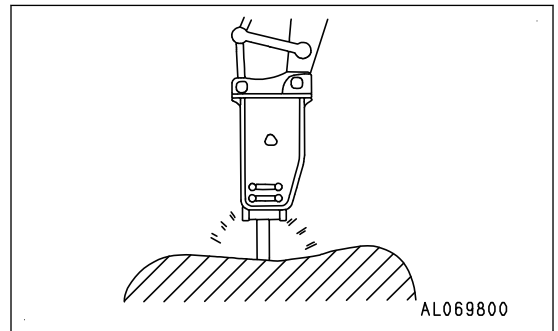
When the chisel does not penetrate or break the surface by continuous impact to the same impact surface for 1 minute, change the point of impact and perform breaking operations by scraping from the edge.



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.

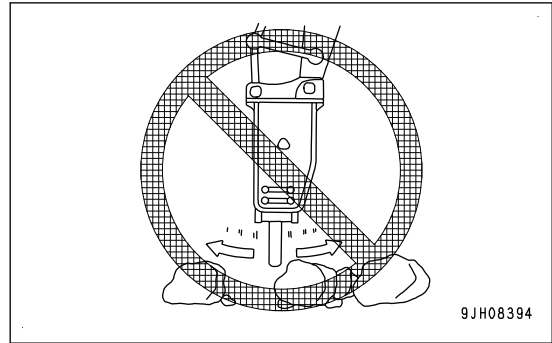


**Prohibited operations**

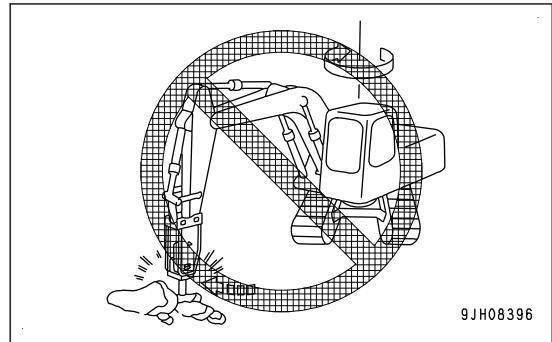
To ensure that the machine has a long life, and to ensure that operations are performed in safety, do not operate the machine in any of the following ways.

Do not operate all cylinders to the end of their strokes. Always leave approximately 5 cm to spare.

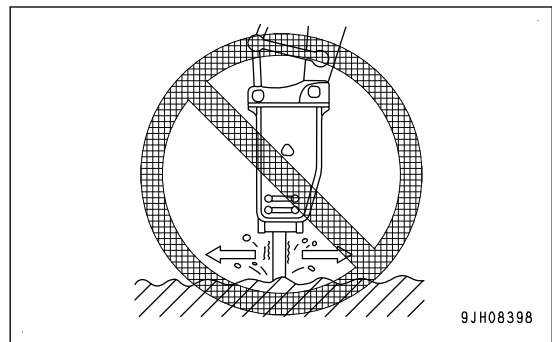
Do not use the mount to gather in pieces of rock.



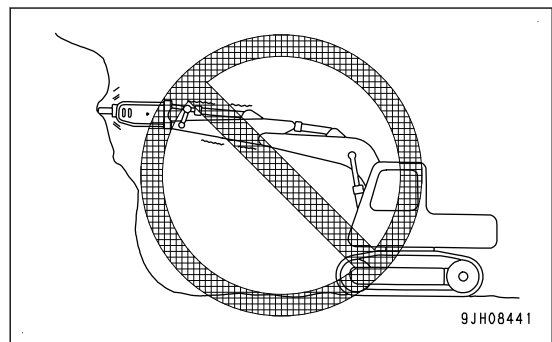
Do not work by using the swing force.



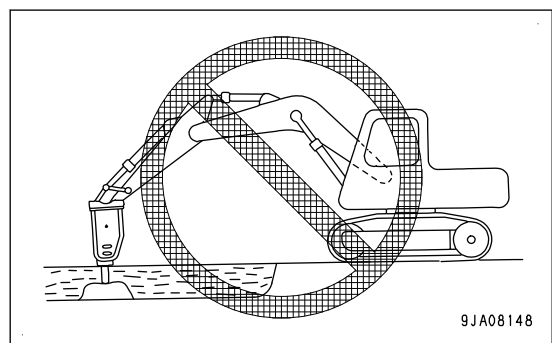
Do not move the chisel while performing breaking operation.



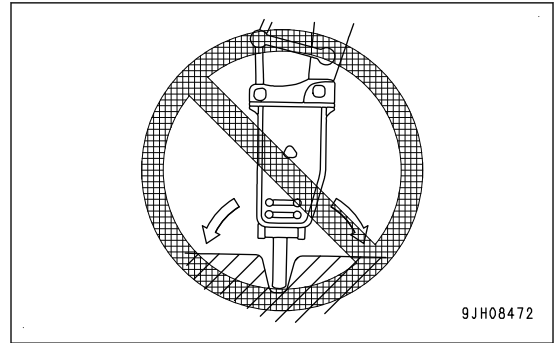
Do not perform breaker operation in horizontal or upward direction.



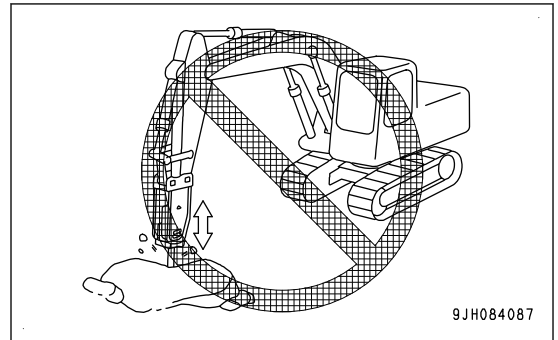
Do not work under water.



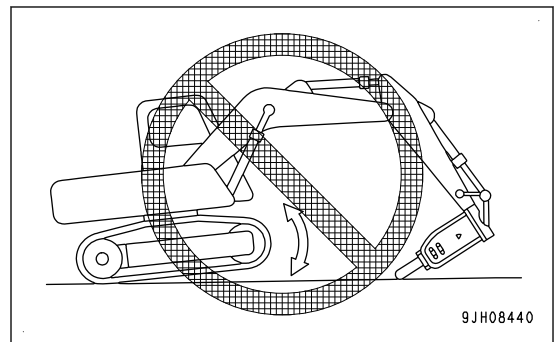
Do not pry the ground or rock with the chisel penetrated.



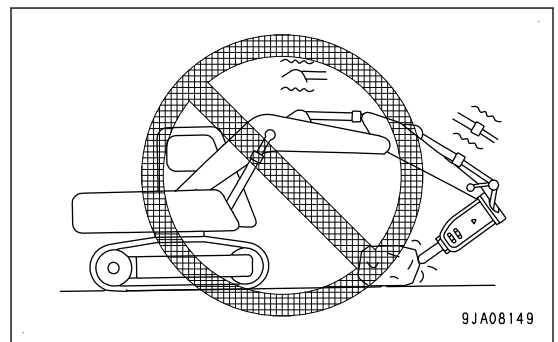
Do not perform pick work.



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.



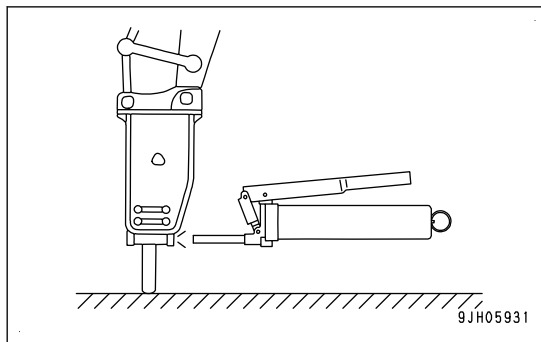
## Posture of hydraulic breaker to be greased

### NOTICE

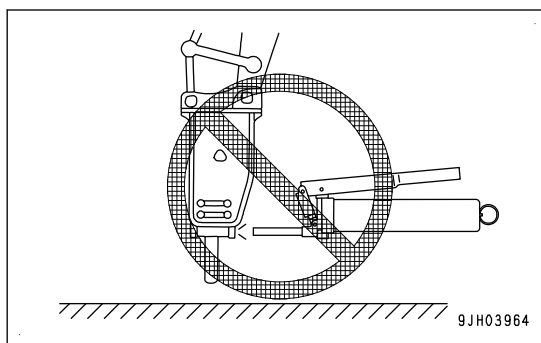
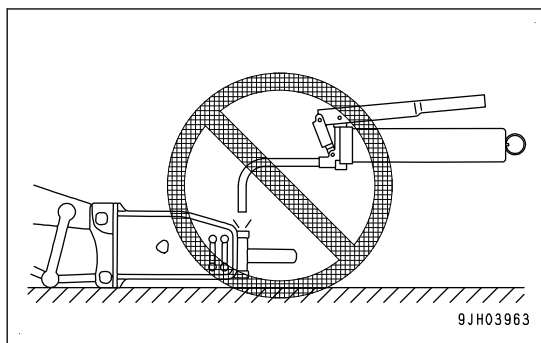
If the breaker is greased in an improper posture, it is filled with more grease than necessary. As a result, dirt will enter the hydraulic circuit and can damage the hydraulic components while the breaker is in use. Be sure to grease the breaker, keeping it in the right posture.

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



# 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.	Parts for periodic replacement		Replacement interval
1	Fuel system	Fuel 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 Pump delivery hose Pump branch hose Main pump LS hose Swing line hose Main suction hose	
		External work equipment hose <ul style="list-style-type: none"> <li>• Boom foot connection hose</li> <li>• Boom cylinder hose</li> <li>• Arm connection hose</li> <li>• Arm cylinder hose</li> <li>• Bucket cylinder hose</li> <li>• Line hose for additional attachment</li> </ul>	
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. Inform your Komatsu distributor of the machine serial number and check the latest part number when ordering parts.

## CONSUMABLE PARTS

The parts in parentheses are to be replaced at the same time.

Item	Part No.	Part Name	Q'ty	Replacement interval
Engine oil filter	6736-51-5142	Cartridge	1	Every 500 hours
Fuel prefilter	600-319-3610	Cartridge	1	
Hydraulic tank cap breather	20Y-60-21470	Element	1	Every 1000 hours
Hydraulic oil filter	207-60-71183 (07000-15195)	Element (O-ring)	1 (1)	
Fuel main filter	600-319-3750	Cartridge	1	
Hydraulic tank breather	421-60-35170	Element	1	
DEF tank breather element	421-60-35170	Element	1	
DEF filter	6540-71-2320	Element	1	
KCCV filter	600-331-2900	Element	1	
Air conditioner RECIRC air filter	2A5-979-1551	Filter	1	Every 1 year
Air conditioner FRESH air filter	17M-911-3530	Element	1	
Air cleaner	600-185-4100	Element assembly	1	—
Electric heater	6754-11-4120	Gasket	2	—
Bucket	Vertical pin type			—
	206-70-54221 (207-70-34221) (205-70-74291)	Tooth (Pin) (Lock)	4 (4) (4)	
	Horizontal pin type			
	206-70-48610 (09244-02516)	Tooth (Pin)	4 (4)	
	205-70-74180 205-70-74190 (176-32-11210) (01803-02430)	Side cutter (left) Side cutter (right) (Bolt) (Nut)	1 1 (8) (8)	
	20Y-934-2150 (209-32-11234) (195-32-11222)	Side shroud (Bolt) (Bolt)	2 (6) (6)	
	20Y-970-1820 (07000-12115) (07000-12014)	Element (O-ring) (O-ring)	1 (1) (1)	

Item	Part No.	Part Name	Q'ty	Replacement interval
Breaker circuit additional pilot oil filter (if equipped)	20Y-62-51691 (706-76-71390)	Element (O-ring)	1 (1)	—



# RECOMMENDED FUEL, COOLANT, AND LUBRICANT

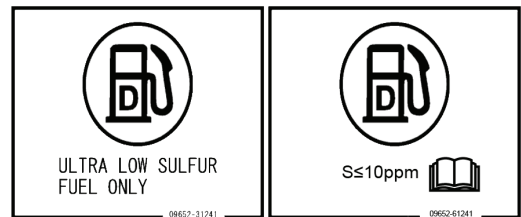
## NOTICE

- 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.
- Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure, shortening of the machine life, lowering of performance and increase of fuel consumption.
- Use the oil according to the ambient temperature as recommended in the chart below.
- If the machine is operated at a temperature of -20 °C and below, separate devices are needed, so consult your Komatsu distributor.

## NOTICE

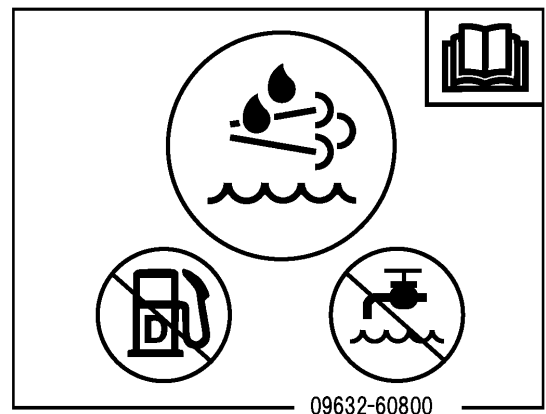
The fuel used must be ultra low-sulfur diesel fuel ( $\leq 10\text{ppm}$ ).

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 (KDPF). 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 remarkably. And using fuel with high sulfur content can deteriorate the engine parts and KDPF catalyzer, inducing failures, decrease of the life and degradation in performance.



## NOTICE

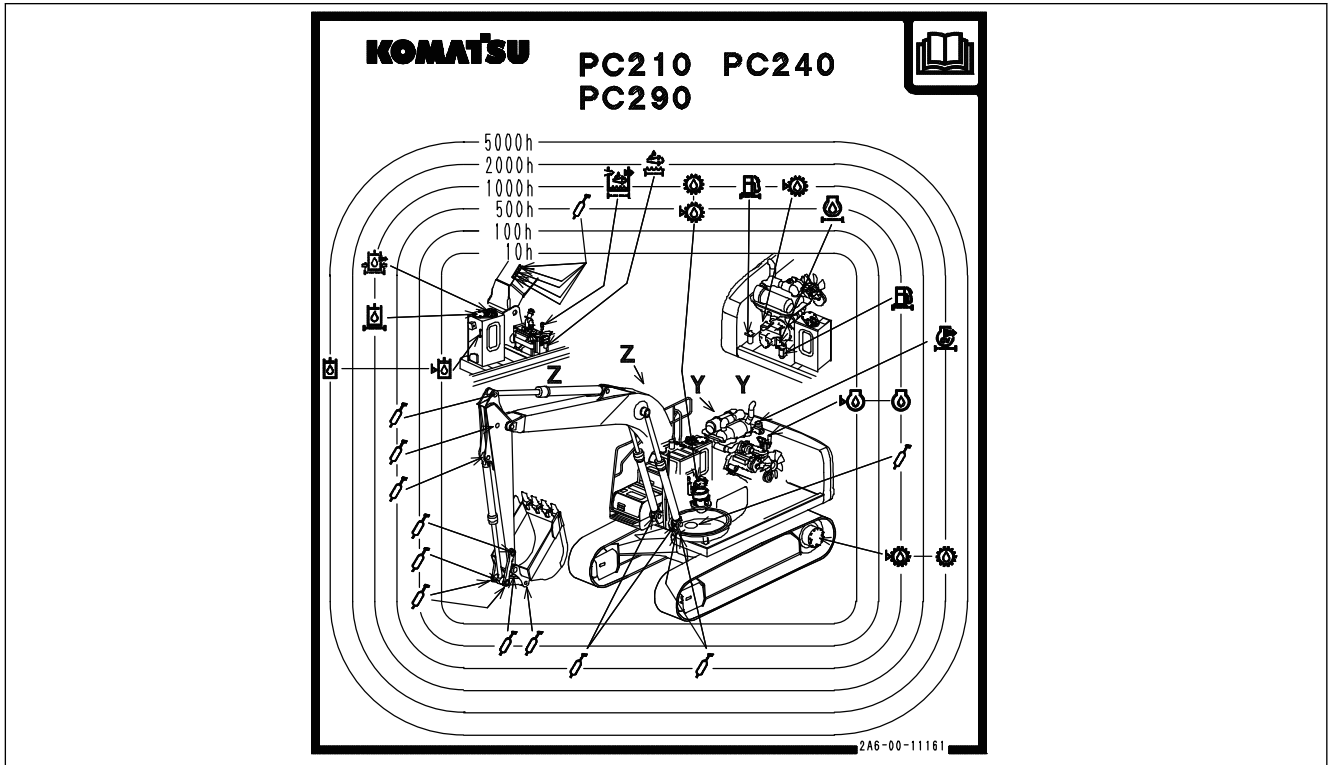
Use DEF as the aqueous urea solution for SCR system. DEF is a colorless transparent 32.5% aqueous urea solution. The quality of DEF is prescribed in ISO22241-1. Always use DEF that conforms to this quality standard.



## LUBRICATION CHART

- The lubrication standard chart uses symbols to show the lubrication points and types of lubricant by each lubrication interval.  
Keep this standard chart in the magazine box inside the cab so that the people concerned can reference it any time during lubrication.
- Even if the same symbol is used in the lubrication standard chart, the recommended genuine oil may differ according to the lubricated location and the ambient temperature. For details, see “USE OF FUEL, COOLANT AND LUBRICANTS TO ACCORDING TO AMBIENT TEMPERATURE (7-6)”.

- For details of lubrication, see “Maintenance schedule (4-12)”.



**Symbols used in the lubrication standard chart**

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		

**USE OF FUEL, COOLANT AND LUBRICANTS TO ACCORDING TO AMBI-ENT 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)

		Engine oil pan	Swing machinery case	Final drive case (each of right and left)	Damper case	Hydraulic oil system	Cooling system	Fuel tank	DEF tank
Specified capacity	Litre	25.4	8.2	9.0	0.65	253	38	400	39.4
Refill capacity	Litre	23.1	7.2	8.0	0.65	132	36	-	23.1

**REMARK**

Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.

Note 1: KDPF engine oil for cold district is deteriorated easily than that for normal area (replace every 500 hours), so replace oil and filter cartridge every 250 hours. For changing the replacement interval of machine monitor, ask your Komatsu distributor.

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 bio-grease. 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 (4-20)".

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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PC290LC-11, PC290NLC-11 HYDRAULIC EXCAVATOR

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